Renewable energy access: Towards a modern legal African Union energy framework

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Graduation: July 2019
Student number: 23928042
The lack of access to energy, specifically modern energy, and the heavy reliance on traditional biomass (collectively referred to as energy poverty) is often blamed for negative health impacts and poor overall socio-economic development on the African continent. Renewable energy (RE) has been identified as a modern energy source and increased access to such energy is an important measure to address the issues mentioned above. Recognising the important role of RE access, the African Union (AU) called on member states to increase their RE access (among other modern energy sources). Increased RE access as one of the areas of common concern is mandated by the Treaty Establishing the African Economic Community, 1992, the Constitutive Act of the African Union, 2000 and the Convention of the African Energy Commission, 2001. In giving effect to the AU mandate, sub-regional economic communities (RECs) have adopted RE frameworks and other initiatives such as the Treaty Establishing the Economic Community of Central African States, 1983, the ECCAS & CEMAC White Paper: Regional Policy for Universal Access to Modern Energy (2014), the Treaty of the Economic Community of West African States, 1975, ECOWAS Energy Protocol, 2007, the ECOWAS Renewable Energy Policy, 2012, Treaty for the Establishment of the East African Community, 1999, the Treaty Establishing the Southern African Community, 1992, and the Southern African Community Energy Protocol, 1996 among others.

The aim of this study is to identify the necessary components of a possible AU legal energy framework. RE access is mostly regulated by soft law instruments (at the international and regional levels) with no specific RE provision, targets, mechanisms or specific frameworks regulating increased RE access. The RECs are important role players in achieving increased RE access. It is recommended that the AU should adopt a modern legal binding energy framework that promotes increased RE access. This framework should spell out clear objectives and targets and mechanisms to achieve them. These targets and objectives of the AU legal energy framework should be informed by the Agenda 2030 Sustainable Development Goals and its targets, as well as the IRENA RE mechanisms and international best practices.
The RECs should set their own RE targets and mechanisms based on those of the AU legal energy framework.

**Keywords:** African Union, energy poverty, access to modern energy, increased renewable energy access, regional cooperation, African regional legal instruments, African Union legal energy framework
I would like to thank my study supervisor, Professor Michelle Barnard, for her expertise in the supervision of this thesis. Her insight was instrumental in directing the current focus of my thesis. As academia you continue to inspire me through your hard work, selflessness and ongoing contribution to the body of knowledge.

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Sincere words of gratitude go to my brother, Dr Nembo Joseph Lekunze, for his financial and unconditional emotional support over the past four years. To my father, Mr Ketuma Timothy Lekunze (RIP) and my mother, Mrs Rose Bethe Lekunze, I say thank you for your prayers and for always reminding me of the importance of education in life.

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Above all, I will forever be grateful to God Almighty who has made me to be the person I am today. With us in mind God has a better plan.
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>AU</td>
<td>African Union</td>
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<tr>
<td>AfDB</td>
<td>African Development Bank</td>
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<tr>
<td>AGECC</td>
<td>Advisory Group on Energy and Climate Change</td>
</tr>
<tr>
<td>COP</td>
<td>Conference of parties</td>
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<tr>
<td>CDM</td>
<td>Clean development mechanism</td>
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<tr>
<td>CSD</td>
<td>Commission on Sustainable Development</td>
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<tr>
<td>CAFREC</td>
<td>Technical Committee on Energy and Natural Resources and environment</td>
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<tr>
<td>DALY</td>
<td>Disability adjusted life year</td>
</tr>
<tr>
<td>ElectriFI</td>
<td>Electrification Financing Initiative</td>
</tr>
<tr>
<td>EJIL</td>
<td>European Journal of International Law</td>
</tr>
<tr>
<td>EPI</td>
<td>Energy poverty index</td>
</tr>
<tr>
<td>EDI</td>
<td>Energy development index</td>
</tr>
<tr>
<td>EAC</td>
<td>East African Community</td>
</tr>
<tr>
<td>ECCAS</td>
<td>Economic Community of Central African States</td>
</tr>
<tr>
<td>ECOWAS</td>
<td>Economic Community of West African States</td>
</tr>
<tr>
<td>ECT</td>
<td>Energy Charter Treaty</td>
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<tr>
<td>GHG</td>
<td>Green house gas</td>
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<tr>
<td>GIZ</td>
<td>Deutsche Gesellschaft für Internationale Zusammenarbeit</td>
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<tr>
<td>GW</td>
<td>Gigawatt</td>
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<tr>
<td>HDI</td>
<td>Human development index</td>
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<tr>
<td>IISD</td>
<td>International Institute for Sustainable Development</td>
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<tr>
<td>IEPF</td>
<td>Journal of <em>Institut de l’Energie et de l’Environnement de la Francophonie</em></td>
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<tr>
<td>IEA</td>
<td>International Energy Agency</td>
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<tr>
<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>IPCC</td>
<td>Inter-Governmental Panel on Climate Change</td>
</tr>
<tr>
<td>IIASA</td>
<td>International Institute for Applied Systems Analysis</td>
</tr>
<tr>
<td>IJSBE</td>
<td>International Journal of Sustainable Built Environment</td>
</tr>
<tr>
<td>IRENA</td>
<td>International Renewable Energy Agency</td>
</tr>
<tr>
<td>IPP</td>
<td>Independent power producer</td>
</tr>
<tr>
<td>JPOI</td>
<td>Johannesburg Plan of Implementation</td>
</tr>
<tr>
<td>JESA</td>
<td>Journal of Energy in Southern Africa</td>
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<tr>
<td>JESD</td>
<td>Journal of Economics and Sustainable Development</td>
</tr>
<tr>
<td>JESS</td>
<td>Journal for Environmental Study Science</td>
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<tr>
<td>JESA</td>
<td>Journal of Energy in Southern Africa</td>
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<tr>
<td>JAS</td>
<td>Journal of AgriSearch</td>
</tr>
<tr>
<td>JDRS</td>
<td>Journal of Disaster Risk Studies</td>
</tr>
<tr>
<td>KAS</td>
<td>Konrad-Adenauer-Stiftung</td>
</tr>
<tr>
<td>kWh</td>
<td>Kilowatt hour</td>
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<tr>
<td>LDC</td>
<td>Least developed countries</td>
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<tr>
<td>LPG</td>
<td>Liquefied petroleum gas</td>
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<tr>
<td>MDGs</td>
<td>Millennium Development Goals</td>
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<tr>
<td>MTF</td>
<td>Multi-tier framework</td>
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<tr>
<td>MW</td>
<td>Megawatt</td>
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<tr>
<td>NDCs</td>
<td>Nationally Determined Contributions</td>
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<tr>
<td>NEPAD</td>
<td>New Partnership for Africa’s Development</td>
</tr>
<tr>
<td>NSI</td>
<td>National Systems of Innovation</td>
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<tr>
<td>PV</td>
<td>Photovoltaic</td>
</tr>
<tr>
<td>PEEREA</td>
<td>Protocol on Energy and Efficiency and Related Environmental Aspects</td>
</tr>
<tr>
<td>RE</td>
<td>Renewable energy</td>
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<tr>
<td>REC</td>
<td>Regional economic communities</td>
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CHAPTER 1

INTRODUCTION

1.1 Background

Energy poverty is becoming a defining human developmental challenge in the 21st century. This term refers to “the lack of adequate modern energy for the basic needs of cooking, warmth, lighting, and essential energy for manufacturing services, schools, health centres and income generation”. Globally, over 1.2 billion people, almost one third of humanity, suffer the effects of energy poverty. According to the International Energy Agency (IEA) and the World Summit on Sustainable Development’s (WSSD) Johannesburg Plan of Implementation (JPOI), energy poverty poses substantial challenges for development and remains crucial for the partial realisation of the Millennium Development Goals (MDGs).

Noting the effects of energy poverty, the UN General Assembly declared the year 2014–2024 the Decade of Sustainable Energy for All (UN Declaration). In terms of the UN Declaration, states resolved to ensure universal access to modern energy services, to double the global rate of improvement in energy efficiency and to double the share of RE in the global energy mix. In line with the Decade of Sustainable Energy for All, the

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1 IEA "Energy Access Outlook" 19–25. See also Bouzarovski and Petrova 2015 Energy Research & Social Science 31–40; Thomson, Bouzarovski and Snell 2017 SAGE 880–881; Herrero 2017 Indoor and Built Environment 1018–1031; Hafner, Tagliapietra and de Strasser Energy in Africa: Challenges and Opportunity 1; Bridge Individual and household-level effects of energy poverty on human development 1; See 2.2 below.
2 Energy poverty as a concept does not have a universally acceptable definition. This is because energy poverty is multifaceted and connects with the enforcement of broader social policies. See Kulinska 2017 Economic Alternatives 672. See 1.1.3 for different definitions of energy poverty as provided by authors and international organisations.
3 IEA "2017 Energy Access Outlook" 26–33. See also Ismail and Khembo 2015 JESA 67.
5 Energy poverty as a concept does not have a universally accepted definition. It is defined differently by different international organisations and authors focussing on either social, economic or environmental aspects. For different definitions of energy poverty and a definition for the purpose of this study, see Paragraph 2.2.
6 Paragraph 9 Johannesburg Plan of Implementation. See also UN Energy Paper 22, Mutanga, Quitzow and Steckel 2018 Kiel Institute for the World Economy 1–12; Nussbaumer Energy for Sustainable Development 21–31; Masud, Sharon and Lohani "Energy for All" 47. See Paragraph 3.4.6.
7 A/70/150. See also Ismail 2015 JESD 45–66. See paragraph 3.4.9 for discussion on the UN Declaration.
8 UN GA/11333-EN/274. See also IRENA "Rethinking Energy 2017" 94–107.
recently adopted Sustainable Development Goals (SDGs) express provide for increased access to affordable, reliable, sustainable and modern energy for all. The Decade of Sustainable Energy for All and the newly adopted SDGs identify increased renewable energy (RE) access as critical in addressing energy poverty.

RE refers to energy generated from natural resources at sustainable levels and may come from non-fossil energy sources (solar power, wind, hydropower, wave and tidal power, biomass and geothermal power). According to the 2017 World Energy Outlook Special Report, RE sources will power over 60 per cent of the new access and off-grid systems by 2030 and up to 77 per cent of global electricity by 2050. Viewed by many as one of the most comprehensive measures to increase access to modern energy, RE access is likely to reduce the warming of the climate system (21 per cent by 2030), promoting sustainable development among other benefits. According to the IEA, nothing more than an energy revolution, a movement from the use of fossil fuel to the use of less carbon intensive sources (RE, energy efficiency among others), is needed to better the life of the world’s people and to avert climate change. Increased RE access as an option to address energy poverty could be achieved via cooperation, increased energy investment, development and implementation of policies, actions and programmes, taking into account policies and programmes adopted by developing countries and regional economic communities.

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10 There is no universally accepted definition for RE. The definition of RE differs either in terms of the energy sources that constitute RE or the sustainability of the energy sources. See Paragraph 2.3.1 for different definitions of RE. See also Bjork et al “Encouraging renewable energy” 12; Corder and Andzenge “Regulation as a catalyst for the electrification of Africa” 71–85.

11 IEA “World Energy Outlook Special Report 2017” 12. See also World Bank “2017 State of Electricity Access Report” 2-11. The critical role of RE in increasing access to modern energy has also been acknowledge by the IRENA Director General Adnan Admin in his article titled “RE will power Africa’s ambitious Future” stating “Africa is blessed with plentiful land and natural resources. Prodigious sunshine blanket the continent for much of the year, conditions ideal for solar power”. Adnan 2014 https://www.thenational.ae.


14 Goal 7.a and 7.b SDGs A/RES/70/1. See also UN “Achieving the Sustainable Development Goals” 8; UNIDO “Delivering the Sustainable Development Goals” 6.
At the African regional level, the energy poverty situation is critical. Out of 49 countries on the United Nations Least Developed Countries (LDC) list, 33 are African countries.\textsuperscript{15} In addition, out of the 53 African countries that submitted a Nationally Determined Contributions (NDCs)\textsuperscript{16} at the 21\textsuperscript{st} Conference of Parties (COP21) to the United Nations Framework Convention for Climate Change (UNFCCC),\textsuperscript{17} 34 mentioned modern energy access as a key enabler for development.\textsuperscript{18} According to the former UN Secretary General, Ban Ki Moon,

The people who lack energy access are mainly the same people who lack access to clean water and sanitation, experience high food insecurity and would experience the worst impacts of climate change.\textsuperscript{19}

The African regional economic communities (RECS)\textsuperscript{20} and countries\textsuperscript{21} are characterised by weak governance of their economic, institutional and human resources, which in turn results in an inability to provide modern energy to their people.\textsuperscript{22} According to the IEA, the number of people on the African continent who do not have access to electricity grid system have grown by 114 million since the year 2000, with several million joining each year.\textsuperscript{23} It is projected that about 530 million people will still live off the electricity grid

\textsuperscript{15} UN 2010 \url{http://www.unohrlls.org}.
\textsuperscript{16} The Nationally Determined Contributions (NDCs) is a term used under the UNFCCC for reductions in GHG emissions that all countries that signed the UNFCCC were asked to publish in the lead-up to the 2015 United Nations Climate Change Conference held in Paris, France, in December 2015. USAID “Analysis of Intended Nationally Determined Contributions” 102. See also Campbell “Meeting our Paris Commitment” 3.
\textsuperscript{17} The United Nations Framework Convention for Climate Change, 1992.
\textsuperscript{18} USAID “Analysis of Intended Nationally Determined Contributions” 102.
\textsuperscript{19} Report of the UN SG A/69/395 on the UN decade on sustainable energy for all.
\textsuperscript{20} African RECs refers to groups of African states that have merged to advance an economically integrated Africa and solve issues of common interest. Established in terms of the \textit{Abuja Treaty}, there are eight sub-regional building blocks. They include the Maghreb Union, the Economic Community of West African States, the East African Community, the Intergovernmental Authority on Development (IGAD), the Southern African Community, the Common Market for Eastern African States (COMESA), the Economic Community of Central African States and the Community of Sahel-Saharan States (CENSAD). See Adetula, Bereketeab and Jaiebo 2016 Nordic Africa Institute 7-8.
\textsuperscript{21} There are 54 countries on the African continent. They include South Africa, Cameroon, Burundi, Comoros, Egypt, Lesotho, Mali, Namibia, Seychelles, Uganda, Tanzania, Kenya, and Senegal among others. See World Bank 2013 \url{http://www.worldbank.org}.
\textsuperscript{22} Third United Nations Conference for Least Developed Countries Outline for the modalities of the Fourth United Nations Conference on the Least Developed Countries and its preparatory process, 2 A/63/248 2. See also Sewankambo \textit{et al} “Climate change in Africa” 7–46.
system by 2040.\textsuperscript{24} Since about 95 per cent of the world’s 1.2 billion people without electricity grid access live in sub-Saharan Africa,\textsuperscript{25} switching to RE among other things, remains imperative for increasing access to modern energy services within and outside the electricity grid for addressing energy poverty on the African continent.\textsuperscript{26}

1.1.1 The African regional energy situation

Although Africa is richly endowed with abundant natural resources, most of these resources are yet to be exploited.\textsuperscript{27} It is estimated that Africa’s energy resource endowments with respect to the world totals are in the following order of magnitude: oil 9.5 per cent, coal 5.6 per cent and natural gas 8 per cent.\textsuperscript{28} Notwithstanding its abundance of natural resources that could be used for energy services, sub-Saharan Africa, as stated above, remains the world region with the lowest access to electricity, with the worst rates in rural areas.\textsuperscript{29} Traditional biomass, mostly in the form of wood and charcoal, accounts for more than 60 per cent of the energy demand in Africa.\textsuperscript{30} More than 700 million people in sub-Saharan Africa depend on traditional biomass for energy services and this is expected to increase to about 880 million people by 2020 with population growth.\textsuperscript{31} Out of the 1.6 million deaths resulting from indoor air pollution from wood smoke in the world, African alone accounts for about 600 000 of such deaths, with

\begin{itemize}
\item \textsuperscript{24} World Bank “Off-grid solar market trends Report” 4–5.
\item \textsuperscript{25} IEA “African Energy Outlook World Energy Outlook Special Report 2014” 130. See also World Bank “Off-grid solar market trends Report 2016” 2; Batinge, Musango and Brent 2017 SAJIE 33–35.
\item \textsuperscript{27} Bhattacharyya and Palit 2016 Energy Policy 168. See also Afrobarometer 2016 http://afrobarometer.org.
\item \textsuperscript{28} Avila et al “The energy challenge in sub-Saharan Africa” 20. See also IEA World energy outlook 2014 http://www.worldenergystoutlook.org.
\item \textsuperscript{29} Avila et al “The energy challenge in sub-Saharan Africa” 20. See also IEA World energy outlook 2014 http://www.worldenergystoutlook.org; Hancock 2015 Energy Research & Social Science 1.
\item \textsuperscript{30} IEA World energy outlook 2014 http://www.worldenergystoutlook.org. See also Afrobarometer 2016 http://afrobarometer.org.
\item \textsuperscript{31} The phrase “traditional biomass” refers to the unsuitable use of fuel from wood, charcoal, tree leaves, animal dung and agricultural residues for cooking, lighting and space heating, while modern biomass energy use refers to the conversion of biomass energy to advanced fuels such as liquid fuels, gas and electricity. Modern biomass on the other hand refers to sustainable sources of electricity as well as liquid and gaseous fuels produced from wood fuel. Compared to “modern biomass”, which normally includes an effective technical utilisation of wood fuel to produce energy efficiently, traditional biomass is used with very low energy efficiency. IEA 2014. See also Ekouevi et al “Overview of State of Electricity” 4–5.
\end{itemize}
millions more having significant health issues from traditional biomass, such as asthma, respiratory disease, and low-birth-weight babies. Wood gathering for burning is one of the main causes of deforestation in Africa. All of sub-Saharan Africa (minus South Africa) uses 40 terawatt hours of electricity, the same amount of electricity used by the state of New York, even though New York serves only 19.5 million people compared to 791 million in Africa. New Yorkers thus consume about 2050 kWh per capita, while Africans consume 52 kWh per capita.

Increased RE access offers particular advantages in an African context. Apart from its great potential to mitigate energy poverty, RE can provide wider benefits. Increased access to RE may contribute to the achievement of SDGs (social and economic development in general); reduce dependence on costly fuel imports, which are subject to volatile international prices; mitigate climate change; provide electricity beyond the electricity grid system; secure energy supply; and reduce negative impacts the environment and health, among other things. These objectives can be achieved by establishing and strengthening legal, regulatory, institutional and financial support mechanisms for RE deployment. The application of RE on the African continent may address energy poverty, curb greenhouse gas emissions (GHG) and promote sustainable development.

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33 Deforestation refers to “the conversion of forest to another land use or the long-term reduction of tree canopy cover below the 10% threshold. Deforestation can result from deliberate removal of forest cover for agriculture or urban development, or it can be an unintentional consequence of uncontrolled grazing. Deforestation implies the long-term (more than 10 years) or permanent loss of forest cover.” UN Food and Agricultural Organisation “Manual on Deforestation, Degradation, and Fragmentation using remote sensing and GIS” 5.
37 IPCC 2012 Special Report on RE Sources and Climate Change Mitigation www.ipcc.ch 71. See also Kaggwa, Mutanga and Simelane 2011 “Factors determining the affordability of renewable energy” 8; Balakrishnan et al “Energy poverty and Health” 133–152.
38 REN21 Renewables 2015 Global Status Report 103.
39 Energy is the live wire carrying out development, and as such, increases access to energy is likely to increase level of development in the continent. See Benali and Barrett “Alleviating Energy Poverty” 441–450.
As explicitly mentioned by the SDGs, the provision of modern energy services is critical in ensuring a county or region’s growth.\textsuperscript{40} Without access to modern fuels and electricity, it is highly unlikely that any of the objectives of the SDGs would be achieved.\textsuperscript{41} It is therefore necessary to compare RE to other energy sources for RE to be classified as modern.\textsuperscript{42}

1.1.2 Modern energy sources and RE

According to the International Institute for Applied Systems Analysis (IIASA), modern/sustainable energy typically includes access to three forms of energy, each of which provides (a) essential benefits for environmental and socio-economic development; (b) less polluting household energy for cooking and heating\textsuperscript{43}; and (c) electricity for powering appliances and lights in households and public facilities.\textsuperscript{44} The 2014 Africa Energy Outlook defines modern energy as high quality and reliable energy that provides services such as lighting, heating, transport, communication and mechanical power that support education, better health, higher incomes and all-round improvements in the quality of life.\textsuperscript{45} According to the UNDP and the World Health Organization,\textsuperscript{46} modern energy refers to electricity, liquid fuels (such as kerosene) and gaseous fuels (such as liquefied petroleum gas (LPG), natural gas) and excludes traditional biomass and coal. In summary, the term modern/sustainable energy may be used to refer to any energy source

\textsuperscript{40} Schwerhoff and Mouhamadou 2017 \textit{Renewable and Sustainable Energy Reviews} 239–402, See also UNDP “Delivering Sustainable Energy in a Changing Climate” 34.
\textsuperscript{41} The most common energy challenge African countries face, specifically the least developed countries (LDC) in sub-Saharan Africa, is energy poverty. One of the least mentioned measures to increase access to modern energy in Africa is increased access to RE. Schwerhoff and Mouhamadou 2017 \textit{Renewable and Sustainable Energy Reviews} 239–402. See also Jensen 2015 “Realising rights through the SDGs” 1-7; Bazilian and Nussbaumer “UNIDO Contribution to the 4th UN Conference on LDCs Energy Services Background Paper” 3; Word Bank “Gender Equality and Energy” 3; World Bank “2017 State of Electricity Access Report” 2-11; IEA “World Energy Outlook Special Report 2017” 12.
\textsuperscript{42} In this research the terms \textit{modern} and \textit{sustainable} are used interchangeably to mean the same thing.
\textsuperscript{43} Household energy services in this regard includes improved stoves with traditional solid biomass fuels, from liquid and gaseous fuels such as kerosene and LPG or energy from RE sources such as solar. See IIASA “Access to modern energy” 1.
\textsuperscript{44} IIASA “Access to modern energy” 1. Electricity appliances and lights here include health clinics, schools, government offices among others and mechanical power from either electricity or other energy sources that improve the productivity of labour.
\textsuperscript{46} UNDP and World Health Organization “The energy access situation” 13.
that is reliable, that has limited environmental and social impacts and that promotes socio-economic development.

In ascertaining whether RE can be labelled a modern energy source, one must compare it to other energy sources. The GHGs emissions associated with RE life cycle (ranging from manufacturing, installation, operation and maintenance, and dismantling and decommissioning) are minimal. Compared to natural gas, which emits between 0.6 and 2 pounds of carbon dioxide equivalent per kilowatt-hour (CO2E/kWh), and coal, which emits between 1.4 and 3.6 pounds of CO2E/kWh, the emission rate for RE is far less. Wind emits 0.02 to 0.04 pounds of CO2E/kWh; solar power emits 0.07 to 0.2; geothermal power emits 0.1 to 0.2; and hydroelectric power emits between 0.1 and 0.5. Renewable electricity generation from biomass can have a wide range of GHGs depending on the resource and how it is harvested. Modern biomass has a low emissions footprint, while traditional sources of biomass can generate significant GHGs emissions.47

The most important advantages attached to RE, especially for developing countries, is its availability. RE is likely to improve access to modern energy and reduce serious health problems caused by the use of traditional fuelwood, charcoal, dung and agricultural waste.48 For industrialised countries, the primary reasons to encourage RE include emission reductions to mitigate climate change, secure energy supply concerns and employment creation.49 A comprehensive analysis of GHG emissions from different energy sources shows that RE is environmentally, socially and economically friendly and therefore a modern energy source.50 As such, for an energy sources to be labelled modern, that energy source must therefore be liable, less polluting and promote sustainable development on the environmental, social and economic level.

47 IPCC Special Report on RE Sources and Climate Change Mitigation 1075. See also WNA “Comparison of Lifecycle Greenhouse Gas Emissions” 6-8.
48 IPCC Special Report on RE Sources and Climate Change Mitigation 10-75. See also WNA “Comparison of Lifecycle Greenhouse Gas Emissions” 6-8.
49 IPCC Special Report on RE Sources and Climate Change Mitigation 44. See also WNA “Comparison of Lifecycle Greenhouse Gas Emissions” 6-8.
50 IPCC Special Report on RE Sources and Climate Change Mitigation 44. See also WNA “Comparison of Lifecycle Greenhouse Gas Emissions” 6-8.
1.1.3 Modern energy access and the SDGs

The phrase “modern energy access” is not easily definable. This is mainly because different definitions are accorded to the phrase depending on the targeted beneficiary of the modern energy (for example, villages or households), the types of energy supply included (for example, grid-connected or off-grid electricity), and the characteristics that make the service “accessible” (for example, affordability, reliability, quality and adequacy). These properties and the impacts of providing energy services vary significantly based on the types of energy sources, the characteristics of the energy carriers, the end-use devices that convert energy into services and the conditions in which these devices are deployed. According to the 2017 UN Least Developed Countries Report, access to modern energy (including RE) is central to achieving Agenda 2030, stating “the core principle of the 2030 Agenda is one of inclusivity—leaving no one behind—and this applies as much to universal access to modern energy as to other SDGs”. Access to RE is of particularly advantage to the least developed countries (LDCs), as increased access is likely to increase access for all socially excluded or disadvantaged population groups, whether connected to the grid or not. This would include people of all ages (the youth and the elderly), genders, races, ethnicity, the poor and the rich, residents of cities and rural areas, and equally encompassing people with disabilities and chronic illnesses. However, the frameworks and policies that seek to

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51 See paragraph 2.4 below for definitions of the phrase “access to modern energy”.
52 Pachauri et al “Access to modern energy” 2. See paragraph 2.3.
53 Pachauri et al “Access to modern energy” 2. See paragraph 2.3.
56 LDCs “refers to a state that is deemed highly disadvantaged in its development and faces a particularly significant risk of failing to eliminate or even reduce poverty”. Countries designated as LDCs by the UN as of December 2017, include, “Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, the Central African Republic, Chad, the Comoros, the Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, the Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, the Lao People’s Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Myanmar, Nepal, the Niger, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, South Sudan, the Sudan, Timor-Leste, Togo, Tuvalu, Uganda, the United Republic of Tanzania, Vanuatu, Yemen and Zambia”. Almost all 54 countries in Africa are classified as LDCs. See UN “The Least Develop Countries Report 2017” 18.
57 UN “The Least Develop Countries Report 2017” 18-23. See paragraph 3.5.
regulate increased access to RE taking into account the needs of LDCs and regions in the context as presented by Agenda 2030, are likely to be of great importance.58

1.1.4 Regional initiatives on increased access to modern renewable energy through regional cooperation in Africa

In terms of the Constitutive Act of the African Union (Constitutive Act)59 the integration of African economies is imperative to addressing issues of common interest.60 African economies should integrate and promote cooperation in all fields of human activity to raise the living standards of African peoples by coordinating and harmonising policies between existing and future RECs and advancing the development of the continent by promoting research in all fields, particularly energy, science and technology.61 The Protocol on Relations between the African Union and the Regions of Africa (2009) (AU-RECs Protocol) states that the African Union (AU) should consolidate and promote closer cooperation among the RECs and between them and the AU. The AU should further establish a framework for the coordination of the activities of the RECs by harmonising all policies, measures and programmes in order to realise the objective of the Constitutive Act.62

The New Partnership for Africa’s Development (NEPAD) has as its objective to provide certain essential public goods (of which energy is one) through development programmes at a regional and sub-regional level.63 NEPAD aims to enhance regional development and economic integration, which will lead to achieving the objectives regarding sectoral priorities that hinge on increased interaction and cooperation among sub-regional economic groupings.64 The important role energy plays in the economic growth and development process is evident, taking into account that it is identified as one of the critical sectoral priorities specified by NEPAD. With specific reference to energy, NEPAD

62 Policies, programmes and measures entails harmonisation in all fields of human endeavour, including RE and climate change. Article 3 (a) and (b) of the Protocol on Relations between the African Union and the Regions of Africa, 2009.
63 Paragraph 95 of the NEPAD.
64 Paragraph 94 of the NEPAD.
recommends that African countries should focus on increasing access to reliable and affordable commercial energy, reversing environmental degradation associated with the heavy reliance on traditional fuels in rural areas and stimulating a stronger focus on modern energy sources.\textsuperscript{65}

The objective of cooperation in addressing issues of common interest is reaffirmed by the \textit{Treaty Establishing the African Economic Community (1991) (Abuja Treaty)}.\textsuperscript{66} Among other objectives, the \textit{Abuja Treaty} aims to promote economic, social and cultural development of the continent through regional cooperation.\textsuperscript{67} Energy is identified as an important role player in improving development in the region and increased cooperation on the harmonisation of policies in the fields of new and RE sources should receive attention.\textsuperscript{68}

Recognising the role of modern energy (including RE) in improving access to energy in Africa, many regional economic and development communities, including the \textit{East African Community} (EAC), the \textit{Economic Community of West African States} (ECOWAS), the \textit{Economic Community of Central African States} (ECCAS) and the \textit{Southern African Development Community} (SADC)\textsuperscript{69} have drafted policies to that effect. In terms of the provisions of the \textit{Treaty Establishing the Economic Community of Central African States} (1983) (hereafter the ECASS Treaty),\textsuperscript{70} member states must harmonise their national energy development plans and establish a common energy policy. This policy should particularly refer to the exploitation, production and distribution of energy to promote RE as part of diversifying energy sources, increasing the Community’s energy resources and ensuring a regular energy supply.\textsuperscript{71} The \textit{Treaty for Establishment of the East African Community}, which came into force in 2000 (EAC Treaty), member states must promote cost-effective methods of developing and transmitting electric power, the efficient exploration and exploitation of fossil fuels and the utilisation of new and RE sources.\textsuperscript{72}

\textsuperscript{65} Paragraph 112 of the \textit{NEPAD}.
\textsuperscript{66} The Treaty Establishing the African Economic Community, 1991.
\textsuperscript{67} Article 4(1) (a)-(d) of the \textit{Abuja Treaty}.
\textsuperscript{68} Article 55(1) (c) of the \textit{Abuja Treaty}.
\textsuperscript{69} The Treaty of the Southern African Development Community, 1992.
\textsuperscript{70} The Treaty Establishing the Economic Community of Central African states, 1983.
\textsuperscript{71} Article 54 of the \textit{ECASS Treaty}.
\textsuperscript{72} Article 101 of the \textit{EAC Treaty}.
The Treaty Establishing the Economic Community of West African States (ECOWAS Treaty) provides for coordination and harmonisation of member states’ policies on energy in ensuring the effective development of new and RE resources.\(^{73}\) In Southern Africa, the Southern African Development Community Protocol on Energy of 1996 (SADC Energy Protocol) emphasises the important role energy plays in the development of the region\(^ {74}\) and states as one of its objectives the efficient and cost-effective provision of reliable, continued and sustainable energy services.\(^ {75}\)

Regional cooperation and harmonisation with regard to increased use of new and RE sources seem to be common objectives endorsed in the regional instruments mentioned above. The ECASS, ECOWAS, EAC and SADC have drafted policies in attaining these objectives. They include, the ECCAS & CEMAC White Paper: Regional policy for universal access to modern energy services and economic and social development (2014-2030) (ECCAS White Paper 2014-2030), the EAC Regional Strategy on Scaling up Access to Modern Energy Services of 2009 (EAC Strategy, 2009), the ECOWAS White Paper for a Regional Policy on Access to Energy Services of 2006 (ECOWAS Policy, 2006), and the SADC Draft Regional Energy Access Strategy and Action Plan of 2010 (SADC Strategy, 2010). The underlying theme common to these policies is to increase regional cooperation on the harmonisation of the regulation of access to electricity, modern fuels, improved cooking stoves and mechanical power, with the common objective of improving access to modern energy. When analysing the scope of energy sources included under the broad term of “modern energy”, one must consider the services that should be facilitated on the application of the energy source. Simply put, different energy needs will necessitate different energy sources. The most popular primary modern energy sources mentioned in the regional strategies and policies are RE (biomass, hydraulic power, wind, and solar), crude oil, natural gas and coal.\(^ {76}\)

To address energy poverty in Africa, the role of increased RE access through harmonised regulation might be necessary. The RECs policies and strategies on increased access to

\(^{73}\) Article 8(1) and (2) (a)-(c) of the ECOWAS Treaty.

\(^{74}\) Article 2(1) of the SADC Energy Protocol.

\(^{75}\) Article 3(4) of the SADC Energy Protocol.

\(^{76}\) The EAC Strategy, 2009 5.
energy (RE inclusive) indicate that regional bodies are important role players in addressing energy poverty in Africa. Mindful of the fact that, the African continent is endowed with abundant RE sources and yet has the lowest rate of energy access, there is a need to analyse existing sub-regional policies on increased modern energy access (including RE) to identify the components of a modern AU legal framework that promotes increased RE access while addressing energy poverty in Africa.

1.2 Central research question

The central research question to be answered in this thesis is therefore what would constitute a modern African Union legal energy framework that would promote access to RE and address energy poverty in Africa?

1.3 Aim of the study

The aim of the study is therefore to analyse the AU and RECs legal frameworks on RE to identify what should constitute a modern AU legal energy framework that promote increased RE access and address energy poverty in Africa.

To support the main aim, the following sub-aims are formulated:

1. to discuss the relationship between increased RE access and energy poverty in order to provide a theoretical framework for the study;

3. to discuss international RE instruments to determine what is needed to achieved the SDGs, specifically goal seven, namely to increase the share of RE in the global energy mix;

4. to investigate the legal nature of the Agenda 2030 SDGs and targets and their role in establishing a legal energy framework that promotes increased access to RE;

5. to identify RE mechanisms as provided for by the IRENA framework and best international RE practices;

6. to explore the AU mandate on regional cooperation with regard to increased RE access; and
7. to make recommendations aimed at enhancing a modern AU legal energy framework that promotes increased access to RE.

1.4 Research methodology and study outline

This research is based on a literature review of international, regional and sub-regional legal instruments and policies as primary sources, supplemented by secondary sources such as books, journal articles, chapters in books and other sources. The study includes a comparison of the legal frameworks on the African continent pertaining to increased access to energy. In explaining some concepts, the study refers to foreign jurisdictions (outside Africa) not as a cooperative study, but to illustrate specific concepts. Although there is a range of scholarly writing on the contribution of RE as a modern energy source on the African continent, little has been written on this subject from a regional legal perspective.

In addressing the research question and aim, Chapter 2 begins by identifying and defining conceptual perspectives related to access to modern energy in Africa. It defines and unpacks energy poverty and analyses Africa’s current energy pattern. The chapter also defines RE, identifies the different sources of RE, the advantages and disadvantages associated with increased access to RE, as well as the role of RE in achieving increased access to modern energy in Africa.

Chapter 3 analyses international RE instruments and initiatives to identify what is needed (gaps) to achieve goal seven of the SDGs, specifically, increased share of RE in the global energy mix.

Chapter 4 focuses on the nature of the SDGs, specifically goal seven, to question and unpack the role it can play in establishing a legal energy framework that promotes increased RE access.

Chapter 5 compares the potential and relevance of the energy frameworks in the AU and RECs’ as regional legal frameworks in pursuit of increased RE access.
Chapter 6 offers recommendations aimed at enhancing a modern legal energy framework in realising the AU mandate of increased RE access and to address energy poverty in Africa.
CHAPTER 2

ENERGY POVERTY AND AFRICA

2.1 Introduction

The aim of this chapter is to analyse conceptual perspectives of energy poverty in order to set a normative basis from which to explore the role of increased RE access in addressing energy poverty.

The first part of the chapter defines and reviews different theatrical approaches of measuring energy poverty underscoring the importance of measuring energy poverty and benchmarks what matters for Africa when measuring energy poverty.1 The second part of the chapter critically examines Africa’s current energy situation. It further deals with the approaches to measure energy poverty and benchmark an African approach to measure energy poverty. This part of the chapter also examines the implications of increased access to RE in general and modern biomass energy in particular with regards to addressing energy poverty.2 The last part of the chapter analyses the relevance and challenges of increased access to RE (amongst other energy sources) underscoring the role and highlighting what is needed to increase access to RE at the African level.3

2.2 The concept of energy poverty

The term “energy poverty” is not an easily definable concept. This is mainly because it is a multi-dimensional concept which is connected to broader social, economic and environmental aspects.4 The UN Secretary General’s Advisory Group on Energy and Climate referred to “energy poverty” as “the provision of a basic minimum threshold of modern energy services for both consumption and productive uses. Access to these modern energy services must be reliable and affordable, sustainable and where feasible, from low-GHG-emitting energy sources.”5 The United Nations Developmental Programme

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1 See paragraphs 2.2.1.1 and 2.2.2.2.
2 See paragraph 2.4.4.
3 See paragraph 2.4.5.
4 Culver “Energy poverty” 1. See also Barnard Nuclear energy in Africa 15–16.
(UNDP) defines “energy poverty” as “the inability to cook with modern cooking fuels and the lack of a bare minimum of electric lighting for reading or for other household and productive activities at sunset”. Modern energy access in terms of the Asian Development Bank entails the absence of sufficient choice in accessing adequate, affordable, reliable, high-quality, safe and environmentally benign energy services to support economic and human development”. The IEA refers to energy poverty as “the lack of access to modern energy services. These services are defined as household access to electricity and clean cooking facilities (e.g. fuels and stoves that do not cause air pollution in houses)”. According to the World Economic Forum energy poverty refers to “the lack of access to sustainable modern energy services and products”. In terms of the International Network for Sustainable Energy (INFORSE)-Europe, energy poverty occurs if household energy costs are above 10 per cent of disposable income, transport fuels not included.

From above, it is clear that there is no single universally acceptable definition for energy poverty and that a range of energy services are referred to. Energy services as identified by the definitions include energy services for lighting, cooking, cooling and space heating, refrigeration, mechanical power and mobility. The nature of the energy services identified, includes reliability, affordability, sustainability, low GHGs emitting energy sources, high-quality, safe and environmentally benign energy services and modern energy services. Based on the energy services and the nature associated with the services as identified by the above definitions “energy poverty” for the purpose of this study is referred to as

lack of adequate access to basic energy services such as lighting, cooking, cooling and space heating, mechanical power, mobility, communication, process heat and inter-communication which are reliable, affordable, sustainable and low in GHG gas emissions.

As a multi-dimensional concept, measuring energy poverty is likely to be of great importance when establishing energy frameworks that aimed at addressing energy poverty. It would therefore be necessary to measure energy poverty in order to track
progress towards targets if set in these frameworks. Such measurement will allow international organisations and regional communities to determine the progress towards achieving universal access to modern energy. It could also provide clarity on existing energy initiatives, making it easier for investors to understand the state of affairs within specific regions and sub-regions.

Acknowledging the importance of measuring energy poverty, it may therefore be necessary to analyse the different approaches of measuring energy poverty. Being multidimensional in nature, many ways of measuring energy poverty has been developed. The goal of this section is not to focus on the differences that has arisen from the range of scholarly writings on the subject of measuring energy poverty but rather, to provide a short analysis of literature regarding the approaches of measuring energy poverty underscoring the strength and weakness of each approach. The approaches of measuring energy poverty pertains to energy access, energy input, the outcomes of energy use, the quality of quality delivered, the Energy Development Index, the Multidimensional Poverty Index and the Energy Poverty Index.

The energy access approach to measure energy poverty is based on the observation of households access to both electricity and cooking fuels. Electricity access in this regard refers to the percentage of the population with a connection to an electric grid system and cooking fuels refers to the inputs of energy measures in terms of the quantity of energy consumed or income spent on energy. Put differently, the energy access approach refers to the number of households with access to the electricity grid and access to modern cooking fuels. Notably, the binary nature of the energy access approach makes it easy and convenient to understand and be calculated mainly because it is easy to

12 Nussbaumer Energy for Sustainable Development 38.
15 Culver “Energy poverty” 3–18. See also Herrero 2017 Indoor and Built Environment 1018–1031.
identify people “having access” to an electricity connection and those “having not”.

Though easy to understand, the energy access approach does not take into consideration all forms of household energy use and energy use outside the household.

The input approach to measuring energy poverty is based on the inputs of energy measured either in terms of the amount of money that is spent on energy or the amount of energy consumed. While the input approach to measure energy is likely to very useful in measuring energy poverty across countries, it is however likely to be less effective for managing policies and investment to reduce energy poverty. This is mainly because energy inputs vary greatly between countries, rural and urban areas, income groups and personal energy choice.

For example, if a household were to gain access to the grid system, they might pay a lower price per unit of electricity compared to when they are not connected, giving room for them to increase their consumption. Increase in consumption would not have occurred if their energy expenditure were to remain the same. Unlike the access approach that focuses on access to electricity for cooking, the input approach is more general (energy can be used for cooking, among others) with regards to the services for which energy can be used. However, the input approach does not provide for access to a grid which is a prerequisite for people to increase their income spent on energy services.

The outcomes approach to measure energy poverty focuses on outcomes resulting from energy poverty and measured in three ways. Firstly, measuring the outcomes of energy poverty in terms of opportunity cost such as time lost gathering fuelwood that could have been spent at school or other productive activities. Secondly measuring energy poverty in terms of individual impacts such as the number of respiratory infections, kerosene

18 Pelz, Pachaun and Groh 2018 WIRE s Energy and Environment 1–16. See also Pachauri and Spreng “Energy use and energy access” 5.
20 Culver “Energy poverty” 8–10.
21 Culver “Energy poverty” 8–10. See also Pelz, Pachaun and Groh 2018 WIRE s Energy and Environment 1–16.
22 Culver “Energy poverty” 8–10.
24 Culver “Energy poverty” 12. See also Mirza and Szirmai “Towards a new measurement of energy poverty” 1–41, Masud, Sharon and Lohani “Energy for All” 1–123.
burns and environmental impacts amongst others.\cite{25} Lastly, measuring outcomes in terms of the availability of choice in accessing energy. For example, when a household has a choice to exercise their choice of energy services that household has escaped energy poverty.\cite{26} While the outcomes captures the essence of the poverty to be alleviated, measuring the achievement in alleviating the poverty, it is likely to pose a number of challenges. Firstly, measuring opportunity cost would likely be problematic mainly as a result of variations (the effects of environmental impacts such as deforestation varies from one geographical region to another for example) that exist between individuals and regions.\cite{27}

The Multi-Tier Framework (MTF) approach to energy poverty focus on the quality of end use energy services namely, energy for productive use, household energy and energy for community use.\cite{28} For each end use energy service, there are seven attributes to quality as per an MTF approach. These attributes include reliability, voltage stability, capacity duration (daily and evening energy supply), affordability, legality and health and safety.\cite{29} While the MTF approach is likely broader (incorporating advanced measures for energy poverty) compared to the access, input and outcomes approaches, it is not without limitation. Measuring three energy services and seven attributes for each end use services on an equal basis is likely to be cumbersome, difficult or sometimes impossible.\cite{30}

Another approach used in measuring energy poverty is the Energy Development Index (EDI). The EDI approach to measure energy poverty is based on “the average between per capita commercial energy consumption, the share of commercial energy in total final energy use and the electrification rate”.\cite{31} Importantly, the EDI approach includes energy

\cite{25} Mirza and Szirmai “Towards a new measurement of energy poverty” 1–41.
\cite{26} Masud, Sharon and Lohani “Energy for All” 1–123.
\cite{28} Bhatia and Angelou “Beyond Connections” 14–17. See also Rademaekers et a/ “Selecting Indicators” 43-55.
\cite{29} Bhatia and Angelou “Beyond Connections” 14–17.
\cite{30} Bhatia and Angelou “Beyond Connections” 14–17.
\cite{31} Culver “Energy poverty” 17. See also IEA “World Energy Outlook” 1–8.
for commercial purposes. One criticism of the EDI is that it does not provide for household deprivation of energy services.\(^{32}\)

The Multidimensional Energy Poverty Index (MEPI) approach to measures energy poverty focus on the deprivation of energy services such as energy for cooking, lighting, service delivered by household appliances, entertainment, education and communication.\(^{33}\) That is, the deprivation rule for each element is set, the total number of deprivation added against a set threshold (for example two) and an average of each category is then calculated.\(^{34}\) For example, a household without a fridge is considered energy poor and if that same household does not have a TV and a washing machine (making it three which is above the two threshold) that household is said to be energy poor.\(^{35}\) The MEPI is useful in that it gives a comprehensive understanding of national energy poverty for specific categories of energy appliances but it excludes energy beyond household use and energy for productive and commercial purposes.\(^{36}\)

Energy poverty is also measured in terms of the Energy Poverty Index (EPI) approach. The EPI approach calculates energy poverty based on the average of energy shortfall, a percentage of the minimum basic level of energy consumption and a measure of the inconvenience of energy services.\(^{37}\) Inconveniences in terms of the EPI approach include the distance households travel to purchase energy or fetch fuelwood, their means of transportation, the rate of buying or fetching a specific source of energy, the number of household members involved in the buying process, household health, time spent on collecting energy sources and children’s involvement in the collection of energy source.\(^{38}\) Seen against the EDI and the MEPI, the EPI is sensitive to household cooking fuels. For example, households with are considered energy poor mainly because of the opportunity cost associated with purchasing electricity.\(^{39}\) While the EPI approach to energy poverty is

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\(^{34}\) Pelz, Pachaun and Groh 2018 WIREs Energy and Environment 3–6.


\(^{37}\) Bollino and Botti 2017 PSL Quarterly Review 479–480. See also Rademaekers et al “Selecting Indicators” 43–55.

\(^{38}\) Bollino and Botti 2017 PSL Quarterly Review 479–480.

\(^{39}\) Bollino and Botti 2017 PSL Quarterly Review 479–480.
likely to reduce the many facets of energy into a single number, variations associated with opportunity cost remains a serious setback.\textsuperscript{40}

Based on the above discussion, it is clear that there is no universal acceptable approach to measure energy poverty. The above approaches to measure energy poverty assess energy poverty either as (1) a two-way description of access to electricity and cooking fuels, (2) the outcomes of energy use, (3) energy consumption inputs measures in terms of money or units, (4) the quantity of energy consumed, (5) an average between commercial energy consumption and total final energy use, (6) deprivation of energy services and (7) the inconveniences of energy services. In the absence of an agreed approach to measure energy poverty, it might be relevant for policy makers to evaluate above approaches and make a selection of indicators relevant to their specific needs. Indicators should be chosen for each dimension on the basis of accuracy with regards to implementation. To this end, it is necessary to examine Africa’s current energy situation in order to determine a possible African approach to measure energy poverty.

2.2.1 Africa’s current energy pattern

Traditional biomass remains the dominant source of energy in Africa. More than 700 million people rely on traditional biomass for basic energy services and about 530 million do not have access to the electricity grid, categorising Africa as energy poor.\textsuperscript{41} The intention of this section will be to analyse Africa’s energy pattern based on its people reliance on traditional biomass and the lack of access to electricity in order to identify possibly indicators for an African approach to measure energy poverty.

2.2.1.1 Traditional biomass energy

For better understand of the phrase “traditional biomass” in the context of Africa’s energy situation, a distinction can be drawn between traditional biomass and modern biomass. Traditional biomass refers to “the use of fuel wood, charcoal, tree leaves, animal dung and agricultural residues for cooking, lighting and space heating in an unsuitable manner while modern biomass energy use refers to the conversion of biomass energy to advanced

\textsuperscript{40} Bollino and Botti 2017\textit{ PSL Quarterly Review} 479–480.
\textsuperscript{41} Barnard\textit{ Nuclear energy in Africa} 17–22. See also paragraph 1.1 above.
fuels such as liquid fuels, gas and electricity”.42 Seen against modern biomass use, which normally includes an effective technical utilisation to produce energy efficiently, traditional biomass is has low energy efficiency.43

According to the IEA traditional biomass remains the dominant source of energy in Africa with sub-Saharan Africa having the greatest proportion of population dependent on traditional biomass use.44 With population growth, that number of people relying on traditional biomass is expected to rise from 700 million to about 880 million by 2020.45 Reliance on these fuels has many adverse impacts on the environment and also impact on development, as collecting and cooking with these fuels are time consuming and tedious.46 Traditional biomass energy use can also have serious negative impacts on health and living conditions such as chronic obstructive pulmonary diseases or lung cancer for example and pneumonia.47

According to the World Health Organisation (WHO), health issues as a result of indoor pollution in Africa is a crucial issue. Children under five years old are highly expose to severe lower respiratory infections from household air pollution resulting from the burning of solid fuels. The burning of traditional biomass also increases the risk of the number of adverse pregnancy outcomes, and may as well impair cognitive development.48 In 2012, almost 600 000 deaths in sub-Saharan Africa are estimated to have been caused by exposure to smoke from traditional biomass with about half of the deaths occurring in children under the age of five years.49 The health burden resulting from indoor air pollution can also be expressed in disability adjusted life years (DALYs).50

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50 The disability-adjusted life year (DALY) is a measure of overall disease burden, expressed as the number of years lost due to ill health, disability, or early death. One DALY can be thought of as one lost year of “healthy” life. The sum of these DALYs across the population, or the burden of disease, can be thought of as a measurement of the gap between current health status and an ideal health situation where the entire population lives to an advanced age, free of disease and disability. See the WHO metrics overview at http://www.who.int.
household air pollution was the second highest risk factor for DALYs and the third highest factor of premature deaths in sub-Saharan Africa. Among these illnesses, they contributed to at least 581,000 premature deaths every year in Africa.\textsuperscript{51} It is estimated that, by 2030, if no action is taken, about 870 thousand people will die each year from severe lower respiratory infections and obstructive pulmonary diseases linked to solid fuel cooking.\textsuperscript{52} Household air pollution is also likely to increase the risk of chronic obstructive pulmonary diseases such as lung cancer, cataracts and tuberculosis among adults.\textsuperscript{53} However, diseases resulting from traditional biomass likely speak to the access approach to measure energy poverty - access to electricity and cooking fuels. This is because most people using traditional biomass in Africa lives in the rural areas with no access to electricity. Furthermore, cooking and heating remains the energy services for which traditional biomass is used for. To this end, access to electricity for cooking and heating would likely be of great importance when measuring energy poverty in Africa.\textsuperscript{54}

Annually, more than 300 million tonnes of wood are used for cooking in Africa and sub-Saharan Africa in particular. About 130–180 million tons of wood are used for charcoal production, leading to forest degradation, biodiversity loss and in a few instances, localised deforestation.\textsuperscript{55} About 120–380 million tons of carbon dioxide (CO\textsubscript{2}), the equivalent of Kyoto protocol GHGs (0.4–1.2\% of global CO\textsubscript{2} emissions) are produce during charcoal production, contributing to climate change. A 50 per cent reduction in biomass could to save 60 to 190 million tons of CO\textsubscript{2}.\textsuperscript{56}

Traditional biomass solid fuels also poses huge negative effects on gender equity.\textsuperscript{57} Women and girls in most African countries bears an unequal burden of the cost of solid fuel by spending about five hours per day gathering fuelwood for cooking, cooking duties

\textsuperscript{52} Goldemberg \textit{et al} 2018 Environmental Research Letters 1-3.
\textsuperscript{54} See paragraph 2.2.
\textsuperscript{55} World Bank 2011b.
\textsuperscript{56} Lambe \textit{et al} “Bringing clean, safe, affordable cooking energy to households across Africa” 9. See also Baillis \textit{et al} “The carbon footprint” 1.
\textsuperscript{57} Ketloholwe and Kanene 2018 \textit{JDRS} 1–4. See also Rysankova \textit{et al} “Clean and Improved Cooking in Sub-Saharan Africa” 20–26.
and a greater risk of physical injury and sexual violence during fuel collection trips.\textsuperscript{58} These women are even more exposed to perils in conflict zones where they face high rates of physical violence when leaving their refugee camps to gather wood. Decreased educational opportunities for children, particularly girls, impaired nutrition resulting from the diversion of scarce resources to fuel purchases and the aesthetic disutility of kitchens, dishes, and home environments damaged by smoke and soot are also negative social outcomes associated with women as a result of traditional biomass use.\textsuperscript{59} The time and perils faced by women and girls as a result of time spent in gathering biomass directly speaks to the MEPI approach to energy poverty. That is, both time and perils leads deprivation. The absence of electric cookstoves (an appliance) to use for cooking deprive women and girls of time.\textsuperscript{60} However, access to modern energy services would mean more time for women and girls to rest, to be involved in income generating opportunities, complete other house hold jobs or pursue education among others.\textsuperscript{61}

According to the World Bank, urban African households dedicate a significant portion of their expenditure (7\% on average) to lighting and cooking energy.\textsuperscript{62} The greater economic impact falls on the urban poor, who spends 15 to 20 per cent of their monthly income on high cost cooking fuels, such as charcoal among others.\textsuperscript{63} Due to the inefficiency of existing traditional cookstoves and fuels, the total amount of energy spending has risen to 10 billion US Dollars annually, or half of the total African household is cooking fuel bill of 20 billion US Dollars, an amount that will more than double in the coming decade if current price and fuel consumption trends continue.\textsuperscript{64} Billions of potential productive hours are also wasted on avoidable fuel collection and slow cooking time suffering an efficiency loss of about 40 million potentially productive person years

\textsuperscript{58} Ketlohilwe and Kanene 2018 \textit{JDRS} 1-4. Lambe \textit{et al} “Bringing clean, safe, affordable cooking energy to households across Africa” 8. See also Rysankova \textit{et al} “Clean and Improved Cooking in Sub-Saharan Africa” 20-26.

\textsuperscript{59} Ketlohilwe and Kanene 2018 \textit{JDRS} 1-4.

\textsuperscript{60} See paragraph 2.2 above.

\textsuperscript{61} Ketlohilwe and Kanene 2018 \textit{JDRS} 1-4.

\textsuperscript{62} Jongdeepsal and Nasu 2018 \textit{Energies} 1-2. See also Lambe \textit{et al} “Bringing clean, safe, affordable cooking energy to households across Africa” 7.

\textsuperscript{63} Bildirici and Özaksoy 2018 \textit{Routledge} 386–391. See also Lambe \textit{et al} “Bringing clean, safe, affordable cooking energy to households across Africa” 7; World Bank “Clean and Improved Cooking in Sub-Saharan Africa” 22.

\textsuperscript{64} Lambe \textit{et al} “Bringing clean, safe, affordable cooking energy to households across Africa” 7. See also Rysankova \textit{et al} “Clean and Improved Cooking in Sub-Saharan Africa” 20-26.
annually. Economically, the effects of money and time spent on traditional biomass relates to the two approaches to measuring energy poverty. That is the input approach that measures energy poverty in terms of the amount of money spent and the outcome approach that calculate energy poverty based on opportunity cost (time spent on acquiring fuel, amount of people in the household involved in the acquisition process among others) respectively.

No single approach to measure energy poverty is likely to be applicable to the perils of traditional biomass use in Africa. Rather a range of approaches either directly or indirectly speak to it. In order to identify possible applicable approach to measure the current African energy pattern, it will be important for Africa’s energy access rate to be analysed.

2.2.1.2 Lack of access to modern energy

2.2.1.2.1 Delimiting energy access

Though energy access is a widely recognised goal, there is no clear and universally accepted definition of the term. The term is ambiguous and often used within a particular context. The 2015 World Energy Outlook defines energy access as “the provision of cooking facilities without harm to the health of those in the household and which are more environmentally sustainable and energy efficient than the average biomass cookstove currently used in developing countries”. This definition refers primarily to biogas systems, liquefied petroleum gas stoves and improved biomass cookstoves that have considerably lower emissions and higher efficiencies than traditional three-stone fires for cooking. The term energy access on the other hand refers to the ability to use energy services (the services that energy and energy appliances provide such as lighting, heating for cooking and space heating, power for transport, water pumping, grinding and numerous other services that fuels, electricity and mechanical power make possible). In terms of the UN-Energy Secretary-General’s Advisory Group on Energy and Climate

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65 Lambe et al “Bringing clean, safe, affordable cooking energy to households across Africa” 7. See also Rysankova et al “Clean and Improved Cooking in Sub-Saharan Africa” 20–26.
66 See paragraph 2.2 above.
67 See paragraph 2.2 above.
Change (AGECC), access to energy refers to “access to clean, reliable and affordable energy services for cooking, heating, lighting, communications and productive uses”.

The different definitions above suggest that, the term “energy access” is a flexible concept made up of different facets, yet significant commonality exists across these definitions. They include “household access to a minimum level of electricity, household access to safer and more sustainable cooking and heating fuels and stoves, access to modern energy that enables productive economic activity (mechanical power for agriculture, textile and other industries) and access to modern energy for public services (electricity for health facilities, schools and street lighting)”. Access to energy can therefore be defined as the provision of affordable energy services that can be grouped as (a) electricity for lighting, health, education, communication, modern fuels and technologies for cooking and heating (b) electricity to improve productivity in the fields of agriculture, commercial uses and transport and (c) modern energy services for powering domestic appliances and private transportation. Access to energy therefore seems to be critical in undertaking above activities, promoting economic development as well as improving the livelihood of the African people.

2.3 Energy access in Africa

Currently, access to energy in Africa is the lowest worldwide, irrespective of the fact that Africa has significant energy resources in the form of oil, gas, coal, and RE sources.

About half of the population of the continent do not have access to electricity and generation is often not enough to meet the demand of those who do.

Worldwide, Africa remains the only region where the number of people living without access to electricity is increasing as rapid population growth outpaced the efforts to provide access. As stated before in sub-Saharan Africa, the number of people without

71 The Energy Sector Management Assistance Programme (ESMAP) “Beyond connection” 1. The ESMAP is a global knowledge and technical assistance programme administered by the World Bank. It provides analytical and advisory services to low and middle income countries to increase their know-how and institutional capacity to achieve environmentally sustainable energy solutions for poverty reduction and economic growth. ESMAP is funded by Australia, Austria, Denmark, Finland, France, Germany, Iceland, Lithuania, the Netherlands, Norway, Sweden, United Kingdom and the World Bank.
72 Scott “Building Electricity Supplies in Africa” 4.
73 Scott “Building Electricity Supplies in Africa” 4.
electricity in 37 countries has increased since 2000 but the total population also increased by around 100 million people. On a more positive note, the overall electricity access rate for sub-Saharan Africa increased from 23 per cent in the year 2000 to 32 per cent in the year 2012 with about 145 million people gaining access to electricity (led by Nigeria, Ethiopia, South Africa, Ghana, Cameroon and Mozambique).  

In West Africa, the rates electricity range from less than 20 per cent access in Liberia, Sierra Leone, Niger and Burkina Faso to more than 50 per cent in Senegal and above 70 per cent in Ghana. By 2020, Nigeria has as target to make reliable electricity available to 75 per cent of the population and 100 per cent by 2030, irrespective of the fact that more than 55 per cent do not currently have access to electricity. In Northern Africa electricity has been made available to about 99 per cent of the population while Central Africa exhibits great variation in providing access to electricity, for example, 66 per cent in Equatorial Guinea, 60 per cent in Gabon, 54 per cent in Cameroon, less than 3 per cent in Central African Republic, 4 per cent in Chad and 9 per cent in DR Congo. Despite the fact that crude oil exportation is Chad’s major source of income, it remains one of the countries with the lowest access to energy in Central Africa. Similar to West Africa, about 200 million people do not have access to electricity in East Africa. Countries such as Ethiopia, Kenya and Uganda, among others, have the largest populations both with and without access to electricity in East Africa. As of 2013, 90 per cent of public facilities in Kenya had access to electricity due to the work of the Rural Electrification Authority, which was created in 2006 with the aim to achieve universal access to energy by 2030. In Tanzania, electricity rates have increased from about 13 per cent in 2008 to 24 per cent in 2012. Nonetheless, household access remains low. The Southern African situation is unique. South Africa has the highest electrification rate in Africa with only about 11 per cent household without access to electricity and four per cent relying on illegal access

76 On a positive note, other countries (Ghana for example) have made major progress on improving access to electricity. Energy Commission of Nigeria, 2013 National Energy Policy, Federal Republic of Nigeria.
77 IEA 2014 Africa Energy Outlook 32.
78 IEA 2014 Africa Energy Outlook 32.
Though huge progress has been made with regards to energy access in South Africa, the *National Development Plan*, however, warns that, the reliability of the electricity supply has deteriorated and prices are likely to rise quickly.\(^{81}\) On the other hand, only about 40 per cent of the population of Mozambique have access to electricity.\(^{82}\) Generally speaking, the average energy consumption per capita in sub-Saharan Africa is 317 kWh per year, which is about half the average that of China, 20 per cent of Europe and seven per cent of the United States.\(^{83}\)

The lack of energy access has a major impact on development and the livelihoods of the African people. The deprivation of energy services is likely to entrench poverty, negatively affects health and education, inhibits local service delivery, increases vulnerability to climate change, limits expansion of opportunities and erodes environmental sustainability. In terms of the *Human Development Index* (HDI),\(^{84}\) energy access and human development are closely linked. There is a positive correlation between the percentage of electricity access and the HDI and a similar relationship exists between education enrolment rates and per cent of electricity access. A negative correlation exists between child and maternal mortality rates and the percentage of access to electricity. Worldwide, increased urbanisation most often facilitate increased household access to modern energy. Unlike many other regions in the world, it is unclear whether this would play a similar role in sub-Saharan Africa despite the fact that a significant growth in both urban and rural population is expected. In this light, efforts towards increased access to modern energy will require effective solutions for both rural and urban communities.\(^{85}\)

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81 IEA 2014 Africa Energy Outlook 32.
82 IEA 2014 Africa Energy Outlook 33.
83 Electricity consumption per capita levels are estimated taking into account residential electricity consumption and population with electricity access by country.
84 The Human Development Index is a summary composite index that measures a country’s average achievements in three basic aspects of human development: health, knowledge and standard of living. Health is measured by life expectancy at birth, knowledge is measured by a combination of the adult literacy rate and the combined primary, secondary, and tertiary gross enrolment ratio and standard of living by Gross Domestic Product (GDP) per capita (US$ at purchasing power parity) 4.
Based on above current energy pattern, it is possible that, no single approach to measure energy poverty will likely incorporate all aspects of Africa’s current energy pattern. As such, an approach that would likely speak to Africa’s energy pattern must therefore incorporate all impacts resulting from the use of traditional biomass and the lack of access to electricity. Most often, households at the outskirts or informal settlements around big African cities and in rural areas are not connected to the grid (the access) with much of their household incomes spent on biomass wood fuel and charcoal (input approach) for energy services. Furthermore, health impacts as well dangers faced by women and children especially in the rural areas during the process of fetching traditional biomass is a serious challenge dependant on traditional biomass for energy services (outcome approach). In addition, the time lost and health issues resulting from traditional biomass also amounts to depreciations suffered as a result of traditional biomass use (MEPI approach). To this end, for the purpose of this study, an approach to measure energy poverty that should speak to Africa’s current energy pattern (traditional biomass use and lack of access to electricity) must therefore take in to consideration;

- the access
- the input
- the outcomes and
- the deprivation approaches to measure energy poverty.

The impact of heavy reliance on traditional biomass for household services and the lack of access to modern energy in Africa however suggest that, access to energy in Africa must be geared towards access to modern energy sources.86

### 2.4 Modern energy access

According to Culver refers to modern energy access as “the physical connection of households to the electricity grid and their use of clean non solid fuels for cooking”.87 The

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87 Non fossil fuel hear includes RE, nuclear among others. However, this definition has received criticism stating that, it is narrow and potentially misleading as it does not address issues relating to agents other than households, to the amount of energy to which households have access, to attributes of the energy supply to which they have access, or to the use of energy for productive or other non-domestic purposes. See Culver “Energy poverty Culver” 5.
United Nations Secretary-General’s Advisory Group on Energy and Climate Change (AGECC), refer to modern energy access as the “physical availability of modern energy carriers and improved end use devices such as cookstoves at affordable prices for all. Access to these modern energy services must be reliable and affordable, sustainable and, where feasible, from low GHG emitting energy sources.”88 The Sustainable Energy for All (SE4ALL) Knowledge Hub in contextualising ‘modern energy access’ proposes three levels for modern energy access as household access, access for productive uses and access to community facilities.89 The different definitions above suggest that the phrase access to modern energy does not have universal accepted definition. However, indicators of access to modern within these definitions include household access to electricity, household access to non-fossil fuels, access to modern energy that enables productive economic activity and access to modern energy for public services. To this end, modern energy access based on above indicators will entail access to modern energy for household services (such as cooking, lighting and heating), productive economic activity (such as mechanical power for agriculture, textile and other industries) and public services (such as electricity for health facilities, schools and street lighting).

The United Nations General Assembly (UNGA) in declaring the year 2012 the International Year of Sustainable Energy for All (SE4ALL), reckoned “access to modern energy services in developing countries is essential for the achievement of the internationally agreed development goals, including sustainable development which would help to reduce poverty and to improve the conditions and standard of living for the majority of the world’s population.”90 This initiative has as its objective to double the share of RE in the global energy mix by 2030. At the core of the SE4All initiative is the concept that access to sustainable energy through doubling the share of RE is not an end in itself but that increased access to RE and modern energy services is key to achieve improvements in most sectors, including health, education, economic development, poverty reduction, gender empowerment, environment protection and climate change.91 At the African level,

88 AGECC “Energy for a Sustainable Future” 7.
89 UN The Least Developed Countries Report 2017 3.
90 The Sustainable Energy for All (SE4All) initiative is a multi-stakeholder partnership between governments, the private sector, and civil society, launched by the UN Secretary-General in 2011. A more detail discussion on SDGs and sustainable development in chapter 4.
the SE4All Africa Hub\textsuperscript{92} has as its objective to provide guidance for the SE4All country and sub-regional action processes in Africa, delivering technical assistance to partner countries, networking and communication, and mobilisation of financing towards doubling the share of RE among others.

In 2012, the UNGA’s Second Committee approved a draft resolution on the “Promotion of new and renewable sources of energy” which declares 2014-2023 the “United Nations Decade of Sustainable Energy for All”. The International Renewable Energy Agency (IRENA) members expressed strong support for the Agency to be the “Hub for Renewable Energy”\textsuperscript{93} within the SE4ALL initiative. IRENA is currently developing a global Renewable Energy Roadmap (REMAP 2030) to double the share of RE in the global energy mix by 2030. As the most mansion to increase access to modern energy in Africa,\textsuperscript{94} RE sources are estimated to power over 60 per cent of the new access and off-grid systems, providing for almost half of the new energy access in Africa by 2030.\textsuperscript{95} As such, it may therefore be necessary to analyse Africa’s RE potential, underscoring the role it might play in increasing access to modern energy and addressing energy poverty.

\section*{2.5 RE in Africa}

The African continent is endowed with diverse energy resources, unevenly located across the continent.\textsuperscript{96} These energy sources include 9.4 per cent reserves of oil, 7.9 per cent

\textsuperscript{92} The SE4All rely on its partners in order to achieve its objectives. These partners are classified under two hubs namely Regional Hubs (the Africa Hub at the African Development Bank in Abidjan, Côte d’Ivoire, the Latin America and Caribbean Hub at the Inter-American Development Bank in Washington DC, USA, the Asia-Pacific Hub at the Asian Development Bank in Manila, Philippines and the Europe-Central-Asia-Mediterranean Hub at the European Bank for Reconstruction and Development in London, UK) and Thematic Hubs (Energy Efficiency at the Technical University of Denmark/UNEP in Copenhagen, Denmark, Renewable Energy at the International Renewable Energy Agency in Abu Dhabi, UAE, Knowledge Management at the World Bank in Washington, DC, USA), Capacity Building (at the Energy and Resources Institute in New Delhi, India, Energy Efficiency Facilitation in Tokyo, Japan and the Bottom-of-the-Pyramid UNDP in New York, USA. However, following the decision of the May 2015 Advisory Board meeting, the structure of SE4All is undergoing modifications in line its structure. The new structure will be based on two central pillars: the UN on one side, and a new international non-profit organization called “The Sustainable Energy for All Partnership”.

\textsuperscript{93} Hubs are partners on which the SE4ALL initiative rely on. There is the Regional and Thematic Hubs. The IRENA forms part of the Thematic Hub.


\textsuperscript{96} Hancock 2015 Energy Research & Social Science 1.
of gas and 5.54 per cent coal of the world total.\textsuperscript{97} The hydropower potential is mostly located in central and western Africa, oil and gas resources in western and northern parts of the continent, coal reserves almost exclusively in Southern Africa and geothermal energy in eastern Africa. The hydropower potential of the continent amounts to 13 per cent of the world. Energy in Africa is mostly produced from biomass (47%), oil (24.8%), coal (16.5%), gas (10.4%), and other renewable sources, such as large and small hydro, solar, and geothermal sources (1.3%).\textsuperscript{98} The continent has abundant solar irradiation ranging from 5 to 7 Kilowatt-hours (hereafter kWh), all year round, and it enjoys a relatively strong wind power potential in Northern, Southern and Eastern Africa.\textsuperscript{99} Furthermore, the geothermal energy potential of the continent, estimated at 9,000 MW located in the Rift Valley in East Africa.\textsuperscript{100}

In terms of the \textit{World Energy Outlet} (WEO), the current global trends in energy supply and consumption are unsustainable, environmentally, economically and socially.\textsuperscript{101} It therefore seems that the future of human prosperity depends on how successfully the two central energy challenges facing us today are tackled - effecting a rapid transformation to a low-carbon, efficient and environmentally benign system of energy supply and securing the supply of reliable and affordable energy.\textsuperscript{102} RE sources offer particular advantages in this context. As well as having large potential to mitigate energy poverty, RE can provide wider benefits. Increased access to RE may contribute to the achievement of SDGs (social and economic development in general),\textsuperscript{103} mitigate climate change, reduce dependence on costly fuel inputs (which are subject to volatile international prices), secure energy supply, reduce negative impacts on the environment and health, among others.\textsuperscript{104} Being vital in mitigating energy poverty, there may therefore

\begin{small}
\textsuperscript{97} Economic Commission for Africa “African regional implementation review” 1. See also Colenbrander \textit{et al} 2015 \textit{Energy Research & Social Science} 70-71.
\textsuperscript{98} Economic Commission for Africa “African regional implementation review” 1, Colenbrander \textit{et al} 2015 \textit{Energy Research & Social Science} 70-71.
\textsuperscript{99} Economic Commission for Africa "African regional implementation review” 1. See also Colenbrander \textit{et al} 2015 \textit{Energy Research & Social Science} 70-71; IRENA “Africa’s RE future” 7–11.
\textsuperscript{100} Colenbrander \textit{et al} 2015 \textit{Energy Research & Social Science} 71.
\textsuperscript{101} IEA 2008 World Energy Outlook.
\textsuperscript{102} IEA WEO 2010 World Energy Outlook, IEA WEO 2008 World Energy Outlook.
\textsuperscript{103} See paragraph 3.5.
\end{small}
be a need to define RE in order to ascertain the different types of energy sources that constitute it.

2.5.1 Defining RE

Though there is a broad consensus among international organisations, government institutions and regional commissions on what constitutes RE, these groups employ legal or formal definitions that slightly differ depending on the types of resources and sustainability considerations. In terms of the IRENA, RE refers to “all forms of energy produced from renewable sources in a sustainable manner, which include, inter alia, bioenergy, geothermal energy, hydropower, ocean energy (including tidal, wave and ocean thermal energy), solar energy and wind energy”.105 According to the IEA, RE refers to “energy derived from natural processes that are replenished constantly. In its various forms, it derives directly or indirectly from the sun, or from heat generated deep within the earth”.106 These definitions vary in the type of energy resources included and in whether sustainability considerations are explicitly incorporated. These differences illustrate that, there is no common definition for RE. Energy resources and sustainability considerations of above definitions include solar, wind, biomass, geothermal, hydropower, ocean, tidal, biofuels and hydrogen produced in an economic, social and environmentally sustainable manner respectively. Based on above commonalities, RE for the purpose of this work is referred to as

energy originating from natural processes in the form of bioenergy, geothermal, hydropower, ocean, solar and wind energy produced in a social, economic and environmentally friendly manner.

In terms of the 2014 Inter-Governmental Panel on Climate Change (IPCC) Report, RE are affordable, available, and less polluting energy sources.107 While different types of energy

& Social Science 71; Kaggwa, Mutanga and Simelane 2011 “Factors determining the affordability of renewable energy” 8.

105 Article III Statute of IRENA, 2009 www.irena.org. The IRENA is an intergovernmental organisation that promotes the adoption and sustainable use of renewable energy. It was founded in 2009 and its statute entered into force on 8 July 2010 with its headquarters in Abu Dhabi.

106 Included in the definition is energy generated from solar, wind, biomass, geothermal, hydropower and ocean resources, and biofuels and hydrogen derived from renewable resources.

sources constitute RE, it may therefore be necessary to analyse these different sources in order to determine whether they can be seen as modern.

2.5.2 RE sources

RE sources as per the IRENA statute include bioenergy, geothermal, hydropower, ocean energy, solar energy, and wind energy, produced in a sustainable manner. Bioenergy is a term generally used to cover energy derived from a wide variety of material of plant or animal origin (such as wood and wood residues, agricultural crops and residues, animal fats, and animal and human wastes) all of which can yield useful fuels either directly or after some form of conversion. Sometimes called "the green gold" of Africa, bioenergy presently provide and is likely to still provide the greatest part of primary energy in Africa by 2030. Nonetheless, its distribution greatly varies, with grassland region of the Sahel and the dry savannas being particularly low in biomass and the humid tropical forest regions having very high biomass values. Though having a great potential, biomass energy production in Africa remains unsustainable.

According to the World Energy Council (WEC), solar energy technologies can broadly be divided into two categories, solar thermal systems and solar electric or photovoltaic (PV) systems. PV devices convert sunlight directly into electrical energy. The amount of energy produced is directly proportional to the intensity of the sunshine. PV has a

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108 See paragraph 2.4.1.
109 UNIDO "Sustainable energy regulation and policymaking for Africa" 19.
110 European Commission "Renewable energies in Africa" 25.
113 WEC "World energy resources 2013 survey" 324–351. The WEC is the principal impartial network of leaders and practitioners promoting an affordable, stable and environmentally sensitive energy system for the greatest benefit of all. Formed in 1923. The WEC is the UN-accredited global energy body, representing the entire energy spectrum, with more than 3000 member organisations located in over 90 countries and drawn from governments, private and state corporations, academia, NGOs and energy related stakeholders. The WEC informs global, regional and national energy strategies by hosting high-level events, publishing authoritative studies, and working through its extensive member network to facilitate the world's energy policy dialogue.
114 WEC "World energy resources 2013 survey" 325. See also Hoogwijk and Graus "Global potential of renewable energy sources" 22-27.
115 Hafner, Tagliapietra and de Strasser Energy in Africa Challenges and Opportunity 50–53.
seasonal variation in potential electricity production with the peak in summer and almost constant exploitable potential throughout the year. Solar thermal systems on the other hand use the sun’s power in terms of its thermal or heat energy for heating, drying, evaporation and cooling.\textsuperscript{116} Many developing countries have traditional community products such as solar water heaters and solar grain dryers, among others.\textsuperscript{117} PV panels are cheaper than conventional electricity sources in many parts of Africa and can provide efficient and reliable electricity without damaging the climate (less polluting).\textsuperscript{118}

Worldwide, hydropower is one of the largest RE sources used. It is extracted from falling water and made to pass through an energy conversion device, such as a water turbine or a water wheel.\textsuperscript{119} The hydroelectric plants produce around 3230 TWh/year, about 15% of the global electricity production. The hydroelectric potential in North America and Europe is exploited for more than 85%, in South America for 33% and in Asia and Africa for 22% and 7%, respectively. At the African level, there is a possibility of an installed hydropower capacity of over 250GW with a production of 1000 TWh/year (500 in the Democratic Republic of Congo, 160 in Ethiopia, 160 in Cameroon, 25 in Angola), however, there are difficulties in the development thereof since hydroelectric plants are capital-intensive, often tied to long transmission systems involving many crossed countries and very sensitive to droughts.\textsuperscript{120} In 2013, Africa started building the largest hydroelectric plant in the Congo River, expected to provide electricity to half of the continent. Hydropower is clean and emission free electricity generation technology and is promoted as an environment friendly energy option for Africa.\textsuperscript{121}

\textsuperscript{116} Hoogwijk and Graus “Global potential of renewable energy sources” 22–27.
\textsuperscript{117} REN21 “Renewables Global Status Report” 8–10. The RE Policy Network for the 21st Century (REN21), is a global multi-stakeholder policy network that provides international leadership for the rapid transition to renewable energy. The network was launched in June 2004 as an outcome of the International Conference for Renewable Energies in Bonn, Germany. REN21 brings together governments, nongovernmental organisations (NGOS) research and academic institutions, international organisations and industry to learn from one another and build on successes that advance RE. To assist policy decision making, REN21 provides high quality information, catalyses discussion and debate and supports the development of thematic networks.
\textsuperscript{118} REN21 “Renewables Global Status Report” 8–10.
\textsuperscript{119} WEC 2013 World energy resources survey 220. See also Hafner, Tagliapietra and de Strasser Energy in Africa Challenges and Opportunity 55–56.
\textsuperscript{120} WEC 2013 World energy resources survey 222. See also Hafner, Tagliapietra and de Strasser Energy in Africa Challenges and Opportunity 55–56.
\textsuperscript{121} WEC 2013 World energy resources survey 222. See also Hafner, Tagliapietra and de Strasser Energy in Africa Challenges and Opportunity 55–56.
Wind energy is produced by converting the force of the wind into energy. That is, wind turbines produce power by converting the force of the wind acting on the rotor blades (rotational energy) into energy.\textsuperscript{122} Globally, wind energy is considered a RE for developed countries. However, this is slowly changing with steady worldwide wind energy rising since 2004 with the actively installed global capacity increased from 40000 MW at the end of 2003 to 94000 MW at the end of 2007.\textsuperscript{123} According to the Global Wind Energy Council,\textsuperscript{124} wind power capacity was installed in developing and emerging economies in 2010. At the African regional level, the potential of wind energy has started to be recognised. Currently, Egypt has the largest share of wind energy production in Africa a total wind capacity of 550 MW. Wind energy production and around 290 MW in Morocco, 120 MW in Tunisia and 377 MW in South Africa.\textsuperscript{125} Though the majority of winds farms are predominantly to be found in Northern Africa and mostly along the Mediterranean coast, wind farm projects are now also under discussion for other areas (wind production farms for Nigeria with capacity of about 10 MW, in Ethiopia for about 120 MW, and for Kenya with capacity of 300 MW).\textsuperscript{126} While wind energy is generally cost effective, reliable, environmentally and socially friendly, delays, cost and service providing companies not giving access to grid systems remains a huge challenge.\textsuperscript{127}

To date, more than 58 countries worldwide are operating in the geothermal energy sector.\textsuperscript{128} Geothermal energy refers to energy that flows from the inner core to the surface of the earth.\textsuperscript{129} Geothermal heat has two sources, namely heat produced from

\textsuperscript{122} Hafner, Tagliapietra and de Strasser Energy in Africa Challenges and Opportunity 54–55. See also WEC 2013 World energy resources survey 222.

\textsuperscript{123} Hafner, Tagliapietra and de Strasser Energy in Africa Challenges and Opportunity 54–55. See also European Wind Energy Association 2009.

\textsuperscript{124} GWEC 2011 Global Wind Report 16. See also Hafner, Tagliapietra and de Strasser Energy in Africa Challenges and Opportunity 55.

\textsuperscript{125} Hafner, Tagliapietra and de Strasser Energy in Africa Challenges and Opportunity 55. See also GWEC 2011 Global Wind Report 16.

\textsuperscript{126} Hafner, Tagliapietra and de Strasser Energy in Africa Challenges and Opportunity 55. See also GWEC 2011 Global Wind Report 16.

\textsuperscript{127} WEC 2013 World energy resources survey 415-416. It is a requirement that RE projects are connected to the grid once the construction of the wind project is completed. In South Africa for example, such connections require an input from Eskom. However, dada indicates that cost and Eskom are huge impediments to the implementation of wind projects. See Forsyth Impediments implementing RE Projects in South Africa 79; Pegels 2010 Energy Policy 4945–4954.

\textsuperscript{128} WEC 2013 World energy resources survey 352. See also Bertani “Geothermal Power Generation” 1–19, Georgsson “Geothermal Energy in the World” 1–12.

\textsuperscript{129} WEC 2013 World energy resources survey 353. See also Hafner, Tagliapietra and de Strasser Energy in Africa Challenges and Opportunity 62.
the formation of the earth by gravitational collapse and the heat produced by the radioactive decay of various isotopes.\textsuperscript{130} Compared to other renewables, geothermal energy has the advantage that the source is consistently available without any restriction, having almost zero emissions and requires little space for generation (geothermal power plants require approximately 11 per cent of the total land used compared to 12-30 per cent of land occupied by other RE technologies).\textsuperscript{131} At the African regional level, Ethiopia, Kenya, Uganda and Tanzania have the highest geothermal grid. Currently, Kenya has exploited 57 MW of its total geothermal potential and plans are underway to increase electricity generation from geothermal energy to 576 MW by 2019.\textsuperscript{132}

Ocean energy represent a considerable source of RE in several different forms,\textsuperscript{133} such as wave, tidal and ocean thermal energy. Ocean thermal energy conversion exploits the temperature gradient between shallower and deeper layers in the deep ocean to produce energy.\textsuperscript{134} Wave energy on the other hand arises from the interaction between the winds and the surface of the ocean. Contrary, tidal energy has its origin in the gravitational attraction that exists between the earth and the moon and is transmitted through the ocean. Out of these three ocean energy types, only tidal energy has a significant installed capacity and the only technology which is fully matured worldwide.\textsuperscript{135} At the African regional level, ocean energy is still to be developed and potential identified. Not limited to reliability, ocean energy also have low carbon emission rates.\textsuperscript{136}

As seen above, Africa is endowed with abundant RE sources. Nevertheless, the sustainability patterns and efficiency in production of these RE sources remains critical.\textsuperscript{137} It may therefore be necessary to determine the sustainability or modern nature of these RE sources in order to understand the need for their increase.

\textsuperscript{130} WEC 2013 World energy resources survey 353. See also Bertani “Geothermal Power Generation” 1–19; Georgsson “Geothermal Energy in the World” 1–12.
\textsuperscript{131} WEC 2013 World energy resources survey 353. See also Bertani “Geothermal Power Generation” 1–19, Georgsson “Geothermal Energy in the World” 1–12.
\textsuperscript{132} WEC 2013 World energy resources survey 353.
\textsuperscript{133} WEC 2013 World energy resources survey 443.
\textsuperscript{134} WEC 2013 World energy resources survey 444.
\textsuperscript{135} WEC 2013 World energy resources survey 444. See also Bradbrook “Achieving access to modern energy services” 26–44; See paragraph 1.1.3.
\textsuperscript{136} WEC 2013 World energy resources survey 445. See also Bradbrook “Achieving access to modern energy services” 26–44.
\textsuperscript{137} WEC 2013 World energy resources survey 444.
2.5.3 Modern energy

In terms of the International Institute for Applied Systems Analysis (IIASA), modern energy typically includes access to three forms of energy, each of which provides (a) essential benefits for socio-economic development (b) less polluting household energy for cooking and heating\(^\text{138}\) and (c) electricity for powering appliances and lights in households and public facilities.\(^\text{139}\) The 2014 Africa Energy Outlook defines modern energy as high quality and reliable energy that provides services such as lighting, heating, transport, communication and mechanical power that support education, better health, higher incomes and all-round improvements in the quality of life.\(^\text{140}\) According to the UNDP and the WHO,\(^\text{141}\) modern energy refers to electricity, liquid fuels (such as kerosene) and gaseous fuels (such as liquefied petroleum gas (LPG), natural gas) and excludes traditional biomass and coal. Summarised, the term modern energy may be used to refer to any energy source that is reliable, that which show limited environmental and social impacts and promote socio-economic development.\(^\text{142}\) The different definitions above suggest that the term modern energy does not have universally acceptable definition. The commonalities among these definitions include less polluting, high quality and efficient energies. Looking at the different RE sources above,\(^\text{143}\) traditional bioenergy production in Africa is likely to be categorised non-modern.

2.5.3.1 Bioenergy against modern energy

With final consumption estimated to lie between 51 and 57 per cent by 2035 in Africa the production of bioenergy is highly unsustainable.\(^\text{144}\) As a readily available local energy source, traditional biomass provides the energy needs of a significant proportion of the

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\(^{138}\) Household energy services in this regard includes improved cookstoves with traditional solid biomass fuels, from liquid and gaseous fuels such as kerosene and LPG or energy from RE sources such as solar. See IIASA “Access to modern energy” 1.

\(^{139}\) IIASA “Access to modern energy” 1. Electricity appliances and lights here include health clinics, schools, government offices among others and mechanical power from either electricity or other energy sources that improve the productivity of labour.


\(^{141}\) UNDP and World Health Organisation “The energy access situation” 13.

\(^{142}\) While the definition afforded to the term modern energy includes reference to the elements of sustainable development, a more unambiguous term is needed.

\(^{143}\) See paragraph 2.4.2 above.

\(^{144}\) IRENA “Biomass potential in Africa” 13. See also UNIDO “Scaling up renewable energy in Africa” 14. See paragraph 2.2.1.1.
population particularly the poor in rural areas of the continent. According to the IRENA, traditional biomass is unsustainable, unreliable, highly polluting and inefficient. In comparison to modern biomass which normally includes an effective and less polluting technical utilisation to produce energy efficiently, traditional biomass is used with very low energy efficiency. If traditional biomass energy is developed in a modern manner, it is likely to create opportunities for increased energy access and promote food production especially in rural areas. Modern biomass use can also reduce negative health and living conditions accruing from use of traditional biomass (pneumonia, chronic obstructive pulmonary diseases or lung cancer, among others) as well as negative deforestation impact, for example, traditional charcoal production. Increased use of modern biomass in households, institutions and industries is likely to reduce fuel consumption, improve product quality and products with a better shelf life. In addition, modern biomass energy use may as well alleviate the burden of wood fuel collection placed on women and children, hence freeing up more time for women to engage in other activities, especially income generating activities. In terms of the IEA, the total energy share from traditional biomass is estimated to decline by 2035, although biomass will continue to be an important energy resource for Africa in the future. To this end, there may therefore be a need to discuss the importance of increased access to RE and its challenges in order to be able to propose solutions for them.

2.5.4 Increased access to RE in Africa

As discussed above, there is great potential for the introduction of RE in Africa. RE technologies are deployable in a decentralised and modular manner. This makes them a particularly suitable energy source for small grids or off-grid solutions, which in turn bear great potential in many rural regions where connection to the grid is too
expensive. Providing Africans living in rural areas with electricity would often require large and costly grid infrastructure expansion. However, REN21 encourages the extension of existing grids in sub-Saharan Africa. In addition, RE off grid solutions are increasingly acknowledged to be the cheapest, suitable and most sustainable option for rural areas in much of the developing world. Mini-grid RE solutions also provide higher efficiency in electricity distribution, an intractable problem in sub-Saharan Africa with distribution losses nearing 20 per cent of the total electricity consumption per year compared to 8 per cent in North America and Europe.

Increased RE deployment and access can increase energy security by diversifying the existing energy mix and reduce dependence on costly fossil fuels import. Sub-Saharan African countries may collectively export five times the volume of oil (crude and refined products combined) than they import. If the six largest oil exporting African countries are excluded (Angola, Congo Brazzaville, Equatorial Guinea, Nigeria, Gabon and Sudan) and the situation reanalysed for the remaining 40 plus countries, the picture changes. Not only are the total imports larger than the total exports, imports are also growing faster than exports. Whereas the total exports of petroleum-based products grew by 61 per cent, imports grew by 72 per cent. However increased access to RE can greatly mitigate this situation, though its uptake remains marginal due to some challenges.

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152 Batinge, Musango and Brent 2017 *SJE* 38. See also AfDB 2010 Committee of Ten Policy Brief http://www.afdb.org.
153 Batinge, Musango and Brent 2017 *SJE* 38. See also AfDB 2010 Committee of Ten Policy Brief http://www.afdb.org.
156 Cross “Sustainable, Cost-Effective and Environmentally Sound Energy” 203.
157 Cross “Sustainable, Cost-Effective and Environmentally Sound Energy” 203.
158 That is, from 223 thousand barrels per day in 1998 to 360 thousand barrels per day in 2008.
159 REN21, 2011 (from a much higher level at 528 000 barrels per day in 1998 to 908 thousand barrels per day in 2008).
2.5.5 Challenges for increased access to RE

2.5.5.1 Challenge 1: Cost, capital and competitiveness of RE

2.5.5.1.1 Cost of electricity generation from RE

Investing in any electricity generation is driven by profits accruing from such technology to the extent to which it is competitive with other technologies. Costs obtained during electricity generation from RE sources are generally more expensive compared to conventional sources (for example fossil fuel).\(^{160}\) However, the continue decrease in the cost RE technologies makes them fully competitive with conventional forms of electricity generation in many parts of the world. For example, in South Africa solar photovoltaic (PV) generation was fully competitive with conventional coal-fired generation at some point between 2012 and 2014.\(^{161}\) In windy sites, wind-based generation can deliver electricity at a cost below 69 per US Dollars megawatt-hour (MWh) which is comparable to the average cost of coal-fired generation at approximately 67 US Dollars per MWh.\(^{162}\) The competitiveness of certain forms of RE generation is further improved where end-users are not yet connected to and are relatively far from the centralised grid, which is the case with most of the rural populations in developing regions. In greater parts of sub-Saharan Africa, only about two to five per cent of the rural population is connected to the grid. In such situations, small RE grids or off-grid provision (for example rooftop PV installations or solar water heaters), when based on local availability, RE sources can be considerably more cost-efficient than large-scale grid build-out and expansion.\(^{163}\)

In sub-Saharan Africa, the average cost of electricity generation amounts to about 0.18 US Dollars per kilowatt-hour (KWh), more than twice when compared to South Asia (0.04 US Dollars) and East Asia (0.07 US Dollars).\(^{164}\) This therefore means that, in the quest for the quick expansion of energy access, particularly to poor communities and in light of

\(^{160}\) UNEP FI and Partners “Investment-grade climate change policy” 6–37.

\(^{161}\) PV magazine 2010 South Africa: Grid parity within sight, but Refit needs to be implemented soon http://www.pv-magazine.com.


\(^{164}\) AfDB “Clean energy” 1–20. See also Deichmann et al “The Economics of Renewable Energy” 4-6. See also Lyu and Shi 2018 Sustainability 1–13.
tight public budgets, cost minimisation and cost efficiency are high priorities for policymakers, developers and the local population. Most often, even if access to electricity is provided, the local population cannot necessarily afford it. As such, when aiming to expand electrification, AU policy makers should not only focus on providing energy access to as many people as possible, but also to do so in ways that increase affordability as well.

2.5.5.1.2 The capital intensity of RE

RE technologies in most developed countries are becoming increasingly competitive with regards to innovation as well as the long-term upward price trends for fossil fuels. At the sub-Saharan Africa level, the operations-related expenditure associated with different energy options should play a more important role than their capital investment expenditure, which is likely to result in preferential treatment of technologies that are relatively low in capital investment and relatively high in operations-related expenditure. The Different regional conditions especially investment-related risks (country, regulatory, commercial and market) is likely to be more pronounced in sub-Saharan Africa and other developing countries than in developed countries. These risks will immediately increase the return expectations of investors. This will discourage capital-intensive energy options and encourage less capital-intensive, conventional energy technologies. Furthermore, the novelty associated with RE technology result in higher risk and in turn a higher return expectations from investors, more so in developing countries than in both mature energy markets and developed countries. This will discourage capital-intensive RE technologies in favour of less capital-intensive conventional energy sources.

166 AfDB “Clean energy” 21–23. See also Deichmann et al “The Economics of Renewable Energy” 8-10. See also Lyu and Shi 2018 Sustainability 1–13.
167 The price of oil in 2009, for instance, was USD 59.21 per barrel and is predicted to be USD 135.22 per barrel in 2035. The price of natural gas was USD 3.33 per 1,000 cubic feet in 2009 and is predicted to be USD 8.06 in 2035.
In addition, investments with high capital expenditures require relative easy access to capital, in order to be viable. In almost all African countries, capital markets are not mature, thus making it difficult to get private financing. Sub-Saharan African governments in the last few decades have taken advantage of a relatively easy access to concessional finance, which partly can explain the poorly developed bond markets. The bond markets in sub-Saharan Africa are still in the developing characterised by illiquidity, lack of depth and small size. For increased RE deployment and access to be achieve, these inefficiencies will have to be address in order to lower both risks and cost of capital in Africa and make investments more attractive.

2.5.5.1.3 High transaction costs

The implementation of RE technology requires relatively high transaction costs compared to conventional energy. RE projects are naturally smaller than conventional energy projects, given rise to increased transaction costs which tend to be fixed. The transaction costs per kilowatt of electricity produced from a central coal plant for instance will be lower than the costs of the many thousands of transactions required for comparable capacity from solar home systems, making investors more interested in fossil fuel energy generation than RE. Furthermore, RE development requires more information such as historic weather related data regarding wind, sun radiation and precipitation in particular areas. However, this information which may not be readily available or easily obtained in African and sub-Saharan countries at any given moment, makes the development of these RE technologies more difficult. On a more general note,

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174 Bonds are financial debt instrument, establishing a loan commitment between the borrower and the lender. In a loan relationship, the borrower committed to the bond to pay to the lender or investor the amount of money received, increased by the amount of interest accrued until a particular date or until bond’s maturity date. However, upon their issuance, the bonds are traded in the market. See Adelegan and Radzewicz-Bak “What Determines Bond Market” 4–5. See also Mu, Phelps and Stotsky “Bond Markets in Africa” 1–48.
177 UNEP “Financing renewable energy” 27.
the novelty of RE technologies or uncertainties over performance makes it more difficult for RE development particularly in countries with an insufficient track record. As such, the transaction costs of RE projects including resource assessment, siting, permitting, planning, developing project proposals, assembling financing packages and negotiating power purchase contracts with utilities may be much larger on a per kilowatt capacity basis than for conventional power plants. In addition, fossil fuel subsidies further deteriorate the competitiveness between RE technologies development compared to that of conventional energy. In the year 2009 a global total of 312 billion US dollars subsidy was allocated to fossil fuel compared to a 57 billion US dollars for RE sources. These fossil fuel subsidies include direct budgetary transfers, tax incentives, research and development spending, liability insurance, leases, land rights-of-way, waste disposal, and guarantees to mitigate project financing or fuel price risks. Despite the shape or form, these subsidies work to lower the price of energy generated from fossil fuels artificially making them relatively cheaper compared to RE.

The primary solutions to these challenges refers to the consideration of RE quotes, grants, rebates and fiscal incentives, feed-in tariffs and carbon taxes geared towards levelling the playing ground for RE and conventional energy options. The

179 UNEP “Financing renewable energy” 27.
180 UNEP “Financing renewable energy” 27.
181 IEA “Clean energy progress report” 40-57.
184 A quota-scheme, sometimes called a renewable portfolio standard (RPS), “requires power generators and utilities to generate and supply a predetermined proportion of electricity from RE sources. Such obligations are often combined with tradable RE credits (RECs) or renewable obligation certificates (ROCs). These are certificates awarded to RE generators that can be used to meet the required RE targets specified in the RPS. Any excess certificates can be sold to other generators or utilities that need them to comply with regulation”. See IRENA “Renewable Energy Auctions” 1–60. See chapter 4.
185 Grants and rebates such as capital subsidies are other types of public support mechanisms that promote the mobilisation of private finance for renewable energy. Another category is tax incentives. Examples include tax credits given to RE generators, or sales tax exemptions for equipment used for RE generation. IRENA “Renewable Energy Auctions” 1–60.
186 A feed-in tariff (FIT) is a policy instrument where long-term purchase contracts are offered to RE producers at a fixed price or at a fixed premium to the market price. When a fixed premium is chosen, the output price offered to suppliers is often provided as a ceiling and a floor price.
187 Carbon taxes levy a fixed amount of tax per ton of carbon dioxide emitted. The rationale is that the market is steered away from high-emission fossil fuels into more low-carbon alternatives in order to avoid taxes. IRENA “Renewable Energy Auctions” 1–60.
188 See chapter 4.
second challenge related to the RE development in Africa is the need for increased access to RE based on rules and obligations.

2.5.5.2 Challenge 2: Legal and regulatory

To ensure increased RE access on the continent, coherent, consistent and conducive energy policy and regulatory frameworks should be developed. The absence of RE policies and regulations that offer clear direction and leadership from governments make it difficult to invest in the development and use of RE on the continent. On a positive note, Kenya and Zimbabwe have instituted RE Policies, by for example removing excise tax on PV systems. Though these efforts are laudable, they are not widespread and in some cases neither consistent nor well-coordinated. The absence of RE development plans at the sub-regional and national levels in Africa further worsen the situation. The review of the World Bank’s Poverty Reduction Strategy Papers for African countries shows that only very few countries mention the energy sector in their policies let alone the RE sector as a priority. However, despite the significance of energy and particularly RE in the economic and social development of the continent, it does not receive adequate policy attention. Despite the recent development of several RE policies in many developing countries, only a few have been developed in Africa and especially in northern and southern Africa. In addition, where suitable policies for promoting RE do exist their impact is weakened by lack of enforcement mechanisms.

The low budgetary allocation in many African countries is a major impeding factor for RE development. Generally, the majority of energy projects are externally financed and where they do exist dedicated funds for RE is less than three per cent of total public expenditure. The successful development and deployment of any technology,
especially relatively new ones such as RE technology need several institutions covering the different technical, economic and market aspects.

On a negative note, this institutional capacity is not always available in most parts of Africa and this puts RE at a disadvantaged position.\textsuperscript{196} The size of RE technology (such as solar, biomass, wind among others) and the normal resistance to change in any well-established institution coming from the side of power supply utilities further worsen the situation.\textsuperscript{197} Power utilities normally find it difficult to match such power with their usual peak load due to problems of intermittency in the RE supply.\textsuperscript{198}

Shortages of subsidiary technical institutions for testing, operation and maintenance of technologies also challenge RE development and access. The absence of National Systems of Innovation (NSI) that promotes technology development and transfer is one of the areas in which Africa suffers the most.\textsuperscript{199} Such systems have proved to be significant in increasing technological receptivity in most developed and emerging economies.\textsuperscript{200} In Africa, only Egypt and South Africa\textsuperscript{201} have attempted to put systems that foster technology incubation and commercialisation into place.\textsuperscript{202} Therefore, in formulating an African regional energy legal framework capable of promoting increased access to RE, the AU policy makers need to be mindful of NSI that would create a landscape favourable for the inception of new RE technologies into the existing energy mix. The financial risk involved in the development of RE is another challenging factor.

\textsuperscript{196} UNEP “Financing renewable energy” 14. See also Nasirov, Silva and Agostini 2015 Energies 3796.
\textsuperscript{197} UNEP “Financing renewable energy” 14. See also Bridle et al 2018 IISD 8.
\textsuperscript{198} UNEP “Financing renewable energy” 15. Nasirov, Silva and Agostini 2015 Energies 3796.
\textsuperscript{199} NSI are systems that foster technology incubation and commercialisation into place.
\textsuperscript{200} UNEP “Financing renewable energy” 15. See also Nasirov, Silva and Agostini 2015 Energies 3796.
\textsuperscript{201} A NIS refers to all economic, political and other social institutions affecting learning, searching and exploring activities to advance a country’s innovation profile (i.e. a nation’s universities and research bodies, financial system, its monetary policies, and internal organisation of private firms). NSI in Egypt is governed by the Information and Decision Support Center, 1985. In South Africa, the NSI is governed by the White Paper on Science and Technology, 1996 which has been amended, the White Paper on Science and Technology, 2017. See Abdulrahman Innovation in the Local Administration 58; Department of Science and Technology Republic of South Africa the White Paper on Science, Technology and Innovation, 2017 https://tbsca.travel respectively. Moet ek hierdie maak dat dit nie split oor twee bladsye nie?
\textsuperscript{202} Bridle et al 2018 IISD 8. See also UNEP “Financing renewable energy” 15. Nasirov, Silva and Agostini 2015 Energies 3796.
2.5.5.3 Challenge 3: Financial risks and mobilisation of funds

2.5.5.3.1 Financial risks

A variety of investment risk poses serious treats to financing RE development and access in developing countries. Firstly, the general risk associated with the novelty of RE technologies is particularly pronounced in developing countries that lack track records, overall business infrastructure and professional expertise in these technologies. Secondly, this risk is exacerbated by such investment risks that are typical for developing countries, namely, political risks, currency risks and commercial risks induced by the poor creditworthiness of state owned utilities that carry the payment obligations to buy generated power under power purchase agreements. Poor creditworthiness is often express in terms of poor billing and payment collection systems, limited innovation, and prices that reflect neither costs nor demand, but rather determined on political grounds. A culminaton of these factors worsens the risk profile of investment and the return expectations of potential developers. This is particularly detrimental to RE technology given its capital intensity. The main non-technology risk categories that characterise investment in Africa, particularly in sub-Saharan Africa, would now be discussed.

Country and political risks encompass the risk of expropriation, breach of contract, war and civil disturbance. These categories of risk may act as an early selection filter in many financial decision making processes and based on broader macroeconomic, political concerns, it often hinders the implementation of otherwise promising and high potential projects on the ground. Political risk in sub-Saharan Africa, more than in any other part of the world, is not only rooted in the potential behaviour of governments and other

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203 Lyu and Shi 2018 Sustainability 3. See also Gabaldón-Estevan, Peñalvo-López and Solar 2018 Sustainability 2–3.
207 UNEP and Partners "Catalysing low-carbon” 14. See also Lyu and Shi 2018 Sustainability 3.
208 Broking “Political Risks in Sub-Saharan Africa” 3–9. See also UNEP and Partners "Catalysing low-carbon” 15.
official actors, but in that of any organisation or individual with political aims. Even relatively advanced states in the region cannot always claim control of their entire sovereign territory. In such vacuums of public authority, potential threats to investments are competing investors, non-governmental organisations, militia groups, individual politicians or specific arms of a government. Many of the bigger African banks have operations in a number of sub-Saharan African countries, which tend to reduce risk overall simply by making institutions more diversified.

Low-carbon policy risk is another component under regulatory risk that applies specifically to RE projects and other low GHGs emission energy options. It relates to how credible and reliable public policies, regulation and incentives are over the appropriate timeframes, and how effectively they are implemented by government agencies. Given the political instability, frequent lack of law enforcement regulation in many developing countries (even if supportive policies for RE sources are put in place) may inhibit private initiative and investment. Private initiatives will only materialise if the continuity of such policies is ensured. Countries could avoid this by introducing policies when there are changes in a public administration after elections for instance. Establishing regulatory agencies that are independent from the central government make them less exposed to political tactics. This may also contribute to the continuity and stability of the regulation of RE markets.

Currency risk is a trivial but critical risk class for foreign financiers to engage investments in Africa and particularly in Least Developed Countries (LDCs) such as Benin, Burkina Faso, Burundi, Chad amongst others. Currency risks are especially pertinent for projects delivering a public good to local populations, such as electricity or water, given that project cash flows are mostly denominated in local currency. RE technologies are strongly affected by foreign exchange risk given their novelty and short track record,

Broking “Political Risks in Sub-Saharan Africa” 3–9. See also UNEP and Partners “Catalysing low-carbon” 15.
Broking “Political Risks in Sub-Saharan Africa” 5–9.
Broking “Political Risks in Sub-Saharan Africa” 5–9.
Broking “Political Risks in Sub-Saharan Africa” 5–9.
Broking “Political Risks in Sub-Saharan Africa” 5–9. See also Shrimali “Instruments to Mitigate Financial Risk” 3.
Broking “Political Risks in Sub-Saharan Africa” 16–18.
especially in those countries with volatile currencies.\textsuperscript{217} The result is a lack of technology expertise among local financial institutions and a heavier reliance on foreign finance than in the context of conventional energy technologies.\textsuperscript{218}

2.5.5.3.2 Mobilisation of funds

While it is obvious that finances are needed in addressing energy issues, the mobilisation of such funds remain a huge challenge on the African continent. It is estimated that significant doses of local financing would be required in addressing African energy problems.\textsuperscript{219} The primary solution to this challenge lies in raising finances from a range of public sector resources such as national budgets, electrification/energy funds based on levies and surcharges and debt relief among others.\textsuperscript{220} Still on the domestic front, private commercial finance will need to be brought in for equity, loans, consumer credit and microfinance among others. With regards to domestic financial solutions, it is evident that unless consumers are willing to pay for operating costs, at the very least, energy access programmes are unlikely to be sustainable. Domestic energy end-users will therefore have to bear operating costs and cross subsidies or other forms of appropriate financing mechanisms/schemes, which will need to be developed to cater for poorer consumers.\textsuperscript{221}

Externally, significant donor sources such as traditional bilateral and multilateral agencies, new funds like infrastructure consortium among others and various schemes, for example, grants and concessional loans, further debt relief will need to be drawn upon to meet a significant part of the shortfall between current funding levels and anticipated investment requirements.\textsuperscript{222} The primary solution to this might be the World Bank’s sector syndication approach for electrification projects which can make a major contribution.\textsuperscript{223} Carbon finance has also tended to by-pass sub-Saharan Africa and current efforts

\textsuperscript{217} Shrimali “Instruments to Mitigate Financial Risk” 2–3.  
\textsuperscript{218} Broking “Political Risks in Sub-Saharan Africa” 9.  
\textsuperscript{219} Sy and Copley “Closing the Financing Gap” 4. See also Brew-Hammond 2010 Energy Policy 2296.  
\textsuperscript{220} Sy and Copley “Closing the Financing Gap” 4. See also Brew-Hammond 2010 Energy Policy 2296.  
\textsuperscript{221} Sy and Copley “Closing the Financing Gap” 4. See also Doukas and Ballesteros “Clean Energy Access in Developing Countries” 3.  
\textsuperscript{222} Sy and Copley “Closing the Financing Gap” 4. See also Doukas and Ballesteros “Clean Energy Access in Developing Countries” 3.  
\textsuperscript{223} Sy and Copley “Closing the Financing Gap” 4. See also Doukas and Ballesteros “Clean Energy Access in Developing Countries” 3.
including those led by UNEP and UNDP to assist African countries to gain better access to the Clean Development Mechanism (CDM) could help improve this situation.  

2.5.5.4 Challenge 4: Information, technical capacity and full range technology

2.5.5.4.1 Information and technical capacity

The availability of accurate and well-organised information and data is a major factor regarding RE access in Africa. Data on RE, particularly solar and wind as indicated above are very scanty. Compared to other energy sources, RE projects will often require additional information, which may not be readily available at any given moment, including historic weather-related data such as wind, sun radiation and precipitation. While such data can be easily obtained in developed countries there is a large gap in the availability of such data in Africa, particularly sub-Saharan region.

The poor technical skills on the continent further worsen the development of RE technologies on the generation of data on RE in the region. Inadequate domestic technical skills account for poor maintenance of imported systems and lack of provision of adequate after-sales service. As such, there is need for high and middle level technical manpower in business development, manufacturing, data collection and overall management. The public sector sometimes lacks adequate personnel to undertake effective monitoring and evaluation. Ensuring the secure sustainable commercial success of RE will depend on institutional and human capacities in the region and individual countries as well as business and market capabilities.

224 Sy and Copley “Closing the Financing Gap” 4. See also Doukas and Ballesteros “Clean Energy Access in Developing Countries” 3.
225 Kaggwa, Mutanga and Simelane “Factors determining the affordability of renewable energy” 2.
226 See paragraph 2.5.2.
227 The UNEP in collaboration with a number of partners, has developed the Solar and Wind Energy Resource Atlases (http://swera.unep.net), which improve access to, and understanding of, information relevant to solar and wind energy project development through high-resolution maps of solar and wind energy resources. However, South Africa, Egypt, Tunisia, Morocco and Algeria are exempted to that effect. See Kaggwa, Mutanga and Simelane “Factors determining the affordability of renewable energy” 2.
228 Kaggwa, Mutanga and Simelane “Factors determining the affordability of renewable energy” 2.
229 Kaggwa, Mutanga and Simelane “Factors determining the affordability of renewable energy” 2.
230 Kaggwa, Mutanga and Simelane “Factors determining the affordability of renewable energy” 2.
2.5.5.4.2 Full range technology

With the task to achieve up to 100 per cent modern energy access by 2030, a broad view of both energy resources and associated technologies (conventional and renewable energy) will need to be maintained. In the first instance with regards to cooking, Africa and specifically sub-Saharan Africa use inefficient cookstoves and the three stone firewood resulting to huge energy loss and indoor air pollution. The main reason behind such a situation is the availability of wood and the lack of grid connection in many areas, particularly rural areas. The primary solution to this challenge lies in establishing modern cookstoves geared towards the provision of modern energy services to the rural areas by means of efficient energy produced technologies.

With regards to envisaged modern cookstoves solutions, one must be mindful of the fact that, energy challenges and needs in rural areas differ from those in urban areas, so to should the solutions differ. In terms of traditional biomass fuel use through poor energy efficient technologies (tree stone fuel wood among others), the focus must fall on improved cookstoves using wood fuel and cleaner fuels (and associated technologies) from biogas to LPG. In the biomass area, developing sustainable supplies at community level is an attractive option, as it yields positive results both at the level of environmental protection and income generation. Another important technological solution would be to provide energy through biogas programmes which can be used for cooking. Ethanol gelfuel, might be another technological energy option for Africa. Ethanol gelfuel may make better inroads as far as rural applications are concerned, if it is deployed in tandem with income generation projects possibly including the production of bioethanol or bioethanol feedstocks in Southern Africa. A similar suggestion could be made regarding the promotion of plant oils for cooking and biodiesel/ bio-oil production.

While it is obvious that access to efficient energy technologies is important to address Africa’s energy challenge, electricity is probably the area where a broad view may be the
most difficult to maintain given that there are deep seated preferences for grid extension over decentralised options, and there are strong advocates for de-emphasising solar PV because of the many failed donor funded programmes across the region. The push for RE access systems at all costs has indeed been very strong and for some people energy for development equals alternative energy regardless of the fact that conventional energy resources and technologies often provide more financially and technically viable options in many situations. Indeed, oil-producing countries make up about a third of the total number of African countries such that the use of locally produced oil and natural gas constitute a key option in the bid to extend access to modern energy services for all. Energy efficiency also tends to be overlooked even though this usually presents some least cost options on both the supply and demand sides. Harmonised planning in increasing access to modern energy services in the region might therefore be necessary to level the playing field for upcoming least cost technologies the different situations.

2.5.5.5 Energy actors and institutions

To ensure that the targets for energy access are met over the next decades or more, Africa and sub-Saharan Africa in particular need to increase its number of actors in the energy access market. These actors could range from small to large stakeholders, rural to rural-urban, sub-regional to regional levels all geared towards promoting electricity generation and distribution. Stakeholders may include local companies (marketing of petroleum products), local entrepreneurs (providing electricity generation services in small quantity), local community based organisations (providing mechanical power in the MFP programme countries), larger municipalities (electricity generation and distribution). At the micro level, primary institutions such as Energy/Utilities Regulatory Commissions and Rural Electrification/Energy Agencies would be needed not only to ensure a level playing field but also to ensure effective oversight for policy

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238 Ahlborg et al 2015 Energy Policy 126. See also de Jongh, Ghoorah and Makina 2014 JESA 17.
239 Ahlborg et al 2015 Energy Policy 126. See also de Jongh, Ghoorah and Makina 2014 JESA 17.
Examples of such existing institutions include the Senegalese Rural Electrification Agency (ASER) and the Malian Rural Energy Agency (AMADER). They have already register positive results with regards to levelling the energy playing field between RE and conventional energy sources which can be emulated by other countries in sub-Saharan Africa.\textsuperscript{242}

The establishment of a separate agency for rural and urban electrification or one that deals with all rural and urban is important in that energy issues greatly differ within countries and regions.\textsuperscript{243} Notably, whichever institution is chosen, communities should participate in the design and execution of programmes to extend access to energy services. Nevertheless, it is important to note that the rural electrification agenda should not be left in the hands of officials pre-occupied with urban energy issues.\textsuperscript{244}

On a macro level, multi-sectoral committees involving government ministries from key sectors should be the channels for developing energy poverty reduction strategies and programmes.\textsuperscript{245} These committees should also serve as platforms for coordinating energy interventions with other infrastructural interventions and services and could help to, for instance, integrate rural electrification programmes into other rural development programmes as reported to have been the case in South Africa.\textsuperscript{246}

At the sub-regional level, power pools such as the Southern African Power Pool and the West African Power Pool are already playing an important role in advancing the energy access agenda with respect to power generation and transmission, and also trans-border electrification in the region. A gas pipeline regulatory authority and the proposed energy access agency for ECOWAS are also in the making. These regional institutions will need continued political support from the Forum of Energy Ministers of Africa members acting in cooperation with their respective RECs.\textsuperscript{247} In addressing the different challenges discussed, AU and the regional policy makers would need energy policies that enhance

\textsuperscript{241} Ahlborg \textit{et al} 2015 \textit{Energy Policy} 126. See also de Jongh, Ghoorah and Makina 2014 \textit{JESA} 17.
\textsuperscript{242} Ahlborg \textit{et al} 2015 \textit{Energy Policy} 126. See also de Jongh, Ghoorah and Makina 2014 \textit{JESA} 17.
\textsuperscript{243} See also de Jongh, Ghoorah and Makina 2014 \textit{JESA} 17.
\textsuperscript{244} Ahlborg \textit{et al} 2015 \textit{Energy Policy} 126.
\textsuperscript{245} Ahlborg \textit{et al} 2015 \textit{Energy Policy} 126.
\textsuperscript{246} Ahlborg \textit{et al} 2015 \textit{Energy Policy} 126.
\textsuperscript{247} Ahlborg \textit{et al} 2015 \textit{Energy Policy} 126.
the mobilisation of necessary energy funds, encouraging the introduction of RE sources and technology as well as involving a wide range of energy actors.\textsuperscript{248}

2.5.5.6 Developing innovative policies

To ensure that the poor benefit fully from greater access to energy, energy development policies and programmes should be developed at the regional, sub-regional and national levels.\textsuperscript{249} In developing a regional energy legal framework capable of promoting increased access to energy, AU policy makers need to be mindful of the international development agenda and the fact that there are no one-size-fits-all solutions for either a country or a sub-regional level.\textsuperscript{250} Such a framework would have to include a comprehensive set of benchmarks and indicators to measure progress in implementation.\textsuperscript{251} These policies can take the form of an energy law/bill that support distributed generation using both renewable and non-RE sources through de-licensing, technical standards and ballpark tariff recommendations, licensing regulations that differentiate between small and large-scale distributed generation and grid connected schemes.\textsuperscript{252} In addition, the removal of licensing barriers to encourage owners of small generators to invest in distributed generation systems in rural areas, the distribution of energy-efficient lighting as a demand side management measures especially in urban areas, smart subsidies drawn from rural electrification or other funds (for example community development funds) to reduce upfront costs of small and medium-sized diesel engines to support productive uses in rural areas. Furthermore, lifeline tariffs whereby the first 50 kWh of electricity is provided at a subsidised rate to benefit the poor could also be of great importance.\textsuperscript{253} Energy for Poverty Reduction Action Plans according to the World Bank are also important policy tools, to facilitate increased access to energy in Africa.\textsuperscript{254} Two such action plans have been develop for Cameroon and Ghana.\textsuperscript{255} Nonetheless, the development process of the Ghana Poverty Reduction Strategy took several years to complete and as such does not

\textsuperscript{248} Ahlborg \textit{et al} 2015 Energy Policy 126.

\textsuperscript{249} Vladimirov and Galev "Report on Governance Barriers" 13.

\textsuperscript{250} Vladimirov and Galev "Report on Governance Barriers" 13.

\textsuperscript{251} Vladimirov and Galev "Report on Governance Barriers" 13.

\textsuperscript{252} Abdullahi et al 2017 Earth and Environmental Science 2.

\textsuperscript{253} Abdullahi et al 2017 Earth and Environmental Science 2.

\textsuperscript{254} Abdullahi et al 2017 Earth and Environmental Science 2.

augur well for meeting both national and regional targets in the short term. National adaptation plans of action to tackle climate change, which are under consideration in many countries (for example Tanzania, Ghana amongst others) could also serve as a policy tool to confront energy access issues in relation to RE and sub-Saharan Africa’s ability to adapt to climate change at the global level.

In terms of the Abuja Treaty, RE energy sources are an important part of the diversified African energy mix. Article 55(1)(c) of the Abuja Treaty read with article 3 of the Convention of the African Energy Commission, 2006 (CAFREC) highlights the significance of regional and sub-regional cooperation in the field of energy. The interpretation of the provisions of the Abuja Treaty in particular points toward the inclusion of RE as a sustainable energy source which should mitigate environmental impacts, fosters economic growth and stimulates social well-being of current and future generations. RE sources as part of a diversified African energy mix geared towards mitigating energy poverty in Africa, will be discussed more detailed in chapter five.

The above discussion of energy poverty, RE and its related challenges served to underscore the important role increased RE access might play in mitigating energy poverty and its negative effects on the Africa continent. At the international level, the objective of increased RE access and energy in general strongly features as a basis for global efforts to promote universal access to modern energy by 2030. The IEA in its 2013 WEO however forecast that, without new policies and efforts, 800 million people in rural areas are likely to be unlit in 2030 and an additional 200 million will rely on solid fuel; about 1 billion people will still be without access to electricity and 2.5 billion people will lack access to clean cooking facilities in 2030. Challenges for increased RE access include full range of resources and technology, mobilising domestic financial resources, increasing actors and developing effective energy institutions, developing innovative

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256 Abdullahi et al 2017 Earth and Environmental Science 2.
258 See paragraph 5.5.
259 See paragraph 5.5.1.
260 See paragraph 5.5.3.
261 See chapter 5.
262 IEA WEO 2013 24. See also Kaggwa, Mutanga and Simelane “Factors determining the affordability of renewable energy” 2.
policies, cost, capital and competitiveness of RE, legal and regulatory, financial risks and information and technical capacity respectively. The challenges of increased RE access should form the basis of the AU energy access agenda and should be used as indicators for establishing policy geared towards promoting access to modern energy in Africa.

Africa faces major challenges to improve the performance of its energy services and this may negatively affect the overall development of the region. Challenges affecting increased RE access are different from those affecting increased energy access in general. Challenges for increased energy access include full range of resources and technology, mobilising domestic financial resources, increasing actors and developing effective energy institutions and developing innovative policies. These challenges and particularly those of RE should be seen as the point of departure for AU policy makers to propose solutions in the form of harmonisation of a regional legal energy framework geared towards promoting increased RE access addressing energy poverty and specifically the reliance on the traditional biomass use as an indicator of energy poverty.263

2.6 Conclusion

Energy poverty and the role of RE in mitigating their effects on the African continent form the centre of discussion of this chapter. It has been established that the African energy situation is characterised by a dependence on traditional biomass as the primary energy source coupled with the lack of access to energy. Increased access to RE will play an important role in mitigating the situation. The negative impact of reliance on traditional biomass has been highlighted by analysing the potential positive impacts thereof on increased access to modern energy sources, particularly RE. From the onset, it is deduced that increased access to modern energy is a prerequisite for the development of the African continent. Stated differently, in the absence of access to modern energy (RE amongst others), universal energy access cannot be achieved.

The fact that access to RE (among other modern energy sources) is a factor contributing to development and the overall well-being of the African people is evident from the access, input, outcomes and the MEPI approaches to measure energy poverty. The

263 See paragraph 2.2.1.2.2.
specific objectives of these approaches relate to the crucially important role of tracking progress towards universal access to modern energy. The conclusion is therefore reached that an approach (taking into account the access, input, outcomes and the MEPI approaches) to measure energy poverty could form an important part of an AU framework response to the challenge of energy poverty in Africa.264

Increased access to energy and particularly RE, as part of the AU’s response to energy poverty should take note of the challenges with respect to specific sub-regions of the continent. These challenges (RE and energy in general) include the cost, capital and competitiveness of RE legal and regulatory frameworks, financial risks, mobilisation of funds, information and technical capacity, full range technology, mobilisation financial resources, increase the rage of energy actors, developing effective institutions and the development of innovative policies. An AU policy should include supportive regulatory policies addressing the role of international assistance and cooperation as well as regional action in the form of harmonised regional law and policies. Such a policy should further define RE, modern energy and access to modern energy.

The need to increase the share of RE on the African continent as a primary measure to promote access to modern energy has been established. The projections, which indicate that access to modern energy is unlikely to be achieved in the face of energy poverty, should serve as an indication of the desperate need for increased access to RE sources in Africa. The same is true for the relationship between increased RE access and the achievement of the promotion of sustainable development as a mandate common to the AU and the RECs.265

In the next chapter, RE access as an indicator for sustainable development in contemporary international law will be examined.
CHAPTER 3

INTERNATIONAL LEGAL INSTRUMENTS AND INITIATIVES RELATED TO RE ACCESS

3.1 Introduction

In 2017, the energy supply sector experienced its largest annual increase in capacity ever, with significant growth in all regions.\(^1\) RE, particularly, wind and solar PV, had record additions accounting for about 77 per cent of new installations, and hydropower represented most of the remainder.\(^2\) The world now adds more RE power capacity annually than it adds (net) capacity from all fossil fuels combined.\(^3\) By the end of 2017, the RE capacity in place was enough to supply an estimated 23.7 per cent of global electricity.\(^4\) According to the former UN Secretary General Ban Ki-moon:

> Sustainable energy\(^5\) is the golden thread that connects economic growth, increased social equity and an environment that allows the world to thrive. Low-carbon growth can foster decent jobs, empower women, promote equality, provide access to sustainable energy, make cities more sustainable and enhance the health of both people and the planet.\(^6\)

Though not a cure-all solution, RE access is most often seen as an important measure to address energy poverty and promote sustainable development.\(^7\) In recent decades, the idea of energy access at international level is gaining ground, raising possible challenges to traditional sources of international law.\(^8\) Notwithstanding, the role of international law

\(^{3}\) REN21 2018 Global Status Report 17. See also REN21 2017 Global Status Report 30.
\(^{4}\) REN21 2018 Global Status Report 17. See also REN21 2017 Global Status Report 30.
\(^{5}\) See paragraph 1.1.3 for the definition of sustainable energy.
\(^{8}\) Bruce 2013 Melbourne Journal of International Law 10. See also Hirschl 2009 Energy Policy 4408-4409.
in promoting RE access is relevant in that increased access to and cooperation on RE is core at both regional (Africa for example) and sub-regional levels. The historical development of RE access within international law is relevant to the problem statement outlined in Chapter 1 above as RE is an energy source that promotes sustainable development, a goal of regional cooperation at the AU level. To that effect, Africa’s energy choices need to promote sustainable development.

The aim of this chapter is twofold. First, existing international law pertaining to increased RE access, both binding and non-binding, will be analysed, providing a basis for evaluating what is needed to achieve increased RE access. Second, challenges pertaining to increased RE access at the international level will be discussed.

This chapter commences with discussion of the concept of soft law, international law and the relationship between international law and sustainable development to provide a background to the chapter. This will be followed by the historical evolution of the development and promotion of increased RE access within relevant hard and soft international law instruments (in a chronological manner). The historical evolution is followed by a discussion on the challenges related to the international regulation of increased RE access, providing the conceptual basis for the proposal that a legal basis for its expansion needs to be identified. As such, the promotion of RE access within international energy law and initiatives, international climate change law and international sustainable development initiatives are discussed. First, the concept of soft law is discussed.

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9 Article 55(1)(a)–(c) of the Abuja Treaty, the AU’s energy mix should include new and RE, mineral and water resources, and nuclear energy, Article 101 of the EAC Treaty (member states must promote cost-effective methods of developing and transmitting electric power, the efficient exploration and exploitation of fossil fuels and the utilisation of new and RE sources), Article 8(1) and (2)(a)-(c) (member states must coordination and harmonisation policies on energy in ensuring the effective development of new and RE resources) among others. See 5 for regional and sub-regional RE expansion. See chapter 5.

10 See paragraph 5.2 above.
3.2 Soft law, international energy law and the relationship between international law and sustainable development

3.2.1 Soft law

The concept of soft law developed post–World War II (WWII) in an attempt to classify international instruments that lack the elements of international law. The definitions of soft law are generally based on the lack of a legal obligation to obey an instrument in that the instrument is not in treaty form or part of customary law. Soft law can take a variety of forms: governmental recommendations, guidelines, communications or notices, processes of international organisations (such as their codes of conduct, guidelines and recommendations), explanatory documents accompanying treaties or declarations of intergovernmental conferences and UN resolutions among others. Notably, soft law is not regulated either by customary law or the Statute of the International Court of Justice, which provides for traditional sources of international law. As such, there are no clear rules on the interpretation and application of soft law. Soft law norms, the content of which may be contested, play an important role in the development of hard law. It also plays an important role in the integration and influence at the intersection of international

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11 Soft law is an umbrella concept that includes a variety of ideas. There is no universally acceptable definition for soft law and it is generally used to refer to rules that are not inherently binding, not founded on a legal basis and not identified with any particular actors responsible for its adoption, but which may have practical and legal effects. For the purpose of this research, soft law refers to non-legally binding obligations or norms and includes principles, policies and conference resolutions adopted by non-state actors. Other forms of soft law include formal exchanges of premises through diplomatic correspondence, formal written non-treaty agreements (for example pacta de contrahendo, non-self-executing treaty provisions). See also Weiss “Conclusions: Understanding Compliance with Soft Law” 535, Bruce 2013 Melbourne Journal of International Law 11. Hirschl 2009 Energy Policy 4408-4409, Nlacker The use of soft law 2.


13 The binding nature of an instrument should not be confused with the precise nature of its content since soft law does not consist of technical specific rules that provide clear solutions to particular problems. Korkea-Aho 2009 Maastricht Journal of European and Comparative Law 275.


15 Article 38(1) of the Statute of the International Court of Justice provides the formal sources of international law. It provides: “the Court, whose function is to decide in accordance with international law such disputes as are submitted to it, shall apply (a) international conventions, whether general or particular, establishing rules expressly recognized by the contesting states (b) international custom, as evidence of a general practice accepted as law (c) the general principles of law recognized by civilized nations (d) subject to the provisions of Article 59, judicial decisions and the teachings of the most highly qualified publicists of the various nations, as subsidiary means for the determination of rules of law”. See also Weiss “Conclusions: Understanding Compliance with Soft Law” 536-537.

environmental and energy law. The growing importance of soft law, however, challenges the formal sources of international law as articulated in articles 38(1)(a)–(c) of the Statute of the International Court of Justice. The principle of state sovereignty, for example, is being weakened by states entering into economic and trade agreements that affect domestic choice and international regulation of activities, mandating compliance with consensual obligations. This represents a gradual but significant development towards responsible management of natural resources. Soft law is not without its critics. It is often seen as a product of states maximising their interest, a place-maker for justice or as a vehicle for the regulation of the international community, among others.

With regard to RE access, soft law is important in that many soft law instruments stimulate normative responses from states and non-state actors, assuming a regulatory role and justification for actions. To this end, soft law may be required to assist increased RE access, which may subsequently become the objectives of binding energy laws.

3.2.2 International energy law

Energy law regulates the allocation of rights and duties concerning the exploitation of energy resources. International energy law stems from three broad sources. First, the principles enumerated in traditional sources of international law such as treaties and

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17 Bruce 2013 Melbourne Journal of International Law 12.
18 The principle of state sovereignty over natural resources is a customary rule that was established during decolonisation and that recognises the state’s inalienable right to dispose of their natural wealth and resources in accordance with their national interests. Bruce 2013 Melbourne Journal of International Law 12.
19 Article 102 of the North American Free Trade Agreement restricts the sovereign enactment of energy laws that are inconsistent with freedom of trade in energy. This Treaty was opened for signature on 17 December 1992 and entered into force 1 January 1994 (‘NAFTA’). Other treaties regulating the management of natural resources include the International Convention on Oil Pollution Preparedness, Response and Cooperation, opened for signature on 30 November 1990 and entering into force 13 May 1995 and the Convention on Nuclear Safety, opened for signature 20 September 1994, and entering into force 24 October 1996.
21 Charlesworth “Law-Making and Sources” 198.
22 Wawryk “International energy law” 2. See also Kim “Internationalisation of energy law” 1–17; Park International Law for Energy and the Environment 3.
customary international law. The second source is derived from the global spread of national laws and regulatory principles relevant to energy law to create common principles of energy law applied across countries, though there is no treaty binding the parties to apply these principles. Lastly, the principles of soft law, such as treaties expressed in non-mandatory language and the non-binding UN resolutions (such as the MDGs and the newly adopted SDGs among others), directives, standards or model codes of international bodies, including intergovernmental organisations such as the International Atomic Energy Agency and initiatives that do not qualify as soft law. While such initiatives (SDGs, MDGs among others), guidelines and standards are not hard or legally binding law, their importance in regulating behaviour in the energy industries cannot be underestimated. To this end, Bradbrook defines international energy law as “a conglomeration of rules of custom, treaties, national and regional laws, and principles of intergovernmental, resolutions non-governmental international institutions which together regulate the various aspects of energy production, supply, consumption and trade”. These laws include the UNFCCC, the Energy Charter Treaty and UN resolutions, among others. Notably, these binding international laws reflect RE as an objective for achieving sustainable development. To this end it may therefore be necessary to discuss the relationship between international law and sustainable development.

3.2.3 Relationship between international law and sustainable development

The concept of sustainable development emerged as a collective goal of the world community and international law has been gradually aligning to it since the late 1980s.

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23 d’Aspremont Formalism and the sources of International Law 5. See also Haggenmacher “Sources of Scholastic Legacy” 10. See also Park International Law for Energy and the Environment 3.
24 See paragraph 3.2.
25 Wawryk “International energy law” 3.
26 South Africa for example constitutes states that take international law into account. That is When interpreting any legislation, every court must prefer any reasonable interpretation of the legislation that is consistent with international law over any alternative interpretation that is inconsistent with international law. Section 233 of the Constitution of the Republic of South Africa, 1996.
28 See paragraph 3.5.
The adoption of the SDGs through a UN member state led process with civil society participation provides an opportunity to further reinforce the legal status of the sustainable development concept. Established on 25 September 2015, the SDGs are to be implemented in a manner that is consistent with the rights and obligations of States under international law. The 2030 Agenda for Sustainable Development is informed by a number of international legal instruments. Instruments that are explicitly mentioned include the UN Charter, the Universal Declaration of Human Rights and the Rio Declaration on Environment and Development. The international agreements from which the SDG targets were derived in some instances can be identified from the wording of the targets. For example, target 15.7 for ending poaching and trafficking of protected species is traceable to the objective of the Convention on International Trade in Endangered Species of Wild Fauna and Flora. However, not all existing international commitments have made it into the 2030 Agenda. The SDGs and targets are intended to stimulate action in areas of critical importance for humanity and the planet, hence they focus on and address priority areas. For example, no goal or target for addressing stratospheric ozone depletion was adopted, despite the Ozone Secretariat’s effort to embed ozone protection in the 2030 Agenda. This may be because the Montreal Protocol has successfully phased out the use of ozone-depleting substances and ozone depletion is no longer considered an issue that requires urgent attention. The SDGs and targets may best be conceptualised as a subset of existing intergovernmental agreements.

31 The Future We Want UNGA Resolution A/RES/66/288 para 10–12.
32 Charter of the United Nations (San Francisco June 1945 and came into force October 1945).
34 Rio Declaration UN Doc. A/CONF.151/26/Rev.
35 Compendium of Existing Goals and Targets under the 19 Focus Areas being considered by the Open Working Group at http://www.stakeholderforum.org.
37 The 2030 Agenda preamble.
38 The Future We Want para 247.
39 Embedding Ozone Protection in the Sustainable Development Agenda; Note by the Secretary UN Doc UNEP/OZL.Pro.Wg.1/33/INF/4 2013.
commitments. To understand the evolution of sustainable development, it is first necessary to give an exposition of the historical background with specific reference to RE.

International hard and soft law related to RE access have evolved over time and will be discussed under the historical evolution of the promotion of RE access within the following themes: Energy law, climate change law and sustainable development law. These different themes relate to the different subject matter or field of law with regards to the promotion of increased access to RE.

3.3 Historical evolution of sustainable development

Access to RE as measure of promoting sustainable development and access to energy within contemporary international law has evolved over time. RE access is grounded in both hard and soft international law and correlates with existing commitments expressed in various international agreements, resolutions and other soft law instruments. This section puts the development of access to RE into different periods or eras, exploring initiatives with the view to outline the reasons for their limited success and providing a base for evaluating what is needed to achieve increased RE access. The different periods are chronologically discussed by addressing the following sub-headings: sustainable development, MDGs, energy for sustainable development, sustainable energy for all and the SDGs. These different sub-headings are classified under relate themes pertaining to specific subject matter (energy law, climate change aw and sustainable development law). The theme of energy law will now be discussed beginning with the United Nations Conference on New and Renewable Sources of Energy will now be are discussed.

Pavoni and Piselli 2016 Veredas do Direito Belo Horizonte 1-60. See also Bruce 2013 Melbourne Journal of International Law 14.
See paragraphs 3.4.2 to 3.4.11 above.
3.3.1 Energy law 1981-2015

3.3.1.1 United Nations Conference on New and Renewable Sources of Energy, 1981

In 1981 RE was directly addressed for the first time as an energy source that promotes sustainable development through the intergovernmental policy of the UN (United Nations Conference on New and Renewable Sources of Energy).\(^45\) Among other things, the Conference underscored the importance of developing new and RE sources of energy to contribute to meeting the requirements for continued economic and social development and called for a shift from the present international economy based primarily on fossil fuel to one based on new and RE sources of energy.\(^46\) Though states were urged to change their energy mix, it ultimately remains a matter of sovereign choice.\(^47\) The Conference recommended that an intergovernmental body be established to implement and monitor the action on new and renewable sources of energy. In response, the UN General Assembly established the Committee on the Development and Utilisation of New and Renewable Sources of Energy.\(^48\) Nonetheless, the task of RE assessment and planning, research and development, transfer, adaptation and application of mature technologies, information exchange, education and training as set out in the programme of action, was never realised. Noting its failure, the Committee at its sixth session stated that ten years had essentially been lost following its establishment since there had been no political resolve to develop and increase RE access as an alternative to the hydrocarbons powering all the major economies at that time.\(^49\)

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Provision of institutions dealing with RE specifically as a gap that should be considered when one aims to increase access to RE at international, regional, sub-regional or national levels.

See paragraph 3.4.8 above.

After the United Nations Conference of New and Renewable Sources of Energy, 1981, RE expansion and access to express features in sustainable development initiatives such as the Brundtland Commission, the UNFCCC and its Kyoto Protocol, Johannesburg Plan of Implementation and subsequently the SDGs.

The Energy Charter Treaty and the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects were signed in December 1994 and entered into force in April 1998. To date the Treaty has been signed or acceded to by 83 European, Asian and African states as well as the European Communities. The Treaty was developed on the basis of the European Energy Charter of 1991, but whereas the latter document was drawn up as a declaration of political intent to promote East-West energy cooperation, the Energy Charter Treaty is a legally binding multilateral instrument, the only one of its kind dealing specifically with inter-governmental cooperation in the energy sector. African country member states include Kenya in 2015, Burkina Faso in 2017, Nigeria in 2017, Rwanda in 2016, Senegal in 2016 and Swaziland in 2016. See IISD “Expansion of the Energy Charter to Africa” 5.
specifically address RE. Founded on the non-binding post-Cold War *European Energy Charter* (EC), the ECT provides a legal and institutional framework to integrate and improve the efficient operation of energy markets in Europe.\(^5\) As such, it may be characterised as a watershed sectoral energy and energy security instrument, establishing a significant number of legal rights and obligations. These rights and obligations include improved development and the use of RE sources,\(^6\) developing an open and competitive market for energy products,\(^7\) alleviating market distortions and barriers in the energy sector,\(^8\) facilitating the transit of energy materials and products,\(^9\) promoting access to and transfer of energy technology,\(^10\) having state sovereignty and sovereign rights over energy resources, promoting access to energy resources, exploration and development among others.\(^11\)

The obligation with regard to RE access can implicitly be inferred from two articles, namely Articles 1(5) and 19(d) of the ECT. Article 1(5) provides for economic activity in the energy sector that relates to the production aspects of the energy cycle among others. Activities illustrative of production include the construction and operation of power generation facilities, particularly those powered by RE sources. Consequently, RE is considered a type of energy investment implied in the ECT in general. Article 19 urges state parties to develop and increase access to RE while reaffirming states’ sovereignty and sovereign rights over energy resources. This section is stated among the other environmental aspects regulated by the ECT. According to Wälde,\(^12\) the ECT tries to be politically correct with environmental issues, yet carefully avoids any legally binding environmental obligation.\(^13\) RE access as referred to in Article 19(1)(d) requires parties

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\(^{5}\) ECT Preamble para 5, article 2. It provides: Wishing to implement the basic concept of the European Energy Charter initiative, which is to catalyse economic growth by means of measures to liberalise investment and trade in energy. This Treaty establishes a legal framework to promote long-term cooperation in the energy field, based on complementarities and mutual benefits in accordance with the objectives and principles of the Charter respectively. The ECT has 53 Eurasian members in addition to observer states from around the world.

\(^{6}\) Article 19 ECT.

\(^{7}\) Article 3 ECT.

\(^{8}\) Article 6 ECT.

\(^{9}\) Article 7 ECT.

\(^{10}\) Article 8 ECT.

\(^{11}\) Article 18-19 ECT.


to regard the development and use of RE sources while promoting cleaner fuels. Notwithstanding, this phrase is weak and does not indicate a mandatory obligation to develop, use, promote or implement RE law or policy domestically within an environmental framework.

Though it is claimed that the ECT and its PEEREA mark the beginning of international law with regard to energy efficiency, the same cannot be said for RE. In 2001, the ECT Secretariat established a Legal Advisory Task Force to assist in drafting balanced and legally coherent model agreements, commencing with cross-border energy projects. This led to the development of an intergovernmental agreement and a heads of government agreement for states and investors to voluntarily use in negotiations. These agreements have as its objective to facilitate the efficient realisation of prospective cross-border electricity systems by addressing complex technical and regulatory aspects of energy transmission. In its 2005 publication titled *Integration of Energy Efficiency and RE Policies*, the ECT Secretariat expressly acknowledges the absence of RE in the PEEREA, but asserts that the link between RE and energy efficiency is obvious. To this effect, state parties have a wide range of energy efficiency and RE policies (the two concepts are integrated under the banner sustainable energy). Furthermore, the ECT Secretariat report provides an analysis of climate and energy science and barriers to RE uptake as well as promote domestic policy options for contracting parties. Notwithstanding, the

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64 This goal is reiterated, politically, in the context of promoting energy efficiency and energy supply diversity to minimise environmental harm.
70 ECT Secretariat *Integration of Energy Efficiency and Renewable Energy Policies* 2005. In Western Europe, the EU-15 plus Norway and Switzerland, in particular, have developed robust policies and programmes for renewable energy, especially since the early 1990s. Climate change strategies have led governments to reconsider the role RE can play in the overall fuel mix. Within the EU all of the member states are obliged to have indicative targets for renewables and to develop their policies and institutional/legislative framework accordingly. In the other PEEREA countries in Central and Eastern Europe and the CIS, RE has not been a high policy priority so far.
report does not indicate “RE measures” (a gap that needs to be addressed) that would be used in advancing such issues.

While the ECT urges broad legal obligations relating to RE and environmental protection, no meaningful legal content and specific policy recommendations are provided. It is a pro-investment treaty that favours traditional production and utilisation of non-renewable energies. Furthermore, the ECT’s energy obligations appear to be of minimal relevance in facilitating RE expansion.

3.3.1.3 Ad hoc initiatives 2004–2015

The ad hoc initiatives resulting from the UN’s soft law can be seen from the number of International RE Conferences (IRECs) held from 2004 to 2015. At the International Conference for RE in Bonn (renewables2004), states agreed on the urgent need to increase the share of RE in the total energy mix.\textsuperscript{71} Renewables2004 also advocated for the development of domestic RE policy by raising awareness and facilitating the global exchange of policy and technology experience.\textsuperscript{72} Similar intentions are encapsulated in declarations made at the 2005 (Beijing), 2008 (Washington), 2010 (Delhi), 2013 (Abu Dhabi) and 2015 (South Africa) conferences. Though attendance at some of these conferences was affected by the global financial crisis, their intentions have resulted in hundreds of voluntary pledges for action on RE.\textsuperscript{73} At the Beijing International RE Conference of 2005 (BIREC), participating states backed up the UN Secretary General’s Advisory Group on Energy and Climate Change (AGECC), which endorsed the goal of realising universal access to modern energy services by 2030 and supported the General Assembly’s resolution to designate 2012 as the International Year of Energy Access.\textsuperscript{74} At the Abu Dhabi Conference in 2013 (ADIREC), 160 ministers welcomed the UN Secretary

\textsuperscript{71} The International Conference for Renewable Energy in Bonn, Germany took place from the 1-4 June 2004, with over 3000 participants and 154 countries represented. See Olesen 2004 http://www.inforse.org. See also Citelli, Marco and Belykh 2014 Groningen Journal of International Law 6.

\textsuperscript{72} Citelli, Marco and Belykh 2014 Groningen Journal of International Law 6. See also Roehrkasten Global Governance on Renewable Energy 118-126.

\textsuperscript{73} Citelli, Marco and Belykh 2014 Groningen Journal of International Law 6. See also Roehrkasten Global Governance on Renewable Energy 118-126.

\textsuperscript{74} DIREC Declaration paras 6 and 7. Citelli, Marco and Belykh 2014 Groningen Journal of International Law 6. See also Roehrkasten Global Governance on Renewable Energy 118-126.
General’s SE4ALL initiative\textsuperscript{75} and noted that they will continue to pursue its combined goals of providing access to modern energy services for all, doubling the share of RE and doubling energy efficiency by 2030.\textsuperscript{76} They also support the unanimous declaration of the Decade of SE4ALL, underscoring the need for increased use of RE sources.\textsuperscript{77} Far from developing any binding obligations concerning RE use, technology and quantified targets, participating states attempted to build bridges with the KP by initially pointing at the CDM as an important tool to generate public funds for RE development.\textsuperscript{78} At the South African International RE Conference of 2015 (SAIREC),\textsuperscript{79} states agreed to scale up renewables deployment and access in order to achieve a global energy transition. Following the adoption of the Agenda 2030, the SAIREC supported the SDGs – increasing the share of RE in the global energy mix. In order to achieve increased access to RE, SAIREC put forward the following proposals. These proposals of the SAIREC include promoting transparent and effective procurement processes of RE, advancing RE globally, promoting skills transfer and development, securing financial resources, conducting research and development, prioritising regulatory frameworks, integrated planning, regionalising trade and energy resource development, conducting programmes for infrastructural development in Africa, embarking on clean energy corridor initiatives and focusing on the African RE Initiative (AREI), as well as regional and international cooperation.

The continued emphasis on RE development from the above conference declarations is an example of state practice that appear to be consistent with increased RE development. However, it is less apparent whether they also evince a belief to increased access to that

\textsuperscript{75} See paragraph 3.4.9 above.
\textsuperscript{78} Paragraph 9 of the Beijing Declaration. See also Bruce 2013 Melbourne Journal of International Law 26.
\textsuperscript{79} Hosted by the South African Department of Energy in collaboration with the South African National Energy Development Institute (SANEDI) and supported by the Renewable Energy Policy Network for the 21st century (REN21); SAIREC 2015 is the first of these high-level conferences to take place on African soil, precisely South Africa. Delegates who attended the Conference include cabinet ministers, government delegations, representatives from the private sector, non-governmental organisations, academia, business, industry and international organisations and took place from the 4\textsuperscript{th} to the 7\textsuperscript{th} October 2015 in Cape Town, South Africa.
can support the formation of a new international customary obligation. Nonetheless, RE normative influence is considerable and demonstrative of the direction of SDGs – specifically increase share of RE.

The Charter of the United Nations, 1945, initially did not place any obligation with regard to access to energy. The importance of energy could be inferred from a broad and general perspective under Articles 1, 55 and 66 of the Charter respectively. Accordingly the UN established over 40 programmes, providing about US$16 billion in funding, with US$4 billion specifically allocated to RE. In 2004, the UN also established UN-Energy. Being the first attempt within the UN to take a broader view on energy issues, UN-Energy aims to ensure coherence within the UN system and provides a multidisciplinary response in the field of energy, including RE.

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80 Citelli, Marco and Belykh 2014 Groningen Journal of International Law 6. See also Bruce 2013 Melbourne Journal of International Law 26
81 Citelli, Marco and Belykh 2014 Groningen Journal of International Law 6. See paragraph 3.5 below.
83 Articles 1 of the Charter of the United Nations, 1945. The Charter has as objective to “maintain international peace and security, and to that end: to take effective collective measures for the prevention and removal of threats to the peace, and for the suppression of acts of aggression or other breaches of the peace, and to bring about by peaceful means, and in conformity with the principles of justice and international law, adjustment or settlement of international disputes or situations which might lead to a breach of the peace. 55 (the United Nations shall promote: (a) higher standards of living, full employment, and conditions of economic and social progress and development, (b) solutions of international economic, social, health, and related problems; and international cultural and educational cooperation and (c) universal respect for, and observance of, human rights and fundamental freedoms for all without distinction as to race, sex, language, or religion. Article 66 provides, the Economic and Social Council shall perform such functions as fall within its competence in connexion with the carrying out of the recommendations of the General Assembly. It may, with the approval of the General Assembly, perform services at the request of members of the United Nations and at the request of specialized agencies and it shall perform such other functions as are specified elsewhere in the present Charter or as may be assigned to it by the General Assembly”.
84 UN energy-related programmes include the Food and Agriculture Organization (FAO), Global Environment Facility (GEF), International Atomic Energy Agency (IAEA), United Nations Development Programme (UNDP), United Nations Energy Africa (UNEA), United Nations Environment Programme (UNEP) among others.
85 Lafontaine et al “Delivering on energy” 2.
86 UN-Energy was established in response to the World Summit on Sustainable Development (WSSD) in Johannesburg to support the transition to sustainable energy. It is formed as a non-hierarchical network mechanism aiming at connecting actors within the UN with each other as well as connecting UN agencies with key external stakeholders. In the same year, UN-energy Africa (UNEA) was established as a sub programme focusing specifically on the African context.
87 Lafontaine et al “Delivering on energy” 4. UN-Energy is a lean body with a Secretariat provided by the Department of Economic and Social Affairs (DESA) with few staff members. It possesses limited independent financial resources and depends largely on contributions from its 21 UN member agencies in response to the WSSD, and support countries in their transition to sustainable energy
As a coordinating body, UN-Energy has limited formal power and influence, but it also has the advantage of being better at adapting to changes due to its small organisation and limited bureaucracy. According to a UN-initiated review of UN-Energy, there is still a wide range of views among its members on what is important, as well as which interventions and activities are appropriate to meet the global RE expansion. Gupta and Ivanova state that, “the mandate on energy issues are spread among many UN agencies and that no clear message is sent to the global community on global energy policy”. UN-Energy also does not provide for intergovernmental RE cooperation, a role fulfilled by the IRENA. Though the UN General Assembly can only make recommendations, it can also provide significant guidelines on issues. While most of its instruments and decisions are not legally binding, their influence on promoting RE development spurred RE into the SDGs. While the measures to increase access to RE are commendable, no provision for binding targets and measures to achieve them were provided for. It is therefore necessary to discuss the international climate change regime in order to find out if the above mention limitations to increase RE access are addressed.

3.3.2 International climate change regime 1992–2015

The biggest failure in international diplomacy relating to energy policy is perhaps exemplified by the absence of any commitment to the promotion of RE within the global climate change regime. In this section, the current climate change regime is examined while arguing that the constitutive convention, regulatory protocol and subsequent international negotiations represent a missed opportunity for putting in place global binding targets for SDGs, specifically the increased share of RE in the energy mix.

89 See paragraph 3.4.8 above.
90 Article 10 Charter of the United Nations. The Charter of the United Nations was signed on 26 June 1945, in San Francisco, at the conclusion of the United Nations Conference on International Organisation, and came into force on 24 October 1945. Article 10 provides “the General Assembly may discuss any questions or any matters within the scope of the present Charter or relating to the powers and functions of any organs provided for in the present Charter, and, except as provided in Article 12, may make recommendations to the members of the United Nations or to the Security Council or to both on any such questions or matters”.
91 Bruce 2013 Melbourne Journal of International Law 17.
92 See paragraph 3.3.2.1.
93 See paragraph 3.3.2.2.
94 See paragraphs 3.3.2.2.
3.3.2.1 The United Nations Framework Convention on Climate Change, 1992 (UNFCCC)

Climate change has been termed the defining human developmental challenge of the 21st century. Climate change refers to a change in the state of the climate that can be identified by changes in the mean or the variability of its properties and that persists for an extended period, typically decades or longer. That includes any change in climate over time, whether due to natural variability or as a result of human activities. In terms of the Fifth Report of the Inter-governmental Panel on Climate Change anthropogenic GHGs) emissions (for example, the energy sector, transport and industry, among others) are the dominant causes of observed warming since the mid-20th century. Noting the contribution of human activities in causing climate change, countries highlighted the need for urgent action. In 1992, states adopted the UNFCCC which entered into force in March 1994. It is interesting to note that although the UNFCCC is considered to be of historical significance as the first global convention that recognises the need to reduce GHG emissions, this Convention marked an international acknowledgment that energy production and consumption from fossil fuels, among other things, are sources of climate change and part of the solution for adaptation and mitigation. Nonetheless, the UNFCCC’s regulatory role of minimising damage to the climate and natural processes seems to be limited.

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96 IPCC 2014 Synthesis Report www.ipcc.ch. In terms of the UN A/RES/43/53, climate change is acknowledged as a common concern of mankind, highlighting the need for global protection of the climate for present and future generation.
100 UN A/RES/43/53. Protection of the Global Climate for Present and Future Generations of Mankind. In 1988, the UNGA acknowledged that climate change is a common concern of mankind precipitating the adoption of the UNFCCC, in 1992.
101 In terms of the 2007 IPCC Report, adaptation refers to an adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which demonstrate harm or exploit beneficial opportunities.
102 Mitigation according to the IPCC refers to an anthropogenic intervention to reduce the sources or enhance the sinks of GHGs. It also refers to an intervention to reduce GHG concentrations or move carbon out of the atmosphere, which can range from investment in clean energies, forest conservation among others.
According to Bodansky, this text was agreed upon during UNFCCC negotiations because oil-producing states oppose the regulation of sources of emission and the United States of America (USA) strongly resisted emissions timetables and targets that could potentially impact domestic fossil fuel use. State parties’ (which are classified in Annex I and II) obligations under the UNFCCC are few and even fewer with regard to energy. The primary obligation of states under the UNFCCC is to establish an inventory of GHG emissions and to develop national or regional measures to mitigate climate change. The UNFCCC expressly provides for the sustainable development (the overall objective of the SDGs) by noting that the establishment of mitigation measures must be guided by the intergenerational equity principle, the precautionary principle and sustainable development based on the common but differentiated responsibilities of states. In this regard the UNFCCC states that parties have a right to, and should, promote sustainable development, focusing on policies and measures that will protect the climate system against human-induced change. In the final instance, the role the UNFCCC played in furthering the sustainable development agenda is evident considering the impact the principles would later have on the Johannesburg Plan of Implementation.

3.3.2.2 Kyoto Protocol to the Paris Agreement of the UNFCCC

From the outset, it must be stated that the Kyoto Protocol (KP) was never intended to produce new ideas related to climate change. The main aim of the KP was to propose methods to achieve the objectives put forward by the UNFCCC, putting in place legally

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104 Annex I States refer to developed countries and Annex II refers to developing countries. See Article 4 UNFCCC.
105 The UNFCCC Preamble recognises energy as important to the economic growth for developing countries and article 8(h) requires special consideration for states with specific needs, including fossil fuel exporting countries.
106 Article 4(1) (a)–(b) of the UNFCCC. See also Bruce 2013 *Melbourne Journal of International Law* 18.
107 Article 3(1) to (4) of the UNFCCC.
108 Article 3(4) of the UNFCCC. The UNFCCC further elaborates on the SDGs by allowing state parties the freedom to choose domestic measures to reduce and stabilise GHG emissions levels in order to prevent dangerous anthropogenic climate change. However, articles 3(4) and (2) may be interpreted to include RE technologies – target 7.2 of the SDGs. See paragraph 4.2 below.
109 See paragraph 3.4.7 for Johannesburg Plan of Implementation.
binding quantified emission targets for Annex B parties. Regarded as one of the early instruments that promote joint action among states in the RE sector, the KP may be regarded as the fruit of a large consensus on the seriousness and legitimacy of pressing climate change concerns and the inevitability of undertaking binding commitments to reduce GHG emissions. In order to curb GHG emissions, Annex I parties are mandated to reduce overall emissions below the 1990 levels in the first commitment period (2008 to 2012). The KP expressly provides for the establishment of a joint implementation (JI) system: a flexible mechanism where Annex I parties may transfer or acquire emission reduction units among themselves resulting from the projects aimed at reducing anthropogenic emissions by sources or enhancing anthropogenic removals by sinks of GHGs in any sector (including energy) of the economy. The provisions for the Clean Development Mechanism (CDM), which aimed to assist developing countries in achieving sustainable development and in contributing to the ultimate objective of the Convention, as well as assisting developed countries to respect their commitments under Article 3 of the Convention, is of importance to RE development. Provision is also made for emission trading schemes where extra carbon credits resulting from the implementation of the JI and the CDM projects can be sold, actually creating a new carbon market.

However, the KP does not require the adoption of RE technologies as a mandatory method for cutting GHG emissions. RE access is rather referred to in Article 2(1)(a), a non-exhaustive list of eight non-binding policy options that suggest that state parties research, develop, promote and increase the use of new and renewable forms of

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111 Annex I parties include industrialised OECD countries as of 1992 and states with economies in transition (Russia, the Baltic states, several Central and Eastern European countries). Non-annex I Parties refer to developing and least developed contracting parties.
112 Article 6 KP. Flexibility mechanisms were inserted in the KP to facilitate compliance with this provision and to enhance cooperation among all the UNFCCC Contracting Parties.
113 The CDM is one of the flexible mechanisms defined in the KP that provides for emission reduction projects that generate certified emission reduction units that are treatable in the trading emission scheme. Article 12 of the KP.
114 Article 17 KP.
115 Article 2(1)(a) of the KP.
energy. Nevertheless, the Protocol does not exclude investments in RE development and access either, but rather encourages them through its flexibility mechanisms designed to supplement the efforts undertaken by Annex I state parties in achieving their national targets of emission reduction, particularly the CDM. In practice, projects established as a result of the KP flexibility mechanisms, particularly the CDMs, have reduced about 45 million tonnes of carbon dioxide equivalent using these clean technologies.

The next stage in the global climate change regime was the conception of the Copenhagen Accord. This Accord pledged to keep the temperature below two degrees Celsius and to cut down GHG emissions. Regardless of creating mitigation actions and pledged targets, no RE targets were provided for. The same situation continue with the Cancun Agreement where no targets were set for RE. Notwithstanding the emission gap, state parties agreed to establish a new global platform with legal force to enhance ambition and action on GHG emissions reductions, namely the Ad hoc Working Group on the Durban Platform for Enhanced Action (ADP) in 2011. The ADP provided food for thought with its repeated emphasis on the need for sustainable development. It is worth noting that the Durban Platform for Enhanced Action views social and economic development and poverty eradication as both an objective and an essential requirement for sustainable development, thereby linking the SDG initiative with the sustainable development agenda.

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116 Article 2(1) (a) (iv) of the KP.
120 Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010, FCCC/CP/2010/7/Add.1.
121 Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010, FCCC/CP/2010/7/Add.1.
123 Paragraph 31 of the ADP.
refers expressly to the direct link between the protection of the environment (through low-emission/climate-friendly technologies and development strategies) as central for the promotion of sustainable development. The same situation continues with the eighteenth and the nineteenth Conference of Parties, held at Doha and Warsaw respectively, where the decisions of the conferences reinforce sustainable development as the link between the promotion of sustainable development and appropriate national CDM mitigation actions. These actions may be interpreted to include development and access to RE.

In line with the above, the Paris Agreement reaffirmed climate change concerns raised at Doha and Warsaw and added to the issue of global reduction of GHG emissions. The Agreement provides for a long-term term temperature goal (below two degree Celsius) for achieving global sustainable development and fostering cooperation to mitigate and adapt measures between the developed and developing countries. This must be done based on common but differentiated responsibilities of states and their respective capabilities in light of their different national circumstances. In addition, the Paris Agreement clearly acknowledges the role of RE access in achieving universal access to modern energy in developing countries, particularly in Africa, through the enhanced deployment of RE. Articles 4 and 5 of the Paris Agreement call on states to develop and increase access to RE as part of their nationally determined contributions. Another important theme repeated in the Paris Agreement is the need for recognising the importance of poverty alleviation (which would later become one of the SDGs) as part of the Paris Agreement’s integrated approach to address climate change.

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124 Paragraph 135(d) of the ADP.
125 Report of the Conference of the Parties on its eighteenth session, held in Doha from 26 November to 8 December 2012, FCCC/CP/2012/8/Add.1 and Report of the Conference of the Parties on its nineteenth session, held in Warsaw from 11 to 23 November 2013, FCCC/CP/2013/10/Add.2/Rev.1 respectively.
126 Paragraph 31(b) and 51(k) FCCC/CP/2012/8/Add.1 and Preamble FCCC/CP/2013/10/Add.2/Rev.1.
127 RE development is classified a mitigation measure in terms of article 4(2)(a) of the UNFCCC.
129 Articles 6(1) (2) and 7(6) (7) of the Paris Agreement.
130 Article 4(3) of the Paris Agreement.
131 Preamble of the Paris Agreement.
132 Articles 2(1), 4(1) and 6(8) of the Paris Agreement.
development and access to RE as provided for by the Paris Agreement not only called for, but also served as impetus for the SDGs.\textsuperscript{133}

While the international legal climate change regime regulates climate change, which is dominantly caused by human activities (especially energy, among others) it does not instruct any of its member states on what they have to do with regard to RE generation, access and consumption. This situation would likely be better if preventative actions to avert catastrophic climate change and the gap of RE development and access are closed by putting in place RE targets within the climate change regime. Ferrey\textsuperscript{134} is of the opinion that the RE development and access has largely been ignored both by the UNFCCC and its KP. While the UNFCCC and its KP promote sustainable development, there is no specific mandate for RE.\textsuperscript{135} The inclusion of binding obligations under Articles 4(1)(b)(c) and 4(2)(a) of the UNFCCC, Article 2(1)(a)(iv) of KP\textsuperscript{136} and Articles 4 and 6 of the Paris Agreement (clearly identifying RE access as part of the national determined contributions) would increase access to RE and possibly reduce global GHG emissions.\textsuperscript{137} Without modification, the existing regime commitment to energy generation issues is likely to prove inadequate to effectively address climate change.\textsuperscript{138}

The international energy initiatives of the 1990s (UNFCCC, KP and the ECT) made no clear provisions for increased access to RE. According to Kaime and Glicksman, the 1990s may be characterised as a lost decade, as international law and policy concerning modern energy failed to make headway in acknowledging the role played by RE on increased access to energy, energy poverty and the mitigation of climate change.

The period of sustainable development that followed the World Commission on Environment and Development, also known as the Brundtland Commission Report offered

\textsuperscript{133} See paragraph 4.3 below.
\textsuperscript{134} Ferrey “The Failure of International Global Warming Regulation” 67-126.
\textsuperscript{135} Articles 2, 3(4) (5) and art 2(1) (a) of the UNFCC and the KP respectively. See also Ferrey “The Failure of International Global Warming Regulation” 67; Bruce 2013 Melbourne Journal of International Law 21.
\textsuperscript{136} See paragraphs 3.4.4.1 and 3.4.4.2 above respectively.
\textsuperscript{137} Ferrey “The Failure of International Global Warming Regulation” 68. See also Bruce 2013 Melbourne Journal of International Law 22.
\textsuperscript{138} Ferrey “The Failure of International Global Warming Regulation” 68. See also Bruce 2013 Melbourne Journal of International Law 22.
better guidance to RE development as an alternative energy source to fossil fuel.\textsuperscript{139} The Report underscored the importance of development that meets the needs of present generations without compromising the ability of future generations to meet their needs.\textsuperscript{140}

3.3.3 Sustainable development 1986–2015

RE has always been an agenda item at global environmental conferences.\textsuperscript{141} However, issues such as the dissemination of its related technologies and the relationship between RE and the principle of sustainable development or the creation of international rules binding states were never fully explored on those occasions.\textsuperscript{142} In 1986 the Brundtland Commission’s landmark report, \textit{Our Common Future},\textsuperscript{143} recommended that states should place energy at the forefront of national policies.\textsuperscript{144} Acknowledging the importance of energy in development, the Commission urged states to put in place policies that would ensure a movement from a period in which energy has been used unsustainably to a period where they will be used in a sustainable or modern manner. The Commission also made recommendations addressing the importance of transitioning from fossil fuels to RE sources through national energy programmes. The Commission called upon states to deploy funding that would assist in realising the necessary research, development, demonstration projects, institutional and technical capacity in achieving RE access.\textsuperscript{145} States had to take proactive measures to encourage energy efficiency gains across all sectors, from household to industry, and to do so using devices that would ensure the long-term sustainability of such measures, including incentives, among others.\textsuperscript{146} Notably, the development of policies and programmes as a measure to effect RE access and other

\begin{footnotesize}
\begin{enumerate}
\item Lyster and Bradbrook Energy Law and the Environment 66.
\item \textit{Our Common Future} chapter 1 13–15.
\item Our Common Future chapter 7.
\item Our Common Future Chapter 6.
\end{enumerate}
\end{footnotesize}
measures to promote sustainable development would later become a core measure for effecting SDGs. The Report, however, did not address the issue of universal access to modern energy as a driver for sustainable development.

The Brundtland Commission’s Report informed the United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro, Brazil, in 1992. During the preparatory meetings for the summit, energy (increased investment in RE among others) was placed at the centre of the discussion. RE was not included in the final document, Agenda 21. RE as a topic was excluded as a result of resistance from oil-producing states such as Canada, Sweden and Norway, among others. Notwithstanding, Agenda 21 embraced only timidly the straightforward objective of RE access. That is, among the principles shaping the Rio Declaration, only a few are of relevance to the RE sector. The principles relevant to RE are principle 2, which combines the sovereign right to natural resources with the prohibition of transboundary harm. Principle 16 (polluter pay principle), principle 17 (on environmental impact assessments (EIA)) and principle 10 (on access to justice and information in environmental matters) are of special relevance. Energy is referred to in Agenda 21 in

147 The development of policies and programmes as a measure of effecting modern energy among others goals would later be repeated in the SDGs. For example, paragraphs 21, 34 40 as well as goal 1c and 5c, among others.
150 The principal objective of the Rio Declaration, 1992, was to establish a new and equitable global partnership through the creation of new levels of cooperation among states, key sectors of societies and peoples, and to develop international agreements that would respect the interest of all and protect the integrity of the global environmental and development systems. See Lyster Energy Law and the Environment 66.
151 State arguments were based on the fact that changes in energy patterns are likely to pose great threats to their economic prospects. Kaime and Glicksman 2015 Fordham International Law Journal 1412. See also Lyster Energy Law and the Environment 66.
153 Principle 2 of the Rio Declaration give states the sovereign right to exploit their resources while bearing in mind their obligation to not allow domestic activities to cause transboundary damage to the environment. See Kaime and Glicksman 2015 Fordham International Law Journal 1412.
154 Principle 16 of the Rio Declaration. It provides that national authorities should endeavour to promote the internalisation of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment. Kaime and Glicksman 2015 Fordham International Law Journal 1412.
155 These principles are directly linked to RE development and access in that the development and access to RE has a direct effect on the environment. The application of the polluters pay-principle for example
the chapters on human settlement (where energy produced and used are said to be unsustainable), protection of the atmosphere and promotion of agriculture and rural development. In this regard, governments are urged to develop economically and environmentally sound energy sources, including RE systems, reviewing current energy supply mixes to determine how new and RE systems could be increased, and promoting the use energy efficient technologies. The role the Rio Declaration would play in the establishment of the SDGs was evident considering the reaffirmation of its principles (which would later become shared principles of the SDGs) as part of the SDG approach to development. In addition, the Rio Declaration states that its ultimate goal is cooperation focused on the fostering of international agreements that protect the environment.

Although a range of non-binding resolutions called for an energy revolution to move from fossil fuel-based energy sources to energy produced from RE sources by 1994, the UN stimulated the idea by calling for national "RE targets" as a means to advance energy for sustainable development in 1997. While there is no international consensus with regard to its legal status, sustainable development as a concept has influenced the evolution of energy policy. Firstly, the Brundtland Commission elaborates on the development of RE by noting that the processes implemented to promote its achievement must be based on the establishment of RE policies, programmes and above all funding for research, projects and institutions to that effect. Another important theme repeated would entail taking all necessary steps to avoid biodiversity loss or disruption of the biodiversity ecosystem within or across national borders when installing a solar panel in a specific area. Notably, this biodiversity loss can be addressed by conducting an EIA prior to the solar panel installation or making use of environmental information and data for the said area.

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156 Chapter 7.1–7.80 Agenda 21.
157 Chapter 9.1–9.35 Agenda 21.
159 Chapter 9.12 a–d Agenda 21.
160 Chapter 9.12 (f) Agenda 21.
161 Chapter 9.12 (c) 12.1 Agenda 21.
162 Paragraphs 11–12 Agenda 2030.
163 Preamble Agenda 21.
164 The lack of RE targets are important gaps that should be addressed when aimed increasing access to RE.
166 Sands "International Law in the Field of Sustainable Development" 303–338.
167 Paragraph 74 of the Brundtland Report.
throughout the Report is the need for recognising the importance of the long-term sustainability of such measures as part of the Commission’s approach to development.\footnote{Paragraph 85 of the Brundtland Report.} In the final instance, the role of the Brundtland Commission and its Report played in furthering RE agenda\footnote{Paragraphs 73–88 of the Brundtland Report. Summarily, the Brundtland called for increase development and access to RE sources in a sustainable manner.} (which would become one of the SDGs) is evident, considering the impact the proposals put forward would later have on the \textit{Johannesburg Plan of Implementation} and subsequently the SDGs.\footnote{See paragraph 3.4.7 and 3.4.10 for discussion of the \textit{Johannesburg Plan of Implementation} and the SDGs respectively.} Though the Brundtland Commission created grounds for RE expansion, an opportunity was lost to create binding international laws and policies with RE targets referred to as a “significant RE gap”. Notably, Agenda 21 was formulated six years after the Brundtland Commission did not provide for RE development – rather energy was inferred from the chapters on human settlement, protection of the atmosphere, and promotion of agriculture and rural development.\footnote{See Chapter 7, 9 and 14 Agenda 21.} The global change era is another important phase with regard to RE access as a measure to promote sustainable development. Fourteen years after the Brundtland Report was adopted, the UN adopted yet another declaration, the Millennium Declaration, 2000, which provided yet another missed opportunity to further the normative development and increased access to RE.

After the Brundtland Commission of 1986,\footnote{See paragraph 3.3.3.} the initiatives of the 1990s (UNFCCC, KP, ECT and the Rio Declaration)\footnote{See paragraphs 3.3.2.} made no clear provisions for RE development. According to Kaime and Glicksman,\footnote{Kaime and Glicksman 2015 \textit{Fordham International Law Journal} 1405-1444.} the 1990s may be characterised as a lost decade, as international law and policy concerning modern energy failed to make headway in acknowledging the role played by RE on increased access to energy, energy poverty and the mitigation of climate change. Fourteen years after the Brundtland Report the UN adopted another declaration, the \textit{Millennium Declaration}, 2000.
3.3.3.1 Millennium Development Goals (MDG), 2000

The MDGs, another form of soft law,\textsuperscript{175} represent another disappointing era with regard to increasing the share of RE in the global energy mix. Adopted by the UN General Assembly Millennium Declaration 2000,\textsuperscript{176} the MDGs set out challenges facing humanity, outlined a response to these challenges and established measures of evaluating performance based on a set of inter-related commitments, goals and targets. The MDGs included that extreme poverty and hunger should be dramatically reduced, universal primary education should be achieved, gender equality and empowering women should be promoted, child mortality be combated, maternal health improved, combating HIV/AIDS, malaria and other diseases combatted, environmental sustainability ensured and global partnerships for developed.\textsuperscript{177} These goals, especially (reducing poverty: SDGs goal 1; reducing hunger: SDGs goal 2; gender equality; and empowering women: SDGs goal 5 among others) which will not only be called for but also serve as a fulfilment of the SDGs. Another important theme repeated throughout the MDG is the need for recognising the importance of sustainable development (which would later form the base for the SDGs) as the approach to development.\textsuperscript{178}

Notably, the MDGs made no provision for access to energy and do not refer to RE access.\textsuperscript{179} The absence of an energy provision in the MDGs quickly ushered in a new recognition of the critical role of modern energy (RE among others).\textsuperscript{180} The *World Energy Assessment: Energy and the Challenges of Sustainability*,\textsuperscript{181} a document prepared by the United Nations Development Programme, the United Nations Department of Economics and Social Affairs and the World Energy Council, brought to the fore the strong

\textsuperscript{175} See paragraph 3.2.1 above for the different forms of soft law. See also paragraph 4.4 below for a discussion of the SDGs being advancement to the MDGs.
\textsuperscript{176} UNGA Resolution 55/2 8 September 2000. World leaders from 189 countries, including 147 heads of state and government, gathered at the UN General Assembly and adopted the Millennium Declaration in the year 2000.
\textsuperscript{177} UNGA Resolution 55/2 8 September 2000.
\textsuperscript{178} Paragraphs 6, 20 and 22 of the MDGs.
\textsuperscript{179} Bradbrook “The Development of Renewable Energy Technology” 112. See also Lyster *Energy Law and the Environment* 68.
\textsuperscript{180} Bradbrook “The Development of Renewable Energy Technology” 112. See also Lyster *Energy Law and the Environment* 68. See also 2.4.3, RE as a modern energy source.
relationship between energy and poverty, calling on international action to provide universal energy for all.\textsuperscript{182} The role of energy in achieving all the MDGs was further elaborated on by the UNDP’s \textit{World Energy Assessment 2004 Update},\textsuperscript{183} stating that none of the MDGs can be achieved without greater access to improved modern energy services. Annex 1 of this update contains a detailed matrix of energy and the MDGs, indicating the role energy plays in the achievement of each MDG and highlighting the link between the promotion of access to energy and sustainable development.\textsuperscript{184} The role of energy in promoting sustainable development as provided for by the \textit{UNDP’s World Energy Assessment 2004 Update}, not only calls for but serves as a drive for the \textit{World Summit on Sustainable development} and the \textit{Johannesburg Plan of Implementation}.

3.3.3.2 Energy for Sustainable Development, 2002

Energy and climate change were addressed for the first time at the \textit{2002 World Summit on Sustainable Development} (WSSD).\textsuperscript{185} Prior to the WSSD, the Water, Energy, Health, Agriculture and Biodiversity Working Group (WEHAB-WG) published \textit{A Framework for Action on Energy}.\textsuperscript{186} The Framework sets out ambitious strategies for sustainable development, principally through Agenda 21.\textsuperscript{187} The framework identifies major challenges for sustainable energy development including RE access, access to modern energy, energy efficiency and the advancement of fossil fuel technologies.\textsuperscript{188} RE technologies and access were identified as suitable options for rural energy access and environmentally sound alternatives to grid extension.\textsuperscript{189} With regard to increasing access to energy in the rural areas, RE technologies are said to be promising with technology

\footnotesize{\textsuperscript{182} In terms of the Background Paper by the UNEP on the MDGs, access to energy services is an essential prerequisite to the achievement of all the stated goals and RE is an essential element of the provision of access to energy services.  
\textsuperscript{183} UNDP, United Nations Department of Economic and Social Affairs and World Energy Council \textit{World Energy Assessment 2004 Update}.  
\textsuperscript{184} UNDP, United Nations Department of Economic and Social Affairs and World Energy Council \textit{World Energy Assessment 2004 Update}.  
\textsuperscript{185} Lyster Energy Law and the Environment 70.  
\textsuperscript{186} During the process that led to the WSSD, energy was identified as one of the areas requiring further efforts in order to fully implement Agenda 21. To this effect, a Water, Energy, Health, Agriculture and Biodiversity Working Group (WEHAB) was established that later published the \textit{A Framework for Action on Energy}.  
\textsuperscript{187} Lyster \textit{Energy Law and the Environment} 70. See also paragraph 3.4.3 above.  
\textsuperscript{188} Lyster Energy Law and the Environment 70.  
\textsuperscript{189} Lyster Energy Law and the Environment 70.}
transfer between developed and developing countries. Urged by the WEHAB-WG Framework for Action on Energy, about 118 countries implemented domestic RE laws and policies at varying levels.\(^{190}\) This idea was acknowledged by the Group of Eight RE Task Force,\(^{191}\) stating, “by expanding RE technologies in industrialised countries, the cost of RE will be reduced and that with supportive policy measures, market incentives and promotion activities energy needs can be met”.

Of most significant importance to international RE law and policy is the non-binding Johannesburg Plan of Implementation (Johannesburg Plan).\(^{192}\) Though possibly lacking specificity, it provides clear goals for RE, calling on states to:

(c) Develop and disseminate alternative energy technologies with the aim of giving a greater share of the energy mix to renewable energies ....

(e) With a sense of urgency, substantially increase the global share of RE sources with the objective of increasing its contribution to total energy supply.\(^{193}\)

The substantially increased RE access as provided for by the Johannesburg Plan would later become one of the SDGs.\(^{194}\) The Johannesburg Plan concentrates on renewables as cross-cutting issues (for poverty eradication and in the context of the needed changes to the patterns of energy consumption and production).\(^{195}\) The decisions made at the WSSD
are ascribable to the pre-eminence accorded to developmental issues over the environmental ones, as well as to the endorsement of the MDGs.\textsuperscript{196} It is also noteworthy that the \textit{Johannesburg Plan} repeatedly place emphasis on the need for poverty eradication, identifying it both as an objective and an important element for sustainable development, creating a link between poverty eradication and sustainable development agenda,\textsuperscript{197} a link clearly provided by the SDGs. At the 9\textsuperscript{th} Session of the Commission on Sustainable Development (CSD), the floor for international cooperation in the energy sector was set, stating:

\begin{quote}
Energy is central for achieving the goals of sustainable development,\textsuperscript{198} energy resources are plentiful and environmentally sound technological options exist and should be made available by developed countries to developing countries\textsuperscript{199} pursuant to the common but differentiated responsibilities principle (CBDRs).\textsuperscript{200}
\end{quote}

However, increased development, utilisation and dissemination of RE technologies are major challenges for both developed and developing countries.\textsuperscript{201} During its 14\textsuperscript{th} and 15\textsuperscript{th} sessions, the CSD increased its influence over international energy law, particularly by encouraging the use of RE to mitigate climate change.\textsuperscript{202} Of utmost importance was its call for time-bound targets for RE,\textsuperscript{203} which was unsuccessful due to disagreements over the proposed text. This notwithstanding, the global approach to RE development

\begin{small}
\textsuperscript{196} See paragraph 3.3.3.1 above.
\textsuperscript{197} Paragraph 12 of the \textit{Johannesburg Plan}.
\textsuperscript{198} Decision 9/1 paragraph 1 of 9th session of CSD "Energy for sustainable development".
\textsuperscript{199} Decision 9/1 paragraph 3 of 9th session of CSD.
\textsuperscript{200} Decision 9/1 paragraph 5 and 7 9th session of CSD.
\textsuperscript{201} Decision 9/1 paragraph 16, 9th session of CSD. Amongst recommended actions, the 9th session of the CSD proposed the promotion of renewable natural resources (solar, wind, biomass, geothermal, hydro and ocean) to partially meet energy needs for sustainable development, paragraph 17(e), the development and use of indigenous sources of renewable energy, paragraph 17(g) and the development and implementation of measures to make renewable energy technologies more affordable, paragraph 17(h).
\textsuperscript{202} Report on the 14\textsuperscript{th} session of the CSD, UN Doc E/2006/29. See also Bruce 2013 \textit{Melbourne Journal of International Law} 16.
\textsuperscript{203} Report on the 15\textsuperscript{th} session of the CSD, UN Doc E/2007/29 and E/CN.17/2007/15. While a number of countries stressed the need to substantially increase the global share of RE sources with the objective of increasing its contribution to total energy supply, they also wanted to go beyond simply recognising the role of national and voluntary regional targets and initiatives, and to establish time-bound targets in that regard. The mention of time-bound targets proved to be one of the areas in which agreement could not be reached.
\end{small}
can be said to have improved since the *World Solar Programme* of 1996 to 2005\(^{204}\) and the UN Secretary General, UN General Assembly\(^{205}\) and UN Economic and Social Council\(^{206}\) continue to urge for an increased share of RE in the global energy mix.\(^{207}\) With RE being mentioned 12 times in the *Johannesburg Plan* it remains the most extensive soft law instrument supporting RE development, implementation and technology transfer.\(^{208}\) However, these initiatives gained further impetus with the UN *Sustainable Energy for All* initiative.

3.3.3.3 Sustainable Energy for All (SE4ALL), 2012

The 2012 Rio+20 UN Summit lacked political commitments in the field of RE.\(^{209}\) The SE4ALL initiative called on states to support the implementation of national, sub-national policies and strategies, based on individual national circumstances and development aspirations, using an appropriate energy mix to meet developmental needs.\(^{210}\) In order to achieve this, states agreed to cooperate and increase the use of RE sources and other low-emission technologies, coupled with more efficient use of energy, greater reliance on advanced energy technologies (including cleaner fossil fuel technologies) and the

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\(^{205}\) In 2001, the United Nations Development Programme, for example, recommends RE as a technology option to equitably balance economic development without prejudicing options and quality of resources and environment for future generations. See Bruce 2013 *Melbourne Journal of International Law* 14. See also UNDP *Human Development Report 2011* 1-105.

\(^{206}\) The Economic and Social Councils Commission on Sustainable Development Report clearly states "while sustainable development was originally developed in relation to environmental concerns, energy policy is likely to be central in achieving its goals". See Economic and Social Council, Commission on Sustainable Development Report on the Ninth Session, UN ESCOR, 9th session, UN Doc E/2001/29.

\(^{207}\) Promotion of New and Renewable Sources of Energy: Report of the Secretary General, UN GAOR, 64th session, Agenda Item 55(i), UN Doc A/64/277 (UNSG Report 2009).

\(^{208}\) Bruce 2013 *Melbourne Journal of International Law* 16.

\(^{209}\) The Rio+20 UN Summit was held in Rio de Janeiro, Brazil on 20-22 June 2012 and it focus on green economy in the context of poverty eradication and on the enhancement of the international governance for sustainable development. See also Citelli, Barassi and Belykh 2014 *Groningen Journal of International Law* 4.

sustainable use of traditional energy resources. More importantly, the SE4ALL further states:

We recognise the critical role that energy plays in the development process, as access to sustainable modern energy services contributes to poverty eradication, saves lives, improves health and helps provide for basic human needs. We stress that these services are essential to social inclusion and gender equality, and that energy is also a key input to production. We commit to facilitate support for access to these services by 1.4 billion people worldwide who are currently without them. We recognise that access to these services is critical for achieving sustainable development. Although this contribution is deemed important, the sovereign right of states to choose the energy mix they deem more appropriate to meet their developmental needs was left untouched: where RE and cleaner fossil fuel technologies were most often regarded as equal options for sustainable development. The role SE4ALL played in furthering the SDGs is evident considering the impact the proposals put forward would later have on the SDGs. The proposals of the SE4ALL included doubling the share of RE in the global energy mix, increasing access to modern energy in order to ensure universal access, eradicate poverty, improve health and well-being, improve production, gender equality as well as the overall achievement of sustainable development. This proposal, especially the last, not only called for but also served as an impetus for the SDGs. It is also interesting to note that the SE4ALL initiative clearly indicates a link between access to modern energy and the eradication of poverty, improved health, provision of basic human needs and that gender equality increases production. It underscores the principle of integration in achieving sustainable development, a principle that would later become significant in the formulation of the SDGs.

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214 Preamble of the SDGs. The interlinkages and integrated nature of the SDGs are of crucial importance in ensuring that the purpose of the new Agenda is realised. If we realise our ambitions across the full extent of the Agenda, the lives of all will be profoundly improved and our world will be transformed for the better. See also paragraphs 63 and 72 SDGs.
From above discussion, it is clear that increased RE access finds its origins and progressive development within related international RE hard law, soft law and other international initiatives. Related RE hard and soft laws promote increased access to RE either directly or indirectly. To increase access to RE, cooperation, development of RE programmes, promotion of research, transfer of information and technology, education and training programmes, integrated planning as well as the establishment of laws and policies are imperative.

However, the regulation of energy resources which are mostly domestic (RE among others), is likely to pose a number of challenges to increased RE access at both international regional levels as a result of the principle of state sovereignty and energy security. In the next section, state sovereignty and energy security are discussed as possible challenges for increased RE access at both international and regional levels.

### 3.4 Challenges for increased RE access at the global level

International energy law is likely to face several challenges if it is to regulate increased access to RE at the international level. State sovereignty over natural resources and energy security policies inhibit the political will required to agree and implement international regulation.\(^\text{215}\) The discussion begins by considering permanent sovereignty.

#### 3.4.1 Permanent sovereignty

The principle of state sovereignty is an international law principle that provides states with jurisdiction to regulate the conduct and consequences of activities within their national territory - energy among others.\(^\text{216}\) Having a sole right over natural resources, the internationalisation of RE deployment (essentially a domestic matter) is likely to create tension between sovereign rights and principles of international law such as the no harm rule.\(^\text{217}\) At the international level, states regularly enter into binding international arrangements regarding matters that normally within their domestic jurisdiction.

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\(^\text{215}\) Bruce 2013 *MJIL* 6.
\(^\text{216}\) Crawford 2000 *EJIL* 621–636.
\(^\text{217}\) The no-harm rule is a widely recognised principle of customary international law where a State is duty-bound to prevent, reduce and control the risk of environmental harm to other states.
Practically, such voluntary actions restrict state conduct without diminishing its actual legal sovereignty. If RE obligations were to be established at an international level, states would be obliged under substantive international law to achieve them or else risk being held internationally responsible, but would nonetheless retain jurisdiction over domestic energy activities, including related policy and technology choices.

Another concern could be the growing number of voluntarily multilateral environmental agreements as a result of collective efforts to resolve the transboundary impacts of domestic activities. This being at the core of international environmental law, it is gradually weakening states’ sovereign veil by mandating compliance with consensual obligations. For example, states have accepted economic and trade agreements that affect domestic choice and the regulation of activities related to fossil fuel and nuclear energy, for example, the *International Convention on Oil Pollution Preparedness, Response and Cooperation* (ICOPRC) and nuclear power (*Convention on Nuclear Safety*) respectively. This represents a gradual but significant advance towards responsible natural resource management.

On the other hand, the principle of state sovereignty over natural resources is most oftentimes seen as a customary rule that recognises states’ inalienable right to dispose of their natural wealth and resources in accordance with their national interests. This principle brought international law into the domain of domestic energy activities and challenges

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218 Crawford 2000 *EJIL* 621-636.
220 Handl “Transboundary Impacts” 531-548.
221 Kelsen Principles of International Law 100.
223 Permanent Sovereignty over Natural Resources, GA Res 1803 (XVII), UN Doc A/5217 (14 December 1962). Though not an internationally recognised view, the opinion of the principle of state sovereignty over natural resources being an a customary international has been supported by a number of tribunals. For example, the tribunal in the *Libyan American Oil Co. ("LIAMCO") v Libya* opined that, “the said Resolutions, if not a unanimous source of law, are evidence of the recent dominant trend of international opinion concerning the sovereign right of States over natural resources.” (*Libyan Am. Oil Co. (LIAMCO) v. Gov't of Libyan Arab Republic*, 53 (1981). Similarly, this position has been accepted by the ICJ in the case of Congo v Uganda, where the court explicitly recognised the principle of state sovereignty over natural resources as “a principle of customary international law” (*Democratic Republic of Congo v. Uganda*, 2005 ICJ 361, 56 (Dec. 19).
the legal relationship between international conservation efforts, resource ownership and domestic exploitation of natural resources for economic gain. Sovereignty over natural resources is balanced by, among other things, principles of international environmental law, specifically the customary international law obligation not to cause significant transboundary harm to other states. Whether the consequences of fossil fuel energy generation activities (high levels of GHG emissions and depletion of finite natural resources) fall within the scope of environmental harm sufficient to trigger international responsibility is still to be decided. If so, it could provide an incentive to adopt low-carbon alternatives. However, the principle is insufficiently developed to benefit RE. In contrast, it is uncontroversial that contemporary international law requires permanent sovereignty over natural resources to be exercised responsibly. Just as sovereignty may require cooperation for the global good, it can be used as an argument to delay international energy regulation that can advance RE initiatives. Energy security similar to state sovereignty may challenge the global regulation of RE.

3.4.2 Energy security for future demand

There is no single universally acceptable definition for energy security as the concept entails countless energy matters that are regulated under international law. Globally, energy security first became an issue during the 1973 oil shock, leading to the formation of the International Energy Agency, which established oil-based energy supply security obligations for its members. According to Bradbrook, energy supply security involves three main issues. They include (a) reducing reliance on imported oil, (b) price stability, and (c) supply reliability. These elements are negatively affected by import dependency, natural disasters and political instability in oil-exporting states. These risks

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224 Trail Smelter Case (United States of America v Canada) (Awards) (1938/1941).
226 Energy security can be broadly understood as robustness against sudden disruptions of energy supply. Redgwell “International Energy Security” 22. See paragraph 2.3.4 above.
have advanced the quest for diversification of fossil fuel investments. While mitigating energy supply security, RE access can also limit GHG emissions. In 2011, almost half of the added global power capacity was from RE, constituting 257 billion US dollars investments and a 74 per cent increase in global photovoltaic capacity. Furthermore, in 2012 the US dependence on foreign oil was 15 per cent less than in 2006, a consequence of a deliberate government strategy that included the expansion of RE among its measures. At the international level, RE benefits were recognised in 2005 at the 31st Summit of the Group of Eight (G8) where the IEA was called upon to broaden its mandate to include alternative energy scenarios and strategies. Since then, the G8 has repeatedly emphasised the need for global energy security cooperation, diversification of the energy mix, substitution of fossil fuels and the reduction of GHG emissions. The IEA has also urged for large-scale RE investment among its members.

Increased global energy supply security through increased RE access (among other modern energy sources) requires international cooperation and considerable financial investment. The question remains whether current international law is sufficient to achieve these goals. This question is addressed below.

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232 Bradbrook “The Development of Renewable Energy Technologies and Energy Efficiency Measures through Public International Law” 109. See also REN21 2012 Global Status Report at www.ren21.net/Portals/0/documents/Resources/GSR2012_low%20res_FINAL.pdf. This remarkable increase is from a historically very low baseline for photovoltaic capacity, but indicates the potential of RE as a clean technology.


234 The Group of Eight (currently known as Group of Seven) is a governmental political forum. It was originally formed by six leading industrial countries and subsequently extended with two additional members – one of which, Russia, has been suspended. Since 2014 in effect it comprises seven nations and the European Union.


3.5 Possible ways forward

The primary ways forward for current international law with regard to doubling the share of RE include an international energy convention, an energy protocol to the \textit{UNFCCC} and a new protocol to the \textit{ECT}.

Firstly, international conventions are the predominant form of international regulation. Currently, there is no single internationally binding treaty regulating modern energy or that which govern the energy sector as a whole. Given the urgent need for worldwide cooperation on energy and the environment to address the negative impacts of climate change, a legally binding agreement may be of great importance. Though negotiating treaties are difficult and challenging, it is suggested that the \textit{Paris Agreement} with clear RE targets is likely one of the most effective means of reducing emissions below two degree Celsius, the climate change threshold. This can be done by means of a conference decision as an annex to the \textit{Paris Agreement}. In this case, an international convention with binding RE targets that address issues of climate change, equity, finance and technology transfer in a practical and progressive manner would come into existence without the difficulty of negotiating a new international agreement. Existing guidelines that might inform the RE targets within the \textit{Paris Agreement} include the \textit{Energy Charter Treaty} \footnote{The \textit{International Energy Charter} was adopted as an update of the \textit{European Energy Charter} of 1991. Notably, the International Energy Charter is not legally binding. It has as objective to promote cooperation in the production, distribution and use of energy in a sustainable manner (Title I objective). See paragraph 3.3.4.} and \textit{Directive 2009/28/EC}.\footnote{Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the Promotion of the Use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives 2001/77/EC and 2003/30/EC [2009] OJ L 140/16. See paragraph 3.3.4.}

Secondly, an energy protocol to the \textit{UNFCCC} is another possible option for promoting RE at an international level.\footnote{Article 17 UNFCCC provides for the adoption of protocols to the Convention. See also Werksman and Herbertson 2010 \textit{Maryland Journal of International Law} 109-142.} As a result of the significant GHG emission reduction offered by RE,\footnote{See paragraph 3.1.} an energy protocol might be a possible evolution for the climate change regime. Such a protocol might not be compulsory for member states to join. An energy protocol could be of great significance since the Ad Hoc Working Group on the Durban Platform
Draft 2015 Outcomes does not provide for RE. The express purpose of the ADP was to develop a protocol, another legal instrument or an agreed outcome with legal force under the UNFCCC applicable to all parties by the end of 2015. With RE not expressly provided for in the draft 2015 ADP outcome, it would likely be excluded in the final document. Adopting an energy protocol with a clear mandate on RE could be of great importance, but perhaps not definite to RE expansion or cutting down GHG emissions.

Thirdly, an energy protocol to the ECT. Currently, the EC Secretariat is undergoing a process of review and modernisation. Among other goals, the modernisation process aimed at opening membership to all states regardless of the geographical scope and making it a global energy cooperation instrument. Committed to investigating investment in RE technology transfer (EC Secretariat), a reform of the ECTs general provisions may also be required. With the PEEREA and a modified energy protocol, the ECT could be elevated to become the first global instrument dedicated to all energy activities. Though currently underdeveloped, the future of international law on RE should take a far more active, dynamic and influential role in promoting the SDGs, specifically increased RE access and share in the global energy mix. However, the question of how AU policy makers would develop a legally binding base on which RE access should be promoted, still remains.

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242 The Ad hoc Working Group on the Durban Platform for Enhanced Action (ADP) is a subsidiary body that was established by decision 1/CP 17 2011. The mandate of the ADP is to develop a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all parties, which was to be completed in 2015 in order for it to be adopted at the twenty-first session of the Conference of the Parties (COP) and for it to come into effect and be implemented from 2020.


245 See paragraph 3.4.4 above.


248 Bruce 2013 MJIL 33. See also Lyster and Bradbrook Energy Law and the Environment 198.

249 Bruce 2013 MJIL 33. See also Lyster and Bradbrook Energy Law and the Environment 198.
3.6 Conclusion

This chapter analysed the current international law and initiatives related to sustainable development and how they reflect RE access as an objective. Global RE development and access to is primarily promoted through soft law instruments and as such not legally binding. International soft law instruments and continued ministerial support at international conferences have greatly advanced global RE development, particularly since the WSSD. This means that RE development and access occupies an important position in international law, a fact that is underscored by the normative developments and brought about by the evolution of relevant international law.\textsuperscript{250} The historical evolution prior to the SDGs do little to address the challenges related to RE implementation.\textsuperscript{251} The lack of specific RE provisions, targets, measures of achieving increased RE access and specific policies regulating RE leads to the conclusion that a novel model for promoting increased RE access is needed. This paradigm could take the form of finding a legal basis for its implementation.\textsuperscript{252} Possibly ways to increase RE access addressing the challenge of state sovereignty over natural resources and energy security at both international and regional levels include, the insertion of RE targets in the Paris Agreement, an energy protocol to the UNFCCC or an energy protocol to the ECT.

However, the explicit provision for and RE targets put in place by the SDGs form the conceptual basis for analysing the normative value of the SDGs in order to determine if it can act as a basis for establishing an internationally recognised legal energy framework that could guide global efforts in promoting increased RE access. The normative value of the SDGs forms the centre of discussion of the next chapter.

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\textsuperscript{250} See paragraph 3.4.
\textsuperscript{251} See paragraph 3.4.11.
\textsuperscript{252} See Chapter 4.
CHAPTER 4

THE ROLE OF AGENDA 2030 AND THE SDGs IN INFORMING A PROPOSED AU LEGAL ENERGY FRAMEWORK ON INCREASED RE ACCESS

4.1 Introduction

The main aim of this chapter will be to indicate how international soft law could inform a proposed modern AU legal energy framework. In doing so, the focus will be on Agenda 2030 and the IRENA legal framework on increased RE access. First, Agenda 2030 will be analysed, discussing its normative value. The arguments of certain scholars on this topic will be discussed. Once the perceived legal status of Agenda 2030 has been established, the MDGs will be analysed to indicate how they have been developed upon by the SDGs. This is followed by an analysis of the central role of RE access (among other modern energy sources) in achieving other SDGs, underscoring the role increased RE access would play in addressing energy poverty as well as the promotion of the achievement of sustainable development.

The international RE legal framework will be analysed referring to specific measures covered by the current international RE legal framework – that is IRENA RE mechanisms on increased RE access and international RE best practices. This chapter will put forward certain recommendations as to how the SDGs and their targets combined with IRENA mechanisms may be used to inform a modern AU legal energy framework regulating increased RE access.

4.2 Examining the international legal status of Agenda 2030

Representing a transformational development plan, determining the legal status of Agenda 2030 on the development of energy frameworks is of utmost importance. Adopted by the UNGA, authors have different views on the legal status of Agenda 2030.

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1 See paragraph 3.3.5.
2 See paragraph 3.4.
To this end, it is important to determine whether Agenda 2030 qualifies as a soft law that may influence the development of energy frameworks that regulate increased RE access (among other modern energy sources).³

In examining the legal status of Agenda 2030, which contains the SDGs, authors’ views range from specific SDGs and their targets as having a soft law normative value and the Agenda 2030 as a whole having such value that can influence the establishment of relevant legal frameworks at the international, regional and national levels. Beginning with specific SDGs having a soft law value, Lode et al in analysing the link between the SDG and air quality in international law consider the SDGs as having a soft law value⁴ in that air quality in international environmental agreements seems to be a patchwork.⁵ Put differently, air quality in environmental agreements is primarily regulated at the regional level. He argues that the universal nature of SDGs (as it makes provision of air quality) may elevate the issue to the international level and serve as a catalyst for a future international legally binding framework on air pollution.⁶

The SDGs, goal six in particular, can add “substantive flesh to the otherwise abstract skeleton of general international water law and subsequently be elevated from a purely political commitment to legally relevant obligations when they can be so ‘attached’ to the norms of international water law”.⁷ In supporting this view, Spijkers identifies three ways in which SDG six can influence the development of international water law. That is SDG six can be used to motivate states to “interpret and apply the foundational principles of international water law in a sustainable manner, encourage the further development of

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³ See paragraph 3.2.1.
⁴ Lode, Schonberger and Toussaint 2016 RECIEL 35.
⁵ Examples of patchwork agreements include the Agreement on Transboundary Haze Pollution (ASEAN Haze Agreement). ASEAN is signed by member states of the Association of Southeast Asian Nations. The agreement is a binding treaty under international law with the objective to prevent and monitor haze from forest fires by obliging states to cooperate, exchange information, facilitate research, and monitor and prevent fires at the national level. The Convention on Long-Range Transboundary Air Pollution, 1979 (CLRTAP) is another air pollution patchwork treaty. It has been ratified by 76 parties, 51 mostly member states of the European Union, and other European states, but also including Canada, the United States and a number of republics of the former Soviet Union. The Convention aims at reducing, preventing and controlling transboundary air pollution from new and existing sources, among others. See Lode, Schonberger and Toussaint 2016 RECIEL 33–35.
⁷ Spijkers 2016 RECIEL 40.
the ecosystems approach to international water law and use the legal framework of international water law to facilitate public participation at all levels of water governance”.

The idea of legally non-binding UNGA resolutions having a soft law value had been affirmed by the International Court of Justice in 1996 when it noted that the General Assembly resolutions can, in certain circumstances, provide evidence important enough to establish the existence of a rule. In addition, legally non-binding UNGA resolutions have also been used by the international community, the UN, other international organisations and states as the basis for developing frameworks to measure progress. The SDGs, specifically goal six, could influence the interpretation of the *UN Watercourses Convention* and subsequently be used to confirm evolving customary practice.

Scholtz and Barnard agree with the above scholars, stating that Agenda 2030 was adopted through an intergovernmental process in the form of a UN General Assembly Resolution, representing a global agreement/common objective with regard to sustainable development within states. Created by subjects of international law, Agenda 2030 indeed conforms to the intrinsic aspects of soft law. Furthermore, Agenda 2030 was not adopted in a normative vacuum as it affirms its objectives and is to be implemented in a manner that is consistent with the rights and obligations of states under current international law. For example, SDG goal 13 and its targets are to be achieved in terms of the UNFCCC. In order to ensure the sustainable use of the oceans, seas and marine resources, goal 14 is to be implemented as reflected in the *United Nations Convention on the Law of the Sea*, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of “The Future We Want”.

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11 Spijkers 2016 *RECIEL* 40–42.
12 Scholtz and Barnard “The Environment and the SDGs” 4–7. See also Scholtz and Barnard “The Environment and the SDGs” 222–249.
13 Scholtz and Barnard “The Environment and the SDGs” 4–7.
15 Scholtz and Barnard “The Environment and the SDGs” 4–7.
Agenda 2030 in the opinion of Persson et al amounts to soft law norms that can influence policy and framework development.\(^{16}\) They found support for their views in the substance and nature of the SDGs, stating that the SDGs are inclined with some form of normative value and can be seen as a set of norms at the softest end of the “hard-to-soft” law in international law.\(^{17}\) They argue that some of the SDGs and targets are relatively precise, hence they can influence the development of frameworks to that effect,\(^{18}\) for example to reduce by one third premature mortality from non-communicable diseases through prevention and treatment by 2030.\(^{19}\) Furthermore, the SDGs are grounded in international human rights law and can be used as a basis to place rights and obligations on states.\(^{20}\) The process that led to the establishment and the manner in which the SDGs are to be implemented are consistent with the rights and obligations of states under international law.\(^{21}\) Although goal 15 for example does not contain reference to any international legal instruments relating to the protection, restoration and promotion of the sustainable use of terrestrial ecosystems, combat desertification, halt and reverse land degradation and biodiversity loss, its objectives can be traced back to a number of key international environmental legal instruments. In support of protection of biodiversity loss, the *Convention on Biological Diversity*, 1992 provides the right for states to exploit their own biological and genetic resources in terms of national legal frameworks, but on condition that such exploitation does not cause harm to areas beyond their national territory.\(^{22}\)

French, however, seems to disagree with the above authors. Acknowledging that the SDGs and targets are mere political commitments with no legal obligation, French is of the opinion that the SDGs do not amount to soft law for two main reasons.\(^{23}\) In the first

\(^{16}\) Persson, Weitz and Nilsson 2016 RECIEL 60.

\(^{17}\) Persson, Weitz and Nilsson 2016 RECIEL 60.

\(^{18}\) Persson, Weitz and Nilsson 2016 RECIEL 60. See also Scholtz and Barnard “The Environment and the SDGs” 4.

\(^{19}\) A/RES/70/1 target 3.4. See paragraph 3.5.3 above.

\(^{20}\) Singh 2015 CAPRISA 60.

\(^{21}\) Kim 2016 RECIEL 16.


\(^{23}\) French “The Global Goals” 165. See also French “Partnerships for the Goals – cooperation within the context of a voluntarist framework” 271–304.
instance, Agenda 2030 and the SDGs do not exhibit a sense of movement of contribution to formal legality to facilitate the progressive evolution of international law. That is, the purpose of the goal is “for want of a better phrase – to achieve the common good” making them neither prescriptive nor regulatory. To him, the politics of Agenda 2030 construction and implementation are framed in a manner that does not challenge the world. It takes the form of phrases that are often used to deny unilateralism, be it regressive or progressive in nature. He concludes that the intent to regulate and contribute to formal legality is absent. Secondly, Agenda 2030 and the goals are too rhetoric. To him, the numerous goals and targets are measurable, but the end purpose is too idealised and idealistic to be contained in models of governance and regulation that soft law often stands in for.

From the above discussion, it is clear that the SDGs are legally non-binding. Persson, Singh, Kim, and Lode disagree with French as they consider the SDGs as having a soft law value. Spijkers, Scholtz and Barnard further disagree with French in the sense that the SDGs as a whole do not have a soft law value, but specific SDGs and targets do. It is not the intention of the present author to engage in a comprehensive analysis in this regard, but suffice it to agree that Agenda 2030 as a whole and some of the specific SDGs and targets do have soft law values that are likely to contribute to the development of international law.

The soft law legal status of the SDGs is evident in the fact that Agenda 2030 has a close proximity to international law. It incorporates objectives of states directing them to work in a similar manner towards specific goals, giving them some potential to contribute towards the development of international law as indicated by Spijkers, Scholtz and Barnard.

Agenda 2030 reiterates the concept of sustainable development, an ancient integrated principle that is well recognised in various international, regional and national legal instruments. Development according to Agenda 2030 must be done in a sustainable

24 French “The Global Goals” 165. See also French “Partnerships for the Goals – cooperation within the context of a voluntarist framework” 271–304.  
25 French “The Global Goals” 166. See also French “Partnerships for the Goals – cooperation within the context of a voluntarist framework” 271–304.
manner, taking into consideration the three dimensions of sustainable development. Mere development will not suffice. It is important to note that sustainable development as a concept has been referred to in about 112 multilateral and roughly 30 universal conventions, giving a total of about 300 legal instruments aimed at universal participation.26 Agenda 2030’s proximity to international law is also evident in the express provision that international law instruments should guide the implementation of Agenda 2030. It states that “Agenda 2030 declaration is guided by international instruments, most notably, the UN Charter, Rio Declaration on Environment and Development, the Universal Declaration of Human Rights amongst others”.27 To this end, it is clear that the drafters of Agenda 2030 had in mind that the resulting SDGs would inform or be informed by international law, either individually or collectively. Notably, goal 13, which calls for urgent actions to combat climate change expressly identifies the UNFCCC (which is the international legal framework governing global climate change) as the basis for its implementation.28

Furthermore, the traceable nature of the wording of international law within the context of Agenda 2030 further acknowledges its soft law legal status. Goal 15, target 15.7, refers to the need to end poaching and trafficking of protected species. The affirmation of the objective to end poaching in Agenda 2030 corresponds with international biodiversity law. The Convention on International Trade in Endangered Species of Wild Fauna and Flora has as central objective to end poaching of protected species and to regulate the trade to that effect.29 Furthermore, SDG 14 and some of its targets directly speak to UN Convention on the Law of the Sea (UNCLOS), 1982. Target 14.1, which calls for the prevention and significant reduction in marine pollution of all kinds by 2025 directly relate to articles 192 and 194, 195 and 196 of the UNCLOS respectively. These articles relate to

26 Barral 2012 European Journal of International Law 377. Sustainable development as a concept finds expression in the Rio Declaration (principles 4, 5, 8, 12, 20, 21, 22, 24 and 27); the UNFCCC (articles 2 and 3(4)); the Convention on Biological Diversity (article 1); the Convention on Access to Information, Public Participation in decision-making and access to Justice in Environmental matters, 1998 (preamble); the Convention on Environmental Impact Assessment in a Transboundary Context, 1991 (preamble); the Abuja Treaty (article 4(1)(a)) among others.

27 Paragraphs 10 to 12 of A/RES/70/1.

28 Goal 13 of the A/RES/70/1. See also paragraph 3.5.12 above.

the protection and preservation of marine life, the reduction and control of marine pollution and pollution resulting from natural resources exploration on the seabed or subsoil and other marine installations. Target 7.2 provides for an increased share of RE in the global energy mix by 2030. This speaks to the *Paris Agreement*, which states “promote universal access to sustainable energy in developing countries, in particular in Africa, through the enhanced deployment of RE”. It is in particular the common but differentiated responsibility of states that gives effect to the increased share of RE that has served as the basis for target 7.2. It is clear that some SDGs and targets were developed with the intention to inform or re-enforce existing commitments under existing international law. To this effect, it is important to note that SDG goal seven and targets would likely be of great importance in directing the regional development of legal energy frameworks.

Agenda 2030 represents global consensus on the issues expressed in it as well as on specific SDGs and targets. This is evident in the process that lead to the adoption of the Agenda 2030 that has largely been coined as an exemplary model of public participation, involving not only governments, but also stakeholders from across all fields of work. Expressing the world’s opinion through its public participation process indeed conforms to the intrinsic aspects of soft law.

From above discussion, it can be said that Agenda 2030 and some specific SDG and targets do have a soft law value that can influence the development of future international law. To this end, Agenda 2030 and its SDG goal 7 will now be discussed to underscore its importance in developing and increasing access to RE.

### 4.3 Agenda 2030

#### 4.3.1 Overview of Agenda 2030

The momentum generated by the above developments finally crystalised at the UN Summit for the adoption of the post-2015 development agenda. At the 70th Session of

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30 Preamble of the *Paris Agreement*.
31 Target 7.b of goal seven SDGs.
32 See paragraph 4.2.2 above.
the UN General Assembly (UNGA), heads of state and governments from 193 member states of the UN adopted Agenda 2030 for Sustainable Development.\textsuperscript{33} Meant to guide global development, Agenda 2030 aims to eradicate poverty, an indispensable requirement for sustainable development.\textsuperscript{34} The outcome document sets forth a policy framework for people, planet and prosperity. This policy framework is integrated, indivisible, and balances the three dimensions of sustainable development\textsuperscript{35} at the international, regional, sub-regional and national levels. It is also universally applicable to all and seeks to address challenges related to ending poverty and hunger, combating inequalities, building peaceful and inclusive societies, promoting human rights, and ensuring the protection of the planet and its natural resources.\textsuperscript{36} Agenda 2030 is structured in four main parts, namely, its declaration, 17 goals and 169 targets, the means for implementation, follow-up and review. The declaration section of Agenda 2030 provides for a vision,\textsuperscript{37} shared principles,\textsuperscript{38} commitments and the objective of the post 2015 developmental framework.\textsuperscript{39} The 17 goals and the 169 targets guide decisions of all UN member states at the national, regional and global levels, considering the different national realities, capacities and levels of development, respecting national policies and priorities, while highlighting the importance of regional and sub-regional frameworks in achieving its goals.\textsuperscript{40} In implementing Agenda 2030, states are required to revitalise global partnerships, based on the spirit of solidarity, particularly with the poorest and people in vulnerable situations, while intensifying global engagement among governments, the private sector, civil society, the UN system and other actors.\textsuperscript{41} Lastly, governments must monitor the progress of the implementation of the goals and targets

\textsuperscript{33} UN A/RES/70/1.
\textsuperscript{34} Paragraph 1 A/Res/70/1
\textsuperscript{35} The three dimensions or arms of sustainable development: economic, social and environmental.
\textsuperscript{36} Paragraph 3 A/RES/70/1. See also paragraph 3.5 above.
\textsuperscript{37} Agenda 2030 envisages a world “free of poverty, hunger, disease and want, where all life can thrive. A world free of fear and violence. A world where we reaffirm our commitments regarding the human right to safe drinking water and sanitation and where there is improved hygiene; and where food is sufficient, safe, affordable and nutritious. A world where human habitats are safe, resilient and sustainable and where there is universal access to affordable, reliable and sustainable energy”.
\textsuperscript{38} Agenda 2030 reaffirms all the principles of the Rio Declaration on Environment and Development, including the principle of common but differentiated responsibilities among others.
\textsuperscript{39} Paragraph 1-17 A/RES/70/1. See also UNIDO “Sustainable Energy, SDGs and the Paris Agreement” 1-32.
\textsuperscript{40} Paragraph 18-38 A/RES/70/1.
\textsuperscript{41} Paragraph 39-46 18-38 A/RES/70/1. See also Pavoni and Piselli \textit{Veredas do Direito, Belo Horizonte} 1–19.
at the national, regional and international levels (through a follow-up and review process).\footnote{Paragraph 27-48 A/RES/70/1.}

The purpose of this overview is to understand the wide range of inputs and sections that encompass Agenda 2030. While having a composite structure, Agenda 2030 explicitly provides for increased RE access as a means of achieving the overall aim of sustainable development.

4.3.2 Energy goal and targets in the Agenda 2030 (SDG 7)

Currently, international law regulating increased RE access (among other access modern energy sources) is underdeveloped. At present the international law regulating increased modern access is underdeveloped. However, Agenda 2030, unlike its predecessor the MDG framework, explicitly provides for access to modern energy as a means of achieving its overall objective.\footnote{See paragraph 3.4.11 above. See also Goal Seven A/RES/70/1.} According to the SDG goal seven of Agenda 2030, states should ensure access to affordable, reliable, sustainable and modern energy for all, underscoring the importance of a sustainable energy future. It also highlights the need for a transition to a low-carbon energy system.\footnote{Goal seven SDGs A/Res/70/1.} Goal seven of the SDGs further provide three interlinked targets to be achieved by 2030; (7.1) ensuring universal access to energy services; (7.2) substantially increasing RE in the global energy mix; and (7.3) doubling the rate of energy efficiency improvement.\footnote{Although these targets are integrated and indivisible. the present study focuses on renewable energy and the extent to which they are provided for in existing AU RE law and policy.}

The express inclusion of access to RE among other modern energy sources in the SDGs formally acknowledges the importance of modern energy in the realisation of global sustainable development as an integrated, indivisible set of global priorities. Seeking to increase access to affordable, reliable, sustainable, and modern energy for all, especially for the 1.3 billion people without electricity and 2.7 billion people who use wood and biomass to cook and heat their homes,\footnote{See paragraph 2.1 above.} Agenda 2030 advocates for cooperation among states. In addition, states are also called upon to develop support programmes, policies

\footnote{See paragraph 2.1 above.}
and frameworks to that effect.\textsuperscript{47} In establishing energy frameworks, the poorest and people in vulnerable situations are to be considered while involving governments, the private sector, civil societies and the UN system among other actors.\textsuperscript{48} Furthermore, economically sound energy technologies should be transferred from developed to the developing countries based on mutual understanding and multi-national agreements.\textsuperscript{49}

At a national level, parliaments are urged to enact energy law and frameworks and to ensure their effective implementation. On implementing the energy framework, governments and public institutions are urged to work together with local authorities, regional and sub-regional institutions, international institutions, academia, philanthropic organisations, and volunteer groups, among others.\textsuperscript{50}

However, in achieving increased access to energy as per goal seven of the SDG, policy makers must take note of a number issues. While goal seven of the SDGs is the only goal that explicitly addresses the energy sector and mentions RE as a means to achieve it, no definition was provided for terms such as “modern energy” and “modern energy services” as used in SDG 7 and target 7.1 respectively.\textsuperscript{51} This is not to mention the inherent uncertainty in defining “affordable, reliable and energy efficiency improvement” in SDG 7.1, 7.2 and 7.3 respectively. Definitional uncertainties within binding frameworks are likely to have severe impacts on the obligations of states.\textsuperscript{52} To this end, in implementing goal seven of the SDGs, clear definitions should be provided for necessary terms in order to eliminate uncertainty with regard to states’ obligation.\textsuperscript{53}

Target 7.1 provides “ensure universal access to affordable, reliable and modern energy services”, thus avoiding the term sustainable and thereby retaining the possibility of fossil fuel-based energy production. The second target calls for the share of RE to be increased substantially, but avoids any clear commitment on quantified RE targets. Though goal

\textsuperscript{47} SDG goal 7.b and Para 40 A/RES/70/1.
\textsuperscript{48} Paragraph 39 A/RES/70/1.
\textsuperscript{49} Paragraph 41 A/RES/70/1.
\textsuperscript{50} Paragraph 45 A/RES/70/1.
\textsuperscript{51} The term modern energy has no universally acceptable definition. Modern energy for the purpose of this research refer to “any energy source that is reliable, that which show limited environmental and social impacts and promote socio-economic development”. See paragraph 2.4.3 above.
\textsuperscript{52} Bruce and Stephenson “SDG 7 on Sustainable Energy” 7–8.
\textsuperscript{53} See paragraphs 2.4.4 and 2.4.1 for the definitions of modern energy and RE respectively.
seven of the SDGs is ambitious, the achievement of its target to substantially increase the share of RE in the global energy mix by 2030 will likely be difficult without a general shift from non-RE to RE sources of energy, with quantitative targets set and measures of achieving identified.

Though Agenda 2030 may be universally relevant to promoting increased RE access, there may be large regional differences in opportunities and perceived priorities. In many low-income countries, the focus might understandably be to ensure universal access to modern energy services, whereas for many developed countries, the emphasis may rather be on working towards decoupling energy use and GHG emissions. Furthermore, while the SDGs are guidelines to global development, this may be an opportunity for states as well as regions to adopt a more ambitious agenda with regard to specific goals and targets within Agenda 2030.

Furthermore, the implementation of the SDGs calls for practical operationalisation. The principle of common but differentiated responsibilities is upheld. As such, the achievement of the targets and indicators will require some degree of burden sharing and fair allocation of responsibilities among states, taking into consideration their individual capacities and responsibilities in light of their different national circumstances. Given that, the cost of modern energy technology (RE among others) and efficiency improvements are slightly higher than fossil fuels, the burden of adopting or facilitating adoption of such technologies should be shared among countries based on their common but differentiated responsibilities and respective capacities. In this regard, the progress on this principle with the Paris Agreement may be considered as an example.

Currently, trade disputes arising as a result of domestic measures to support increased RE access have been on the rise. In the case of *PV Solar Investors v Spain*, investors

54 Nakicenovic, Rogner and Srivastava “Toward Energy” 3.
56 Paragraph 12 Agenda 2030.
57 See paragraph 2.4.5.1 above.
58 The Paris Agreement, 2015. Articles 2(2) and Article 4(1)-(19).
59 *PV Solar Investors v Spain* 2014 PCA paragraph 16. Other cases in this regard include *CSP Equity Investment S.à.r.l. v Spain, Antin Energia Termosolar B.V. v Kingdom of Spain*, ICSID Case No. ARB/13/31, *Eiser Infrastructure Limited and Energia Solar Luxembourg S.à.r.l. v Spain*, ICSID Case No. ARB/13/36, *Masdar Solar & Wind Cooperatief U.A. v Kingdom of Spain*, ICSID Case No. ARB/14/1,
alleged that the repeal of clean PV solar programmes, mal-administration of clean energy programmes and/or the imposition of performance requirements have resulted in indirect expropriation, devaluation of their investments and breaching fair and equitable treatment, which includes legitimate expectations. Notably, these investment disputes do not challenge the competence of states to establish laws and regulations regarding RE sources, but rather the differential treatment of programmes and policies, which allegedly breach obligations related to international investment agreements. Based on goal seven of the SDGs, it is possible for states to establish legal RE energy frameworks. However, these legal frameworks must be developed and implemented in a manner that does not contradict the terms and conditions of existing trade agreements.

From the above discussion, it is clear that Agenda 2030 acknowledges the need for increasing access to modern energy sources and encourages cooperation to that effect. More importantly, it explicitly identifies increased RE access as an important factor to that effect. It is therefore clear that the SDG – specifically goal seven, stands on the

Claimants also argued that they had legitimate expectations in relation to the non-alteration of the regulatory framework, in which they based their investments. Claimants considered that modifying such regulatory framework implied a breach of Spain’s specific compromises with investors regarding their investment, and therefore a breach of the ECT obligations provided under its article 10(1). The Tribunal considered that Spain had not entered into specific compromises with investors regarding the non-alteration of the regulatory framework. For adopting this ruling in order to determine if the legal system in force at the time of the investment created legitimate expectations for investors and which were those, if any, the Tribunal analysed such legal system. The Tribunal considers that investors cannot have a legitimate expectation regarding a particular framework not to be altered when no specific agreement in this regard existed. The Tribunal also considered that a particular analysis of the Spanish legal system should have been done by Claimants before investing to determine whether the legal framework could be modified. If Claimants would have done such analysis, they would have realised that a modification of the legal system could be expected at some point, or at least that such modification could take place at some point, as Spanish domestic legislation leaves such a door open.

Transforming the World: the 2030 Agenda for Sustainable Development Para 27 A/Res/70/1, Abrahamyan et al “SDGs in Post-Truth” 65-68.

See paragraph 3.4.1-3.4.10 above. See also Transforming the World: the 2030 Agenda for Sustainable Development Para 27 A/Res/70/1, Abrahamian et al “SDGs in Post-Truth” 65-68.
shoulders of other efforts that have gradually brought the issue of RE access to the forefront of international law. While some of the earlier initiatives met with modest success, the SDG is likely to succeed as a result of the express provision for RE targets, absent in all relevant hard and soft laws and other initiatives.  

Although there has been widespread support globally, the SDGs are neither a treaty nor customary international law and as such they do not constitute part of the formal sources of international law. Access to modern energy and the increased RE access at the global level would have a positive effect on the overall achievement of sustainable development. To further underscore the role of Agenda 2030 on the development of future international law, the MDGs are analysed with a focused on how they have been developed upon by the SDGs.

4.4 The SDGs: advancement to the MDGs

While there is a wide range of aspects that differentiate the SDGs from the MDGs, the author will focus on four aspects that stand out as significant advancements of the SDGs over the MDGs. The purpose of such advancements is to underscore the role of modern energy in achieving the SDGs. These advancements include express provision of access to modern energy services, integration of the three pillars of sustainable development, development and monitoring progress (follow-up).

Firstly, the SDGs as opposed to the MDGs are likely to be seen as a key milestone in global modern energy access. Energy was not explicitly provided for as one of the MDGs. It and was subsequently termed the "underlying" MDG or "missing" MDG. The 2005 UN energy study *The Energy Challenge for Achieving the MDGs* acknowledges the role of energy in the realisation of the MDGs, stating “energy services such as lighting, heating, cooking and mechanical power were essential for alleviating poverty and achieving the goals”. That is, energy is needed to power irrigation systems and farm machinery, in

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63 See paragraph 3.4.4 above.
64 See paragraph 3.4.1 above.
65 UNDP *From the MDGs to Sustainable Development for All* 18–24. The Millennium Declaration that was adopted at the 55th session of the UNGA made no provision for the MDGs and they were subsequently added as an Annex to the 2001 Report of the Secretary-General on the implementation of the Millennium Declaration. See also Pavoni and Piselli 2016 *Veredas do Direito Belo Horizonte* 22; Wisor 2012 *Carnegie Council for Ethics in International Affairs* 115.
66 UNDP *From the MDGs to Sustainable Development for All* 18–24.
order to increase agricultural yields and thus boost earnings and food security while eradicate extreme poverty and hunger among others.\textsuperscript{68} By contrast, the SDGs explicitly provide for access to modern energy services for all by substantially increase access to RE (among other modern energy sources), doubling the global rate of energy efficiency by 2030, among others.\textsuperscript{69} Acknowledging that energy is critical for development and the realisation of other SDGs,\textsuperscript{70} the SDGs can be described as a key milestone for global modern energy access that the MDGs largely ignored.

Secondly, the process that lead to the adoption of Agenda 2030, as opposed to that of the MDGs paint a picture of an instrument that seek to acknowledge public participation. According to Etty, the process can be described as an exemplary model of public participation.\textsuperscript{71} The adoption of the MDGs was not preceded by public consultation, but it was formulated within an “inside UN conference room” during an inter-agency technical process co-chaired by the UN Assistant Secretary-General and UNDP Director of the Poverty Group.\textsuperscript{72} There was no formal or informal consultation held amongst the relevant stakeholders but rather mere follow-up conversations with member states and particularly developing countries.\textsuperscript{73} As a result of this criticism against the MDGs, the SDGs went through an extensive three-year consultation process involving the governments of both developed and developing countries as well as all segments of society.\textsuperscript{74} The formulation of the newly adopted Agenda 2030 was based on the recommendations of the Open Working Group (OWG) Proposal for the SDGs. With 30 seats shared by a group of 70 UN member state representatives, the OWG conducted 13 thematic and 83 national consultations and launched an online “My World Survey” inviting the general public to

\textsuperscript{68} MDG1. With regard to universal education (MDG2), energy access can release pupils from the time consuming tasks of water and fuel gathering and provide lighting to enable them to study at night. Energy can empower women (MDG3) by powering street lighting to increase safety and enabling them to attend school or community activities after dark. Energy can also support the functioning of clinics and hospitals (MDGs 4, 5, and 6). Deficient access also undermines resilience to socioeconomic and climate vulnerabilities. UN Energy Paper 2005 at www.undp.org/...energy/...energy/the_energy_ challengeforachievingthemillennium. See also Siala et al 2016 OPEC Fund for International Development 23–24.

\textsuperscript{69} SDG goal 7.

\textsuperscript{70} See paragraph 4.3. The role of modern energy in the realisation of other SDGs.

\textsuperscript{71} Etty et al 2015 Transnational Environmental Law 235–236.

\textsuperscript{72} See paragraph 4.2.

\textsuperscript{73} Pavoni and Piselli 2016 Veredas do Direito Belo Horizonte 22.

prioritise the areas they would like to see addressed, facilitating national, regional and international ownership of the goals. 

Assuming ownership of the SDGs, access to modern energy services can be reflected in a set of common priorities and developmental frameworks for both developed and developing states, as well as regions.

Thirdly, the principle of integration, which has been a core component of sustainable development and has informed the conclusion of a range of environmental agreements since the 1990s, was reiterated by the SDGs. With the MDGs there was no attempt to produce an integrated system, which could help facilitate policy integration across the three pillars of sustainable development. In fact, environmental sustainability was simply added to the MDGs in the form of goal number seven. By contrast, Agenda 2030 provides “We are committed to achieving sustainable development in its three dimensions: economic, social and environmental – in a balanced and integrated manner”. The SDGs represent a noticeable shift away from an un-integrated to a more balanced and conceptualised set of goals, returning to integration (economic, social and environmental) as a core component of sustainable development that was largely ignored by the MDGs. In effect, access to modern energy would have to be promoted in a balanced and integrated manner with the economic, environmental and social pillars in order for the SDGs to be achieved.

Lastly, the follow up process which aims at monitoring progress is another significant advancement of the SDGs over the MDGs. Though explicitly mentioned in both the Millennium Declaration and the 2001 Report of the Secretary General, the outcome of the International Conference on Financing for Development and the global indicator framework (meant to monitor the progress of the implementation of the MDGs) emerging

77 MDG goal 7.
78 Paragraph 2 A/RES/70/1.
from the Inter-Agency Expert Group on MDG Indicators (IAEG-MDG),\textsuperscript{80} did not form part of the development process of the MDGs. It was rather a mere ancillary/additional undertaking as the conference was held after the MDGs had already been adopted. Contrarily, the Addis Ababa Action Agenda on Financing for Development\textsuperscript{81} and the global indicator framework emerging from the work of the Inter-Agency and Expert Group on SDG Indicators (IAEG-SDGs)\textsuperscript{82} constitute an integral part of the development process of the SDGs. With the IAEG-SDGs global indicator framework forming part of the development process of Agenda 2030, the idea of coherence, focus, comprehensive action and compliance is likely to come into play. In addition, the inclusion of the review and monitoring section of the SDGs is likely not only allow for the measurement of progress, but can also drive progress by changing the understanding of the issues (reducing uncertainty) and build on consensual knowledge over time.

From above discussion, it is clear that the SDGs developed the MDGs at least with regard to the promotion of access to modern energy (including RE). African policy makers must therefore provide clear definitions for terminologies, take ownership of their policies and do so in an integrated manner with regard to the three dimensions of sustainable development. While promoting a spirit of global partnership, the control of modern energy access as provided for by SDG goal seven target 7.2 in achieving other SDGs becomes a very important topic to consider especially when one proposes that Agenda 2030 direct regional development on the formulation of legal energy frameworks.

4.5 Central role of modern energy access and achievement of other SDGs

Access to RE\textsuperscript{83} is central in achieving other SDGs that extend far beyond the energy sector, such as eradicating poverty, increasing food production, providing clean water, improving public health, enhancing education, creating economic opportunity,

\textsuperscript{80} IAEG was responsible for the preparation of data and analysis to monitor progress towards the MDGs.
\textsuperscript{81} United Nations Addis Ababa Action Agenda, UN Doc A/RES/69/313. 2015c.
\textsuperscript{82} United Nations Report of the Inter-Agency Expert Group on Sustainable Development Goal Indicators, UN Doc E/CN.3/2016/2. The framework was agreed upon earlier in the year before Agenda 2030 was finally adopted in December 2015.
\textsuperscript{83} See paragraph 2.4.3 above. See also Calzadilla and Mauger Journal of Energy & Natural Resources Law 235.
empowering women among others.\textsuperscript{84} The inference can be drawn that without access to modern energy services, none of the SDGs are likely to be achieved.\textsuperscript{85} In this section, the role of modern energy as a measure that promotes other goals in Agenda 2030 will be analysed.

4.5.1 End poverty in all its forms everywhere (SDG 1)

Ensuring access to modern, reliable and affordable energy is critical in eradication poverty in all its forms.\textsuperscript{86} Access to modern energy and RE fuels will help in facilitating economic development by providing less polluting and efficient means to undertake basic household activities such as cooking, lighting and also power other activities.\textsuperscript{87} Access to modern energy and electricity can as well extend hours of work beyond daylight, improving household income, reduce GHGs and promote the achievement of extreme poverty reduction.\textsuperscript{88} Additional value and revenue earning options thus made possible can help diversify and expand income sources, increasing the scope of local employment and levels of skill development, and improve the capacity of the poor to overcome economic setbacks and challenges, allowing them to move away from the margins of poverty.\textsuperscript{89} However, RE expansion can result in higher prices if the cost of moving from fossil fuel to RE are not subsidised.\textsuperscript{90} This can undermined universal access to modern energy since higher energy prices would add to the challenges of improving living to the world’s poor.\textsuperscript{91}

\textsuperscript{84} Goal one, two, three among others SDGs. See also UN 2016 http://www.un.org.
\textsuperscript{85} McCollum et al “SDG 7 Ensure Access” 130. See also Vienna Energy Forum “Sustainable Energy” 11.
\textsuperscript{86} McCollum et al “SDG 7 Ensure Access” 131. See also Ahlborg and Sjostedt 2015 Energy Research and Social Science 26–28; Schwerhoff and Sy “Financing Renewable Energy in Africa” 4.
\textsuperscript{87} Modi et al “Energy services” 17. See also Ahlborg and Sjostedt 2015 Energy Research and Social Science 26–28.
\textsuperscript{88} Modi et al “Energy services” 17. See also Ahlborg and Sjostedt 2015 Energy Research and Social Science 26–28.
\textsuperscript{89} Modi et al “Energy services” 17. Modern energy can also make possible “most of the economically vital activities and services upon which societies developed and flourish in industrialisation, high speed transportation, telecommunications, information technology, personal work and lifestyle aids, none of which can function on traditional fuels. Denying people access to modern energy is thus equivalent to depriving them of the fruits of human economic and technological progress in virtually all fields. Instead, it confines them and their future generations to a low-yield, labour intensive life and denies them the means and tools to raise incomes and escape perpetual poverty”. See Blyth et al “Low carbon jobs” 14.
However, continued RE technology innovations can result in reduction in cost, making RE profitable in regions – as some of the poorest regions (Africa among others) possess huge potential for RE.\textsuperscript{92}

4.5.2 **End hunger, achieve food security and improved nutrition and promote sustainable agriculture (SDG 2)**

Ending hunger, achieve food security and promote sustainable agriculture requires access to modern energy to cook food and promote irrigation technologies, which are dependent on electricity, in order to improve agricultural productivity. Access to modern energy services is therefore likely to improve food security, improve nutrition, increase labour productivity as well as create employment.\textsuperscript{93} Access to modern fuels and electricity will also help promote more efficient means to cook the basic staple foods that form the basis of human nutrition.\textsuperscript{94} Most cooked food also requires water, which must be pumped and transported using modern energy.\textsuperscript{95} The use of modern fuels will also help reduce the reliance on biomass and allow a greater proportion of farm waste to be returned to the soil, increasing the fertility of the soil and better agricultural productivity.\textsuperscript{96} Furthermore, increased commercialisation of bioenergy\textsuperscript{97} production is likely to create jobs as well as diversifying income streams for land owners. However, developing bioenergy (especially wood) can also lead to higher global food prices (and thus reduced access to affordable food by the poor) and competition between biofuels and food crops over scarce agricultural land and water for its production. Notably traditional biomass energy such as domestic wastes do not compete with food production, though transportation of waste residues and operation of biofuels processing plants can be energy-intensive.\textsuperscript{98}

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{92} Modi \textit{et al} “Energy services” 17. See also IEA “Energy Access Outlook 2017” 26. See also Calzadilla and Mauger \textit{Journal of Energy & Natural Resources Law} 235; paragraph 2.4.
\item \textsuperscript{93} Modi \textit{et al} “Energy Services” 23. See also Calzadilla and Mauger \textit{Journal of Energy & Natural Resources Law} 235.
\item \textsuperscript{94} Modi \textit{et al} “Energy Services” 23.
\item \textsuperscript{95} Modi \textit{et al} “Energy Services” 23.
\item \textsuperscript{96} See paragraph 2.2.1.1 above. See also UN 2016 http://www.un.org, Howden-Chapman \textit{et al} “SDG 3 Ensure healthy lives” 87. See also Raman and Bhatt 2017 \textit{JAS} 76–78; Langarita \textit{et al} 2017 \textit{Renewable and Sustainable Energy Review} 1008–1019.
\item \textsuperscript{97} See paragraph 2.2.1.1 above. See also Howden-Chapman \textit{et al} “SDG 3 Ensure healthy lives” 87.
\item \textsuperscript{98} Sola \textit{et al} 2016 \textit{Food Security} 636–638.
\end{itemize}
\end{footnotesize}
4.5.3 Ensure healthy lives and promote well-being for all at all ages (SDG 3)

Achieving the goal of ensuring a healthy life and wellbeing for all at all ages requires development and this depends on modern energy services in a number of ways.\textsuperscript{99} Having access to RE can reduce the need for energy generation with fossil fuels and traditional biomass, reducing indoor air pollution that causes respiratory ailments and therefore reduces this health threat for all at all ages.\textsuperscript{100} Modern fuel and electricity will also contribute towards a healthy life and well-being in that, health care infrastructure even in the smallest clinics and health centres relies on refrigeration for vaccines and sterilisation. Furthermore, lighting for patient care after dark for operating theatres, and for public safety surrounding hospitals increases the health systems ability to serve the population.\textsuperscript{101} Education and awareness campaigns on diseases such as HIV/AIDS using radio and television, which require electricity, are essential to educate the population about prevention and treatment options in the most affected areas.\textsuperscript{102} Energy-saving measures such as cycling and walking can improve health and well-being by lowering rates of diabetes, heart disease and dementia and at the same time reduce deaths and injuries from road traffic accidents in cases where the infrastructure provided is unsatisfactory.\textsuperscript{103}

4.5.4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all (SDG 4)

Well-heated and cooled schools as well as households are essential for creating comfortable learning spaces for children and adults and reduce dependency on natural variations in daylight.\textsuperscript{104} The use of communication technologies and information on which modern learning is based also require modern energy input. Increased access to modern energy in countries where access to reliable energy services may be lacking can

\textsuperscript{99} Howden-Chapman et al “SDG 3 Ensure healthy lives” 87.
\textsuperscript{103} See also Howden-Chapman et al “SDG 3 Ensure healthy lives” 87. See also Sola et al 2016 Food Security 636–638.
\textsuperscript{104} Squires “The Impact of Access to Electricity on Education” 2. See also Nalule Energy Poverty and Access Challenge in Sub-Saharan Africa 12.
therefore reinforce education goals. According to Tollefson, RE powered by micro grids is likely to extend the house of students in Africa beyond daylight. The level of educational attainment within a society can influence its collective awareness about sustainable development and sustainable lifestyles as well as an understanding of why transformative changes in the energy system are necessary. Knowledge and skills in the area of energy sustainability and specifically RE may then influence which technological, financial and political solutions are feasible to implement. Energy is also a key element of science education and the inclusion of energy in school curricula may enhance science literacy at all levels of society.

4.5.5 Achieve gender equality and empower all women and girls (SDG 5)

Without access to modern energy, women and girls spend much of their time completing domestic tasks. Access to modern energy services with electric and fuel-operated pumps can bring water closer to homes, freeing up time for women, increasing their chances of employment opportunities and income generating activities. Access to modern energy can also empower women and girls, improving their social, economic, and political status in turn. By reducing their time and effort on domestic duties they gain access to education, better health conditions, and income-generating opportunities. In addition, it can help increase their participation in public affairs and challenge traditional gender roles allowing communities to better address issues of poverty, hunger and disease. As women’s political representation increases they gain the power to influence, create and implement policies and projects to ensure energy access. As a result, these policies and projects will increase employment, education, and income

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105 Kumar 2018 Energy Research and Social Science 4–6.
107 Kumar 2018 Energy Research and Social Science 4–6.
108 Kumar 2018 Energy Research and Social Science 4–6.
109 Instead of advancing their socio-economic station, women in most developing countries spend their time and effort is exerted on domestic tasks such as collecting traditional biomass for cooking and heating homes, carrying water for household use, manual crop processing, and food preparation. See paragraph 2.2.1.1 above.
109 Ames “When Access is not enough” 148. See also International Council for Science “Review of Targets for the Sustainable Development Goals” 33–35, Danielson “Gender Equity, woman’s right and access to energy services” 15–23.
110 Ames “When Access is not enough” 148.
111 Dinkelman 2011 American Economic Review 3080. See also Grogan and Sadanan 2013 World Development 257.
opportunities for women and men for generations to come. By focusing on specific initiatives that prioritise women’s energy needs, policymakers are not only addressing the economic future of their countries, but also investing in the health, education, and overall welfare of their families and children.

4.5.6 Ensure availability and sustainable management of water and sanitation for all (SDG 6)

Increased access to modern energy is likely to affect sustainable management of water and sanitation in a number of ways. In many developing countries, collecting water is primarily the responsibility of women. Women’s lives are further impacted by a lack of water and sanitation because they are responsible for the care of children, who are affected by water borne diseases (diarrhoea among others) due to untreated water. Access to modern energy will help in sourcing water (pumping it to treatment facilities), treat and distribute clean water to homes, reducing the burden of time-consuming water collection.

However, thermal cooling and heating require vast amounts of water, while wastewater from the energy sector releases large quantities of thermal and chemical pollution into aquatic ecosystems. In most cases, a shift from fossil energy technology to renewables and boosting energy efficiency would reinforce the achievement of sustainability objectives related to water access, scarcity, management and pollution. Nonetheless, some RE sources such as bioenergy and hydropower could, if not managed correctly, have counteracting effects that compound existing water related problems.

\[\text{References}\]

113 Dinkelman 2011 American Economic Review 3080. See also Grogan and Sadanan 2013 World Development 257.
114 See paragraph 2.2.1.1 above. See Rasul 2016 Environmental Development 16–17; Cole et al 2017 SAJS 2–3.
117 Byers, Hall and Amezaga “Electricity generation and cooling water use” 17.
118 Byers, Hall and Amezaga “Electricity generation and cooling water use” 17.
119 Byers, Hall and Amezaga “Electricity generation and cooling water use” 18. See also paragraph 2.3.2 above.
The establishment and installation of water extraction and treatment systems require considerable amount of modern energy. Bringing such services to the world’s poor, especially in water stressed regions would generally increase the energy demand. RE may be of great importance in such cases. If water-related infrastructure and equipment can be used for demand-side power management, developing water and sanitation systems could help grid integration of existing electricity sources. However, water-related energy demand increases could be challenging if there are constraints to RE deployment.

4.5.7 Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all (SDG 8)

Increased access to RE can promote innovation and reinforce local, regional and national industrial and employment objectives. However, active measures may be needed to minimise the impacts of transition to RE on those currently working in the fossil fuels sector – government incentives may be needed for industries to re-tool and retrain workers. Workforce migration may also be needed because fossil fuel development is highly concentrated whereas RE projects are distributed across wide geographic areas. Strengthened financial institutions providing capital, credit and insurance to local entrepreneurs attempting to enact change may be necessary in all countries in order to increase access to RE. This may, however, constrain countries’ economic growth, but benefits decoupled from environmental degradation and job growth from installing and maintaining RE and energy efficiency technologies could more than compensate for

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120 McCollum et al “SDG 7 Ensure Access” 132. See also Byers, Hall and Amezaga “Electricity generation and cooling water use” 17.
121 McCollum et al “SDG 7 Ensure Access” 132. See also Byers, Hall and Amezaga “Electricity generation and cooling water use” 17.
122 McCollum et al “SDG 7 Ensure Access” 132. See also Byers, Hall and Amezaga “Electricity generation and cooling water use” 17.
125 Riahi et al “Energy pathways for sustainable development” 1203–1306. See also Schwerhoffa and Sy 2018 Renewable and Sustainable Energy Reviews 3; Stefan et al 2017 Energies 2–3.
economic costs associated with these changes means. This interaction seems only mildly counteracting.\textsuperscript{127}

\textbf{4.5.8 Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation (SDG 9)}

Ensuring modern energy access and increasing the share of RE in the global energy mix are prerequisites for building resilient infrastructure, promoting inclusive and sustainable industrialisation and fostering innovation.\textsuperscript{128} RE deployment will directly benefit energy industries by upgrading and retrofitting infrastructure to make it more reliable and sustainable; providing financial and technical support to promote technological development and encourage innovation through scientific research funding.\textsuperscript{129} However, one concern could be the early retirement of fossil energy infrastructure (for example power plants, refineries, pipelines), which may be needed to mitigate related sustainability challenges. Unless targeted policies are used to help alleviate the burden on industry, the economic implications could in some cases be negative. Carbon pricing through a carbon tax or cap-and-trade market mechanism may be used to reduce carbon intensity in industrial processes and provide states with funds to help innovation and compliance in the industrial sector.

\textbf{4.5.9 Reduce inequality within and among countries (SDGs 10)}

Ensuring universal access to energy is critical in achieving equality among/within countries where all are free to exercise their development options.\textsuperscript{130} Increased access

\textsuperscript{127} Riahi \textit{et al} “Energy pathways for sustainable development” 1203–1306. See also Stefan \textit{et al} 2017 \textit{Energies} 2–3.

\textsuperscript{128} McCollum \textit{et al} “SDG 7 Ensure Access” 133. See also Schwerhofia and Sy 2018 \textit{Renewable and Sustainable Energy Reviews} 3.

\textsuperscript{129} In this regard “countries are urged to put in place technical structures such as roads, streets, bridges, ports, airports, tunnels, railways, water supply, sewers and information and communication technology. Access to modern energy and electricity will help fuel equipment’s that are used in the construction of these facilities, light up bridges, airports and tunnels. Another factor closely related to lighting facilities is powering the telecommunication technologies. Using electricity and other modern fuels, powering technology and innovation will undoubtedly unlock the unlimited knowledge and connective potential of the internet for everyone and create more jobs in this sector”. See International Council for Science “Review of Targets for the Sustainable Development Goals” 49. See also McCollum \textit{et al} “SDG 7 Ensure Access” 133.

\textsuperscript{130} Access to electricity will promote the “achievement of reducing inequality includes the fact that, modern energy will facilitate communication, particularly through information and technology,
to and doubling the share of RE such as agriculture and forest based biomass energy can enable educational, health and employment opportunities for the rural poor, with positive effects on income and equality.\textsuperscript{131} In effect, policy makers must be careful to ensure that energy remains affordable to the poorest, especially if higher costing renewables are deployed.\textsuperscript{132} Ideally, institutional and financial capacity should be established in order to source funds be it locally or internationally through foreign investment (from rich to poor countries).\textsuperscript{133} Either of this can foster socio-economic development and help reduce in equalities between countries, as well as within them (across different social, gender, economic, ethnic, religious and racial groups).\textsuperscript{134} Furthermore, RE deployment and access to at the local level may also reduce inequalities due to fluctuations in the international fossil fuel market as a result of political or speculative pressures.\textsuperscript{135}

4.5.10 Make cities and human settlements inclusive, safe, resilient and sustainable (SDG 11)

Modern energy access is central in making cities and human settlements safe and sustainable. Increased access to RE (among other modern sources) is likely to facilitating economic development by providing efficient and healthier basic services and developing infrastructure in cities.\textsuperscript{136} Being central to urbanisation, clean, modern and efficient

promoting the importation of new technologies from the developed to the developing world. Access to modern energy and electricity will also facilitated the construction of infrastructure (liking provinces within the countries and one country to the other) enabling countries to exchange ideas and ease the movement of goods thereby promoting knowledge transfer from developed countries to developing countries, reducing the inequality among them”. See McCollum \textit{et al} ”SDG 7 Ensure Access“ 133. See also UNDP \textit{et al} ”Interlinkages among Energy, Poverty and Inequalities“ 5.  

IRENA ”Renewable energy benefits” 24–54. See also McCollum \textit{et al} “SDG 7 Ensure Access“ 133, Frondel \textit{et al} ”Economic impacts from the promotion of renewable energy” 4048–4056, UNDP \textit{et al} ”Interlinkages among Energy, Poverty and Inequalities“ 5. 

IRENA ”Renewable energy benefits” 24–54. See also McCollum \textit{et al} “SDG 7 Ensure Access“ 133, Frondel \textit{et al} ”Economic impacts from the promotion of renewable energy” 4048–4056, UNDP \textit{et al} ”Interlinkages among Energy, Poverty and Inequalities“ 5. 

IRENA ”Renewable energy benefits” 24–54. See also McCollum \textit{et al} “SDG 7 Ensure Access“ 133, Frondel \textit{et al} ”Economic impacts from the promotion of renewable energy” 4048–4056, UNDP \textit{et al} ”Interlinkages among Energy, Poverty and Inequalities“ 5. 

IRENA ”Renewable energy benefits” 24–54. See also McCollum \textit{et al} “SDG 7 Ensure Access“ 133, Frondel \textit{et al} ”Economic impacts from the promotion of renewable energy” 4048–4056, UNDP \textit{et al} ”Interlinkages among Energy, Poverty and Inequalities“ 5. 

IRENA ”Renewable energy benefits” 24–54. See also McCollum \textit{et al} “SDG 7 Ensure Access“ 133, Frondel \textit{et al} ”Economic impacts from the promotion of renewable energy” 4048–4056, UNDP \textit{et al} ”Interlinkages among Energy, Poverty and Inequalities“ 5. 

IRENA ”Renewable energy benefits” 24–54. See also McCollum \textit{et al} “SDG 7 Ensure Access“ 133, Frondel \textit{et al} ”Economic impacts from the promotion of renewable energy” 4048–4056, UNDP \textit{et al} ”Interlinkages among Energy, Poverty and Inequalities“ 5. 

IRENA ”Renewable energy benefits” 24–54. See also McCollum \textit{et al} “SDG 7 Ensure Access“ 133, Frondel \textit{et al} ”Economic impacts from the promotion of renewable energy” 4048–4056, UNDP \textit{et al} ”Interlinkages among Energy, Poverty and Inequalities“ 5. 

In most cities, especially in developing countries, charcoal is the main source of energy for cooking. Access to modern fuels and electricity will help in prompting the achievement of building sustainable cities by providing stoves for cooking, promote transport facilities (electric trains, lighting tunnels among others), easing the movement of people within cities and lighting city buildings beyond
energy systems, in particular, create conditions for cities and human settlements to be inclusive, safe, resilient, less polluting and more sustainable. A transition from fossil fuel energy sources to RE technologies and infrastructure systems can have a major impact on the sustainability of city or communities – reducing air and water pollution arising from fossil transport, housing and urban planning. Ideally, smart grids may be developed in order to facilitate the uptake of RE development at the domestic or neighbourhood scale.

4.5.11 Ensure sustainable consumption and production patterns (SDG 12)

Measures to reduce waste and pollution, improve resource efficiencies, increase recycling and reuse and promote awareness about more sustainable lifestyles are directly linked to the efficient use of energy resources. In this regard, countries are to develop and use their natural resources that respond to basic needs and bring better quality of life while minimising the use of natural resources and toxic materials as well as the emission of waste and pollutants, not to prejudice the needs of the future generations. Phasing out inefficient, wasteful and market-distorting fossil fuel subsidies – in a way that minimises counteracting adverse side effects on the poor could reinforce attempts to deploy renewables and energy-efficient technologies and consumption patterns. Responsible consumption is likely to trigger responsible production and minimise waste, in turn reducing the amount of energy associated with waste handling and management.

See also McCollum et al “SDG 7 Ensure Access” 134. See also Wolpe, Reddy and Euston-Brown “Energising Urban South Africa” 3–4.
4.5.12 Take urgent action to combat climate change and its impacts (SDG 13) and conserve and sustainably use the oceans, seas and marine resources for sustainable development SDG 14)

The deployment of RE is central to keeping global climate change warming to well below two degree Celsius above the pre-industrialised levels in order to address the effects of climate change. However, increased access to RE would not be entirely sufficient given the scale of challenges surrounding its uptake. Ideally, climate change measures would have to be integrated into national planning, improve education, awareness, and capacity on climate issues, and mobilise funds for mitigation to further targets for RE.

RE generated from offshore wind, wave and tidal power farms is a good resource base for coastal communities. The use of fossil fuel reserves located offshore is likely to increase GHG emissions resulting to increased ocean acidification. However, increased RE access will help decrease ocean acidification (via lower carbon emissions), resulting from fossil fuel production and transport activities on aquatic habitats. Concerns of ocean-based energy installations could be spatial competition with other marine activities such as tourism, shipping, resource exploitation, marine and coastal habitats as well as protected areas.

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145 See paragraph 2.4.5 above. See also Vienna Energy Forum “Sustainable Energy” 14.

146 McCollum et al “Connecting the Sustainable Development Goals” 1–17.

147 Ocean acidification occurs when carbon dioxide (CO2) is absorbed by seawater, chemical reactions occur that reduce seawater pH (pH is a measure of acidity or alkalinity. A pH below seven is considered acidic and a pH greater than seven is considered alkaline) carbonate ion concentration, and saturation states of biologically important calcium carbonate minerals. These chemical reactions are termed “ocean acidification”. Ocean acidification has a dramatic effect on some calcifying species, including oysters, clams, sea urchins, shallow water corals, deep sea corals, and calcareous plankton, putting shelled organisms at risk as well as the aquatic ecosystems. See NOAA 2016 http://oceanacidification.noaa.gov/Home.aspx.


4.5.13 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss (SDG 15)

Ensuring that the world’s terrestrial ecosystems and forest is sustainably used will have a direct effect of halting deforestation, since firewood taken from forests is an energy resource used by the poor. Conversely, protecting terrestrial ecosystems, sustainably managing forests, halting deforestation, preventing biodiversity loss and controlling invasive alien species could potentially clash with efforts to expand renewables as the large scale use of bioenergy would be constraining. Extensive land needed for RE production such as solar panels is likely to conflict with land use for agricultural purposes and protected lands. Sound policies could ensure that bioenergy crops are primarily grown on degraded lands, which might mean they have little impact on global agricultural markets and could simultaneously improve soil carbon and terrestrial biodiversity. Furthermore, international cooperation is of particular relevance, since deforestation in one country may have indirect impacts on the world’s emission reduction level.

4.5.14 Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels (SDG 16)

To ensure universal access to energy and increase the share of RE in the global energy mix, institutions are needed at all levels of government—local, national, international, for creating necessary conditions. The reduction of corruption, where it exists, will help these institutions (domestic and international) maximise their societal impacts and ensure that the optimal mixes of measures for energy access provision and RE are implemented.

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150 See paragraph 2.2.1 above. In most developing countries, traditional biomass mostly in the form of wood is the major source of energy for basic household services such as cooking and lighting. The cutting down of tress for wood is unsustainable and leads to deforestation, desertification, land degradation and massive biodiversity loss. See International Council for Science “Review of Targets for the Sustainable Development Goals” 77.


effectively. Furthermore, strengthening the capacity of developing countries to participate at the international level—within UN agencies, regional development banks, the World Trade Organisation, among others—will be of great importance for issues such as trade, foreign direct investment, labour migration, policy and institutional arrangements and technology transfer. Importantly, cutting down on perverse subsidies for fossil fuels could help to achieve increased RE access.

4.5.15 *Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development (SDG 17)*

Ensuring that the means of implementation of the SDGs are strengthened and the Global Partnership for Sustainable Development revitalised will reinforce the overall objective of realising all the SDGs. In order to achieve universal access to modern energy and to increase access to RE, it is critical that all countries are able to mobilise the necessary financial resources and share knowledge and innovative technologies. Furthermore, countries would have to be willing to follow recognised international trade rules and ensure that least developed countries take part in global trade, countries should respect each other’s policy space and decisions, forge new partnerships between their public and private entities and within civil society and support the collection of high-quality, timely and reliable data relevant to the furthering of their aims.

From the above discussion, it is clear that access to modern energy and specifically RE as provided for by Agenda 2030 is critical for the overall promotion of sustainable development. While specific measures of achieving the SDGs and targets are sometimes not provided for by Agenda 2030, it becomes necessary to discuss the relevant international legal framework measures related to increased RE access.

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155 Finances in this case can be mobilised via taxes on fossil energy, sustainable financing, foreign direct investment and financial transfers from industrialised to developing countries. See Berensmann *et al* “Strengthen the means of implementation” 87–92.

156 Berensmann *et al* “Strengthen the means of implementation” 87–92.
4.6 International legal framework on RE access

The international legal framework on RE is actually well developed in relation to the IRENA mechanisms and international best practices. While the establishment of the IRENA and the subsequent drafting of its Statute undoubtedly initiated the movement towards a global RE regime, the growing concerns of lack of access to modern energy and climate change effects underlined some significant deficiencies and gaps in the international legal and regulatory norms established to promote increased RE access. In this regard the IRENA has set out an international legal framework to gear cooperative efforts towards building and strengthening a global RE regime. Although an international legal framework, it is important to note that IRENA mechanisms on increased RE access are not binding international law as they are neither contained in a treaty or form part customary international law. They only become binding once they are adopted either as voluntary or legally binding instruments at the regional, sub-regional and national levels. To start with, a discussion on the IRENA would be provided providing a background for its mechanisms on increased RE access.

4.6.1 IRENA, 2009

Initially, there was no international organisation with a mandate to host and facilitate discussions on RE. In responding to such a need, the International Renewable Energy Agency (IRENA) was established in 2009. This non-UN organ has as main objective to promote the widespread, increased adoption and the sustainable use of all forms of RE (which would later become one of the targets of the SDGs). The Agency’s Statute

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158 See paragraph 3.4.8 above.

159 Overland and Reischl 2018 IEGPLE 336. See also Urpelainen and Van de Graaf 2015 IEGPLE 161; Parker 2016 Yale International Law Yearbook 363.

160 International organisations usually consisting of codes of conduct, guidelines and recommendations. See paragraph 3.4.1 above.

161 Paragraph 1 IRENA Statute. IRENA was established in Bonn on 26 January 2009. Being one of the leading RE international organisations, IRENA’s prime objective is to foster the widespread and sustainable use of RE around the world. This broad aim finds expression in a number of concrete activities. These include: improving political framework conditions for RE by means of customised political consultancy, promoting the transfer of knowledge and technology in the field of RE and
charges it with fulfilling this mission by, among other things, analysing member states' laws and policies with regard to RE and technology transfer, coordinating with other intergovernmental and non-governmental agencies, facilitating investment in RE and technology transfer as well as encouraging research into RE, its effects, and how it can be effectively deployed. Research as a measure to promote RE would later be provided for by the SDGs.

The main objective of IRENA is weakened by the requirement that it takes into account state’s national and domestic priorities. As such, IRENA has no express power to establish legally binding international RE obligations. This may limit the organisation’s opportunity to promote the SDGs, where such a power could assist in improving the coordination and effectiveness of domestic RE targets. Meyer is of the opinion that “the narrow mandate of IRENA could be perceived as a strength that could potentially equip IRENA to become a streamlined institutional facilitator and global centre of excellence for RE.” He proposes that IRENA could push for global innovation and diffusion of RE technology, which might likely bring about the direct benefit of addressing energy poverty and mitigating climate change. Furthermore, he argues that, IRENA’s limited mandate may also reduce the jurisdictional overlap between IRENA and other intergovernmental organisations. The IRENA is still the only organisation directly focusing on RE. The International Energy Agency (IEA) is one of the organisations with a similar mandate as IRENA.

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162 Support capacity building in the field of RE. Article 3 Statute of the International IRENA, Bonn (Germany), 26 January 2009, in force 8 July 2009.

163 Article IV IRENA Statute. In January 2018, IRENA had 106 members, including the EU and 54 signatories. African member states include Senegal, Cameroon, Côte d’Ivoire, Egypt, Kenya, Morocco, Nigeria, Seychelles, Zambia, Zimbabwe, Togo, South Africa, Sierra Leone, Rwanda, Mozambique, Gabon, Chad, Burkina Faso, Botswana, Benin, Algeria, Ethiopia, Eritrea, Ghana, Lesotho, Mali, Namibia, Tunisia and Uganda. See IRENA “Africa Power Sector” 8.

164 Article II (a) IRENA Statute.

165 Articles IV (A) (1), IX (A) (3) (a)–(b), IX (G), X (F), XI IRENA Statute.

166 Meyer 2012 Duke Journal of Comparative & International Law 345.

167 The other organisations have different aims with indirect mandate to promote RE development. These organisations include IEA, REN21, UNEP, UNIDO amongst others.

168 The IEA was founded in 1974 to help countries co-ordinate a collective response to major disruptions in the supply of oil. While this remains a key aspect of its work, the IEA has evolved and expanded. It is at the heart of global dialogue on energy, providing authoritative statistics and analysis. As an
Nonetheless, it has a broader mandate (energy security, economic development through stable energy supply, analysis of the traditional energy sources employment) and as a result of its restricted membership (membership limited only to OECD countries), RE does not form its main focus.\textsuperscript{169} The mandate of the Renewable Energy and Energy Efficiency Partnership (REEEP)\textsuperscript{170} and the Renewable Energy Policy Network for the 21st Century (REN21)\textsuperscript{171} is similar to that of the IRENA. Though REN21 has some common goals with the IRENA, being a multi-stakeholder network and a platform for knowledge exchange, REEEP is mostly involved in practical operations.\textsuperscript{172} For example, it has gathered funds for over 180 clean energy projects in 58 countries. The IRENA’s Statute does not provide for direct financing of RE projects.\textsuperscript{173} The \textit{United Nations Environment Programme} (UNEP) has as objective to assist developing countries in all kinds of environmental activities and to advise on policies that are not limited to climate change mitigation but include wise environmental management and technology transfer for sustainable development.\textsuperscript{174} Furthermore, the \textit{United Nations Development Programme} (UNDP) focuses on development and collaborates with developing countries in capacity building to integrate environmental considerations into their national policies.\textsuperscript{175} However, UNIDO promotes autonomous organisation, the IEA works to ensure reliable, affordable and clean energy for its 29 member countries and beyond.


\textsuperscript{170} REEEP is a non-profit organisation operating in developing countries in order to scale up clean energy projects in three main ways. They include “funding small-to-medium scale project interventions that address the barriers to market development and assist business models in scaling up, providing internet-based information resources an information portal for clean energy that is funded jointly with REN21 and connecting and supporting champions of clean energy via several sub-networks of stakeholders”. Launched in 2002, the organisation is supported by various governments (e.g. certain EU countries, Australia, Canada, New Zealand, Switzerland and the US), as well as financial institutions (e.g. the OPEC Fund for International Development).

\textsuperscript{171} REN 21 is a non-profit association that tries to connect governments, international organisations, industry and academia in an effort to promote joint action in the RE deployment. Its goal is to facilitate knowledge exchange, policy development and joint action towards a rapid global transition to RE. Its activities are managed by a lean Secretariat, based at UNEP in Paris, France. See REN 21 2013 http://www.ren21.net.

\textsuperscript{172} IRENA Handbook on RE Nationally Appropriate Mitigation Actions (NAMAs) for Policy Makers and Project Developers. IRENA 2012 https://www.irena.org.

\textsuperscript{173} IRENA Handbook on Renewable Energy Nationally Appropriate Mitigation Actions (NAMAs) for Policy Makers and Project Developers. IRENA 2012 https://www.irena.org.

\textsuperscript{174} Institutional and financial arrangements for international environmental cooperation UN GA resolution A/RES/27/2997.

\textsuperscript{175} UN GA resolution A/RES/20/2029 of 22 November 1965 on "Consolidation of the Special Fund and the expanded Programme on Technical Assistance in a United Nations Development Programme."
mainly cleaner energy and environmentally sustainable use of electricity in the industrial
and agro-processing sectors.¹⁷⁶

In order to enhance RE access and to achieve sustainable development, IRENA is urged
to cooperate with organisations and institutions operating in the field of RE.¹⁷⁷
Acknowledging benefits that could stem from collaboration with such organisations, a
partnership of cooperation was signed between IRENA and REEEP in August 2011.¹⁷⁸ In
terms of this partnership, the two organisations are to cooperate, exchange information,
expertise and implement various programmes and best RE practices.¹⁷⁹ Furthermore, the
IRENA and REN21 signed a memorandum of understanding in January 2012 – mandating
IRENA and REN21 to cooperate in the development of joint projects on creating
qualitative and quantitative RE database framework.¹⁸⁰ Notwithstanding, in enhancing a
RE finance, technology, knowledge as well as cooperation programmes, IRENA has
among other things released a *Nationally Appropriate Mitigation Actions Handbook*¹⁸¹ to
assist in the transition to sustainable energy production and consumption, engaged
representatives from Gulf states to discuss increase use of RE in the region.¹⁸²
Appreciation to this effect is due to the fact that, the IRENA Statute clearly makes mention
of cooperation in RE development and use – a measure that would later become
synonymous with the SDGs.¹⁸³

While facing challenges for RE access, IRENA’s limited mandate allows it to focus on
improving access to RE technology but cannot set binding targets. Though difficult to
establish an international institution with powers to negotiate and monitor international
principles, rules and standards on RE, such a forum would likely advance the initiative of
doubling the share of RE in the global energy mix. Expanding IRENA’s mandate to include

¹⁷⁷ Article XIV of the IRENA Statute.
¹⁸¹ IRENA Handbook on Renewable Energy Nationally Appropriate Mitigation Actions (NAMAs) for Policy
¹⁸² Furthermore, IRENA has also agreed on a memorandum with the Dubai Electricity and Water Authority
to accelerate Dubai’s RE uptake and created the Global Atlas for RE Resources. See IRENA Welcome
¹⁸³ See paragraph 4.3.
binding RE targets and making it an international RE hub would likely foster RE development. With the recently launched IRENA RE Roadmap to 2030 that might boost this process, IRENA would likely advance universal access to modern energy. Although not part of the UN family, it is possible for IRENA to be incorporated in the future. Having 158 states and the European Union as a member (almost all European and African countries and also major states such as US, China, India, Japan and Australia), as members should be considered a great achievement on international effort towards increased RE access.

The envisaged regime of the IRENA mechanism to increase RE access can be categorised under two principal headings, namely, regulatory and fiscal instruments necessary to increase RE access in the global energy mix. While the RE regulatory instruments focus on challenging RE power producers to produce more energy to inject into the power grid, the public finance instruments are geared towards making finances and subsidies available for prospective RE power producers. In order to obtain clarity to the content of IRENA legal framework, an overview of measures comprising the framework is provided.

4.6.2 Regulatory instruments

RE regulatory instruments under IRENA legal framework include renewable energy portfolio standard, feed-in laws, tradable RE certificates and net-metering.

4.6.2.1 Renewable energy portfolio standard

The RE portfolio standard, as part of IRENA’s legal framework and also known as a quota obligation, requires power supply utilities or bodies to obtain a specific quantity or percentage of energy from RE sources. RE portfolio standards, which most often take the form of mandatory frameworks is one implemented in a number of ways, namely,

\[ \text{IRENA Doubling the Global Share of Renewable Energy: A Roadmap to 2030, 2013 at http://www.irena.org.} \]
\[ \text{Overland and Reischl 2018 IEGPLE 336. See also Urpelainen and Van de Graaf 2015 IEGPLE 161, Parker 2016 Yale International Law Yearbook 363; Gao “A more sustainable way to promote PV” 47-49.} \]
\[ \text{UNDP “Review of international”8. See also GIZ “Legal Frameworks for Renewable Energy” 19} \]
through megawatt targets and specific quantities of RE and specific technologies. Implementation based on megawatt targets entails obtaining specific megawatts of energy from RE sources, which is likely to increase at a set rate or percentage over time.\textsuperscript{187} Based on binding obligations, RE portfolio standards require power supply utilities to obtain specific quantities of their electricity from RE sources and from certified independent RE power producers.\textsuperscript{188} Specific RE technology specific entails power supply utilities to supply energy based on specific RE technology. For example, power supply utilities can be obliged to supply electricity for lighting specifically through PV systems and fuel household gas such as solar water gassers among others. Notably, under the specific technology RE portfolio standards, power supply utilities have the choice of obtaining power supply either from personally operated power plants or from independent power producers at market determined prices.\textsuperscript{189} The megawatt (MW) targets and specific quantities RE portfolio measures of implementation are technology neutral (do not specify technologies through which sourced RE is to be supplied to end users). Technology measures on the other hand, clearly specify technologies through which sourced RE sources are to be supplied to end users. Compliance with the RE portfolio standards must be prove by obtaining “RE credits”\textsuperscript{190} from a competent energy authority.\textsuperscript{191}

There are Challenges associated with the RE portfolio standards. They include the possibility monopoly of power supply utility (market cannot determine price since there is no competition among buyers) determining the price for credits to their benefit against that of independent power producers.\textsuperscript{192} Another challenge is cost as electricity from RE sources appears to be slightly higher than energy from conventional sources.\textsuperscript{193}

\begin{thebibliography}
\bibitem{187} UNDP “Review of international” 8. See also Mormann 2017 \textit{Harvard Environmental Law Review} 198.
\bibitem{188} UNDP “Review of international” 8. See also GIZ “Legal Frameworks for Renewable Energy” 19.
\bibitem{189} UNDP “Review of international” 8. See also Mormann 2017 \textit{Harvard Environmental Law Review} 198.
\bibitem{190} Renewable energy credits refer to Tradable Green Certificates or Renewable Energy Guarantees of origin obtained from relevant energy authority as a sign of compliance with RE portfolio standards. See Mormann 2017 \textit{Harvard Environmental Law Review} 198.
\bibitem{191} Mormann 2017 Harvard Environmental Law Review 198.
\bibitem{192} Passey, Watt and Woldring “Review of International Renewable Energy Support Mechanisms” 9. faces a number of challenges. The monopoly/single power supply utility in Fiji for example poses serious to Fiji’s RE portfolio standards.
\bibitem{193} This is a common challenge faced by RE portfolio standards in UK, Denmark, Italy and Australia among others. Passey, Watt and Woldring “Review of International Renewable Energy Support Mechanisms” 9, See also Haas \textit{et al} 2011 \textit{Renewable and Sustainable Energy Reviews} 1021–1023.
\end{thebibliography}
Nonetheless, a quota or auction procurement programme availing RE producers to power supply utilities would likely be of great importance to balance or level the playing field between RE and conventional energy sources.194

4.6.2.2 Feed-in tariffs

Feed-in tariffs as a legal RE mechanism requires electricity suppliers to purchase and connect independent RE power producers to their power grid at a fixed price (per kWh) and for a specific period.195 Most often set by the relevant power supply utilities, specific feed-in tariffs are set for specific RE technologies.196 These types of feed-in tariffs include gross feed-in tariff197 and net feed-in tariff.198

Feed-in tariffs that are most often regulated based on feed-in procurement programmes require open access to long term purchase contracts for the sale of RE.199 Typically offered between 10 to 15 years, feed-in procurement payment levels are periodically reviewed and adjusted to keep payment levels in line with cost trends.200 Either payments under feed-in procurement are set, based on the estimated generation cost of projects or utilities avoided cost for specific technology types and project sizes.201

While feed-in procurement programmes give developers access to markets, they also provide market security by offering long-term contracts, transparent prices, and standardised contracts. Supporting a wide variety of developers (including homeowners,
business owners, federal, state and local government agencies, private investors, non-profit organisations, and sometimes utilities) and installation of different technologies means that feed-in tariffs do not target least cost generation. Higher rates affect consumers.\textsuperscript{202} In addition, the geographic distribution of renewable electricity development under feed-in tariffs can also require investments in new grid capacity, which can reduce the willingness of utilities to cooperate unless rate recovery is assured.\textsuperscript{203}

Being one of the most widely used RE mechanism,\textsuperscript{204} feed-in has been adopted by a range of countries globally. With regard to the developed world, countries such as Germany, Spain, United States of America, France, Greece and Australia, have for example, introduced feed-in tariffs.\textsuperscript{205} At the African level, feed-in tariffs have been adopted by Ghana, Nigeria, Uganda, Kenya and South Africa.\textsuperscript{206} Common deficiencies in the implementation of feed-in tariffs include lack of statutory provisions, limited scope as well as fixed maximum tariffs.\textsuperscript{207} As in the case in most African countries, Kenya’s feed-in tariff provides for maximum tariffs, limiting actual payments to lower rates depending on the agreement between the power utility provider and the independent power producers. Furthermore, Kenya’s feed-in tariffs was created \textit{via} a regulation as opposed to a statutory provision.\textsuperscript{208} This created insecurity and discourages investors.\textsuperscript{209} Ideally, feed-in tariffs would likely work best where there is long-term reliability and continuity of public policies as well as legal security for individuals and relatively small investors.\textsuperscript{210}

\textsuperscript{204}Feed-in tariffs current exist in 98 countries with most of the recent adopters being developing nations See REN21 2014 http://www.ren21.net/Portals/0/documents/Resources.
\textsuperscript{205}Grau “Comparison of Feed-in Tariffs and Tenders to Remunerate” 2.
\textsuperscript{207}Grau “Comparison of Feed-in Tariffs and Tenders to Remunerate” 2.
\textsuperscript{208}Kenya’s Feed-in-Tariffs policy for wind, biomass, small hydro’s, geothermal, biogas and solar, 2nd revision, December 2012.
\textsuperscript{209}Van der Linden \textit{et al} “Review of international” 11. See also Gachenga “Legal and Policy Frameworks” 143.
\textsuperscript{210}Van der Linden \textit{et al} “Review of international” 11. See also Gachenga “Legal and Policy Frameworks” 143.
levelling the playing field for all power. Similar to feed-in tariff is tradable RE certificates.

4.6.2.2.1 Tradable renewable energy certificates

As part of IRENA’s legal framework, tradable renewable energy certificates (TRECs) are also known as green certificates, green certificates, RE credits, alternative energy credits or green tags. TRECs are non-tangible and tradable commodities that prove that a specific quantity of electricity was generated from RE resources. TRECs, which are being used in either voluntary or mandatory frameworks, are issued by relevant energy authorities to RE producers and are tradable. Generally, tradable RE certificates operate under three institutional entities, namely, an executive body, issuing body and a monitoring body. The executive body formulates rules and regulations for the issuing body, monitoring body, producers and the renewable energy credit (RE credit) market and set binding targets for RE producers. RE producers are to obtain RE credit for electricity produced from eligible RE resources specified by the executive body. In the process of issuing the TRECs the monitoring body verifies the RE production technology and total RE produced as claimed before the TRECs is issued. Once the TRECs are received, producers can now distribute the TRECs to the market for it to be traded. There is no uniform institutional entities, obligated actors, quotas and market rules exist for TRECs as this varies from country to country depending on specific regulatory framework. However, RE credits can provide additional revenue stream for RE Independent Power Producers (IPPs) and as such increase investment in RE projects. Furthermore, the verification of green power is likely to create a credible platform from which individuals and organisations can demonstrate a commitment to environmentally sustainable

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211 Van der Linden et al “Review of international” 11. See also Gachenga “Legal and Policy Frameworks” 143.
218 Brick and Visser “Green certificate Trading” 7.
purchases and consumption. TREC would also allow mandatory share of renewable electricity to be achieved in a more cost-effectively manner and as such levelling the playing field between energy generated from RE and conventional energy sources.

TREC as a mechanism to increased access to RE has been adopted in Denmark Australia, Sweden, Norway, the United States of America and South Africa. In South Africa for example, the TREC, which is operated as a voluntary market, has been developed consistent with the EU RE credits. The TREC is managed by the South African National Tradable Renewable Energy Certificate Team (SANTRECT) with zaREC as the TREC body responsible for issuing RE certificates. Currently, the South African voluntary RE credit market has about 100 active participants and has issued about 40 897 MWh worth RE credits. Another mechanism is net-metering.

4.6.2.2.2 Net-metering

Net-metering, as part of IRENA’s legal framework, allows utility customers (electricity consumers) to offset some or all of their electricity use against the electricity they use from the grid. Net-metering operates through the installation of meters that spin and record energy flow into and out of the power grid. Installed net-metering meters move forward when power is being drawn from the utility supply grid (indicating consumers are using more than they are producing) and move backward when energy is being injected into the supply grid (indicating that electricity consumers are using less energy than they

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219 Brick and Visser “Green certificate Trading” 7.
220 Brick and Visser “Green certificate Trading” 7.
222 Formed by the Department of Energy, the SANTRECT has a responsibility to facilitate and coordinate the establishment of Issuing Body (IB) as Non-Profit Organisation (NPO) that will be responsible for registering, issuing, transfer and redeem certificate in South Africa. SANTRECT is made up of zaRECs (Pty) Ltd is a company designated by the SANTRECT to act as TREC issuing body for the South African voluntary REC market on behalf of members of the voluntary Renewable Energy Certificate South Africa market participant’s association (RECSA).
223 Brick and Visser “Green certificate Trading” 7.
224 Brick and Visser “Green certificate Trading” 7.
are producing), billing customer only for net electricity used at the end of each month.\(^{228}\) In situations where more energy is produced than consumed, utility consumer’s accounts are credited and RE credit received towards the next billing circle.\(^{229}\) However, in the case of a surplus at the end of a year, consumers can either receive payments for such at retail cost price from power utility suppliers or RE credit carried over for the next year (compensation for positive negative balances) or RE credit are return back to the power utility supplier depending on the nature of the regulatory policy.\(^{230}\)

Net-metering schemes are operated under both voluntary and legal frameworks and have been adopted in Belgium, Cyprus, Denmark, Italy, the Netherlands, Australia, Canada, Thailand and the US.\(^{231}\) In Africa, only Cape Verde has adopted net-metering as a mechanism to increase RE access. Net-metering as a voluntary RE measure is regulated in terms of Decree n° 1/2011 of Cape Verde.\(^{232}\) In South Africa, a draft consultative paper for net-metering was issued by the National Energy Regulator of South Africa in 2015, but till date guiding rules are yet to be published. It creates uncertainty to the implementation of net-metering in South Africa.\(^{233}\)

\textbf{4.6.3 Fiscal instruments}

Fiscal instruments as envisaged by the IRENA are discussed under two sub-headings, namely, public finance instruments and tax incentives. Public finance instruments will be discussed first.

\textbf{4.6.3.1 Public finance instruments}

Periods with regard to repayments and interest rates on loans have huge impacts on the cost of RE projects, especially on smaller RE projects or project developers with no proven track record.\(^{234}\) Consequently, governments or proxies acting on behalf of government

authorities can intervene by increasing the commercial viability of RE projects significantly by offering low interest loans, loan guarantees, grants, capital subsidies, rebates and government procurement programmes.\textsuperscript{235}

Loan programmes, as public frameworks offer financing for the development of RE projects. Loan guarantees require a contractual promise provided by financial or capitalised organisations, taking responsibilities for the payment of the producer’s debts and offsetting of the incurred losses.\textsuperscript{236} Loans, which can be below or at market interest rates, can take a variety forms, for example, residential, commercial and industrial loans.\textsuperscript{237} Funding, which may range from a fraction to 100 per cent of a project, can be sourced from well-capitalised organisations (World Bank, African Development among others) and in a situation where projects or regional programmes fall into arrears, the guarantor can step in to cover the loss.\textsuperscript{238} Loans, as measures for increased RE access have been adopted in a range of developing countries, namely, India, China and Sri Lanka. The India Renewable Energy Development Agency, 1987 was for example established with the aim of providing assistance in obtaining multi-lateral international and national commercial RE loans.\textsuperscript{239} By the end of 2001, the India Renewable Energy Development Agency had disbursed about US$400 million for RE projects, resulting to about 1600 MW of RE generated.\textsuperscript{240}

As an alternative to loans as measure to increase RE access some governments offer RE grants to RE producers either on voluntary or legally binding basis. Grants can be obtained from governmental entities or international organisations, promoting environmental and developmental policies, taking the form of a statement of the work that will be performed using the aid.\textsuperscript{241} These statements of work must provide timeframes as well as restrictions on how the money will be spent.\textsuperscript{242} Grants are commonly directed towards research and development, system demonstration, feasibility studies, installations as well as operation

\textsuperscript{237} Becks and Martinot 2004 Encyclopaedia of Energy 375.
\textsuperscript{239} Becks and Martinot 2004 Encyclopaedia of Energy 375.
\textsuperscript{241} Cox “Financial Incentives” 2.
\textsuperscript{242} Cox “Financial Incentives” 2.
of the projects.\textsuperscript{243} In line with the RE grants, rebates do not require repayment. Rebates are commonly directed towards the purchase of appliances after installation RE of the projects.\textsuperscript{244} In South Africa grants are provided for RE generation under the Department of Trade and Industry’s (DTI) voluntary Manufacturing Competitiveness Enhancement Programme. Under the Manufacturing Competitiveness Enhancement Programme, the DTI has assisted a number manufactures in the RE sector such as SMA Solar Technology South Africa and Jinko Solar through its trade and investment promotion activities.\textsuperscript{245} The interest rate and repayments schedule under the Competitiveness Enhancement Programme vary as they are based on specific contractual arrangements.

Capital subsidy requires a direct transfer of money from government to RE producers to cover a share of the upfront capital cost for specific RE technologies.\textsuperscript{246} At the international level, banks such as the Asian Development Bank and the African Development Bank have also provided funding for RE projects.\textsuperscript{247} However, the international climate change funds are also a possible funding source for RE development. Capital subsidies as increased RE deployment mechanisms have been adopted in Chile, China, Ghana, India, Indonesia, South Africa, Thailand, and Tunisia.\textsuperscript{248} The capital subsidies in Ghana are provided in terms of its \textit{Renewable Energy Act}, 2011.\textsuperscript{249} Nonetheless the government of Ghana does not personally provide such capital but rather source funds from international organisations.\textsuperscript{250} For example, the African Development Bank in 2015 approved a 1.5 million US dollar grant from its Sustainable Energy Fund for Africa (SEFA), to assist Ghana’s RE investment drive.\textsuperscript{251} Grants and rebates provide direct cash incentives to support RE deployment and do not require repayments. However, rebates are provided after actual installation of RE projects while grants are provided before actual installation.

\begin{footnotesize}
\textsuperscript{243} Cox "Financial Incentives" 2.
\textsuperscript{244} Akan et al 2015 \textit{Sustainability} 16386.
\textsuperscript{245} Department of Trade 2015 http://www.dti.gov.za.
\textsuperscript{246} Akan et al 2015 \textit{Sustainability} 16386.
\textsuperscript{247} Akan et al 2015 \textit{Sustainability} 16386.
\textsuperscript{249} Ghana Renewable Energy Act, 2011.
\textsuperscript{250} UNDP "Renewable Energy Policy Review" 5.
\textsuperscript{251} UNDP "Renewable Energy Policy Review" 5.
\end{footnotesize}
Procurement programmes that operate either on a mandatory or voluntary basis require governments to launch an auction process or issue a call for tenders, setting an auction demand, qualification requirements, winning selection processes and set out the seller and buyer liabilities and obligations. The implementation of procurement programmes takes a variety of approaches, namely, a sealed-bid auction, the descending clock auction and hybrid type of auction/tender. Importantly, in order for a procurement programme to be functionally competitive, there must be more than one approach.

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252 Auction demand under auction procurement includes specific demand bands, determining the auctioned volume, periodicity and long-term commitments as well as the demand side responsibilities. See Kruger and Eberhard "Renewable Energy Auctions in Sub-Saharan Africa" 3. See also IRENA and CEM "Renewable Energy Auctions – A Guide to Design" 13–14.

253 Qualification under auction determines which suppliers are eligible to participate in the auction, as well as the conditions with which they must comply and the documentation that they must provide prior to the bidding/evaluation stage. This includes "reputation requirements, technological requirements, production site selection and documentations securing grid access and measures to ensure socio-economic development". See Kruger and Eberhard "Renewable Energy Auctions in Sub-Saharan Africa" 3. See also IRENA and CEM "Renewable Energy Auctions – A Guide to Design" 13–14.

254 Winner selection process involves "the bidding and clearing rules as well as the process of awarding contracts to the winners. This includes bidding procedure, requirements of minimal competition, winner selection criteria and payment to the Auction Winner". See Kruger and Eberhard "Renewable Energy Auctions in Sub-Saharan Africa" 3.

255 Sellers and buyer's liabilities and obligations under auction procurement includes "commitment to contract signing, contract schedule, remuneration profile, settlement rules and underperformance penalties, delay and underbuilding penalties, assigned liabilities for transmission delays and risk mitigation and credit enhancement". See Kruger and Eberhard "Renewable Energy Auctions in Sub-Saharan Africa".

256 Under a sealed-bid auction procurement bidders are required to simultaneously submit their bid, stipulating their price and quantity and do not disclose their information to other bidders. The selection process subsequently commences with the government selecting winning bids based on mandated requirements, classifying them beginning with the lowest to the highest price. Price must be approximate to marginal cost. Contracts are awarded beginning with the lowest price until the quantity that the government offers covers the quantity needed. IRENA "Renewable Energy Auctions" 11. See also Elizondo, Barroso and Cunha "Promoting Renewable Energy through Auctions" 1–7; Förster and Amazo "Auctions for Renewable Energy" 1–18; Gephart, Klessmann and Wigand 2017 Energy & Environment 145–165.

257 A descending clock auction encourages the development of RE generation by conducting a multi-rounds bids – where the government/auctioneer calls for bid for a specific quantity of electricity and at a particular price (announced price). Developers bid for the right to supply RE and the quantity of electricity they wish to supply at the announced price. The announced price is progressively being lower until the quantity offered aligned with the quantity to be procured. Being very dynamic, in the case of a descending clock auction, developers know each other’s bids and adapt their quantity and price according to subsequent rounds. Maurer and Barroso "Electricity Auctions: An overview of efficient practices" 19. See also Wigand et al "Auctions for Renewable Energy Support: Lessons Learnt from International Experiences" 1–43.

258 The implementation of hybrid auctions, requires actioners/government to organise a two round bid, with the first round operating as a descending clock bid and the second as a pay-as-bid sealed bid auction. The hybrid auction in encouraging RE development, takes advantage of the benefits of both the descending clock bid and the pay-as-bid sealed bid auction. IRENA "Renewable Energy Auctions" 10. See also Maurer and Barroso Electricity Auctions: An overview of efficient practices 19.
buyer or seller. If these conditions are met, procurement programmes are likely to result in cost efficiency as a result of price competition among producers. Procurement programmes are also likely to negatively impact access to markets, particularly for smaller and less established players. Such participants, particularly those without access to capital, may have trouble meeting the minimum project viability criteria since financing occurs later in the project development process.

Countries that have adopted procurement programmes include the United States of America, UK, Denmark, Germany, Ireland, Brazil, China, Australia, Italy, Portugal, China, Morocco and South Africa. In Australian, for example, the Mandatory Renewable Energy Target (MRET), 2001 was established as part of a broader government response to climate change. The Australia Renewable Energy (Electricity) Act, 2000 mandates the generation of an additional 9500 GWh of RE per year by 2010 in the period 2020. The MRET operates by imposing a binding obligation to support RE electricity generation on large wholesaler purchasers of electricity, for example, an electricity retailer that buy’s wholesale electricity to meet its retail sale obligations. The MRET is backed by a TREC system that held parties liable if they do not comply with their RE target obligations, in which case “a Renewable Energy Shortfall Charge (penalty) of 40 Australian dollars per TREC applies”. Furthermore, in the USA, about 25 states have mandatory renewable portfolio standard obligations while four additional states have voluntary RE standards.

The South African government introduced its voluntary base Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) in 2011. Established in terms of the Integrated Resource Plan, 2011 (IRP), the REIPPPP aims to achieve a 19 GW installed RE capacity by 2030 as set out in the IRP. In achieving this target, the

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262 The South African REIPPPP is a competitive tender process that is designed to facilitate private sector investment into RE generation, diversifying RE technologies in South Africa. Bischof-Niemz and Fourie “Cost of new power generators in South Africa” 4.
263 The Integrated Resource Plan (IRP) is the key planning document that guides the energy mix for electricity generation in South Africa.
264 The overall requirements for the SA REIPPPP were established through Ministerial Determinations based on the IRP, specifying what new generation capacity is needed, from which sources, and whether it should be from Eskom or an independent power producer. The regulator (which is the National Energy Regulator of South Africa, established in terms of section 3 of the National Energy
REIPPPP between 2011 and 2015 completed four bidding rounds with Eskom being the only buyer. With a fierce competition of bidding rounds, about 390 submissions and a quarter of these being selected for the procurement of 6,328 MW, amounting to R193 billion investment. An additional expedited round was held in 2015. This permitted previous losing bidders to rebid their projects at more competitive prices.

In bridging the gap between big and small RE developers (as such encouraging small RE developers in to the market), the South African the Department of Energy (DOE) also introduced the Small Projects Independent Power Producers Procurement Programme (SP-IPPPP) in 2013. Aimed at procuring 200 MW from projects of only 1 to 5 MW each and making the bidding process simpler and less expensive for small and medium enterprises (SMEs) in South Africa (which were often unable to compete effectively with larger players), the SP-IPPPP offered a 50 MW tender in 2013. At the end of a prequalification phase in March 2014, 29 bids amounting to 139 MW were received in November 2014. Out of these, 10 projects amounting to 49 MW were awarded in October 2015 with a further 10 projects awarded in January 2017.

In addressing the challenge of a monopoly or single power supply utility, bilateral contract procurement programmes can be of great assistance. Bilateral contract negotiations require the entering into an agreement between producers and purchasers of RE. This process is typically private and can either be initiated by the developer or purchaser. That is, bilateral contracts occur if a purchaser implores a bid from a specific developer if a developer approaches a purchaser with a proposal to develop RE power. In contracting bilateral contracts, parties individually contract with each other and agreed on the

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Act, 2004), in issuing licenses, is bound by these determinations. There have been three such determinations for the REIPPPP. The first determination in 2011 allocated 3,725 MW to be generated by renewable energy sources from independent power producers. As a result of the significant positive response, an additional 3,200 MW (2012) and 6,300 MW (2015) has been allocated RE based generation. Kruger and Eberhard “Renewable Energy in sub-Saharan Africa” 8.


Kreycik, Couture and Cory “Procurement Options” 13–16.

Kreycik, Couture and Cory “Procurement Options” 13–16.
purchase price (usually per kilowatt). Utility buyers in bilateral contract procurement have the ability to shop around for the best price without the formality of a request for proposals.

While reducing chances of breach of contracts as well as aiding the administrative burden, bilateral contracts signed in extraordinary situations may contradict applicable legislation. The lack of competition among developers in bilateral procurement can limit the effectiveness and limit the entering of new developers into the market. In support of RE market that will accommodate small size developers, market players have come out in support of a new RE procurement mechanism, namely standardised contracts and open access to all developers with viable projects, aligning them with the auction/tenders and feed-in tariff mechanisms. Apart from public finance instruments, the IRENA framework also provide for fiscal instruments promoting increased RE access.

4.6.3.2 Tax incentives

The payment of taxes can be a huge burden on RE power producers and suppliers. These burdens include subsidies through fiscal incentives that can take a variety of forms, such as personal tax, property income tax, sales or value added tax, property tax and accelerated depreciation. Personal tax requires deductions or credits geared towards investment or the cost of RE generation technologies. Property taxes are used when RE technologies are implemented to improve properties – reducing the level of taxes associated with improvements on properties. A mix of these fiscal incentives has been adopted by governments such as Brazil, Chile, China, Indonesia, Tunisia and Thailand. At the African level, Egypt, Ethiopian, Ghana and Kenya have also adopted fiscal incentives.
In China, the National Tax Administration Act, 2008b provides for a three-year corporate income tax exemption, followed by another three-year 50 per cent reduction of the corporate income tax rate. Corporate income tax, which is geared towards initial installation cost, must form part of qualified projects under applicable fields, namely, biomaterial energy, energy cogeneration, utilisation of methane and technological innovation in energy conservation and emissions. In line with value added tax (VAT), China issue the Circular on Value-Added Tax Policy of Comprehensive Utilisation of Resources and Other Products in terms of the National Tax Administration Act, 2008a. VAT in China as per the circular entails a 50 per cent refund of the VAT is paid on the sale of wind power, reducing the VAT on wind power from 17 to 8.5 per cent. In addition, a 100 per cent refund of the VAT is paid on the sale of biodiesel oil generated from discarded animal fat and vegetable oil as well as electricity generated waste, crops, sewage, and medical waste.

Accelerated depreciation (AD) as a measure to promote increased RE access requires the allocation of asset cost towards expenses for the RE project lifecycle. In India for example, the Accelerated depreciation Scheme, 1994 makes available cost for all RE technologies (including wind, biomass and small hydro). Calculated in terms of the written-down-value method, as per the India Income Tax Act, 1961 the scheme allows a 100 per cent rate in 1994, with only half of the depreciation rate allowed during the first year for assets commissioned after September 30 of any financial year for wind energy. As a result the scheme attracted investments in the wind energy sector and the annual grid connected capacity installation rose steadily from 61 MW to 236 MW in

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276 Paragraph 12 of the National Tax Administration, 2008b. See also UNDP “Renewable Energy Policy Review” 41.
277 See also UNDP “Renewable Energy Policy Review” 41.
278 See also UNDP “Renewable Energy Policy Review” 41.
281 Under the written-down-value method “AD is calculated upon the original cost in the first year and on the written-down value, in subsequent years of the asset, over the expected useful life of the asset. Using this method, the amount decreases annually, whereas the rate of depreciation remains constant”. IISD “India’s Accelerated Depreciation Policy” 7. Beck and Martinot 2004 Encyclopedia of Energy 373.
283 IISD “India’s Accelerated Depreciation Policy” 6.
1994 and 1995 respectively.\textsuperscript{284} As the RE production began to stabilise, the AD rate was revised to 80 per cent in 2002 and subsequently withdrawn 2012.\textsuperscript{285} The withdrawal of the AD Scheme was mainly as a result of the response to concerns that it had incentivised the development of inefficient capacity rather than generation and appealed to a specific group of investors only.\textsuperscript{286} However, with pressure from stakeholders the AD Scheme was reintroduced in the 2014 budget, at an 80 per cent depreciation rate – same as at the time of its withdrawal.\textsuperscript{287}

While public finance instruments provide direct funding to individuals or RE independent power producers, fiscal instruments are only made available to entities having a tax burden and as such are likely not to provide direct financial benefits to the poor and non-profit and governmental entities.

From the foregoing section it is clear that the IRENA legal framework mechanisms are of great importance to facilitate increased RE access. This is mainly because RE mechanisms as prescribed in the IRENA legal framework has been adopted by both developed and developing countries (as either voluntary or binding legally binding frameworks). However, there are other RE mechanisms not included into the IRENA framework. These mechanisms that can seen as best practices, would be discussed in the next paragraph.

\section*{4.7 International best practices}

Best international RE practices here pertain to a RE market structure, energy planning and licensing schemes and zoning schemes.

\subsection*{4.7.1 Market structure}

The availability of RE buyers has the potential to drive a new RE development and to help mature the RE markets.\textsuperscript{288} However, the structure of the market (which can either be a

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\textsuperscript{284} India Ministry of New and Renewable Energy 2015b. See also IISD "India’s Accelerated Depreciation Policy” 6, Beck and Martinot 2004 Encyclopedia of Energy 373


\textsuperscript{286} IISD "India’s Accelerated Depreciation Policy” 8.

\textsuperscript{287} IISD "India’s Accelerated Depreciation Policy” 8.

\textsuperscript{288} Elliot “Comparing Support for Renewable Power” 220. See also Bird \textit{et al} “Policies for Enabling Corporate Sourcing” 7.
traditionally or liberalised electricity market) is of significance in determining increased 
energy production from RE sources as well as to reduce the cost of production by the 
adoption of cost effective measures.\textsuperscript{289} Traditionally regulated electricity markets require 
a vertical integration of power supply utilities, granting them the authority to provide the 
transmission and distribution of RE power from installed projects.\textsuperscript{290} RE power under 
traditional markets can be sourced either for supply utilities own projects or independent 
power producers. In the case where power supply utilities source RE power from 
independent power producers, such power must be procured directly from the producers 
and on-site.\textsuperscript{291}

A liberalised electricity market on the other hand requires a disconnection between power 
supply utility generation and non-utility producers (independent power producers) 
offering generation services into competitive wholesale markets.\textsuperscript{292} In fully liberalised 
markets, suppliers compete at the retail level, leaving customers with the choice to 
procure electricity from RE sources.\textsuperscript{293} In addition, competitive wholesale power markets 
provide price transparency to buyers and can enable more energy production from RE 
sources.\textsuperscript{294} At the regional level, the EU for example liberalised the EU electricity market 
through Directive 96/92/EC.\textsuperscript{295} In terms of Articles 7 and 11 of the Directive 96/92/EU, 
owners of both transmission and distribution systems are obliged to designate 
transmission and distribution system operators (TSO/DSO) with the purpose to ensure 
equal network access for all users of the system, without granting any preferences to the 
related generation segment in the same vertically integrated firm, where TSO and DSO

\footnotesize{\begin{itemize}
  \item \textsuperscript{289} Bird \textit{et al} “Policies for Enabling Corporate Sourcing” 7. See also Elliot “Comparing Support for Renewable Power” 220.
  \item \textsuperscript{290} Bird \textit{et al} “Policies for Enabling Corporate Sourcing” 7. See also Elliot “Comparing Support for Renewable Power” 220. See also Elliot “Comparing Support for Renewable Power” 220.
  \item \textsuperscript{291} Elliot “Comparing Support for Renewable Power” 220. See also Eikeland 2011 \textit{Journal of Common Market Studies} 243–263.
  \item \textsuperscript{292} Elliot “Comparing support for renewable power” 220. See also Haar and Marinescu 2011 \textit{Energy Policy} 2245–2255; Karova \textit{Liberalisation of Electricity Markets and the Public Service Obligation in the Energy Community} 436.
  \item \textsuperscript{293} Elliot “Comparing support for renewable power” 220.
  \item \textsuperscript{294} Elliot “Comparing support for renewable power” 220.
  \item \textsuperscript{295} Directive 96/92/EC as the first EU directive introducing liberalisation of electricity market was issued appeared in 1996 after a period of highly conflicting and long lasting negotiations in the Council and the Parliament. This Directive allows member states to choose between main reform provisions (such as new generation capacity, third party network access, a market regulator or unbundling degree and the speed of market opening).
\end{itemize}}
constitute a part in a vertically integrated structure.\textsuperscript{296} This should have allowed more clarity regarding costs of the network services. In order to promote and reinforced the adoption of a liberalised electricity market within member states, the EU issued Directive 2009/72/EC, calling on member states to transpose the liberalised electricity market into national laws by March 2011. As a result of this, the liberalised electricity market has been adopted by a rage of EU countries, namely the UK, Belgium, Denmark, Portugal and Romania. Another coalition that consists of Germany, France, Austria, Bulgaria, Latvia, Slovakia, Cyprus and Luxemburg opposes this idea.\textsuperscript{297}

While consumers or buyers generally rely on the power supply utility for the provision and procurement of RE services in traditional integrated markets, buyers or consumers in liberalised markets have the choice to contract and purchase RE directly from independent RE producers.\textsuperscript{298} As such Governments’ choice of an energy market is of significance to promote of RE development as liberalised energy market structures stand a chance to promote RE access more when compared to traditional energy markets.\textsuperscript{299}

\textbf{4.7.2 Licensing and zoning schemes}

The installation of RE projects may require permits from a multitude of agencies (building, electrical, mechanical, plumbing, fire among others), various site inspections, grid connection review, rezoning as well as permitting fees. All these are likely to influence differences in cost as well as slow down the speed of installation.\textsuperscript{300} Ideally, the permitting should be streamlined to accelerate the process of RE project development. Coordination across permitting agencies and zoning ordinances can simplify the process for end users, reduce unnecessary delays, creating certainty and increase the viability of RE projects. A zoning ordinance can include specific exemptions or allowances to RE systems from building zoning requirements and clarifying language for RE system deployment.\textsuperscript{301} An

\textsuperscript{296} Articles 7 and 11 of the EU Directive 96/92/EC. See also Lindt “Renewable Energy and Liberalisation of Energy Markets” 6.

\textsuperscript{297} Eikeland 2011 Journal of Common Market Studies 252.


example of a zoning law for RE development is the South African *National Environmental Act* 107 of 1998 (NEMA). In terms of section 24(25)(a) and (b) of the NEMA read together with listed item of the Environmental Assessment Regulation, 2014\\(^{302}\) identifying special procedures to obtain environmental authorisation within eight RE development zones for large scale wind and solar PV are identified.\\(^{303}\) The RE development zones include, RE development zone one (Overberg), RE development zone two (Komsberg), RE development zone three (Cookhouse), RE development zone four (Stormberg), RE development zone five (Kimberly), RE development zone six (Vryburg), RE development zone seven (Upington) and RE development zone eight (Springbok).\\(^{304}\) These are possible development zones where solar PV installations would be preferable due to solar radiation.\\(^{305}\)

### 4.7.3 Energy planning

The need for energy plans to aid RE deployment and access is of great significance. Such laws especially those addressing issues relating to noise and environmental impacts are required to set aside specific locations for RE development or restricted areas as a result of a higher risk to environmental damage or biodiversity impact.\\(^{306}\) The lack of energy planning law in the UK, for example, has resulted to very little wind capacity added despite the fact that UK remains one of the best wind resources in Europe.\\(^{307}\) On the other hand, the *German Renewable Energy Sources Act*, 2017 includes provisions related to area planning for onshore wind energy, offshore wind energy, photovoltaic installations and biomass energy.\\(^{308}\) Areas where the PV system can be constructed, for example, include commercial and industrial property and areas for which a plan approval decision has been obtained.\\(^{309}\) As such a successful bidder obtains exclusive rights for conducting

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302 GN No 982 in GG Gazette No. 38282 of 4 December 2014.
303 GN 114 in GG No. 41445 16 February 2018.
304 GN 114 in GG No. 41445 16 February 2018.
305 All installations would still have to comply with rezoning in terms of the SLUMA and all other applicable environmental and energy laws.
306 McEwan 2017 *Political Geography* 1–12.
307 McEwan 2017 Political Geography 1–12.
308 Sections 36, 37 and 39 of the *German Renewable Energy Sources Act*, 2017 respectively. See also Allen and Overy "The German Renewable Energy Act 2017 – An overview for foreign investors/banks" 2.
the plan approval procedure with the competent authorities and receives permission to use the connection to the grid system.\textsuperscript{310} Energy planning can greatly reduce uncertainty whether and where RE can be sited.\textsuperscript{311}

\textbf{4.8 Conclusion}

The express provision of increased RE access and the absence of measures to achieve access to RE in national laws form the basis for the proposition that Agenda 2030 specifically SDG goal seven and the targets and measures provided for by IRENA and international best practices could inform regional legal energy frameworks. It was established that Agenda 2030 constitutes a soft law norm, which could influence the development of regional legal energy frameworks and promote increased RE access. On analysing the international legal status of Agenda 2030, authors’ opinions range from the attribution of soft law value to complete denial. Spijker, Scholtz and Barnard concluded that, specific SDGs (goal six and 13 of the SDGs respectively) have soft law status that would likely influence the development of international law to that effect.\textsuperscript{312} While agreeing with above authors, Persson, Singh and Kim concluded that the Agenda 2030 as a whole possesses some form of soft law legal status that can influence the development of international law.\textsuperscript{313} Contrary to above views, French reckoned that Agenda 2030 exhibits no formal sense of legality or the intention to do so, thus having no soft law value. Attesting with Spijker, Scholtz and Barnard, this study concludes that some SDGs do hold a soft law normative value arguing that the traceable nature of the wording of some SDGs and targets (for example target 7.2 traceable nature in the \textit{Paris Agreement}) within existing international law indeed accord them soft law status.\textsuperscript{314}

To further underscore the role of Agenda 2030 in informing an AU legal energy framework, the MDGs was compared to the SDGs and the central role of modern energy in achieving other SDGs as provided for by Agenda 2030 was analysed. In comparing the

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{310} Competent authorities here refer to the Federal Maritime and Hydrographic Agency for onshore wind projects or by competent state authority in respect to coastal waters. See Allen and Overy “The German Renewable Energy Act 2017 – An overview for foreign investors/banks” 7.
\item \textsuperscript{311} See paragraph 4.4 above.
\item \textsuperscript{312} See paragraph 2.3.4 above.
\item \textsuperscript{313} See paragraph 2.3.4 above.
\item \textsuperscript{314} See paragraph 2.3.4 above.
\end{itemize}
\end{footnotesize}
MDGs to the SDGs, it was concluded that the SDGs expressly provide for increased RE access (among other modern energy sources), while the MDGs did not. The SDGs, other than the MDGs, also adhere to the core sustainable development principle of integration and provide for a review process, which was absent in the MDGs.

The challenge of a lack of measures to achieve increased RE access in related international laws and specifically SDG goal seven and targets in Agenda 2030 form the basis for the proposal that the IRENA RE measures and international best practices should inform the development of modern regional legal energy frameworks that promote increased RE access. RE measures, which are classified under regulatory and fiscal incentives under the IRENA framework, and other best practices include RE portfolio standards, feed-in tariffs, TREC, net-metering, loans, grants, capital subsidies, personal tax, property tax, VAT, AD, licensing and zoning schemes, energy planning and market structures.

Based on the above discussion, it can be deduced that the regulation of future African increased RE access should be based on a modern legal energy framework informed by SDG goal seven and its targets, the IRENA legal framework mechanisms as well as international best practices. The IRENA mechanisms and international best practices list measures that can be utilised to reach the targets set in SDG goal seven. Increased RE access as a means to increase access to modern energy in Africa is expressly mandated for by the *Abuja Treaty*. In order for this to be achieved member states are called upon to cooperate and harmonise their laws and policies. Africa is divided into sub-regions that could facilitate the *Abuja Treaty’s* implementation. To this end, African regional cooperation and harmonisation of laws and policies regulating increased RE access will be elaborated upon in the next chapter.
CHAPTER 5

REGIONAL ENERGY COOPERATION AND THE PROMOTION OF INCREASED ACCESS TO RE IN AFRICA

5.1 Introduction

The provision of modern energy services as a means to promote better welfare and economic development dates back to the 1950s. In 1950 the UN Rural Electrification stated as follows:

the supply of electricity as a means of achieving “development first” improved the economic status of populations living in rural areas by increasing human productivity and welfare.¹

This did not necessarily apply to the African continent.² Increased RE access in terms of the Africa 2030 Roadmap is an important means of effecting access to modern energy on the African continent.³ However, without new and harmonised policies, a wide range of people in Africa will still lack access to modern energy by 2030 according to the Global Energy Assessment.⁴

In terms of the Constitutive Act,⁵ cooperation is imperative in addressing issues of common interest.⁶ Some of these issues include that the African economies should integrate and promote cooperation in all fields of human activity in order to raise the

² See paragraph 2.2.1.
³ IRENA Africa 2030: Roadmap for a RE Future 7. See also World Energy Assessment 2004 Update, Part III. While there may be some scope to develop new and to extend the existing electricity grid systems in developing countries, it is anticipated that in most cases access to electricity services would be provided by stand-alone systems based on RE resources. In achieving this, nothing more than cooperation is needed with regard to topics relating to policy formulation and the harmonisation of regional policies.
⁴ IIASA “Global Energy Assessment” 75–93.
living standards of African peoples. The objective of cooperation is reaffirmed by the *Abuja Treaty*.

It also provides the necessary context of the concept of "all fields of human activity" as provided by the *Constitutive Act*. The *Abuja Treaty* makes reference to a range of "aspects of human endeavour" which should enjoy the cooperative attention of AU policy makers. Among others, energy is identified as an important area of human endeavour to improve development on the continent.

Although cooperation in the energy sector at the AU level is geared towards the development of the continent, there is still no legal framework dealing with increased modern energy access. A harmonised regional legal energy framework resulting from regional cooperation may serve to promote progress towards AU regional integration. This chapter discusses regional cooperation within the context of access to modern energy via the development of RE.

This chapter discusses the role of regional cooperation in the development of a harmonised legal modern energy framework promoting RE access as well as cooperative AU RE legal frameworks as a contributing factor to increase access to modern energy in Africa. Firstly, the mandate for African regional cooperation is discussed, followed by an exposition of the current African energy cooperation and its challenges. Thereafter, the mandate for regional cooperation to formulate and establish regional and/or sub-regional policies and programmes aimed at increasing access to modern energy and specifically RE in Africa are considered. The mandate to include RE as part of the AU diversified energy mix is provided, setting the basis for the discussion of AU RE initiatives.

### 5.2 AU legal framework on cooperation and the promotion of RE access

Africa has a fairly long history of regional cooperation. Beginning in 1980 with the adoption of the *Lagos Plan of Action*,

African heads of states formally recognised the importance of regional cooperation on the African continent. In terms of the *Lagos Action Plan*, African states are to cooperate in the extraction of natural resources, the preservation, protection and improvement of the natural environment in a sustainably manner in order to create a dynamic and independent Africa at both regional and sub-
regional levels.\textsuperscript{11} Cooperation on energy and specifically the development of new and RE sources (solar, wind, geothermal, biomass and among others) is identified as a priority area for increasing access to modern energy in Africa.\textsuperscript{12} With reference to the implementation of this goal, the Chicago Plan of Action calls for the establishment of an African Energy Commission with overall responsibility to oversee African energy activities.\textsuperscript{13}

The objective of regional cooperation was reiterated in the provisions of the Abuja Treaty and the Constitutive Act,\textsuperscript{14} emphasising the importance of cooperation among member states and regional economic communities (RECs). The Abuja Treaty provides for the establishment of the African Economic Community (AEC).\textsuperscript{15} The Abuja Treaty has as objective to promote cooperation and development in all aspects of human activity with a view to raise the standard of life of Africa’s people, maintaining economic stability and establishing a close and peaceful relationship between member states, among others.\textsuperscript{16}

In order for this goal to be achieved, the Abuja Treaty envisages an AEC to be set up through a gradual process, which would be achieved through coordination, harmonisation and progressive integration in six stages,\textsuperscript{17} over a period of 34 years. Existing RECs are

\begin{itemize}
  \item \textsuperscript{11} Paragraph 3 (iv) (f) (h) and (v) of the Lagos Plan of Action.
  \item \textsuperscript{12} Paragraph 287 of the Lagos Plan of Action.
  \item \textsuperscript{13} Paragraph 294(i) of the Lagos Plan of Action. Responsibilities of the African Energy Commission include: coordinating all activities being undertaken in the field of energy in Africa, assisting African states in the formulation and coordination of energy policies and programmes, disseminating data and information pertaining to energy on the continent, establishment of a Regional Geothermal Energy Centre in order to assist African countries to explore and exploit their geothermal resources, putting in place of framework for the implementation of recommendations made at earlier meetings in the field of energy, establishment of an African Energy Development Fund for financing African energy projects and development of Regional Solar Energy Centres. See paragraph 294 (i)(a)–(ix) Lagos Plan of Action.
  \item \textsuperscript{14} Article 3 of the Constitutive Act provides for the need to coordinate and harmonise the policies between existing and future Regional Economic Communities for the gradual attainment of the objectives of the African Union.
  \item \textsuperscript{15} The AEC was established by the Abuja Treaty in 1991 and ratified in 1994. The treaty aims to build the AEC gradually through harmonisation, coordination and effective integration of Africa’s RECs, eight of which have been chosen as “pillars” of the AEC. It proposes the establishment of a continental free trade area (CFTA) and integration of the RECs into a single customs union with a common currency, central bank and parliament by 2028. The Abuja treaty does not lay out precise, top-down steps for achieving this goal.
  \item \textsuperscript{16} The AEC further aims to promote economic, social and cultural development as well as African economic integration in order to increase self-sufficiency and endogenous development and to create a framework for development, mobilisation of human resources and material.
  \item \textsuperscript{17} Stage 1: strengthening existing RECs and creating new ones where needed (5 years), Stage 2: stabilisation of tariff and other barriers to regional trade and the strengthening of sectoral integration,
used as building blocks to establish the AEC. To emphasise the importance of these RECs in the establishment of the AEC, a Protocol was concluded in 1998 on the relations between the AU and RECs.\textsuperscript{18} The \textit{Protocol on Relations between the African Union and the Regional Economic Communities} (RECs Protocol) provides for the establishment of a framework to promote cooperation through the harmonisation and coordination of policies, measures, programmes among RECs and between them and the AU with the aim of realising the objectives of the \textit{Constitutive Act} and the \textit{Abuja Treaty}.\textsuperscript{19} To this end, the role of RECs in attaining these objectives is of great significance. That is, that RECs must harmonise and coordinate their policies, measures, programmes and activities while avoiding duplication of efforts, which would hamper the achievement of the objectives of the AEC.\textsuperscript{20}

Being a legally binding instrument,\textsuperscript{21} the RECs Protocol is of great importance in that it has potential to drive regional cooperation and integration in Africa through the harmonisation of conflicting policies. This Protocol also demonstrates the extent to which the AU formalises its support for regional cooperation and integration at continental level. Lastly, the Protocol calls for cooperation in the harmonisation of policies, measures, programmes and activities among RECs and between the RECs and the AU in priority sectors (energy among others)\textsuperscript{22} in order to promote development on the Continent.

18 Protocol on Relations between the African Union (AU) and the Regional Economic Communities (RECs) 1998.

19 Article 3(a) and (b) of the RECs Protocol. See also Saurombe 2012 \textit{SAPL} 292–314.

20 Article 4(a) of the RECs Protocol. See also Saurombe 2012 \textit{SAPL} 292–314.

21 In terms of Articles 6 and 88 of the \textit{Treaty Establishing the African Economic Community} provisions of the RECs Protocol shall be legally binding and applicable to the relations between the Parties and measures that the Parties shall implement in order to fulfil the responsibilities placed on them under articles 6 and 88.

22 Article 7 of the RECs Protocol calls for the establishment of a Committee on Coordination and Composition and Function which is responsible for providing policy orientation and implementation in priority sectors of energy and environment, agriculture, industry, transport and communication, trade and customs, monetary and financial matters, integration legislation, human resources, development, housing, health and water, tourism, science and technology including information technology, cultural
The provisions of the above frameworks either directly or indirectly underscore the importance of cooperation, geared towards the harmonisation of policies and programmes in all fields of human life (creating a mandate for regional and sub-regional cooperation in all fields). The RECs Protocol acknowledges the importance of RECs in promoting cooperation on the continent. With regard to energy and RE in particular, African states and RECs would therefore have to cooperate (between AU and RECs and within AU member states) in order to harmonise related policies, frameworks and programmes, with the overall objective of increasing access to modern energy at both regional and sub-regional levels. The next section offers an overview of existing regional energy cooperative arrangements in Africa.

5.3 Regional cooperation and access to modern energy

The deliberations of the WSSD, held in Johannesburg in 2002, expressly noted the importance of cooperation to increase modern energy access. In its Plan of Implementation the (Johannesburg Plan) cooperation among member states was identified as an important step towards increasing access to modern energy on the African continent, and this is in line with the provisions of the New Partnership for Africa’s Development (NEPAD) which provides for the establishment of regional/sub-regional initiatives on increased modern energy access.

The NEPAD strategic framework arises from a mandate given to the five initiating heads of state by the Organisation of African Unity (OAU) to develop an integrated socio-economic development framework for Africa. The socio-economic framework was a result of the merger of the OMEGA initiative, which was initiated by President Wade of Senegal and social affairs. See article 7 RECs Protocol. See also Nalule Energy Poverty and Access Challenge in Sub-Saharan Africa 41–90.

23 See paragraph 3.3.3.2 above.

24 See paragraph 3.3.3.2 above.

25 Track II of the WSSD outcomes.

26 Algeria, Egypt, Nigeria, Senegal and South Africa.

27 The Organisation of African Unity (OAU) was established on 25 May 1963. On 9 September 1999, the heads of state and governments of the OAU issued the Sirte Declaration, calling for the establishment of an African Union (AU). The Sirte Declaration was named after Sirte in Libya. The Declaration was followed by summits in Lomé in 2000, when the Constitutive Act was adopted, and in Lusaka in 2001, when the NEPAD was adopted. The AU was launched in Durban on 9 July 2002 by the then South African president, Thabo Mbeki, at the First Session of the Assembly of the AU. See Ruppel 2012 SLJ 16.
and the Millennium Partnership for the African Recovery Programme (MAP) into the New Africa Initiative (NAI). The NAI, which was later named the NEPAD and formerly adopted at the 37th Summit of the OAU in July 2001, in Lusaka, Zambia. In 2002, NEPAD was ratified by the AU and serves as a partnership and cooperation framework between Africa and the developed world. NEPAD is:

a pledge by African leaders, based on a common vision and a firm and shared conviction, that they have a pressing duty to eradicate poverty and to place their countries, both individually and collectively, on a path of sustainable growth and development, and at the same time to participate actively in the world economy and body politic. The programme is anchored on the determination of Africans to extricate themselves and the continent from the malaise of underdevelopment and exclusion in a globalising world.28

In implementing its objectives, NEPAD focuses on six thematic areas, namely, agriculture and food security, climate change and natural resource management, regional integration and infrastructure, human development, economic and corporate governance, cross-cutting issues such as gender, inter-technology transfer (ICT), capacity development and communications. In order to give effect to these objectives, programmes are to be develop for each priority sector. These priority sectors cut across the economic, social and environmental spheres covering essential regional public goods such as energy, transport, water, ICT, disease eradication, environmental preservation, among others.29

In order to achieve the goals in these priority sectors, states are called to cooperate, taking into account principles of good governance, human rights, security, democracy, peace and sound economic management at both the sub-regional and regional levels.30

In terms of NEPAD, energy is critical for development processes:

- first, as a domestic necessity and
- second, as a factor of production.32

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28 See paragraph 1 of the NEPAD. See also Ruppel 2012 SLJ 16.
29 Regional research capacity as well as the promotion of intra-African trade and investments at both regional and sub-regional levels.
30 See paragraph 45 of the NEPAD.
31 See paragraph 71 of the NEPAD.
32 See paragraph 109 of the NEPAD.
As such, NEPAD has as an objective to increase access to a reliable and affordable energy supply from 10 per cent to 35 per cent or more within 20 years in the region.\textsuperscript{33} This would be achieved through the development of regional or sub-regional cooperative power markets that allow economies of scale through the pooling of energy resources by interconnecting national power systems.\textsuperscript{34} While focusing on capacity building in order to enhance the effectiveness of existing regional structures and the rationalisation of existing regional organisations, NEPAD provides programmes for essential public goods,\textsuperscript{35} with the aim of bridging existing gaps between Africa and the developed countries.\textsuperscript{36} Adopted by the AU, the UN resolution (A/RES/57/7) recognised NEPAD internationally.\textsuperscript{37}

While the NEPAD strategic framework is only a guideline and therefore not legally binding at the African regional and sub-regional levels it, however, provides a good start in that it makes recommendations for the development of RE sources, in order to increase access to energy. Increased access to RE should be achieved by pooling energy resources. Pooling of energy resources are most often based on cooperative arrangements.\textsuperscript{38} The provisions relating to the development of RE sources at both the regional and sub-regional levels in giving effect to increased modern energy access should therefore serve as a mandate for develop a harmonised regional legal energy framework promoting increased RE access based on regional cooperation.

In giving effect to the NEPAD mandate, the UN Secretary-General urged for the development of regional consultative meetings to coordinate the efforts of the different UN agencies and organisations at an African level. The UN-Energy Africa (UNEA) was established as a subsidiary of UN-Energy in order to ensure a linkage between global and

\textsuperscript{33} See paragraph 109 of the NEPAD.
\textsuperscript{34} Establish an African Forum for Utility Regulation and establish regional regulatory associations, Establish a task force to recommend priorities and implementation strategies for regional projects, including hydropower generation, transmission grids and gas pipelines, Establish a task team to accelerate the development of energy supply to low-income housing, broaden the scope of the programme for biomass energy conservation, for example, from the Southern African Development Community (SADC) to the rest of the continent. See paragraph 110 of the NEPAD. See details of African power pooling in paragraph 5.2 below.
\textsuperscript{35} Human resources, including education, skills development and reversing the brain drain, health, agriculture, access to the markets of developed countries for African exports.
\textsuperscript{36} See paragraph 94 and 95 of the NEPAD.
\textsuperscript{37} UN General Assembly Declaration (A/RES/57/2) and the Resolution on NEPAD (A/RES/57/7).
\textsuperscript{38} See 5.3 for details on power pooling cooperative agreements.
regional energy issues. This institution serves as the regional collaborative framework to promote more efficient, coherent, coordinated and cooperative actions on increased energy development in Africa.  

### 5.4 RE as part of AU diversified energy mix

#### 5.4.1 Abuja Treaty

Establishing the African Economic Community (AEC), the *Abuja Treaty* has as objective to promote economic, social and cultural development and the integration of African economies in order to increase economic self-reliance and self-sustained development. To further develop the continent, states are called upon to cooperate in all fields of human endeavour and harmonise policies among existing and future RECs in order to foster the gradual establishment of the Community. For this to be achieved, states are called upon to harmonise national policies in order to promote Community activities, particularly in the fields of energy, agriculture, industry, transport and communications, natural resources, trade, money and finance, human resources, education, culture, science and technology.

Recognising the role of energy in realising an AEC, the *Abuja Treaty* calls on AU member states to cooperate in the harmonisation of policies and programmes in the field of energy. For this to be achieved, member states are legally obliged to ensure the effective development of the continent’s energy and natural resources promote the development of new and RE in the framework of the policy of the diversification of sources of energy, harmonise national energy plans and articulate a common energy policy, and collectively

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39 Following the creation of the UN-Energy (on 14–15 April 2004) in Rome, African Energy Ministers gathered in a meeting co-organised by UNEP, ECA and the African Union on 8 May 2004 in Nairobi, adopted a recommendation for the creation of UN-Energy/Africa. UN-Energy/Africa should along the line of UN Water/Africa be a regional collaborative framework with the objective to promote more efficient, coherent and coordinated actions of UN and non-UN organisations working in Africa on the issues of energy for development. See Ruppel 2012 *SLJ* 16.

40 Article 4 (1) (a) of the *Abuja Treaty*. See paragraph 5.2.

41 Article 4 (1) (b) and (c) of the *Abuja Treaty*.

42 Article 4(2) (e) of the *Abuja Treaty*.

43 Article 54 (1) of the *Abuja Treaty*.

44 Article 54 (2) (a) of the *Abuja Treaty*.

45 Article 54 (c) of the *Abuja Treaty*.

46 Article 54 (d) of the *Abuja Treaty*. 

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solve the energy problems (particularly those related to energy transmission, the shortage of skilled technicians, and the insufficiency of the financial resources available for the implementation of the energy projects of member states) among other problems.\textsuperscript{47} These activities directly relates to cooperation in the development of new and RE which must take place in accordance to the provisions of a legal energy framework as a means of diversification of energy mix.\textsuperscript{48}

From above provisions, the development of new and RE sources (diversifying African energy mix) is critical for addressing African energy problems and also establish a clear nexus between regional cooperation and the development of harmonised regional policy that promotes the development of RE. For harmonised energy policies that promote RE to be develop, member states must cooperate and specific needs of the region taken in to account.

\textit{5.4.2 Constitutive Act}

With the creation of the AU in 2002, African leaders reiterated their commitment to a united Africa and committed themselves to the promotion of socio-economic development of the continent. The \textit{Constitutive Act} of the AU specifically provides for the promotion of sustainable development as an objective of the AU.\textsuperscript{49} It states that, the executive council, composed of the minister of foreign affairs or such other ministers or authorities designated by governments of member states shall coordinate and take decisions on policies in areas of common interest including energy, water, mineral resources, food, agriculture, forestry among others.\textsuperscript{50} Furthermore, it establishes a specialised technical committee on energy, natural resources and environment,\textsuperscript{51} which has as function to prepare energy projects and programmes, ensure the supervision and implementation and ensure the coordination and harmonisation of such projects.\textsuperscript{52}

\begin{flushright}
\textsuperscript{47} Article 54 (e) and (f) of the \textit{Abuja Treaty}.
\textsuperscript{48} Such a framework is yet to be adopted. See Article 54 (c) \textit{Abuja Treaty}.
\textsuperscript{49} Article 3((j)) of the \textit{Constitutive Act}.
\textsuperscript{50} Articles 10(1) and 13(1) of the \textit{Constitutive Act}.
\textsuperscript{51} Article (14)(1)(d) of the \textit{Constitutive Act}.
\textsuperscript{52} Article 15(a)(b) and (c) of the \textit{Constitutive Act}.
\end{flushright}
Being a legally binding framework, the *Constitutive Act* identified energy as being critical for Africa development. However, energy as indicated by the *Constitutive Act* has not been divided or classified into different sources (such RE or non-RE sources). As such, RE therefore forms part of the energy as identify by the *Constitutive Act*. To this end, the technical committee on energy, natural resources and environment must therefore prepare RE projects and programmes, ensure their supervision and evaluate implementation and the coordination and harmonisation of RE projects and programmes of the African continent. With the overarching objective of promoting the development of RE sources, the important role of coordinated efforts of member states (cooperation) and the harmonisation of projects programme in the development of RE is again underscored. Notably, matters arising from the application of RE projects and programmes must be submitted to the Court of Justice and decisions passed are legally binding on member states and organs of the AU.53

5.4.3 *Convention of the African Energy Commission, 2001*

In line with the mandate of the *Abuja Treaty* “the establishment of an adequate mechanism of concerted action and coordination for the collective solution of the energy development problems within the community”54 and the *Lagos Plan of Action*55 the *Convention of the African Energy Commission, 2001* (AFREC) was established. Reiterating the commitment to the promotion of socio-economic development of the continent, functions of the AFREC include to assist in the development and utilisation of new and renewable sources of energy,56 map out energy development policies, strategies and plans based on sub-regional, regional and continental development priorities and recommend their implementation,57 and to encourage research, development and energy information among member states and among RECs.58 The functions of the AFREC are to

53 The Court of Justice of the AU is established in terms of Article seven of the *Constitutive Act*. The Court of Justice has as function to ensure the adherence to law in the interpretation and application of the provisions of the *Constitutive Act* and decisions passed by the court are binding on member states and organs of the AU. Article 18(1)–(5) *Constitutive Act*.
54 Article 54 (2) (f) *Abuja Treaty*.
55 See paragraph 5.2 above.
56 Article 4(m) AFREC.
57 Article 4(a) AFREC.
58 Article 4(d) and (e) AFREC. Other functions of the AFREC include; advise and encourage the development of human resources in the energy sector in particular, through training, mobilise financial
be exercise taking into account the guiding principles that underpin regional and sub-regional cooperation in the development of new and renewable sources of energy as provided for in Article 3 of the AFREC.\textsuperscript{59}

The provisions of the legally binding AFREC established, to one extent or another, cooperation among member states in the development of energy frameworks that promote the development of new and renewable sources of energy with the aim of addressing energy challenges on the African continent while taking into account article 3 guiding principle. With clear and implicit provisions on the development of energy sources, the importance of RE in addressing Africa’s energy challenges in Africa is underscored in the provisions of sub-regional as well regional frameworks. Common objectives among both sub-regional and regional frameworks to increase RE access include (1) cooperation and (2) harmonisation of policies in the development of RE resources. It is however important to note that, the legally binding \textit{Constitutive Act}, the \textit{Abuja Treaty} and the AFREC do not provide measures which are to cooperated upon in order for increased RE access to be achieved. RECs and the AU must therefore cooperate and harmonised their energy frameworks taking into account the IRENA RE measures and best international RE practices\textsuperscript{60} when aiming to increase RE access in the continent.

\footnotesize{\begin{itemize}
\item Article 3 AFREC principles include \textquote{"(a) development of the use of energy to promote and support rapid economic and social development, eradication of poverty, combat desertification and improve the standard and quality of life throughout the member states, (b) Cooperation in the area of energy among member states, particularly through joint development of energy resources and identification and promotion of regional and/or sub regional projects, (c) development and utilisation of sustainable and environmentally sound energy, (d) acceleration of the implementation of the \textit{Abuja Treaty} through the integrated, coordinated and harmonised development and utilization of energy and the development and implementation of energy policies and programmes, (e) promotion of research and development, and the encouragement of transfer of technology in the energy sector, (f) enhancement of integration, collective self-reliance, security and reliability of energy supply among member states, (g) inter-state, sub-regional and regional cooperation in training and development of human resources in the energy field, (h) harmonization of standards and procedures in the energy sector, (i) promotion of trade and technical assistance in energy among member states, (j) promotion of partnership among enterprises and institutions of member states through, inter alia, the creation of favourable conditions for that purpose, (k) equitable cost-sharing in the implementation of this Convention in a spirit of good governance and transparency and (l) peaceful settlement of disputes".\}
\smallskip
\footnotesize{\textsuperscript{59} See paragraphs 4.6 and 4.7above.}
\end{itemize}}
5.5 African regional energy cooperation

It is apparent that regional cooperation is an important means of managing natural resources (areas of common interest) on the African continent. Although this may be so, the state of current regional energy (among other natural resources) cooperation is a relevant topic. While cooperation on energy in Africa dates back to the 1950s, regional energy cooperation became more visible in the 1960s with the establishment of sub-regional economic communities enjoying much attention.\(^{61}\) Though the RECs were successfully created, regional energy cooperation initiatives (which most often take the form of power pool arrangements) are battling with achieving their objectives.\(^{62}\) The act of power pooling refers to an agreement from national electric utilities to join the required resources to interconnect their generating, transmitting and distribution capacities.\(^{63}\) Notably, cooperation on energy among these power pools has no uniform format, but rather depends on their respective mandates.\(^{64}\) According to an assessment carried out by the United Nations Economic Commission for Africa (UNECA),\(^{65}\) power pool arrangement can broadly be classified under three main headings, namely, interconnection, loose,\(^{66}\) tight\(^{67}\) and new pools.\(^{68}\)

As far as the African region is concerned, there are primarily five cooperative power pools acting as specialised agencies of their respective RECs. They include (a) the Central Africa
Power Pool (CAPP) for the Economic Commission for Central African States (ECCAS), (b) the Comité Maghrébin de l’Electricité (COMELEC) for the Union of Maghreb Arab (UMA), (c) the Eastern Africa Power Pool (EAPP) for COMESA, (d) the Southern Africa Power Pool (SAPP) for SADC, and (e) the West Africa Power Pool (WAPP) for ECOWAS.\(^69\)

In Central Africa, the CAPP has taken on an ambitious role of increasing access to modern energy services.\(^70\) The vision of the CAPP is to use the enormous central African hydroelectric potential, estimated at more than 650 TWh/year (52 % of all the African potential), to satisfy all the demands for electricity, in favour of households, states and industries of central Africa through systems of interconnection of national networks and an open market for electric energy exchanges.\(^71\) CAPP has as its objective to increase access to electricity to populations and reduce poverty, enforce energy policy, promote and develop power trade and ancillary services, improve electricity system reliability and quality of supply in the whole region as well as create a free regional electricity market. In order to obtain these goals, members are called upon to cooperate among themselves.\(^72\) As far as the CAPP energy mix is concerned, most of the existing installed capacity is from RE, specifically hydropower (accounting for 86 per cent of the total installed capacity). Mandated in 2004 as a specialised institution of the ECCAS with the aim of implementing ECCAS energy policy,\(^73\) CAPP adopted its \textit{CAPP Regional Power Master Plan} in 2006 (CAPP Master Plan). The CAPP Master Plan identifies the overall interconnection schemes that would run up to 2030 as well as medium term priority projects. These projects include the Inga III (3500 MW) hydropower plant,\(^74\) Chollet

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\(^{69}\) Though there are five regional energy cooperation initiatives on the African continent, this work will focus on four only. That is the CAPP, EAPP, SAPP and the WAPP.

\(^{70}\) The CAPP is a body of the Economic Community of Central African States (ECCAS) and is headquartered in Brazzaville, Republic of Congo. See Nalule \textit{Energy Poverty and Access Challenge in Sub-Saharan Africa} 41–90.

\(^{71}\) 2016 \textit{Sub-Saharan Africa Power Outlook} 15. See also Musaba and Naidoo 2005 \textit{Energizes} 39.

\(^{72}\) CAPP was created in 2003 and has ten countries as member states. They include Sao Tome, Chad, Angola, Burundi, Cameroon, Congo, Equatorial Guinea, Central African Republic (CAR) and the Democratic Republic of Congo (DRC). See \textit{Sub-Saharan Africa Power Outlook} 2016 15. See also See also Nalule \textit{Energy Poverty and Access Challenge in Sub-Saharan Africa} 41–90.

\(^{73}\) See paragraph 5.4.1 below.

\(^{74}\) A pre-feasibility study was conducted in 2008 under ACDI funding. The various attempts to mobilise funding for both a detailed feasibility study and for investment by private promoters have not been materialised. The present approach consists in considering this option in light of the results of the study being conducted under ADB funding on “Development of the Inga site and of related interconnections”. See also Nalule \textit{Energy Poverty and Access Challenge in Sub-Saharan Africa} 41–90.
2x320 MW hydropower,\textsuperscript{75} Mem’vele 220 MW hydropower plant,\textsuperscript{76} Kakobola hydropower plant (80 MW),\textsuperscript{77} DRC (Inga)-Angola (Cabinda)-Congo (Pointe Noire) interconnection,\textsuperscript{78} among others. Notably, power projects within CAPP are based on bilateral or tripartite agreements among member states. Though CAPP has increased access to electricity in the sub-region (5.5 GW in 2009 to 6GW at the end of 2015)\textsuperscript{79} the pool faces a number of challenges. Being one of the least developed pooling agreement,\textsuperscript{80} the CAPP does not have regional hydropower regulations, frameworks for electricity trading, appropriate mechanisms for dispute resolution as well as platforms for mobilising investment for power projects.\textsuperscript{81} With regard to lack of regulations, in Cameroon for example, there are three main transmission grids which are completely isolated from one another. There is no exchange of available surpluses between the grids, highlighting the need for regulations that would guide the affairs of all power transition grid bodies.\textsuperscript{82}

In the West African sub-region, cooperation in the energy sector dates back to the early 1970s, with bilateral energy agreements such as the Ghana’s Volta River Authority

\begin{itemize}
  \item Chollet 2x320 MW hydropower site located on Cameroon-Congo borders and its associated transmission lines. Its objective is to secure power supply to South Cameroon and to North Congo. An Inter-state MoU was signed in October 2010 between Cameroon and Congo. The project is to be developed through partnership with China.
  \item Mem’vele 220 MW hydropower plant located in Cameroon and the construction of two transmission lines linking respectively Cameroon-Gabon and Cameroon-Equatorial Guinea. A tri-partite agreement between Cameroon-Gabon-Equatorial Guinea is still to be signed. The project implementation started in November 2010. It is being developed through partnership with China. See Nalule Energy Poverty and Access Challenge in Sub-Saharan Africa 41–90.
  \item Kakobola hydropower plant (80 MW) in DRC: The power plant is being constructed in cooperation with India with a total cost estimated at US$90m.
  \item The Inter-state and Inter-Utilities memorandum of understanding were signed. The funding of investment estimated at 175 MEUR is still to be mobilised. According to CAPP, this link is a critical constraint to exporting generation capacity available respectively in Angola (Moanda) and in Congo (Pointe Noire).
\end{itemize}

\textsuperscript{75} Sub-Saharan Africa Power Outlook 2016 15. See also Infrastructure Consortium for Africa "Regional power status" 16. See also Nalule Energy Poverty and Access Challenge in Sub-Saharan Africa 41–90.
\textsuperscript{76} Compared to the SAPP, WAPP and EAPP, CAPP remains the least developed. Sub-Saharan Africa Power Outlook 2016 15.
\textsuperscript{77} Sub-Saharan Africa Power Outlook 2016 15. See also Nalule Energy Poverty and Access Challenge in Sub-Saharan Africa 41–90.
\textsuperscript{78} Sub-Saharan Africa Power Outlook 2016 15. See also Nalule Energy Poverty and Access Challenge in Sub-Saharan Africa 41–90.
(VRA), the Communaute Electrique du Benin (CEB) and Cote d'Ivoire since 1984. With regard to regional cooperation, the first formal step was a decision taken in 1999 (A/DEC.5/12/99), establishing the West African Power Pool (WAPP). The WAPP comprises fourteen out of the fifteen member countries of the ECOWAS. Established in October 2000, the WAAP has as its objective to institutionalise more formal and extensive regional cooperation in the development of cost effective electricity infrastructure and energy trading networks in order to increase energy supply and enhance energy security within the region, improve electricity system reliability and power quality throughout the region, increase the overall access to electricity service within the region through the implementation of priority generation and transmission projects among others. In order to achieve these objectives, state parties are called upon to cooperate in the implementation of priority interconnection projects, adopt appropriate tariff policies and regulations, harmonise their respective regulatory frameworks and facilitate cooperation among operators to administer settlements among others. Furthermore, national power utilities are also called upon to cooperate with the ECOWAS secretariat, collect, validate and provide necessary information, participate in the development of WAPPs framework agreements and facilitate the adoption of legal and regulatory framework in order to

83 The 1970 Ghana's Volta River Authority has been supplying electricity from its Akosombo hydroelectric dam to Togo and Benin grouped under the bi-national joint utility.
84 The CEB since 1972.
85 Two or more countries have also been promoting cooperation in the joint development of hydropower projects, such Togo and Benin for the construction of the Nangbeto hydropower project, or Mali, Mauritania and Senegal for the development of the Manantali hydropower project.
86 In November 1999, the ECOWAS Ministers of Energy adopted the indicative master plan for the development of energy production facilities and the interconnection of electricity grids of member states, including the establishment of the West African Power Pool. See Nalule Energy Poverty and Access Challenge in Sub-Saharan Africa 143–168.
87 WAPP member countries include Benin, Côte d'Ivoire, Burkina Faso, Ghana, Gambia, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo.
88 The objectives of WAPP was put in place Resolution I, adopted at the 3rd meeting of the Steering Committee of WAPP held in Accra Ghana on 5th April 2002. They include lower electricity system costs by increasing economic trading of both power and energy within the region, optimising the utilisation of energy resources in the region and managing more effectively and efficiently the region's seasonal and weather-related imbalances. Furthermore, WAPP has as its objective to reduce the overall amount of capital needed for electricity system expansion in the region by promoting implementation of "bankable" projects on a least cost basis, create an investment environment for the region's power sector that will facilitate the financing of priority generation and transmission projects, create an ongoing forum in which regional power issues can be discussed and worked out within an agreed-upon policy framework and set of operating principles, create a transparent and reliable mechanism for the prompt settlement of commercial electricity transactions.
89 The obligations of state parties of the WAPP was put in place by an Inter-Governmental MoU adopted by the ECOWAS Ministers of Energy, during their meeting held in Lome, Togo in September 2000.
achieve the objectives of the WAPP. Projects aimed at facilitating these objectives are spread over a period of 20 years and divided under different phases:

(a) Design Completion of Interconnection between zone A and zone B by 2006,

(b) Completion of Institutions for the management of international electricity trading by 2012,

(c) Full Operation by 2023.

Progress over the three periods include the existence of the Coastal transmission Backbone project, connecting zone A countries and facilitating actual electricity exchange among them. Nevertheless, the lack of capacity to attract private investors remains a huge challenge, retarding full operation of the programme by 2023.

With regard to the energy mix, fossil fuels predominately gas, account for about 64 per cent of power generation in West Africa, closely followed by hydro (31 per cent) and other sources (5 per cent). As of 2010, the West African region had an estimated installed capacity of about 14,091 MW with an expected increase in demand to about 22,500 MW or more in the next seven years. Recognising the need for rapid intervention in meeting future demands, WAPP declares a state of emergency for rapid power

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90 The obligations of national power utilities were put in place by an Inter-Utility Memorandum of Understanding adopted by the Chief Executives and General Managers of the national power utilities representing the Transmission System Operators of the ECOWAS member states at a meeting held in Dakar, Senegal in March 2001. WAPP, which currently has 26 member utility companies, consists of public and private generation, transmission and distribution companies involved in the operation of electricity in West Africa.

91 Zone A countries include: Benin, Burkina Faso, Ivory Coast, Ghana, Nigeria and Togo and zone B include: Cape Verde, the Gambia, Guinea, Guinea Bissau, Liberia, Mali, Senegal and Sierra Leone. See Gnansounou “Boosting the Electricity Sector in West Africa” 28. See also Luqman The Implication of West African Power Pool 2–6; Gnansounou “Boosting the Electricity Sector in West Africa” 27.


93 Africa in Depth 2013 http://www.africapractice.com. West Africa: Pooling together for power 1. Nigeria is the primary supplier of natural gas in the region and the country also accounts for about 43.4% of regional hydropower generation, closely followed by Ghana, which generates 40.9% of regional hydropower. The remaining production is shared by Côte d’Ivoire, Guinea, Mali, and Burkina Faso. Other countries such as Togo, Benin, and Burkina Faso rely on expensive imported heavy fuel oil or gas oil, or electricity imports from neighbouring countries. See Kambanda “The African Experience” 157–10.
infrastructures in its Master Plan. The WAPP Master Plan divides WAPP countries into two zones and identified 14 major priority interconnections projects. However, an update on the WAPP project status in 2012 shows that, only an additional 1800–2300 MW was planned and only two projects under the generation and transition projects had been completed. As such the Master Plan was revised in 2012. The revised plan identified 36 priority projects, with more emphasis on generation than transmission projects. This was as a result of the realisation that progress had previously been hampered by the inability to match the commissioning of transmission projects with the commissioning of adequate generation. An estimated US$26.4bn was required to cover the generation cost (US$18bn) and transmission costs (US$6bn) for the 36 priority projects identified by the revised Master Plan. These projects included the development of 16,000km of transmission lines, 7,092 MW of hydropower and 800 MW of other RE projects to be executed in three phases over the period 2012 to 2025. Operating projects include the 330 Kv Ikeja West Project (Nigeria) – Sekete (Benin), 225 Kv Bobo Dioulasso – Ouagadougou, 330 Kv Aboadze (Ghana) – Volta (Ghana), 225 Kv Cote d’Ivoire – Mali, 60 MW WAPP Felou Hydropower and the 240 240 MW Keleta Hydropower Projects.

The ECOWAS Energy Plan (Master Plan) was established under the WAPP agreement in 1999 and later revised in 2004. The plan envisages a maximum demand of almost 22 500 MW for the target year 2020. This figure is believed to be a modest estimate. Nigeria alone, which consumes about two thirds of energy in the region, has a current estimated national demand of 10 000–12 000 MW, a figure also likely to be on the conservative side given the country’s rapid growth. See Kambanda “The African Experience” 157–10.

The WAPP Master Plan was designed by an American consulting firm, Nexant, and presented to the funding agency of the project, USAID, and to the ECOWAS Secretariat.

WAPP Zone A comprises Benin, Burkina Faso, Côte d’Ivoire, Ghana, Niger, Nigeria and Togo. Countries in Zone B include Gambia, Guinea, Guinea–Bissau, Liberia, Mali, Mauritania, Senegal and Sierra Leone.

ECOWAS Master Plan was revised in 2005 and adopted by the ECOWAS Heads of State and Government through Decision A/DEC.7/01/05 and was adopted in 2012 through Supplementary Act A/SA.12/02/12.

The 330 Kv Ikeja West Project (Nigeria)– Sekete (Benin) has been running since 2007.
The 225 Kv Bobo Dioulasso – Ouagadougou operating since 2009.
Operating since 2010. See Ikeonu “Perspectives in Regulating a Regional Electricity Market” 15–22.
Operating since 2012.
Operating since 2013.
Notably, projects within WAPP operate on a bilateral or tripartite agreement among member states.\textsuperscript{106} Examples of both bilateral and tripartite agreements include the bilateral agreement between the Compagnie Ivoirienne d’Electricité (CIE) of Cote d’Ivoire and the Société Nationale d’Electricité du Burkina (SONABEL) of Burkina Faso\textsuperscript{107} the bilateral agreement signed between CIE and the bi-national utility of Togo and Benin (CEB) among others. Disputes arising from both contracts are settled amicably through mutual agreement within three months\textsuperscript{108} and if not settled within the required time be submitted to an ad hoc tribunal for resolution.\textsuperscript{109} Ad hoc tribunals refer to courts or administrative tribunals of the contracting parties,\textsuperscript{110} International Centre for Settlement of Investment Disputes,\textsuperscript{111} a sole arbitrator or ad hoc arbitration tribunals established under the Arbitration Rules of the United Nations Commission on International Trade Law,\textsuperscript{112} an arbitrary proceeding under the Arbitration Institute of the Stockholm Chamber of Commerce\textsuperscript{113} and an arbitrary proceeding under the organisation for the Harmonisation of Trade Laws in Africa (OHADA).\textsuperscript{114} Issues before such tribunals must be done with the unconditional written consent of contracting parties.\textsuperscript{115}

However, the above measure of dispute resolution does not apply to issues relating to the elimination of competition and market distortion as well as environmental sustainability or the use of cleaner fuels.\textsuperscript{116} At the request of contracting parties, such issues are settled under appropriate international fora, but where such do not exist, the dispute is reviewed by the ECOWAS Meeting of Energy Ministers aiming at a solution.\textsuperscript{117}

\textsuperscript{107} The CIE and SONABEL signed a bilateral agreement which came into effect in April 2001. Under the terms of this agreement, CIE agreed to supply a maximum amount of 100 GWh per year to SONABEL. This amount was however exceeded with SONABEL importing a total of a total of 66.665 MWh in 2001.
\textsuperscript{109} Article 26(2) ECOWAS Energy Protocol.
\textsuperscript{110} Article 26(2) ECOWAS Energy Protocol.
\textsuperscript{111} The International Centre for Settlement of Investment Disputes, established pursuant to the Convention on the Settlement of Investment Disputes between States and Nationals of other States opened for signature at Washington, 18 March 1965.
\textsuperscript{112} Article 26 (4) (b) ECOWAS Energy Protocol.
\textsuperscript{113} Article 26 (4) (c) ECOWAS Energy Protocol.
\textsuperscript{114} Article 26 (4) (d) ECOWAS Energy Protocol
\textsuperscript{115} Article 5(a) ECOWAS Energy Protocol.
\textsuperscript{116} Article 6 and 19 of the ECOWAS Energy Protocol respectively.
\textsuperscript{117} Article 19 (2) of the ECOWAS Energy Protocol.
Unlike the CAPP, the WAPP has a better institutional structure. Its General Assembly is the highest decision making body for the WAPP and comprises the representatives of all member states. It has as its objective to coordinate measures towards the implementation of the principles of the Articles of Agreement, facilitate the implementation of programmes and projects, review and approve new membership applications, elect the members of the Executive Board, examine and to adopt the financial regulations of the structures of governance of the WAPP, among others. The Executive Board (EB) which is the decision making authority of the WAAP has the responsibility to develop and implement initiatives to achieve the objectives of the organisation. The EB also directs the activities of all WAPP committees, examines, recommends and implementing the decisions of the General Assembly, the entry, exit and re-entry of members to the WAPP, authorises all major contracts and finance/debts instruments, sets out the standards and policies of the WAPP Organisation and penalties for non-compliance, and acts on appeals, among others. In executing it functions, the ED is supported by three committees, namely the Engineering and Operation Committee (dealing with the standards), the Strategic Planning Committee (dealing with overall coordination of planning activities such as transmission networks and new capacity production) and the Finance and Human Resource Committee (dealing with the development of WAPP activities). This committee constitute of experts from WAPP members regional energy utilities, the WAPP general Secretariat and the ECOWAS Regional Regulatory Authority.

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118 Oseni and Pollitt “Institutional Arrangements for the Promotion of Regional Integration of Electricity Markets” 13–14.

119 Oseni and Pollitt “Institutional Arrangements for the Promotion of Regional Integration of Electricity Markets” 13–14.

120 The WAPP General Secretariat as the coordination body managing the day to day activities of the WAPP is organised in three divisions: operations division (acting as the information and coordinating centre), finance, procurement and human resource division, and the planning, investment programming and environmental safeguards division. See Monga, Mhlanga and Lunmayr “Decentralised Power in countries in the ECOWAS region” 179–191.

121 The ECOWAS Regional Electricity Regulatory Authority (ERERA) established in terms of ECPWAS A/SA.2/1/08 as a regional regulator for cross-border electricity interconnections in West Africa has as function to regulation of cross-border electricity connections and trading among ECOWAS member states, facilitating the setting up of regulatory and economic environment for the development of the regional market, establishment of clear and transparent tariff setting methodology for regional power pooling, regulate the regional power pooling and monitoring of regional market operations, assist in defining the strategy for the regional energy policy, develop effective dispute resolution methods.
Just like in Central and West African sub-regions, the East Africa Power Pool (EAPP) has also been established in the East African sub-region. Established in 2005 by the Inter-Governmental Memorandum of Understanding (IGMOU), the EAPP is made up of ten countries and 12 member utilities which are divided into active and affiliate members. With the vision to facilitate and secure electricity supply in the sub-region, the EAPP aimed at pooling energy resources, promote power exchanges between utilities in Eastern Africa and reduce power supply costs based on an integrated master plan and grid code. In given effect to the EAPP objectives, the EAC and EAPP developed the EAPP/EAC Interconnection Code, governing the design and operation of electricity interconnections in the region. The EAPP/EAC Interconnection Code further provides the rules and standards for technical planning and operation of the EAPP interconnected transmission system. In terms of the IGMOU, the Council of Ministers is the supreme governing body that delivers strategic guidance and oversight to the Steering Committee and approves membership to the pool as well as regional master plans. The Steering Committee that comprises member utility firms constitutes the executive arm responsible for policy formulation and execution. The Executive Secretariat located in Addis Ababa, Ethiopia handles the day to day activities of the pool.

Adopted as a specialised institution for energy by the Common Market for East Africa (COMESA), EAPP has as objective to cooperate in the development of energy resources in the region and to facilitate access to electricity through regional power interconnections. This would be achieved through the pooling of the regions energy among regional market participants and upon request assisting national regulatory bodies in ECOWAS on capacity building and technical issues. See Monga, Mhlanga and Lunmayr “Decentralised Power in countries in the ECOWAS region” 179–191

EAPP member states include; Burundi, Democratic Republic of Congo (DRC), Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, Libya and Uganda.

EAPP member utilities include; REGIDESO (Burundi), SNEL (DR Congo), KenGen and KPLC (Kenya), EEHC (Egypt), EEPCO (Ethiopia), GECOL (Libya), NEC (Sudan), Tanesco (Tanzania), EWSA (Rwanda), and SINELAC (DR Congo–Rwanda–Burundi).

Active members are public or concessionary utilities in charge of electric power production, transmission and/or distribution in the region and who have fulfilled membership conditions. Affiliate members are Independent Power Producers operating in the region and who have fulfilled the membership conditions.

Activities manage by the Executive Secretariat of the EAPP.

Other objectives of EAPP include Secure power supply for the countries of the region, optimise the use of energy resources available in the region by working out regional investment schemes in power generation, transmission and distribution taking into account the socio-economic and environmental
resources to satisfy increasing electricity demand. The first Master Plan of the EAPP was released in 2011 and an updated plan in 2014. These Master Plans identify priority regional generation projects mainly in hydropower projects. These projects are to run up to 2025 and have a total installed capacity of 10 870 MW (hydropower represents 97% and the remaining 3% from thermal using methane from Lake Kivu in Rwanda). These projects include the GIBE III, GIBE IV, Ruzizi 3, Kivu I and Karuma, among others. Regarding the current energy mix, about 77 per cent of the EAPP’s existing installed power capacity comes from thermal sources with hydropower comprising about 22 per cent of the total power capacity. The share of hydropower is expected to increase with current hydropower projects such as GIBE III, which has an estimated capacity of about 1,870 MW. Although one of the main goal of the EAPP is to increase access to energy, the EAPPs Master Plan does not specifically provide detailed plans to expand existing electricity grid in to areas that are not connected to the grids system. The EAPPs Master Plan is not a legally binding instrument, but a guideline document.

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127 Final Master Plan Report: Executive Summary “Regional Power System Master Plan and Grid Code Study”. See also Infrastructure Consortium for Africa“ Regional power status” 39–49.
128 Infrastructure Consortium for Africa” Regional power status” 39–49.
129 GIBE III (1870 MW) hydropower site in Ethiopia. The project is being implemented. The contract was signed in 2009 and went operational in 2013.
130 GIBE IV (1468 MW) hydropower site in Ethiopia. A preliminary report was produced by Pietrangeli-Salini in 2008. A MoU was signed with a Chinese company in 2010. A feasibility study is required as well as securing the funding of the project.
131 Ruzizi 3 (145 MW) & Ruzizi 4 (287 MW) hydropower sites in Eastern DRC. The project will supply at least the three Grand Lac Countries (Burundi, DRC and Rwanda): For Ruzizi 3, the feasibility study was conducted. A Transaction Advisor has been recruited to assist the countries to select a developer (IPP/PPP). Funding of the project for construction is still required.
132 Kivu I (100 MW) thermal project in Rwanda. It is expected to use the methane from lake Kivu. The project includes gas gathering system, supply pipeline, Diesel generation plant, road access and development of port facility at Kibuye. Development of the project will be in two phases.
133 Karuma (700 MW) hydropower project in Uganda: It was initially conceived as a run of the river scheme. The project is included as a preferred option in Uganda Generation Plan. prior to EAPP Master Plan, various studies and projects were initiated in the region. They Eastern Nile Power Trade Investment Project, Opportunities for Power Trade In The Nile Basin Final Scoping Study, the Vision And Strategy Framework For Management And Development of Lake Victoria Basin, and the East Africa Power Master Plan Study.
134 Infrastructure Consortium for Africa” Regional power status” 39–49.
promoting energy cooperation in the regional. The Master Plan does no place any legal binding obligations on member states.

Similar to the Central and West African regions is the Southern African region which has established the Southern African Power Pool (SAPP). The SAPP was established in August 1995 at a SADC summit held in Kempton Park, South Africa, when member states signed an IGMOU for the formation of an electricity power pool in the region. The objectives of SAPP include to provide a forum for the development of a world class, robust, safe, efficient, reliable and stable interconnected electrical system in the region, harmonise inter-utility relationships, coordinate the development of common regional standards on quality of supply and facilitate the development of expertise through training programmes and research. In order to achieve these objectives, members are called upon to cooperate and coordinate the planning and operation of the electric power system to minimise cost through coordination, share equitably in the resulting benefits, including reductions in required generating capacity, reductions in fuel costs and improved use of hydroelectric energy.135

The SAPP is an association of 12 member utilities from 12 of SADC countries.136 There are four legal documents covering the rights and obligations of the SAPP participants. They include an IGMOU,137 an inter-utility memorandum of understanding (IUMOU) between participants,138 an agreement between operating members (ABOM)139 and operating guidelines (OG).140 The SAPP is organised under an executive committee which acts as

135 SAPP IGMOU.
136 The twelve SAPP members and member utilities include: Angola’s Empresa Nacional de Electricidade (ENE), Botswana’s Botswana Power Corporation (BPC), Democratic Republic of Congo’s Societe Nationale d’Electricite (SNEL), Lesotho’s Lesotho Electricity Supply Commission (LEC), Malawi’s Electricity Supply Commission (ESCOM), Mozambique’s Electricidade de Mocambique (EDM), Namibia’s Namibia Power (NamPower), South Africa’s Electricity Supply Commission (Eskom), Swaziland’s Swaziland Electricity Board (SEB), Tanzania’s Tanzania Electricity Supply Company (Tanesco), Zambia’s Zambia Electricity Supply Corporation (ZESCO), and Zimbabwe’s Zimbabwe Electricity Supply Authority (ZESA).
137 The IGMOU which grants permission for the utilities to participate in the SAPP and enter into contracts. It also guarantees the financial and technical performance of the power utilities.
138 The IUMOU defines ownership of assets and other rights, for example, provision for change in status from participating to operating member.
139 The ABOM determines the interaction between the utilities with respect to operating responsibilities under normal and emergency conditions.
140 The OG which defines the sharing of costs and functional responsibilities for plant operation and maintenance including safety rules and standards.
the board of directors of the pool and a management committee which oversees the administration of the pool. Three subcommittees serve under the direction of the management committee, the planning subcommittee (which focuses on reviewing wheeling rates annually and developing an indicative SAPP expansion plan every two years), the operating subcommittee and its associated Coordination Centre, and the environmental subcommittee. The Coordination Centre is responsible for such tasks as undertaking most pool monitoring activities, carrying out operating and planning studies, determining transfer limits on tie-lines, administering a regional database, disseminating maintenance schedules, providing technical advice and seeking funding for its needs.

In Africa, power pooling has the potential to increase access to modern energy and in the long run alleviate energy poverty. However, these pooling arrangements face a number of challenges. The African power pooling challenge is mainly attributed to the adoption of a western model of pooling arrangement that was designed to suit the conditions of developed countries. Pineau views this as Africa not having ownership over their own projects while making a clear distinction between ownership of projects and successful implementation of such projects. According to him, ownership occurs when policymakers are responsible for the formation and implementation of electricity cooperation in their respective regions and allows for accountability to the local or domestic population who are recipients of policy decisions. For African pooling to be successful the needs of specific regions should inform the establishment of the institutions, norms and regulations of the pooling agreements. Furthermore, the argument about ownership is likely to disappear if capital used in building, operating and sustain regional pools are sourced via self-raised funds among member states rather than aid or foreign investments.

The funding of pooling arrangements by foreign investors poses another crucial challenge to African pooling arrangements. Funds are very crucial in the establishment and management of power pools. Most often, cooperating member states are unable to raise

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the entire capital for the running of the pooling projects. When foreign donors step in to offer their funds through aid or investment, cooperating members have to adjust their objectives to accommodate the demands of their donors. Most often, actors sign deals with donors just so that they can have some funds to execute their regional projects. The challenge of sustaining that cooperative agreement usually becomes very difficult to maintain in the implementation phase of the projects, making it difficult to attain the overall objective of increased modern energy access.\textsuperscript{146}

The domination of particular states in pooling agreements is another issue that further exacerbates the challenge of an effective energy pooling arrangement in Africa. The generating capacity and energy resources are unevenly distributed on the African continent. As such, states with little or no resources have to accept the terms and conditions of pooling energy resources together for the purpose of having access to electricity for their domestic consumption. However, these issues could be addressed if each collaborating party is assured that the required efforts will be harnessed for the common good of all.\textsuperscript{147}

The purpose of the African CAPP, WAPP, EAPP and SAPP pooling agreement is to understand the nature of the different energy pooling arrangements and challenges, with overall objective to increase access to modern energy in Africa. This notwithstanding, cooperation in order to harmonise energy policies among member states while promoting the development of the African continent is an objective common to the African power pool agreements either directly or indirectly, fulfilling the mandates of both the AU\textsuperscript{148} and NEPAD.\textsuperscript{149} This, however, underscores the importance of regional energy cooperation on increased modern energy access while putting in place mandates for the development of regional and sub-regional cooperative frameworks to that extent. The challenges to the above power pooling arrangements are directed to designing of power pools in Africa taking into account the need of the specific RECs as pointed out by Pineau, the inability of cooperating states to fund power projects, multiple membership and the domination

\textsuperscript{146} Pineau 2008 \textit{Energy Policy} 219–221.
\textsuperscript{147} Pineau 2008 \textit{Energy Policy} 219–221.
\textsuperscript{148} Article 3(k) of the \textit{Constitutive Act}. Member states are called upon to cooperate in areas on common interest. Energy is one of such areas.
\textsuperscript{149} See paragraph 5.1 above.
of pooling agreements by specific states. In the light of the AU’s and regional energy cooperation limitations, cooperative sub-regional frameworks to increase access to RE as well as other initiatives have been developed. In the next section, an overview of existing regional and sub-regional cooperative energy frameworks on increased RE in effecting access to modern energy in Africa would be discussed.

5.6 RECs Cooperative frameworks on increased RE access in Africa

Regional and sub-regional cooperation on the management of energy resources appears to be of great significance. The African continent is endowed with abundant RE and non-RE sources, which are unevenly distributed. This amounts to challenges such as RE not being regulated or partially regulated by related energy regulations. Recognising the importance of regional and sub-regional energy cooperation, the cooperative frameworks and initiatives promoting increased RE access in ECCAS, ECA, ECOWAS and SADC are of great relevance. These include but are not limited to the ECCAS & CEMAC White Paper: Regional Policy for Universal Access to Modern Energy (2014), the ECOWAS Renewable Energy Policy, 2012 and the SADC Energy Protocol, 1996.

5.6.1 ECCAS frameworks on increase access to RE

The Treaty Establishing the Economic Community of Central African States, 1983 (ECCAS Treaty) established the ECCAS. The ECCAS has as its objective to promote and strengthen cooperation and achieve and self-sustained development in all fields of economic and social development. Similar to other RECs, ECCAS is made up of six

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150 See paragraph 2.4 above.
151 See paragraph 2.4.5 above.
152 The Treaty Establishing the Economic Community of Central African States, 1983 http://www.wipo.int/edocs/trtdocs/en/eccas/trt_eccas.pdf. ECCAS member states include, Gabon, Cameroon, the Central African Republic (CAR), Chad, Congo Brazzaville and Equatorial Guinea - and those of the Economic Community of Great Lake Countries (CEPGL) as well as Angola and Sao Tome and Principe (except Rwanda, Burundi and the Democratic Republic of Congo (DRC)). Covering an area of 6630539 km², ECCAS has a total population of approximately 121 million.
153 Fields include transport and communications, energy, agriculture, natural resources, trade, customs, monetary and financial matters, human resources, tourism, education, further training, culture, science and technology and the movement of persons among others. Article 4 (1) ECCAS Treaty.
in institutional bodies, the Conference of Heads of States, the Council of Ministers, the Consultative Commission, the General Secretariat, the Community Court of Justice and Specialised Technical Committees.

With reference to the energy sector, states are called upon to promote renewable forms of energy as part of the policy of diversification of energy sources, develop a common energy policy relating more specifically to the exploitation, production and distribution of energy sources and to develop appropriate exchange measures to ensure regular supply of electricity among others. In giving effect to above provisions, member states are to conclude agreements with other member states. However, issues arising from the implementation as well as the interpretation of agreements/provisions of treaty are to be settled either amicably between parties or be tabled before the ECCAS Court of Justice. Decisions of the ECCAS Court of Justice are legally binding on member states as well as institutions of the community. Notably, the ECCAS Court of Justice is yet to go operational.

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155 The Conference of Heads of States serves as the supreme body, intended to meet once a year to define the organisation’s major policy priorities.
156 The Council of Ministers is responsible for the functioning and development, makes recommendations to the Conference and is guides the activities of the other institutions. See Byiers “Understanding regional economic policies in Central Africa” 6–7.
157 The Consultative Commission brings together experts appointed by the member states and is responsible for advising the Council and answering questions by other institutions. Furthermore, they can establish Specialised Technical Committees for support. See Byiers “Understanding regional economic policies in Central Africa” 6–7.
158 The General Secretariat of ECCAS is based in Libreville, Gabon, and responsible for the execution of decisions and directives from the Conference and the regulations issued by the Council of Ministers. Headed by a Secretary General and three deputies, it is structured around three departments: human, peace, security and stability integration; physical, economic and monetary integration; and programme, budget, administration and human resources issues. See Byiers “Understanding regional economic policies in Central Africa” 6–7.
159 The ECCAS Court of Justice is to enforce the Community’s legal documents and give advice in questions of law interpretation.
160 The Specialised Technical Committees has as function to support all other bodies in carrying out their duties. See Byiers “Understanding regional economic policies in Central Africa” 6–7.
161 Article 54 (1) (a)–(d) ECCAS Treaty.
162 Article 86 (1) (4) ECCAS Treaty.
163 The ECCASS Court of Justice is established in terms of article 16 of the ECCAS Treaty.
164 Article 17 of the ECCAS Treaty.
Heads of State in the ECCAS N’Djamena Conference under decision number 52/CEEA/CCEG/15 later formally adopted the ECCAS White Paper. This ECCAS White Paper acknowledges the overall objective of increased RE access as contained in the ECCAS Treaty and set out clear objectives until 2030. With regard to targets relating to RE sources, the ECCAS White Paper proposes to have all bioenergy produced in a sustainable manner by 2030 and have more than 95 per cent of the additional power capacity until 2030 coming from RE sources (hydro, biomass and other RE sources). The ambitious targets of all additional power generation capacity coming from RE sources by 2030 and all biomass energy coming from sustainable sources. For these targets to be achieved member states have to cooperate in the development of their RE projects, diversifying their energy sources to include RE in their energy mix at both national and regional levels and harmonise their energy policies in order to increase access to modern energy in the sub-region. Furthermore, a common energy policy more particularly as concerns exploitation, production and distribution, establish an adequate system of concerted action and coordination for jointly solving the Community’s energy development problems (in particular those relating to energy transmission, the lack of skilled cadres and the shortage of funds for implementing their energy projects and promote the training and further training of cadres). In providing guidelines (as a soft law instrument) in realising the objective of the ECCAS, the ECCAS White Paper does not

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166 On universal access and quality of service the ECCAS White Paper sets the following targets “to multiply by three the penetration of non-solid fuels (notably GPL) in urban areas and by four in rural areas, with the more advanced countries (Angola and Gabon) to target universal access to LPG by 2025, to increase electrification rate to 54 per cent by 2030 and 63 per cent by 2040, with more advanced countries such as Gabon and Cameroon to target universal access before 2030, to reduce kerosene to residual utilization in rural areas by 2030, through substitution with RE technologies and to have blackouts only in residual situations before 2020. With regard to energy efficiency the ECCAS White Paper sets the following targets: reduce to a third the level of energy losses, increase efficiency in public buildings by 25 per cent and in new buildings/houses by 50% until 2030, progressive phase out of inefficient equipments, with incandescent lamps to be prohibited before 2020, to have all urban households and 90 per cent of rural households using biomass for domestic uses with efficient cook-stoves (with at least 40 per cent improvement regarding traditional ones) and to increase efficiency in charcoal production to 35 per cent”.

167 Article 54(2) (a)–(d) ECCAS Treaty.
place any legally binding obligations on ECCAS member states. Similar to the ECCAS, RE development is also being promoted in ECOWAS.

5.6.2 Regional cooperation and increased access to RE in ECOWAS

In terms of the Treaty of the Economic Community of West African States, 1975 (ECWAS Treaty),168 member states are to cooperate, coordinate and harmonise their policies, frameworks and programmes with the aim of diversifying their energy mix,169 and ensure effective development of energy resources on the region. The member states also have to promote the development of new and RE sources as a means of diversifying their energy mix.170

In giving effect to this mandate, the ECOWAS Energy Protocol, 2007 was adopted in 2003.171 The ECOWAS Energy Protocol is a legally binding instrument regulating the common objective of promoting long-term cooperation in the field of energy. In terms of the ECOWAS Energy Protocol, cooperation is indispensable in promoting the development of new and RE sources.172 As its over-arching objective, the ECOWAS Energy Protocol aims to promote the development and use of RE in pursuit of sustainable development.173

In order to achieve this objective member states are to develop RE sources in a cost effective manner, minimise any harmful environmental impacts occurring either within or outside its area from all operations within the energy cycle in its area.174 However, disputes arising from the development of RE to the extent that mutual arrangements for the consideration of such disputes fail, such issues can be resolved by seeking adjudication with appropriate international fora or be reviewed by the ECOWAS Meeting of Energy Ministers.175

169 Cooperation, coordination and harmonisation of policies, framework and programmes should take place in the energy sector, food and agricultural sector, transport and communication sector, economic reform policies, human resources, education, information, culture, science, technology, services, health, tourism, legal matters. Article 3 ECOWAS Treaty. See also Gachenga “Legal and policy frameworks” 138.
170 Article 28 ECOWAS Treaty.
171 The ECOWAS Energy Protocol A/P4/1/03.
172 Article 2 ECOWAS Energy Protocol.
173 Article 19 (1) (d) of ECOWAS Energy Protocol.
175 See paragraph 5.3 above.
To further effect, the mandate of increased access to RE, the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) was established in 2010. The ECREEE has as its objective to promote increase access to modern energy and the establishment of frameworks that promote access to RE, covering areas such as policy development, capacity building, resource assessment, knowledge management, and investment promotion. The ECREEE has been successful since its creation\textsuperscript{176} and gained international recognition as a unique regional RE and energy efficiency promotion agency in sub-Saharan Africa. Though the ECREEE can be eluded for the range of RE projects promoting increased access to RE in the sub-region, it remains a mere centre of excellence promoting increased RE access within member states.

To further promote access to RE in the ECOWAS sub-region, the ECOWAS Energy Ministers adopted the \textit{ECOWAS Renewable Energy Policy, 2012} (EREP).\textsuperscript{177} Being a soft law instrument with no legally binding force, the EREP aims to increase the use of RE sources and to help enable, amongst other things, universal access to electricity via targets by 2030.\textsuperscript{178} With regard to targets relating to RE sources, the EREP proposes to:

- increase the share of RE in the overall electricity mix, including large hydro to 35 per cent by 2020 and 48 per cent by 2030 and other RE sources to 10 per cent by 2020 and 19 per cent by 2030\textsuperscript{179} for grid-connected RE,\textsuperscript{180}
- increase the share of the rural population served by decentralised RE electricity services (mini-grids and stand-alone systems) to 22 per cent by 2020 and 25 per cent by 2030 and\textsuperscript{181}

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\textsuperscript{176} The ECREEE achievements since its formation include the following. In the first call for proposals for the ECOWAS Renewable Energy Facility, 41 projects were approved with an overall volume of €2 million. The web-based ECOWAS Observatory for Renewable Energy and Energy Efficiency (ECOWREX) has also been established, providing targeted investment/business information for the private and public sectors. The ECOWAS Renewable Energy Investment Initiative (EREI) was also formed to support the development of a renewable energy project pipeline for medium and large-scale projects.

\textsuperscript{177} The ECOWAS Renewable Energy Policy (EREP) 2012.

\textsuperscript{178} Adrianus "An opportunity” 316–320. See also Vilar, Lugmayr and Fall” ECREEE Investment Promotion Initiatives” 327–329.

\textsuperscript{179} This will lead to the installation of 2424 MW RE generation capacity from wind, solar, bioenergy and small-scale hydropower by 2020 and to 7606 MW by 2030.

\textsuperscript{180} Article 2(1) EREP.

\textsuperscript{181} Article 2(2) EREP.
• ensure universal access to improve cook-stoves to 100 per cent by 2020 and increase the share of the population served with modern fuel alternatives, including LPG for cooking to 36 per cent by 202 and 41 per cent 2030 among others.¹⁸²

For these targets to be achieved, the EREP call for the development of a coherent, efficient and flexible legal, institutional and regulatory framework in order to develop consistency between the regional and the national RE policies.¹⁸³ Furthermore, member states are to develop national RE policies with an associated implementation strategy to make the RE production attractive for investors, promote RE advocacy, awareness and knowledge management, among others.¹⁸⁴ In developing RE sources in the ECOWAS sub-region, the principles of subsidiarity, participatory approach, optimisation of the use of available financial resources, promoting public-private partnerships and support for gender equality must be taken into account.¹⁸⁵ Just like in the ECOWAS sub-region, increased access to RE is also being promoted in the East African sub-region.

5.6.3 East African Community initiatives on increased access to RE

The EAC does not have a specific policy on energy. The EAC Treaty nevertheless recognises the need for regional cooperation in the development of the energy sector in East Africa.¹⁸⁶ In terms of the Article 101 EAC Treaty, member states are obliged to adopt

¹⁸² Article 2(3) EREP. Increase the share of solar water heating technologies for sanitary hot water and preheating for commercial and industrial processes, introduce blending for ethanol/bio-diesel in transport fuels of 5 per cent by 2020 and 10 per cent by 2030, prepare separate regional policy for sustainable use of bioenergy including bio fuels and waste to power to be adopted by the ECOWAS Ministers of Energy.

¹⁸³ Article 3 EREP.

¹⁸⁴ Article 3 EREP.

¹⁸⁵ The EREP is based on five guiding principles. (1) subsidiarity principle: to be applied during the implementation of the policy. The EREP will intervene in regional actions only when they can bring added value to national actions. The roles of national and regional institutions in the EREP process will be defined precisely. (2) Participatory approach: promotion of the approach based on the involvement of the end users in the definition of technical and organisational options. This will be realised by creating, when needed, a forum of national stakeholders for the private sector and the civil society together with the national officials from the relevant ministries, utilities and regulatory authorities. (3) Optimisation of the use of available financial resources and the raising of additional resources will require a mix of Public Development Aid (multi- and bi-lateral), national public financing and private financing. This will be done by seeking complementarities between regional and national funding sources and by prioritising high impact/low cost’ solutions. (4) Promoting public-private partnerships: these partnerships will cover technical aspects, management systems, fund-raising and financial risk-taking. (5) Support for gender equality: in the context of implementation of the EREP, an effort will be made to mainstream gender issues. Participatory approaches will be applied.

¹⁸⁶ The Treaty for the Establishment of the East African Community was signed in Arusha on 30 November 1999. The Treaty entered into force on 7 July 2000 following the conclusion of the process of its
policies and mechanisms to promote the efficient exploitation, development, joint research and utilisation of the various energy resources available in the region. For these to be achieved, EAC member states committed themselves to promote the least cost development and transmission of electric power, efficient exploration and exploitation of fossil fuels and the utilisation of new and RE sources. Issues arising from the development and utilisation of RE sources are resolved before the East African Court of Justice (EAC Court) which is made up of the First Instance Division and the Appellate Decision. Having jurisdiction over the interpretation and application of the EAC Treaty, the EAC Court is divided into the First Instance Division that hears and adjudicates matters at first instance which is subject to appeal at the Appellate Division. Grounds for appeal may be based on points of law, lack of jurisdiction, as well as procedural irregularity.

With reference to the development of coherent, harmonised and efficient RE policies amongst member states, the East African Centre for Renewable Energy and Energy Efficiency (EACREEE) was established in 2015. Objectives of the EACREEE include ratification and deposit of the Instruments. Upon the entry into force of the Treaty, the East African Community (EAC) was established. Member states of EAC include the Republics of Burundi, Kenya, Rwanda, South Sudan, the United Republic of Tanzania, and the Republic of Uganda, with its headquarters in Arusha, Tanzania.

Article 101 (1) EAC Treaty. See UNDP "Scaling up modern energy services in East Africa" 1–16.

Article 101 (2) (a) and 8 of the EAC Treaty respectively. See AU "African Union Commission" 191–219.

The East African Court of Justice was established in terms of Article 9 of the EAC Treaty. The EAC Court is the judicial body of the East African Community and has jurisdiction over matters relating to adherence, interpretation and implementation of the EAC Treaty as well as regulations, directives and decisions made in terms of the provisions of the EAC Treaty. Article 9 and 16 and 23 of the ECT Treaty respectively.

Article 27 of the EAC Treaty.

Article 23(2) of the EAC Treaty. Notably, the EAC Court is not the only organ of the East African Community. EAC Community has organs such as the Summit that gives general directions and impetus to the development and achievement of the objectives of the Community (Articles 10–12). The Council is the policy organ that promotes, monitors and review the implementation of the programmes of the Community ensuring proper functioning and development of the Community (Article 13–16). The Coordination Committee submits reports and make recommendations to the Council either on its own initiative or upon the request of the Council regarding the implementation of the EAC Treaty (Articles 17–19). The Sectoral Committees prepares comprehensive implementation programmes and the set out of priorities with respect to its sector (Articles 20–22). The East African Legislative Assembly has the function to liaise with the National Assemblies of the Partner States on matters relating to the Community, debate and approve the budget of the Community among others (Articles 49–61). The Secretariat has the function to initiate, receive and submit recommendations to the Council as well as and forwarding Bills to the Assembly through the coordination Committee (Articles 66–71 EAC Treaty).

Article 35A EAC Treaty.

The EACREEE is supported by UNIDO and the Austrian Development Agency, and is part of the Global Network of Regional Sustainable Energy Centres (Centre). The Centres respond to the urgent need
developing and implementing a coherent regional RE and energy efficiency policy framework for the EAC and facilitating its implementation at national levels, developing and executing regional programmes and projects with other partners and mobilising funding, operating as key entry point for the implementation of international funding to mitigate climate change in the energy sector.\textsuperscript{194} Other objectives of the EACREEE include strengthening regional cooperation with the view to further regional integration and harmonised frameworks based on increasing access to RE and addressing energy poverty in EAC. The EACREEE is a centre of excellence and not a legally binding instrument, meaning it lays down guidelines and help in the development of RE policies among member states but does not place any legal obligations on them. Similar the EAC sub-region, the SADC sub-region also has as an objective to promote increased access to modern energy services.

### 5.6.4 Regional initiatives on increased access to RE in the SADC region

An objective common to all SADC member states in terms of SADC Treaty is to achieve sustainable use of natural resources and the effective protection of the environment.\textsuperscript{195} This objective will be achieved via cooperation in the harmonisation of political and socio-economic policies of member states among others.\textsuperscript{196} Though no explicit reference is made to the development of RE in the SADC Treaty, RE development can be inferred from its provisions. The SADC Treaty refers to “effective protection of the environment” of the region. Keeping in mind that energy from fossil fuels is the highest producer of

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\textsuperscript{194} Other objectives of the EACREEE include; to provide co-funding for demand-driven programmes and projects executed by the private and public sector or civil society in the region (e.g. call for proposals and tenders), provide a framework for capacity building activities and strengthen networks between research and training institutions as well as organise training of trainers workshops, update and provide RE&EE information and data for investors, act as Think Tank, Lobbying Agent and Advisory Platform for RE and energy efficiency in East Africa and networking and co-organisation of conferences, forums and workshops and to facilitate North-South and South-South cooperation for knowledge and technology transfer.

\textsuperscript{195} Treaty Establishing the SADC 1992. Article 5(1) (g) SADC Treaty.

\textsuperscript{196} Article 5 (2) (a) SADC Treaty.
carbon dioxide which is the main cause of climate change (drought, floods, and decrease in water levels among others) which is already affecting the continent. RE use has less impact on the environment. It is therefore the submission of the author that, though the SADC Treaty does not explicitly provide for the production of energy from RE sources, its overall objectives comprise of such a mandate.

The *SADC Regional Indicative Strategic Development Plan* 2003 (RISDP) sets specific quantitative targets for infrastructure development for a 15-year period (2004–2018), while providing deeper cooperation and integration in priority sectors among SADC member states. In terms of the RISDP, regional cooperation is of great importance with regard to the development of harmonised policies related to specific priority sectors (energy among others). With regard to the energy sector, the target was for at least 70 per cent of rural communities within SADC to have access to modern forms of energy supplies through rural electrification and the development of new and RE sources.

In giving effect to the objective of regional cooperation, the SADC Treaty call upon member states to cooperate in necessary areas that would foster regional development and integration. Cooperation in terms of the Treaty refers to the harmonisation, coordination and rationalisation of member states overall macro-economic and sectoral policies and strategies as well as programmes and projects by appropriate SADC institutions in the areas of cooperation listed. Listed areas of cooperation include infrastructure and services, food security, land and agriculture, natural resources and environment among others. Of relevance is cooperation in the area of infrastructure and services which falls under the Directorate of Infrastructure and Services. The Directorate of Infrastructure and Services in terms of the SADC Treaty has as mandate to conclude protocols necessary in each area of cooperation spelling out the objectives

199 The SADC RISDP.
200 Paragraph 1.5 of the RISDP.
201 Article 21(1) (2) SADC Treaty.
202 Article 21 (3) (d) SADC Treaty.
and scope of institutional mechanisms for cooperation. In giving effect to such a mandate, the *SADC Protocol on Energy*, 1996 (SADC Energy Protocol) was adopted.

The SADC Energy Protocol (signed in August 1996 and came into force in April 1997) is a legally binding document that aims at the harmonisation of national and regional energy policies, cooperation in the development of energy and energy pooling and ensuring the provision of reliable, continued and sustainable energy services in the most efficient and cost effective manner among others. Cooperation in the SADC energy sector involves working together in the development and utilisation of energy in the region in subsectors such as new and RE sources, woodfuel, petroleum and natural gas, electricity, coal, energy efficiency and conservation and other cross-cutting themes of interest to member states. With specific reference to RE, projects implemented in the region in terms of the SADC Energy Protocol include the Programme for Biomass Energy Conservation (ProBEC) and the United Nations Development Programme-supported Financing Energy Services for Small-Scale Energy Users Project. Pursuance to article 12(1) of the SADC Energy Protocol, disputes arising from RE development are addressed amicably or tabled before the SADC Tribunal. Notably, the decision of the SADC Tribunal remains final and legally binding.

With focus on the role of regional cooperation as a means of effecting a harmonised framework that promotes RE development, the provisions of the SADC Treaty refer to a coordinated regional approach where, states are obliged to develop national energy policies that promote RE development in order to achieve equitable energy development in the SADC region. In the opinion of the author, the SADC Energy Protocol provides for the connection between regional cooperation and the objective of developing a harmonised energy framework that promotes increased access to RE. Unlike the SADC

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203 Article 22 (1) SADC Treaty.
204 Article 3(1) and (4) of the SADC Energy Protocol. Other sectors of cooperation include promoting joint development of human resources and organisational capacity building; and cooperation in research, development, adaptation, dissemination and transfer of low-cost energy technologies.
205 Article 3(3) of the SADC Energy Protocol.
206 The SADC Tribunal is established in terms of article 9(f) of the SADC Treaty. The SADC Tribunal has as function to ensure adherence and provide interpretation to provisions of the Treaty as well as subsidiary instrument (SADC Energy Protocol, among others).
207 Article 16(5) SADC Treaty.
Treaty that does not contain any specific reference to RE access, cooperation in the
development of energy resources as a means of effecting increased access to modern
energy. The SADC Energy Protocol contains specific reference to the development of RE.
It is, however, possible to deduce that, the development of RE is an overall objective of
the SADC Treaty when interpreting its provisions.

The SADC Energy Protocol is implemented through the SADC Energy Cooperation Policy,
Energy Cooperation Policy and the SADC Activity Plan put in place timeframes for regional
energy activities. The Activity Plan regulates four main activities under the energy sector
(energy trading, investment and finance, training and organisational capacity building
and the exchange of information and experience), with the overall objective of increased
access to modern energy. The SADC Energy Cooperation Policy and SADC Activity Plan
are not legally binding instruments. They are frameworks to implement of the SADC
Energy Protocol. The objective of increased access to modern energy forms the base for
the development of the SADC Regional Infrastructure Development Master Plan 2012–
2027 (RIDMP) and the SADC Energy Sector Plan, 2012 (ESP).

As part of the RIDMP, the ESP aims to define regional infrastructure requirements and
conditions to facilitate the realisation of key infrastructure in the energy, water, transport,
tourism, meteorology and telecommunications sectors by 2027. With the overall
objective to increase access to modern energy, among others the ESP provides for a
review of the current energy supply-demand balance and future projections.
Furthermore, SADC energy policies and/or strategies and regulatory frameworks call for
the assessment of energy institutional frameworks and financing in order to meet SADC’s
energy vision and strategic goals. The energy sub-sectors covered by the ESP include
RE, petroleum and gas, coal, nuclear energy and energy efficiency for both SADC and

208 SADC Energy Sector Activity Plan Technical Report Review submitted by AECOM International
210 Other objectives of the ESP include energy security, developing energy resources and achieving
211 The ESP is designed to address four key strategic objectives that are paramount in the energy sector
of SADC namely, ensuring energy security, improving access to modern energy services, tapping the
abundant energy resources and achieving financial investment and environmental sustainability.
member states. The ESP, just like the RIDMP, runs for a period of 15 years (2012–2017) with its projects being divided into short, medium and long term periods spanning five years to 2017, 2022 and 2027 respectively.\textsuperscript{212}

The main focus of the RIDMP is to provide strategic direction with respect to SADC programmes and activities and align the strategic objectives and priorities of SADC with the policies and strategies for achieving its long-term goals. The RIDMP is legally non-binding, indicative in nature and merely outlining the necessary conditions towards achieving those goals. In order to facilitate the monitoring and measurement of progress, it sets targets and timeframes for goals in the various fields of cooperation inclusive of energy. To further give effect to the mandate of regional cooperation while promoting access to RE as a means of effecting access to modern energy as captured in the SADC Protocol on Energy, the \textit{SADC Revised Regional Indicative Strategic Development Plan, 2015–2020 (RISDP)} was endorsed.

The SADC member states endorsed the RISDP during an extraordinary summit of SADC heads of state and government held in April 2015 in Harare, Zimbabwe.\textsuperscript{213} Adopted in response to the need to assess progress and make necessary adjustments, the RISDP established an implementation framework for the period 2015–2020. The RISDP aims to deepen regional integration in SADC and it provides SADC member states with a consistent and comprehensive programme of medium-term economic and social policies. Furthermore, the RISDP provides the Secretariat and other SADC institutions with a clear view of SADC’s approved economic and social policies and priorities.\textsuperscript{214} The RISDP four priority areas include industrial development and market integration, infrastructure in support of regional integration, peace and security cooperation and special programmes of regional dimension. The energy sector that falls under the priority area infrastructure in support of regional integration is identified as critical for SADC economic growth and includes the original target of “increased/efficient use of renewable and other low cost

\begin{itemize}
\item SADC ESP 2012.
\item SADC Revised Regional Indicative Strategic Development Plan, 2015–2020 http://www.sadc.int/documents-publications/show.
\item SADC Energy Monitor, 2016 28. SADC institutions include the Summit of Heads of States, the Council of Ministers, the Commissions, the Standing Committee of Officials, the Secretariat and the Tribunal. See article 9(a)–(f) of the SADC Treaty.
\end{itemize}
energy sources (biomass, solar, wind)” in order to ensure that 10 per cent of rural communities have access to new and RE sources.\textsuperscript{215} This would be achieved through rural electrification and the development of new and renewable energy sources.\textsuperscript{216} The RISDP acknowledged good political, economic and corporate governance as prerequisites for the realisation of SADC’s sustainable socio-economic development, poverty eradication and deeper levels of cooperation. Similar to the RIDMP, the RISDP is a legally not binding instrument. Compared to the RIDMP which is indicative in nature, the RISDP is a measuring framework that measures the overall progress of increased access to modern energy as provided for by the SADC Energy Protocol. To further give effect to the SADC Energy Protocol’s objective of cooperation on access to RE as a means of effecting increased access to modern energy, SADC adopted the SADC Industrialisation Strategy and Roadmap, 2015.

The \textit{SADC Industrialisation Strategy and Roadmap, 2015} (Strategy and Roadmap) is another important SADC energy policy document. Approved during a SADC extraordinary summit of heads state and government in 2015, the Strategy and Roadmap aims at strengthening the comparative and competitive advantages of economies of the region and allow the region to leverage its vast natural resources endowment such as energy resources. Focusing on three priority areas, namely, industrialisation, competitiveness and regional integration, the Strategy and Roadmap spans over the period 2015–2063. Energy access in terms of the Strategy and Roadmap is critical for efficient and affordable infrastructural services and low transaction cost for industry, trade as well as the economic and social well-being of the SADC sub-region. In order to increase access to modern energy, the Strategy and Roadmap advocates for the exploitation of alternative sources of energy particularly RE sources among others.\textsuperscript{217} The Strategy and Roadmap is a soft law instrument. Promoting competition among member states with regard to the

\textsuperscript{215} SADC Energy Monitor, 2016 28.
\textsuperscript{216} SADC Energy Monitor, 2016 28.
\textsuperscript{217} Other means of achieving access to energy include; increase public investment in energy provision for both domestic use and export to regional partners through the Southern African Power Pool, pay attention to the reliability, efficiency and cost effectiveness of energy supply, step up the involvement of independent power providers to ease the burden on government investment spending, adopt energy efficient technologies to reduce the cost of production and minimise GHG emissions that contribute to climate change among others.
development of energy resources as such poses no legal obligations on member states. To further effect increased RE access as a means of effecting access to modern energy, SADC is in the process of establishing the *SADC Centre for Renewable Energy and Energy Efficiency*, 2015 (SACREEE).

Approved during the 34th Meeting of the Energy Ministers of the SADC, SACREEE aims to promote RE and energy efficiency technologies and the development of markets, through sharing information and best practices, developing sound policy, regulatory, and legal frameworks, and building the capacity within SADC member states for RE and energy efficiency. Furthermore, SADC pledges to install additional 24 062 MW of new generation capacity by 2019 in order to address generation deficit of which 70 per cent is expected to come from RE sources, hydro, wind and solar among others. The SACREEE is expected to work closely with other SADC energy subsidiary organisations when it becomes operational. In line with the objective of increased access to RE as a means of effecting increased access to modern energy, SADC is in the process of developing a *Renewable Energy and Energy Efficiency Strategy and Action Plan* (REEESAP).

Energy experts from the SADC approved the *SADC Regional Renewable Energy and Energy Efficiency Strategy and Action Plan* (REEESAP), at a validation meeting held in October 2016 in Johannesburg, South Africa. The REEESAP is expected to spans the period 2016 to 2030 and aim to provide a framework for SADC member states to develop RE strategies, leading to greater uptake of RE resources as well as the mobilisation of financial resources in the sector. This will be achieved via measures such as the establishment of RE agencies in all 15 SADC member states that will have a specific mandate for off-grid systems, as well as developing and adopting guidelines to meet the SADC target of cost-reflective tariffs by 2019. Other proposed measures include awareness raising on the value and benefits of RE and introducing sustainable energy issues in school curricula and tertiary education. The REEESAP proposes to reach

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219 In 2011, SADC started the process of developing a Renewable Energy and Energy Efficiency Strategy and Action Plan (REEESAP), which is still under development as officials and ministers need to ensure that the targets are achievable and appropriate to each member state.
electricity savings of 5 per cent by 2015, 10 per cent by 2020 and 15 per cent by 2030 of total in the sectors that use electricity. Notably, the REEESAP is yet to be adopted.

SADC has put in place a range of legal and supporting policies to promote RE development in the sub-region. The SADC Energy Protocol remains the only legally binding document on RE (as well other energy sources) development. The activities and plans of the ESP, RIDMP, RISDP, Strategy and Roadmap, SACREEE and REEESAP (supporting instruments) revolves around the objective of increased access to RE among other modern energy sources. In the opinion of the author the said instruments reiterate the objective of the legally binding SADC Energy Protocol: cooperate and develop RE sources in promoting development of the sub-region. These documents clearly refer to the development of RE as well as the correlation between the promotion of RE and increased access to modern energy and alleviating energy poverty. It is, however, possible to deduce that the provisions of the said instruments (that is the ESP, RIDMP, RISDP, Strategy and Roadmap, SACREEE and REEESAP) are legally binding as they give effect to the objectives of the SADC Energy Protocol.

RE as a convenient and available energy source, access to which should be increased has been listed in the SADC Energy Protocol (and subsequent non-binding instruments), the ECCAS Treaty, ECOWAS Energy Protocol and EAC Treaty, underscoring the importance of the sub-regional role in the overall achievement of increased RE access in Africa. Cooperation in the harmonisation of the legal framework is further acknowledged as critical in the realisation of the said development.

### 5.7 African Union initiatives to increase access to RE

The determination of the AU to promote increased access to RE can be traced back to 2009, when the AU Assembly of Heads of State and Government decided in Addis Ababa to develop RE resources in order to provide access to clean, reliable, affordable and

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220 Article 3(1) (4) SADC Energy Protocol. See Paragraph 5.4.4 above.
221 Article 54(1) (a)–(d) ECCAS Treaty. See paragraph 5.4. above.
222 Article 2 ECOWAS Protocol. See paragraph 5.4.2 above.
223 Article 101 of the EAC Treaty. See paragraph 5.4.4 above.
environmentally friendly energy. African governments reaffirmed their political will in 2010, with the Maputo Declaration (that established the Conference of Energy Ministers of Africa (CEMA)), which further led to development of a range of RE initiatives on the continent. These initiatives include but are not limited to the Africa-European Union Energy Partnership, 2008, the Abu Dhabi Communiqué on Renewable Energy, the AU Agenda 2063 and the Africa Renewable Energy Initiative.

5.7.1 Africa-European Union Energy Partnership, 2008

In promoting access to modern energy through the development of RE, the Africa–EU Energy Partnership (AEEP) was established in response to the mandate of the Africa–EU Strategic Partnership (AEUSP). The AEUSP is a long-term framework for Africa–EU relations, in response to the long history of cooperation between the EU and the AU. Launched during the first historic Africa–EU Summit in Cairo, 2000, the framework aims to enhance political dialogue between Africa and the EU in strategic areas. With increased regional integration in both the EU and AU, the EU Strategy for Africa was drafted. The EU Strategy for Africa aims to mirror the thematic areas that were identified during the Africa–EU summit in Cairo. In fear of the EU Strategy for Africa not reflecting Africa’s agenda, the AEUSP was adopted. With the vision to strengthen the political partnership and enhanced cooperation in all thematic areas and levels, the objective of the AEUSP will be achieved through the adoption of partnerships, priority actions and action plans that identify main political priorities, policy commitments, programmes and actions that will be needed to achieve success.

In line with the provisions of the AEUSP, the AEEP was established in 2008. With its overall objective to secure reliable and sustainable energy services and extend their

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224 Assembly/AU/Decl.9–XII.
226 In the year 2000, regional integration at both EU and AU had been deepened with EU almost doubled in size. The Organisation of African Unity (OAU) has transformed into the AU with its socio economic programme, the New Partnership for Africa’s Development (NEPAD) established.
227 The AEUSP is a framework of the two continents for cooperation beyond development aid, instituted in 2007 at the Africa-EU Summit in Lisbon.
228 The AEEP is an established forum for high-level political dialogue between Europe and Africa, and it has performed as an instrumental agenda-setter in African-European cooperation on energy issues as well as contribution at the international scene.
member states access on both continents, the two continents share their knowledge and resources while harmonising their interests and policies to collectively meet energy challenges. Among other energy sources, RE is identified as part of a diversified energy mix that is critical in prompting access to reliable, secure, affordable, climate friendly and sustainable and modern energy in the continent.229 Furthermore, the AEEP acknowledges the role of cooperation on the establishment of legal, fiscal and regulatory energy frameworks at the continental, regional and national levels in Africa. As such the Renewable Energy Cooperation Programme was launched in 2010.

Recognising the role of RE on increasing access to modern and sustainable energy services for socio-economic development, leaders from Africa and the EU launched the Renewable Energy Cooperation Programme, 2010 (RECP) at the first high level meeting of the AEEP, held in Vienna.230 The RECP has as objective to contribute to the ambitious political objectives of the AEEP for increasing access to modern energy services in Africa, to improve energy security by increasing the use of RE in Africa, while contributing to sustainable economic and social development of the African continent.231 In order to achieve its objectives, the RECP focuses on four strategic action areas. They include policy advisory services (where they seek to provide the groundwork to create an enabling environment for RE investments), private sector cooperation (by fostering cooperation between African and European businesses), project preparation and flagship investment projects (by developing strategically projects and facilitate financing) and technological innovation and capacity development (provide support for applied RE research and capacity enhancement for African research institutions, strengthening academic and vocational training institutions in order to develop the next generation of RE professionals). The RECP is set to run for the period 2011 to 2020.232

229 AEUSP 2008 61.
230 The Renewable Energy Cooperation Programme, 2010 is an open-ended framework for cooperation between the two continents to increase the use of RE on the African continent.
232 The Renewable Energy Cooperation Programme, 2010. During the period 2011 to 2020 the RECP will undertake three key reviews, in 2013 and 2017 and a thorough overall programme review in 2020. AEEP “10 Years of Successful Cooperation” 8.
In the context of RECP, the AEEP supports RE development at the sub-regional level. The AEEP supports the EAC (East African Community) with an advanced scoping mission into the area of technical gaps within the small hydropower sector. In scoping the small hydropower sector, the role of RECs in the African energy sector was identified as an important gap on achieving increased access which later became one of EACs recommendations to the AU on how to formulate a regional policy on RE. With support of the RECP, the *Centre for Renewable Energy and Energy Efficiency of the Economic Community of West African States* formulated a regional policy on RE that was adopted in 2013 by the Ministers of ECOWAS. Apart form steering RE development at sub-regional level, AEEP has played an important role in the private sector where the AEEP launched the Electrification Financing Initiative (ElectriFi), which has received almost 600 applications from African–European stakeholders for project support, resulting in more than 160 MW projected installed capacity on the continent. The AEEP has supported and closely cooperated with the South African Wind Energy Association (SAWEA) in promoting wind energy development in South Africa.

The *Renewable Energy Cooperation Programme, 2010* is seen as the most significant initiative in the realisation of one of the objectives of the AEUSP, namely to increase access to modern energy through the use of RE. Both the AEUSP and *Renewable Energy Cooperation Programme* underscore the importance of RE on increasing access to modern energy while identifying policy development, cooperation and the strengthening of research and institutions as critical to that effect. While the AEEP creates a platform for dialogue and broader energy policies between the EU and African Union, a great milestone has been reached in the field of RE. It has supported a number of regional and private RE initiatives. It should be noted that the AEUSP, the AEEP and its resulting RECP

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233 AEEP “10 Years of Successful Cooperation” 8. See also Tywuschik and Sherriff “Beyond Structures” 1–38.
234 AEEP “10 Years of Successful Cooperation” 8. See also Tywuschik and Sherriff “Beyond Structures” 1–38 and UN “Regional Cooperation Policy” 28.
235 AEEP “10 Years of Successful Cooperation” 11. See also Tywuschik and Sherriff “Beyond Structures” 1–38.
236 AEEP “10 Years of Successful Cooperation” 11. See also UN “Regional Cooperation Policy” 28.
are all RE support tools in the realisation of the objective of increased RE access and as such place no legal obligation on both Africa and the European Union.237

5.7.2 Abu Dhabi Communiqué on Renewable Energy, 2011

Adopted in 2011 by 46 African countries with the participation of 25 African energy ministers, the Abu Dhabi Communiqué on Renewable Energy (Abu Dhabi Communiqué) aims to accelerate Africa’s development, through increase utilisation of Africa’s RE resources.238 In order for these objectives to be achieved, members are urged to cooperate and strengthen national, regional and continental policy frameworks and provide support for RE research.239 The Abu Dhabi Communiqué promotes IRENA’s policies as a framework document. The IRENA policy focuses on improving policy frameworks to ensure increased RE access while providing necessary measures needed to ensure social inclusion of RE, brokering services in capacity building including for entrepreneurs in RE, cooperation on technology and innovation to enhance human and physical capacity to accommodate expanded renewables deployment, fostering regional and local level renewable energy technology production and service industries and support communication campaigns to promote the uptake of RE.240 It should be noted that, all signatories to the Abu Dhabi Communiqué acknowledge the policy options on increased access to RE as set out by IRENA. The Abu Dhabi Communiqué is an initiative accelerating Africa’s development through the development of RE sources but places no legal obligations on signatory states. Its focus on cooperation development and strengthening of policy framework at national and regional level and highlights the need of an AU harmonised energy framework. Similar to the Abu Dhabi Communiqué on Renewable Energy is the African Bioenergy Policy Framework and Guidelines, 2012.

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237 AEEP “10 Years of Successful Cooperation” 11. See also UN “Regional Cooperation Policy” 28.
239 Paragraph (I) (a)–(c) Abu Dhabi Communiqué on Renewable Energy.
240 Paragraph (I) and (iii) (a)–(e) Abu Dhabi Communiqué on Renewable Energy.
5.7.3 African Bioenergy Policy Framework and Guidelines, 2012

Adopted by the Assembly of Heads of States of the AU, the African Bioenergy Policy Framework and Guidelines, 2012 (ABPFG) is a joint initiative of the AU Commission (AUC) and the United Nations Economic Commission for Africa. The non-binding ABPFG aims to provide principles and guidelines for RECs and African countries, guide policies and regulations and enhance awareness in order to promote a sustainable bioenergy sector. In an effort for this to be achieved the ABPFG urge for bioenergy policies to be mainstreamed into the RECs frameworks and be linked to already existing initiatives at national, sub-regional and regional levels. However, both the Abu Dhabi Communiqué on Renewable Energy and the ABPFG remains legally non-binding and are regarded as mere initiatives.

5.7.4 AU Agenda 2063

The non-binding AU Agenda 2063 was adopted at the 50th anniversary Summit of AU Heads of State and Government on 25 May 2013. A general objective contained in the strategic framework for socio-economic transformation for the next 50 years relates to connect Africa through world class infrastructure with a concerted push to finance and implement major infrastructure projects in priority areas. Priority areas under the infrastructure sub-sector include energy, transport and inter communication technology. In order to achieve this in the energy sub-sector, members agree to harness all African energy resources to ensure access to a modern, efficient, reliable, cost-effective, renewable and environmentally friendly energy to all African households, businesses, industries and institutions via regional energy cooperation power pools and grids.

In essence, the non-binding AU Agenda 2063 is designed to provide the AU and its member states with the means of having access to modern energy services through regional energy cooperation and energy power pools.

242 AU/CEMA/MIN/Res (II).
244 AU Agenda 2063 The Africa We Want.
245 Paragraph 72(g) of AU Agenda 2063.
5.7.5 *Africa Renewable Energy Initiative, 2015*

In 2015 the members of the UNFCCC at COP 21 underscore the importance of RE in reducing the effects climate change and increasing access to energy in Africa. In effect, the *Africa Renewable Energy Initiative, 2015* (AREI) was launched to assist African countries leapfrog to RE systems, while ensuring a universal access to modern energy. As a transformative, African-led effort to accelerate and scale-up the development of the continent’s RE sources, AREI seeks to achieve at least 10 GW of new capacity by 2020 and as an aspirational goal. This implies an additional RE generation of 300 GW by 2030. The AREI identifies specific activities under five core work areas and four cross-cutting work areas, ranging from strengthening policy, regulatory, support and incentives frameworks to provide project development and support and financing of RE projects.\(^\text{246}\)

5.7.6 *African Energy Leaders Group*

Headed by the Heads of State and corporate executives of companies from across the African continent, the African Energy Leaders Group (AELG)\(^\text{247}\) bring together political and economic leaders at the highest level to drive the reforms and investment needed to end energy poverty and sustainably fuel the continent’s economic future. In achieving this, the AELG urged for energy sector reforms and support for technological energy innovation in the African continent, while focusing on two key areas (innovative public-private partnerships and the creation of integrated and commercially viable regional power plans). This will be done through two regional sub-groups, namely, West and Eastern Africa groups with each composed of Heads of State and Chief Executives of businesses that have a direct interest in energy issues, civil societies and regional development banks. Being an alliance of various stakeholders, rather than an investor or donor, the AELG supports the formulation of sub-regional energy strategies, facilitating cross-border communications and outreach.

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\(^{246}\)Other work areas of the AREI include but not limited to; capacity mobilisation and building, mobilisation of finance for incentives and investment, Socio-economic and environmental assessments of RE technologies, multi-stakeholder engagement, wider context monitoring and assessment and communications and outreach.

\(^{247}\)The AELG is a community of energy leaders from the public and private sector dedicated to promote a sustainable energy transition in Africa in support of the objectives of the SE4All Initiative. The AELF was launched in January 2015 at the World Economic Forum in Davos, Switzerland.
energy trade, collaborating on efforts to reduce electricity costs and promoting the financial viability and creditworthiness of state-owned power utilities.\textsuperscript{248}

Similar to the \textit{Africa–European Union Energy Partnership 2008}, the \textit{Abu Dhabi Communiqué on Renewable Energy 2011}, \textit{African Bioenergy Policy Framework and Guidelines 2012}, \textit{AU Agenda 2063}, \textit{Africa Renewable Energy Initiative} and the \textit{Africa Renewable Energy Initiative}, the African Energy Leaders Group remain mere initiatives with the common objective to increase RE access. Commonalities among the AU initiatives on measures how increase access to RE can be achieved include the development and strengthening of energy policies at both regional and sub-regional levels, cooperation and RE finances. Increased access to RE as envisaged by the AU initiatives can only be achieved through cooperation and RE legal frameworks on the African continent. Apart from AU RE initiatives, there are other initiatives or programmes that seek to increase access to RE. Other than above AU initiatives, a host of non-AU initiatives aimed at promoting increased RE access in Africa do exist.

\textbf{5.8 Other initiatives on increase access to RE in the African continent}

A host of alliances and initiatives have been set up to address the energy deficit challenge in Africa. They include Power Africa, the New Deal for Energy in Africa, Energy Africa campaign among others. These initiatives focus on increasing access to modern energy in Africa, through the expanded use of RE resources. These initiatives, for example, government tools, financial capital provided by private investors and the economic incentives of markets.

\textbf{5.8.1 Power Africa}

Power Africa was launched by the Obama administration as the USA government’s flagship energy initiative in Africa.\textsuperscript{249} Headed by the USA government, Power Africa draws

\textsuperscript{248} Sustainable energy for all at www.se4all.org/sites/default/files/I/2014/08/se4all_aelg.pdf.

\textsuperscript{249} Tagliapietra “Electrifying Africa” 10. See also Quitzow \textit{et al} 2016 \textit{IASS} 1–74. Notably initiative has never been about providing money to African governments with US tax money. It was always designed to use public policy tools, like risk guarantees to catalyse private capital to help build power plants, expand grids, and deploy RE energy systems in Africa. Nonetheless, president Trump’s campaign made no mention of Power Africa in any campaign materials. The sole data point seems to be a three-year-old tweet complaining that money going to Africa will be stolen. Moss 2017
on the resources of 12 government agencies to advance energy sector reforms, expand energy access and boost electricity generation capacity from RE sources in Africa. It has as target to add more than 30,000 MW of clean and efficient electricity generation in sub-Saharan Africa and to increase electricity access by adding 60 million new home and business connections.

In order to achieve these targets, the USA has committed to provide more than US $7 billion in financial support, through direct and indirect funding’s. Direct funding is geared to expand energy infrastructure projects in the form of loan guarantees, direct loans, technical assistance risk mitigation insurance, direct grants to African governments for energy projects and working capital loans for USA exporters. Other indirect, financial tools employed by the government to support Power Africa include advocacy for legal, regulatory and institutional reforms, feasibility and project preparation and a government trade missions training programme. Since the launch of Power Africa, the African Development Bank, the World Bank Group and the Swedish government have committed an additional US $9 billion in support. According to the Power Africa road map, the original US $7 billion has leveraged an additional US $43 billion from a wide range of public and private sector partners.

In 2014, President Obama raised the Power Africa targets threefold to 30 GW of electricity capacity and 60 million new domestic electricity connections by 2030. The Beyond the Grid programme, a new programme with the Power Africa was further launched in 2015, focused on unlocking investment for off-grid and mini-grid energy solutions in rural areas. In in the same year, Power Africa was further strengthened with the adoption of the USA Electrify Act of 2015. The USA Electrify Act provides for access to electricity for


252 Tagliapietra “Electrifying Africa”10.

253 Tagliapietra “Electrifying Africa”10. See also Quitzow et al 2016 IASS 1–74.

254 Tagliapietra “Electrifying Africa”10. See also Quitzow et al 2016 IASS 1–74, Batinge, Musango and Brent 2017 SAJIE 41.

255 Tagliapietra “Electrifying Africa”10. See also Quitzow et al 2016 IASS 1–74.

256 Tagliapietra “Electrifying Africa” 11–12. See also Quitzow et al 2016 IASS 1–74.
at least 20 GW of electrical capacity by 2020 in line with the Power Africa targets for 2030.  

The involvement of 12 different government agencies relating to, for example, the foreign policy, energy and trade in dealing with Africa’s energy problems underscore the need for a multidimensional effort. This points to the fact that a multi-dimensional effort involving Africa and Africa’s RECs in the developing RE resources while dealing with the Africa’s energy problem is of great importance.

5.8.2 New Deal for Energy in Africa

The New Deal for Energy in Africa (New Deal) is an African Development Bank lead initiative to increase access to modern energy in Africa. Launched in 2015, the New Deal aims to coordinate all of the other programmes and efforts aimed at achieving universal energy access in Africa by 2025 (over a ten-year period). To achieve this goal, the African Development Bank (AfDB) works with governments, the private sector and energy sector initiatives to develop a Transformative Partnership on Energy for Africa. This is done by working with existing initiatives to achieve an impact at greater speed and scale. The AfDB hopes to:

...increase on-grid generation to add 160 gigawatts of new capacity by 2025, increase on-grid transmission and grid connections by 160 per cent in order to create 130 million new connections by 2025, increase off-grid generation to add 75 million connections by 2025, an increase that is twenty times more than what Africa generates today and increase access to clean cooking energy for 130 million households.

In an effort to attain these goals, the AfDB established a new complex on Power, Energy, Climate Change and Green Growth in 2016. Furthermore, the US $500 million debt fund Facility for Energy Inclusion with an initial Bank contribution of US $100 million targeting small-scale renewable independent power producers (IPPs), mini-grids and off-grid

258 Batinge, Musango and Brent 2017 SAJIE 41.
solutions by the AfDB’s Board of Directors was approved in December 2016. In 2017, directors for the five directorates of the Power, Energy, Climate Change and Green Growth Complex were recruited among others.\textsuperscript{261} As a result, an additional 546 MW of installed capacity of which 526 MW are from RE sources have been added.\textsuperscript{262}

Just like Power Africa, the New Deal is an initiative and as such poses no legal obligation on both the AfDB and African countries. Both Power Africa and the New Deal provide non-refundable finance for RE development on the continent. While the New Deal for Africa focuses on both development and the extension of transmission lines, Power Africa only focused on RE development. However, the provision for finance incentives and as identified by Power Africa and New Deal remains critical when proposing regional legal energy frameworks that aimed at promoting RE development.

5.8.3 Energy Africa Campaign

The \textit{Energy Africa Campaign} is an initiative that focuses predominantly on energy access for rural populations who live beyond the reach of national grids. Launched in 2015, the \textit{Energy Africa Campaign} aims to boost electricity in Africa by expanding the rural household solar market.\textsuperscript{263} This will be achieved by aligning a supportive policy with coordinated donor support to improve RE investment and market conditions in off-grid energy firms, overcome regulatory barriers, foster innovation and accelerate the delivery of solar energy systems to households across Africa, through partnerships with African government, private investors, NGOs, think tanks and other donors.\textsuperscript{264}

In attaining its objective the “Sierra Leone Energy Africa Compact” was entered in to between the and the Sierra Leone government in 2015.\textsuperscript{265} As an initiative similar to the

\textsuperscript{261} The directors are to lead specialised activities on “power systems development, RE and energy efficiency, energy financial solutions, policy and regulation, energy partnerships and climate change and green growth”. Furthermore, in May 2016, the New Deal Strategy was approved by the Board to deploy US $12 billion to leverage US $45 billion to a further US $50 billion by 2020. AfDB Group “The New Deal” 10.

\textsuperscript{262} AfDB Group “The New Deal” 11.

\textsuperscript{263} See paragraph 2.5.2 above for different sources of RE. See also Batinge, Musango and Brent 2017 \textit{SAJIE} 41, UK Department of International Development 2015 at https://www.gov.uk.

\textsuperscript{264} Batinge, Musango and Brent 2017 \textit{SAJIE} 41. See also UK Department of International Development 2015 at https://www.gov.uk.

\textsuperscript{265} The Sierra Leone Energy Africa Compact is the first move by the Energy Africa Campaign. More of such agreements are yet to be entered in to. See Tice “Energy Africa Access Campaign Policy” 18.
New Deal, the Energy Africa Campaign focuses on expanding modern energy services to rural populations beyond grid connection while the New Deal focuses on the entire African population not having access to and beyond the energy grid. A similar initiative to increase access to modern energy on the African Continent through increased access to RE is the Sustainable Energy Fund for Africa.

5.8.4 Sustainable Energy Fund for Africa

The Sustainable Energy Fund for Africa (SEFA) is a US $95 million multi-donor facility aimed at supporting small and medium-scale RE and energy efficiency projects in Africa.\(^{266}\) Launched in 2012, the SEFA seeks to provide grants and technical assistance to bring viable RE and energy efficiency projects to bankability and enable finance from the AfDB. SEFA funds come from the governments of Denmark, Italy, UK and the USA and the fund is administered by the AfDB. The SEFA issues three types of funding, namely project preparation funds, SEFA’s equity investments and stream offers grants.\(^{267}\) The preparation funds focus on RE development activities from feasibility to financial closure for projects with a total capital investment between US $30 million and US $200 million. SEFA’s equity investments provide seed capital for small-and medium-sized projects, as well as initial managerial and technical support for smaller entrepreneurs and developers. Lastly, stream offers grants support public sector activities that create and improve the enabling environment for private sector investments in RE development.\(^{268}\) However, SEFA is still in its first operational phase of providing support grants for projects that fulfil a number of criteria.\(^{269}\) SEFA projects include the 2013 1-million Mauritius project,\(^{270}\) the 2015

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\(^{266}\) Batinge, Musango and Brent 2017 *SAJIE* 41. See also SEFA “Unlocking Private Sector Potential” 1–4.

\(^{267}\) Batinge, Musango and Brent 2017 *SAJIE* 41. See also Sustainable Energy Fund for Africa https://www.africa-eu-renewables.org/_funds/sefa.


\(^{269}\) They include projects undertaken in African countries, proposed project’s sponsor is privately-owned, the project shows strong commercial viability. Once fully prepared, the total capital needed will be between US $30–75 million and project will result in an increased availability of productive energy from RE sources. Eligibility criteria for proposed projects at the second and third phase include “Alignment with SEFA objectives and mandate and with the relevant strategic and policy documents of the Bank, Effectiveness of proposed technology and appropriateness for local context, Adherence/commitment to highest environmental and social standards through project design among others. See GIZ “How to include energy efficiency” 1–38.

\(^{270}\) In 2013, SEFA approved a US $1-million project preparation grant to support the development and installation of the Sea Water Air Conditioning System in Mauritius, an innovative low-carbon technology that lowers building cooling costs using cold ocean water. Being the first of its kind in Africa, the
930,000 USA dollars Cape Verde project,\textsuperscript{271} Ethiopia Corbetti Geothermal 20 MW,\textsuperscript{272} and the 2014 530,000 USA dollars Mali project.\textsuperscript{273} SAFA approve projects, yet to be sponsored, include, the JCM Greenquest project in Cameroon, StarSol project in Chad, Mutunguru in Kenya and the Makambako project of Tanzania among others.

In essence, the New Deal, the Energy Africa Campaign and the SEFA remain initiatives. However, obligations under approved SEFA projects (since they are privately owned) will be binding law under the national law of a country if the country enter into a contact to that effect.

\textbf{5.8.5 Electrification Financing Initiative}

Initiated by the European Commission and Power Africa, the Electrification Financing Initiative (ElectriFI) seeks to provide middle and long-term capital for energy access projects in emerging and developing countries in sub-Saharan Africa.\textsuperscript{274} Launched in 2016\textsuperscript{275} the ElectriFI focus is on private sector-led rural electrification projects, and target mainly those using RE, specifically small hydro, wind, solar and biomass sources. The total fund size will be EUR 75 million (equivalent to US $81.8 million) with average investments between EUR 1 million and 10 million.\textsuperscript{276} The first invitation for applications under ElectriFI generated 290 project proposals requesting EUR 800 million of financial support to leverage a total investment amount of EUR 8.5 billion for installing 3.7 Gigawatts new RE generation capacity in 55 African countries.\textsuperscript{277} In response to the

\begin{itemize}
\item project involves the construction and operation of a ground-breaking system that pumps cold water from the Indian Ocean and uses it for air conditioning purposes in buildings located in the beach and nearby cities. See SEFA “Unlocking Private Sector Potential” 3.
\item SEFA granted a total US $930,000 to Cape Verde to develop the world’s first wave-driven desalination system in 2015. see SEFA “Unlocking Private Sector Potential” 4.
\item The SEFA-sponsored Africa Renewable Energy Fund, AREF, invests US $20 million into the first 20 MW phase of the Corbetti Geothermal Project in central Ethiopia. Following a successful phase one expected to generate at least 20 MW of power, an additional 50 MW of future production is predicted.
\item In 2014 SEFA approved a USD 530,000 grant to the government of Mali to strengthen the enabling environment for private sector involvement in RE development. SEFA “Unlocking Private Sector Potential” 5.
\item Electrification Financing Initiative at https://eeas.europa.eu.
\item The Electrification Financing Initiative is a financing mechanism aimed to support market development and private sector initiatives for affordable, sustainable and reliable energy solutions in sub-Saharan Africa.
\item Electrification Financing Initiative at https://eeas.europa.eu.
\item Electrification Financing Initiative at https://eeas.europa.eu.
\end{itemize}
success of the first invitation, financial support to ElectriFI has been scaled up and the second invitation for applications under ElectriFI was launched in 2017.

However, the participation of the private sector and the financiers to the first invitation under ElectriFI indicates that finance (main function of the ElectriFI) is likely to be a game changer in responding to the challenge of increased access to RE energy in Africa.

The provisions of AU regional initiatives, the *Abuja Treaty*, the *Constitutive Act* and the AFREC either explicitly or implicitly provides for legal obligations to cooperation in one hand and the harmonisation of energy policies, programmes or frameworks on the other hand as a means to effect increased RE access. RE at the AU level is mostly dealt with through non-binding AU non-binding instruments that takes the form of either initiative or a tool.
Table 1: The nature of the AU RE related frameworks.

<table>
<thead>
<tr>
<th>AU RE Frameworks(^{278})</th>
<th>Hard Law Instruments</th>
<th>Tools and initiatives</th>
<th>Legal enforceability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Treaty</td>
<td>Policy</td>
<td>Initiatives</td>
</tr>
<tr>
<td>Abuja Treaty</td>
<td>√</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Constitutive Act</td>
<td>√</td>
<td>x</td>
<td>x</td>
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<tr>
<td>AFREC(^{279})</td>
<td>√</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>AEEP(^{280})</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Abu Dhabi Communiqué</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>ABPFG(^{281})</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>AU Agenda 2063</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>AREI(^{282})</td>
<td>x</td>
<td>x</td>
<td>√</td>
</tr>
<tr>
<td>AELG(^{283})</td>
<td>x</td>
<td>x</td>
<td>√</td>
</tr>
<tr>
<td>Power Africa</td>
<td>x</td>
<td>x</td>
<td>√</td>
</tr>
<tr>
<td>New Deal(^{284})</td>
<td>x</td>
<td>x</td>
<td>√</td>
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<tr>
<td>Energy Africa campaign</td>
<td>x</td>
<td>x</td>
<td>√</td>
</tr>
<tr>
<td>SEFA(^{285})</td>
<td>x</td>
<td>x</td>
<td>√</td>
</tr>
<tr>
<td>Electrifi(^{286})</td>
<td>x</td>
<td>x</td>
<td>√</td>
</tr>
</tbody>
</table>

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278 African Union Renewable energy frameworks.
284 The New Deal for Energy in Africa.
285 The Sustainable Energy Fund for Africa.
286 The Electrification Financing Initiative.
From the above table, it is clear that most of the AU RE related initiatives remains initiatives and tools with no legal binding force. The *Abuja Treaty*, the *Constitutive Act* and the AFREC which are legally binding instruments do not specifically regulate RE. The development and strengthening of policies, mainstreaming RE in to existing policy frameworks, development of technical and innovative capacity, provision of finances and most importantly cooperation remain core measures of increasing access to RE as identified by AU related RE initiatives. Importantly, neither the AU legally binding instrument nor the tools provides for mechanisms which are to be used in order to achieve the goal of increased RE access. Considering that the AU currently lacks a legal energy framework that regulates energy activities and RE specifically, IRENA mechanisms and international best practices\(^{287}\) as well as measures identified by the AU instruments are especially relevant for the preliminary stage of adopting a regional energy framework that regulates increased access to RE sources. It could offer legal assistance to AU as well as other developing regions.

5.9 Conclusion

Regional cooperation on policy harmonisation on issues of common interest is an important approach followed by the AU, geared towards promoting development in the African continent. The objective of increased RE access in Africa must be achieved through the promotion of regional cooperation, harmonising and coordinating policies between AU and existing and future RECs as well as within AU members. Existing regional energy cooperative arrangements in Africa face challenges. These challenges pertain to claims that the African energy cooperative arrangements (power pools) adopt the European model of energy pooling arrangements which do not fit into the African context. The lack of funds and the domination of particular states in pooling arrangements are other challenges facing the African power pooling arrangements. Proposed solutions in order to address these challenges include, for example, pooling arrangements being informed by the needs of specific sub-regions. African energy pools should raise their

\(^{287}\) See paragraphs 4.4 and 4.5.
own funds to avoid the possibility of being managed by fund donors and states within pooling arrangements operating on an equal basis.

The collective efforts of AU member states and sub-regional communities must be geared towards the formulation of a cooperative regional energy framework that promotes the development of RE as a means of effecting access to modern energy. The ECCAS, the ECWAS, the EAC and the SADC acknowledge the importance of regional cooperation and identify access to RE as critical in effecting increased access to modern energy.\(^{288}\) Notably, in promoting increased RE access, the RECs are far ahead of the AU putting in place a range of RECs initiatives to that effect. The structure and method of implementation amongst these RECs, however, differ.\(^{289}\)

Regional cooperation on the development of RE as a means of effecting increased access to modern energy is again reaffirmed by the current AU legal frameworks. The legal mandate to develop an AU legal framework that promotes RE development is contained in the provisions of the *Abuja Treaty*, providing that AU member states must cooperate and harmonise policies and programmes that promote the development of RE.\(^{290}\) The objective of cooperation in promoting RE is reaffirmed by the *Constitutive Act*, providing for the coordination and harmonisation of RE projects and programmes through the Technical Committee on Energy and Natural Resources and environment (CAFREC).\(^{291}\) The CAFREC acknowledges the connection between cooperation among member states and the establishment of a regional energy law and framework that promote increased RE access.\(^{292}\)

In line with the *Abuja Treaty*, the *Constitutive Act* mandates the development of RE on the African continent. The AEEP, established under the mandate of the AEUSP stresses the importance of regional cooperation among members in the development of legal, fiscal and regulatory energy frameworks, that include RE in diversifying the energy mix at the regional and sub-regional and national levels. The *Renewable Energy Cooperation*

\(^{288}\) See paragraph 5.4 above.  
\(^{289}\) See paragraph 5.4 above.  
\(^{290}\) See paragraph 5.5.1 above.  
\(^{291}\) See paragraph 5.5.2 above.  
\(^{292}\) See paragraph 5.5.3 above.
Programme and the *Abu Dhabi Communiqué on Renewable Energy* are significant RE initiatives, demonstrating the role of regional cooperation, development of frameworks that promote RE development acknowledging the IRENA mechanism for Africa. Other initiatives demonstrating the critical role of RE on increasing access to modern energy in Africa include the AU Agenda 2063, Africa Renewable Energy initiative, Power Africa, the New Deal for Energy in Africa, the Energy Africa campaign, Sustainable Energy Fund for Africa, the Electrification Financing Initiative and the African Energy Leaders Group. The overall objectives of these initiatives are to promote RE development on the African continent. The provision of finance remains a common goal for above initiatives. However, Power Africa and the New Deal go a step further by identifying grid extension as a major factor to be considered when providing financial support for RE projects.

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293 See paragraphs 5.6.1 and 5.6.1 above.
CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1 Overview of assumptions and hypothesis

The aim of this thesis was to identify the necessary components of a modern AU legal energy framework that could regulate increased RE access and address energy poverty in Africa. In order to determine what should constitute an AU legal energy framework that would promote increased access to RE, related RE law and instruments (both hard and soft) at the international, AU and sub-regional (RECs) levels were analysed.

Increased access to RE relates to energy poverty. Energy poverty for the purpose of this study is defined as the lack of adequate access to basic energy services for lighting, cooking, cooling and space heating, mechanical power, mobility, communication, process heat and communication that are reliable, affordable, sustainable and low in GHG emissions.¹

Benchmarking an African approach to measuring energy poverty proved challenging.² Approaches to measuring energy poverty focuses on different challenges resulting from energy poverty.³ The challenges resulting from the current African energy use pattern (that is the use of traditional biomass and the lack of access to modern energy services) cut across more than one approach to measuring energy poverty.⁴ The challenges range from household income spent on energy services as a result of not being connected to the grid system (access approach), the health impacts of traditional biomass use (MEPI and outcome approaches), the dangers women and children face during fuel fetching in rural areas, as well as time lost in this process (outcome approach).⁵ Based on the challenges resulting from Africa’s current energy pattern, the author benchmarked an

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¹ See paragraph 2.2 above.
² See paragraph 2.2 above.
³ See paragraph 2.2 above.
⁴ See paragraph 2.2.1 above.
⁵ See paragraphs 2.2.1.2 and 2.2.1.2 above.
African energy approach to measure energy poverty as a combination of the access, input, outcomes and the deprivation approaches to measure energy poverty.⁶

RE, based on the definitions provided by the IRENA Statute and IEA, is defined as energy originating from natural processes in the form of bioenergy, geothermal energy, hydropower, the ocean, solar energy and wind energy produced in a social, economic and environmentally friendly manner.⁷

RE sources are regarded as part of modern energy. The IIASA identifies three criteria associated with modern energy, namely energy that provides essential benefits for socio-economic development, energy that is less polluting for basic domestic services and energy for appliances and lights in households and public facilities.⁸ The Africa Energy Outlook accordingly defines modern energy as high quality and reliable energy that provides services such as lighting, heating, transport, communication and mechanical power that supports education, better health, higher incomes and all-round improvements in the quality of life.⁹ The UNDP and the World Health Organization refer to modern energy as electricity, liquid fuels and gaseous fuels, but exclude electricity produced from traditional biomass and coal. The practical application of these definitions would entail modern energy as energy sources that are reliable, less polluting and that promote sustainable development.¹⁰

The phrase “modern energy access” according to the AGECC entails the physical availability of modern energy carriers and improved end use devices such as cookstoves at affordable prices for all. Access to these modern energy services must be reliable and affordable, sustainable and, where feasible, from low GHG emitting energy sources.¹¹ The SE4ALL Knowledge Hub in contextualising “modern energy access” proposes three levels for modern energy access as household access, access for productive uses and access to community facilities.¹² Modern energy access based on the above definitions entails

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⁶ See paragraph 2.2.1.2.2 above.
⁷ See paragraph 2.5.1 above.
⁸ See paragraph 2.5.3 above.
⁹ See paragraph 2.5.3 above.
¹⁰ See paragraph 2.5.3 above.
¹¹ See paragraph 2.4 above.
¹² See paragraph 2.4 above.
access to modern energy for household services (such as cooking, lighting and heating), productive economic activity (such as mechanical power for agriculture, textile and other industries) and public services (such as electricity for health facilities, schools and street lighting).¹³

6.2 Main findings

The main findings of the study relate to the normative response to energy poverty, gaps in existing international law with respect to RE, international law in informing a modern AU legal energy framework and regional cooperative AU RE frameworks.

6.2.1 Normative response to energy poverty

The challenge of energy poverty in Africa warrants a normative response from the AU. The identification of RE as critical in addressing energy poverty on the African continent is not by choice. The drivers for increased RE access in Africa include, among others, mitigation of energy poverty, the availability of RE in Africa, contributions to the achievement of the SDGs,¹⁴ reduction dependence on the costly fuel imports, mitigation of climate change, provision of electricity beyond the electricity grid system, secure energy supply and the reduction of negative impacts on the environment and health, among others.¹⁵ Although critical in mitigating energy poverty and increasing access to modern energy, the RE uptake remains somewhat slow. The uptake is inhibited by high RE cost, high capital, the competitiveness of RE with conventional energy sources, lack of legal and regulatory RE frameworks, financial risks associated with RE, lack of information and technical capacity, lack of RE domestic finance and effective RE institutions.¹⁶

Notwithstanding the challenges, the UN Resolutions SE4ALL initiative and Agenda 2030 expressly acknowledge the important role of RE in achieving universal access to modern energy and the promotion of sustainable development by 2030.¹⁷ The 2017 WEO Special

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¹³ See paragraph 2.4 above.
¹⁴ See paragraph 3.5 above.
¹⁵ See paragraph 2.4.4 above.
¹⁶ See paragraph 2.4.5 above.
¹⁷ See paragraph 2.3 above.
Report indicates that RE sources will power over 60 per cent of the new access and off-grid systems by 2030 and supply up to 77 per cent of global electricity by 2050.\textsuperscript{18} The emphasis on increased RE access as a means of mitigating energy poverty and increasing access to modern energy leads to the author concluding that increased RE access must receive attention from AU policy makers. The recommendation was made that a supportive legal harmonised energy framework promoting increased RE access (among other modern energy sources) taking into account the above challenges, should be the primary AU normative response to the challenge of energy poverty in Africa.\textsuperscript{19}

6.2.2 RE gaps in existing international law

Increased RE access strongly features in a number of international law instruments on sustainable development (both hard and soft laws).\textsuperscript{20} The gaps with regard to the achievement of this objective were identified as a lack of measures that could be used to achieve increased RE access.\textsuperscript{21} There is no specific provision for RE and no RE targets were set.\textsuperscript{22} There is also no international institution to manage RE activities specifically.\textsuperscript{23} The nearest thing to a specific provision for RE in international law is the JPI (paragraph 9(a)(e)(e) JPI) and Agenda 21 where RE is referred to as a cross-cutting issue for poverty reduction in order to change the patterns of energy production and consumption.\textsuperscript{24} RE sources are also referred to in the chapters on human settlement (where energy produced and used is said to be unsustainable).\textsuperscript{25} The JPI calls on states to substantially increase the global share of RE sources with the objective of increasing its contribution to the total energy supply and to disseminate alternative energy technologies with the aim of giving a greater share of the energy mix to RE sources.\textsuperscript{26} The Resolution of the United Nations Conference on New and Renewable Sources of Energy, acknowledges the importance of RE in addressing the need for modern energy access. The Committee on the Development

\textsuperscript{18} See paragraph 2.3 above.
\textsuperscript{19} See paragraph 2.5 above.
\textsuperscript{20} See paragraph 3.3 above.
\textsuperscript{21} See paragraph 3.4.5 above.
\textsuperscript{22} See paragraphs 3.4.4.1 and 3.4.4.2 above.
\textsuperscript{23} See paragraph 3.3.3 above.
\textsuperscript{24} See paragraph 3.3.3 above.
\textsuperscript{25} See paragraph 3.3.3 above.
\textsuperscript{26} See paragraph 3.3.1 above.
and Utilisation of New and Renewable Sources of Energy proposes a strong international institution to give RE the necessary visibility and weight to be established.\textsuperscript{27} With regard to measures to achieve increased RE access, the \textit{Energy Treaty}, 1998 calls for the development of an open and competitive market for energy products, to alleviate market distortions and barriers in the energy sector, to facilitate the transit of energy materials and products, and to promote access to and transfer of energy technology.\textsuperscript{28}

### 6.2.3 International law in informing an AU legal energy framework

Agenda 2030 SDG goal 7 provides for increased access to modern energy. The targets set out increased RE access and energy efficiency as measures to achieve universal access to modern energy by 2030. Several authors argue that Agenda 2030 and some SDGs and targets are soft laws, based on the following reasons.\textsuperscript{29} Firstly, the idea of UNGA resolutions having a soft law value was affirmed by the International Court of Justice in 1996 when it noted that the General Assembly resolutions can, in certain circumstances, provide evidence important for establishing the existence of a rule.\textsuperscript{30} Secondly, Agenda 2030 was created by subjects of international law and as such should be considered soft law.\textsuperscript{31} Thirdly, specific SDGs and targets are rooted in international hard law instruments.\textsuperscript{32} The provision of RE access as an objective for sustainable development in international law provides the basis for the current author agreeing with the above authors that Agenda 2030 has a soft law value that should inform an AU legal energy framework.\textsuperscript{33} In addition, Agenda 2030 was created following a process that has been coined as an exemplary model of public participation, thereby representing a global opinion on issues addressed within the SDGs and their targets.\textsuperscript{34} Furthermore, Agenda 2030 reiterates the age-old sustainable development principle of integration that has informed a range of agreements at both regional and national levels.\textsuperscript{35}

\textsuperscript{27} See paragraph 3.3.3 above.
\textsuperscript{28} See paragraph 3.3.1 above.
\textsuperscript{29} See paragraph 4.2 above.
\textsuperscript{30} See paragraph 4.2 above.
\textsuperscript{31} See paragraph 4.2 above.
\textsuperscript{32} See paragraph 4.2 above.
\textsuperscript{33} See paragraph 4.2 above.
\textsuperscript{34} See paragraph 4.2 above.
\textsuperscript{35} See paragraph 4.2 above.
The analysis of the SDGs development upon the MDGs and the relationship between increased RE access and the achievement of the SDGs as provided for by Agenda 2030, underscored the need for increased RE access as a means to increase access to RE and effect sustainable development. The SDGs, however, do not set specific measures and targets for achieving increased RE access. RE measures could be found in the international law that pertains to IRENA mechanisms and international best practices.

6.2.4 Regional cooperative African Union renewable energy frameworks

The Abuja Treaty, the Constitutive Act and the RECs Protocol underscore the importance of regional cooperation among member states and RECs on the establishment of harmonised law and policy geared towards addressing issues of common interest. The harmonisation of law and policy is an important means to ensure this cooperation. The challenge of energy poverty is an aspect of common interest among AU member states. RE is one of the energy sources to be included in a diversified African energy mix aimed at increased modern energy access. The overall objective of a modern legal AU energy framework should be to increase access to RE in order to promote access to modern energy and the achievement of sustainable development. The practical implementation of the modern legal AU energy framework requires cooperative efforts through public participation.

In giving effect to the objective of increased RE access and diversifying the African energy mix, RECs have taken a few steps more than the AU, putting in place specific cooperative frameworks aimed at increased RE access at the ECCAS, ECOWAS, EAC and SADC levels. They include the ECCAS Treaty, the ECCAS & CEMAC White Paper: Regional Policy for Universal Access to Modern Energy (2014), the ECOWAS Treaty, ECOWAS Energy

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See paragraphs 4.4 above.
See paragraphs 4.6 above.
See paragraph 5.2 above.
See paragraph 5.2 above.
See paragraph 5.2 above.
See paragraph 5.5 above.
See paragraphs 5.6 above.
Common measures of achieving increased RE access within regional and sub-regional cooperative initiatives include RE targets and time frames, finance, RE institutions and energy pooling, with cooperation in the harmonisation of policies as a method of effecting them. The author is of the opinion that a regional approach towards increased RE access in effecting modern energy access is the most suitable for the African context. Furthermore, RECs are important role players in increasing access to and doubling the share of RE in the African energy mix.

This thesis sought to identify the components of a possible modern legal AU energy framework aimed at regulating increased RE access as a means of addressing energy poverty while promoting sustainable development on the African continent. To summarise, Africa is energy poor. The African people largely depend on traditional biomass for basic energy services and lack access to modern energy. RE is a modern energy source and increased access will address energy poverty and promote the achievement of sustainable development. Increased access to RE is mostly regulated by soft law that has no legally binding force. Increased access to RE should be regulated in terms of cooperative legally binding frameworks spelling out measures on how they should be achieved.

Soft law cannot address the goal of increased RE access. A legally binding energy framework stands a chance to better enhance increased RE access. An inter-disciplinary approach is required to develop an African energy framework.

6.3 Recommendations

Based on the above findings, the following recommendations are made:

- At the AU level, there should be a binding modern legal energy framework promoting increased RE access. This framework should take the form of an AU energy treaty.
• This AU energy treaty must be a cooperative framework established through a public participation process, using the process that led to the adoption of Agenda 2030 as an exemplary model.

• The AU energy treaty should put in place clear definitions of energy poverty, RE, modern energy, modern energy access as well as an approach to measure energy poverty that takes African specific issues into consideration.

• The AU energy treaty must have an objective with targets and timeframes based on international law – specifically SDG goal 7 and its targets.

• The AU energy treaty should put in place measures to achieve increased RE access based on international instruments, specifically IRENA mechanisms and best international practices. These measures should be categorised under two broad headings, namely regulatory and fiscal instruments. Fiscal instruments should further be divided into two sub-headings, public finance instruments and tax incentives.

• The regulatory instruments should include instruments such as RE portfolio standards, feed-in tariffs, tradable RE certificates and net-metering.

• Fiscal instruments, which should be further sub-divided into public finance instruments and tax incentives should include measures such as RE loans, grants, capital subsidies, rebates, government procurement programmes, income tax, personal income tax, property tax, value added tax and accelerated depreciation respectively.

• International best practices should include measures such as market structure, licensing and zoning schemes and energy planning.
• The AU energy treaty must put in place an institution to monitor progress of RE targets set at both regional and sub-regional levels. The African Energy Commission should be used to that effect.

• Members of the African Energy Commission should not only come from the legal field, but also from all necessary disciplines with regard to the evaluation of the implementation of RE mechanisms and measuring progress.

• Each sub-region must set targets for themselves depending on the dominant type of RE source in that specific region as they differ from one sub-region to the other.

• Sub-regions must set targets, timeframes and identify specific measures that should be used to achieve increased RE access based on those spelled out in the AU energy treaty.

• The *ECOWAS Renewable Energy Policy, 2012* could be used as an exemplary model by other sub-regions to develop their targets and timeframes.

• Sub-regions must establish a four years reporting system to the AU (African Energy Commission in this regard), creating room for monitoring and evaluation of progress toward their specific targets
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ADDENDUM A: DECLARATION OF LANGUAGE EDITING

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DECLARATION OF LANGUAGE EDITING

I, Christina Maria Etrece Terblanche, hereby declare that I edited the research study titled:

Renewable energy access: Towards a modern legal African Union energy framework

for AR Lekunze for the purpose of submission as a postgraduate research study for examination. Changes were indicated in track changes and implementation was left up to the author.

Regards,

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