Atlas of Africa Energy Resources

Information note

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Introduction

Africa is rich in energy resources but poor in its capability to exploit and use them. Many African countries face an energy crisis. Power is inaccessible, unaffordable and unreliable for most people, trapping them in poverty. There are solutions, however, including the following: significant investment in energy infrastructure ; technology transfers; improving access to electricity on a large scale; boosting cross-border power trade; improving the performance of existing utility companies; and helping countries chart low-carbon growth paths. Understanding where the opportunities for tapping this wealth exist and where shortages occur is fundamental to developing these solutions, but until now, this kind of information has not been readily available all in one place.

The Challenge

There currently exist several good sources of information on Africa's energy at the continental scale and a wealth of data at the national level. However, there is need for a document that compiles and Synthesizes relevant data and information in a format that is easily understandable to both the public and policy makers. To fill this gap, the African Development Bank (AfDB) and the Infrastructure Consortium for Africa (ICA), in cooperation with the United Nations Environment Programme (UNEP) have developed an ***ATLAS OF AFRICA ENERGY RESOURCES*** to graphically illustrate where the resources are, where the potential for expansion occurs and what the possible impacts on the environment could be. It provides visual information on the challenges and opportunities to providing Africa's population with access to reliable, affordable and modern energy services. Through maps, charts and images, this Atlas combines scientifically reliable data sources to provide a complete view of Africa's energy needs, resources and opportunities. Comparative satellite images illustrate the positive and negative changes that have taken place over the years to help policy-makers reach better- informed decisions.

Process for the Atlas Production

Extensive research was undertaken to compile and analyze information from various energy databases; global, regional and national reports; and web sites. Historical and current satellite images of relevant places were selected and analyzed using Geographic Information Systems (GIS) technology.

A number of experts continent-wide were involved. And consultation meetings were organized to seek input from national experts, academics, international organizations and officials of regional power pools as well as from the African Power Utility Association. An intensive review process was undertaken to ensure quality control and scientific validity of the Atlas.

Scope of the Atlas

The content of the Atlas is organized in five chapters:

1. ENERGY RESOURCES OF AFRICA

This chapter presents the various energy resources that are available in Africa and shows production and consumption trends at the continental level. It takes stock of renewable and non-renewable energy reserves and links them with aspects of current and projected demand and production of energy at both continental and regional levels.

2. ENERGY AND CROSS CUTTING ISSUES

Energy is required for all human endeavours. But its production and everyday use has profound impacts on the environment and human society. This chapter illustrates the interlinkages between energy and the environment, demographic trends, gender issues and economic growth, and the impacts of energy use and development on human health as well as the cross-cutting issues related to energy and transportation and agriculture.

3. REGIONAL ENERGY INTEGRATION AND MARKETS

Considering the small size of many of the economies of African countries, regional energy integration is extremely important to attract investment, for the security of energy supply and mix and to reduce the cost of doing business (economies of scale) and costs to consumers. Regional energy generation provides an optimal economic solution to generating and using energy, because energy is produced where it is most economical and supported, and is provided where it is most highly needed. Power pools are also important because power trade is an indicator of energy integration; power pools themselves are key drivers of regional integration; there is high political commitment to regional energy markets; and regional energy integration through power pools is a prerequisite for sustainable development. This chapter looks at the current status of frica's regional power pools, including the installed capacity and energy mix, future demand, power trade, and their institutional arrangements. Sections are devoted to describing and providing key information about each of the 5 regional power pools.

4. ENERGY AND SUSTAINABLE DEVELOPMENT

This chapter looks at the energy components of high-level African-led strategies for future development of the continent. In May 2013, the Organization of African Union (OAU), now th African Union (AU), celebrated its Golden Jubilee. It reaffirmed its Pan-African vision of "an integrated, prosperous and peaceful Africa, driven by its own citizens and representing a dynamic force in the international arena." Summit leaders asked the African Union Commission (AUC), supported by the New Partnership for frica's Deve lopment (NEPAD) Planning and Coordinating Agency (NPCA), the African Development Bank (AfDB) and the United Nations Economic Commission for Africa (UNECA), to engage in a people -driven process to prepare a 50-year continental agenda.

The frican Union's genda 2063 and its priority areas have inspired a number of initiatives to stimulate frica's access to energy. One of them is the frica Power Vision (PV), based on the Programme for Infrastructure Development in Africa (PIDA). PIDA is the continent's framework to close frica's vast infrastructure gap across transport, energy and water sectors as well as Information and Communication Technologies. The African Heads of State unanimously endorsed PIDA at their Summit in 2012. The Africa Power Vision is a long-term plan to increase acces

reliable and affordable energy. Its main aim is to drive and rapidly accelerate the implementation of critical energy projects in Africa under PIDA.

The Africa Renewable Energy Initiative (AREI) is another transformative, Africa-led effort to accelerate the exploitation of the continent's huge renewable energy potential. Under the U's mandate and endorsed by African Heads of State, it aims to achieve at least 10 gigawatts (GW) of new renewable energy generation capacity by 2020 and to realize the continent's potential to generate at least 300 GW by 2030.

The chapter also provides information about the commitments African nations have made towards energy for sustainable development. One of the main outcomes of the 2012 Rio+20 United Nations Conference on Sustainable Development was a new set of Sustainable Development Goals (SDGs), agreed upon in September 2015. Out of 17 goals, Goal 7 focuses on ensuring "access to affordable, reliable, sustainable and modern energy for all". Furthermore there are also energy related commitments under the Paris Agreement on Climate Change. This chapter highlights key messages and synergies between the overarching continental initiatives as well as the issues related to the SDGs and the Paris Agreement.

5. ENERGYPROFILESOF THECOUNTRIES

The energy policy landscape in frica's countries is rapidly evolving. This chapter presents an energy profile of each one of the 54 African countries, supplying specific information on their energy sectors. These profiles enable a better understanding of the energy resources available, the production and consumption trends and the potential for renewable alternatives. It describes each of the energy resources in the country, specifically hydropower, oil, natural gas, coal, wind, nuclear, and solar energy resources, as the case may be. It also presents some of the strategies and practices in place to effectively and efficiently use these resources.

Carbon dioxide emissions from the energy sector are recognized as a key factor contributing to climate change. To that end, the chapter mentions some of the pledges that the countries have made through their Intended Nationally Determined Contributions (INDCs) arising from the 2015 Paris Agreement. It gives a snapshot of progress towards achieving Sustai nable Development Goal (SDG) number 7 on energy, with progress towards achieving this goal measured against three indicators, as follows:

To ensure universal access to affordable, reliable and modern energy services by 2030;

To increase substantially the share of renewable energy in the global energy mix by 2030; and

To double the rate of improvement in energy efficiency by 2030.

Finally, based on available data, the profiles provide a matrix showing institutional and legal frameworks responsible for policy in the country, the energy regulator and some of the key elements that lay the foundation for managing the energy sector.

Findings

The uniqueness and value of the Atlas lies in how the facts about frica's energy situation are compiled and presented in an easily understandable format. For example, maps show the distribution of various energy-related phenomenon across the continent, from pipelines and dams, to the location of coal deposits and wind and solar energy potential. Paired satellite images of energy projects before and after development impress upon viewers the scale of development required to generate energy for frica's needs and the enormous change such projects can have on landscapes. Pie graphs and bar charts showing proportions of various parameters give readers an immediate understanding of data because of the clear visual representation. Examples include its place in the global context, such as the low percentage of energy use in Africa compared to other world regions and frica's share of the world's various energy sources, especially renewable ones; and comparisons of the share of those resources and their production and consumption within Africa, especially at regional levels.

There are other distinctive features of the Atlas that help it deliver unique and memorable messages about energy in Africa. One is its focus on the environmental dimensions of energy developments, which can both affect the environment and suffer from the impacts of environmental deterioration. It also makes the important conne ctions between energy and population; gender; health; education; agriculture; industry; transport; and conflict that are found together nowhere else. Another is the chapter with the most up-to-date energy profiles of each of the 54 African countries, including their progress towards Sustainable Development Goal 7 and a table of each country's institutional and legal frameworks, both prepared especially for this Atlas. For some readers, the most interesting and valuable part of the Atlas will be the chapter on regional integration, which provides information about each of the continent's five power pools. nother significant feature of the chapter on energy and Sustainable Development that was also compiled as a special contribution to this Atlas is a list of each country's Intended Nationally Determined Contributions to the UN Framework Convention on Climate Change (UNFCCC).

Finally, the Atlas contributes to the African Development Bank's 2016 energy strategy, which is based on its New Deal on Energy for Africa (NDEA). Recognizing that energy shortages, high costs and poor access remain major impediments to frica's continued social and economic progress, the NDEA has an aspirational overarching goal of achieving universal access by 2025: 100 per cent access in urban areas and 95 per cent access in rural areas and leveraging on and off-grid solutions and related technological advances. Despite the enormous potential for harnessing its untapped energy resources as presented in the Atlas, universal access will require technology transfer, capacity building and large financial investments: by some estimates, US$ 43-55 billion per year are needed until 2030-2040, compared to current energy investments of about US$ 8-9.2 billion.

Thus, the African Development Bank (AfDB), the Infrastructure Consortium for Africa (ICA) and the United Nations Environment Programme (UNEP) look forward to presenting this Atlas for the interest of all parties, but especially in hopes that it will benefit those organizations and individuals working towards a solution to frica's urgent energy needs and implementing the New Deal on Energy for Africa.

Way Forward

The Atlas is scheduled to be launched officially at the African Union STC ministerial meeting on December 2nd , 2016, Addis Ababa. Further dissemination activities are planned in 2017.

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