

**Statement of
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Before the

**Subcommittee on Africa, Global Health,
Global Human Rights, and International Organizations
Committee on Foreign Affairs
United States House of Representatives**

The Future of Energy in Africa

November 14, 2014

Chairman Smith, Ranking Member Bass, and members of the Subcommittee, thank you for the opportunity to testify on behalf of the U.S. Department of Energy (DOE) on The Future of Energy in Africa.

The Department of Energy shares the Subcommittee's interest in the energy issues facing Africa. The International Energy Agency (IEA) recently released its Africa Energy Outlook, a special feature in the 2014 World Energy Outlook. The data make clear that with fast-growing economies, expanding populations, and newly-discovered natural resources, African nations will be increasingly important producers and consumers in the global energy sector. Moreover, given the diversity of the African energy sector, it is important to look at distinct regional and national trends in oil production, gas production, and power sector development to adequately capture the energy trends occurring across the continent.

Through a variety of cross-cutting program initiatives, DOE's Office of International Affairs (IA) responds to the most pressing global energy challenges, ranging from energy security and market volatility to long-term efforts to reduce carbon pollution and the impacts of climate change. IA has the primary responsibility for coordinating the efforts of diverse elements in the Department to ensure a unified voice in our international energy engagements, based on data and analysis of energy markets, technologies, and policies.

IA also has lead responsibility for the Department's international activities including those relating to national security, energy security, and international cooperation in science and technology. IA works closely with inter-agency partners, led by the National Security Council. Within the State Department, IA works closely with regional bureaus and the Bureau of Energy Resources. Finally, IA also coordinates DOE's engagement with other Federal agencies, national and international organizations, and the private sector with regard to energy-related entities such as the International Energy Agency, the Asia Pacific Economic Cooperation forum, the Energy

and Climate Partnership of the Americas, the Clean Energy Ministerial, the President's Power Africa initiative, and others.

In June 2013, President Obama underscored the U.S. commitment to Africa by announcing the launch of the Power Africa Initiative. In support of the President's message, Secretary Moniz, together with the Energy and Water Minister of Ethiopia, held a U.S.-Africa Energy Ministerial in June 2014 to identify the most critical energy issues facing African countries and develop plans for future cooperation. The Ministerial brought together minister-level attendance from sub-Saharan African and North African countries, as well as senior U.S. government officials, multilateral development partners, regional and sub-regional African energy organizations, academia, civil society, and U.S. and African private sector leaders. The Ministerial provided opportunities for government-to-government, government-to-industry, and company-to-company informational exchanges, and networking on topics such as clean energy technologies, increased power generation, rural electrification, regional integration, oil and gas development, policy and regulatory issues, investment opportunities, and financing.

Following that very successful event, the Department is working with Africa's leading energy economies to address their energy access goals and their ambitions for the growth of their energy sectors. In particular, the Department is developing collaborations with U.S. and African partners to leverage DOE's core competencies in four strategic areas: renewable energy, energy efficiency, safe and responsible oil and natural gas development, and technical capacity-building. These efforts reflect the fact that cooperation with African governments on policy frameworks can help attract energy investment, particularly from world-class U.S. companies and project developers.

In my testimony, I will provide data and analysis of the energy landscape in sub-Saharan Africa, an overview of the Department's activities in the African energy sector, and highlights of our collaborative engagements with other U.S. government agencies.

The Energy Situation in Sub-Saharan Africa

Africa is experiencing rapid economic development—sub-Saharan Africa is the world's second fastest growing region, after emerging Asia. The World Bank reports that economic growth rates in Sub-Saharan Africa continue to rise from 4.7% in 2013 to a forecasted 5.2% in 2014.¹ In North Africa, economies grew in 2013 at a rate of 2.6%.² Recent economic growth can be attributed to a period of relative stability and security, improved macroeconomic management, strong domestic demand driven by a growing middle class, an increased global interest in Africa's natural resources, population growth, and urbanization. The combination of these factors—fast-growing economies, expanding populations, and newly-discovered natural resources—means that African nations are positioned to become increasingly important producers and consumers in the global energy sector.

¹ World Bank, *Africa's Pulse*.

² World Bank, *Africa's Pulse*.

Given the global impact of Africa's natural resources, it is helpful to explore three sectors of energy trends in Africa: oil development, natural gas development, and power sector development.

Oil Development in Africa

Sub-Saharan Africa has long been an important player in the world oil market, and it is poised to become even more important. Oil production in the region has doubled since 1990, and now accounts for 6% of world oil production.³ The region is likely to become increasingly important, since Sub-Saharan Africa accounted for almost 30% of oil and gas discoveries made in the last five years.⁴

IEA forecasts that sub-Saharan African oil production will grow from 5.3 million barrels per day in 2013 to approximately 6.2 million barrels per day before 2020.⁵ Sub-Saharan Africa currently exports more than 80 percent of the oil it produces, and since 2000, two out of every three dollars invested into the sub-Saharan African energy sector has been committed to the development of resources for export.⁶ However, with increasing demand for oil and oil products in sub-Saharan Africa, the oil production used for export is likely to shift towards domestic use. The IEA projects that demand within sub-Saharan Africa will grow to 4 million barrels per day by 2040, lessening the region's net contribution to the global oil balance.⁷

North Africa's oil production (Algeria, Egypt, Libya, Morocco, and Tunisia), which is currently about 3.5 million barrels per day, is projected to decline modestly by 2040.⁸ In particular, Libyan and Algerian crude and lease condensate production is expected to decline from 3.2 million barrels per day in 2010 to 3.0 million barrels per day in 2040, according to IEA International Energy Outlook 2014 data.⁹ While potential for growth in Libyan production is high, social and political unrest have hampered production. Algerian production has been slowly declining as a result of amendments to the country's hydrocarbon law which is viewed as unfavorable to foreign investment. The law has since been amended, but increases in investment have not yet been seen.

As a result of the growth in domestic tight oil production since 2008, the United States is importing less crude oil from Africa. In 2008, the United States imported nearly 780 million barrels of crude oil from Africa (approximately 22% of U.S. imports), but by 2013, total annual imports dropped to 236 million barrels (approximately 8.2%).¹⁰ Initially, the majority of U.S. crude imports came from Angola and Nigeria; by 2013, the U.S. imported crude oil from Algeria, Angola, Libya, Nigeria, Chad, Republic of Congo, Egypt, Equatorial Guinea, Gabon, Ghana, and Mauritania. At the other end, Europe has increased its purchases of African crude oil

³ International Energy Agency, *Africa Energy Outlook*.

⁴ International Energy Agency, *Africa Energy Outlook*.

⁵ International Energy Agency, *Africa Energy Outlook*.

⁶ International Energy Agency, *Africa Energy Outlook*.

⁷ International Energy Agency, *Africa Energy Outlook*.

⁸ International Energy Agency, *Africa Energy Outlook*.

⁹ International Energy Agency, *Africa Energy Outlook*.

¹⁰ U.S. Energy Information Administration.

to replace its own decreasing oil production, and Chinese refinery expansions have also created new markets for African crude oil.

Natural Gas Development in Africa

In addition to the established North African natural gas producers, major new gas discoveries have been made in Sub-Saharan Africa. These significant discoveries of natural gas in East Africa are generating excitement in global markets and Africa's growing economies. Among the countries with emerging oil and gas developments, Mozambique, Tanzania, Uganda, and Madagascar have shown the most progress toward commercial development of newly discovered resources in recent years. The development of these resources will be important to meeting energy needs in Africa and supplying global markets. The IEA projects that Sub-Saharan Africa will make the fourth largest contribution to incremental global gas supply through 2040.¹¹

East African countries are exploring natural gas development both for export as LNG and for domestic utilization, including power production and petrochemicals.

Power Sector Development in Africa

According to the International Energy Agency, North Africa's regional electrification rate is over 99%, whereas, in sub-Saharan Africa, the electrification rate averages only 32%.¹² For the discussion of power sector development, I will largely focus on sub-Saharan Africa, where more than 620 million people lack access to modern energy services.

Sub-Saharan Africa accounts for 13% of the world's population but only 4% of its energy demand. Since 2000, energy use in sub-Saharan Africa has risen 45%.¹³ Yet, only 290 million out of 915 million people in sub-Saharan Africa have access to electricity. Due to rapid population growth, the total number of people living in sub-Saharan Africa without access to electricity is rising, even as new energy access efforts gain momentum. The IEA estimates that the Sub-Saharan African economy will quadruple in size and energy demand will grow by 80 percent to 2040.¹⁴ Even with robust economic and energy development in coming years, Sub-Saharan African countries will still struggle to meet the energy needs of their people. So while 950 million people in Africa will gain access to electricity between now and 2040, over half a billion people will still lack access to electricity in 2040, according to IEA forecasts.¹⁵

Sub-Saharan Africa has vast untapped potential in renewables resources, including geothermal, solar, hydro, biomass, and wind, which could make substantial contributions to Africa's electrification goals. However, governments alone will not be able to provide the funding required to meet electrification goals in Africa. Therefore, increased investment from the private sector will be critical. The current estimated annual investment in sub-Saharan Africa's power

¹¹ International Energy Agency, *Africa Energy Outlook*.

¹² International Energy Agency, *Africa Energy Outlook*.

¹³ International Energy Agency, *Africa Energy Outlook*.

¹⁴ International Energy Agency, *Africa Energy Outlook*.

¹⁵ International Energy Agency, *Africa Energy Outlook*.

systems is about \$8 billion per year. The IEA estimates the scale of investment needed to achieve universal energy access in sub-Saharan Africa will require more than \$300 billion by 2030.¹⁶

Department of Energy Engagement in Africa

Understanding the importance of supporting sustainable energy development in Africa, the U.S. Department of Energy is working to bring the capacity of our staff and the national labs to bear in partnering with partner countries throughout Africa to help chart their energy futures. To address the myriad challenges and opportunities in Africa's energy sector, as I noted above Secretary Moniz hosted the U.S.-Africa Energy Ministerial June 3-4, 2014 in Addis Ababa, Ethiopia. Over 500 participants attended the U.S.-Africa Energy Ministerial, with participants from 42 governments, including 22 energy ministers, 5 U.S. government agency heads, and over 50 private sector representatives. The Ministerial featured high-level plenary sessions, a ministers-only meeting, and 10 panel discussions, which addressed the most pressing energy development issues in Africa, including natural gas utilization, mini-grid development, regional power pool coordination, energy efficiency deployment, and technical capacity building through university partnerships.

The Ministerial was a key element of the Administration's efforts to advance critical U.S. energy policy goals in Africa. The forum provided participants with a unique opportunity to share best practices in energy sector development, make policy and project commitments, strengthen energy cooperation, and network with energy infrastructure project financiers and technology providers. By focusing on energy sector growth through private sector investment in Africa, the Ministerial worked to advance the deployment of clean energy and energy efficiency, reduce gas flaring through power generation, foster responsible energy development through use of advanced technologies and industry practices, and grow bilateral trade between the United States and Africa nations.

The Ministerial brought together multiple U.S. government agencies—USAID, State Department, Millennium Challenge Corporation, the U.S. Trade and Development Agency, the Overseas Private Investment Corporation, the U.S. Export Import Bank, U.S. African Development Foundation, and the U.S. Embassy in Ethiopia—in a coordinated effort. Additionally, the U.S.-Africa Energy Ministerial helped facilitate a natural gas-focused Reverse Trade Mission, which was co-sponsored by DOE and the U.S. Trade and Development Agency. The Reverse Trade Mission helped increase demand for U.S. exports, which in turn help create jobs in the United States and provide valuable investment opportunities for U.S. businesses.

As a direct outcome of the U.S.-Africa Energy Ministerial, DOE is pursuing cooperative activities with U.S. and African partners in energy efficiency, safe and responsible oil and natural gas development, renewable energy, and capacity building. I'd like to highlight some of our engagements:

Energy Efficiency

¹⁶ International Energy Agency, *Africa Energy Outlook*.

- DOE is working with Power Africa and the Clean Energy Ministerial to improve energy access through energy efficiency, looking particularly at mini-grids and super-efficient appliances opportunities and challenges. DOE will host two events in Tanzania in early 2015 focused on increasing energy access in Africa through off-grid solutions + super-efficient appliances, and a technical workshop on a quality assurance framework for isolated mini-grids.

- DOE is working with West Africa nations on an Efficient Lighting Policymakers' Toolbox. This collaborative effort will develop a suite of resources on lighting standards & labeling for energy policymakers in West Africa. The toolbox will include the lighting standards, labeling, monitoring, valuation, and enforcement mechanisms for the West Africa region. Toolbox partners include the Economic Community of West African States, Ghana Energy Commission, Lawrence Berkeley National Laboratory.

Oil and Natural Gas

- DOE is working with the Government of Tanzania on a Natural Gas Training for university students and government officials. The training is planned for early 2015.

- DOE/Fossil Energy Acting Assistant Secretary Chris Smith will travel to emerging oil and gas producing countries in sub-Saharan Africa in early 2015. His efforts will focus on sharing best practices with emerging oil and gas producing countries. The location and partnering organizations are still being determined.

Renewable Energy

- DOE's Office of Energy Efficiency and Renewable Energy is implementing a comprehensive program to spur growth in South Africa's energy efficient and renewable energy market and to create opportunities for U.S. energy efficiency and renewable energy companies in South Africa. Specific activities include policy advising, workshops, pilot projects, and university partnerships. The Comprehensive Renewables and Efficiency Program will be an ongoing initiative, partnering with the Global Cool Cities Alliance and PEER Africa.

- The National Renewable Energy Laboratory is working with Angola's Ministry of Energy and Water to deliver a solar electric train-the-trainer program to increase the number of photovoltaic instructors and eventually solar technicians in Angola and to support the development of an Angolan rural solar electrification program. Solar Photovoltaic Train-the-Trainer Program will be in Angola in late February 2015. The program will partner the National Renewable Energy Laboratory, Angola Ministry of Energy and Water, and Sonangol of Angola.

Capacity Building

- DOE will develop an African continent-wide tool for strengthening energy capacity building, particularly focusing on partnerships between U.S. and African universities.

DOE is also an active participant in the interagency Power Africa initiative. Secretary Moniz announced the Beyond the Grid initiative within Power Africa at the June 2014 U.S-Africa Energy Ministerial in Addis Ababa. The initiative focuses on fostering private investment in off-grid and small-scale energy solutions that seek to expand access to remote areas across Sub-Saharan Africa. Beyond the Grid is partnering with over 40 investors and practitioners that have committed to invest over \$1 billion into off-grid and small-scale solutions to the underserved market. The U.S. Department of Energy is supporting Beyond the Grid by leveraging the work and resources of three DOE-led initiatives under the Clean Energy Ministerial, a global forum to share best practices and promote policies and programs that encourage and facilitate the transition to a global clean energy economy. These initiatives include the Clean Energy Solutions Center; the Global Lighting and Energy Access Partnership or “Global LEAP”; and, a Quality Assurance Framework for Mini-Grids.

Conclusion

DOE has a strong interest in working with other U.S. government agencies and U.S. companies delivering technology and policy expertise to support individual country and regional efforts to address the opportunities and challenges presented in the African energy sector. We believe that strategic partnerships are critical to developing effective practices across Africa and accelerating the utilization of clean energy sources and safe and responsible oil and gas development as well as the adoption of energy efficient technologies. These partnerships must leverage African leadership and advance the Administration’s focus on trade and investment and clean sustainable energy development in Africa.

In order to secure a more stable global energy future and combat the effects of climate change, we must ensure sustainable management of natural resources and revenues through the development of transparent frameworks. Energy is a necessary cornerstone of an African strategy for poverty reduction and economic growth. DOE recognizes that economic growth in Africa is closely tied to increasing energy access, and we are partnering our expertise and research with African governments to help unleash the full energy potential of Africa for the benefit of African and U.S. citizens.

Thank you and I look forward to any questions you may have.