



## U.S.-AFRICA CLEAN ENERGY STANDARDS PROGRAM

# After Action Report: U.S. – South Africa Workshop on Energy Storage Standards, Conformance and Technology

Phase I Workshop No. 3 USTDA Activity No. (2015-11008A) and Contract No. (CO201511061)

Produced through cooperation between  
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## PUBLIC MARKET REPORT

### U.S.-South Africa Workshop on Energy Storage Standards, Conformance and Technology

February 28, 2017

9:00 AM –5:15 PM

Radisson Blu Gautrain,  
Johannesburg, South Africa

### BACKGROUND

Energy is an essential component of a functional economy. To date, no nation has developed its economy without abundant and affordable access to energy. This fact underscores the importance of mitigating energy shortages in the developing world. Currently sub-Saharan Africa (SSA), with a population of roughly one billion people, generates approximately the same amount of power as South Korea, with a population of 50 million.<sup>1</sup> Recognizing the limitations of low energy access, SSA nations have begun expanding energy capacity through the development of renewable sources.

South Africa has emerged as a continental leader for energy generation and investment. With more than 44 gigawatts (GW) of installed energy capacity, South Africa is nearly energy self-sustaining and accounts for roughly half of the total installed energy capacity in SSA.<sup>2</sup> However, the country is heavily reliant on coal-powered energy, which makes up approximately 77% of the nation's energy production. This dependence renders South Africa one of the world's largest greenhouse gas emitters and has compelled the nation to seek renewable energy solutions.

In 2011, the government of South Africa committed to increase the share of renewable energy sources in the national energy mix from approximately 5 percent to 30 percent by 2025.<sup>3</sup> The nation's lofty goals have helped South Africa become the African leader for renewable energy investment. In 2015 alone, South Africa received more than \$4.5 billion.<sup>4</sup> While public and private investments have expanded available energy capacity, South Africa continues to struggle to meet growing electricity demands. Further the utility of renewable energy sources is limited by their intermittent energy generation that provides power when renewable sources are available rather than when energy is needed.

Energy Storage Systems (ESS) provide a solution to both inconsistent energy flows and thereby help to expand energy generation. Storage systems can augment electricity supplies by increasing the viability and affordability of renewable energies by balancing power supplies and preventing overloads and blackouts. Due to the complementary relationship between ESS and renewable energy development, increases in renewable energy investment and production will be met by similar increases in the market for ESS. As South Africa transitions away from fossil fuels, this relationship will establish ESS as central features of the electricity infrastructure.

### WORKSHOP SUMMARY

In this context, the American National Standards Institute (ANSI), through the support of the U.S. Trade and Development Agency (USTDA) initiative the U.S.-Africa Clean Energy Standards Program (CESP), held

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<sup>1</sup> World Bank Group. (2016). Independent Power Projects in Sub-Saharan Africa: Lessons from Five Key Countries.”

<sup>2</sup> World Bank Group. (2016). Independent Power Projects in Sub-Saharan Africa: Lessons from Five Key Countries.

<sup>3</sup> South Africa Department of Energy. (2012). Strategic Plan 2011-2016. Retrieved from [http://www.energy.gov.za/files/aboutus/DoE%20Strategic%20plan%202011\\_12%20-%202015\\_16.pdf](http://www.energy.gov.za/files/aboutus/DoE%20Strategic%20plan%202011_12%20-%202015_16.pdf)

<sup>4</sup> UN Environmental Programme (UNEP). (2016). Global Trends in Renewable Energy Investment 2016. Retrieved from [http://fs-unep-centre.org/sites/default/files/publications/globaltrendsinrenewableenergyinvestment2016lowres\\_0.pdf](http://fs-unep-centre.org/sites/default/files/publications/globaltrendsinrenewableenergyinvestment2016lowres_0.pdf)

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the “U.S. – South Africa Workshop on Energy Storage Standards, Conformance and Technology” in Johannesburg, South Africa on February 28, 2017.

The workshop featured presentations by U.S. and South African experts from both the public and private sectors. Presentations focused on key aspects of energy storage system development with the objective of fostering discussions among U.S. and South African experts regarding regulatory challenges and opportunities in the South African market.

Seven speakers discussed varying aspects of the South African energy storage environment. Four U.S. private sector speakers from the National Electrical Manufacturers Association (NEMA), National Fire Protection Association (NFPA), and two speakers from Underwriters Laboratory (UL) provided presentations on standards and conformance practices for energy storage systems as well as developments in energy storage technology. Three South African speakers, the Industrial Development Corporation (IDC), South African Bureau of Standards (SABS), and UYilo Programme, provided background on the state of the energy storage market, as well as related standards and conformance in South Africa.

The workshop was attended by 48 participants. Attendees included seven U.S. companies, such as Comverge and Fluidic Energy, as well as multiple South African government officials from the Department of Trade and Industry, the Department of Energy, and the national utility Eskom.

Links to a flyer, photos, the final agenda and presentations from the workshop are available for on the U.S.-Africa CESP web site: [www.StandardsPortal.org/us-africacesp](http://www.StandardsPortal.org/us-africacesp)

### MARKET OPPORTUNITY

Among African nations, South Africa has emerged as a leader in renewable energy investment. Renewable-focused policies that attempt to shift national energy production away from predominately coal-powered energy will continue to galvanize energy investment. In support of these policies, South Africa has also committed to adding 13 GW of renewable electricity generation capacity by 2025.<sup>5</sup> However, energy expansion has not kept pace with growing electricity demands, requiring South Africa to amplify its generation capacity. As South Africa expands renewable capacity to meet energy shortfalls, ESS will become an essential component of the energy infrastructure.

To diversify its energy mix and meet growing consumer demand, South Africa is encouraging renewable investment through private sector-friendly policies. These policies include both renewable energy feed-in-tariffs (REFIT) and private sector bidding for energy projects. As of January 2017, the South African government has approved 92 Independent Power Producer (IPP) contracts for wind and solar PV generation with a total generation capacity of 6.3GW.<sup>6</sup>

The ongoing expansion of renewable generation in South Africa will make storage systems critical components of the energy infrastructure. This is because renewables, such as wind and solar, provide intermittent outputs, which must be either balanced by non-renewable sources or storage systems that help to level energy flows. ESS provide the ability to harness the intermittent nature of renewable sources by balancing ebbs and flows in the energy supply from intermittent renewable sources. These systems allow power providers to more effectively manage peaks and valleys from inconsistent energy inputs to match variations in consumer demand.

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<sup>5</sup> USAID (July 2016). “Assessing South Africa’s Energy Storage Market.” Retrieved from <https://www.usaid.gov/power-africa/newsletter/june2016/assessing-south-africas-energy-storage-market>

<sup>6</sup> Department of Energy, Republic of South Africa. (September, 2015). State of Renewable Energy in South Africa. . Retrieved from [http://www.gov.za/sites/www.gov.za/files/State%20of%20Renewable%20Energy%20in%20South%20Africa\\_s.pdf](http://www.gov.za/sites/www.gov.za/files/State%20of%20Renewable%20Energy%20in%20South%20Africa_s.pdf)

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Effective and safe ESS must be built on a firm foundation of installation codes, standards, and conformity assessment. These elements also allow storage systems to work efficiently across on- and off-grid systems. As South African utilities, IPPs, and residential property owners deploy ESS to complement renewable generation, relevant authorities will require an understanding of these emerging technologies to ensure safe and reliable energy. U.S. perspectives and experience deploying storage systems will benefit South African organizations as they seek to uptake of ESS.

The adoption of a U.S.-style safety system in South Africa would set a foundation to ensure safe and dependable energy access while creating consistency in expectations that will decrease market uncertainties. This would also provide a commercial advantage to related U.S. equipment manufacturers and service providers, since such components need to be aligned with the underlying codes and standards to form a total safety system. According to NEMA, when considering the size of South Africa's economy and current estimates of the global market demand for energy storage systems, the addressable market in South Africa can be estimated to be approximately \$130 million.