Accelerating the Deployment of Energy Efficiency & Renewable Energy Technologies in South Africa

A Summary of the Trust for Conservation Global Cool Cities Alliance Project

In 2010, the Deputy Secretary of the U.S. Department of Energy and the Energy Minister of the Republic of South Africa (RSA) launched the U.S. – RSA Energy Dialogue to facilitate cooperation in a number of areas, including energy efficiency and renewable energy. In support of the U.S. – RSA Energy Dialogue, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) is leading an initiative to spur growth in South Africa's energy efficiency and renewable energy market and to create opportunities for U.S. companies in South Africa.

In South Africa, the U.S.-based project team led by the Global Cool Cities Alliance (GCCA) project team is:

- Providing technical assistance for policymakers and experts
- Offering guidance on designing and implementing effective energy efficiency ratings and labeling program.
- Providing opportunities for large and small U.S. companies to better understand the South African business and policy environment, develop relationships with potential local partners, and demonstrate their products in South Africa's growing market
- Supporting capacity building for developing a skilled domestic workforce

Technologies and services covered by this project primarily include:

- Energy efficient electrical transformers
- Reflective "cool" paints and pavements
- Energy efficient windows
- Building insulation
- Energy modeling/assessment software tools
- Solar (solar thermal, PV, concentrated solar arrays).

DOE is funding project activities on two interrelated objectives:

1.0 Growing a robust market for energy efficient and renewable energy technologies in South Africa

- **1.1 Support Capacity Building for Policymakers and Experts in South Africa by:**
  - *Organizing a workshop to train policymakers to use energy saving assessment tools:* Technical experts from Lawrence Berkeley National Laboratory (LBNL), WinBuild Inc, trained South African policymakers and technical experts on modeling and testing protocols for energy efficiency and renewable energy technologies. (September 2014: First training; April 2015: Second training; October 2014: Third training)
  - *Advising on national policies to support solar energy deployment:* Experts from the University of South Florida met with officials from the government of South Africa to discuss how national policies and goals could support deployment of high-impact solar energy technologies (Photo Voltaic (PV) and Concentrated Solar (CSP). (Completed August 2014)

Partners:

Global Cool Cities Alliance (GCCA) (lead); South Africa National Energy Development Institute (SANEDI); PEER Africa; WinBuild; Lawrence Berkeley National Laboratory (LBNL); National Fenestration Rating Council (NFRC); University of South Florida (USF)

Participating U.S. Companies:

3M; Alphabet Energy; Clime Co International; Dow Chemical Company; Eastman Chemical; Empores; Energy Optimizer; EnviroECOats; EPOX-Z; First Solar; GAF; Glen Raven; Global Citizen, Inc; Guardian Industries; Intertek; Milgard; Millenium Roofing Solutions; SunBorne Energy; Sundolier

Duration:

02/2014 - 12/2016

Demonstration:

!Kheis and Kimberley municipalities, South Africa

Project technical lead, Bipin Shah, briefing South African Energy Minister, Tina Joemat-Pettersson, and Wolsey Barnard, Acting Deputy Director General of SA DOE on the cool paint project at !Kheis. *Photo credit Bipin Shah.*

- *Organizing a workshop to train municipal policymakers and technical experts on off grid deployment of renewable energy technologies.* Experts from the University of South Florida held sessions in South Africa for municipal leaders to advise on deployment of select renewable energy technologies (primarily solar thermal, solar PV, and concentrated solar PV arrays). Experts provided guidance to municipalities on draft funding requests for national government support to deploy solar technologies in their jurisdictions. (Completed August 2014)
- *Recommending best practices for energy efficiency and renewable energy policies:* The project team is developing a report on opportunities for South Africa to spur the clean energy market development through adopting global best practices for policies, including a gap analysis for global best practices based on current policies in South Africa. (Completed May 2015)

- **1.2 Support Energy Efficiency and Renewable Energy Workforce Development and Certification Programs in Existing South African Educational Intuitions by:**

  - *Providing hands on training of U.S. technology at demonstration sites.* Twenty local residents were trained on proper technique for mixing and applying cool paint in the !Kheis and Kimberley municipality. As a result of this pilot and training, five new small businesses will be started in South Africa to sell and apply cool paints. The program can support other technology pilots at the municipal level, with support from industry. (Complete)
  - *Establishing a University Partnership.*
    - The Clean Energy Research Center of the University of South Florida (CERC-USF) and the Northern Cape Rural Further Education and Training College (NCRFET) entered into a Memorandum of Understanding to collaborate on capacity building through student and faculty exchanges and to collaborate on renewable energy research and education. (MOU signed August 2014).
    - University of Florida and University of Pretoria signed an MOU that will train graduate students to utilize state of the art modeling software to analyze energy opportunities at a Reconstruction and Development Programme (RDP) hosing project. The analysis will identify energy saving opportunities and assess impacts to human health and ecosystem services resulting from energy efficiency upgrades. This agreement will also cover a proposed student exchange between the universities to build analytic capacity. (MOU signed May 2015).
  - *Developing curriculum for skilled workforce training in energy efficient and renewable energy technology deployment.* The project team is gathering existing job training materials to compile and curate for South African training facilities, including local Further Education & Training (FET) colleges. Topics that will be covered by the job training materials include cool coatings and solar technologies. (completed)

- **1.3 Assist in the Development and Implementation of Effective Ratings and Labeling Programs in South Africa for Energy Efficient Building Envelope Components by:**

  - *Providing technical support for the establishment of a new facility to test and simulate reflective roofing and surface products.* The project team designed a business plan for launching product testing/simulation lab facilities for cool coatings to evaluate the performance of reflective roofing and service products. The strategy included recommendations on equipment requirements, simulation tools, and certification protocols. The strategy is to use the resulting data to inform energy efficiency incentive programs and building code requirements made by the AAASMA Group and the South African Bureau of Standards. (Business plan complete, March 2014)
  - *Provide training for building model simulation software and fenestration testing procedures.* The project team hosted trainings in South Africa for 14 participants on simulation, testing, and modeling the energy efficiency of building envelope components at the NFRC-certified fenestration testing facility and insulation performance lab in South Africa. Participants took an exam to be certified as building energy modelers. (Complete)

2.0 Creating opportunities for U.S. companies in South Africa's EERE Sector

2.1 Help U.S. Businesses Better Understand the South African Business and Policy Environment by:

- *Developed a guide to help U.S. companies leverage South African policies to support energy efficiency and renewable deployment*. The guide highlights the variety of South African policies, incentives, and initiatives that define national goals and support local energy efficiency and renewable energy deployment. (Completed August 2014)
- *Building a website for sharing relevant materials on energy efficiency and renewable energy technologies, standards, and policies.* The website contains documents, presentations, and reports detailing South African EE policy, procurement policies, case studies and more. Content will be added to the website over the course of the project. (Completed)

Identified South African Stakeholders

- **South African National Energy Development Institute (SANEDI):** Promotes clean energy research and policy as part of its mandate.
- **South African Department of Energy:** Sets national energy policies.
- **South African Renewable Energy Council (SAREC):** Industry trade group.
- **South African Renewables Initiative:** Multilateral initiative launched in 2011 at the UNFCCC meeting to spur renewable energy growth.
- **National Energy Regulator of South Africa (NERSA):** 9-member authority established to regulate electricity, pipelines, and petroleum.
- **Eskom**: National utility, owns much of the existing generation and transmission infrastructure in South Africa.
- **PEER Africa:** A low-income community developer that facilitates demonstrations of materials on newly constructed homes and structures.
- **South Africa Cool Surfaces Association (SACSA):** Industry trade group to develop market growth and standards for cool roofing and surfaces.

- **2.2 Help U.S. Businesses Develop Relationships with Potential Business Partners by:**
  - *Identifying U.S. and South African stakeholders.*
    - o The project team has identified a non-exhaustive list of 19 participating U.S. companies (see p. 1) interested in exporting to South Africa and working with the project team.
    - o The team created a map of South African EERE stakeholders, including government entities, private sector representatives, and academic institutions/technical experts. This is intended to assist U.S. companies to find suitable South African counterparts.
  - *Organizing an event in South Africa to promote U.S. energy efficiency and renewable energy companies interested in exporting to South Africa.* The Powering South Africa event will promote U.S. business development, marketing/funding opportunities, and relationship building with South African stakeholders. The conference is hosted by SANEDI, SA-DOE, US-DOE, US-Project team and Dow Chemical. Following the event, the project team will develop a summary report. (Completed May 2015)
- **2.3 Help U.S. Businesses Demonstrate Their Products by:**
  - *Organizing cool paint pilot project:* The project team partnered with Millennium, a California-based start-up manufacturer of cool paint (high reflective/emissivity paint to improve thermal comfort), for a pilot project in the !Kheis and Kimberly municipalities. Owing to its success, South Africa's Department of Housing is considering several cool paint pilots in other provinces. Lessons learned from this pilot are informing the development of an online guide to help U.S. companies leverage South African policies for export market development. (Complete)

Cool Paint Pilot Outcomes:

- 20% reduction in temperature and up to 20% reduction in cooling energy use.
- Additional building owners have expressed interest in upgrading to a cool roof.
- Several businesses have been established to mix and apply the paint to meet increased demand.
- Project team is working with Dow and Millennium to identify additional coating sources.

- *Organizing a transformer pilot project:* The project team conducted a pilot project in which it partnered with Empores, a Louisiana-based startup manufacturer of highly efficient ES-25 transformers, and tested them in the South African !Kheis municipality. The transformers effectively lowered monthly electric consumption. Empores technical staff trained a local group of interested companies to perform prerequisite audits and technical requirements. (Complete)

Transformer Pilot Outcomes:

- 22% energy savings and a payback of less than two years for the pilot municipality.
- Nationwide interest among private and government backers.
- Potential to connect with over 100,000 Public Work and private company facilities nationwide.

Further Reading

Website for knowledge-sharing of relevant materials generated by the project and other resources for EERE technologies, standards and policies: http://www.globalcoolcities.org/south-africa-energyefficiency-and-renewable-energy-exchange/.

Website with more information on the University of Pretoria/ University of Florida collaboration: https://sardp.wordpress.com/.

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About EERE International

EERE International works to increase the speed and scale of clean energy deployment and facilitate market access for American companies through international collaboration with strategic partners. ■