COGEN FOR AFRICA

An initiative of UN-Environment, African Development Bank (AfDB) and the Energy, Environment and Development Network for Africa (AFREPREN/FWD)

Cogeneration – An attractive option for power generation in Africa

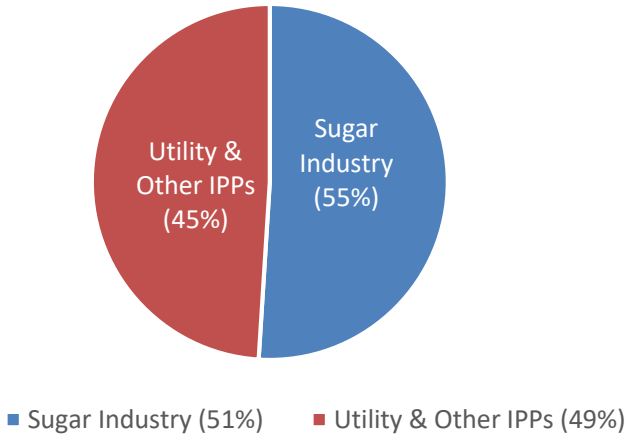
Cogeneration is the simultaneous production of two different forms of energy, heat and power, from a single energy system and source. Cogeneration is also known as combined heat and power (CHP) technology. In a cogeneration plant, very high efficiency levels, in the range of 75-90% can be reached. Since co-generation can meet both power and thermal energy needs, it has other advantages such as significant cost savings for the plant and reduction in emissions of pollutants due to reduced fuel consumption. The potential for cogeneration is attractive in industries with joint requirement of thermal energy and electricity, primarily agro-industries such as sugar, rice mills, wood, coconut, palm oil, pulp & paper industries as well as other sub-sectors such as tea, fertilizers, steel, chemical, cement, horticulture and municipal waste management.

Introduction

Cogen for Africa – an innovative and first-of-its-kind regional initiative which is funded by the Global Environmental Facility (GEF) with a grant of US$5.2million. The initiative is co-implemented by UN-Environment and AfDB and executed by AFREPREN/FWD. Cogen for Africa builds on the success of cogeneration in Mauritius, which currently meets abouthalf of the country's electricity needs. The project aims to promote scaled-up use of efficient cogeneration systems initially in seven Eastern and Southern African countries (Kenya, Ethiopia, Malawi, South Sudan, Uganda, Tanzania and Swaziland – see following map).

The Cogen for Africa project was designed to work with promising and profitable agro-industries with a solid track record and that have demonstrated acommitment to expanding their cogeneration investments in Africa. Notable agro-industries that have actively participated in the project include private-sector-owned and profitable sugar companies as well as private sector entities involved in agro-processing industries such as pulp and paper, forest products, palm oil, groundnuts, sisal, horticulture, teaand rice. Mauritius provides a model of how cogeneration can be successfully promoted and provides important lessons learned for mainland Africa. As shown below, the cogen industry in Mauritius sugar sector provides more than half of the country electricity generation.

Power generation in Mauritius:



Key Project Management Structure

The key decision-making body of the Cogen Project is its Project Steering Committee (PSC) composed of representatives from AfDB, UN-Environment and AFREPREN/FWD. AfDB and UN-Environment PSC representatives review and approved the Cogen Project annual workplan, budget and major expenditures as well as quarterly and annual expenditure reports and annual audit reports of the previous year. AfDB was initially represented on the PSC by Youssef Arfaoui who was replaced by Kurt Lonsway who was subsequently replaced by Engeda Negash. PSC Meetings are usually held once or twice a year and often via skype conferences.

Key Project Activities

- Developing and enhancing the capacity of project developers, technical service providers and local manufacturers of modern and efficient cogeneration systems (primarily through training courses and consultancy support).
- Mobilizing financing for cogeneration projects and in terms and conditions that are favourable for cogeneration investments.
- Demonstrating the commercial, technical, economic and environmental benefits of modern and efficient cogeneration systems in a number of new cogeneration plants and enhancing the confidence in the cogeneration market (primarily through financing of feasibility studies that lead to actual investment in cogeneration).
- Promoting more favourable policies and institutional arrangements that support cogeneration.

Expected Key Outcomes of First Phase (2007-2012):

- By the end of the first phase, the Cogen Projectwas expected to have set the stage for accelerated cogen investments in the region.

Milestones / Key Outputs as of December 2012

- **20.8 MW(e+th) installed by June 2012 against end-of-project target of 40MWe+th.**
- **The project had identified 197 potential cogeneration investments and investment of up to US$1,403million.**
- **Total estimated capacity of up to 927MW electrical and 2,691MW thermal, giving a total of 3,618MWe+th that could potentially be developed in the region.**
- **Signed Cooperation Agreements with 19 stakeholders who confirmed that the Cogen project has been useful in planning to overcome important barriers to cogeneration investments.**
- **Commissioned 9Full-Scale Feasibility Studies as of June 2012.**
- **Provided technical training and support to 103 Workshop participants against the end-of-project target of 100.**
- **Registered 431, 437 hits on the Cogen for Africa Project Website as of June, 2012.**

An independent international team of experts commissioned by United Nations Environment Programme (UNEP) and African Development Bank (AfDB) undertook an extensive and detailed Mid Term Review of the AFREPREN/FWD's Cogen for Africa project and ranked it ***"Highly Satisfactory"***.

Expected Key Outcome of 2nd Phase(2013-2018)

- During the 2nd phase, the Cogen project was expected to lead to the development of 40MWe+th of modern and more efficient cogeneration as well as raise US$60million financing for cogeneration investment by end of project
- By the end of the 2nd phase, the Cogen project was also expected to have 20MWe+th of cogen capacity in the pipeline.

Milestones / Key Outputs as of December 2017

- **Surpassed the principal target of 40MW of installed cogeneration capacity: An equivalent of 110.8MW (33.8 MW Electric and 77 MW Thermal) of Efficient Cogeneration systems has been constructed and commissioned. Kakira Sugar Limited, Uganda has successfully installed a new 90MWe+th (30MWe +60MWth) cogeneration plant**

Photos of Kakira Sugar Company's 30MWe Cogeneration Plant, Uganda

- **Surpassed the target of 20MW cogeneration investment in the pipeline: There is an expected follow-up of 27 MWe+th (9MWe + 18MWth) cogeneration plant using woody biomass in the Sugar sector in Tanzania.**

- **Surpassed the target of raising US$60million financing for cogen by mobilizing close to US$80million in investment finance for 3 new operational cogen plants in Uganda and Kenya.**

- **729 Investment Opportunities identified as of July 2017 that could lead to 1.1GW of electricity capacity and 2.9GW of thermal capacity with an estimated investment value of over US$1.5billion.**

- **Signed Cooperation Agreements with 20 cogen project developers in Kenya, Uganda, Tanzania, Ethiopia, Swaziland and Malawi.**

- **Commissioned 14Full-Scale Feasibility Studies as of July 2017**

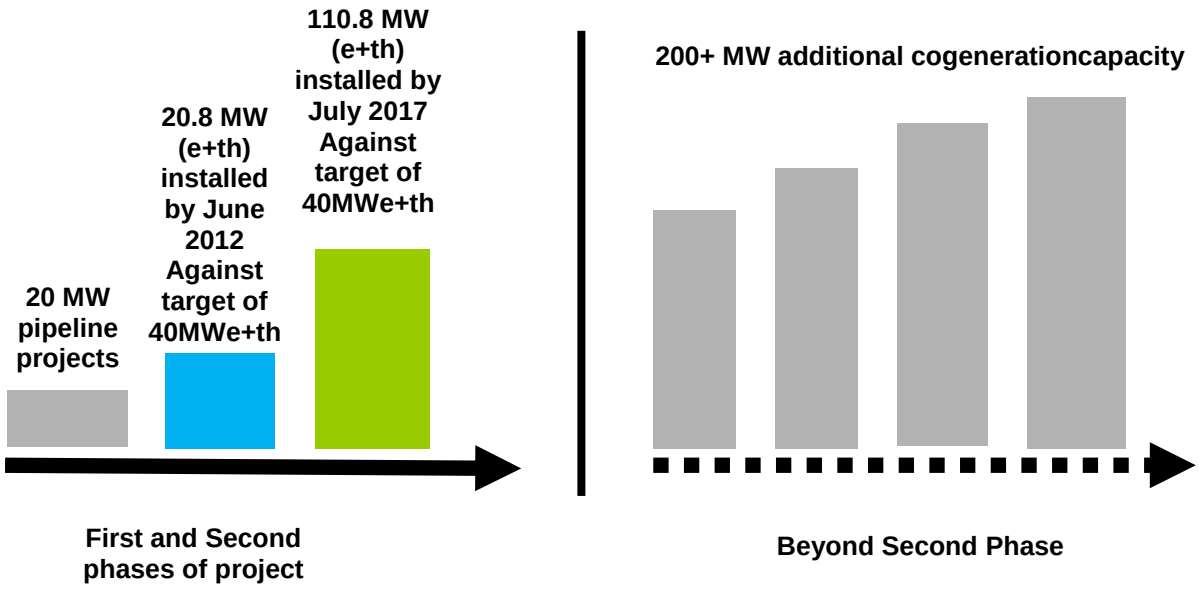
    i. 8 full feasibility studies in Kenya (4 in Tea, 1 in Horticulture& 3 in Sugar Sector)

ii. 4full feasibility studies in Uganda (2 in Tea & 2 in Sugar Sector)

iii. 2 full feasibility studies in Tanzania in Sugar Sector

- 4 ongoing full feasibility studies as of December 2017
- **Provided training to 124 Workshop/training course participants**
- **Registered 466,106 hits on the Cogen for Africa Project Website as of 21st April 2017**

Key outputs and envisaged future growth of cogeneration in East and Southern Africa



For more information visit the project website: http://cogen.unep.org or www.afrepren.org/cogen