

UNECA TECHNICAL TRAINING

Energy planning: LEAP and contemporary Planning Approaches

An introductory session on

Power Sector Planning Model for East African Countries (SPLAT-E model)

3 October, 2014

Concept Summary

Background

Africa needs to raise its electricity supply significantly to provide the necessary energy for economic growth and enhance energy access for its growing population. IRENA has reported on the outlook for the continent and its regional power pools in *Scenarios and Strategies for Africa*, and *Prospects for the African Power Sector*.

In July 2011 the African energy ministers at their summit in Abu Dhabi asked IRENA to assist in the planning for an accelerated deployment of renewable energy in the continent. In response IRENA has taken up a number of areas of research. The goal is to assist in the development of a suitable toolbox, as well as the application of this toolbox to enhance the renewable energy planning as a part of national energy mix strategies.

IRENA has developed the SPLAT-E model, which is suited for electricity sector planning in the East African countries and provides a framework for consistently comparing various investment options based on economic, technical, environmental and other social objectives. SPLAT-E is only one out of five regional power pool models - SPLAT models - developed by IRENA. The model computes an economically optimal series of supply side investment under a set of assumptions. With such a model, one can analyse the implications of alternative policies and the robustness of “optimal” investment paths, taking into account the uncertainty of future developments in key parameters such as electric demand, technology costs and fossil fuel prices among others. This kind of modelling tool is commonly used as a basis for the development of mid- or long-term electricity master plans.

IRENA intends to share the model with the government divisions in charge of energy planning as well as any other interested organisations. In the long-term, the agency, together with its partner organisations, seeks to establish a network of centres of excellence on the subject of energy planning in Africa.

Based on this context, IRENA and UNECA will hold a one day workshop to discuss the model, its applications, and possible collaboration opportunities with East African member countries.

The Model

The SPLAT-E model was developed using a modelling platform software called Model for Energy Supply Strategy Alternatives and their General Environmental Impact (MESSAGE), a dynamic, bottom-up, multi-year energy system model applying linear and mixed integer optimisation techniques.

The SPLAT-E model is built on a database of power systems (consisting of existing generation units and international transmission lines, along with a range of future technology options). The model calculates the future configuration of power systems with specified system requirements to meet given and fluctuating demands. The resulting installed capacity configuration is defined primarily by minimizing total energy system costs within the planning horizon (i.e. 2010-2050). The SPLAT-E model is calibrated to the current status of the EAC for each country using the Regional Power System Master Plan and Grid Code Study, complemented with data from UN Statistics and the WEPP database. The model covers the following eleven countries: Burundi, Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, Sudan, Tanzania and Uganda.

The Workshop

The objective of this workshop is to discuss the methodology of the SPLAT-E model and its policy applications. IRENA will present the model input parameters, model structure and illustrate their influence on the results. The results from a demonstrative analysis using the SPLAT-E model will be discussed to further improve the model and its policy relevance. A sustainable energy planning support framework will be also discussed.

As a result of the workshop, we expect to identify:

- Follow-up activities for capacity building in the member states in the region together with the transfer of appropriate tools and training.
- Areas of improvement to make IRENA's energy planning tool for the East African region more policy-relevant.
- Possible benefits from the combined/complementary use of different modelling platforms with different strong points.

Agenda

9:00-9:45	Introduction to the session by Yohannes Hailu/Asami Miketa <ul style="list-style-type: none">- IRENA's mandate and work program- Energy Planning Programme- SPLAT models- Objective of the session
9:45-10:30	IRENA's SPLAT model: Modeling approach <ul style="list-style-type: none">- General introduction of the modeling approach- Optimization- Scenario approach- Process of model development
10:30-10:45	Coffee break
10:45-11:30	IRENA's SPLAT model: Main results from IRENA's preliminary scenario analysis <ul style="list-style-type: none">- Generation- Inter-country trade- Grid vs Off grid- Generation costs- Investment needs
11:30-12:15	Hands-on session: reviewing main model assumptions <ul style="list-style-type: none">- Model structure- Scenario definitions- Data sources- Resource data- Trade data- Characterization of RE technologies (capacity credit, diurnal variation etc)- Characterization of non RE technologies (costs, fuel price etc)- Characterization of transmission and distribution technologies (loss, cost, reserve margin etc)
12:15-13:00	Energy Security assessment: methods and application by UNECA
13:00-14:00	Lunch break
14:00-15:30	Hands-on demonstration: <ul style="list-style-type: none">- Scenario development- Sensitivity analysis- Extracting results and interpreting
15:30-16:00	Gap analysis in energy planning capacity: the case of Rwanda by MININFRA/UNECA Consultant, James Wahogo
16:00-16:15	Coffee break
16:15-17:00	Round table discussion: Gap analysis in energy planning in Eastern Africa sub-region (chaired by UNECA) <ul style="list-style-type: none">- Identification of further training needs- Data gaps- Possible follow-up activities
17:00-17:10	Closing