Understanding Modelling Tools for Sustainable Development

MODULE: ENERGY SYSTEMS MODEL: A LEARNING GUIDE

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INTRODUCTION

The 2030 Agenda for Sustainable Development endorsed by UN Member States in September 2015 calls for transformative and integrated policies leading towards a sustainable development path. Realizing the vision of the 2030 Agenda requires better informed policy decision-making in all three dimensions of sustainable development along with dedicated attention to their interlinkages. Policies need to support a complex balancing of global goals with national development aspirations while also balancing trade-offs across sectors, goals and targets. Science-informed policymaking will help unveil policy and investment opportunities in all three dimensions. It will also help to define interlinkages that will lead countries towards sustainable development.

This **outreach hands-on training course** aims to enhance understanding of how modelling tools can be used to unveil interlinkages across different policy areas, and how they can inform policy decision-making. The course is a practical guide on the principles of five modelling tools and the insights they can offer to policy decision-making. It is targeted to policy decision makers and development practitioners who want to gain understanding about a selected number of modelling tools available for evidence-based decision-making for sustainable development.

This module sheds light on how optimization can be used in energy planning to assess the technical, economic and environmental challenges of steering national electricity systems towards a sustainable path. Particular attention is given to how different combinations of renewable and non-renewable sources can satisfy the growing demand for electricity in developing countries and at what cost.

The module starts with a quick review of the link between energy and development, the questions raised by this relationship, and the ways modelling tools can help to answer the policy challenges associated with these issues. Second, the module will present the main features of electrification analysis through the use of the OSeMOSYS and MoManI energy modelling tools.

MODULE: ENERGY SYSTEMS DYNAMIC MODEL

LEARNING OBJECTIVES

- Review the link between development and energy (including electricity infrastructure).
- Understand the basics of mid- to long-term energy planning.
- Understand how linear optimization modelling can inform energy planning and policy decision-making.
- Understand the main building blocks of energy and electricity systems modelling.
- Understand the power and weaknesses of linear optimization in energy systems modelling.
- Understand the role of electricity demand and its seasonality in the modelling of the evolution of mid- to long-range energy systems planning.
- Understand how the technological/physical features of alternative energy sources interact with the demand for electricity to determine the optimal energy system configuration.
- Perform an electrification analysis and identify the lowest overall cost option for a given region using the ONSSET interface.

WORKSHOP SCHEDULE

Key	Session	Resources	Time
1	Energy systems modelling	Presentation	40 minutes
2	Electricity systems modelling	Presentation	45 minutes
Coffee break			20 minutes
3	Exercise on energy planning 1	Work group	30 minutes
4	Reporting and discussing work in groups	General discussion	20 minutes
5	Introduction to OSeMOSYS and MoManI tools	Presentation	20 minutes
Lunch break			60 minutes
6	Hands-on exercises with OSeMOSYS and MoManI	Work group	90 minutes
7	Reporting and discussing work in groups	General discussion	30 minutes
Coffee break			20 minutes
8	Hands-on exercises with Osemosys and MoManI 2	Work in groups	90 minutes
	Reporting and discussing work in groups	General discussion	30 minutes
Total time of the workshop			**6 hours and 45 minutes**

REFERENCES

Dyer, H., and M. J. Trombetta (2013). *International Handbook of Energy Security.* Cheltenham, United Kingdom: Edward Elgar.