ETSAP Webinar Series No 6
30th March 2021, 13.00 – 14.00 CET,

Topic 1: Stochastic Modelling of VRES in TIMES.

In this webinar Dr Pernille Seljom will present an approach which models the short-term uncertainty of the generation of VRES explicitly, and thus provides results that capture the need for flexibility. The presentation will provide a guideline on how to model the uncertain characteristics of wind power, PV and hydropower generation by a two-stage stochastic modelling approach in TIMES with a demonstration in VEDA. This involves demonstrating stochastic parameters, scenario files, model run settings and corresponding results.

Pernille Seljom (PhD) is a senior research scientist at Institute for Energy Technology (IFE) since 2008. Seljom has a Master of Science (2006) in Energy and Environmental Engineering and a PhD (2017) in Operations Research from the Norwegian University of Science and Technology (NTNU). Seljom is an experienced energy system analyst and an advanced user of the TIMES energy system modelling tool. Her current research focus includes the role flexibility in a future decarbonised energy system, including the competition and interaction between renewable supply and end-use flexibility measures, from a Norwegian and European perspective.

Topic 2: Modelling high VRES with hourly TS resolution, unit commitment, dispatch and capacity expansion in TIMES.

This approach explicitly models the hourly variations and fluctuating resource dynamics of wind, solar and hydro availability, integrated with the unit commitment (UC) constraints of dispatch fossil generation power plants all balanced with short term and long-term demand variations and fluctuations with capacity expansion. The approach captures the energy system requirements for system flexibility, demand load shifting in the power and electro-mobility sectors as well as intra-day and intra-seasonal energy storage in batteries, pumped hydro storage and hydrogen production and consumption. The webinar section will provide guidance on how to explicitly optimise the characteristics of wind power, solar and hydropower generation at hourly resolution with unit commitment and dispatch with a demonstration in VEDA2. This involves demonstrating hourly Time-Slice definition setup, year fraction, Demand Fractions, unit commitment dispatch parameters, scenario files and corresponding results tables export and visualisation in Tableau. I will also briefly touch on hourly dispatch model run settings (CPLEX, EXPRESS, GUROBI) and the resulting computing hardware requirements (Cloud or Server) CPU and RAM needed to best solve such large sparce TIMES GAMS matrices.

James Glynn (PhD) is a research fellow at the SFI-MaREI Centre for Energy, Climate and Marine, based in the Environmental Research Institute in University College Cork. James is the Irish & MaREI contact points for IEA_ETSAP and the Integrated Assessment Modelling Consortium (IAMC). James' research interests focus on the development and application of integrated energy systems models and their interactions with the climate, economy, and society to find resilient pathways to a future sustainable energy system. He is an expert developer and user of the TIMES source code as with applications such as IEA ETSAP-TIAM (Global), TIMES_GEO (Global), Irish-TIMES, and the TIMES_Ireland Model (TIM). @james_glynn (twitter) | linkedin.com/in/jamesglynn/