

## Concept Paper

### Webinar on “Economic Dispatch and Unit Commitment Modelling Using PLEXOS® or Similar Software”

#### Background:

The electrical load of a power system is continuously changing throughout a day and its peak changes from one day to another. Given this ever-changing load, the power system operator schedules beforehand the start-up time of required generating units as well as time to connect them to the grid. The sequence to shut down the operating generating units and length of downtime is scheduled as well. This complete scheduling process involves challenging optimization decisions and is known as *Unit Commitment*<sup>1</sup>. *Economic dispatch*, as defined by US Energy Policy Act of 2005, is optimal operation of generation facilities to generate electricity at the lowest cost while reliably serving the consumers as well as respecting the operational constraints of generation and transmission facilities<sup>2</sup>. Economic dispatch and unit commitment are the key conundrums for a power system operator to solve optimally for ensuring economic and reliable power supply to consumers.

PLEXOS is an integrated optimization platform for electric power, water and gas systems developed by Energy Exemplar, currently in use in more than 62 countries. PLEXOS is a robust mathematical optimization tool which involves deterministic & stochastic techniques and can be used to solve the complex problems of economic dispatch and unit commitment<sup>3</sup>. By training their professionals to optimize the economic dispatch, SAARC Member States can reap multiple benefits of economic dispatch such as reduced electricity costs; more efficient generation which in turn means better fuel utilization, lower fuel usage and reduced air emissions; increased operational reliability; and flexibility to incorporate policy targets.

#### Introduction:

SAARC Energy Centre (SEC), under its thematic of “Program to Successfully Implement Technology Transfer (POSIT)”, is conducting a webinar on “Economic Dispatch and Unit Commitment Modelling using PLEXOS® or similar software”. The webinar will be a one-day activity and will include presentations from various experts working for Energy Exemplar to share their experience on optimizing economic dispatch using PLEXOS software package.

During the webinar, the invited speakers will focus on the importance of economic dispatch and

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<sup>1</sup> Grainger J., Stevenson Jr. D., “Power System Analysis”, McGraw Hill Inc., 1994.

<sup>2</sup> US Department of Energy, “The Value of Economic Dispatch”, November 7 2005.  
<https://www.energy.gov/sites/prod/files/oeprod/DocumentsandMedia/value.pdf>

<sup>3</sup> Energy Exemplar, “Energy System Optimization Modelling through PLEXOS® in SAARC Member States”, July 2 2020.  
<https://www.saarcenergy.org/webinar-on-energy-system-optimization-modelling-through-plexos-for-saarc-member-states/>

unit commitment, capabilities offered by PLEXOS® to solve the economic dispatch problem for different power system scenarios, as well as potential benefits of economic dispatch. This event will serve as a platform to disseminate practicable information for power system operators in particular and power system professionals in general, regarding economical operation of a power system.

**Objectives:**

The objective of this webinar shall be to familiarise the participants on the application of PLEXOS® to economic dispatch problems for power systems of varying sizes, diverse generation sources and dispatch facilities. The motive shall be to introduce the power system operators/planners, working in the SAARC region, to the functionality offered by PLEXOS software and its suitability to different power system operation scenarios.

**Major Aspects /Topics to be Covered:**

The following aspects shall be covered during the webinar:

1. Importance and potential benefits of economic dispatch and unit commitment.
2. Significant parameters and complexities involved in economic dispatch.
3. Introduction to PLEXOS® software.
4. Mathematical model and optimization method used by PLEXOS® software to solve economic dispatch problem.
5. Case studies depicting application of PLEXOS®.
6. Knowledge sharing and interactive discussions.

**Venue of the Webinar:**

The webinar shall be broadcasted from the office of SAARC Energy Centre.