

# ePSR

## corporate management system for energy planning applications

### Objective

ePSR is an integrated computational environment for the collaborative development of energy studies. Using a comprehensive central database, ePSR architecture integrates PSR applications and is designed to facilitate integration with third party components, such as ERP systems.

ePSR is a workbench in which information for the applications and the output results are available to the users through a common database. The resources are accessed through a friendly interface working under a security control framework. Corporate-wide features increase productivity and assist the management of the studies.

### Modeling Aspects

**General Framework Architecture:** ePSR is built under a multi-tier architecture comprising of a graphical user interface, business rules, database management systems, energy applications and data format converters.

**Access Control:** ePSR environment is security controlled through two mechanisms: access control and workgroup profile. Users have to "login" to the ePSR framework in order to gain access. Personal logins are related to workgroups for which access profiles are defined. A workgroup access profile establishes privileges to access a set of ePSR functions, restricting information and models to the members of the workgroup.

**Organization:** ePSR organizes the information into five categories, as follows:

- **Power System Components:** describe the power system components (power plants, reservoirs, circuits, substations and others). Data can be constant or dynamic (time-dependent). Data are versioned which means that power system components from previous years may be used (important for auditing the results)
- **Power System Configurations:** abstract organizations of the power system components. Configurations are defined by clustering these components into sets of interrelated energy systems, geo-electrical areas and electrical control areas
- **Time series:** historical data and forecasted scenarios, such as hydrological inflows, reservoir storage level, fuel prices, macro-climatic variables and others

- **Constraints:** operational rules which constrain the power dispatch, such as reservoir operation constraints, individual or combined generation limits for the power plants, spinning reserves, unit commitment constraints, transmission security constraints, and many others
- **Study Management:** a case study is defined by selecting information from available configurations, historical data, scenarios, and constraints, previously defined from the database. Additional parameters which depend on the application are required, such as the study horizon. Users benefit from information already available in the common ePSR database, sometimes defined by others

### System Characteristics

- Windows-based User Interface
- Software Code: Microsoft .NET (object-oriented code, based on state of the art design patterns)
- Database: Oracle RDBMS
- Data Interchange Format: Web Services and XML

### Recent Applications

Some of the recent uses of ePSR include:

- **Turkey:** EÜAŞ, largest generation company in the country, has been using ePSR since 2007 to coordinate studies related to long-term planning activities and firm-energy calculation (SDDP/ MAXREV models), dispatch of energy scheduled in the short term market resulting from the combined effect of self-dispatch and position in the balancing market (NCP model)
- **Ecuador:** CENACE, the institution responsible for operating the power system and the electricity market, has been using ePSR since 2006 to integrate PSR applications for optimizing the system dispatch in studies ranging from a few hours (NCP model) to several years ahead (SDDP model) and to determine ex-ante and ex-post prices according to regulations (MSP model). ePSR also integrates application results with SCADA and ERP systems
- **Norway:** Agder Energi has been evaluating ePSR to manage its short term energy application (NCP model) for optimizing the scheduled generation of its power plants in order to maximize revenues from power sales into the Nordpool