ENERGY MARKETS GROUP

ABB PROMOD®
Generation and transmission modeling system with nodal and zonal price forecasting
ABB PROMOD® is the premier integrated electric generation and transmission market simulation system. PROMOD is recognized in the industry for its flexibility and breadth of technical capability, incorporating extensive details in generating unit operating characteristics and constraints, transmission constraints, generation analysis, unit commitment/operating conditions and market system operations.
For over 40 years, energy firms have been using PROMOD for a variety of applications that include locational marginal price (LMP) forecasting, financial transmission right (FTR) valuation, environmental analysis, asset valuations (generation and transmission), transmission congestion analysis, and purchased power agreement evaluations.

PROMOD provides valuable information on the dynamics of the marketplace by determining the effects of transmission congestion, fuel costs, generator availability, bidding behavior, and load growth on market prices. PROMOD performs a daily or weekly commitment and hourly or sub-hourly dispatch, recognizing both generation and transmission impacts at the nodal and zonal level.

PROMOD forecasts hourly and sub-hourly energy prices, unit generation, revenues and fuel consumption, external market transactions, transmission flows and congestion and loss prices.

PROMOD is built on robust data structures. This includes the ability to enter time-based data changes at the hourly and sub-hourly granular level and detailed generator data inputs. In addition to unit capacity changes, users can enter data describing future changes to generator data.

Nodal: price forecasting

PROMOD performs a security constrained unit commitment and economic dispatch that is co-optimized with operating reserve requirements, similar to how transmission/independent system operators (TSOs / ISOs) set schedules and determine prices, in order to provide forecasts of LMPs. LMP may be reported for selected nodes, user-defined hubs, or load-weighted or generator-weighted hubs; this may be further broken down into a reference price, a congestion price (showing individual flowgate contributions to congestion), and a marginal loss price.

Nodal: transmission and congestion valuation

PROMOD performs valuation of transmission, congestion and associated financial instruments, such as financial transmission rights (FTRs), congestion revenue rights (CRRs) and transmission congestion contracts (TCCs), by providing all market participants and energy companies with the powerful tools needed to quantify market prices, identify binding constraints, and evaluate economic impacts of the specific constraints that have strategic significance to specific portfolios and business needs.

Nodal: renewable energy valuation

PROMOD simulates the effects of intermittent energy schedules from wind, solar, and other renewable projects on transmission congestion, and forecasts the amount of energy that may be curtailed considering the opportunity costs from production tax and renewable energy credits. This information enables the user to evaluate renewable projects and their impacts on the wider generation and transmission system.

Nodal: economic transmission analysis

PROMOD provides market participants and energy companies with the ability to evaluate the economic benefit, changes in transmission congestion, and impact to generation assets associated with transmission expansion and outage scheduling. By simulating the energy market in detail, users are able to see the LMP and its components, transmission flows, and the behavior of the generating units.

Zonal: power market analysis

PROMOD simulates, on an hourly and sub-hourly basis, the applicable region under a variety of conditions. This information is then used to quantify the operating risks associated with each facility and develop a detailed forecast of zonal market clearing prices and system operation under these conditions. PROMOD is also used to perform long-term, transportation-based simulations of regions with robust hourly unit commitment and sub-hourly dispatch decisions, using the capacity expansion determined by ABB’s Reference Case, Capacity Expansion or Market Power solutions.
PROMOD is built upon our latest technology platform, e7, which has been completely refreshed to address the changing needs of the modern customer. It utilizes a common interface that is shared by ABB’s other market and portfolio solutions, allowing a consistent look and feel across many products (Capacity Expansion, Portfolio Optimization and SENDOUT). New workflow management features, configurable reporting and an in-application formula tool provide users the flexibility to mold the application to their specific needs. Easy-to-configure activities can be automated, resulting in a seamless integration with upstream and downstream systems. All of these features have been developed to optimize the user experience, regardless of whether they are modeling a small portfolio deployed on a single machine or modeling multiple markets in the cloud on thousands of nodes.

### Workflows

A workflow is a collection of user-defined views including data entry views, activities, pivot tables, and output reports. These views are easily defined, customized and ordered creating a consistent and repeatable user experience that reduces time spent searching for data and allows for a greater focus on modeling.

### Data views

Data views are configured by the user and can include both input and output data items. Input values can be displayed in unique datasets or as the fully resolved data exactly as it is sent to the engine. Views allow full data entry and editing as well as simple graphing and reporting. Creating a new view is as easy as selecting a scenario, entity(s) and data item(s).
**Pivot views**

In-application reusable pivot tables allow for complex reporting and aggregation, with the ability to look at a single scenario or compare multiple runs. Configuration of a pivot table is consistent with any user-defined view and can be included in a workflow as described above.

Pivot views facilitate graphing for quick and easy visualization of results to better understand the information within the raw data.

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**Formulas**

Formula Editor functionality allows for basic adjustments of data such as patterns, escalations or reusable indexes to more complex calculations including conditionals and topology aggregations. Included in the formula capabilities are:

- Basic math functions (+, -, *, /)
- Complex math functions (abs, sum, exp, log, round, min, max, floor, ceiling)
- Built-in functions (iif, decendantof, nvl, lag, lagyear, daysinmo)
- Inputs can derive their value from a combination of indexes, patterns or functions
- Custom outputs can be calculated based on inputs, outputs, indexes and functions
- Output cells can be shaded different colors based on conditional statements
Security

With disparate groups using the software, there is a need for different groups to have permissions to different areas and data within the software. With the security capabilities groups of users can be limited to only editing and viewing data in specified datasets and views within the software. This allows the same software to be deployed to numerous groups pointing to the same database and prevents groups of users from viewing and editing data they should not be permitted.

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Automation and activities

An activity is a user-defined, in-application set of steps built as part of a workflow. Automation of activities give users a simple way to define a set of tasks (activities) to execute automatically. These steps include items such as:

- Executing a scenario
- Importing data
- Publishing a run to an output API
- Adding or removing datasets from a scenario
- Executing custom T-SQL for easy integration

Once configured, automation can significantly reduce repeatable steps, reduce data input errors and ultimately reduce the time to obtain valid results.
About us

ABB’s Enterprise Software product group

We provide industry-leading software and deep domain expertise to help the world’s most asset-intensive industries such as mining, energy, and utilities solve their biggest challenges, from plant level, to regional network scale, to global fleet-wide operations.

Our enterprise software portfolio offers an unparalleled range of solutions for energy portfolio management, asset performance management, operations and workforce management and network control to help customers reach new levels of efficiency, reliability, safety and sustainability. We are constantly researching and incorporating the latest technology innovations in areas such as mobility, analytics and cloud computing.

We offer unmatched capabilities to integrate information technologies (IT) and operational technologies (OT) to provide complete solutions to our customers’ business problems.