GE Energy

# MAPS* Software for Informed Economic Decisions

fact sheet

In the rapidly changing world of the electric power industry, one thing has remained constant—the need to accurately model the economic operation of the power system in order to make informed decisions. Whether your interest is in assessing the value of a portfolio of generating units or in identifying the transmission bottlenecks that most seriously constrain the economic operation of the system, you must capture the complex interaction between generation and transmission systems. GE Energy offers the Multi-Area Production Simulation Software program (MAPS), which provides the detailed modeling your business needs.

## MAPS Modeling Detail

MAPS software integrates highly detailed representations of a system's load, generation, and transmission into a single simulation. This enables calculation of hourly production costs in light of the constraints imposed by the transmission system on the economic dispatch of generation. Generation system data capabilities of MAPS include multistep cost curves, unit cycling capabilities, emission characteristics, and market bids by unit loading block. The generation units, along with chronological hourly load profiles, are assigned to individual buses on the system. The transmission system is modeled in terms of individual transmission lines, interfaces (which are groupings of lines), phase-angle regulators (PARs), and HVDC lines. Limits can be specified for the flow on the lines and interfaces as well as operation of the PARs. MAPS software models voltage and stability considerations through operating nomograms that define how these limits can change hourly as a function of loads, generation, and flows elsewhere on the system.

Hourly load profiles are adjusted to meet peak and energy forecasts input to the model on a monthly or annual basis. Information on hourly loads at each bus in the system is required for MAPS to accurately calculate electrical flows on the transmission system. This is specified by assigning one, or a combination of several hourly load profiles to each load bus. In addition to studying all of the hours in the year, MAPS can be used to study all the days in the year on a bi-hourly basis, or a typical week per month on an hourly or bi-hourly basis. With these modeling options, MAPS simulates the loads in chronological order and does not sort them into load duration curves.

Based on this detailed representation of the entire system, MAPS performs a security-constrained dispatch of the generation by monitoring transmission system flows under both normal and contingency conditions.

## Data for Informed Decisions

Making the right choices in today's environment requires increasingly more detailed information about the operation of the system. In addition to traditional production costing quantities of unit generation and costs, MAPS also provides the following data:

- Calculations of hour-by-hour, nodal or bus spot prices of energy
- Calculations of hourly line flows and congestion costs
- Determinations of unit revenues based on MW output and bus spot prices
- Computations of hourly emission quantities and removal and trading costs
- Identification of companies and generators responsible for power flows on lines

| Generation | Transmission | Loads | Transactions |
|---|---|---|---|
| Detailed Representation | Tracks Individual Flows | Chronological by Bus | Automatic Evaluation |
| Secure Dispatch | Obeys Real Limits | Varying Losses | Location Specific |

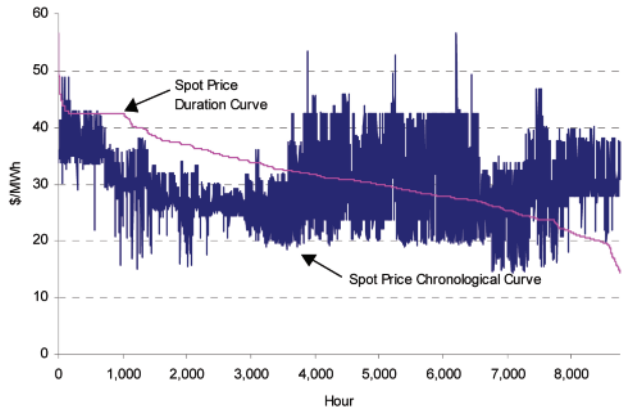
MAPS also ties to other software programs offered and supported by GE Energy, thus expanding its data analysis capabilities even further:

- MAPS ties to Positive Sequence Load Flow software (PSLF) to analyze the dispatch for a given hour for an accurate picture of voltage profile, var requirements, and system and area losses.
- MAPS ties to Multi-Area Reliability Simulation software (MARS) to determine adequacy of installed capacity via Multi-Area Reliability Simulation.

## MAPS Applications

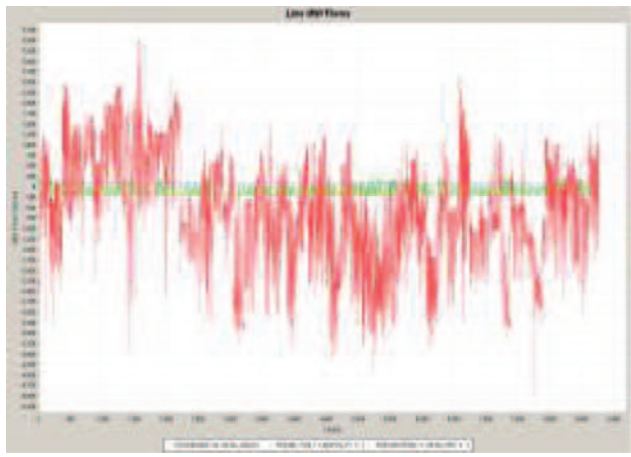
Because of its detailed representation of generation and transmission systems, MAPS can be used to study a number of issues related to the deregulated utility market:

- The attributes of different proposed market structures and the development of pricing algorithms
- The possibility of one or more market participants exerting market power
- The value of a generation portfolio operating in a deregulated market
- The location of transmission bottlenecks and associated congestion costs as well as transmission congestion contract (TCC) valuation
- The impact on total system emissions that result from the addition of new generation




## Accurate Decisions Depend on Accurate Data

Your business depends on accurate modeling data for accurate decision-making. GE leverages more than 80 years of experience in analyzing the power industry's economics and equipment to provide you with the tools you need to run your business successfully. Contact the representative named below to find out more about how MAPS software and other services GE provides can help optimize your business strategies.



### For more information on MAPS software contact

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