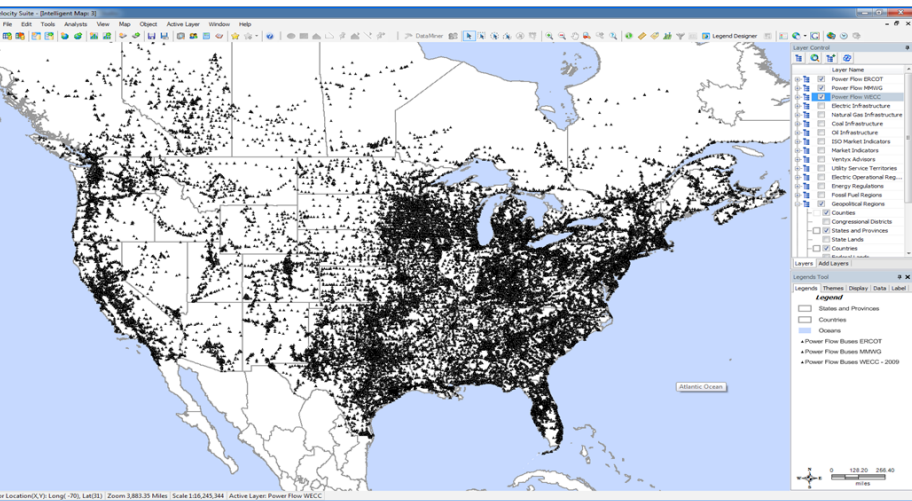


# Nodal Reference Case



Transmission grid nodes (Source: ABB Ability™ Velocity Suite)

Nodal Reference Case is an hourly, off-the-shelf, pre-simulated LMP fundamental 25-year forecast for all nodes across the three transmission Interconnects in the United States (Eastern Interconnect, WECC and ERCOT).

The Federal Energy Regulatory Commission’s (FERC) deregulation and eventual opening of energy markets introduced competition to previously vertically-integrated markets. As before, the need for periodic planning and investment in the transmission network and generation resources in maintaining bulk electric system reliability remains vital.

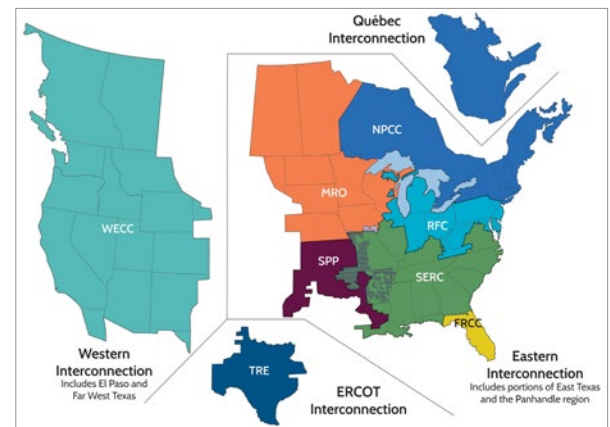
## LMP forecast

Locational marginal pricing (LMP) provides a method of accounting for variations in load, generation and the physical limitations of the transmission system in these markets. Being able to accurately estimate future LMPs is crucial for long-term reliability, trading prospects and investments in the industry.

LMPs, driven by fuel, generation mix, transmission and load, are excellent signals in identifying constrained areas for reliability or economic investment. With effective LMP forecasting, operators and investors can identify both near- and long-term needs and opportunities within the market.

The US and Canadian electric systems (and, to some extent, the Northern Mexican grid) are interconnected

via three large interconnection systems. The Western Electricity Coordinating Council (WECC) interconnects the electric system of 11 western states, two Canadian provinces and Baha, Mexico. The Electric Reliability Council of Texas (ERCOT) covers 90 percent of the state load. And finally, the Eastern Interconnect covers from central Canada eastward to the Atlantic coast (excluding Quebec), south to Florida and back west to the foot of the Rockies (excluding most of Texas).



North American regional reliability councils and interconnections (Source: North American Reliability Corporation)

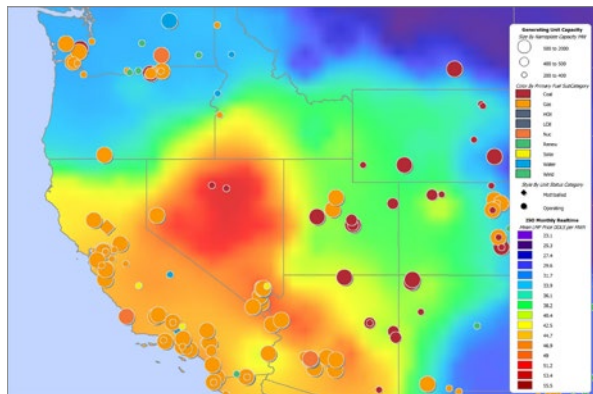
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## ABB consulting solutions

The ABB Enterprise Software product group's **Nodal Advisory Group** is comprised of industry experts with extensive backgrounds and knowledge of electric industry utilizing ABB's best-in-class production costing model, ABB Ability™ PROMOD®. PROMOD's powerful engine is capable of performing security-constrained commitment/dispatch for the entire eastern interconnect, WECC or ERCOT.

ABB's veteran staff of industry experts maintains a detailed simulation-ready set of data covering all transmission lines, generating units and fuel characteristics. The vast library of data includes detailed generating unit characteristics such as min and max capacity, heat rates, forced outage rates, scheduled maintenance, variable operation and maintenance cost (VOM), type of fuel(s) they burn, environmental control equipment, rate of emissions for different effluents, hourly pattern of individual renewable energy sources, as well as vast amounts of necessary market data such as fuel prices, effluent prices, electric demand, unit retirements and additions, among others.

This powerful combination staff consultants who are experts in market dynamics and the industry-leading PROMOD model that is used by FERC, NERC, ISOs, trading companies/banks, and the majority of major utilities around the world puts ABB in a unique position to provide world-class solutions for any and all of the short-term and long-term challenges facing today's market players.



LMP contour for Western Electricity Coordinating Council  
(Source: ABB Ability™ Velocity Suite)

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## Ready-to-ship, off-the-shelf and pre-simulated LMPs

Nodal Reference Case is an hourly, off-the-shelf, pre-simulated LMP fundamental 25-year forecast for all nodes across the three transmission Interconnects in the US (Eastern Interconnect, WECC and ERCOT). Nodal Reference Case provides a quick and cost-effective option for market participants such as asset developers, utilities, tax equity investors, hedge funds, and banks. The granular LMPs at node levels and hubs provide valuable assistance for initial screening, renewable asset operation assessment, curtailment analysis, PPA negotiations, basis risk outlook, revenue outlook, third party negotiations, pre-evaluation of FTR/CRR/TCRs paths and more.

Nodal Reference Case is an extension of ABB's Standard Zonal Reference Case with input assumptions for the forecasted LMPs that are consistent with the spring release. The hourly, monthly and annual LMPs are derived for 25 years for more than 100,000 nodes in US, as well as more granular hubs and areas such as NYISO's zone A, zone C, zone H and so on.

Results are provided in Microsoft® Excel® spreadsheet format. The delivery is within one business day after the contract is executed.

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## More information

If you would like more information about ABB's LMP fundamental forecast, please contact us: [info.pges@abb.com](mailto:info.pges@abb.com)

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