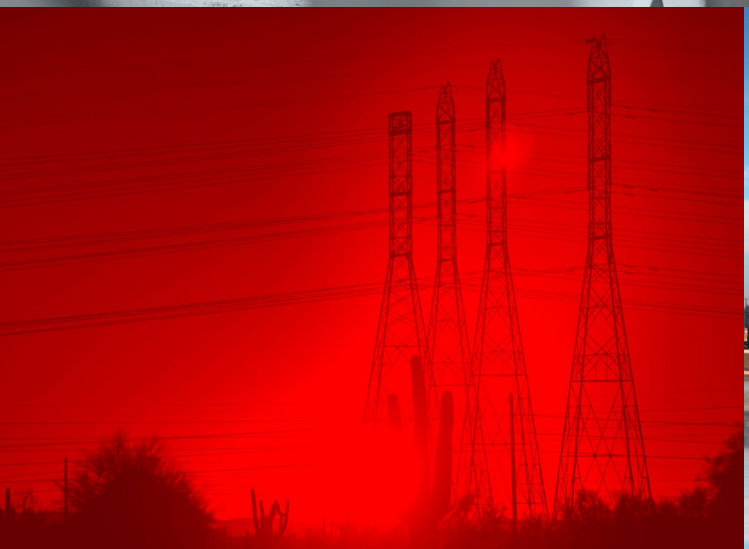
ENERGY PORTFOLIO MANAGEMENT

Creating a competitive advantage in Mexico's new energy market

Software providing investment-grade energy market data, analytics and portfolio planning



Success in Mexico's energy market requires targeted, relevant and trustworthy data & software

ABB has the tools, experience and services you need to stay competitive

"[The National Electric System Development Program (PRODESEN)] represents an important component of Mexico's historic reforms in the energy sector. It documents the Mexican government's intention to open the industry to global companies that possess the financial and technical capabilities to invest in energy infrastructure. According to Ernst & Young's analysis, investment opportunities in the generation, transmission and distribution sectors could exceed $120 billion USD."[1]

Whether you are an energy developer looking to build or buy, or a financial analyst looking to invest, or a planner creating long-range policies, there is one thing you can't do without: data. And if you want to take advantage of Mexico's newly-opened wholesale electric market, that data needs to be targeted, relevant and trustworthy.

The complex nature of Mexico's energy market makes the process of collecting, modeling and analyzing data a monumental and resource-intensive task. The good news is, the monitoring information provided by Mexico's National Energy Control Center (CENACE) means that reporting now standardized, giving stakeholders a reliable source of data that has never before existed. The great news is, ABB has the tools, experience and services to help you immediately leverage this data to make informed decisions so that your projects have the best chance at success.

The industry's most trusted source for data

ABB Ability™ Velocity Suite on Microsoft® Azure®
Velocity Suite is the leading energy market data and analytics solution, designed for quick Azure cloud-based implementation. Velocity Suite enables you to evaluate the activities of market participants and industry dynamics across commodities using a single integrated solution.

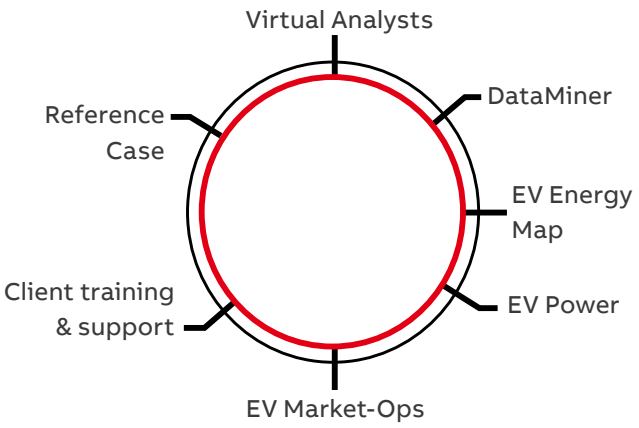
Visualize it – any way you want
Velocity Suite's powerful visualization tools make data easy to understand, and with Microsoft's Power BI™, users can further manipulate data to create custom views and rich interactive reports that speak to their individual needs.

Everything in one place
Analyzing energy market data is already complex – having to continually switch between software applications is no way to operate effectively. The Velocity Suite solution has been delivered as one integrated application since its inception. The data and analysis tools run inside the same interface, allowing you to look at coal production, daily gas prices, plant capacity factors, weather normalized loads, transmission, and more, all at the same time.

It's better in the cloud
The trusted, robust Azure platform provides for a lower cost of implementation and rapid time to productivity. With a cloud-based solution, there is no need to rely on internal IT resources to update applications or databases, and resources automatically scale to meet needs – all with the security, mobility, and speed of hyperscale cloud computing.

[1]Retrieved from: http://www.ey.com/Publication/vwLUAssets/ey-energy-alert-prodesen-2016-2030/%24FILE/ey-energy-alert-prodesen-2016-2030.pdf

The keys to harnessing available data
The Velocity Suite solution offers several specific components that can help you access and effectively use the data available and published by CENACE:



These solutions are further described below.

Analysis by anyone, for everyone

Virtual Analysts
Analysis is time-consuming…is there a way to simplify it?

How can I get more people involved in analysis?

Today's energy professionals need more than accurate data; they need powerful analytical tools to quickly find answers. Virtual Analysts™ (VAs) bring analytical firepower to the desktop. They allow anyone, regardless of their level of product training, to quickly break down and assess complex and data-intensive industry problems.

VAs convert common, time-consuming tasks into a few quick clicks, enabling you to dynamically interact with data to rapidly conduct specific analyses. Questions that previously required a string of complex, tedious tasks can now be answered by simply selecting a few items within pre-built applications.

Virtual Analysts reduce your learning curve so that more people in your organization can use Velocity Suite. ABB's dynamic development approach allows us to design and deploy new VAs quickly and is part of our ongoing commitment to the continuous development and improvement of Velocity Suite.

A new standard for data updates

DataMiner
How can I be sure I have the latest data?

One of the most powerful features available to Velocity Suite customers is the DataMiner™. You can quickly retrieve all data and geographic details available for a company in each sector of the energy industry. The DataMiner has proven to be one of the most valuable aspects of the Velocity Suite, delivering faster and more consistent results.

All data is available quickly and easily in the cloud. Velocity Suite is a fully online solution with updates constantly being applied throughout the day.

Is your position in the market affected by pipeline markets or the spot price of power? By taking advantage of our daily online updates, you won't be left without the critical data you need.

Beyond presentations – investment-quality spatial analysis

EV Energy Map
How can I visualize locational marginal price market data?

How does geographic location impact my delivered fuel cost?

How can I be sure I've selected the best location for my project?

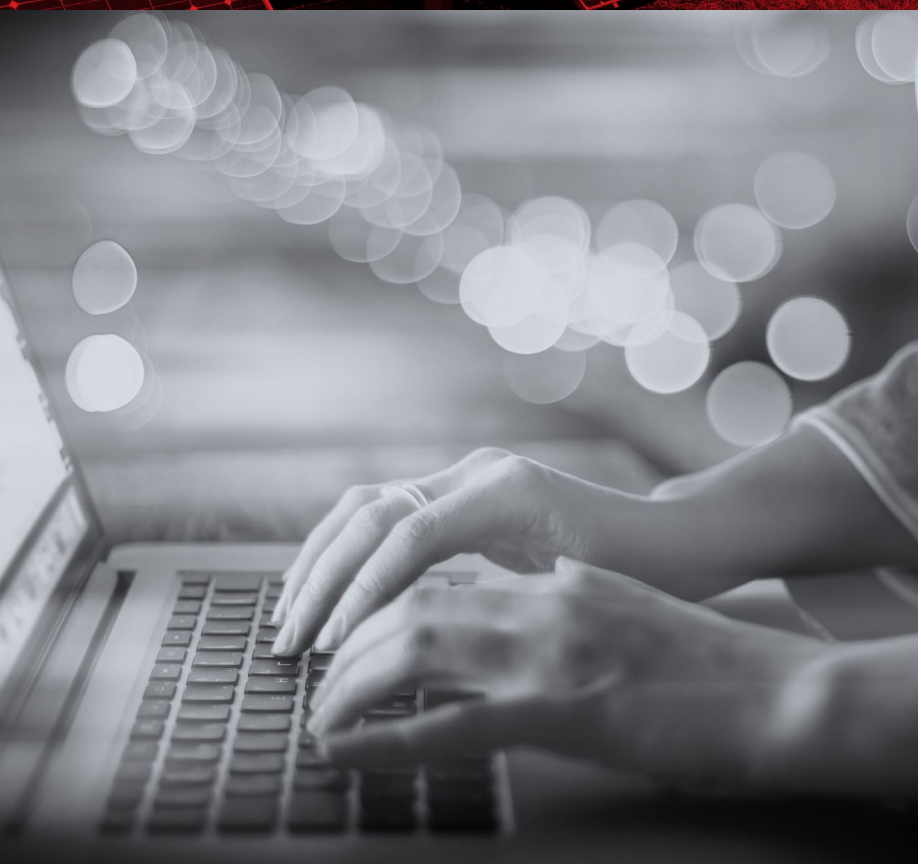
Data visualization is only part of spatial analysis. From simply showing a picture of a company's assets, to a complex analysis that examines how industry infrastructure is interrelated, EV Energy Map helps you understand Mexico's complex market.

EV Energy Map seamlessly integrates market data that is updated daily with aerial imagery and the most accurate geospatial data, making it the industry's most advanced mapping application.

Mapping layers included with EV Energy Map are the most detailed and most complete energy mapping layers available. The solution makes extensive use of aerial imagery in the electric infrastructure layers to provide you with optimum accuracy.

Data coverage:

- Natural gas & oil (pipelines, facilities, receipt/ delivery points, holding companies, etc.)
- Coal industry (mines, railroads, coal basins, etc.)
- Electric industry (generating units, power plants, transmission lines, substations, price points, regions, etc.)
- Environmental (renewable portfolio standards by state, non-attainment regions, land use topographical image)
- Reference (countries, states, cities, major roads, rivers, lakes, aquifers, steam gauging stations, census tracts)
- Background images (high-resolution color topography and bathymetry
- Raster graphics



The most complete picture of today's generating fleet

EV Power

Who owns a unit and what is its operating capacity?

How will an announced merger impact the market?

What new capacity is covered by power contracts?

What power plants are my competitors building?

How can I stay on top of the development and planning history of specific projects?

EV Power tracks development of new and existing generation projects. ABB's unique approach to researching new power station additions, retirements and rerates marries detailed news searches and telephone research with web-scouring technology that notifies our analysts of changes in identified reference sources.

Updated daily, EV Power enables users to see any changes to both planned and existing capacity. By combining market capacity changes with plant attributes, you are able to see the most complete picture of today's generating fleet.

Data coverage:

- Plant operations statistics
  - Existing generating unit capacity
  - Future generating unit capacity
  - Existing and planned emissions controls
  - Document library
  - Daily power prices
  - Forward power prices
  - Short-term price forecasts
- Project tracking
  - Asset sales
  - New entrants phase summary
  - Daily new entrants capacity changes

Detailed operational data that's easy to use and understand

EV Market-Ops

What is the current status of the market?

What's the best strategy to buy, sell or generate power in a locational marginal price (LMP) market?

Do you need "model-ready" data for your market models?

How do LMP prices respond to system load that differs from the forecast provided by CENACE?

EV Market-Ops digs down into the details, enabling you to see the granular operational details from Mexico's electricity grid, including hourly pricing, load, generation and forecasts. EV Market-Ops differs from competing products in quality and quantity in three key ways:

1. All raw data is reviewed for accuracy and corrected or estimated where wrong or incomplete.
2. ABB adds value to all raw operations data by making sure that, when presented, the data has an appropriate market context.
3. ABB creates analytical tools to make your analyses faster and easier.

EV Market-Ops presents all the detail possible, "no holds barred." For example, LMP pricing data is available for all price nodes in Mexico via cloud servers, the majority of which are also viewable in EV Energy Map.

Comprehensive market intelligence and forecasting

Mexico Reference Case

Today's data is great, but what about longer-term?

Whether building a new generation asset, providing financing for new generation, considering entry into the CENACE market, or any other major capital decision, the need for comprehensive market intelligence and accurate forecasts is critical. The data gathering, forecasting and analysis required to make strategic investment and operational decisions requires an enormous amount of resources and expertise. Often, this analysis needs to be independent and unbiased. Market participants, financial institutions and regulators require an integrated forecast model to help them value assets, evaluate market opportunities and increase confidence in investments.

ABB produces a fundamental analysis of the electricity market in Mexico twice a year, developed using the ABB Ability™ PROMOD® electric market simulation tool, Velocity Suite data and ABB's proprietary Integrated Model. ABB's market-based, fundamental model of the Mexico's power, gas, oil, coal and environmental markets, accounts for the interdependency of these markets and provides forecasts based on consistent economic assumptions.

This analysis, called the Mexico Reference Case, considers current and projected new resources; transmission limits and losses; operations and seam issues in neighboring markets; and hourly loads. It includes a fundamental base forecast of market clearing prices, which are comprised of hourly, monthly and annual prices for the 25-year study period.

The Mexico Power Reference Case includes:

- 25-year hourly market clearing prices for 56 pricing zones
- 25-year fuel price forecasts
- Projected 25-year resource build-outs and retirements
- Projected 25-year transmission expansion
- Projected 25-year energy mixture
- 25-year zonal outlook data in PROMOD

Reference Cases and market databases are also available for North America, Europe and Asia-Pacific.

Industry expertise, customized

Market Analytics Services

What is my asset worth, considering uncertainty?

How will the markets and grid change?

What technologies should we consider and how best to analyze them?

What is the risk between the asset location and a delivery hub?

What is the forecasted system impact of this project?

What are possible risks to my portfolio?

The data gathering, forecasting and analysis required to make strategic investment and operational decisions requires an enormous amount of resources and expertise – and this analysis frequently needs to be independent and unbiased. Market participants, financial institutions and regulators require an integrated forecast model to help them value assets, evaluate market opportunities and increase confidence in investments.

ABB Market Analytics Services provide a third-party, customizable, sophisticated approach to the renewable development process. This service provides flexibility and structure to support your analytic needs using the trusted approach outlined below:

- **Market-leading data and software solutions**
  Our Advisory teams utilize best-of-breed solutions for market simulations, historic analytics, capacity expansion, portfolio optimization and risk analysis.
- **Trusted industry experience**
  The ABB Advisory teams have decades of industry experience with specialized focus on fuels markets, renewable integration, emissions markets, and more while also maintaining expertise in different regional markets.
- **A long-standing industry reputation**
  ABB's fundamental forecast, historic analytics and market simulations have been consistently utilized within the industry by regulators, grid operators, developers, generation owners and financiers.

Market Analytics Services provides an in-depth, comprehensive, integrated fundamental analysis covering:

Asset analysis

- Evaluate existing and proposed resources
- Evaluate market risks and revenue potential for your assets

Market analysis

- Custom electric and fuel scenarios reflecting your views
- Renewable energy credit analysis
- Identify basis risk for specific gas/power markets
- Defining commodity price risk

Energy technology analysis

- Solar, wind, conventional, distributed resources
- Energy storage and microgrids
- T&D equipment analysis

Nodal (LMP) analysis

- Detailed analysis of transmission system that considers line flows and load / generation at each node
- Historical locational pricing trends versus delivery hub trends
- Constraint, outage and congestion analysis impacting a potential project site
- Curtailment potentials based on market operations

Transmission analysis

- Transmission infrastructure locations and attributes
- Interconnection Queue positions
- Customization for site assessment reporting

Portfolio analysis

- IRP and request for proposal (RFP) analysis
- Expert system and resource optimization modeling

Unlimited hands-on training and more

Client training and support
What if I need help?

Velocity Suite clients get unlimited hands-on training (in person or through the web) at no additional charge. Request additional training as often as you like!

Support services range from using tools, understanding the content, or assistance from our experts on how data can be applied to your specific analyses – and there is never an additional charge.

Need a little more help? Make ABB part of your analytical staff! As part of your service, you receive an allocation of independent analysis hours so we can help you when you need it. These hours can be used to perform work within the Velocity Suite, research the industry for data that you need, or to create presentation-quality maps.

Good decisions require good data

Velocity Suite facilitates efficient, effective, quality decisions in Mexico's electricity market by enabling you to:

- Access market intelligence without having to switch between disparate applications and solutions
- Easily break down and assess complex and data-intensive industry problems, including geospatial analysis
- Access an extensive breadth of energy market data, leveraging pre-built data relationships

With ABB Ability Velocity Suite, you'll be ready for success in Mexico's wholesale electric power market!

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new.abb.com/enterprise-software/energy-portfolio-management
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