Automated Predictive Analytics for Energy, Electricity & Utilities Providers

Artificial Intelligence & Machine Learning
Open-Data & Big Data Correlation
Predictive Analytics
unique factor of Competitiveness!

**Companies are spending big on big data**

- **Energy** -> SmartGrids
- **Telecom** -> IoT
- **Finance** -> Trading

Source: Bain & Company
Insight Analysis 2015
Energy Transition needs Predictable SmartGrids

Energy Transition : Versatility & Volatility

- Volatile & distributed Renewable Energy Sources
- Volatile & Mobile new consumption use case
- More new Players & tariffs in an Open Market
- End-User/Customer control & engagement (demand/response & load shifting)

Predictive Analytics enabling SmartGrids :

- Integrated flexible Macro & Micro SmartGrids
- Self Configure, Monitor & Heal
- Automated Optimization
Automated Predictive Analytics: key enabler of SmartGrids

- Energy Production & Consumption forecast for capacity Planning & (im)Balancing
- Automate by anticipation of volatile external factors (eg. weather, calendar, tariffs major events, ....)
- Deliver control & flexible capabilities to ‘engaged customers’ & demand/response

Load & Supply Forecast @ each SmartGrid node
Automated optimization with dynamic reconfiguration
Predictive Maintenance & Anomaly Anticipation
Predictive Layer Platform

Time Series, Automated, Open Data, Predictive Services

Open Data
Influencing signals

SmartGrid Management Services (EMS/SCADA)

Forecasting:
- Time Series
- Network Load
- Incidents & Anomalies

Energy Trading
- Purchase & Hedging

National imbalance Markets
(Day-Ahead)

Production

SmartGrids
Predictive Layer Platform

- Automated Prediction Platform with Vertical Focus: Energy & Finance
- Enrich Customer Big Data with exogenous OPEN-DATA sources
- Enabling Predictive & Prescriptive Analytic and Automation

Your Big Data & KPI

Open-Data

Predictive Layer

Predictive Forecasts
Energy, Transport
Products & Services

Machine Learning

Automated

1-7 Days Prediction

List of Next Incidents

Predictability
Predictive Layer

Improving existing Forecasting Systems

Combine the best of all worlds with automated modeling!

Insert automatically into existing SmartGrid EMS & Trading platform to automate selection and combination of the best models and external influence for each evolving context.

- System Big Data
- Existing Models
  - Parametric
  - Regression
  - Physical Models
  - Conso or Prod.
- Open-Data

Predictive Layer

- 1-7 Days Prediction
- List of Next Incidents
- Risk Control Policy
- Accuracy & Volatility Manager

Automated SmartGrid EMS or Trading

EMS/Trading Quality & Risk Management
For Energy & SmartGrids

- Consumption & Production forecasts
  - Aggregated Consumption Forecasts
  - Renewable Energy Production Forecasts
  - Predictive Maintenance of distribution network

- Energy Management – B2B & Residential
  - Consumption Forecast
  - Savings/ Environmental Recommendations
  - Smart Building Anomaly Detection
  - Enabling Demand Response

- Energy Trading
  - Realtime Adjusted forecasts
  - Electricity Market forecast Day-Ahead, H+6
  - FUTURE Contracts Purchase & Trading
LDC/DNOs & Large Consumers: Optimize Electricity Planning & Purchase
Day-Ahead forecast & Intraday EPEX Continous market
Next Day-Ahead Forecasts
Next Hours Forecasts

Allowing Optimized Purchase Strategy on EPEX Market
Renewable Energy production plants are volatile and complex to predict. Volatility brings specific challenges in the access distribution network. Predictive Layer Crystal learns AUTOMATICALLY how to predict consumption/production in different points of the smart grid, allowing automated piloting of sources of storage and classic energy production plants. Automated correlation of multiple weather measurement points bring accuracy and reliability.

Prescriptive Analytics:
- SmartGrid Real-Time Piloting
- Short-Term Power Planning
Automated forecast of SmartGrid power load @HV Transformers serving Group of Buildings + Industries

'Poste Source' - Total Power - H+24:00 - H+48:00

Forecast Overload:
- Anticipate accelerated aging
- Plan exchanged Power
- Anticipate reconfiguration to manage overload

Automated modeling allows accurate dynamic piloting of multiple points of exchanges between transport and distribution networks (DLC/DNO)
Predictive Maintenance for Utilities
with Temporal Profiling of Incidents

- Profiling & Correlation of Network Incidents with Equipment Profiles & Status
  Network Load & SmartGrids Topology

- Anticipation of Future Incidents to allow:
  - Maintenance Resource Planning
  - Preventive Equipment or Network upgrades
  - Optimization of Process for Incident correction

Predictive maintenance Action plan
- upgrade now aged equipment
- upgrade now aged cable/interconnection
- Increase on duty team to react in due time
- Switch maintenance ops on node A & B
Energy Customer Engagement Platform
Churn Management and Up/Cross Sell

- Automated identification & profiling of future churners
  - based on service history and exogenous influential data
- Loyalty Campaign Management
- Risk & Threat Management Platform

Residential Customer Churn & Loyalty Management

Select Probable Churners

Profile Segment of Probable Churners

Loyalty Incentive Selection
- Communication about consumption & pricing relevance
- Recommendation of saving behavior
- Special pricing for extra saving

Loyalty Campaign Manager
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