

ICC Docket No. 16-0259

**Commonwealth Edison Company's Response to
The People of the State of Illinois ("AG") Data Requests**

AG 6.01 - 6.28

Date Received: May 18, 2016

Date Served: June 7, 2016

REQUEST NO. AG 6.26:

(Cloud Computing) Please indicate if the Company is aware of data analytic programs underway or contemplated by its affiliate utilities, Baltimore Gas and Electric (BGE) and PECO. If so, please provide a summary of data analytic activities currently underway and/or planned at the Company's affiliate utilities. If not, please explain why not.

RESPONSE:

ComEd objects to this request on the grounds that it seeks information about its affiliate utilities that is not relevant to the costs at issue in this Formula Rate Update proceeding. ComEd further objects to this request to the extent it requires ComEd to produce information that is solely in the possession of its affiliates or that is otherwise not in ComEd's custody or control. ComEd also objects to this request to the extent it requires ComEd to produce information of affiliates that is not directly related to ComEd operations. ComEd further objects on the grounds that the undefined term "data analytic programs" is vague and ambiguous. Finally, ComEd objects that this request is overly broad and unduly burdensome as data analytics tools are not researched and managed by a central department at ComEd but rather by subject matter experts in different functional areas. Subject to these foregoing specific objections, and to ComEd's General Objections, ComEd responds as follows:

ComEd defines data analytics as the tools and techniques used to understand and forecast business outcomes by analyzing the relationships among data.

Potential business intelligence and data analytics opportunities and initiatives have been, and remain today, under study across multiple departments at ComEd, BGE, and PECO. The number, scope, and nature of such data analytics activities make providing a "summary" impractical in the time period allotted for this response. Examples of data analytic programs underway at ComEd and potentially at its affiliates include:

Business Intelligence and Data Analytics (BI/DA) - A system of tools and technologies that fit together to assemble, transform, display and analyze data collected from a variety of sources. Please refer to the attachment labeled as AG 6.26_Attach 1 for a summary of the BI/DA program.

ComEd AMI Operations and Revenue Protection are using Operations Optimizer (formerly Detectent) software and algorithms to monitor the health and performance of the AMI network and related equipment, examine meter outage events and last gasp messages, meter alarms, meter voltage levels to ensure safe and regular levels at the customer premise, and to ensure the accuracy of billing data to prevent inaccurate bills to customers, among other analytics metrics.

Data Analytics: Putting Smart Grid Data to Work

Carol Bartucci

CIO ComEd

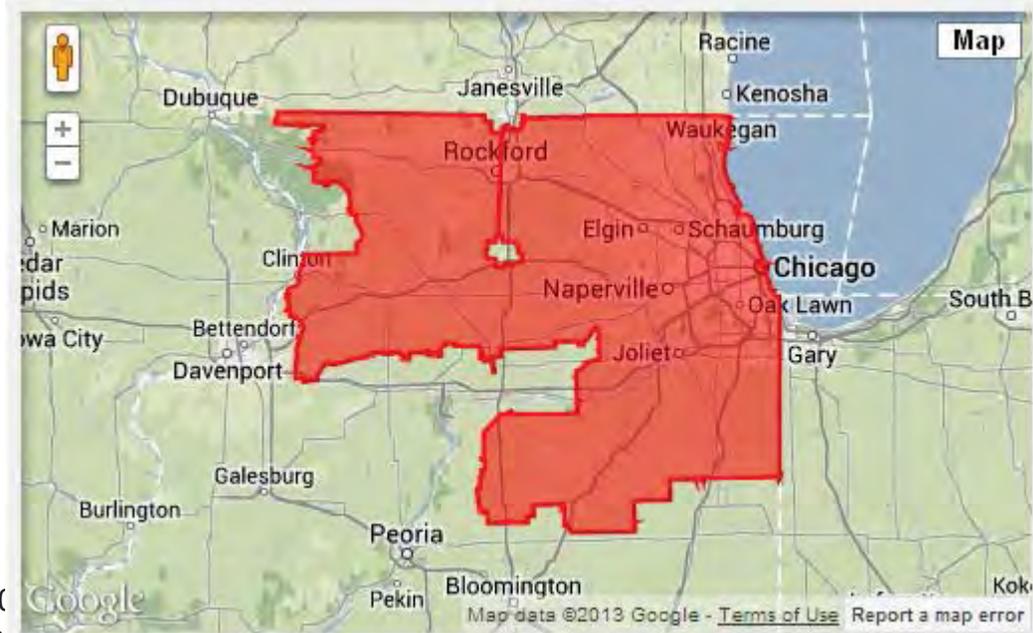
VP IT Exelon Corporation

Exelon

- ComEd
 - Electric Utility in northern Illinois, includes Chicago
 - 11,000 square miles urban and rural

- Exelon
 - Business Units
 - Generation
 - Utility
 - Retail/Commercial
 - Business Services

- Exelon Utilities
 - ComEd: 4M meters
 - Peco: 1.6M electric, 500k gas meters; 2,100 sq. miles
 - BG&E: 1.25M electric, 650 gas meters; 2,300 sq. miles
 - PHI: ACE, DPL, Pepco



Context and scope of BI/DA strategy at Exelon Utilities

Problem / opportunity statement

Context...

Rapid industry evolution requires us simultaneously to optimize performance, transform the utility business model and cultivate new sources of revenue. Mastery over business intelligence and data analytics related to performance and evolving markets will be a competitive advantage.

At the same time, the state of the BI/DA market is extremely fluid, there are no clear winning technologies or solutions across the utility industry and the operating and governance models used in the industry are immature. This places a premium on BI/DA strategies that offer optionality.

... and problem/ opportunity statement

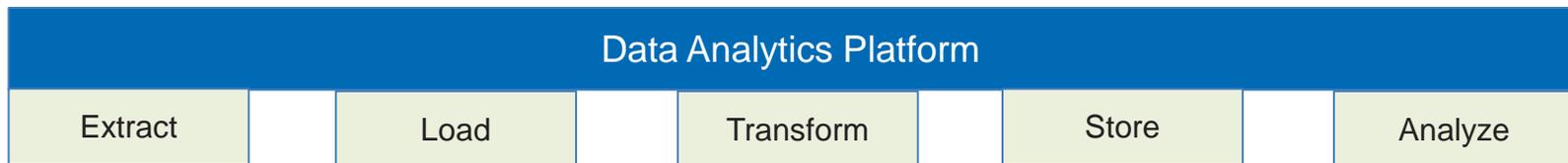
The advancement of technology solutions and products around data analytics combined with the deployment of smart meters provides the Exelon Utilities with the ability to develop a business intelligence (BI) and data analytics (DA) strategy that can yield improvements in operational excellence and insights into the evolving utility model. What is the right approach (level of investment, sequencing, technical set-up, operating mode and level of convergence) across OpCos to realizing that value?

Guiding principles for EU BI/DA strategy

Principle	Examples
1 Ensure convergence and scalability	<ul style="list-style-type: none">• Implement BI/DA solutions that lead to convergence across OpCos• Design for future scalability of EU (e.g. across OpCos)• Ensure scalability of solutions with regards to data increase
2 Insist on clear net benefit	<ul style="list-style-type: none">• Evaluate solutions with regard to delivering clear net benefit across economic, regulatory, operational excellence (e.g. security, reliability) or customer benefit (e.g. CSAT)• Evaluate solutions for benefits across EU not single OpCo where beneficial• Select tools that bring value to end-user/are end-user friendly
3 Ensure technical flexibility and agility	<ul style="list-style-type: none">• Build modern technical stack that allows for expansion/optionality• Choose tools/solutions that enable rapid integration of new data and integration of new tools/BI techniques• Ensure to setup a solution that enables future use cases
4 Choose sustainable sourcing models	<ul style="list-style-type: none">• Maintain ability to exercise choice in vendor selection• Ensure EU has a set of critical BI/DA capabilities in-house, e.g. key data scientists• Ensure that EU keeps rights of data
5 Prioritize data management and quality	<ul style="list-style-type: none">• Prioritize foundational data management/quality over advanced analytics ("Data is the asset")• Keep ownership of data/possibility to access data
6 Assign clear accountability	<ul style="list-style-type: none">• Ensure clear business ownership, e.g. in BU or functional domain• Put in place an effective governance model (overall investments, technical decisions, prioritization etc.)
7 Optimize earning potential	<ul style="list-style-type: none">• Choose a licensing model over a SaaS model to maximize capital accounting treatment for long-term solutions
8 Prioritize security and privacy	<ul style="list-style-type: none">• Prioritize choices that ensure security of data, grid operations, etc.• Ensure solutions enable compliance, privacy (e.g. of customer data)

5 Functional Domains Within the Broader BIDA Initiative

	Grid (T&D)		Customer		Business support
	AMI	Grid (T&D)	Smart Energy Services	Customer Experience	Business support
Immediate (0-3 yr) use cases	<ul style="list-style-type: none"> Meter Malfunction identification Theft Detection Meter System AMI Performance Meter Deployment 	<ul style="list-style-type: none"> CVR /Voltage Outage (ex post) Outage (real-time) Asset Health (T&S) Asset Health (Dist) Grid Monitoring Switching Routine GIS Analytics Vegetation Mgmt Feeder Sizing 	<ul style="list-style-type: none"> Home Energy Reports (HER) Web Presentment Peak Time Rebate 	<ul style="list-style-type: none"> Call Center Effectiveness Channel Effectiveness Social Media Feed 	<ul style="list-style-type: none"> Crew Prep & Routing Credit & Collections Inventory Mgmt Remote Visualization Field Safety Analy. Vehicle Fleet Analy. Warehouse Mgmt
Intermediate (3-5 yr) use cases	<ul style="list-style-type: none"> Billing analytics 	<ul style="list-style-type: none"> Storm vulnerability analy. Phasor measurement Smart city applications DER Siting Microgrid planning Transf. load trends (sub) Transf. load trends (dist) Power quality assessment Smart street lights Smart EV charging stations 	<ul style="list-style-type: none"> Pricing optimization Advanced Demand response ("Smart Home") 	<ul style="list-style-type: none"> Communication effectiveness (segment.) Digital end-to-end retail processes (C&I) Load disaggregation & energy services 	<ul style="list-style-type: none"> Workforce Optimization Exception Workflow Analysis & Improvement Supplier Relations Analytics Liability Claims Root Cause Analytics Real Estate Mgmt Automation



The Data Analytics Platform is foundational to BIDA and will support all 5 domains and provides flexibility for future users and vendors

What Role does IT Play in Analytics Strategy?

IT Enables

Acquisition

Cleansing

Processing

Security/Privacy

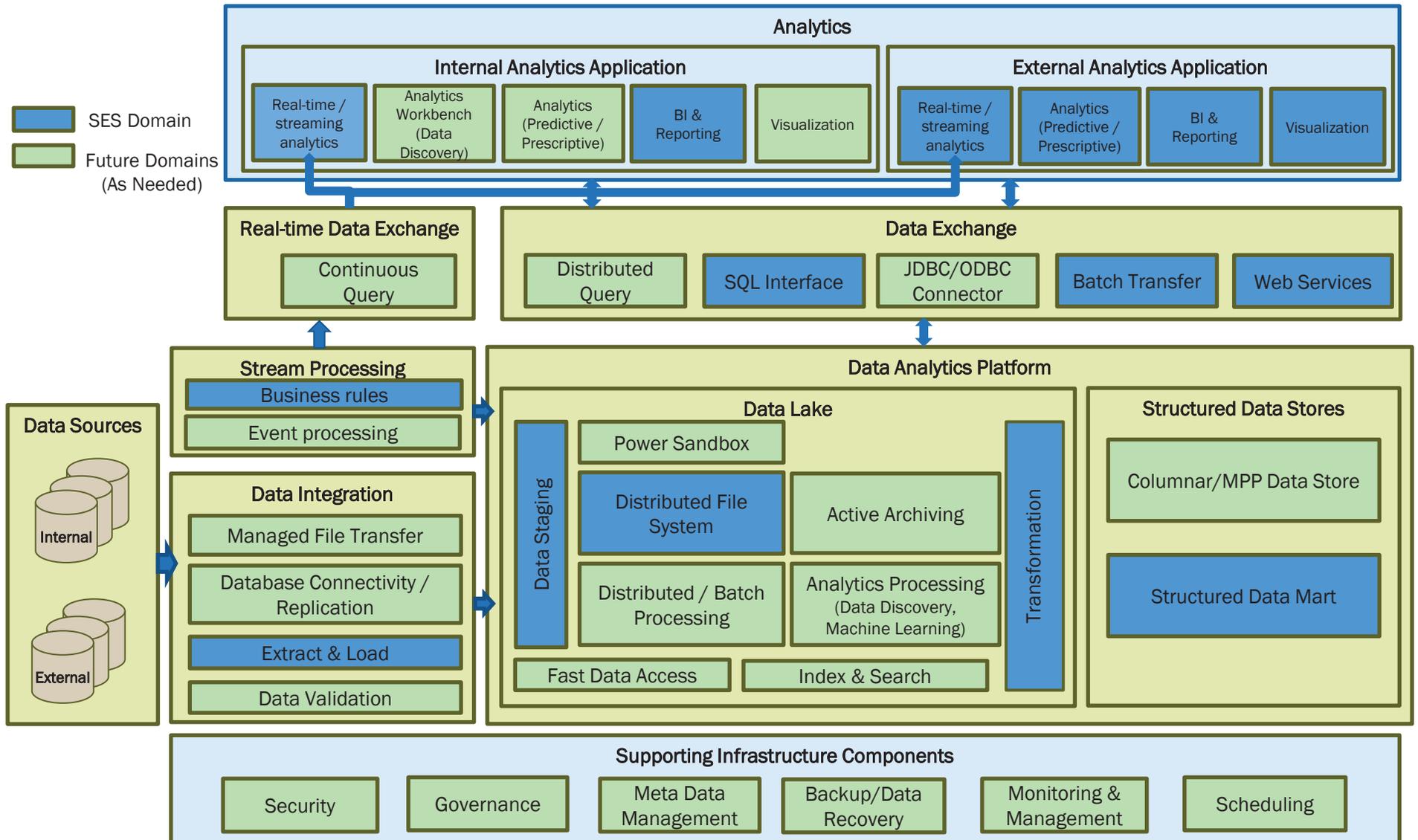
Exchange

Tools

Data Access

Scalability

EU BIDA Reference Architecture Capabilities for SES



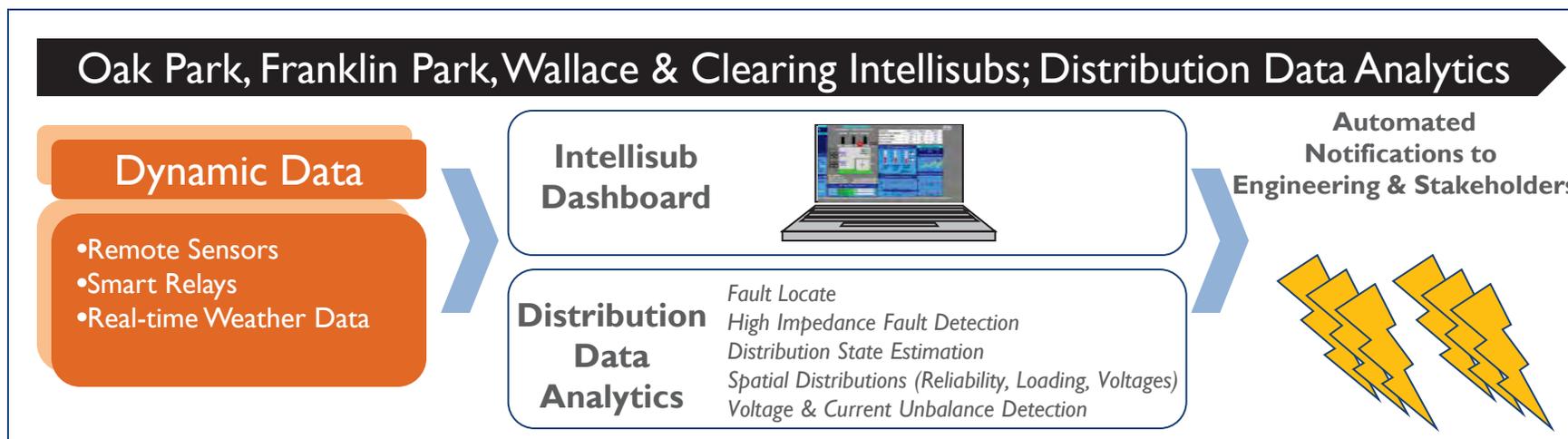
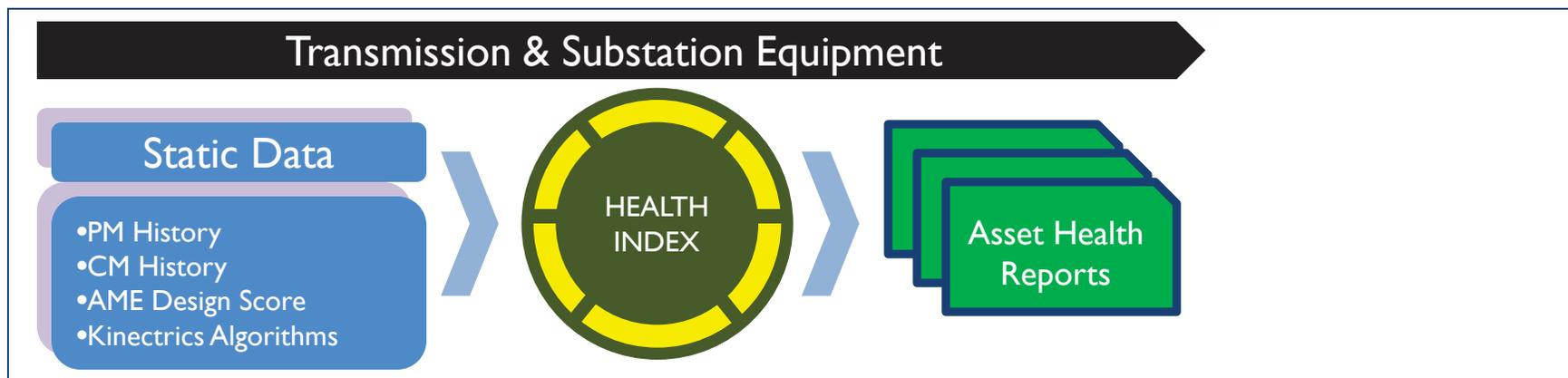
Challenges

- Network Communication
- Hosting Decision
- Data Storage
- Ensure Data is Clean
- Interfaces
- Acquisition from Multiple Source Systems
- Data access for varying user audiences

High-Level Use Case Descriptions of Select Use Cases

Use Case	Description
Asset Health Analytics (T&S)	Develop geo-spatial T&S asset risk / health score to move from a time and failure-based maintenance strategy to a condition-based maintenance and replacement strategy
Asset Health Analytics (Dist.)	Develop geo-spatial distribution asset risk / health score to move from a time and failure-based maintenance strategy to a condition-based maintenance and replacement strategy
Load Forecasting	Forecast bottom-up future demand for electricity, including DER forecast, to make informed investment decisions on purchasing electric power, load switching, infrastructure development, etc.
Gas Asset Analytics	Develop geo-spatial gas asset risk / health score to move from a time and failure-based maintenance strategy to a condition-based maintenance and replacement strategy
Smart Street Lights	Use data from sensors in street lights in cities and municipalities to manage the usage of street lights and locate outages
Volt/ Var Optimization	Minimize reactive power by optimizing voltage / power consumption at customer level based on CVR / VVO analysis.
Switching Routine Analytics (planned outage)	Optimize switching configuration planning in preparation of planned outages
Outage Prediction	Predict potential outages based on momentary outage detection (e.g. from trees touching wires), resulting in increased reliability
Storm Response Analytics	Leverage third party weather models to forecast grid impact and resulting storm response
DER Siting Planning	Determine optimal sizing and potential location on distribution grid for distributed energy resources
Real Time Supply/ Demand Optimization	Effectively operate grid by analyzing and optimizing which tools (DR, DER and microgrids) to employ to mitigate the constraints
Scheduling Effectiveness Analytics	Improve scheduling effectiveness by analyzing key scheduling metrics (Schedule Attainment and Crew Utilization) and balancing internal resources vs. contractors in near-term
Crew Productivity Analytics	Improve crew productivity based on analysis of key field metrics (Yard time AM, Yard time PM, # of delays)

Current Asset Health Process



Gaps

- No integration between Static and Dynamic Datasets; Opportunity for leveraging dist. data
- Health Index is calculated quarterly and does not take into account system configurations
- Difficulty scaling current Intellisub Dashboard for utility-wide application

Recommendations

- Merge Static and Dynamic Datasets using Asset Health solution
- Leverage software solution to consolidate health scores for enterprise scaling & reporting

Key Elements of the “Next Generation” Asset Health Process

Business Intelligence Data Analytics

Distribution, Transmission & Substation Equipment

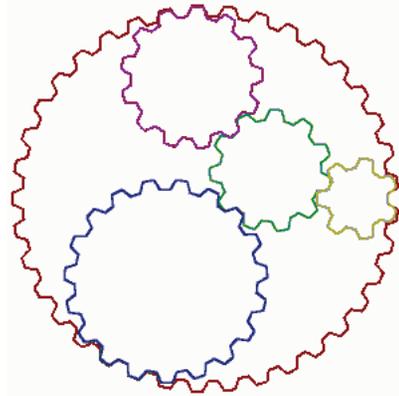
Static Data

- PM History
- CM History
- AME Design Score
- Kinectrics Algorithms
- Fault Trees
- Detailed Failure Mode Data

Dynamic Data

- Remote Sensors
- Smart Relays
- Dist. Automation Data
- Advanced Meter Data
- Real-time Weather Data

Asset Health Solution



Real-Time Health Index



System Generated Health Reports



Data Analytics



Automated Notifications to Engineering & Stakeholders

Configurable Algorithms & Notifications

- Field Data Collection (Tablets)
- Material Re-Use
- Field Root Cause Analysis

TEPCO Hitachi Distribution Enhancement Project

Feedback Loop to Static Data

