



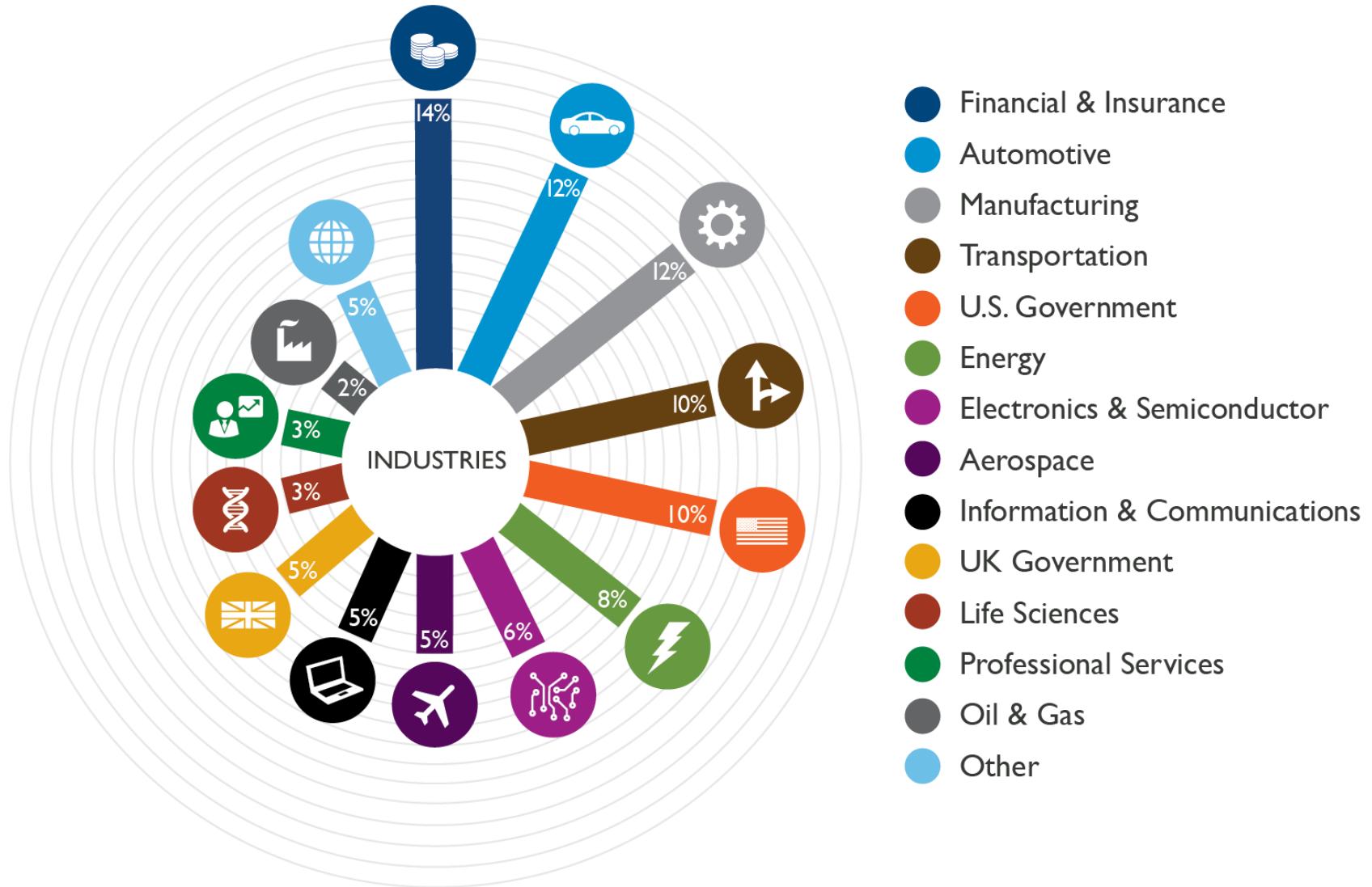
# EtaPRO<sup>®</sup> Performance and Condition Monitoring

July 12, 2018

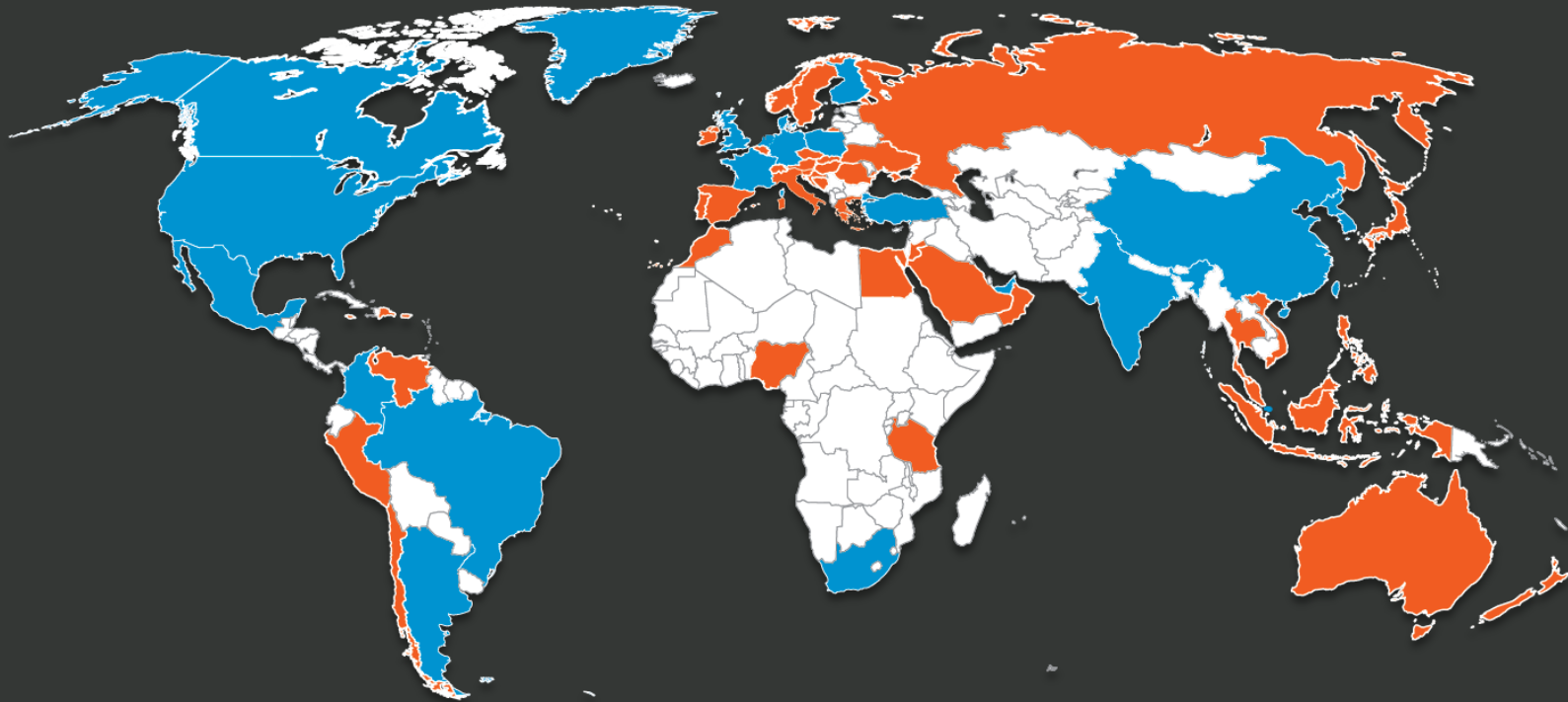


DOE/USEA - Big Data and Machine Learning for  
Clean Coal and Carbon Management  
Strategic Initiative Workshop

# GP Strategies Overview - Industries We **SERVE**



# Our GLOBAL footprint



## Our Office Locations:

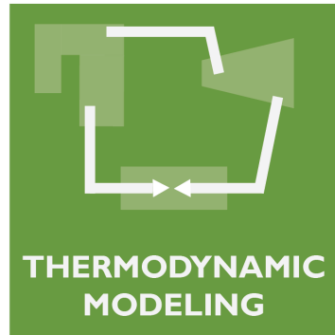
- |             |                        |
|-------------|------------------------|
| Argentina * | Korea                  |
| Brazil      | Mexico                 |
| Canada      | Netherlands            |
| China       | Poland                 |
| Colombia    | Scotland               |
| Denmark     | Singapore              |
| France      | South Africa           |
| Finland     | South Korea *          |
| Germany     | Turkey *               |
| Hong Kong * | United Arab Emirates * |
| India       | United Kingdom         |
|             | United States          |

## Where We Operate:

- |                 |                      |                   |                          |                        |
|-----------------|----------------------|-------------------|--------------------------|------------------------|
| Argentina *     | District of Columbia | Italy             | Philippines              | Spain                  |
| Australia       | Dominican Republic   | Jamaica           | Poland                   | Sultanate of Oman      |
| Austria         | Egypt                | Japan             | Portugal                 | Sweden                 |
| Bahrain         | Finland              | Kingdom of Jordan | Puerto Rico              | Switzerland            |
| Belgium         | France               | Korea             | Qatar                    | Taiwan                 |
| Bogota Columbia | Germany              | Malaysia          | Quebec                   | Tanzania               |
| Brazil          | Greece               | Mexico            | Republic of South Africa | Thailand               |
| Bulgaria        | Guam                 | Morocco           | Russian Federation       | Turkey *               |
| Canada          | Hong Kong *          | Netherlands       | Saudi Arabia             | Ukraine                |
| Cayman Islands  | Hungary              | New Zealand       | Scotland                 | United Arab Emirates * |
| Chile           | India                | Nigeria           | Serbia                   | United Kingdom         |
| China           | Indonesia            | Norway            | Singapore                | United States          |
| Czech Republic  | Ireland              | Ontario           | Slovakia                 | Venezuela              |
| Denmark         | Israel               | Peru              | South Africa             | Vietnam                |
|                 |                      |                   | South Korea *            | West Indies            |

\* Registration in process

# Real-Time Asset Condition Monitoring



## OPERATIONS

- Controllable Losses
- Anomaly Detection
- Shift Reporting
- Trending
- Logging



## MANAGEMENT

- Plant Status
- Reporting
- WEB Client
- Trending



## ENGINEERING

- What-if Modeling
- Anomaly Detection
- Benchmarking
- Diagnostics
- KPI's



## MAINTENANCE

- Anomaly Detection
- Vibration analysis
- Alerts
- Reporting
- Diagnostics

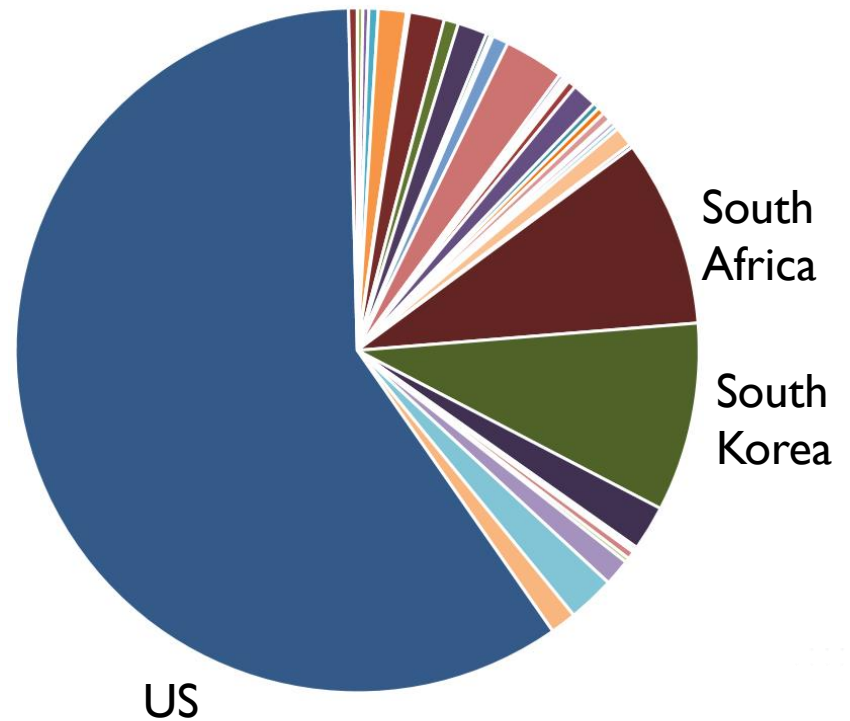
# EtaPRO® Installed Base

MW  
**515,000**

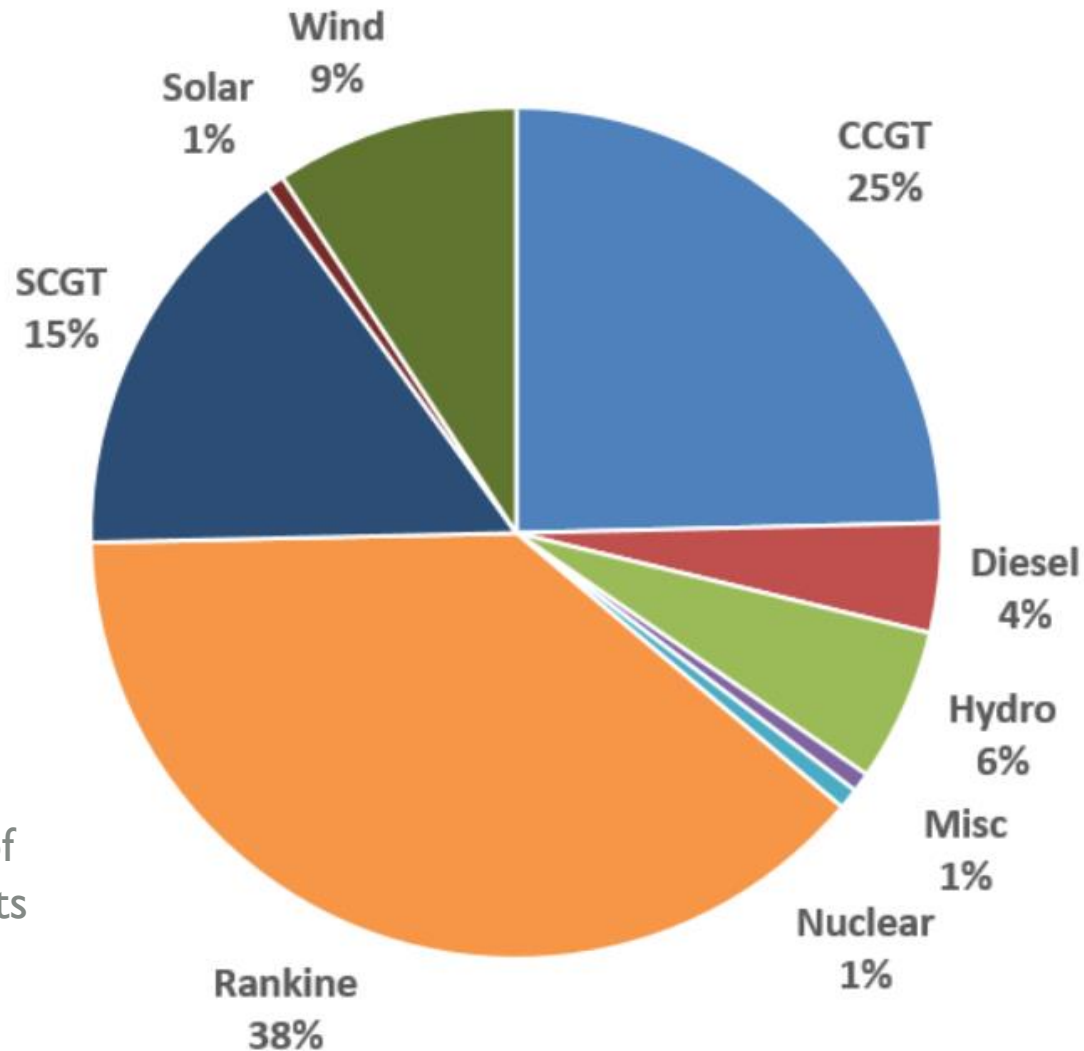
Countries  
**54**

Generating Units  
**1901**

- Algeria
- Argentina
- Australia
- Bahrain
- Brazil
- Bulgaria
- Canada
- Chile
- China
- Dominican Republic
- Egypt
- France
- India
- Indonesia
- Ireland
- Italy
- Japan
- Jordan
- Kuwait
- Malaysia
- Mexico
- New Zealand
- Northern Ireland
- Norway
- Oman
- Panama
- Philippines
- Qatar
- Saudi Arabia
- Singapore
- South Africa
- South Korea
- Spain
- Taiwan
- Tanzania
- Thailand
- The Netherlands
- Trinidad & Tobago
- Turkey
- UAE
- United Kingdom
- United States
- Vietnam



# EtaPRO<sup>®</sup> Installed Base - Generation Technology



Percentages are of  
Total Installed Units

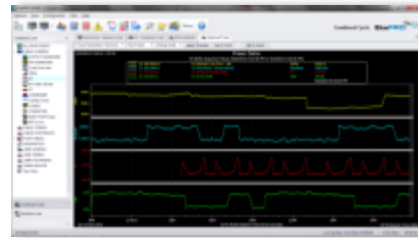


## Anomaly Detection through **A**dvanced **P**atter **R**ecognition

### Asset Sensors



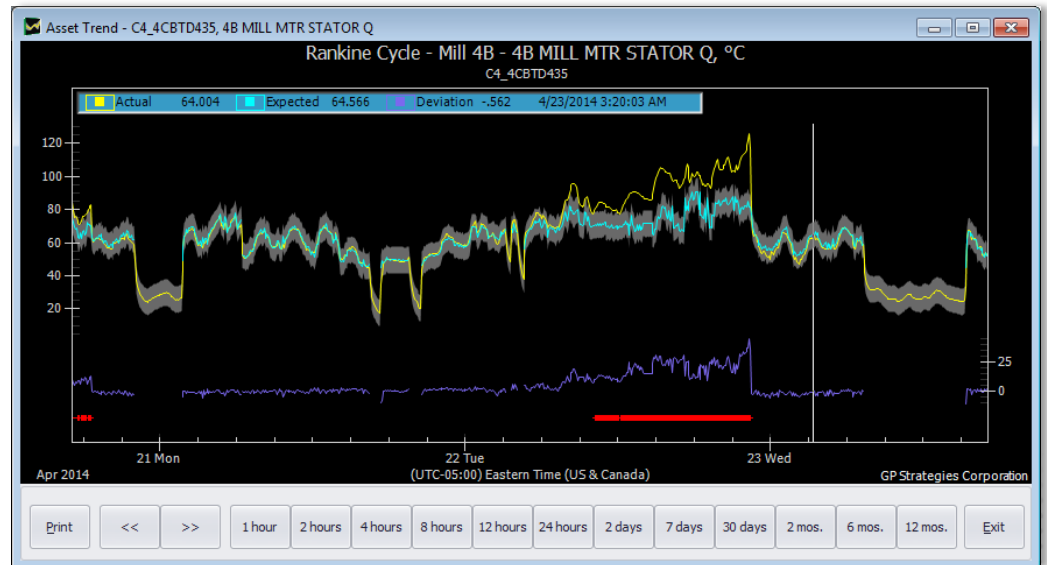
### History



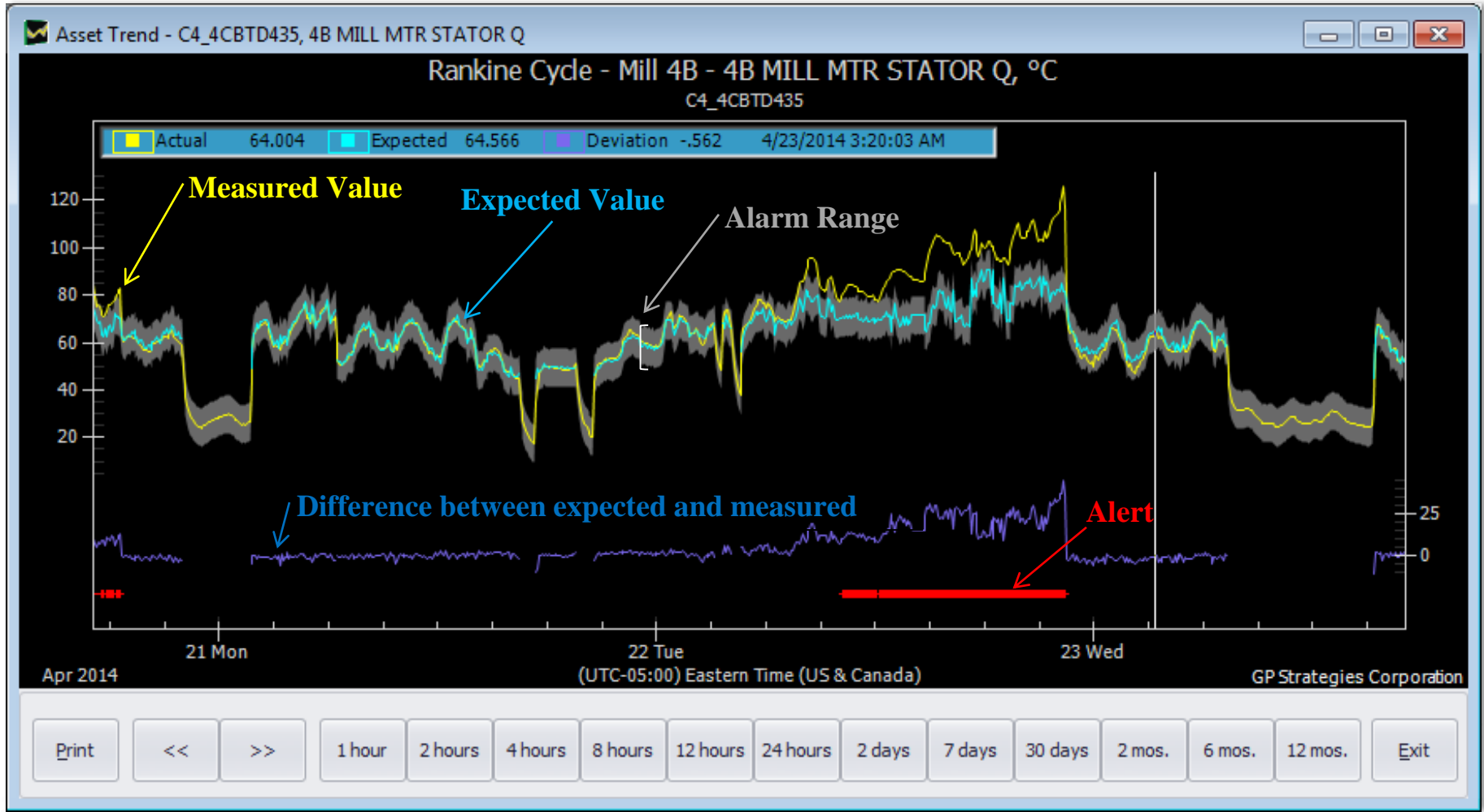
### APR Model



- Flows
- Pressures
- Temperatures
- Ambient Conditions
- Fuel
- Emissions
- Performance Calculations
- Other Sensor Data

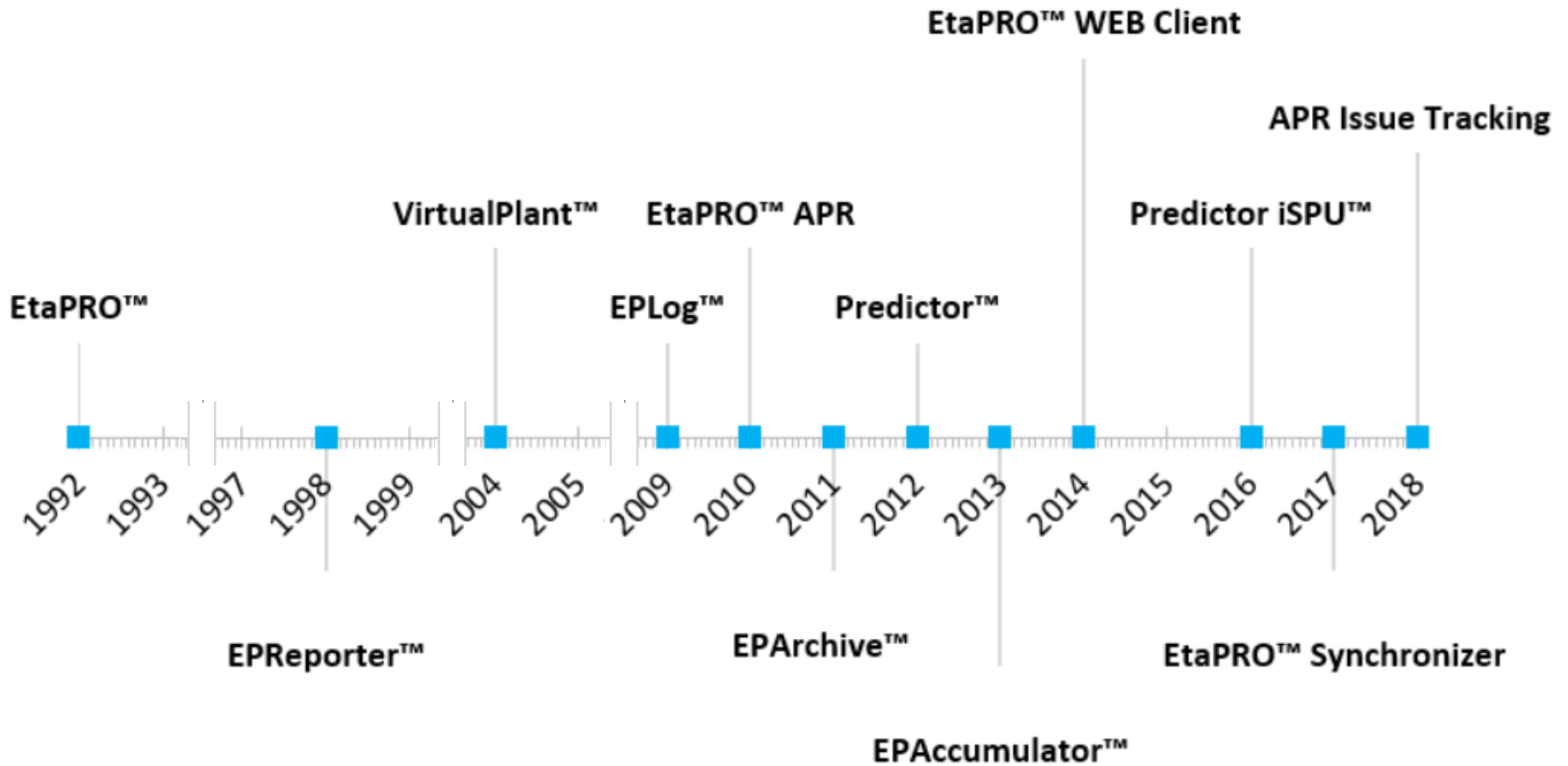


# Actual vs. Predicted Sensor Values





# EtaPRO<sup>®</sup> Evolution



# Moving to Cloud Computing

Cloud Paradigm	What It Is / Impact on EtaPRO
<p data-bbox="241 444 369 496"><b>IaaS</b></p> <p data-bbox="63 515 548 554">Infrastructure as a Service</p>	<p data-bbox="622 436 1904 561">IaaS is a cloud service that mimics networking hardware and devices. <b>EtaPRO 10.X runs in Cloud IaaS as is with no changes.</b> Examples: Microsoft Azure, Amazon EC2, IBM SoftLayer, and Google's Compute Engine (GCE).</p>
<p data-bbox="235 818 378 871"><b>PaaS</b></p> <p data-bbox="110 889 504 928">Platform as a Service</p>	<p data-bbox="622 808 1910 932">PaaS is a cloud service model where the Cloud is used to deliver a platform to users from which they can develop, initialize and manage applications. Examples: Toshiba Spinex, Siemens Mindsphere, GE Predix, C3IoT &amp; Uptake.</p>
<p data-bbox="235 1190 378 1243"><b>SaaS</b></p> <p data-bbox="110 1262 504 1300">Software as a Service</p>	<p data-bbox="622 1158 1872 1325">SaaS is a software licensing and delivery model where a fully functional and complete software product is delivered to users over the web on a subscription basis. <b>GP will utilize a combination of SaaS and PaaS for delivering turnkey EtaPRO solutions and engineering services.</b></p>

[gpstrategies.com](http://gpstrategies.com)

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