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POWER & UTILITIES





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Elevating Combined Cycle Thermal Performance

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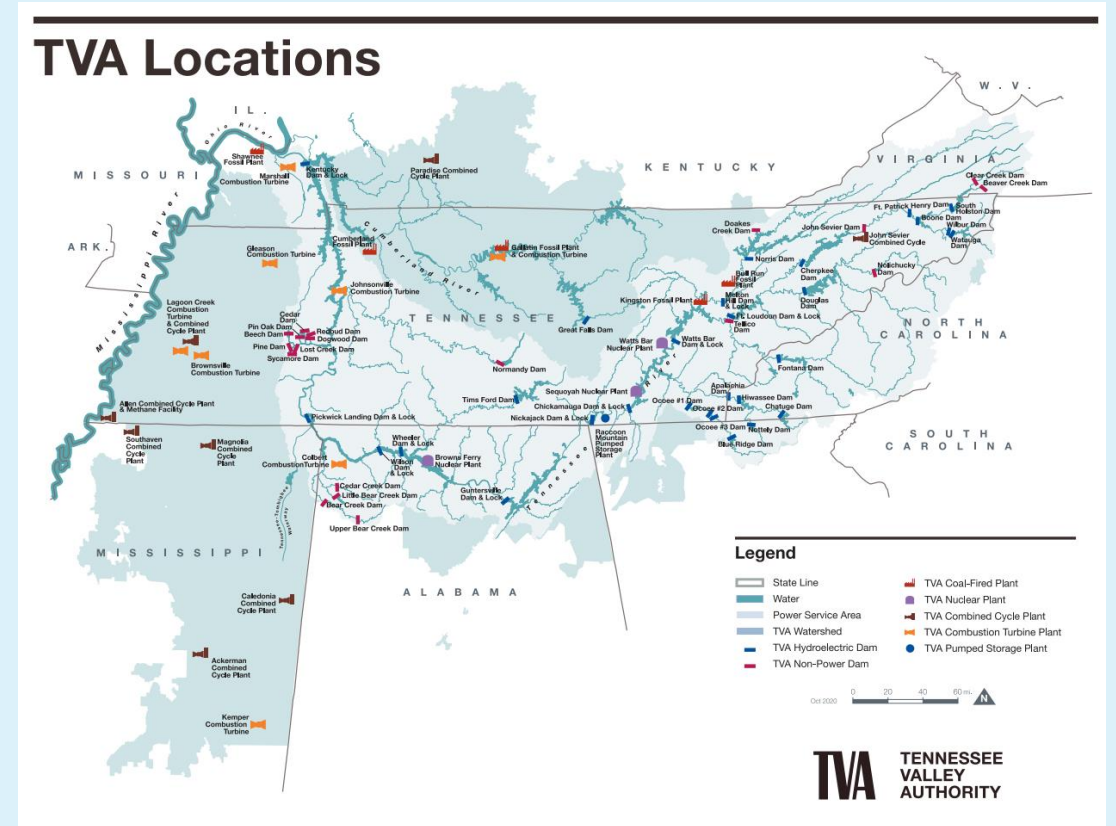
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Introduction

- About TVA
- Challenges Overview:
 - TVA undergoing enterprise transformation, load growth, price pressure
 - Cost savings are vital, optimizing combined cycle performance offers an opportunity
 - Gas turbines/combined cycles are complex, equipment owners want simple, accessible and actionable information

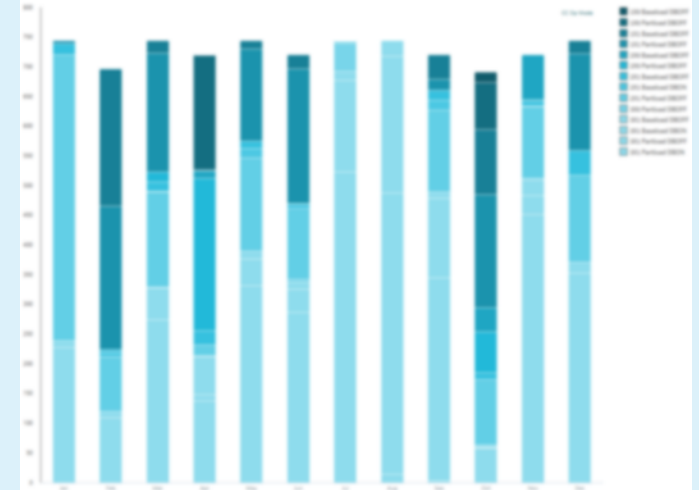


TVA 7 state territory with generating and non-generating assets



Data Accessibility & Collaboration

- Challenge:
 - EtaPro® reporting and graphics separate system, only a subset of historian data
 - No equivalent visualizations and modelling for rest of historian data
 - No environment for other analytics
- Solution:
 - ETAPro® data in historian brings all data into Seeq
 - Filter and calculate on top of data to distill down to actionable information
 - One environment for reporting, highly automated/scalable
 - All users can get access to relevant info through one system

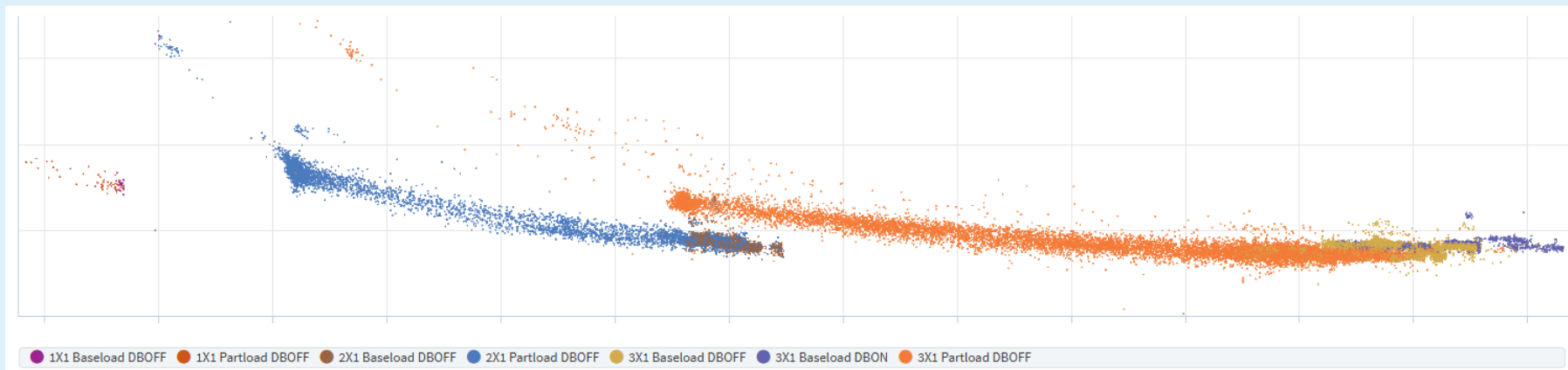


Example Reporting



Automating Routine Tasks

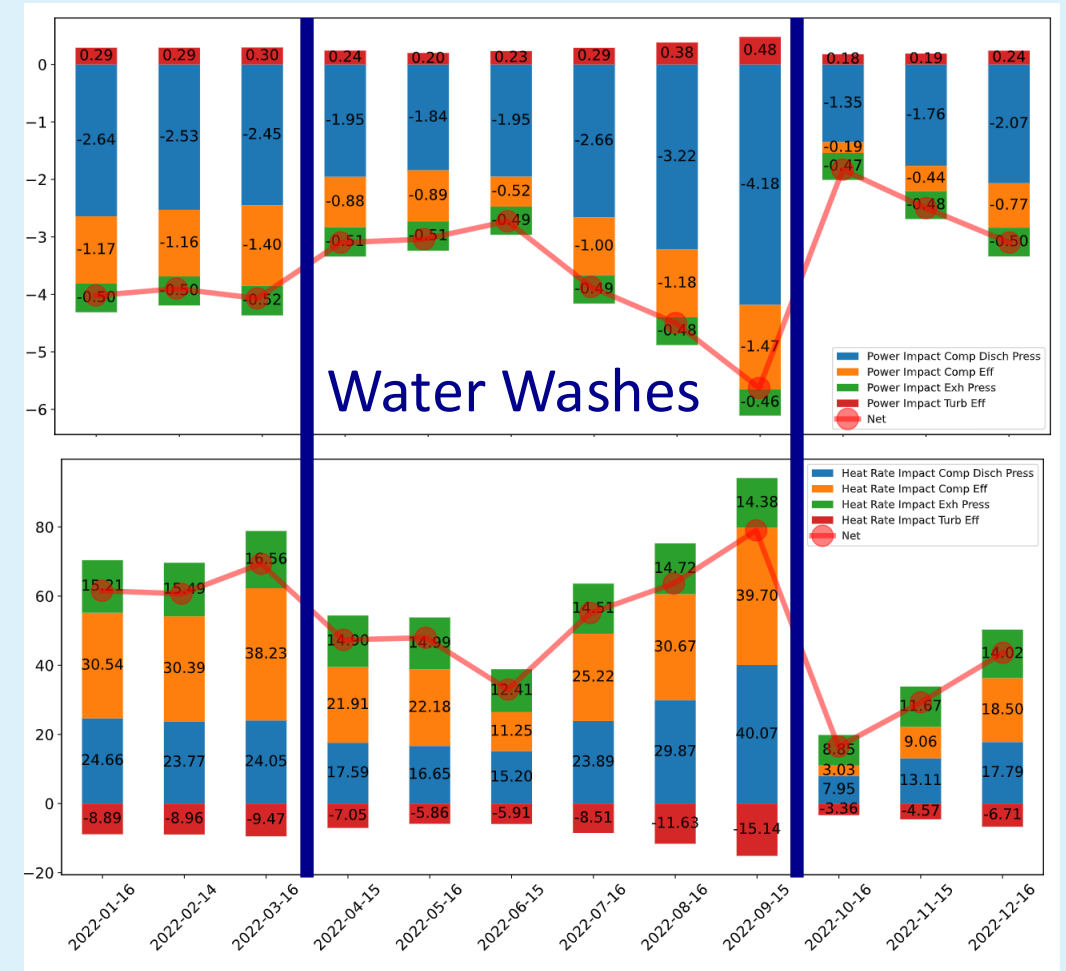
- Challenge:
 - Extracting operating characteristics (e.g. dispatch curves) from data is usually a very manual process of pulling, filtering and fitting the data
- Solution:
 - With all data in one source, analysis of the data can be automated with Seeq
 - Custom conditions for advanced filtering, better handle edge cases
 - Can be run on a schedule such that the whole end to end operation is automated



Example: automating filtering for dispatch curve generation

Advanced Analytics: GT Performance Model

- Challenge:
 - No system to host more complex custom analytics needed for improving operations
- Solution:
 - With all data in historian, information can be brought into Datalabs via Seeq
 - Hybrid physics based & ML approach to gas turbine thermal performance
 - Custom visualizations available within the tool via add-in architecture



Power and Heat Rate Degradation Breakdown

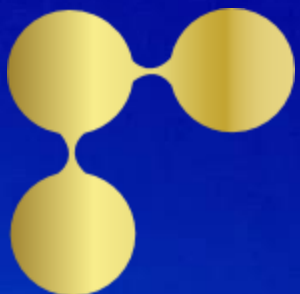


Q&A

- Suggested Discussion Topic
 - How many of you have similar data problems/What are you doing to address?
 - Is everyone coming into Seeq to view reporting or are they mainly getting PDFs?
 - Other experiences with integrating datalabs/custom visualizations/add-ins?

Conclusion

- Front end effort is extensive, but results are usable and maintainable
- Effort is ongoing, but user feedback has been positive
- Ongoing developments in Datalabs and add-in architecture are making integration and utility tighter, though there is a learning curve for developing in it.

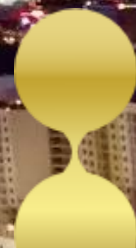


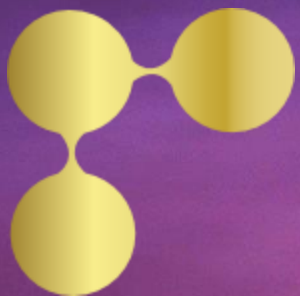
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Questions?





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THANK YOU!

