Northwest **Power** and **Conservation** Council

October 3, 2017

MEMORANDUM

TO: **Council Members**

FROM: **John Ollis**

SUBJECT: GENESYS Redevelopment Update

BACKGROUND:

Presenter: John Ollis, Power System Analyst

Summary: First prototype of redeveloped GENESYS delivered to Council staff by PSR on September 30, 2017, on schedule, and up to specifications. Council staff and PSR have collaborated over the last 6 months to create prototype and scope out future enhancements to GENESYS. This project is on track for delivery by September 2018.

Relevance: The GENESYS model is the primary analytical tool the Council uses for understanding the impacts of changes in the hydroelectric system's operation on the regional power system. The Council has recognized a need to redevelop the model, and to complete the redevelopment in time for use in developing the next regional power plan and fish and wildlife program.

Workplan: A.5 Complete Redevelopment of GENESYS

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Background:

The GENESYS model is used by the Council, Bonneville Power Administration and some utilities, to assess resource adequacy. It does this, in part, by simulating the operation of generating resources, including the operations of the Northwest's hydroelectric facilities, over thousands of varying conditions, in order to determine the likelihood that a future year's power supply will be inadequate. GENESYS is also used to assess resource cost-effectiveness, to evaluate the effective load carrying capability of variable generation such as wind and solar, and to provide estimates of the power system impacts of potential climate change scenarios. In addition, GENESYS is used to assess the impacts and costs of non-power related constraints on the regional power system, such as timing and flow restrictions at the dams implemented to benefit anadromous fish.

The Council commenced with the redevelopment of GENESYS with PSR because it is a critical part of the Council's process of developing a regional power plan, performing regional adequacy assessments and providing other analyses that assist the Council in carrying out its obligations under the Northwest Power Act. The existing model has components and file structures that are decades old. The software code is being brought up to current standards and the data management capabilities and graphical user interface are in need of updating. In addition, the Council and PSR are planning enhancements to the model such as improving the simulation of hourly hydro capability; incorporation of reserves into an optimized dispatch to reflect the interaction between assignment of reserves and other system capacity obligations; improved market representation to reflect the trade-off between decisions made for economics and adequacy; and inclusion of fuel accounting and forecast error to represent limitations on operators in dispatching the system.

More Info:

PSR Workplan

GENESYS Redevelopment Update

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Generating Resource Data
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"Create Time","return SystemTime"
"Database File:","insert DB name here"
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"NProjects",377
*****************************************************************
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"PrimaryNode","PNW East"
"SourceDType","Thr"
"SourcePType","Hyd"
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"Retire Date",#2051-01-01#
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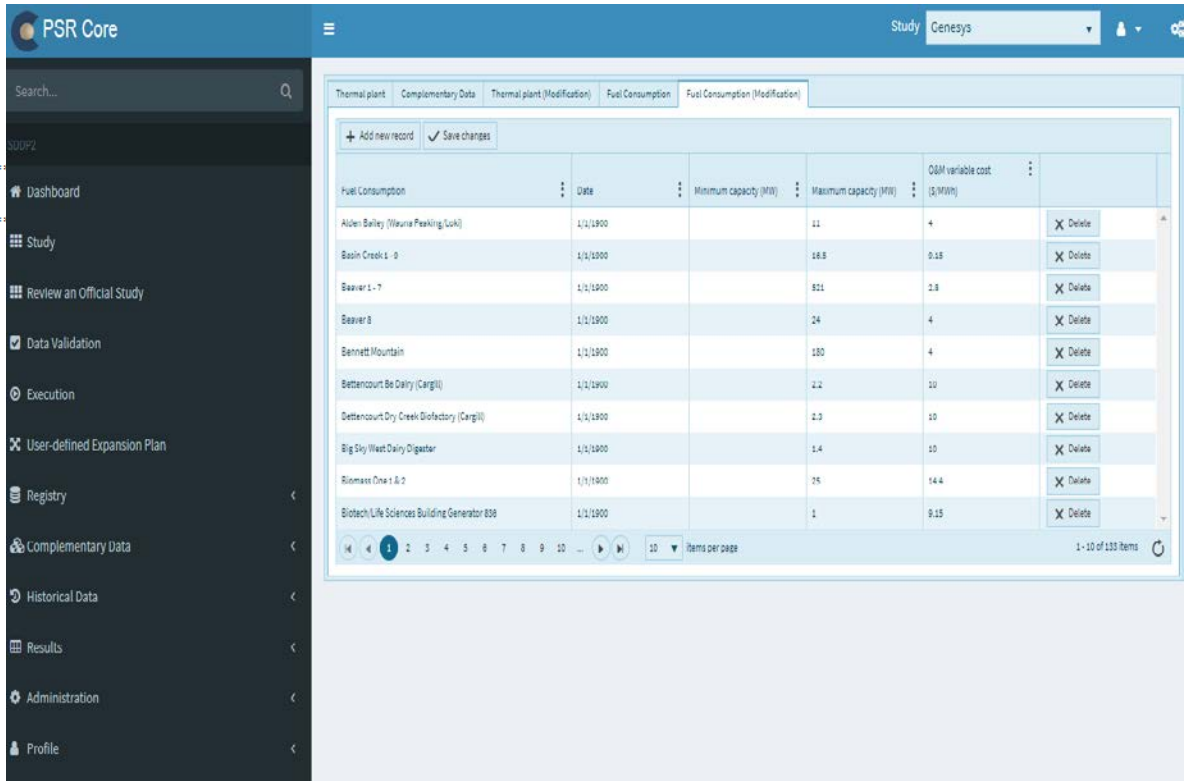
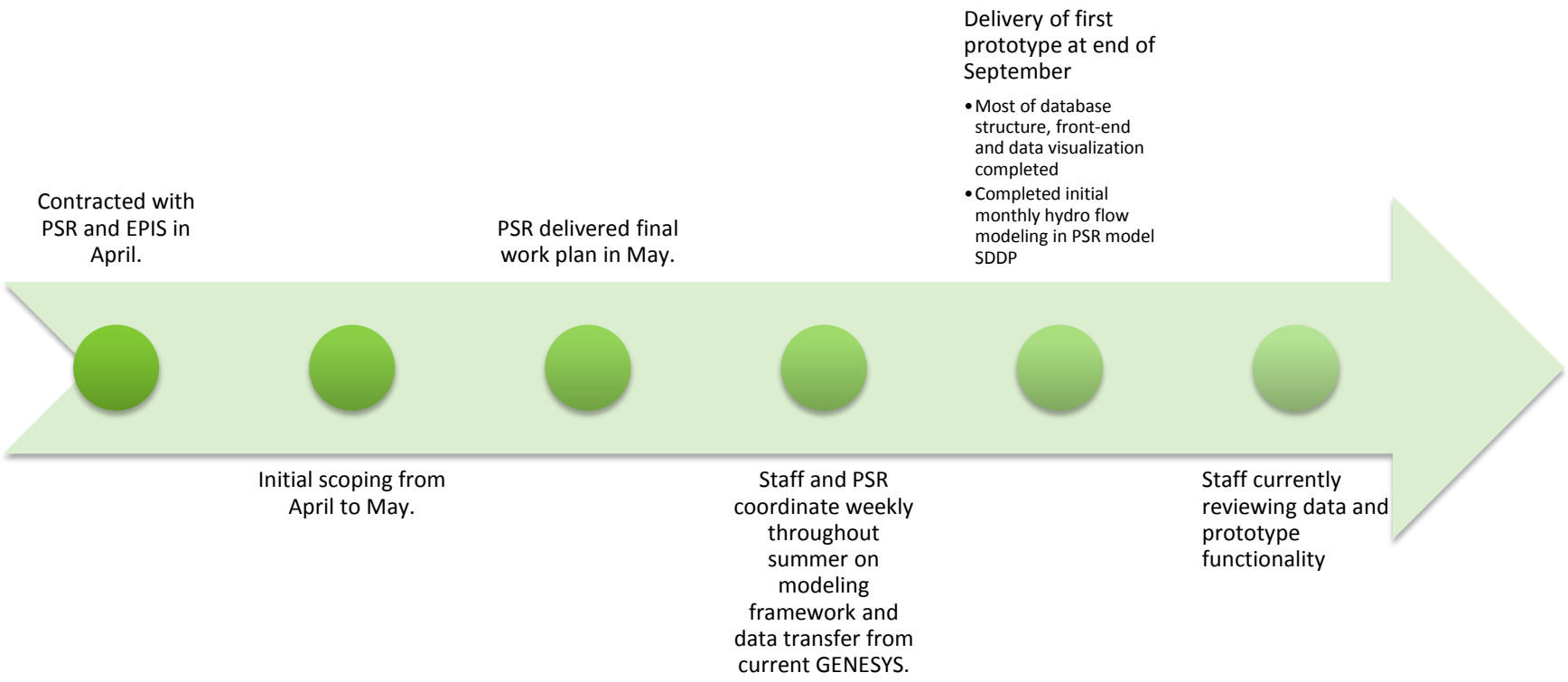


Power Committee

Tuesday October 10, 2017

2017 Timeline Review



Process So Far

- Staff, PSR and EPIS meet weekly to discuss data issues and review modeling updates.
- PSR has multiple teams working on different aspects of project.
- EPIS primarily helping with external to the region market modeling simplifications and transmission topology questions

Next Steps

- Integration with HydSim
  - Monthly hydro regulation model used by BPA
- Coding of Unit Commitment stages
  - Weekly and Hourly
- Second Prototype delivered in early January 2018
  - Incorporate unit commitment and true-up stages
  - Data validation feature
- Stakeholder and staff testing/feedback starts in January 2018, and continues until redevelopment complete.
- Third Prototype delivered at end of April 2018
- Redevelopment completed Summer 2018