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September 6, 2023

DECISION MEMORANDUM

TO: Council members

FROM: John Ollis
Manager of Planning and Analysis

SUBJECT: GENESYS License and Maintenance

PROPOSED ACTION: Staff recommends authorization to contract with PSR Soluções e Consultoria em Energia Ltda (PSR Energy Solutions and Consulting Ltd) in an amount not to exceed \$183,000. This includes \$120,000 for renewal of the GENESYS model software license and software maintenance and technical support and \$63,000 for the OptGen module for the 2024 fiscal year.

Use of the OptGen module is new. At the September meeting, staff will be first discussing with the Power Committee the staff's recommendation that the Council begin using PSR's OptGen module as a capital expansion and resource optimization tool. The staff recommendation here to contract with PSR for a total amount that includes the OptGen module is conditioned on the Power Committee and then the full Council agreeing with the staff recommendation to begin using OptGen.

SIGNIFICANCE: The GENESYS model is a key quantitative tool used in the Council's power planning process. Historically, it is the primary tool used to understand the impacts of changes in the hydroelectric system's operations on the regional power supply and to assess resource adequacy.

For FY24, staff is recommending that in addition to renewing the license for the existing tool, the Council add the OptGen module to the GENESYS tool. These services will replace the Council's Regional Portfolio Model (RPM) with a new capital expansion and resource optimization tool. Staff believes this change is the best path forward for ensuring the modeling ecosystem is ready for the analytical needs of the next power plan.

BUDGETARY/ECONOMIC IMPACTS

For fiscal year 2024, staff recommends authorization to contract with PSR in an amount not to exceed \$183,000. This amount includes \$120,000 for the license of GENESYS and maintenance and technical support. It also includes \$63,000 for the first-year costs of the OptGen module (future year maintenance costs of the OptGen module will be \$24,000). Staff recommends OptGen as a replacement to the existing RPM model. Staff has budgeted for this full amount in the FY24 budget. (Note that the Council will also need to continue purchasing cloud computing time to minimize model run time. We will address that and other ongoing licensing and support needs for the power division technical work in a separate email to the members.)

BACKGROUND

The Council previously contracted with PSR to redevelop the GENESYS model with the intention of improving model usability and accuracy given the increasing complexity of the regional power supply. Since the initial development, PSR has maintained dedicated support staff to ensure that the GENESYS model enhancements would be timely to support plan work, adequacy assessments, and model development. Staff recommends contracting with PSR to renew the software license and for PSR's continued model maintenance and technical support services. With the continuation of the maintenance and support services through FY24, PSR will continue to update and upgrade the model, fix all bugs, and provide its technical support team for web-based meetings with Council staff, which will ensure the model's efficiency, functionality, and accuracy. Specific areas of model enhancement for FY24 include expanding analysis around the climate scenarios (a request from Bonneville and other stakeholders), developing functionality that will reduce modeling time (saving both staff time and money), and fuel accounting and improved forecast error.

In addition to renewing the license, staff is recommending adding PSR's OptGen module to GENESYS. This module would support using GENESYS for regional (and WECC-wide) capital expansion and portfolio optimization. The plan is to move towards using GENESYS for this analysis and replace the Council's existing regional capital expansion and optimization model (RPM). While the RPM was an excellent tool for its time, the changing dynamics of the power system require a different toolset. Over the last several months, staff have been exploring various options for meeting its analytical needs for regional capital expansion and optimization modeling. The options include enhancements to the RPM, leveraging the Council's Aurora model (which is used for west-wide capital expansion and price forecast studies), adding the OptGen module to GENESYS, or another capital expansion model available on the market to supplement our existing modeling suite. Staff compared these options in terms of price, functionality

relative to our future modeling needs, and staffing requirements. Based on this assessment, staff believe that adding the OptGen module to GENESYS provides the best path forward at this time. This addition brings the required functionality, builds off existing tools that are well understood by staff and have gained regional support, allows for good data sharing with utilities, and keeps our costs and resources at a similar level as today. The other alternatives explored either required significant cost and/or staffing resources to develop tools with sufficient functionality or did not meet all the functionality requirements sought for the next power plan.

ANALYSIS

Staff will present its full analysis and recommendation of OptGen to the Power Committee at its September 12 meeting. But to summarize further from the more detailed information presented to the Committee, in developing this recommendation, staff considered the following alternatives:

- **Enhancements to the RPM:** Staff could pursue enhancements to our existing RPM model such that it has the needed functionality to support modeling in the future. Staff estimates this would cost at least \$160,000 and require significant time and resources, likely delaying other important work and the start of the next power plan. Staff does not recommend this approach.
- **Using Aurora for In-Region Analysis:** The Council currently uses Aurora for its west wide capital expansion, market price studies, and marginal emissions analysis. Aurora has the capability to be used for in-region portfolio optimization, either with its own portfolio optimization tool or through a staff development optimization tool in R. Staff is familiar with Aurora's portfolio optimization tool and does not believe it meets the Council's needs for regional portfolio optimization. Therefore, staff does not recommend this approach. Staff is considering developing its own optimization tool in R as a back-up and support option for GENESYS with OptGen. This approach does not have all the functionality of OptGen, but it is low cost (aside from staff time) and low risk, and it will provide the Council flexibility to shift to this approach if the OptGen module ultimately does not meet our needs.
- **Developing an Alternative Model:** The Council specifically explored GridPath, an open-source capital expansion model. Staff were particularly intrigued by the open-source nature of this model, recognizing this is a good fit for the Council's work being done in the public eye. Staff ultimately decided to not recommend this model at this time as the resources required to ensure sufficient functionality and the staff time needed to develop and learn the tool were too large and would likely risk timely development of the next plan. Staff also considered other options, but these would have been replacements for more of the modeling suite (including GENESYS) and staff determined that this would be too risky at this time, although plans to continue to consider alternatives for future power plans.

ALTERNATIVES

The Council could decide to not renew the software license and maintenance and support services. This alternative is not recommended as it would jeopardize the functionality of the model, requiring significant staff resources and time to ensure model usability. These resources and staff time would delay our ability to complete the next adequacy assessment and prepare for the next power plan.

The Council needs a modeling solution for regional capital expansion and portfolio optimization, and staff recommends adding the OptGen to GENESYS as the best tool to meet our current needs. The Council could decide, however, to pursue an alternative to the add-on OptGen module. This could be one of the alternatives explored by staff or another tool altogether.