# Generating Resources – Draft Action Items

GEN-1 **Redevelop the revenue requirements finance model – MicroFin.** [Council Staff, Bonneville Power Administration, User Group]. Council staff, in coordination with BPA and a user group convened from interested parties of the Generating Resources Advisory Committee, should review and redevelop the revenue requirements finance model MicroFin, with a completed model in place by the Seventh Plan Mid-Term Assessment. The Council staff should develop a work plan to review the current version of MicroFin, identify technology needs in order to upgrade the model, and either perform the redevelopment in-house or outsource it via a request for proposals. The redevelopment should be completed by the Seventh Plan Mid-Term Assessment in order to have time to prep the model for the Eighth Power Plan. Council staff should convene a user’s group to help ensure the new model is user friendly and to help inspect the results.

MicroFin is the Council’s primary financial tool for developing levelized costs and RPM inputs for new generating resources and it is in need of redevelopment. The model produces accurate and useful results, however it is based on a legacy system that no longer fits the current Excel environment and is cumbersome to work with. An upgrade will allow for easier enhancements to be made to the model and an improved user interface. The new model will ideally be accompanied by a user’s guide that will ensure that it is easier to use as well as to share with the public.

GEN-2 **Update generating resource datasets and models.** [Council Staff]. The Council staff should review its various generating resources datasets, looking for opportunities to consolidate and streamline the data update process. This review and possible upgrade to a single system or dataset should be ongoing after the Seventh Power Plan, with completion in time for the Eighth Power Plan. The Council maintains and updates multiple sets of data on regional generating resources and projects, including:

* Project database – tracks existing and new projects in the region and their development and operating characteristics, generation data, technology and specifications, and various other data
* Renewable Portfolio Standard (RPS) Workbook – tracks generating projects and state RPS within WECC (with a focus on the Pacific Northwest) and forecasts future resource needs
* AURORA resource database
* GENESYS dataset

These datasets are important sources of information for many of the Council’s models and analyses. While currently maintained separately, they share much of the same information and there is an opportunity to streamline both the updating of data and the data sharing. The value in a consolidated data source would be to ensure that all of the models are using the exact same data and values and it would also reduce staff time spent updating and maintaining multiple datasets.

GEN-3 **Monitor and track progress on the emerging technologies that hold potential in the future Pacific Northwest power system.** [Council Staff, GRAC]. Council staff should continue to monitor on an ongoing basis the emerging technologies identified in the Seventh Power Plan as potential resources of the future regional power system. There are several emerging technologies which could play an important role in the operation of the future power system, including:

* Distributed power with and without storage (Solar PV, CHP)
* Enhanced geothermal systems (EGS)
* Offshore wind
* Wave and tidal energy
* Small module reactors (SMR)
* Pumped storage[[1]](#footnote-1)
* Battery storage

Council staff should track significant milestones in development, cost and technology trends, potential assessments, and early demonstration and commercial projects. Included in the analysis of the technologies is identifying any potential benefit the resource might provide during low water years. By monitoring these resources closely in between power plans, the Council will be prepared to analyze them and determine if they are viable resource alternatives in the Eighth Power Plan.

GEN-4 **Scope and identify ocean energy technologies and potential in the region, determine cost-effectiveness, and develop a road map with specific actionable items the region could collaborate on should development be pursued.** [Council, GRAC subgroup of experts].The Council will convene a subgroup of the Generating Resources Advisory Committee that includes regional utilities and other ocean energy stakeholders to a) scope out the emerging ocean energy technologies and identify the cost and realistic potential in the region, b) develop a set of regional priorities and action items needed should ocean energy development be pursued, and c) identify key regional players and reasonable and sustainable funding levels and sources.

 There are several ocean energy technologies that have significant technical potential in the Pacific Northwest, including wave energy and ocean thermal energy conversion. These technologies are still emerging and in various stages of the research and development phase. While there have been efforts within the region to pursue the research and development of ocean energy, they haven’t resulted in investments and projects to-date. The Council can help to foster better coordination of utility efforts across the utility community in collaboration with wave energy developers and other stakeholders to determine if there is regional interest in the development of ocean energy and outline necessary steps to pursue it.

GEN-5 **Research and develop a white paper on the value of storage to the future power system, particularly around pumped storage and battery storage.** [Council Staff, GRAC subgroup of Storage Experts]. Council staff should convene a group of subject matter experts to assist in the research and development of a Council white paper on the full value stream of storage and its role in a power system. Council staff should author the white paper with help from industry experts, or lead a request for proposals and select a consultant to write the paper. The white paper should be completed in 2018.

One of the potential constraints to extensive storage development is the ability of the developer to capture the full value of the storage system’s services and transform interest and overall system need into project funding. Some of the benefits of storage are reflected in the system as a whole, not just solely to a specific power purchaser or end-user, and therefore it can be difficult to raise funds for storage projects if the purchaser is not directly benefiting from all of the services, or is paying for a service that benefits others who are not also contributing funds. The white paper should clearly identify the issue and provide useful information that would be beneficial to the region’s decision makers and power planning entities.

GEN-6 **Track utility scale solar photovoltaic costs, performance and technology trends in the Pacific Northwest, and update cost estimates.** [Council Staff, GRAC]. Council staff should continue to monitor on an ongoing basis the costs and performance and technology trends of solar PV in the Pacific Northwest and update the forecast of future cost estimates as necessary. This should be done on an ongoing basis and with the assistance of subject matter experts from the Generating Resources Advisory Committee.

Solar PV is a rapidly evolving technology, both in terms of cost and performance. The Seventh Power Plan required development of a forecast of future solar PV costs. With continued uncertainty over solar installation costs and performance, updates to estimated installation costs and forecasts are required to accurately reflect the real world market. In addition, solar cell and inverter technology continues to change, which can impact performance. Detailed production estimates for many locations across the Northwest would also be useful.

GEN-7 **Track natural gas-fired technology costs and performance, and update as necessary, particularly around combined cycle combustion turbine (CCCT) and reciprocating engine technologies.** [Council Staff, GRAC]. Council staff should continue to monitor on an ongoing basis natural gas-fired technology costs and performance and technology trends in the Pacific Northwest, specifically concerning CCCTs and reciprocating engines. This should be done on an ongoing basis and with the assistance of subject matter experts from the Generating Resources Advisory Committee.

Natural gas-fired generation, particularly CCCT and reciprocating engine technologies, continue to evolve in terms of cost and performance and may play an important role in the future power system.

GEN-8 **Monitor new natural gas developments in the region and gauge the potential impact on the regional power system.** [Council Staff, GRAC, PNUCC]. Council staff should monitor and track on an ongoing basis new natural gas developments in the region (such as pipelines, storage, LNG export terminals) and determine the potential future impacts on the regional power system. A PNUCC subcommittee is following similar issues, which may offer an opportunity for collaboration.

New natural gas uses and system development in the region may impact future power generation. PNUCC is following similar issues, and may offer a collaborative opportunity. On-going Issues to track and potentially analyze include:

* Potential pipeline constraints, particularly on the west-side
* LNG facility developments in Canada and the West Coast of the U.S.
* Shale production from Canada and the U.S. Rockies
* Methanol plant development
* Natural Gas Vehicle (NGV) transportation

GEN-9 **Monitor current and proposed federal and state regulations regarding the impacts of generating resources on the environment in the Pacific Northwest and subsequent impacts to the regional power system.** [Council Staff, GRAC] Council staff should continue to monitor and track on an ongoing basis the current and proposed regulations regarding the environmental impacts of generating resources and the subsequent impacts on the regional power system in terms of cost and operation.

1. While pumped storage itself is not an emerging technology, its potential uses and benefits are changing and emerging to fit new generation challenges. It should be monitored along with the emerging technologies and assessed as an alternative to battery storage in the future power system. [↑](#footnote-ref-1)