

2016 IRP Update

Supply Side Resource Costs and Parameters

January 2018

Portland General Electric Company (PGE or Company) plans to file a focused Update to its 2016 Integrated Resource Plan (IRP) (Docket LC 66) in March. This update will comply with the Public Utility Commission of Oregon's (OPUC) IRP Guidelines. The Company will seek acknowledgement of updated supply side resource costs and operating parameters, financial parameters, carbon offset costs, and incremental wind and solar capacity contributions. In anticipation of filing the update, PGE is sharing updated supply side resource information as discussed below.

PGE based the 2016 IRP supply side resource costs and parameters on studies conducted by Black & Veatch and DNVGL in 2015. In 2017, PGE requested updated studies for the following six resources:

- Gorge Wind
- Montana Wind
- Tracking Photovoltaic Solar
- Combined-cycle combustion turbine (1x1 GE 7HA.01)
- Simple-cycle combustion turbine (1x0 GE 7F.05)
- Reciprocating engines (6x0 Wärtsilä 18V50SG)

The Company updated the fixed cost revenue requirement calculations to incorporate the refreshed resource studies, financial parameters, and carbon offset costs. The financial parameter update includes assumptions on PGE's corporate tax rate (revised to capture the December 2017 changes to federal tax law), return on equity, cost of debt, inflation, and the economic lives for the supply side resources. The carbon offset costs are estimated payments to the Oregon Energy Facility Siting Committee for natural gas resources. PGE updated these costs to capture both the increased offset rate from October 2017 and the new resource parameters.

The resource updates contain elements that both increased and decreased resource costs. For example, the overnight capital costs for the wind and solar resources declined, while the overnight capital cost increased for a gas-fired combined-cycle turbine. Similarly, a decline in PGE's allowed return on equity lowered the cost of capital while an increase in the assumed cost of debt and decrease in the corporate tax rate increased PGE's after-tax weighted average cost of capital.

PGE has posted the updated supply side resource cost studies and the additional documents described below on the Company's [IRP website](#) to allow stakeholders the opportunity to review the information in advance of filing. Additionally, PGE plans to discuss these inputs to supply side costs and the overall process and time line for the 2016 IRP Update at the upcoming Roundtable in February. PGE looks forward to discussing these updates with stakeholders at the meeting.

Files	Description
BandV_Thermal-SSO-Report.pdf BandV_Thermal-SSO-Tables_2017Fall.xlsx	Fall 2017 updated thermal resource study by Black & Veatch
DNVGL_Renewable-SSO-Report_2017Fall.pdf DNVGL_Renewable-SSOTables_2017Fall.xlsx	Fall 2017 updated renewable resource study by DNVGL
PGE_2016IRPUpdate_TechnologyMaturity.pdf	Figure of technology maturity curves for overnight cost of capital from Fall 2017 studies
PGE_2016IRPUpdate_FinancialParameters.pdf	Updated financial parameters including composite tax rate, cost of debt, return on equity, and economic lives of resources
PGE_2016IRPUpdate_EFSC-CO2_OffsetPayment.pdf	Estimated CO ₂ Offset Payments updated to reflect the October 2017 amendment and updated resource parameters
PGE_2016IRPUpdate_SupplySide_Summary.pdf	A summary of the changes in cost and operating parameters as compared to the 2016 IRP, including the fixed cost revenue requirements