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March 7, 2017

MEMORANDUM

TO: Council members

FROM: John Ollis

SUBJECT: Update from Portland General Electric on Their IRP

BACKGROUND:

Presenter: Franco Albi, Portland General Electric

Summary: This presentation will summarize some key takeaways from the most recent Portland General Electric (PGE) Integrated Resource Plan (IRP) filed with Oregon Public Utility Commission in November 2016.

Relevance: The PGE IRP discusses how PGE might meet resource needs over the planning horizon with a mix of energy efficiency, demand response, renewables, and a combination of other resources that are dispatchable and fulfill annual/seasonal capacity needs.

More Info: Link to PGE 2016 IRP
www.portlandgeneral.com/-/media/public/our-company/energy-strategy/documents/2016-irp.pdf?la=en

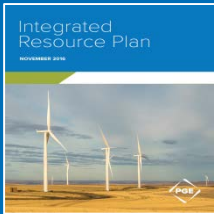
PGE 2016 Integrated Resource Plan

NWPCC – Power Committee
March 14, 2017

Franco Albi
Manager, Integrated Resource Planning



Today's Topics



2016 IRP Overview

OPUC process



Opportunities and Challenges



Continuous Evaluation

Continuous Evolution

2016 IRP

Continuous improvement in a rapidly changing environment

Incorporate changing policy

- Federal Clean Power Plan
- Western Energy Imbalance Market
- Oregon Clean Electricity Plan (SB 1547)

Commitment to rigorous analysis

- Load Forecast methodology
- Resource Adequacy methodology
- Integration of all resources
 - Resource potential studies
 - Flexibility and Energy Storage analysis

Adaptive Action Plan

- Minimize greenhouse gas emissions
- Maintain Resource Adequacy
- Maximize resource options



2016 IRP

Three integrated components to deliver sustainability



Energy Management



Cost-effective
Energy Efficiency

Increasing
Demand Response

Wind, Solar, Hydro,
Biomass, Geothermal



Renewable
Expansion



Optimizing Capacity

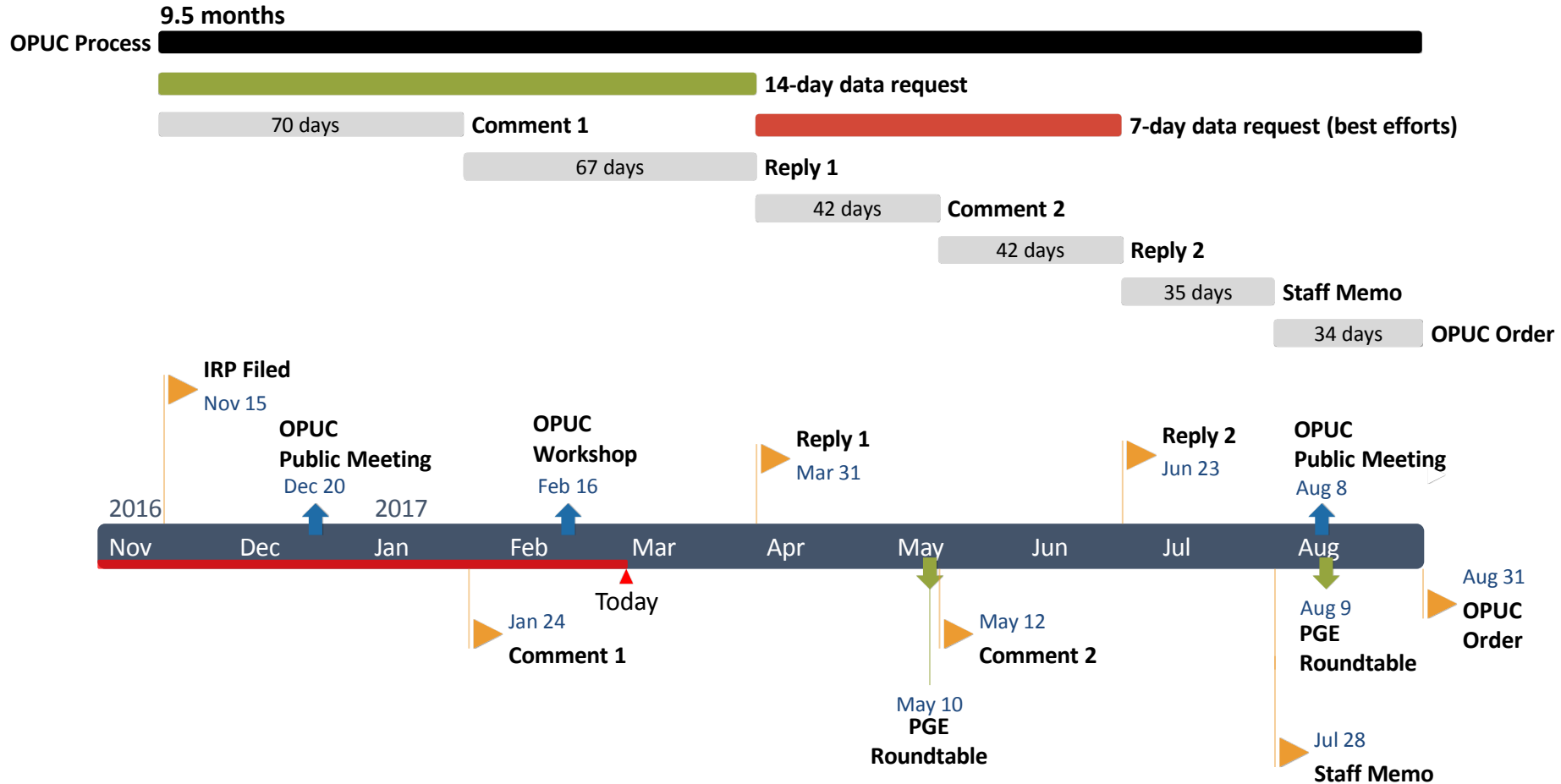


Technology
Integration



2016 IRP

OPUC procedural schedule for Docket LC 66



Opportunities and Challenges

Technology and data enable the integration of centralized generation with renewable and distributed resources

Demand-side and distributed resources continue evolving



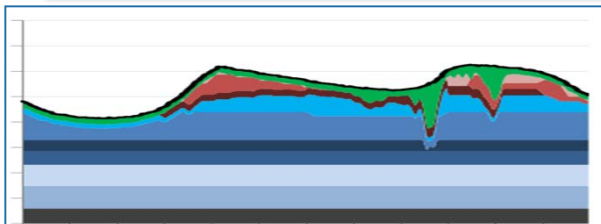
- Energy Trust programs
- PGE Demand Response (Nest pilot)
- Distributed Resource Aggregation
- **Energy Management**

Resource flexibility is increasing and costs are decreasing



- Battery storage
- Renewable diversity
- Advanced thermal technology
- **Flexibility and efficiency**

Evaluation of all resources through the IRP



- Variable resource integration
- Distributed Energy Resource Planning
- Balance cost and risk
- **Increased complexity**

Data and communications enable markets

Connect

- Plants
- Balancing Authority

Monitor

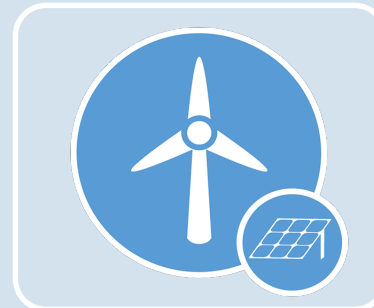
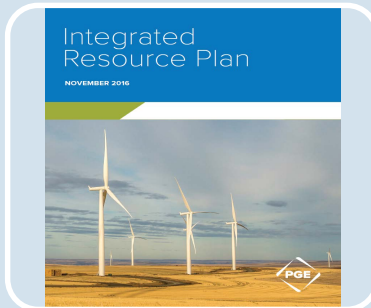
- Performance
- Operations

Enhance

- Efficiency
- Reliability

Continuous Evaluation

Four key areas of focus for Resource Planning at PGE



2016 IRP

OPUC Process

Next IRPs

2016 IRP Updates
Begin 2019 IRP

RPS

Integrating Optimization
with Compliance

Capacity

Resource Adequacy
& Flexibility



Continuous Evolution



Renewable Northwest



Public Utility Commission of Oregon



Natural Resources Defense Council



Industrial Customers of Northwest Utilities



Sierra Club



Northwest and Intermountain Power Producers Coalition



Northwest Energy Coalition



Citizens' Utility Board

2016 Participants

- 9 Advocacy Groups
- 7 Agencies and Utilities
- 13 Commercial Entities

Ongoing engagement

Information sharing

Development input

Data Requests