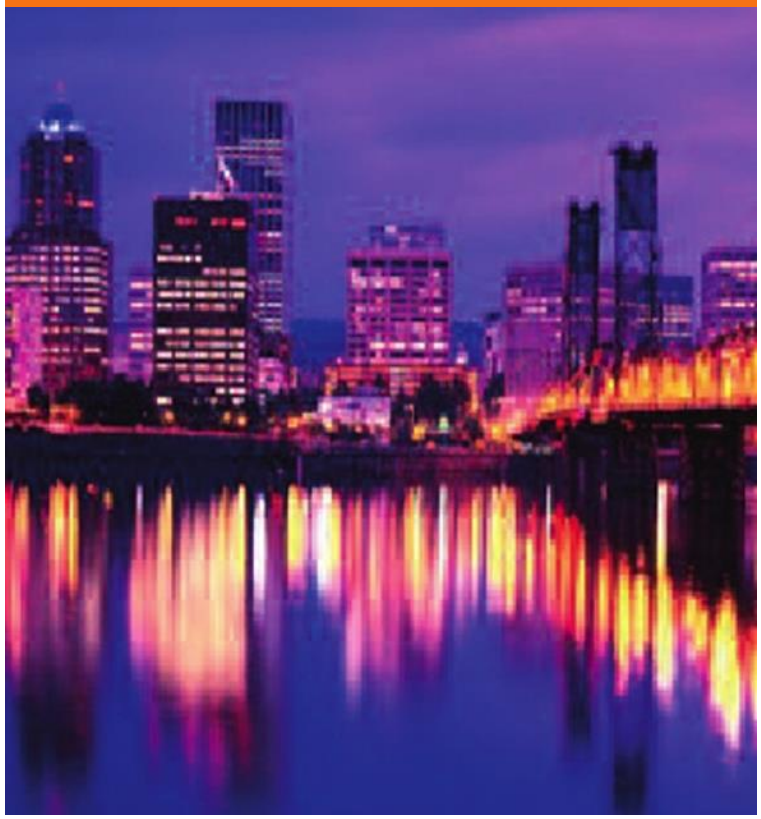
Environmental Best Practices Task Force



Utility impacts

7/11/16

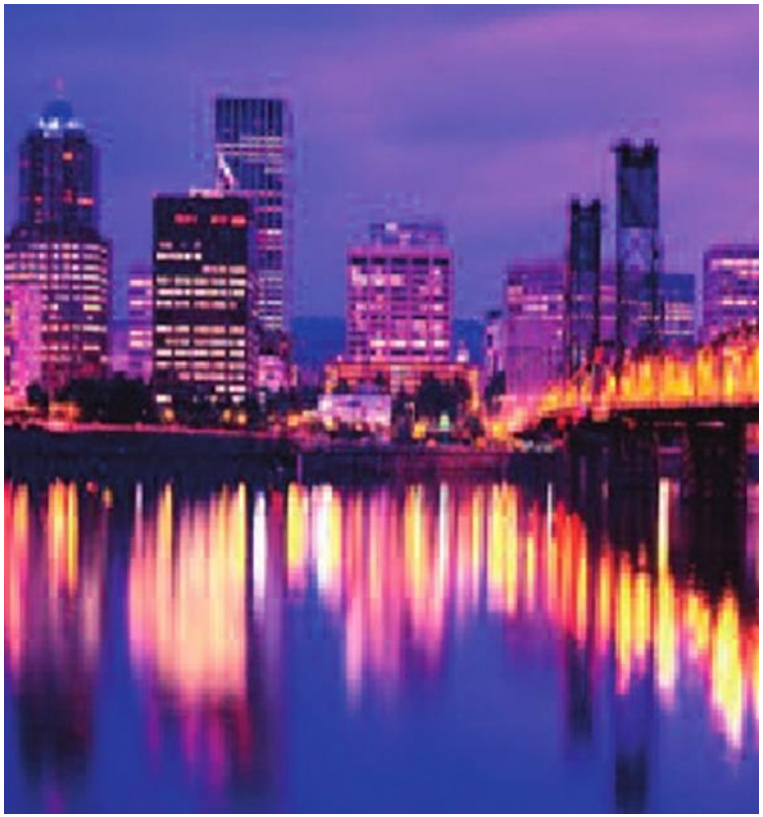
Brendan McCarthy

Environmental Policy Manager, State and Local

Portland General Electric

Presentation today

- Who is PGE?
- How do we plan for energy needs?
  - Load forecasting for cannabis
- Transmission and distribution effects of cannabis production
- Trends and risks
- What can PGE do?



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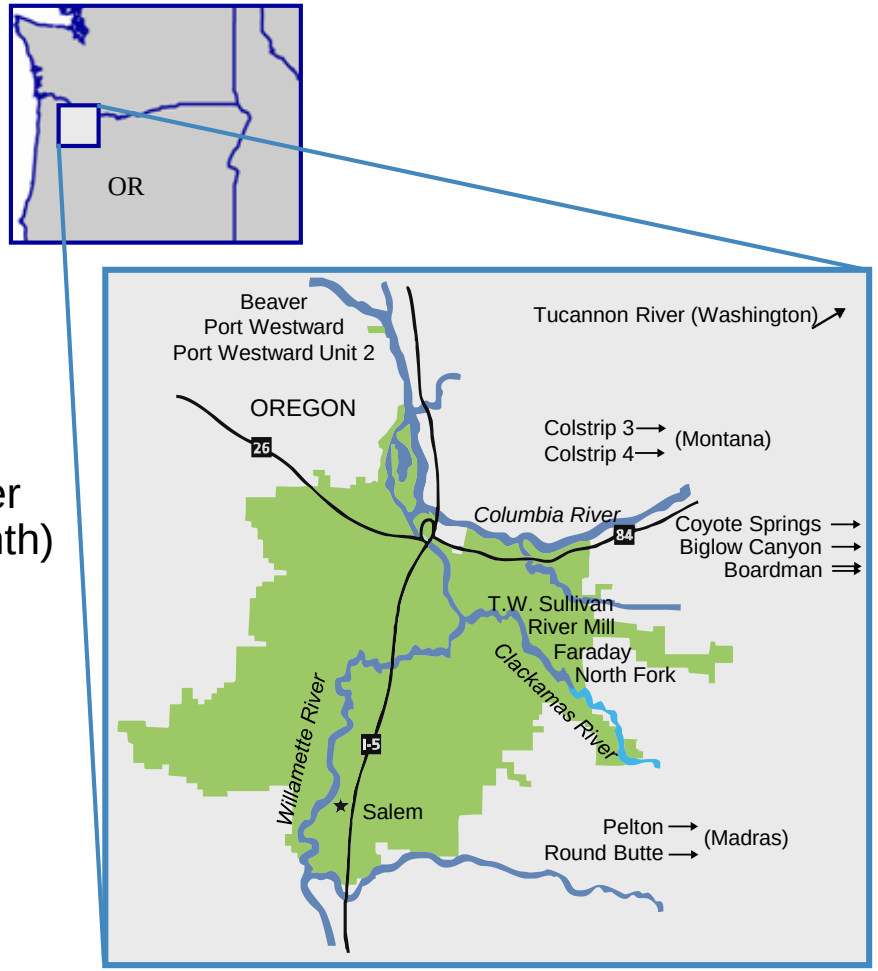
Portland General Electric by the numbers

- Serving Oregon since 1889
  - 4,000-square-mile service area
  - 51 cities covering 45% of Oregon's population (~1.8 million people)
  - ~856,000 customers
  - About 43% of electricity customers, 37% percent of delivered energy
  - Lower residential consumption per customer than 35 of 40 utilities in state (845 kwh/month)
- Diversified power system
  - 16 Power Plants* (coal, gas, wind, hydro)
  - 3,854 megawatts (MW) of generation*
  - Summer peak load of 3,950 MW (2009)
  - Winter peak load of 4,073 MW (1998)



* Including Carty Generating Station (est. online 2016, 440 MW)

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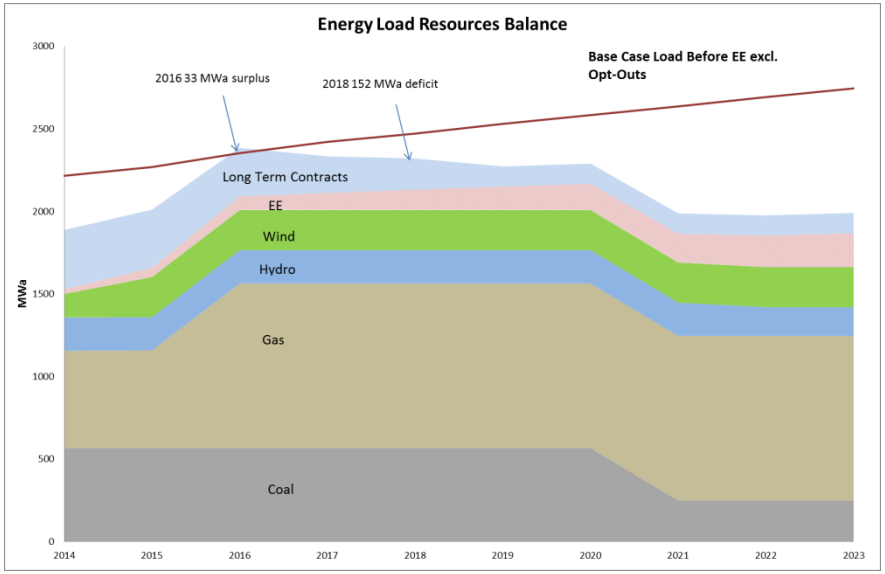
Integrated resource planning (short form)

- Look at resource needs
  - Understand supply side issues and demand side issues
  - Forecast load growth
  - Sometimes analyze separate individual demands: 2013 IRP looked at EV demand
- Develop options of how to meet future needs through both demand side (e.g., EE) and supply side (generation)
- Determine preferred portfolio and action plan



* Chart only for explanatory purposes and should not be cited

For 2016 IRP, cannabis demand is not considered as a separate individual demand due to modest impact on net system basis, BUT…

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…there are localized issues

- 100 Producer applications in Clackamas
  - 65 in Multnomah County
  - 89 in Washington County
- One facility in Clackamas = 5.2 MWa (that's nearly 5,000 homes worth)
- These customers require:
  - Substation engineering
  - Potential transformer upgrades
  - "Reconductoring" of lines (new, heavier gauge power lines)

- *We lack visibility into applicant estimates of water and energy usage assumptions*
- *Applicants lack knowledge of potential usage*
- *Cannot tell from name of company what their business is*

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Transmission and Distribution Impacts

Service and Design Requests

- Customers in this industry:
  - Can be difficult to work with
  - Are very secretive
  - Want speed to market

  It's the "Wild West"

- PGE seeing:
  - High volumes of requests for connection (10s a week across service territory)
  - Most include requests for line upgrades
  - Pushing designers to do things not needed
  - Potential for stranded infrastructure
  - Designing work only to redesign weeks later

Enough work that each line center serving rural areas could employ one SDPM doing nothing but grow operations

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Examples of connection requests

- Request for 1600 amp service
  - Rural area, bare land, no structure in east Multnomah County
  - Leasing land only
  - Does not yet have producer permit
  - Requires:
    - Upgrade to three-phase service
    - 6 miles of new, heavier lines
    - 2000 feet of trenching on property
    - Right-of-way work
    - Potentially new transformer in substation
    - Upwards of $1 Million in improvements
    - Potentially 9-months to a year lead time on transformer

- Other requests for service:
  - cargo containers
  - converted horse arenas
  - barns
  - high tunnel hoop houses

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Trends and Risks

- Industry knowledge base improving, use estimates getting better, some electricians being used frequently
- Some professional producers
- Seems like a bit of a “gold rush” that might be smoothing out

- Risk to customers of nonpayment of upgrade
- Some impact to system costs – we often replace the first transformer at no cost to the individual customer
- Risk that customer will not estimate load correctly – overbuilding
- Providing service to customer without grower permit – stranded asset

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What can PGE provide to the industry?

Compliance

We can share our service requirements, bill payment information

Time to market

Continue service and design, ensure reliability in PGE system, expedite construction where possible, consult on solar and backup generators

Access to information

Embed information on the web, provide industry/customer outreach at events, support Energy Trust

Help differentiate products

Offer renewable energy options, explore demand side options, share expertise from other growers, Energy Tracker/Energy Partner

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Thank you

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