Integrated Resource Plan

2016

Public Meeting #4

Friday, September 25, 2015

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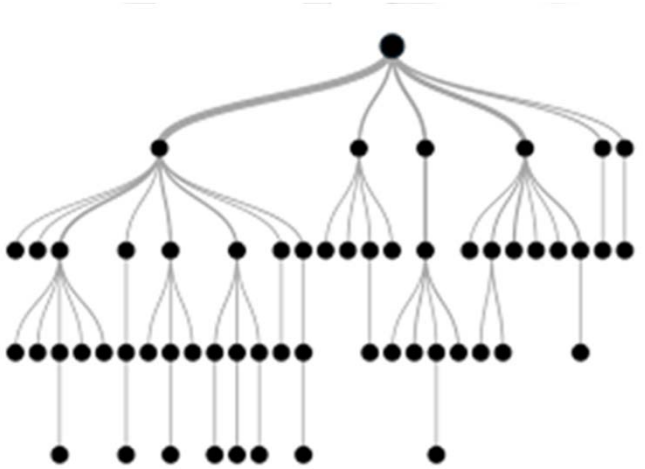
Welcome: Meeting Logistics

- Local Participants:
  - DoubleTree facility

- Virtual Participants:
  - Ask questions via ‘chat’ or ‘raise hand’ feature
  - Meeting will stay open during breaks, but will be muted



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Welcome: Today's Topics

- Welcome and safety moment
- Public process
- Clean Power Plan update
- Climate Study Review
- Conservation Voltage Reduction (CVR) update
- Dispatchable Standby Generation (DSG) update
- Resource Optimization Model (ROM) update

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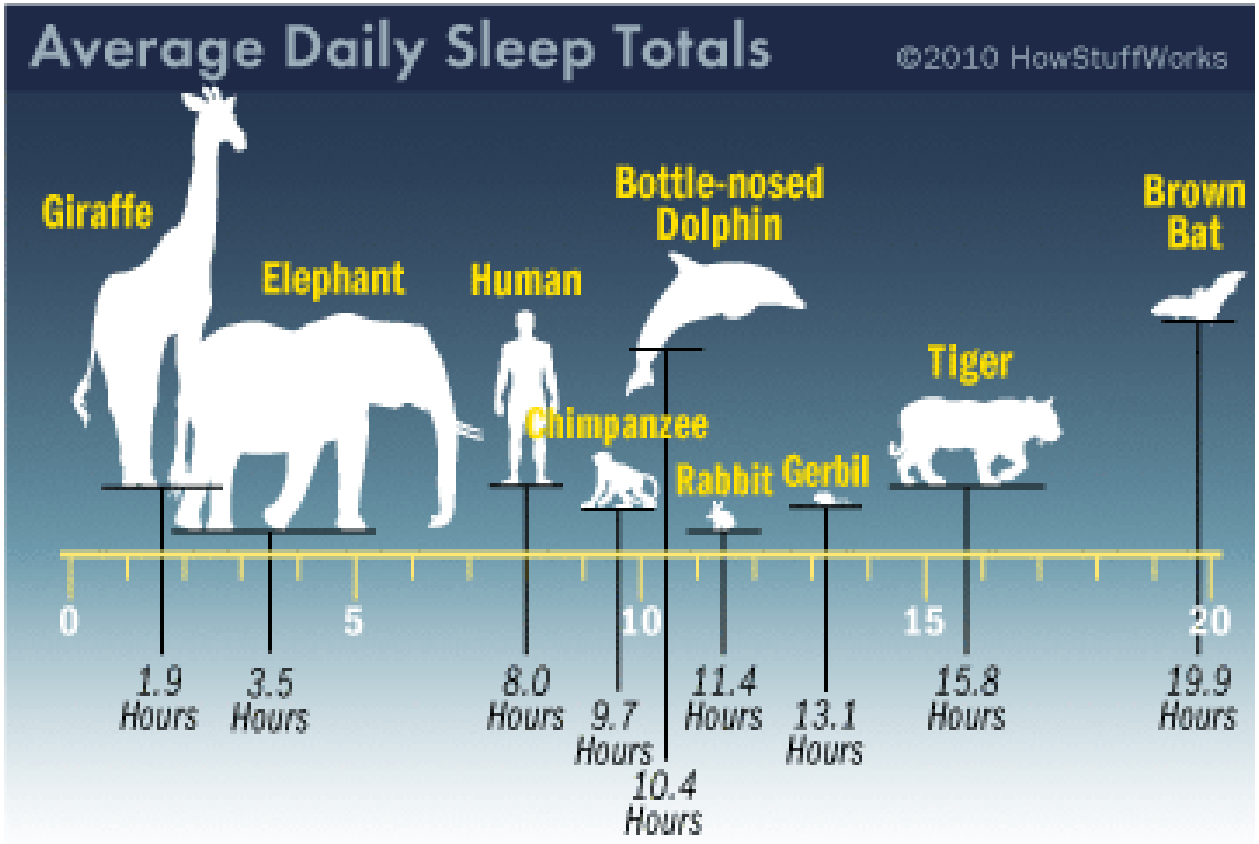
Safety Moment: Sleep

Benefits of getting enough sleep

1. Better health
2. Stronger immunity
3. Lower risk of injury
4. Better mood
5. Clearer thinking



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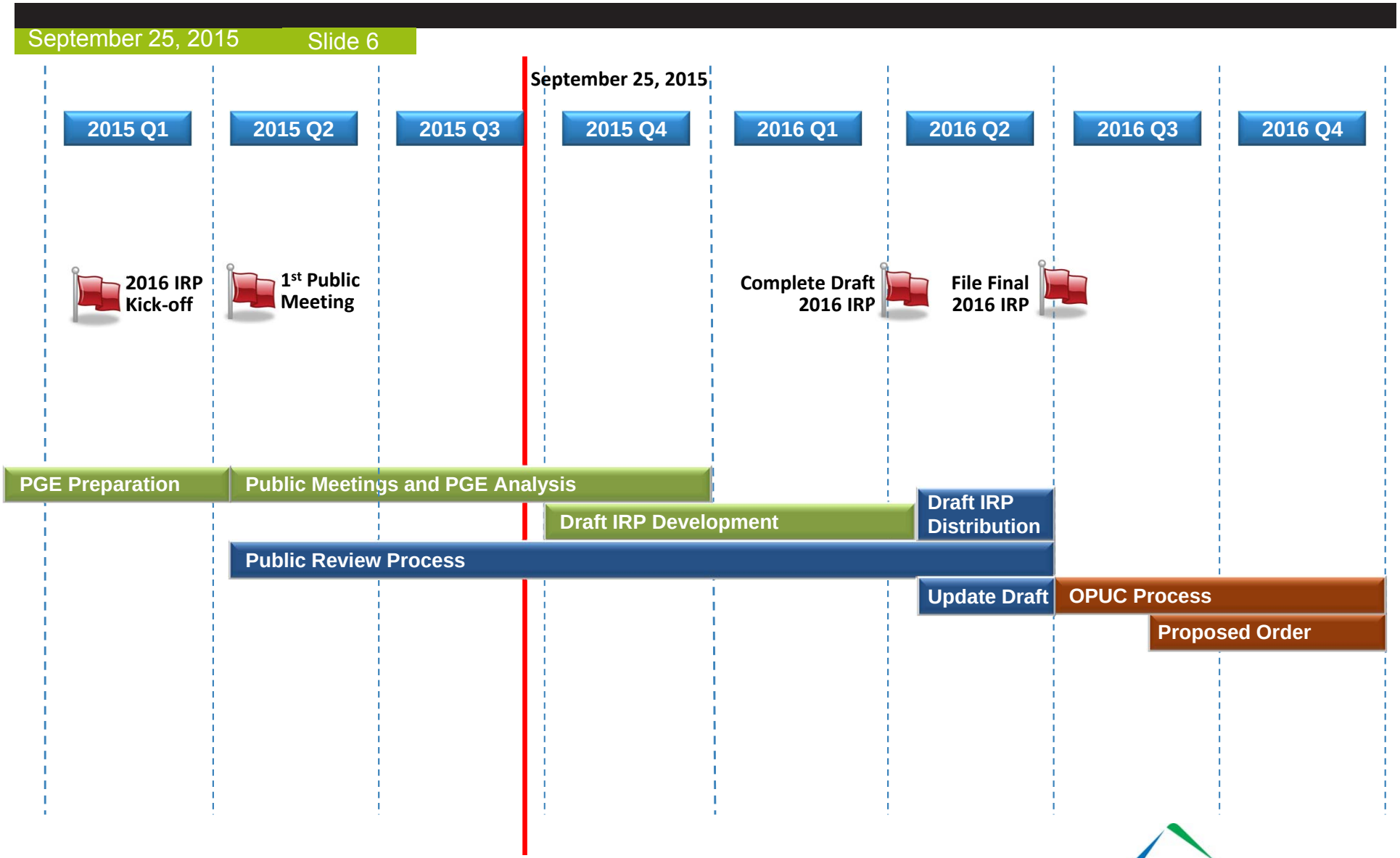
Public Process Overview

2016 IRP Timeline



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2016 IRP: Meeting Schedule And Planned Topics

Q4 2015 (Tentative)

December 4

Meeting #5
Public

- *Development*
- *Analysis*
  - *CPP Demonstration*
  - *Portfolios and Futures*
  - *Transmission*
- *Results*
  - *Planning Reserve Margin*
  - *Capacity Contribution*
- *General*
  - *Natural Gas Hedging*
  - *2013 IRP Update*

Date TBD

Workshop #3
Commission (Salem)

- *EIM Study*

- Future meeting content is tentative, topic suggestions are welcome
- Commission suggested consolidating EIM, Portfolios, and CPP topics into single meeting, if possible

Public Meeting

Technical Workshop

Technical Workshop with Commission Present

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2016 IRP: Meeting Schedule And Planned Topics

Q1 2016 (Tentative)

February 10, 2016

Meeting #6 Public

- *Results*
  - *Colstrip Portfolios*
  - *Variable Resource Integration*
  - *Trigger Points*
  - *Preferred Portfolio*
- *Draft 2016 IRP*

Date TBD

Workshop #3 Commission (Salem)

- *Development*
  - *Portfolios and Futures Review*
- *Results*
  - *Clean Power Plan*

Date TBD

Additional Meetings and Workshops

- *As Required*

Public Meeting

Technical Workshop

Technical Workshop with Commission Present

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2016 IRP: Status

Item	Status
Meetings	**6 Planned** (3 Complete, 3 Scheduled)
Workshops	**4 Planned** (2 Complete, 2 Scheduled)
Feedback Forms	**1 Received**
2013 IRP Action Plan	**5 Actions (OPUC Order No. 14-415)**
Supply Side	In progress (Hydro contracts, portfolios, no major resources)
Demand Side	In progress (EE, DR, CVR)
Enabling Studies	Completed (Load forecast, Emerging EE) In progress (DG, EIM, Capacity, Flexibility)
Transmission	In progress
Other	In progress (RPS, Clean Power Plan)
Related Topics	In progress [UM1713 (IEE); UM 1716 (VoS); UM 1719 (VER CC)]
2016 IRP Development	**~13 Chapters**
Draft	Content outline under development
Final	Not Started

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2013 IRP Update

Table of Contents:

1. **EXECUTIVE SUMMARY**
2. **2013 ACTION PLAN UPDATE**
   - 2.1 SUPPLY-SIDE ACTIONS
   - 2.2 DEMAND-SIDE ACTIONS
   - 2.3 STATUS OF COMMISSION ACKNOWLEDGED ENABLING STUDIES
   - 2.4 STATUS OF ADDITIONAL COMMISSION REQUIREMENTS
3. **RESOURCE INPUT UPDATES**
   - 3.1 DEMAND
   - 3.2 RESOURCES UPDATE
   - 3.3 LOAD-RESOURCE BALANCE
   - 3.4 RESOURCE COSTS
   - 3.5 OTHER UPDATES
     - 3.5.1 FUEL PRICES
     - 3.5.2 CLEAN POWER PLAN
     - 3.5.3 LONG-TERM WHOLESALE ELECTRICTY PRICES
4. **RENEWABLE PORTFOLIO STANDARD**
   - 4.1 OPTIONS FOR ACHIEVING RPS COMPLIANCE
   - 4.2 RPS SCENARIO ANALYSIS
   - 4.3 RPS RECOMMENDATION

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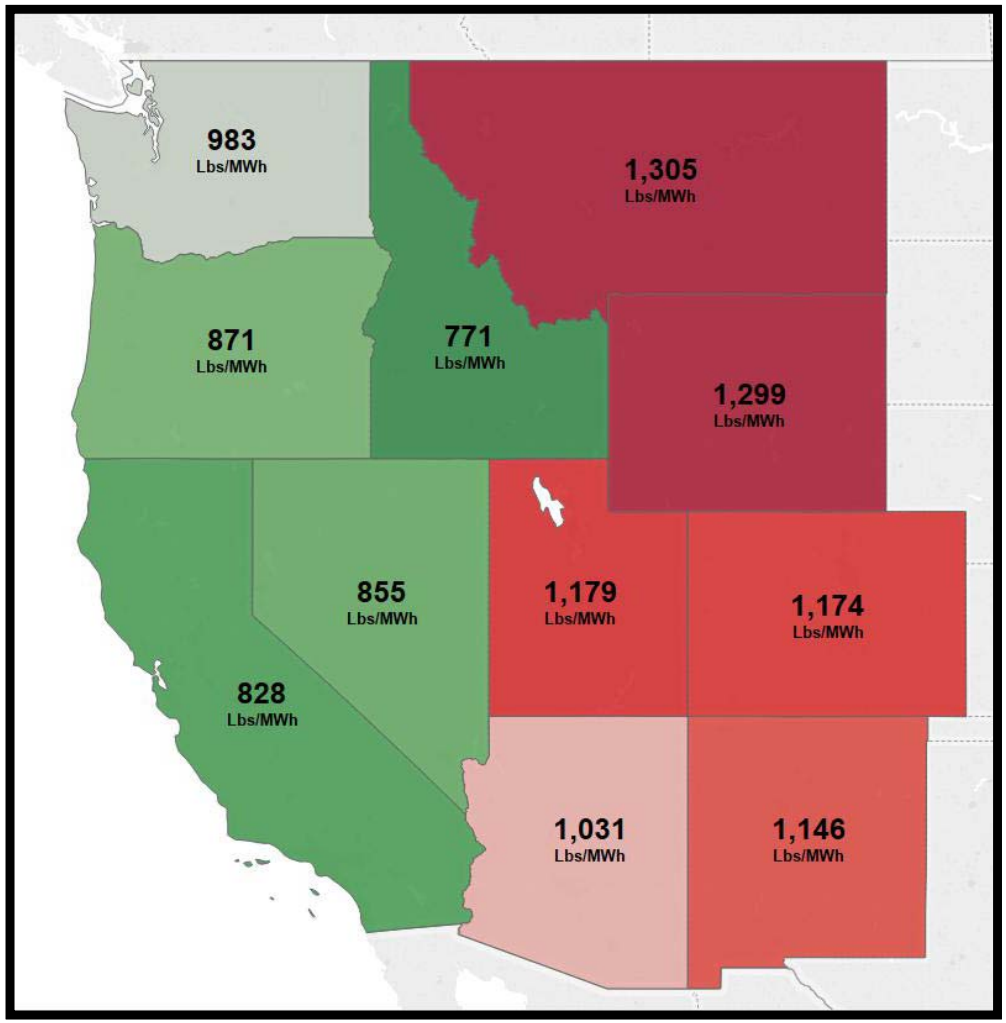
Clean Power Plan Update

Clean Power Plan - Final Rule

- On August 3rd, President Obama announced the release of the final Clean Power Plan
- Significant changes relative to the proposed rule
- Oregon's target less stringent, Montana's more stringent



State	Rate Based	Mass Based
Oregon	871 Lbs/MWh	8,118,654 Tons
Montana	1305 Lbs/MWh	11,303,107 Tons

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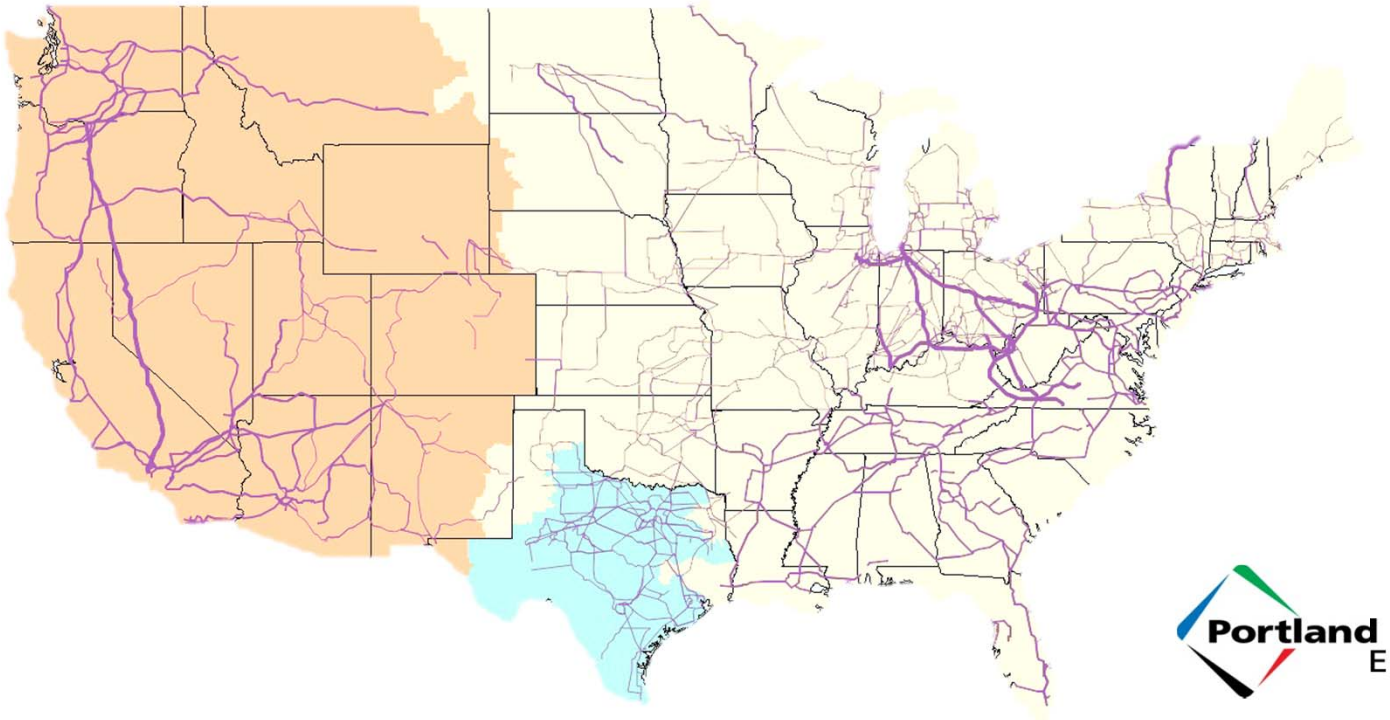
Clean Power Plan - BSER

- For each interconnection, apply building blocks:
  1) Regional specific coal plant efficiency improvements (2.3%-4.3%).
  2) CCCT displacement of coal up to a 75% capacity factor.
  3) New renewables extrapolated from development history.
- BSER for coal and CCCT calculated separately.
- Pick least stringent target from each interconnect for each year.



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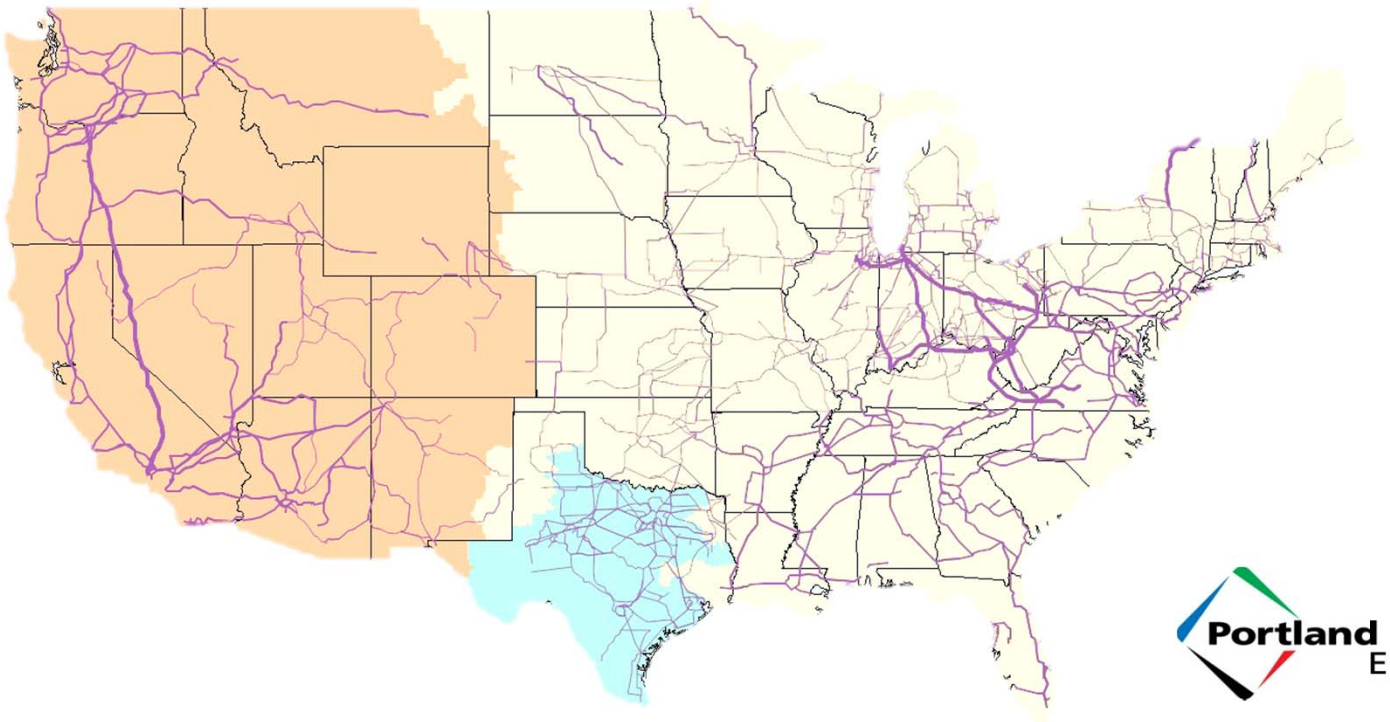
Clean Power Plan – BSER Coal

$$\frac{Coal\ CO2\ after\ BB2\&3\ +\ NGCC\ CO2\ after\ BB2\&3}{Coal\ MWh\ after\ BB2\&3\ +\ NGCC\ MWh\ from\ BB3\ +\ Coal's\ Renewable\ MWh}$$

- Coal remaining after redispatch and renewables
- NGCC changes from baseline credited to numerator and denominator
- Proportion of new renewables that displace coal



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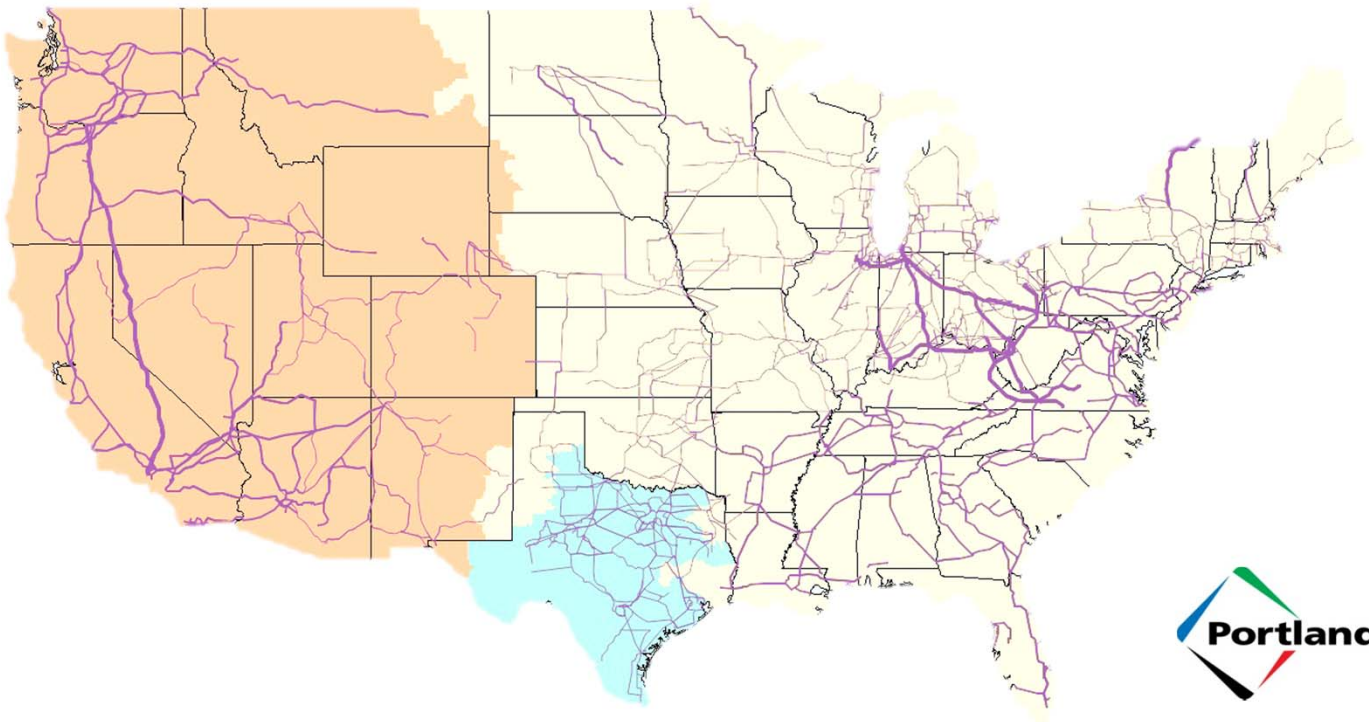
Clean Power Plan – BSER NGCC

$$\frac{NGCC\ CO2\ after\ BB2\&3}{NGCC\ MWh\ after\ BB2\&3 + NGCC's\ Renewable\ MWh}$$

- After all building blocks, the emissions and energy from NGCC
- Proportion of new renewables that displace remaining NGCC



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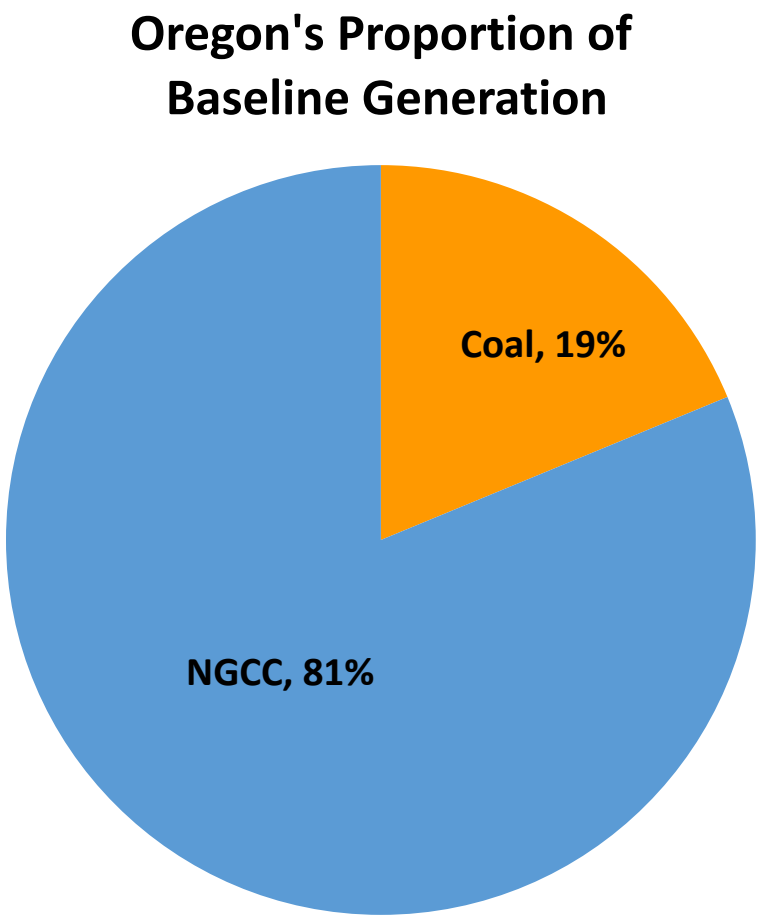
Clean Power Plan – State Goals

- State goals result from the baseline proportion of Coal and NGCC generation
  - Coal BSER = 1305 Lbs/MWh
  - NGCC BSER = 771 Lbs/MWh
- Oregon's State Goal:
  - 19% x Coal BSER
    + 81% x NGCC BSER
    871 Lbs/MWh



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Clean Power Plan - Carty Update

- EPA has provided guidance on the applicability of the ‘existing resource’ standard for Carty.
- Carty will likely become an existing resource, subject to 111(d).
- Impacts to the state rate and mass based target will be explored with EPA and DEQ.

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Clean Power Plan - State Plan Options

State Blended CO_2 Rate Limits

State CO_2 Mass Limits for Existing Sources

State Measures Plan

Mass Limits

Subcategory CO_2 Rate Limits

State CO_2 Mass Limits with New Sources

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Clean Power Plant - State Plan Options

Requires enforceable obligations back stopped by EGU compliance

State Blended CO_2 Rate Limits

State CO_2 Mass Limits for Existing Sources

State Measures Plan

Mass Limits

Subcategory CO_2 Rate Limits

State CO_2 Mass Limits with New Sources

Point of Regulation at the Plant (EGU) Level

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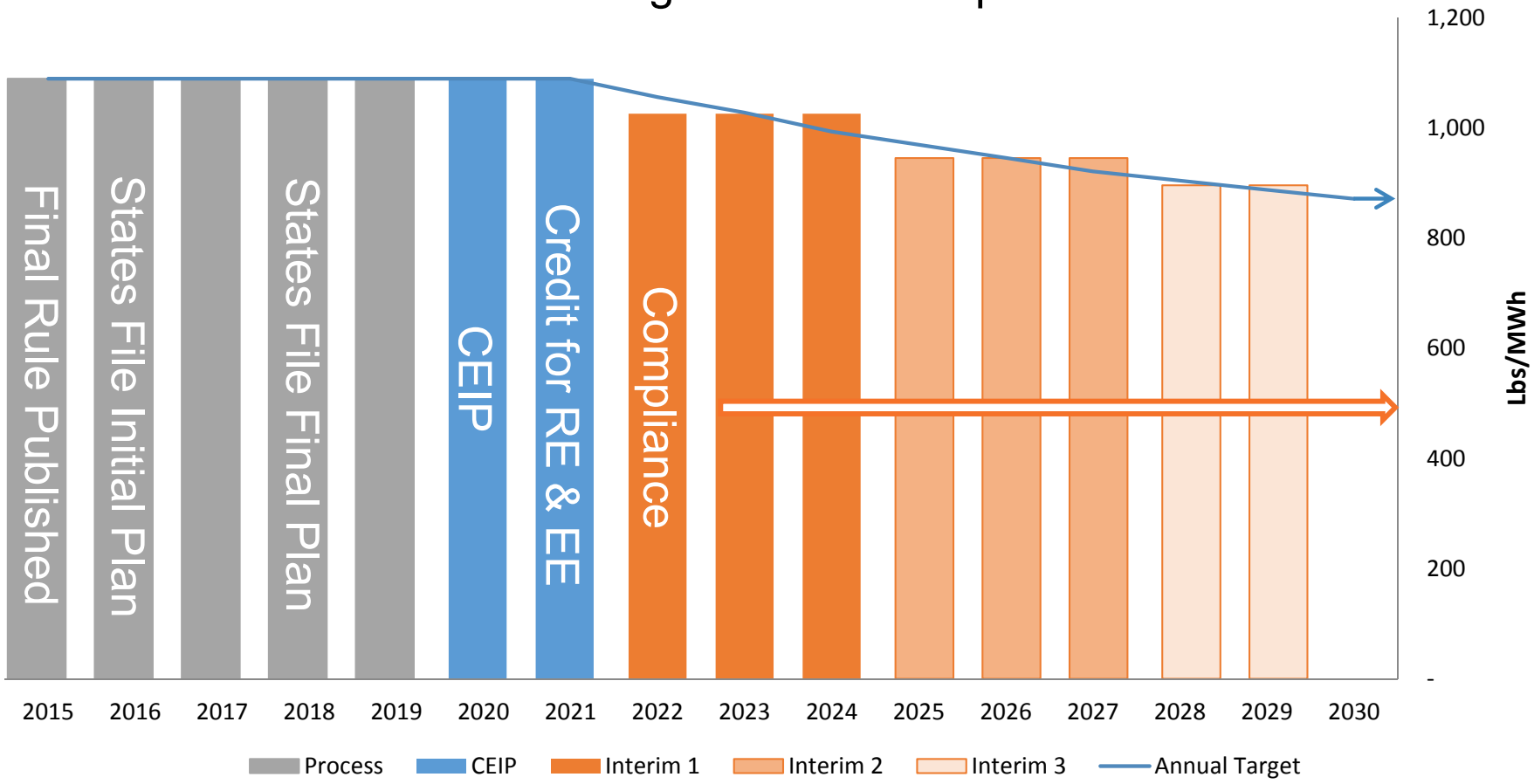
Clean Power Plan – Compliance Timing

Timeline for Oregon's CPP Compliance



Oregon's specific compliance timeline may be adjusted within the state plan

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Clean Power Plan - Compliance Options

- Plant efficiency improvements
- Unit redispatch to lower carbon fuels
- Post 2012 new renewable projects
  - Tucannon qualifies
- New nuclear
- Energy efficiency measures following EM&V
- Compliance instrument trading
  - Plans allow for intrastate trading
  - Plans encouraged to be trading ready to accommodate interstate trading

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Clean Power Plan – Compliance Trading

ERC

- Emission Reduction Credits
- Used within a rate based plan
- Created by new carbon free generation
- EE creates ERCs after EM&V
- NGCC's create "Gas Shift ERCs" after generating beyond baseline, for steam unit compliance only
- Units with intensities lower than the standard create ERCs
- Compliance instruments can be used for interstate trading, only if states adopt equivalent standards.

Allowance

- Retired in order to emit CO_2
- Allocated by the state or auctioned
- EE and RE don't create allowances, but reduce need
- Allowances cannot be converted into ERCs

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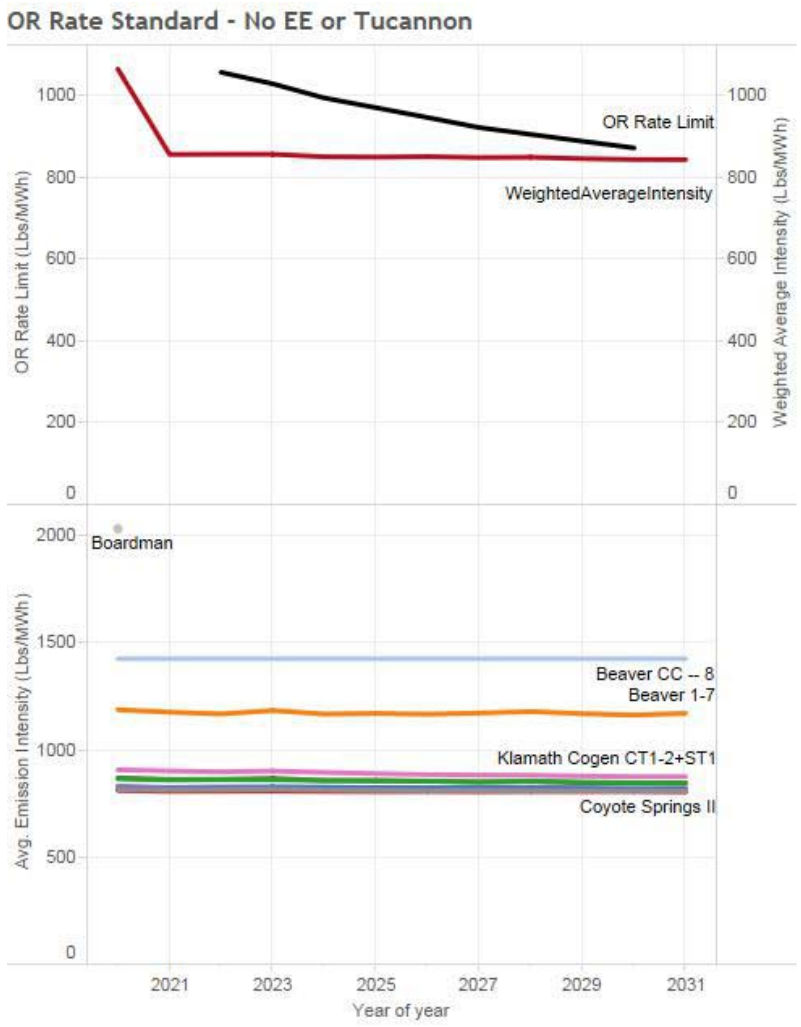
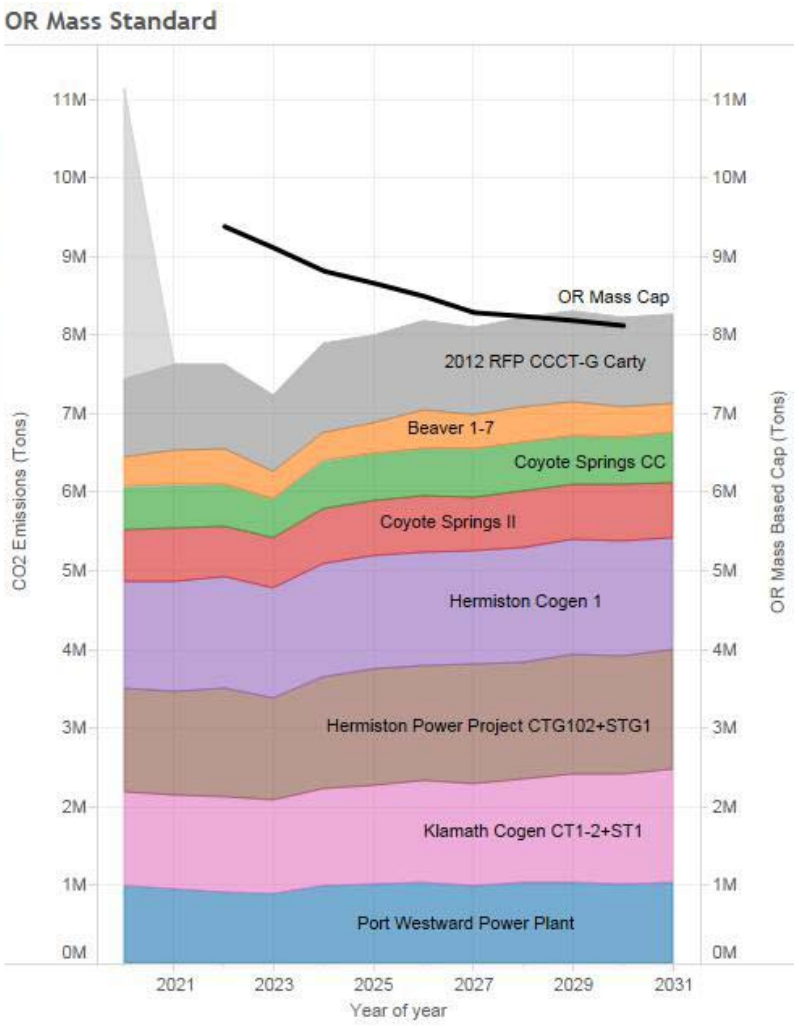
OR Compliance Outlook-
2013 IRP Outputs with Zero Carbon Price





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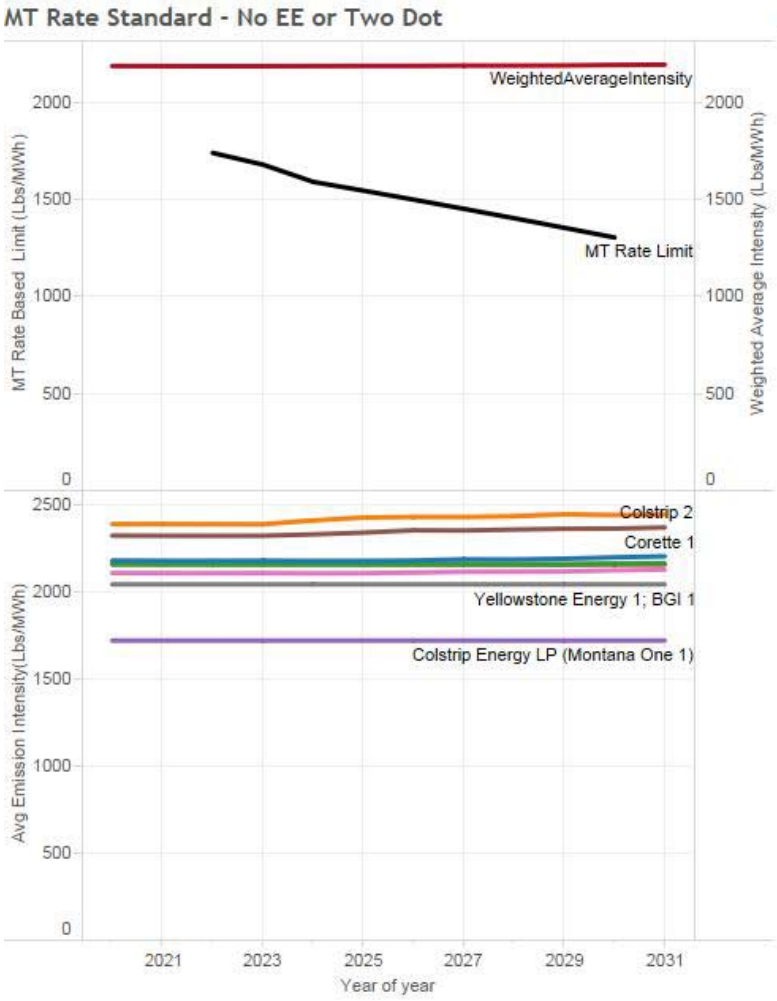
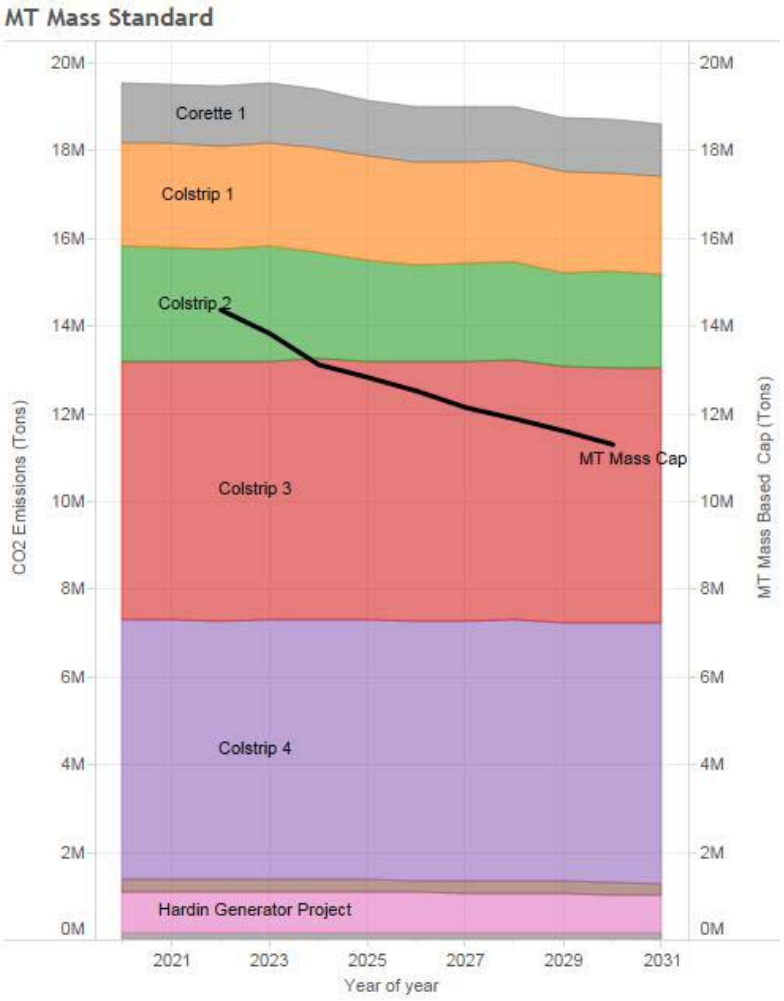
MT Compliance Outlook-
2013 IRP Outputs with Zero Carbon Price





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Clean Power Plan - Modeling

- Increasing complexity to model rate based standards.
  - Subcategory specific rate standards cannot be modeled to allow intrastate trading between subcategories.
  - Gas shift ERCs are only created after exceeding baseline generation.

$$\frac{CO_2}{MWh}$$

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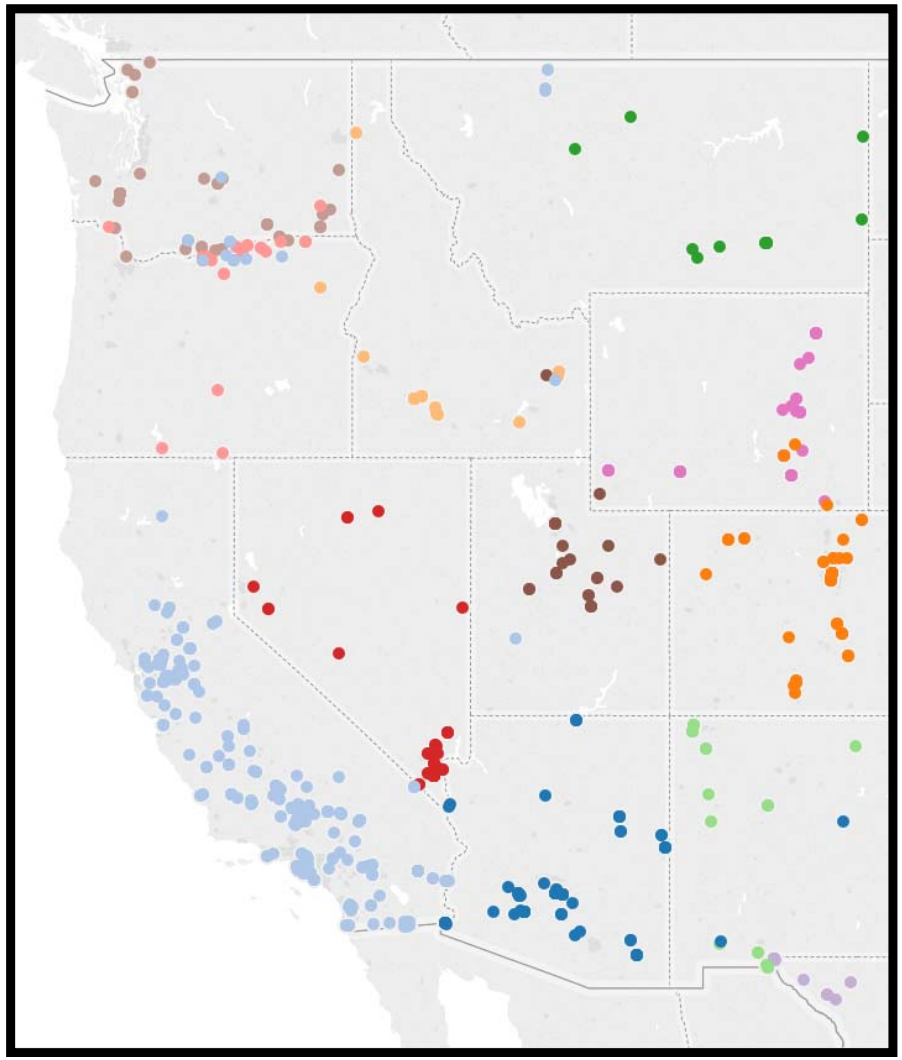
Clean Power Plan - Modeling

- 2016 IRP will continue to model rate and mass based standards, but likely with more mass based futures and less rate based futures than proposed 4/2/2015.
- CPP + CO2 prices modeled
  - Reflects allowance auctioning
- Modeling will include separate 111b and 111d programs, and "new source complements."
- Interstate trading - Perform sensitivities where MT,OR & WA can trade allowances.



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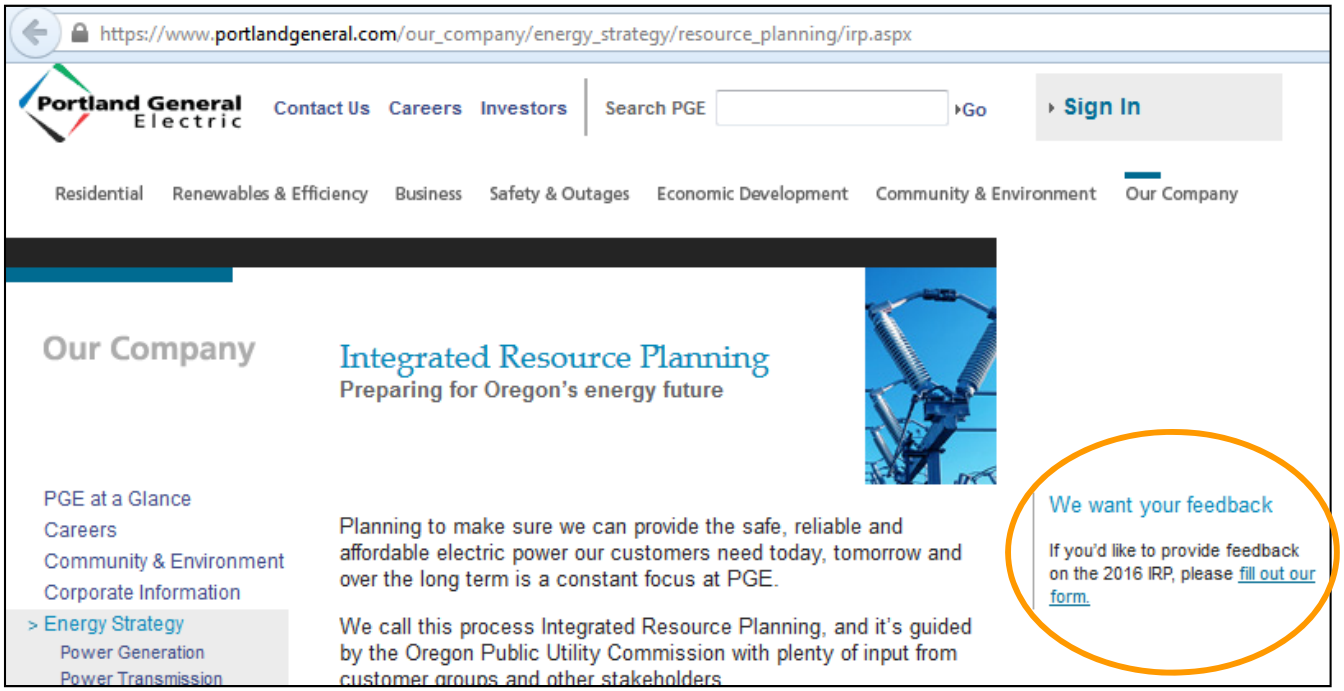
Clean Power Plan – Questions?

Thank you!

Feedback Form:



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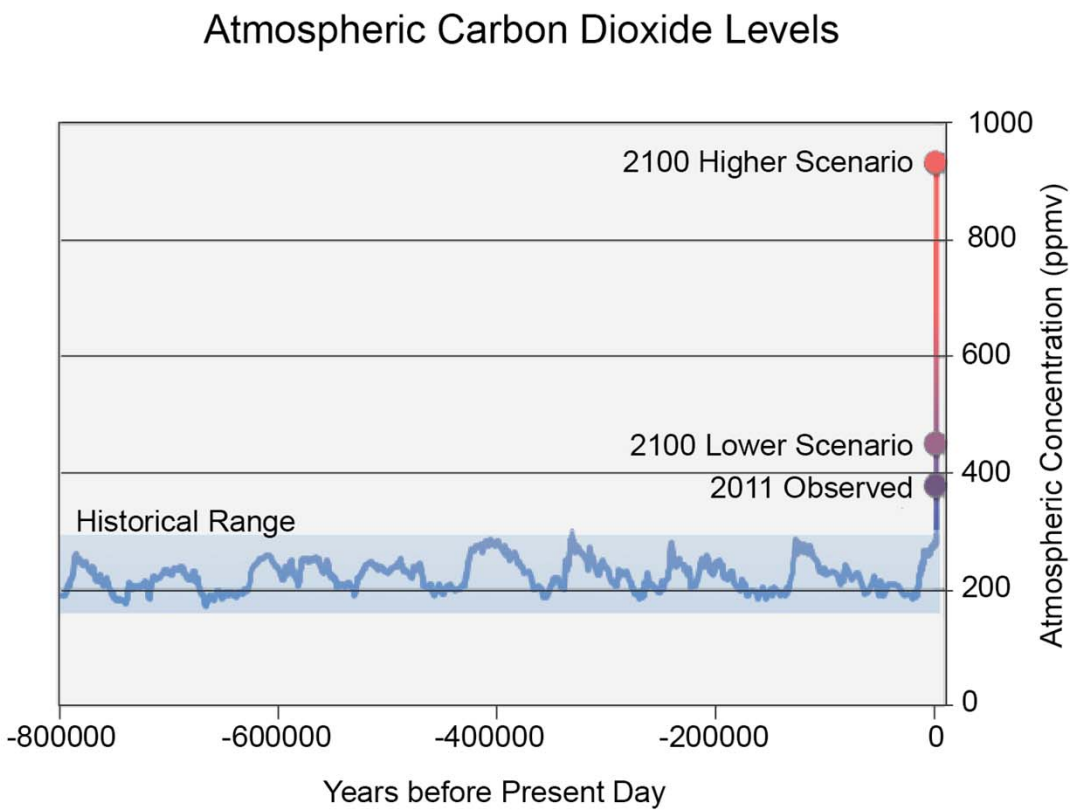
Climate Study Review

Climate Study

- Progress:
  - Received draft Climate Study Report
    - Today we will share informative figures
  - Received draft Climate Study Data
    - Reviewing methodology

Climate Study Report

- **Figure 1 - Atmospheric carbon dioxide levels in the historical record and for future lower (RCP2.6) and higher (RCP8.5) emissions scenarios (Source: Walsh et al., 2014a)**



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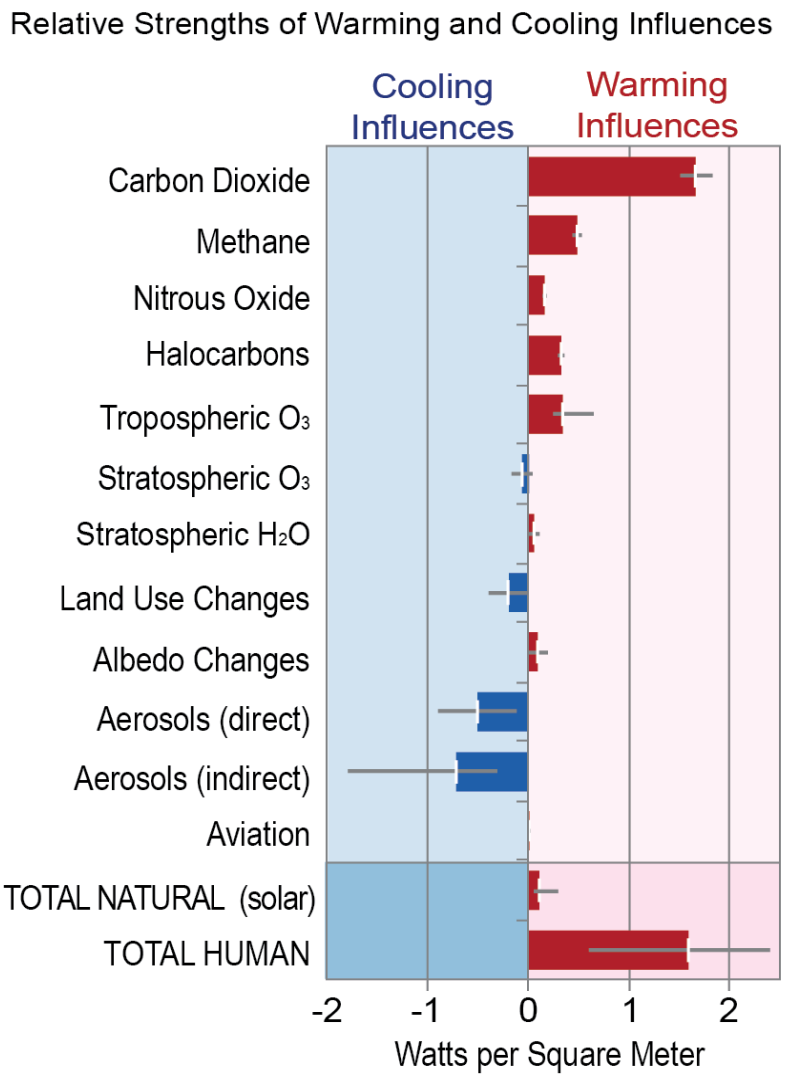
Climate Study Report



- **Figure 2 - Warming or cooling influences of all major human-induced factors and the only major natural factor (solar) with a long-term effect on climate in terms of change in radiative forcing in watts per square meter by 2005 relative to 1750. (Source: Walsh et al., 2014a)**

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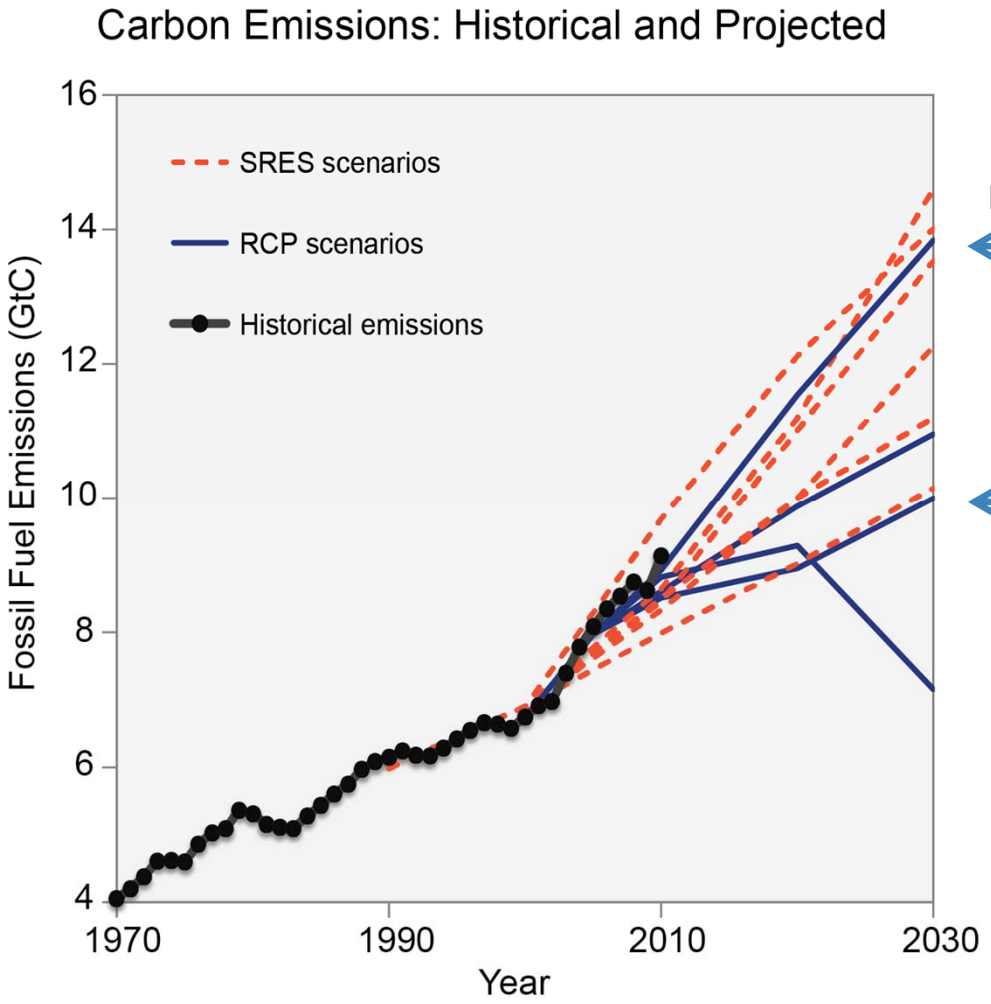
Climate Study Report

- **Figure 3 - Observed historical and projected future SRES and RCP carbon emissions from 1970 to 2030 (Source: Walsh et al., 2014a)**

RCP – Representative Concentration Pathway

SRES – Special Report on Emission Scenarios



RCP 8.5

RCP 4.5

RCP Emission Scenarios Modeled for PGE's System

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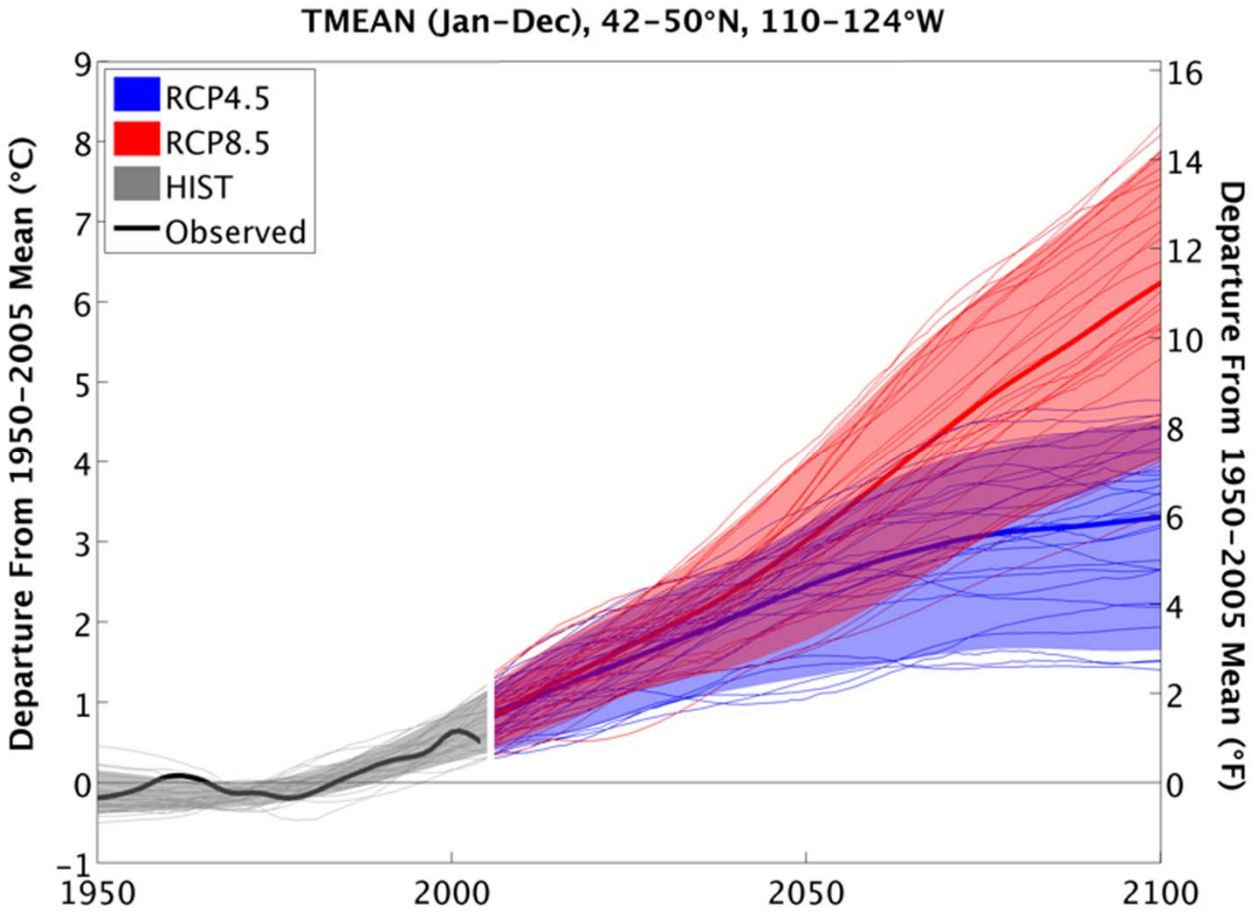
- **Figure 4 - Observed (1950-2011) and simulated (1950-2100) regional mean temperature for selected CMIP5 global models for two emissions scenarios. (Source: Mote et al., 2013)**



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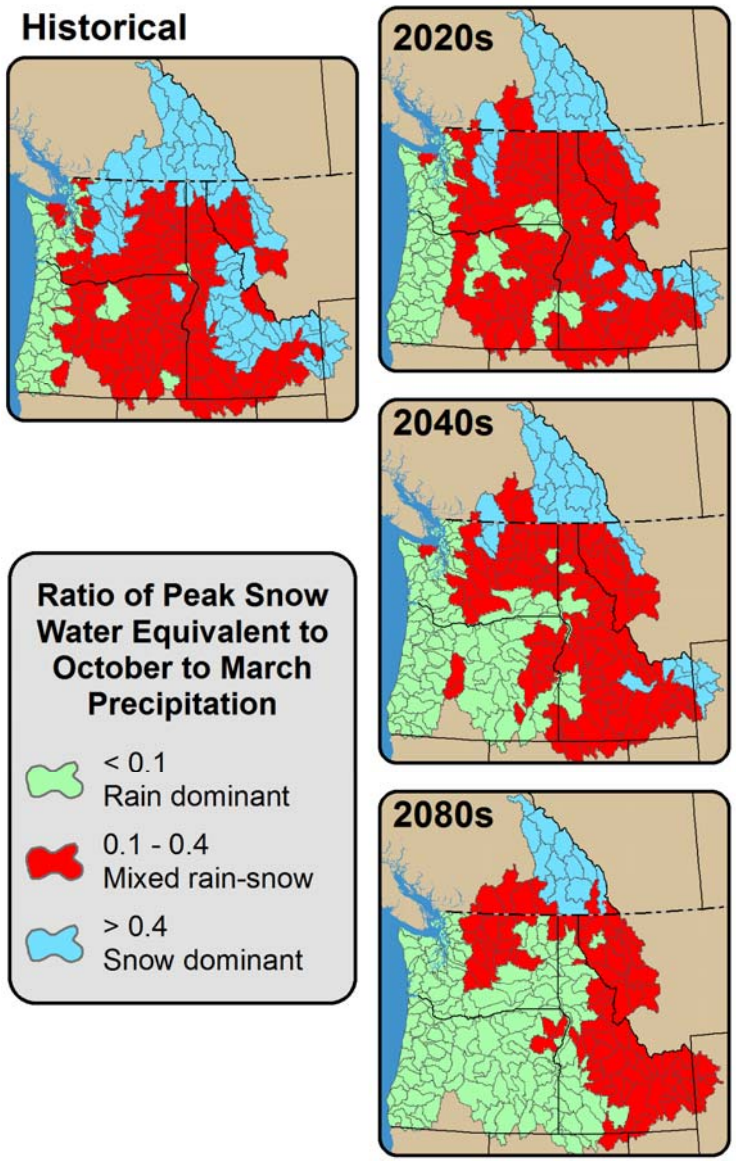

- **Figure 5 - The classification of PNW watersheds into rain dominant, mixed rain-snow, and snowmelt dominant and how these watersheds are expected to changes as a result of climate warming based on the SRESA1B emissions scenario (Source: Hamlet et al., 2013 reproduced in Dalton et al., 2013)**

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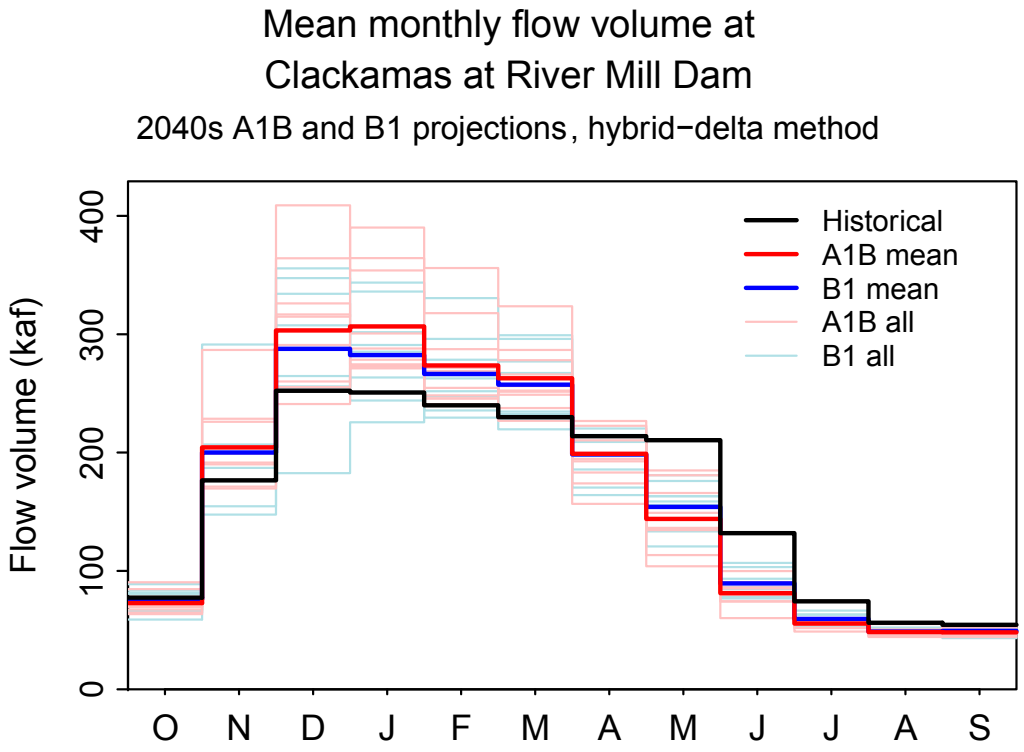
Climate Study Report

- **Figure 6 - Projected change in monthly flow volume by the 2040s at Estacada (Source: David Rupp, OCCRI)**



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Climate Study Data

- QA process continuing with OCCRI

- Questions?

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Conservation Voltage Reduction (CVR) update

Conservation Voltage Reduction (CVR) at PGE

Public Meeting #4

September 25, 2015

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Agenda

- Background
- CVR at PGE
  - Feasibility Study
  - CVR Pilot
  - CVR Pilot Results
  - Next Steps

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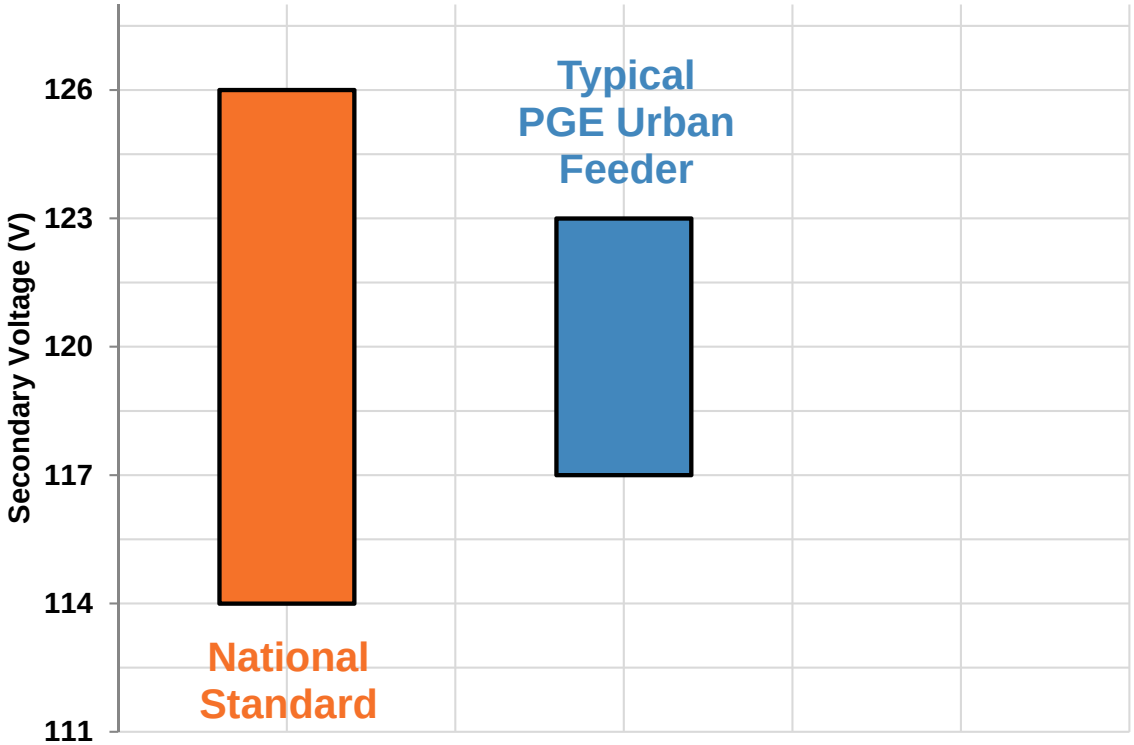
Background

- National Voltage Standard (ANSI C84.1-1989)
  - Range A allows +/- 5% of the base voltage: 114V – 126V



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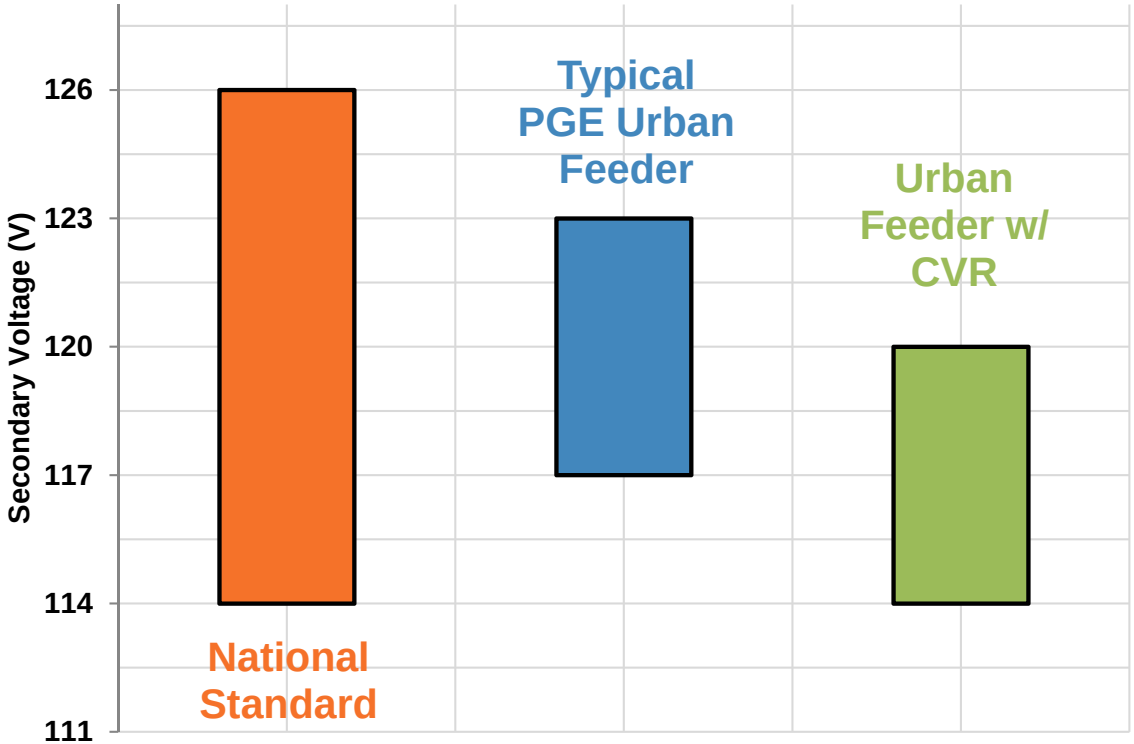
Background

- National Voltage Standard (ANSI C84.1-1989)
  - Range A allows +/- 5% of the base voltage: 114V – 126V
- **CVR:** reduce consumer power demand by operating within the lower portion of the acceptable voltage bandwidth



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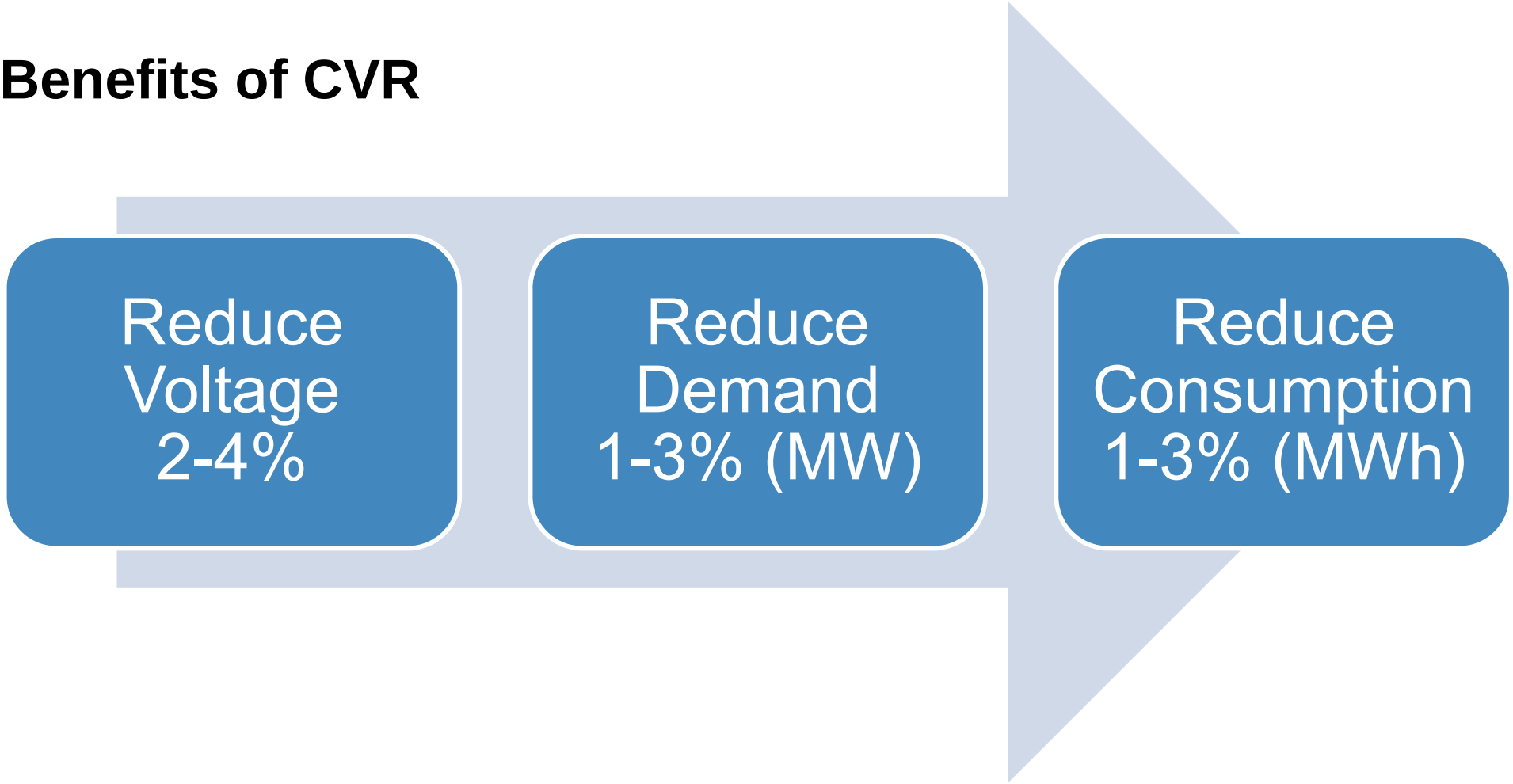
Background

Benefits of CVR



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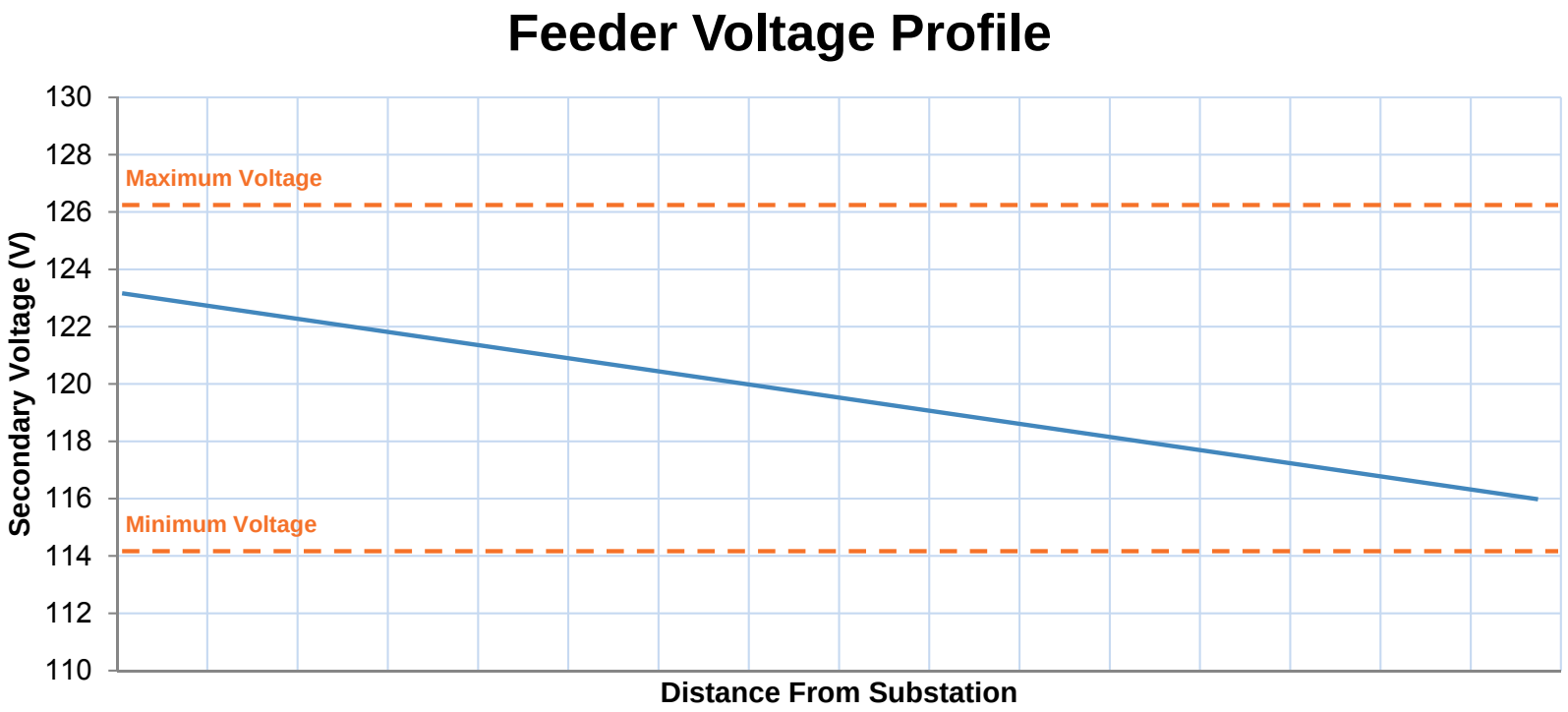
Background



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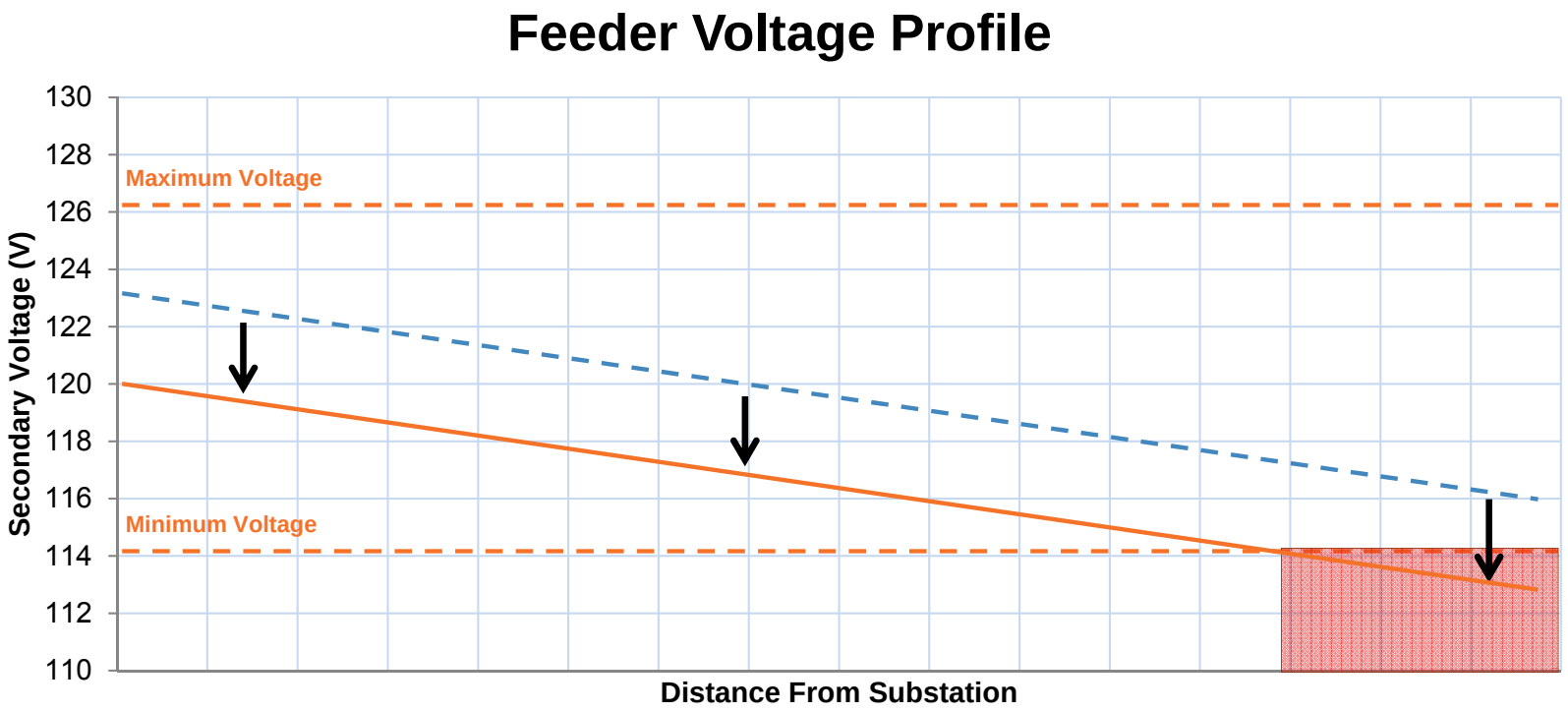
Background

- **Simply reducing voltage at substation can result in service voltage below ANSI standard**



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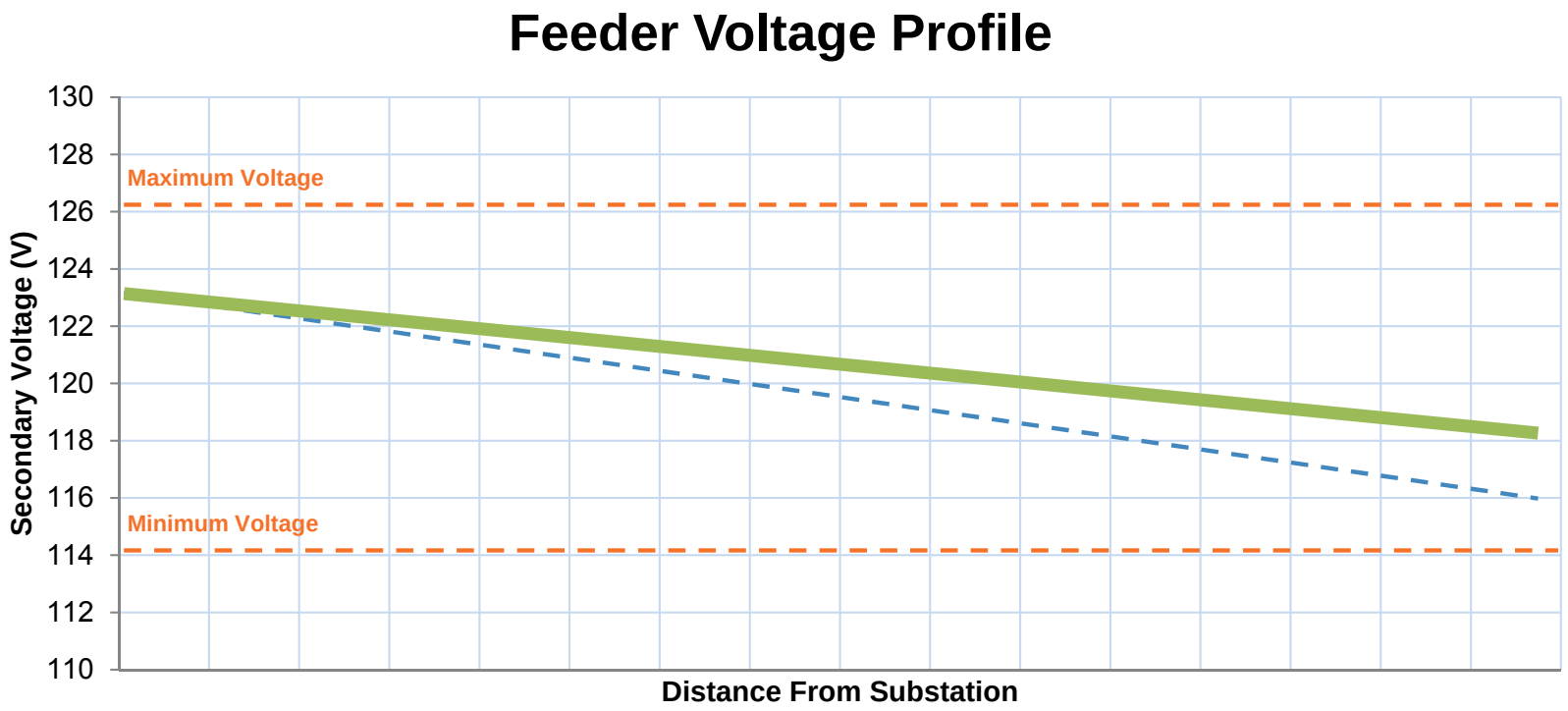
Background

- Install Feeder Capacitor Banks
- Phase Balancing



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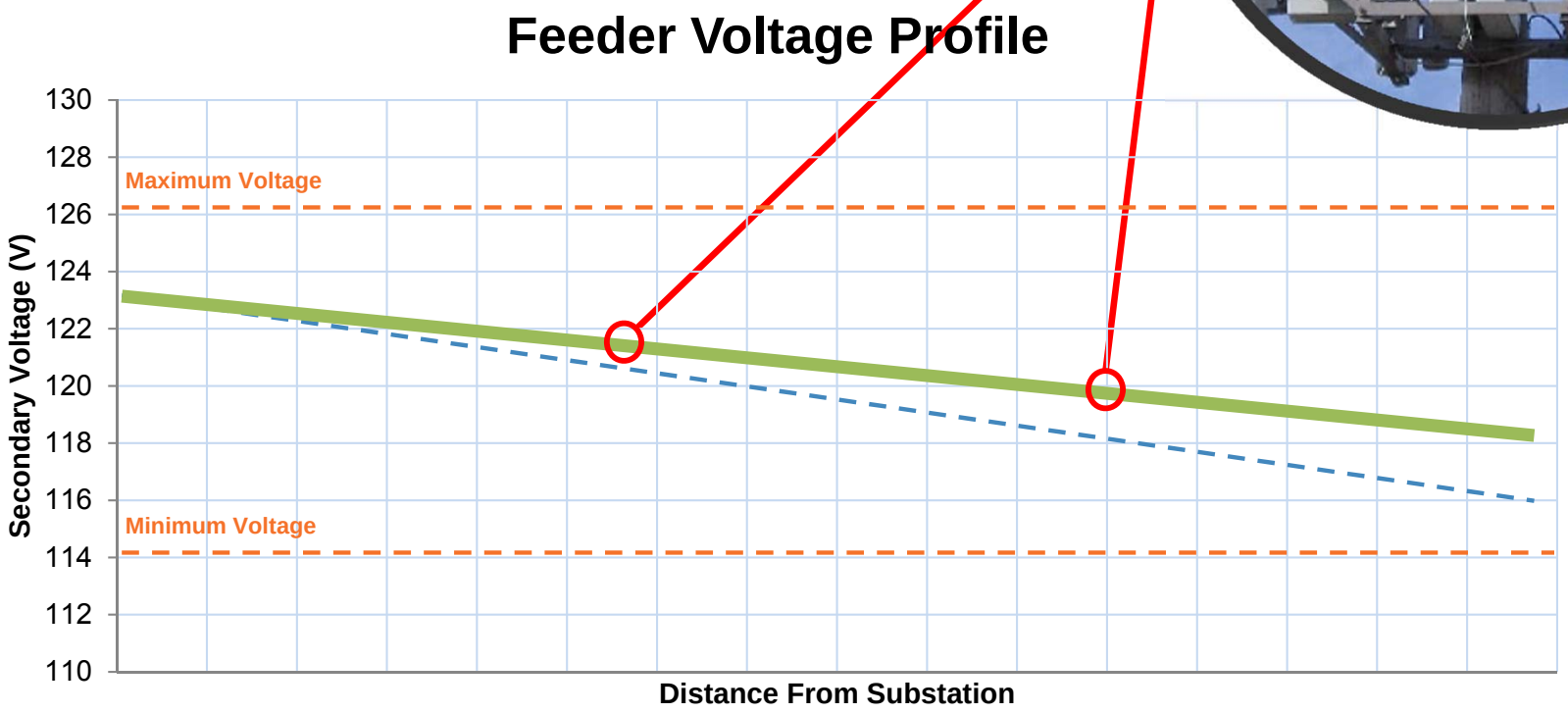

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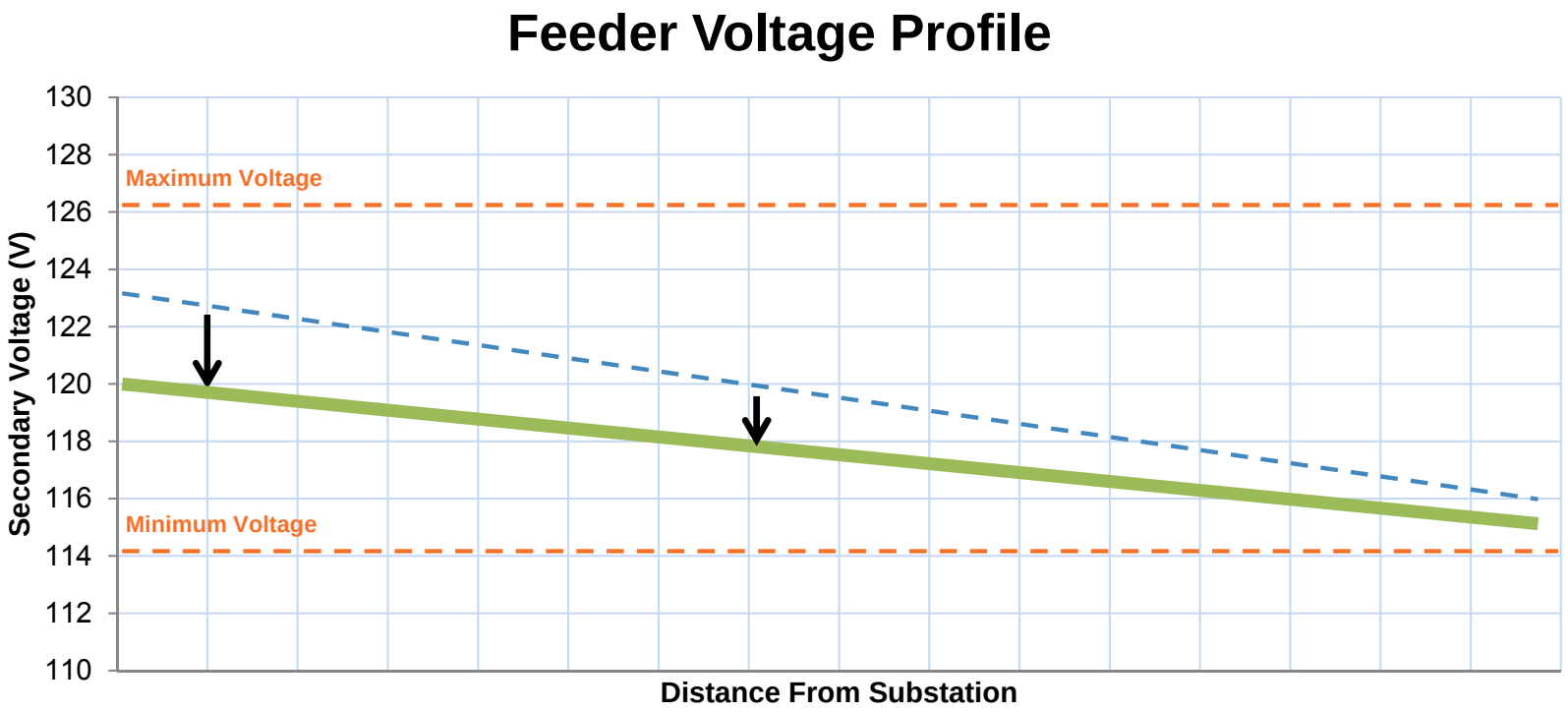

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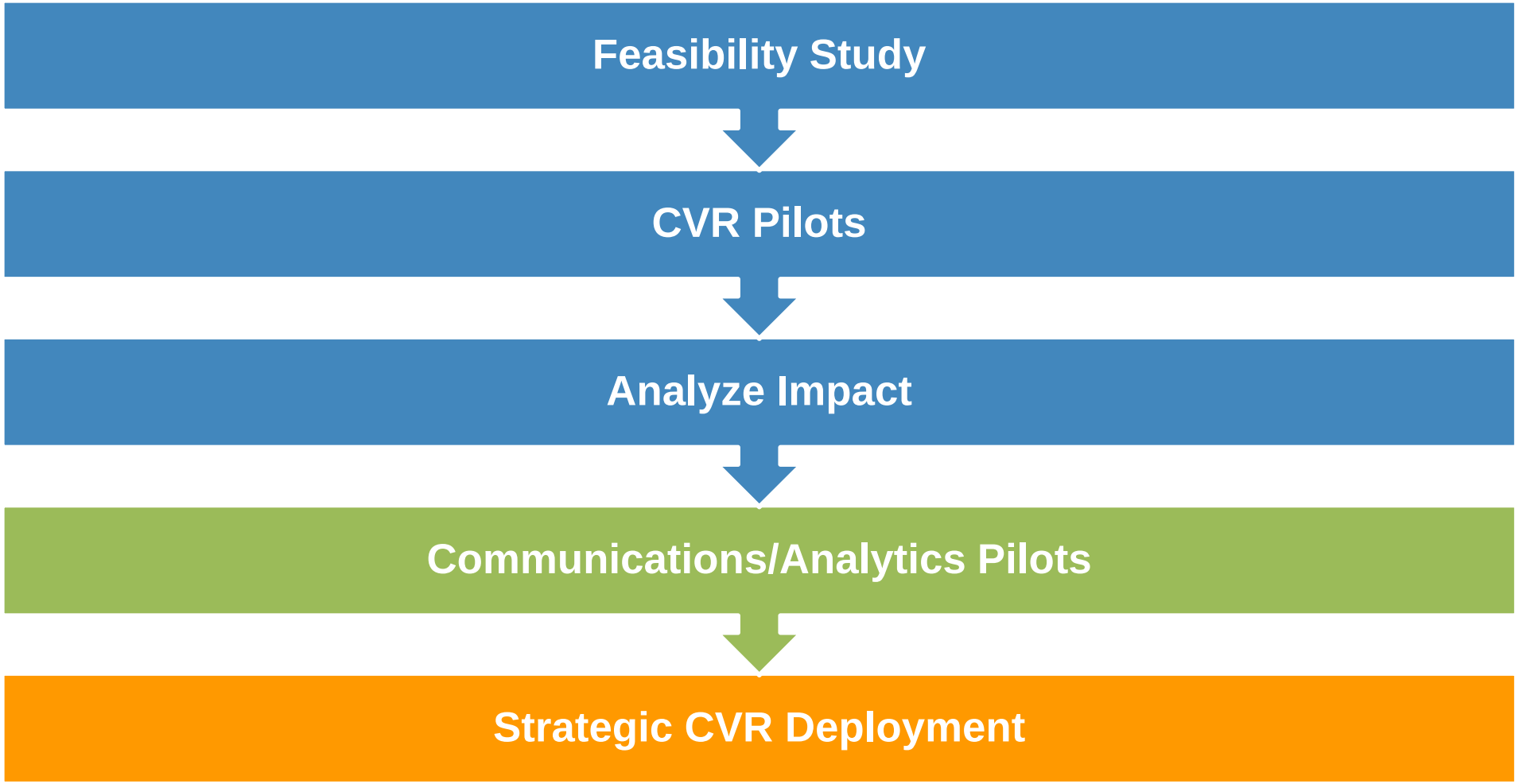
CVR at PGE



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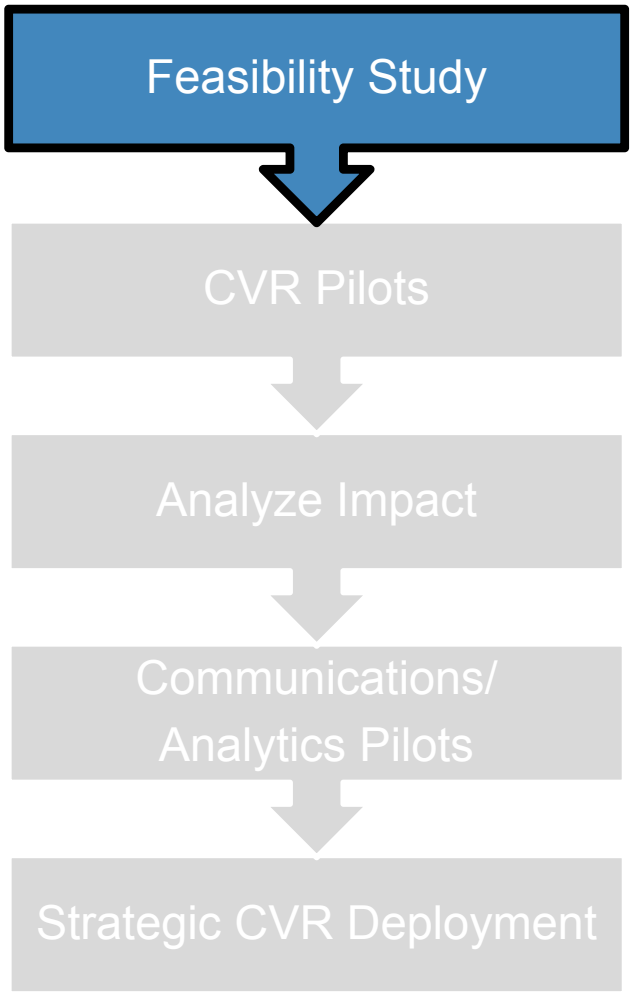
CVR Feasibility Study



Feasibility Study Goals

- Evaluate what energy savings may be present
- Quantify relationship between % voltage reduction and % energy reduction
- Load Characteristics (Z/I/P)
- Greatest reduction during heavy winter loads
- Select substations for pilot

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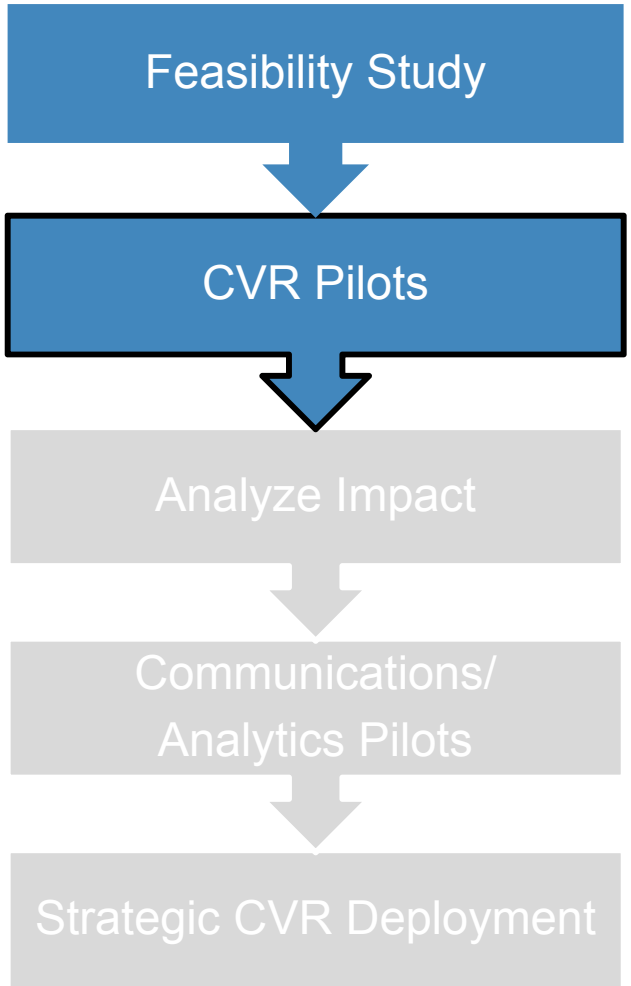
CVR Pilots



CVR Pilot Sites:

- Hogan South (Gresham)
  - Average Feeder Length: 3.4 mi
  - Customer Load Mix
    - 55/45 Residential/Commercial
- Denny (Beaverton)
  - Average Feeder Length: 2.5 mi
  - Customer Load Mix
    - 65/35 Residential/Commercial

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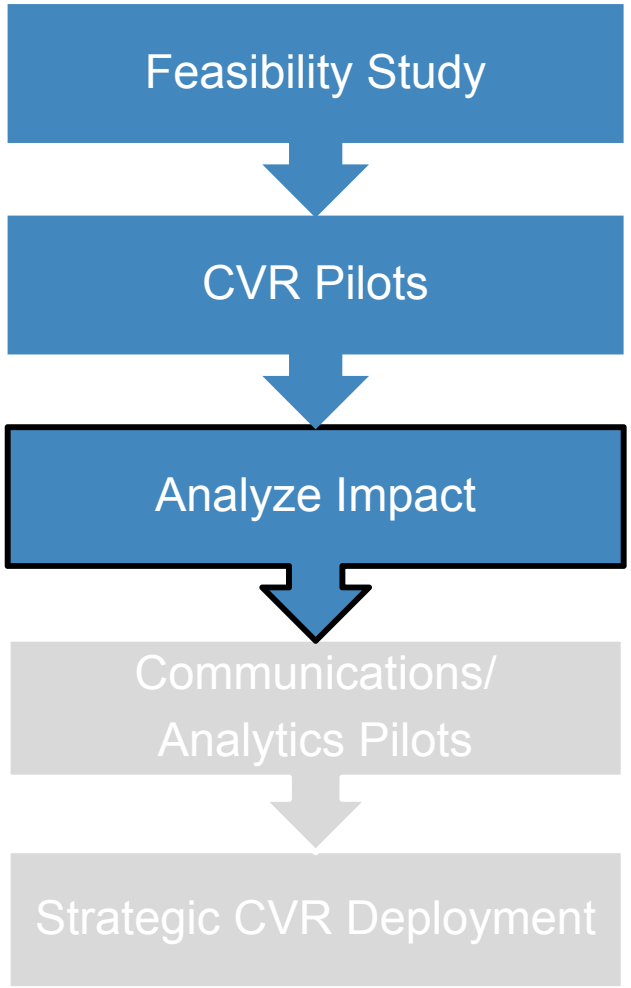
Pilot Results



Pilot Results

Season	Site	%kWh : 1% V[1]	Total % kWh[2]
Winter	Hogan	0.87 : 1	2.17 %
	Denny	0.99 : 1	2.47 %
Summer	Hogan	0.91 : 1	1.37 %
	Denny	0.94 : 1	1.41 %

[1] Percent of kWh reduction per 1% voltage reduction
[2] Total percentage of kWh reduction

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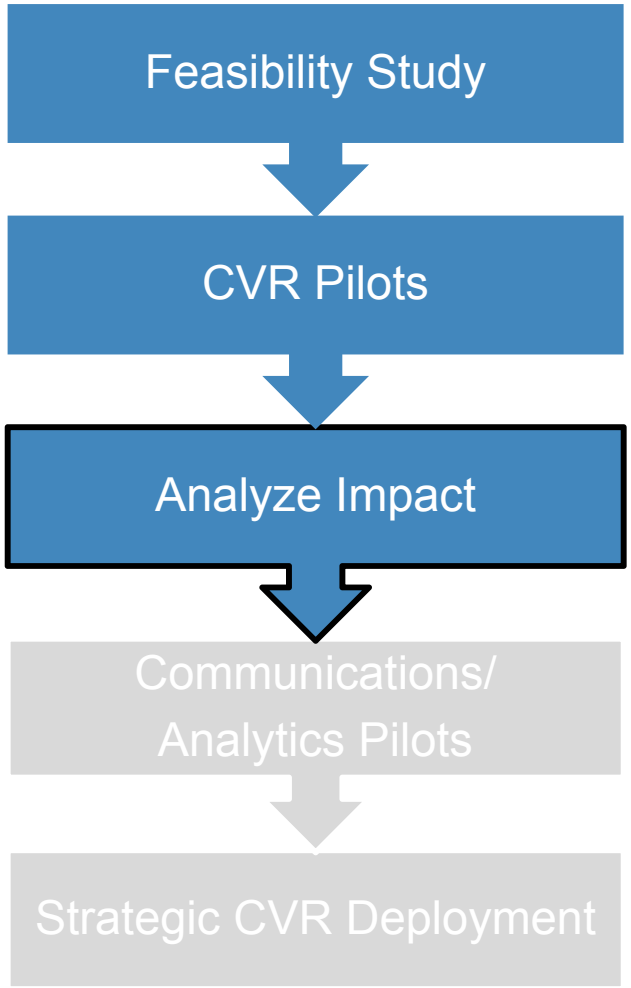
Pilot Results



25 Year NPV Analysis

Present Value of System Benefits	$ 2,530,945
Present Value of Costs	$ (671,872)
Net Present Value[1]	$ 1,859,073
Benefit Cost Ratio	3.77

[1] NPV Analysis was based on 25-year Study Period

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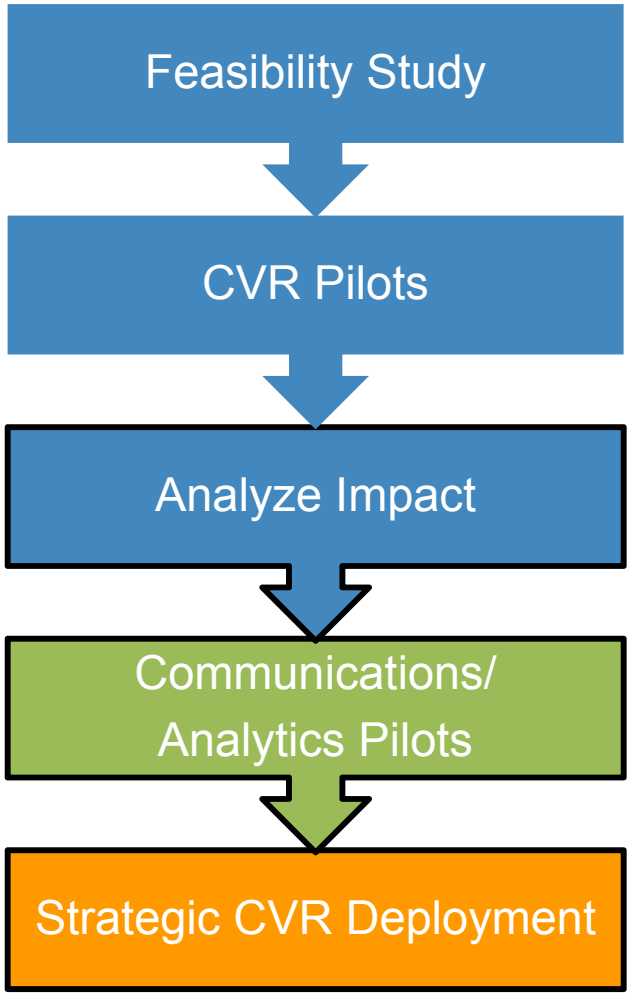
Next Steps



- Communication Network Pilot
  - Compatibility with Distribution Automation
- AMI Voltage Data Bandwidth Expansion
  - Visibility – Low Voltage Nodes
- BitStew Data Analytics R&D
  - Analyze AMI data
- Up to 94 candidate transformers for future CVR
  - 16 MWa annual customer energy savings

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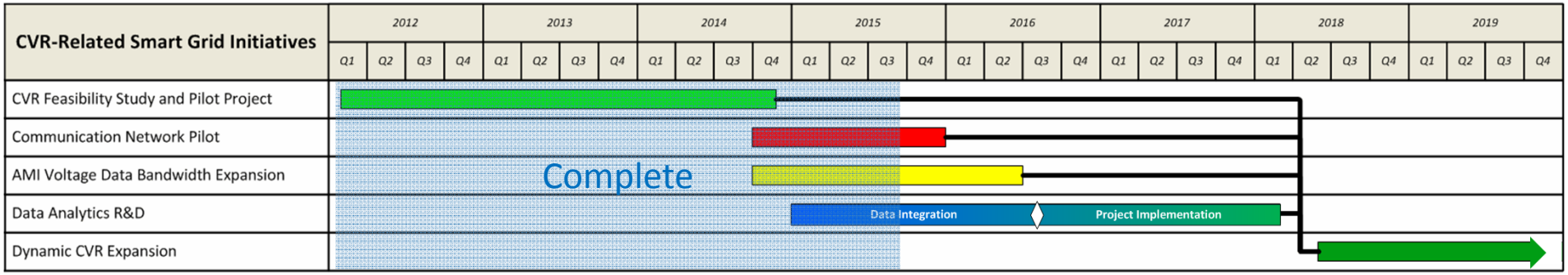
Timeline



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Questions?

- **CVR at PGE**
- Jonathon Robinson
- 503-464-8036

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Resources

- Northwest Energy Efficiency Alliance (NEEA)
- ANSI C84.1-1989 (National Voltage Standard)
- CYME Analysis for Simplified CVR (GRIDCO Systems)
- *Conservation Voltage Reduction: Initial Results* (PGE)
- *Conservation Voltage Reduction: Cost-Benefit Analysis (PGE)*

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Dispatchable Standby Generation (DSG) update

Agenda

- How DSG Works
- Program History
- Typical DSG Project Timeline
- Value of DSG
- Projected Growth of DSG

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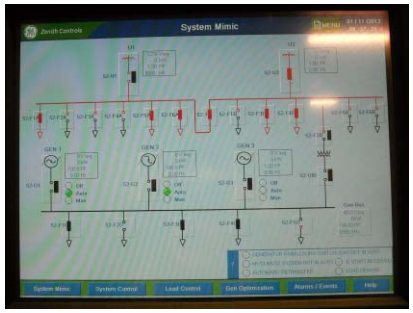
How DSG Works

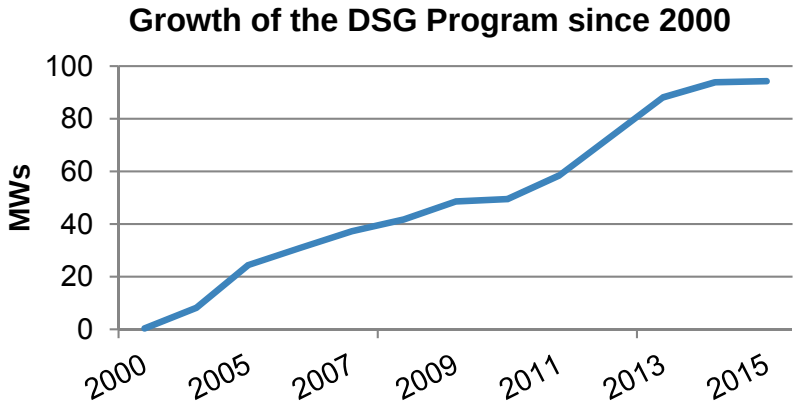
With PGE's Dispatchable Standby Generation (DSG), PGE puts our Customers' standby generators to work when needed by PGE.

- *PGE upgrades Customer system to enable parallel operation.*
- *PGE pays for most maintenance and operation costs.*
- *Customer gains reliability.*
- *Regular system testing under load for enhanced dependability.*
- *Operational support, remote monitoring, and alarming.*
- *Power quality monitoring.*
- *Improved emissions due to catalysts or other required abatement technology.*

HMI Screen



Switchgear



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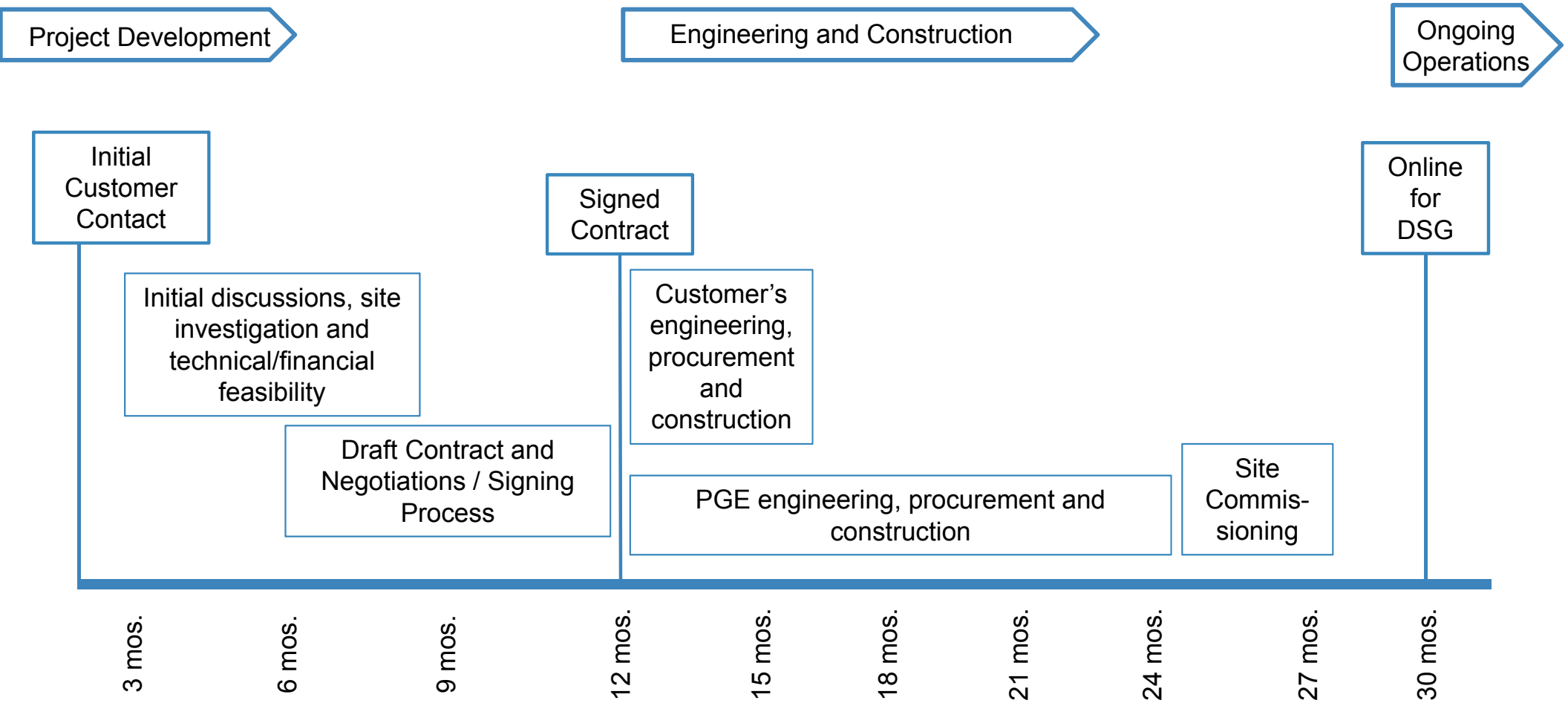
Program History

- 2000 Pilot Project: MacLaren Youth Correctional Facility, 0.4 MW.
- 2006: 25MW milestone with addition of Sunrise Water Authority Pump Station, 1.13 MW.
- 2011: 50MW milestone with addition of Oregon State Hospital, 3.6 MW.
- 2013: 75MW milestone with addition of ViaWest's D1 generator, 1.8 MW.
- 2014 EPA rules change to limit hours of operation.
- 2015: Expected 100 MW milestone with the addition of the Joint Water Commission Pump Station, 4.5 MW.

MacLaren's generator

World Trade Center brings in crane for next step in generator replacement project

Typical DSG Project Timeline



Total Cycle Time: approximately 30 months

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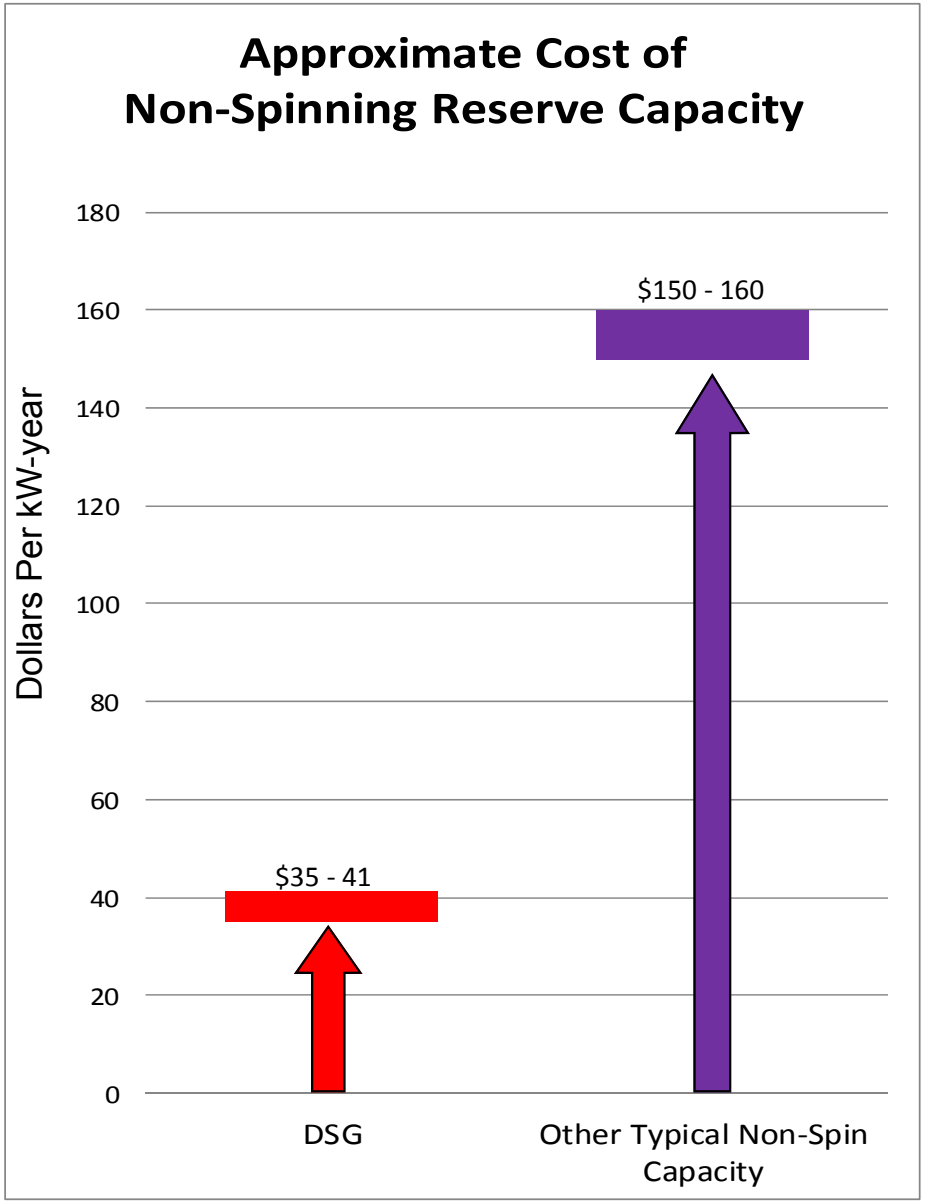
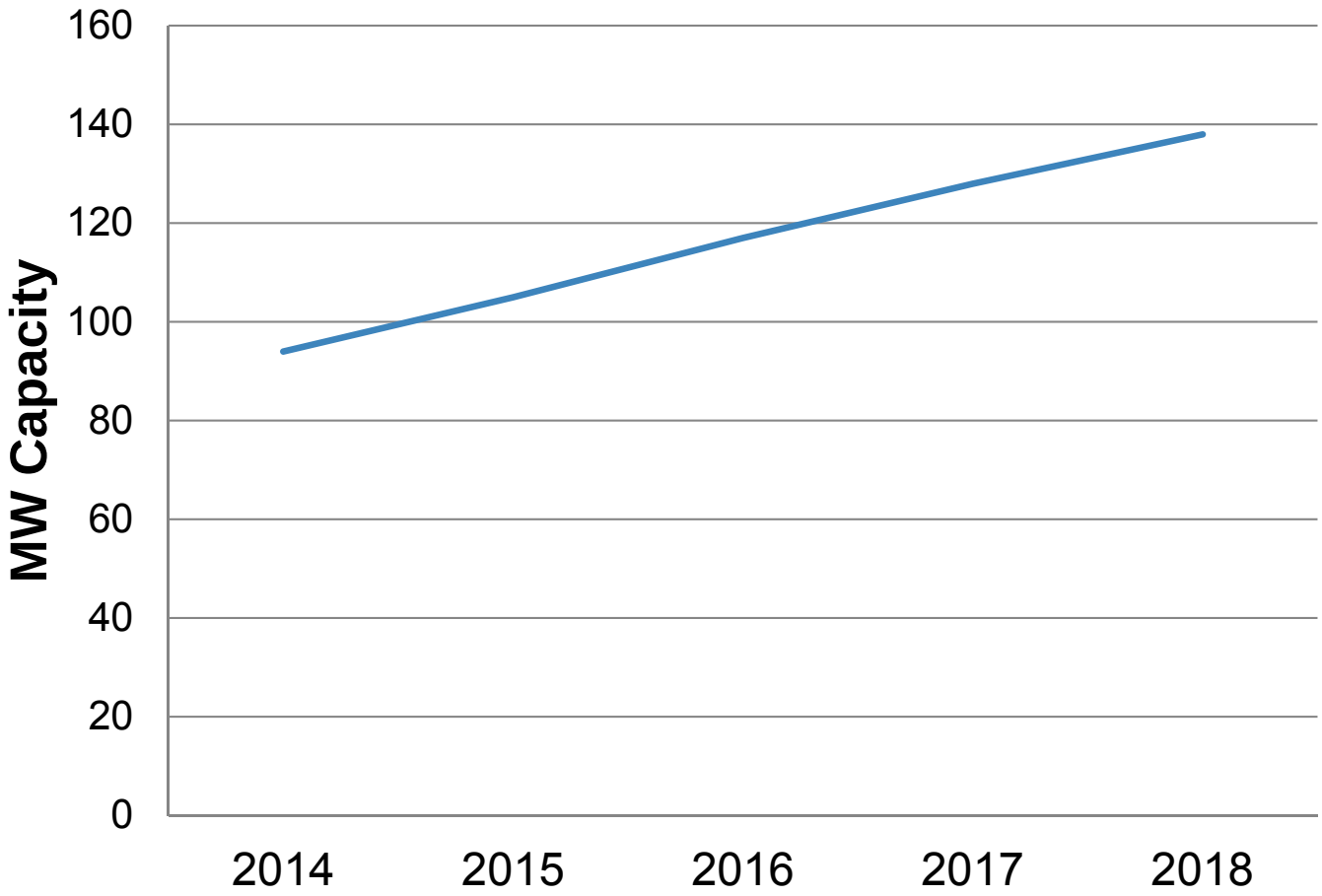
Value of DSG: PGE/Customer Benefit

- DSG cost is typically compared to the lowest cost alternative non-spinning reserve.
- A simple cycle turbine is a typical base-line for comparison.
- This comparison includes capital and O&M cost over 25 years.

City of Hillsboro's Joint Water Commission Pump Station – generator building under construction



Projected Growth of DSG



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Questions?

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Resource Optimization Model

PGE Resource Optimization Model (ROM) Study

Public Meeting #4

September 25, 2015

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Agenda

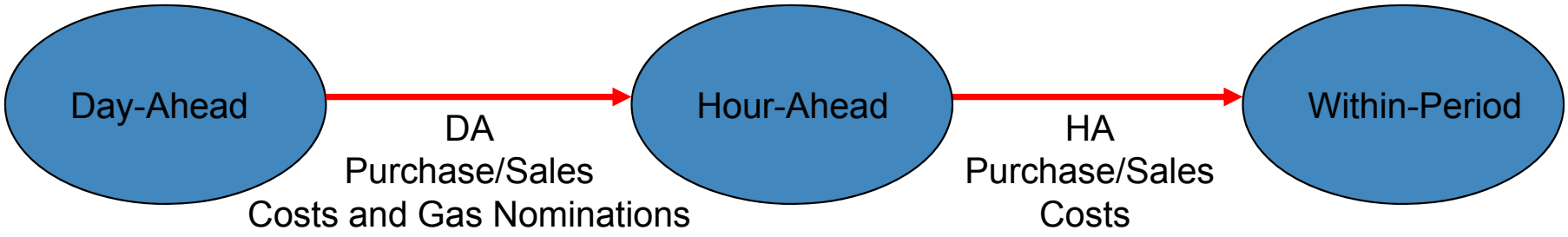
- What is ROM
- How does ROM work
- History
- 2016 IRP

ROM?

Question	Answer
Purpose	ROM's general goal is to estimate the incremental cost of fully self-integrating Variable Energy Resources into PGE's current or future resource portfolio.
What is it	A multi-stage, mixed integer optimization model that considers generation assets, fuel constraints, market availability, and reserve requirements.
Model Acceptance	Independent Technical Review Committee (TRC) and evaluation by external stakeholders in various proceedings.
Uniqueness	ROM is a PGE built model. ROM is constantly being upgraded to handle different VER integration questions. The ROM tool set includes: a virtual wind plant builder, virtual solar plant builder, reserve calculator, and optimization engine.
Advantages	ROM is a PGE-centric model and that focuses on optimizing both reserves and energy, while considering operational constraints (e.g. wear & tear costs, operating limits, fuel, etc.)

Model Stages

- One-year analysis consists of 52 one-week runs.
- Model is currently capable of running on a fifteen minute scheduling interval.
- The model is run in three stages corresponding to:
  - Day-Ahead (DA)
  - Hour-Ahead (HA)
  - Within Period (WP)
- Difference between each scenario's system operating costs from the third stage are used in assessing the costs of VER integration.



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What ROM Considers

Includes	Not Included
▪ Fuel Costs	▪ Capital Costs
▪ O&M Costs	▪ Personnel Costs
▪ Wear & Tear (Cycling) Costs	▪ Hardware/Software Costs
▪ Market Purchases & Sales	▪ Other Fixed Costs
▪ Hydro Limitations	▪ Forced Outage Rates
▪ Plant Characteristics	▪ Storage
▪ Market Dynamics	▪ Transmission Limitations

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ROM Then and Now

- ROM Then:
  - Developed as a result of PGE's 2009 IRP.
  - Single stage production cost model built in Excel using an Add-on solver.
  - Only goal was to estimate variable wind integration costs.
- ROM Today:
  - Accepted and Used to support IRP, General Rate Case/Annual Update Tariff proceedings, conduct internal economic analysis.
  - Multi-stage, flexible modeling platform using a state-of-the-art optimization engine.
  - Considers both wind and solar integration costs.

Evolution of ROM

Enhancement	Description
Sub-Hourly Dispatch	Fully integrated the ability to run the model down to 15 minute dispatch intervals.
Solar Plants and Reserves	Developed the ability to integrate solar generation and model unique solar sites.
Added Day-Ahead Block Purchase	Day-ahead transactions are restricted to on- and off-peak block purchases in order to reflect operations.
Enhanced Reserve Modeling	Inc and Dec reserves are modeled as asymmetric. Model captures associated energy that results from providing certain reserves.
Fuel Modeling	Improved how the model purchases and uses gas to more accurately represent operational realities.
Various Minor Updates	Upgraded from Excel to SQL Server. Added capability to feather wind economically. Model limited intra-dispatch period constraints.

IRP 2016 Study Scope

- Goal: Determine costs of integrating wind and solar generation into PGE's system
  - Target year: 2021
  - Existing PGE generating resources
    - Thermal resources include:
      - Beaver, Colstrip, Coyote Springs, DSG, Port Westward, Port Westward 2, and Carty.
      - Boardman retired
    - Hydro resource include:
      - Mid-Columbia hydro contracts, Westside hydro (run-of-river), and Deschutes hydro.
      - Mid-Columbia contracts adjusted to reflect diminished levels.
    - Assumes 1169 MW of wind and solar resources integrated by PGE's system
      - Existing wind resources: Biglow Canyon (450MW) and Tucannon River (267MW)
      - Proxy resources: Columbia Gorge wind (317MW) and Central Oregon solar (135MW).
  - Data derived from 2005 base year
    - NREL Western Wind and Solar Integration Study data for wind and solar facilities.
    - Stream flow data for Mid-Columbia and Eastside hydro resources.
    - PGE load data.

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2016 IRP Methodology

- 2016 IRP Scenarios:
  - Base case (PGE participation in 30/15)
  - PGE fully self-integrates existing wind (Biglow and Tucannon only)
  - PGE fully self-integrates existing wind and proxy wind resource
  - PGE fully self-integrated existing wind, proxy wind, and proxy solar resource
- Cost estimates from ROM are derived by computing the difference between two unique scenarios.
  - Typically, a “with” compared to “without” or “base” scenario
  - Example: Difference between scenario 1 and 2 above represents incremental variable system costs for moving from 30/15 to full self-integration of PGE’s existing wind resources.
- Cost estimates are used by PGE’s IRP team as a portfolio cost adder for the applicable portfolios.

Future of ROM

- ROM is a continuously evolving model.
- PGE internal ROM group is constantly assessing potential model enhancements and future applications.
- Possibilities include:
  - Developing resource technologies
  - Delivery constraints
  - Portfolio response to different resource types

External Contributors

Technical Review Committee:

- J. Charles Smith, Executive Director
  - Utility Variable-Generation Integration Group (UVIG)
- Michael Milligan, Ph.D.
  - National Renewable Energy Laboratory (NREL)
- Brendan Kirby, P.E.
  - Consultant with NREL
- Michael Goggin, Manager of Transmission Policy
  - American Wind Energy Association (AWEA)
- Bob Zavadil, E.E., Executive VP of Power Systems Consulting
  - EnerNex Corporation

Modeling Consultant:

- Jennifer A. Hodgdon, Ph.D.
  - Poplar ProductivityWare

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Questions

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Appendix

2016 IRP: Feedback Status

Topic	Feedback Received	Resolution	Completed
General	Passing the mic was cumbersome.	For stakeholder questions, provide a stationary microphone at a podium or mics at each table.	4/13/2015
Process	Why is schedule different on handout?	Update schedule slides to account for automation. Plan to revise and post updated slide deck to website and include summary update in 'thank you' email.	4/9/2015
Process	Is schedule firm or can the November 18th date be adjusted? (Power Council has important meeting on November 18)	Moved IRP meeting to November 20th.	4/9/2015
Process	Can the October 23rd date be adjusted? (CUB has important meeting on October 23)	Moved IRP meeting to October 21st.	4/9/2015
Environmental Policy	Why will climate data set be a scenario instead of a base case?	PGE to consider suggestion after vetting data.	
Environmental Policy	Does PGE place any type of weather weighting on load forecast?	PGE uses 15-year average weather, with rolling updates	

2016 IRP: Feedback Status

Topic	Feedback Received	Resolution	Completed
Load Forecast Methodology	For future discussion, how is the ETO forecast in later years developed?	PGE to address questions about EE projection in the future. Refer to April 2nd Slide 31.	Est. 7/15/15 and 7/16/15
Load Forecast Methodology	Comment on in-fill vs. suburban sprawl – suggestion to be cautious about moving to more standard household variables	PGE to take note.	4/8/2015
Load Forecast Methodology	Request to show load growth with and without EE.	PGE to meet this request.	Est. 8/13/2015
Load Forecast Methodology	What % of PGE service territory is within the urban growth boundary?	90% of the UGB is within PGE Service Territory UGB is 822.7 sq. mi. PGE SVC Territory is 7532.2 sq. mi. Overlap is 741.6 sq. mi.	4/8/2015
Environmental Policy	Will temperature data drive (1) increased cooling demand and (2) an acceleration of cooling device purchases?	PGE to follow-up internally with load forecast staff.	Est. 8/13/2015 (with scenarios and climate change weather discussion)

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2016 IRP: Feedback Status

Topic	Feedback Received	Resolution	Completed
Demand Response	How is PGE using the convergence of EE and DR programs, and avoiding over-counting benefits?		
Demand Response	What happened to the EV charging pilot?		
Demand Response	What is the preferred method of evaluating the cost effectiveness of DR in Oregon?		
Demand Response	Would PGE provide a copy of the DR study, along with the assumptions (particularly materials supporting the basis for electric heating load control)?		
Flexible Capacity Study	Rather than focusing on how renewable curtailment can reduce the trough of the duck, can PGE assess how to change the slope of the neck? (Reference- “Teaching the Duck to Fly”)		

2016 IRP: Feedback Status

Topic	Feedback Received	Resolution	Completed
Flexible Capacity Study	Can a scenario be included where market imports are not zero in the summer?		
Flexible Capacity Study	Can the Flexible Capacity Study include a range of CO_2 prices?		
Futures	Can there be discussions about the Clean Power Plan and mass vs. rate-based modeling?		
Portfolios	How will the results of the Flexible Capacity Study inform portfolio scoring? How will REFLEX work with Aurora to help PGE insure that each type of capacity is appropriately valued? (Link between REFLEX and Aurora (i.e., adders)		
Portfolios	Can there be a consideration about the terminology of “reliable percentage” vs. “dependable capacity”?		

2016 IRP: Feedback Status

Topic	Feedback Received	Resolution	Completed
Portfolios	Stakeholders would like to see portfolios that intuitively account for the geographical diversity of renewables (i.e., better examples than Gorge wind).		
PRM Study	What is PGE's definition of dependable hydro capacity or what does it mean in this context? What method was used to create PGE's estimates?		
PRM Study	When will PGE share the other portions of the reliability assessment (in addition to the statistics presented at the meeting)?		
PRM Study	How will risk adjustment measures fit in with the PRM study?		
PRM Study	What was the market import assumption?		

2016 IRP: Feedback Status

Topic	Feedback Received	Resolution	Completed
PRM Study	Can PGE provide clarification on the net capacities used in winter and summer?		
PRM Study	Why does DSM not change from winter to summer?		
PRM Study	Can energy efficiency be pulled out of load forecast and shown as a capacity resource?		
Wind Integration	How does the wind integration study intersect with an EIM?		

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2016 IRP: Meeting Schedule And Planned Topics

Q2/Q3 2015

April 2 — Meeting #1 Public
- Welcome
- Load Forecast Methodology
- Load/Resource Balance
- Environmental Policy

July 6 — Workshop #1 Commission (Salem)
- EIM Study Update
- 111(d) Representation

July 15 — Workshop #1 Technical
- Load Forecast Methodology Implementation
- Load Forecast Results

July 16 — Meeting #2 Public
- Load Forecast
- Energy Efficiency Forecast
- Supply-side Resource Assumptions
- Solar/Dist. Generation Study Presentation

Public Meeting

Technical Workshop

Technical Workshop with Commission Present

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2016 IRP: Meeting Schedule And Planned Topics

Q3 2015 (Tentative)

August 13

Meeting #3
Public

- *Development*
  - *Demand Response*
  - *Flexibility Study*
  - *Planning Reserve Margin*
  - *Portfolios and Futures Ideation*
- *Analysis*
  - *Load Forecast*
  - *Natural Gas Forecast*

September 25

Meeting #4
Public

- *Development*
  - *111(d) Rule update*
  - *Climate Study review*
  - *CVR Update*
  - *DSG Update*
- *Analysis*
  - *ROM Update*
- *Results*
  - *General Updates*

Public Meeting

Technical Workshop

Technical Workshop with Commission Present

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