



2015 Integrated Resource Plan

Public Input Meeting 2

July 17-18, 2014

PACIFICORP

Rocky Mountain Power
Pacific Power
PacifiCorp Energy

Agenda

Day One

- Introductions
- Environmental Policy
- Renewable Portfolio Standards
- *Lunch Break (1/2 hour) 11:30 PT/12:30 MT*
- Transmission
- Portfolio Development

Day Two

- Sensitivities and Risk Analysis Process
- DSM Potential Study
- *Lunch Break (1/2 hour) 11:30 PT/12:30 MT*
- Load Forecast





2015 Integrated Resource Plan

Environmental Policy

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Environmental Policy Overview

- Clean Air Act 111(b)
- Clean Air Act 111(d)
- Regional Haze Updates
- Air Quality Issues
- Coal Combustion Residual Regulation
- Clean Water Act 316(b)

Clean Air Act 111(b)

- Greenhouse gas (GHG) New Source Performance Standards (NSPS) for fossil-fueled electric generating units
- Re-proposed in January 2014 at a level of 1,000 lbs/MWh for large natural gas-fueled units and 1,100 lbs/MWh for coal-fueled units
- Public comment period closed May 9, 2014

Clean Air Act 111(d) – Overview

- Carbon regulation of existing fossil-fueled electric generating units proposed June 2, 2014
- EPA accepting comments through October 16, 2014
- Final rule expected June 2015 with state plans due June 2016 or, with requested extension, June 2017 (for individual state plans) or June 2018 (for multi-state plans)

Clean Air Act 111(d) – BSER

- EPA establishes "best system of emission reduction" (BSER) while states establish standard of performance to meet BSER
- EPA proposed BSER establishes state-by-state emission rate (lb/MWh) goals based on four "building blocks"
  - Efficiency improvements at the plant
  - Increased utilization of existing natural gas-fueled units
  - Increased deployment of zero-emitting resources
  - Energy efficiency

Clean Air Act 111(d) – BSER, con't

- Emission rate goal calculated from 2012 emissions based on "portfolio" basis, i.e., all (with some exceptions) resources within a state
- Goal must be met by 2030 via a 2020-2029 glide path with biennial plans to show reasonable progress
- States may propose a mass-based (tons CO_2) emission goal rather than rate-based

Clean Air Act 111(d) – BSER, con't

- Four "building blocks" of BSER formula including proposed assumptions regarding achievable emissions reductions
  - 6% average heat rate improvement fleet-wide
  - Increased utilization of existing natural gas combined cycle plants up to 70% capacity factor
  - Increased deployment of low- and zero-carbon resources with a regional goal based on existing renewable portfolio standard programs
  - End-use energy efficiency1.5% of load annual increase; 10.7% cumulative increase

Clean Air Act 111(d) – BSER, con't

- Examples of BSER calculation, for PacifiCorp states

PacifiCorp States	2012 fossil rate (lbs/MWh)	2012 emission rate with fossil, creditable RE, and nuclear	Building Block 1	Building Blocks 1&2	Building Blocks 1, 2, & 3	Building Blocks 1, 2, 3, & 4	% change from 2012 fossil rate to 2030 final state goal	% change from 2012 rate with fossil, creditable RE, and nuclear to 2030 final state goal
Washington	1,379	756	728	444	298	215	84%	72%
Idaho	858	339	339	339	291	228	73%	33%
Oregon	1,081	717	701	565	452	372	66%	48%
California	900	698	697	662	615	537	40%	23%
Utah	1,874	1,813	1,713	1,508	1,454	1,322	29%	27%
Wyoming	2,331	2,115	1,988	1,957	1,771	1,714	26%	19%

Clean Air Act 111(d) – state compliance

- States must develop state plans (states can enter into multi-state plans) to meet the established emission rate goal
- State compliance mechanisms are flexible and do *not* need to be based on the four building blocks used to establish BSER
- States may propose any combination of measures so long as they meet EPA established criteria for verification, measurability, and enforceability

Clean Air Act 111(d) – legal & policy issues

- Historically, section 111(d) has seldom been used by EPA so relatively little legal precedent exists
  - EPA "outside the fence" (i.e., introduction of renewables and energy efficiency) approach for establishing BSER has not been tested in court
  - Proposed regulation under the Clean Air Act includes entities that do not own or operate electric generating units
  - Litigation has already been filed, which may impact timing

Clean Air Act 111(d) – legal & policy issues

- Significant unresolved policy issues remain that are likely to impact states' compliance choices and likelihood of multi-state approaches
  - Treatment of new natural gas combined cycle units for compliance (calculation of BSER does not include new NGCC)
  - Treatment of out of state resources used for compliance with in state RPS (calculation of BSER assumes resources physically located within a state only)
  - Treatment of unbundled renewable energy credits
  - How compliance action will be allocated to affected entities or mandate offsetting actions by other entities (within a particular state or among states)

Clean Air Act 111(d) – next steps

- PacifiCorp conducting analysis and assessment of potential 111(d) scenarios which will be incorporated into IRP
- Important additional considerations
  - Impact on near-term investments decisions – regional haze and other environmental compliance requirements remain
  - Impact to multi-jurisdictional cost allocation methodologies (will be assessed outside of IRP)

Clean Air Act 111(d) – next steps, con't

- PacifiCorp will work with states where possible to resolve outstanding policy issues, develop comments to EPA and ultimately develop state plans
- PacifiCorp will also develop and submit comments on the proposed rule

Regional Haze Update – Arizona

- On December 5, 2012, EPA disapproved portions of the Arizona SIP and issued a FIP
  - The FIP requires installation of SCR on Cholla Unit 4 by January 4, 2018 and instituted an averaged No_x emission rate of 0.055 lb/MMBtu for Cholla Units 2, 3, and 4
- PacifiCorp and State of Arizona filed appeals to the FIP with U.S. 9th Circuit Court of Appeals
  - Decision on appeals expected mid-2015
  - Environmental groups participating in litigation in support of EPA
- PacifiCorp is engaged with EPA and the Arizona Department of Environmental Quality in discussions regarding potential compliance alternatives for Cholla Unit 4

Regional Haze Update – Colorado

- In September 2012, EPA approved the Colorado Regional Haze SIP, including the following requirements for PacifiCorp co-owned units
  - Hayden Unit 1 SCR by June 15, 2015
  - Hayden Unit 2 SCR by June 15, 2016
  - Craig Unit 1 LNB/SNCR by January 30, 2018
  - Craig Unit 2 SCR by January 30, 2018
- Environmental groups filed appeals to EPA approval of Colorado SIP, specifically to requirements for Craig Units 1 and 2
  - PacifiCorp intervened in appeal
  - Settlement discussions are ongoing

Regional Haze Update – Utah

- EPA final action on the Utah Regional Haze SIP was effective January 14, 2013
  - EPA approved the SO_2 portions of the SIP but disapproved the NO_x and PM portions
    - Both aspects of SIP were appealed
    - On May 6, 2014 the U.S. 10th Circuit Court of Appeals dismissed PacifiCorp's and Utah's appeal on the NO_x and PM portions; PacifiCorp and Utah filed motions for rehearing, which are pending awaiting 10th Circuit decision on the SO_2 portion
  - EPA did not issue a FIP, providing that Utah complete its five-factor analysis and revise its SIP as necessary
    - Utah five-factor analysis is in progress

Regional Haze Update – Wyoming

- On January 10, 2014, EPA issued a final action largely approving Wyoming original SIP
  - SCRs required for Jim Bridger Units 1-4 (Unit 3 by 12/31/2015, Unit 4 by 12/31/2016, Unit 2 by 12/31/2021, Unit 1 by 12/31/2022)
  - SCR and baghouse at Naughton Unit 3 by December 31, 2014
  - SCR within five years or a commitment to shut down in 2027 at Dave Johnston Unit 3
  - SCR at Wyodak by March 2019
- PacifiCorp proposed to convert Naughton Unit 3 to natural gas, which was supported in EPA final action
  - State of Wyoming issued construction permit to convert the unit to natural gas in 2018 as an alternate compliance approach and amended the BART permit to allow gas conversion
- PacifiCorp and other parties filed administrative and judicial appeals to EPA final action
  - PacifiCorp appeal is specific to Wyodak requirement
  - Appeals remain pending

Air Quality Issues

- Mercury and Air Toxics Standards (MATS)
  - Compliance deadline April 16, 2015
  - Emission reduction projects completed to date or currently permitted or planned are expected to be consistent with achieving MATS requirements
  - PacifiCorp continues to plan for retirement of the Carbon facility in early 2015
- National Ambient Air Quality Standards (NAAQS)
  - One-hour NO2 standard; all areas of the country designated as unclassifiable; EPA to redesignate attainment areas based on expanded ambient monitoring network by 2017
  - One-hour SO2 standard; EPA final designations in July 2013; many areas determined to be unclassifiable and will be redesignated in 2017 based on combination of ambient monitoring and facility modeling
  - Fine particulate (PM2.5) standard; EPA notification in May 2010 to states that failed to submit compliant SIPs (including UT and WY); additional designations anticipated by December 2014; states would have until 2020 to be in attainment
  - Ozone standard is to be readdressed by October 2015 by court order; however, EPA anticipates issuing a proposed standard in late 2014

Other Issues

- Coal Combustion Byproduct Regulation
  - In 2010, EPA issued a proposed rule to regulate coal ash under the Resource Conservation and Recovery Act
  - A final rule has not yet been issued, however, EPA is expected to issue a final rule in 2014
- Clean Water Act 316(b)
  - EPA issued final rule on May 19, 2014 for cooling water intake structures at existing facilities
  - Rule allows seven compliance options to address impingement and to assess best technology options for entrainment
  - Impact on PacifiCorp facilities not expected to be significant as most PacifiCorp facilities do not have once-through cooling
- Effluent Limit Guidelines
  - Technology-based effluent limit guidelines for Steam Electric Power Generating Point Source Category have been in place since 1974
  - EPA proposed revised effluent limit guidelines in April 2013
  - Guidelines expected to be final September 2015 per revised consent decree

Questions





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Renewable Portfolio Standards

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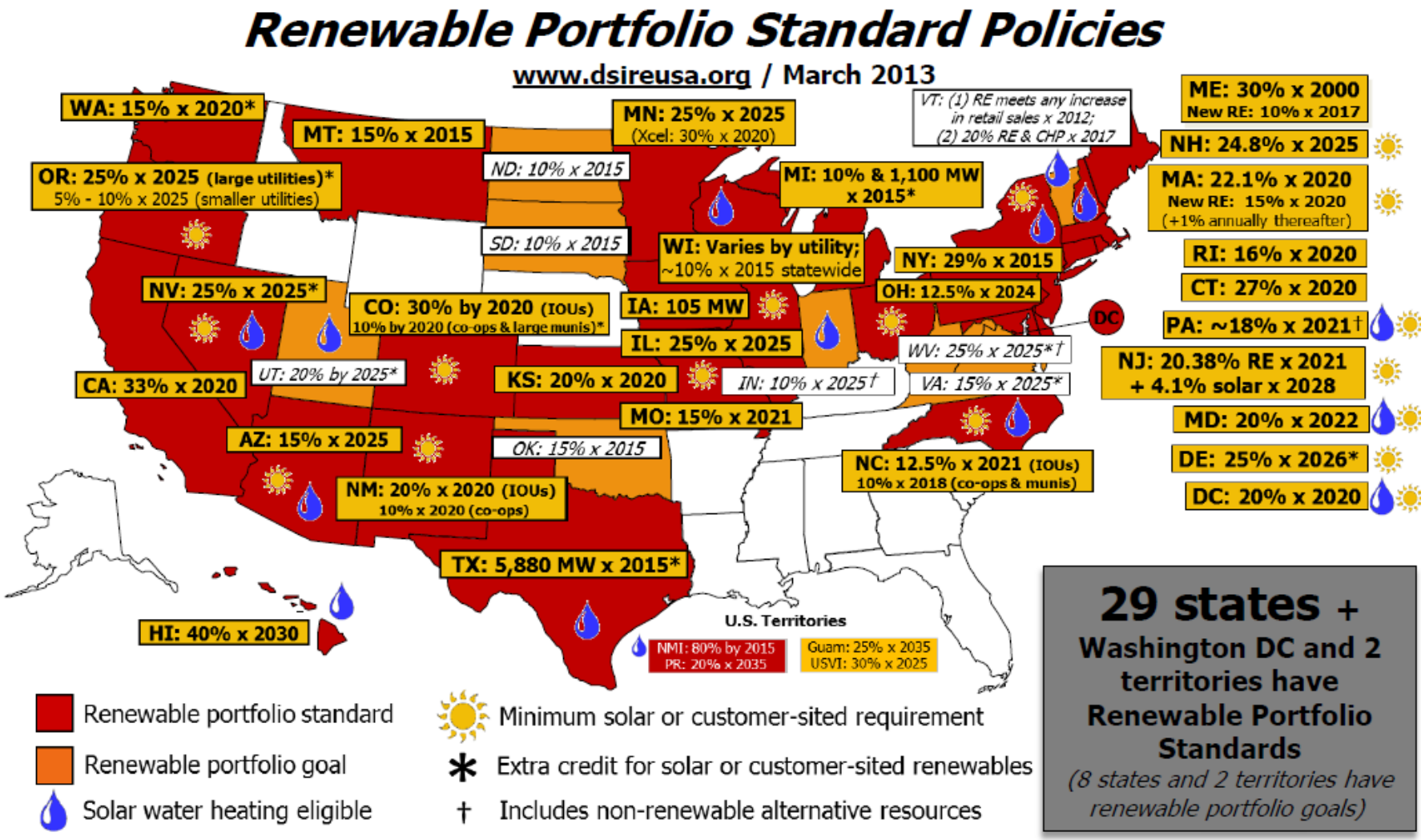
Renewable Portfolio Standards - Overview

- **Renewable Portfolio Standards (RPS)**
  - A requirement on retail electric suppliers…
  - to supply a minimum percentage or amount of their retail load…
  - with eligible sources of renewable energy.
- ***Typically*** backed with penalties of some form
- ***Often*** accompanied by a tradable renewable energy credit (REC) program, to facilitate compliance
- ***Never*** designed the same in any two states

State Renewable Portfolio Standard Policies



Source: DSIREUSA. ORG

Renewable Portfolio Standards - PacifiCorp

	CA	OR	WA	UT
Legislation	• Senate Bill 1078 (2002) • Assembly Bill 200 (2005) • Senate Bill 107 (2006) • Senate Bill 2 First Extraordinary Session (2011)	• Senate Bill 838, Oregon Renewable Energy Act (2007) • House Bill 3039 (2009)	• Initiative Measure No. 937 (2006) • Senate Bill 5400 (2013)	• Senate Bill 202 (2008)
Requirement or Goal	• 20% by 2010 • Average of 20% through 2013 • 25% by December 31, 2016 • 33% by December 31, 2020 and beyond • Based on the retail load for that compliance period	• At least 5% of load by December 31, 2014 • At least 15% by December 31, 2019 • At least 20% by December 31, 2024 • At least 25% by December 31, 2025 and thereafter • Based on the retail load for that year • Invest in 20 MW solar by January 1, 2020 -- PGE, PacifiCorp and Idaho Power combined	• At least 3% of load by January 1, 2012 • At least 9% by January 1, 2016 • At least 15% by January 1, 2020 • Annual targets are based on the average of the utility's load for the previous two years	• Goal of 20% by 2025 (must be cost effective) • Annual targets are based on the adjusted retail sales for the calendar year 36 month prior to the target year • Adjustments for generated or purchased from qualifying zero carbon emissions and carbon capture sequestration and DSM

Other RPS Criteria

	CA	OR	WA	UT
Geographic Eligibility	WECC	WECC	Pacific Northwest*	WECC
REC Products Types and Limitations	• Product Content Category (PCC) 1, 2 and 3 • PacifiCorp not subject to PCC limits	• Bundled • Unbundled limited to 20% of Annual Target, unless from a QF	• Bundled • Unbundled • Eligible Renewable Generation	• Bundled • Unbundled limited to 20% of Annual Target
"Banking"	RECs must be retired within 36 months	Unlimited	RECs from prior, current and subsequent period may be used	Unlimited
Credit Multipliers	• None	• 2x: Utility Owned Solar	• 1.2x: Apprentice Program • 2x: Distributed Generation	• 2.4x: Solar PV or Solar Thermal
Alternative Compliance	No	Yes	Yes	Yes
Cost Containment	Yes, in development	4% of Revenue Requirement	4% of Revenue Requirement	Must be cost effective

*Except for Multi-State Utilities, See SB 5400





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Transmission Overview & Approach

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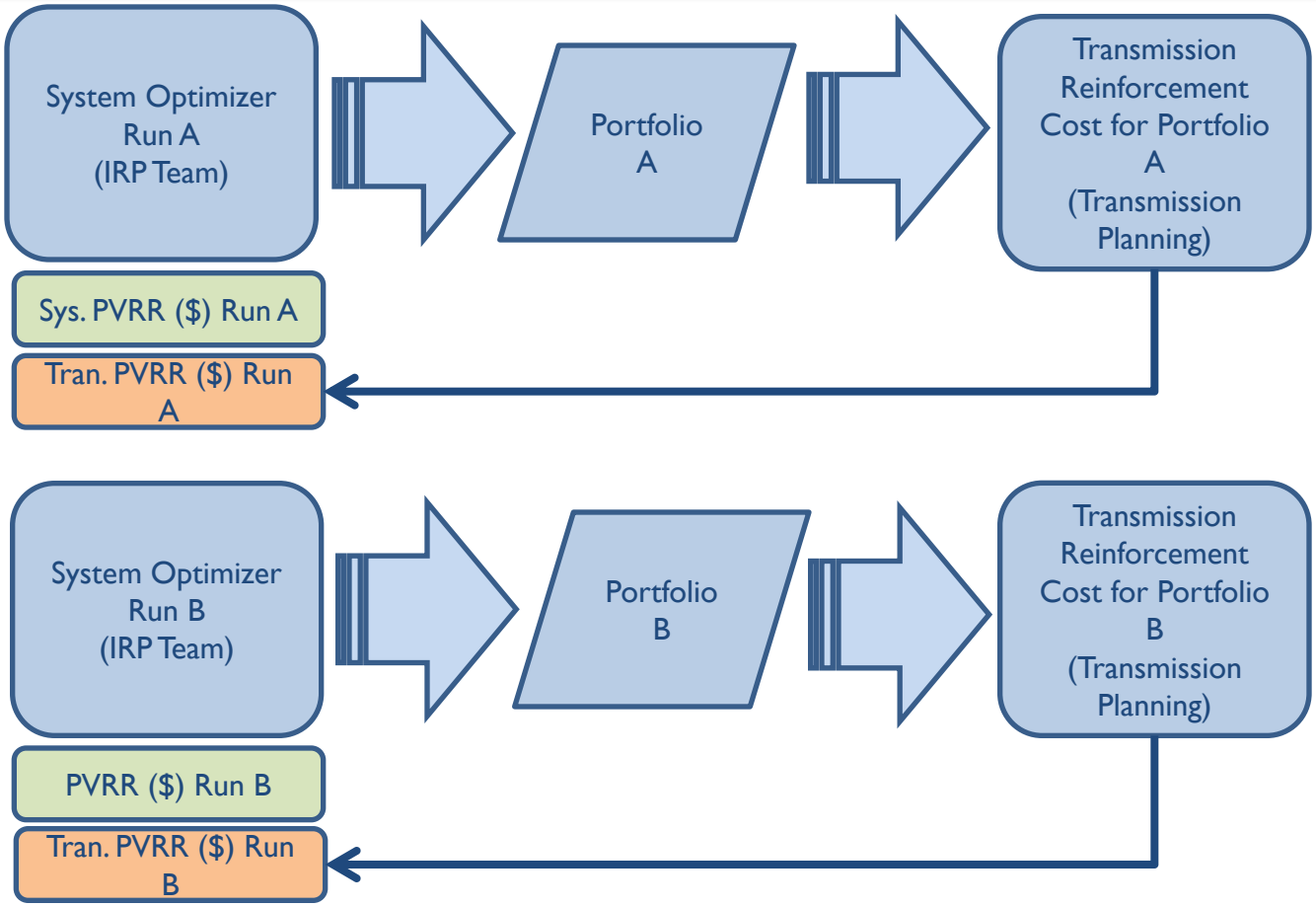
Transmission Agenda

- Transmission in coal analysis
- Transmission planning overview
- Energy Gateway overview and updates
- Wyoming transmission constraints
- Impact of generation retirements on transmission
- Impact of renewable resources on transmission
- System Benefit Tool analysis

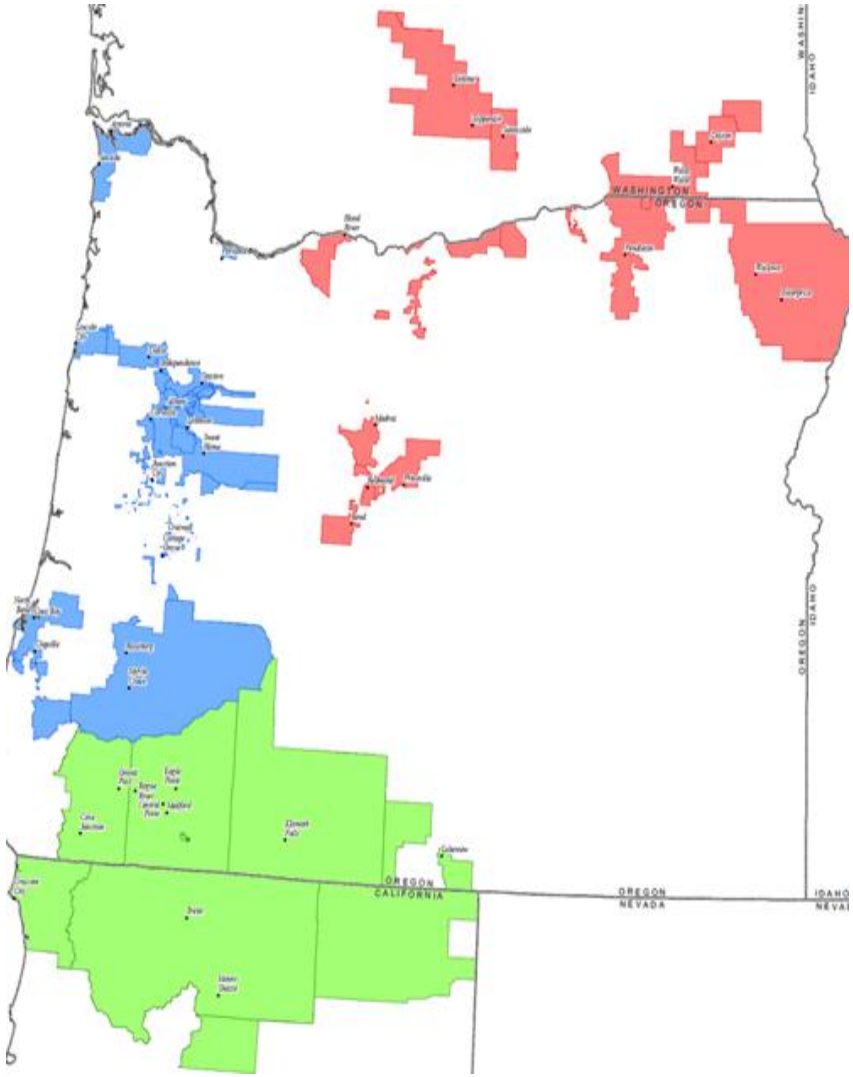
Assessment of Transmission Reinforcements in Coal Analysis



PVRR(d) w/ Transmission Reinforcement Cost = Tran. PVRR Run A – Tran. PVRR Run B

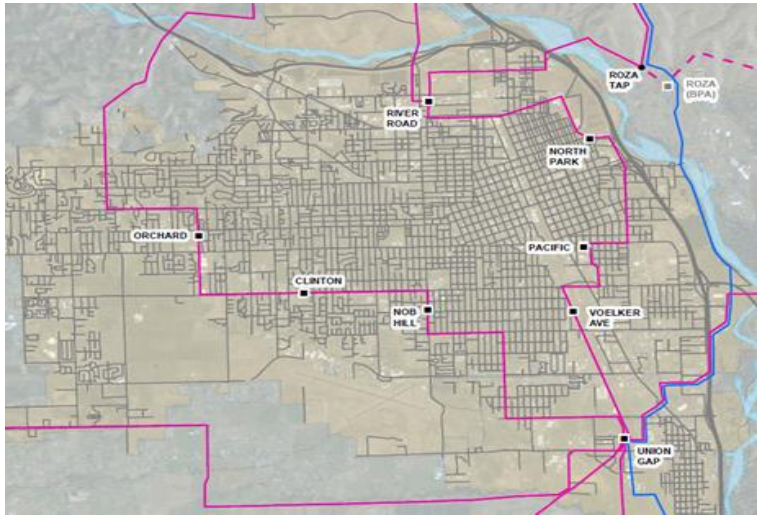
Transmission Planning Overview

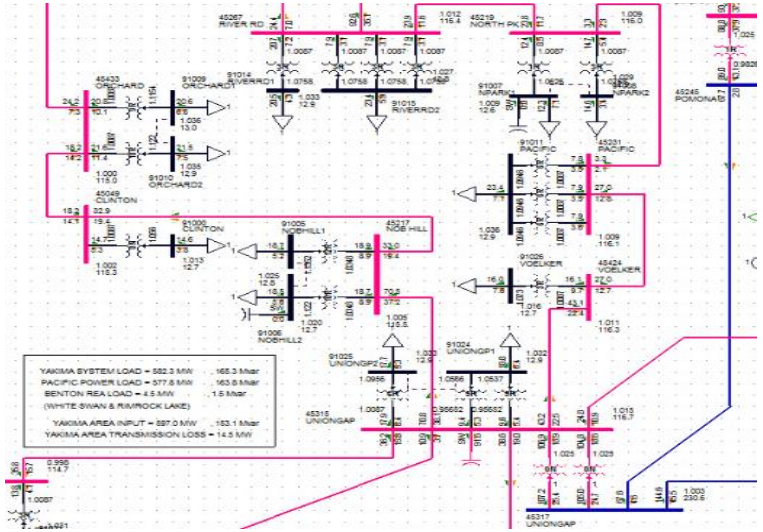
- Transmission planning engineers study and analyze the transmission system in order to:
  - Identify constraints or overloads
  - Connect new loads or resources
  - Maintain or improve reliability
  - Evaluate the system against NERC, WECC, and PacifiCorp operability and reliability criteria and ensure compliance with all standards



Typical Transmission Studies

- 5 year local transmission studies by region
- Annual NERC TPL studies
- Annual network load & resource studies
- Generation interconnection studies
- Transmission service request studies





Typical Assumptions Needed for Studies

- Load growth for study area
- Location of new loads or resources
- Specific load profiles or resource types
- Any existing load or resource changes
- Any planned system changes that will be completed during the study timeframe
- Identify which WECC base case(s) to use for the study including any model updates

Gateway West Overview

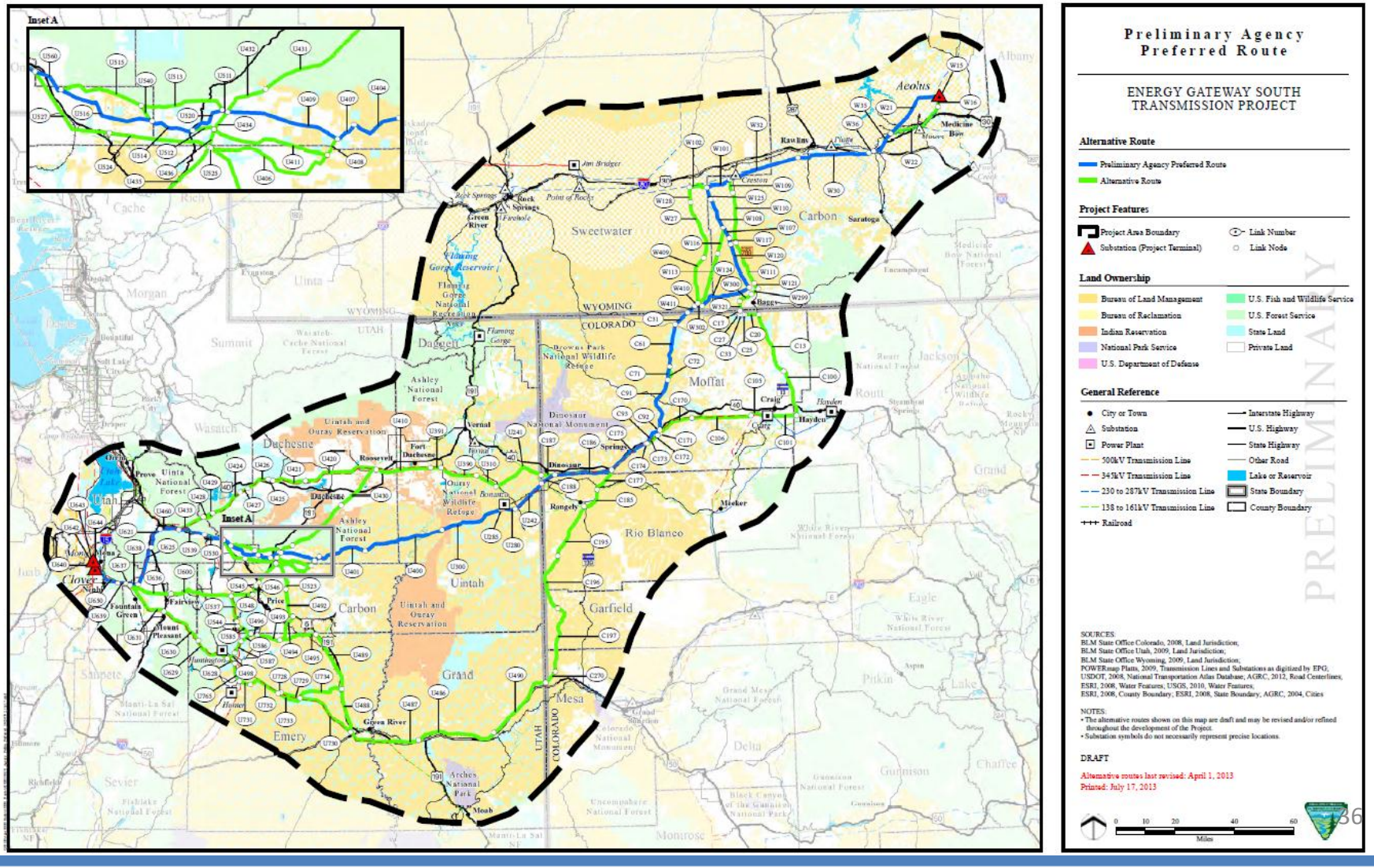
- Windstar to Populus (Energy Gateway Segment D)
  - Approximately 488 miles
    - 131 miles at 230 kV from Windstar to Aeolus
    - 357 miles at 500 kV from Aeolus to Populus
- Populus to Hemingway (Energy Gateway Segment E)
  - Approximately 500 miles at 500 kV

Gateway West Permitting Update

- U.S. Forest Service
  - Issued 2 records of decision in September 2013
- BLM
  - Issued a record of decision November 14, 2013
    - Windstar to Populus (Segment D) and Populus to Midpoint and Populus to Cedar Hill (Segment E partial)
  - Permitting continues on remaining portions of Segment E from Midpoint to Hemingway and Cedar Hill to Hemingway
    - Record of decision expected in late 2015

Gateway South Overview

- Aeolus to Mona (Energy Gateway Segment F)
  - Approximately 400 miles at 500 kV



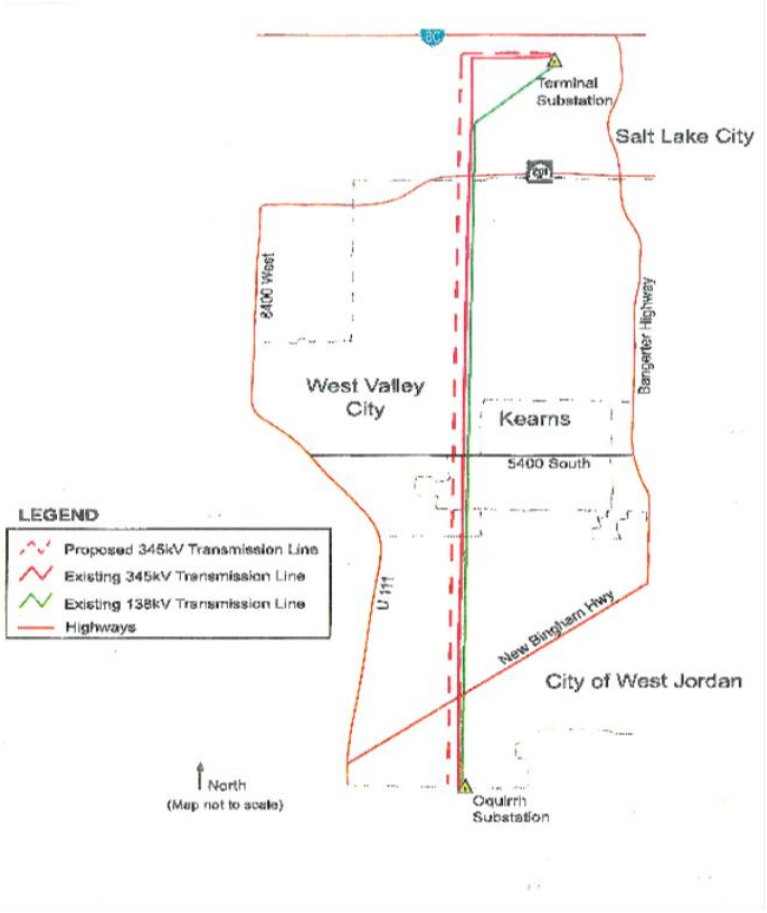
Gateway South Permitting Update

- Gateway South
  - Issuance of draft environmental impact statement received February 2014

- TransWest Express (TWE) Project
  - 725 mile, 600 kV HVDC transmission line
    - Interconnection request to PacifiCorp transmission system
  - Draft environmental impact statement issued July 2013
  - On-going siting coordination between TWE and PacifiCorp

Oquirrh to Terminal

- Approximately 14 miles, double circuit 345 kilovolt line
- Improves reliability and load service
  - Increases south to north transfer capability
  - Corrects TPL violation
  - Increases operational flexibility
- Line route mainly on existing right-of-way
- Line connects Populus-Terminal and Mona-Oquirrh lines
- No federal permitting required
- Target in-service date – May 2020



Wallula to McNary

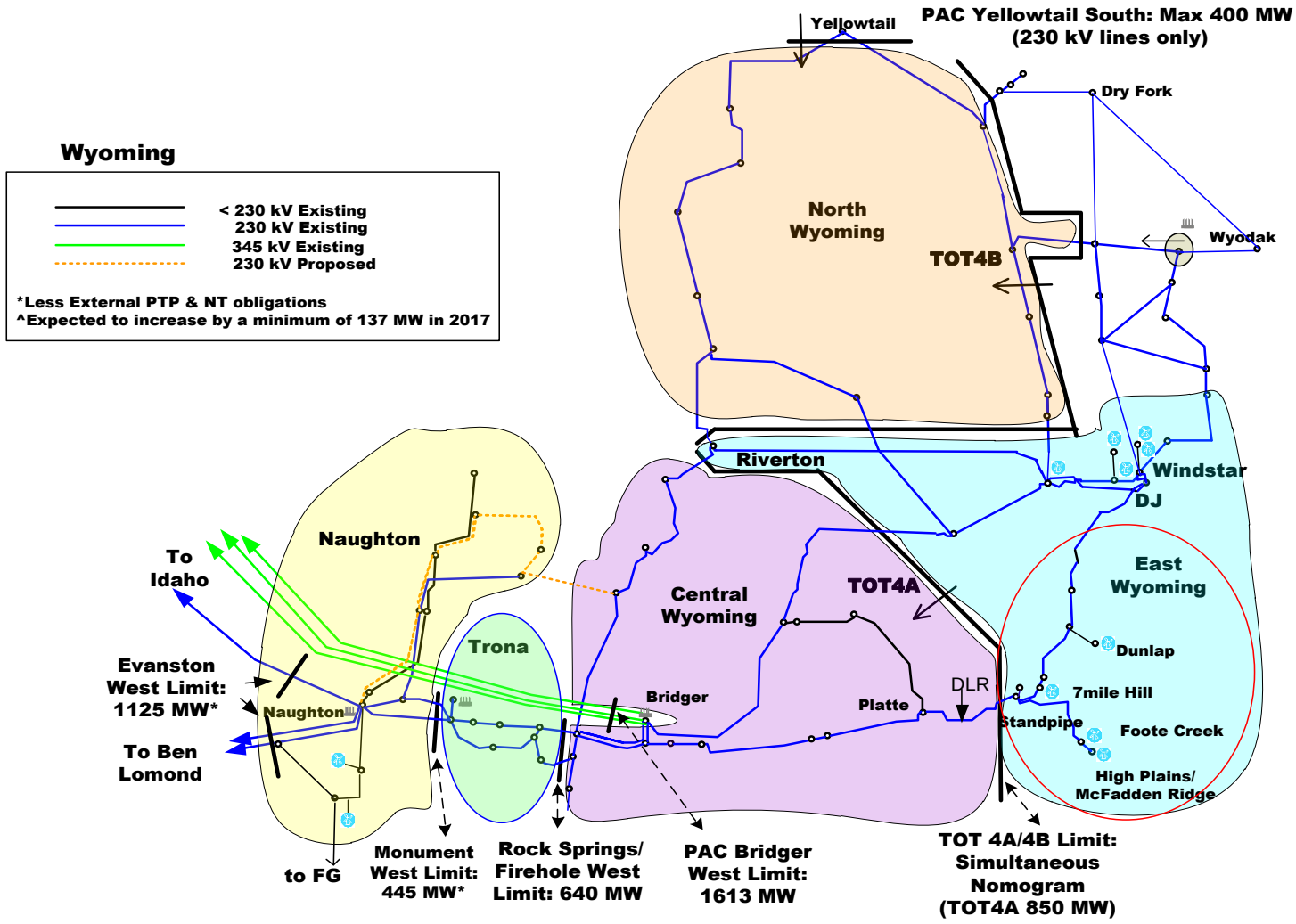
- Approximately 30 miles, single circuit 230 kilovolt line
- Improves reliability and load service
- CPCN issued 2011
- Target in-service date - 2017 – Customer driven

Joint Project Status

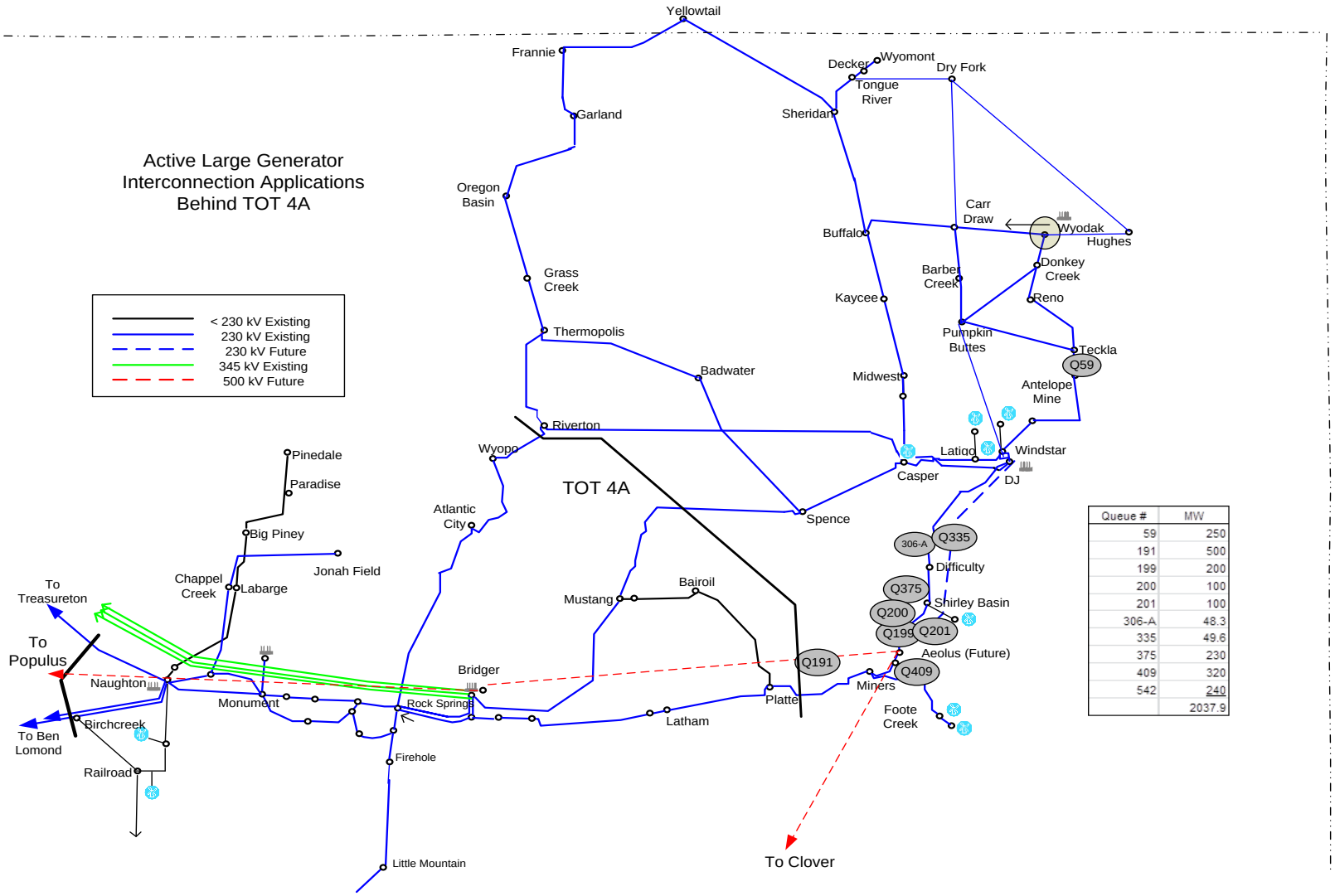
- West of Hemingway
  - Draft environmental impact statement has been delayed and is now currently scheduled for release in Fall 2014
  - Expected in-service date of 2018 has also been delayed

- Cascade Crossing
  - Portland General Electric announced abandonment of the new transmission line across the Cascade mountains as well as termination of the alternative project that would have provided incremental capacity on BPA's transmission system

Wyoming Transmission Constraints

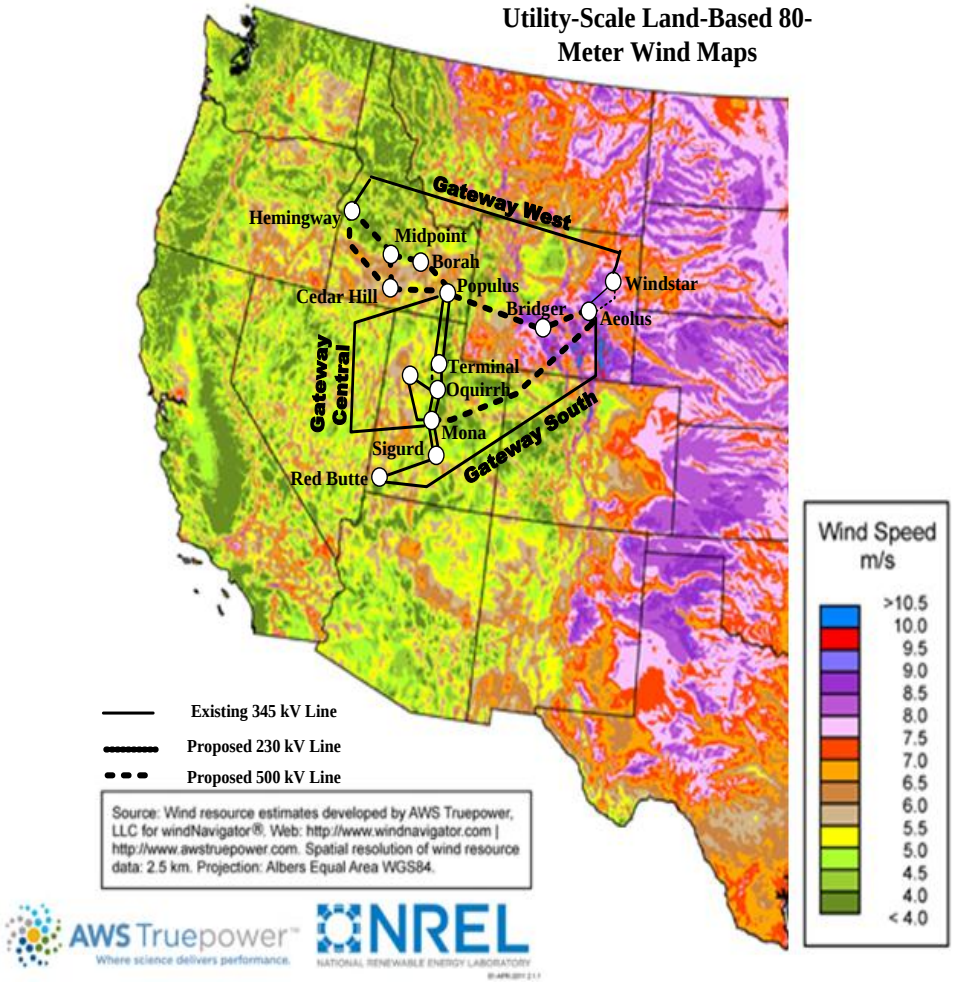


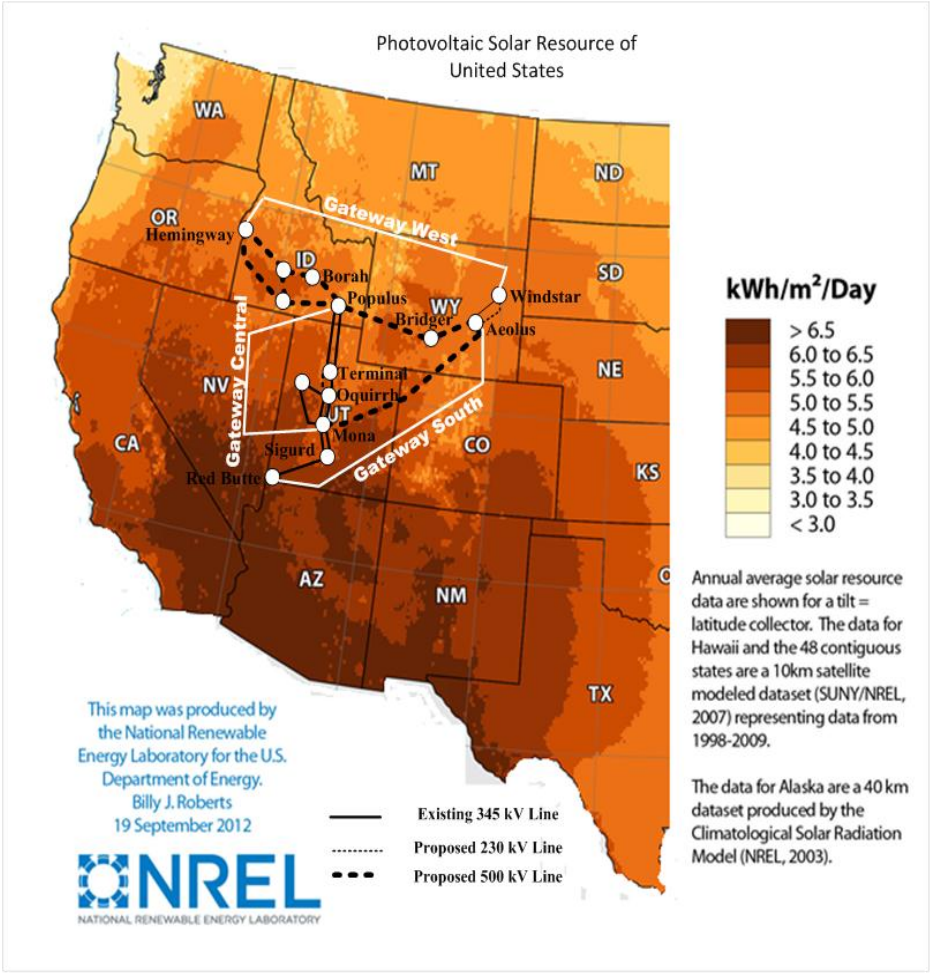
Active LGI Requests – Behind TOT4A



Queue #	MW
59	250
191	500
199	200
200	100
201	100
306-A	48.3
335	49.6
375	230
409	320
542	240
	2037.9

Energy Gateway – Access to Renewables





Impact of Generation Retirements on Transmission

- Generation retirements must not compromise the stability or reliability of the transmission system
- Transmission reinforcements can be required if a generating unit is retired
- An example is the Carbon Plant Decommissioning which requires multiple transmission reinforcements
  - 172 MW retired
  - $46.5m of transmission reinforcement

Transmission Network at Carbon Plant

Impact of Renewable Resources on Transmission

- Generation additions must not compromise the stability or reliability of the transmission system
- Transmission reinforcements can be required
- An example is the Standpipe synchronous condenser project in south-central Wyoming
  - ~ 60 MVAr condenser
  - $47.2m of transmission reinforcement

Picture of a synchronous condenser

System Benefit Tool ("SBT") Analysis

- Energy Gateway investments provide multiple benefit categories
  - Reliability
  - Increased access to potential future generating resources, including renewable resources
  - More efficient use of the transmission system
- Collected stakeholder feedback as part of SBT workgroup workshops
- No SBT analysis anticipated for 2015 IRP
  - Timing uncertainties for project in-service dates due to permitting delays, EPA 111(d) implementation, etc.
- Timing of future analysis to be determined based on:
  - Certainty around resource mix and timing

Questions?





2015 Integrated Resource Plan

Portfolio Development

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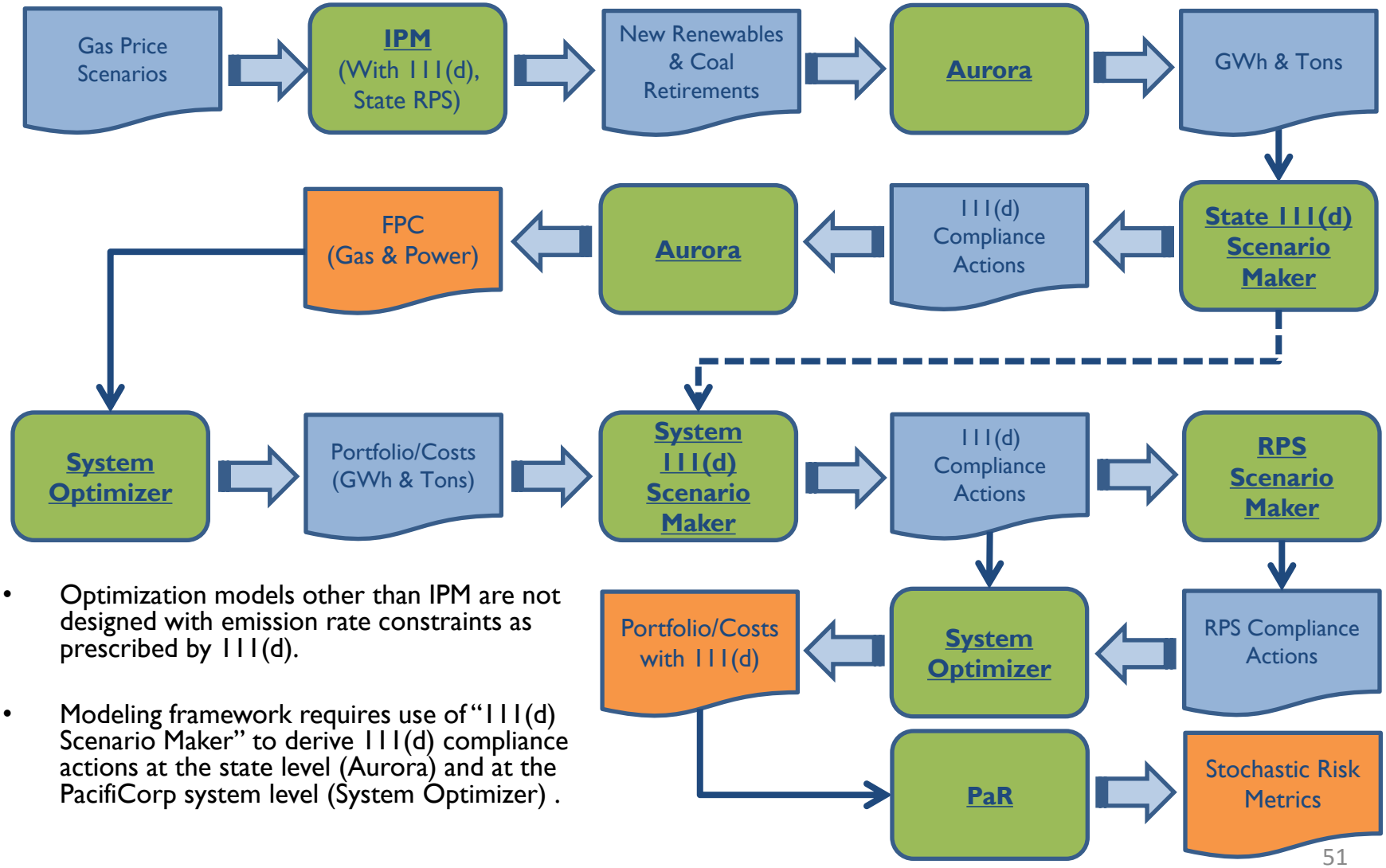
Portfolio Development Goals

- Develop portfolios that result in a range of outcomes that can be analyzed in PaR.
- Incorporate EPA's draft 111(d) regulation into core case definitions.
- Adopt portfolio development framework that captures alternative future Regional Haze outcomes.
- Manage the total number of core case portfolios, allowing sufficient time to complete Volume III studies, sensitivity studies, and risk analysis.
- Energy Gateway transmission investments for a select number of portfolios as sensitivities.

Regional Haze Scenarios

- Portfolios will be developed among two to three Regional Haze scenarios.
- Each Regional Haze scenario will be defined by unit-specific environmental investment assumptions & alternatives (i.e. commitment for an early coal unit retirement to avoid an SCR investment).
  - With regard to the portfolio development framework, the Regional Haze scenarios are akin to the Energy Gateway scenario structure used to develop portfolios in the 2013 IRP.
  - For each Regional Haze scenario, the Company will run a consistent set of portfolio development assumption sets.
  - Results among the Regional Haze scenarios can be used in the Company's acquisition path analysis.
- Alleviates the need to model endogenous coal unit retirements, which introduces data challenges (i.e. cannot input multiple sets of run-rate operating costs or fuel costs for a single unit to reflect changes in costs in an early retirement outcome).
- Unit specific Regional Haze assumptions for different scenarios are under development.

Clean Air Act 111(d) – Modeling Framework



- Optimization models other than IPM are not designed with emission rate constraints as prescribed by 111(d).
- Modeling framework requires use of "111(d) Scenario Maker" to derive 111(d) compliance actions at the state level (Aurora) and at the PacifiCorp system level (System Optimizer) .

Model Descriptions

- Integrated Planning Model (IPM)
  - North American power sector model (used by EPA to model 111(d) regulation)
  - Broad emission policy modeling capabilities
  - Key outputs = coal retirements, renewable resource additions, natural gas price response to changes in electric sector demand

- Aurora
  - WECC-wide power sector resource expansion and dispatch model
  - Used to produce forecasted wholesale power prices
  - Key outputs = Electricity price forecast, dispatch, emissions

- System Optimizer
  - PacifiCorp system resource expansion and dispatch model
  - Used to develop resource portfolios and assess system costs among different portfolios
  - Key outputs = Resource portfolio, system costs, dispatch, emissions

- Planning and Risk (PaR)
  - PacifiCorp system stochastic dispatch model
  - Used to develop resource portfolio metrics
  - Key outputs = Distribution of system costs, energy not served, dispatch, emissions

Scenario Maker Modeling Tools

- RPS Scenario Maker
  - Introduced for the 2013 IRP
  - Spreadsheet modeling tool to develop renewable resource plans that meet RPS requirements
  - Capable of assessing RPS rules (use of unbundled RECs) and flexibility mechanisms (banking)

- 111(d) Scenario Maker
  - Under development for use in the 2015 IRP
  - Spreadsheet modeling tool to develop 111(d) compliance activities (retirement, re-dispatch, new renewables).
  - Does not capture reliability impacts of 111(d) compliance; System Optimizer runs required after a portfolio is assessed using the 111(d) Scenario Maker.

Overview of 111(d) Scenario Maker

- Data Inputs
  - Coal, existing NGCC, new NGCC emissions, generation, and capacity
    - Sourced from Aurora for state-wide version
    - Sourced from System Optimizer for PacifiCorp system version
  - Renewable generation
    - Sourced from Aurora for state-wide version
    - Sourced from System Optimizer for PacifiCorp system version
  - Energy efficiency
    - Sourced from EPA calculation of state goals for state-wide version
    - Sourced from System Optimizer for PacifiCorp system version
  - Other data
    - Distributed generation, sourced from System Optimizer (PacifiCorp system)

- Flexible Structure:
  - Inclusion/exclusion of new NGCC in rate calculations
  - Allocation method for renewable generation (by ownership, by physical location)
  - Inclusion/exclusion of distributed generation (PacifiCorp system version)
  - Selection of specific coal units that can be re-dispatched
  - Selection of re-dispatch assumptions
  - Selection of new renewable characteristics (capacity factor, degradation)

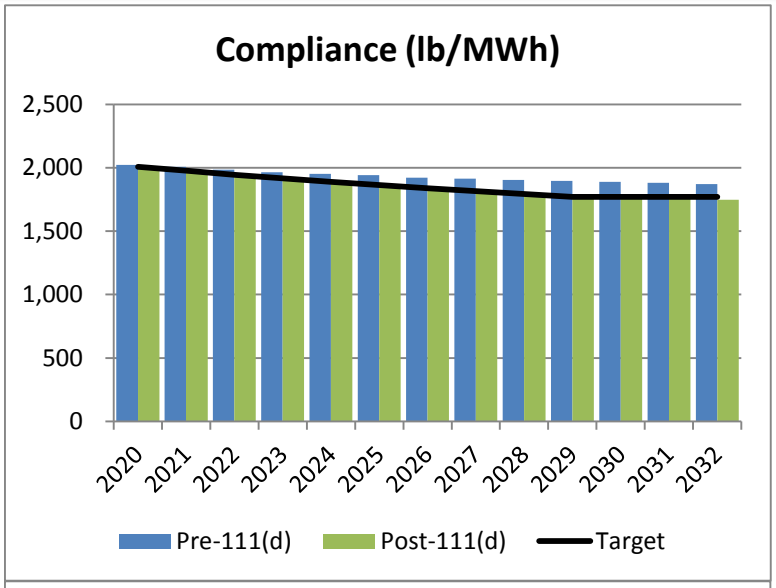
Overview of 111(d) Scenario Maker (Cont'd)

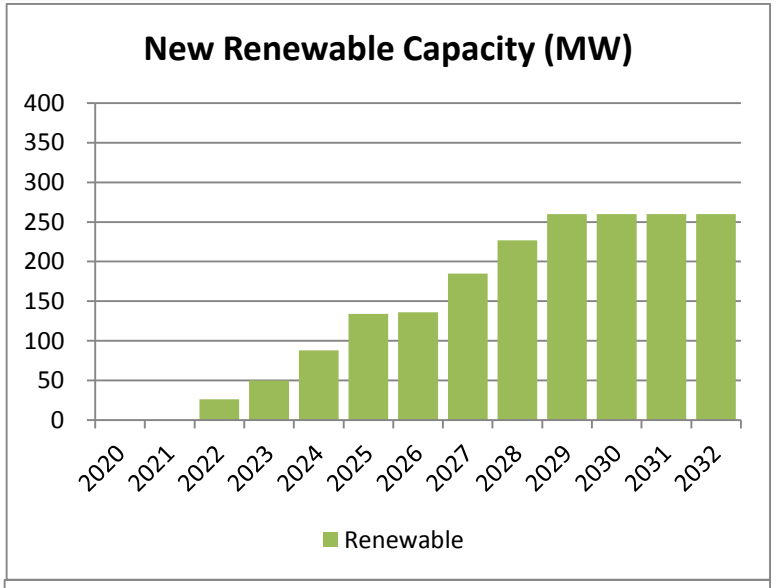
- Basic Logic/Steps in Calculations
  1. Re-dispatch coal to new NGCC (only calculates if new NGCC toggle is turned "on").
  2. Re-dispatch coal to existing NGCC (data flows from step above as applicable, only calculates if re-dispatch to existing NGCC is turned "on", otherwise defaults to re-dispatch to "other" per below).
  3. Re-dispatch coal to "other" (data flows from steps above, as applicable, only calculates if there is coal generation that can be re-dispatched, either based on percentage of back down allowed for specific coal units as set by the user, or based upon re-dispatch that has already occurred to new and/or existing NGCC).
  4. Re-dispatch existing NGCC to "other" (primarily applicable to states with targets that fall below the emission rate of existing NGCC units, allows existing NGCC units to be dispatched down to improve system rate).
  5. Incremental renewable additions made by year to achieve goal given inputs (CF and degradation), and selection of "on/off" switch (note, selecting "off" allows for over compliance in a given year to achieve an average rate across years).

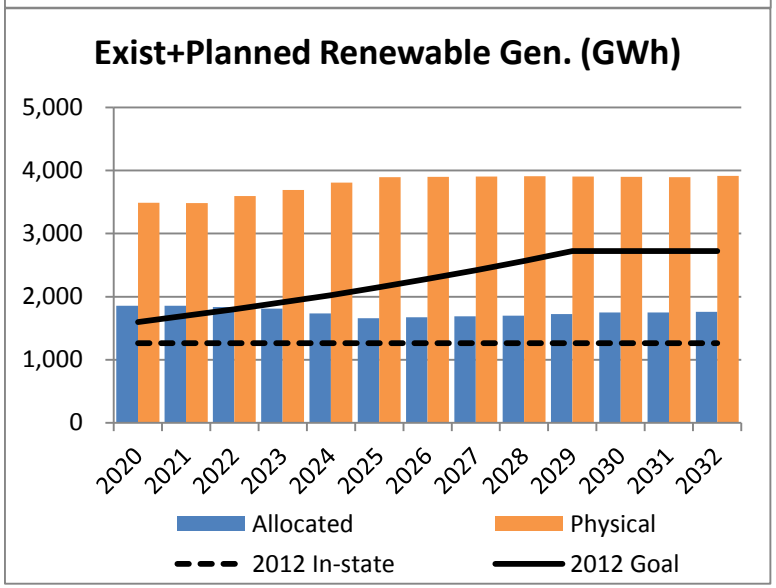
- Results from Calculations above can be used to summarize system adjustments required to achieve compliance, which in turn can be fed back into Aurora or System Optimizer.

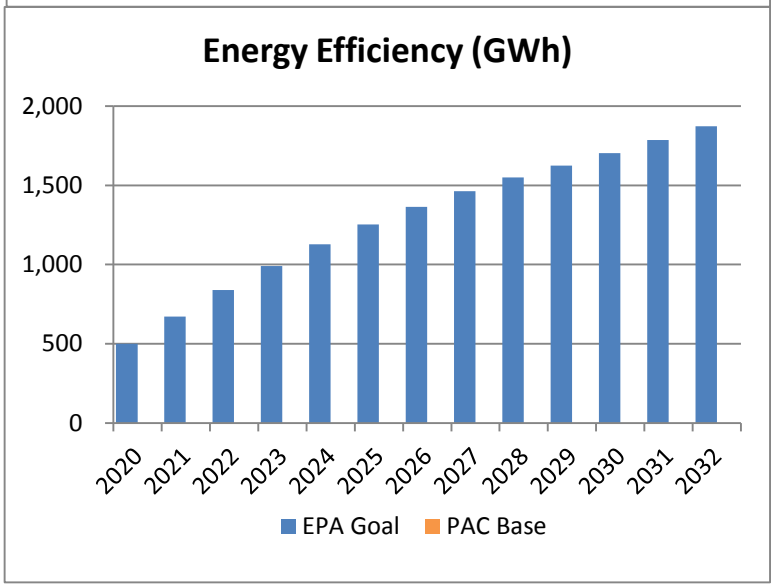
- Standard reporting helps summarize and validate findings.
  - Compliance pre/post-111(d).
  - Capacity factors pre/post 111(d) (existing NGCC, new NGCC, coal, gas steam).
  - Generation pre/post 111(d) (existing NGCC, new NGCC, coal, gas steam, renewables).
  - Renewable capacity added as a result of 111(d).
  - Energy efficiency and DG output included in calculations.
  - Comparison to data in EPA's calculation of the goal and/or comparison to 2012 actuals where applicable.

Overview of 111(d) Scenario Maker: Sample of Standard Reporting













2015 Integrated Resource Plan

Sensitivities and Risk Analysis

PacifiCorp

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Sensitivity Studies

- Separate East/West Control Area (Washington acknowledgement Order)
- Business Plan (Utah acknowledgement Order)
- Carbon Policy
  - Oregon Guideline 8d: "If none of the above portfolios is consistent with Oregon energy policies (including state goals for reducing greenhouse gas emissions) as those policies are applied to the utility, the utility should construct the best cost/risk portfolio that achieves that consistency, present its cost and risk parameters, and compare it to the preferred and alternative portfolios."
- Distributed Generation (low/high)
- Extension of PTC
- Load Growth (low, high, 1 in 20)
- Energy Gateway Transmission
- Energy Storage

Risk Analysis

- Stochastic risk analysis
  - Mean PVRR
  - Risk-adjusted mean PVRR
  - Energy Not Served (ENS)

- Deterministic risk analysis

- Trigger point analyses
  - Solar Costs
  - CO_2 scenario (Oregon Guideline 8c: "The utility should identify at least one CO_2 compliance scenario, which if anticipated now, would lead to or 'trigger' the selection of a portfolio of resources that is substantially different from the preferred portfolio."

- Acquisition path analysis
  - Assessment of portfolio results among core cases and sensitivities used to describe how changes in the planning environment affect changes in the resource plan.





2015 Integrated Resource Plan

DSM Potential Study

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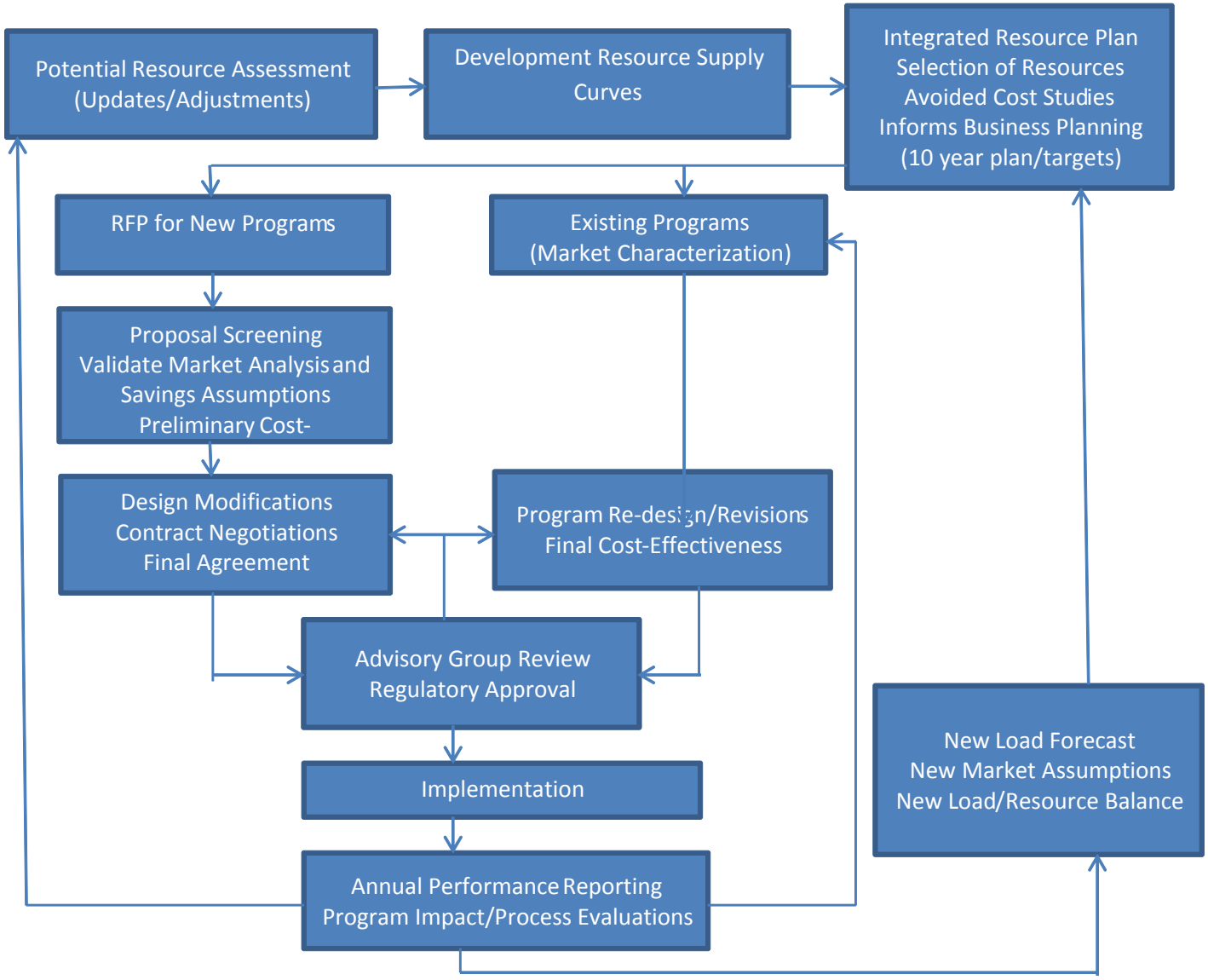
DSM Planning Process Overview



DSM Potential Studies

- Assess available potential and associated cost of Class 1, 2, and 3 DSM potential in each of the Company's six states
- Conducted by independent third-party contractors
- Updated roughly every two years to reflect changes in load forecasts, available data sources, measures, codes and standards, economic assumptions, etc.
- Company and Energy Trust of Oregon staff coordinate on key Class 2 DSM assumptions – measure lists, administrative costs, levelized cost calculations, treatment of non-energy benefits, etc.

General Potential Study Methodology

- State-specific assessments of opportunities in all major sectors and market segments
- Class 1 and 3 DSM
  - Dispatchable and rate-based options currently offered by PacifiCorp or by other utilities
  - IRP supply curves are incremental to impacts of existing Company programs and pricing products
- Class 2 DSM
  - Comprehensive database of existing and expected emerging measures
  - Data on cost, savings, life, and applicability used to calculate potential and levelized cost of each measure
  - Accounts for measure interactions, competition, and technical constraints
  - Calibrated to actual sales and load forecast assumptions to avoid under- or over-stating opportunity

Types of Class 2 DSM Potential

- ***Technical potential*** – savings from installing all technically feasible measures, regardless of cost or other market barriers, after netting out estimated naturally occurring impacts
- ***Achievable technical potential*** **(provided for IRP model)** - the share of technical potential that might reasonably be achievable over the planning period, given market barriers possibly impeding customer adoption.
- ***Achievable economic potential*** **(selected by IRP model)** - the portion of achievable technical potential deemed cost-effective by the IRP model.

Class 2 DSM Supply Curves

- Achievable technical bundles by state, levelized cost range, and year
- Levelized cost methodology and cost bundles same as 2013 IRP: 27 Cost bundles, $10/MWh increments up to $200/MWh, then larger ranges
- Levelized costs differ by state to align with program delivery cost-effectiveness criteria

Perspective	Total Resource					Utility	
State	**OR**	**WA**	**ID**	**CA**	**WY**	**UT**	**Included In:**
State and Sector-Specific Line Losses	✓	✓	✓	✓	✓	✓	Potential Study
Customer Cost	✓	✓	✓	✓	✓		Potential Study
Utility Investment	✓	✓	✓	✓	✓	✓	Potential Study
Annual Incremental O&M	✓	✓	✓				Potential Study
Secondary Fuel Impacts	✓	✓	✓				Potential Study
Non-Energy Impacts	✓	✓	✓				Potential Study
10% Conservation Credit	✓	✓					IRP
T&D Deferral Benefits	✓	✓	✓	✓	✓	✓	IRP
Risk Mitigation Benefits	✓	✓	✓	✓	✓	✓	IRP

2013 Conservation Potential Assessment – Stakeholder Comments

Class 1 and 3 DSM Resources

- IRP didn't select any new capacity resources until 2027. Were the capacity product resource costs overstated in the 2013 Conservation Potential Assessment (CPA)?
  - Costs were determined by a third-party independent consultant and were based on the best available market data at the time
  - Costs were consistent with information the company gained while sourcing capacity resources to meet 2011 IRP resource selections
  - The 2014 CPA is being performed by a different third-party consultant who is reassessing the costs in the 2014 CPA
  - IRP selections are a function of both resource cost and need - the resource need and options associated with the 2011 IRP and 2013 IRP differed, which contributed to the lack of selections

2013 Conservation Potential Assessment – Stakeholder Comments

Class 2 DSM Resources

- Large decrease in potential relative to 2010 potential study
  - Reasons detailed in 2013 potential study report. Data and results are updated through the 2014 potential study
- Six-state potential offered to the IRP decreased over time
  - Findings from the 2013 CPA – driven by codes and standards and aggressive ramp rates
- IRP should include more emerging technologies
  - Need to have sufficient confidence in savings and costs for inclusion in resource planning. Each CPA reviews the current industry projections for specific technologies. 2014 CPA includes new technologies relative to 2013 CPA based on updated review
- Use of market ramp rates understates achievable potential outside of Oregon
  - Market ramp rates in 2014 CPA continue to evolve with updated resource potential, current market data, and methodology

Class 2 DSM in the 2014 CPA- Key Potential Study Updates

- Stakeholder feedback on the 2013 CPA considered in development of 2014 CPA scope of work
- New vendor – fresh look at study methodology, data sources, resource potentials and costs
- Incorporates updates for recent Company sales and customer forecasts, program evaluation results, customer and building stock characteristics
- Comprehensive measure list based on review of:
  - PacifiCorp, Energy Trust, and other administrator program offerings
  - Regional and national databases (RTF, DEER, ENERGY STAR, etc.)
  - Emerging technology projections (DOE, ACEEE, E Source, BPA E3T, etc.)

Class 2 DSM Measure List

- Costs, savings, measure life, and applicability assumptions based on consultant review of best available and most applicable data
- Updated information on building codes, equipment efficiency standards, building stock, and efficient market shares – baseline from which savings are measured
- Updated measure and baseline cost assumptions. Discretionary measures use full costs, lost opportunity use incremental costs above baseline
  - Where reliable projections are available for specific measures, emerging technologies incorporate expected cost declines

Class 2 DSM CPA Results Comparison

- Draft 2014 CPA shows increase in achievable technical potential relative to 2013 CPA, back to levels similar to 2010 CPA
  - 2013 CPA saw large decrease due mainly to new codes and standards – other reasons detailed in study report
  - 2014 CPA includes:
    - large potential for LED lighting based on recent national projections of efficacy, cost, and applicability
    - Solar water heating (previously considered supplemental resource)
    - New emerging technologies based on review of available sources

	20-Year Achievable Technical Potential (aMW)		
State	**2010 Study**	**2013 Study**	**2014 Study**
California	26	14	24
Idaho	63	34	55
Utah	737	389	873
Washington	122	75	110
Wyoming	208	136	235
Oregon	337	296	331

Stakeholder Comments on Accelerated DSM in the 2013 IRP

- Evidence lacking that accelerated selections are unattainable
  - Hypothetical accelerated scenario (2% of sales) was created in response to stakeholder request and was not included in 2013 CPA Scope of Work (characterized as a bookend by stakeholders to test impact)
  - Absent specific data needed to cost this scenario, PacifiCorp assumed cost adjustments to achieve result
  - 2014 CPA includes a task to review available data on feasibility and cost of accelerating acquisitions beyond expected acquisition rates
  - Company's 2013 IRP Action Plan developed to help test achievability
- No additional selection in Oregon indicates Oregon is already accelerated
  - Caused by differences in acceleration methodology. Aligning methodologies in all states for 2015 IRP
- Acceleration methodology is not specific to PacifiCorp's service territory

Accelerated DSM in the 2014 CPA

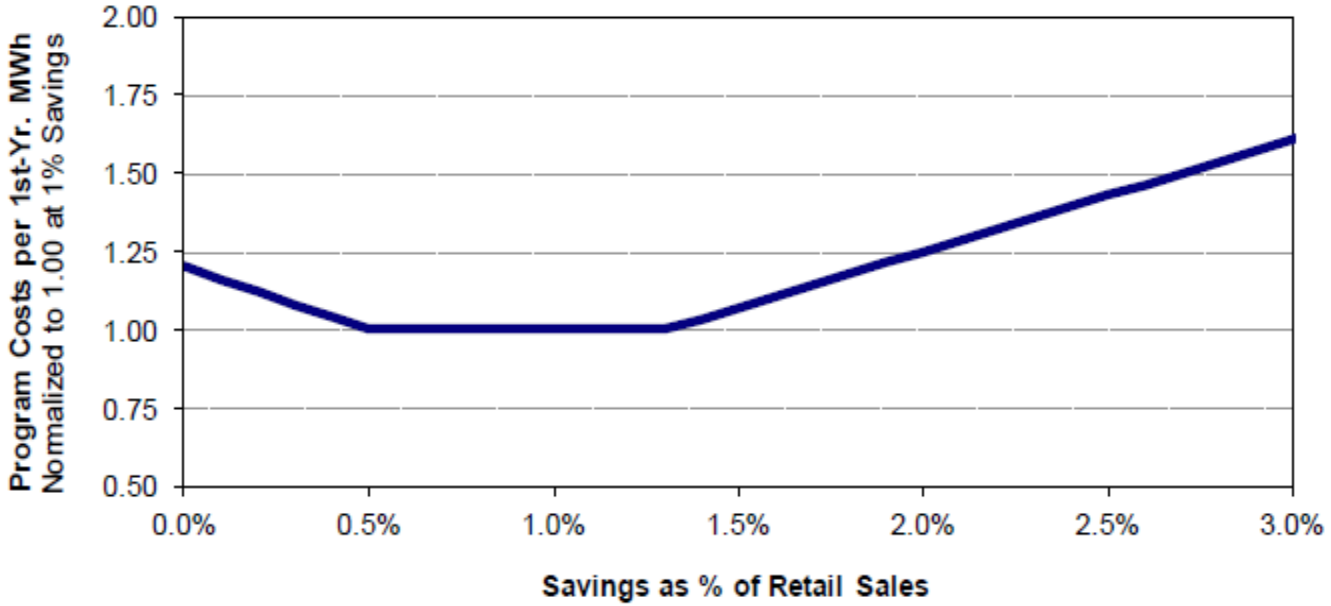
- 2014 CPA Scope of Work includes task to develop acceleration assumptions and methodology which will determine the percent savings to provide to the model
- Applied Energy Group reviewed:
  - National studies on historic, current, and projected energy efficiency savings and spending
  - Observed and theorized relationship between savings and cost
  - Portfolios of program administrators outside of PacifiCorp's service territory

2014 CPA Accelerated Case Methodology (informing the 2015 IRP)

- Identify measures that are "acceleratable" from review of aggressive programs offered by other administrators
  - Deep energy retrofits (discretionary)
  - Increased presence in equipment replacement markets
  - Must have practicable program delivery structures (e.g., direct install, aggressive marketing and/or large incentives at point-of-sale, etc.)
- Move identified measures to more aggressive ramp rate
- Associated costs of acceleration benchmarked against other program administrators with longstanding comprehensive energy efficiency portfolios, including California, Connecticut, Massachusetts, and Vermont
- LBNL found that spending (in $/kWh saved) increases at high levels of savings (see next slide)

LBNL's Generic Program Cost Function

- AEG found the cost function to be reasonable, with caveats:
  - Based on historic data – may not accurately reflect the future
  - Costs are likely to increase over time
  - Based on cost-effective portfolios – IRP supply curves are not screened for economics



- From "The Future of Utility Customer-Funded Energy Efficiency Programs in the United States: Projected Spending and Savings to 2025", LBNL 2013

Next Steps

- Expected and Accelerated supply curves provided later this month for initial modeling
- Final 2014 CPA report by end of year – appendix to the 2015 IRP
- DSM selections will be included as part of candidate portfolio results





2015 Integrated Resource Plan

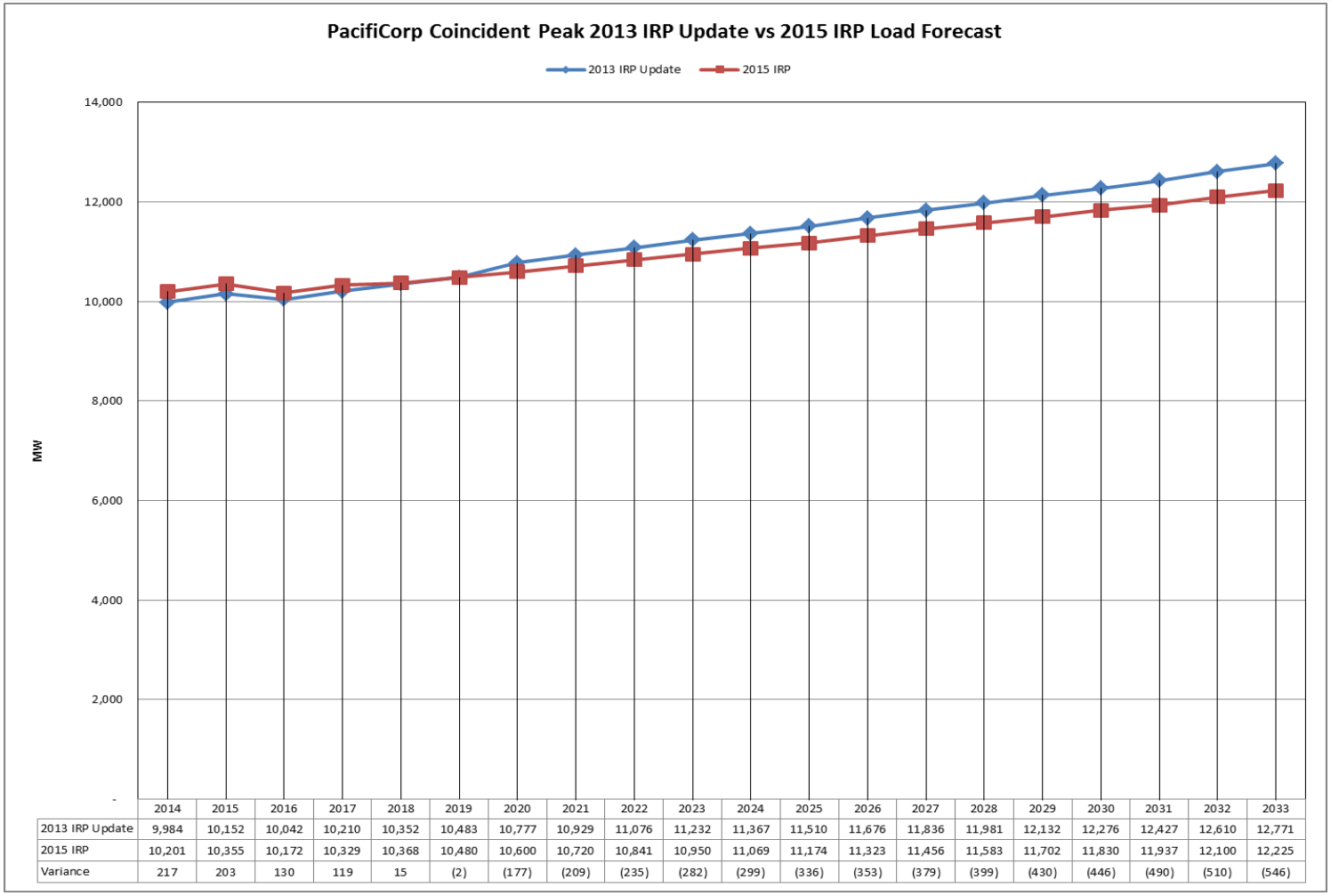
Load Forecast

PacifiCorp
Rocky Mountain Power
Pacific Power
PacifiCorp Energy

Peak Load Forecast Summary

- The current peak load forecast increased on average 137 MW 2014-2018 and decreased on average 340 MW 2019-2033
  - Increase in the peak load forecast 2014 through 2018 is primarily due to an increase in the industrial load forecast associated with strong economic activity
  - Decrease in the peak load forecast 2019 through 2033 is due to a decreased forecast in industrial, commercial and residential loads due to lower data center usage expectations, flattening economic activity and continued declines in residential average use per customer
- The economy
  - The great recession has caused a shift in the way that customers use electricity and has resulted in lower expected usage in the residential and commercial class
- Energy efficiency
  - Slowing growth in appliance saturation and decreased consumption per appliance results in a lower residential forecast relative to the 2013 IRP Update forecast
- 1 in 20 Weather Forecast
  - A look at the 1 in 20 weather forecast and changes in Peak temperatures across PacifiCorp's six state region over the last twenty years

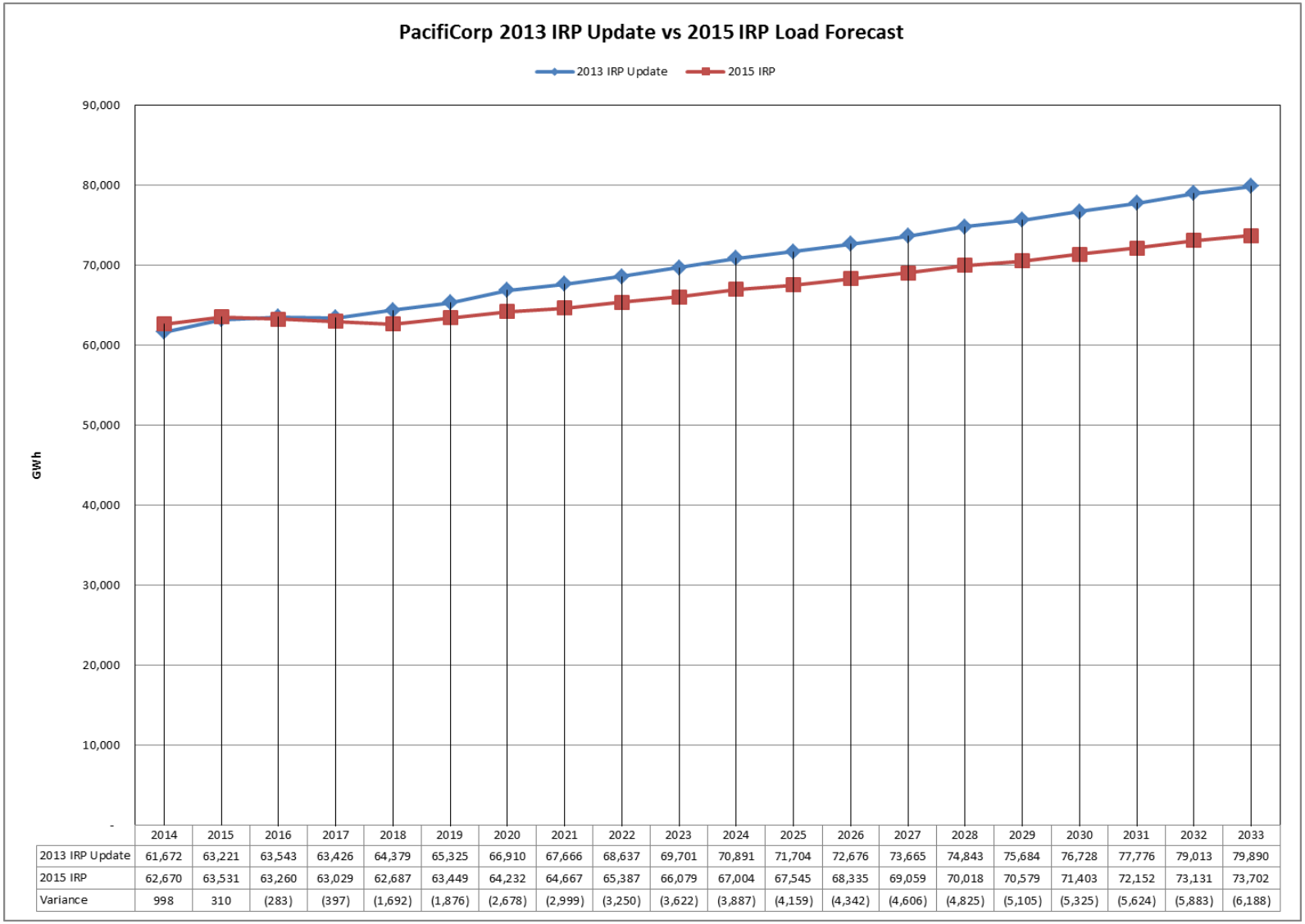
PacifiCorp System Peak Load Forecast Change



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
2013 IRP Update	9,984	10,152	10,042	10,210	10,352	10,483	10,777	10,929	11,076	11,232	11,367	11,510	11,676	11,836	11,981	12,132	12,276	12,427	12,610	12,771
2015 IRP	10,201	10,355	10,172	10,329	10,368	10,480	10,600	10,720	10,841	10,950	11,069	11,174	11,323	11,456	11,583	11,702	11,830	11,937	12,100	12,225
Variance	217	203	130	119	15	(2)	(177)	(209)	(235)	(282)	(299)	(336)	(353)	(379)	(399)	(430)	(446)	(490)	(510)	(546)

- The decrease in 2016 in both the IRP Update and current load forecast is due to the expiration of the BPA Idaho Exchange contract

PacifiCorp System Energy Load Forecast Change

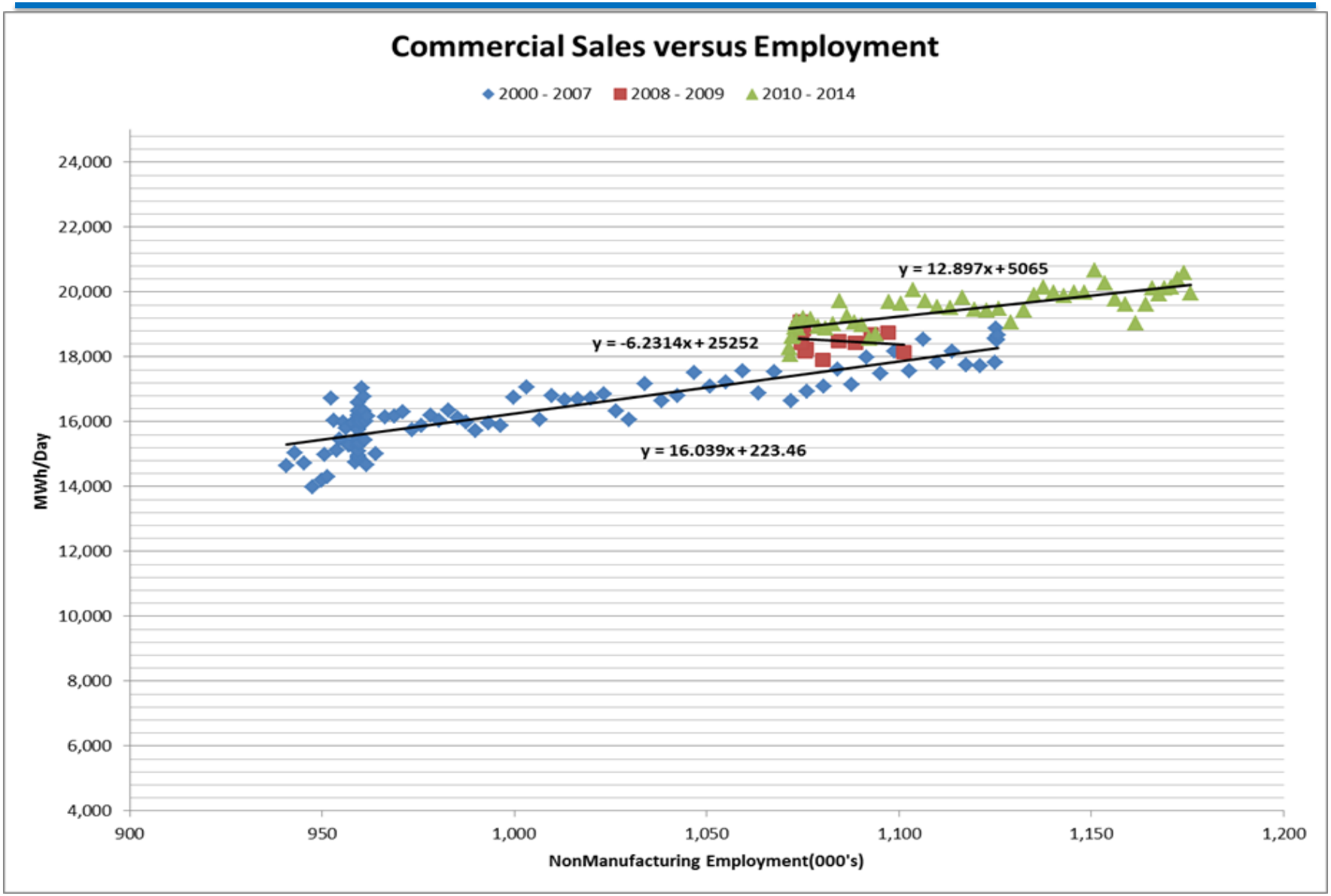


	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
2013 IRP Update	61,672	63,221	63,543	63,426	64,379	65,325	66,910	67,666	68,637	69,701	70,891	71,704	72,676	73,665	74,843	75,684	76,728	77,776	79,013	79,890
2015 IRP	62,670	63,531	63,260	63,029	62,687	63,449	64,232	64,667	65,387	66,079	67,004	67,545	68,335	69,059	70,018	70,579	71,403	72,152	73,131	73,702
Variance	998	310	(283)	(397)	(1,692)	(1,876)	(2,678)	(2,999)	(3,250)	(3,622)	(3,887)	(4,159)	(4,342)	(4,606)	(4,825)	(5,105)	(5,325)	(5,624)	(5,883)	(6,188)

"The New Normal"

- Employment is one of the variables that has historically been used to forecast electricity and since the great recession the relationship of electricity usage to economic variables, such as employment, gross domestic product and personal income, has changed
- Electric appliances are saturated
- Shift to lower use housing
- More efficient lighting driven by Federal Energy Lighting Standards phase in
- The "old normal" was a time of growth in usage across all customer classes with a steady relationship between electricity usage and employment, increased penetration of new appliances to the home and steady growth in single family homes with increasing square footage
  - All of the new "toys" are replacing older ones that used more electricity

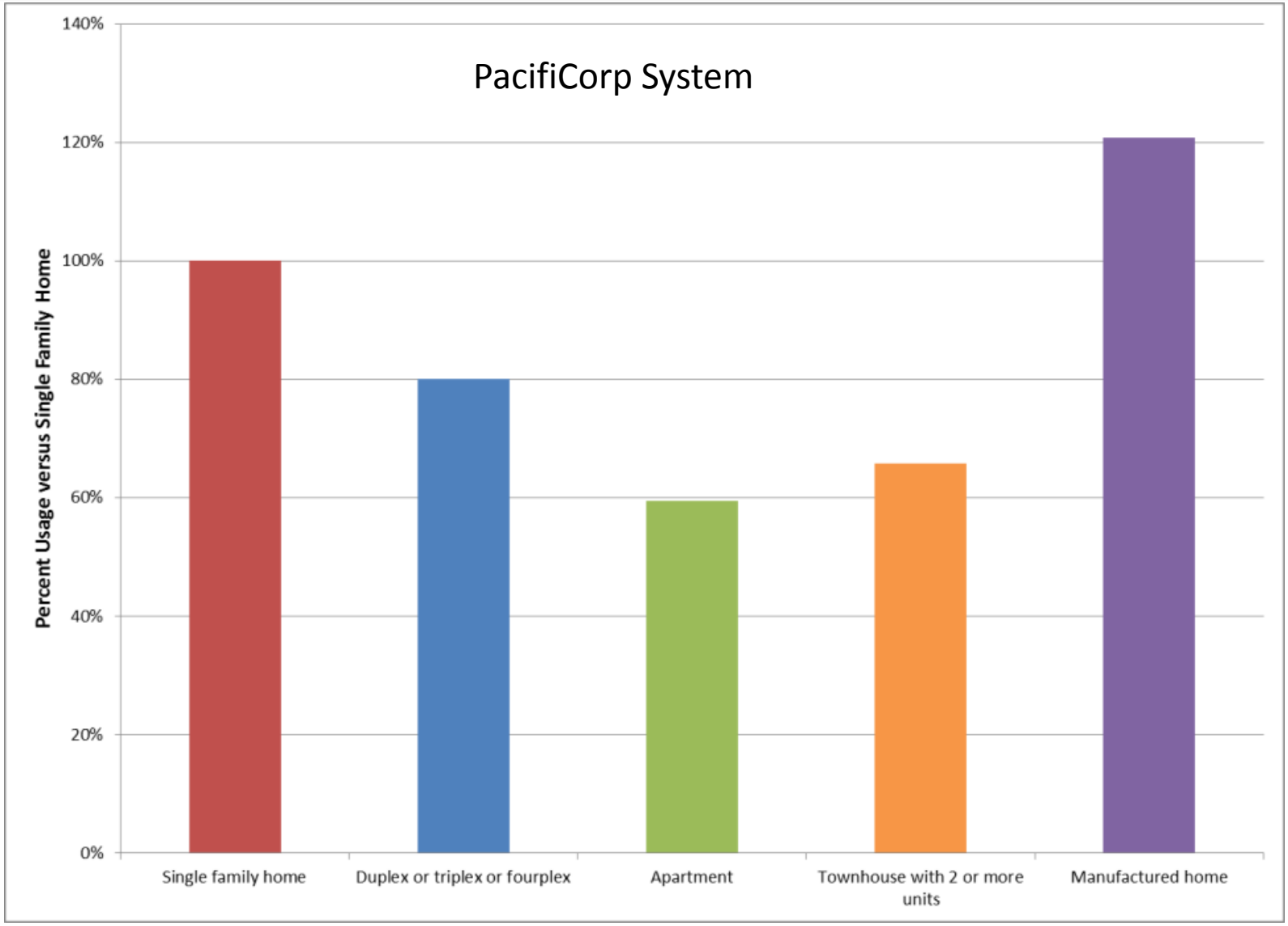
Commercial Sales versus Employment



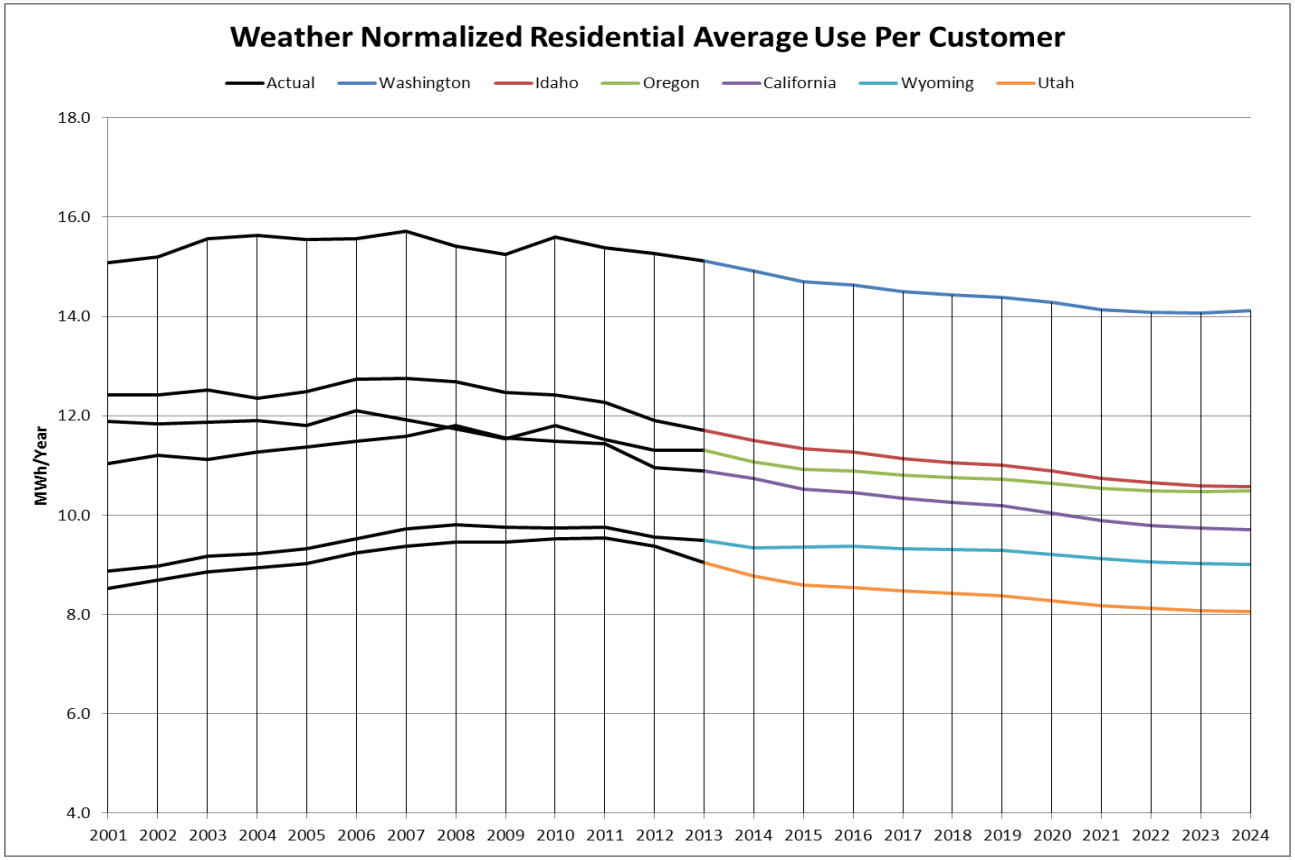
Survey Says…..

- The saturation of electric appliances is flat or decreasing
  - Customers are no longer adding additional appliances to the home but are instead replacing them with more energy efficient ones
- Lighting usage was historically over 20 percent of total annual residential usage
  - Energy efficient lighting such as compact fluorescent (CFL) and light emitting diode (LED) bulbs are 75 to 85 percent more efficient than incandescent bulbs
  - Oregon and Utah residential surveys showed a 50 percent saturation of energy efficient lighting
- Demographic shift from single family homes or manufactured homes to multi-dwelling units that are typically 40 percent more efficient in electricity usage

Shift to Lower Use Housing

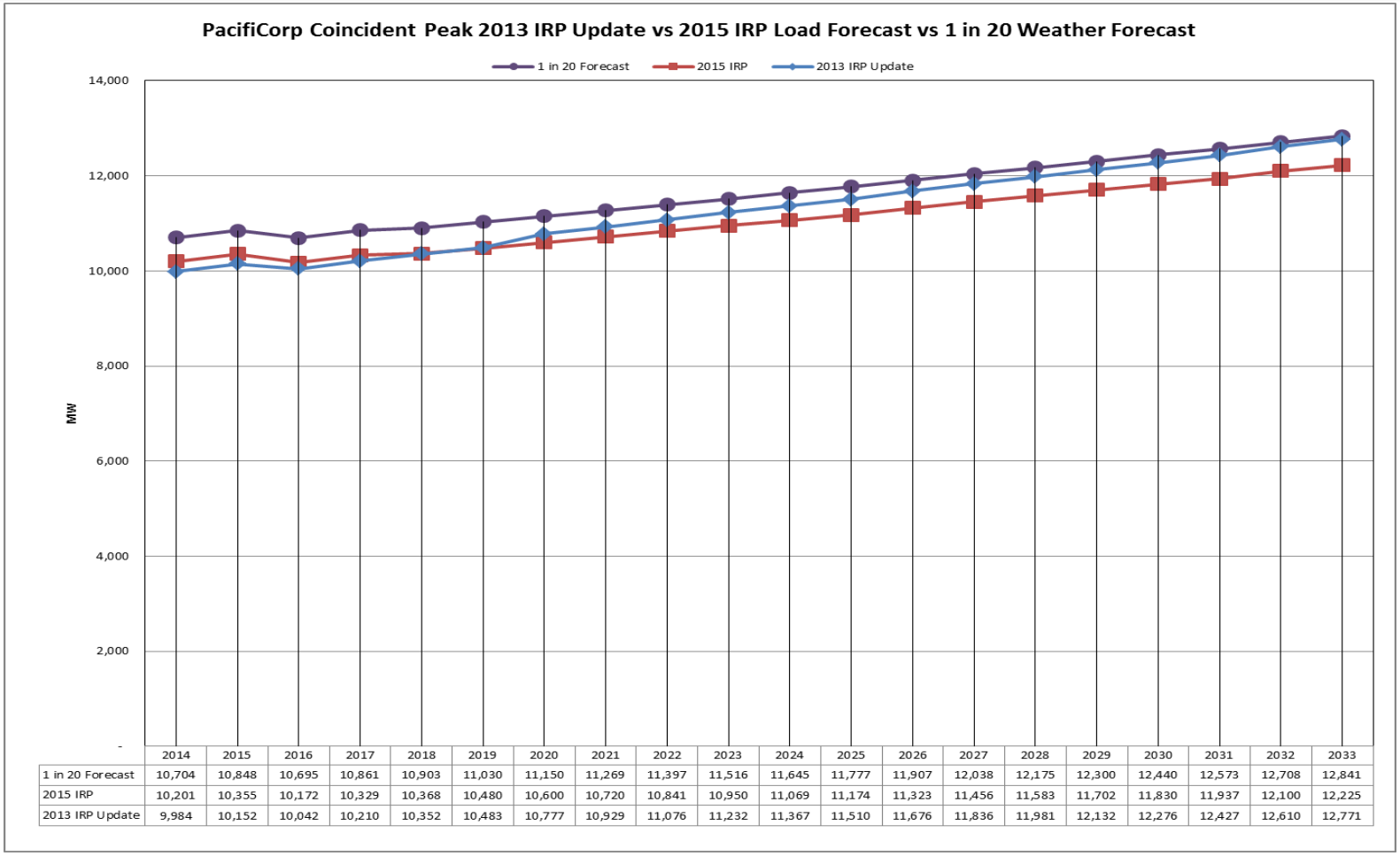


Average Use Per Residential Customer by State



- Average use per residential customer is declining across all six of PacifiCorp's States

1 in 20 Weather Peak Weather Forecast



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
1 in 20 Forecast	10,704	10,848	10,695	10,861	10,903	11,030	11,150	11,269	11,397	11,516	11,645	11,777	11,907	12,038	12,175	12,300	12,440	12,573	12,708	12,841
2015 IRP	10,201	10,355	10,172	10,329	10,368	10,480	10,600	10,720	10,841	10,950	11,069	11,174	11,323	11,456	11,583	11,702	11,830	11,937	12,100	12,225
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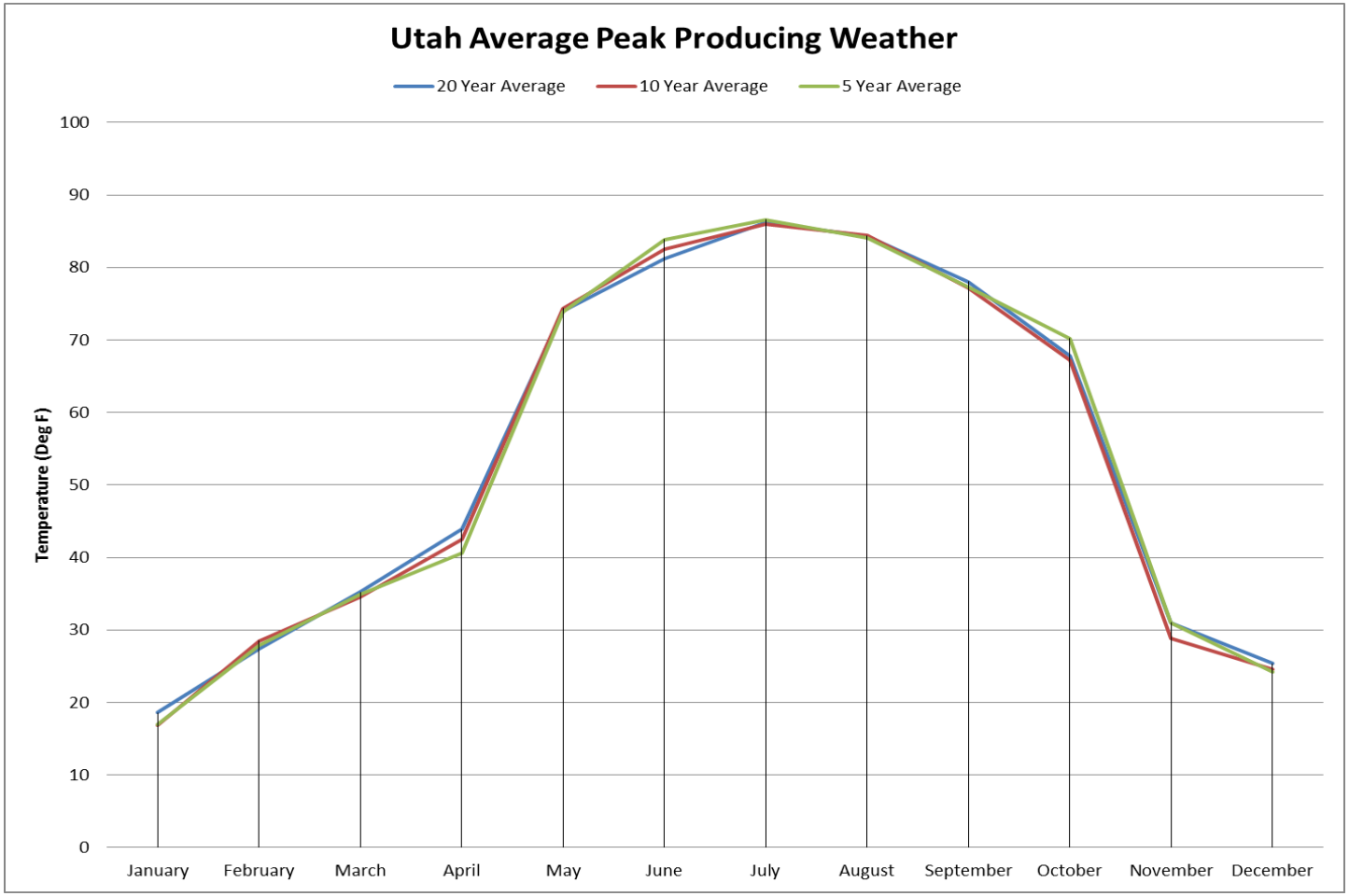
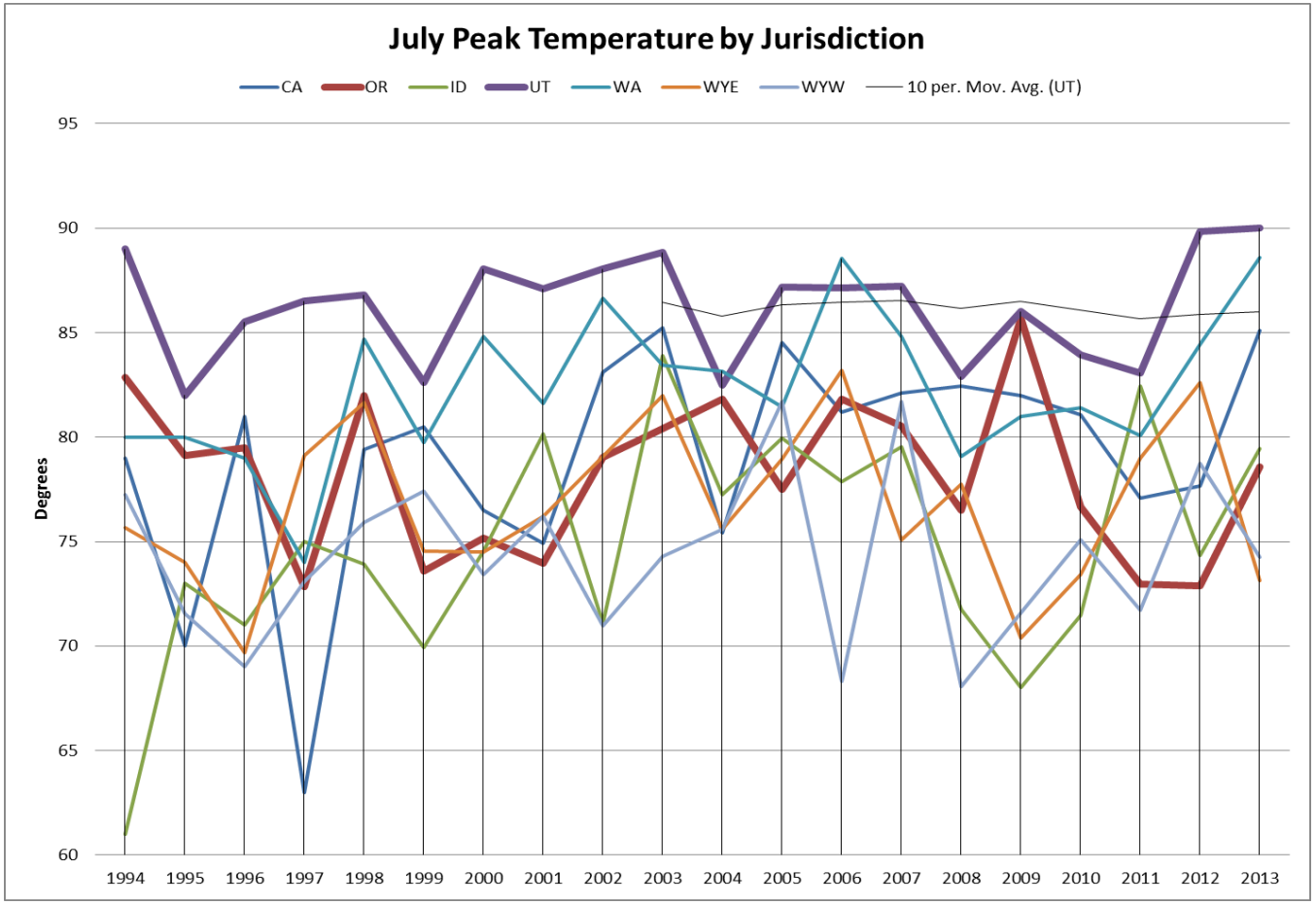
- 1 in 20 weather forecast is based on 2013 actual weather and actual weather pattern

Peak Producing Weather



- Peak producing weather has not changed significantly in July when looking at a five, 10 and 20 year average

July Peak Temperature 1994-2013 by State



- July peak average daily temperature's vary across the states by year and while one state can have a hotter July peak average daily temperature it is typically offset by another state that is experiencing a lower July peak average daily temperature
- 2013 showed an increased July average daily temperature across the majority of PacifiCorp's states, with Utah's highest average daily temperature in last 20 years
- The 10 year trend line for the July Peak average daily temperature in Utah shows a declining to flattening trend going into 2013

Reminder - Upcoming Meetings

- August 7-8
  - Portfolio development
  - Needs Assessment
  - Supply-Side Resources
  - Distributed Generation Study
  - Energy Storage Study
  - Plant Efficiency Study
  - Wind Integration
  - Resource Capacity Contribution
  - LOLP Parameters
- September 25-26
  - Stochastic Modeling
  - EIM Update
  - Smart Grid Update
  - Anaerobic Digester Study
  - Sensitivities/Risk Analysis
- October 27
  - Portfolio Results
- January 2015
  - Confidential Coal Analysis
  - Stochastic Results
  - Sensitivity Analysis Results
  - Preferred Portfolio and Action Plan
- February 2015
  - Final Report

* Meeting topics are tentative and subject to change.