2013 Integrated Resource Plan
Core Case Portfolio Results
Revised
February 13, 2013
Overview

• Core case portfolio results presented at the January 31, 2013 public input meeting have been revised

• Revised results incorporate a correction to escalation rates applied to new resource costs in the System Optimizer Model

• Revised core case result templates in Excel format have been posted online

• The following slides have been updated consistent with the revised results and further expanded to include the results of case C-05-EG2

• The studies for C-19 EG-02 through EG-05 will be completed by the next public input meeting, scheduled February 27, 2013
Escalation Rate Correction

- Costs for supply side resource alternatives are populated into the System Optimizer model for a specific year (i.e. in 2012$)

- The new version of the System Optimizer model being used for the 2013 IRP allows for use of escalation rates and general inflation rates

- An escalation rate is populated for each supply side resource alternative (an escalation rate of 1.9% per year is assumed for most resources)*

- The System Optimizer model also has an input field for “general inflation” that can be populated separate from the escalation rates assumed for specific supply side resource options

- Company was not aware the “general inflation” parameter available in the Planning at Risk model was made available in the new version of the System Optimizer model

- Upon further review of the Core Case results, the Company discovered that the general inflation and resource specific escalation rates were being compounded (i.e. a 1.9% escalation rate was being applied on top of a 1.2% general inflation rate, yielding a compounded escalation rate of 3.12%)

- Consequently, the original core case results were developed with overstated supply side resource costs (capital, annual fixed and annual variable costs)

*Note, escalation for solar resources reflect assumed technological advancements such that annual escalation of costs is less than inflation.
Impact on Portfolio Results

• The correction lowers the cost of supply side resource alternatives with the reduced costs being largely proportionate among each alternative

• Given cost changes are largely proportionate among resource alternatives, general conclusions from the original results are largely unchanged
  – Through 2022, resource portfolios have stable levels of FOTs and DSM
    • Scenarios with early coal retirements yield incremental gas resource additions
    • Scenarios with no RPS have limited incremental renewables
  – Through 2032, incremental resource needs are met with new gas resources and more DSM
    • Scenarios with early coal retirements produce portfolios with the most incremental gas resource additions
    • Long-term growth in renewable resources is driven by RPS requirements and/or significant CO₂ costs

• Case C-18 (Clean Energy Bookend) was most impacted, with selection of over 2,000 MW of nuclear resources in 2024, increased selection of renewables, and reduced selection of natural gas resources

• The renewable resource floors developed using the RPS Scenario Maker model are not impacted

*Note, escalation for solar resources reflect assumed technological advancements such that annual escalation of costs is less than inflation.*
## Core Case Definitions

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<thead>
<tr>
<th>Case #</th>
<th>Natural Gas</th>
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<th>RPS</th>
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## Energy Gateway Scenarios

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<th>Five Energy Gateway Scenarios</th>
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<tr>
<td>1 – Reference</td>
<td>C, G</td>
<td>Mona-Oquirrh-Terminal, Sigurd-Red Butte</td>
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<td>C, D, and G</td>
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<td>3 – West/East Balancing Area</td>
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<td>4 – Triangle</td>
<td>C, D, G, F</td>
<td>East side wind and improved reliability</td>
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<td>5 – Full Gateway</td>
<td>C, D, E, G, H, F</td>
<td>All Energy Gateway segments</td>
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Revised Portfolio Snapshot: EG-1

Energy Gateway Scenario 1: 2022

Energy Gateway Scenario 1: 2032
Revised Portfolio Snapshot: EG-2

Energy Gateway Scenario 2: 2022

Energy Gateway Scenario 2: 2032
Revised Portfolio Snapshot: EG-3

Energy Gateway Scenario 3: 2022

Energy Gateway Scenario 3: 2032
Revised Portfolio Snapshot: EG-4

**Energy Gateway Scenario 4: 2022**

**Energy Gateway Scenario 4: 2032**

[Bar chart showing capacity for different years and categories such as Gas, Renewable, DSM, FOTs, Other, Early Retirement, End of Life Retirement, and Gas Conversion.]
Revised Portfolio Snapshot: EG-5

Energy Gateway Scenario 5: 2022

Energy Gateway Scenario 5: 2032
Energy Gateway Transmission

• The “net power cost” impacts of Energy Gateway can be shown by calculating the difference in system PVRR between EG-2 through EG-5 and the system PVRR from EG-1 for each Core Case

• The PVRR of transmission costs (capital and O&M) among Core Cases in EG-2 through EG-5 can be compared to costs in EG-1 to identify the incremental cost of transmission in each Energy Gateway scenario

• These results exclude potential benefits from the System Benefits Tool and potential stochastic risk benefits that will be analyzed in PaR

• RPS targets improve the economics of the incremental transmission, particularly Segment D (EG-2 vs. EG-1)
Revised Energy Gateway: EG-2 and EG-3 as Compared to EG-1

Energy Gateway Scenario 2

Energy Gateway Scenario 3

- Increase/(Decrease) in System PVRR Without RPS
- Increase/(Decrease) in System PVRR With RPS
- PVRR of Incremental Transmission Cost
Revised Energy Gateway: EG-4 and EG-5 as Compared to EG-1

Energy Gateway Scenario 4

- Increase/(Decrease) in System PVRR Without RPS
- Increase/(Decrease) in System PVRR With RPS
- PVRR of Incremental Transmission Cost

Energy Gateway Scenario 5

- Increase/(Decrease) in System PVRR Without RPS
- Increase/(Decrease) in System PVRR With RPS
- PVRR of Incremental Transmission Cost
Class 2 DSM Summary

- Class 2 DSM energy is stable among nearly all core cases

- Three Core Cases have accelerated ramp rate assumptions (Cases C-14, C-15, and C-18)

- In those cases with accelerated ramp rates, additional Class 2 DSM is selected sooner, but similar levels are chosen over the long-term (through 2032)

- As depicted in the charts that follow, “System Potential” represents achievable potential
Revised Class 2 DSM: EG-1

Energy Gateway Scenario 1: 2022

Energy Gateway Scenario 1: 2032
Revised Class 2 DSM: EG-2
Revised Class 2 DSM: EG-3

Energy Gateway Scenario 3: 2022

Energy Gateway Scenario 3: 2032
Revised Class 2 DSM: EG-4

Energy Gateway Scenario 4: 2022

Energy Gateway Scenario 4: 2032
Revised Class 2 DSM: EG-5

Energy Gateway Scenario 5: 2022

Energy Gateway Scenario 5: 2032
Revised No Thermal Base Load (Case C-15)

- **Case Characteristics**
  - No base load CCCT resources are allowed
  - Accelerated Class 2 DSM

- **Accelerated DSM assumptions contribute to a lower portfolio PVRR**
  - Resource costs may not be representative of actual costs, there was limited information available to inform the accelerated case costs (the Company adjusted incentives in Utah to 100% of incremental costs and increased administration costs, all states, from 20% to 40%).

- **Additional challenges:**
  - Hypothetical set-up in removing ramp rates and altering discretionary measure ramp rates – only enough achievable potential available to sustain 2% of retail sales for 5 years.
  - Customer participation, capital requirements and rate impacts.
  - Supporting market delivery infrastructure.

<table>
<thead>
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<th>PVRR($m)</th>
<th>EG-1</th>
<th>EG-2</th>
<th>EG-3</th>
<th>EG-4</th>
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Revised Geothermal RPS Strategy (Case C-16)

**Case Characteristics**
- Geothermal identified in the 2011 Information Request Report prepared by Black & Veatch must be used to achieve RPS requirements
  - 115 MW in the East (2026), does not qualify for WA RPS
  - 30 MW in the West (25 MW in 2016 and 5 MW in 2026)
- Geothermal priced as a PPA resource

**System costs are similar with geothermal resources in the mix**
- Slightly lower in EG-1 where transmission limits use of lower cost Wyoming wind
- Slightly higher when geothermal displaces lower cost resources that are more readily available with incremental transmission

<table>
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<tr>
<th>PVRR($m)</th>
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Revised Market Price Spike (Case C-17)

- **Case Characteristics**
  - High natural gas prices
  - Power prices spike 2017 – 2022 (50% on-peak, 30% off-peak)

- System costs increase with higher fuel costs and reduced market sales

- A spike in power prices pushes the need for a CCCT (incremental to Lake Side 2) into 2017

<table>
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Revised Clean Energy Bookend (Case C-18)

- Case Characteristics
  - High natural gas prices
  - Hard cap on U.S. power sector emissions beginning 2020
  - Accelerated DSM
  - PTCs/ITCs extended through 2019

- System costs increase by approximately 50%

- High gas prices mitigate early coal retirements pre-2020 and longer term resource additions are comprised of incremental nuclear and renewable and natural gas resources

<table>
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<tr>
<th>PVRR($m)</th>
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<th>EG-3</th>
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