# State-Led Market Study Stakeholder Meeting – Q2 2021

*Exploring Western Organized Market Configurations: A Western States' Study of Coordinated Market Options to Advance State Energy Policies (or the "State-Led Market Study")*

Webinar
June 17, 2021
10:00 am – 12:30 pm Mountain Daylight Time

# Agenda

1. **Introduction – *Utah Office of Energy Development***
2. **Project Overview and Close Out – *Energy Strategies***
   - ❖ Project timeline & status update
3. **Update on Technical Modeling Efforts – *Energy Strategies***
   1. Recap study structure and key questions
   2. 2030 Core Study results
   3. 2030 Sensitivity results
   4. Additional metrics
   5. Technical findings
4. **Update on Market and Regulatory Review Scorecards/Analysis – *Energy Strategies***
5. **Next Steps – *Energy Strategies***
   - ❖Comment opportunity

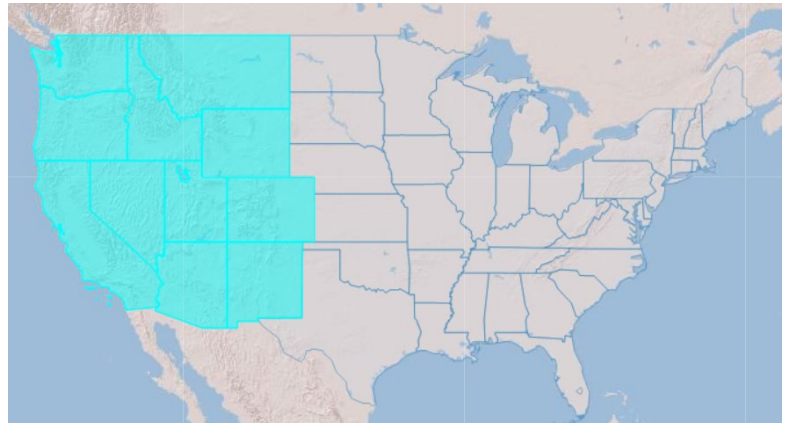
# *Introduction*

*Utah Office of Energy Development*

# State-Led Market Study made possible through DOE grant

- **The last several years have featured numerous discussions and initiatives related to the formation of coordinated wholesale trading markets in the West**
- **The Utah Governor's Office of Energy Development, in partnership with State Energy Offices of Idaho, Colorado, and Montana, applied for and received a grant from the US DOE to facilitate a 2+year state-led assessment of organized market options**
- **The project is called *Exploring Western Organized Market Configurations: A Western States' Study of Coordinated Market Options to Advance State Energy Policies***
  - ❖ Or "State-Led Market Study"
- **The project provides Western States with a neutral forum, and neutral analysis, to independently and jointly evaluate the options and impacts associated with new or more centralized wholesale energy markets and potential footprints**
- **Stakeholder meetings have been held quarterly**
  - ❖ Today (June 17th) is the final stakeholder meeting scheduled for this project
  - ❖ Project completion scheduled by July 31st

**State representatives from 11 Western States are participating in project**



# Lead Team

- **Representatives on Lead Team represent interest of their respective states but take all stakeholder input into consideration**
- **Work coordinated primarily through monthly calls**
- **Group seeks decisions by consensus**
  - ❖ Formal votes are an option, if necessary (but have not been used)

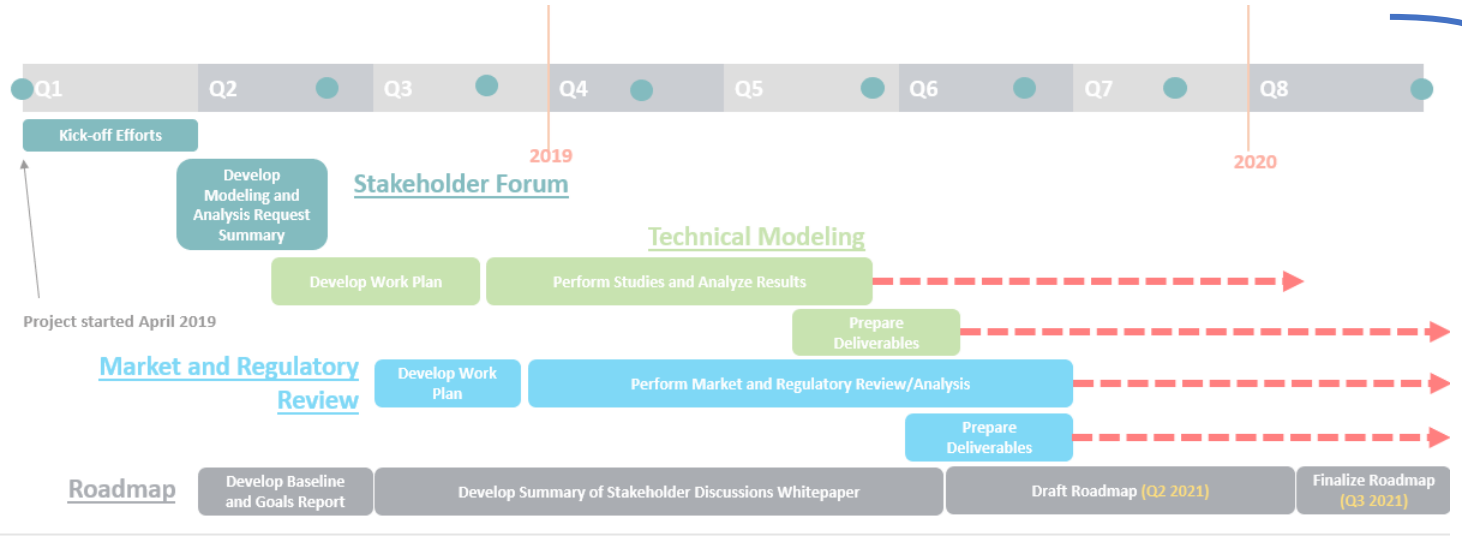
| Lead Team | Name | Organization |
|---|---|---|
| AZ Lead | Steve Olea | Arizona Corporation Commission |
| | | |
| CA Lead | Grace Anderson | California Energy Commission |
| | Yulia Schmidt | California Public Utilities Commission |
| CO Lead | Erin O'Neill | Colorado Public Utilities Commission |
| | Keith Hay | Colorado State Energy Office |
| ID Lead | John Chatburn | Idaho Governor's Office of Energy and Mineral Resources |
| MT Lead | Jeff Blend | Montana Energy Office, Montana Department of Environmental Quality |
| | Ben Brouwer | Montana Energy Office, Montana Department of Environmental Quality |

| Lead Team | Name | Organization |
|---|---|---|
| NM Lead | Erin Taylor | New Mexico Energy, Minerals and Natural Resources Department |
| | AnnaLinden Weller | New Mexico Energy, Minerals and Natural Resources Department |
| NV Lead | Hayley Williamson | Nevada Public Utilities Commission |
| | David Bobzien | Nevada State Energy Office |
| OR Lead | Kristen Sheeran | Oregon Energy and Climate Change Policy Advisory to Governor Kate Brown |
| | Letha Tawney | Oregon Public Utilities Commission |
| UT Lead | Chris Parker | Utah Department of Public Utilities |
| | Antonio Santos Aguilera | Utah Governor's Office of Energy Development |
| WA Lead | Steve Johnson | Washington Utilities and Transportation Commission |
| | Glenn Blackmon | Washington State Energy Office at the Department of Commerce |
| WY Lead | | |
| | Bryce Freeman | Wyoming Office of Consumer Advocate |

# *Project Overview & Progress To Date*

*Energy Strategies*

# Project Status Update




| Ongoing Activities | Expected Delivery Date |
|---|---|
| Preparing Technical Modeling Report | To Lead Team June 25, 2021 |
| Draft Market & Regulatory Review Report has been Sent to Lead Team | Lead Team Comments due June 25, 2021 |
| Draft Roadmap to Lead Team | To Lead Team Week of June 28, 2021 |
| Finalize Roadmap to DOE | By July 31, 2021 |

Final Roadmap/written reports available to stakeholders on or before this date

- Originally, a two-year timeline (eight quarters), but deadline extension received from DOE to provide flexibility given remote work challenges
  - Draft "Roadmap" (reports) will be delivered to Lead Team in June
  - Project completion now anticipated July 31, 2021
- Stakeholder Forum final meeting taking place today with comment opportunity

# Review of Stakeholder Engagement Plan

- **Objective for today's meeting**
  - ❖ Update stakeholders on 2030 study results and draft technical study findings
  - ❖ Review updates to market and regulatory review from stakeholder feedback
  - ❖ Take verbal feedback and questions from stakeholders
  - ❖ Invite the opportunity to provide written comments
    - ➢ Written comments can be submitted to kfraser@energystrat.com through July 1st
    - ➢ Note that comments will be reviewed, but responses to specific comments will not be provided

- **To receive updates (including the Roadmap, when available), navigate to this link to add your name to the project's stakeholder distribution list: http://bit.ly/2nBP6Gt**

# *Update on Technical Modeling*

*Energy Strategies*

# Technical Briefing Agenda

1. Recap study structure and key questions
2. 2030 Core Study results
3. 2030 Sensitivities results
4. Additional metrics
5. Technical findings

# Recap of Study Structure and Questions

Background on Modeling Approach, Assumptions, and Questions

# Recap: Study is focused on analyzing impacts of three "market constructs"

## EIM/Real-Time Market

- ✓ Centrally optimized real-time dispatch – *Day-ahead unit commitment not optimized across market participants*
- ✓ Individual transmission tariffs
- ✓ Limited transmission dedicated to real-time market
- ✓ Balancing Authority Area (BAA) boundaries and associated reliability obligations retained
- ✓ Transmission providers retain operational control of transmission

## Day-Ahead Market (DAM)

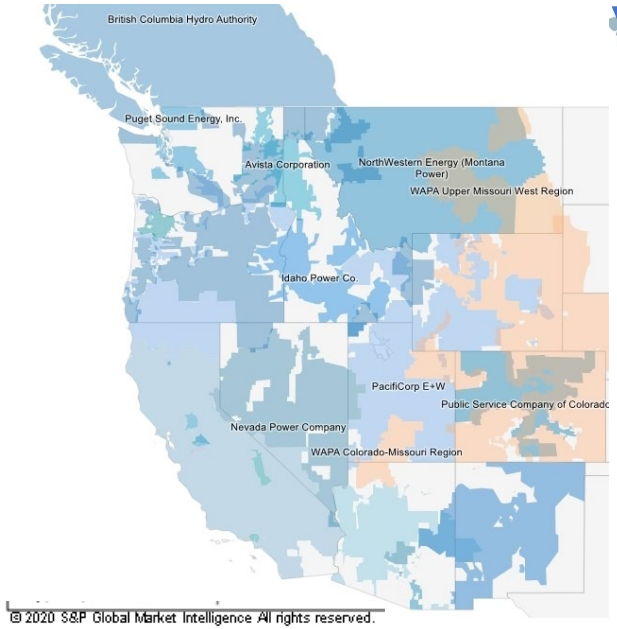
- ✓ Centrally optimized real-time and **day-ahead energy market**
- ✓ Individual transmission tariffs
- ✓ Limited transmission dedicated to market **at assumed rate** (other transactions must pay tariff rate for transmission)
- ✓ BAA boundaries and associated reliability obligations retained
- ✓ Transmission providers retain operational control of transmission

## RTO

- ✓ Centrally optimized real-time and day-ahead energy market
- ✓ **Joint transmission tariff** for participants in a given footprint
- ✓ Transmission used **up to reliability limit**
- ✓ BAA boundaries and reliability obligations **consolidated**
- ✓ **Joint transmission planning** and cost allocation
- ✓ Transmission providers **transfer operational contro**l of transmission

# Recap: Market Constructs + Footprints = “Market Configurations”

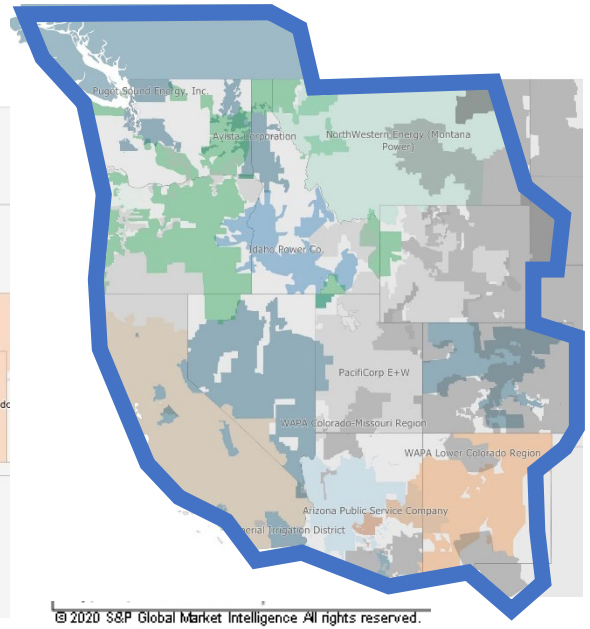
## Status Quo




EIM entities that have announced intent to sign EIM Implementation Agreement (or equivalent)*

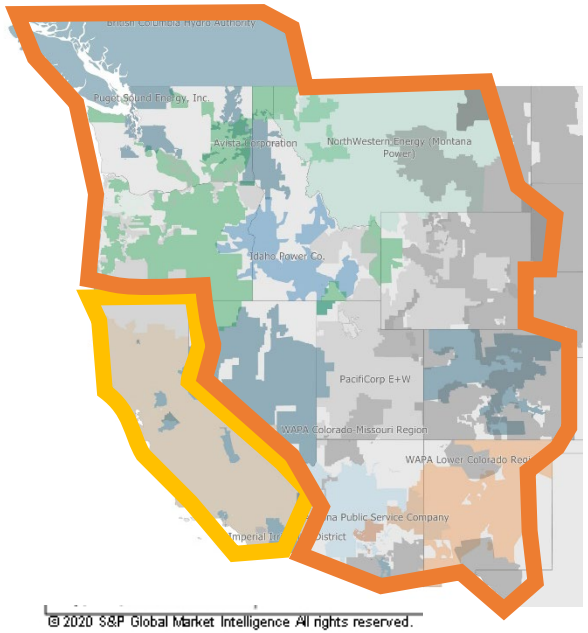
*Announcements that were made before the end of 2019 are included in the Status Quo footprint.

## One Market



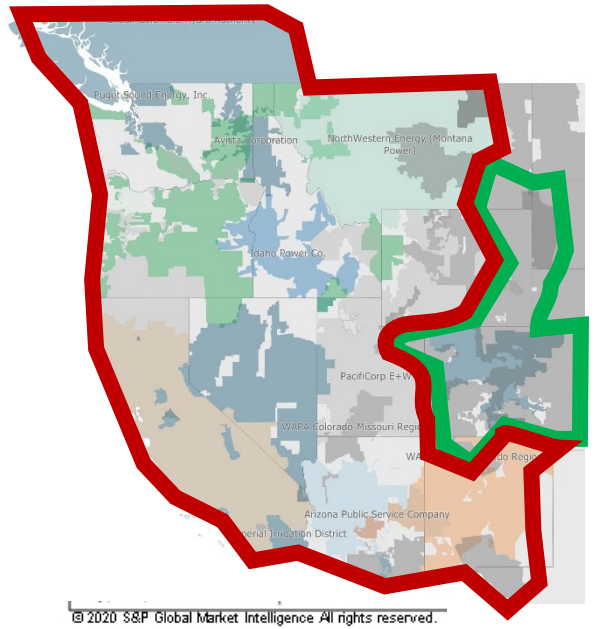

Studied in 2020 and 2030 timeframe

## Two Market A




Only studied in 2030 timeframe

## Two Market B




Only studied in 2030 timeframe

# Recap: Market Configurations Studied in 2020 and 2030

**Key**

Benchmark

## Study featured 16 unique market simulations across two study horizons

| Study Year | Type | Market Scenario | Market Footprints | | | |
|---|---|---|---|---|---|---|
| | | | Status Quo | One Market | Two Market A (No CA Expansion) | Two Market B (Mountain West & CA Expansion) |
| 2020 | Core Studies | Real-time only | ✓ | ✓ | | |
| | | Day-ahead | | | | |
| | | RTO | | ✓ | | |
| 2030 | | Real-time only | ✓ | | | |
| | | Day-ahead | ✓ | ✓ | ✓ | |
| | | RTO | | ✓ | ✓ | ✓ |
| | Sensitivities | Real-time only (EIM) | A | | | |
| | | Day-ahead | | | | |
| | | RTO | | A & B | B | A & B |

**Sensitivity Key**

| |
|---|
| A - Major Transmission Build |
| B - Carbon Price |

Work plan was designed to address specific list of questions posed by Lead Team

# Summary of Market Modeling Assumptions

| Assumption | Market Construct | | |
|---|---|---|---|
| | **EIM Markets** | **Day-ahead Markets** | **RTO Markets** |
| **Real-time intra-market trading costs** | No cost for market transactions | $3/MWh for market transactions above EIM-levels (which are $0/MWh) | No cost for all transactions |
| **Day-ahead intra-market trading costs** | Tariff rate + $4 | $3/MWh for market transactions | No cost for all transactions |
| **Real-time trading costs for market exports and out-of-market transactions** | Tariff rate + $2 | Tariff rate + $2 | Tariff rate + $2 (exports only) |
| **Day-ahead trading costs for market exports and out-of-market transactions** | Tariff rate + $4 | Tariff rate + $4 | Tariff rate + $4 (exports only) |
| **Transmission available for market transactions** | ~15% of inter-area transfer capability for real-time transactions | ~70% of inter-area transfer capability for day-ahead transactions, 15% for real-time | 100% of inter-area transfer capability for day-ahead and real-time transactions |
| **CAISO export limit** | Real-time: 7000 MW<br>Day-ahead: 2000 MW | Real-time: No limit<br>Day-ahead: No limit, except for 2 Market A which has 7,000 | Real-time: No limit<br>Day-ahead: No limit, except for 2 Market A which has 7,000 |
| **Operating reserves** | BA and reserve sharing group obligations retained | | BAs consolidated and reserves held across market footprint |
| **Flexibility reserves** | BA-level constraint based on sub-hourly demand and wind/solar volatility and forecast error | | BAs consolidated and reserves held across market footprint |

# Recap: Study considers certain market benefits and costs in unique state-level analysis

## Market benefits and costs:

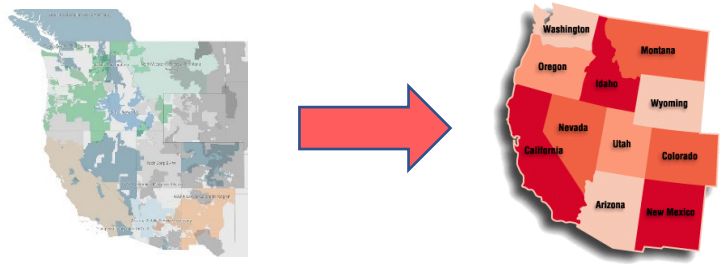
**Estimated in study**

- ✓ **Production cost savings, which capture:**
  - More efficient trade due to reduced transmission wheeling
  - Optimized unit commitment and dispatch
  - Reduced operating and flexibility reserves
  - Reduced curtailment
- ✓ **Capacity savings**
  - Reduced capital investment due to load diversity
- ✓ **Market start-up/administrative costs**

**Not estimated in study**

- × **Other market efficiencies: transparency, independence, transmission planning savings**
- × **Policy-driven resource procurement savings**
- × **Reliability benefits**
- × **Transmission cost allocation**
- × **Many unquantifiable factors**

**Balancing area-level benefits/costs are estimated then allocated to each applicable state**



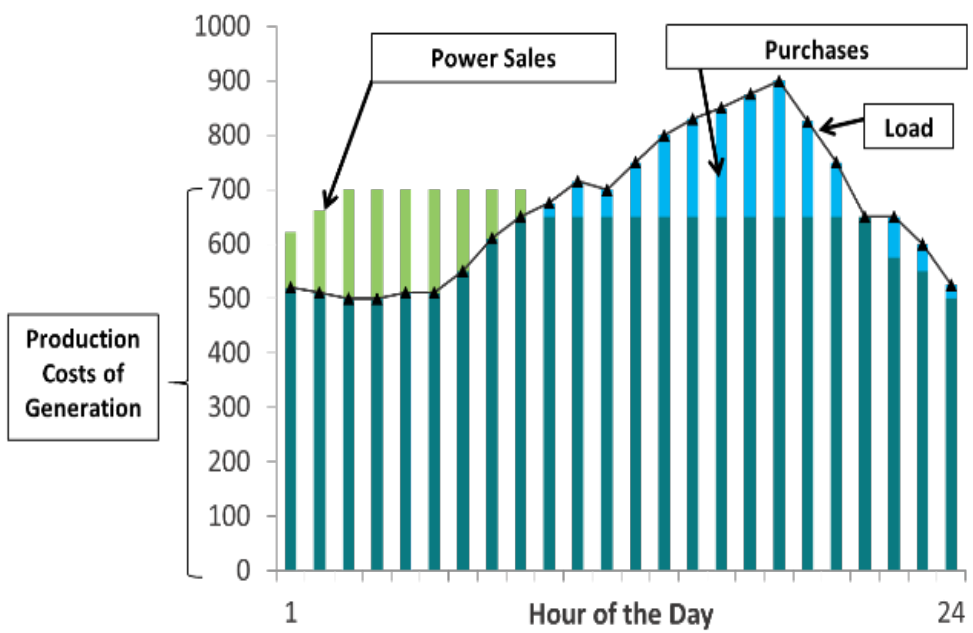

**Other results incorporated into market analysis:**

- ❖ Generation dispatch, by type and state (and WECC-wide)
- ❖ Congestion and utilization of transmission paths
- ❖ GHG emissions by state

# Recap: Study uses Adjusted Production Cost as to Estimate Operational Savings

- **Adjusted production cost (APC) estimates the net costs for a given area to produce, buy, and sell power**
  - Calculated APC on a balancing authority basis and then allocated APC to each state on a load ratio share basis
- **Automatically corrects and internalizes economic benefit associated with opportunities to export (and increase revenues) or import (and avoid running local generation)**
- **Captures impacts to pricing**

## APC Example




Production Costs of Generation — Fuel, Start-up costs, VOM

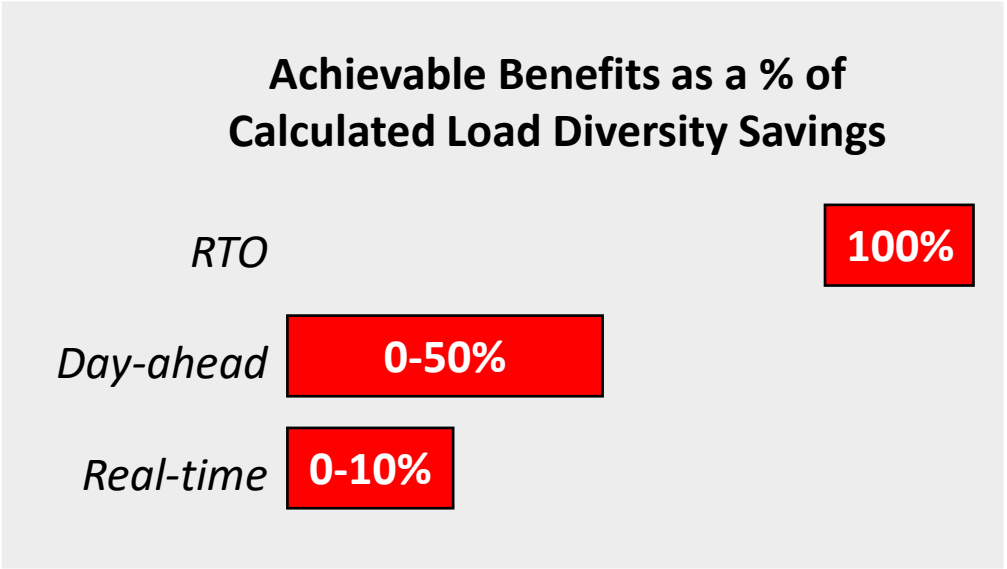
\+ Cost of Purchases

− Power Sales Revenues

= Adjusted Production Cost — Excludes carbon costs and emission import revenues

# Capacity benefits methodology includes a range of estimated achievable benefits for each market construct

- Assumes that in **RTO scenarios, 100% of calculated load diversity benefits** can be realized
  - RTO provides structure to capture full benefit of load diversity
- Assumes that day-ahead market scenarios result in realized **savings of 0-50%** of calculated load diversity benefit, recognizing:
  - Day-ahead markets may not achieve any capacity savings and status quo planning requirements may continue;
  - However, enhanced price discovery, resource pooling, and access to transmission could cause changes to reliability requirements and coordination levels that allow some amount of load diversity benefits to be obtained.
- **Real-time only markets** are unlikely to results in significant capacity savings, therefore we assume they can achieve only **0-10% of load diversity benefits**
  - Increased access to the markets real-time imports that support reliability may, over time, lead to slight changes in amounts of reserves held




*Approach seeks to place reasonable bounds on range of capacity benefits provided by various markets such that stakeholders can draw their own conclusions about what level of benefits is most appropriate.*

# Core Questions

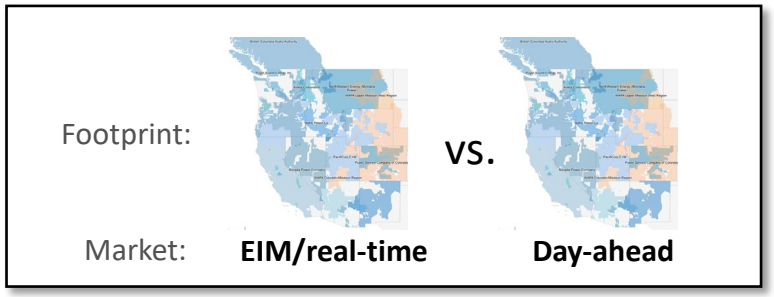
1. Assuming no change in market footprints from the Status Quo, what benefits are expected from adding day-ahead energy market services to the West's real-time markets?
2. Assuming a day-ahead market forms, how do the benefits of two market footprints compare with a single west-wide footprint?
3. How do the benefits of a west-wide RTO compare with a west-wide day-ahead market?
4. What is the trajectory of benefits for a west-wide RTO?
5. How are the benefits of an RTO impacted by market footprints?
6. How do market benefits change if more transmission is built?
7. How sensitive are RTO configurations to a Federal or West-wide carbon pricing regime?

# 2030 Core Study Results

Summary of answers to Core Questions based on Core 2030 study results

# (#1) Assuming no change in market footprints from the Status Quo, what benefits are expected from adding day-ahead energy market services to the West's real-time markets?

**Case Compare Key**




- Expanding services to day-ahead results in approximately $47 million per year of operational savings and as much as $529 million per year in capacity savings, totaling over **$576 million** of annual gross benefits for the West
- System emissions and curtailments fall 0.3% and 6%, respectively, due to the day-ahead market construct
- After accounting for potential capacity benefits of the day-ahead market, **gross benefits for all states are positive**
  - Most states see minor (<1%) changes in operational costs due to the day-ahead market construct
- The incremental cost to implement the day-ahead market for the Status Quo footprint is estimated **between $76-226 million per year**, which is less than the annual gross benefits of $576 million estimated in this study

**2030 Status Quo Day-ahead Annual Benefits**

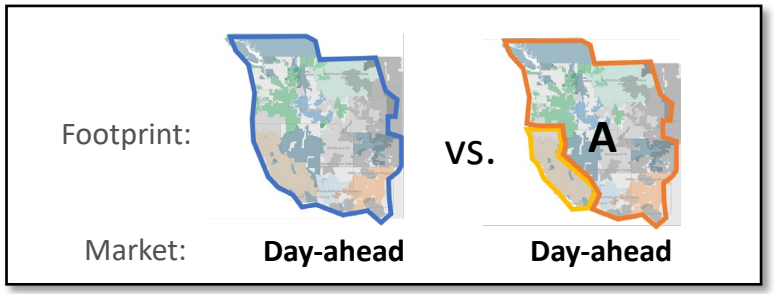
| State | APC Benefit ($M) | Capacity Benefit ($M) | Total Benefit ($M) | |
|---|---|---|---|---|
| AZ | ($11) | $50 | $39 | |
| CA | $63 | $80 | $143 | |
| CO | $3 | $37 | $40 | |
| ID | $2 | $39 | $41 | |
| MT | $1 | $16 | $17 | |
| NM | $1 | $28 | $29 | |
| NV | ($13) | $22 | $10 | |
| OR | $1 | $56 | $57 | |
| UT | $3 | $24 | $27 | |
| WA | ($4) | $168 | $163 | Estimated Ongoing Cost |
| WY | $2 | $8 | $9 | |
| **TOTAL** | **$47** | **$529** | **$576** | $76-226 |

| Note: Only high-end capacity savings are shown |

| 2030 Scenarios (Footprint + Market Construct) | Total Benefits | = | APC Savings | + | Capacity Savings | Admin Cost Range | Carbon Emissions | Curtailments |
|---|---|---|---|---|---|---|---|---|
| Status Quo Real-time/EIM | $0 | | $0 | | $0 | $0 - 0 | 194 | 2.87% |
| Status Quo Day-ahead | $576 | | $47 | | $529 | $77 - 143 | 194 | 2.71% |

# (#2) Assuming a day-ahead market forms, how do the benefits of two market footprints compare with a single west-wide footprint?

**Case Compare Key**




- For the day-ahead market construct, the single-footprint market had gross benefits of $247 million per year more than the two-footprint system
  - Note that there is no cost difference between these two systems since the entire region obtains day-ahead market services in both scenarios
- Most of incremental savings from the single-footprint market are due to the loss of load diversity caused by the the two-market footprint system
- All western states realize higher **gross benefits** in the one market day-ahead configuration
- Curtailments and emissions for the two day-ahead scenarios are similar

**Difference in Annual Benefits: 2030 One Market Day-ahead - 2030 Two Market A Day-ahead**

| State | APC Benefit ($M) | Capacity Benefit ($M) | Total Benefit ($M) |
|---|---|---|---|
| AZ | ($8) | $44 | $36 |
| CA | $23 | $22 | $45 |
| CO | $1 | $0 | $1 |
| ID | $2 | $9 | $11 |
| MT | $1 | $16 | $18 |
| NM | ($4) | $31 | $27 |
| NV | ($12) | $19 | $7 |
| OR | ($1) | $25 | $24 |
| UT | ($0) | $23 | $23 |
| WA | $7 | $41 | $48 |
| WY | $0 | $7 | $7 |
| **TOTAL** | $10 | $237 | **$247** |

The table summarizes the *change in gross benefits and costs* of two day-ahead market scenarios – these are not gross benefits values for either scenario.

| Estimated Ongoing Cost |
|---|
| $0 |

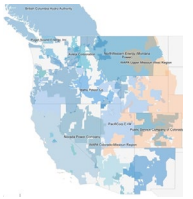
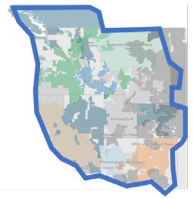
| Note: Only high-end capacity savings are shown |

| 2030 Scenarios (Footprint + Market Construct) | Total Benefits | = | APC Savings | + | Capacity Savings | Admin Cost Range | Carbon Emissions | Curtailments |
|---|---|---|---|---|---|---|---|---|
| One Market Day-ahead | $681 | | $95 | | $586 | $85 - 161 | 193 | 2.62% |
| Two Market A Day-ahead | $435 | | $85 | | $349 | $85 - 161 | 194 | 2.79% |

*Values are in $2020 and million/year and are calculated relative to Status Quo Real-time/EIM* | *Million short tons* | *% RE generation*

# (#3) How do the benefits of a west-wide RTO compare with a west-wide day-ahead market?

**Case Compare Key**

Footprint:  vs 

Market: **EIM/real-time** **Day-ahead or RTO**

- The study estimates that a system-wide **RTO will produce 3x gross benefits** that what might be realized for a day-ahead market with the same footprint ($681 million per year vs. ~$2 billion per year of gross benefits)
  - The RTO is expected to be more expensive to implement, but these incremental costs appear to be made up by the added benefits (for both the high- and low-cost scenarios)
- Reductions in adjusted production cost account for 45% of the relative savings, while capacity benefits due to load diversity causes the remaining 55% of savings, which indicates **both value streams are key drivers of a west-wide RTO**
- An RTO relative to a day-ahead market also better reduces curtailment (43% vs. 9% reduction) and results in about 2.3 million short tons per year fewer $CO_2$ emissions

**Difference in Annual Benefits: 2030 One Market RTO - 2030 One Market Day-ahead**

| State | APC Benefit ($M) | Capacity Benefit ($M) | Total Benefit ($M) | |
|---|---|---|---|---|
| AZ | $71 | $65 | $136 | |
| CA | $214 | $105 | $319 | |
| CO | $35 | $53 | $89 | |
| ID | ($8) | $49 | $40 | |
| MT | $9 | $20 | $29 | |
| NM | $40 | $39 | $78 | |
| NV | $7 | $28 | $35 | |
| OR | $78 | $70 | $148 | |
| UT | $34 | $31 | $65 | |
| WA | $105 | $246 | $351 | Estimated Ongoing Cost |
| WY | $14 | $13 | $27 | |
| **TOTAL** | $599 | $718 | **$1,317** | $102-259 |

| Note: Only high-end capacity savings are shown |

| 2030 Scenarios (Footprint + Market Construct) | Total Benefits | = | APC Savings | + | Capacity Savings | Admin Cost Range | Carbon Emissions | Curtailments |
|---|---|---|---|---|---|---|---|---|
| One Market Day-ahead | $681 | | $95 | | $586 | $85 - 161 | 193 | 2.62% |
| One Market RTO | $1,998 | | $694 | | $1,305 | $187 - 513 | 191 | 1.63% |

*Values are in $2020 and million/year and are calculated relative to Status Quo Real-time/EIM* *Million short tons* *% RE generation*

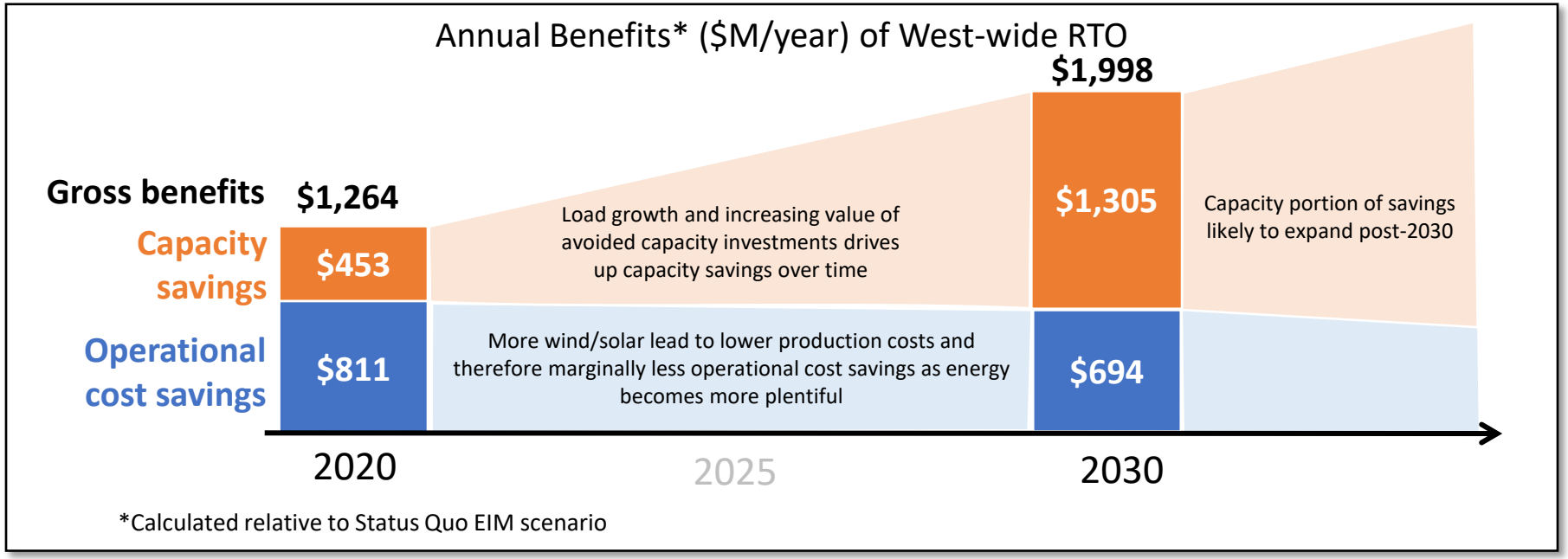
# (#4) What is the trajectory of benefits for a west-wide RTO?

- Results indicate that the gross benefits of a single-footprint RTO are forecasted to increase from $1.2 billion per year in 2020 to **$2 billion per year by 2030**.
  - This forecast of gross benefits exceeds estimated ongoing costs by $1.5 billion per year, or more, and all states are estimated to have positive gross benefits due to the RTO
- Capacity savings due to load diversity benefits **make up 65%** of RTO market benefits by 2030 (versus 35% in 2020)
- By contrast, operational savings are forecasted to **decrease** in the coming years as load is increasingly served by zero-marginal cost resources that offset fuel and operational expenses that make up dispatch savings
  - ❖ Less fuel burn and more efficient thermal dispatch in the BAU means relatively fewer operational savings can be realized due to RTO formation

**2030 One Market RTO Annual Benefits**

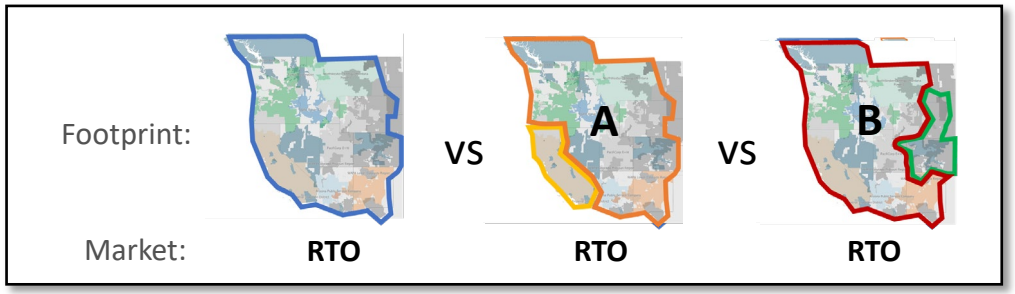
| State | APC Benefit ($M) | Capacity Benefit ($M) | Total Benefit ($M) | |
|---|---|---|---|---|
| AZ | $59 | $117 | $176 | |
| CA | $288 | $190 | $478 | |
| CO | $62 | $98 | $160 | |
| ID | ($8) | $88 | $80 | |
| MT | $10 | $36 | $46 | |
| NM | $43 | $70 | $113 | |
| NV | ($5) | $50 | $45 | |
| OR | $80 | $127 | $207 | |
| UT | $43 | $56 | $99 | |
| WA | $102 | $449 | $552 | Estimated Ongoing Cost |
| WY | $19 | $23 | $43 | |
| **TOTAL** | $694 | $1,305 | **$1,998** | $187-513 |

- The west-wide RTO scenario also caused a reduction in curtailments of 2.9 TWh, dropping system-wide curtailments from 2.9% to 1.6%
- The RTO scenario decreased $CO_2$ emissions by 3.2 million tons annually, a reduction of 2%
  - ❖ In 2020, the One Market RTO Scenario caused emission reductions of only 1.5 million tons, which suggests the environmental benefits of a west-wide RTO will increase over time



# (#5) How are the benefits of an RTO impacted by market footprints?

**Case Compare Key**




- Gross benefits to the region are maximized if the West operates under a single RTO footprint
  - ❖ $2 billion in annual benefits for the west-wide RTO scenario exceeds benefits of two-market RTO systems by $569 million and $187 million for Two Market A and Two Market B footprints, respectively
  - ❖ Given the study's ongoing cost estimation methodology (which is agnostic on service provider and calculated on a $/MWh basis), additional benefits from the one market system do not have additional costs, as all three scenarios have the same load and, thus, same ongoing cost
- Of the two market footprints, Two Market B offers the most benefits ($381 million more than Two Market A)
  - ❖ This is primarily driven by load diversity benefits that are realized due to the broad geographic diversity of Two Market B
  - ❖ Two Market A breaks off diverse southwest loads, which costs the system diversity benefits and savings
- The three RTO cases were the best performing scenarios in terms of emissions and curtailments
  - ❖ The west-wide footprint was more effective at reducing CO2 emissions and integrating renewables

**Difference in Annual Benefits: 2030 One Market RTO - 2030 Two Market A RTO**

| State | APC Benefit ($M) | Capacity Benefit ($M) | Total Benefit ($M) | |
|---|---|---|---|---|
| AZ | $17 | $87 | $105 | |
| CA | $119 | $44 | $163 | |
| CO | ($7) | $0 | ($7) | |
| ID | ($8) | $17 | $10 | |
| MT | ($1) | $33 | $32 | |
| NM | ($1) | $61 | $60 | |
| NV | ($33) | $38 | $5 | |
| OR | ($3) | $50 | $47 | |
| UT | ($2) | $47 | $45 | |
| WA | $14 | $82 | $96 | Estimated Ongoing Cost |
| WY | ($0) | $14 | $14 | |
| **TOTAL** | **$95** | **$473** | **$569** | $0 |

**Difference in Annual Benefits: 2030 One Market RTO - 2030 Two Market B RTO**

| State | APC Benefit ($M) | Capacity Benefit ($M) | Total Benefit ($M) | |
|---|---|---|---|---|
| AZ | $1 | $0 | $1 | |
| CA | $16 | $0 | $16 | |
| CO | $69 | $82 | $151 | |
| ID | ($2) | $0 | ($2) | |
| MT | $4 | $0 | $4 | |
| NM | $1 | $0 | $1 | |
| NV | $0 | $0 | $0 | |
| OR | ($0) | $0 | ($0) | |
| UT | $8 | $0 | $8 | |
| WA | ($1) | $0 | ($1) | Estimated Ongoing Cost |
| WY | $10 | $0 | $10 | |
| **TOTAL** | **$105** | **$82** | **$187** | $0 |

**Difference in Annual Benefits: 2030 Two Market B - 2030 Two Market A RTO**

| State | APC Benefit ($M) | Capacity Benefit ($M) | Total Benefit ($M) | |
|---|---|---|---|---|
| AZ | $16 | $87 | $104 | |
| CA | $103 | $44 | $146 | |
| CO | ($75) | ($82) | ($157) | |
| ID | ($5) | $17 | $12 | |
| MT | ($5) | $33 | $28 | |
| NM | ($2) | $61 | $59 | |
| NV | ($33) | $38 | $5 | |
| OR | ($3) | $50 | $47 | |
| UT | ($10) | $47 | $37 | |
| WA | $15 | $82 | $97 | Estimated Ongoing Cost |
| WY | ($10) | $14 | $4 | |
| **TOTAL** | **($10)** | **$391** | **$381** | $0 |

# 2030 Study Sensitivities

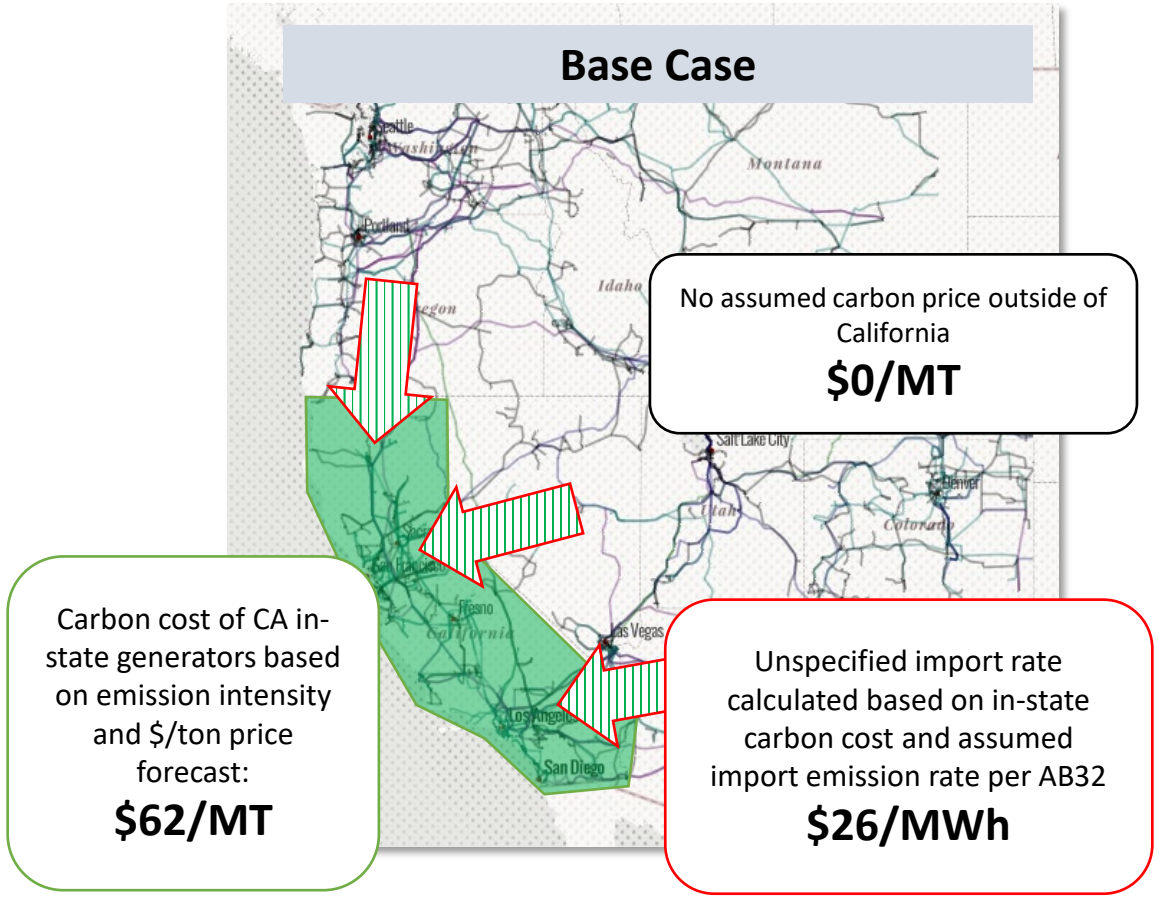
Assumptions

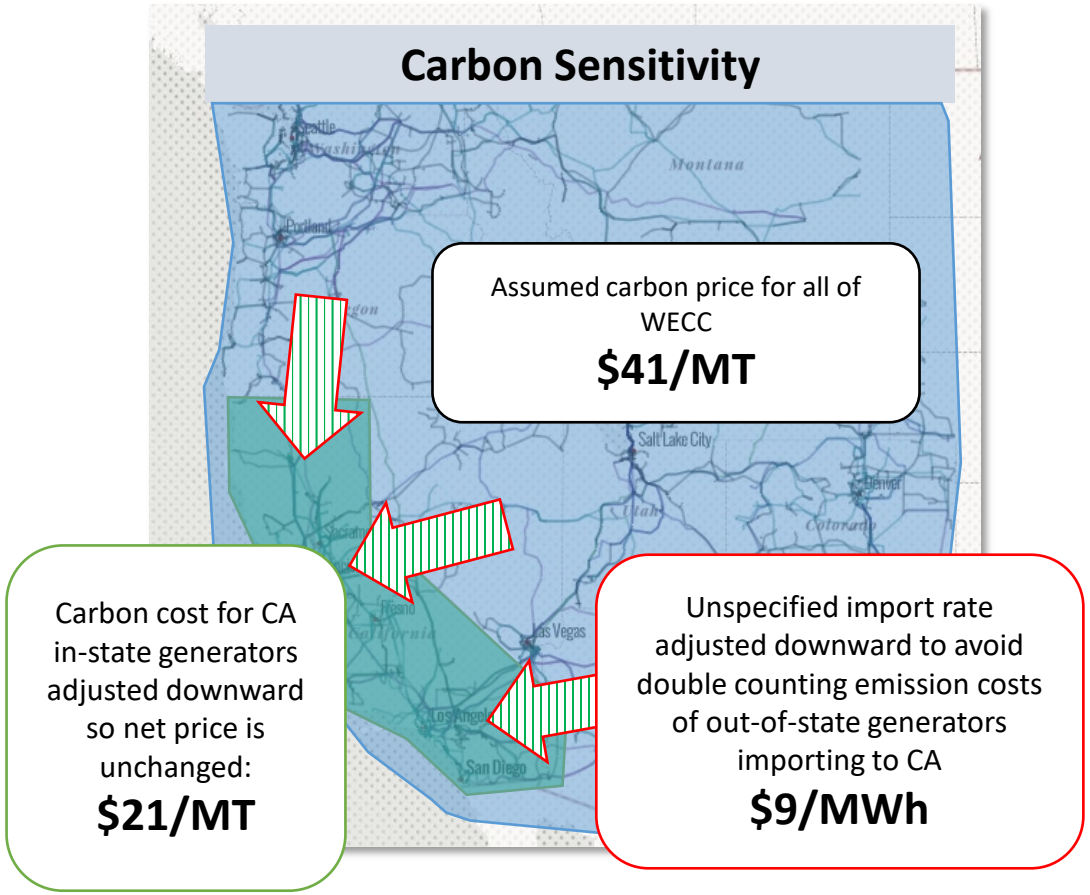
# Carbon Sensitivity: Background and Purpose

- **Core scenarios assumed that California was only state with carbon policy that requires emitting generators to procure allowances based on their emissions**
  - Allowance price of **$62/metric ton** (MT) in 2030 is modeled as carbon adder that impacts the marginal cost required to dispatch an emitting generator
- **Carbon sensitivity assumes that a federally mandated carbon price is implemented across the Western states**
  - Price assumed to be **$41/MT**, based on average 2030 carbon price sourced from a survey of 11 recent integrated resource plans
  - Price was applied to emitting generators in WECC and California, with adjustments to California generators to ensure that there was not a net reduction to the California carbon price (e.g., the higher $62/MT price is retained) – *see subsequent slide*
- **Intent of study is to <u>determine if RTO market benefits are impacted</u> by a federal carbon price**
  - Key case comparisons are as follows:

| Core Studies | | Sensitivity |
|---|---|---|
| One Market RTO Benefits | Vs. | One Market RTO ***w/ Carbon Price*** Benefits |
| Two Market A RTO Benefits | Vs. | Two Market A RTO **w/ *Carbon Price*** Benefits |
| Two Market B RTO Benefits | Vs. | Two Market B RTO ***w/ Carbon Price*** Benefits |

# Carbon Sensitivity: Study Assumption

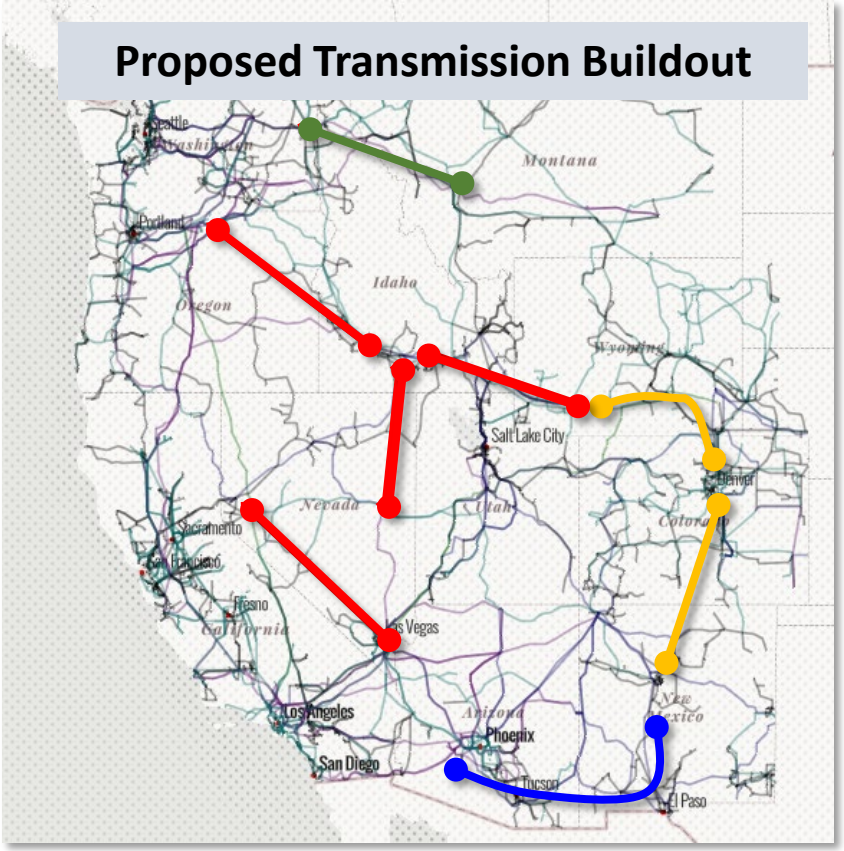



| | | |
|---|---|---|
| **CA in-state/specified resources:** | **$62/MT** | $21/MT + $41/MT = **$62/MT** |
| **CA imports:** | **$62/MT** ($26/MWh) | $21/MT ($9/MWh) + $41/MT = **$62/MT** |
| **WECC system adder:** | **$0/MT** | **$41/MT** |

# Transmission Sensitivity: Purpose and Assumptions

- **Designed to investigate how market benefits change if major transmission upgrades, beyond what is included in the core studies, are placed into service before 2030**
  - ❖ Small changes to system topology likely won't impact study results, so study assumes a relatively large inter-state buildout that could occur in 2030 or beyond
- **The following buildout was added to Status Quo Real-time, One Market RTO, and Two Market B RTO studies:**




- Buildout features:
  - **Additional transmission capacity between Intermountain/PNW and Southwest markets**
  - **New interties to integrate Colorado into rest of WECC system**
  - **Transmission to connect New Mexico to DSW markets**
  - **Upgrades to Montana export path**
- While buildout is inspired by actual projects under development, it is not intended represent a comprehensive "plan" or preference for a given project or set of projects
- Core cases already include the following: Gateway South and Gateway West D.2, Ten West Link, various projects under construction
- **Key case comparisons are as follows:**

| Core Studies | | Sensitivity |
|---|---|---|
| Status Quo Real-time Benefits | Vs. | Status Quo Real-time ***w/ transmission*** Benefits |
| One Market RTO Benefits | Vs. | One Market RTO ***w/ transmission*** Benefits |
| Two Market B RTO Benefits | Vs. | Two Market B RTO ***w/ transmission*** Benefits |

# Carbon Sensitivity Results

Core Studies: One Market RTO Benefits

Vs.

Sensitivity: One Market RTO ***w/ Carbon Price*** Benefits

| 2030 Scenarios (Footprint + Market Construct) | Total Benefits | = | APC Savings | + | Capacity Savings | Admin Cost Range | Carbon Emissions | Curtailments |
|---|---|---|---|---|---|---|---|---|
| Status Quo Real-time/EIM | $0 | | $0 | | $0 | $0 - 0 | 194 | 2.87% |
| One Market RTO | $1,998 | | $694 | | $1,305 | $187 - 513 | 191 | 1.63% |
| One Market RTO *Carbon* | $1,793 | | $489 | | $1,305 | $187 - 513 | 159 | 1.47% |

*Values are in $2020 and million/year and are calculated relative to Status Quo Real-time/EIM* — *Million short tons* — *% RE generation*

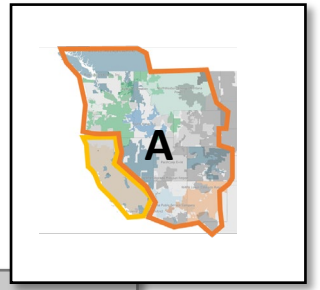
- **Adding a $41/MT carbon price to the west did not materially impact the estimated benefits of a west-wide RTO (One Market RTO)**
  - ❖ It did impact how benefits were estimated among states, however
- **Adjusted production cost savings *decreased* by $205 million (relative to a One Market RTO without a west-wide carbon price) while capacity savings were unchanged**
  - ❖ Note that carbon costs are excluded from the calculation of APC
  - ❖ Fewer dispatched savings can be achieved when supply curve is flattened due to the carbon price
- **The carbon price reduced emission by roughly 42 million tons – a reduction of 22%**
  - ❖ The emission reduction is primarily driven by shifting generation dispatch away from coal to gas, which have lower emission rates

**2030 One Market RTO Carbon vs. No Carbon Cost Annual Benefits**

| State | APC Benefit ($M) | Capacity Benefit ($M) | Total Benefit ($M) |
|---|---|---|---|
| AZ | $48 | $0 | $48 |
| CA | $201 | $0 | $201 |
| CO | ($152) | $0 | ($152) |
| ID | ($191) | $0 | ($191) |
| MT | ($142) | $0 | ($142) |
| NM | ($30) | $0 | ($30) |
| NV | $223 | $0 | $223 |
| OR | $62 | $0 | $62 |
| UT | ($56) | $0 | ($56) |
| WA | ($83) | $0 | ($83) |
| WY | ($84) | $0 | ($84) |
| **TOTAL** | ($205) | $0 | **($205)** |

| Estimated Ongoing Cost |
|---|
| 0 |

# Carbon Sensitivity Results




Core Studies: Two Market A RTO Benefits

Vs.

Sensitivity: Two Market A RTO **w/ *Carbon Price*** Benefits

| 2030 Scenarios (Footprint + Market Construct) | Total Benefits | = | APC Savings | + | Capacity Savings | Admin Cost Range | Carbon Emissions | Curtailments |
|---|---|---|---|---|---|---|---|---|
| Status Quo Real-time/EIM | $0 | | $0 | | $0 | $0 - 0 | 194 | 2.87% |
| Two Market A RTO | $1,430 | | $598 | | $831 | $187 - 513 | 192 | 1.89% |
| Two Market A RTO *Carbon* | $1,163 | | $332 | | $831 | $187 - 513 | 160 | 1.76% |

*Values are in $2020 and million/year and are calculated relative to Status Quo Real-time/EIM* — *Million short tons* — *% RE generation*

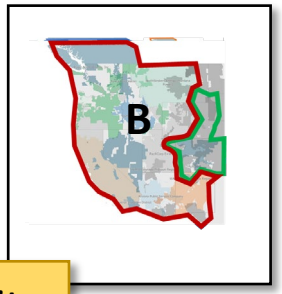
- **Adding a $41/MT carbon price to the west reduced the estimated benefits for an RTO with the Two Market A footprint**
  - ❖ Significant impacts observed at state-level
- **Adjusted production cost savings *decreased* by $266 million (relative to a Two Market A RTO without a west-wide carbon price) while capacity savings were unchanged**
  - ❖ Note that carbon costs are excluded from the calculation of APC
- **The carbon price reduced emission by roughly 32 million tons, a reduction of 17%**
  - ❖ The emission reduction is primarily driven by shifting generation dispatch away from high emitting resources (due to their increasing marginal cost of energy caused by the carbon price)

**2030 Two Market A RTO Carbon vs. No Carbon Cost Annual Benefits**

| State | APC Benefit ($M) | Capacity Benefit ($M) | Total Benefit ($M) |
|---|---|---|---|
| AZ | $109 | $0 | $109 |
| CA | $121 | $0 | $121 |
| CO | ($132) | $0 | ($132) |
| ID | ($194) | $0 | ($194) |
| MT | ($139) | $0 | ($139) |
| NM | ($26) | $0 | ($26) |
| NV | $138 | $0 | $138 |
| OR | $80 | $0 | $80 |
| UT | ($66) | $0 | ($66) |
| WA | ($74) | $0 | ($74) |
| WY | ($82) | $0 | ($82) |
| **TOTAL** | ($266) | $0 | **($266)** |

| Estimated Ongoing Cost |
|---|
| 0 |

# Carbon Sensitivity Results




Core Studies

Two Market B RTO Benefits

Vs.

Sensitivity

Two Market B RTO ***w/ Carbon Price*** Benefits

| 2030 Scenarios (Footprint + Market Construct) | Total Benefits | = | APC Savings | + | Capacity Savings | Admin Cost Range | Carbon Emissions | Curtailments |
|---|---|---|---|---|---|---|---|---|
| Status Quo Real-time/EIM | $0 | | $0 | | $0 | $0 - 0 | 194 | 2.87% |
| Two Market B RTO | $1,811 | | $589 | | $1,223 | $187 - 513 | 191 | 1.65% |
| Two Market B RTO *Carbon* | $1,706 | | $484 | | $1,223 | $187 - 513 | 161 | 1.45% |

*Values are in $2020 and million/year and are calculated relative to Status Quo Real-time/EIM* *Million short tons* *% RE generation*

- **Adding a $41/MT carbon price to the west reduced the estimated benefits for an RTO with the Two Market B footprint**
  - ❖ Significant impacts observed at state-level
- **Adjusted production cost savings *decreased* by $105 million relative to a Two Market B RTO without a west-wide carbon cost, while capacity savings were unchanged**
  - ❖ Note that carbon costs are excluded from the calculation of APC
- **The carbon price reduced emission by roughly 40 million tons, a reduction of 21%**
  - ❖ The emission reduction is primarily driven by shifting generation dispatch away from high emitting resources (due to their increasing marginal cost of energy caused by the carbon price)

**2030 Two Market B RTO Carbon vs. No Carbon Cost Annual Benefits**

| State | APC Benefit ($M) | Capacity Benefit ($M) | Total Benefit ($M) | |
|---|---|---|---|---|
| AZ | $40 | $0 | $40 | |
| CA | $172 | $0 | $172 | |
| CO | ($55) | $0 | ($55) | |
| ID | ($181) | $0 | ($181) | |
| MT | ($138) | $0 | ($138) | |
| NM | ($28) | $0 | ($28) | |
| NV | $201 | $0 | $201 | |
| OR | $62 | $0 | $62 | |
| UT | ($39) | $0 | ($39) | |
| WA | ($69) | $0 | ($69) | Estimated Ongoing Cost |
| WY | ($69) | $0 | ($69) | |
| **TOTAL** | ($105) | $0 | **($105)** | 0 |

# Transmission Sensitivity Results

Core Studies

**Status Quo Real-time Benefits**

Vs.

Sensitivity

**Status Quo *w/ transmission* Benefits**

| 2030 Scenarios (Footprint + Market Construct) | Total Benefits | = | APC Savings | + | Capacity Savings | Admin Cost Range | Carbon Emissions | Curtailments |
|---|---|---|---|---|---|---|---|---|
| Status Quo Real-time/EIM | $0 | | $0 | | $0 | $0 - 0 | 194 | 2.87% |
| Status Quo Real-time/EIM *Transmission* | $107 | | $107 | | $0 | $0 - 0 | 193 | 2.47% |

*Values are in $2020 and million/year and are calculated relative to Status Quo Real-time/EIM* | *Million short tons* | *% RE generation*

- **A larger transmission buildout by 2030 helps improve the operational efficiency of the Status Quo real-time market scenario**
- **Adjusted production cost savings *increased* by $113 million while capacity savings were not quantified for Status Quo EIM scenario as this was the reference case**
  - ❖ Note that capacity savings were unchanged because we conservatively assumed the transmission overlay did not impact inter-area transfer capability
- **The transmission buildout also led to fewer emissions and curtailments**
- **Additional transmission caused most state's adjusted production cost to decline by ~0-4%**

**2030 Status Quo EIM Transmission Annual Benefits**

| State | APC Benefit ($M) | Capacity Benefit ($M) | Total Benefit ($M) | |
|---|---|---|---|---|
| AZ | ($5) | $0 | ($5) | |
| CA | $8 | $0 | $8 | |
| CO | $4 | $0 | $4 | |
| ID | $18 | $0 | $18 | |
| MT | $8 | $0 | $8 | |
| NM | $2 | $0 | $2 | |
| NV | $11 | $0 | $11 | |
| OR | $10 | $0 | $10 | |
| UT | $9 | $0 | $9 | |
| WA | $38 | $0 | $38 | Estimated Ongoing Cost |
| WY | $4 | $0 | $4 | |
| **TOTAL** | **$107** | **$0** | **$107** | 0 |

# Transmission Sensitivity Results

Core Studies: One Market RTO Benefits

Vs.

Sensitivity: One Market RTO ***w/ transmission*** Benefits

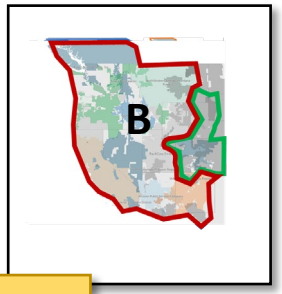
| 2030 Scenarios (Footprint + Market Construct) | Total Benefits | = | APC Savings | + | Capacity Savings | Admin Cost Range | Carbon Emissions | Curtailments |
|---|---|---|---|---|---|---|---|---|
| Status Quo Real-time/EIM | $0 | | $0 | | $0 | $0 - 0 | 194 | 2.87% |
| One Market RTO | $1,998 | | $694 | | $1,305 | $187 - 513 | 191 | 1.63% |
| One Market RTO *Transmission* | $2,089 | | $784 | | $1,305 | $187 - 513 | 190 | 1.39% |
| | *Values are in $2020 and million/year and are calculated relative to Status Quo Real-time/EIM* | | | | | | *Million short tons* | *% RE generation* |

- **A larger transmission buildout by 2030 helps improve the operational efficiency of a future west-wide RTO by about $90 million per year**
  - ❖ Note that capacity savings were unchanged because we conservatively assumed the transmission overlay did not impact inter-area transfer capability
- **The transmission buildout reduced curtailment but didn't lead to a material change in carbon emissions**
- **Most states had APC reductions in the 0-1% range from adding transmission to the One Market RTO market construct, although there were some with larger savings due to the additional transmission (Washington and Montana)**

**2030 One Market RTO Transmission vs. No Transmission Annual Benefits**

| State | APC Benefit ($M) | Capacity Benefit ($M) | Total Benefit ($M) | |
|---|---|---|---|---|
| AZ | ($9) | $0 | ($9) | |
| CA | $0 | $0 | $0 | |
| CO | $5 | $0 | $5 | |
| ID | $11 | $0 | $11 | |
| MT | $10 | $0 | $10 | |
| NM | ($2) | $0 | ($2) | |
| NV | $7 | $0 | $7 | |
| OR | $8 | $0 | $8 | |
| UT | $6 | $0 | $6 | |
| WA | $51 | $0 | $51 | Estimated Ongoing Cost |
| WY | $3 | $0 | $3 | |
| **TOTAL** | $90 | $0 | **$90** | $0 |

# Transmission Sensitivity Results




Core Studies

Two Market B RTO Benefits

Vs.

Sensitivity

Two Market B ***w/ transmission*** Benefits

| 2030 Scenarios (Footprint + Market Construct) | Total Benefits | = | APC Savings | + | Capacity Savings | Admin Cost Range | Carbon Emissions | Curtailments |
|---|---|---|---|---|---|---|---|---|
| Status Quo Real-time/EIM | $0 | | $0 | | $0 | $0 - 0 | 194 | 2.87% |
| Two Market B RTO | $1,811 | | $589 | | $1,223 | $187 - 513 | 191 | 1.65% |
| Two Market B RTO *Transmission* | $1,892 | | $670 | | $1,223 | $187 - 513 | 190 | 1.43% |

*Values are in $2020 and million/year and are calculated relative to Status Quo Real-time/EIM* | *Million short tons* | *% RE generation*

- **A larger transmission buildout by 2030 helps improve the operational efficiency of the Two Market B RTO scenario by $81 million per year**
  - ❖ Note that capacity savings were unchanged because we conservatively assumed the transmission overlay did not impact inter-area transfer capability
- **The transmission buildout reduced curtailment but didn't lead to a material change in carbon emissions**
- **Most states had APC reductions in the 0-2% range from adding transmission to the Two Market B RTO market construct, although there were some with larger savings due to the additional transmission (Washington and Montana)**

**2030 Two Market B RTO Transmission vs. No Transmission Annual Benefits**

| State | APC Benefit ($M) | Capacity Benefit ($M) | Total Benefit ($M) | |
|---|---|---|---|---|
| AZ | ($7) | $0 | ($7) | |
| CA | ($0) | $0 | ($0) | |
| CO | $8 | $0 | $8 | |
| ID | $11 | $0 | $11 | |
| MT | $8 | $0 | $8 | |
| NM | ($1) | $0 | ($1) | |
| NV | $5 | $0 | $5 | |
| OR | $6 | $0 | $6 | |
| UT | $6 | $0 | $6 | |
| WA | $42 | $0 | $42 | Estimated Ongoing Cost |
| WY | $5 | $0 | $5 | |
| **TOTAL** | $81 | $0 | **$81** | $0 |

# Findings

# Summary of Findings *(draft)*

1. **New day-ahead markets could result in $576 million per year of savings if existing market footprints are retained and market services are expanded**
   - **Crucial that load diversity benefits** and associated capacity savings be achieved under the market's design
   - Regarding footprints, a **west-wide day-ahead** market results in $681 million of annual benefits, which is $247 million per year greater than a scenario in which California and the rest of the West operate in two parallel day-ahead markets.
2. **A west-wide RTO provides even greater savings, estimated by the study at ~$2 billion of gross benefits per year, which exceeds the high-end benefits of a west-wide day-ahead market by roughly $1.3 billion per year**
   - Results also demonstrate that **significant benefits are possible regardless if one or two RTO footprints materialize**.
   - However, a single-market system drives between $187-569 million greater savings than the two-market configurations of an RTO.
   - The technical portion of this study **does not consider a host of other benefits** that may be maximized by a consolidated RTO footprint (such as transmission planning, public policy resource access, etc.).
   - The RTO scenario with the lowest benefits considered in this study was the one in which California operated a single-state RTO and the rest of the West operated in parallel with a separate RTO. This scenario still produced $1.4 billion in annual gross benefits.

# Summary of Findings *(draft)*

3. **Results suggest that significant operational savings and capacity benefits occur even under scenarios in which two Western markets operate in parallel**
   - However, modeling of market-to-market seams present in these scenario may be optimistic as practical experience suggests that "unmodelable" interaction between markets could limit benefits realized by each market.
   - Additionally, this effort did not quantify other types of market benefits (e.g., public policy resource access) that may be maximized by a larger market footprint.
4. **The RTO framework led to meaningful reductions in curtailments and emissions**
   - Based on the 2020 and 2030 study results, the ability of new or expanded markets to help reduce system-wide emissions and better integrate renewables is growing.
5. **While modeling did indicate that RTO benefits are lower with a west-wide carbon price in place, the most substantial category of benefits – capacity savings – was not impacted and the RTO market configurations still produced significant savings on the order of $1.1 – 1.7 billion per year**
   - The west-wide carbon price had substantial impact on total carbon emissions, driving them down by 17-22%.
6. **New transmission capacity enhanced the performance and economic benefits of new and expanded energy markets**
   - In all cases, economic benefits increased by $81-107 million per year when a larger 2030 transmission buildout was assumed.
   - Note that this study is not seeking to perform a transmission benefits analysis and did **not** assess other categories of benefits tha may be provided by transmission expansion.

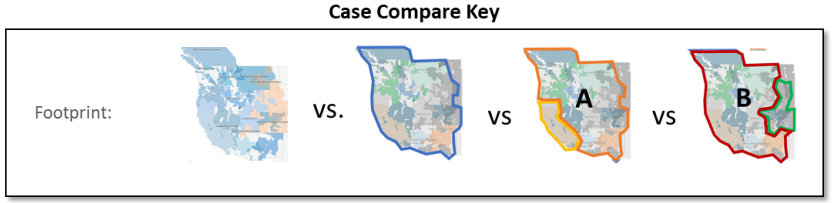
# Additional Observations

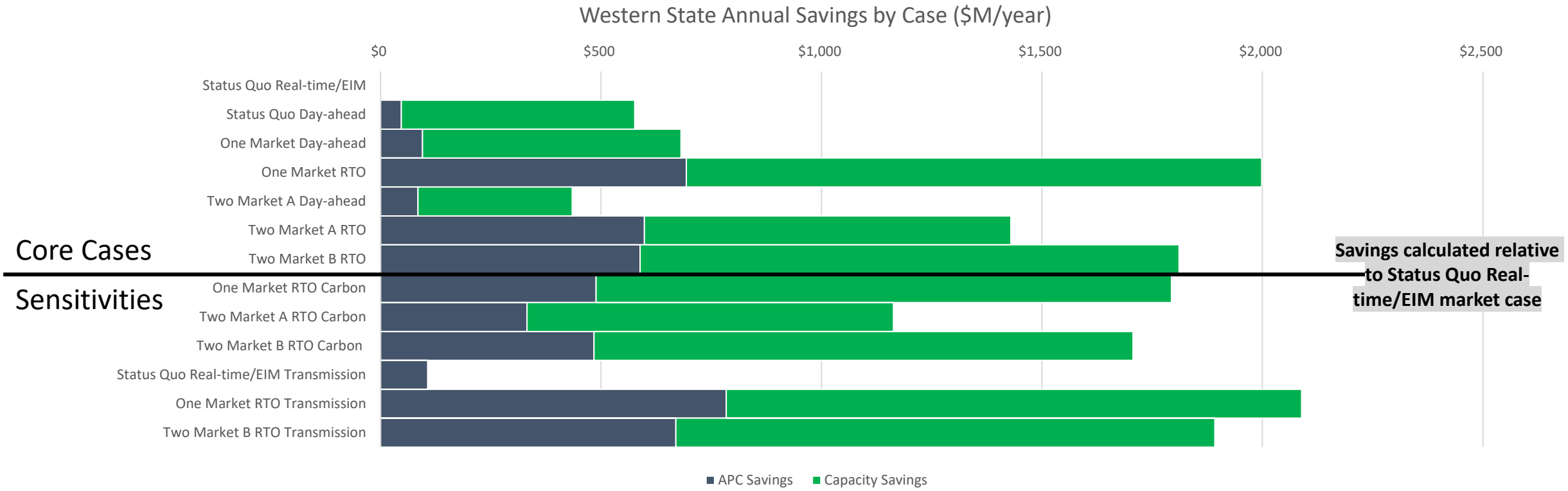
- **The regional economic case for new/expanded markets is supported by the technical findings of the study:** At the regional level, there were not any market configurations in which the high-end ongoing incremental cost estimates to operate these markets eclipsed the high-end gross benefits estimated in this study.
- **Bigger is still better:** Gross benefits results support the perspective that bigger (in footprint) and more comprehensive (in services) markets are best suited to maximize benefits for the most Western states.
- **Alternative types of regional coordination could help achieve capacity benefits estimated in the study:** Material capacity savings could be achieved under even the most limited market frameworks so long as the proper capacity sharing and operational programs are in place.
- **Energy-rich future:** Given the rapidly evolving resource mix in the West, the study suggests that over time operational/dispatch savings from new regional markets is likely to decrease relative to present-day savings. However, integration benefits, reliability benefits, capacity savings from resource and load diversity, among a host of other benefit drives will replace and likely exceed any lost energy benefits caused by an evolving resource mix.
- **State-level metrics:** Observed reductions in regional production costs across all market footprints and constructs suggests that new and expanded markets generally lead to more efficient operations and use of the transmission system.
  - However, at the state-level, the APC metric, which takes into account power prices, purchases/sales and net long/short positions, is complicated to calculate and indicates that not all states may realize operational savings. Further, utilities may implement hedging or other trading strategies to minimize potential downsides, and these actions cannot be captured in the study.
  - Ultimately, targeted BA- or state-by-state studies of actual market proposals – versus the genericized options considered herein – are the best tool to determine if the benefits of new markets are likely to exceed their cost.

# Additional Results

Summary of changes to results

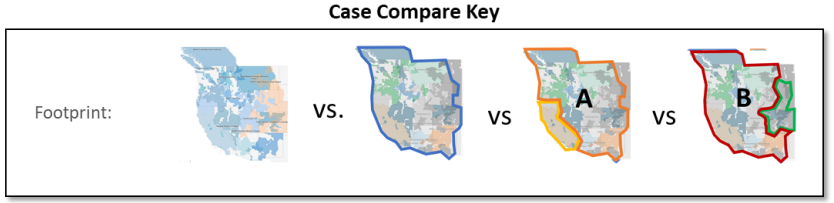
# Annual Savings of Western States due to Market Expansion – High-end Capacity Savings

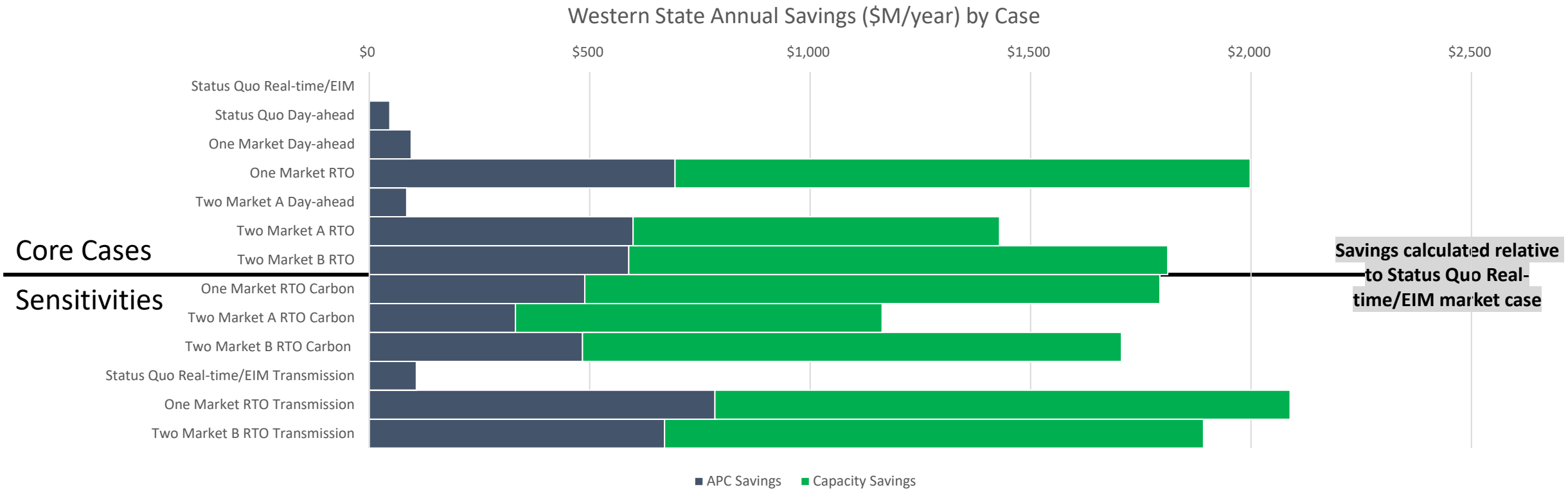



- **Capacity benefits in the form of avoided generation investment dominate savings for all scenarios**
- **RTO scenarios consistently achieve the highest level of savings**

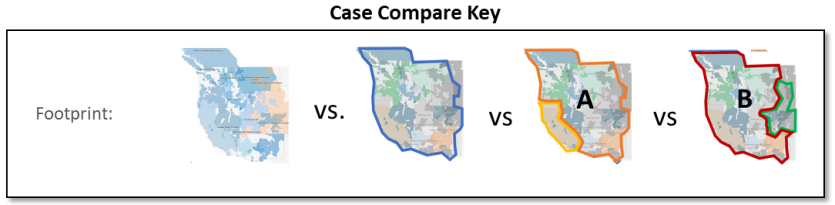
# Annual Savings of Western States due to Market Expansion – Low-end Capacity Savings

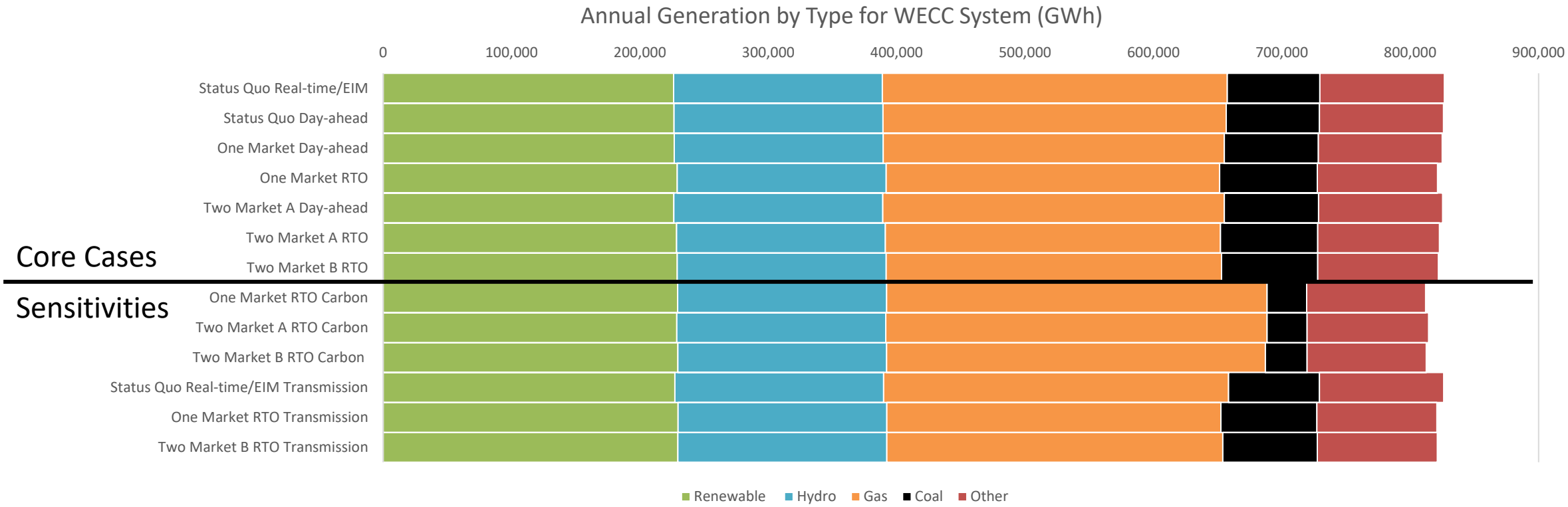



- **Low-end capacity savings for EIM and day-ahead market scenarios assume that no capacity benefits are realized because of these markets**
- **RTO capacity savings are unchanged even in this low-end scenario as it is assumed that there is very little risk that an RTO market not achieve substantial capacity benefits**
- **This causes the RTO scenarios to produce measurably higher benefits than all other scenarios**

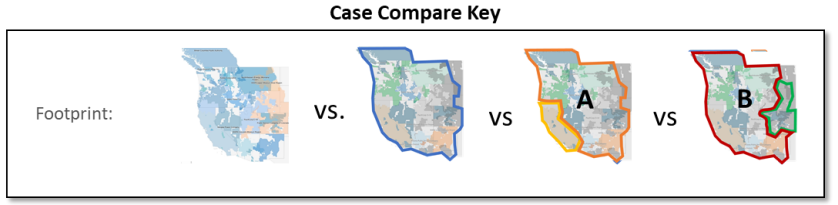
# WECC Annual Generation for 2030 Core Cases and Sensitivities

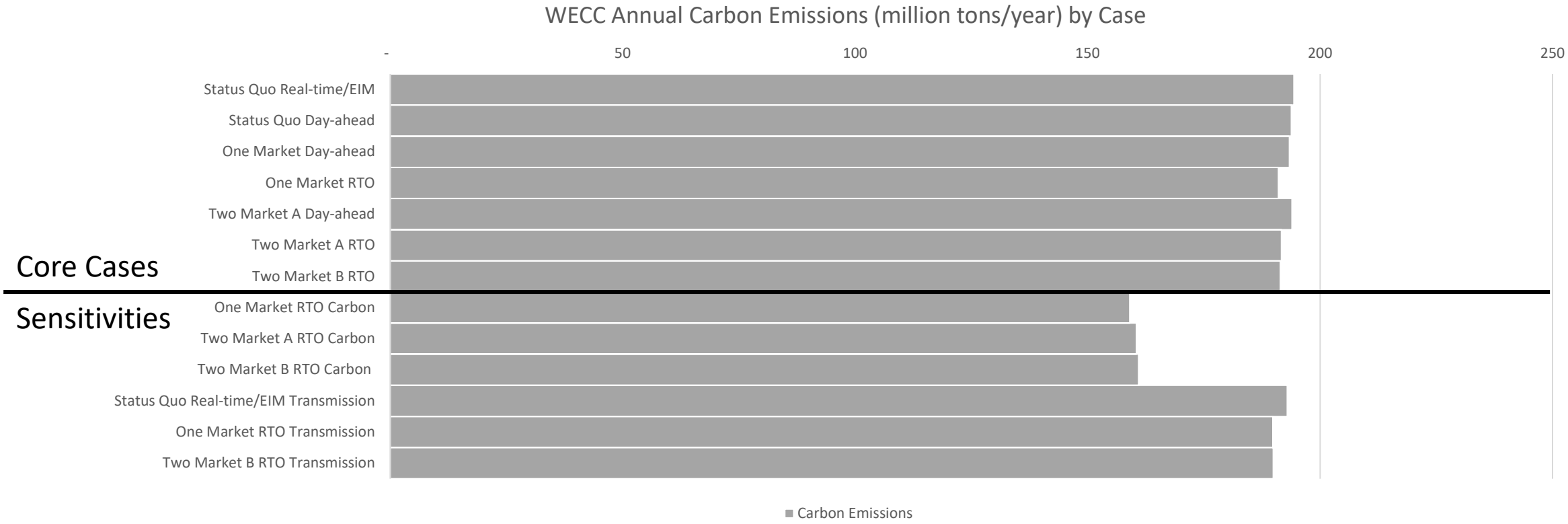



- **Relatively small changes in annual energy production by types due to regionalization**
- **Changes in total generation are due to different amounts of transmission losses occurring on the system, requiring more or less generation to serve load**
- **The carbon price sensitivity causes gas generation to displace coal generation**

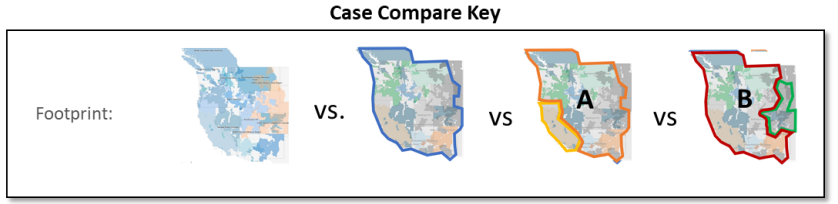
# WECC $CO_2$ Emissions for 2030 Core Cases and Sensitivities

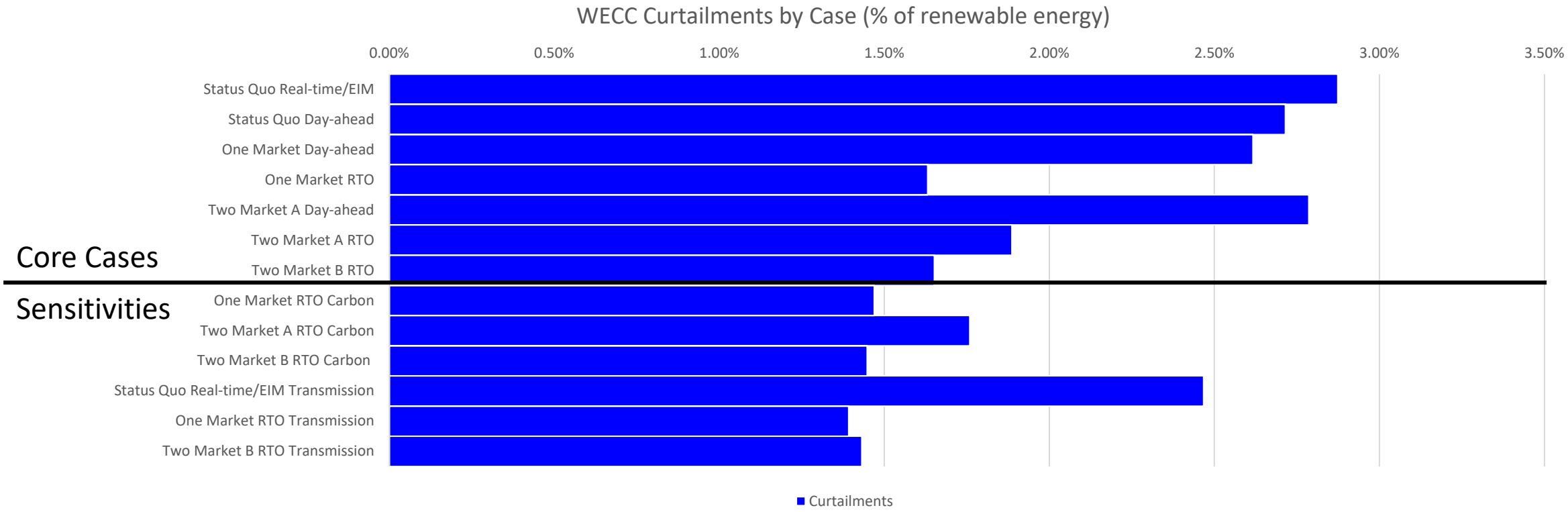



- **The carbon sensitivities are the only scenarios with noticeably lower carbon emissions**
- **The dispatch efficiencies enabled by the RTO scenarios also helped to reduce carbon emissions from the Status Quo, which had the highest emissions of all scenarios**

# WECC Curtailments 2030 Core Cases and Sensitivities




- **The RTO transmission sensitivities have the lowest curtailment levels of all scenarios**
- **The carbon sensitivities also had lower curtailment levels and the core cases**

# *Update on Market and Regulatory Review Scorecards & Analysis*

*Energy Strategies*

# Overview of Market & Regulatory Review

- "Market & Regulatory Review" designed to address more qualitative aspects of the Request from the Lead Team
  - ❖Intended to help the states evaluate more qualitative aspects of different organized market configurations
  - ❖Purpose is to assess how regional market constructs supports state policy priorities
  - ❖Lead Team approved the Work Plan for this effort in October
  - ❖Culminates with the "Market Factor Scorecard" (drafts of which were presented at the Q1 2021 stakeholder meeting)

# Market Factor Scorecard Approach & Ranking Metrics

- **Purpose of scorecards is to assess how regional market construct can support state policy priorities**
- Work Plan identified two overarching state energy policy priorities (which are not mutually exclusive, but each state may weight these priorities differently)
  - ❖ Increased Use of Clean Energy Technologies
  - ❖ Reliable, Affordable Provision of Energy to Consumers
- Scorecard for "Retaining State Authority on Key Jurisdictional Elements" added following stakeholder input
  - ❖ Metrics created from work that was identified in the Work Plan but was not envisioned as fitting under the Scorecard approach
- Work Plan outlined relevant metrics for each overarching policy goal (which have since been slightly reorganized/modified)
- Market constructs evaluated:
  - ❖ Bilateral Only
  - ❖ Real-Time Market
  - ❖ Day-Ahead Market
  - ❖ Regional Transmission Organization

**Metrics for the Market Factor Scorecards**

| Icon | Meaning |
|---|---|
| *Excellent*  | Market construct is expected to substantially support achievement of this metric |
| *Very Good*  | Market construct is expected to mostly support achievement of this metric |
| *Good*  | Market construct is expected to somewhat support achievement of this metric |
| *Fair*  | Market construct is expected to minimally support achievement of this metric |
| *Poor*  | Market construct is not expected to support achievement of this metric |

# Stakeholder Feedback Received on Draft Scorecards

- **After the Q1 2021 Stakeholder Meeting, two sets of comments were received on the Draft Scorecards:**
  - ❖ **Joint EIM Entities**
  - ❖ **Public Interest Organizations**
    - ➢ Renewable Northwest
    - ➢ Western Grid Group
    - ➢ American Clean Power Association
    - ➢ Interwest Energy Alliance
    - ➢ Northwest Energy Coalition
    - ➢ Western Resource Advocates

Joint EIM Entities Comments

**To:** Lead Team members of the State-Led Market Options Study funded by U.S. Department of Energy grant received by the Utah Governor's Office of Energy Development

**From:** Portland General Electric Company, on behalf of the Joint EIM Entities

**Date:** March 17, 2021

**Subject:** Joint Response to Request for Market Operator and Utility Feedback on State-Led Market Options Study Scorecards/Analysis from the Q1 2021 Stakeholder Meeting

The EIM Entities[1] are existing and planned participants in the Western Energy Imbalance Market ("EIM") and have participated for various purposes in the Extended Day-Ahead Market ("EDAM") stakeholder process. We appreciate the opportunity to provide feedback and input throughout the phases of the State-Led Market Options Study ("Study"). The purpose of these comments is to provide feedback on the scorecards and analysis presented to stakeholders on March 3, 2021. Additionally, we recognize the value in providing regulators and policymakers with a neutral forum and analysis that can provide tools to enable the evaluation of market options and impacts in the West. We realize that the wholesale market landscape is rapidly evolving and providing a "roadmap" and tools for reviewing and evaluating this changing landscape can help facilitate decision-making.

As noted in the Study, since the inception of the EIM in 2014, the wholesale energy market in the West has had an impact on bilateral trading timeframes and is moving towards greater degrees of regional integration and market optimization. This shift has enabled EIM and California Independent System Operator ("CAISO") market participants to reduce costs for customers and enable greater integration of variable renewable generation. The EIM Entities also concur that it has brought benefits not fully quantified and strengthened areas of reliability such as greater operational visibility and management of congestion. As the region faces decisions regarding the incremental evolution of market structures, the EIM Entities recognize the value this Study can provide in supporting decision-making among policy makers and regulators when faced with multiple options to evaluate.

The EIM Entities wish to emphasize that an incremental approach to market expansion and evolution in the West with the EIM has so far proven to be a successful method for our region with demonstrable benefits for customers. While we support evaluation of the Regional Transmission Operator ("RTO") alternative as a way of understanding greater degrees of regional integration, it is important to keep in mind the historical "scorecard" of the region's past efforts to create an RTO, which have not been successful for various reasons. Additionally, the initial lift of getting an RTO off the ground can be heavy and time consuming due to the significant administrative costs associated

[1] The following EIM Entities are signatories to these comments and while these comments represent consensus viewpoints of the group as a whole, they may not necessarily represent any individual EIM Entity. Those Entities marked in **bold** were also part of the EDAM Feasibility Assessment: **Arizona Public Service Company ("APS"), Avista Corporation ("AVA"), Balancing Authority of Northern California ("BANC"),** Bonneville Power Administration ("BPA"), **Idaho Power Company ("Idaho Power"), The City of Los Angeles, Department of Water and Power ("LADWP"), NV Energy ("NV Energy"); PacifiCorp, Portland General Electric Company ("PGE"); Powerex Corp. ("Powerex"), Public Service Company of Colorado ("PSCo"), Public Service Company of New Mexico ("PNM"), Puget Sound Energy, Inc. ("PSE"), Salt River Project ("SRP"), The City of Seattle, acting by and through its City Light Department ("Seattle City Light"),** The City of Tacoma, Department of Public Utilities, Light Division ("Tacoma Power"), Tucson Electric Power ("TEP"), Turlock Irrigation District ("TID"); and **NorthWestern Corporation d/b/a NorthWestern Energy ("NWE").**



Public Interest Organization Comments

**Comments of Public Interest Organizations to Utah State-Led Market Study: Stakeholder Webinar (03/22/2021)**

Renewable Northwest, Western Grid Group, American Clean Power Association, Interwest Energy Alliance , Northwest Energy Coalition & Western Resource Advocates

**03/22/2021 – Requested acceptance with late submission.**

**Submitted via email:** kfraser@energystrat.com

| | |
|---|---|
| Renewable Northwest | Nicole Hughes – Exec. Director ( nicole@renewablenw.org) |
| Western Grid Group | Kate Maracas – Director (kate@westerngrid.net)<br>Ron Lehr – Director (rllehr@msn.com) |
| Western Resource Advocates | Vijay Satyal PhD - Sr. Market Policy Analyst (vijay.satyal@westernresources.org) |
| American Clean Power Association | Tom Darin – Sr. Director, Western State Affairs (tdarin@cleanpower.org) |
| Interwest Energy Alliance | Rikki Seguin – Exec. Director (rikki@interstwest.org) |
| Northwest Energy Coalition | Fred Heutte – Sr. Policy Associate (fred@nwenergy.org) |

Public Interest Organizations ("PIOs") and renewable/clean energy Clean Energy Advocates, collectively referred to as "Clean Energy Advocates (or "*Clean Energy Advocates*"), appreciate the opportunity to comment in response to the March 3rd, 2021 webinar "Stakeholder Meeting (Q1 2021) "*Exploring Western Organized Market Configurations: A Western States' Study of Coordinated Market Options to Advance State Energy Policies ("State-Led Market Study").*" These comments are submitted on behalf of the following *Clean Energy Advocates*: American Clean Power Association; Renewable Northwest ("RNW"); Western Grid Group ("WGG"); Interwest Energy Alliance ("IEA"), Northwest Energy Coalition ("NWEC") and Western Resource Advocates ("WRA").

Clean Energy Advocates are encouraged with the grant implementation team's progress. Western states' energy officials, Lead Team members, Energy Strategies - and others have contributed to this work. This study is of significance not only to the state utility regulators but also to western states' policymakers, clean energy advocates and developers, independent power producers and transmission owning utilities (investor owned, cooperatives and municipal owned). Clean Energy Advocates support the need for greater awareness and recognition of benefits of increased regional and wholesale electricity coordination in the West.

# Updates Made to Scorecards Based on Stakeholder Feedback

- **Added additional language and context in the written report (and updated slide graphics) for several metrics**
  - ❖ Added narrative to recognize that the difference in savings from efficient grid operations & reduced costs of integrating clean energy technologies between Day-Ahead and RTO market constructs will begin to converge as more generation and transmission are committed to a Day-Ahead Market
  - ❖ Clarified application of metric related to lowering barriers to access new generation in high quality renewable resource locations was focused on access to *new resources* and *not on the nuances of each individual state policy* (e.g., deliverability requirements)
  - ❖ Clarified that the metric on providing financing opportunities and variety of revenue streams to clean energy technologies was primarily focused on virtual Power Purchase Agreement (PPA) opportunities and not focusedon merchant (non-PPA) development
  - ❖ Added additional language to on state GHG accounting challenges and the need for state coordination on GHG accounting in all market constructs
  - ❖ Reduced the RTO ranking for “long-term mechanism to support a system with adequate electric resources” from “excellent” to “very good” based on stakeholder feedback on continued reliability challenges in RTO constructs
- **Adjusted graphics and added section on “best practices and special considerations” to the scorecard on retaining state authority**
  - ❖ Added narrative in report to help reflect nuances
  - ❖ Updated graphics for scorecards to help provide additional context on the range of rankings for each metric
  - ❖ “Best practices” and “special considerations” for state involvement are discussed

# Scorecard for Increased use of Clean Energy Technologies

| Increased Use of Clean Energy Technologies | Bilateral | Real-Time | Day-Ahead | RTO |
|---|---|---|---|---|
| Efficient grid operation which allows low (and zero) marginal cost resources to be dispatched and reduces overall costs of integrating clean energy technologies | *Fair* | *Good* | *Very Good* | *Excellent* |
| Lower barriers to access new generation in high-quality renewable resource locations | *Poor* | *Poor* | *Good* | *Excellent* |
| Opportunities for clean electricity resources to be added to the grid (e.g. direct customer access to renewable/clean resource power purchase agreements) | *Good* | *Good* | *Very Good* | *Excellent* |
| Provides financing opportunities and a variety revenue stream opportunities for clean electricity technologies | *Fair* | *Good* | *Very Good* | *Excellent* |
| Economically facilitates emissions reduction goals/requirements via market signals | *Fair* | *Good* | *Very Good* | *Excellent* |
| Transparent and timely information on pricing, resource operations, and emissions | *Fair* | *Good* | *Very Good* | *Excellent* |

# Scorecard for Reliable, Affordable Provision of Energy to Consumers

| Ability of Market Construct to Support Reliable, Affordable Provision of Energy to Consumers | Bilateral | Real-Time | Day-Ahead | RTO |
|---|---|---|---|---|
| Efficient grid operation which reduces costs and increases flexibility of transactions | *Fair* | *Good* | *Very Good* | *Excellent* |
| Ability to unlock full potential of existing generation (lowering costs) and to decrease generation capital costs/investments | *Poor* | *Fair* | *Good* | *Very Good* |
| Ability to unlock full potential of existing transmission system (lowering costs) and to decrease transmission capital costs/investments | *Fair* | *Good* | *Very Good* | *Excellent* |
| General ability to support reliable operations | *Good* | *Very Good* | *Very Good* | *Excellent* |
| Visibility into electric system conditions to improve reliability | *Fair* | *Good* | *Very Good* | *Excellent* |
| Transparent and timely information available to state PUCs, consumer advocates and other stakeholders | *Fair* | *Good* | *Very Good* | *Excellent* |
| Long-term mechanisms to support a system with adequate electric resources | *Fair* | *Good* | *Good* | *Very Good* |
| Increased opportunities for cost-effective demand-side resource participation | *Fair* | *Good* | *Very Good* | *Excellent* |

# Retain State Authority on Key Jurisdictional Elements Scorecard

- The Draft Market & Regulatory Review report shared with the Lead Team includes a "special considerations" and "best practices" for retaining state authority section in report
  - ❖Seeks to hit these key points, and highlight a few best practices for state involvement:
- Have updated graphics for this scorecard to include nuances around these rankings
  - ❖Following slide illustrates the current version of this scorecard which is included in the report

- The Lead Team notes, in particular for the RTO market construct, that States may improve their RTO/ISO experience (helping achieve the higher end of these rankings) through:
  - ❖Careful State PUC consideration of conditions of approval of requests by jurisdictional utilities to join an ISO/RTO;
  - ❖Comprehensive review of the impacts of proposals to unbundle State PUC regulated rates; and
  - ❖Informed engagement by a State Commission in the planning, decisions and governance of an ISO/RTO (including participation in a "Regional State Committee")

| Ability of Market Construct to Retain State Regulatory Authority on Key Jurisdictional Elements | Bilateral | Real-Time | Day-Ahead | RTO |
|---|---|---|---|---|
| Ability for state to retain authority over resource adequacy | Good – Excellent | Good – Excellent | Good – Very Good | Poor – Good |
| | *As it exists today, the interconnected nature of the Western grid, including complexities around regulation of multi-state utilities, may limit the practical impact of state authority over resource adequacy. Market development, up to and including an RTO, can provide similar levels of "good" state authority, provided the market design includes best practices for informed engagement and authority of a Regional State Committee over resource adequacy matters. One individual state's ability to affect overall change on resource adequacy will depend on the market's governance, design and make-up.* | | | |
| Ability for state to retain authority over the resource mix of utilities it regulates | Good – Excellent | Good – Excellent | Good – Excellent | Fair – Very Good |
| | *As it exists today, the interconnected nature of the Western grid, including complexities around regulation of multi-state utilities and generation units with multiple owners, may serve as limitations on the practical authority states have over the resource mix of regulated utilities. Market development, up to and including an RTO, can provide similar levels of state authority over the resource mix, though market prices and market rules may impact resource mix decisions. The addition of market elements that are more likely to affect resource mix decisions (such as inclusion of a capacity market) can serve to reduce state's practical authority over the resource mix. States can improve their market experience by participating in market design and discouraging market elements that would serve to impact state's practical authority over the resource mix.* | | | |
| Ability for state to retain authority over transmission planning and prudence/cost recovery for transmission investments | Good – Very Good | Good – Very Good | Good – Very Good | Fair – Good |
| | *As it exists today, states have various roles in transmission planning (with FERC-jurisdictional utilities adhering to FERC transmission planning Orders such as Order 890 and 1000), but states generally retaining siting authority for transmission. FERC has jurisdiction over rates and services for electric transmission in interstate commerce, but most states continue to determine how transmission costs are (or are not) passed on into retail electric rates. Market development, up to and including an RTO, can provide similar levels of "good" state authority over transmission planning and cost allocation, provided the market includes best practices for informed engagement and authority of a Regional State Committee over transmission-related matters.* | | | |
| Ability for state to retain authority over retail electric rates | Good – Excellent | Good – Very Good | Good – Very Good | Fair – Good |
| | *The interconnected nature of the Western grid, including complexities around regulation of multi-state utilities, may serve as limitations on the practical authority a state has over retail electric rates, even when they have full legal authority over these matters. Market development should not change the legal authority of states over retail electric rates. Though as more inputs into the ratemaking process come from a market, a state's ability to challenge costs may be diminished in practice. Market constructs, up to an RTO, can provide strong state authority on retail electric rates. States can improve their market experience through strong engagement in the market processes and through careful consideration of any proposals to unbundle retail rates.* | | | |
| Ability for states to be involved in the process of obtaining approval to participate in the market construct | Fair | Good – Very Good | Good – Very Good | Excellent |
| | *State approval of market participation is almost certainly required for an RTO, while varying degrees of state approval may be necessary for other market constructs. States can utilize the approval process to place conditions on a decision to enter a market, which can help improve state retention of jurisdiction in the other metrics within this scorecard.* | | | |

# Market & Regulatory Review: Next Steps

- Energy Strategies has sent the Draft of the Market & Regulatory Review Report to the Lead Team
  - ❖Lead Team review and comment period is ongoing
- Following Lead Team input on the report and scorecards, the materials will be compiled into the final roadmap/report and shared with stakeholders

# *Next Steps*

*Energy Strategies*

# Opportunity for Written Stakeholder Comments & Next Steps

- **We invite the opportunity for stakeholders to provide written comments on the items discussed today**
- **Process for submitting comments:**
  - ❖Written comments can be submitted to kfraser@energystrat.com through July 1st
  - ❖Note that we will review comments, but will not respond to each comment received
- **Next steps:**
  - ❖ Anticipate releasing written reports/roadmap to stakeholders in July
  - ❖Documents will be sent to those on the project's distribution list
    - ➢ Navigate to this link to add your name to the project's stakeholder distribution list: http://bit.ly/2nBP6Gt