

PGP Market Evaluation Study

DECEMBER 20, 2021



Organized Market Drivers

- Many utilities, both investor-owned and publicly-owned, see organized markets as necessary to help achieve state energy policy goals
- Majority of FERC Commissioners and FERC Chair are supportive of expanded organized markets for efficiency and reliability in the West but support Western development of its markets
- Environmental organizations and large consumers are supportive of organized markets to support renewable integration.
- Independent Power Producers are interested in organized markets to enable better transmission access
- Colorado and Nevada have passed legislation requiring the investor-owned utilities in their states to be in an RTO by 2030

Market Functions

RTO Functions

Day-Ahead Market

Shared Transmission Planning

- Single entity develops plan for reliability of the bulk electric system

Single Transmission Service Provider

- Single entity develops and administers transmission tariff and provides transmission service

Single Transmission Operator

- Single entity responsible for reliability and operation of transmission system

Single Balancing Authority Area

- Single entity maintains load interchange-generation balancing and interconnection frequency in real-time

Common Resource Adequacy Standard

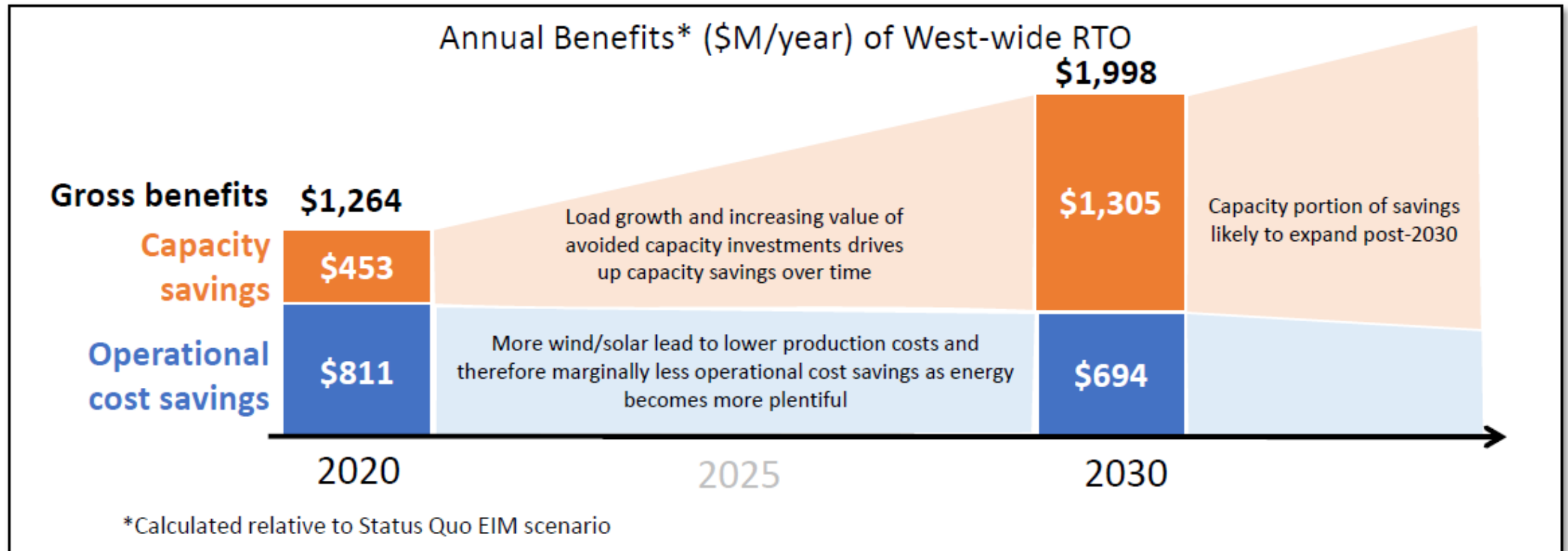
- Single entity develops, implements and manages a commonly applied resource adequacy standard

Market Operator

- Single entity manages tariff, operation of security constrained dispatch model & commercial interfaces with reliability functions

2021 State-Led Market Study

- Study developed for 11 western state policy leaders and regulators
- Gross benefits will be reduced by 10% – 25% for administrative costs



2021 State-Led Market Study

California identified with 2nd greatest benefit; highest production cost benefit

Washington identified with greatest benefit; mostly capacity benefit

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

“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.”

PGP Market Evaluation Study Purpose

- Estimate production cost benefits for three representative portfolios
 - Business-as-usual scenario assumes EIM participation for existing and planned EIM entities
 - Estimate benefits from participating in a day-ahead or RTO market with and without California
 - Consider near-term (2022) and future (2030) study horizons
- Methodology similar to the State-Led market study, but PGP's study...
 - Does not address capacity benefits
 - Uses a detailed multi-stage model that simulates operations and marketing
 - Utilized detailed modeling of individual hydro resources, where the State-Led study used generic hydro modeling

Adjusted Production Cost

Portfolio Production Cost

Fuel + VOM + Cycling Costs³



+ Market Purchase Cost

Outside energy purchased to serve portfolio load



- Market Sale Revenue

Excess energy from the portfolio sold at market price



PGP Market Evaluation General Findings

- A new day-ahead or RTO market is likely to bring about material reductions in adjusted production costs for utilities that are similarly situated as the proxy portfolios
- On a \$/MWh of load basis, all portfolios see estimated benefits from day-ahead market and RTO markets
 - RTO market option appears to offer additional benefits from the day-ahead market
 - Results show benefits across a wide range of sensitivities
- Degree of benefits are highly sensitive to the pricing assumptions and resource mix
 - Differences with/without CA in the market footprint are inconclusive
- Operational savings is only one element of the overall cost and benefits. This study did not explore the other elements but identified them on the following slide

A Wider Look & Context for this Study

	Day-Ahead Market	RTO
Likely Benefits	Operational Savings This study show all portfolios accrue operational benefits under both DAM and RTO market scenarios	
	Capacity Savings from Shared RA Planning Not studied, but State Led Market study informs this issue	
	Benefits from BA Consolidation None	Not studied
	Policy-driven Resource Procurement Savings Not studied	Not studied
	Reliability benefits Not studied	Not studied
Likely Costs	Ongoing Market Administration \$0.15-0.45/MWh	\$0.33-0.90/MWh
	Cost Shifts from Single Transmission Rate (Joint Tariff) N/A	Not studied
	Cost Allocation of New Transmission N/A	Not Studied
	Market Startup Costs Not studied	Not studied

Utility Considerations



Public Studies and PGP staff contact information can be found at:

Publicgeneratingpool.com

- PGP study was conducted on a portfolio basis and was not utility specific. Each utility will ultimately want to conduct their own system specific analysis.
- PGP study evaluated operational costs only. Other costs and benefits should be evaluated.
- There are other considerations outside of direct benefits and costs that should be considered; including governance and reliability.

Current Market Initiatives

Southwest Power Pool
Western Energy Imbalance Service

California ISO
Western Energy Imbalance Market

Northwest Power Pool
Western Resource Adequacy Program

Active and pending participants

