
SPP
75th Anniversary
75
SEVENTY-FIVE YEARS OF
RELIABILITY THROUGH RELATIONSHIPS

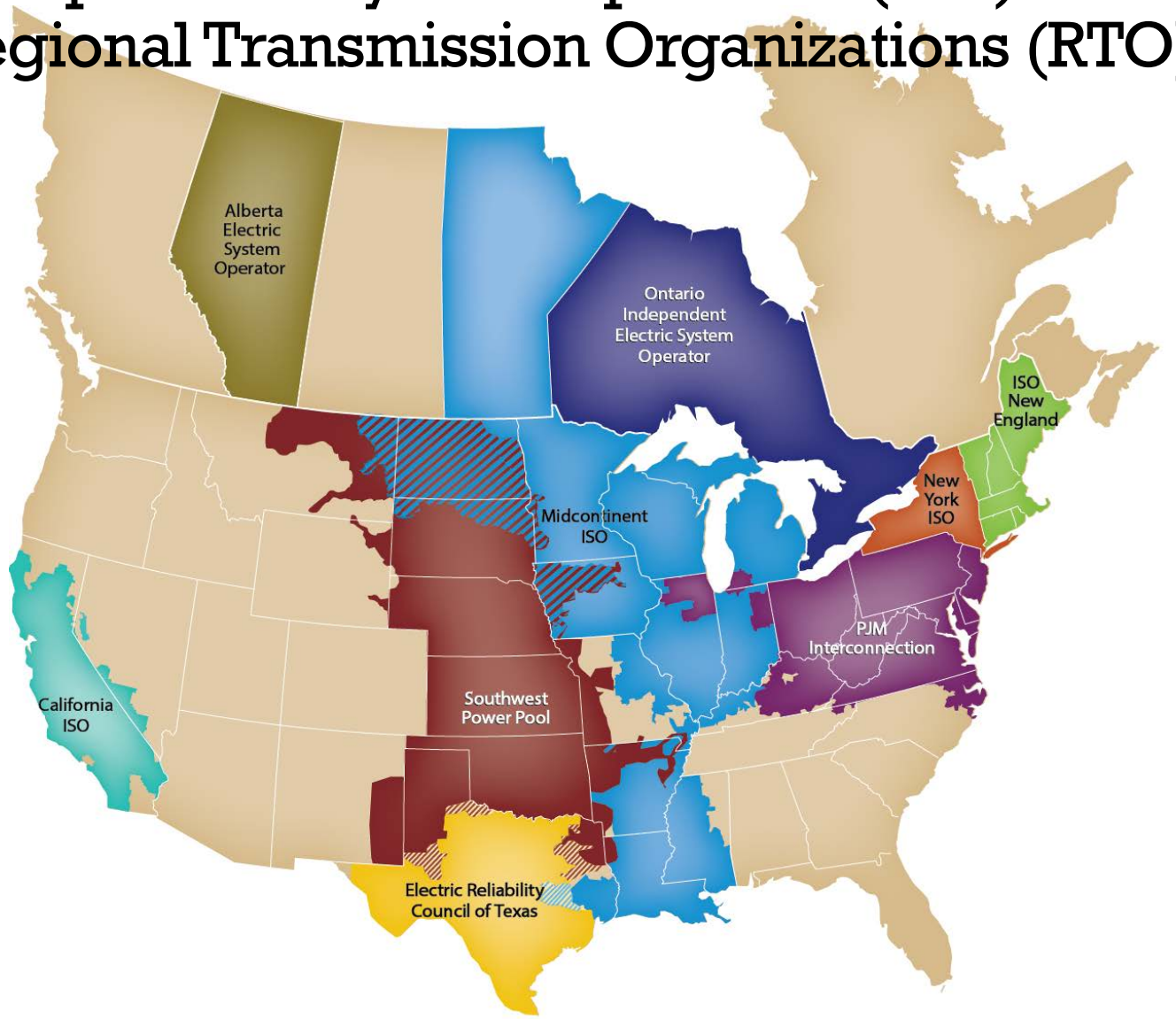
Our Mission

Helping our members work together to keep the lights on …
today and in the future.

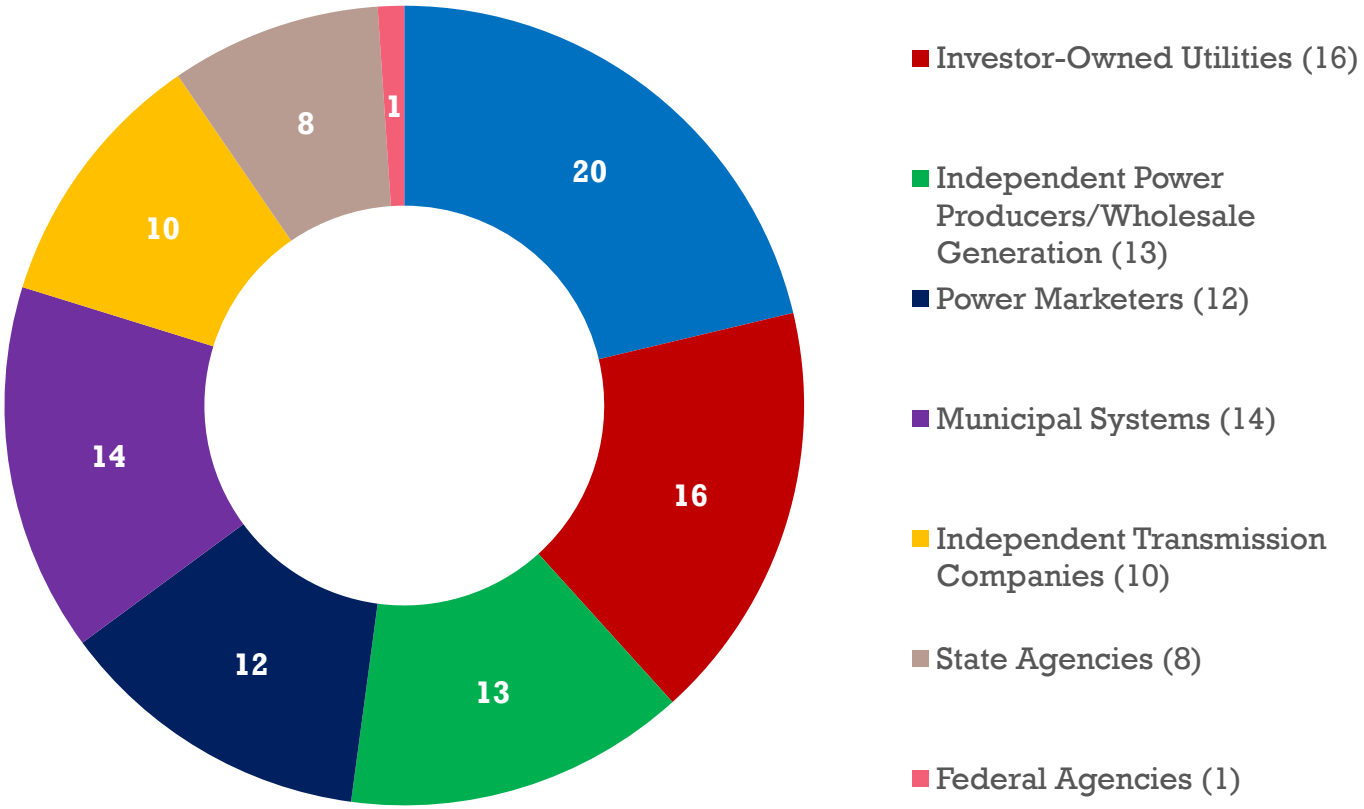
The SPP Difference

- Relationship-based
- Member-driven
- Independence Through Diversity
- Evolutionary vs. Revolutionary
- Reliability and Economics Inseparable

North American Independent System Operators (ISO) and Regional Transmission Organizations (RTO)



SPP's 94 Members: Independence Through Diversity



As of Dec. 15, 2015

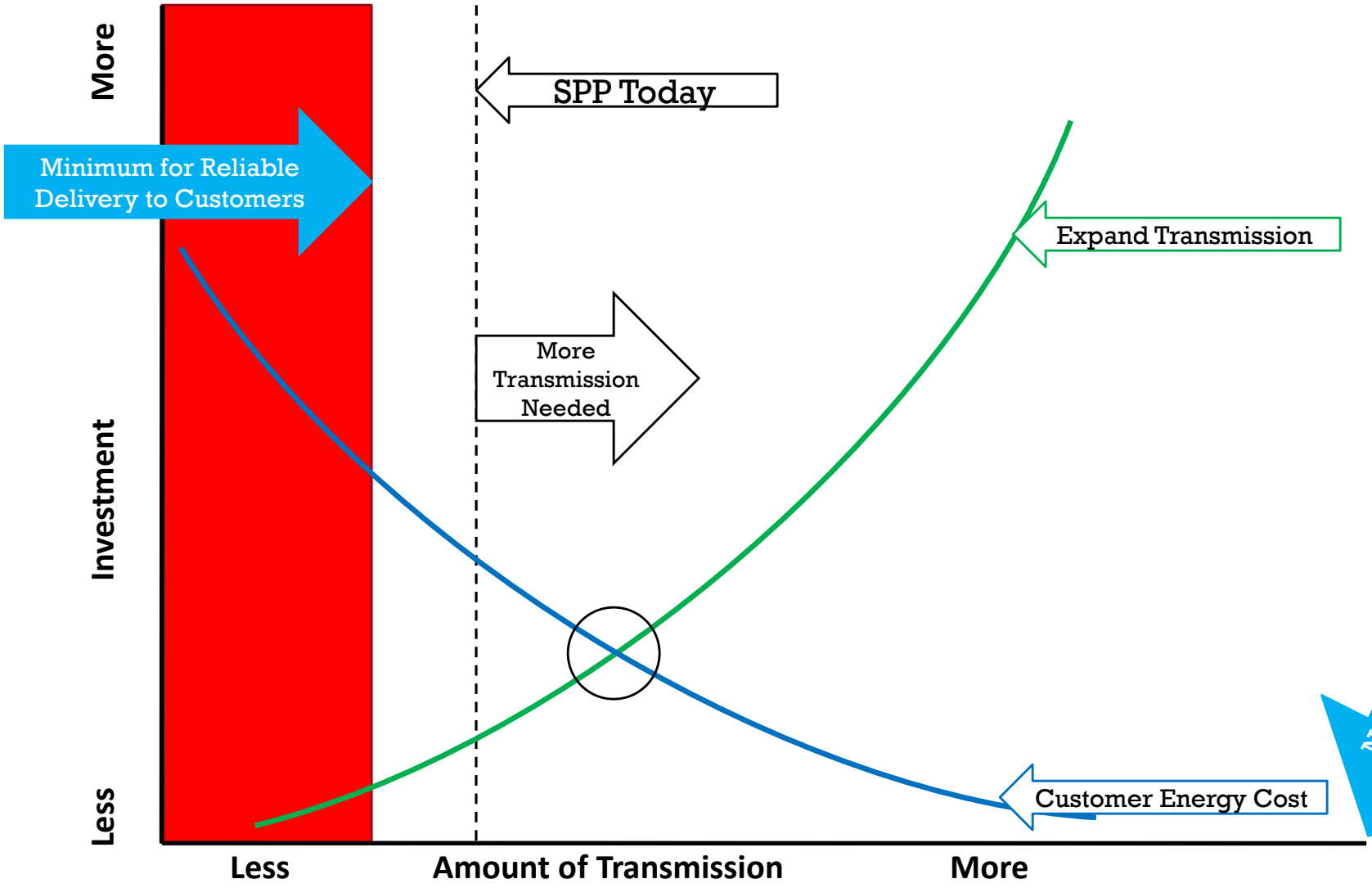
Contract Services

- Alternative to RTO membership for Transmission Owners
- Oversight of Transmission Owners' system operations:
  - Reliability Coordination
  - Transmission Planning
  - Tariff Administration
  - Interregional Coordination
- Provides process for assigning cost responsibility for transmission upgrades

What Kind of Markets Does SPP Operate?

- Transmission Service: Participants buy and sell use of regional transmission lines that are owned by different parties.
- Integrated Marketplace: Participants buy and sell wholesale electricity in day-ahead and real-time.
  - Day-Ahead Market commits the most cost-effective and reliable mix of generation for the region.
  - Real-Time Balancing Market economically dispatches generation to balance real-time generation and load, while ensuring system reliability.

Finding Balance



What is a wholesale energy Market?

Sellers/ Producers	Buyers/ Consumers	Locational Prices	Products
• Utilities • Municipals • Independent Power Producers • Generators • Power Marketers	• Utilities • Municipals • Load Serving Entities (LSEs) • Power Marketers	• Driven by Supply and Demand at defined locations	• Energy • Operating Reserves • Congestion Rights

Day-Ahead Market

- Determines least-cost solution to meet energy bids and reserve requirements
- Participants submit offers and bids to purchase and/or sell energy and operating reserve:
  - Energy
  - Regulation-Up
  - Regulation-Down
  - Spinning Reserve
  - Supplemental Reserve

Real-Time Balancing Market

- Balances real-time load and generation committed by the Day-Ahead Market and Reliability Commitment processes
- Operates on continuous 5-minute basis
  - Calculates dispatch instructions for energy and clears operating reserve by resource

- Energy and operating reserve are co-optimized
- Settlements based on difference between results of RTBM process and Day-Ahead Market clearing
- Charges imposed on market participants for failure to deploy energy and operating reserve as instructed

Transmission Congestion Rights (TCR) Market

- In DA Market, price separation of MP's resource to load may occur due to congestion leaving the MP exposed to high prices
- A TCR can be used as hedge against congestion that allows MPs to reduce their exposure to high market prices and potentially receive lower priced deliverable energy
- TCR Market has Annual and Monthly Auction processes related to two products:
  - Auction Revenue Rights (ARRs)
  - Transmission Congestion Rights (TCRs)

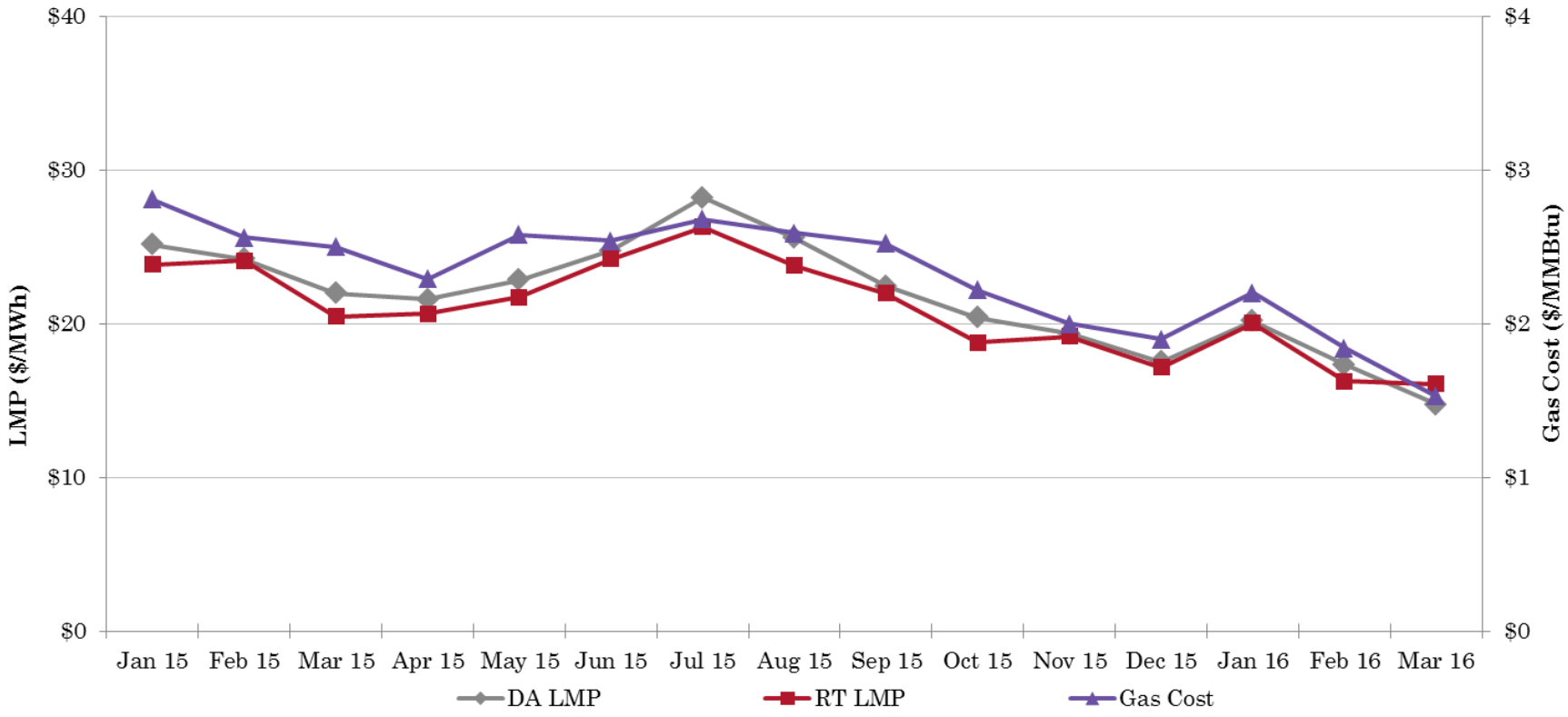
Marketplace Over Last 12 Months

- 172 Market Participants
  - 110 financial only and 62 asset owning
    - Added 6 new Market Participants since January report
- SPP BA has successfully maintained NERC control performance standards (BAAL & CPS)
- High System availability
  - Day-Ahead Market was only delayed from posting once in the first quarter of 2016
  - Real-Time Balancing Market has successfully solved 99.90% of all intervals

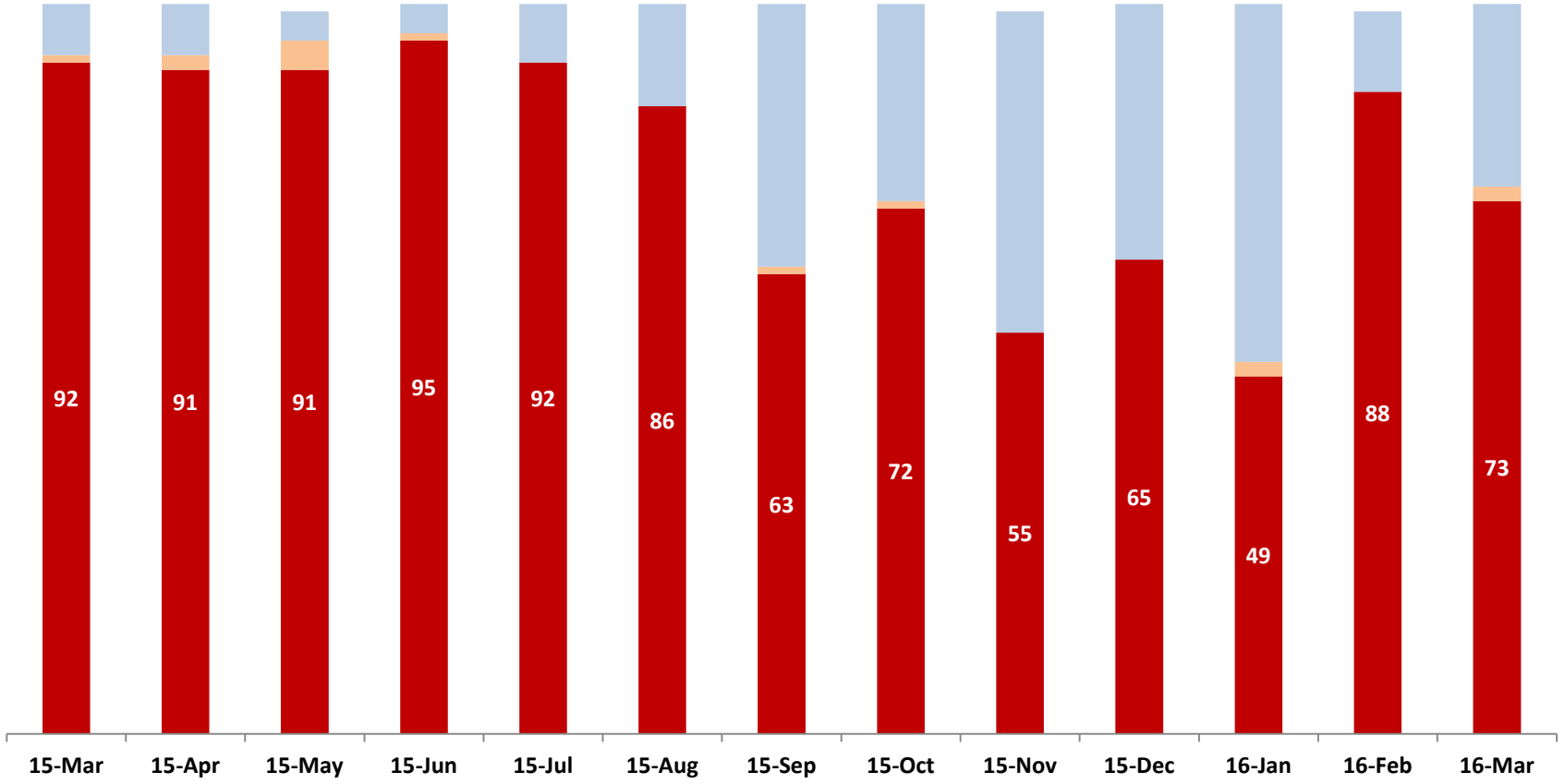
Integrated Marketplace Savings

- Market continues to provide savings even with extremely low natural gas prices below $2
- First year net savings calculated to be $380 million
- 2015 annual net savings calculated to be **$422** million

Real-Time versus DA pricing



% Contribution of LMP Difference



MCC: Marginal Congestion Cost

MLC: Marginal Loss Cost

MEC: Marginal Energy Cost

Marketplace Operational Highlights

- 2015/2016 Winter Peak of 37,412 MW on January 18, 2016
- 2016 Summer peak of 48,323 MW on June 22, 2016
- Total of 12,972 MW of installed and operational wind capacity to date
- Additional 140 MW of solar plants registered on 4/1/2016

Wind Output: January – March 2016

- Wind output represents the total real-time output of all wind generators in the SPP market at a point in time.

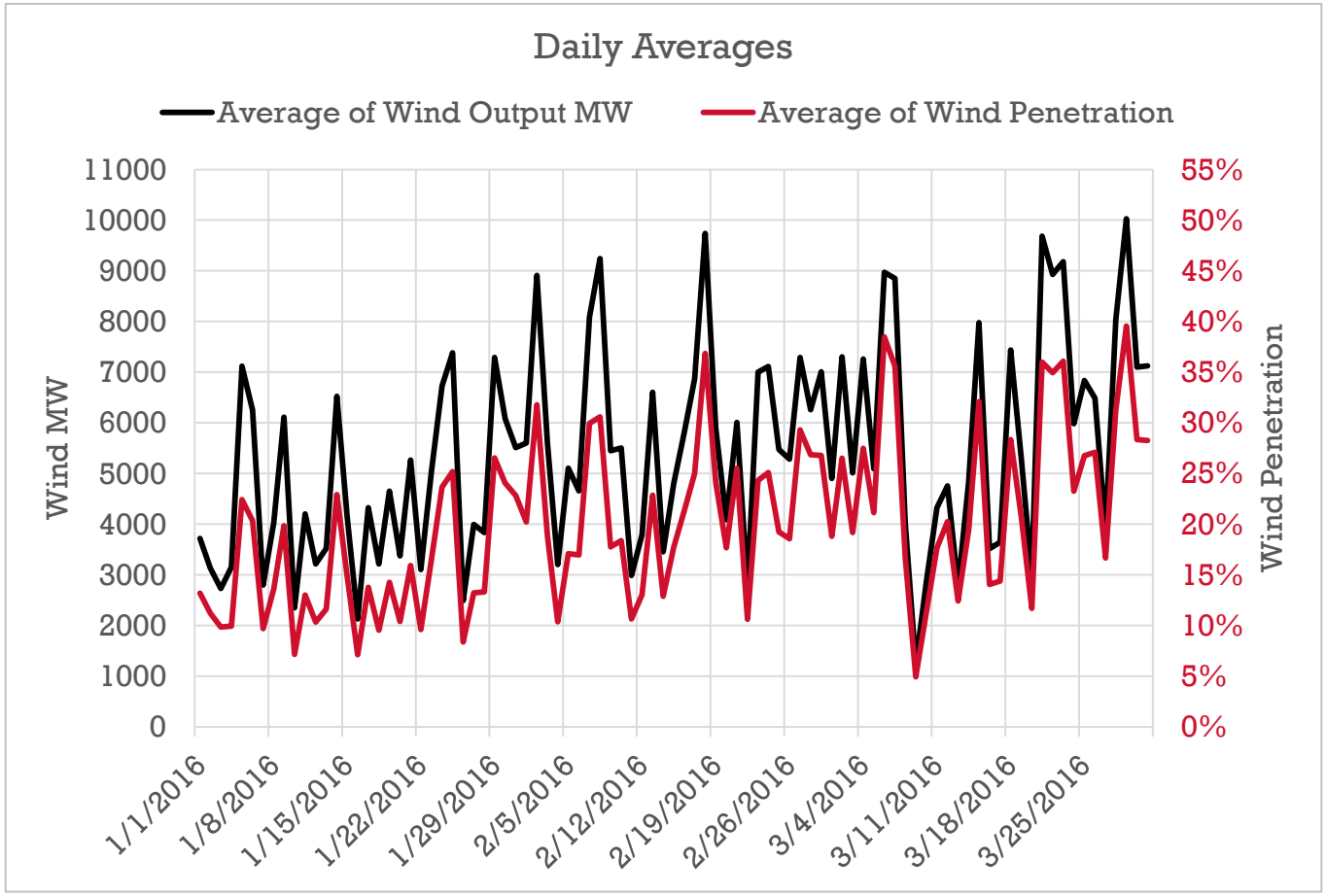
• Max wind output:	10,989 MW	4/23
• Min wind output:	264 MW	1/12
◦ All-Time Min*:	30 MW	3/1/2015
• Q1 Average wind output:	5,422 MW	

- Wind penetration represents the instantaneous wind output divided by the total load. (Wind Gen/SPP Load)

• Max % penetration:	49.17% of load	4/24
• Min % penetration:	0.8% of load	1/12
◦ All-time Min*:	0.1% of load	3/1/2015
• Q1 Average % penetration:	20.0% of load	

*Since Integrated Marketplace Go-Live 3/1/2014

January – March 2016



Integrated Marketplace Enhancements

- **Recently Implemented:**
  - Real-Time Data Precision Enhancement
  - Short-Term Intra-Day RUC (STRUC)
  - Misc Markets UI/API Improvements
- **On The Way (June 1, 2016 Implementation):**
  - ECC Changes/Schema Changes
  - MCE Performance Enhancements (in preparation of ECC)
  - Misc MP Requested Enhancements
- **Tentative Near Term: (Target Nov 1, 2016 Implementation)**
  - ECC Changes as needed
  - Misc Markets UI/API Improvements

Other Initiatives

- Expansion development
  - Mountain West
- Seams
  - Interface Pricing
    - Calculation of Prices
    - Multiple prices along a seam
  - Market-to-Market
- Coordination of Market Design across RTOs
- Responding to FERC proposed rulemaking
  - Offer Cap
  - Price Formation
  - Market Efficiency