

NWPPA's 2016 Power Supply Conference

NWPPA Annual Power Supply Conference

August 2016

The Changing Western Power Supply
Landscape Keynote Panel

NWPPA's 2016 Power Supply Conference

Keynote Panelists

Facilitator:

Todd O'Keefe – Client Services Manager,



Panelists:

Anita Decker – Executive Director, NWPPA

Dian Grueneich – Senior Research Scholar,
Stanford University

Roger Gray – CEO, Northwest Requirements
Utilities

NWPPA's 2016 Power Supply Conference

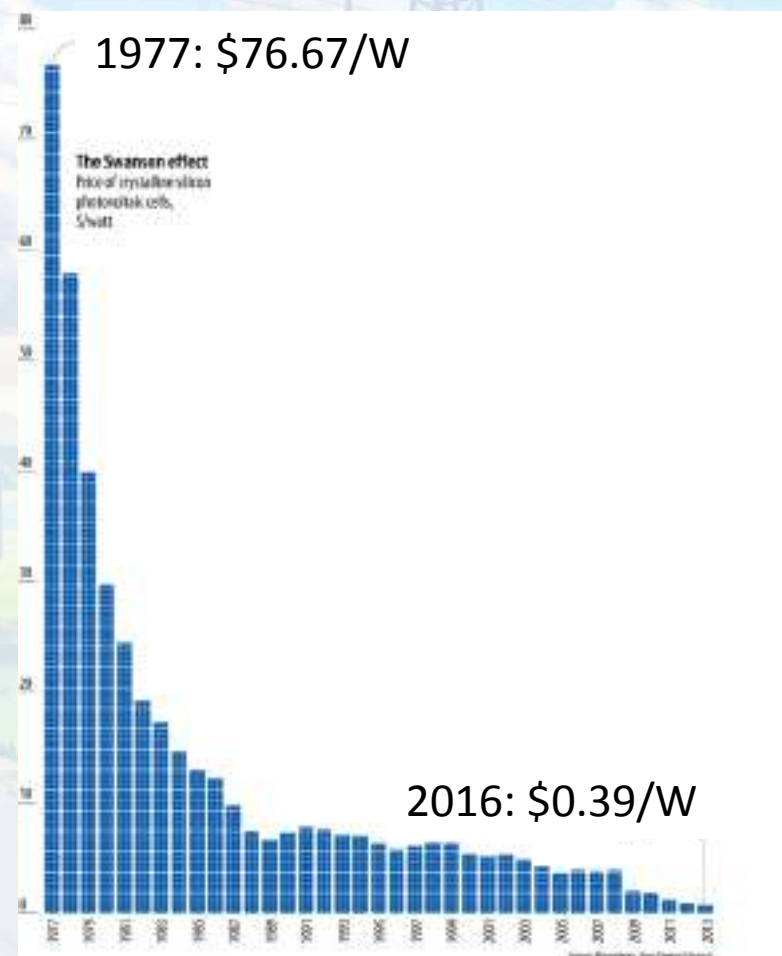
Key Themes

- Pace of technological advances is increasing
- Generation mix is being transformed
- How do we manage the 21st century generation fleet?
- How does should BPA change it's product offerings to meet the demands of the 21st century utility?

NWPPA's 2016 Power Supply Conference

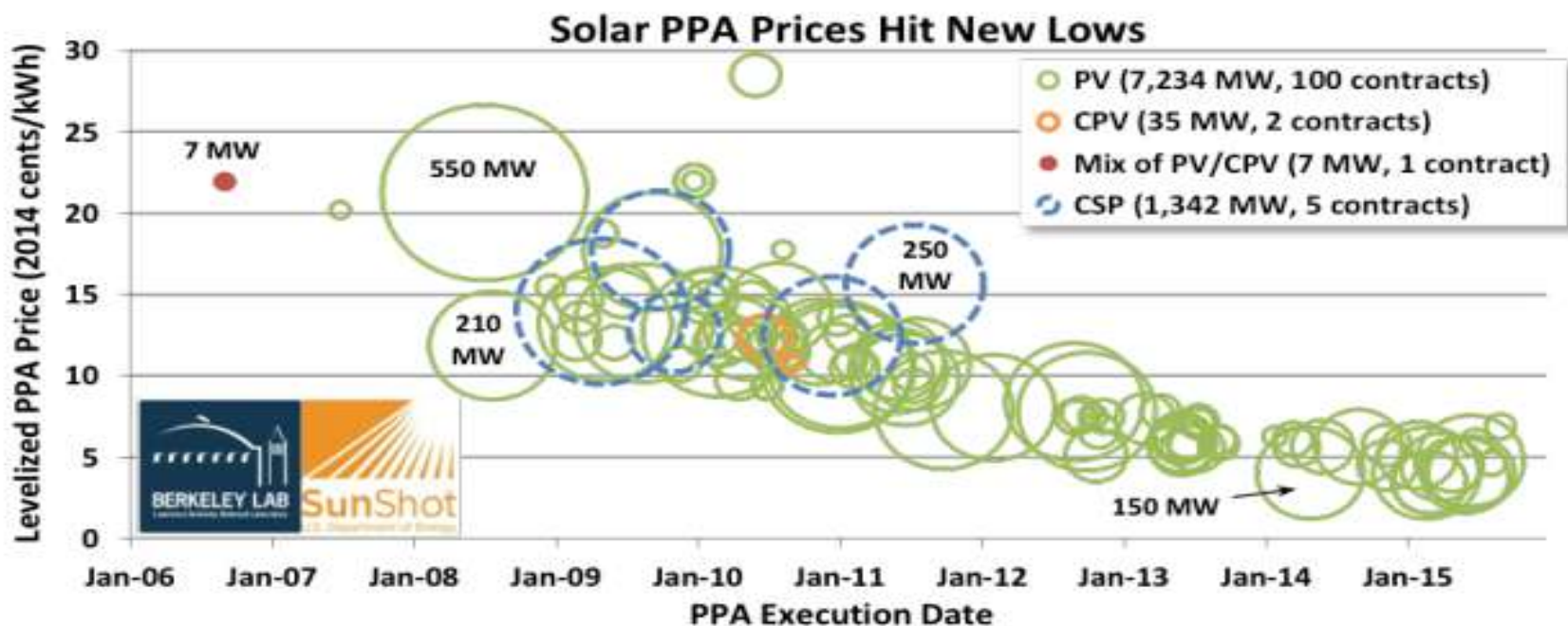
Solar: Swanson's Law

- The price for solar PV modules drops 20% for every doubling of shipped volume
- Prices tend to drop 10% per year
- Does this continue to hold true, or are we in for a game changer with new tech?



NWPPA's 2016 Power Supply Conference

Solar PPA prices continue to decline

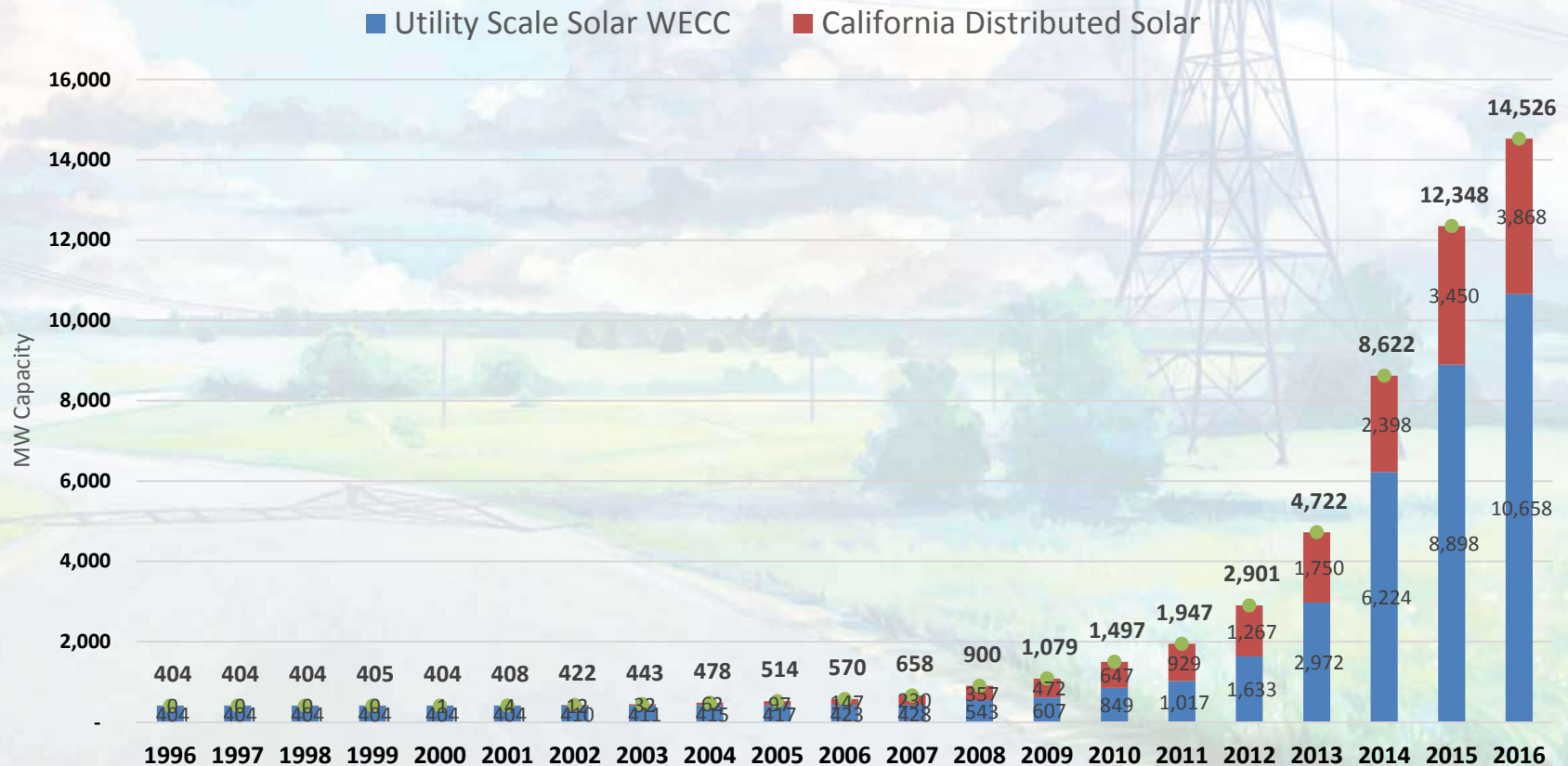


- PPA's under \$40/MWh increasingly common
- Driving incredible Solar Build out

NWPPA's 2016 Power Supply Conference

WECC Solar Capacity will be double what it was in 2014 by the end of 2016

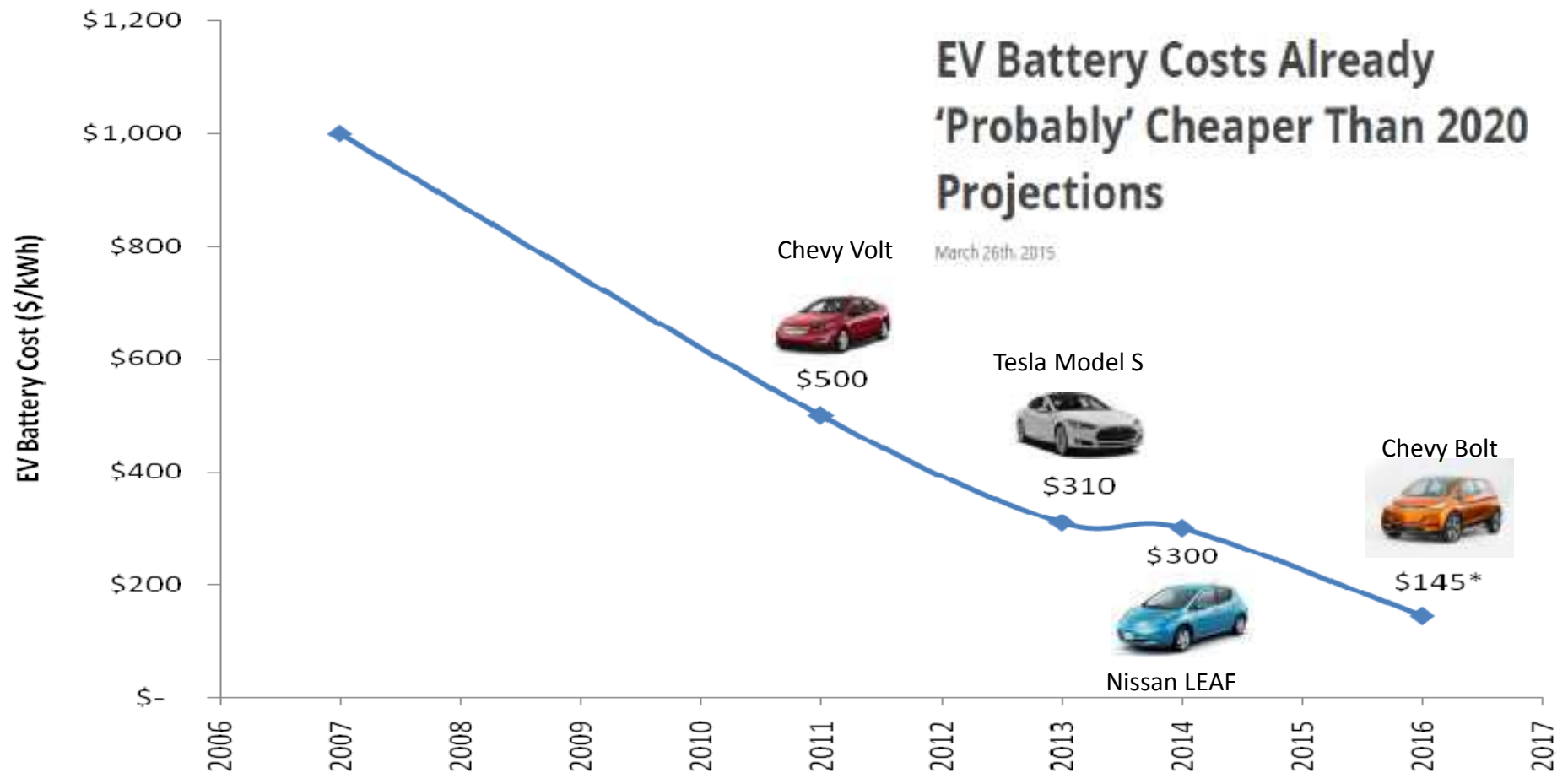
WECC Utility Scale Solar and California Distributed Solar



Source: ABB Velocity Suite

NWPPA's 2016 Power Supply Conference

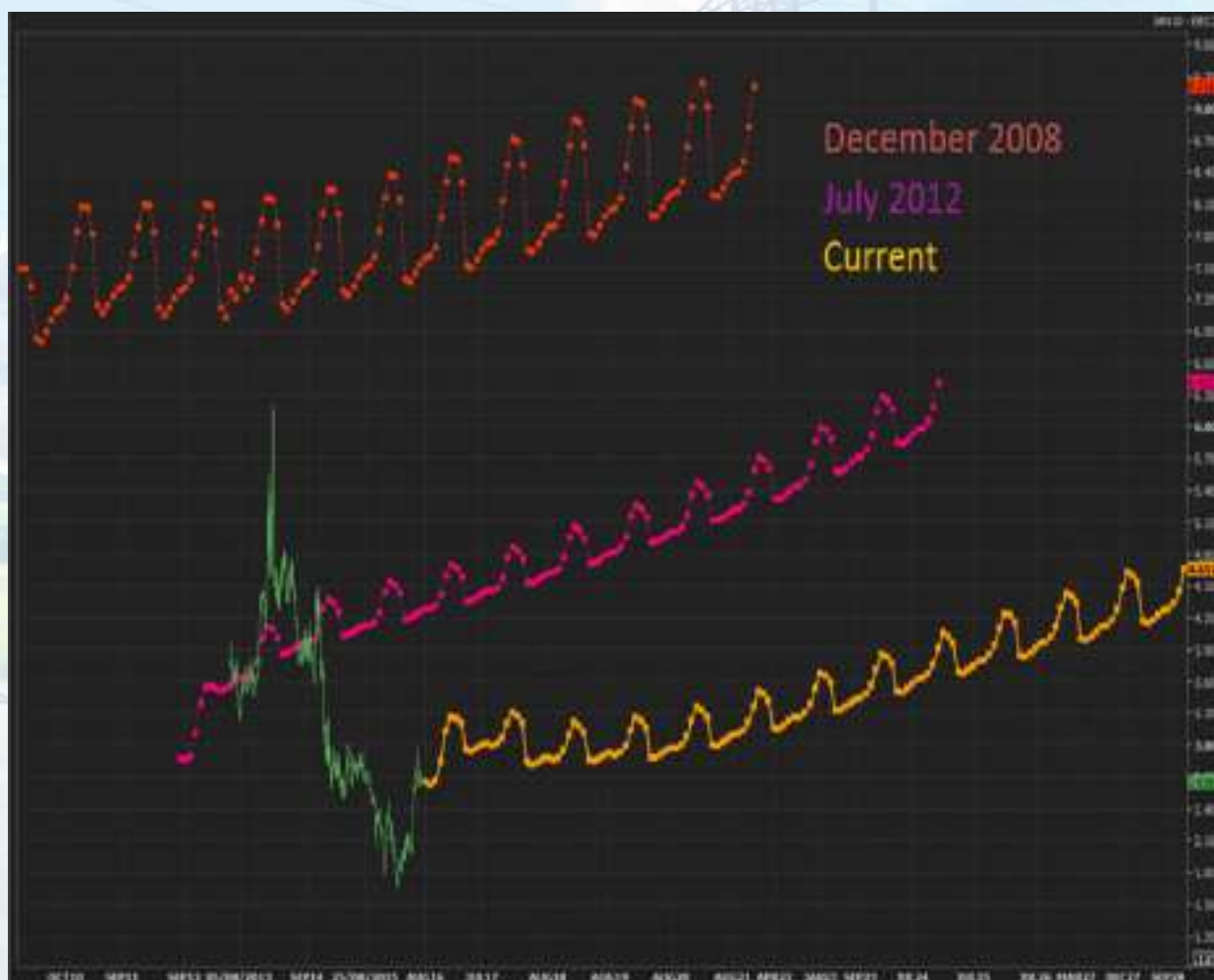
Energy Storage Prices Decline Steeply



NWPPA's 2016 Power Supply Conference

Natural Gas is Cheap Today

- Implications
 - Gas Gen is preferred resource for balancing and integration
 - Gas is still the marginal resource, wholesale prices are LOW
 - Legacy generation retirements
 - Coal
 - Nuclear

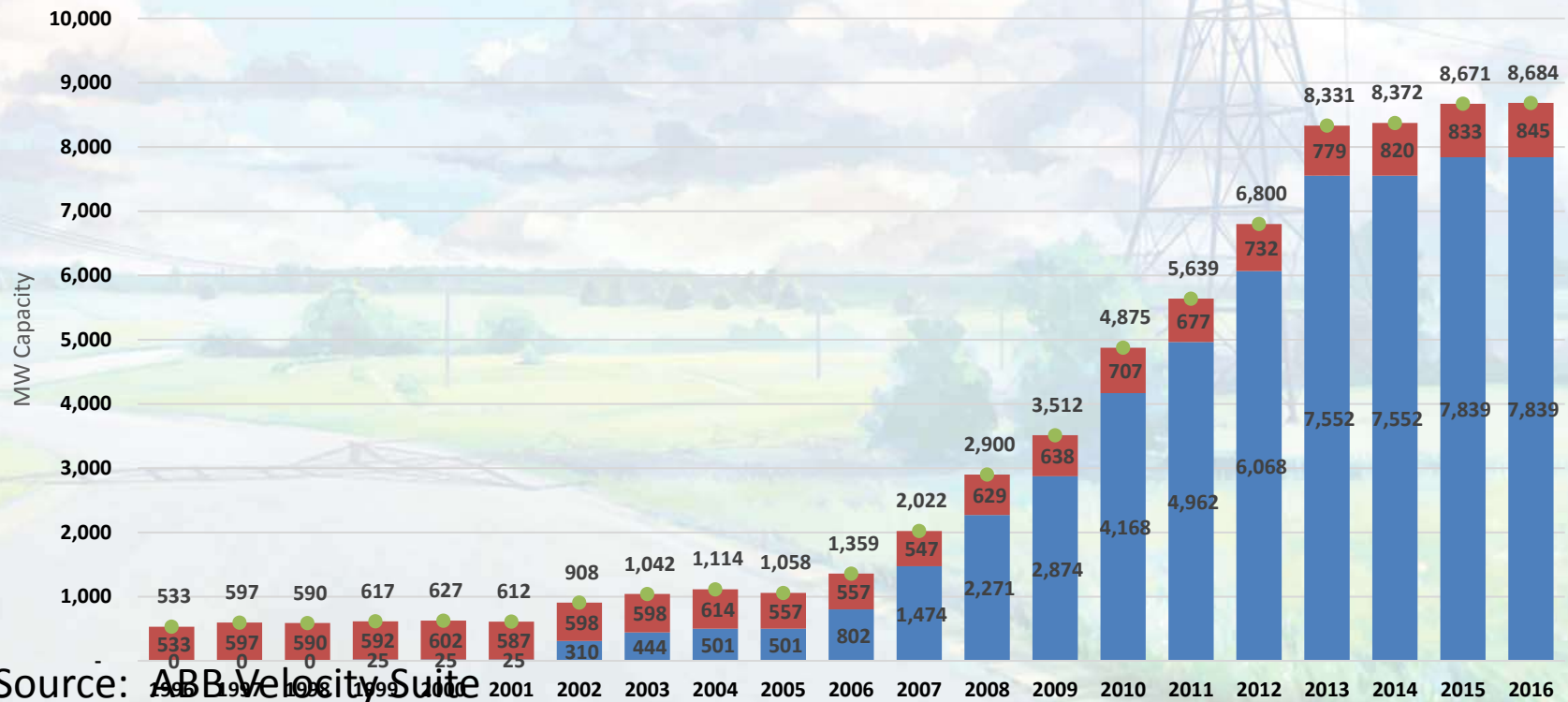


NWPPA's 2016 Power Supply Conference

Significant Wind Penetration in NW, are we done?

WA,OR,ID,MT Renewables Summary

■ Wind ■ ALL Other Renewables

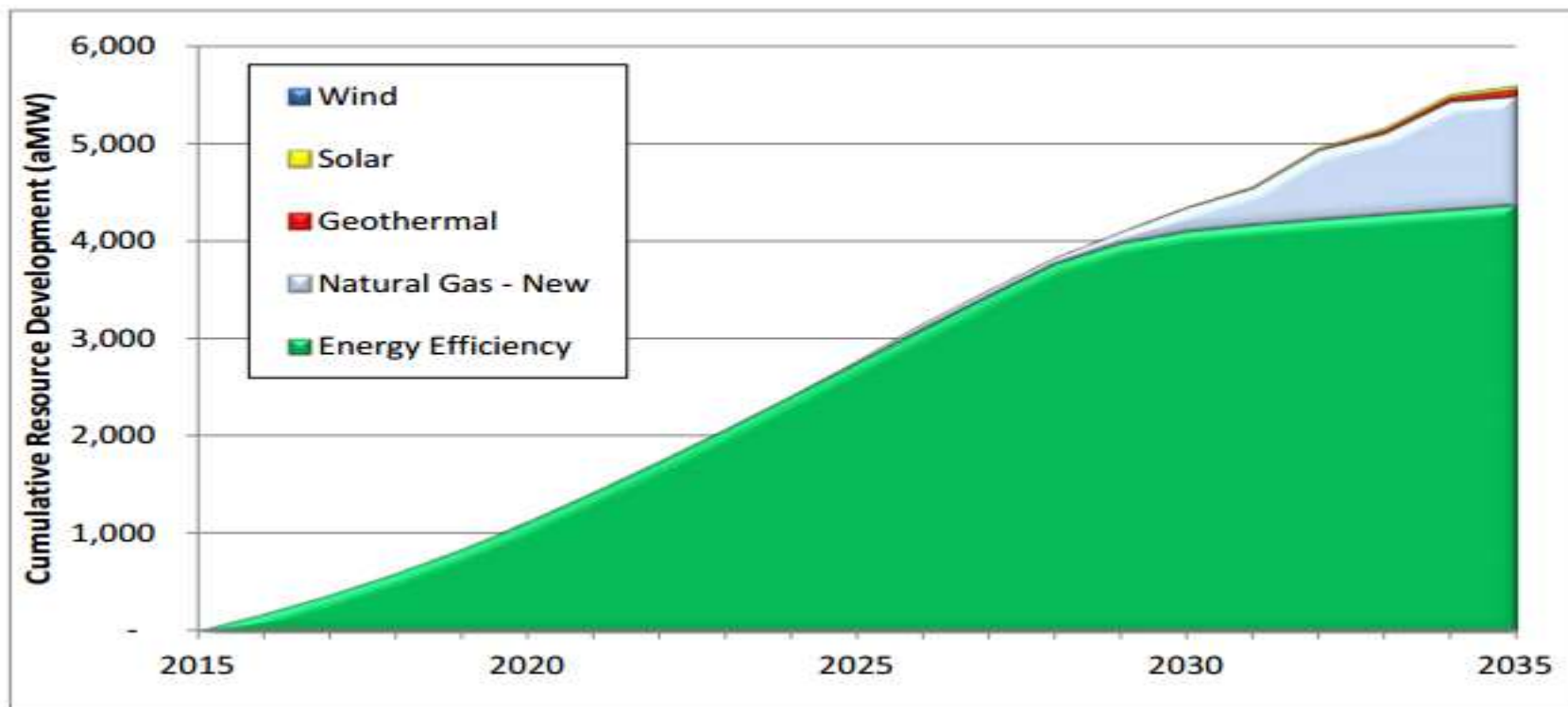


Source: ABB Velocity Suite

NWPPA's 2016 Power Supply Conference

Energy Efficiency as the new NW Resource

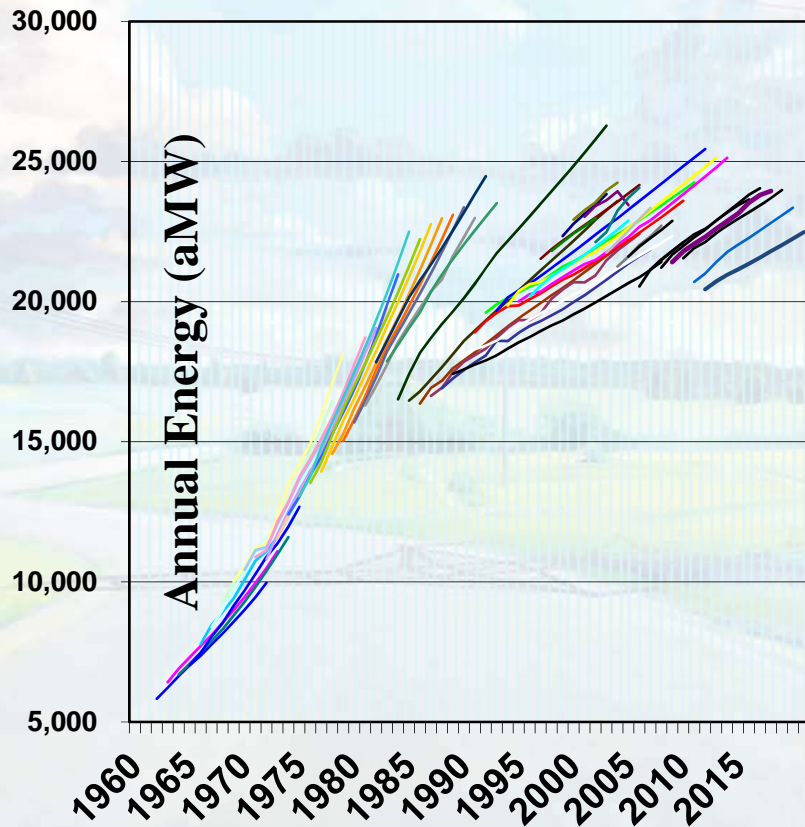
Figure 1 - 1: Seventh Plan Resource Portfolio¹



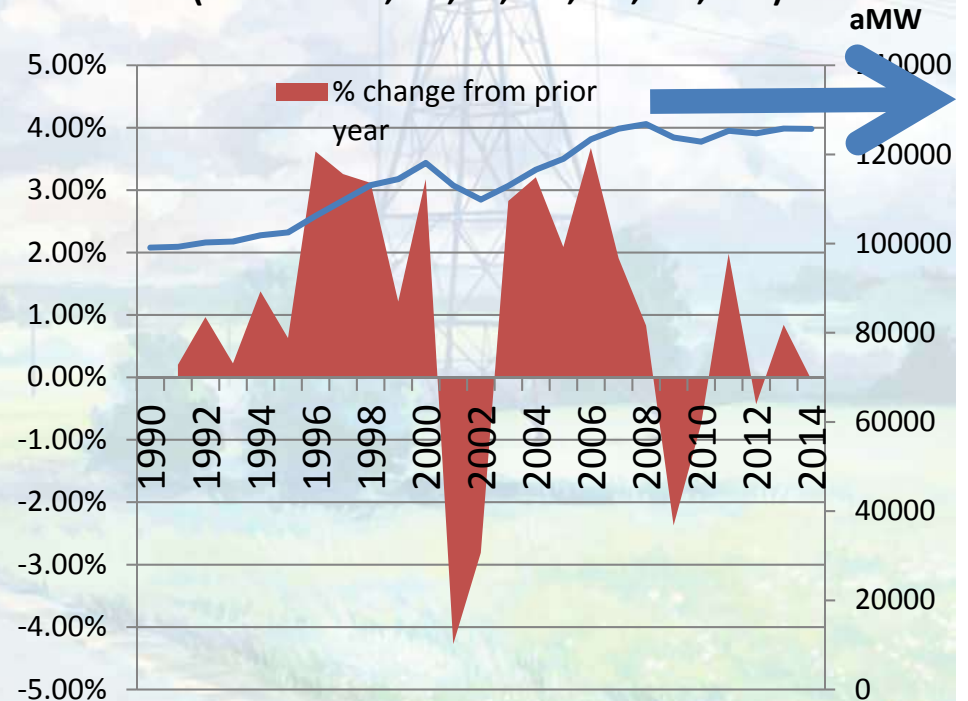
NWPPA's 2016 Power Supply Conference

Loads will never grow again.

Source: PNUCC



year on year Western Electricity Demand Stats change (includes AZ, CA, ID, MT, NV, OR, WA)

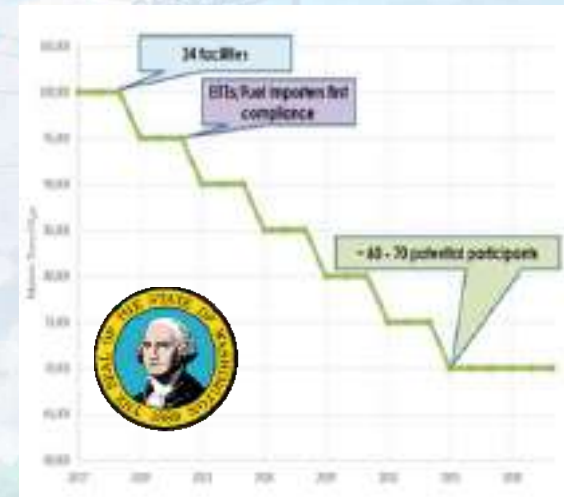


NWPPA's 2016 Power Supply Conference

Reg/Leg – What are we trying to accomplish?

EPA
The Clean Power Plan Protects Our Environment, Health & Economy
 The Clean Power Plan will cut harmful carbon pollution from the power sector that's leading climate change.
The Plan protects our environment.
 By 2030, the Plan will reduce carbon emissions from power plants by 32% below 2005 levels, or ~870 million short tons.*
 That's equal to the annual emissions from:
166 million cars

California Environmental Protection Agency
CA Air Resources Board
 Home | Reducing Air Pollution | Air Quality | Business Assistance
 This page last updated June 20, 2016
Cap-and-Trade Program
Allowance Auctions
 Quarterly Auction Results Summary Statistics



THIS OREGON LEGISLATIVE ASSEMBLY—2016 Regular Session

**Enrolled
 Senate Bill 1547**

Sponsored by Senator BEYER. Senators RATES, BURDICK, DEMBROW, DEYLIN, GELSER, HASS, MORRIS ANDERSON, MONROE, RILEY, ROSENBAUM, SHIELDS, STEINER HAYWARD, Representatives VEGA PEDERSON, WILLIAMSON (Provision filed.)

CHAPTER _____

AN ACT

Relating to public utilities; creating new provisions; amending ORS 409A.005, 409A.020, 409A.022, 409A.025, 409A.061, 409A.071, 409A.100, 409A.120, 409A.125, 409A.140, 409A.145, 409A.230 and 707.370; repealing ORS 707.370; and declaring an emergency.

Be It Enacted by the People of the State of Oregon

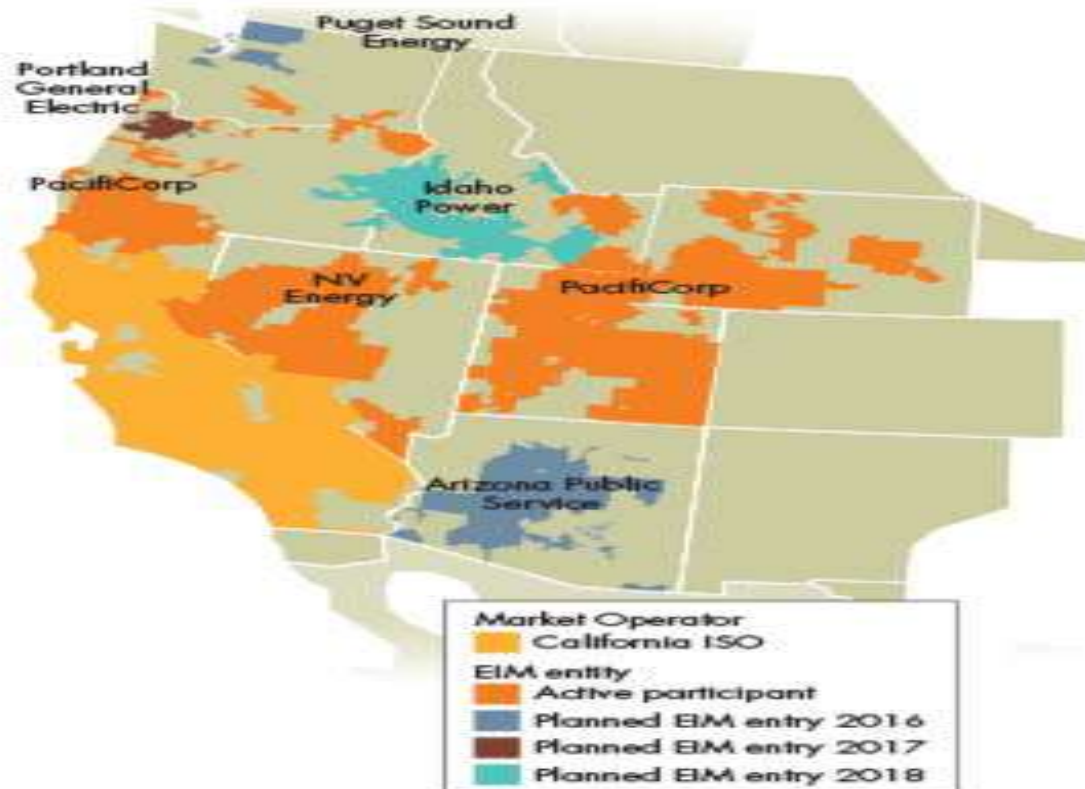
INITIATIVE 937

I, Sam Reed, Secretary of State of the State of Washington and custodian of its seal hereby certify that, according to the records on file in my office, the attached copy of Initiative Measure No. 937 to the People is a true and correct copy as it was received by this office.

NWPPA's 2016 Power Supply Conference

EIM/ISO – What's in it for us?

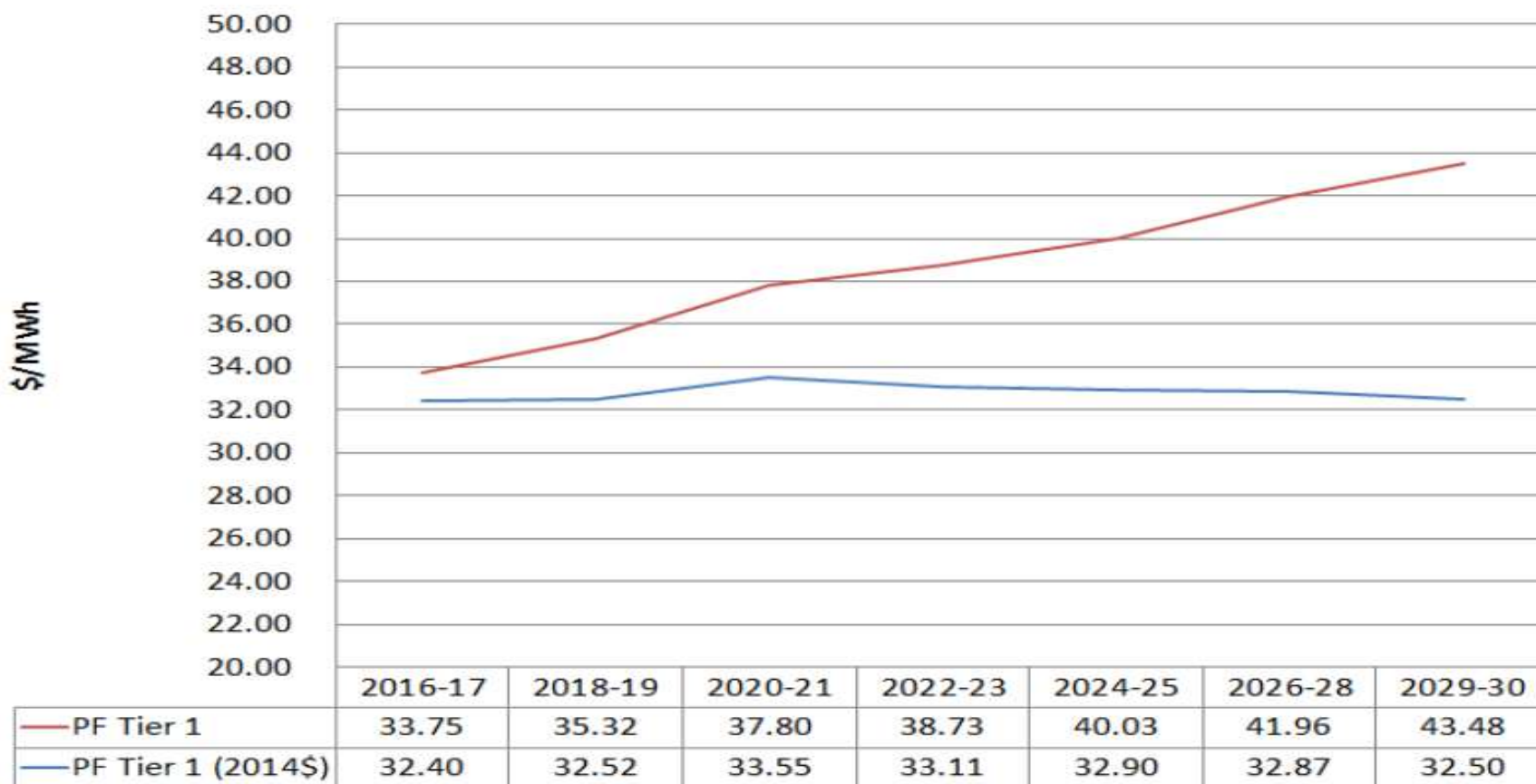
California ISO



NWPPA's 2016 Power Supply Conference

What Role does BPA Play in the Future?

Preference Tier 1 (PF) Rate, FYs 2016-2030



NWPPA's 2016 Power Supply Conference

What does my business look like in the future?



SolarCity



Google



POWERWALL

Tesla Home Battery

Powerwall is a rechargeable battery that stores energy from solar panels or the grid, acting as a flexible reserve for your home.

RESERVE YOURS

[Learn more](#)

Competitors or partners or both?