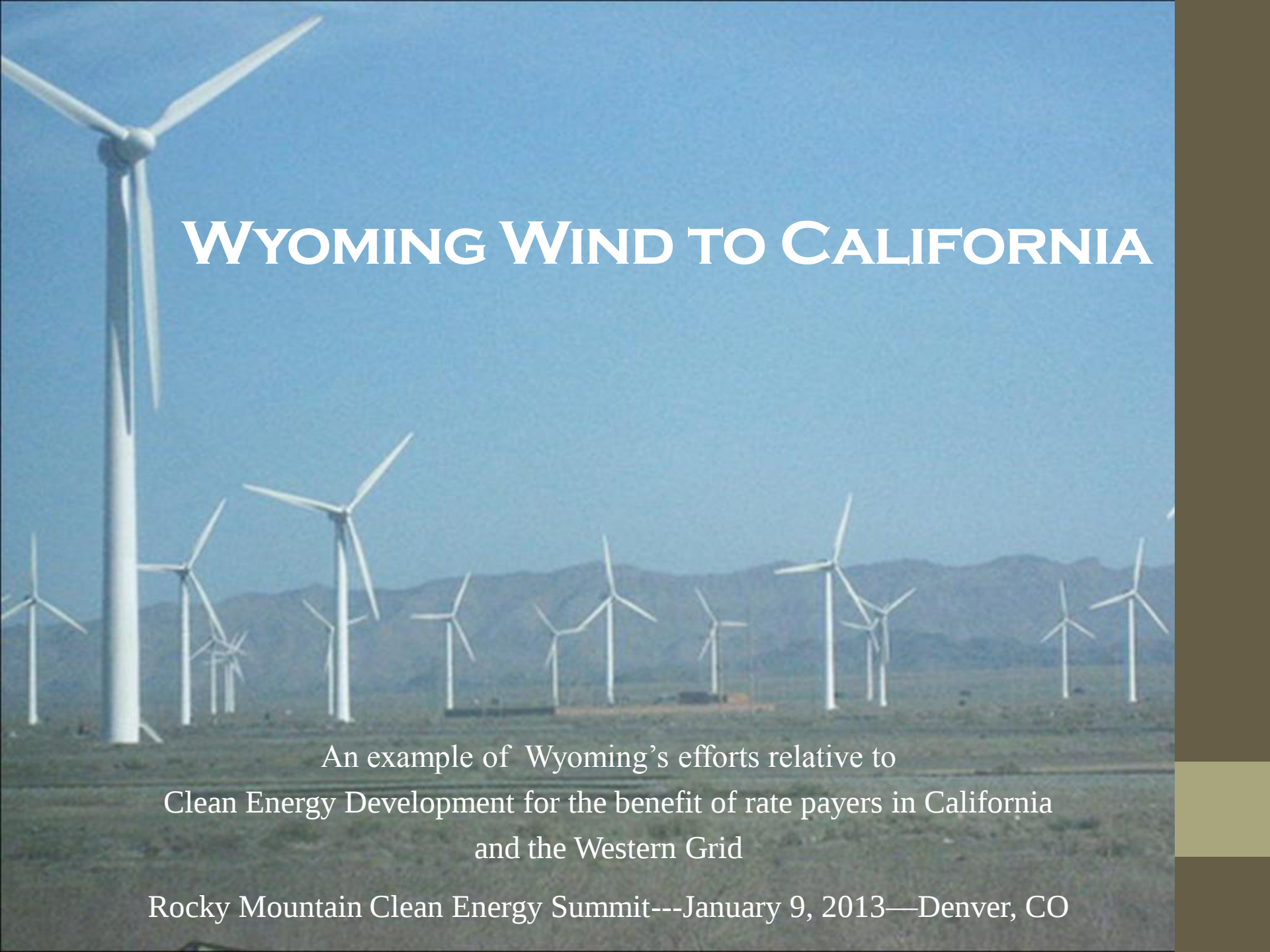




WYOMING WIND TO CALIFORNIA

An example of Wyoming's efforts relative to
Clean Energy Development for the benefit of rate payers in California
and the Western Grid

Rocky Mountain Clean Energy Summit---January 9, 2013—Denver, CO



WYOMING INFRASTRUCTURE AUTHORITY

WYOMING INFRASTRUCTURE AUTHORITY (WIA)

- ***CREATED IN 2004 BY THE WYOMING LEGISLATURE AS AN INSTRUMENTALITY WITH A FIVE (5) MEMBER, GOVERNOR APPOINTED BOARD OF DIRECTORS***
- ***MISSION: DIVERSIFY AND EXPAND THE STATE'S ECONOMY THROUGH IMPROVEMENTS IN THE TRANSMISSION GRID***

WYOMING INFRASTRUCTURE AUTHORITY

STUDIES IN 2012

- ***ROADMAP FOR PERMITTING TRANSMISSION IN WYOMING—COMPLETED***
- ***ROADMAP FOR PERMITTING WIND DEVELOPMENT IN WYOMING—COMPLETED***
- ***SERIES OF FOUR (4) GEOGRAPHIC DIVERSITY STUDIES RELATIVE TO CALIFORNIA; COLORADO; NEBRASKA; AND INTRASTATE WYOMING—CA STUDY WILL BE RELEASED ON JAN 17, 2013***
- ***ECONOMIC BENEFITS & JOB CREATION STUDY FOR THE WYOMING-COLORADO INTERTIE PROJECT—TO BE RELEASED IN FEBRUARY, 2013***

ALL STUDIES WERE PARTIALLY FUNDED BY A DOE GRANT AND ARE /OR TO BE AVAILABLE ON REQUEST OR BY VISITING THE WIA WEBSITE AT WWW.WYIA.ORG

UNIVERSITY OF WYOMING'S GEOGRAPHIC DIVERSITY OF WYOMING WIND COMPARED TO CALIFORNIA WIND FIRST IN A SERIES OF FOUR (4) STUDIES COMMISSIONED BY THE WIA

“The analysis shows that the more coordinated our western grid becomes, the easier it will be to increase the amount of renewable energy available to us while lowering energy costs for all utility customers,” said Carl Zichella, Director of Western Transmission at NRDC. “Wyoming has some of the highest capacity wind on the continent. By integrating Wyoming wind energy, California can meet its renewable standard goals and reduce the amount of reserve energy utilities need to manage the variability of renewable energy.”

**The Study is based on one year of Atmospheric Data for both
California and Wyoming—to be released on Jan 17, 2013**

***The WIA Board of Directors has authorized a Phase II WY/CA Study
that will be based on actual minute-by-minute, multi-year data
from both states—initiated in Jan, 2013***

WYOMING WIND TO CALIFORNIA

...NOT JUST ANY WIND

IT'S DIVERSE PLUS MORE!

IT BLOWS DURING THE DAY AND CORRELATES WELL WITH DEMAND ON THE CAISO SYSTEM!—PLUS

IT MITIGATES THE NEED FOR DISPATCHABLE RESOURCES WHEN THE SUN IN CALIFORNIA GOES DOWN AND CAISO DEMAND REMAINS HIGH!—PLUS

IT SMOOTHES THE VARIABILITY OF RENEWABLES ON THE CAISO SYSTEM ALL DAY LONG!—PLUS

GIVEN ITS HIGH CAPACITY FACTOR, IT IS COST EFFECTIVE!—PLUS

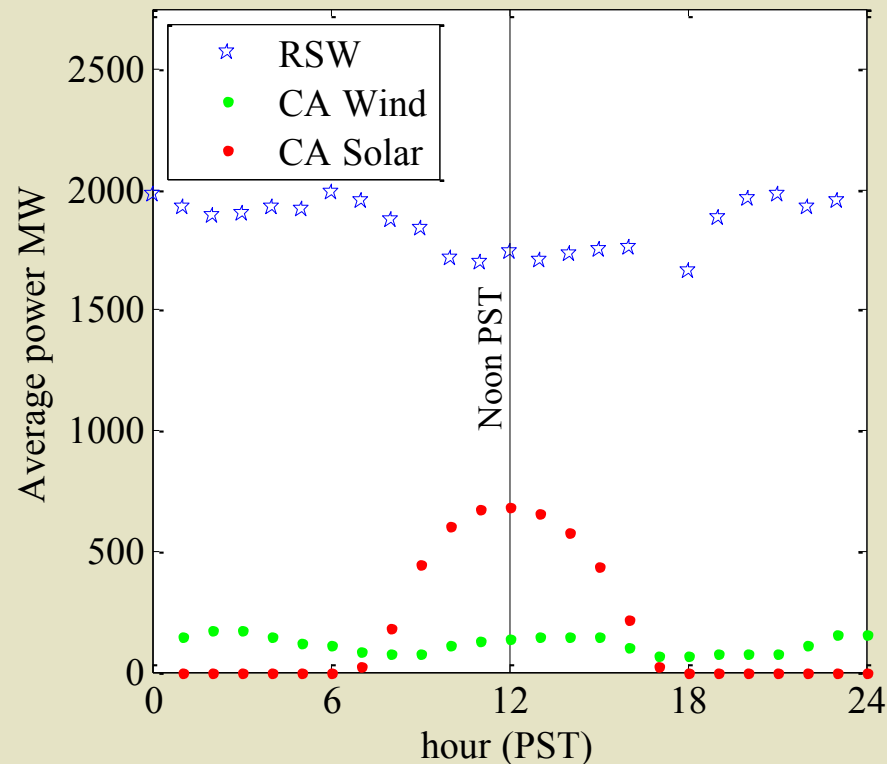
THE HVDC TRANSMISSION INFRASTRUCTURE FROM WYOMING TO CALIFORNIA IMPROVES THE RELIABILITY OF THE WESTERN GRID!

....ALL TO THE BENEFIT OF THE CALIFORNIA RATE PAYER

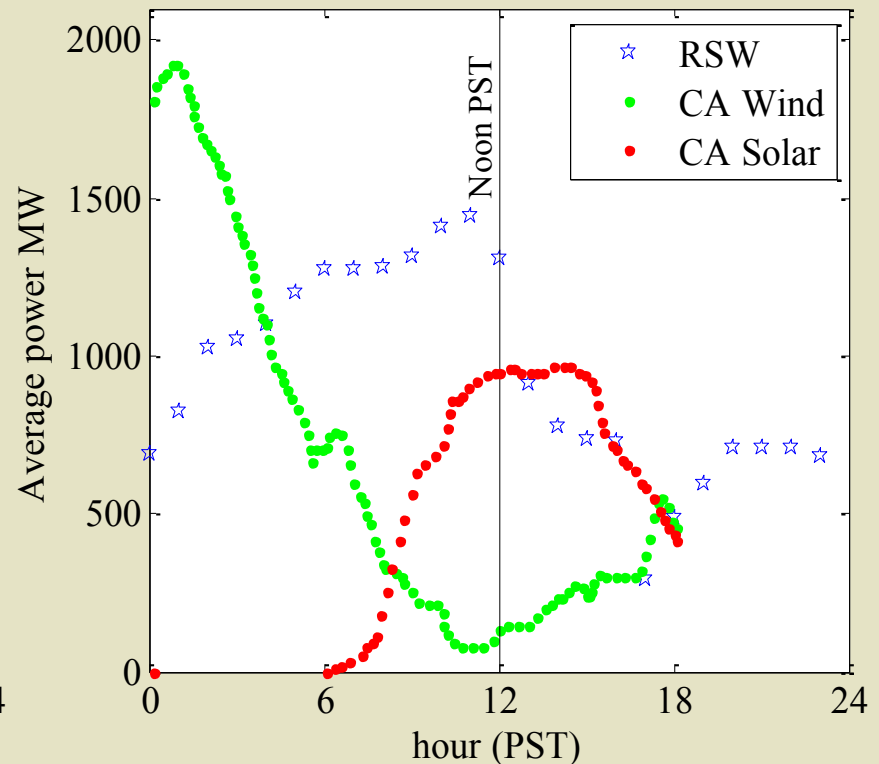
...AND TO OPERATIONS ON THE CAISO SYSTEM

WYOMING'S VALUE ADDED WIND

DIVERSITY IN WIND PRODUCTION



Fall Wind Profile
November 12-16, 2012
7,000 MW + of CA wind
3,000 MW of WY wind

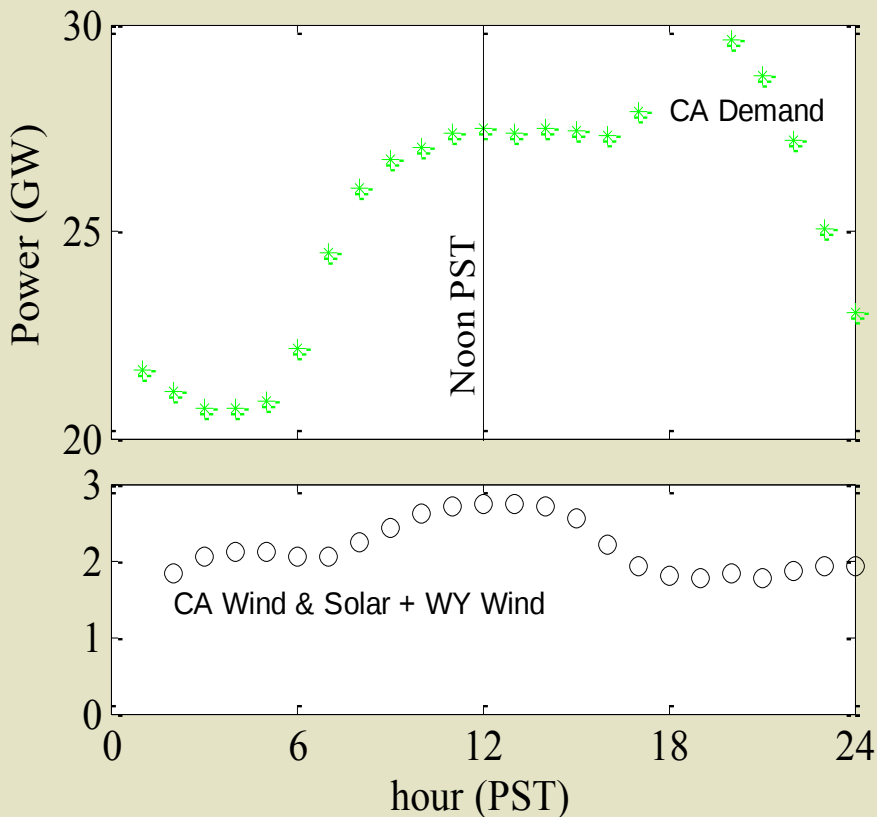


Summer Wind Profile
On August 9, 2012
7,000 MW + of CA wind
3,000 MW of WY wind

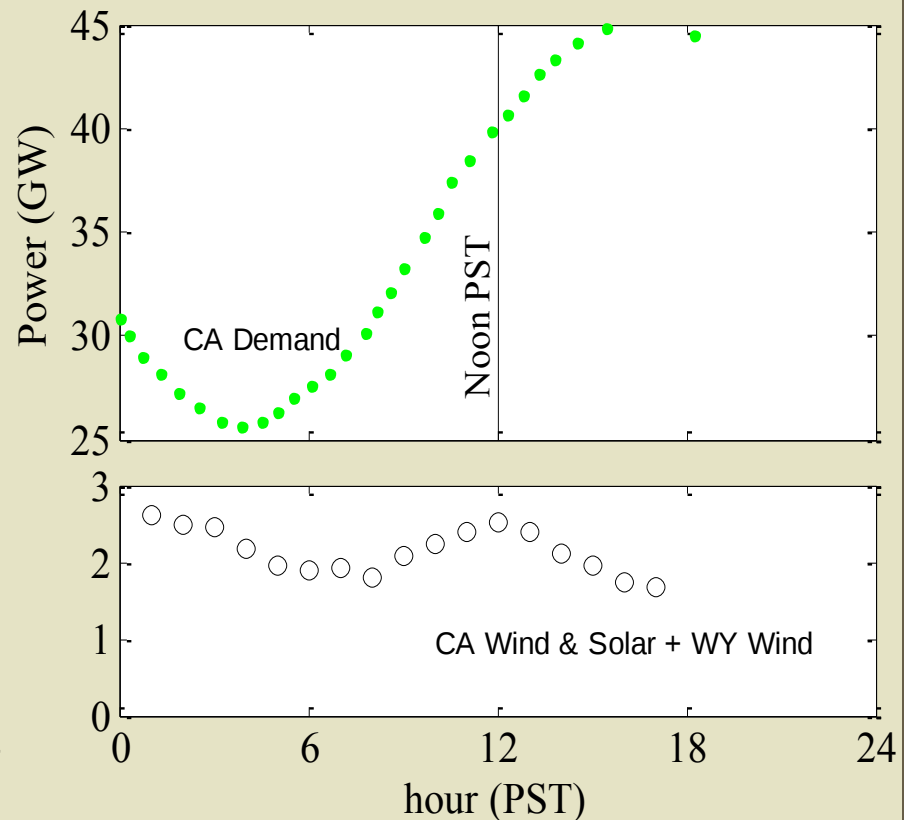
RSW is WY wind near Rawlins, WY

WYOMING'S VALUE ADDED WIND

THE SMOOTHING EFFECT WITH WY WIND

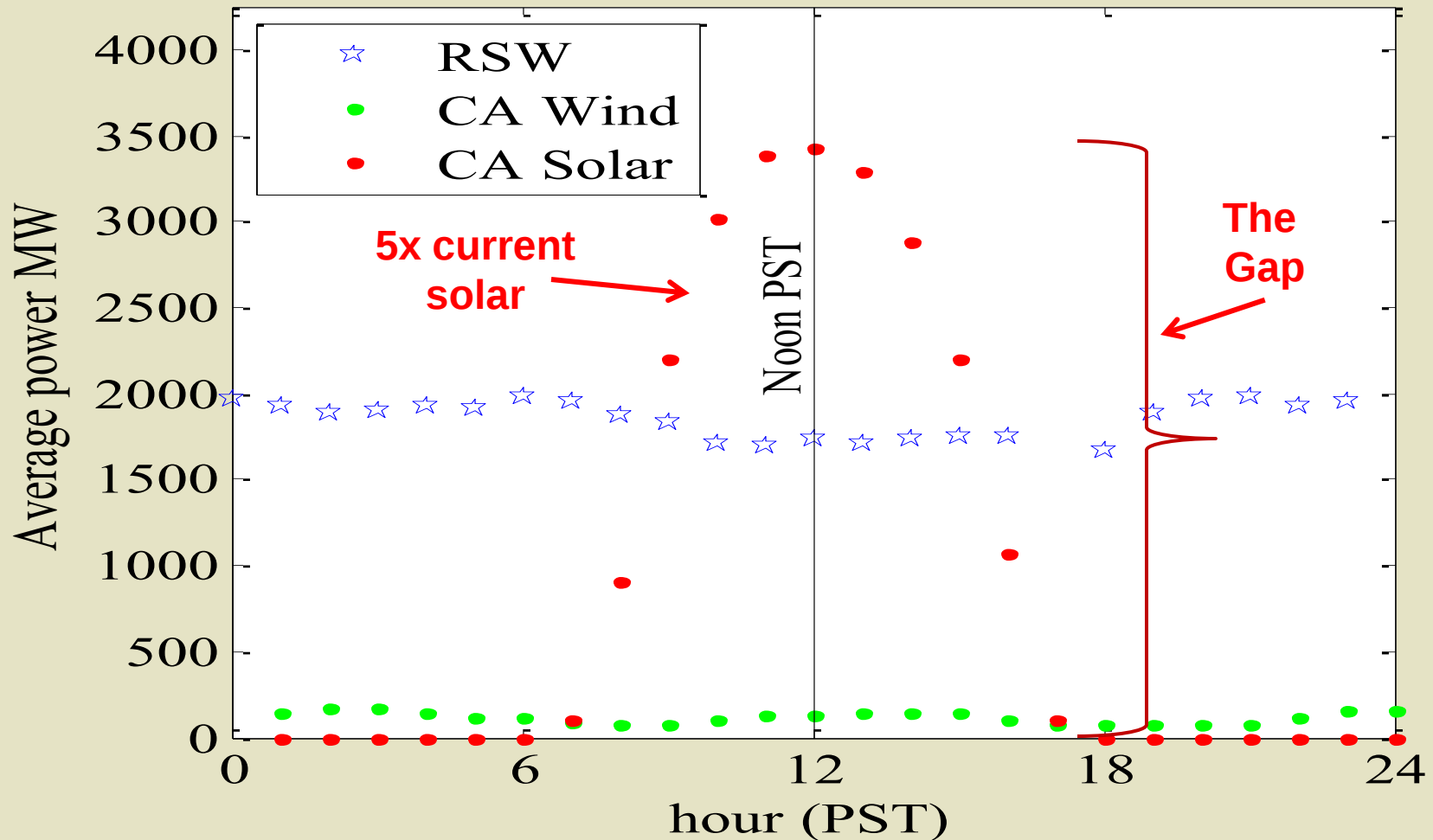


Fall Wind Profile
November 12-16, 2012
*CA wind & solar combined with
3,000 MW of WY wind*



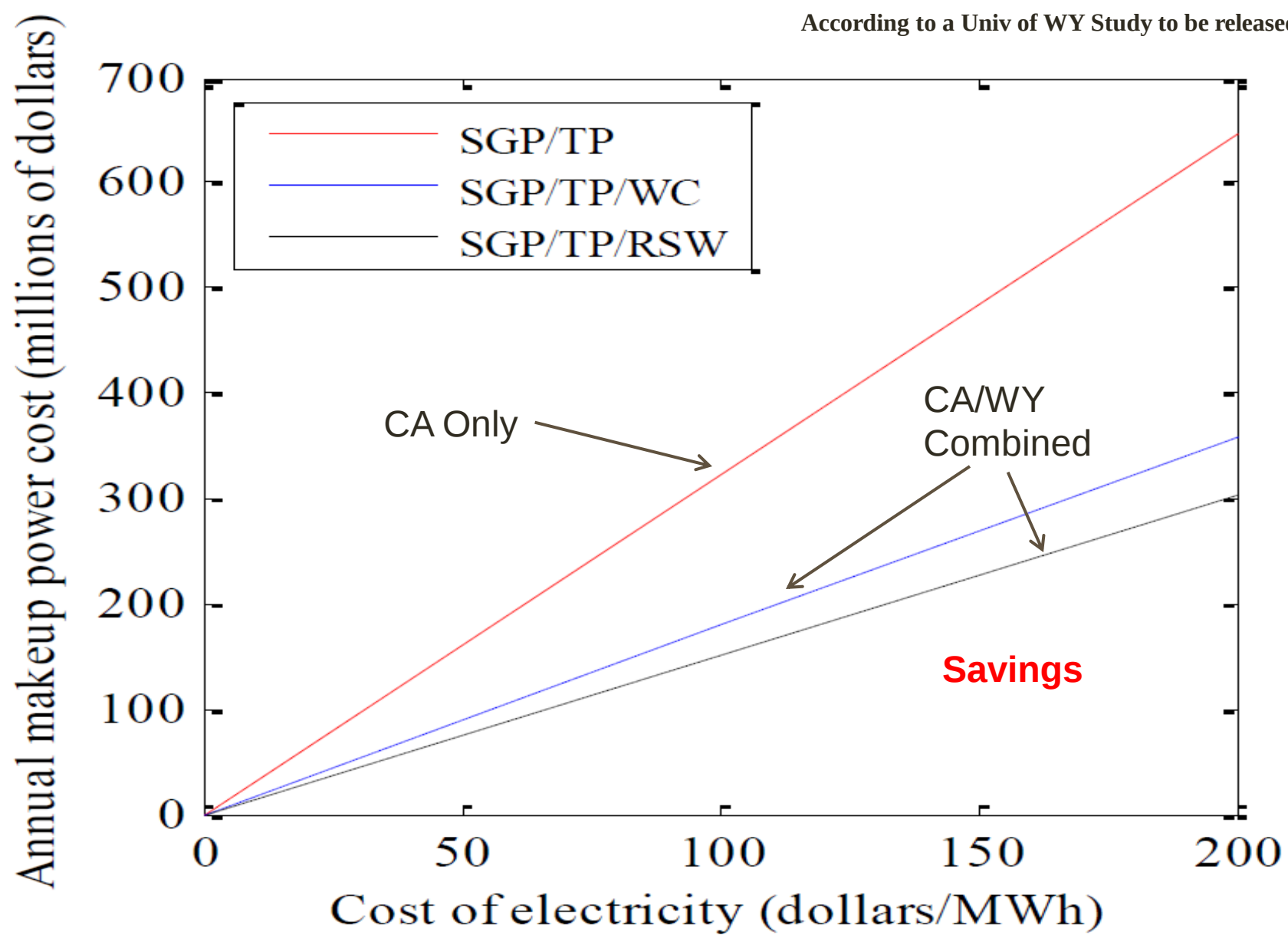
Summer Wind Profile
On August 9, 2012
*CA wind & solar combined with
3,000 MW of WY wind*

5X CURRENT SOLAR WILL REQUIRE EITHER LARGE AMOUNTS OF FOSSIL FUEL GENERATION OR DIVERSE WIND TO ADDRESS THE GAP BETWEEN SUPPLY AND LOAD WHEN THE SUN GOES DOWN



7,000 + Ca wind with 3,000 MW of WY wind

RSW is WY wind near Rawlins, WY



When combining 3,000 MW each of CA wind and WY wind, the savings is approximately \$100 million per yr vs. 6,000 MW of CA wind w/o WY wind holding each at a level of 25% of nameplate capacity with gas-fired generation valued at \$50/MWh—hours from 10pm to 6am is disregarded

CARBON EMISSIONS

- California operates both quick ramp up natural gas facilities and older inefficient thermal natural gas plants to accommodate daily variations in renewable energy generation
- Supplementing California's renewables with Wyoming wind reduces some of the need for these units and their resulting GHG emissions



Huntington Beach natural gas-fired units

According to a Univ of WY Geographic Diversity Study, 3,000 MW of Wyoming wind can reduce the need for 1,800,000 MWh of the electricity produced with natural gas annually which equates to approx. 800,000 tons of GHG emissions each year

1.8 million MWh is the equivalent of a 500 MW gas-fired generation unit operating at a 40% load factor

WIA'S CALIFORNIA OUTREACH INITIATIVE

Since, May, 2012, meetings have been held with forty-one (41) people to-date from the following entities in California:

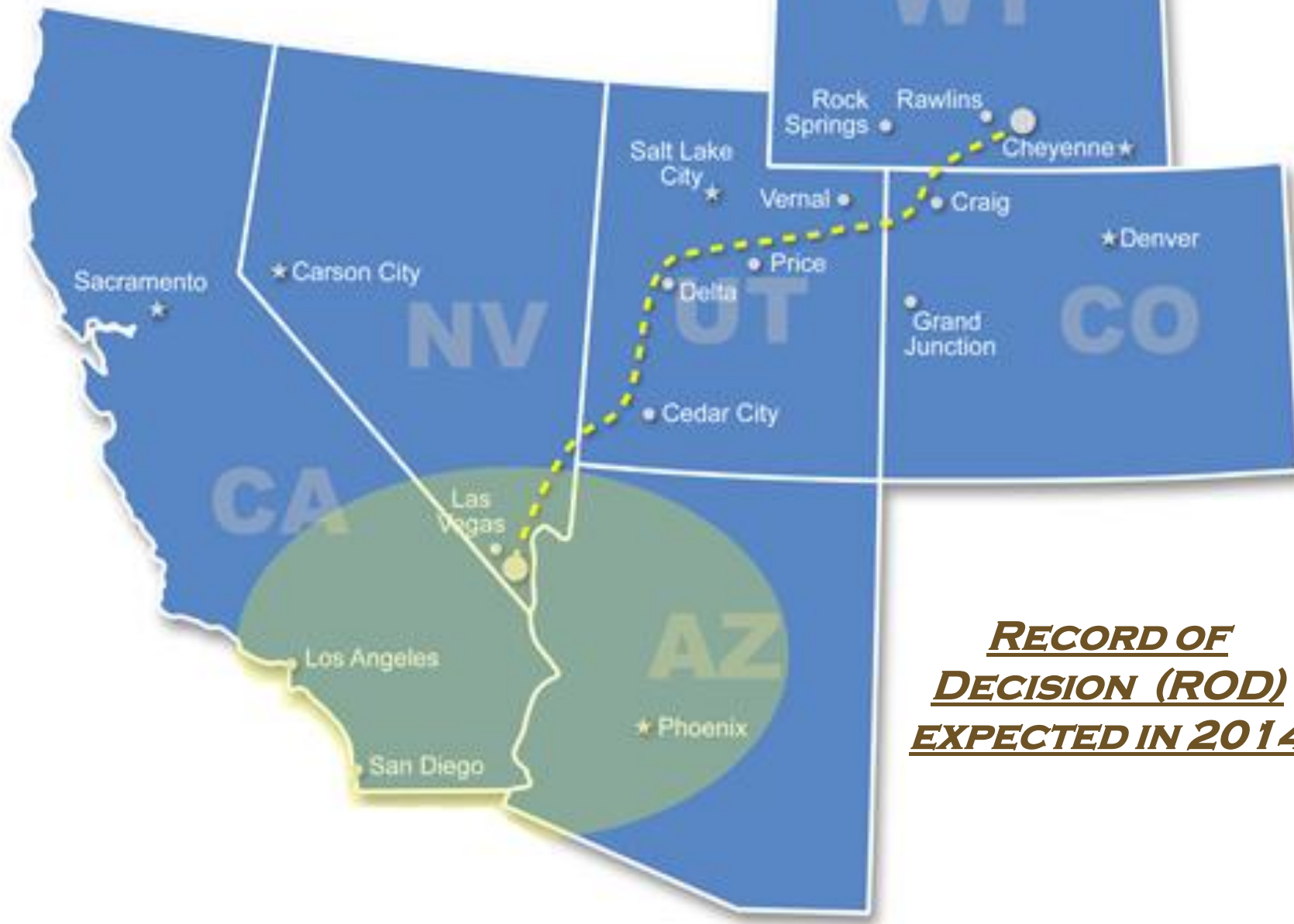
- *Governor Brown's Office*
- *California PUC*
- *California Energy Commission (CEC)*
- *California Independent System Operator (CAISO)*
- *California Air Resources Board (CARB)*
- *California Senate Energy Committee*
- *California Assembly Energy Committee*
- *Southern California Edison*
- *Northern California Power Agency (NCPA)*
- *National Resources Defense Council (NRDC)*
- *Stanford University*
- *University of California, Davis*
- *University of California, Berkeley*

ORGANIZED LABOR SUPPORT FOR THE TRANSWEST EXPRESS PROJECT FROM WYOMING

In 2012, organized labor at both the national and regional (California) levels has voiced strong support for the 3,000 MW TransWest Express Transmission Project that would deliver cost-effective, diverse wind energy to California. This support has included letters to Governor Jerry Brown, Interior Secretary Ken Salazar and Energy Secretary Chu by:

- *The International Brotherhood of Electric Workers (IBEW);*
- *The California Conference of Carpenters;*
- *The National Construction Alliance;*
- *The International Union of Operating Engineers; and*
- *The American Federation of Labor and Congress of Industrial Organizations.*

TRANSWEST EXPRESS **TRANSMISSION PROJECT**



RECORD OF
DECISION (ROD)
EXPECTED IN 2014

Annual Cost Estimates for Delivering Approximately 3,000 MW of Renewable Energy to California by 2019

Source: WECC DRAFT 10-Year Regional Transmission Plan Summary, August 2011



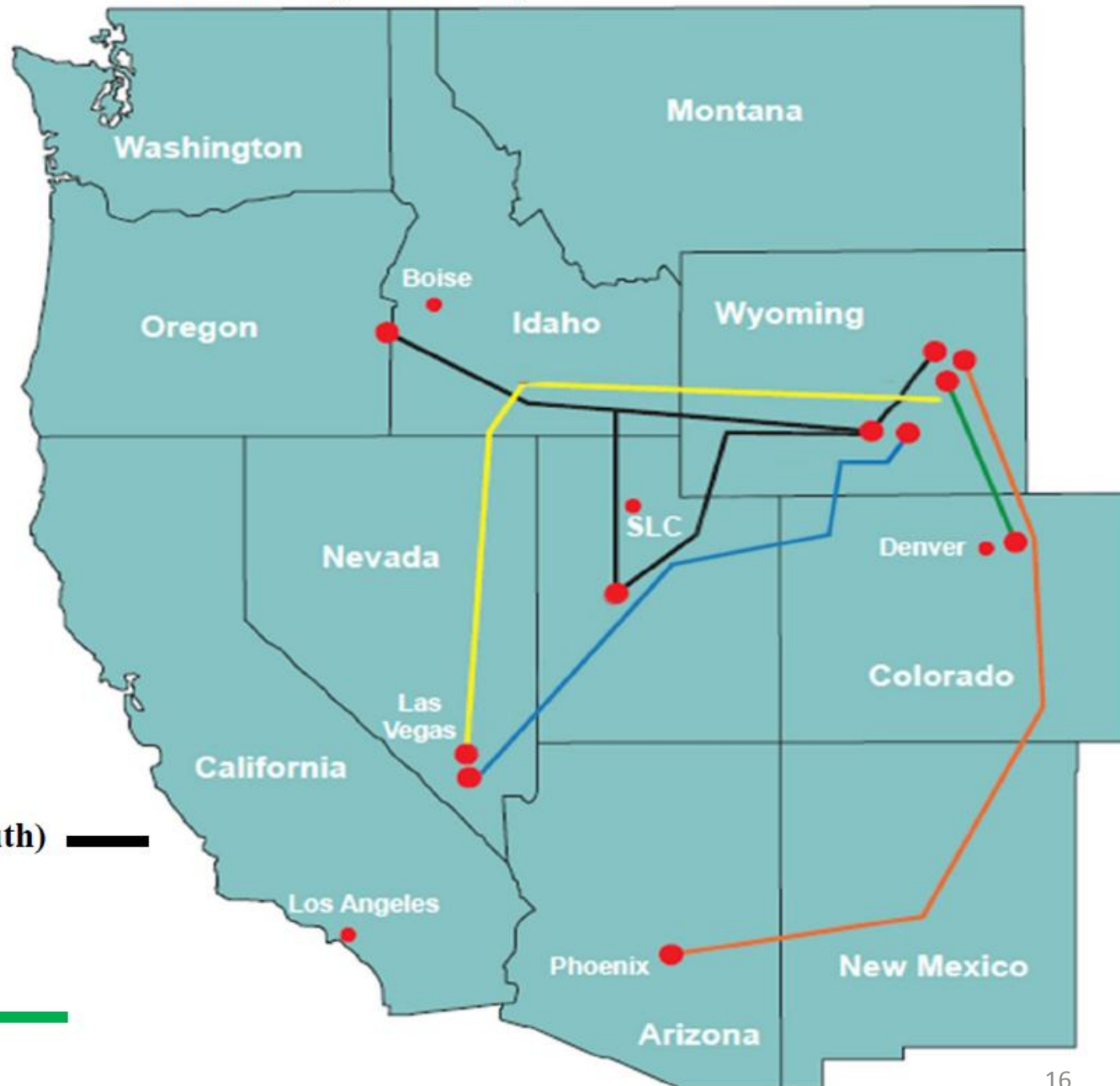
SUMMARY OF BENEFITS TO CALIFORNIA RATE PAYERS

- *WECC Study reflects savings to rate payers of \$600 million/yr;*
- *The Univ of WY Study reflects an additional \$100 million /yr;*
- *Less standby generation required on the CAISO System*
- *Less GHG emissions annually*
- *Ability to provide dispatchable, Ancillary Services to address the variability of wind and solar on the CAISO System and the issues in California with Once-Through-Cooling; whether San Onofre Nuclear Generating Station (SONGS) will ever go back on line; and the ability to acquire air permits*
- *The HVDC Transmission Infrastructure from Wyoming to California improves the reliability of the Western Grid!*

Importing cost-effective energy from other states is an everyday occurrence for California with Wyoming supplying over one-third of California's needs for natural gas; and the large amount of hydroelectric-power from Nevada and the Pacific Northwest.

Transmission Projects Under Development in Wyoming

Routes are subject to change



Projects:

Energy Gateway (West & South) —

TransWest Express —

Zephyr —

Wyoming-Colorado Intertie —

High Plains Express —

WINTER BOARD MEETING—JACKSON, WY

FEB 11-12, 2013

Invitation to attend the WIA's Winter Meeting with the following topics:

- *Keynote Address: Neil Kornze, acting Director, Bureau of Land Management (BLM)*
- *Transmission update from PacifiCorp; TransWest Express; DATC; and LS Power*
- *Univ of WY's Geographic Diversity Study*
- *Benefits of resource diversity on the MISO System*
- *Energy Imbalance Market (EIM) Value to Markets in the Western and Eastern Interconnects*
- *CO2 Capture and Sequestration from Research to Operational Success by the Southern Company*
- *Plus a number of other topics*

Contact Holly.Martinez@wyo.gov for more information

QUESTIONS?

***LOYD DRAIN
EXECUTIVE DIRECTOR,
WYOMING INFRASTRUCTURE AUTHORITY***

LOYD.DRAIN@WYO.GOV

307.635.3573