IBERDROLA RENEWABLES

Differences between Western US Markets for Renewables

Symposium on PNW Power Markets
Seattle, WA
July 8, 2013

U.S. Power Assets & Customers (by NERC region)

IBERDROLA RENEWABLES

1 - Klondike IIIa
76.5 MW owned
PG&E
2 - Hay Canyon
100.8 MW owned
Snohomish PUD
3 - Klondike
24 MW owned
BPA
4 - Klondike III
223.6 MW owned
PG&E, PSE, BPA, EWEB
5 - Star Point
99 MW owned
MID
6 - Klondike II
75 MW owned
PGE
7 - Big Horn
199.5 MW owned
MID, Santa Clara, Redding
8 - Big Horn II
50 MW owned
MID, Santa Clara, Redding
9 - Juniper Canyon
151.2 MW owned
10 - Pebble Springs
98.7 MW owned
SCPPA
11 - Leaning Juniper II
201.3 MW owned

WIND PROJECTS

WIND PROJECTS

1 - Buffalo Ridge 50.4 MW owned
NIPSCO
2 - Buffalo Ridge II 210 MW owned
NIPSCO
3 - MinnDakota 150 MW owned
Northern States Power (Xcel)
4 - Moraine 51 MW owned
Northern States Power (Xcel)
5 - Moraine II 49.5 MW owned
Northern States Power (Xcel)
6 - Elm Creek 99 MW owned
Great River Energy
7 - Elm Creek II 148.8 MW owned
Great River Energy
8 - Trimont 101 MW owned
Great River Energy
9 - Flying Cloud 43.5 MW owned
Alliant
10 - Winnebago 20 MW owned
Dairyland Power
11 - Top of Iowa II 80 MW owned
Madison Gas and Electric, Wisconsin Public Power
12 - Barton 160 MW owned
NIPSCO, WI Public Power, Ino, WE Energies
13 - New Harvest 100 MW owned
Ameren, ComEd

Simpson Biomass
55 MW PPA
SMUD

Rugby
149.1 MW owned
Missouri River Energy Services

Klamath Cogen
536 MW
Klamath Generating
100 MW

Pleasant Valley
144 MW PPA
LADWP, Anaheim, Glendale, Burbank, UAMPS

High Winds 162 MW PPA
SMUD, Merced, Modesto
Palo Alto, Alameda, SCPPA

Shiloh 150 MW owned
PG&E, Palo Alto, MID

San Luis
30 MW owned
Public Service Co. of CO (Xcel)

Twin Buttes
75 MW owned
Public Service Co. of CO (Xcel)

Elk River
150 MW owned
Empire Dist. Electric Co.

Providence Heights
72 MW owned

Streator Cayuga Ridge
300 MW owned

Farmers City
146 MW owned

Maple Ridge II
45.4 MW owned
(91 MW project)
NY Power Authority, SNHU, NStar

Maple Ridge
115.5 MW owned
(231 MW project)
NYSERDA

Hardscrabble
74 MW owned
NYSERDA

Groton
48 MW owned
NSTAR

Lempster
24 MW owned
PSNH

Hoosac
28.5 MW owned
NSTAR

Locust Ridge
26 MW owned
PPL EnergyPlus

Locust Ridge II
102 MW owned
Various healthcare organizations

Casselman
34.5 MW owned
FirstEnergy Solutions

South Chestnut
48 MW owned

Blue Creek
304 MW owned
FirstEnergy Solutions
AMP

Colorado Green
81 MW owned
(162 MW project)
Public Service Co. of CO (Xcel)

Dry Lake
63 MW owned
Salt River Project

Manzana
189 MW owned
SDG&E, Santa Clara

Mountain View III 22.44 MW owned
SDG&E

Dillon 45 MW owned
SCE

Copper Crossing
20 MW owned
Salt River Project

Dry Lake II
65.1 MW owned
Salt River Project

Barton Chapel
120 MW owned

Peñascal II 201.6 MW owned
BTU (City of Bryan, Texas)
City of Austin

Peñascal 201.6 MW owned
City of San Antonio,
South Texas Electric Co-op

MISO
SPP
PJM
NYISO
NEPOOL
WECC
ERCOT

Wind generation
Thermal generation
Biomass generation
Solar generation

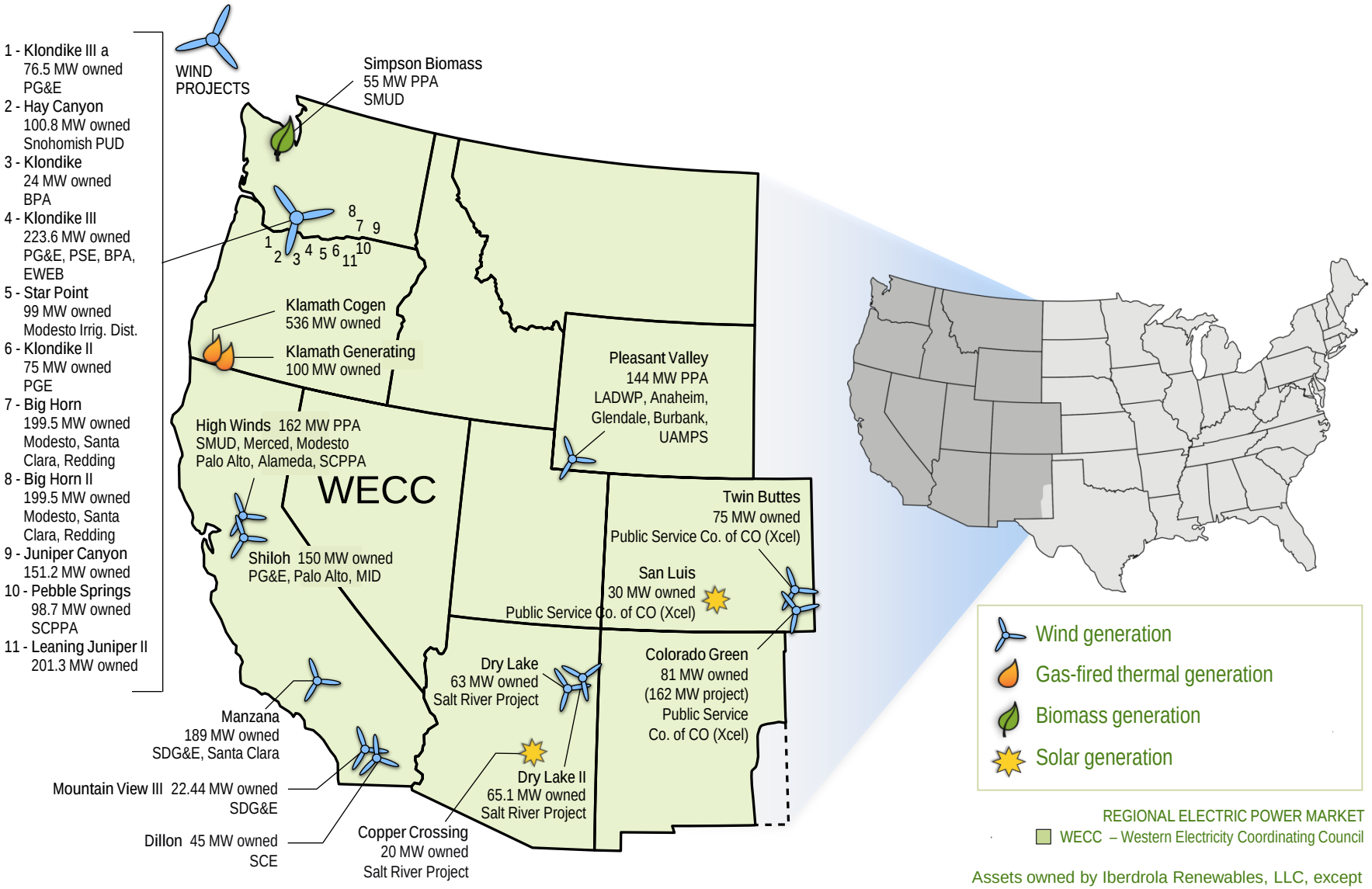
Electric Power Markets

- WECC – Western Electricity Coordinating Council
- MISO – Midwest Independent Transmission System Operator
- SPP – Southwest Power Pool
- PJM – Pennsylvania New Jersey Maryland Interconnection
- ERCOT – Electric Reliability Council of Texas
- NYISO – New York Independent System Operator
- NEPOOL – New England Power Pool

Assets owned by Iberdrola Renewables, LLC, except where noted as a Power Purchase Agreement (PPA)

MAP-US2001, Rev. 12/31/2012

U.S. Power Assets & Customers – West (WECC)



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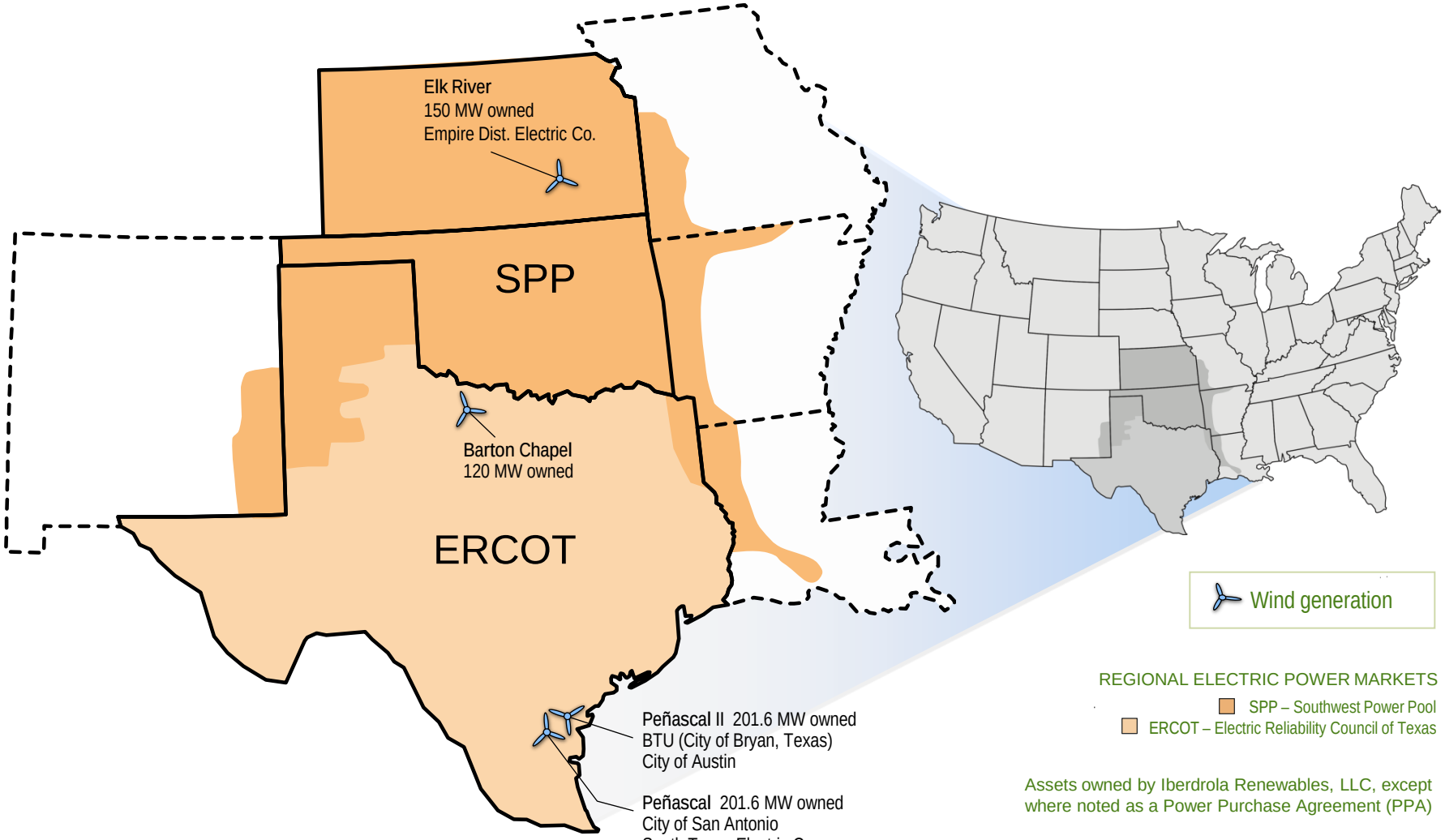
MAP-US2101, Rev. 12/31/2012

U.S. Power Assets & Customers – Mid-Continent, South (SPP, ERCOT)



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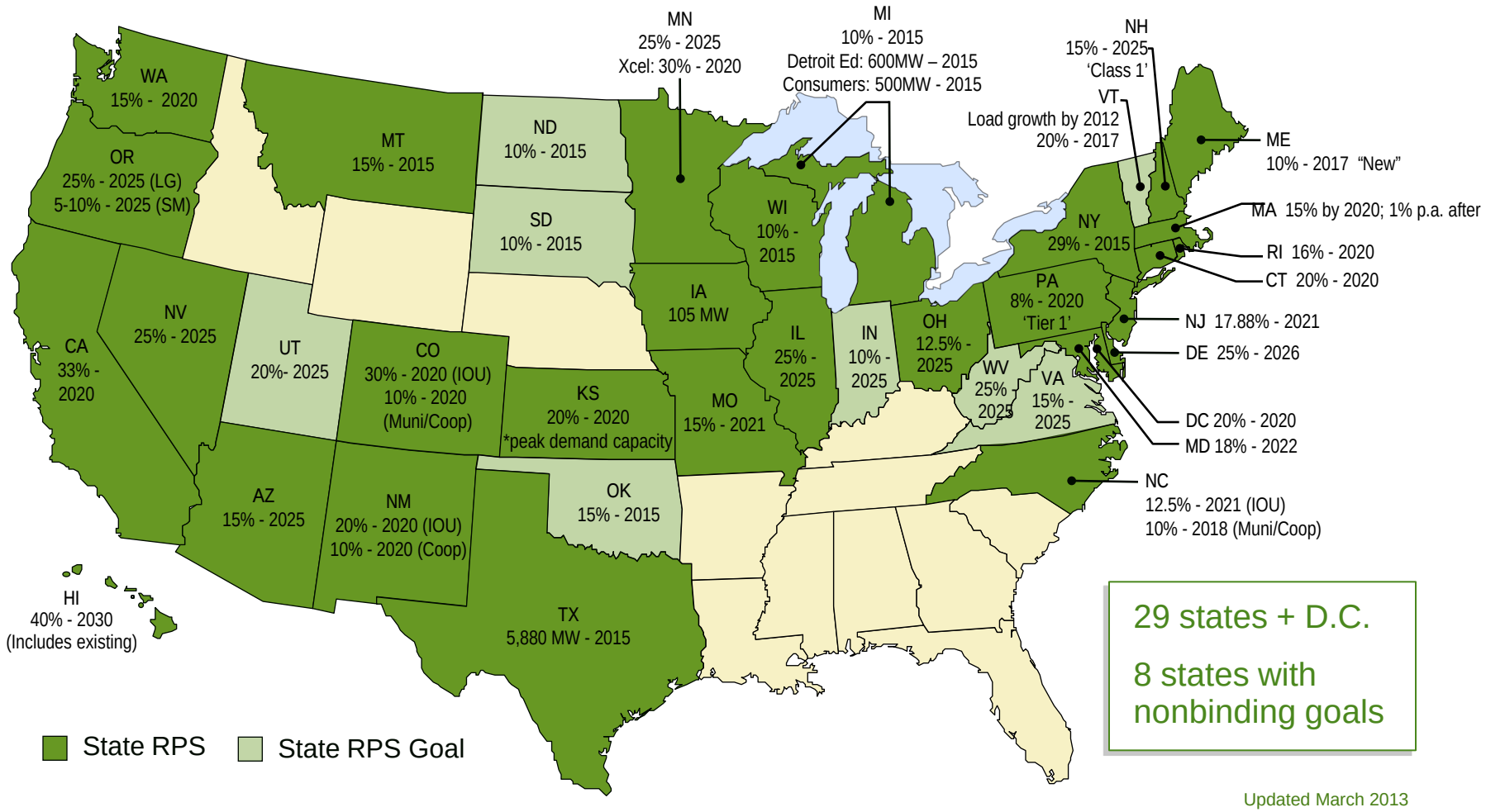
MAP-US2401, Rev. 6/21/2012

Renewable Development - Basics

- Resource (wind, solar, etc.) is most important economic driver
- Location
  - Ability to get site control and permits
  - Constructability
  - Tax regime/incentives
- Market
  - Transmission – busbar vs. delivered; congestion
  - Offtakers – long-term vs. short-term
- Technology
  - Wind: Hub height, blade diameter
  - PV Solar: Thin film vs. crystalline, Tracking vs. fixed, AC/DC ratios
- Ownership/Financing
  - Cost of capital (Levered, Unlevered)
  - Tax efficiency

Renewable Portfolio Standards (RPS) and RPS Goal States



29 states + D.C.

8 states with nonbinding goals

Updated March 2013

Generation Mix

	WECC	SPP	ERCOT
Coal	18%	**40%**	34%
Hydro	**29%**	4%	
Nat Gas or Cogen	41%	48%	45%
Nuclear	4%	3%	**12%**
Renewables	8%	5%	9%

Approximate 2012 generation sources

Renewable Market - WECC

- In general, WECC is a fragmented set of sub-regions with some points of liquidity but no jurisdiction that manages one marketplace.
- CA is largest component of the market; 33% RPS is a major driver of activity across the WECC though:
  - In-state preference created by 3 “buckets” affects procurement behavior
  - Declining costs of in-state PV have been game-changer in pricing
  - Bulk transmission to import renewables has been slow to materialize
  - Coal and Nuclear coming offline presents opportunity
- WA and OR RPS are mostly satisfied in the near-term; much of existing supply feeds CA via intertie but not competitive currently.
- NV, AZ and CO rebounding from recession, load decreases. Each have sizable RPS and renewable supply within their borders.
- Other high-wind/low-load states such as MT, WY and NM present opportunities if transmission is made available.

Renewable Market – SPP/ERCOT

- SPP and ERCOT are both organized markets with LMPs, etc.
- Extremely high wind resources make wind cost competitive without much of a REC component; drive procurement beyond RPS.
- ERCOT has a coastal wind resource which is peak-coincident.
- ERCOT is de-regulated with retail competition, making municipals and co-ops only long-term buyers.
- Power prices highly correlated with price of natural gas; ERCOT has significant rate caps of $5,000/MWh (going up to $9k).
- New EPA rules regulating existing coal plants could have significant impact in both regions; more gas-fired development is expected.
- SPP has been able to expand its transmission significantly by spreading across large geographic footprint; not all members happy.
- Texas approved Competitive Renewable Energy Zones (CREZ) which built $2B+ of new rate-based transmission to the panhandle.

Renewable Development – Regional Matrix

	CA	Pacific NW	Desert SW	SPP	ERCOT
Wind Resource	25-35%	30-35%	25-50%	50%	40-50%
Solar Resource	25-35%	20-30%	30-35%	20-30%	20-30%
Permitting	Difficult	Medium	Medium	Light	Light
Interconnect $	High	Low	Low	High	Low
Liquidity	Yes	No	No	Price-taker	Yes
RPS demand	Strong in 2015+	Late Decade	Some	Weak	Late Decade
Politics	Supportive	Supportive	NV Yes, AZ no	EcoDev yes, RPS no	Not a priority

Conclusions

- California is strongest market in the West but most challenging within which to develop. Will CA accept imports?

- Pacific Northwest currently oversupplied from an RPS standpoint but demand will increase again closer to 2020.

- Texas has gotten out ahead of its RPS so renewables is not a priority but energy shortages and price spikes are very much so.

- Other WECC and SPP states will be impacted by Obama climate initiative with a) older coal plants being shuttered and newer emitting plants being cost prohibitive and b) transmission availability.

- Natural gas is a key driver of how competitive renewables will be on a cost basis across the West. Gas and renewables could be complementary.