

Power Task Force Agenda Number 2.

ENERGY LANDSCAPE SHAPING OPPORTUNITIES

Presentation to Power Task Force, Central Arizona Water Conservation District

Amanda Ormond, Managing Director, Western Grid Group

April 20, 2017

What
characteristics
are desirable
in a energy
source?

Reliable
Low Cost
Price Stable
Local Economic Development
Low Water Use
Low Pollution
Carbon Free
Other?

Natural Gas	Desirable Energy Characteristics	Wind & Solar
✓	Reliable	✓
✓	Low Cost	✓
✗	Price Stable	✓
—	Local Economic Development	✓
✗	Low Water Use	✓
✗	Low Pollution	✓
✗	Carbon Free	✓
	Other?	3

WIND AND SOLAR RELIABILITY

- Primary risk for renewable energy is around **quantity**.
- **Individual** wind and solar plants can't provide firm energy.
- But a **combination of resources** (wind, solar, hydro, storage and market power) can provide **24/7 power**.

4

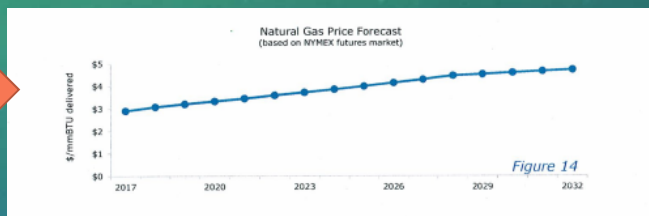
NATURAL GAS RELIABILITY CONSIDERATIONS

- Availability of natural gas fuel
 - International exports of fuel
 - New 36" pipeline to Mexico
 - Demand from industrial and utilities
 - No Arizona storage capacity
- Pipeline capacity
 - Arizona produces no natural gas
 - Pipeline expansion will be needed to meet future utilities demand

5

NATURAL GAS PRICE RISK

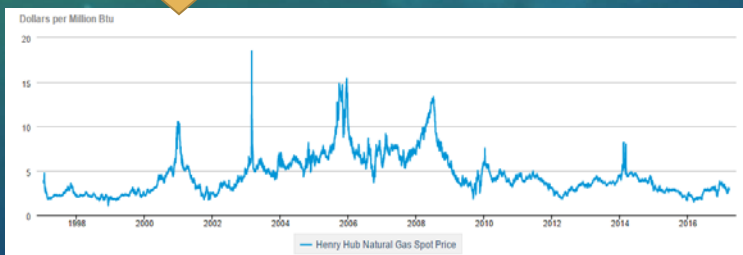
Prices are **predicted** to be



APS - Preliminary 2017 IRP (October 2016 Update)

Page 16 of 36

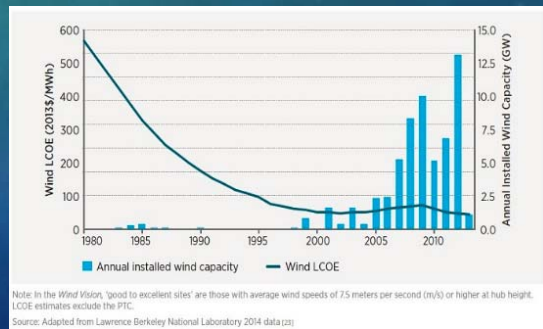
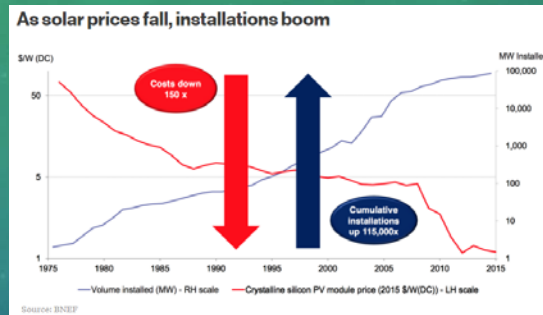
But **historically** have been



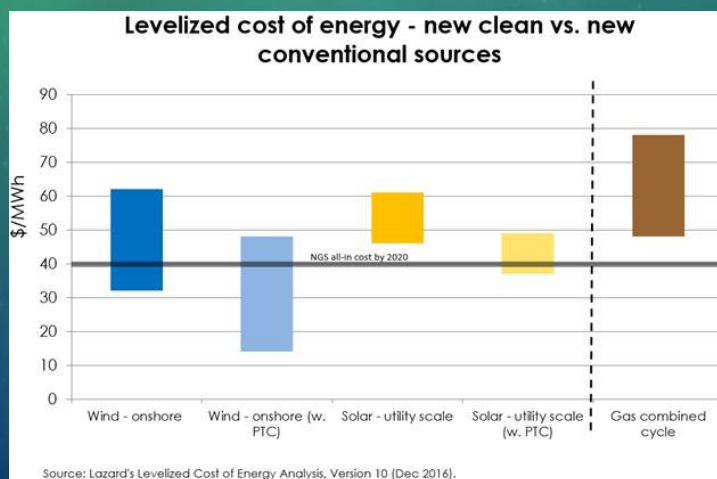
KEY CONSIDERATION:
Who bears natural
gas price increase
risk?

SIMPLE ECONOMICS

As prices drop
installations of wind and
solar increase

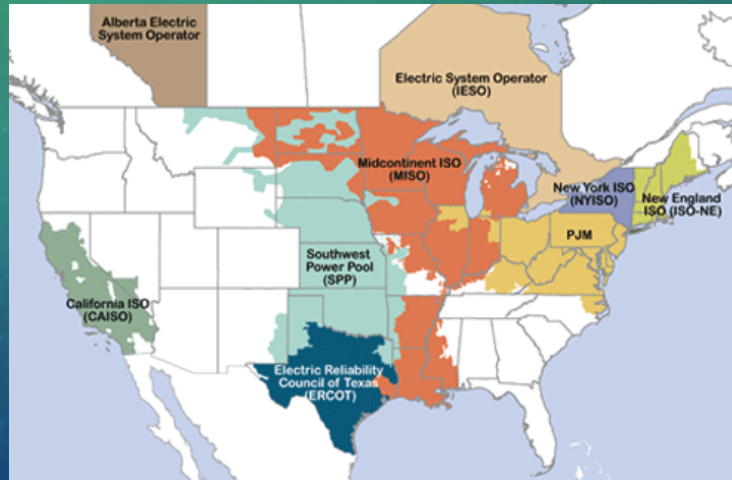


Natural gas is Cheap but Wind and Solar are Cheaper



ORGANIZED MARKETS ARE THE NORM

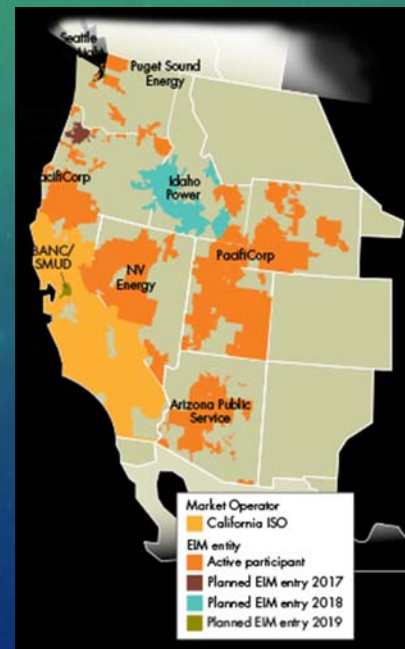
In most of the U.S. utilities efficiently share resources through Regional Transmission Organizations (RTO)



11

MARKETS ARE FORMING IN WEST

- The **Energy Imbalance Market (EIM)** is a 5-minute trading platform.
- Participation in a market is an indicator of **modernization**.
- Market participants can provide the most **energy options**.

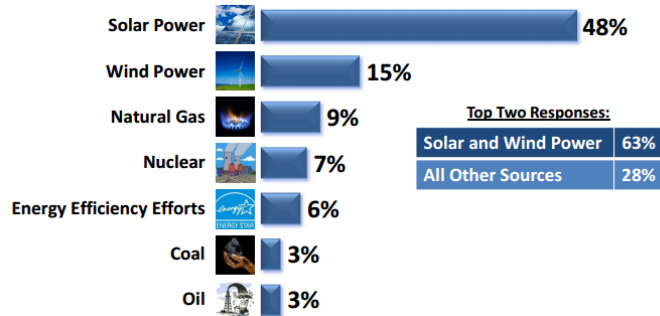


The public
overwhelmingly
supports clean
 energy
 development



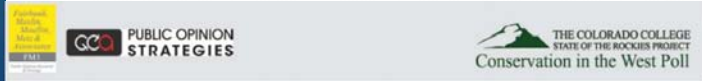
Solar and wind continue to be the energy sources Westerners most want to encourage in their state.

"Which one of the following sources of energy would you want to encourage the use of here in your state?"



Top Two Responses:

Solar and Wind Power	63%
All Other Sources	28%



13

<https://www.coloradocollege.edu/dotAsset/18dc097b-dce9-4003-8630-12796a054c8f.pdf>

CAWCD Customers Support Clean Energy

Tempe Sustainability at a Glance FY2013

RENEWABLE ENERGY & ENERGY EFFICIENCY
 (In Tempe city facilities)

20%

Percentage of municipal operations' energy from renewable energy sources by 2025, equivalent to 7.8 Megawatts.

City of Phoenix

Environmental Sustainability Goals

Becoming a Carbon Neutral City
 operating on 100% clean energy

BUILDINGS AND LAND USE
 REDUCE COMMUNITY CARBON EMISSIONS BY 80-90% WITH THE LONGER TERM 2060 GOAL OF BECOMING A CARBON-NEUTRAL CITY.

14

Leadership
in RE
development
is coming
from Private
Industry

89 RE100 companies have made a
commitment to go '100% renewable'
www.there100.org



CAWCD'S ENERGY CHOICE CAN:

- be visionary
- support customer goals
- influence energy future of state
- provide economic development in counties and Tribal Nations

Amanda Ormond
Amanda@westerngrid.net
www.westerngrid.net



Power Task Force Agenda Number 2.

Vita for Amanda Ormond

Amanda Ormond serves as the Managing Director for Western Grid Group, a non-governmental organization that works throughout the Western Interconnection to accelerate the adoption of cost-effective, low-carbon technologies and to improve the efficiency of the Western electric grid. Amanda has worked in energy and public policy for almost thirty years in Arizona and the West.

For the past 15 years she has managed the Ormond Group LLC, a consulting firm specializing in education and advocacy for clean energy. Amanda is a seasoned communicator who strives to identify and implement collaborative solutions to develop the West's vast renewable energy resources and the transmission to bring these resources to market. She has served as facilitator for utilities, environmental representatives, renewable energy developers, and government to identify appropriate siting of energy projects. Amanda is able to translate technical energy concepts to lay audiences. Current clients include Western Grid Group, Interwest Energy Alliance and Advanced Energy Economy.

Prior to consulting Amanda served as the Governor's appointed Director for the Arizona Energy Office, a division of the Arizona Department of Commerce. In her seven year as Director she was responsible for developing state policy legislation and promoting energy efficiency, renewable energy and alternative fueled vehicles throughout the state. She also served in other positions at the Energy Office.

Amanda serves on the board of directors of the Regulatory Assistance Project and Western Energy Futures Institutes and is the manager of the collaboration - Western Clean Energy Advocates.