APS Renewable Energy
Overall Commitment and Distributive Energy Program

DOE Tribal Energy Summit
December 20, 2011

Arvin Trujillo
4CPP-Government Relations
About Arizona Public Service Co. "APS"

- APS has the 5th Largest Service Territory in US & over 1M customers
- Arizona is one of the fastest growing states in the nation
- Energy demand will increase almost 50% in 20 yrs
- Our customer growth has been 3 times U.S. Average
- 5,039 miles of transmission lines in APS territory
Renewable Energy Standards in the U.S.

- **Minnesota (MN):** 25% by 2025 (Xcel: 30% by 2020)
- **VT:** RE meets load growth by 2012
- **Michigan (MI):** requirement varies by utility; 10% by 2015 goal
- **Iowa (IA):** 105 MW
- **Tennessee (TN):** RE meets load growth by 2020
- **Wisconsin (WI):** requirement varies by utility; 10% by 2015 goal
- **California (CA):** 20% by 2010
- **NV:** 20% by 2015
- **New Mexico (NM):** 20% by 2020 (IOUs), 10% by 2020 (co-ops)
- **Arizona (AZ):** 15% by 2025
- **Oregon (OR):** 25% by 2025 (large utilities); 5% - 10% by 2025 for smaller utilities
- **New York (NY):** 24% by 2013
- **New Jersey (NJ):** 22.5% by 2021
- **Pennsylvania (PA):** 18%¹ by 2020
- **Maryland (MD):** 9.5% in 2022
- **Virginia (VA):** 12% by 2022
- **Connecticut (CT):** 23% by 2020
- **District of Columbia (DC):** 11% by 2022
- **Maine (ME):** 30% by 2000; 10% by 2017 goal - new RE
- **Massachusetts (MA):** 4% by 2009 + 1% annual increase
- **Rhode Island (RI):** 16% by 2020
- **Rhode Island (RI):** 16% by 2020
- **New Hampshire (NH):** 23.8% in 2025
- **North Dakota (ND):** 15% by 2015
- **Delaware (DE):** 10% by 2019
- **Illinois (IL):** 8% by 2013
- **Virginia (VA):** 12% by 2022
- **Michigan (MI):** requirement varies by utility; 10% by 2015 goal
- **Missouri (MO):** 11% by 2020
- **Arizona (AZ):** 15% by 2025
- **Oregon (OR):** 25% by 2025 (large utilities); 5% - 10% by 2025 for smaller utilities
- **New York (NY):** 24% by 2013
- **New Jersey (NJ):** 22.5% by 2021
- **Pennsylvania (PA):** 18%¹ by 2020
- **Maryland (MD):** 9.5% in 2022
- **Virginia (VA):** 12% by 2022

- **Arizona RPS**
- **State RPS**
- **State Goal**
- **Solar water heating (SWH) eligible**
- **Arizona RPS**

- ☼ Minimum solar or customer-sited RE requirement
- * Increased credit for solar or customer-sited RE
- ¹PA: 8% Tier I / 10% Tier II (includes non-renewables); SWH is a Tier II resource
APS Commitment to Renewable Energy
Renewable Energy Today

APS’s renewable energy portfolio is expanding rapidly, growing from less than one megawatt in 2001 to 362 megawatts (MW) today. This is enough power to meet the needs of 91,000 customers.

Renewable Energy Incentive Program
To help customers with the cost of adding renewable energy systems to their homes or businesses, APS offers the Renewable Energy Incentive Program.

KEY FACTS
- Started in 2002 with photovoltaic solar electric systems and then added solar water heaters in 2003.
- Additional incentives were added in May 2008 for wind, biogas/biomass and geothermal.
- More than 17,500 APS customers have participated in the program since inception.
APS Energy Sources 2011 vs. 2025

2011 Energy Mix
- Nuclear: 9,224 GWh
- Natural Gas: 8,364 GWh
- Coal: 12,532 GWh
- Distributed Renewable Energy: 1,430 GWh
- Energy Efficiency: 226 GWh
- Utility-Scale Renewable Energy: 830 GWh

Total: 32,606 GWh

2025 Energy Mix
- Nuclear: 9,369 GWh
- Natural Gas: 11,138 GWh
- Coal: 12,314 GWh
- Distributed Renewable Energy: 5,982 GWh
- Energy Efficiency: 7,722 GWh
- Utility-Scale Renewable Energy: 1,682 GWh

Total: 48,207 GWh

APS Energy Growth Sources 2011 - 2025
- 33% Utility-Scale Renewable Energy
- 40% Energy Efficiency
- 17% Natural Gas
- 10% Distributed Energy
- 83% clean energy
Solar Segments

<table>
<thead>
<tr>
<th>Distributed Energy</th>
<th>Small Utility-Scale</th>
<th>Large Utility-Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>3kW – 10MW</td>
<td>1 – 20MW</td>
<td>&gt;50 MW</td>
</tr>
<tr>
<td>Customer Sited</td>
<td>Distribution Level</td>
<td>Central Station</td>
</tr>
</tbody>
</table>
Distributed Programs
Distributed Energy Incentive Program

• Technologies
  o Solar thermal
  o Solar photovoltaic
  o Biomass and Biogas
  o Geothermal – direct and indirect
  o Solar daylighting
  o Wind (small scale)
  o Non-residential pool heating
  o Solar cooling/HVAC
  o Combined heat and power (CHP)

• Residential and Non-Residential

• Production Based Incentives (PBIs)
  o Payment over time based on system output

• Up Front Incentives
  o Payment at installation based on system size
How Solar Is Used by Customers

Deer Valley High School, Glendale, AZ - 1 MW installation
ASU

ASU is committed to expanding solar installations across all four campuses to a total of 10 MW by the end of 2010, and 20 MW by 2020.

Source: http://www.asu.edu/fm/albums/energy/campus_solarization.htm
How Solar Is Used by Customers

Solar Daylighting

Solar Daylighting with PV
Distributed Energy Growth

- More than 17,000 customers have participated in APS programs
- Incentive have declined each year, but demand remains strong
Community Power Project - Flagstaff

A new approach for solar resources on customer roof-tops

- APS ownership of roof-top systems
- Provides insight on adoption, service, O&M and operations
- Build additional markets for customers

APS pilot project to evaluate operations with high PV penetration on a single distribution feeder

- Builds on findings from the APS 2009 R.W. Beck study on the cost and value of distributed energy resources
Status of Flagstaff Pilot

Customer Perspective

- Customer interest is high and implies relationship to overall satisfaction
- Works to minimize cost transfer among greater range of customers
- Increases opportunity for renewable energy adoption

Residential

- APS has received over 344 residential applicants from the approximately 2,400 customer pool
- 120 completed installs = 420kW
- 6 installs remaining - will be completed by EOY 2011

Commercial

- Cromer Elementary School in the Flagstaff Unified School District will host 400kW system
2012 Implementation Plan

- Compliance with annual and 2009 Settlement commitments
- 100 MW expansion of the AZ Sun program
- Expansion of APS ownership in the Schools and Government program and other future DE initiatives
- Residential and commercial incentive program adjustments
- Opportunities to simplify, streamline, and increase customer/industry awareness and knowledge of programs
The Utility Business is Changing

New Challenges:

- **New technologies** – on both sides of the meter
- **Emerging policies** – state and federal, mandates, incentives, environmental, etc.
- **Heightened economic concerns** – cost of energy and impact on jobs

Retain Focus

- Safety
- Reliability
- Cost
- Environmental impact
Contact

• If your tribe is interested in finding more about programs provided by APS, please contact:

Arvin S. Trujillo, Manager
Four Corners Power Plant – Government Relations
505-598-8205

arvin.trujillo@aps.com