Arizona Electric Utility Perspective on GHG Mitigation and the Role of CCS

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- About SRP
- Current SRP generation profile
- H.R. 2454 Climate legislation impact to SRP
- Opportunities to narrow the gap
  - Short term
  - Long term
- Challenges
About SRP

- One of the largest public power utilities in the nation
- Over 920,000 electric customers
- 13,000 square mile watershed
  - Largest water supplier in the Phoenix metro area
- 2009 Retail peak – 6,438 MW

Salt River Project Energy Mix

- Coal 55%
- Gas 13%
- Nuclear 16%
- Other 9%
- Sustainable 7%

32,000 Gigawatt-hours
### Generation Resource Needs

- **Existing Resources**
- **Remaining Resource Need**

#### Planned Additional Resources

**Energy Efficiency**
- Increasing existing programs
- Allow customers to manage use
- Initial target at 3-4% of retail sales and about 100 megawatts
- Adjust programs with more experience

**Renewables**
- Add about 520 megawatts (nameplate) of new wind, geothermal, solar, and distributed generation resources by 2018
- 160 megawatts of solar online in 2013

**Natural Gas**
- 900 megawatts power purchase by 2015
- New 820 megawatt plant by 2018
- Provides system support, flexibility, and firm resource to back intermittent sources

**Nuclear Baseload**
- Evaluate as a potential option after 2020

**Replacement Baseload**
- **Springerville 4 by end of 2009**
SRP Position on Cap and Trade

- Set realistic reduction targets and timetables
- Economy wide application of legislation
- Federal preemption of state and regional programs
- Multi-year compliance periods
- Recognize the challenges of high growth states

- Transition the economy through allocation of allowance value
- Cost containment measures
  - Reserve allowance price
  - Emission offsets
  - Banking and borrowing

Climate Legislation

- H.R. 2454 American Clean Energy and Security Act (ACES)
  - Renewable Electricity Standard (RES)
    - 20% of retail sales from renewable and EE by 2020
  - Cap-and-Trade Program
    - Declining cap
    - Early utility Allocation
  - Energy Efficiency Standard
    - Buildings, appliances and industry
Global Warming Provisions
ACES Cap-and-Trade Program

- Covers 85% of the overall economy, including electricity producers, oil refineries, natural gas suppliers, and energy-intensive industries like iron, steel, cement, and paper manufacturers.
- Emission cuts would start in 2012
- The goals for U.S. emission reductions, below 2005 levels:
  - 3 percent by 2012
  - 17 percent by 2020
  - 42 percent by 2030
  - more than 80 percent by 2050

ACES Cap-and-Trade Program

- Cap-and-Trade Program
  - Cap emissions from large sources
  - Portion of free allowances allocated until 2030
  - Cost Containment Provisions
    - Borrowing
    - Banking
    - Strategic Reserve
- Offset Program
  - Up to 2 Billions tons of offsets allowed annually
  - Domestic agriculture and forestry offsets regulated by Dept. of Ag
Potential SRP Allowance Gap
(w/o abatement options)
Compliance Options

- Reduce emissions
  - Fuel switching
  - Increased renewable energy supply
  - Increased energy efficiency
  - Nuclear
  - Carbon capture
- Purchase allowances
- Borrow allowances
- Purchase offsets

Potential GHG Emissions Reductions

- On-System
  - Environmental Dispatch*
  - Renewables*
  - Generation Efficiency
  - New Generation*/Fuel Switching
  - Biomass Co-Firing
  - Capture and disposal
- Off-System
  - Demand-side management
  - Market purchases*
  - Offsets (Terrestrial sequestration, clean projects)

* Options considered in SRP study
SRP’s Challenges

- Increasing regional energy demand
- Anticipated population growth in service area of Maricopa and Pinal Counties
- Energy use per household growing
  - Larger homes
  - More electrical appliances
- Resource mix dependent on fossil fuels

CO₂ Reductions … Technical Potential

- 41% reduction in 2030 from 2005 level is technically feasible using a full portfolio of technologies

*Achieving all targets is very aggressive, but potentially feasible.
SRP – A Long Commitment to R&D

- Quarter of a billion dollars in R&D support
- Support climate studies at three state universities
- Hosting a sequestration site in Arizona

- Smart grid demonstration project
- Testing CO₂ extraction at a plant in Wisconsin
- Target 90% removal rate
- 10% efficiency
- Carbon Capture

Stimulus Application to DOE

- Site Characterization of Promising Geologic Formations for CO₂ Storage
  - 80% federal cost share, $5 million project
  - Studying Black Mesa Basin for carbon capture
  - SRP Application for consortium: TEP, Peabody, Hopi Nation, Tri-State
  - SRP: $500,000
Resource Options and Timing

- Sustainable resources
- Natural gas resources
- Efficiency upgrades
- Fuel switching
- Short term resources
- Advanced coal
- Short and mid term resources
- Nuclear
- Advanced coal with carbon capture/storage
- Retrofit existing units with carbon capture/storage

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<thead>
<tr>
<th>Short Term</th>
<th>Medium Term</th>
<th>Long Term</th>
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<td>Present-2014</td>
<td>2015-2019</td>
<td>2020-beyond</td>
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Going Forward

- Climate change regulation will have a major impact on SRP, our customers and our state.
- SRP has already taken action and wants to find sustainable solutions to reducing greenhouse gas emissions.
- Guiding Principles:
  - Promote Clean & Efficient Energy
  - Portfolio Approach
  - Progress in Technology
  - Protect Consumers & Environment
  - Purposeful, Efficient Market Mechanisms
- Focus should be on reducing carbon with flexibility on how goal is achieved.