



# APS Renewable Energy Overview

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# Arizona Public Service

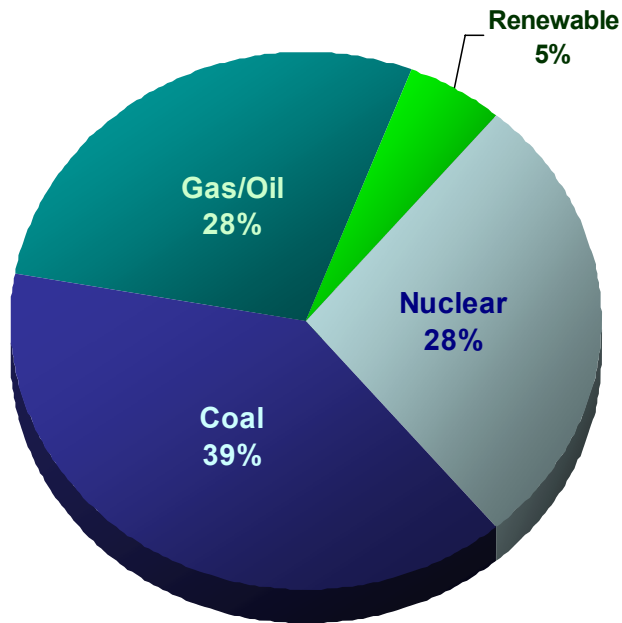
- Largest utility in Arizona
- Serves about ½ of Arizona's population
- 5<sup>th</sup> largest service territory in the US
- Peak demand over 7,000 MWs
- Owns and operates about 5,000 miles of transmission lines
- Energy demand will almost double in 20 yrs



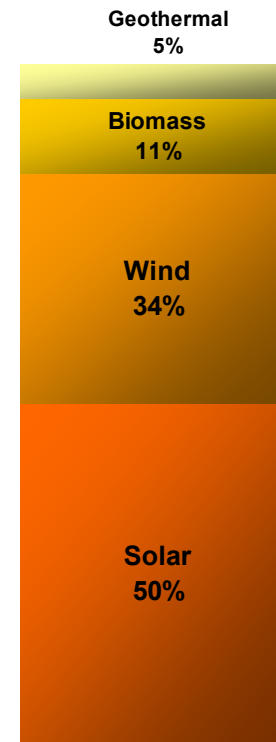
APS Retail Service Territory



# APS Generation Portfolio - 2012



2012 Generation Mix



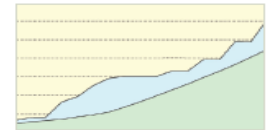
2012 Renewable Mix

# APS Resource Plan

## Renewables



- Rapidly accelerates adoption of renewables
- 1,650+ MW
- Doubles the RES by 2015
- 50% more energy than required by the RES through 2025

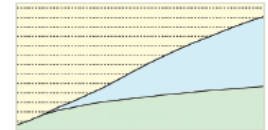


Exceeding the RES

## Energy Efficiency



- Seizes opportunity to partner with customers on energy future
- 587 MW of energy offset
- 3,100 GWHs
- Substantial increase in annual customer incentives

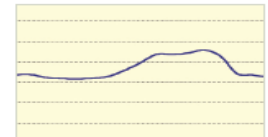


Increased Energy Efficiency

## Nuclear



- Carbon emission free baseload resource
- 800 MW of 2022-23 capacity
- 6,400 GWHs/year



Managing CO2 Emission

## Gas Combined Cycle Gas Combustion Turbine



- Limit natural gas consumption to within 10% of 2009 level
- Realigns resources more towards peaking role
- 3,500 MW (about 70% replacing expiring contracts)
- Wholesale market or demand response opportunities



Replacing Expiring Contract Capacity

# APS Renewable Generation

## Current Portfolio

Current Capacity Contracted -> 500 megawatts (MW) – enough for over 125,000 homes

### Projects Online

1. Aragonne Mesa
2. Salton Sea
3. Prescott Airport
4. STAR Center  
(and other AZ sites)
5. Saguaro
6. 27th Ave Landfill
7. Snowflake White Mt.
8. Solana
9. High Lonesome
10. City of Glendale Landfill

### Capacity

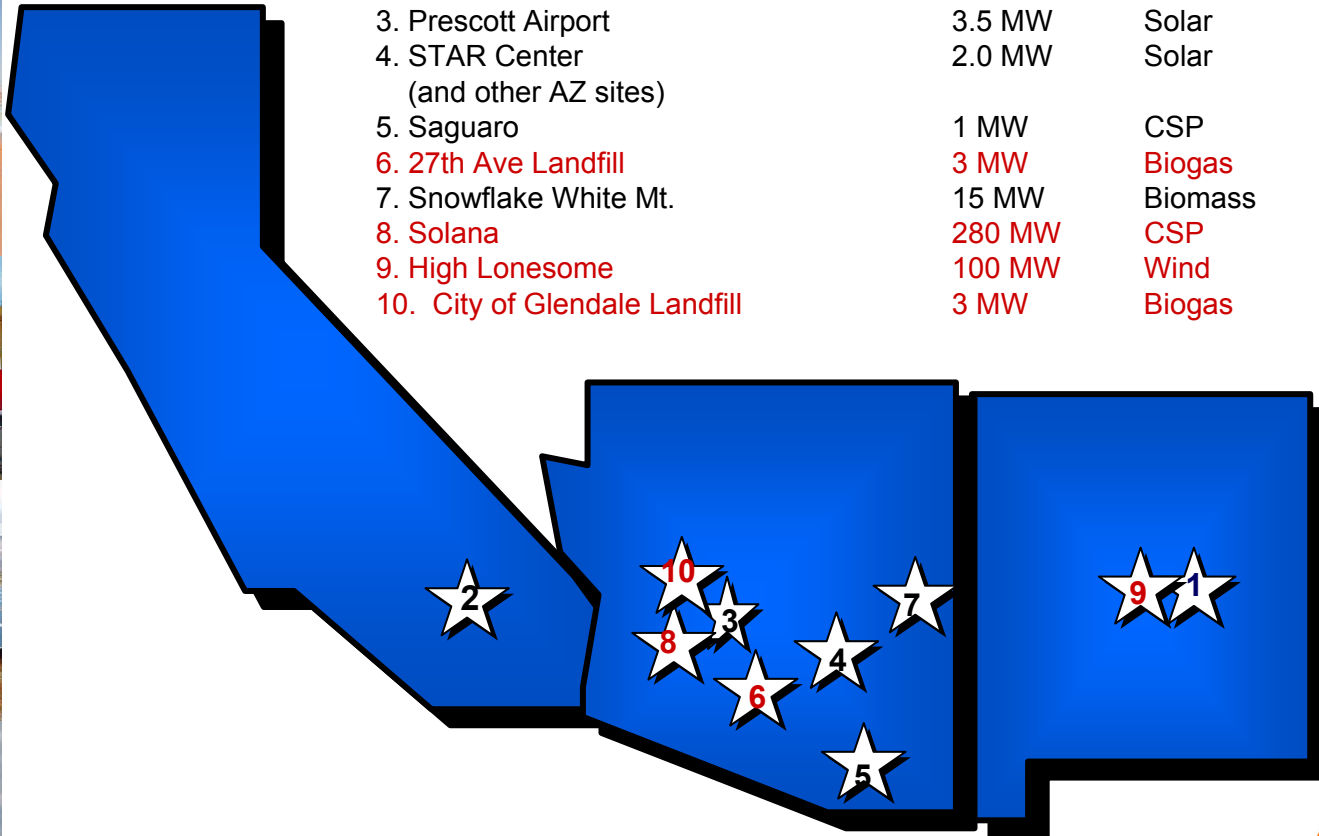
- 90 MW  
10 MW  
3.5 MW  
2.0 MW  
1 MW  
3 MW  
15 MW  
280 MW  
100 MW  
3 MW

### Type

- Wind  
Geothrml  
Solar  
Solar  
CSP  
Biogas  
Biomass  
CSP  
Wind  
Biogas

### Status

- In operation  
In operation  
In operation  
In operation  
In operation  
Under development  
In operation  
Under development  
In construction  
Under development





# APS Renewable Generation

## ■ Aragonne Mesa

- 90 MW wind
- Began operation Dec 2006
- Long term contract
- 40 miles SW of Santa Rosa, NM



## ■ High Lonesome

- 100 MW wind
- Begins operation mid-2009
- Long term contract
- 55 miles SE of Albuquerque, NM

# APS Renewable Generation

- Snowflake White Mountain Power

- 24 MW biomass near Snowflake, AZ
- Began operation April 2008
- Long term contract



- CE Turbo

- 10 MW geothermal in Salton Sea, CA
- Began delivery January 2006
- Long term contract





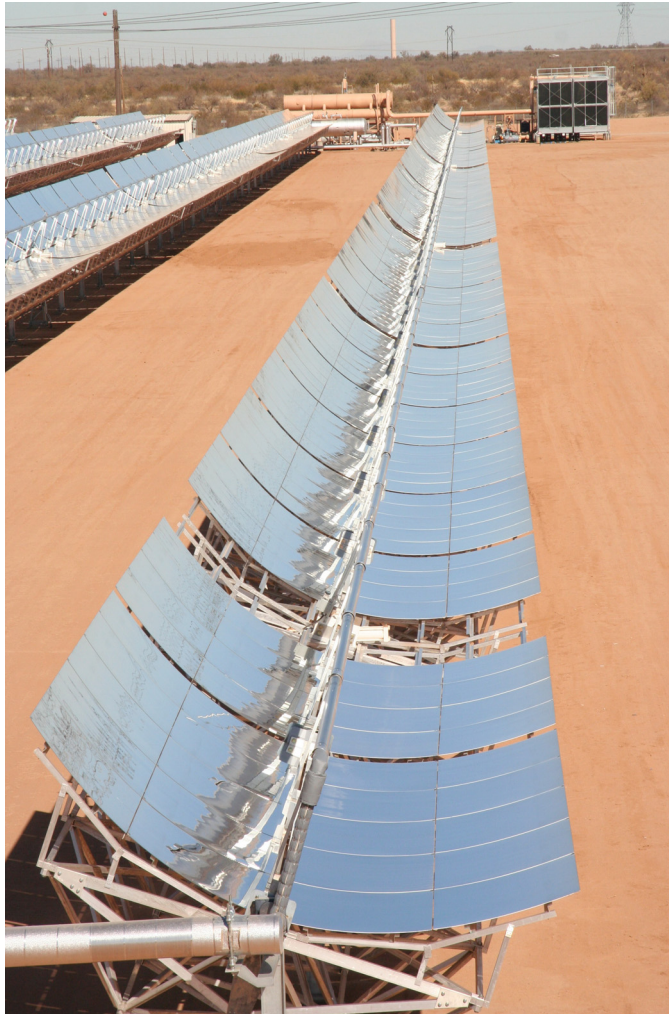
# APS Renewable Generation



- Prescott Airport PV
  - 3.5 MW Photovoltaic solar plant
  - Began operation 2002 with final installation in 2006
  - APS owned & operated



# APS Renewable Generation

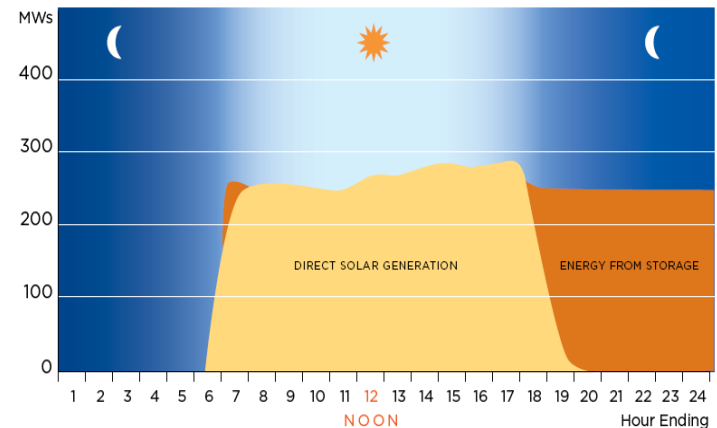
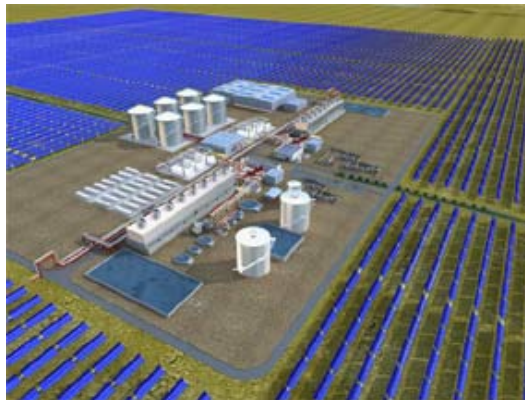


- Saguaro Concentrating Solar Power Plant
  - 1 MW
  - Completed in 2005
  - APS owned & operated

# SOLANA CSP PLANT

## Project Facts

- Concentrating Solar Power (CSP)
- Thermal energy storage ensures solar production at peak demand
- 2,700 parabolic trough collectors covering 3 square miles
- 280 megawatts - enough for 70,000 homes
- Abengoa Solar will own and operate
- Largest solar plant in the world if operating today





# Solar Power

Light  
Photovoltaics

HEAT  
Solar Thermal





# What can you do to “GO GREEN”?

## DISTRIBUTED ENERGY PROGRAM

- Robust, Well-Funded Incentive Program
  - Multiple solar and non-solar technologies
  - More than \$55 million available for 2009
  - Regulatory requirement of 4.5% of retail sales by 2010
- Strong Customer Commitment
  - Over 8.7 MW installed to date
  - Additional major systems in progress
- Exploring Innovative Approaches
  - 2008 DE RFP targeting 200,000 MWh energy
  - Distributed Energy Value Study



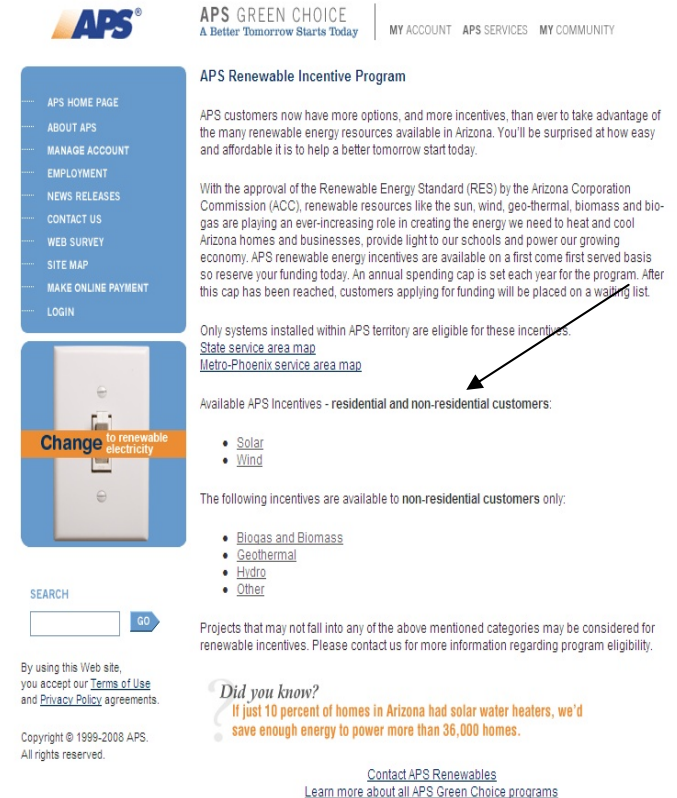
# Renewable Energy Incentive Program

## – Residential Technologies:

- Photovoltaic Systems
- Solar Water Heating
- Solar Space Heating
- Wind
- Geothermal

## – Non-Residential Technologies:

- Solar
- Wind
- Biogas/Biomass
- Geothermal
- Hydro
- Other



**APS**  
APS GREEN CHOICE  
A Better Tomorrow Starts Today

MY ACCOUNT APS SERVICES MY COMMUNITY

### APS Renewable Incentive Program

APS customers now have more options, and more incentives, than ever to take advantage of the many renewable energy resources available in Arizona. You'll be surprised at how easy and affordable it is to help a better tomorrow start today.

With the approval of the Renewable Energy Standard (RES) by the Arizona Corporation Commission (ACC), renewable resources like the sun, wind, geo-thermal, biomass and bio-gas are playing an ever-increasing role in creating the energy we need to heat and cool Arizona homes and businesses, provide light to our schools and power our growing economy. APS renewable energy incentives are available on a first come first served basis so reserve your funding today. An annual spending cap is set each year for the program. After this cap has been reached, customers applying for funding will be placed on a waiting list.

Only systems installed within APS territory are eligible for these incentives.  
[State service area map](#)  
[Metro-Phoenix service area map](#)

Available APS Incentives - residential and non-residential customers:

- Solar
- Wind

The following incentives are available to non-residential customers only:

- Biogas and Biomass
- Geothermal
- Hydro
- Other

Projects that may not fall into any of the above mentioned categories may be considered for renewable incentives. Please contact us for more information regarding program eligibility.

*Did you know?*  
It just 10 percent of homes in Arizona had solar water heaters, we'd save enough energy to power more than 36,000 homes.

[Contact APS Renewables](#)  
[Learn more about all APS Green Choice programs](#)

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# Renewable Energy Incentive Program

## – Up-Front Incentive (UFI):

- A one-time incentive paid to a customer upon successful completion of all program requirements.
- In exchange for this incentive, APS will receive title and ownership to all the Renewable Energy Credits (RECs) attributed to the operation of the customer's system for the next 20 years.



# Project Funding

## – PV Example

- 6 kW<sub>DC</sub> System
  - Project Cost \$45,000
  - Federal Incentive – 30% (\$15,000)\*
  - State Incentive – 25% (\$ 1,000)\*
  - APS Incentive – (\$3/w x 6,000) (\$18,000)
- Net Cost \$11,000

\*Consult your Tax Professional for Clarification and Interpretation

6kW System will produce approximately 9,600 kWhs/year

Average Cost per kWh ~ \$0.10/kWh

Annual Energy Offset = 9,600 kWhs x \$0.10/kWhs = \$960

Simple Payback ~ 11.5 years

# A BRIGHT FUTURE!

*“I’d put my money on the sun, and solar energy. What a source of power! I hope we don’t have to wait until oil and coal run out before we tackle that.”* - Thomas Edison



# Questions



a better tomorrow  
starts today

a better tomorrow  
starts today



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A better tomorrow starts today.



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