

Eco-Efficiency

Eco-efficiency is a management philosophy that aims at minimizing ecological damage while maximizing efficiency of the firm's production processes. While eco-efficiency at PNW takes many forms in our sustainability efforts, for the purpose of this report we are focusing on four primary areas that have some of the greatest potential in providing a cost effective energy future to our customers while continuing to reduce the environmental impacts and resource utilization associated with our product. These are forward looking, innovative approaches that look for new solutions or approaches to continually improve our sustainability effort. Key areas in which we accomplish that include:

Renewable Energy

Renewable energy will be an increasingly important part of our overall energy mix into the future. It can provide a carbon-free source of energy, while at the same time diversifying our fuel mix and reducing exposure to price volatility and other concerns associated with fossil fuels.

Technology Innovation

The use of innovative new products and technologies will play a critical role in providing a sustainable energy future, providing new ways to deliver our product in a cost effective manner, improve customer service and system reliability and reduce negative impacts to our environment.

Demand Side Management / Energy Efficiency

Demand Side Management/energy efficiency is also a critical component of our overall program to achieve a sustainable energy future. We are helping our customers to understand how they can more effectively use energy, and providing resources and incentives for them to accomplish that goal. By reducing the overall usage of electricity, we are preventing the emissions and use of resources needed to generate that electricity.

Supply Chain Management

Effective management of the materials and services provided by our suppliers is a critical aspect of sustainability. This includes extending the focus upstream towards the suppliers and manufacturers, as well as downstream towards our customers and our recycling and reuse efforts. By considering the environmental, social and economical facets of our supply chain, our company can help improve the environmental and social aspects of our communities, as well as achieving cost reductions and service improvements to our customers. Our supply chain sustainability management is discussed primarily in the Supplier and Material & Chemical Management sections of this report.

APS announces new solar power plant, among world's largest

With Arizona sunshine in abundance, APS plans to continue its leadership role in the area of solar generation. The company recently announced plans for one of the world's largest solar facilities — Solana, a 280-megawatt (MW) concentrating solar power (CSP) plant to be built 70 miles southwest of Phoenix, near Gila Bend, Ariz.

RENEWABLE ENERGY STANDARD (RES)

In 2006, the ACC gave approval to the RES, which requires regulated utilities, including APS, to generate 15 percent of their energy from renewable sources – solar, wind, biomass, biogas and geothermal – by 2025. The RES sets the minimum baseline for our future renewable energy resources. In August of 2007, APS submitted to the ACC a strategy for meeting the first five years of the RES.

Under the RES, in 2007 APS is required to have 5 percent of retail energy sold to come from renewable sources by 2015 and further increasing by 1 percent each year until 2025, when it reaches 15 percent. APS renewable energy results in 2007 were communicated to the ACC in a Renewable Energy Programs Compliance Report. There is no specific obligation to fulfill any portion of that 15 percent with a particular renewable resource. The standard does require that nearly one-third of the total renewable portfolio consist of distributed energy. Distributed energy includes customer-owned, customer-generated electricity, such as solar photovoltaic (PV) rooftop systems. The distributed generation requirement begins

at 5 percent in 2007, increasing 5 percent each year until it reaches 30 percent in 2012. In addition to this requirement, one-half of the distributed generation must come from residential applications, the other half from non-residential projects.

If all goes as planned, by 2025, around 4.5 percent (30 percent of 15 percent) of APS' total energy sales will be generated by customers. Since it's not practical to put up a windmill or start a biogas plant in most backyards, a large proportion of the residential distributed generation requirement likely will be met with solar projects. One measure of the popularity of APS' distributed renewable incentive program, primarily roof-top solar installations, is the number of incentive payments that have been processed. Through the end of 2007, APS has provided over \$12 million dollars to almost 1,600 APS customers.

Renewable Energy Programs

Renewable energy is a critical component of our future energy mix. Renewable energy will lower carbon emissions, diversify our generation mix, reduce dependence on fossil fuels and can help create economic opportunities in for Arizona

For all of 2007, APS purchased or generated 324,094 MWh of renewable energy, or approximately 1.1 percent of total retail sales. This total includes renewable generation APS has under contract, APS-owned solar generation, as well as the energy generated by Solar Partners Incentive Program ("SPIP") participants. It also represents a nearly three-fold increase in renewable energy on the APS system over 2006.

While we are exploring a wide range of renewable sources, including biomass and geothermal, the majority of our future renewable energy will likely come from solar, which is the most available natural resources for renewable energy in Arizona. APS has long been a leader in solar energy development and implementation. Our Star Center is one of the leading solar energy research facilities in the world.

Current Renewable Energy Projects			
Project	Fuel Source	Capacity (MW)	Status
CE Turbo	Geothermal	10	In operation
Snowflake White Mountain Power	Biomass (Wood)	14	Under construction
Various Solar Plants	Solar	>3	In operation
Prescott Airport	Solar	3.5	In operation
Saguaro Trough Plant	Solar	1	In operation
Solana	Solar	280	Under development
27th Ave Landfill	Biogas	3	Under development
Aragonne	Wind	90	Under construction

APS Renewable Energy Programs

APS' commitment to renewable energy is divided into three initiatives:

- Procurement and Generation: producing and purchasing renewable energy for our customers
- Consumer Programs: facilitating customers use of and support for renewable energy generation, including photovoltaic grid-tied and remote solar (off-grid) systems and small solar hot water systems
- Technology Development: developing new, more-efficient ways of producing renewable energy. This is discussed further in the Technology Section of this report

a better tomorrow starts today



If just 10% of homes in Arizona had solar water heaters, it would reduce green house gas emissions equal to taking 57,000 cars off the road.

Green Rates and Solar Partners Incentive Program

APS offers its customers the opportunity to voluntarily participate in our Green Choice Program. As a Green Choice member, you choose how much of the energy you use is produced from renewable resources. A small premium is added to the normal monthly charges. This is a convenient, affordable way to help preserve the environment while providing for a secure energy source for our future. The Green Choice Program offers customers two different green rates:

- The Green Choice Block option (GPS-1) is designed to offer the opportunity to purchase a fixed amount of monthly usage from renewable resources. Each kWh (kilowatt hour), available in 100 kWh blocks, is priced at a premium of \$0.01 plus tax, in addition to the normal monthly charges. The customer chooses how many blocks he or she wishes to purchase.
- The Green Choice Percentage option (GPS-2) is designed to give the customer the option to choose what percentage of actual monthly usage is provided by renewable resources. Each kWh purchased is priced at a premium of \$0.01 plus tax, in addition to the normal monthly charges. They can choose 10 percent (non-residential only), 35 percent, 50 percent or 100 percent of your monthly usage.

a better tomorrow starts today



If just 8,000 Arizona homes installed more energy-efficient AC, we could save enough energy to light every home in Yuma for a year.

APS also offers financial incentives to residential and commercial customers who install qualified solar systems through our Solar Partners[®] Incentive Program. Participation in the Solar Partners Incentive Program continued to increase in 2007. During 2007, APS paid over \$5 million in incentives to customers on a total of 529 installations. Of those installations, 277 were photovoltaic and 252 were solar water heating. APS is expecting approval of its RES Implementation Plan in the first half of 2008 and therefore expects to see a continued increase in Program participation with increased marketing funds and several new technologies becoming eligible for incentives.

APS' efforts to develop and promote the use of renewable energy were recognized in 2007 by some of the most respected media in the United States:

- The APS Saguaro solar trough was featured on ABC News' live 20/20 program, Planet Earth 2007: Seven Ways to Help Save the World, a live ABC News program that aired in April.
- The Saguaro solar trough also was featured in a special green section produced by The New York Times in March.
- The company's Emissions-to-Biofuels project at the Redhawk Power Plant was featured in an October 2007 National Geographic cover story about how plants are being developed into fuel.

Solar

For more than 25 years APS has been a national leader in solar research and development, and in the practical use of solar as an energy source for utility power

APS now has more than 6.55 megawatts (MW) of installed solar capacity statewide providing energy to APS customers. APS' distributed generation capacity currently comes from our solar energy facilities installed at customer locations. Below are some of the solar power plants that APS currently has in operation.

- Flagstaff: The Flagstaff solar power plant inaugurated the APS Solar Partner[®] Program. The Flagstaff plant is housed within the APS service yard and produces 82 kilowatts of solar energy. Built in 1997, the plant employs the use of single axis tracking technology to maximize the sun's energy.
- Glendale: The City hosts APS' first municipal application of high-concentration photovoltaic arrays at the Glendale Municipal Airport. This technology tracks the sun's movement and employs special lenses to concentrate the sun's rays 250 times onto each solar cell.
- Gilbert: The 125-kW plant is adjacent to the Town's original ground water recharge site. The one-acre site consists of 10 solar arrays, which will track the sun from east to west on a single axis. Each solar

array (or series of panels) is about 150-feet long and eight-feet wide and sits relatively low to the ground.

- Prescott: APS and Embry Riddle Aeronautical University joined to construct a 190-kilo-watt (kW) plant, which feeds solar power to the electric grid. The plant uses a single axis tracking system that allows the photovoltaic arrays to track the sun through the sky. The plant was dedicated in April 2001.
- Prescott Airport Solar Plant: APS and the City of Prescott teamed to build a plant near the Prescott Airport which currently produces 3.5 MW of solar energy, our largest solar facility to date.
- Scottsdale: In 1999, the City of Scottsdale formed a unique alliance with APS in an effort to meet the need for covered parking at commercial buildings with a practical way of generating clean energy. An 8,500-square-foot parking structure covered with photovoltaic panels began generating 34 kW of solar energy at a City of Scottsdale service yard.
- Scottsdale Water Campus: APS and Scottsdale officials joined to build a single-axis tracking, photovoltaic plant atop of the City's domestic water tanks which produces 230 kW of solar energy.
- STMicro Rooftop Solar System: This system was the first solar application in Arizona installed for commercial grid-connected customers.
- Tempe: Located on the grounds of the APS Solar Test and Research Center (APS STAR Center®) in Tempe, this solar plant generates 480 kW of solar energy for use by all APS customers.
- Yuma: APS built a new solar power plant near Yuma, which will generate 100 kW of energy. The plant is located at the Yucca Power Plant and will generate enough energy to serve about 31 homes.
- Phoenix: The Arizona Department of Environmental Quality (ADEQ) hosts a 127-kW flat panel solar plant built atop the facility's parking canopy. The facility is a partnership between ADEQ and APS that makes the facility one of the most energy efficient of all City facilities.

In 2006, the APS Saguaro Solar Power Plant was named Energy Project of the Year by the Association of Energy Engineers (AEE). This honor came on the heels of the facility being named one of the top 12 power plants in the world by Power Magazine. Located near Red Rock, Arizona, the one-megawatt plant is the first solar trough generator in the state and the first solar trough built in the United States in almost 20 years. Unlike a photovoltaic solar plant, which uses sunlight to produce electricity, a solar trough uses heat from the sun to create electricity. The sun heats oil, which is then used to drive a turbine/generator. This technology can easily be combined with a storage facility, allowing it to hold energy, and to provide electricity when needed, not just when the sun is shining. The APS Saguaro Solar Power Plant also is the first to combine solar trough technology with an Organic Rankine Cycle Power Block, typically used in geothermal and biomass applications. The block allows the plant to produce more power at lower temperatures.

In addition, as described in other sections of this report, APS has announced plans for a new 280 MW solar power plant, Solana, to be build near Gila Bend, Arizona.

Customer Solar Programs

APS Solar Partners Rate Program

Under it's Solar Partners Rate Program, APS customers are invited to purchase 15 kilowatt-hour blocks of energy generated by the solar power plants. The cost to customers is a \$2.64 per month premium. Solar Partners offers residential and business customers an affordable way to take advantage of the state's most abundant source of renewable energy, the sun, while helping APS develop a secure energy source for our future. At year's end, APS had more than 3,800 Solar Partners.



APS Solar Partner Incentive Program

This program offers financial incentives to customers (residential and commercial) who install qualified solar systems. Each year APS sets aside a certain amount of money to fund the Solar Partner Incentive Program. In 2007, the company set aside \$10 million dollars.

For the period from 2002 through 2007, 546 customers have installed a cumulative total of 3.1 MW of grid-tied PV systems, and 379 customers have installed a cumulative total of 0.6 MW of off-grid PV systems. In addition, since 2003, APS has purchased renewable energy credits from customers who have installed solar water heating systems. Since the program started, 645 solar water heating systems have been installed offsetting an estimated equivalent of 1.6 million kWh of conventional generation.

Wind

Recently APS signed a long-term contract with a Santa Rosa, New Mexico company to bring 90 megawatts (MW) of wind energy to the Valley of the Sun.

The 90-megawatt (MW) Aragon Mesa Wind Farm will serve about 22,500 APS customers. Aragonne Wind, LLC, a wholly-owned subsidiary of Babcock & Brown Operating Partners LLC owns and operates the facility. APS has a long-term agreement to purchase all the power from the farm. It increased APS' renewable energy portfolio from 16 MW (10 MW geothermal, 6 MW solar) to 106 MW — a 563 percent increase

TECHNOLOGY INNOVATION

Innovative new technologies are essential to a sustainable energy future. These technologies are required to cost effectively increase the efficiencies of electric system infrastructure, reduce carbon emissions, increase reliability and respond to future emerging issues. APS has been actively involved in technology research and innovation for many years and has helped develop and implement many new technologies. From our leading edge solar research, to the use of algae to reduce carbon emissions, to the use of smart meters or hydrogen vehicles, we are continually evaluating technology innovation to help create our sustainable energy future. We are also active participants in industry research activities through organizations such as the Electric Power Research Institute and the Edison Electric Institute.

Below are several examples of new technologies we are researching and implementing in our operation. Our research programs are heavily focused on our Key Issues, including climate change, renewable energy, system reliability and improved energy delivery systems. Please visit our online report for more information about each of these programs:

Solar Energy

APS has been involved in solar energy research since the 1980s and is a leader in the research and development of utility scale solar energy generation

APS Emissions to BioFuel Project

APS is conducting an exciting demonstration project in conjunction with GreenFuel Technology that uses carbon dioxide from power plant emissions to grow algae which is then used to produce biofuels. This addresses two important issues in the U.S. today; reducing greenhouse gases from power plants and producing more domestic sources of alternative fuels for cars and power plants. This project started at our Redhawk natural gas power plant, and in 2007 was expanded to our Four Corners coal fired power plant.

APS Coal to Substitute Natural Gas Project

APS is working with the U.S. Department of Energy (DOE) to develop a process to manufacture substitute natural gas (SNG) via a carbon hydro-gasification process. This is a multi-phase project in which the hydro-gasification process will be modeled and ultimately demonstrated. The source of carbon for the process can be coal or a bio-source such as the algae described in the Emissions to Biofuels Project section.

APS Hydrogen Park

Hydrogen has great promise as a sustainable future fuel, and APS is actively exploring energy opportunities associated with hydrogen. An exciting example of this is the APS Hydrogen Park, which uses solar panels to convert water to hydrogen, which is stored for fuel use.

The APS Hydrogen Park was the first commercial hydrogen motor vehicle refueling station in Arizona. The park was permitted to fuel hydrogen motor vehicles in March, 2002. Located in the downtown Phoenix historic district, the park provides an example of modern fueling infrastructure integrated with urban architecture. Hydrogen, CNG (compressed natural gas), CHyNG (blends of hydrogen and CNG), and "fast charge" BEV (battery electric vehicle) motor vehicle fueling are all available at the Hydrogen Park fuel dispensers.

West Coast Regional Carbon Sequestration Partnership (WESTCARB)

APS is working with Salt River Project and Tucson Electric Power as part of WESTCARB, a research project evaluating whether storing carbon dioxide underground may be a viable option for reducing greenhouse gas emissions into the atmosphere.

This project will take place on APS land near the Cholla Power Plant in Joseph City, Arizona. The site was selected by geologists because of its deep, impervious geologic formations containing salty water that is unsuitable for drinking or irrigation. Commercial CO₂ will be transported by trucks to the site and pumped about three-fourths of a mile into the underground formation, where it will be stored and monitored with sensitive instruments.

Smart Meters

The use of "smart meters" and advanced metering technology holds the potential of providing our customers with a quantum leap in service in the future.

APS Pyrolysis Project

APS is sponsoring a pyrolysis demonstration project to research the potential for a biodiesel fuel source, a renewable fuel for power plant co-firing and for carbon sequestration with the char (bio-mass waste materials) used as a fertilizer supplement.

ECObus Hydrogen-Powered Bus

Arizona's first hydrogen-powered bus. ECotality, Inc. has teamed up with APS to bring the ECObus to Arizona to educate the public on the use of renewable energies

DEMAND SIDE MANAGEMENT

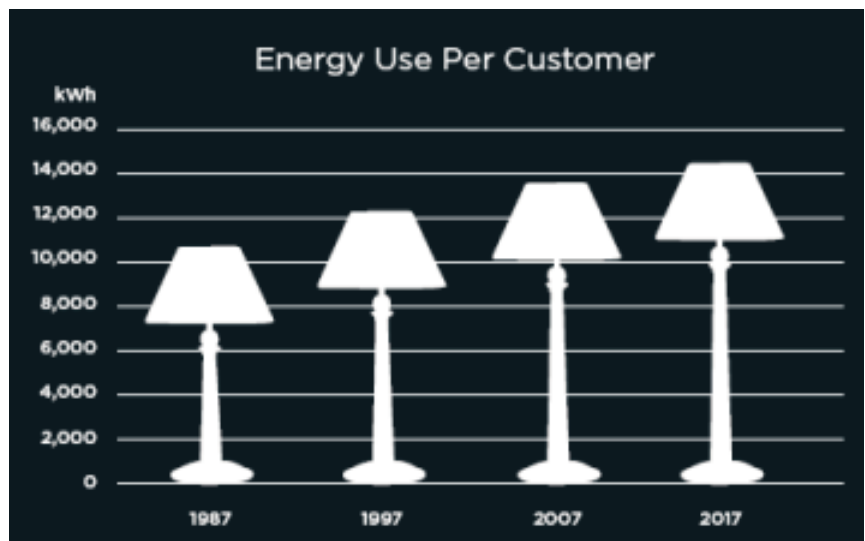
Helping our customers use electricity more efficiently is a critical component of our company's sustainability effort. Not only are our numbers of customers growing, but the energy use per customer continues to grow.

By taking steps to conserve power, customers can reduce their costs and also provide significant benefits to the environment. Adopting energy efficient practices has many benefits for consumers as well as the environment. Conserving energy means less power needs to be generated, which results in fewer emissions impacting the environment and fewer resources being consumed.

DSM and energy efficiency programs are also an important resource for APS. Reducing demand will result in the amount of electricity that may have to be purchased (particularly expensive peak energy) and may even result in fewer new power plants needing to be built in the future. The APS DSM Program is managed by the Customer Information & Programs Department. This Department works closely with the Resource Analysis Department to integrate DSM into the Resource Alternatives Report. This includes evaluating the effectiveness of future DSM programs on APS costs and energy generation, and incorporating anticipated DSM future demand reduction into the APS Resource Alternatives Report. The APS Resource Alternatives Report shows the projected impact of our currently projected DSM programs on future resource planning.

APS was named EPA/DOE 2007 Energy Star Partner of the year from the U.S. Environmental Protection Agency for the APS Energy Star Residential Lighting Program. "Partners like APS have had an outstanding

year in helping consumers help themselves," said Bill Wehurm, acting assistant administrator for the EPA Office of Air and Radiation. "In addition to leading the way in promoting products that earn the ENERGY STAR, APS also works to educate consumers about the importance of energy efficiency. These efforts are a win for consumers and for the environment." The program also received the 2007 American Council for an Energy-Efficient Economy's "Exemplary Program" award and has been recognized by E-Source as a "best practice" program. As part of this program, in 2007, more than 2.6 million energy efficient light bulbs were sold as a result of the APS Compact Fluorescent Lighting (CFL) Program.



APS' Demand Side Management (DSM) energy conservation program was approved by the Arizona Corporation Commission (ACC), and APS works closely with the ACC in developing future goals and funding levels for our DSM efforts. The DSM programs provide information, tools and incentives for our customers to reduce energy use. APS spends more than \$18 million dollars per year in its DSM programs, and plans to increase spending on these programs to \$25 million per year. The company will request an approval from the ACC to increased spending levels and for specific new programs. APS files a semi-annual progress report with the ACC on our DSM efforts. The 2007 report can be viewed [here](#).

The approved programs are designed to influence energy decisions by residential and non-residential customers and other market players through a combination of rebates and incentives, technical assistance and training, and consumer education.

By the end of 2007, APS' DSM programs have resulted in:

2,300 Lifetime GWh of electricity saved

\$18 million annual savings on customer bills

Elimination of 154 lbs. of CO2 per \$ invested in DSM programs

The current programs include:

Residential Programs

- Residential New Construction
- Residential Existing Homes AC Efficiency
- Residential Consumer Products
- Residential "Energy Wise" Low Income Weatherization Program

Non-Residential Programs

- Schools
- Non-Residential Existing Facilities
- Non-Residential New Construction and Major Renovation
- Small Non-Residential Program
- Building Operator Training
- Energy Information Services

As seen in the following table, the anticipated environmental benefits, including CO2 reductions, from the 2005-2007 DSM programs are significant.

The environmental reductions are based on the kWh savings of all program measures over their expected lifetimes.

More information on our DSM programs can be found at www.aps.com.

**DSM Estimated Environmental Benefits
2005 - 2007 Programs**

	Water Mil Gal	SOx Lbs	NOx Lbs	CO2 Mil Lbs	PM10 Lbs
Residential					
Consumer Products	769.3	2,146	85,854	457.7	11,830
Existing Home HVAC	31.1	574	22,958	122.4	3,163
New Construction	100.7	1,858	74,340	396.3	10,243
Low Income	11.8	217	8,687	46.3	1,197
Totals for Residential	912.9	4,795	191,839	1,022.70	26,433
Non-Residential					
Existing Facilities Large	179.7	3,161	126,432	674.1	17,421
Small Non-Residential	132.4	2,320	92,785	494.7	12,785
New Construction	179.7	3,161	126,432	674.1	17,421
Building Operator Training	17.2	317	12,677	67.6	1,747
Energy Information System	9.5	174	6,977	37.2	961
Schools	36.4	697	27,876	148.6	3,841
Totals for Non-Residential	554.9	9,830	393,179	2,096.30	54,176
Total	1,467.80	14,625	585,018	3,119.00	80,609

The environmental reductions are based on the kWh savings of all program measures over their expected lifetimes