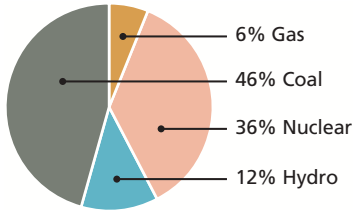


Arizona Renewable Energy Resources

Existing Generation Mix



Data source: Energy Information Administration 1999

Renewable Energy Policies

SBC **System Benefits Charge**
Arizona Public Service (APS) and Tucson Electric Power (TEP) each have an SBC used to partially meet requirements under the RPS and fund other public interest programs.

RPS **Renewable Portfolio Standard**
0.2% at start (2001), 1.1% by 2007. Solar to meet 50% initially, 60% by 2004.

NM **Net Metering**
Maximum capacity set by utilities: TEP – 100 kW, APS – 10 kW. APS' program is "net billing," requiring the use of dual meters.

GP **Green Power Programs**

ST **Personal/Corporate Tax Incentives**

SS **Sales Tax Exemption**

\$ **Rebate, Grant or Loan Program**

Data source: Database of State Incentives for Renewable Energy (www.dsireusa.org)

Annual Electricity Consumption (1999)

58 million MWh

Arizona is often called the "solar capital" of the US. Despite the state's tremendous solar and other renewable resources, Arizona lags behind the rest of the region with only 9 MW of installed renewable energy facilities. However, thanks to the passage of a renewable portfolio standard designed to boost the development of renewables, especially solar, across the state, a number of new large-scale solar projects are now under construction. The RPS requires utilities to obtain nearly 1% of their power from renewables, half of which must be from solar.

Renewable Energy Installed Renewable Capacity¹

Resource Type	Installed Capacity
Wind	.04 MW
Solar (PV)	4 MW
Solar (Thermal)	.08 MW
Geothermal	0 MW
Biomass	5.3 MW
Total	9.4 MW

¹Source: REIS database, plus known installations

NativeSUN – Solar Power on Indian Lands



Photovoltaic System on the Hopi Reservation

Photo: NativeSUN

In 1985, the Hopi Foundation began a new solar electric enterprise called NativeSUN. This project was one of several designed to help the Hopi become a self-sufficient community. According to Doran Dalton, the chair of the Hopi Foundation, NativeSUN's mission is not only to provide needed

electrical services and bring training and economic development opportunities to Native Americans in the Southwest, but also to accomplish this with technologies and approaches that are consistent with tribal cultural, traditional and religious norms.

By installing photovoltaic panels on homes and businesses where thousands of Hopi live without electricity, NativeSUN became an overwhelming success. The cost of a NativeSUN PV system (\$5,000–\$15,000) is far less than the cost to extend the electric grid to serve a home in these communities (nearly \$40,000 per mile).

NativeSUN also brings much needed jobs and capital investment to the reservation – to date more than 450 systems have been installed. NativeSUN sells its solar electric renewable credits to Arizona Public Service Company to help the utility meet its goals under the state's RPS.

Solar

In addition to the thousands of small-scale solar photovoltaic (PV) installations found across Arizona, a number of larger scale solar projects have been developed or are in the planning stages. Solar PV provides an economical way to

bring electricity to areas of the state out of reach of the grid. Grid-connected PV has the added value of reducing peak summer time electric loads.

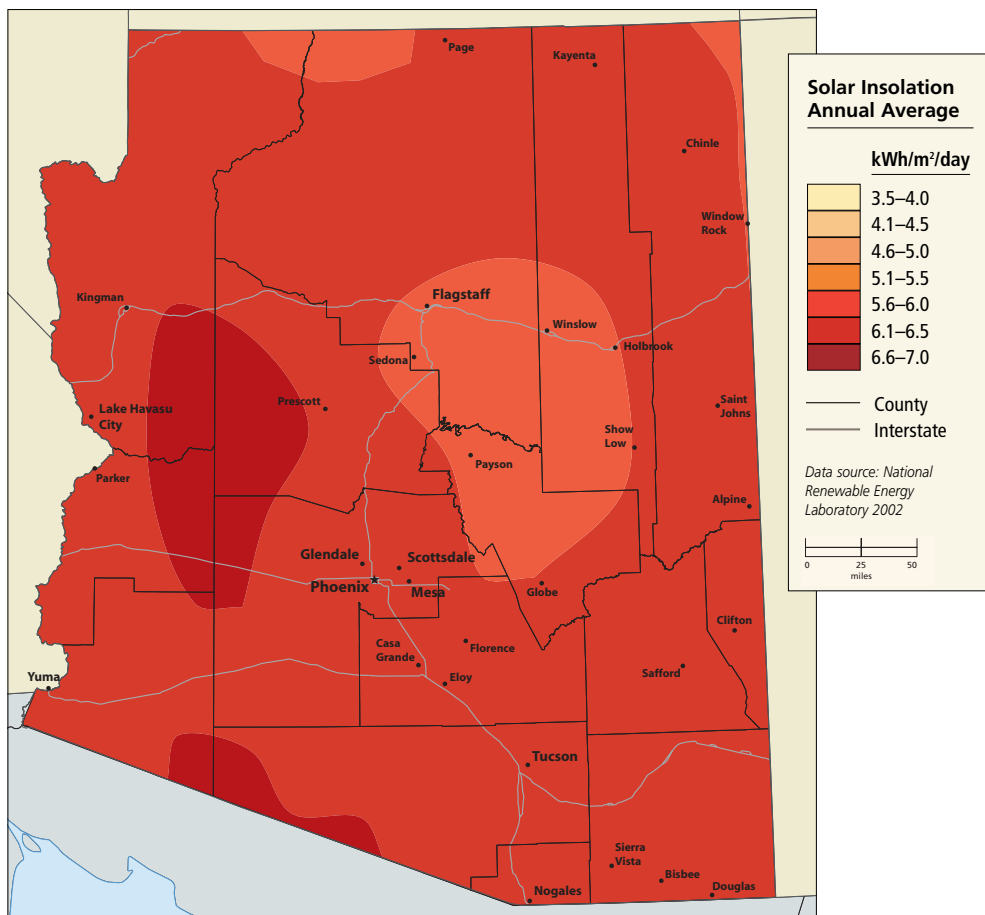
Electricity Generation Potential: 101 million MWh/yr.



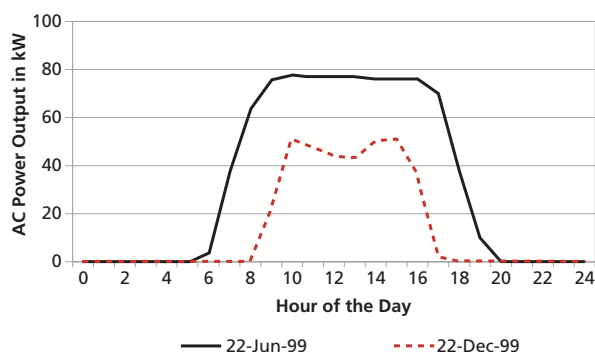
Arizona Public Service Company's Solar Dish

Arizona Public Service (APS) is evaluating the performance of the latest in Dish Stirling Solar power systems at its STAR Research Center in Tempe. This new technology, capable of producing 25kW of electricity, uses mirrors to focus sunlight onto a thermal receiver. This highly efficient solar system also can use alternative fuels instead of the sun's heat, so power can be made any time, day or night.

Photo: Bill Timmerman



Hourly PV Performance at APS Flagstaff Site



Output from a 79 kW PV System in Flagstaff

This chart demonstrates the variations in power produced by a PV system in northern Arizona. The amount of power is clearly affected by time of year and day. It is important to note the system produces its maximum output consistently throughout the day, especially during peak afternoon hours in the summer months when demands on the electric system are greatest.

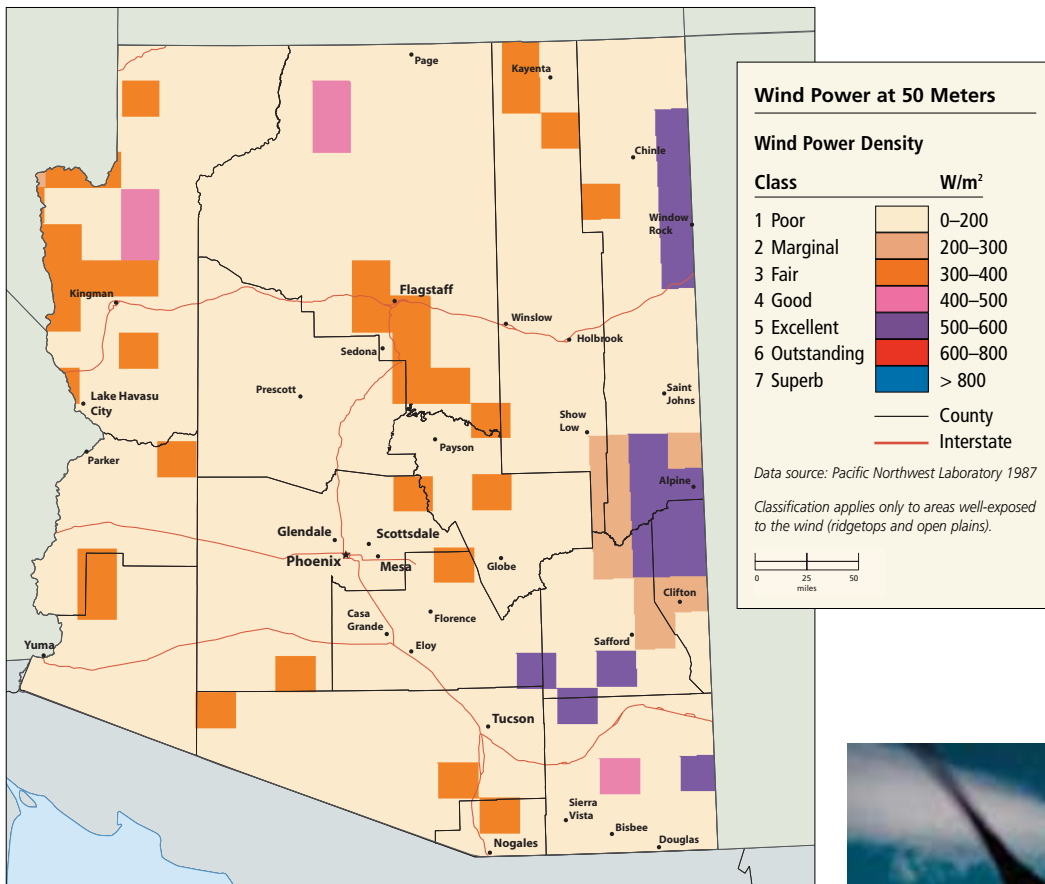
Source: Solar Electric Power Association's TEAM-UP Photovoltaic Data Summary and Analysis for Arizona Public Service

Wind

This map shows 1987 wind data, the most recent available for Arizona. While modern resource modeling techniques will give more detail, this map shows promising areas for large-scale wind development along the eastern border. Rural Arizonans have also been able to rely on small-

scale wind generation to supplement their electricity needs. Less than 1 MW of wind power is currently online in Arizona, but there are over 75,000 acres of windy land.

Electricity Generation Potential: 5 million MWh/yr.



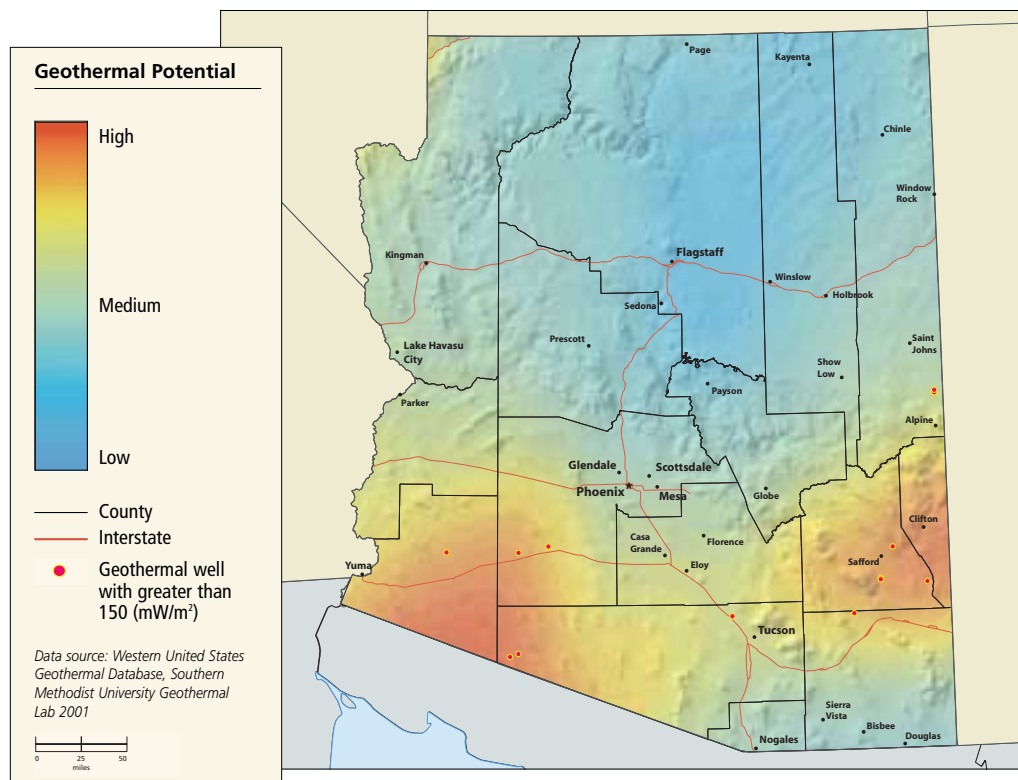
Small wind turbine

Small wind turbines like this Air 403, manufactured by Southwest Windpower, can be used for applications such as charging batteries on recreational vehicles and supplementing the electricity supply for a home, thereby lowering utility bills.

Photo: Southwest Windpower



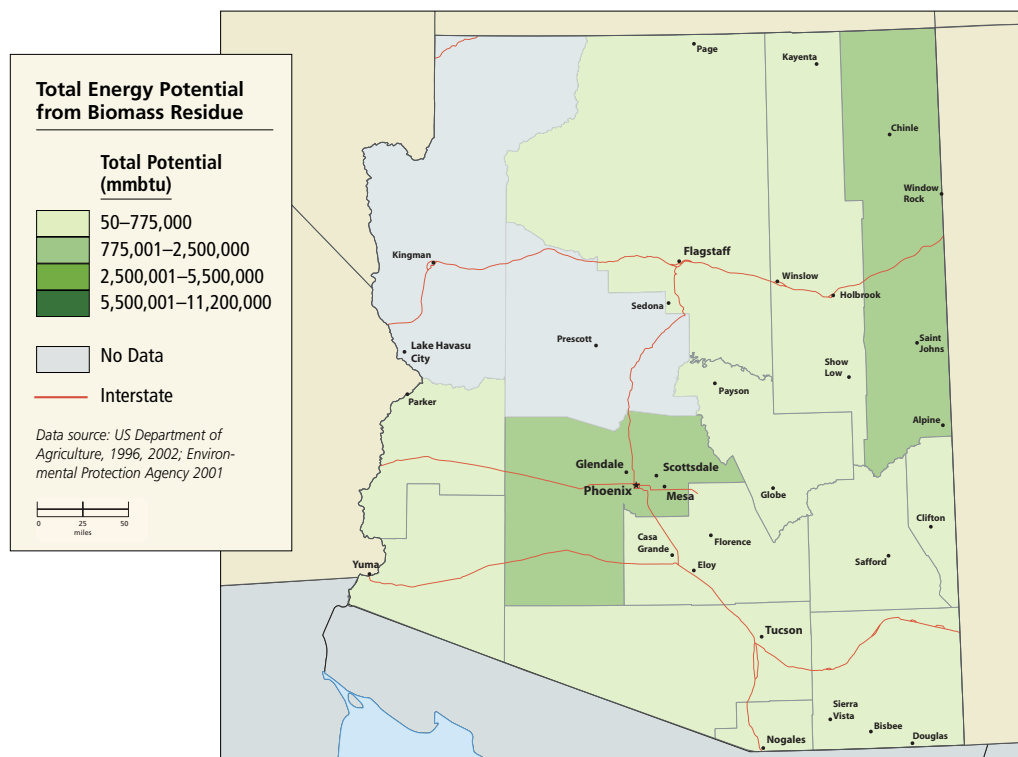
Geothermal



Arizona's geothermal resources, found almost exclusively in the southern half of the state, are a potential source of electricity and direct heating and cooling. There are currently no geothermal installations producing electricity in the state.

Electricity Generation Potential:
5 million MWh/yr.

Biomass



As an arid state, Arizona does not produce a high volume of agricultural crops or forest residues. However, producing electricity from landfill gas or animal wastes currently provides about 5 MW of electricity.

Electricity Generation Potential:
1 million MWh/yr.