



An Overview of Energy Efficiency

Energy efficiency means reducing the amount of energy that you need to perform a particular task. When you practice energy efficiency, you increase or maintain your level of service, but you decrease the energy used to provide that service through efficient technologies.

Examples include ENERGY STAR appliances, compact fluorescent and LED light bulbs, better insulation for buildings, more efficient windows, high efficiency air conditioning equipment, and vehicles with higher miles per gallon (mpg). Another distinct strategy is energy conservation, which means that you change your behavior or lifestyle to reduce energy use. Examples include carpooling, using mass transit, turning thermostats down in the winter and up in summer, and other behavioral changes.

Improving energy efficiency is a “win-win” strategy — it saves money for consumers and businesses, reduces the need for costly and controversial new power plants, increases the reliability of energy supply, cuts pollution and greenhouse gas emissions, and lowers energy imports. There is vast potential for improving the energy efficiency of homes, appliances, businesses, and vehicles throughout Arizona.

Quick Facts:

- ◆ Population, 2016: 6,908,642
 - ◆ Population growth rate, 2008-2016: 1.20% per year
 - ◆ Number of households, 2016: 2,913,541
- Source: United States Census Bureau.*

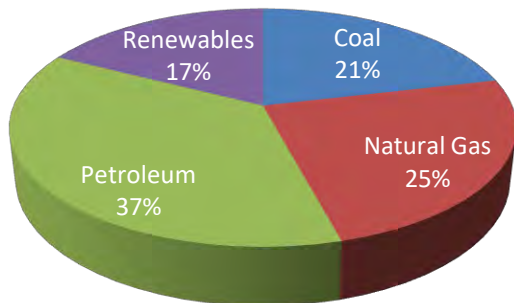
Primary Energy Consumption (2016)

- ◆ Primary energy consumption: 1,471 trillion Btu
- ◆ Growth rate, 2008-2016: 0.03% per year
- ◆ Primary energy consumption per capita: 213.0 million Btu
- ◆ Ranking, energy consumption per capita: 43
- ◆ Ranking, total energy consumption: 26
- ◆ Ratio of consumption to production: 2.48

Energy Expenditures (2016)

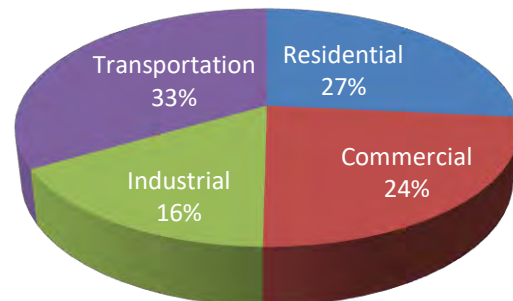
- ◆ Total energy expenditures: \$19.1 billion
 - ◆ Ranking, energy expenditures: 21
 - ◆ Energy expenditures per capita: \$2,758
 - ◆ Ranking, energy expenditures per capita: 48
- Source: U.S. Energy Information Administration, State Energy Data System, June 2018.*

2016 Primary Energy Consumption (by energy resource)



Renewables include hydropower, wood, solar, geothermal and waste materials

2016 Primary Energy Consumption (by end use)



Primary energy use includes the losses in electricity generation and distribution. Rankings are position among US states plus DC (1 is highest, 51 is lowest).

ARIZONA ENERGY FACT SHEET

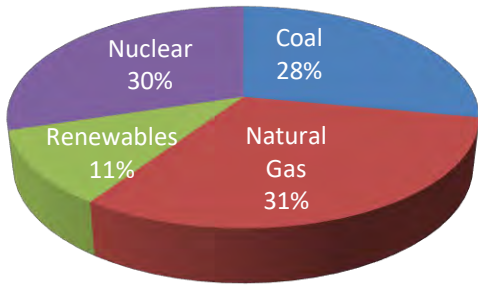
Electricity Use (2016)

| | |
|--|------------------|
| ◆ Total retail sales: | 78.2 billion kWh |
| ◆ Ranking, total retail sales: | 19 |
| ◆ Consumption growth rate, 2008-2016: | 0.32% per year |
| ◆ Electricity use per capita: | 11,325 kWh |
| ◆ Residential electricity use per household: | 11,564 kWh |
| ◆ Average retail price, all sectors: | 10.3 cents/kWh |
| ◆ Ranking, average electricity price: | 18 |

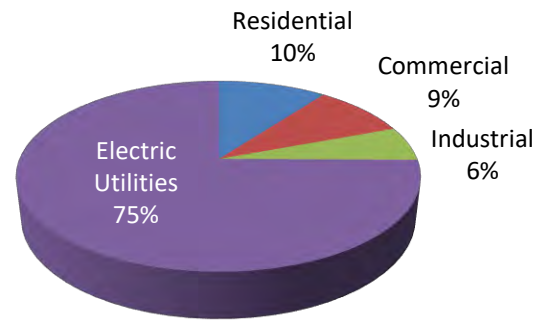
Natural Gas Use (2016)

| | |
|---|-----------------|
| ◆ Natural gas consumption: | 358.3 Bcf |
| ◆ Ranking: | 22 |
| ◆ Consumption growth rate, 2008-2016: | -1.34% per year |
| ◆ Natural gas use per capita: | 50,844 cf |
| ◆ Residential natural gas use (per residential consumer): | 28,889 cf |

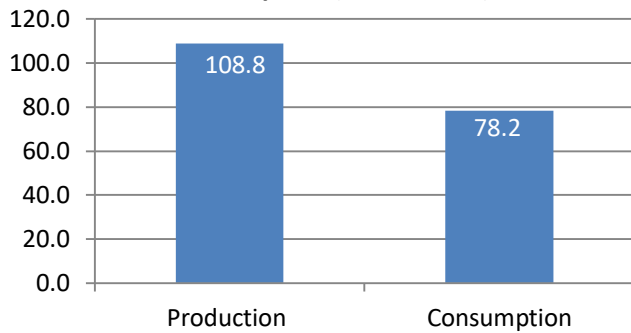
2016 Electricity Generation Breakdown



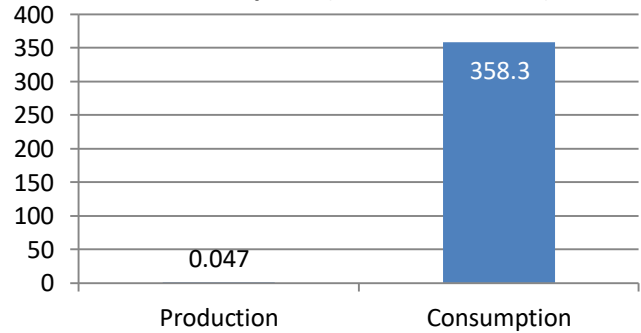
2016 Natural Gas Use by Sector



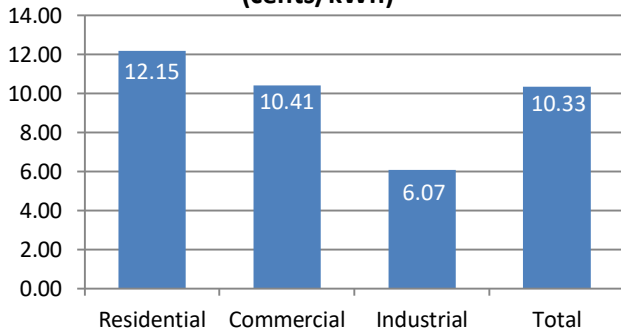
2016 Electricity Production and Consumption (Billion kWh)



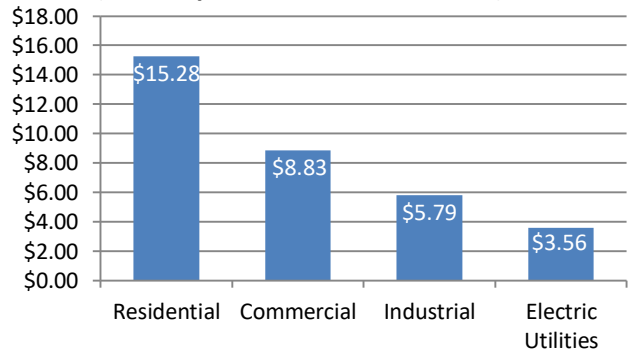
2016 Natural Gas Production and Consumption (Billion Cubic Feet)



2016 Electricity Average Retail Prices (cents/kWh)



2015 Natural Gas Average Retail Prices (Dollars per Thousand Cubic Feet)



ARIZONA ENERGY FACT SHEET

Energy Efficiency Policy and Programs in Arizona

Electricity Demand-Side Management

The Arizona Corporation Commission (ACC) has adopted stringent energy efficiency standards that require investor-owned electric utilities to achieve 20 percent electricity savings by 2020. As a result, Arizona Public Service, Tucson Electric Power, and UNS Electric offer a wide variety of energy efficiency programs for residential and business customers. Salt River Project, a large self-governed utility, implements efficiency programs as well as part of its overall sustainable energy portfolio. Total spending by these utilities' electric utility energy efficiency programs in 2017 was \$117 million, or 1.5 percent of utility revenues.

- ◆ ACC order: <http://www.swenergy.org/news/regional?Year=2010#294>
- ◆ Arizona Utility Programs: <http://www.swenergy.org/programs/utilities/state/arizona>

Natural Gas Demand-Side Management

The ACC has also adopted energy efficiency standards for investor-owned gas utilities. As a result, Southwest Gas Corporation implements energy efficiency programs, including promotion of ENERGY STAR[®] gas appliances, low-income home retrofit, ENERGY STAR homes, commercial high efficiency equipment, and distributed generation programs. The total budget for gas utility energy efficiency programs in Arizona was about \$3.6 million in 2017.

- ◆ Arizona Utility Programs: : <http://www.swenergy.org/programs/utilities/state/arizona>

Building Energy Codes

Arizona has no mandatory statewide energy codes. Four municipalities, Phoenix, Glendale, Tucson and Pima County have adopted the 2018 version of the International Energy Conservation Code (IECC); Scottsdale, Chandler, and Paradise Valley have adopted the 2015 IECC and other cities and counties are in the process of adopting the 2018 IECC. The U.S. Department of Energy estimates that new homes built in Arizona complying with an up-do-date energy code rather than the 2006 IECC will save \$486 per year in energy costs.

- ◆ More info: <http://www.swenergy.org/buildings/energy-codes/arizona>

Energy Efficiency Standards

In 2005 Arizona adopted minimum efficiency standards for 12 products not covered by federal standards. These standards took effect in 2008. In 2009, Arizona adopted minimum efficiency standards for pool pumps and spas.

State Energy Efficiency Scorecard

The American Council for an Energy-Efficient Economy (ACEEE) has ranked states based upon scores in six categories including: 1) utility and public benefits of energy efficiency programs; 2) combined heat and power (CHP); 3) building energy codes; 4) transportation policies; 5) appliance and equipment efficiency standards; and 6) state government initiatives. In the 2018 state scorecard, Arizona was 17th among all states with a score of 22 out of a possible 50 points.

<http://aceee.org/research-report/u1808>

Electricity Conservation Potential and Impacts in Arizona*

| | |
|-----------------------------|------------------------------|
| Energy savings potential: | 21% |
| Avoided power capacity: | 3,239 MW |
| Net dollar savings: | \$7.3 billion |
| Potential increase in jobs: | 10,400 |
| Potential water savings: | 4.1 billion gallons per year |

*Based on SWEET's study *The \$20 Billion Bonanza: Best Practice Electric Utility Energy Efficiency Programs and Their Benefits for the Southwest*. This study, completed in 2012, presents the energy savings potential and impacts from a strong commitment to utility energy efficiency programs over a 10-year period.

ARIZONA ENERGY FACT SHEET

Residential Energy Consumption Survey (2015)

Housing Characteristics:

The Energy Information Administration has published housing characteristics data from the 2015 Residential Energy Consumption Survey. The EIA presents regional aggregates of household characteristics in the Mountain South region, which includes Arizona, Nevada and New Mexico. The table below indicates the percentage of households that report having, using, or practicing the following equipment and/or behaviors in their homes:

| | |
|---|-----|
| Find household too drafty at least some of the time | 38% |
| Single Pane Windows | 31% |
| | |
| Homes with Efficient Lighting | |
| At least one CFL Bulb | 84% |
| At least one LED Bulb | 28% |
| | |
| Two or more Refrigerators | 26% |
| Energy Star Refrigerator | 43% |
| Energy Star Dishwasher | 29% |
| Energy Star Clothes Washer | 40% |
| Three or more Televisions | 33% |
| Electric Heat (all types) | 44% |
| Programmable Thermostat | 51% |
| Central Air Conditioning | 79% |
| Use an Evaporative or Swamp Cooler | 19% |
| Use a Ceiling Fan | 84% |
| Electric Water Heating | 37% |

Source: U. S. Energy Information Administration, 2015 Residential Energy Consumption Survey: Housing Characteristics Tables.

More Information on Energy Efficiency

- ◆ American Council for an Energy-Efficient Economy (ACEEE) www.aceee.org
- ◆ Alliance to Save Energy www.ase.org
- ◆ Consortium for Energy Efficiency <https://www.cee1.org/>
- ◆ ENERGY STAR® Products www.energystar.gov
- ◆ Southwest Energy Efficiency Project www.swenergy.org
- ◆ U.S. DOE's Energy Efficiency & Renewable Energy Programs <https://energy.gov/eere/office-energy-efficiency-renewable-energy>