



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, 2014: 6,731,484
- ◆ Population growth rate, 2006-2014: 0.79% per year
- ◆ Number of households, 2014: 2,387,246

Source: United States Census Bureau.

Primary Energy Consumption (2013)

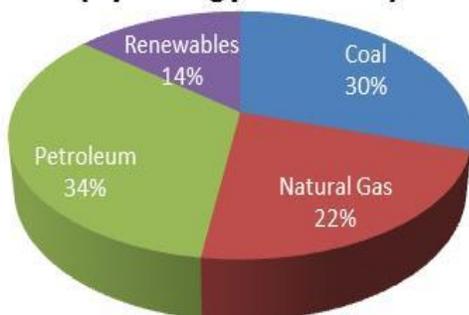
- ◆ Primary energy consumption: 1,415 trillion Btu
- ◆ Growth rate, 2006-2013: -0.57% per year
- ◆ Primary energy consumption per capita: 213 million Btu
- ◆ Ranking, energy consumption per capita: 43
- ◆ Ranking, total energy consumption: 27
- ◆ Ratio of consumption to production: 2.38

Energy Expenditures (2013)

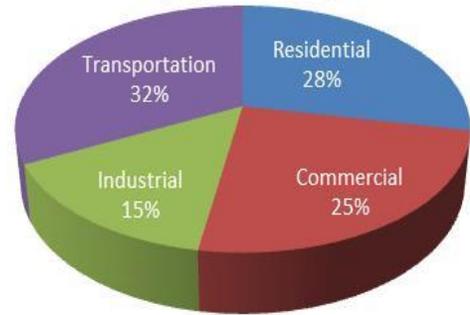
- ◆ Total energy expenditures: \$ 22.8 billion
- ◆ Ranking, energy expenditures: 23
- ◆ Energy expenditures per capita: \$ 3,434
- ◆ Ranking, energy expenditures per capita: 46

Source: U.S. Energy Information Administration, State Energy Data System, March 2016.

**2013 Primary Energy Consumption
(by energy resource)**



**2013 Primary Energy Consumption
(by end use)**



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

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).

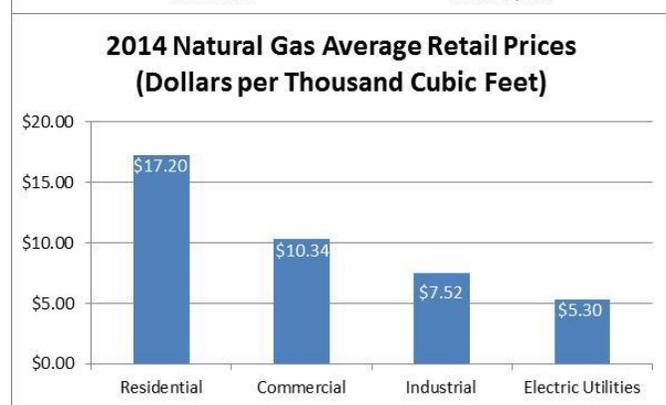
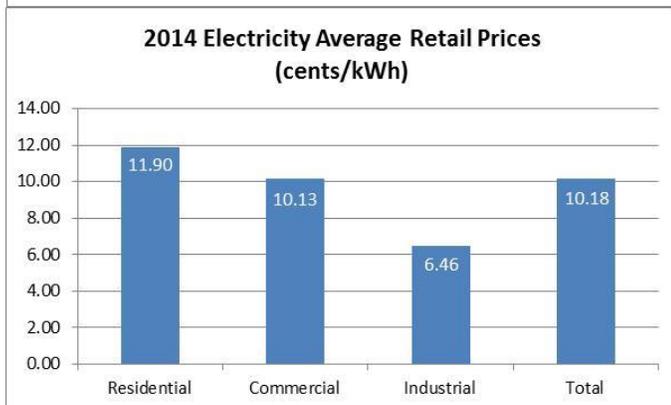
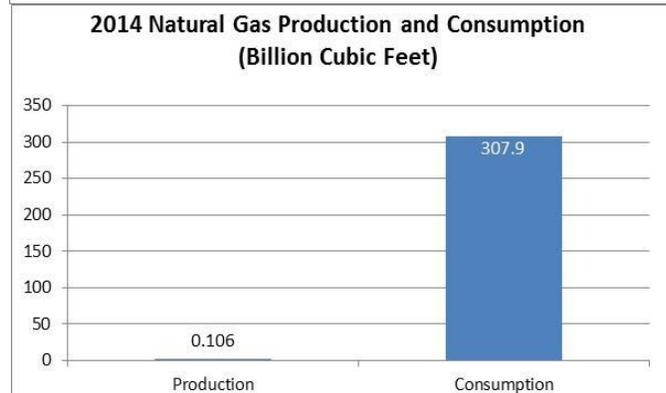
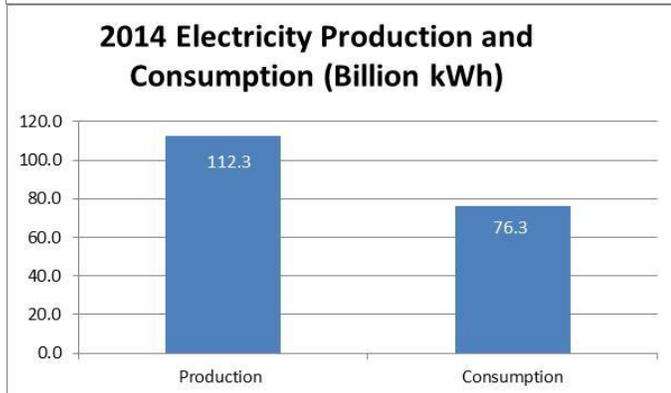
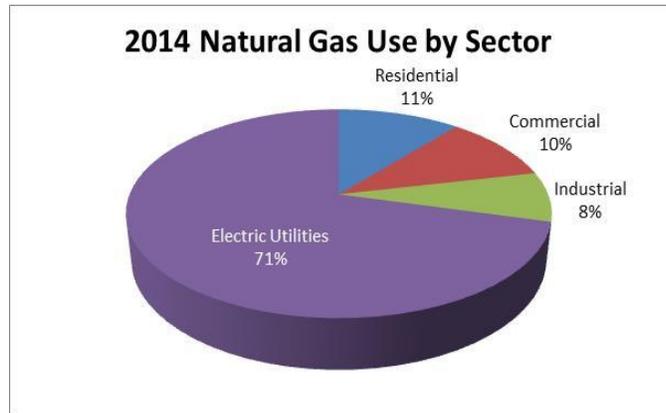
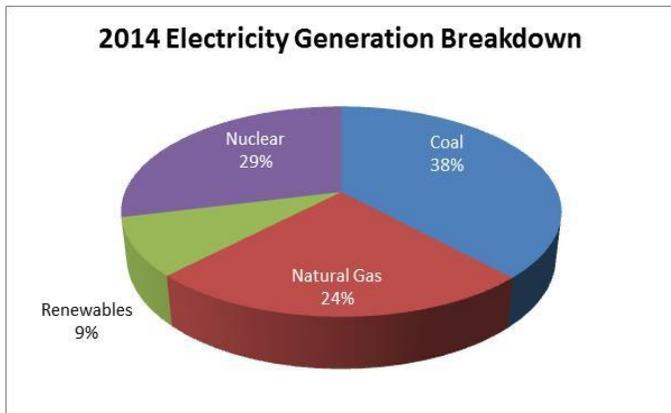
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Electricity Use (2014)

- ◆ Total retail sales: 75.3 billion kWh
- ◆ Ranking, total retail sales: 20
- ◆ Consumption growth rate, 2008-2014: 0.01% per year
- ◆ Electricity use per capita: 11,334 kWh
- ◆ Residential electricity use per household: 13,550 kWh
- ◆ Average retail price, all sectors: 10.18cents/kWh
- ◆ Ranking, average electricity price: 19

Natural Gas Use (2014)

- ◆ Natural gas consumption by ultimate customers: 294.5 Bcf
- ◆ Ranking: 25
- ◆ Consumption growth rate, 2008-2014: -4.03% per year
- ◆ Natural gas use per capita: 43,744 cf
- ◆ Residential natural gas use (per residential consumer): 27,298 cf



Sources: U. S. Energy Information Administration (www.eia.doe.gov) and U. S. Census Bureau (www.census.gov)

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Status of Energy Efficiency 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% electricity savings by 2020. As a result, Arizona Public Service and Tucson Electric Power offer a wide variety of energy efficiency programs for residential and business customers. Salt River Project implements efficiency programs as well. Total spending on electric utility energy efficiency programs in 2015 was \$121 million, or 1.8% 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 \$6 million in 2013.

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

Status of Building Energy Codes

Arizona has no mandatory statewide energy codes. Cities such as Phoenix, Glendale, Peoria, Tempe, Casa Grande, Pima County, Prescott and Tucson, fifteen municipalities, have adopted the 2012 version of the International Energy Conservation Code (IECC); Scottsdale has adopted the 2015 IECC and other cities and counties are in the process of adopting the 2015 IECC. The U.S. Department of Energy estimates that new homes built in Arizona complying with the 2012 or 2015 IECC rather than the 2006 version 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.

Climate Change

In 2006, former Governor Janet Napolitano established a statewide goal to reduce Arizona's future greenhouse gas (GHG) emissions to year 2000 levels by 2020, and to 50% below 2000 levels by 2040. Key strategies include improving energy efficiency for buildings and appliances and reducing energy demand by consumers and businesses. Under Governor Jan Brewer, the emphasis was on solar and other renewable energy development in order to stimulate job creation and reduce GHG emissions.

- ◆ More info: <https://www3.epa.gov/climatechange/impacts/southwest.html>

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 2015 state scorecard, Arizona was 17th among all states with a score of 22 out of a possible 50 points.

Electricity Conservation Potential and Impacts in Arizona*

Savings potential in 2020:	21%
Avoided new power capacity:	3,239 MW
Net dollar savings (2010-2030):	\$7.3 billion
Net increases in jobs by 2020:	10,400
Water savings by 2020:	4.1 billion gallons/year

*Based on the High Efficiency Scenario in SWEEP's study *The \$20 Billion Bonanza: Best Practice Electric Utility Energy Efficiency Programs and Their Benefits for the Southwest*. This study, completed in 2011, presents the energy savings potential and impacts from a strong commitment to utility energy efficiency programs over a 10-year period.

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Residential Energy Consumption Survey (2009)

Housing Characteristics:

The Energy Information Administration has published housing characteristics data from the 2009 Residential Energy Consumption Survey.

The table below indicates the fraction of households in Arizona that report having, using or practicing the following equipment and/or behaviors in their homes:

Poor insulation:	9%
Home is too drafty during the winter some or most of the time:	13%
Single pane glass in windows:	48%
Energy-efficient light bulbs:	65%
Two or more refrigerators:	26%
ENERGY STAR refrigerator:	35%
ENERGY STAR dishwasher:	30%
ENERGY STAR clothes washer:	39%
Three or more televisions:	39%
Keep some or all portable tools and appliances chargers always plugged in:	17%
Turn off computers when not in use:	48%
Keep some or all cell phone and other electronic device chargers always plugged in:	26%
Electric resistance heating as a main heating source:	30%
Have and use a programmable thermostat:	30%
Central air conditioning:	87%
Evaporative cooling:	13%
Use ceiling fans quite a bit or all summer:	65%
Electric resistance water heating:	52%
Insulation blanket on main water heater:	9%

Source: U. S. Energy Information Administration, 2009 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 www.cee.org
- ◆ ENERGY STAR® Products www.energystar.gov
- ◆ Southwest Energy Efficiency Project www.swenergy.org
- ◆ U.S. DOE's Energy Efficiency & Renewable Energy Programs www.eere.energy.gov