SOLAR

The sun provides more energy in only one day than the entire world would use in 27 years. Solar energy is used in two ways: photovoltaic (PV) cells convert sunlight into electricity, while solar thermal is used for direct heating and indirect electricity production.

Energy from the sun is completely renewable, inexhaustible, clean and entirely domestic. Since no fuel is burned, no air pollution is generated.

PV cells, or solar cells, require very little maintenance with a life span of up to 30 years. A system can be enlarged, downsized and easily moved to meet the changing energy needs. They can power residences, businesses, water wells, and streetlights, among other things. Solar products can be integrated into building design, such as solar roof shingles. Solar thermal energy is being used to heat air and water for buildings.

Large-scale solar energy is not yet cost effective. But as the price of solar power decreases and the costs of conventional fuel increases, solar energy collection will become more accessible.

GEOTHERMAL

High temperature steam or hot water from the earth is used as energy in many parts of the world. In Oklahoma it is limited to low temperature heat from shallow rock and soil, also called earth energy. The Oklahoma climate is well suited for geothermal heat pumps. These use the ground temperature to heat and cool houses. In the winter, heat is extracted from the ground and in the summer, heat is discharged into the ground. This system is exceptionally efficient for home cooling and heating.

Cost of wind energy in relation to conventional power technologies is becoming competitive. In fact, it’s dropping at a faster rate than conventional. Financial incentives are also available to help offset the initial cost.

Since no combustion takes place, no air or water emissions are released. This means no air toxins, greenhouse gases, or smog-producing pollutants. Because wind is so variable, if wind energy is combined with other renewable sources such as fuel cells, an even better alternative results.

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Experts estimate that by the year 2020 electricity needs in the U.S. will increase by 33%.

Fossil fuels also emit pollutants into the air, water and soil. Air pollution from fossil fuels contributes to many health problems as well as property damage and visibility degradation. Asthma, allergies, chronic bronchitis, lung cancer and other respiratory diseases are caused or amplified by air pollution.

Because of these issues, a future of energy options must be considered. Many sources are less harmful to health and the environment and some are even renewable. Research and development are ongoing to improve existing fuels and explore options for new fuels. Some sources that have been used minimally in years past are becoming more readily available and economical.

With the various offered incentive plans and improved technologies, many alternative energy sources are viable options today. The stage is now set to educate consumers and to make these options more widespread.
Natural Gas

Natural gas is the most common alter-
native vehicle fuel used in Oklahoma. Even
though natural gas is a fossil fuel and not
renewable, it does fulfill the major criteria of
alternative fuels. It is produced domestically,
even locally in Oklahoma. Its use ensures
energy security in addition to a degree of
economic security for Oklahoma.

When compared to conventional ve-
cicles, natural gas vehicle engine life in-
creases without sacrificing performance. Ve-
ciles using natural gas are ideal for com-
muters and company fleets. Many manufac-
turers offer passenger vehicles and heavy-
duty vehicles equipped to burn natural gas.
Powerful natural gas vehicles can be easily con-
verted to run on natural gas.

Propane

Liquefied petroleum gas, or propane, is a
by-product from natural gas processing and
crude oil refining. It is convenient and avail-
able across the vehicle spectrum, from farm
trucks to city buses. Propane vehicles perform
comparably to conventional vehicles yet have increased engine life
and reduced maintenance.

Vehicles can be purchased as pro-
pane powered or they can be converted
from gasoline to propane use. Refu-
ed station and ease is comparable to
gasoline and public fueling stations are available.

Propane is one of the cleanest
burning fuels. It releases half
the amount of air toxics and
particulate emissions of gasoline
and up to 90% less carbon
monoxide.

Ethanol

Ethanol

Ethanol is the most
widely used alternative fuel. It is a re-
newable energy source produced pri-
marily from grains such as corn, bar-
ley and wheat. It can be blended with
natural at any percentage level or even used in its pure form. All manufac-
turers selling cars in the U.S. ap-
prove the use of certain ethanol
vehicles. Check the owner’s manual. In fact, many
models can now use ethanol as an alternative to
either gasoline or diesel fuel.

Ethanol performance is comparable to conventional fuels.
Costs for ethanol vehi-
cles are similar to gasoline ve-
hiles, but run slightly higher for heavy-duty
vehicles. Ethanol is produced domestically and is of tremendous importance for Ameri-
can farmers and the American economy. It is by far the most efficient liquid trans-
portation fuel available today. Eighty per-
cent more energy is used to produce gaso-
line than is needed to produce the same amount of ethanol.
Ethanol is a good choice for an alternative fuel in many states. How-
ever, this fueling infrastructure is not yet available in Oklahoma.

Methanol

Like ethanol, methanol is an alcohol-
based fuel. It can be made from renewable resources that contain carbon, but is currently
produced mostly from natural gas. Perfor-
mance, availability, and benefits are similar
to those of ethanol. Future applications lie
in the use of fuel cells. Methanol is the most
economic means of supplying hydrogen to
the fuel cell. In Oklahoma, the infrastruc-
ture for methanol-powered vehicles is not yet available.

Biodiesel

Made from renewable sources such as
vegetable oils and animal fats, biodiesel is
an alternative to diesel. Use of biodiesel
blended with conventional diesel at 20%/80%
do not require any engine modifications
and provides the same performance and range
as diesel. Higher blends, even at 100%
biodyeisel, can be used in many engines with
little or no modification.

Biodiesel is only available through bulk
suppliers. Fuel cost varies depending on the
feedstock. Soy biodiesel is more expensive
than that produced from fats and greases.
Biodiesel is a viable alternative for diesel fuel.
It is gaining interest as an alternative in situa-
tions where workers are exposed to diesel
exhaust.

Hydrogen

Hydrogen can be supplied to the fuel
cell from any hydrogen-rich material such as
gasoline, methanol, hydrogen gas, and even
water. Today, for economic and availability
reasons, hydrogen is mostly supplied through
methanol made from natural gas. Methanol
and other sources of hydrogen production are
being explored. The goal is to find totally renew-
able and economical sources of hydrogen
supply and transport. Promising options in-
clude sunlight and water, wind, biomass, bio-
logical organisms, methanol, and ethanol.

Electric

Electric vehicles (EVs) produce no emissions from the tail pipe. The only emissions come from the
generation plant during electric power generation.

Wind

Possibly, one of the oldest sources of
energy used is wind. Today’s windmills are
capable of producing up to 40% of the energy
efficiency of a wind farm. Today, for economic
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Future widespread use of hydrogen is targeted for vehicles, aircraft,
portable electronics, and heat and electricity for homes and buildings. Hydrogen shows potential for being a future energy carrier,
much like electricity is today.