Biomass

	RELEVANCE		
	IT'S A FACT	ADVANTAGE	DISADVANTAGE
1. Biomass is a source of energy from plant materials and animal waste.			
2. Biomass is a renewable energy source; we can grow more biomass.			
3. Biomass is difficult to store and transport because it decays.			
4. As biomass decays, more of its energy is available for use as fuel.			
5. Biomass was the first source of energy harvested and used by humans.			
6. Some of the carbon dioxide created by burning biomass can be absorbed by planting new biomass.			
7. The amount of energy stored in biomass is less than the amount of energy stored in an equivalent weight of a fossil fuel.			
8. Biomass can be used as a fuel because it captures and stores radiant energy from the sun through the process of photosynthesis.			
9. Less than 3% of American homes use biomass (burn wood) as their only heat source.			
10. Biomass is abundant and can be produced almost everywhere in the U.S.			
11. Burning biomass can produce odors and emissions.			
12. Burning biomass in a waste-to-energy plant produces a small amount of U.S. electricity.			
13. Biomass provides 4.9 percent of the nation's total energy demand.			
14. Today, about 44 percent of biomass energy comes from wood.			
15. The pulp and paper industries use waste wood to generate steam and electricity, meeting over half of their own needs.			
16. Biomass can be made into ethanol and biodiesel, transportation fuels that are cleaner-burning than unleaded gasoline and traditional diesel.			
17. Alcohol fuels made from biomass can be domestically produced.			
18. Mixing 10 percent ethanol with gasoline produces E10, a cleaner-burning fuel used nationwide.			
19. Burning biomass in a waste-to-energy plant reduces the amount of garbage sent to landfills.			
20. Waste-to-energy plants use scrubbers and other technologies to reduce emissions and odors.			

Coal

	RELEVANCE		
	IT'S A FACT	ADVANTAGE	DISADVANTAGE
1. Coal is one of the most abundant fuels in the United States. We have over a 280 year supply based on the current rate of consumption.			
2. Although coal is still being formed today, we use it thousands of times faster than it is formed.			
3. Coal generates 33 percent of the electricity in the U.S.			
4. The U.S. exports about 8.3 percent of the coal it produces to other countries.			
5. Coal has been burned to cook food and heat living spaces and water for thousands of years.			
6. Today, over 90 percent of the coal consumed in the U.S. is used by the electric power sector to generate electricity.			
7. When coal is burned, carbon dioxide, sulfur dioxide, nitrous oxide, and other pollutants are produced.			
8. To remove coal buried deep in the earth, mine shafts are constructed to bring the coal to the surface.			
9. An easier way to mine coal near the earth's surface is to remove the layers of earth to uncover the coal. This is called surface mining.			
10. Large amounts of land are disturbed in the process of surface mining.			
11. Surface mines can be restored to grasslands or parks after the coal is removed.			
12. About one-third of the nation's coal is produced from underground mines.			
13. The water that filters through abandoned mines can pick up chemicals that pollute the water if the mines are not closed correctly.			
14. Coal is used to smelt iron into steel and by the paper and building supply industries.			
15. Coal can be turned into a gas to make it burn cleaner. This process is expensive.			
16. Coal mining can be dangerous for miners due to gases and explosion hazards.			
17. Ash from coal plants can be recycled and used for cement additives, roadway materials, and even in habitat restoration for oysters.			
18. Some cleaner coal technologies require less coal to produce the same amount of electricity.			
19. The methane gas that is found around much of the coal in the U.S. is a valuable resource.			
20. The electricity industry uses items like scrubbers to reduce harmful emissions from coal plants.			

Natural Gas

	RELEVANCE		
	IT'S A FACT	ADVANTAGE	DISADVANTAGE
1. Natural gas was formed from the decomposition of tiny sea plants and animals that lived hundreds of millions of years ago.			
2. Natural gas is mostly made of a chemical called methane.			
3. Natural gas is odorless; an odorant called mercaptan is added for safety.			
4. Natural gas can be processed and other products, like propane and the materials in plastics, can be recovered from it.			
5. Natural gas is considered to be the cleanest-burning fossil fuel. It produces almost no sulfur or nitrogen oxides.			
6. Natural gas and petroleum are often found together in underground deposits.			
7. In the past, oil drillers were not interested in the natural gas that was found at the site of an oil well. Today, it is as valuable as the oil.			
8. The invention of high pressure pipelines has made it possible to transport natural gas all over the U.S.			
9. Leaks can occur in natural gas pipelines. Fires and explosions can result from these leaks if proper safety precautions are not taken.			
10. About 5.5 percent of the natural gas we produce comes from federal offshore wells in the Gulf of Mexico.			
11. Natural gas is a nonrenewable resource.			
12. Today, the U.S. has a large supply of natural gas. There are also large reserves of natural gas offshore, on the outer continental shelf, and in the Gulf of Mexico.			
13. Natural gas is used almost equally by homes and businesses, industry, and for electric power generation.			
14. Natural gas can be used as a cleaner-burning transportation fuel.			
15. Natural gas supplies will likely last about 93 years at today's prices and consumption rate.			
16. Natural gas accounts for 29.0 percent of total U.S. energy consumption.			
17. If a higher price is charged for natural gas, supplies could last as long as 200 years.			
18. Roughly half of the homes in the U.S. use natural gas as their main heating fuel.			
19. Natural gas is used to produce peak load electricity because natural gas furnaces can be brought on line and shut down quickly and efficiently to generate steam for electricity.			
20. Burning methane produces carbon dioxide. Both methane and carbon dioxide are greenhouse gases that trap heat energy. Increasing the levels of greenhouse gases in the atmosphere can affect the global climate.			

Solar

	RELEVANCE		
	IT'S A FACT	ADVANTAGE	DISADVANTAGE
1. The sun radiates more energy in one day than the world can use in a year.			
2. The sun is a star made up mostly of hydrogen and helium gas. It produces radiant energy in a process called nuclear fusion.			
3. Harnessing radiant energy from the sun is difficult because the energy that reaches the Earth is very spread out.			
4. Only a small part of the solar energy radiated ever reaches the Earth.			
5. It takes the sun's energy just over eight minutes to travel 93 million miles to the Earth.			
6. Solar energy is a renewable energy source.			
7. Solar energy is used to heat passive solar buildings and water and to generate about one percent of U.S. electricity.			
8. The amount of solar energy reaching an area depends on the time of day, season of the year, cloud coverage, and geographic location.			
9. Solar water heaters can reduce energy bills by half when installed.			
10. A solar collector can be used to capture sunlight and change it into usable heat energy.			
11. An active solar home in the Northern Hemisphere uses special equipment on the south side of the building to absorb sunlight and change it into thermal energy. Air or water flows through the collector and is warmed by the energy inside.			
12. Passive solar homes do not depend on mechanical equipment to transform radiant energy into thermal energy.			
13. Photovoltaic cells can convert radiant energy from the sun directly into electricity.			
14. Concentrated solar power technology uses reflective mirrors to focus solar energy, producing high temperatures and generating electricity.			
15. Photovoltaic—or PV—systems have a long payback period because of their initial cost.			
16. PV cells are used to power homes, roadside telephones, calculators, and toys, and work well for items in remote locations.			
17. Crystalline silicon PV cells convert about 16 percent of the energy they receive into electricity.			
18. Electricity from PV cells has a cost range of $0.12-0.30/kWh. The average cost of electricity (generated mostly from fossil fuels) in the U.S. today is about $0.127 cents/kWh.			
19. Large solar systems can take up a large amount of land or can be placed on large, flat roofs.			
20. Solar energy does not pollute the air.			

Uranium

	RELEVANCE		
	IT'S A FACT	ADVANTAGE	DISADVANTAGE
1. In 1939, scientists discovered that certain atoms could be split. The splitting of these atoms releases a great amount of energy.			
2. Ninety-nine nuclear power reactors at 61 plants operate in the U.S.			
3. Nuclear plants provide 19.4 percent of the electricity generated in the U.S.			
4. A nuclear reactor can supply a large amount of energy using a very small amount of fuel.			
5. The construction of nuclear power plants is very expensive compared to fossil fuel plants.			
6. Nuclear reactors do not burn uranium or fuel to generate electrical power. They split the uranium atoms—so their emissions are minimal.			
7. Uranium is easy to transport.			
8. Uranium is inexpensive.			
9. The U.S. has abundant supplies of uranium. However, we import most of the uranium used in power plants because it is cheaper than mining it.			
10. Nuclear power plants produce electricity by heating water into steam in the same way as fossil fuel plants.			
11. Workers at nuclear power plants receive less radiation from the plant than they do from other sources like medical x-rays.			
12. Some parts of reactors become radioactive after they have been used.			
13. Radioactive waste from nuclear power plants is stored underground in spent fuel pools or dry cask containers at the plant sites.			
14. Uranium has a very high energy density, producing a large amount of energy from a small amount of mass or space.			
15. Uranium is a nonrenewable energy source.			
16. A nuclear power plant produces a lot of waste heat. If this heat is put into a moving water system, the water temperature can increase.			
17. The main health risk from a nuclear power plant is potential radiation exposure.			
18. Nuclear power plants in the U.S. are highly regulated.			
19. An accident at a nuclear power plant could cause widespread damage if people or the environment were exposed to high levels of radioactivity.			
20. There has been renewed interest in nuclear power in the U.S. in the last few years as concern over global climate change has increased.			

Wind

	RELEVANCE		
	IT'S A FACT	ADVANTAGE	DISADVANTAGE
1. Wind is air in motion caused by the uneven heating of the Earth's surface by the sun.			
2. Wind turbines do not cause air or water pollution because no fuel is burned to generate electricity.			
3. Wind is a renewable source of energy.			
4. Wind turbines operate on average about three-fourths of the time, though not always at capacity.			
5. For hundreds of years, windmills were used to grind wheat and corn, to pump water, and to cut wood at sawmills.			
6. Wind turbines have turning blades to harness the wind's kinetic energy. The blades are connected to drive shafts that turn generators to make electricity.			
7. Wind plants can typically convert 30-40 percent of the wind's kinetic energy into electricity.			
8. When the wind is not blowing, other sources of energy must be used to generate needed electricity.			
9. The locations of wind farms are carefully planned—good sites include the tops of smooth, rounded hills, open plains or shorelines, and mountain gaps.			
10. Offshore turbines produce more electricity than turbines on land.			
11. Wind power plants, or wind farms, are clusters of several wind turbines spread over a large area. The land around the wind turbines can also be used for grazing or growing crops.			
12. Wind farms are often owned and operated by business people who sell the electricity to utility companies because they can be expensive to build.			
13. Wind turbines can be used in remote areas that do not otherwise have access to electricity.			
14. Almost every state has the capacity to produce electricity from wind.			
15. The U.S. generates about 14 percent of the world's wind energy.			
16. Older wind turbines are very noisy; new technologies have eliminated most noise.			
17. Wind turbines can injure birds or bats that fly into the spinning blades.			
18. It costs about $0.03 to $0.05/kWh to produce electricity from wind power plants. The average cost of electricity (generated mostly from fossil fuels) in the U.S. today is about $0.127 cents/kWh.			
19. Wind turbines provide the U.S. with enough electricity to power over 17 million homes.			
20. Offshore turbines cost more money to build and operate than turbines on land.			

Geothermal

	RELEVANCE		
	IT'S A FACT	ADVANTAGE	DISADVANTAGE
1. Geothermal energy comes from heat within the Earth.			
2. Examples of geothermal energy are hot springs, volcanoes, and geysers.			
3. Geothermal energy is generated in Earth's core, which is made of magma (molten iron) surrounding a solid, mostly iron core.			
4. Red hot temperatures are maintained inside the Earth because of the slow decay of radioactive particles found in all rocks, and the immense pressure on the core.			
5. Geothermal energy is renewable. The hot water used by power plants is replenished by precipitation and the geothermal heat is continually produced.			
6. Wells can be built to pump super-heated water to the surface.			
7. Geothermal energy is used to produce electricity and to heat and cool buildings.			
8. Geothermal energy was used by ancient people for heating and bathing. Hot springs are said to have therapeutic effects today.			
9. In 1904, the Italians first used steam erupting from the earth to power a turbine generator.			
10. Dry steam reservoirs are the most efficient for producing electricity, but they are very rare.			
11. The United States generates more electricity from geothermal than any other country in the world.			
12. High temperature geothermal resources capable of producing electricity are not economically available in all parts of the nation.			
13. The most active geothermal resources are found along major tectonic plate boundaries, where magma comes very near Earth's surface.			
14. Geothermal energy produces less than one percent of the electricity consumed in the nation today.			
15. Geothermal energy does little damage to the environment because geothermal power plants sit on or near the geothermal reservoirs and do not burn any fuel.			
16. Geothermal steam and hot water contain traces of hydrogen sulfide and other gases, as well as chemicals that are harmful at high concentrations.			
17. The gases and chemicals from geothermal power plants are usually reinjected into the Earth.			
18. The temperature of the earth a few feet underground remains constant year round—about 52 degrees Fahrenheit in moderate climates.			
19. Low temperature geothermal energy is available everywhere in the U.S. for heating and cooling homes.			
20. Geothermal heat pumps use the Earth's constant temperature as an energy source to heat buildings in winter and cool them in summer.			

Hydropower

	RELEVANCE		
	IT'S A FACT	ADVANTAGE	DISADVANTAGE
1. Moving water has been used as a source of energy for thousands of years.			
2. Hydropower is considered one of the cleanest and cheapest energy sources in widespread use today.			
3. Moving water is a renewable energy source.			
4. Moving water can turn a turbine to generate electricity.			
5. Hydropower was first used to turn water wheels to grind grain.			
6. Hydroelectric power is reliable because dams can be built to store water. Controlling the flow of the stored water allows a power plant to operate in all weather conditions and at times of greater electrical demand.			
7. About 5-10 percent of total U.S. electricity is generated by hydropower plants, depending on the amount of rainfall.			
8. Hydropower provides the U.S. with about 2.4 percent of our total energy consumption.			
9. In the last 60 years, hydropower production in the United States has increased by 63 percent.			
10. The nation's largest producer of hydroelectric power is the Federal Government, which operates many large dams and power plants.			
11. There are about 2,200 hydroelectric power dams in the U.S. today.			
12. There are about 81,800 dams that do not have generating plants on them.			
13. New construction and improvements at existing hydropower plants could increase our hydroelectric capacity by 30,000 to 60,000 MW by 2025.			
14. When a hydropower dam is built, thousands of acres of nearby land are flooded to create a reservoir.			
15. Projects using wave and tidal energy to generate electricity are being tested and used in a few locations in the U.S. and around the world.			
16. Dams can disturb the migration and spawning of fish populations in the river.			
17. Dams can alter the natural flow of the river and change the amount of water that reaches communities downstream.			
18. Reservoirs that result from construction of a dam are often developed for recreational purposes, such as boating and fishing.			
19. The use of conventional hydropower in the U.S. is not expected to increase significantly in the future, but wave and tidal projects are expected to increase.			
20. Some countries use hydropower as their main source to produce electricity. Norway produces 96 percent of its electricity from hydropower.			