Sources of Energy Facts and Misconceptions: A Science & Logic Compilation

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Entry [#1]: Renewable Energy Sources: **Solar Energy**

Statement (COR 008):
"Using tilted solar panels can maximize sunlight absorption and energy production even without tilting it."

Logical Proposition (COR 005):
"If the panels are tilted, it can maximize solar energy production."

Symbolized: P ^ Q
(where P = panels are tilted, Q = maximize energy production)

Truth Value (COR 005):
True – Tilted solar panels receives maximize energy of direct sunlight.

Scientific Explanation (COR 008):
Solar energy came from the radiation of the sun, converting sunlight into electrical energy through photovoltaic (PV) panels. The tilting of the solar panels helps obtain the highest annual energy output, as it is pointed directly at the sun throughout the day. While, flat solar panels receives direct sunlight for a short amount of time, if the roof structure is not tilted directly to the sun. This means that the statement is a fact and not a misconception.

Sources: www.supremesolarpower.com
www.energy.gov
www.solarnplus.com
www.energysage.com

Entry [#2]: Renewable Energy Sources: **Wind Energy**

Statement (COR 008):
"Wind turbines can still make electricity even if there is no wind."

Logical Proposition (COR 005):
"If there is no wind, then the turbine can still produce electricity."

Symbolized: $\neg P \rightarrow Q$
(where P = there is no wind, Q = turbine produces electricity)

Truth Value (COR 005):
False – A turbine cannot generate power without wind.

Scientific Explanation (COR 008):
Wind turbines depend on the movement of air to turn their blades. The spinning blades drive a generator that makes electricity. If there is no wind, the blades won't move and no electricity will be produced. This means that the statement is a misconception and not a fact.

Source: https://www.energy.gov/eere/wind/how-do-wind-turbines-work

Entry [#3]: Renewable Energy Sources: **Hydropower Energy**

Statement (COR 008):
"Hydroelectric power converts flowing water energy into electricity."

Logical Proposition (COR 005):
"If there is flowing water, then hydroelectric power can be generated."

Symbolized: $P \rightarrow Q$
(Where P = there is flowing water, Q = hydroelectric power is generated)

Truth Value (COR 005):
True – Hydroelectric power plants use the kinetic energy of flowing water to spin turbines and generate electricity.

Scientific Explanation (COR 008):
Hydroelectric power plants harness the energy of moving water to produce electricity. The flowing water spins the rotors of a turbine, which is connected to an electromagnetic generator. This generator converts the mechanical energy of the spinning turbine into electrical energy. The water cycle, driven by the sun, constantly renews the water supply, making hydroelectricity a renewable energy source. This means that the statement is a fact and not a misconception.

Sources: www.energy.gov (Energy Efficiency & Renewable Energy&Office of Energy Efficiency and Renewable Energy.)

Entry [#4]: Renewable Energy Sources: **Geothermal Energy**

Statement (COR 008):
"Geothermal energy can effectively used to heat and cool buildings by using the stable temperature of the Earth's subsurface."

Logical Proposition (COR 005):
"Geothermal energy is effective for heating and cooling buildings if and only if the subsurface earth temperature is relatively stable."

Symbolized: $P \leftrightarrow Q$
(where P = geothermal energy is effective for heating and cooling buildings, Q = subsurface earth temperature is relatively stable)

Truth Value (COR 005):
True – Geothermal heat pumps provides the heating and cooling source for buildings.

Scientific Explanation (COR 008):
Geothermal resources such as naturally occurring underground reservoirs of hot water or the stable temperature of the subsurface can be used to heat and cool buildings. Geothermal heat pumps provide heating and cooling using the ground as a heat sink, absorbing excess heat when the aboveground temperatures are warmer, and as a heat source when aboveground temperatures are cooler. This means that the statement is a fact and not a misconception.

Source: www.energy.gov.com

Entry [#5]: Renewable Energy Sources: **Nuclear Energy**

Statement (COR 008):
"Nuclear energy is the cleanest energy source because it produces almost no greenhouse gas emissions."

Logical Proposition (COR 005):
"If electricity is generated by nuclear fission, then it is one of the cleanest sources of energy."

Symbolized: $P \rightarrow Q$
(where P = electricity is generated by nuclear fission, Q = one of the cleanest sources of energy)

Truth Value (COR 005):
True – Nuclear power does not release carbon dioxide during operation, making it the cleanest energy source.

Scientific Explanation (COR 008):
Nuclear power plants produce energy through fission, a process that does not require burning coal, oil, or natural gas. As a result, nuclear energy produces minimal air pollution and greenhouse gases, making it one of the cleanest large-scale energy sources available today. The main concern is the management of radioactive waste, but in terms of air emissions, nuclear energy is among the cleanest. This means that the statement is a fact and not a misconception.

Source: https://world-nuclear.org/information-library/energy-and-the-environment/carbon-dioxide-emissions-from-electricity

Entry [#6]: Renewable Energy Sources: **Biomass Energy**

Statement (COR 008):
"Burning biomass does not release carbon dioxide because it is a natural fuel."

Logical Proposition (COR 005):
"If a fuel is natural, then burning it does not release carbon dioxide."

Symbolized: $P \rightarrow \neg Q$
(where P = fuel is natural, Q = burning releases carbon dioxide)

Truth Value (COR 005):
False – Burning biomass releases carbon dioxide just like other fuels.

Scientific Explanation (COR 008):
Biomass is organic matter like wood, crop waste, or animal manure used as fuel. When burned, biomass undergoes combustion, releasing carbon dioxide (CO_2), water vapor, and energy. While it is considered renewable because new plants can regrow and reabsorb CO_2, it does not mean the process is carbon-free. The key difference is that the carbon released is part of the short-term carbon cycle, unlike fossil fuels that release carbon stored for millions of years. This means that the statement is a misconception and not a fact.

Source: U.S. Energy Information Administration – Biomass explained (2023).
🔗https://www.eia.gov/energyexplained/biomass/

Entry [#7]: Renewable Energy Sources: **Tidal Energy**

Statement (COR 008):
"Tidal energy can generate electricity at any time, regardless of the movement of tides."

Logical Proposition (COR 005):
"If tidal energy is used, then electricity can be generated anytime."

Symbolized: P → Q
(where P = tidal energy is used, Q = electricity is generated anytime)

Truth Value (COR 005):
False – Tidal energy depends on the natural rise and fall of tides.

Scientific Explanation (COR 008):
Tidal energy comes from the gravitational pull of the moon and sun, which causes the rise and fall of ocean water levels. Power plants use turbines or barrages to convert this movement into electricity. However, tides follow predictable cycles, so energy generation is not continuous—it only occurs when the tide is moving in or out. This means tidal power is reliable but not available at all times. This also means that the statement is a misconception and not a fact.

Source: National Oceanic and Atmospheric Administration (NOAA) – Tides and Water Levels (2023).
🔗https://oceanservice.noaa.gov/education/tutorial_tides/tides05_energy.html

Entry [#8]: Renewable Energy Sources: **Biofuels**

Statement (COR 008):
"Using biofuels does not release greenhouse gases, so it is completely environmentally friendly."

Logical Proposition (COR 005):
"If biofuels are used, then no greenhouse gases are released."

Symbolized: $P \rightarrow \neg Q$
(where P = biofuels are used, Q = greenhouse gases are released)

Truth Value (COR 005):
False – Biofuels still release greenhouse gases when burned.

Scientific Explanation (COR 008):
Biofuels such as ethanol and biodiesel are made from biomass sources like corn, sugarcane, or vegetable oils. When burned, they release carbon dioxide (CO_2) and other greenhouse gases. However, unlike fossil fuels, the carbon released by biofuels comes from plants that recently absorbed CO_2 during growth, making the cycle shorter. This means biofuels can reduce net emissions compared to petroleum, but they are not completely free from greenhouse gas emissions. This also means that the statement is a misconception and not a fact.

Source: U.S. Department of Energy – Biofuels Basics (2023).
🔗https://www.energy.gov/eere/bioenergy/biofuels-basics

Entry [#9]: Non-Renewable Energy Source: **Fossil Fuels**

Statement (COR 008):
"The emissions of fossil fuels are much clearner than other energy sources."

Logical Proposition (COR 005):
"If fossil fuels are burned, then its emissions is clean for the environment"

Symbolized: $P \rightarrow Q$
(where P = fossil fuels are burned, Q = Emissions is clean for the environment)

Truth Value (COR 005):
False – Fossil fuels is the major contributor of greenhouse gases that causes global warming.

Scientific Explanation (COR 008):
Fossil fuels have three types: coal, oil and gas, which are non-renewable resources that take hundreds of millions of years to form. Fossil fuels, when burned to produce energy, releases large amounts of carbon dioxide, a greenhouse gas, into the air. Greenhouse gases trap heat in our atmosphere, causing global warming. This means that the statement is a misconception and not a fact.

Sources: www.clientearth.org
www.un.org

Group Reflection: *What did you learn from myth-busting?*

I found out that some things we believe about energy aren't always true. This activity made me more curious to double-check information before accepting it. -Kian Zachary Paez

I realized that both renewable and non-renewable energy have their own strengths and weaknesses. It showed me why science-based facts are really important for making decisions. -Yoni Belith Patricio

Doing this task helped me understand energy sources better and clear up common myths. I also learned how logic can make explanations easier to understand. -Chrizzia Ann Edang

I learned that without energy, our industry is too weak is a basic truth. Energy is essential for a strong, innovative, and competitive economy. -Edrian Broñosa

I learned that not all energy sources affect the environment the same way. This helped me see why choosing the right source really matters. -Nikko Jofferson Aldaba

I realized that some facts about energy can be misunderstood. Now I know it's important to search what I hear. -Christian Rich Cofreros

This activity taught me how to differentiate facts and misconceptions. It's really important to know, if the informations we hear is true or just a misconception. -Kaleah Jazzelle Labatigan

I have learned that both renewable and non-renewable energy have their own strengths and weaknesses. I also found out how each affects the environment. -Nicole Pancrudo

I found out that energy isn't just about power, it's also about how it will impact the world. This activity made me aware of how much energy we consumed everyday and how it impact our environment. -Bonifacio Pedroso jr.