# Documentary Script: Energy Myths and Logic

# [Intro - Narrator]

"Energy powers our lives every day. But with so many sources of energy, there are also a lot of misconceptions. In this documentary, we'll use logic and science to separate fact from fiction. For each energy source, we'll test a statement, symbolize it in logic, and explain the truth behind it."

# ★ Entry #1: Solar Energy

#### Narrator / Member 1:

"Our statement is: 'Using tilted solar panels can maximize sunlight absorption and energy production even without tilting it.'

Logical Proposition: If the panels are tilted, it can maximize solar energy production.

Symbolized: **P** ∧ **Q** 

Here, P means 'the panels are tilted.'

Q means 'energy production is maximized.'

Truth Value: <a> True</a>.

### Scientific Explanation:

Solar energy comes from sunlight, which is captured by photovoltaic panels. Tilting the panels allows them to face the sun directly throughout the day, maximizing the amount of energy they absorb. Flat panels can still work, but tilted ones ensure better efficiency year-round. This makes the statement a fact, not a misconception."

# Entry #2: Wind Energy

### Narrator / Member 2:

"The statement says: 'Wind turbines can still make electricity even if there is no wind.'

Logical Proposition: If there is no wind, then the turbine can still produce electricity.

Symbolized:  $\neg P \rightarrow Q$ 

Here, **P means 'there is wind.'** So ¬P means 'there is no wind.'

Q means 'the turbine produces electricity.'

Truth Value: X False.

## Scientific Explanation:

Wind turbines depend on moving air to spin their blades. The spinning blades turn a generator to produce electricity. Without wind, there is no movement — and no electricity. This means the statement is a misconception."



# Entry #3: Hydropower

#### Narrator / Member 3:

"The statement says: 'Hydroelectric power converts flowing water energy into electricity.'

Logical Proposition: If there is flowing water, then hydroelectric power can be generated.

Symbolized:  $P \rightarrow Q$ 

Here, P means 'there is flowing water.'

Q means 'hydroelectric power is generated.'

Truth Value: V True.

### Scientific Explanation:

Hydropower plants use the kinetic energy of flowing water to spin turbines connected to generators. These generators then produce electricity. Since flowing water is a renewable source, hydroelectricity is sustainable and reliable. This statement is a fact."



# Entry #4: Geothermal Energy

#### Narrator / Member 1:

"Our statement is: 'Geothermal energy can be effectively used to heat and cool buildings by using the stable temperature of the Earth's subsurface.'

Logical Proposition: Geothermal energy is effective for heating and cooling buildings if and only if the subsurface temperature is stable.

Symbolized:  $P \leftrightarrow Q$ 

Here, P means 'geothermal energy is effective for heating and cooling buildings.' Q means 'the subsurface Earth temperature is relatively stable.'

Truth Value: V True.

## Scientific Explanation:

Geothermal heat pumps use the ground as a heat sink and a heat source. The Earth below the surface keeps a steady temperature, which allows buildings to stay warm in winter and cool in summer. This proves the statement is a fact."

# **★** Entry #5: Nuclear Energy

#### Narrator / Member 2:

"Our statement is: 'Nuclear energy is the cleanest energy source because it produces almost no greenhouse gas emissions.'

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

Symbolized:  $P \rightarrow Q$ 

Here, P means 'electricity is generated by nuclear fission.'

Q means 'it is one of the cleanest energy sources.'

Truth Value: V True.

## Scientific Explanation:

Nuclear plants generate power through fission without burning fossil fuels. That means they release almost no greenhouse gases. While nuclear waste is a concern, in terms of air emissions, nuclear energy is among the cleanest options available today. This statement is a fact."

# ✓ Entry #6: Biomass Energy

## Narrator / Member 3:

"The statement says: 'Burning biomass does not release carbon dioxide because it is a natural fuel.'

Logical Proposition: If a fuel is natural, then burning it does not release carbon dioxide.

Symbolized:  $P \rightarrow \neg Q$ 

Here. P means 'the fuel is natural.'

Q means 'burning releases carbon dioxide.'

Truth Value: X False.

#### Scientific Explanation:

Biomass, like wood or crop waste, is natural, but when burned, it still releases carbon dioxide. The difference is that the carbon released is part of the short-term cycle — plants can regrow and reabsorb CO2. Still, it is not carbon-free. So, the statement is a misconception."

**Entry #7: Tidal Energy** 

#### Narrator / Member 1:

"The statement is: 'Tidal energy can generate electricity at any time, regardless of the movement of tides.'

Logical Proposition: If tidal energy is used, then electricity can be generated anytime.

Symbolized:  $P \rightarrow Q$ 

Here, P means 'tidal energy is used.'

Q means 'electricity is generated anytime.'

Truth Value: X False.

# Scientific Explanation:

Tidal energy comes from the rise and fall of ocean tides caused by the moon and sun's gravity. Energy is only generated when tides move in or out, not continuously. This makes tidal energy predictable but not available at all times. So, the statement is a misconception."



# Entry #8: Biofuels

#### Narrator / Member 2:

"Our statement is: 'Using biofuels does not release greenhouse gases, so it is completely environmentally friendly.'

Logical Proposition: If biofuels are used, then no greenhouse gases are released.

Symbolized: **P** → ¬**Q** 

Here, P means 'biofuels are used.'

Q means 'greenhouse gases are released.'

Truth Value: X False.

### Scientific Explanation:

Biofuels like ethanol and biodiesel come from plants. When burned, they release carbon dioxide, but since the carbon comes from plants that recently absorbed it, the cycle is shorter compared to fossil fuels. Biofuels reduce emissions but are not completely emission-free. This makes the statement a misconception."



# 📑 Entry #9: Fossil Fuels

#### Narrator / Member 3:

"The statement says: 'The emissions of fossil fuels are much cleaner than other energy sources.'

Logical Proposition: If fossil fuels are burned, then emissions are clean for the environment.

Symbolized:  $P \rightarrow Q$ 

Here, P means 'fossil fuels are burned.'

Q means 'emissions are clean for the environment.'

Truth Value: X False.

# Scientific Explanation:

Fossil fuels such as coal, oil, and gas release large amounts of greenhouse gases when burned. These gases trap heat and contribute to global warming. This makes fossil fuels one of the dirtiest sources of energy. So, the statement is a misconception."

## [Outro – Narrator]

"Through logic and science, we've seen which statements are facts and which are misconceptions. By symbolizing them in logic, we can break them down clearly: P represents one condition, Q represents another, and together they show us the truth. Energy is powerful — but understanding it with reason is even more powerful."