Energy Flows: Answer Key

How is energy transformed? Compare and contrast energy transformations below.

Directions:
After your teacher hands out a set of energy source transformation cards to your group, sequence the cards in the order that they happen. The initial card should begin on the left with the subsequent cards following to the right.

What do the sources have in common?
Sun is the beginning, many use radiant energy to produce chemical energy in plants, heat and pressure are used in producing fossil fuels, power plants use a generator to transform the energy source to electricity.

Can each of these sources produce the same end product?
Yes, electricity can be used for many things from lighting a bulb to powering an electric car.

Is electricity a primary or secondary source of energy?
Electricity is the flow of electrical power or charge. It is a secondary energy source because we get it from the conversion of other sources of energy, like coal, natural gas, oil, nuclear power and other natural sources, which are called primary sources.
<table>
<thead>
<tr>
<th><strong>Sun</strong></th>
<th>Through the process of fusion, I convert nuclear energy into radiant energy.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ancient Sea Plant</strong></td>
<td>Through the process of photosynthesis, I converted radiant energy into chemical energy and stored it in my cells.</td>
</tr>
<tr>
<td><strong>Ancient Sea Animal</strong></td>
<td>I stored chemical energy from food—ancient sea plants—in my cells.</td>
</tr>
<tr>
<td><strong>HEAT AND PRESSURE</strong></td>
<td>I turned ancient plants and animals into fossil fuels.</td>
</tr>
<tr>
<td><strong>Petroleum</strong></td>
<td>I am a fossil fuel. The chemical energy stored in me came from the remains of ancient sea plants and animals.</td>
</tr>
<tr>
<td><strong>Automobile</strong></td>
<td>I convert chemical energy in petroleum into motion, sound, and heat.</td>
</tr>
<tr>
<td>![Symbol: Radiant Energy]</td>
<td>Through the process of fusion, I convert nuclear energy into radiant energy.</td>
</tr>
<tr>
<td>---------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Sun</strong></td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Ancient Fern" /></td>
<td>Through the process of photosynthesis, I converted radiant energy into chemical energy and stored it in my cells.</td>
</tr>
<tr>
<td><strong>Ancient Fern</strong></td>
<td></td>
</tr>
<tr>
<td><strong>HEAT AND PRESSURE</strong></td>
<td>I turned ancient plants into fossil fuels.</td>
</tr>
<tr>
<td><img src="image" alt="Coal" /></td>
<td></td>
</tr>
<tr>
<td><strong>Coal</strong></td>
<td>I am a fossil fuel. The chemical energy stored in me came from the remains of ancient ferns.</td>
</tr>
<tr>
<td><strong>Thermal Power Plant</strong></td>
<td>I convert chemical or nuclear energy in fuels into thermal energy then into electrical energy.</td>
</tr>
<tr>
<td><img src="image" alt="Television" /></td>
<td>I convert electrical energy into light, heat, and sound.</td>
</tr>
<tr>
<td>Sun</td>
<td>Through the process of fusion, I convert nuclear energy into radiant energy.</td>
</tr>
<tr>
<td>-----</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Water</td>
<td>I am a renewable energy source. The sun drives the water cycle and keeps me replenished in lakes, rivers, and oceans.</td>
</tr>
<tr>
<td>River</td>
<td>Through the water cycle I am always flowing and am fed by smaller streams and creeks.</td>
</tr>
<tr>
<td>Reservoir</td>
<td>I stay full because of the water cycle. I hold water as gravitational potential energy.</td>
</tr>
<tr>
<td>Hydropower Plant</td>
<td>I convert the kinetic energy of moving water into electrical energy.</td>
</tr>
<tr>
<td>Light Bulb</td>
<td>I convert electrical energy into radiant and thermal energy.</td>
</tr>
</tbody>
</table>
Through the process of fusion, I convert nuclear energy into radiant energy.

Ancient Sea Plant

Through the process of photosynthesis, I converted radiant energy into chemical energy and stored it in my cells.

Ancient Sea Animal

I stored chemical energy from food—ancient sea plants—in my cells.

HEAT AND PRESSURE

I turned ancient plants and animals into fossil fuels.

Propane

I am a fossil fuel. The chemical energy stored in me came from the remains of ancient sea plants and animals.

Propane Grill

I convert the chemical energy in propane into thermal energy.
<table>
<thead>
<tr>
<th>Sun</th>
<th>Through the process of fusion, I convert nuclear energy into radiant energy.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photovoltaic Solar Panel</td>
<td>I absorb sunlight as a source of energy to generate direct current electricity.</td>
</tr>
<tr>
<td>Inverter</td>
<td>I convert direct current to alternating current.</td>
</tr>
<tr>
<td>Light Bulb</td>
<td>I convert electrical energy into radiant and thermal energy.</td>
</tr>
<tr>
<td><strong>Sun</strong></td>
<td>Through the process of fusion, I convert nuclear energy into radiant energy.</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Green Plant</strong></td>
<td>Through the process of photosynthesis, I convert radiant energy into chemical energy and store it in my cells.</td>
</tr>
<tr>
<td><strong>Combustor or Furnace</strong></td>
<td>I burn the biomass and steam is generated to turn a turbine. The turbine generator generates electrical energy.</td>
</tr>
<tr>
<td><strong>Light Bulb</strong></td>
<td>I convert electrical energy into radiant and thermal energy.</td>
</tr>
<tr>
<td>Sun</td>
<td>Radiant Energy</td>
</tr>
<tr>
<td>-----</td>
<td>----------------</td>
</tr>
<tr>
<td>Wind</td>
<td>Wind Turbine</td>
</tr>
<tr>
<td>Light Bulb</td>
<td></td>
</tr>
</tbody>
</table>
Through the process of fusion, I convert nuclear energy into radiant energy.

Through the process of photosynthesis, I converted radiant energy into chemical energy and stored it in my cells.

I stored chemical energy from food—ancient sea plants—in my cells.

I turned ancient plants and animals into fossil fuels.

I am a fossil fuel. My chemical energy came from the remains of ancient sea plants and animals.

I convert the chemical energy in natural gas into thermal energy.
<table>
<thead>
<tr>
<th>Uranium</th>
<th>I am a common rock found around the world. My nuclear energy comes from the splitting of my atoms.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Splitting Atom</td>
<td>A uranium atom is split (fission) releasing thermal energy to produce steam.</td>
</tr>
<tr>
<td>Thermal Power Plant</td>
<td>I convert chemical or nuclear energy in fuels into thermal energy then into electrical energy.</td>
</tr>
<tr>
<td>Light Bulb</td>
<td>I convert electrical energy into radiant and thermal energy.</td>
</tr>
<tr>
<td>Earth</td>
<td>Much of the heat from the Earth’s interior is left over from its formation and from ongoing radioactive decay.</td>
</tr>
<tr>
<td>-------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Geothermal Power Plant</td>
<td>Steam from underground reservoirs is pumped directly into turbine generators in the power plant. The steam generators provide electricity.</td>
</tr>
<tr>
<td>Light Bulb</td>
<td>I convert electrical energy into radiant and thermal energy.</td>
</tr>
</tbody>
</table>