To Grid or Not to Grid

From a global perspective, the United States is, and will continue to be, a major consumer of energy. This has sparked a national conversation regarding the pros and cons of various fuel sources, engaging such diverse constituencies as climate scientists, corporate interests, public health advocates, politicians, and communities reviewing their power needs. As a result of these conversations, terms like the Greenhouse Effect have emerged. Although this may seem like a recent concept, Jean Baptiste Joseph Fourier, a French mathematician, actually proposed in 1827 that the Earth's atmosphere acts to raise the planet's temperature.

Currently, a traditional processing plant uses a network of power lines, called a power grid, to disseminate power. Fuel sources include nuclear energy as well as natural resources, such as coal or natural gas. With growing concerns about sustainability and climate, there has been a push to explore alternative energy sources. Innovations have included individual solutions, such as solar panels on a roof, or regional solutions, such as a wind farm, with its own power grid to serve area customers.

In recognition of the upcoming Earth Day, your Challenge Problem is to explore the pros and cons of different ways to obtain power for a specific home in your area. This could be a home owned by a group member, the Faculty Mentor, or any home that you have access to information, including utility bills, home layout, and energy demands. What are the best sources for power in your area (staying with the traditional grid, converting to a different power grid, or establishing a source of power in your own house or backyard)? Power generating sources can vary by location: Oklahoma might be great for wind power; Seattle might not be a good choice for solar power; and not everyone has a geothermal pool in their backyard.

Your team must decide on the best solution specific to the energy needs of the home you have chosen, taking into account its size, appliances, entertainment, HVAC, technology, etc. You may consider single or a combination of energy sources (like how a hybrid car uses both battery and gasoline). Alternative fuels include, but are not limited to, solar, wind, biofuels, geothermic, and hydroelectric. This could also be an opportunity to propose a vision and plan for an as-yet-untapped alternate energy source for your area. Your team must consider and address the following in making the decision about how to best supply the chosen house with the necessary energy:

1. What modifications would have to be made to the home and property?
2. What are the immediate and long-term fiscal and environmental consequences?
3. What are the results of a Cost-Benefit Analysis when determining the feasibility of your proposed modifications?

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