

Alternative Energy and Conservation

- Alternative energy sources are energy sources that are still in development.
- Some methods of electricity generation in use today were once considered alternative energy.
- Do you think you can name a few?

Alternative Energy and Conservation

- Photovoltaic
- Biomass
- Wind
- Geothermal

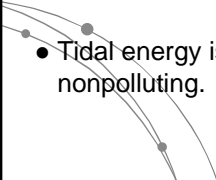
Alternative Energy and Conservation

- What makes an alternative energy a viable option for the future?
 - The source must be proven to be cost effective.
 - The environmental impact of using the energy must be acceptable.

Tidal Power

Pros

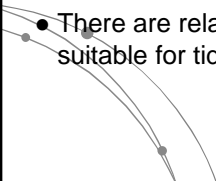
- Energy gotten from the natural rise and fall of the tides can be used to generate electricity.
- Tidal energy is renewable and nonpolluting.



Tidal Power

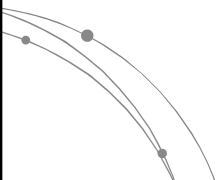
Cons

- The cost of building and maintaining a tidal power plant is high.
- There are relatively few locations that are suitable for tidal power plants.



Tidal Power

- Tidal Energy Pty Ltd (4:44)
<http://www.youtube.com/watch?v=4lq-h4ShZ8s&feature=related>



Tidal Power

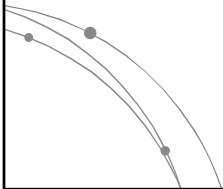
- Ocean Energy – Wave Power Station (2:43)

<http://www.youtube.com/watch?v=gCStpg3i5V8&feature=related>



Ocean Thermal Energy Conversion (OTEC)

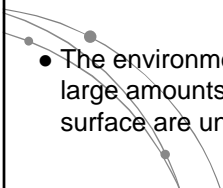
- OTEC relies on the temperature difference between surface waters and deep ocean waters to generate electricity.



Ocean Thermal Energy Conversion (OTEC)

Unfortunately

- 1/3 of the power generated is used to pump cold water from the deep ocean making the process inefficient.
- The environmental effects of pumping large amounts of deep cold water to the surface are unknown.



Hydrogen

- Hydrogen is the most abundant element in the universe.
- Hydrogen does not contain carbon so it does not produce the pollutants that fossil fuels do when burned.

Hydrogen

The Challenge

- A lot of energy is needed to obtain hydrogen.
- Example - (Splitting water to produce hydrogen)
 - Electricity is used to split water. How do you produce the electricity necessary?

Hydrogen

Fuel Cells

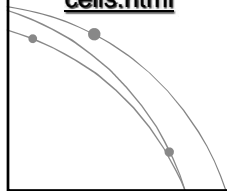
- Create electrical energy by combining hydrogen with oxygen.
- The byproduct is simply water.
- Fuel cells can use any fuel that contains enough hydrogen to work efficiently.

Hydrogen

Fuel Cells

- NOVA ScienceNow – Fuel Cells (12:49)

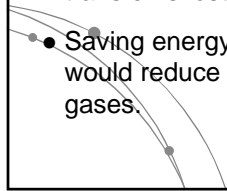
<http://www.pbs.org/wgbh/nova/tech/fuel-cells.html>



Energy Efficiency

The percentage of energy put into a system that does useful work.

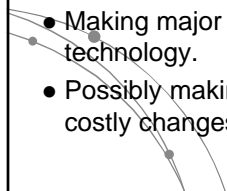
- Most of the energy wasted during energy transfer is lost as heat.
- Saving energy by reducing energy waste would reduce air pollution and greenhouse gases.



Energy Efficiency

The Holdup

- Increasing efficiency usually means making sacrifices such as speed or range in vehicles.
- Making major financial investments in new technology.
- Possibly making time consuming and costly changes to infrastructure.



Cogeneration

- The production of two useful forms of energy from the same fuel source.
- Cogeneration involves using what might otherwise be wasted for positive gain.
- Cogeneration is an more efficient use of fuel by using the fuel to a greater potential.

Energy Conservation

How is our energy wasted in our own homes?

- Poorly insulated:
 - Windows
 - Doors
 - Walls
 - Attic spaces

Energy Conservation

Find this image on p. 471 for more info

