

S
L
I
D
E

1

Chemistry in Focus 3rd edition
Tro

Chapter 10
Energy for Tomorrow: Solar and
Other Renewable Energy
Resources

S
L
I
D
E

2

Earth's Ultimate Energy Source

- Provides more energy than we need to solve all of our energy needs...
- But at low concentration

• ***Fossil fuels are hard to beat for concentrated energy content.***

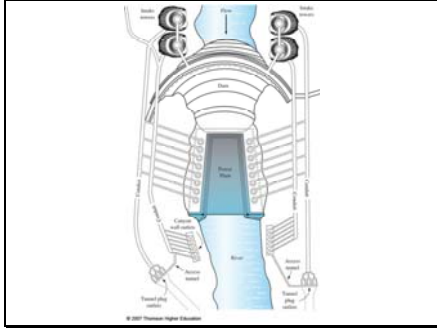
S
L
I
D
E

3

Hydroelectric Power

- Considered to be a form of solar energy
- Clean, efficient, renewable
- Major limitation: small number of dammable rivers in the U. S.
 - 42% already have dams
- Also threats to marine life, potential dam failure, impact on the river as a whole
- Main areas for growth: developing nations

S
L
I
D
E



4

S
L
I
D
E

Wind Power

- Another indirect form of solar energy.
- The Sun heats air which expands and rises; cooler air rushes in to fill the void, creating wind that can turn a turbine.



5

S
L
I
D
E

Advantages and Disadvantages

- | | |
|--|---|
| • Price is competitive with coal | • Unattractive |
| • Clean | • Uses lots of land |
| • Efficient | • Winds are intermittent and uncontrollable |
| • Renewable | • Secondary energy source or storage mechanism is necessary |
| • Releases nothing into the atmosphere | |

6

S
L
I
D
E

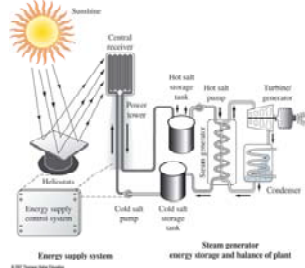
Solar Thermal Energy

- Concentrating and focusing the sun's rays with mirrors generates enough heat at the focal point to produce steam and turn a turbine, generating electricity.
- Three designs
 - Solar power towers (\$0.12/kwh, \$0.05 for coal)
 - Parabolic troughs (\$0.12 per kwh)
 - Dish/engine (\$0.15 per kwh)
- Prices continue to drop as technologies improve.
- The cost per kilowatt hour of coal is \$0.05.

7

S
L
I
D
E

Solar Two/Solar Power Tower



8

S
L
I
D
E

Parabolic Troughs

- Troughs trap and focus sunlight onto a receiver pipe through which flows synthetic oil.
- In a heat exchanger, water is heated to steam to turn a turbine.



9

S
L
I
D
E

The 2050 World

- Who is the real winner with respect to new energy technologies?

2
5
