

Chapter 16 Notes – Renewable Energy

Core Case Study: ...Wind Power

- Define “wind farm”
- Which states are the two top producers of wind electricity? a)
- What type of energy is wind?
- Why are turbines generally so tall?
- What are some of the advantages?

16-1 Why is Energy Efficiency an Important...

- What is the quickest, cleanest, and cheapest way to provide more energy?
- What is energy efficiency?
- What are the four most energy inefficient devices? And roughly what percent of energy is wasted for each one?
- Looking at Figure 16-2, how much of the country’s high-quality energy ends up performing useful tasks?
- Give four examples of how industries could improve energy efficiency.
- What are four ways that smart grids are better than our current electrical grid system?
- What are the hidden cost associated with gasoline?
- How much energy could electric cars save the US? Where does the carbon footprint of an electric car come from? How can this carbon emission be lowered?
- What are the advantages of H₂ fuel cells? Why do they yield a negative net energy yield?
- What benefits do ultralight/strong cars have?
- List ways we can design buildings to save energy?
- List ways we can save energy in existing buildings?
- Why does energy remain artificially cheap, and why does renewable energy account for only 8% of world consumption?

16-2 What are the Advantages...Solar Energy?

Describe two types of solar heating.

- How can you cool buildings naturally
- Describe a solar thermal system and how they are used. What are dis/advantages?
- How are photovoltaic cells different than solar thermal systems?
- What are dis/advantages with Solar Cells?

16-3 Advantages...Hydropower

- Three ways of using water include:
- What are dis/advantages with hydropower?
- Why is it likely large hydropower energy sources will diminish in the future?
- What are Micro-hydropower generators, and what benefit do they provide?
- Why is power from tides and waves limited?

16-4 Advantages...Wind Power?

- Wind power has the potential to produce _____ times of the world's current electricity used.
- Why are offshore windfarms likely to be more common in the future?
- What are dis/advantages of wind farms?
- How can bird and bat collisions be lessened?

16-5 Advantages ... Biomass...

- What harmful effects come from using solid biomass as an energy source?
- How can using biomass fuel be potentially CO₂ neutral? Where are two ways they could increase greenhouse gases?
- What are the benefits of biodiesel?
- What are the drawbacks of corn based ethanol? Why is cellulosic ethanol preferable?
- What are other promising sources of biofuel?

16-6 Advantages... Geothermal?

- Where is geothermal energy stored?
- Describe three ways geothermal energy is captured?
- Look at Figure 16-30a and describe in your own words the process of geothermal energy on a large scale.

16-7 The advantages... Hydrogen?

- What are two big advantages of Hydrogen as a fuel?
- What are three challenges of Hydrogen?
- Why is it likely Hydrogen will require government subsidies?

16-8 How Can We Make the Transition?

- What does it typically take to phase in new energy alternatives?
- What are some key considerations when developing an energy policy?
- Describe the scenario in figure 16-34. Why is it more likely in the future?
- Why is it so important for China and the US to shift away from fossil fuels?
- What are three conclusions you can draw from the data in Figure 16-35?
- What effects would reducing or removing subsidies to non-renewable fuels have?
- Why is cloudy Germany the world's most solar-powered nation?