

ENERGY Learning Objectives

Students should be able to...

(Based on Bloom's taxonomy of learning objectives)

Remember

- ... List the different ways to generate energy
- ... name the order of magnitudes of energy production and consumption
- ... name energy prices
- ... name implications of high/low energy prices
- ... rank types of energy production by production costs
- ... describe the amount of experience we have with different types of energy production/what the development status is
- ... identify the sectors that consume a lot of energy
- ... explain what integrated design is
- ... rank household appliances by energy consumption
- ... quantify efficiencies of different ways of producing power
- ... identify the units of electricity
- ... recall that energy is difficult to store

Understand

- ... explain how each type of energy production converts fuel to electricity
- ... visually distinguish between coal and nuclear power plants
- ... rank types of energy production by emissions
- ... distinguish between capex and opex
- ... explain why there are no zero emissions
- ... explain the implications of Life-cycle assessments
- ... distinguish between power and energy
- ... explain what fracking is, incl. advantages and disadvantages
- ... distinguish between energy conservation and energy efficiency
- ... explain how the development of the electrical grid impacted the design of power plants (i.e. lead to large centralized power plants rather than distributed generation)
- ... rank generation technology by efficiency
- ... explain why solar and wind energy needs back-up power generation capacity

Apply

- ... identify the energy sources and consumers in their own community
- ... interpret data on energy consumption
- ... predict their city's future energy demand
- ... describe what impact fracking will have on their community

Analyze

- ... predict the impact of high energy prices on different industry
- ... determine if a proposal to save energy is feasible/effective
- ... analyze an electricity bill to identify what causes periods of high or low usage
- ... examine different ways to cope with the variability of renewable resources like wind and solar

Evaluate

- ... evaluate U.S. and international energy policies
- ... evaluate efforts to save energy that they see or hear about
- ... the environmental and economic tradeoffs between different generation technologies

Create

- ... draft a plan to save energy in their community/school/house
- ... find ways to produce energy in their own house (e.g. solar water heater)
- ... write opinion piece on energy topics
- ... design a micro-grid for their community (i.e. what resources wind/solar/geothermal exist where you live)