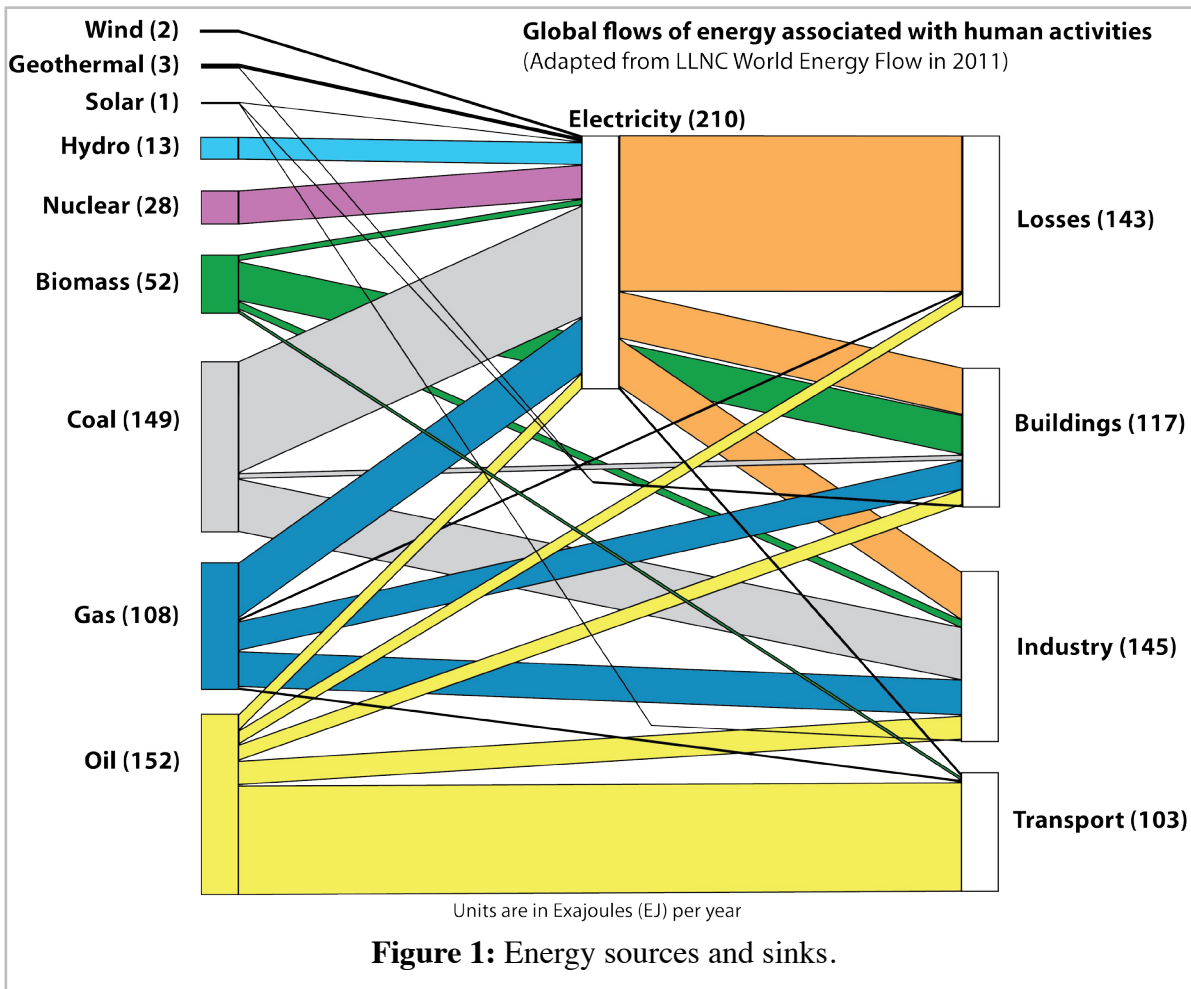


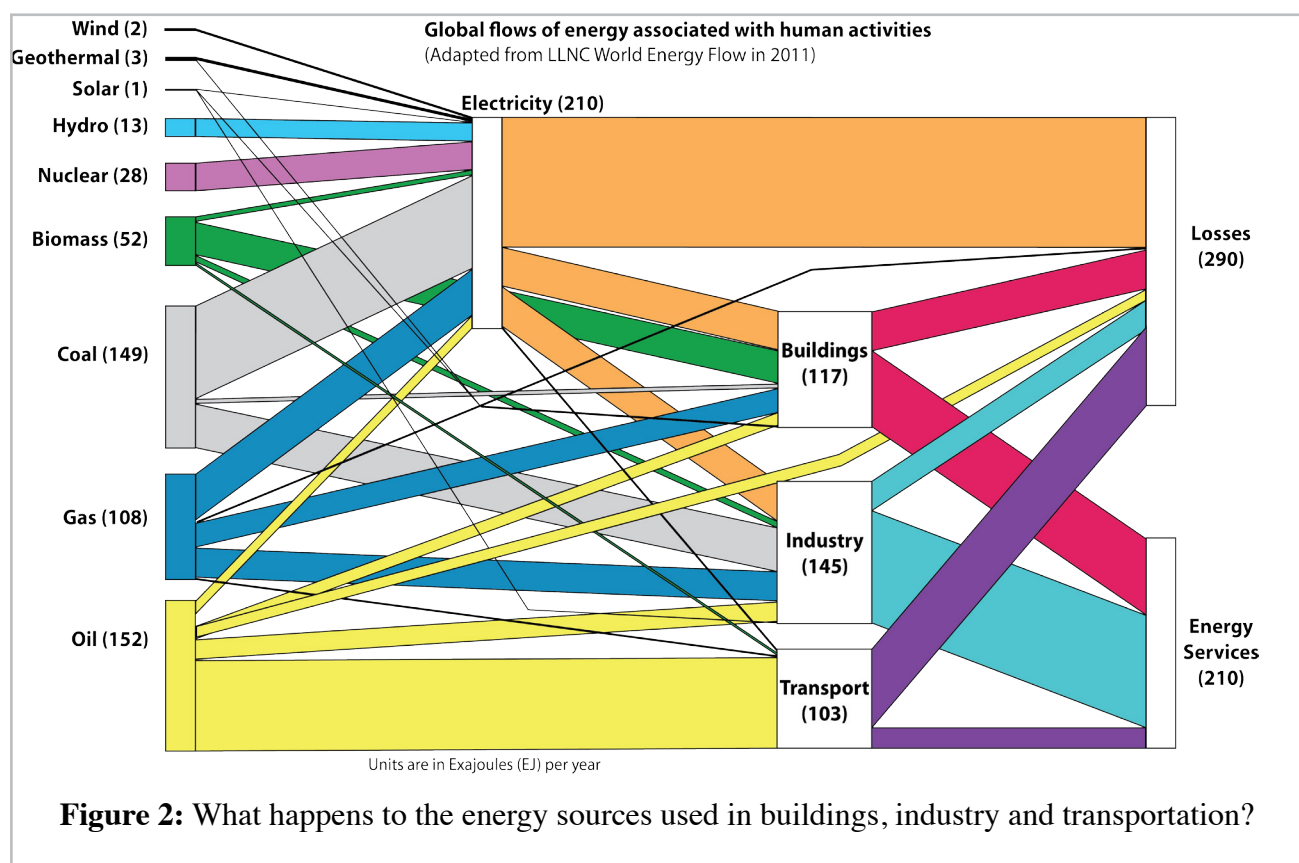
Energy Services and Energy Losses: Supplemental Analysis

In the Global Energy Flows activity, we followed the flow of different sources of energy to their end uses in buildings, industry and transportation. We have also discussed the losses associated with generating electricity. Almost two thirds of the energy that flows through electricity generation is lost as heat in most power plants (Figure 1). Is this the only loss of energy in this system?



Think about some of the specific ways that energy is used in buildings, industry, and transportation. Energy provides many valuable uses to people, such as lighting, heating, cooling, powering electronics, moving vehicles and running machines. We call these various human uses **energy services**.

Question for discussion: When energy sources are used in buildings, industry, and transportation, can you think of any ways that energy is “lost”? Explain and, if possible, describe an example of how some energy is lost in providing a specific service.



Questions for discussion:

Does anything surprise you about this diagram? Share your observations.

What percent of total global energy sources ends up providing energy services? What percent is lost?

What form does most lost energy take?

What are some ways that we might reduce the amount of energy lost globally?

Share one questions that you have after analyzing this diagram.

What additional information or data would help you answer that question?

Global Energy Use: Energy Services and Losses Units: Exajoules (EJ), or 1×10^{18} Joules

Transport		Industry		Buildings	
Lost energy	81	Lost	28	Lost	40
Services	21	Services	110	Services	75
Total	102	Total	138	Total	115

Global Energy Service to Sink

Lost energy		Services	
Buildings	40	Buildings	75
Industry	28	Industry	110
Transport	81	Transport	21
Total	149	Total	206

Data Source: LLNL 2014. Data is based on IEA's Extended World Energy Balances (2013 Edition). World Energy Flow in 2011. United States Department of Energy. <https://flowcharts.llnl.gov/commodities/energy>

About the data: The data shows how much energy used in buildings, industry and transportation is lost compared to how much ends up providing energy services (like lighting, heating, moving machines, powering electronics and moving vehicles). Note that the energy losses from generating electricity is not included. This data was used to generate the right-hand extension of the global energy flow Sankey diagram.

