

The Kaya Identity: Energy Use, Efficiency, and Conservation

2022-03-21

Contents

Reading: 1

Reading:

Required Reading (everyone):

- The Climate Fix, Ch. 3.
- Climate Casino, Ch. 14.

Reading Notes:

In both chapters, the focus is on what it would take to reduce CO₂ emissions around the world.

Key concepts that you should understand are:

- We will be discussing national and global energy consumption in terms of **quads** (see p. 63 in Climate Fix). You should have a good feeling for how much a quad is and how many quads the US consumes.
- The **Kaya Identity** and the factors that go into it (p. 71 of *The Climate Fix*; you might also go back and quickly review pp. 19–23 of *Climate Casino*, which we read for Aug. 28):
 - Total CO₂ emissions (F)
 - Population (P)
 - Per-capita GDP (g)
 - Energy intensity of the economy (e)
 - Carbon intensity of the energy supply (f)
- How would you make sense of the fact that the U.S. has a much greater F than India and a slightly smaller F than China, but a much smaller e and f than either India or China?
- What trends have we seen over the past several decades in the energy intensity of the economy and the carbon intensity of the energy supply? (pp. 74–79 of *The Climate Fix* and Fig. 3 on p. 22 of *Climate Casino*)
- What is **primary energy consumption** and how does it differ from other kinds of energy consumption?
- Why does Pielke argue that **energy dependence** leads to **energy insecurity**?
- In *Climate Casino*, look at Figure 23 and the table of carbon emissions on p. 159. How do different fuels compare in terms of carbon emissions?
- In *Climate Casino*, look at Table 6 and get a sense of what activities cause the most CO₂ emissions.
- What does the Kaya Identity and the material from *Climate Casino* suggest for where we should focus in our economy to reduce CO₂ emissions?