Transporting Stuff

Physics and Mathematics of Sustainable Energy

College of the Atlantic. October 28, 2022

A few facts:

- Gasoline: 10 kWh per litre or 38 kWh per gallon
- Typical gas mileage for car: 25mph, but this ranges considerably.
- Carbon intensity of gasoline: 9 kg per gallon.
- Energy intensity of different forms of shipping:
  - Road: 1 kWh per ton-km
  - Container Ship: 0.015 kWh per ton-km
  - Plane: 1.6 kWh per ton-km
  - Rail: 0.1 kWh per ton-km
- Carbon intensity of different forms of shipping. Units are tons of CO_2e per million ton-km.
  - Road: 180
  - Container Ship: 11
  - Plane: 680
  - Rail: 18

1. Suppose you live in Boston and purchase 30 kg of tomatoes. What are the emissions and energy associated with transporting these tomatoes to you if:
   (a) The tomaotes come from Italy on a boat?
   (b) The tomatoes come from Sacramento, CA, via a train?
   (c) The tomatoes come from Sacramento, CA, via a truck?