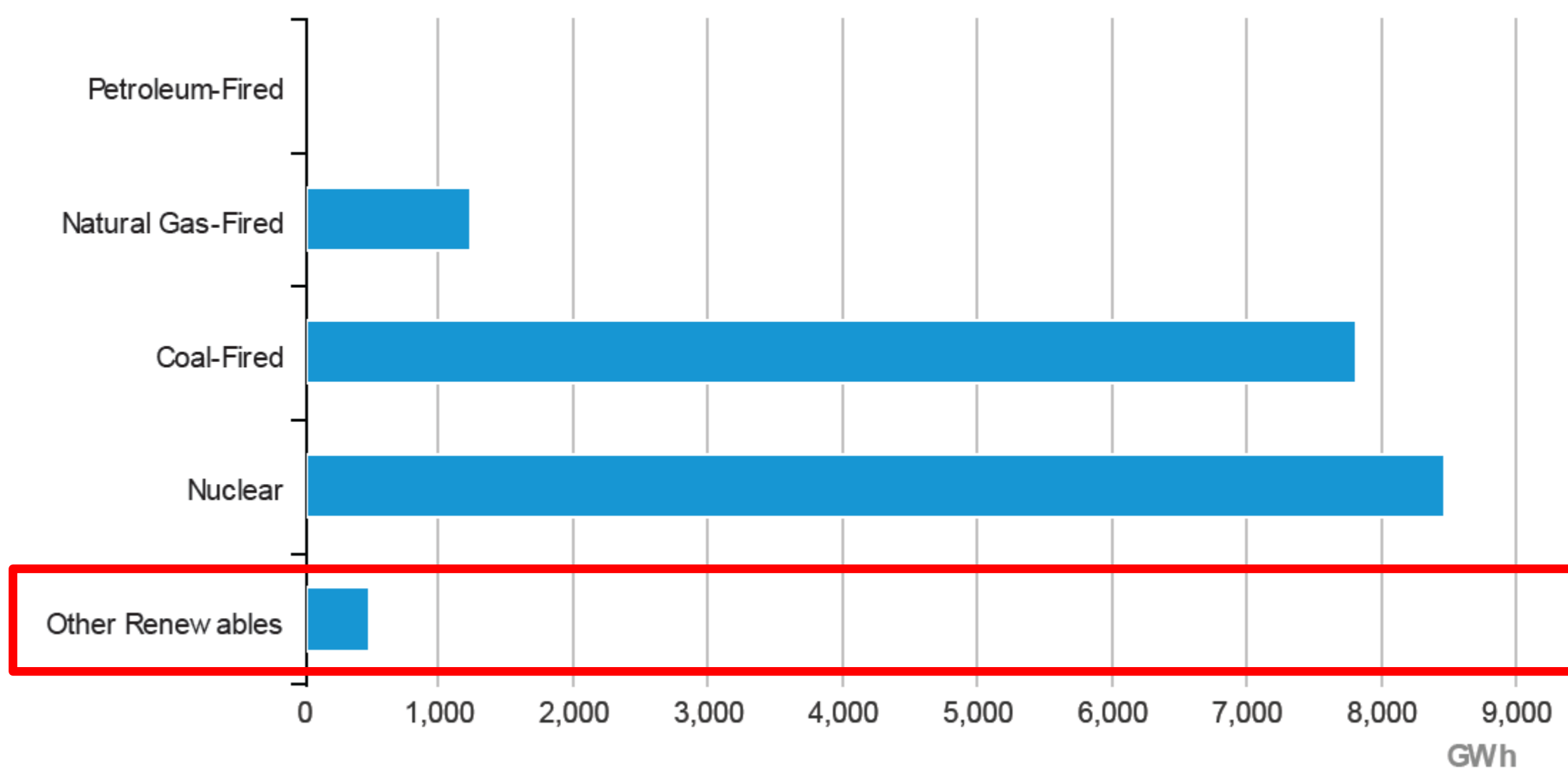


## Increasing Renewable and Alternative Energy Sources

### Illinois Energy Generation

Illinois Net Electricity Generation by Source, Jul. 2013

(U.S. Energy Information Administration)



Illinois state mandates that 25% of electricity generated should be from renewable sources by 2025. Illinois currently produces ~18,000 GWh of electricity per year and only about **2.5%** of that is from renewable sources, which leaves significant room for growth in renewable and alternative energy sources.

## Alleviating Petroleum Dependence

- US uses 200 billion gallons of fuel annually with \$12 trillion of infrastructure
- US Energy Independence & Security Act (EISA): 21 billion gallons of non-cornstarch biofuel by 2022
- US Navy pledge: 40% alternative fuels by 2020

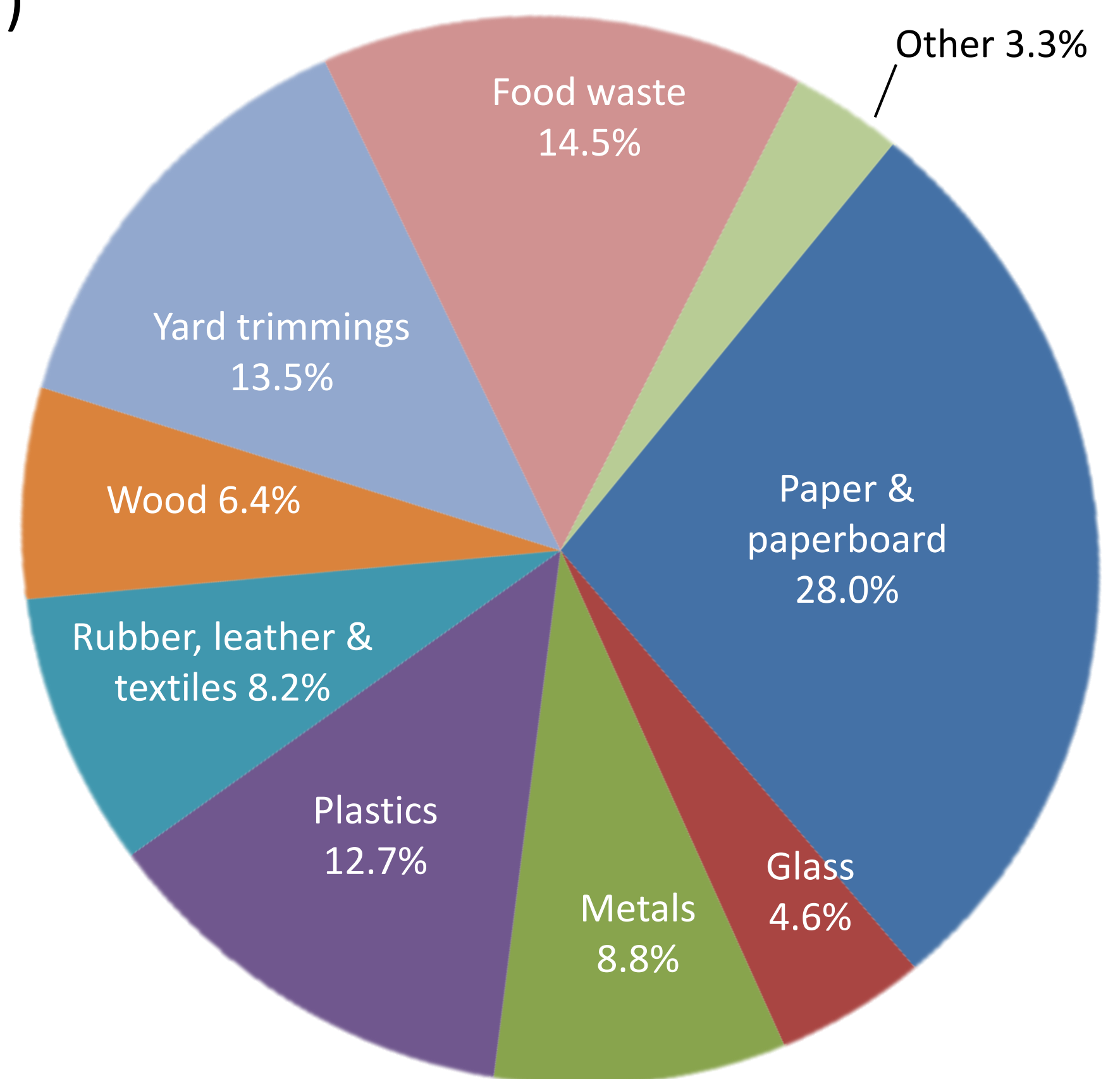


### Alternative Feedstock Options for Bio-fuels

In 2011, 250 million tons of Municipal Solid Waste (MSW) were generated in the US. The 55% MSW currently not recycled could produce 1.4% of the US annual energy needs. (USEPA)

#### Feedstock Options

- Waste material:
  - Municipal solid waste
  - Plastic
  - Spent tires
  - Spent coffee ground
  - Food waste
  - Soapstock
  - Yellow and brown grease
- Biomass:
  - Sustainably procured crop residues
  - Biomass crops
  - Timber and forestry residues
  - Green waste
  - Algae



Pyrolysis and hydrothermal liquefaction are two routes that ISTC researchers investigate to make crude oil and a byproduct called biochar.