Chapter 2
Greenhouse Gases by Sector

Abstract Most analysis of greenhouse gas (GHG) emissions in the literature concentrates on motor vehicle emissions, since transportation generates the most GHG emissions at 33 % (with the industrial sector second at 27 %) if the GHGs from electricity are distributed to each end-use sector. But if electricity is counted as a separate “sector”, then electricity in 2014 accounted for 39.4 % of all U.S. GHG emissions in 2013 (with transportation second at 33.7 %). Electricity is the major source of U.S. GHG emissions since most electricity is generated from fossil fuels, particularly coal, the highest carbon content fuel. The U.S. Energy Information Administration (EIA) projects that fossil fuels will still generate 61.6 % of all electricity by 2040, down only slightly from 64.9 % in 2015.

2.1 Greenhouse Gas Emissions by Sector

As shown in Fig. 2.1, if we consider the four sectors of society (Commercial, Industrial, Residential and Transportation) with the GHG emissions from electricity generation assigned to each end-use sector, then transportation accounts for the largest share of GHG emissions at 33.8 %, with the industrial sector generating the next highest percentage at 27 % according to the U.S [1].

However, Fig. 2.1 is based on EPA data with the GHGs from electricity generation allocated to each sector where the electricity is consumed.

If we remove the electricity GHGs from each sector and include electricity as a separate GHG category, then electricity produces the largest share of GHGs (39.4 %), with transportation second at 33.7 % as shown in Fig. 2.2.
2.2 Electricity Projections

The EIA’s projection of U.S. electricity generation by fuel though 2040 is shown in Fig. 2.3. Natural gas and diesel fuel use increase slightly over this period, while coal use decreases. Renewable energy rises slightly by 2020, with a slower but steady rise after 2020 according to EIA projections. The net fossil fuel used for generating electricity is fairly flat through 2040 according to the EIA projections in their Annual Energy Outlook (AEO) for 2015 [1]. Fossil fuels produce 64.9 % of all U.S. electricity in 2015, falling only slightly to 61.6 % by 2040 according to the EIA projections in their reference case. This AEO “reference case” assumes that the U.S. Congress passes no legislation to cut greenhouse gas emissions, and is therefore a “business-as-usual” scenario.
We conclude that we must replace existing electricity generators with lower GHG emitting power plants if we are to reduce electricity GHGs that accounted for 39 % of all U.S. emissions in 2015.

Reference

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