

Fueling a Clean Transportation Future

Smart Fuel Choices for a Warming World
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Appendix: Detailed Explanation of Key
Calculations

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Cumulative oil use calculation 2015-2035

Our calculation of cumulative oil use starts with 16 million barrels per day (MBPD) in 2015 (EIA 2015a) and has oil use falling by 0.25 MBPD each year to 11 MBPD in 2035¹ (the 2035 target for the UCS Half the Oil Plan (UCS 2012)). This amounts to a total of 103 billion barrels over the timeframe 2015–2035. For comparison, the Energy Information Administration forecast is for oil use to rise by 5 percent between 2015 and 2035 reaching 16.7 MBPD in 2035 (EIA 2015a).

Millions of barrels of oil per day	2015	2020	2025	2030	2035	Cumulative oil use 2015–2035
	Total US oil use in millions of barrels per day					Billions of barrels
EIA Annual Energy Outlook 2015 (EIA 2015)	16.0	16.1	16.4	16.5	16.7	125
UCS Half the Oil plan	16.0	14.7	13.5	12.2	11.0	103

Emissions per barrel of oil, 2015–2035

Emissions to extract and refine the oil used in the United States in 2014 are approximately 130 Kg of CO₂e/barrel of oil. The California Air Resources Board for the Low Carbon Fuel Standard calculated a value of 131 Kg CO₂e/barrel (CARB 2014) for California gasoline.

Emissions	2015	2020	2025	2030	2035
	Kg CO ₂ e / barrel of oil				
Constant	130	130	130	130	130
Rising 1 kg/barrel/year	130	135	140	145	150

Multiplying the emissions per barrel by the annual oil use illustrates how large an increase in total emissions can result from even a small increase in emissions per barrel. If the emissions associated with extracting and refining oil (the carbon intensity, or CI) increase by 1 Kg/barrel per year over that timeframe, the cumulative additional emissions will be 964 million metric tons (MMT) if oil use follows the UCS Half the Oil plan trajectory, and 1,261 MMT under the EIA oil use scenario. The calculation of the increase is actually independent of the assumption about the current baseline emissions per barrel, but we include it for context.

	UCS Half the Oil Plan Oil Use 2015–2035	EIA AEO 2015 forecasted Oil Use 2015–2035 (reference case)
	Cumulative emissions from oil extraction and refining 2015–2035 (million metric tons CO ₂ e)	
Constant CI	13,432	16,263
Rising CI	14,396	17,524
Increase due to rising CI	964	1,261

For comparison, the tailpipe emissions from burning gasoline in the U.S. in 2014 were 1095 MMT CO₂e, and diesel (distillate) was 610 MMT CO₂e, jet fuel was 216 MMT CO₂e (EIA 2015b).

¹ The Half the Oil plan was based on cutting consumption of crude oil and “other petroleum supply,” which includes natural gas plant liquids, refinery processing gain and net product imports. This broad definition was appropriate to a consumption oriented analysis like the Half the Oil plan, but for this analysis of emissions from oil production we need to know how much crude is produced rather than how much total product is consumed. The EIA’s most recent 2015 Annual Energy Outlook projects that total crude supply will be almost 17 MBPD in 2035, very close to the forecast of just over 17 MBPD for total crude plus other petroleum supply in 2035 from the EIA 2012 Early Release on which the Half the Oil Plan is based (EIA 2015a). For simplicity, we have kept the Half the Oil target of 11 MBPD for 2035 but applied it to total crude oil. While not identical to the earlier goal, it remains a similarly ambitious oil savings target based on current projections.

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