BIOFUELS IN THE CLEAN TRANSPORTATION FUTURE

LOOKING BEYOND 2025

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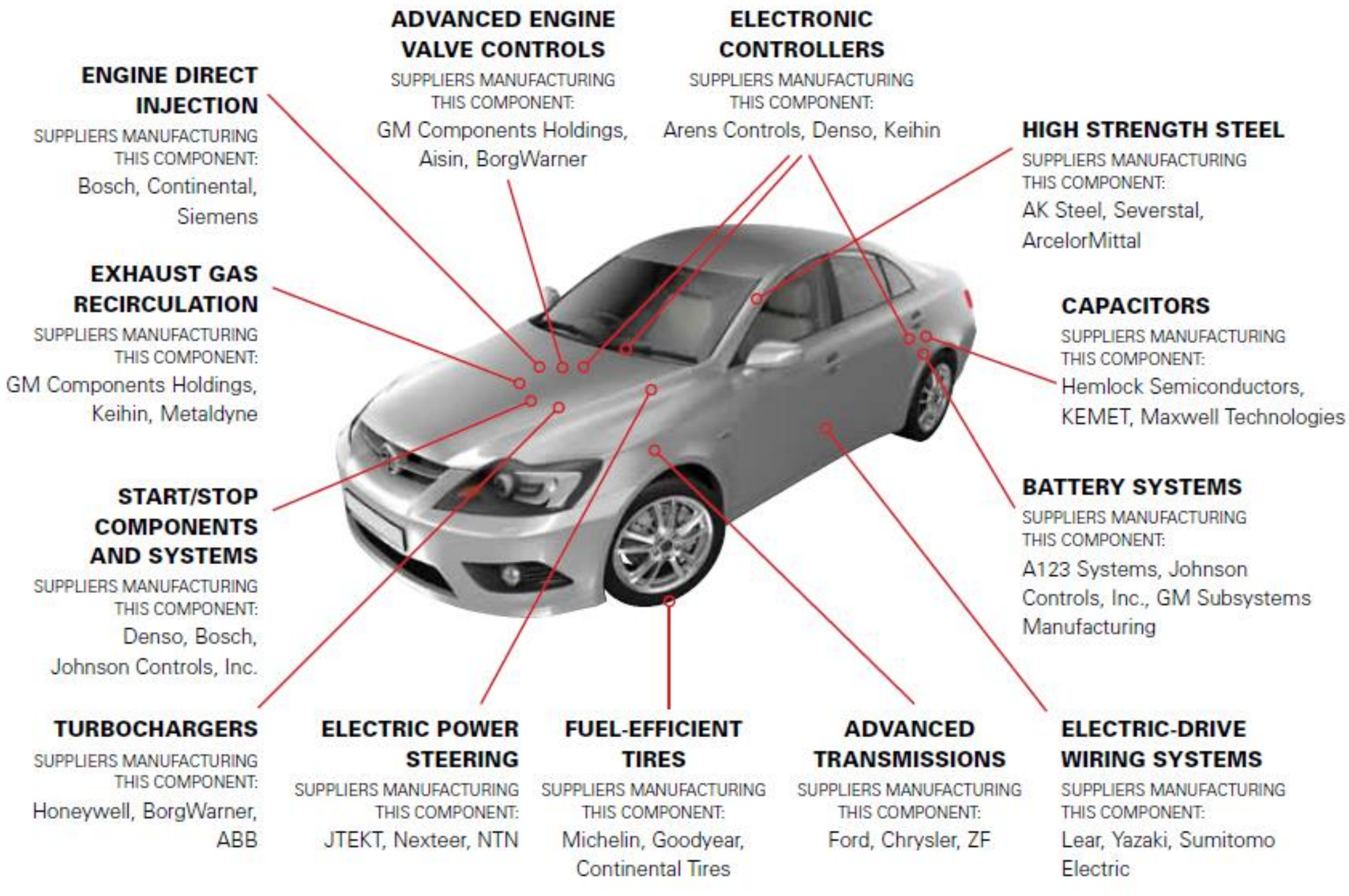
EPA MSTRS

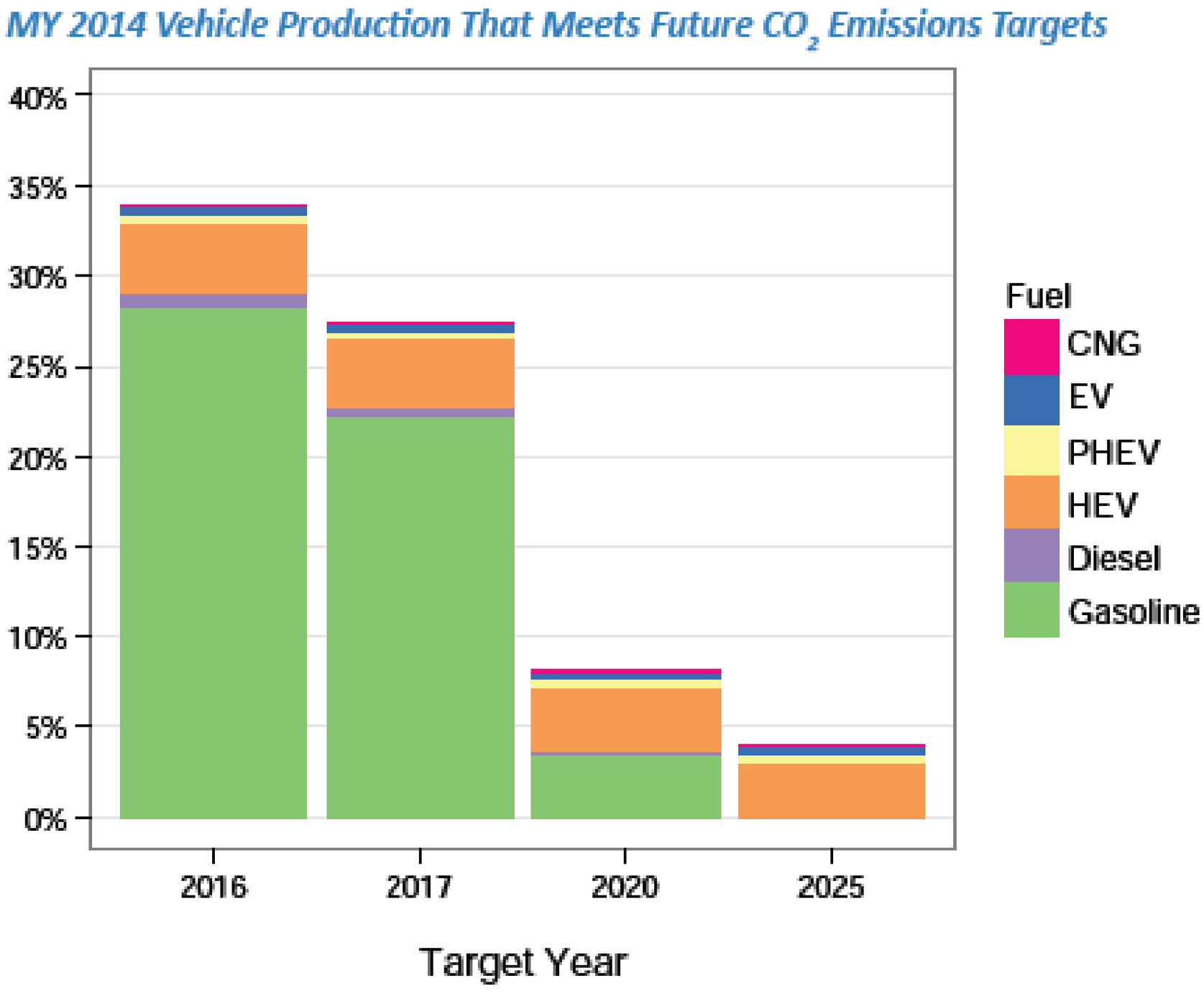
LUKE TONACHEL, NRDC

163 g/mi (54.5 mpg) Feasible Without New Liquid Fuels



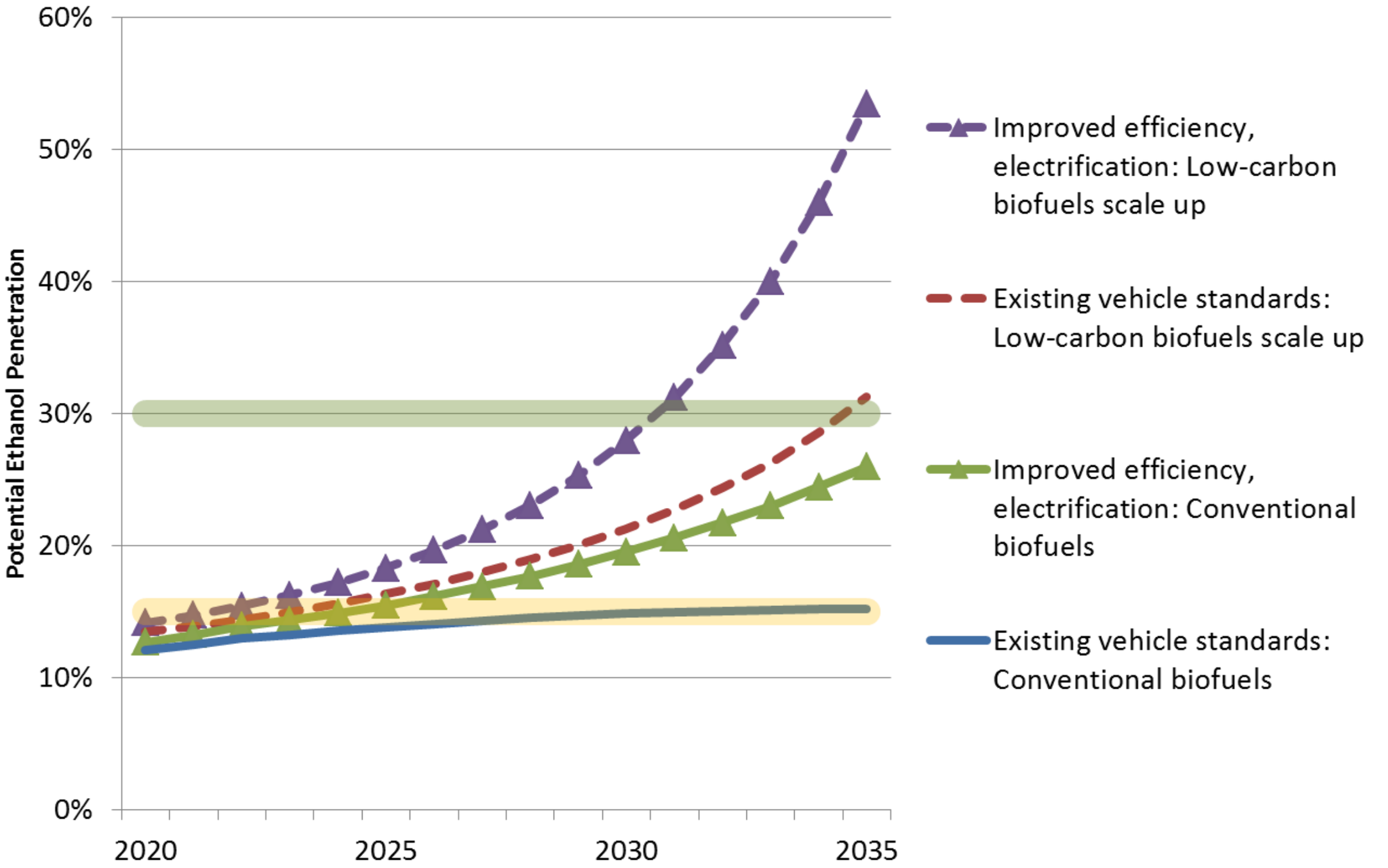
NRDC, UAW, NWF, “Supplying Ingenuity: U.S. Suppliers of Clean, Fuel-Efficient Vehicle Technologies”, August 2011.

Vehicles Meeting Future Standards



EPA, *Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2014*, October 2014.

2020-2035: Scaling Up Low-carbon Biofuels



Source: NRDC Analysis.

Billion Gallon Challenge for Cellulosic Biofuels

Energy Facts

Good biofuels versus bad biofuels: The best biofuels come from sustainable sources such as triticale (above left), a biomass grown as a winter crop. Bad biofuels can clearcut forests and demolish landscapes (above right).

The Billion Gallon Challenge: How America Can Produce One Billion Gallons of the Best Biofuels By 2014

To avoid the worst impacts of global warming, we need to make low-carbon biofuels work. But the best biofuels have yet to make the jump from the lab to the pump. As a first step, policy makers should stop spending tax dollars on the dirty biofuels of yesterday and start paying for performance, while maintaining our existing safeguards and standards. But that's not enough. We need to jumpstart the best biofuels and make them work for our economy and our environment.

We need a Billion Gallon Challenge.

Excerpt from NRDC Factsheet, 2009. http://www.nrdc.org/energy/files/billion.pdf.

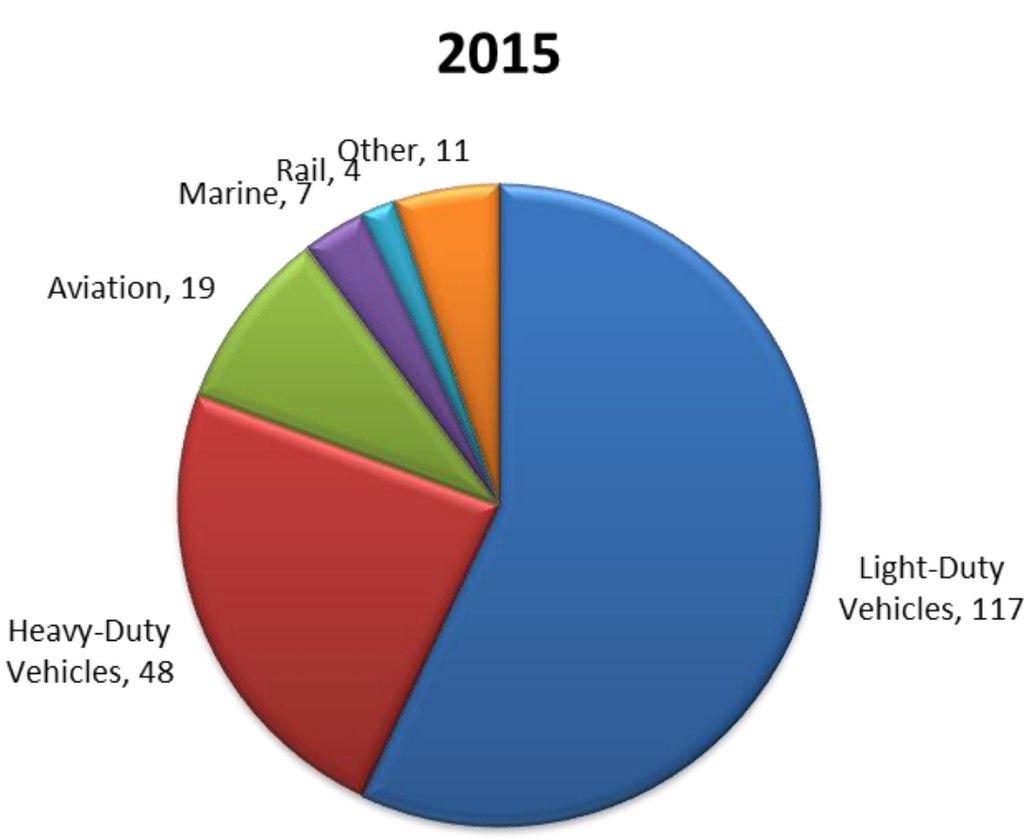
NAS: Cellulosic Potential

TABLE 3.5 Estimates of Future Biofuel Availability

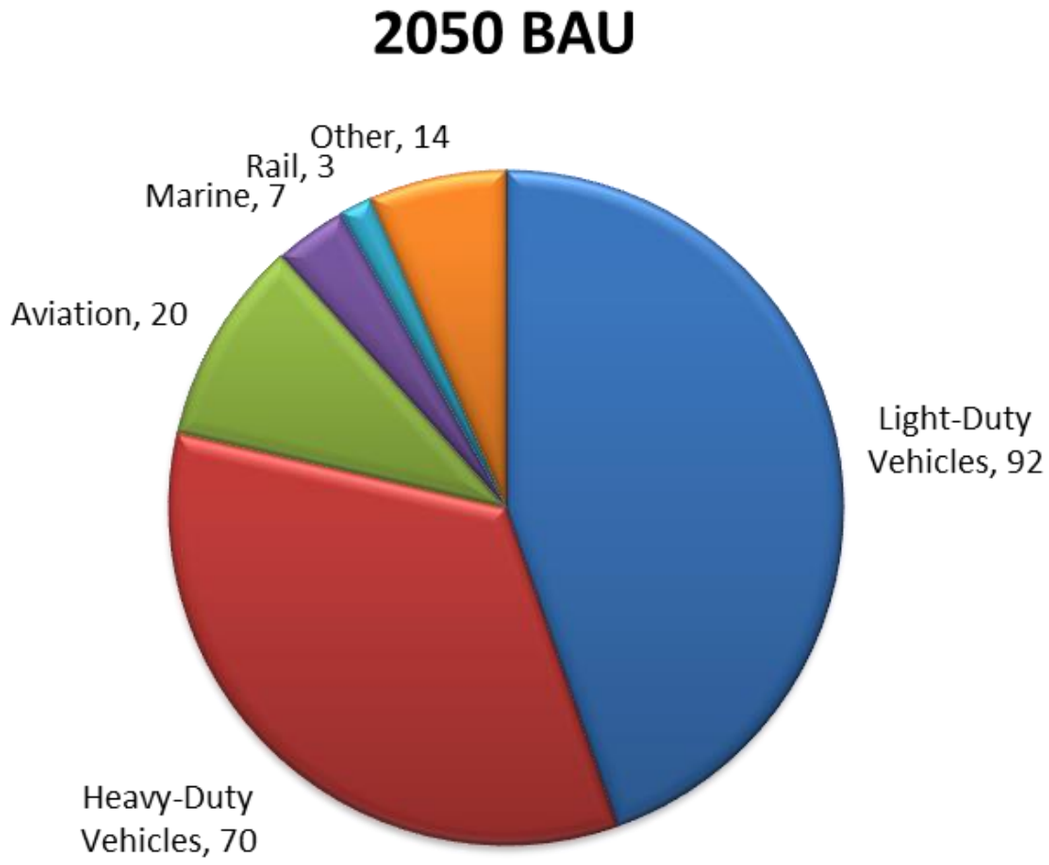
	Annual Plant Investment Rate (billion dollars per year)			
	1	4	7.2	10.4
Biofuel production (billion gge per year) by				
2022	0.9	3.7	6.7	9.7
2030	1.8	7.4	13.3	19.2
2050	4.3	17.3	31.2	45.0
Biomass required in 2050 (million dry tons per year)	68	270	488	703
Estimated land-use change (million acres)	5.5	22.2	40.1	57.8
Total investment to 2050 (billion dollars)	38	152	275	396
Average number of biorefineries built per year	2.7	10.8	19.5	28.2

National Research Council, *Transitions to Alternative Vehicles and Fuels,* National Academies Press, 2013.

Transportation Oil Demand without Advanced Biofuels (1)

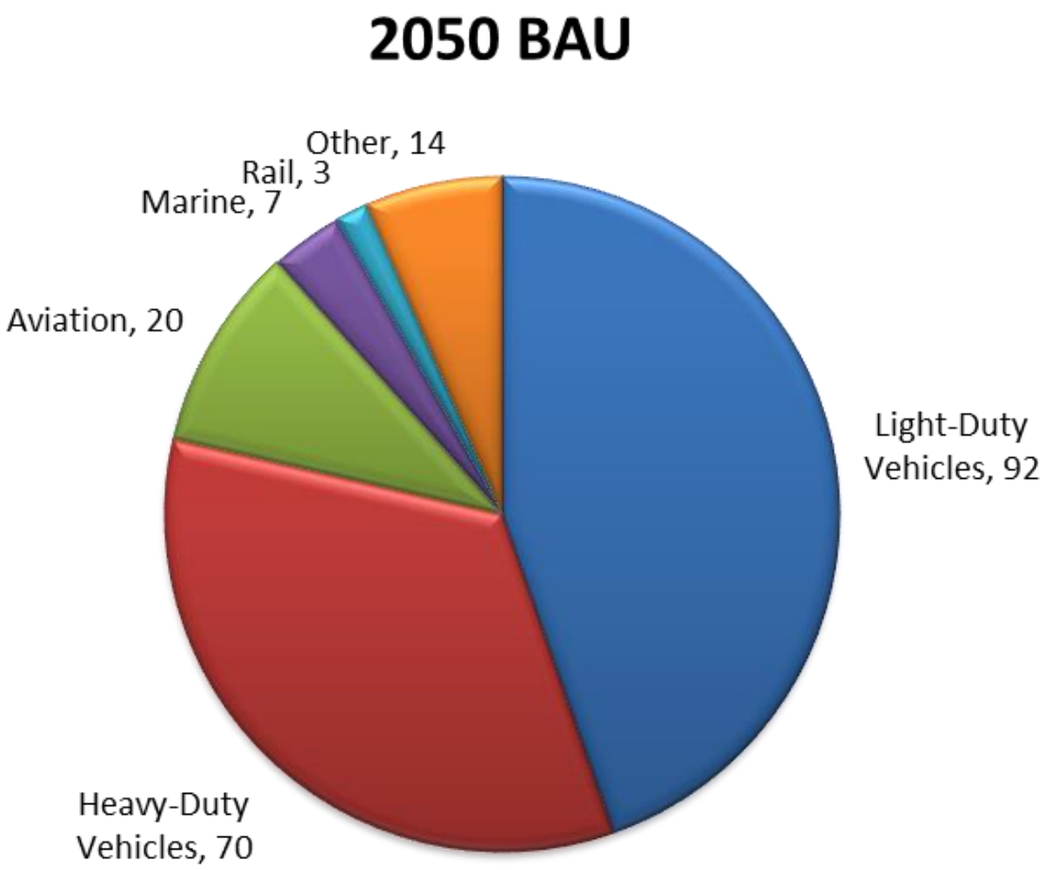


Total: 205 billion gge

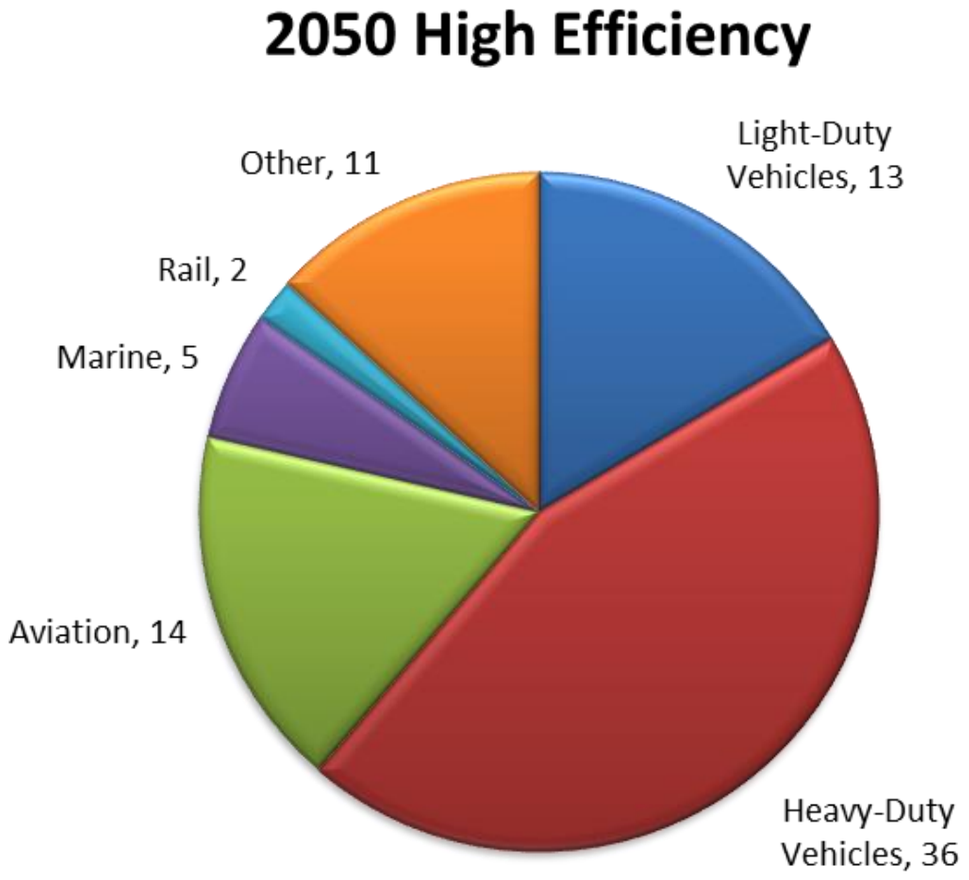


Total: 206 billion gge

Transportation Oil Demand without Advanced Biofuels (2)



Total: 206 billion gge



Total: 81 billion gge;
60% Reduction from 2015

Summary

- Current vehicle standards are feasible with existing liquid fuels.

- Expanded biofuels must be focused on scaling up feedstocks and technologies that ensure large GHG reductions on a lifecycle basis.

- Must consider biofuels in the context of full transportation sector GHG goals. For 2050, we must keep our focus on light-duty electrification. Subsectors with less ability to electrify (aviation, long-range heavy-duty applications) will need other fuel solutions, such as very low-carbon biofuels.