



U.S. Department Of Transportation
National Highway Traffic Safety Administration

APPENDIX I

CAFE Analysis Data Book

Standard Setting Analysis

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This appendix presents a broad range of outputs from the CAFE Model analysis discussed in this PRIA. The model outputs in this appendix are presented in tables that are grouped by theme, each of which are itemized in the table of contents. The themes reviewed detail areas of central interest in fuel economy rulemaking, including: core effects of focal fuel economy stringency levels (e.g., net benefits, required and achieved CAFE levels, changes in fuel consumption, environmental impacts); benefits; costs (e.g., regulatory costs, consumer cost impacts, safety impacts, technology costs, price impacts); changes in fleet characteristics (e.g., penetration rates for powertrain, mass reduction, and electrification technologies); and other outcomes (e.g., labor utilization, vehicle sales impacts). Information within many themes in this appendix is presented from multiple perspectives (e.g., by vehicle type, by manufacturer, by model year) to enable critical comparisons of estimated impacts across alternatives, the vehicle fleet, stakeholders, and time.

As discussed in the TSD, PRIA, and today’s notice, NHTSA has performed two types of supporting analysis. Today’s notice and PRIA focus on the “standard setting” analysis, which sets aside the potential that manufacturers could respond to standards by using compliance credits or introducing new alternative fuel vehicle (including BEVs) models during the “decision years” (for today’s notice, 2024, 2025, and 2026). The data in this appendix are for the “standard setting” analysis.

The accompanying Draft SEIS focuses on an “unconstrained” analysis, which does not set aside these potential manufacturer actions. Appendix II presents data for the “Draft SEIS” analysis.

Note that due to rounding of presented output components within each table, totals may not exactly match the sum of the rounded impacts

1. Summary Tables

**Table A-1-1 - Estimated Costs, Benefits, and Net Benefits Across MYs 1981-2029 (billions of dollars),
Total Fleet for Alternative 1**

	Totals		Annualized	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Costs	66.5	49.3	2.61	3.58
Benefits	82.6	51.6	3.24	3.75
Net Benefits	16.1	2.3	0.63	0.17

**Table A-1-2 - Estimated Costs, Benefits, and Net Benefits Across MYs 1981-2029 (billions of dollars),
Passenger Car Fleet for Alternative 1**

	Totals		Annualized	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Costs	15.5	14.1	0.61	1.02
Benefits	45.1	28.4	1.77	2.06
Net Benefits	29.6	14.3	1.16	1.04

**Table A-1-3 - Estimated Costs, Benefits, and Net Benefits Across MYs 1981-2029 (billions of dollars),
Light Truck Fleet for Alternative 1**

	Totals		Annualized	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Costs	51.0	35.2	2.00	2.56
Benefits	37.5	23.2	1.47	1.69
Net Benefits	-13.5	-12.0	-0.53	-0.87

**Table A-1-4 - Estimated Costs, Benefits, and Net Benefits Across MYs 1981-2029 (billions of dollars),
Total Fleet for Alternative 2**

	Totals		Annualized	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Costs	121.1	90.7	4.75	6.59
Benefits	121.4	75.6	4.76	5.49
Net Benefits	0.3	-15.1	0.01	-1.10

**Table A-1-5 - Estimated Costs, Benefits, and Net Benefits Across MYs 1981-2029 (billions of dollars),
Passenger Car Fleet for Alternative 2**

	Totals		Annualized	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Costs	38.0	33.3	1.49	2.42
Benefits	80.5	50.4	3.16	3.66
Net Benefits	42.5	17.1	1.66	1.24

**Table A-1-6 - Estimated Costs, Benefits, and Net Benefits Across MYs 1981-2029 (billions of dollars),
Light Truck Fleet for Alternative 2**

	Totals		Annualized	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Costs	83.1	57.4	3.26	4.17
Benefits	40.9	25.2	1.61	1.83
Net Benefits	-42.1	-32.2	-1.65	-2.34

**Table A-1-7 - Estimated Costs, Benefits, and Net Benefits Across MYs 1981-2029 (billions of dollars),
Total Fleet for Alternative 3**

	Totals		Annualized	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Costs	176.3	132.8	6.91	9.65
Benefits	172.9	107.6	6.78	7.82
Net Benefits	-3.4	-25.2	-0.13	-1.83

**Table A-1-8 - Estimated Costs, Benefits, and Net Benefits Across MYs 1981-2029 (billions of dollars),
Passenger Car Fleet for Alternative 3**

	Totals		Annualized	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Costs	51.0	45.0	2.00	3.27
Benefits	109.5	68.5	4.29	4.98
Net Benefits	58.5	23.5	2.29	1.71

**Table A-1-9 - Estimated Costs, Benefits, and Net Benefits Across MYs 1981-2029 (billions of dollars),
Light Truck Fleet for Alternative 3**

	Totals		Annualized	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Costs	125.2	87.8	4.91	6.38
Benefits	63.4	39.1	2.48	2.84
Net Benefits	-61.9	-48.7	-2.43	-3.54

Table A-1-10 - Estimated Costs, Benefits, and Net Benefits Across Calendar Years 2021-2050 (billions of dollars), Total Fleet for Alternative 1

	Totals		Annualized	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Costs	185.7	108.9	9.47	8.77
Benefits	266.6	145.2	13.60	11.70
Net Benefits	81.0	36.4	4.13	2.93

Table A-1-11 - Estimated Costs, Benefits, and Net Benefits Across Calendar Years 2021-2050 (billions of dollars), Passenger Car Fleet for Alternative 1

	Totals		Annualized	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Costs	11.9	14.9	0.61	1.20
Benefits	150.4	82.2	7.67	6.63
Net Benefits	138.5	67.4	7.07	5.43

Table A-1-12 - Estimated Costs, Benefits, and Net Benefits Across Calendar Years 2021-2050 (billions of dollars), Light Truck Fleet for Alternative 1

	Totals		Annualized	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Costs	173.7	94.0	8.86	7.58
Benefits	116.2	63.0	5.93	5.08
Net Benefits	-57.5	-31.0	-2.94	-2.50

Table A-1-13 - Estimated Costs, Benefits, and Net Benefits Across Calendar Years 2021-2050 (billions of dollars), Total Fleet for Alternative 2

	Totals		Annualized	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Costs	333.6	198.9	17.02	16.03
Benefits	433.6	236.0	22.12	19.02
Net Benefits	100.0	37.1	5.10	2.99

Table A-1-14 - Estimated Costs, Benefits, and Net Benefits Across Calendar Years 2021-2050 (billions of dollars), Passenger Car Fleet for Alternative 2

	Totals		Annualized	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Costs	51.8	45.3	2.64	3.65
Benefits	274.3	150.1	13.99	12.10
Net Benefits	222.5	104.8	11.35	8.45

Table A-1-15 - Estimated Costs, Benefits, and Net Benefits Across Calendar Years 2021-2050 (billions of dollars), Light Truck Fleet for Alternative 2

	Totals		Annualized	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Costs	281.8	153.6	14.38	12.38
Benefits	159.3	85.9	8.13	6.93
Net Benefits	-122.5	-67.7	-6.25	-5.45

Table A-1-16 - Estimated Costs, Benefits, and Net Benefits Across Calendar Years 2021-2050 (billions of dollars), Total Fleet for Alternative 3

	Totals		Annualized	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Costs	474.8	285.8	24.22	23.03
Benefits	606.5	331.7	30.94	26.73
Net Benefits	131.7	45.9	6.72	3.70

Table A-1-17 - Estimated Costs, Benefits, and Net Benefits Across Calendar Years 2021-2050 (billions of dollars), Passenger Car Fleet for Alternative 3

	Totals		Annualized	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Costs	75.8	64.0	3.86	5.15
Benefits	378.3	206.9	19.30	16.67
Net Benefits	302.5	143.0	15.44	11.52

Table A-1-18 - Estimated Costs, Benefits, and Net Benefits Across Calendar Years 2021-2050 (billions of dollars), Light Truck Fleet for Alternative 3

	Totals		Annualized	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Costs	399.0	221.8	20.36	17.88
Benefits	228.2	124.8	11.64	10.05
Net Benefits	-170.8	-97.1	-8.72	-7.82

Table A-1-19 - Estimated Total Fleet Costs, Benefits, and Net Benefits Across MYs 1981-2029 (billions of dollars) Total Fleet, by Alternative

Alternative	3% Discount Rate			7% Discount Rate		
	Costs	Benefits	Net Benefits	Costs	Benefits	Net Benefits
Alternative 1	66.5	82.6	16.1	49.3	51.6	2.3
Alternative 2	121.1	121.4	0.3	90.7	75.6	-15.1
Alternative 3	176.3	172.9	-3.4	132.8	107.6	-25.2

**Table A-1-20 - Estimated Passenger Car Fleet Costs, Benefits, and Net Benefits Across MYs 1981-2029
(billions of dollars) Passenger Car Fleet, by Alternative**

Alternative	3% Discount Rate			7% Discount Rate		
	Costs	Benefits	Net Benefits	Costs	Benefits	Net Benefits
Alternative 1	15.5	45.1	29.6	14.1	28.4	14.3
Alternative 2	38.0	80.5	42.5	33.3	50.4	17.1
Alternative 3	51.0	109.5	58.5	45.0	68.5	23.5

**Table A-1-21 - Estimated Light Truck Fleet Costs, Benefits, and Net Benefits Across MYs 1981-2029
(billions of dollars) Light Truck Fleet, by Alternative**

Alternative	3% Discount Rate			7% Discount Rate		
	Costs	Benefits	Net Benefits	Costs	Benefits	Net Benefits
Alternative 1	51.0	37.5	-13.5	35.2	23.2	-12.0
Alternative 2	83.1	40.9	-42.1	57.4	25.2	-32.2
Alternative 3	125.2	63.4	-61.9	87.8	39.1	-48.7

Table A-1-22 – Estimates of Benefits and Costs of the Preferred Alternative for Model Years 2023 through 2026, 3% Discount Rate

MY	Cost	Benefit	Net Benefits
	Present Values		
2023	\$5.6	\$3.5	-\$2.1
2024	\$8.9	\$13.6	\$4.7
2025	\$10.7	\$21.2	\$10.5
2026	\$12.2	\$27.5	\$15.3
Sum	\$37.4	\$65.8	\$28.4

2. Estimated Required CAFE Levels

**Table A-2-1 - Average CAFE Requirements for Passenger Cars, Light Trucks, and Combined (mpg),
Alternative 0 (Baseline)**

Model Year	Passenger Car	Light Truck	Combined
2020	43.3	31.0	35.4
2021	43.9	31.5	36.0
2022	44.6	31.9	36.8
2023	45.2	32.4	37.4
2024	45.9	32.9	38.1
2025	46.6	33.5	38.7
2026	47.3	33.9	39.4
2027	47.3	33.9	39.4
2028	47.3	33.9	39.5
2029	47.3	33.9	39.5

**Table A-2-2 - Average CAFE Requirements for Passenger Cars, Light Trucks, and Combined (mpg),
Alternative 1**

Model Year	Passenger Car	Light Truck	Combined
2020	43.3	31.0	35.4
2021	43.9	31.5	36.0
2022	44.6	31.9	36.8
2023	45.2	32.4	37.4
2024	49.8	36.4	41.8
2025	51.5	37.7	43.2
2026	53.2	39.0	44.7
2027	53.2	39.0	44.8
2028	53.2	39.0	44.8
2029	53.2	39.0	44.9

**Table A-2-3 - Average CAFE Requirements for Passenger Cars, Light Trucks, and Combined (mpg),
Alternative 2**

Model Year	Passenger Car	Light Truck	Combined
2020	43.3	31.0	35.4
2021	43.9	31.5	36.0
2022	44.6	31.9	36.8
2023	45.2	32.4	37.4
2024	49.2	35.1	40.7
2025	53.4	38.2	44.2
2026	58.1	41.5	48.1
2027	58.1	41.5	48.1
2028	58.1	41.5	48.2
2029	58.1	41.5	48.2

**Table A-2-4 - Average CAFE Requirements for Passenger Cars, Light Trucks, and Combined (mpg),
Alternative 3**

Model Year	Passenger Car	Light Truck	Combined
2020	43.3	31.0	35.4
2021	43.9	31.5	36.0
2022	44.6	31.9	36.8
2023	45.2	32.4	37.4
2024	50.2	35.9	41.5
2025	55.8	39.9	46.2
2026	62.0	44.3	51.3
2027	62.0	44.3	51.3
2028	62.0	44.3	51.3
2029	62.0	44.3	51.4

Table A-2-5 - Estimated Required Average Fuel Economy (mpg), Total Fleet for Manufacturer (Total)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	35.4	36.0	36.8	37.4	38.1	38.7	39.4	39.4	39.5	39.5
Alternative 1	35.4	36.0	36.8	37.4	41.8	43.2	44.7	44.8	44.8	44.9
Alternative 2	35.4	36.0	36.8	37.4	40.7	44.2	48.1	48.1	48.2	48.2
Alternative 3	35.4	36.0	36.8	37.4	41.5	46.2	51.3	51.3	51.3	51.4

Table A-2-6 - Estimated Required Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Total)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	43.3	43.9	44.6	45.2	45.9	46.6	47.3	47.3	47.3	47.3
Alternative 1	43.3	43.9	44.6	45.2	49.8	51.5	53.2	53.2	53.2	53.2
Alternative 2	43.3	43.9	44.6	45.2	49.2	53.4	58.1	58.1	58.1	58.1
Alternative 3	43.3	43.9	44.6	45.2	50.2	55.8	62.0	62.0	62.0	62.0

Table A-2-7 - Estimated Required Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Total)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	31.0	31.5	31.9	32.4	32.9	33.5	33.9	33.9	33.9	33.9
Alternative 1	31.0	31.5	31.9	32.4	36.4	37.7	39.0	39.0	39.0	39.0
Alternative 2	31.0	31.5	31.9	32.4	35.1	38.2	41.5	41.5	41.5	41.5
Alternative 3	31.0	31.5	31.9	32.4	35.9	39.9	44.3	44.3	44.3	44.3

Table A-2-8 - Estimated Required Average Fuel Economy (mpg), Total Fleet for Manufacturer (BMW)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	37.7	38.4	39.2	39.9	40.6	41.3	42.0	42.0	42.1	42.2
Alternative 1	37.7	38.4	39.2	39.9	44.4	46.0	47.6	47.6	47.7	47.6
Alternative 2	37.7	38.4	39.2	39.9	43.4	47.3	51.4	51.4	51.5	51.5
Alternative 3	37.7	38.4	39.2	39.9	44.4	49.3	54.8	54.8	54.9	54.9

Table A-2-9 - Estimated Required Average Fuel Economy (mpg), Total Fleet for Manufacturer (Daimler)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	35.6	36.3	37.0	37.6	38.4	39.0	39.6	39.7	39.7	39.8
Alternative 1	35.6	36.3	37.0	37.6	42.1	43.5	45.0	45.0	45.1	45.1
Alternative 2	35.6	36.3	37.0	37.6	41.0	44.6	48.5	48.5	48.6	48.6
Alternative 3	35.6	36.3	37.0	37.6	41.9	46.5	51.7	51.7	51.8	51.8

Table A-2-10 - Estimated Required Average Fuel Economy (mpg), Total Fleet for Manufacturer (FCA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	31.3	31.7	32.3	32.8	33.4	33.9	34.4	34.4	34.4	34.4
Alternative 1	31.3	31.7	32.3	32.8	36.9	38.2	39.5	39.5	39.5	39.5
Alternative 2	31.3	31.7	32.3	32.8	35.7	38.8	42.2	42.2	42.2	42.2
Alternative 3	31.3	31.7	32.3	32.8	36.4	40.5	45.0	45.0	45.0	45.0

Table A-2-11 - Estimated Required Average Fuel Economy (mpg), Total Fleet for Manufacturer (Ford)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	31.8	32.4	33.0	33.6	34.1	34.7	35.2	35.3	35.3	35.4
Alternative 1	31.8	32.4	33.0	33.6	37.5	38.8	40.2	40.2	40.2	40.3
Alternative 2	31.8	32.4	33.0	33.6	36.4	39.6	43.0	43.0	43.1	43.1
Alternative 3	31.8	32.4	33.0	33.6	37.2	41.3	45.9	45.9	46.0	46.0

Table A-2-12 - Estimated Required Average Fuel Economy (mpg), Total Fleet for Manufacturer (GM)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	32.7	33.2	33.9	34.4	35.0	35.6	36.1	36.2	36.2	36.3
Alternative 1	32.7	33.2	33.9	34.4	38.3	39.6	41.0	41.0	41.1	41.1
Alternative 2	32.7	33.2	33.9	34.4	37.1	40.4	44.0	44.0	44.0	44.1
Alternative 3	32.7	33.2	33.9	34.4	37.9	42.2	46.9	46.9	46.9	47.0

Table A-2-13 - Estimated Required Average Fuel Economy (mpg), Total Fleet for Manufacturer (Honda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	38.6	39.3	40.1	40.7	41.4	42.2	42.8	42.9	43.0	43.0
Alternative 1	38.6	39.3	40.1	40.7	45.4	47.0	48.6	48.6	48.7	48.7
Alternative 2	38.6	39.3	40.1	40.7	44.4	48.2	52.5	52.5	52.5	52.6
Alternative 3	38.6	39.3	40.1	40.7	45.4	50.4	56.0	56.0	56.0	56.1

Table A-2-14 - Estimated Required Average Fuel Economy (mpg), Total Fleet for Manufacturer (Hyundai Kia-H)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	41.6	42.3	43.1	43.8	44.5	45.2	45.9	45.9	45.9	46.0
Alternative 1	41.6	42.3	43.1	43.8	48.3	50.0	51.7	51.7	51.7	51.7
Alternative 2	41.6	42.3	43.1	43.8	47.6	51.7	56.2	56.2	56.2	56.3
Alternative 3	41.6	42.3	43.1	43.8	48.6	54.1	60.1	60.1	60.1	60.1

Table A-2-15 - Estimated Required Average Fuel Economy (mpg), Total Fleet for Manufacturer (Hyundai Kia-K)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	38.9	39.7	40.5	41.3	42.0	42.7	43.5	43.5	43.6	43.7
Alternative 1	38.9	39.7	40.5	41.3	46.0	47.6	49.2	49.2	49.3	49.4
Alternative 2	38.9	39.7	40.5	41.3	44.9	48.8	53.1	53.1	53.2	53.2
Alternative 3	38.9	39.7	40.5	41.3	45.9	50.9	56.7	56.6	56.7	56.8

Table A-2-16 - Estimated Required Average Fuel Economy (mpg), Total Fleet for Manufacturer (JLR)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	32.6	33.1	33.7	34.2	34.7	35.3	35.9	35.9	35.9	35.9
Alternative 1	32.6	33.1	33.7	34.2	38.5	39.9	41.2	41.2	41.2	41.2
Alternative 2	32.6	33.1	33.7	34.2	37.3	40.5	43.9	43.9	44.0	44.0
Alternative 3	32.6	33.1	33.7	34.2	38.1	42.2	47.0	47.0	47.0	47.0

Table A-2-17 - Estimated Required Average Fuel Economy (mpg), Total Fleet for Manufacturer (Mazda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	38.7	39.3	40.0	40.7	41.3	42.0	42.7	42.8	42.8	42.8
Alternative 1	38.7	39.3	40.0	40.7	45.4	47.0	48.6	48.7	48.7	48.7
Alternative 2	38.7	39.3	40.0	40.7	44.3	48.1	52.3	52.3	52.4	52.4
Alternative 3	38.7	39.3	40.0	40.7	45.2	50.2	55.8	55.8	55.9	55.9

Table A-2-18 - Estimated Required Average Fuel Economy (mpg), Total Fleet for Manufacturer (Mitsubishi)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	40.7	41.3	42.1	42.7	43.5	44.2	44.9	44.9	44.9	45.0
Alternative 1	40.7	41.3	42.1	42.7	47.8	49.4	51.2	51.1	51.2	51.2
Alternative 2	40.7	41.3	42.1	42.7	46.5	50.6	55.0	55.0	55.0	55.1
Alternative 3	40.7	41.3	42.1	42.7	47.5	52.9	58.7	58.7	58.7	58.8

Table A-2-19 - Estimated Required Average Fuel Economy (mpg), Total Fleet for Manufacturer (Nissan)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	39.2	39.9	40.6	41.3	42.0	42.7	43.4	43.5	43.5	43.5
Alternative 1	39.2	39.9	40.6	41.3	45.9	47.5	49.1	49.1	49.2	49.2
Alternative 2	39.2	39.9	40.6	41.3	45.0	48.9	53.2	53.2	53.2	53.3
Alternative 3	39.2	39.9	40.6	41.3	46.0	51.1	56.7	56.7	56.8	56.8

Table A-2-20 - Estimated Required Average Fuel Economy (mpg), Total Fleet for Manufacturer (Subaru)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	37.0	37.7	38.3	39.0	39.7	40.3	41.0	41.0	41.1	41.1
Alternative 1	37.0	37.7	38.3	39.0	43.8	45.3	46.9	47.0	47.0	47.1
Alternative 2	37.0	37.7	38.3	39.0	42.5	46.2	50.2	50.2	50.3	50.3
Alternative 3	37.0	37.7	38.3	39.0	43.4	48.2	53.6	53.5	53.6	53.6

Table A-2-21 - Estimated Required Average Fuel Economy (mpg), Total Fleet for Manufacturer (Tesla)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	40.5	40.4	41.1	41.8	42.4	43.1	43.7	43.7	43.7	43.8
Alternative 1	40.5	40.4	41.1	41.8	46.0	47.6	49.2	49.2	49.2	49.2
Alternative 2	40.5	40.4	41.1	41.8	45.4	49.3	53.6	53.6	53.6	53.6
Alternative 3	40.5	40.4	41.1	41.8	46.3	51.5	57.3	57.3	57.3	57.3

Table A-2-22 - Estimated Required Average Fuel Economy (mpg), Total Fleet for Manufacturer (Toyota)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	37.1	37.9	38.6	39.3	40.1	40.8	41.4	41.5	41.6	41.6
Alternative 1	37.1	37.9	38.6	39.3	43.9	45.4	47.0	47.0	47.1	47.2
Alternative 2	37.1	37.9	38.6	39.3	42.9	46.6	50.7	50.7	50.8	50.8
Alternative 3	37.1	37.9	38.6	39.3	43.8	48.6	54.1	54.1	54.1	54.2

Table A-2-23 - Estimated Required Average Fuel Economy (mpg), Total Fleet for Manufacturer (Volvo)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	34.3	34.9	35.5	36.0	36.6	37.2	37.8	37.9	37.9	37.9
Alternative 1	34.3	34.9	35.5	36.0	40.4	41.8	43.3	43.3	43.3	43.4
Alternative 2	34.3	34.9	35.5	36.0	39.2	42.6	46.3	46.3	46.3	46.3
Alternative 3	34.3	34.9	35.5	36.0	40.1	44.5	49.4	49.4	49.5	49.5

Table A-2-24 - Estimated Required Average Fuel Economy (mpg), Total Fleet for Manufacturer (VWA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	37.1	37.9	38.7	39.4	40.1	40.8	41.5	41.5	41.6	41.7
Alternative 1	37.1	37.9	38.7	39.4	44.1	45.6	47.2	47.2	47.3	47.4
Alternative 2	37.1	37.9	38.7	39.4	42.9	46.6	50.7	50.8	50.8	50.9
Alternative 3	37.1	37.9	38.7	39.4	43.8	48.7	54.1	54.1	54.2	54.3

Table A-2-25 - Estimated Required Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (BMW)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	42.5	43.1	43.8	44.4	45.1	45.8	46.5	46.5	46.5	46.5
Alternative 1	42.5	43.1	43.8	44.4	48.9	50.6	52.3	52.3	52.3	52.2
Alternative 2	42.5	43.1	43.8	44.4	48.3	52.5	57.1	57.1	57.1	57.1
Alternative 3	42.5	43.1	43.8	44.4	49.4	54.9	60.9	60.9	60.9	60.9

Table A-2-26 - Estimated Required Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Daimler)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	41.4	42.0	42.7	43.3	44.0	44.6	45.3	45.3	45.3	45.3
Alternative 1	41.4	42.0	42.7	43.3	47.7	49.3	50.9	50.9	50.9	50.9
Alternative 2	41.4	42.0	42.7	43.3	47.1	51.2	55.6	55.6	55.6	55.6
Alternative 3	41.4	42.0	42.7	43.3	48.1	53.5	59.4	59.4	59.4	59.4

Table A-2-27 - Estimated Required Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (FCA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	41.6	42.0	42.5	43.0	43.6	44.2	44.9	44.9	44.8	44.7
Alternative 1	41.6	42.0	42.5	43.0	47.3	48.9	50.5	50.5	50.4	50.4
Alternative 2	41.6	42.0	42.5	43.0	46.8	50.9	55.2	55.2	55.1	55.1
Alternative 3	41.6	42.0	42.5	43.0	47.8	53.1	59.0	59.0	59.0	59.0

Table A-2-28 - Estimated Required Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Ford)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	42.2	42.8	43.5	44.1	44.8	45.5	46.1	46.1	46.1	46.1
Alternative 1	42.2	42.8	43.5	44.1	48.5	50.2	51.9	51.9	51.9	51.9
Alternative 2	42.2	42.8	43.5	44.1	47.9	52.2	56.7	56.7	56.7	56.7
Alternative 3	42.2	42.8	43.5	44.1	49.0	54.5	60.5	60.5	60.5	60.5

Table A-2-29 - Estimated Required Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (GM)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	43.9	44.5	45.2	45.8	46.5	47.3	48.0	48.0	48.0	47.9
Alternative 1	43.9	44.5	45.2	45.8	50.4	52.2	53.9	53.9	53.9	53.9
Alternative 2	43.9	44.5	45.2	45.8	49.8	54.2	58.9	58.9	58.9	58.9
Alternative 3	43.9	44.5	45.2	45.8	50.9	56.7	62.9	62.9	62.9	62.9

Table A-2-30 - Estimated Required Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Honda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	43.6	44.3	45.0	45.6	46.3	47.0	47.7	47.7	47.7	47.7
Alternative 1	43.6	44.3	45.0	45.6	50.2	51.9	53.7	53.7	53.7	53.6
Alternative 2	43.6	44.3	45.0	45.6	49.6	53.9	58.6	58.6	58.6	58.6
Alternative 3	43.6	44.3	45.0	45.6	50.7	56.4	62.6	62.6	62.6	62.6

Table A-2-31 - Estimated Required Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Hyundai Kia-H)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	43.3	44.0	44.7	45.5	46.2	46.9	47.6	47.6	47.6	47.6
Alternative 1	43.3	44.0	44.7	45.5	50.0	51.7	53.4	53.4	53.4	53.4
Alternative 2	43.3	44.0	44.7	45.5	49.4	53.7	58.3	58.3	58.3	58.3
Alternative 3	43.3	44.0	44.7	45.5	50.5	56.1	62.3	62.3	62.3	62.3

Table A-2-32 - Estimated Required Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Hyundai Kia-K)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	44.0	44.7	45.4	46.1	46.8	47.5	48.3	48.3	48.3	48.3
Alternative 1	44.0	44.7	45.4	46.1	50.8	52.5	54.2	54.2	54.3	54.3
Alternative 2	44.0	44.7	45.4	46.1	50.1	54.5	59.2	59.2	59.2	59.2
Alternative 3	44.0	44.7	45.4	46.1	51.2	56.9	63.3	63.3	63.3	63.3

Table A-2-33 - Estimated Required Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (JLR)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	42.1	42.7	43.3	44.0	44.7	45.4	46.1	46.1	46.1	46.1
Alternative 1	42.1	42.7	43.3	44.0	48.4	50.1	51.8	51.8	51.8	51.8
Alternative 2	42.1	42.7	43.3	44.0	47.8	52.0	56.5	56.5	56.5	56.5
Alternative 3	42.1	42.7	43.3	44.0	48.9	54.3	60.4	60.4	60.4	60.4

Table A-2-34 - Estimated Required Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Mazda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	43.9	44.6	45.2	45.9	46.6	47.3	48.0	48.0	48.0	48.0
Alternative 1	43.9	44.6	45.2	45.9	50.5	52.3	54.1	54.1	54.1	54.1
Alternative 2	43.9	44.6	45.2	45.9	50.0	54.3	59.0	59.0	59.0	59.0
Alternative 3	43.9	44.6	45.2	45.9	51.1	56.7	63.0	63.0	63.0	63.0

Table A-2-35 - Estimated Required Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Mitsubishi)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	46.5	47.2	48.0	48.8	49.6	50.4	51.2	51.2	51.2	51.2
Alternative 1	46.5	47.2	48.0	48.8	53.8	55.6	57.5	57.5	57.5	57.5
Alternative 2	46.5	47.2	48.0	48.8	53.1	57.7	62.7	62.7	62.7	62.8
Alternative 3	46.5	47.2	48.0	48.8	54.2	60.3	67.0	67.0	67.0	67.0

Table A-2-36 - Estimated Required Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Nissan)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	43.2	43.9	44.5	45.1	45.8	46.5	47.3	47.3	47.2	47.2
Alternative 1	43.2	43.9	44.5	45.1	49.7	51.4	53.1	53.1	53.1	53.1
Alternative 2	43.2	43.9	44.5	45.1	49.1	53.4	58.0	58.0	58.0	58.0
Alternative 3	43.2	43.9	44.5	45.1	50.2	55.8	61.9	61.9	61.9	61.9

Table A-2-37 - Estimated Required Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Subaru)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	44.9	45.5	46.2	46.9	47.7	48.4	49.1	49.1	49.1	49.1
Alternative 1	44.9	45.5	46.2	46.9	51.7	53.4	55.2	55.2	55.2	55.2
Alternative 2	44.9	45.5	46.2	46.9	51.0	55.5	60.3	60.3	60.3	60.3
Alternative 3	44.9	45.5	46.2	46.9	52.2	57.9	64.4	64.4	64.4	64.4

Table A-2-38 - Estimated Required Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Tesla)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	40.9	40.8	41.4	42.1	42.7	43.4	44.0	44.0	44.0	44.1
Alternative 1	40.9	40.8	41.4	42.1	46.3	47.9	49.5	49.5	49.5	49.5
Alternative 2	40.9	40.8	41.4	42.1	45.7	49.7	54.0	54.0	54.0	54.0
Alternative 3	40.9	40.8	41.4	42.1	46.7	51.9	57.7	57.7	57.7	57.7

Table A-2-39 - Estimated Required Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Toyota)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	43.6	44.3	45.0	45.6	46.3	47.1	47.8	47.8	47.8	47.8
Alternative 1	43.6	44.3	45.0	45.6	50.3	51.9	53.7	53.7	53.7	53.7
Alternative 2	43.6	44.3	45.0	45.6	49.7	53.9	58.6	58.6	58.6	58.6
Alternative 3	43.6	44.3	45.0	45.6	50.8	56.4	62.7	62.7	62.7	62.7

Table A-2-40 - Estimated Required Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Volvo)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	40.9	41.5	42.2	42.8	43.4	44.1	44.7	44.7	44.7	44.7
Alternative 1	40.9	41.5	42.2	42.8	47.1	48.6	50.3	50.3	50.3	50.3
Alternative 2	40.9	41.5	42.2	42.8	46.5	50.5	54.9	54.9	54.9	54.9
Alternative 3	40.9	41.5	42.2	42.8	47.5	52.8	58.7	58.7	58.7	58.7

Table A-2-41 - Estimated Required Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (VWA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	43.6	44.3	45.0	45.7	46.4	47.1	47.8	47.8	47.9	47.9
Alternative 1	43.6	44.3	45.0	45.7	50.3	52.0	53.8	53.8	53.8	53.8
Alternative 2	43.6	44.3	45.0	45.7	49.7	54.0	58.7	58.7	58.7	58.7
Alternative 3	43.6	44.3	45.0	45.7	50.8	56.4	62.7	62.7	62.7	62.7

Table A-2-42 - Estimated Required Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (BMW)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	31.7	32.2	32.6	33.1	33.6	34.2	34.7	34.7	34.7	34.7
Alternative 1	31.7	32.2	32.6	33.1	37.4	38.6	39.9	39.9	39.9	39.9
Alternative 2	31.7	32.2	32.6	33.1	36.0	39.2	42.6	42.6	42.6	42.6
Alternative 3	31.7	32.2	32.6	33.1	36.8	40.9	45.5	45.5	45.5	45.5

Table A-2-43 - Estimated Required Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Daimler)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	31.7	32.2	32.6	33.1	33.7	34.2	34.7	34.7	34.7	34.7
Alternative 1	31.7	32.2	32.6	33.1	37.4	38.6	39.9	39.9	39.9	39.9
Alternative 2	31.7	32.2	32.6	33.1	36.0	39.2	42.6	42.6	42.6	42.6
Alternative 3	31.7	32.2	32.6	33.1	36.8	40.9	45.5	45.5	45.5	45.5

Table A-2-44 - Estimated Required Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (FCA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	30.1	30.5	31.0	31.5	32.0	32.5	32.9	32.9	32.9	32.9
Alternative 1	30.1	30.5	31.0	31.5	35.5	36.7	37.9	37.9	37.9	37.9
Alternative 2	30.1	30.5	31.0	31.5	34.2	37.2	40.4	40.4	40.4	40.4
Alternative 3	30.1	30.5	31.0	31.5	34.9	38.8	43.1	43.1	43.1	43.1

Table A-2-45 - Estimated Required Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Ford)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	29.2	29.7	30.1	30.6	31.0	31.5	32.0	32.0	32.0	32.0
Alternative 1	29.2	29.7	30.1	30.6	34.3	35.5	36.7	36.7	36.7	36.7
Alternative 2	29.2	29.7	30.1	30.6	33.1	36.0	39.1	39.1	39.1	39.1
Alternative 3	29.2	29.7	30.1	30.6	33.8	37.6	41.8	41.8	41.8	41.8

Table A-2-46 - Estimated Required Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (GM)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	29.1	29.5	30.0	30.4	30.9	31.4	31.8	31.8	31.8	31.8
Alternative 1	29.1	29.5	30.0	30.4	33.9	35.1	36.3	36.3	36.3	36.3
Alternative 2	29.1	29.5	30.0	30.4	32.7	35.6	38.7	38.7	38.7	38.7
Alternative 3	29.1	29.5	30.0	30.4	33.4	37.2	41.3	41.3	41.3	41.3

Table A-2-47 - Estimated Required Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Honda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	33.3	33.8	34.3	34.8	35.3	35.9	36.4	36.4	36.4	36.4
Alternative 1	33.3	33.8	34.3	34.8	39.2	40.6	41.9	41.9	41.9	41.9
Alternative 2	33.3	33.8	34.3	34.8	37.8	41.1	44.7	44.7	44.7	44.7
Alternative 3	33.3	33.8	34.3	34.8	38.7	43.0	47.7	47.7	47.7	47.7

Table A-2-48 - Estimated Required Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Hyundai Kia-H)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	31.3	31.7	32.2	32.7	33.2	33.7	34.2	34.2	34.2	34.2
Alternative 1	31.3	31.7	32.2	32.7	36.9	38.1	39.4	39.4	39.4	39.4
Alternative 2	31.3	31.7	32.2	32.7	35.6	38.6	42.0	42.0	42.0	42.0
Alternative 3	31.3	31.7	32.2	32.7	36.3	40.4	44.9	44.9	44.9	44.9

Table A-2-49 - Estimated Required Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Hyundai Kia-K)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	32.8	33.3	33.9	34.4	34.9	35.4	36.0	36.0	36.0	36.0
Alternative 1	32.8	33.3	33.9	34.4	38.8	40.1	41.4	41.4	41.4	41.4
Alternative 2	32.8	33.3	33.9	34.4	37.4	40.6	44.1	44.1	44.1	44.1
Alternative 3	32.8	33.3	33.9	34.4	38.2	42.4	47.1	47.1	47.1	47.1

Table A-2-50 - Estimated Required Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (JLR)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	32.3	32.8	33.3	33.8	34.3	34.9	35.4	35.4	35.4	35.4
Alternative 1	32.3	32.8	33.3	33.8	38.1	39.4	40.7	40.7	40.7	40.7
Alternative 2	32.3	32.8	33.3	33.8	36.8	40.0	43.4	43.4	43.4	43.4
Alternative 3	32.3	32.8	33.3	33.8	37.6	41.7	46.4	46.4	46.4	46.4

Table A-2-51 - Estimated Required Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Mazda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	34.8	35.3	35.8	36.4	36.9	37.5	38.1	38.1	38.1	38.1
Alternative 1	34.8	35.3	35.8	36.4	41.0	42.4	43.9	43.9	43.9	43.9
Alternative 2	34.8	35.3	35.8	36.4	39.6	43.0	46.7	46.7	46.7	46.7
Alternative 3	34.8	35.3	35.8	36.4	40.4	44.9	49.9	49.9	49.9	49.9

Table A-2-52 - Estimated Required Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Mitsubishi)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	36.8	37.3	37.9	38.4	39.0	39.6	40.2	40.2	40.2	40.2
Alternative 1	36.8	37.3	37.9	38.4	43.4	44.8	46.4	46.3	46.4	46.4
Alternative 2	36.8	37.3	37.9	38.4	41.8	45.4	49.4	49.4	49.4	49.4
Alternative 3	36.8	37.3	37.9	38.4	42.7	47.5	52.7	52.8	52.7	52.8

Table A-2-53 - Estimated Required Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Nissan)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	32.5	33.0	33.5	34.0	34.6	35.1	35.6	35.6	35.6	35.6
Alternative 1	32.5	33.0	33.5	34.0	38.4	39.7	41.0	41.0	41.0	41.0
Alternative 2	32.5	33.0	33.5	34.0	37.0	40.2	43.7	43.7	43.7	43.7
Alternative 3	32.5	33.0	33.5	34.0	37.8	42.0	46.7	46.7	46.7	46.7

Table A-2-54 - Estimated Required Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Subaru)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	35.4	35.9	36.4	37.0	37.6	38.1	38.7	38.7	38.7	38.7
Alternative 1	35.4	35.9	36.4	37.0	41.7	43.1	44.6	44.6	44.6	44.6
Alternative 2	35.4	35.9	36.4	37.0	40.2	43.7	47.5	47.5	47.5	47.5
Alternative 3	35.4	35.9	36.4	37.0	41.1	45.7	50.7	50.7	50.7	50.7

Table A-2-55 - Estimated Required Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Tesla)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	30.6	31.1	31.6	32.0	32.5	33.0	33.5	33.5	33.5	33.5
Alternative 1	30.6	31.1	31.6	32.0	36.1	37.3	38.6	38.6	38.6	38.6
Alternative 2	30.6	31.1	31.6	32.0	34.8	37.8	41.1	41.1	41.1	41.1
Alternative 3	30.6	31.1	31.6	32.0	35.6	39.6	43.9	44.0	44.0	43.9

Table A-2-56 - Estimated Required Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Toyota)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	31.8	32.3	32.7	33.2	33.8	34.3	34.8	34.8	34.8	34.8
Alternative 1	31.8	32.3	32.7	33.2	37.5	38.7	40.0	40.0	40.0	40.0
Alternative 2	31.8	32.3	32.7	33.2	36.1	39.3	42.7	42.7	42.7	42.7
Alternative 3	31.8	32.3	32.7	33.2	36.9	41.0	45.6	45.6	45.6	45.6

Table A-2-57 - Estimated Required Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Volvo)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	32.5	33.0	33.5	34.0	34.5	35.0	35.6	35.6	35.6	35.6
Alternative 1	32.5	33.0	33.5	34.0	38.3	39.6	41.0	41.0	41.0	41.0
Alternative 2	32.5	33.0	33.5	34.0	36.9	40.2	43.6	43.6	43.6	43.6
Alternative 3	32.5	33.0	33.5	34.0	37.8	42.0	46.6	46.6	46.6	46.6

Table A-2-58 - Estimated Required Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (VWA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	33.5	34.1	34.6	35.1	35.6	36.2	36.7	36.7	36.7	36.7
Alternative 1	33.5	34.1	34.6	35.1	39.6	40.9	42.3	42.3	42.3	42.3
Alternative 2	33.5	34.1	34.6	35.1	38.2	41.5	45.1	45.1	45.1	45.1
Alternative 3	33.5	34.1	34.6	35.1	39.0	43.3	48.2	48.2	48.2	48.2

3. Estimated Achieved CAFE Levels

Table A-3-1 - Estimated Achieved Average Fuel Economy (mpg), Total Fleet for Manufacturer (Total)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	34.3	35.9	38.2	39.8	41.3	42.1	43.2	43.5	43.8	44.2
Alternative 1	34.3	35.9	38.2	40.3	42.8	44.1	45.5	46.0	46.4	46.8
Alternative 2	34.3	35.9	38.2	40.5	43.2	45.1	47.6	48.3	48.9	49.2
Alternative 3	34.3	35.9	38.2	40.7	44.2	46.6	49.7	50.6	51.4	51.7

Table A-3-2 - Estimated Achieved Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Total)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	41.7	43.6	46.6	48.3	50.4	51.5	52.4	52.8	53.0	53.4
Alternative 1	41.7	43.6	46.6	49.3	52.6	54.6	55.8	56.3	56.7	57.0
Alternative 2	41.7	43.6	46.6	49.7	53.9	57.1	59.6	60.5	61.3	61.4
Alternative 3	41.7	43.6	46.6	50.1	55.3	59.4	62.9	64.1	65.3	65.5

Table A-3-3 - Estimated Achieved Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Total)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	30.2	31.5	33.1	34.4	35.5	36.0	37.0	37.2	37.4	37.7
Alternative 1	30.2	31.5	33.1	34.6	36.6	37.5	38.7	39.2	39.5	39.8
Alternative 2	30.2	31.5	33.1	34.8	36.5	37.9	40.2	40.7	41.1	41.4
Alternative 3	30.2	31.5	33.1	34.9	37.4	39.1	41.8	42.5	43.0	43.2

Table A-3-4 - Estimated Achieved Average Fuel Economy (mpg), Total Fleet for Manufacturer (BMW)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	34.6	36.3	39.7	43.2	44.8	47.0	48.1	48.2	48.3	48.4
Alternative 1	34.6	36.3	39.7	43.5	45.4	47.5	48.4	48.5	48.6	48.8
Alternative 2	34.6	36.3	39.7	43.5	45.3	48.5	50.2	51.5	51.5	51.8
Alternative 3	34.6	36.3	39.7	43.6	45.9	50.2	52.1	54.8	55.0	55.2

Table A-3-5 - Estimated Achieved Average Fuel Economy (mpg), Total Fleet for Manufacturer (Daimler)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	31.5	33.5	34.7	36.8	39.2	40.6	41.4	41.8	41.9	42.4
Alternative 1	31.5	33.5	34.7	36.7	40.0	41.5	42.9	43.8	43.9	44.1
Alternative 2	31.5	33.5	34.7	36.6	39.8	41.3	42.5	44.9	45.5	45.7
Alternative 3	31.5	33.5	34.7	36.7	40.1	41.6	42.9	45.2	46.7	46.9

Table A-3-6 - Estimated Achieved Average Fuel Economy (mpg), Total Fleet for Manufacturer (FCA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	28.4	29.5	32.2	34.0	34.6	34.6	35.4	35.7	36.3	36.4
Alternative 1	28.4	29.5	32.2	33.9	34.4	34.4	35.4	36.3	37.4	37.8
Alternative 2	28.4	29.5	32.2	33.9	34.3	34.4	35.4	36.2	37.7	38.1
Alternative 3	28.4	29.5	32.2	33.9	34.3	34.3	35.4	36.2	37.9	38.3

Table A-3-7 - Estimated Achieved Average Fuel Economy (mpg), Total Fleet for Manufacturer (Ford)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	31.6	33.0	35.1	37.4	38.6	39.1	40.6	40.7	40.9	41.0
Alternative 1	31.6	33.0	35.1	38.5	39.7	40.1	41.0	41.1	41.1	41.1
Alternative 2	31.6	33.0	35.1	38.9	40.1	40.6	43.7	43.8	44.0	44.0
Alternative 3	31.6	33.0	35.1	39.0	41.4	41.8	46.5	46.7	46.8	47.0

Table A-3-8 - Estimated Achieved Average Fuel Economy (mpg), Total Fleet for Manufacturer (GM)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	30.9	32.4	33.9	34.4	35.3	36.2	36.8	37.0	37.1	37.8
Alternative 1	30.9	32.4	33.9	34.6	38.1	40.1	41.4	41.9	42.0	42.5
Alternative 2	30.9	32.4	33.9	34.5	37.0	40.4	43.6	44.4	44.5	45.0
Alternative 3	30.9	32.4	33.9	34.7	37.8	42.2	46.3	47.4	47.6	47.6

Table A-3-9 - Estimated Achieved Average Fuel Economy (mpg), Total Fleet for Manufacturer (Honda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	40.3	41.3	44.5	45.5	46.8	48.4	49.5	49.5	49.7	49.7
Alternative 1	40.3	41.3	44.5	45.5	46.6	48.4	49.3	49.4	49.5	49.5
Alternative 2	40.3	41.3	44.5	46.5	48.6	50.9	52.2	52.3	52.6	52.6
Alternative 3	40.3	41.3	44.5	48.2	51.8	54.5	56.0	56.0	56.7	56.8

Table A-3-10 - Estimated Achieved Average Fuel Economy (mpg), Total Fleet for Manufacturer (Hyundai Kia-H)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	37.7	39.0	42.1	43.9	46.3	46.5	47.3	47.6	47.6	47.9
Alternative 1	37.7	39.0	42.1	43.9	47.7	49.1	51.8	52.3	52.4	52.5
Alternative 2	37.7	39.0	42.1	44.0	47.8	50.7	56.3	56.8	57.0	57.2
Alternative 3	37.7	39.0	42.1	44.0	48.7	52.6	60.1	60.5	60.8	61.3

Table A-3-11 - Estimated Achieved Average Fuel Economy (mpg), Total Fleet for Manufacturer (Hyundai Kia-K)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	36.3	40.6	41.4	41.8	44.7	45.6	45.8	46.5	46.6	46.7
Alternative 1	36.3	40.6	41.4	41.8	47.2	48.7	49.2	50.1	50.3	50.4
Alternative 2	36.3	40.6	41.4	41.8	49.3	51.5	53.1	54.1	54.5	54.7
Alternative 3	36.3	40.6	41.4	41.8	50.8	54.8	56.7	57.3	57.8	58.0

Table A-3-12 - Estimated Achieved Average Fuel Economy (mpg), Total Fleet for Manufacturer (JLR)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	28.9	30.1	31.6	33.6	35.3	35.8	36.4	36.8	36.8	37.0
Alternative 1	28.9	30.1	31.6	34.0	36.4	37.6	38.3	39.2	39.2	40.7
Alternative 2	28.9	30.1	31.6	34.0	36.4	37.6	38.3	39.2	39.2	40.8
Alternative 3	28.9	30.1	31.6	34.0	36.5	37.8	38.5	39.3	39.3	40.9

Table A-3-13 - Estimated Achieved Average Fuel Economy (mpg), Total Fleet for Manufacturer (Mazda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	36.4	37.7	38.7	43.6	44.2	45.2	45.9	46.0	46.0	46.1
Alternative 1	36.4	37.7	38.7	43.7	44.7	47.7	49.2	49.3	49.3	49.4
Alternative 2	36.4	37.7	38.7	43.7	44.5	50.8	53.5	53.6	53.6	53.9
Alternative 3	36.4	37.7	38.7	43.7	45.1	52.2	56.0	56.1	56.1	56.4

Table A-3-14 - Estimated Achieved Average Fuel Economy (mpg), Total Fleet for Manufacturer (Mitsubishi)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	38.7	39.4	39.8	40.1	40.3	45.9	46.0	46.0	46.1	46.2
Alternative 1	38.7	39.4	39.8	40.1	40.2	51.5	51.6	51.6	51.7	51.8
Alternative 2	38.7	39.4	39.8	40.1	40.2	56.2	56.3	56.3	56.4	56.4
Alternative 3	38.7	39.4	39.8	40.1	40.2	58.7	58.7	58.7	58.8	58.8

Table A-3-15 - Estimated Achieved Average Fuel Economy (mpg), Total Fleet for Manufacturer (Nissan)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	37.6	40.1	42.3	43.0	44.6	45.3	45.6	45.7	46.0	46.1
Alternative 1	37.6	40.1	42.3	44.5	47.1	48.5	49.2	49.3	50.3	50.4
Alternative 2	37.6	40.1	42.3	45.2	48.4	52.0	53.2	53.6	54.9	55.4
Alternative 3	37.6	40.1	42.3	45.2	49.3	53.4	54.6	55.9	57.9	58.6

Table A-3-16 - Estimated Achieved Average Fuel Economy (mpg), Total Fleet for Manufacturer (Subaru)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	38.7	39.9	42.4	45.7	48.0	49.5	50.1	50.3	50.3	50.4
Alternative 1	38.7	39.9	42.4	46.5	49.8	51.4	52.3	52.5	52.5	52.5
Alternative 2	38.7	39.9	42.4	46.5	49.8	51.4	53.3	53.6	53.6	53.6
Alternative 3	38.7	39.9	42.4	46.5	49.8	51.4	54.1	54.3	54.4	54.4

Table A-3-17 - Estimated Achieved Average Fuel Economy (mpg), Total Fleet for Manufacturer (Tesla)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	720.6	747.7	750.2	755.2	756.2	756.8	757.6	758.0	758.7	759.2
Alternative 1	720.6	747.7	750.2	755.2	756.0	756.3	756.8	757.1	757.7	758.2
Alternative 2	720.6	747.7	750.2	755.2	756.0	756.0	756.2	756.3	756.9	757.3
Alternative 3	720.6	747.7	750.2	755.2	755.8	755.6	755.7	755.6	756.2	756.5

Table A-3-18 - Estimated Achieved Average Fuel Economy (mpg), Total Fleet for Manufacturer (Toyota)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	36.7	38.1	40.1	41.4	42.5	42.8	45.1	45.6	46.2	47.0
Alternative 1	36.7	38.1	40.1	42.6	45.7	46.1	48.9	49.5	50.2	51.1
Alternative 2	36.7	38.1	40.1	43.2	47.4	48.1	51.6	52.0	52.7	52.8
Alternative 3	36.7	38.1	40.1	43.4	49.8	50.5	55.0	55.5	56.4	56.5

Table A-3-19 - Estimated Achieved Average Fuel Economy (mpg), Total Fleet for Manufacturer (Volvo)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	33.1	33.4	33.6	41.5	41.7	42.7	43.5	45.2	45.2	45.2
Alternative 1	33.1	33.4	33.6	41.4	41.6	42.6	43.6	46.1	46.1	46.1
Alternative 2	33.1	33.4	33.6	42.1	42.3	43.5	44.5	48.1	48.2	48.2
Alternative 3	33.1	33.4	33.6	43.9	44.1	45.4	46.4	51.2	51.3	51.3

Table A-3-20 - Estimated Achieved Average Fuel Economy (mpg), Total Fleet for Manufacturer (VWA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	33.1	34.9	37.0	38.2	44.9	46.9	48.2	48.6	49.2	49.7
Alternative 1	33.1	34.9	37.0	38.1	44.0	46.0	48.0	48.3	48.9	49.6
Alternative 2	33.1	34.9	37.0	38.2	44.2	47.0	48.5	49.9	51.4	51.6
Alternative 3	33.1	34.9	37.0	38.1	44.4	47.8	50.7	52.4	53.3	53.5

Table A-3-21 - Estimated Achieved Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (BMW)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	36.6	38.4	42.2	45.4	47.3	50.8	52.6	52.7	52.7	52.8
Alternative 1	36.6	38.4	42.2	46.3	48.9	52.4	53.8	54.0	54.0	54.2
Alternative 2	36.6	38.4	42.2	46.1	48.4	53.9	57.1	57.2	57.2	57.5
Alternative 3	36.6	38.4	42.2	46.3	49.4	57.2	60.9	61.1	61.1	61.5

Table A-3-22 - Estimated Achieved Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Daimler)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	33.9	36.9	38.7	39.5	45.0	46.4	46.7	46.9	47.0	47.7
Alternative 1	33.9	36.9	38.7	39.7	47.7	49.3	49.6	50.9	51.0	51.1
Alternative 2	33.9	36.9	38.7	39.5	47.1	48.6	48.9	54.0	55.6	55.7
Alternative 3	33.9	36.9	38.7	39.8	48.1	49.7	50.0	55.3	59.4	59.6

Table A-3-23 - Estimated Achieved Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (FCA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	30.7	38.4	41.6	44.1	45.9	46.0	48.6	48.6	49.5	49.5
Alternative 1	30.7	38.4	41.6	45.5	47.3	47.4	51.0	51.0	51.9	52.0
Alternative 2	30.7	38.4	41.6	45.5	47.2	47.5	51.0	51.0	56.2	56.3
Alternative 3	30.7	38.4	41.6	45.5	47.3	47.4	51.0	51.0	59.2	59.5

Table A-3-24 - Estimated Achieved Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Ford)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	36.9	37.3	42.9	47.0	47.0	47.9	50.3	50.5	50.7	50.8
Alternative 1	36.9	37.3	42.9	54.9	54.8	56.1	56.7	56.6	56.5	56.4
Alternative 2	36.9	37.3	42.9	57.5	57.5	59.0	61.0	61.1	61.1	61.0
Alternative 3	36.9	37.3	42.9	57.5	57.5	57.6	64.0	64.6	64.6	64.6

Table A-3-25 - Estimated Achieved Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (GM)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	40.0	41.2	43.7	45.2	46.8	48.8	49.1	49.3	49.3	49.4
Alternative 1	40.0	41.2	43.7	46.6	49.7	54.0	54.9	55.6	55.6	55.6
Alternative 2	40.0	41.2	43.7	46.1	49.2	53.9	57.0	59.0	59.0	59.1
Alternative 3	40.0	41.2	43.7	46.8	50.0	56.4	59.8	63.1	63.2	63.2

Table A-3-26 - Estimated Achieved Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Honda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	45.0	45.9	48.9	50.4	51.1	52.8	54.6	54.6	54.7	54.8
Alternative 1	45.0	45.9	48.9	50.4	51.1	52.8	54.5	54.6	54.6	54.6
Alternative 2	45.0	45.9	48.9	52.1	53.3	55.6	58.1	58.2	58.7	58.7
Alternative 3	45.0	45.9	48.9	54.7	56.5	59.0	61.8	62.0	63.1	63.2

Table A-3-27 - Estimated Achieved Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Hyundai Kia-H)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	39.1	40.6	44.3	45.7	48.5	48.7	48.9	49.3	49.4	49.7
Alternative 1	39.1	40.6	44.3	45.7	50.3	51.9	53.6	54.1	54.2	54.3
Alternative 2	39.1	40.6	44.3	45.8	50.3	53.9	58.4	59.0	59.2	59.4
Alternative 3	39.1	40.6	44.3	45.8	51.4	56.3	62.3	62.8	63.1	63.7

Table A-3-28 - Estimated Achieved Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Hyundai Kia-K)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	41.4	45.8	47.0	47.2	49.7	51.0	51.1	51.4	51.4	51.4
Alternative 1	41.4	45.8	47.0	47.2	51.2	53.6	54.2	54.6	55.0	55.0
Alternative 2	41.4	45.8	47.0	47.2	52.8	56.5	59.2	59.7	60.2	60.6
Alternative 3	41.4	45.8	47.0	47.2	53.4	60.2	63.3	63.8	64.5	64.9

Table A-3-29 - Estimated Achieved Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (JLR)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	35.7	36.9	37.0	38.6	46.1	46.1	46.1	48.0	48.0	48.0
Alternative 1	35.7	36.9	37.0	39.4	47.2	47.2	47.2	49.4	49.4	52.1
Alternative 2	35.7	36.9	37.0	39.4	47.2	47.2	47.2	49.4	49.4	53.5
Alternative 3	35.7	36.9	37.0	39.4	47.2	47.2	47.2	49.4	49.4	53.5

Table A-3-30 - Estimated Achieved Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Mazda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	38.6	41.3	43.1	48.1	48.8	50.5	50.7	50.8	50.8	50.8
Alternative 1	38.6	41.3	43.1	48.2	49.9	54.0	55.4	55.5	55.5	55.6
Alternative 2	38.6	41.3	43.1	48.2	49.6	56.9	59.4	59.4	59.4	60.0
Alternative 3	38.6	41.3	43.1	48.2	50.9	60.2	63.1	63.1	63.1	63.8

Table A-3-31 - Estimated Achieved Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Mitsubishi)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	42.3	44.0	44.6	45.0	45.3	52.0	52.2	52.3	52.5	52.6
Alternative 1	42.3	44.0	44.6	45.0	45.2	57.7	57.9	58.0	58.1	58.2
Alternative 2	42.3	44.0	44.6	45.0	45.2	63.0	63.1	63.1	63.2	63.3
Alternative 3	42.3	44.0	44.6	45.0	45.2	66.9	67.0	67.0	67.1	67.1

Table A-3-32 - Estimated Achieved Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Nissan)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	41.7	43.3	45.5	46.1	48.4	48.7	48.9	49.0	49.1	49.2
Alternative 1	41.7	43.3	45.5	47.9	51.5	53.0	53.3	53.4	54.4	54.4
Alternative 2	41.7	43.3	45.5	48.3	52.9	58.1	58.4	58.7	60.3	60.6
Alternative 3	41.7	43.3	45.5	48.3	54.3	60.4	60.7	62.1	63.7	64.4

Table A-3-33 - Estimated Achieved Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Subaru)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	38.1	40.1	44.3	46.0	48.6	48.9	50.5	50.5	50.5	50.5
Alternative 1	38.1	40.1	44.3	46.0	52.4	52.7	55.2	55.2	55.2	55.2
Alternative 2	38.1	40.1	44.3	46.0	52.4	52.7	60.3	60.3	60.3	60.3
Alternative 3	38.1	40.1	44.3	46.0	52.4	52.7	64.4	64.4	64.4	64.4

Table A-3-34 - Estimated Achieved Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Tesla)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	725.7	752.4	754.6	755.9	756.9	757.5	758.3	758.7	759.4	759.9
Alternative 1	725.7	752.4	754.6	755.9	756.7	757.0	757.5	757.8	758.4	758.9
Alternative 2	725.7	752.4	754.6	755.9	756.7	756.7	756.9	757.0	757.6	758.0
Alternative 3	725.7	752.4	754.6	755.9	756.5	756.3	756.4	756.3	756.9	757.2

Table A-3-35 - Estimated Achieved Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Toyota)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	46.0	47.1	49.1	49.8	50.7	51.1	51.8	52.8	53.1	54.6
Alternative 1	46.0	47.1	49.1	49.8	52.9	53.4	54.2	55.2	55.7	57.2
Alternative 2	46.0	47.1	49.1	50.0	56.3	57.4	58.6	59.5	59.8	59.9
Alternative 3	46.0	47.1	49.1	50.4	59.4	61.0	62.8	63.8	64.1	64.2

Table A-3-36 - Estimated Achieved Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (Volvo)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	35.7	36.4	36.5	40.7	41.0	42.5	44.9	46.6	46.7	46.7
Alternative 1	35.7	36.4	36.5	40.7	41.0	42.5	45.5	50.2	50.3	50.4
Alternative 2	35.7	36.4	36.5	40.7	41.0	42.5	45.5	54.9	55.0	55.1
Alternative 3	35.7	36.4	36.5	40.7	41.0	42.5	45.4	58.7	58.8	58.8

Table A-3-37 - Estimated Achieved Average Fuel Economy (mpg), Passenger Car Fleet for Manufacturer (VWA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	37.6	38.6	40.7	42.9	53.9	55.0	56.3	56.7	58.3	59.3
Alternative 1	37.6	38.6	40.7	42.6	49.6	50.7	53.8	54.2	55.7	57.3
Alternative 2	37.6	38.6	40.7	42.9	53.5	54.9	56.6	56.7	60.6	60.9
Alternative 3	37.6	38.6	40.7	42.6	52.3	54.2	59.5	59.6	61.9	62.3

Table A-3-38 - Estimated Achieved Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (BMW)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	31.7	33.1	35.7	39.3	40.3	40.5	40.5	40.6	40.6	40.6
Alternative 1	31.7	33.1	35.7	38.8	39.6	39.8	39.9	39.9	39.9	39.9
Alternative 2	31.7	33.1	35.7	39.1	40.0	40.2	40.2	42.6	42.6	42.6
Alternative 3	31.7	33.1	35.7	39.1	40.0	40.2	40.2	45.3	45.5	45.5

Table A-3-39 - Estimated Achieved Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Daimler)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	29.7	30.8	31.4	34.3	34.4	35.6	36.7	37.1	37.2	37.4
Alternative 1	29.7	30.8	31.4	34.0	34.1	35.5	37.3	37.9	37.9	38.1
Alternative 2	29.7	30.8	31.4	34.0	34.1	35.5	37.3	37.9	37.9	38.1
Alternative 3	29.7	30.8	31.4	34.0	34.1	35.5	37.3	37.9	37.9	38.1

Table A-3-40 - Estimated Achieved Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (FCA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	28.1	28.4	31.0	32.6	33.1	33.1	33.6	34.0	34.5	34.6
Alternative 1	28.1	28.4	31.0	32.4	32.7	32.7	33.5	34.4	35.5	35.9
Alternative 2	28.1	28.4	31.0	32.4	32.7	32.7	33.5	34.4	35.5	35.9
Alternative 3	28.1	28.4	31.0	32.4	32.7	32.7	33.5	34.4	35.5	35.9

Table A-3-41 - Estimated Achieved Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Ford)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	30.0	31.6	32.8	34.5	35.9	36.3	37.5	37.6	37.7	37.7
Alternative 1	30.0	31.6	32.8	34.3	35.7	35.9	36.7	36.8	36.8	36.8
Alternative 2	30.0	31.6	32.8	34.4	35.7	36.0	39.1	39.2	39.3	39.3
Alternative 3	30.0	31.6	32.8	34.5	37.1	37.6	41.8	41.9	42.0	42.2

Table A-3-42 - Estimated Achieved Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (GM)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	27.8	29.3	30.4	30.5	31.2	31.7	32.3	32.5	32.5	33.3
Alternative 1	27.8	29.3	30.4	30.5	33.9	35.2	36.5	36.9	37.0	37.6
Alternative 2	27.8	29.3	30.4	30.5	32.7	35.6	38.7	39.2	39.3	39.8
Alternative 3	27.8	29.3	30.4	30.5	33.4	37.2	41.3	41.8	42.0	42.0

Table A-3-43 - Estimated Achieved Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Honda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	35.3	36.0	39.1	39.4	41.0	42.5	42.5	42.5	42.5	42.5
Alternative 1	35.3	36.0	39.1	39.4	40.7	42.5	42.5	42.5	42.5	42.5
Alternative 2	35.3	36.0	39.1	39.6	42.4	44.7	44.7	44.7	44.7	44.7
Alternative 3	35.3	36.0	39.1	40.5	45.6	48.5	48.5	48.5	48.5	48.5

Table A-3-44 - Estimated Achieved Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Hyundai Kia-H)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	29.1	29.3	29.3	32.2	32.4	32.5	35.4	35.4	35.4	35.4
Alternative 1	29.1	29.3	29.3	32.2	32.4	32.5	39.4	39.4	39.4	39.4
Alternative 2	29.1	29.3	29.3	32.2	32.4	32.5	42.0	42.1	42.1	42.1
Alternative 3	29.1	29.3	29.3	32.2	32.4	32.5	45.1	45.2	45.2	45.2

Table A-3-45 - Estimated Achieved Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Hyundai Kia-K)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	30.3	34.0	34.1	34.4	37.4	37.6	37.8	38.8	38.8	38.8
Alternative 1	30.3	34.0	34.1	34.4	41.0	41.2	41.4	42.8	42.8	42.8
Alternative 2	30.3	34.0	34.1	34.4	43.6	43.9	44.1	45.7	45.7	45.7
Alternative 3	30.3	34.0	34.1	34.4	46.5	46.8	47.1	47.9	47.9	47.9

Table A-3-46 - Estimated Achieved Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (JLR)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	28.7	29.8	31.4	33.4	34.8	35.3	35.9	36.3	36.3	36.5
Alternative 1	28.7	29.8	31.4	33.7	35.9	37.2	37.9	38.7	38.7	40.2
Alternative 2	28.7	29.8	31.4	33.7	35.9	37.2	37.9	38.7	38.7	40.2
Alternative 3	28.7	29.8	31.4	33.8	36.0	37.4	38.1	38.9	38.9	40.4

Table A-3-47 - Estimated Achieved Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Mazda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	34.5	34.8	35.1	39.8	40.2	40.6	41.6	41.6	41.6	41.6
Alternative 1	34.5	34.8	35.1	39.8	40.2	42.5	43.9	43.9	43.9	43.9
Alternative 2	34.5	34.8	35.1	39.8	40.2	45.6	48.4	48.5	48.5	48.5
Alternative 3	34.5	34.8	35.1	39.8	40.2	45.8	50.1	50.2	50.2	50.2

Table A-3-48 - Estimated Achieved Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Mitsubishi)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	36.1	36.2	36.3	36.5	36.5	41.3	41.3	41.3	41.3	41.3
Alternative 1	36.1	36.2	36.3	36.5	36.5	46.8	46.8	46.8	46.8	46.8
Alternative 2	36.1	36.2	36.3	36.5	36.5	51.2	51.2	51.2	51.2	51.2
Alternative 3	36.1	36.2	36.3	36.5	36.5	52.8	52.8	52.8	52.8	52.8

Table A-3-49 - Estimated Achieved Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Nissan)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	30.9	34.3	36.1	36.7	37.2	38.1	38.5	38.5	39.1	39.1
Alternative 1	30.9	34.3	36.1	37.8	38.6	39.7	41.0	41.0	41.6	41.8
Alternative 2	30.9	34.3	36.1	38.8	39.8	40.9	43.2	43.7	44.4	45.0
Alternative 3	30.9	34.3	36.1	38.8	40.0	41.1	43.4	44.5	46.7	47.5

Table A-3-50 - Estimated Achieved Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Subaru)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	38.8	39.8	41.9	45.6	47.8	49.7	50.0	50.2	50.2	50.3
Alternative 1	38.8	39.8	41.9	46.7	49.0	51.0	51.3	51.6	51.6	51.6
Alternative 2	38.8	39.8	41.9	46.7	49.0	51.0	51.3	51.6	51.6	51.6
Alternative 3	38.8	39.8	41.9	46.7	49.0	51.0	51.3	51.6	51.6	51.6

Table A-3-51 - Estimated Achieved Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Tesla)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	588.5	617.1	617.1	728.4	728.4	728.4	728.4	728.4	728.3	728.3
Alternative 1	588.5	617.1	617.1	728.4	728.4	728.4	728.4	728.4	728.4	728.4
Alternative 2	588.5	617.1	617.1	728.4	728.3	728.4	728.3	728.3	728.3	728.3
Alternative 3	588.5	617.1	617.1	728.4	728.4	728.3	728.3	728.3	728.2	728.3

Table A-3-52 - Estimated Achieved Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Toyota)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	29.8	31.0	32.4	33.9	34.7	34.8	38.0	38.0	38.7	38.8
Alternative 1	29.8	31.0	32.4	35.7	38.5	38.7	43.0	43.1	43.9	44.1
Alternative 2	29.8	31.0	32.4	36.6	39.0	39.3	44.2	44.2	45.1	45.1
Alternative 3	29.8	31.0	32.4	36.7	40.8	41.0	47.1	47.1	48.4	48.4

Table A-3-53 - Estimated Achieved Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (Volvo)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	32.3	32.4	32.6	41.8	42.0	42.8	43.0	44.6	44.6	44.6
Alternative 1	32.3	32.4	32.6	41.7	41.9	42.7	42.9	44.6	44.6	44.6
Alternative 2	32.3	32.4	32.6	42.7	42.9	43.9	44.1	45.9	45.9	45.9
Alternative 3	32.3	32.4	32.6	45.2	45.4	46.6	46.8	48.8	48.8	48.8

Table A-3-54 - Estimated Achieved Average Fuel Economy (mpg), Light Truck Fleet for Manufacturer (VWA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	30.5	32.5	34.3	34.9	38.9	41.2	42.3	42.5	42.5	42.5
Alternative 1	30.5	32.5	34.3	34.9	39.9	42.4	43.5	43.7	43.7	43.7
Alternative 2	30.5	32.5	34.3	34.9	38.2	41.6	42.9	44.9	44.9	44.9
Alternative 3	30.5	32.5	34.3	34.9	39.0	43.3	44.8	47.3	47.3	47.3

4. CAFE Cost per Vehicle

Table A-4-1 - MY 2029 Required and Achieved CAFE Levels (mpg), and Per-Vehicle Costs (billions of dollars) for Total Fleet by Alternative

	Avg Required (mpg)	Avg Achieved (mpg)	Avg Cost (\$b)
Alternative 0 (Baseline)	39.5	44.2	11.9
Alternative 1	44.9	46.8	18.2
Alternative 2	48.2	49.2	25.6
Alternative 3	51.4	51.7	32.1

Table A-4-2 - MY 2029 Required and Achieved CAFE Levels (mpg), and Per-Vehicle Costs (billions of dollars) for Passenger Car Fleet by Alternative

	Avg Required (mpg)	Avg Achieved (mpg)	Avg Cost (\$b)
Alternative 0 (Baseline)	47.3	53.4	5.3
Alternative 1	53.2	57.0	8.4
Alternative 2	58.1	61.4	12.9
Alternative 3	62.0	65.5	15.6

Table A-4-3 - MY 2029 Required and Achieved CAFE Levels (mpg), and Per-Vehicle Costs (billions of dollars) for Light Truck Fleet by Alternative

	Avg Required (mpg)	Avg Achieved (mpg)	Avg Cost (\$b)
Alternative 0 (Baseline)	33.9	37.7	6.6
Alternative 1	39.0	39.8	9.9
Alternative 2	41.5	41.4	12.7
Alternative 3	44.3	43.2	16.5

5. Various Impacts of Alternatives

Table A-5-1 - Impacts for Alternative 1

Category	Passenger Car	Light Truck	Combined Fleet
Fuel Economy			
Required Fuel Economy for MY 2029(mpg)	53.2	39.0	44.9
Achieved Fuel Economy for MY 2029 (mpg)	57.0	39.8	46.8
Achieved Fuel Economy for MY 2020 - for reference (mpg)	41.7	30.2	34.3
Average MY 2029 Vehicle - Incremental to Alternative 0 (Baseline)			
Per Vehicle Price Increase (dollars)	425	444	437
Lifetime Fuel Cost (per vehicle), 3% Discount Rate (dollars)	-541	-730	-581
Lifetime Fuel Cost (per vehicle), 7% Discount Rate (dollars)	-421	-559	-449
Payback Period Relative to MY 2020, 3% Discount Rate (years)	1.0	1.0	1.0
Payback Period Relative to MY 2020, 7% Discount Rate (years)	1.0	1.0	1.0
Lifetime of Vehicles Through 2029 - Incremental to Alternative 0 (Baseline)			
Total Lifetime Fuel Volume (billion gallons)	-15	-12	-27
Total Lifetime CO2 Volume (million metric tons)	-151	-113	-264
Fatalities (Including Rebound Miles)	-73	1,093	1,019
Fatalities (Excluding Rebound Miles)	-246	818	570
Total Technology Costs, 3% Discount Rate (\$b)	17.1	17.2	34.3
Total Technology Costs, 7% Discount Rate (\$b)	14.1	14.0	28.1
Total Net Societal Benefits, 3% Discount Rate (\$b)	29.6	-13.5	16.1
Total Net Societal Benefits, 7% Discount Rate (\$b)	14.3	-12.0	2.3

Table A-5-2 - Impacts for Alternative 2

Category	Passenger Car	Light Truck	Combined Fleet
Fuel Economy			
Required Fuel Economy for MY 2029(mpg)	58.1	41.5	48.2
Achieved Fuel Economy for MY 2029 (mpg)	61.4	41.4	49.2
Achieved Fuel Economy for MY 2020 - for reference (mpg)	41.7	30.2	34.3
Average MY 2029 Vehicle - Incremental to Alternative 0 (Baseline)			
Per Vehicle Price Increase (dollars)	1,073	846	960
Lifetime Fuel Cost (per vehicle), 3% Discount Rate (dollars)	-1,053	-1,027	-937
Lifetime Fuel Cost (per vehicle), 7% Discount Rate (dollars)	-820	-786	-726
Payback Period Relative to MY 2020, 3% Discount Rate (years)	3.0	2.0	2.5
Payback Period Relative to MY 2020, 7% Discount Rate (years)	6.0	2.0	3.9
Lifetime of Vehicles Through 2029 - Incremental to Alternative 0 (Baseline)			
Total Lifetime Fuel Volume (billion gallons)	-28	-15	-43
Total Lifetime CO2 Volume (million metric tons)	-279	-175	-454
Fatalities (Including Rebound Miles)	-43	1,865	1,822
Fatalities (Excluding Rebound Miles)	-348	1587	1238
Total Technology Costs, 3% Discount Rate (\$b)	39.1	28.5	67.6
Total Technology Costs, 7% Discount Rate (\$b)	31.9	23.0	55.0
Total Net Societal Benefits, 3% Discount Rate (\$b)	42.5	-42.1	0.3
Total Net Societal Benefits, 7% Discount Rate (\$b)	17.1	-32.2	-15.1

Table A-5-3 - Impacts for Alternative 3

Category	Passenger Car	Light Truck	Combined Fleet
Fuel Economy			
Required Fuel Economy for MY 2029(mpg)	62.0	44.3	51.4
Achieved Fuel Economy for MY 2029 (mpg)	65.5	43.2	51.7
Achieved Fuel Economy for MY 2020 - for reference (mpg)	41.7	30.2	34.3
Average MY 2029 Vehicle - Incremental to Alternative 0 (Baseline)			
Per Vehicle Price Increase (dollars)	1,505	1,378	1,444
Lifetime Fuel Cost (per vehicle), 3% Discount Rate (dollars)	-1,490	-1,454	-1,332
Lifetime Fuel Cost (per vehicle), 7% Discount Rate (dollars)	-1,160	-1,113	-1,032
Payback Period Relative to MY 2020, 3% Discount Rate (years)	3.0	3.0	3.0
Payback Period Relative to MY 2020, 7% Discount Rate (years)	10.0	4.0	6.9
Lifetime of Vehicles Through 2029 - Incremental to Alternative 0 (Baseline)			
Total Lifetime Fuel Volume (billion gallons)	-38	-23	-61
Total Lifetime CO2 Volume (million metric tons)	-379	-270	-650
Fatalities (Including Rebound Miles)	-31	2,655	2,624
Fatalities (Excluding Rebound Miles)	-450	2272	1822
Total Technology Costs, 3% Discount Rate (\$b)	52.4	47.8	100.1
Total Technology Costs, 7% Discount Rate (\$b)	42.8	38.7	81.4
Total Net Societal Benefits, 3% Discount Rate (\$b)	58.5	-61.9	-3.4
Total Net Societal Benefits, 7% Discount Rate (\$b)	23.5	-48.7	-25.2

6. Required and Achieved CAFE Levels, Baseline vs. Alternative 2

Table A-6-1 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Total Fleet (mpg), Part 1 of 6

Model Year	BMW				Daimler				FCA			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	37.7	34.6	37.7	34.6	35.6	31.5	35.6	31.5	31.3	28.4	31.3	28.4
2021	38.4	36.3	38.4	36.3	36.3	33.5	36.3	33.5	31.7	29.5	31.7	29.5
2022	39.2	39.7	39.2	39.7	37.0	34.7	37.0	34.7	32.3	32.2	32.3	32.2
2023	39.9	43.2	39.9	43.5	37.6	36.8	37.6	36.6	32.8	34.0	32.8	33.9
2024	40.6	44.8	43.4	45.3	38.4	39.2	41.0	39.8	33.4	34.6	35.7	34.3
2025	41.3	47.0	47.3	48.5	39.0	40.6	44.6	41.3	33.9	34.6	38.8	34.4
2026	42.0	48.1	51.4	50.2	39.6	41.4	48.5	42.5	34.4	35.4	42.2	35.4
2027	42.0	48.2	51.4	51.5	39.7	41.8	48.5	44.9	34.4	35.7	42.2	36.2
2028	42.1	48.3	51.5	51.5	39.7	41.9	48.6	45.5	34.4	36.3	42.2	37.7
2029	42.2	48.4	51.5	51.8	39.8	42.4	48.6	45.7	34.4	36.4	42.2	38.1

Table A-6-2 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Total Fleet (mpg), Part 2 of 6

Model Year	Ford				GM				Honda			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	31.8	31.6	31.8	31.6	32.7	30.9	32.7	30.9	38.6	40.3	38.6	40.3
2021	32.4	33.0	32.4	33.0	33.2	32.4	33.2	32.4	39.3	41.3	39.3	41.3
2022	33.0	35.1	33.0	35.1	33.9	33.9	33.9	33.9	40.1	44.5	40.1	44.5
2023	33.6	37.4	33.6	38.9	34.4	34.4	34.4	34.5	40.7	45.5	40.7	46.5
2024	34.1	38.6	36.4	40.1	35.0	35.3	37.1	37.0	41.4	46.8	44.4	48.6
2025	34.7	39.1	39.6	40.6	35.6	36.2	40.4	40.4	42.2	48.4	48.2	50.9
2026	35.2	40.6	43.0	43.7	36.1	36.8	44.0	43.6	42.8	49.5	52.5	52.2
2027	35.3	40.7	43.0	43.8	36.2	37.0	44.0	44.4	42.9	49.5	52.5	52.3
2028	35.3	40.9	43.1	44.0	36.2	37.1	44.0	44.5	43.0	49.7	52.5	52.6
2029	35.4	41.0	43.1	44.0	36.3	37.8	44.1	45.0	43.0	49.7	52.6	52.6

Table A-6-3 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Total Fleet (mpg), Part 3 of 6

Model Year	Hyundai Kia-H				Hyundai Kia-K				JLR			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	41.6	37.7	41.6	37.7	38.9	36.3	38.9	36.3	32.6	28.9	32.6	28.9
2021	42.3	39.0	42.3	39.0	39.7	40.6	39.7	40.6	33.1	30.1	33.1	30.1
2022	43.1	42.1	43.1	42.1	40.5	41.4	40.5	41.4	33.7	31.6	33.7	31.6
2023	43.8	43.9	43.8	44.0	41.3	41.8	41.3	41.8	34.2	33.6	34.2	34.0
2024	44.5	46.3	47.6	47.8	42.0	44.7	44.9	49.3	34.7	35.3	37.3	36.4
2025	45.2	46.5	51.7	50.7	42.7	45.6	48.8	51.5	35.3	35.8	40.5	37.6
2026	45.9	47.3	56.2	56.3	43.5	45.8	53.1	53.1	35.9	36.4	43.9	38.3
2027	45.9	47.6	56.2	56.8	43.5	46.5	53.1	54.1	35.9	36.8	43.9	39.2
2028	45.9	47.6	56.2	57.0	43.6	46.6	53.2	54.5	35.9	36.8	44.0	39.2
2029	46.0	47.9	56.3	57.2	43.7	46.7	53.2	54.7	35.9	37.0	44.0	40.8

Table A-6-4 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Total Fleet (mpg), Part 4 of 6

	Mazda				Mitsubishi				Nissan			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
Model Year	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	38.7	36.4	38.7	36.4	40.7	38.7	40.7	38.7	39.2	37.6	39.2	37.6
2021	39.3	37.7	39.3	37.7	41.3	39.4	41.3	39.4	39.9	40.1	39.9	40.1
2022	40.0	38.7	40.0	38.7	42.1	39.8	42.1	39.8	40.6	42.3	40.6	42.3
2023	40.7	43.6	40.7	43.7	42.7	40.1	42.7	40.1	41.3	43.0	41.3	45.2
2024	41.3	44.2	44.3	44.5	43.5	40.3	46.5	40.2	42.0	44.6	45.0	48.4
2025	42.0	45.2	48.1	50.8	44.2	45.9	50.6	56.2	42.7	45.3	48.9	52.0
2026	42.7	45.9	52.3	53.5	44.9	46.0	55.0	56.3	43.4	45.6	53.2	53.2
2027	42.8	46.0	52.3	53.6	44.9	46.0	55.0	56.3	43.5	45.7	53.2	53.6
2028	42.8	46.0	52.4	53.6	44.9	46.1	55.0	56.4	43.5	46.0	53.2	54.9
2029	42.8	46.1	52.4	53.9	45.0	46.2	55.1	56.4	43.5	46.1	53.3	55.4

Table A-6-5 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Total Fleet (mpg), Part 5 of 6

Model Year	Subaru				Tesla				Toyota			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	37.0	38.7	37.0	38.7	40.5	720.6	40.5	720.6	37.1	36.7	37.1	36.7
2021	37.7	39.9	37.7	39.9	40.4	747.7	40.4	747.7	37.9	38.1	37.9	38.1
2022	38.3	42.4	38.3	42.4	41.1	750.2	41.1	750.2	38.6	40.1	38.6	40.1
2023	39.0	45.7	39.0	46.5	41.8	755.2	41.8	755.2	39.3	41.4	39.3	43.2
2024	39.7	48.0	42.5	49.8	42.4	756.2	45.4	756.0	40.1	42.5	42.9	47.4
2025	40.3	49.5	46.2	51.4	43.1	756.8	49.3	756.0	40.8	42.8	46.6	48.1
2026	41.0	50.1	50.2	53.3	43.7	757.6	53.6	756.2	41.4	45.1	50.7	51.6
2027	41.0	50.3	50.2	53.6	43.7	758.0	53.6	756.3	41.5	45.6	50.7	52.0
2028	41.1	50.3	50.3	53.6	43.7	758.7	53.6	756.9	41.6	46.2	50.8	52.7
2029	41.1	50.4	50.3	53.6	43.8	759.2	53.6	757.3	41.6	47.0	50.8	52.8

Table A-6-6 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Total Fleet (mpg), Part 6 of 6

Model Year	Volvo				VWA				Total			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	34.3	33.1	34.3	33.1	37.1	33.1	37.1	33.1	35.4	34.3	35.4	34.3
2021	34.9	33.4	34.9	33.4	37.9	34.9	37.9	34.9	36.0	35.9	36.0	35.9
2022	35.5	33.6	35.5	33.6	38.7	37.0	38.7	37.0	36.8	38.2	36.8	38.2
2023	36.0	41.5	36.0	42.1	39.4	38.2	39.4	38.2	37.4	39.8	37.4	40.5
2024	36.6	41.7	39.2	42.3	40.1	44.9	42.9	44.2	38.1	41.3	40.7	43.2
2025	37.2	42.7	42.6	43.5	40.8	46.9	46.6	47.0	38.7	42.1	44.2	45.1
2026	37.8	43.5	46.3	44.5	41.5	48.2	50.7	48.5	39.4	43.2	48.1	47.6
2027	37.9	45.2	46.3	48.1	41.5	48.6	50.8	49.9	39.4	43.5	48.1	48.3
2028	37.9	45.2	46.3	48.2	41.6	49.2	50.8	51.4	39.5	43.8	48.2	48.9
2029	37.9	45.2	46.3	48.2	41.7	49.7	50.9	51.6	39.5	44.2	48.2	49.2

Table A-6-7 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Passenger Car Fleet (mpg), Part 1 of 6

	BMW				Daimler				FCA			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
Model Year	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	42.5	36.6	42.5	36.6	41.4	33.9	41.4	33.9	41.6	30.7	41.6	30.7
2021	43.1	38.4	43.1	38.4	42.0	36.9	42.0	36.9	42.0	38.4	42.0	38.4
2022	43.8	42.2	43.8	42.2	42.7	38.7	42.7	38.7	42.5	41.6	42.5	41.6
2023	44.4	45.4	44.4	46.1	43.3	39.5	43.3	39.5	43.0	44.1	43.0	45.5
2024	45.1	47.3	48.3	48.4	44.0	45.0	47.1	47.1	43.6	45.9	46.8	47.2
2025	45.8	50.8	52.5	53.9	44.6	46.4	51.2	48.6	44.2	46.0	50.9	47.5
2026	46.5	52.6	57.1	57.1	45.3	46.7	55.6	48.9	44.9	48.6	55.2	51.0
2027	46.5	52.7	57.1	57.2	45.3	46.9	55.6	54.0	44.9	48.6	55.2	51.0
2028	46.5	52.7	57.1	57.2	45.3	47.0	55.6	55.6	44.8	49.5	55.1	56.2
2029	46.5	52.8	57.1	57.5	45.3	47.7	55.6	55.7	44.7	49.5	55.1	56.3

Table A-6-8 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Passenger Car Fleet (mpg), Part 2 of 6

Model Year	Ford				GM				Honda			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	42.2	36.9	42.2	36.9	43.9	40.0	43.9	40.0	43.6	45.0	43.6	45.0
2021	42.8	37.3	42.8	37.3	44.5	41.2	44.5	41.2	44.3	45.9	44.3	45.9
2022	43.5	42.9	43.5	42.9	45.2	43.7	45.2	43.7	45.0	48.9	45.0	48.9
2023	44.1	47.0	44.1	57.5	45.8	45.2	45.8	46.1	45.6	50.4	45.6	52.1
2024	44.8	47.0	47.9	57.5	46.5	46.8	49.8	49.2	46.3	51.1	49.6	53.3
2025	45.5	47.9	52.2	59.0	47.3	48.8	54.2	53.9	47.0	52.8	53.9	55.6
2026	46.1	50.3	56.7	61.0	48.0	49.1	58.9	57.0	47.7	54.6	58.6	58.1
2027	46.1	50.5	56.7	61.1	48.0	49.3	58.9	59.0	47.7	54.6	58.6	58.2
2028	46.1	50.7	56.7	61.1	48.0	49.3	58.9	59.0	47.7	54.7	58.6	58.7
2029	46.1	50.8	56.7	61.0	47.9	49.4	58.9	59.1	47.7	54.8	58.6	58.7

Table A-6-9 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Passenger Car Fleet (mpg), Part 3 of 6

Model Year	Hyundai Kia-H				Hyundai Kia-K				JLR			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	43.3	39.1	43.3	39.1	44.0	41.4	44.0	41.4	42.1	35.7	42.1	35.7
2021	44.0	40.6	44.0	40.6	44.7	45.8	44.7	45.8	42.7	36.9	42.7	36.9
2022	44.7	44.3	44.7	44.3	45.4	47.0	45.4	47.0	43.3	37.0	43.3	37.0
2023	45.5	45.7	45.5	45.8	46.1	47.2	46.1	47.2	44.0	38.6	44.0	39.4
2024	46.2	48.5	49.4	50.3	46.8	49.7	50.1	52.8	44.7	46.1	47.8	47.2
2025	46.9	48.7	53.7	53.9	47.5	51.0	54.5	56.5	45.4	46.1	52.0	47.2
2026	47.6	48.9	58.3	58.4	48.3	51.1	59.2	59.2	46.1	46.1	56.5	47.2
2027	47.6	49.3	58.3	59.0	48.3	51.4	59.2	59.7	46.1	48.0	56.5	49.4
2028	47.6	49.4	58.3	59.2	48.3	51.4	59.2	60.2	46.1	48.0	56.5	49.4
2029	47.6	49.7	58.3	59.4	48.3	51.4	59.2	60.6	46.1	48.0	56.5	53.5

Table A-6-10 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Passenger Car Fleet (mpg), Part 4 of 6

Model Year	Mazda				Mitsubishi				Nissan			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	43.9	38.6	43.9	38.6	46.5	42.3	46.5	42.3	43.2	41.7	43.2	41.7
2021	44.6	41.3	44.6	41.3	47.2	44.0	47.2	44.0	43.9	43.3	43.9	43.3
2022	45.2	43.1	45.2	43.1	48.0	44.6	48.0	44.6	44.5	45.5	44.5	45.5
2023	45.9	48.1	45.9	48.2	48.8	45.0	48.8	45.0	45.1	46.1	45.1	48.3
2024	46.6	48.8	50.0	49.6	49.6	45.3	53.1	45.2	45.8	48.4	49.1	52.9
2025	47.3	50.5	54.3	56.9	50.4	52.0	57.7	63.0	46.5	48.7	53.4	58.1
2026	48.0	50.7	59.0	59.4	51.2	52.2	62.7	63.1	47.3	48.9	58.0	58.4
2027	48.0	50.8	59.0	59.4	51.2	52.3	62.7	63.1	47.3	49.0	58.0	58.7
2028	48.0	50.8	59.0	59.4	51.2	52.5	62.7	63.2	47.2	49.1	58.0	60.3
2029	48.0	50.8	59.0	60.0	51.2	52.6	62.8	63.3	47.2	49.2	58.0	60.6

Table A-6-11 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Passenger Car Fleet (mpg), Part 5 of 6

Model Year	Subaru				Tesla				Toyota			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	44.9	38.1	44.9	38.1	40.9	725.7	40.9	725.7	43.6	46.0	43.6	46.0
2021	45.5	40.1	45.5	40.1	40.8	752.4	40.8	752.4	44.3	47.1	44.3	47.1
2022	46.2	44.3	46.2	44.3	41.4	754.6	41.4	754.6	45.0	49.1	45.0	49.1
2023	46.9	46.0	46.9	46.0	42.1	755.9	42.1	755.9	45.6	49.8	45.6	50.0
2024	47.7	48.6	51.0	52.4	42.7	756.9	45.7	756.7	46.3	50.7	49.7	56.3
2025	48.4	48.9	55.5	52.7	43.4	757.5	49.7	756.7	47.1	51.1	53.9	57.4
2026	49.1	50.5	60.3	60.3	44.0	758.3	54.0	756.9	47.8	51.8	58.6	58.6
2027	49.1	50.5	60.3	60.3	44.0	758.7	54.0	757.0	47.8	52.8	58.6	59.5
2028	49.1	50.5	60.3	60.3	44.0	759.4	54.0	757.6	47.8	53.1	58.6	59.8
2029	49.1	50.5	60.3	60.3	44.1	759.9	54.0	758.0	47.8	54.6	58.6	59.9

Table A-6-12 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Passenger Car Fleet (mpg), Part 6 of 6

Model Year	Volvo				VWA				Total			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	40.9	35.7	40.9	35.7	43.6	37.6	43.6	37.6	43.3	41.7	43.3	41.7
2021	41.5	36.4	41.5	36.4	44.3	38.6	44.3	38.6	43.9	43.6	43.9	43.6
2022	42.2	36.5	42.2	36.5	45.0	40.7	45.0	40.7	44.6	46.6	44.6	46.6
2023	42.8	40.7	42.8	40.7	45.7	42.9	45.7	42.9	45.2	48.3	45.2	49.7
2024	43.4	41.0	46.5	41.0	46.4	53.9	49.7	53.5	45.9	50.4	49.2	53.9
2025	44.1	42.5	50.5	42.5	47.1	55.0	54.0	54.9	46.6	51.5	53.4	57.1
2026	44.7	44.9	54.9	45.5	47.8	56.3	58.7	56.6	47.3	52.4	58.1	59.6
2027	44.7	46.6	54.9	54.9	47.8	56.7	58.7	56.7	47.3	52.8	58.1	60.5
2028	44.7	46.7	54.9	55.0	47.9	58.3	58.7	60.6	47.3	53.0	58.1	61.3
2029	44.7	46.7	54.9	55.1	47.9	59.3	58.7	60.9	47.3	53.4	58.1	61.4

Table A-6-13 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Light Truck Fleet (mpg), Part 1 of 6

Model Year	BMW				Daimler				FCA			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	31.7	31.7	31.7	31.7	31.7	29.7	31.7	29.7	30.1	28.1	30.1	28.1
2021	32.2	33.1	32.2	33.1	32.2	30.8	32.2	30.8	30.5	28.4	30.5	28.4
2022	32.6	35.7	32.6	35.7	32.6	31.4	32.6	31.4	31.0	31.0	31.0	31.0
2023	33.1	39.3	33.1	39.1	33.1	34.3	33.1	34.0	31.5	32.6	31.5	32.4
2024	33.6	40.3	36.0	40.0	33.7	34.4	36.0	34.1	32.0	33.1	34.2	32.7
2025	34.2	40.5	39.2	40.2	34.2	35.6	39.2	35.5	32.5	33.1	37.2	32.7
2026	34.7	40.5	42.6	40.2	34.7	36.7	42.6	37.3	32.9	33.6	40.4	33.5
2027	34.7	40.6	42.6	42.6	34.7	37.1	42.6	37.9	32.9	34.0	40.4	34.4
2028	34.7	40.6	42.6	42.6	34.7	37.2	42.6	37.9	32.9	34.5	40.4	35.5
2029	34.7	40.6	42.6	42.6	34.7	37.4	42.6	38.1	32.9	34.6	40.4	35.9

Table A-6-14 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Light Truck Fleet (mpg), Part 2 of 6

Model Year	Ford				GM				Honda			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	29.2	30.0	29.2	30.0	29.1	27.8	29.1	27.8	33.3	35.3	33.3	35.3
2021	29.7	31.6	29.7	31.6	29.5	29.3	29.5	29.3	33.8	36.0	33.8	36.0
2022	30.1	32.8	30.1	32.8	30.0	30.4	30.0	30.4	34.3	39.1	34.3	39.1
2023	30.6	34.5	30.6	34.4	30.4	30.5	30.4	30.5	34.8	39.4	34.8	39.6
2024	31.0	35.9	33.1	35.7	30.9	31.2	32.7	32.7	35.3	41.0	37.8	42.4
2025	31.5	36.3	36.0	36.0	31.4	31.7	35.6	35.6	35.9	42.5	41.1	44.7
2026	32.0	37.5	39.1	39.1	31.8	32.3	38.7	38.7	36.4	42.5	44.7	44.7
2027	32.0	37.6	39.1	39.2	31.8	32.5	38.7	39.2	36.4	42.5	44.7	44.7
2028	32.0	37.7	39.1	39.3	31.8	32.5	38.7	39.3	36.4	42.5	44.7	44.7
2029	32.0	37.7	39.1	39.3	31.8	33.3	38.7	39.8	36.4	42.5	44.7	44.7

Table A-6-15 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Light Truck Fleet (mpg), Part 3 of 6

Model Year	Hyundai Kia-H				Hyundai Kia-K				JLR			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	31.3	29.1	31.3	29.1	32.8	30.3	32.8	30.3	32.3	28.7	32.3	28.7
2021	31.7	29.3	31.7	29.3	33.3	34.0	33.3	34.0	32.8	29.8	32.8	29.8
2022	32.2	29.3	32.2	29.3	33.9	34.1	33.9	34.1	33.3	31.4	33.3	31.4
2023	32.7	32.2	32.7	32.2	34.4	34.4	34.4	34.4	33.8	33.4	33.8	33.7
2024	33.2	32.4	35.6	32.4	34.9	37.4	37.4	43.6	34.3	34.8	36.8	35.9
2025	33.7	32.5	38.6	32.5	35.4	37.6	40.6	43.9	34.9	35.3	40.0	37.2
2026	34.2	35.4	42.0	42.0	36.0	37.8	44.1	44.1	35.4	35.9	43.4	37.9
2027	34.2	35.4	42.0	42.1	36.0	38.8	44.1	45.7	35.4	36.3	43.4	38.7
2028	34.2	35.4	42.0	42.1	36.0	38.8	44.1	45.7	35.4	36.3	43.4	38.7
2029	34.2	35.4	42.0	42.1	36.0	38.8	44.1	45.7	35.4	36.5	43.4	40.2

Table A-6-16 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Light Truck Fleet (mpg), Part 4 of 6

Model Year	Mazda				Mitsubishi				Nissan			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	34.8	34.5	34.8	34.5	36.8	36.1	36.8	36.1	32.5	30.9	32.5	30.9
2021	35.3	34.8	35.3	34.8	37.3	36.2	37.3	36.2	33.0	34.3	33.0	34.3
2022	35.8	35.1	35.8	35.1	37.9	36.3	37.9	36.3	33.5	36.1	33.5	36.1
2023	36.4	39.8	36.4	39.8	38.4	36.5	38.4	36.5	34.0	36.7	34.0	38.8
2024	36.9	40.2	39.6	40.2	39.0	36.5	41.8	36.5	34.6	37.2	37.0	39.8
2025	37.5	40.6	43.0	45.6	39.6	41.3	45.4	51.2	35.1	38.1	40.2	40.9
2026	38.1	41.6	46.7	48.4	40.2	41.3	49.4	51.2	35.6	38.5	43.7	43.2
2027	38.1	41.6	46.7	48.5	40.2	41.3	49.4	51.2	35.6	38.5	43.7	43.7
2028	38.1	41.6	46.7	48.5	40.2	41.3	49.4	51.2	35.6	39.1	43.7	44.4
2029	38.1	41.6	46.7	48.5	40.2	41.3	49.4	51.2	35.6	39.1	43.7	45.0

Table A-6-17 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Light Truck Fleet (mpg), Part 5 of 6

Model Year	Subaru				Tesla				Toyota			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	35.4	38.8	35.4	38.8	30.6	588.5	30.6	588.5	31.8	29.8	31.8	29.8
2021	35.9	39.8	35.9	39.8	31.1	617.1	31.1	617.1	32.3	31.0	32.3	31.0
2022	36.4	41.9	36.4	41.9	31.6	617.1	31.6	617.1	32.7	32.4	32.7	32.4
2023	37.0	45.6	37.0	46.7	32.0	728.4	32.0	728.4	33.2	33.9	33.2	36.6
2024	37.6	47.8	40.2	49.0	32.5	728.4	34.8	728.3	33.8	34.7	36.1	39.0
2025	38.1	49.7	43.7	51.0	33.0	728.4	37.8	728.4	34.3	34.8	39.3	39.3
2026	38.7	50.0	47.5	51.3	33.5	728.4	41.1	728.3	34.8	38.0	42.7	44.2
2027	38.7	50.2	47.5	51.6	33.5	728.4	41.1	728.3	34.8	38.0	42.7	44.2
2028	38.7	50.2	47.5	51.6	33.5	728.3	41.1	728.3	34.8	38.7	42.7	45.1
2029	38.7	50.3	47.5	51.6	33.5	728.3	41.1	728.3	34.8	38.8	42.7	45.1

Table A-6-18 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Light Truck Fleet (mpg), Part 6 of 6

Model Year	Volvo				VWA				Total			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	32.5	32.3	32.5	32.3	33.5	30.5	33.5	30.5	31.0	30.2	31.0	30.2
2021	33.0	32.4	33.0	32.4	34.1	32.5	34.1	32.5	31.5	31.5	31.5	31.5
2022	33.5	32.6	33.5	32.6	34.6	34.3	34.6	34.3	31.9	33.1	31.9	33.1
2023	34.0	41.8	34.0	42.7	35.1	34.9	35.1	34.9	32.4	34.4	32.4	34.8
2024	34.5	42.0	36.9	42.9	35.6	38.9	38.2	38.2	32.9	35.5	35.1	36.5
2025	35.0	42.8	40.2	43.9	36.2	41.2	41.5	41.6	33.5	36.0	38.2	37.9
2026	35.6	43.0	43.6	44.1	36.7	42.3	45.1	42.9	33.9	37.0	41.5	40.2
2027	35.6	44.6	43.6	45.9	36.7	42.5	45.1	44.9	33.9	37.2	41.5	40.7
2028	35.6	44.6	43.6	45.9	36.7	42.5	45.1	44.9	33.9	37.4	41.5	41.1
2029	35.6	44.6	43.6	45.9	36.7	42.5	45.1	44.9	33.9	37.7	41.5	41.4

Table A-6-19 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Domestic Car Fleet (mpg), Part 1 of 6

Model Year	BMW				Daimler				FCA			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.9	29.9	40.9	29.9
2021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.3	38.7	41.3	38.7
2022	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.8	38.9	41.8	38.9
2023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.3	41.5	42.3	43.2
2024	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.9	42.9	46.0	44.6
2025	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.5	43.0	50.0	44.8
2026	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.2	45.7	54.3	48.4
2027	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.1	45.7	54.3	48.4
2028	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.1	46.7	54.2	54.2
2029	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.0	46.7	54.2	54.3

Table A-6-20 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Domestic Car Fleet (mpg), Part 2 of 6

Model Year	Ford				GM				Honda			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	41.9	36.8	41.9	36.8	42.9	39.8	42.9	39.8	43.2	44.7	43.2	44.7
2021	42.5	37.2	42.5	37.2	43.5	40.3	43.5	40.3	43.9	45.7	43.9	45.7
2022	43.2	43.2	43.2	43.2	44.2	42.2	44.2	42.2	44.6	48.2	44.6	48.2
2023	43.8	46.7	43.8	54.4	44.8	44.0	44.8	45.2	45.2	49.9	45.2	52.0
2024	44.5	46.7	47.6	54.4	45.5	45.5	48.7	48.7	45.9	50.7	49.2	53.4
2025	45.2	47.6	51.8	55.8	46.2	48.1	53.0	54.5	46.6	51.9	53.5	55.1
2026	45.8	50.1	56.3	57.8	46.9	48.3	57.6	57.6	47.3	54.1	58.1	58.1
2027	45.8	50.3	56.3	57.9	46.9	48.4	57.6	57.7	47.3	54.1	58.1	58.1
2028	45.8	50.4	56.3	57.9	46.9	48.4	57.6	57.7	47.3	54.2	58.1	58.2
2029	45.8	50.5	56.3	57.8	46.9	48.6	57.6	57.8	47.3	54.2	58.1	58.2

Table A-6-22 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Domestic Car Fleet (mpg), Part 4 of 6

	Mazda				Mitsubishi				Nissan			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
Model Year	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	45.0	38.5	45.0	38.5	0.0	0.0	0.0	0.0	43.0	43.2	43.0	43.2
2021	45.7	38.9	45.7	38.9	0.0	0.0	0.0	0.0	43.7	43.7	43.7	43.7
2022	46.4	39.2	46.4	39.2	0.0	0.0	0.0	0.0	44.3	45.6	44.3	45.6
2023	47.1	44.4	47.1	44.4	0.0	0.0	0.0	0.0	45.0	45.9	45.0	46.9
2024	47.8	44.7	51.2	44.7	0.0	0.0	0.0	0.0	45.7	48.7	48.9	51.6
2025	48.5	59.3	55.6	63.3	0.0	0.0	0.0	0.0	46.4	49.1	53.2	58.3
2026	49.3	59.5	60.5	63.6	0.0	0.0	0.0	0.0	47.1	49.3	57.8	58.5
2027	49.3	59.5	60.5	63.6	0.0	0.0	0.0	0.0	47.1	49.4	57.8	58.8
2028	49.3	59.5	60.5	63.5	0.0	0.0	0.0	0.0	47.1	49.5	57.8	60.8
2029	49.3	59.5	60.5	63.5	0.0	0.0	0.0	0.0	47.1	49.6	57.8	60.9

Table A-6-23 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Domestic Car Fleet (mpg), Part 5 of 6

Model Year	Subaru				Tesla				Toyota			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	0.0	0.0	0.0	0.0	40.9	725.7	40.9	725.7	42.1	43.8	42.1	43.8
2021	0.0	0.0	0.0	0.0	40.8	752.4	40.8	752.4	42.8	45.7	42.8	45.7
2022	0.0	0.0	0.0	0.0	41.4	754.6	41.4	754.6	43.4	46.0	43.4	46.0
2023	0.0	0.0	0.0	0.0	42.1	755.9	42.1	755.9	44.1	46.9	44.1	47.6
2024	0.0	0.0	0.0	0.0	42.7	756.9	45.7	756.7	44.7	47.3	47.9	54.3
2025	0.0	0.0	0.0	0.0	43.4	757.5	49.7	756.7	45.4	47.5	52.1	56.2
2026	0.0	0.0	0.0	0.0	44.0	758.3	54.0	756.9	46.1	47.7	56.6	56.6
2027	0.0	0.0	0.0	0.0	44.0	758.7	54.0	757.0	46.1	48.8	56.6	58.2
2028	0.0	0.0	0.0	0.0	44.0	759.4	54.0	757.6	46.1	49.2	56.6	58.2
2029	0.0	0.0	0.0	0.0	44.1	759.9	54.0	758.0	46.1	49.2	56.6	58.2

Table A-6-24 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Domestic Car Fleet (mpg), Part 6 of 6

Model Year	Volvo				VWA				Total			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	41.0	36.4	41.0	36.4	41.2	33.9	41.2	33.9	42.5	43.2	42.5	43.2
2021	41.6	36.4	41.6	36.4	41.9	34.5	41.9	34.5	43.1	44.9	43.1	44.9
2022	42.3	36.4	42.3	36.4	42.7	34.8	42.7	34.8	43.7	47.6	43.7	47.6
2023	42.9	40.6	42.9	40.6	43.4	35.6	43.4	35.6	44.4	49.5	44.4	51.9
2024	43.6	40.9	46.7	40.9	44.1	41.8	47.2	41.8	45.0	51.0	48.2	55.1
2025	44.2	42.8	50.7	42.8	44.8	42.0	51.3	41.9	45.7	52.2	52.5	58.8
2026	44.9	42.9	55.1	42.9	45.5	44.7	55.8	45.2	46.4	53.5	57.0	61.0
2027	44.9	44.7	55.1	55.1	45.5	44.7	55.8	45.2	46.4	53.8	57.0	61.4
2028	44.9	44.7	55.1	55.1	45.6	50.5	55.8	64.4	46.4	54.1	57.0	62.6
2029	44.9	44.7	55.1	55.1	45.6	50.6	55.8	64.6	46.4	54.2	57.0	62.7

Table A-6-25 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Imported Car Fleet (mpg), Part 1 of 6

	BMW				Daimler				FCA			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
Model Year	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	42.5	36.6	42.5	36.6	41.4	33.9	41.4	33.9	44.8	34.4	44.8	34.4
2021	43.1	38.4	43.1	38.4	42.0	36.9	42.0	36.9	45.5	37.0	45.5	37.0
2022	43.8	42.2	43.8	42.2	42.7	38.7	42.7	38.7	46.1	60.1	46.1	60.1
2023	44.4	45.4	44.4	46.1	43.3	39.5	43.3	39.5	46.7	61.6	46.7	60.3
2024	45.1	47.3	48.3	48.4	44.0	45.0	47.1	47.1	47.4	68.0	50.8	65.1
2025	45.8	50.8	52.5	53.9	44.6	46.4	51.2	48.6	48.1	68.2	55.2	65.4
2026	46.5	52.6	57.1	57.1	45.3	46.7	55.6	48.9	48.8	69.6	60.0	68.0
2027	46.5	52.7	57.1	57.2	45.3	46.9	55.6	54.0	48.8	69.6	60.0	68.0
2028	46.5	52.7	57.1	57.2	45.3	47.0	55.6	55.6	48.8	69.6	59.9	68.0
2029	46.5	52.8	57.1	57.5	45.3	47.7	55.6	55.7	48.7	69.5	59.9	67.9

Table A-6-26 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Imported Car Fleet (mpg), Part 2 of 6

Model Year	Ford				GM				Honda			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	48.0	38.8	48.0	38.8	46.8	40.4	46.8	40.4	45.4	46.4	45.4	46.4
2021	48.7	38.8	48.7	38.8	47.5	43.7	47.5	43.7	46.1	46.9	46.1	46.9
2022	49.5	39.0	49.5	39.0	48.3	48.3	48.3	48.3	46.8	52.2	46.8	52.2
2023	50.2	53.7	50.2	1517.4	49.1	49.0	49.1	49.0	47.4	52.5	47.4	52.5
2024	51.0	53.7	54.6	1517.4	49.8	50.8	53.3	50.8	48.2	52.9	51.6	52.9
2025	51.8	53.7	59.3	1517.4	50.6	51.0	58.0	52.2	48.9	57.2	56.0	57.9
2026	52.5	53.7	64.5	1517.4	51.4	51.4	63.0	55.5	49.6	57.2	60.9	57.9
2027	52.5	53.7	64.5	1517.4	51.4	52.0	63.0	63.0	49.6	57.2	60.9	58.8
2028	52.5	56.8	64.5	1517.4	51.4	52.0	63.0	63.0	49.6	57.3	60.9	60.9
2029	52.5	56.8	64.5	1517.4	51.4	52.1	63.0	63.1	49.6	57.4	60.9	60.9

Table A-6-27 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Imported Car Fleet (mpg), Part 3 of 6

Model Year	Hyundai Kia-H				Hyundai Kia-K				JLR			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	43.2	38.7	43.2	38.7	44.0	41.4	44.0	41.4	42.1	35.7	42.1	35.7
2021	43.9	40.2	43.9	40.2	44.7	45.8	44.7	45.8	42.7	36.9	42.7	36.9
2022	44.6	44.0	44.6	44.0	45.4	47.0	45.4	47.0	43.3	37.0	43.3	37.0
2023	45.3	45.2	45.3	45.2	46.1	47.2	46.1	47.2	44.0	38.6	44.0	39.4
2024	46.0	48.0	49.2	49.8	46.8	49.7	50.1	52.8	44.7	46.1	47.8	47.2
2025	46.7	48.2	53.5	53.5	47.5	51.0	54.5	56.5	45.4	46.1	52.0	47.2
2026	47.4	48.4	58.1	58.1	48.3	51.1	59.2	59.2	46.1	46.1	56.5	47.2
2027	47.4	48.8	58.1	58.7	48.3	51.4	59.2	59.7	46.1	48.0	56.5	49.4
2028	47.4	48.8	58.1	58.9	48.3	51.4	59.2	60.2	46.1	48.0	56.5	49.4
2029	47.4	49.1	58.1	59.1	48.3	51.4	59.2	60.6	46.1	48.0	56.5	53.5

Table A-6-28 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Imported Car Fleet (mpg), Part 4 of 6

Model Year	Mazda				Mitsubishi				Nissan			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	43.8	38.6	43.8	38.6	46.5	42.3	46.5	42.3	43.6	38.2	43.6	38.2
2021	44.4	41.6	44.4	41.6	47.2	44.0	47.2	44.0	44.3	42.2	44.3	42.2
2022	45.1	43.7	45.1	43.7	48.0	44.6	48.0	44.6	45.0	45.1	45.0	45.1
2023	45.8	48.6	45.8	48.7	48.8	45.0	48.8	45.0	45.6	46.6	45.6	53.2
2024	46.5	49.4	49.8	50.3	49.6	45.3	53.1	45.2	46.3	47.4	49.6	57.1
2025	47.2	49.6	54.1	56.2	50.4	52.0	57.7	63.0	47.0	47.6	53.9	57.5
2026	47.9	49.8	58.8	58.9	51.2	52.2	62.7	63.1	47.8	47.8	58.6	57.9
2027	47.9	49.9	58.8	58.9	51.2	52.3	62.7	63.1	47.8	47.8	58.6	58.5
2028	47.9	50.0	58.8	58.9	51.2	52.5	62.7	63.2	47.7	47.7	58.6	58.7
2029	47.9	50.0	58.8	59.6	51.2	52.6	62.8	63.3	47.7	47.7	58.6	59.7

Table A-6-29 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Imported Car Fleet (mpg), Part 5 of 6

Model Year	Subaru				Tesla				Toyota			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	44.9	38.1	44.9	38.1	0.0	0.0	0.0	0.0	44.2	46.9	44.2	46.9
2021	45.5	40.1	45.5	40.1	0.0	0.0	0.0	0.0	44.9	47.6	44.9	47.6
2022	46.2	44.3	46.2	44.3	0.0	0.0	0.0	0.0	45.6	50.5	45.6	50.5
2023	46.9	46.0	46.9	46.0	0.0	0.0	0.0	0.0	46.3	51.0	46.3	51.0
2024	47.7	48.6	51.0	52.4	0.0	0.0	0.0	0.0	47.0	52.3	50.4	57.1
2025	48.4	48.9	55.5	52.7	0.0	0.0	0.0	0.0	47.8	52.8	54.7	57.9
2026	49.1	50.5	60.3	60.3	0.0	0.0	0.0	0.0	48.5	53.7	59.5	59.5
2027	49.1	50.5	60.3	60.3	0.0	0.0	0.0	0.0	48.5	54.7	59.5	60.1
2028	49.1	50.5	60.3	60.3	0.0	0.0	0.0	0.0	48.5	54.9	59.5	60.5
2029	49.1	50.5	60.3	60.3	0.0	0.0	0.0	0.0	48.5	57.2	59.5	60.6

Table A-6-30 - Comparison of Alternative 0 (Baseline) and Alternative 2 Required and Achieved CAFE Levels in MYs 2020-2029 for the Imported Car Fleet (mpg), Part 6 of 6

Model Year	Volvo				VWA				Total			
	Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2		Alternative 0 (Baseline)		Alternative 2	
	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved	Required	Achieved
2020	40.8	35.1	40.8	35.1	44.1	38.4	44.1	38.4	44.0	40.4	44.0	40.4
2021	41.4	36.4	41.4	36.4	44.8	39.5	44.8	39.5	44.6	42.5	44.6	42.5
2022	42.0	36.6	42.0	36.6	45.5	42.1	45.5	42.1	45.3	45.8	45.3	45.8
2023	42.6	40.8	42.6	40.8	46.2	44.6	46.2	44.6	46.0	47.1	46.0	47.8
2024	43.2	41.2	46.3	41.1	46.9	57.0	50.2	56.5	46.7	49.8	50.0	52.9
2025	43.9	42.2	50.3	42.2	47.6	58.4	54.5	58.3	47.4	50.9	54.4	55.7
2026	44.5	47.6	54.7	48.8	48.3	59.2	59.3	59.4	48.2	51.4	59.1	58.4
2027	44.5	49.1	54.7	54.7	48.3	59.7	59.3	59.6	48.1	51.9	59.1	59.7
2028	44.5	49.3	54.7	54.9	48.3	60.0	59.3	59.9	48.1	52.0	59.1	60.1
2029	44.5	49.4	54.7	55.0	48.3	61.3	59.3	60.3	48.1	52.6	59.1	60.3

7. Incremental Benefits and Costs

Table A-7-1 - Incremental Benefits and Costs Over the Lifetimes of Total Fleet Produced Through 2029 (2018\$ Billions), 3% Percent Discount Rate, by Alternative

Alternative	1	2	3
Private Costs			
Technology Costs to Increase Fuel Economy	34.3	67.6	100.1
Increased Maintenance and Repair Costs	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.1	0.6	1.3
Safety Costs Internalized by Drivers	6.2	8.2	11.2
Subtotal - Incremental Private Costs	40.6	76.3	112.7
External Costs			
Congestion and Noise Costs from Rebound-Effect Driving	7.3	10.1	13.5
Safety Costs Not Internalized by Drivers	7.5	15.8	23.2
Loss in Fuel Tax Revenue	11.0	18.9	27.0
Subtotal - Incremental External Costs	25.9	44.7	63.6
Total Incremental Social Costs	66.5	121.1	176.3
Private Benefits			
Reduced Fuel Costs	47.9	73.0	103.8
Benefits from Additional Driving	12.3	15.3	20.8
Less Frequent Refueling	-0.5	-0.8	0.3
Subtotal - Incremental Private Benefits	59.7	87.6	124.8
External Benefits			
Reduction in Petroleum Market Externality	0.9	1.5	2.1
Reduced Climate Damages	20.3	32.0	45.6
Reduced Health Damages	1.7	0.4	0.3
Subtotal - Incremental External Benefits	22.8	33.9	48.0
Total Incremental Social Benefits	82.6	121.4	172.9
Net Incremental Social Benefits			
Net Incremental Social Benefits	16.1	0.3	-3.4

Table A-7-2 - Incremental Benefits and Costs Over the Lifetimes of Passenger Car Fleet Produced Through 2029 (2018\$ Billions), 3% Percent Discount Rate, by Alternative

Alternative	1	2	3
Private Costs			
Technology Costs to Increase Fuel Economy	17.1	39.1	52.4
Increased Maintenance and Repair Costs	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.1	0.3	0.6
Safety Costs Internalized by Drivers	2.5	4.4	6.0
Subtotal - Incremental Private Costs	19.7	43.8	59.0
External Costs			
Congestion and Noise Costs from Rebound-Effect Driving	-6.3	-11.1	-15.4
Safety Costs Not Internalized by Drivers	-4.2	-6.4	-8.4
Loss in Fuel Tax Revenue	6.4	11.7	15.9
Subtotal - Incremental External Costs	-4.2	-5.7	-8.0
Total Incremental Social Costs	15.5	38.0	51.0
Private Benefits			
Reduced Fuel Costs	27.5	49.0	66.6
Benefits from Additional Driving	4.5	7.6	10.3
Less Frequent Refueling	-0.1	0.4	0.7
Subtotal - Incremental Private Benefits	31.8	57.0	77.7
External Benefits			
Reduction in Petroleum Market Externality	0.5	0.9	1.3
Reduced Climate Damages	11.6	20.9	28.4
Reduced Health Damages	1.2	1.7	2.2
Subtotal - Incremental External Benefits	13.3	23.5	31.9
Total Incremental Social Benefits	45.1	80.5	109.5
Net Incremental Social Benefits			
Net Incremental Social Benefits	29.6	42.5	58.5

Table A-7-3 - Incremental Benefits and Costs Over the Lifetimes of Light Truck Fleet Produced Through 2029 (2018\$ Billions), 3% Percent Discount Rate, by Alternative

Alternative	1	2	3
Private Costs			
Technology Costs to Increase Fuel Economy	17.2	28.5	47.8
Increased Maintenance and Repair Costs	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.1	0.3	0.7
Safety Costs Internalized by Drivers	3.7	3.8	5.2
Subtotal - Incremental Private Costs	20.9	32.6	53.6
External Costs			
Congestion and Noise Costs from Rebound-Effect Driving	13.6	21.1	28.9
Safety Costs Not Internalized by Drivers	11.8	22.2	31.6
Loss in Fuel Tax Revenue	4.6	7.2	11.1
Subtotal - Incremental External Costs	30.1	50.5	71.6
Total Incremental Social Costs	51.0	83.1	125.2
Private Benefits			
Reduced Fuel Costs	20.5	24.0	37.1
Benefits from Additional Driving	7.9	7.8	10.5
Less Frequent Refueling	-0.4	-1.2	-0.5
Subtotal - Incremental Private Benefits	27.9	30.6	47.2
External Benefits			
Reduction in Petroleum Market Externality	0.4	0.6	0.9
Reduced Climate Damages	8.7	11.1	17.1
Reduced Health Damages	0.5	-1.3	-1.8
Subtotal - Incremental External Benefits	9.6	10.3	16.2
Total Incremental Social Benefits	37.5	40.9	63.4
Net Incremental Social Benefits			
Net Incremental Social Benefits	-13.5	-42.1	-61.9

Table A-7-4 - Incremental Benefits and Costs Over the Lifetimes of Total Fleet Produced Through 2029 (2018\$ Billions), 7% Percent Discount Rate, by Alternative

Alternative	1	2	3
Private Costs			
Technology Costs to Increase Fuel Economy	28.1	55.0	81.4
Increased Maintenance and Repair Costs	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.1	0.5	1.1
Safety Costs Internalized by Drivers	3.7	4.9	6.8
Subtotal - Incremental Private Costs	31.9	60.4	89.3
External Costs			
Congestion and Noise Costs from Rebound-Effect Driving	4.8	6.8	9.3
Safety Costs Not Internalized by Drivers	5.5	11.6	17.3
Loss in Fuel Tax Revenue	7.0	11.9	17.0
Subtotal - Incremental External Costs	17.3	30.3	43.5
Total Incremental Social Costs	49.3	90.7	132.8
Private Benefits			
Reduced Fuel Costs	29.7	44.9	63.7
Benefits from Additional Driving	7.5	9.3	12.7
Less Frequent Refueling	-0.4	-0.6	0.0
Subtotal - Incremental Private Benefits	36.8	53.6	76.4
External Benefits			
Reduction in Petroleum Market Externality	0.5	0.9	1.3
Reduced Climate Damages	13.3	21.0	29.9
Reduced Health Damages	0.9	0.1	-0.1
Subtotal - Incremental External Benefits	14.8	22.0	31.2
Total Incremental Social Benefits	51.6	75.6	107.6
Net Incremental Social Benefits			
Net Incremental Social Benefits	2.3	-15.1	-25.2

Table A-7-5 - Incremental Benefits and Costs Over the Lifetimes of Passenger Car Fleet Produced Through 2029 (2018\$ Billions), 7% Percent Discount Rate, by Alternative

Alternative	1	2	3
Private Costs			
Technology Costs to Increase Fuel Economy	14.1	31.9	42.8
Increased Maintenance and Repair Costs	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.2	0.5
Safety Costs Internalized by Drivers	1.5	2.7	3.7
Subtotal - Incremental Private Costs	15.7	34.9	47.0
External Costs			
Congestion and Noise Costs from Rebound-Effect Driving	-3.7	-6.4	-8.9
Safety Costs Not Internalized by Drivers	-1.9	-2.5	-3.1
Loss in Fuel Tax Revenue	4.1	7.4	10.0
Subtotal - Incremental External Costs	-1.6	-1.5	-2.0
Total Incremental Social Costs	14.1	33.3	45.0
Private Benefits			
Reduced Fuel Costs	17.1	30.3	41.2
Benefits from Additional Driving	2.8	4.7	6.4
Less Frequent Refueling	-0.1	0.2	0.4
Subtotal - Incremental Private Benefits	19.8	35.2	48.0
External Benefits			
Reduction in Petroleum Market Externality	0.3	0.6	0.8
Reduced Climate Damages	7.6	13.8	18.7
Reduced Health Damages	0.6	0.9	1.1
Subtotal - Incremental External Benefits	8.6	15.2	20.6
Total Incremental Social Benefits	28.4	50.4	68.5
Net Incremental Social Benefits			
Net Incremental Social Benefits	14.3	17.1	23.5

Table A-7-6 - Incremental Benefits and Costs Over the Lifetimes of Light Truck Fleet Produced Through 2029 (2018\$ Billions), 7% Percent Discount Rate, by Alternative

Alternative	1	2	3
Private Costs			
Technology Costs to Increase Fuel Economy	14.0	23.0	38.7
Increased Maintenance and Repair Costs	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.1	0.2	0.6
Safety Costs Internalized by Drivers	2.2	2.2	3.1
Subtotal - Incremental Private Costs	16.2	25.5	42.3
External Costs			
Congestion and Noise Costs from Rebound-Effect Driving	8.5	13.2	18.2
Safety Costs Not Internalized by Drivers	7.5	14.2	20.4
Loss in Fuel Tax Revenue	2.9	4.5	7.0
Subtotal - Incremental External Costs	18.9	31.9	45.5
Total Incremental Social Costs	35.2	57.4	87.8
Private Benefits			
Reduced Fuel Costs	12.6	14.6	22.5
Benefits from Additional Driving	4.7	4.7	6.3
Less Frequent Refueling	-0.3	-0.8	-0.4
Subtotal - Incremental Private Benefits	17.0	18.4	28.4
External Benefits			
Reduction in Petroleum Market Externality	0.2	0.3	0.5
Reduced Climate Damages	5.7	7.3	11.2
Reduced Health Damages	0.3	-0.8	-1.2
Subtotal - Incremental External Benefits	6.2	6.8	10.6
Total Incremental Social Benefits	23.2	25.2	39.1
Net Incremental Social Benefits			
	-12.0	-32.2	-48.7

Table A-7-7 - Incremental Benefits and Costs Over Total Fleet Produced Through 2029 (2018\$ Billions), 3% Percent Discount Rate, for Alternative 1

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Private Costs											
Technology Costs to Increase Fuel Economy	0.0	0.0	0.0	2.0	5.0	5.6	5.8	5.5	5.4	5.0	34.3
Increased Maintenance and Repair Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Safety Costs Internalized by Drivers	0.0	0.0	0.0	0.1	0.7	1.0	1.0	1.1	1.1	1.1	6.2
Subtotal - Private Costs	0.0	0.0	0.0	2.2	5.7	6.6	6.8	6.6	6.5	6.1	40.6
External Costs											
Congestion and Noise Costs from Rebound-Effect Driving	6.4	0.7	0.8	0.1	-0.8	-0.6	-0.4	0.1	0.4	0.6	7.3
Safety Costs Not Internalized by Drivers	5.8	-2.2	-3.9	-5.8	-7.7	-7.9	-8.0	-7.4	-7.1	-6.8	-51.2
Loss in Fuel Tax Revenue	-1.2	-0.1	-0.1	0.6	1.8	2.1	2.1	2.0	2.0	1.9	11.0
Subtotal - External Costs	11.0	-1.6	-3.2	-5.1	-6.8	-6.5	-6.3	-5.3	-4.7	-4.3	-32.8
Total Social Costs	16.2	1.3	1.6	3.0	5.5	6.7	7.4	8.1	8.4	8.3	66.5
Private Benefits											
Reduced Fuel Costs	-5.6	-0.5	-0.6	2.0	7.6	9.0	9.3	9.1	9.2	8.6	47.9
Benefits from Additional Driving	-1.2	0.0	0.0	0.2	1.4	1.9	2.0	2.1	2.3	2.2	11.1
Less Frequent Refueling	-0.2	0.0	0.0	-0.4	-0.1	0.0	0.0	0.0	0.1	0.1	-0.5
Subtotal - Private Benefits	-7.1	-0.6	-0.6	1.8	8.9	10.9	11.4	11.3	11.6	10.9	58.5
External Benefits											
Reduction in Petroleum Market Externality	-0.1	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.9
Reduced Climate Damages	-2.2	-0.2	-0.3	0.9	3.2	3.8	3.9	3.8	3.9	3.6	20.3
Reduced Health Damages	-1.3	-0.1	-0.1	0.0	0.4	0.5	0.5	0.5	0.5	0.5	1.7
Subtotal - External Benefits	-3.6	-0.3	-0.3	0.9	3.7	4.5	4.6	4.5	4.6	4.3	22.8
Total Social Benefits	-9.5	-0.8	-1.0	2.7	12.6	15.4	16.0	15.7	16.2	15.2	82.6
Net Social Benefits											
Net Social Benefits	-25.7	-2.2	-2.5	-0.2	7.1	8.6	8.6	7.7	7.8	7.0	16.1

Table A-7-8 - Incremental Benefits and Costs Over Passenger Car Fleet Produced Through 2029 (2018\$ Billions), 3% Percent Discount Rate, for Alternative 1

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Private Costs											
Technology Costs to Increase Fuel Economy	0.0	0.0	0.0	1.6	2.4	2.8	2.8	2.7	2.5	2.4	17.1
Increased Maintenance and Repair Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Safety Costs Internalized by Drivers	0.0	0.0	0.0	0.1	0.3	0.4	0.4	0.4	0.4	0.4	2.5
Subtotal - Private Costs	0.0	0.0	0.0	1.7	2.7	3.2	3.3	3.1	3.0	2.8	19.7
External Costs											
Congestion and Noise Costs from Rebound-Effect Driving	3.4	0.3	0.4	0.1	-0.7	-1.6	-2.1	-2.0	-2.0	-2.1	-6.3
Safety Costs Not Internalized by Drivers	2.1	-1.7	-2.6	-3.4	-4.5	-5.3	-5.7	-5.6	-5.5	-5.6	-37.8
Loss in Fuel Tax Revenue	-0.5	0.0	0.0	0.4	0.8	1.1	1.2	1.2	1.2	1.1	6.4
Subtotal - External Costs	5.0	-1.4	-2.3	-2.9	-4.4	-5.8	-6.6	-6.4	-6.4	-6.5	-37.7
Total Social Costs	7.9	0.6	0.7	2.2	2.1	1.1	0.4	0.4	0.3	-0.1	15.5
Private Benefits											
Reduced Fuel Costs	-2.5	-0.2	-0.2	1.4	3.4	4.8	5.2	5.2	5.3	5.1	27.5
Benefits from Additional Driving	-0.8	0.0	0.0	0.2	0.5	0.7	0.7	0.8	0.8	0.7	3.7
Less Frequent Refueling	-0.1	0.0	0.0	-0.2	-0.1	0.0	0.0	0.1	0.1	0.1	-0.1
Subtotal - Private Benefits	-3.4	-0.2	-0.2	1.3	3.8	5.6	6.0	6.0	6.2	6.0	31.0
External Benefits											
Reduction in Petroleum Market Externality	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.5
Reduced Climate Damages	-1.0	-0.1	-0.1	0.6	1.4	2.0	2.2	2.2	2.2	2.2	11.6
Reduced Health Damages	-0.6	0.0	0.0	0.0	0.2	0.3	0.3	0.3	0.3	0.3	1.2
Subtotal - External Benefits	-1.6	-0.1	-0.1	0.7	1.7	2.4	2.6	2.6	2.6	2.6	13.3
Total Social Benefits	-4.3	-0.3	-0.3	2.0	5.5	8.0	8.6	8.6	8.8	8.6	45.1
Net Social Benefits	-12.1	-0.9	-1.0	-0.2	3.4	6.8	8.2	8.2	8.5	8.7	29.6

Table A-7-9 - Incremental Benefits and Costs Over Light Truck Fleet Produced Through 2029 (2018\$ Billions), 3% Percent Discount Rate, for Alternative 1

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Private Costs											
Technology Costs to Increase Fuel Economy	0.0	0.0	0.0	0.5	2.6	2.8	2.9	2.9	2.8	2.6	17.2
Increased Maintenance and Repair Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Safety Costs Internalized by Drivers	0.0	0.0	0.0	0.0	0.4	0.5	0.6	0.6	0.7	0.7	3.7
Subtotal - Private Costs	0.0	0.0	0.0	0.5	3.0	3.4	3.6	3.5	3.5	3.3	20.9
External Costs											
Congestion and Noise Costs from Rebound-Effect Driving	3.0	0.4	0.5	0.1	-0.1	1.0	1.7	2.1	2.4	2.7	13.6
Safety Costs Not Internalized by Drivers	3.6	-0.5	-1.3	-2.5	-3.3	-2.6	-2.3	-1.8	-1.6	-1.2	-13.4
Loss in Fuel Tax Revenue	-0.6	-0.1	-0.1	0.2	1.0	0.9	0.9	0.9	0.8	0.7	4.6
Subtotal - External Costs	6.0	-0.2	-1.0	-2.2	-2.4	-0.7	0.3	1.1	1.6	2.2	4.9
Total Social Costs	8.4	0.7	0.9	0.8	3.4	5.6	7.0	7.7	8.1	8.4	51.0
Private Benefits											
Reduced Fuel Costs	-3.1	-0.4	-0.4	0.6	4.2	4.2	4.1	3.9	3.9	3.5	20.5
Benefits from Additional Driving	-0.5	0.0	0.0	0.1	0.9	1.2	1.3	1.4	1.5	1.5	7.4
Less Frequent Refueling	-0.1	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	-0.4
Subtotal - Private Benefits	-3.7	-0.4	-0.4	0.5	5.1	5.4	5.4	5.3	5.4	5.0	27.5
External Benefits											
Reduction in Petroleum Market Externality	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.4
Reduced Climate Damages	-1.2	-0.1	-0.2	0.2	1.7	1.7	1.7	1.6	1.7	1.5	8.7
Reduced Health Damages	-0.7	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.5
Subtotal - External Benefits	-2.0	-0.2	-0.2	0.3	2.0	2.1	2.0	1.9	1.9	1.7	9.6
Total Social Benefits	-5.2	-0.6	-0.6	0.7	7.1	7.4	7.4	7.2	7.4	6.7	37.5
Net Social Benefits											
Net Social Benefits	-13.6	-1.3	-1.5	-0.1	3.7	1.8	0.4	-0.5	-0.8	-1.7	-13.5

Table A-7-10 - Incremental Benefits and Costs Over Total Fleet Produced Through 2029 (2018\$ Billions), 3% Percent Discount Rate, for Alternative 2

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Private Costs											
Technology Costs to Increase Fuel Economy	0.0	0.0	0.0	3.6	7.0	10.0	12.5	12.1	11.6	10.7	67.6
Increased Maintenance and Repair Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.6
Safety Costs Internalized by Drivers	0.0	0.0	0.0	0.2	0.8	1.2	1.4	1.5	1.6	1.5	8.2
Subtotal - Private Costs	0.0	0.0	0.0	3.8	7.9	11.3	14.0	13.7	13.3	12.3	76.3
External Costs											
Congestion and Noise Costs from Rebound-Effect Driving	13.9	1.5	1.9	0.5	-0.4	-1.6	-2.7	-1.6	-0.9	-0.4	10.1
Safety Costs Not Internalized by Drivers	18.4	-1.3	-2.9	-5.4	-7.2	-8.8	-10.1	-9.1	-8.5	-7.9	-42.9
Loss in Fuel Tax Revenue	-2.5	-0.2	-0.3	0.8	2.1	3.2	4.1	4.0	4.0	3.6	18.9
Subtotal - External Costs	29.8	0.0	-1.3	-4.1	-5.5	-7.2	-8.6	-6.7	-5.5	-4.7	-14.0
Total Social Costs	35.0	2.9	3.5	5.6	8.9	10.7	12.2	13.7	14.4	14.1	121.1
Private Benefits											
Reduced Fuel Costs	-12.2	-1.2	-1.4	2.6	8.3	12.8	16.5	16.2	16.3	15.0	73.0
Benefits from Additional Driving	-1.2	0.0	0.1	0.3	1.5	2.2	2.6	2.8	3.0	2.9	14.1
Less Frequent Refueling	-0.5	-0.1	-0.1	-0.7	-0.3	0.0	0.3	0.2	0.2	0.2	-0.8
Subtotal - Private Benefits	-13.9	-1.2	-1.4	2.3	9.5	15.0	19.4	19.1	19.4	18.1	86.3
External Benefits											
Reduction in Petroleum Market Externality	-0.2	0.0	0.0	0.1	0.2	0.2	0.3	0.3	0.3	0.3	1.5
Reduced Climate Damages	-4.9	-0.5	-0.6	1.2	3.5	5.5	7.1	7.0	7.0	6.5	32.0
Reduced Health Damages	-2.8	-0.1	-0.1	0.0	0.4	0.6	0.7	0.6	0.6	0.6	0.4
Subtotal - External Benefits	-7.8	-0.6	-0.7	1.3	4.1	6.3	8.1	7.9	8.0	7.4	33.9
Total Social Benefits	-20.5	-1.8	-2.1	3.5	13.6	21.2	27.5	27.1	27.4	25.5	121.4
Net Social Benefits	-55.6	-4.7	-5.6	-2.1	4.7	10.5	15.3	13.4	13.0	11.4	0.3

Table A-7-11 - Incremental Benefits and Costs Over Passenger Car Fleet Produced Through 2029 (2018\$ Billions), 3% Percent Discount Rate, for Alternative 2

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Private Costs											
Technology Costs to Increase Fuel Economy	0.0	0.0	0.0	2.8	4.5	6.1	6.9	6.6	6.4	5.9	39.1
Increased Maintenance and Repair Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.3
Safety Costs Internalized by Drivers	0.0	0.0	0.0	0.1	0.5	0.7	0.8	0.8	0.8	0.7	4.4
Subtotal - Private Costs	0.0	0.0	0.0	2.9	5.0	6.8	7.7	7.4	7.2	6.6	43.8
External Costs											
Congestion and Noise Costs from Rebound-Effect Driving	7.3	0.7	0.8	0.2	-0.5	-2.5	-4.1	-4.5	-4.2	-4.3	-11.1
Safety Costs Not Internalized by Drivers	7.8	-1.3	-2.2	-3.2	-4.3	-6.2	-7.6	-7.8	-7.6	-7.6	-39.9
Loss in Fuel Tax Revenue	-1.1	-0.1	-0.1	0.5	1.2	1.9	2.3	2.4	2.4	2.3	11.7
Subtotal - External Costs	14.1	-0.8	-1.4	-2.4	-3.6	-6.8	-9.4	-9.9	-9.4	-9.6	-39.2
Total Social Costs	16.9	1.3	1.5	3.9	5.2	3.8	2.1	1.2	1.4	0.6	38.0
Private Benefits											
Reduced Fuel Costs	-5.4	-0.4	-0.5	1.8	5.0	8.0	9.9	10.2	10.4	10.0	49.0
Benefits from Additional Driving	-0.8	0.0	0.0	0.2	0.9	1.2	1.3	1.3	1.4	1.2	6.8
Less Frequent Refueling	-0.3	0.0	0.0	-0.3	-0.1	0.1	0.3	0.3	0.2	0.2	0.4
Subtotal - Private Benefits	-6.4	-0.4	-0.5	1.7	5.8	9.4	11.4	11.8	12.0	11.4	56.2
External Benefits											
Reduction in Petroleum Market Externality	-0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.9
Reduced Climate Damages	-2.2	-0.2	-0.2	0.8	2.1	3.4	4.2	4.3	4.4	4.3	20.9
Reduced Health Damages	-1.3	0.0	-0.1	0.0	0.3	0.5	0.6	0.6	0.6	0.6	1.7
Subtotal - External Benefits	-3.5	-0.2	-0.3	0.9	2.4	4.0	4.9	5.1	5.2	5.0	23.5
Total Social Benefits	-9.2	-0.6	-0.7	2.6	8.2	13.3	16.4	16.9	17.3	16.4	80.5
Net Social Benefits	-26.2	-1.9	-2.3	-1.3	3.0	9.5	14.3	15.7	15.8	15.8	42.5

Table A-7-12 - Incremental Benefits and Costs Over Light Truck Fleet Produced Through 2029 (2018\$ Billions), 3% Percent Discount Rate, for Alternative 2

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Private Costs											
Technology Costs to Increase Fuel Economy	0.0	0.0	0.0	0.9	2.5	4.0	5.6	5.5	5.2	4.9	28.5
Increased Maintenance and Repair Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.3
Safety Costs Internalized by Drivers	0.0	0.0	0.0	0.1	0.3	0.5	0.6	0.7	0.8	0.8	3.8
Subtotal - Private Costs	0.0	0.0	0.0	0.9	2.8	4.5	6.3	6.3	6.1	5.7	32.6
External Costs											
Congestion and Noise Costs from Rebound-Effect Driving	6.5	0.9	1.0	0.2	0.1	0.9	1.5	2.8	3.3	3.8	21.1
Safety Costs Not Internalized by Drivers	10.6	0.0	-0.8	-2.2	-2.9	-2.6	-2.5	-1.3	-0.9	-0.4	-3.0
Loss in Fuel Tax Revenue	-1.4	-0.2	-0.2	0.3	0.9	1.3	1.8	1.7	1.6	1.4	7.2
Subtotal - External Costs	15.7	0.7	0.1	-1.7	-1.9	-0.4	0.8	3.2	4.0	4.9	25.3
Total Social Costs	18.1	1.6	1.9	1.7	3.7	6.9	10.2	12.5	13.0	13.4	83.1
Private Benefits											
Reduced Fuel Costs	-6.8	-0.8	-0.9	0.8	3.4	4.8	6.7	6.0	5.8	5.0	24.0
Benefits from Additional Driving	-0.5	0.0	0.0	0.1	0.6	0.9	1.3	1.5	1.6	1.6	7.3
Less Frequent Refueling	-0.3	0.0	0.0	-0.4	-0.2	-0.1	0.0	-0.1	0.0	0.0	-1.2
Subtotal - Private Benefits	-7.5	-0.8	-0.9	0.6	3.8	5.6	8.0	7.4	7.4	6.7	30.1
External Benefits											
Reduction in Petroleum Market Externality	-0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.6
Reduced Climate Damages	-2.7	-0.3	-0.4	0.4	1.4	2.1	3.0	2.7	2.6	2.3	11.1
Reduced Health Damages	-1.5	-0.1	-0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	-1.3
Subtotal - External Benefits	-4.3	-0.4	-0.5	0.4	1.6	2.3	3.2	2.8	2.8	2.4	10.3
Total Social Benefits	-11.3	-1.2	-1.4	1.0	5.4	7.9	11.2	10.2	10.2	9.1	40.9
Net Social Benefits	-29.4	-2.8	-3.3	-0.7	1.7	1.0	1.0	-2.3	-2.9	-4.3	-42.1

Table A-7-13 - Incremental Benefits and Costs Over Total Fleet Produced Through 2029 (2018\$ Billions), 3% Percent Discount Rate, for Alternative 3

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Private Costs											
Technology Costs to Increase Fuel Economy	0.0	0.0	0.0	4.7	11.1	15.2	18.3	17.8	17.1	15.9	100.1
Increased Maintenance and Repair Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.3	0.2	0.2	1.3
Safety Costs Internalized by Drivers	0.0	0.0	0.0	0.3	1.2	1.6	1.9	2.0	2.1	2.0	11.2
Subtotal - Private Costs	0.0	0.0	0.0	5.0	12.4	17.0	20.6	20.1	19.4	18.1	112.7
External Costs											
Congestion and Noise Costs from Rebound-Effect Driving	21.3	2.3	2.8	1.2	-0.9	-2.9	-4.4	-2.9	-1.9	-1.1	13.5
Safety Costs Not Internalized by Drivers	31.0	-0.5	-1.9	-4.8	-7.9	-10.1	-12.0	-10.6	-9.8	-9.0	-35.5
Loss in Fuel Tax Revenue	-3.9	-0.4	-0.4	1.0	3.2	4.7	6.0	5.8	5.7	5.2	27.0
Subtotal - External Costs	48.4	1.5	0.5	-2.6	-5.6	-8.3	-10.5	-7.7	-6.0	-4.9	4.9
Total Social Costs	53.7	4.4	5.3	8.3	13.4	15.3	17.0	19.1	20.1	19.7	176.3
Private Benefits											
Reduced Fuel Costs	-18.7	-1.8	-2.1	3.1	12.8	18.6	23.8	23.3	23.3	21.6	103.8
Benefits from Additional Driving	-1.2	0.0	0.1	0.5	2.2	2.9	3.5	3.7	3.9	3.9	19.6
Less Frequent Refueling	-0.8	-0.1	-0.1	-0.7	-0.2	0.3	0.6	0.4	0.4	0.4	0.3
Subtotal - Private Benefits	-20.7	-1.9	-2.2	2.9	14.8	21.7	28.0	27.4	27.6	25.9	123.6
External Benefits											
Reduction in Petroleum Market Externality	-0.3	0.0	0.0	0.1	0.2	0.4	0.5	0.5	0.5	0.4	2.1
Reduced Climate Damages	-7.4	-0.7	-0.9	1.4	5.4	7.9	10.2	10.1	10.1	9.4	45.6
Reduced Health Damages	-4.3	-0.2	-0.2	0.0	0.6	0.8	1.0	0.9	0.9	0.8	0.3
Subtotal - External Benefits	-12.0	-0.9	-1.1	1.5	6.3	9.1	11.7	11.4	11.4	10.7	48.0
Total Social Benefits	-31.5	-2.8	-3.3	4.4	21.1	30.8	39.6	38.8	39.0	36.6	172.9
Net Social Benefits	-85.2	-7.3	-8.6	-3.9	7.7	15.5	22.7	19.7	18.9	16.9	-3.4

Table A-7-14 - Incremental Benefits and Costs Over Passenger Car Fleet Produced Through 2029 (2018\$ Billions), 3% Percent Discount Rate, for Alternative 3

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Private Costs											
Technology Costs to Increase Fuel Economy	0.0	0.0	0.0	3.5	6.0	8.1	9.2	8.9	8.7	8.0	52.4
Increased Maintenance and Repair Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.6
Safety Costs Internalized by Drivers	0.0	0.0	0.0	0.2	0.7	0.9	1.0	1.0	1.1	1.0	6.0
Subtotal - Private Costs	0.0	0.0	0.0	3.7	6.8	9.1	10.4	10.1	9.9	9.1	59.0
External Costs											
Congestion and Noise Costs from Rebound-Effect Driving	11.2	1.0	1.3	0.6	-1.1	-4.0	-6.0	-6.4	-6.0	-6.0	-15.4
Safety Costs Not Internalized by Drivers	13.5	-1.0	-1.7	-2.9	-4.9	-7.5	-9.3	-9.6	-9.3	-9.2	-42.0
Loss in Fuel Tax Revenue	-1.7	-0.1	-0.1	0.7	1.7	2.6	3.2	3.3	3.3	3.1	15.9
Subtotal - External Costs	23.0	-0.1	-0.6	-1.6	-4.3	-8.9	-12.2	-12.7	-12.0	-12.1	-41.5
Total Social Costs	25.9	1.9	2.4	5.4	6.3	4.0	2.0	1.1	1.5	0.7	51.0
Private Benefits											
Reduced Fuel Costs	-8.3	-0.6	-0.8	2.2	7.0	11.1	13.6	14.1	14.4	13.9	66.6
Benefits from Additional Driving	-0.7	0.0	0.0	0.4	1.2	1.6	1.7	1.8	1.8	1.7	9.5
Less Frequent Refueling	-0.4	0.0	0.0	-0.3	0.0	0.2	0.4	0.4	0.3	0.2	0.7
Subtotal - Private Benefits	-9.4	-0.6	-0.8	2.3	8.2	12.9	15.8	16.2	16.5	15.9	76.9
External Benefits											
Reduction in Petroleum Market Externality	-0.1	0.0	0.0	0.0	0.1	0.2	0.2	0.3	0.3	0.3	1.3
Reduced Climate Damages	-3.3	-0.3	-0.3	1.0	2.9	4.6	5.7	6.0	6.1	5.9	28.4
Reduced Health Damages	-2.0	-0.1	-0.1	0.0	0.4	0.7	0.8	0.8	0.8	0.8	2.2
Subtotal - External Benefits	-5.4	-0.3	-0.4	1.1	3.5	5.5	6.8	7.1	7.2	7.0	31.9
Total Social Benefits	-14.1	-1.0	-1.1	3.3	11.6	18.3	22.5	23.3	23.7	22.8	109.5
Net Social Benefits	-40.0	-2.9	-3.5	-2.1	5.4	14.3	20.6	22.2	22.3	22.2	58.5

Table A-7-15 - Incremental Benefits and Costs Over Light Truck Fleet Produced Through 2029 (2018\$ Billions), 3% Percent Discount Rate, for Alternative 3

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Private Costs											
Technology Costs to Increase Fuel Economy	0.0	0.0	0.0	1.2	5.1	7.1	9.1	8.9	8.4	7.9	47.8
Increased Maintenance and Repair Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.7
Safety Costs Internalized by Drivers	0.0	0.0	0.0	0.1	0.5	0.7	0.9	1.0	1.0	1.1	5.2
Subtotal - Private Costs	0.0	0.0	0.0	1.3	5.6	7.8	10.2	10.0	9.6	9.0	53.6
External Costs											
Congestion and Noise Costs from Rebound-Effect Driving	10.0	1.3	1.6	0.6	0.2	1.1	1.6	3.5	4.1	4.9	28.9
Safety Costs Not Internalized by Drivers	17.5	0.5	-0.2	-1.9	-3.0	-2.6	-2.6	-1.0	-0.5	0.2	6.4
Loss in Fuel Tax Revenue	-2.1	-0.2	-0.3	0.3	1.5	2.1	2.8	2.5	2.4	2.1	11.1
Subtotal - External Costs	25.4	1.6	1.1	-1.0	-1.3	0.6	1.7	5.0	6.1	7.2	46.4
Total Social Costs	27.8	2.5	3.0	2.9	7.1	11.3	15.0	18.0	18.6	19.1	125.2
Private Benefits											
Reduced Fuel Costs	-10.4	-1.2	-1.4	0.9	5.8	7.5	10.2	9.1	8.9	7.7	37.1
Benefits from Additional Driving	-0.4	0.0	0.0	0.2	1.0	1.3	1.8	1.9	2.1	2.2	10.0
Less Frequent Refueling	-0.4	-0.1	-0.1	-0.4	-0.1	0.0	0.2	0.1	0.1	0.2	-0.5
Subtotal - Private Benefits	-11.3	-1.2	-1.4	0.6	6.7	8.9	12.2	11.1	11.1	10.1	46.7
External Benefits											
Reduction in Petroleum Market Externality	-0.2	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.9
Reduced Climate Damages	-4.1	-0.5	-0.6	0.4	2.5	3.3	4.5	4.1	4.0	3.5	17.1
Reduced Health Damages	-2.3	-0.1	-0.1	0.0	0.2	0.2	0.2	0.1	0.1	0.1	-1.8
Subtotal - External Benefits	-6.6	-0.6	-0.7	0.4	2.8	3.6	4.9	4.4	4.2	3.7	16.2
Total Social Benefits	-17.4	-1.9	-2.1	1.1	9.5	12.5	17.1	15.5	15.3	13.8	63.4
Net Social Benefits	-45.2	-4.4	-5.1	-1.8	2.3	1.2	2.1	-2.5	-3.3	-5.3	-61.9

Table A-7-16 - Incremental Benefits and Costs Over Total Fleet Produced Through 2029 (2018\$ Billions), 7% Percent Discount Rate, for Alternative 1

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Private Costs											
Technology Costs to Increase Fuel Economy	0.0	0.0	0.0	1.9	4.4	4.8	4.8	4.4	4.1	3.7	28.1
Increased Maintenance and Repair Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Safety Costs Internalized by Drivers	0.0	0.0	0.0	0.1	0.5	0.6	0.6	0.6	0.6	0.6	3.7
Subtotal - Private Costs	0.0	0.0	0.0	2.0	4.9	5.4	5.4	5.1	4.8	4.3	31.9
External Costs											
Congestion and Noise Costs from Rebound-Effect Driving	4.6	0.5	0.6	0.0	-0.6	-0.5	-0.3	0.0	0.2	0.3	4.8
Safety Costs Not Internalized by Drivers	3.7	-1.7	-2.9	-4.1	-5.2	-5.1	-5.0	-4.4	-4.1	-3.8	-32.6
Loss in Fuel Tax Revenue	-0.8	-0.1	-0.1	0.4	1.3	1.4	1.4	1.3	1.2	1.1	7.0
Subtotal - External Costs	7.5	-1.3	-2.4	-3.6	-4.6	-4.2	-3.9	-3.1	-2.7	-2.4	-20.8
Total Social Costs	11.6	0.9	1.0	2.5	4.7	5.5	5.7	5.9	5.9	5.5	49.3
Private Benefits											
Reduced Fuel Costs	-3.9	-0.4	-0.4	1.4	5.2	6.0	5.9	5.6	5.4	4.9	29.7
Benefits from Additional Driving	0.6	0.0	0.0	0.2	1.0	1.2	1.3	1.3	1.3	1.2	8.1
Less Frequent Refueling	-0.2	0.0	0.0	-0.3	-0.1	0.0	0.0	0.0	0.1	0.0	-0.4
Subtotal - Private Benefits	-3.5	-0.4	-0.4	1.3	6.1	7.2	7.2	6.9	6.8	6.2	37.4
External Benefits											
Reduction in Petroleum Market Externality	-0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.5
Reduced Climate Damages	-1.5	-0.1	-0.2	0.6	2.1	2.5	2.6	2.5	2.5	2.4	13.3
Reduced Health Damages	-0.8	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.3	0.9
Subtotal - External Benefits	-2.4	-0.2	-0.2	0.6	2.4	2.9	3.0	2.9	2.9	2.7	14.8
Total Social Benefits	-6.5	-0.6	-0.6	1.9	8.5	10.1	10.2	9.8	9.8	8.9	51.6
Net Social Benefits	-18.1	-1.4	-1.7	-0.5	3.8	4.6	4.5	3.9	3.9	3.4	2.3

Table A-7-17 - Incremental Benefits and Costs Over Passenger Car Fleet Produced Through 2029 (2018\$ Billions), 7% Percent Discount Rate, for Alternative 1

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Private Costs											
Technology Costs to Increase Fuel Economy	0.0	0.0	0.0	1.4	2.1	2.4	2.3	2.1	2.0	1.7	14.1
Increased Maintenance and Repair Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Safety Costs Internalized by Drivers	0.0	0.0	0.0	0.1	0.2	0.3	0.3	0.3	0.3	0.2	1.5
Subtotal - Private Costs	0.0	0.0	0.0	1.5	2.3	2.6	2.6	2.4	2.2	2.0	15.7
External Costs											
Congestion and Noise Costs from Rebound-Effect Driving	2.5	0.2	0.3	0.0	-0.5	-1.1	-1.4	-1.3	-1.2	-1.2	-3.7
Safety Costs Not Internalized by Drivers	1.4	-1.3	-1.9	-2.4	-3.0	-3.5	-3.6	-3.3	-3.2	-3.1	-23.9
Loss in Fuel Tax Revenue	-0.4	0.0	0.0	0.3	0.6	0.8	0.8	0.7	0.7	0.6	4.1
Subtotal - External Costs	3.5	-1.1	-1.7	-2.0	-3.0	-3.8	-4.2	-3.9	-3.7	-3.7	-23.6
Total Social Costs	5.7	0.4	0.5	1.9	1.9	1.3	0.8	0.7	0.6	0.3	14.1
Private Benefits											
Reduced Fuel Costs	-1.8	-0.1	-0.1	1.0	2.4	3.2	3.3	3.2	3.1	3.0	17.1
Benefits from Additional Driving	0.3	0.0	0.0	0.1	0.4	0.5	0.5	0.5	0.5	0.4	3.1
Less Frequent Refueling	-0.1	0.0	0.0	-0.2	-0.1	0.0	0.0	0.1	0.1	0.1	-0.1
Subtotal - Private Benefits	-1.6	-0.1	-0.1	1.0	2.6	3.7	3.8	3.7	3.7	3.4	20.1
External Benefits											
Reduction in Petroleum Market Externality	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.3
Reduced Climate Damages	-0.7	0.0	-0.1	0.4	0.9	1.3	1.4	1.4	1.5	1.4	7.6
Reduced Health Damages	-0.4	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.6
Subtotal - External Benefits	-1.1	-0.1	-0.1	0.4	1.1	1.6	1.7	1.7	1.7	1.6	8.6
Total Social Benefits	-3.0	-0.2	-0.2	1.4	3.7	5.3	5.5	5.4	5.4	5.1	28.4
Net Social Benefits	-8.7	-0.6	-0.7	-0.4	1.8	4.0	4.7	4.6	4.8	4.7	14.3

Table A-7-18 - Incremental Benefits and Costs Over Light Truck Fleet Produced Through 2029 (2018\$ Billions), 7% Percent Discount Rate, for Alternative 1

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Private Costs											
Technology Costs to Increase Fuel Economy	0.0	0.0	0.0	0.5	2.3	2.4	2.4	2.3	2.2	2.0	14.0
Increased Maintenance and Repair Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Safety Costs Internalized by Drivers	0.0	0.0	0.0	0.0	0.3	0.3	0.4	0.4	0.4	0.4	2.2
Subtotal - Private Costs	0.0	0.0	0.0	0.5	2.6	2.8	2.8	2.7	2.6	2.3	16.2
External Costs											
Congestion and Noise Costs from Rebound-Effect Driving	2.1	0.3	0.3	0.0	-0.1	0.6	1.1	1.3	1.4	1.5	8.5
Safety Costs Not Internalized by Drivers	2.4	-0.4	-1.0	-1.7	-2.2	-1.7	-1.4	-1.1	-0.9	-0.7	-8.7
Loss in Fuel Tax Revenue	-0.4	0.0	-0.1	0.1	0.7	0.6	0.6	0.5	0.5	0.4	2.9
Subtotal - External Costs	4.0	-0.2	-0.7	-1.6	-1.6	-0.4	0.3	0.7	1.0	1.3	2.8
Total Social Costs	5.8	0.5	0.6	0.6	2.9	4.2	5.0	5.2	5.3	5.2	35.2
Private Benefits											
Reduced Fuel Costs	-2.1	-0.2	-0.3	0.4	2.8	2.8	2.6	2.4	2.3	2.0	12.6
Benefits from Additional Driving	0.3	0.0	0.0	0.1	0.6	0.7	0.8	0.8	0.9	0.8	5.0
Less Frequent Refueling	-0.1	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	-0.3
Subtotal - Private Benefits	-1.9	-0.2	-0.3	0.4	3.4	3.5	3.4	3.2	3.2	2.8	17.4
External Benefits											
Reduction in Petroleum Market Externality	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Reduced Climate Damages	-0.8	-0.1	-0.1	0.2	1.1	1.1	1.1	1.1	1.1	1.0	5.7
Reduced Health Damages	-0.4	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.1	0.1	0.3
Subtotal - External Benefits	-1.3	-0.1	-0.1	0.2	1.3	1.3	1.3	1.2	1.2	1.1	6.2
Total Social Benefits	-3.5	-0.4	-0.4	0.5	4.8	4.8	4.7	4.4	4.4	3.9	23.2
Net Social Benefits	-9.4	-0.8	-1.0	-0.1	1.9	0.6	-0.3	-0.8	-0.9	-1.3	-12.0

Table A-7-19 - Incremental Benefits and Costs Over Total Fleet Produced Through 2029 (2018\$ Billions), 7% Percent Discount Rate, for Alternative 2

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Private Costs											
Technology Costs to Increase Fuel Economy	0.0	0.0	0.0	3.4	6.3	8.6	10.3	9.6	8.9	7.9	55.0
Increased Maintenance and Repair Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.5
Safety Costs Internalized by Drivers	0.0	0.0	0.0	0.1	0.5	0.8	0.9	0.9	0.9	0.8	4.9
Subtotal - Private Costs	0.0	0.0	0.0	3.5	6.8	9.4	11.3	10.6	9.9	8.8	60.4
External Costs											
Congestion and Noise Costs from Rebound-Effect Driving	9.7	1.0	1.2	0.2	-0.4	-1.2	-1.8	-1.1	-0.6	-0.3	6.8
Safety Costs Not Internalized by Drivers	12.5	-1.1	-2.2	-3.9	-4.9	-5.7	-6.3	-5.5	-4.9	-4.4	-26.5
Loss in Fuel Tax Revenue	-1.8	-0.2	-0.2	0.6	1.5	2.2	2.7	2.5	2.4	2.1	11.9
Subtotal - External Costs	20.5	-0.3	-1.2	-3.0	-3.8	-4.7	-5.4	-4.0	-3.1	-2.6	-7.8
Total Social Costs	24.6	1.9	2.2	4.6	7.4	9.0	10.1	10.6	10.6	9.8	90.7
Private Benefits											
Reduced Fuel Costs	-8.4	-0.8	-0.9	2.0	5.8	8.5	10.6	10.0	9.6	8.6	44.9
Benefits from Additional Driving	0.6	0.0	0.0	0.2	1.0	1.4	1.6	1.7	1.7	1.6	10.0
Less Frequent Refueling	-0.4	0.0	0.0	-0.5	-0.2	0.0	0.2	0.1	0.1	0.1	-0.6
Subtotal - Private Benefits	-8.2	-0.8	-0.9	1.7	6.6	9.9	12.4	11.7	11.5	10.3	54.3
External Benefits											
Reduction in Petroleum Market Externality	-0.1	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.9
Reduced Climate Damages	-3.2	-0.3	-0.4	0.8	2.3	3.6	4.7	4.6	4.6	4.3	21.0
Reduced Health Damages	-1.8	-0.1	-0.1	0.0	0.3	0.4	0.4	0.3	0.3	0.3	0.1
Subtotal - External Benefits	-5.1	-0.4	-0.5	0.8	2.7	4.1	5.3	5.1	5.1	4.7	22.0
Total Social Benefits	-13.9	-1.2	-1.4	2.6	9.3	14.0	17.7	16.9	16.6	15.1	75.6
Net Social Benefits	-38.5	-3.1	-3.6	-2.0	1.9	5.1	7.6	6.3	6.1	5.2	-15.1

Table A-7-20 - Incremental Benefits and Costs Over Passenger Car Fleet Produced Through 2029 (2018\$ Billions), 7% Percent Discount Rate, for Alternative 2

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Private Costs											
Technology Costs to Increase Fuel Economy	0.0	0.0	0.0	2.6	4.0	5.2	5.7	5.3	4.9	4.3	31.9
Increased Maintenance and Repair Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2
Safety Costs Internalized by Drivers	0.0	0.0	0.0	0.1	0.3	0.5	0.5	0.5	0.5	0.4	2.7
Subtotal - Private Costs	0.0	0.0	0.0	2.7	4.4	5.7	6.2	5.8	5.4	4.8	34.9
External Costs											
Congestion and Noise Costs from Rebound-Effect Driving	5.2	0.4	0.6	0.1	-0.4	-1.7	-2.7	-2.8	-2.6	-2.5	-6.4
Safety Costs Not Internalized by Drivers	5.4	-1.1	-1.6	-2.2	-2.9	-4.0	-4.8	-4.7	-4.4	-4.2	-24.5
Loss in Fuel Tax Revenue	-0.8	-0.1	-0.1	0.4	0.9	1.3	1.5	1.5	1.4	1.3	7.4
Subtotal - External Costs	9.9	-0.7	-1.1	-1.7	-2.5	-4.5	-6.0	-6.0	-5.5	-5.4	-23.5
Total Social Costs	12.1	0.8	1.0	3.3	4.4	3.7	2.6	2.0	2.0	1.4	33.3
Private Benefits											
Reduced Fuel Costs	-3.8	-0.3	-0.3	1.3	3.5	5.4	6.4	6.3	6.2	5.7	30.3
Benefits from Additional Driving	0.3	0.0	0.0	0.2	0.6	0.8	0.8	0.8	0.8	0.7	5.0
Less Frequent Refueling	-0.2	0.0	0.0	-0.2	-0.1	0.1	0.2	0.2	0.1	0.1	0.2
Subtotal - Private Benefits	-3.7	-0.3	-0.3	1.3	4.0	6.2	7.3	7.3	7.2	6.6	35.5
External Benefits											
Reduction in Petroleum Market Externality	-0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.6
Reduced Climate Damages	-1.4	-0.1	-0.1	0.5	1.4	2.2	2.7	2.8	2.9	2.8	13.8
Reduced Health Damages	-0.8	0.0	0.0	0.0	0.2	0.3	0.3	0.3	0.3	0.3	0.9
Subtotal - External Benefits	-2.3	-0.1	-0.2	0.6	1.6	2.6	3.2	3.3	3.3	3.2	15.2
Total Social Benefits	-6.3	-0.4	-0.5	1.8	5.6	8.8	10.5	10.6	10.5	9.7	50.4
Net Social Benefits	-18.5	-1.3	-1.5	-1.5	1.2	5.2	7.9	8.6	8.5	8.4	17.1

Table A-7-21 - Incremental Benefits and Costs Over Light Truck Fleet Produced Through 2029 (2018\$ Billions), 7% Percent Discount Rate, for Alternative 2

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Private Costs											
Technology Costs to Increase Fuel Economy	0.0	0.0	0.0	0.8	2.2	3.4	4.6	4.4	4.0	3.6	23.0
Increased Maintenance and Repair Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2
Safety Costs Internalized by Drivers	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.4	0.4	0.4	2.2
Subtotal - Private Costs	0.0	0.0	0.0	0.8	2.4	3.8	5.1	4.8	4.5	4.1	25.5
External Costs											
Congestion and Noise Costs from Rebound-Effect Driving	4.5	0.6	0.7	0.1	0.0	0.5	0.9	1.7	2.0	2.2	13.2
Safety Costs Not Internalized by Drivers	7.1	-0.1	-0.6	-1.6	-2.0	-1.7	-1.6	-0.8	-0.5	-0.2	-2.0
Loss in Fuel Tax Revenue	-1.0	-0.1	-0.1	0.2	0.6	0.9	1.2	1.0	1.0	0.8	4.5
Subtotal - External Costs	10.6	0.4	-0.1	-1.3	-1.3	-0.3	0.5	2.0	2.4	2.8	15.7
Total Social Costs	12.4	1.1	1.2	1.3	3.0	5.3	7.5	8.6	8.6	8.5	57.4
Private Benefits											
Reduced Fuel Costs	-4.6	-0.5	-0.6	0.7	2.3	3.2	4.2	3.6	3.4	2.8	14.6
Benefits from Additional Driving	0.3	0.0	0.0	0.1	0.4	0.6	0.8	0.9	0.9	0.9	5.0
Less Frequent Refueling	-0.2	0.0	0.0	-0.3	-0.2	-0.1	0.0	-0.1	0.0	0.0	-0.8
Subtotal - Private Benefits	-4.4	-0.5	-0.6	0.5	2.6	3.7	5.0	4.5	4.3	3.8	18.7
External Benefits											
Reduction in Petroleum Market Externality	-0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.3
Reduced Climate Damages	-1.8	-0.2	-0.2	0.2	1.0	1.4	1.9	1.8	1.7	1.5	7.3
Reduced Health Damages	-0.9	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	-0.8
Subtotal - External Benefits	-2.8	-0.3	-0.3	0.3	1.1	1.5	2.1	1.9	1.8	1.6	6.8
Total Social Benefits	-7.6	-0.8	-0.9	0.7	3.7	5.2	7.1	6.3	6.1	5.3	25.2
Net Social Benefits	-20.0	-1.8	-2.1	-0.5	0.7	-0.1	-0.4	-2.3	-2.5	-3.1	-32.2

Table A-7-22 - Incremental Benefits and Costs Over Total Fleet Produced Through 2029 (2018\$ Billions), 7% Percent Discount Rate, for Alternative 3

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Private Costs											
Technology Costs to Increase Fuel Economy	0.0	0.0	0.0	4.4	9.9	13.0	15.1	14.2	13.1	11.7	81.4
Increased Maintenance and Repair Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.2	0.2	0.2	1.1
Safety Costs Internalized by Drivers	0.0	0.0	0.0	0.2	0.8	1.0	1.2	1.2	1.2	1.1	6.8
Subtotal - Private Costs	0.0	0.0	0.0	4.6	10.8	14.2	16.6	15.6	14.5	13.0	89.3
External Costs											
Congestion and Noise Costs from Rebound-Effect Driving	14.9	1.6	1.9	0.6	-0.8	-2.1	-3.0	-1.9	-1.2	-0.7	9.3
Safety Costs Not Internalized by Drivers	21.3	-0.6	-1.6	-3.5	-5.4	-6.6	-7.5	-6.4	-5.7	-5.0	-20.8
Loss in Fuel Tax Revenue	-2.7	-0.2	-0.3	0.8	2.3	3.2	3.9	3.6	3.4	3.0	17.0
Subtotal - External Costs	33.5	0.7	0.0	-2.1	-3.9	-5.5	-6.6	-4.7	-3.4	-2.6	5.4
Total Social Costs	37.6	2.9	3.4	6.6	11.2	13.0	14.3	14.9	14.9	14.0	132.8
Private Benefits											
Reduced Fuel Costs	-12.9	-1.2	-1.4	2.4	8.9	12.3	15.2	14.3	13.8	12.3	63.7
Benefits from Additional Driving	0.7	0.0	0.1	0.4	1.5	1.9	2.2	2.2	2.3	2.2	13.3
Less Frequent Refueling	-0.6	-0.1	-0.1	-0.5	-0.1	0.2	0.4	0.3	0.3	0.3	0.0
Subtotal - Private Benefits	-12.8	-1.2	-1.4	2.2	10.2	14.4	17.8	16.8	16.3	14.8	77.0
External Benefits											
Reduction in Petroleum Market Externality	-0.2	0.0	0.0	0.1	0.2	0.2	0.3	0.3	0.3	0.2	1.3
Reduced Climate Damages	-4.9	-0.5	-0.6	0.9	3.6	5.2	6.8	6.6	6.6	6.2	29.9
Reduced Health Damages	-2.7	-0.1	-0.1	0.0	0.4	0.5	0.6	0.5	0.5	0.4	-0.1
Subtotal - External Benefits	-7.8	-0.6	-0.7	1.0	4.1	6.0	7.6	7.4	7.4	6.8	31.2
Total Social Benefits	-21.3	-1.8	-2.1	3.2	14.4	20.4	25.4	24.2	23.7	21.6	107.6
Net Social Benefits	-58.9	-4.7	-5.6	-3.3	3.1	7.4	11.2	9.3	8.8	7.6	-25.2

Table A-7-23 - Incremental Benefits and Costs Over Passenger Car Fleet Produced Through 2029 (2018\$ Billions), 7% Percent Discount Rate, for Alternative 3

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Private Costs											
Technology Costs to Increase Fuel Economy	0.0	0.0	0.0	3.2	5.3	7.0	7.6	7.1	6.7	5.9	42.8
Increased Maintenance and Repair Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.5
Safety Costs Internalized by Drivers	0.0	0.0	0.0	0.2	0.5	0.6	0.6	0.6	0.6	0.6	3.7
Subtotal - Private Costs	0.0	0.0	0.0	3.4	5.9	7.6	8.4	7.8	7.4	6.5	47.0
External Costs											
Congestion and Noise Costs from Rebound-Effect Driving	8.0	0.7	0.8	0.3	-0.9	-2.7	-4.0	-4.0	-3.7	-3.5	-8.9
Safety Costs Not Internalized by Drivers	9.5	-0.8	-1.3	-2.1	-3.3	-4.9	-5.8	-5.8	-5.4	-5.1	-25.1
Loss in Fuel Tax Revenue	-1.2	-0.1	-0.1	0.5	1.2	1.8	2.1	2.0	2.0	1.8	10.0
Subtotal - External Costs	16.3	-0.2	-0.6	-1.2	-3.0	-5.9	-7.7	-7.8	-7.0	-6.8	-23.9
Total Social Costs	18.6	1.3	1.6	4.5	5.4	4.2	3.0	2.3	2.4	1.8	45.0
Private Benefits											
Reduced Fuel Costs	-5.9	-0.4	-0.5	1.6	4.9	7.4	8.7	8.8	8.6	8.0	41.2
Benefits from Additional Driving	0.3	0.0	0.0	0.3	0.8	1.0	1.1	1.1	1.1	1.0	6.7
Less Frequent Refueling	-0.3	0.0	0.0	-0.2	0.0	0.2	0.3	0.2	0.2	0.1	0.4
Subtotal - Private Benefits	-5.8	-0.4	-0.5	1.7	5.7	8.6	10.1	10.0	9.9	9.1	48.3
External Benefits											
Reduction in Petroleum Market Externality	-0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.1	0.8
Reduced Climate Damages	-2.2	-0.2	-0.2	0.7	1.9	3.1	3.8	3.9	4.0	3.9	18.7
Reduced Health Damages	-1.3	0.0	0.0	0.0	0.3	0.4	0.5	0.5	0.4	0.4	1.1
Subtotal - External Benefits	-3.6	-0.2	-0.3	0.7	2.3	3.6	4.4	4.6	4.6	4.4	20.6
Total Social Benefits	-9.7	-0.6	-0.8	2.4	8.0	12.2	14.5	14.6	14.5	13.6	68.5
Net Social Benefits	-28.3	-1.9	-2.3	-2.1	2.5	8.0	11.5	12.3	12.0	11.8	23.5

Table A-7-24 - Incremental Benefits and Costs Over Light Truck Fleet Produced Through 2029 (2018\$ Billions), 7% Percent Discount Rate, for Alternative 3

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Private Costs											
Technology Costs to Increase Fuel Economy	0.0	0.0	0.0	1.2	4.5	6.1	7.6	7.1	6.5	5.8	38.7
Increased Maintenance and Repair Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.6
Safety Costs Internalized by Drivers	0.0	0.0	0.0	0.1	0.3	0.4	0.5	0.6	0.6	0.6	3.1
Subtotal - Private Costs	0.0	0.0	0.0	1.2	4.9	6.6	8.2	7.8	7.1	6.5	42.3
External Costs											
Congestion and Noise Costs from Rebound-Effect Driving	6.9	0.9	1.0	0.3	0.0	0.7	1.0	2.1	2.5	2.8	18.2
Safety Costs Not Internalized by Drivers	11.8	0.3	-0.3	-1.4	-2.1	-1.7	-1.6	-0.6	-0.3	0.1	4.2
Loss in Fuel Tax Revenue	-1.5	-0.2	-0.2	0.2	1.1	1.4	1.8	1.6	1.4	1.2	7.0
Subtotal - External Costs	17.2	1.0	0.6	-0.9	-1.0	0.4	1.1	3.1	3.6	4.2	29.4
Total Social Costs	19.0	1.6	1.9	2.1	5.8	8.8	11.3	12.6	12.5	12.2	87.8
Private Benefits											
Reduced Fuel Costs	-7.1	-0.8	-0.9	0.7	4.0	5.0	6.5	5.6	5.2	4.3	22.5
Benefits from Additional Driving	0.3	0.0	0.0	0.1	0.6	0.8	1.1	1.2	1.2	1.2	6.6
Less Frequent Refueling	-0.3	0.0	0.0	-0.3	-0.1	0.0	0.1	0.0	0.0	0.1	-0.4
Subtotal - Private Benefits	-7.0	-0.8	-0.9	0.6	4.6	5.8	7.7	6.8	6.4	5.7	28.8
External Benefits											
Reduction in Petroleum Market Externality	-0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.5
Reduced Climate Damages	-2.7	-0.3	-0.4	0.3	1.7	2.2	3.0	2.7	2.6	2.3	11.2
Reduced Health Damages	-1.4	-0.1	-0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	-1.2
Subtotal - External Benefits	-4.3	-0.4	-0.5	0.3	1.9	2.4	3.2	2.8	2.7	2.4	10.6
Total Social Benefits	-11.6	-1.2	-1.4	0.8	6.4	8.2	10.9	9.6	9.2	8.1	39.1
Net Social Benefits	-30.6	-2.8	-3.3	-1.2	0.6	-0.6	-0.4	-3.0	-3.3	-4.1	-48.7

Table A-7-25 - Incremental Benefits and Costs for Calendar Years 2021-2050 for Total Fleet Produced Through MY2050 (2018\$ Billions), 3% Percent Discount Rate, by Alternative

Alternative	1	2	3
Private Costs			
Technology Costs to Increase Fuel Economy	102.1	195.9	281.8
Increased Maintenance and Repair Costs	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.2	1.0	2.3
Safety Costs Internalized by Drivers	17.5	23.8	31.9
Subtotal - Incremental Private Costs	119.9	220.7	316.1
External Costs			
Congestion and Noise Costs from Rebound-Effect Driving	22.6	30.8	41.1
Safety Costs Not Internalized by Drivers	9.6	18.7	26.8
Loss in Fuel Tax Revenue	33.6	63.5	90.8
Subtotal - Incremental External Costs	65.8	112.9	158.7
Total Incremental Social Costs	185.7	333.6	474.8
Private Benefits			
Reduced Fuel Costs	155.0	264.0	373.8
Benefits from Additional Driving	36.9	47.4	62.4
Less Frequent Refueling	-3.2	-8.7	-15.0
Subtotal - Incremental Private Benefits	188.8	302.7	421.2
External Benefits			
Reduction in Petroleum Market Externality	3.0	5.7	8.2
Reduced Climate Damages	68.3	119.5	169.5
Reduced Health Damages	6.5	5.7	7.6
Subtotal - Incremental External Benefits	77.8	130.9	185.3
Total Incremental Social Benefits	266.6	433.6	606.5
Net Incremental Social Benefits			
Net Incremental Social Benefits	81.0	100.0	131.7

Table A-7-26 - Incremental Benefits and Costs for Calendar Years 2021-2050 for Passenger Car Fleet Produced Through MY2050 (2018\$ Billions), 3% Percent Discount Rate, by Alternative

Alternative	1	2	3
Private Costs			
Technology Costs to Increase Fuel Economy	42.9	99.0	137.3
Increased Maintenance and Repair Costs	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.1	0.5	1.1
Safety Costs Internalized by Drivers	6.6	11.1	15.8
Subtotal - Incremental Private Costs	49.5	110.5	154.2
External Costs			
Congestion and Noise Costs from Rebound-Effect Driving	-31.4	-53.9	-72.3
Safety Costs Not Internalized by Drivers	-26.0	-42.7	-57.9
Loss in Fuel Tax Revenue	19.8	37.8	51.7
Subtotal - Incremental External Costs	-37.6	-58.8	-78.5
Total Incremental Social Costs	11.9	51.8	75.8
Private Benefits			
Reduced Fuel Costs	92.5	169.8	233.5
Benefits from Additional Driving	11.9	19.2	27.5
Less Frequent Refueling	-1.1	-1.1	-1.2
Subtotal - Incremental Private Benefits	103.3	188.0	259.8
External Benefits			
Reduction in Petroleum Market Externality	1.8	3.4	4.6
Reduced Climate Damages	40.6	75.3	103.4
Reduced Health Damages	4.8	7.6	10.5
Subtotal - Incremental External Benefits	47.2	86.3	118.5
Total Incremental Social Benefits	150.4	274.3	378.3
Net Incremental Social Benefits			
Net Incremental Social Benefits	138.5	222.5	302.5

Table A-7-27 - Incremental Benefits and Costs for Calendar Years 2021-2050 for Light Truck Fleet Produced Through MY2050 (2018\$ Billions), 3% Percent Discount Rate, by Alternative

Alternative	1	2	3
Private Costs			
Technology Costs to Increase Fuel Economy	59.3	96.9	144.6
Increased Maintenance and Repair Costs	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.1	0.5	1.2
Safety Costs Internalized by Drivers	11.0	12.7	16.1
Subtotal - Incremental Private Costs	70.3	110.1	161.8
External Costs			
Congestion and Noise Costs from Rebound-Effect Driving	54.0	84.7	113.4
Safety Costs Not Internalized by Drivers	35.6	61.4	84.8
Loss in Fuel Tax Revenue	13.8	25.6	39.0
Subtotal - Incremental External Costs	103.4	171.7	237.2
Total Incremental Social Costs	173.7	281.8	399.0
Private Benefits			
Reduced Fuel Costs	62.6	94.1	140.3
Benefits from Additional Driving	25.0	28.2	34.9
Less Frequent Refueling	-2.0	-7.6	-13.8
Subtotal - Incremental Private Benefits	85.5	114.7	161.4
External Benefits			
Reduction in Petroleum Market Externality	1.2	2.3	3.5
Reduced Climate Damages	27.7	44.2	66.2
Reduced Health Damages	1.7	-1.9	-2.9
Subtotal - Incremental External Benefits	30.7	44.7	66.8
Total Incremental Social Benefits	116.2	159.3	228.2
Net Incremental Social Benefits			
Net Incremental Social Benefits	-57.5	-122.5	-170.8

Table A-7-28 - Incremental Benefits and Costs for Calendar Years 2021-2050 for Total Fleet Produced Through MY2050 (2018\$ Billions), 7% Percent Discount Rate, by Alternative

Alternative	1	2	3
Private Costs			
Technology Costs to Increase Fuel Economy	63.9	124.4	180.6
Increased Maintenance and Repair Costs	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.1	0.7	1.7
Safety Costs Internalized by Drivers	9.0	12.1	16.3
Subtotal - Incremental Private Costs	73.1	137.2	198.6
External Costs			
Congestion and Noise Costs from Rebound-Effect Driving	11.9	16.1	21.6
Safety Costs Not Internalized by Drivers	6.5	12.7	18.5
Loss in Fuel Tax Revenue	17.4	32.8	47.1
Subtotal - Incremental External Costs	35.8	61.7	87.2
Total Incremental Social Costs	108.9	198.9	285.8
Private Benefits			
Reduced Fuel Costs	78.9	133.2	189.2
Benefits from Additional Driving	19.0	24.2	31.9
Less Frequent Refueling	-1.5	-4.1	-6.7
Subtotal - Incremental Private Benefits	96.4	153.2	214.4
External Benefits			
Reduction in Petroleum Market Externality	1.5	2.8	4.1
Reduced Climate Damages	44.4	77.6	110.2
Reduced Health Damages	3.0	2.3	3.0
Subtotal - Incremental External Benefits	48.9	82.8	117.3
Total Incremental Social Benefits	145.2	236.0	331.7
Net Incremental Social Benefits			
Net Incremental Social Benefits	36.4	37.1	45.9

Table A-7-29 - Incremental Benefits and Costs for Calendar Years 2021-2050 for Passenger Car Fleet Produced Through MY2050 (2018\$ Billions), 7% Percent Discount Rate, by Alternative

Alternative	1	2	3
Private Costs			
Technology Costs to Increase Fuel Economy	28.1	64.8	89.2
Increased Maintenance and Repair Costs	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.1	0.3	0.8
Safety Costs Internalized by Drivers	3.4	5.8	8.3
Subtotal - Incremental Private Costs	31.6	71.0	98.3
External Costs			
Congestion and Noise Costs from Rebound-Effect Driving	-15.3	-26.3	-35.5
Safety Costs Not Internalized by Drivers	-11.8	-19.1	-25.8
Loss in Fuel Tax Revenue	10.3	19.7	26.9
Subtotal - Incremental External Costs	-16.7	-25.7	-34.3
Total Incremental Social Costs	14.9	45.3	64.0
Private Benefits			
Reduced Fuel Costs	47.1	86.4	118.7
Benefits from Additional Driving	6.3	10.2	14.4
Less Frequent Refueling	-0.5	-0.5	-0.4
Subtotal - Incremental Private Benefits	52.8	96.1	132.7
External Benefits			
Reduction in Petroleum Market Externality	0.9	1.7	2.3
Reduced Climate Damages	26.4	48.9	67.2
Reduced Health Damages	2.2	3.4	4.6
Subtotal - Incremental External Benefits	29.5	54.0	74.2
Total Incremental Social Benefits	82.2	150.1	206.9
Net Incremental Social Benefits			
Net Incremental Social Benefits	67.4	104.8	143.0

Table A-7-30 - Incremental Benefits and Costs for Calendar Years 2021-2050 for Light Truck Fleet Produced Through MY2050 (2018\$ Billions), 7% Percent Discount Rate, by Alternative

Alternative	1	2	3
Private Costs			
Technology Costs to Increase Fuel Economy	35.8	59.5	91.4
Increased Maintenance and Repair Costs	0.0	0.0	0.0
Sacrifice in Other Vehicle Attributes	0.0	0.0	0.0
Consumer Surplus Loss from Reduced New Vehicle Sales	0.1	0.4	0.9
Safety Costs Internalized by Drivers	5.6	6.3	8.0
Subtotal - Incremental Private Costs	41.5	66.2	100.3
External Costs			
Congestion and Noise Costs from Rebound-Effect Driving	27.2	42.4	57.0
Safety Costs Not Internalized by Drivers	18.2	31.8	44.4
Loss in Fuel Tax Revenue	7.1	13.1	20.1
Subtotal - Incremental External Costs	52.5	87.3	121.5
Total Incremental Social Costs	94.0	153.6	221.8
Private Benefits			
Reduced Fuel Costs	31.8	46.8	70.4
Benefits from Additional Driving	12.7	14.0	17.5
Less Frequent Refueling	-1.0	-3.6	-6.2
Subtotal - Incremental Private Benefits	43.6	57.2	81.7
External Benefits			
Reduction in Petroleum Market Externality	0.6	1.1	1.8
Reduced Climate Damages	18.0	28.7	43.0
Reduced Health Damages	0.8	-1.1	-1.6
Subtotal - Incremental External Benefits	19.4	28.8	43.1
Total Incremental Social Benefits	63.0	85.9	124.8
Net Incremental Social Benefits			
Net Incremental Social Benefits	-31.0	-67.7	-97.1

8. Technology Costs and Civil Penalties per Vehicle, by Model Year

Table A-8-1 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Total Fleet for Manufacturer (Total)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	203	255	447	547	688	749	805	789	774	759
Alternative 1	203	255	447	671	1,074	1,205	1,289	1,242	1,231	1,195
Alternative 2	203	255	447	770	1,184	1,542	1,872	1,805	1,778	1,717
Alternative 3	203	255	447	838	1,474	1,954	2,409	2,319	2,281	2,201

Table A-8-2 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Passenger Car Fleet for Manufacturer (Total)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	309	314	462	520	640	711	754	724	699	677
Alternative 1	309	314	462	718	997	1,148	1,215	1,162	1,132	1,092
Alternative 2	309	314	462	876	1,284	1,671	1,937	1,853	1,801	1,724
Alternative 3	309	314	462	968	1,510	2,033	2,405	2,302	2,239	2,145

Table A-8-3 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Light Truck Fleet for Manufacturer (Total)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	121	207	434	571	733	784	855	852	848	841
Alternative 1	121	207	434	630	1,143	1,256	1,357	1,316	1,326	1,295
Alternative 2	121	207	434	676	1,093	1,425	1,812	1,760	1,756	1,711
Alternative 3	121	207	434	722	1,441	1,883	2,413	2,334	2,319	2,254

Table A-8-4 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Total Fleet for Manufacturer (BMW)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	70	582	744	1,018	1,152	1,356	1,550	1,510	1,458	1,415
Alternative 1	70	582	744	1,063	1,293	1,487	1,585	1,543	1,491	1,456
Alternative 2	70	582	744	1,071	1,263	1,690	2,138	2,078	1,998	1,938
Alternative 3	70	582	744	1,111	1,409	2,125	2,644	2,595	2,498	2,419

Table A-8-5 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Total Fleet for Manufacturer (Daimler)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	437	464	743	810	1,017	1,178	1,197	1,161	1,117	1,058
Alternative 1	437	464	743	782	1,536	1,674	1,796	1,635	1,617	1,534
Alternative 2	437	464	743	771	1,379	1,802	2,213	2,056	1,993	1,881
Alternative 3	437	464	743	791	1,548	2,087	2,649	2,460	2,345	2,208

Table A-8-6 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Total Fleet for Manufacturer (FCA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	380	258	865	1,100	1,174	1,148	1,190	1,209	1,257	1,236
Alternative 1	380	258	865	1,048	1,424	1,526	1,625	1,497	1,627	1,595
Alternative 2	380	258	865	1,048	1,280	1,605	1,942	1,806	1,935	1,892
Alternative 3	380	258	865	1,048	1,368	1,801	2,266	2,121	2,246	2,191

Table A-8-7 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Total Fleet for Manufacturer (Ford)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	137	463	729	876	1,000	1,096	1,240	1,193	1,156	1,109
Alternative 1	137	463	729	1,369	1,431	1,478	1,486	1,407	1,342	1,265
Alternative 2	137	463	729	1,545	1,591	1,624	2,087	1,990	1,901	1,798
Alternative 3	137	463	729	1,591	1,962	1,979	2,707	2,601	2,491	2,385

Table A-8-8 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Total Fleet for Manufacturer (GM)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	290	347	408	442	499	620	659	657	637	665
Alternative 1	290	347	408	507	1,294	1,630	1,735	1,701	1,654	1,624
Alternative 2	290	347	408	481	965	1,808	2,365	2,317	2,251	2,200
Alternative 3	290	347	408	520	1,198	2,342	3,035	2,958	2,863	2,770

Table A-8-9 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Total Fleet for Manufacturer (Honda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	0	15	191	261	358	541	695	664	633	602
Alternative 1	0	15	191	261	321	562	708	674	641	610
Alternative 2	0	15	191	435	721	1,090	1,348	1,255	1,210	1,154
Alternative 3	0	15	191	861	1,459	1,810	2,074	1,890	1,853	1,747

Table A-8-10 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Total Fleet for Manufacturer (Hyundai Kia-H)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	562	330	375	440	537	516	545	520	497	485
Alternative 1	562	330	375	440	747	986	1,250	1,224	1,192	1,155
Alternative 2	562	330	375	443	732	1,321	2,125	2,072	2,015	1,958
Alternative 3	562	330	375	446	920	1,741	2,748	2,671	2,590	2,497

Table A-8-11 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Total Fleet for Manufacturer (Hyundai Kia-K)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	269	354	356	347	595	603	579	581	560	539
Alternative 1	269	354	356	346	907	987	996	1,006	1,013	983
Alternative 2	269	354	356	347	1,297	1,494	1,784	1,779	1,763	1,693
Alternative 3	269	354	356	347	1,616	2,192	2,457	2,411	2,375	2,282

Table A-8-12 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Total Fleet for Manufacturer (JLR)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	96	78	398	590	761	783	797	858	836	818
Alternative 1	96	78	398	667	1,259	1,477	1,556	1,573	1,528	1,479
Alternative 2	96	78	398	667	1,102	1,558	1,889	1,899	1,847	1,787
Alternative 3	96	78	398	682	1,224	1,776	2,257	2,258	2,197	2,128

Table A-8-13 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Total Fleet for Manufacturer (Mazda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	342	960	1,024	1,179	1,159	1,220	1,204	1,162	1,130	1,091
Alternative 1	342	960	1,024	1,184	1,312	1,476	1,519	1,470	1,431	1,386
Alternative 2	342	960	1,024	1,185	1,237	1,986	2,132	2,064	2,009	1,982
Alternative 3	342	960	1,024	1,185	1,380	2,305	2,590	2,505	2,434	2,395

Table A-8-14 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Total Fleet for Manufacturer (Mitsubishi)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	209	43	166	403	465	398	384	370	359	347
Alternative 1	209	43	166	403	1,007	937	920	904	890	876
Alternative 2	209	43	166	403	861	1,592	1,559	1,531	1,505	1,481
Alternative 3	209	43	166	403	985	2,065	2,013	1,970	1,925	1,886

Table A-8-15 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Total Fleet for Manufacturer (Nissan)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	97	224	264	270	395	403	396	389	394	388
Alternative 1	97	224	264	517	718	755	783	762	801	784
Alternative 2	97	224	264	1,113	1,883	2,404	2,483	2,402	2,407	2,328
Alternative 3	97	224	264	1,124	2,113	2,726	2,946	2,824	2,853	2,795

Table A-8-16 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Total Fleet for Manufacturer (Subaru)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	28	46	250	520	553	579	574	553	536	520
Alternative 1	28	46	250	786	1,109	1,141	1,114	1,082	1,053	1,028
Alternative 2	28	46	250	786	1,109	1,203	1,254	1,216	1,185	1,156
Alternative 3	28	46	250	786	1,107	1,272	1,365	1,322	1,288	1,257

Table A-8-18 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Total Fleet for Manufacturer (Toyota)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	49	45	210	230	316	321	396	376	374	389
Alternative 1	49	45	210	418	872	861	951	926	933	923
Alternative 2	49	45	210	546	1,021	1,049	1,171	1,151	1,154	1,110
Alternative 3	49	45	210	600	1,487	1,536	1,768	1,759	1,765	1,707

Table A-8-19 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Total Fleet for Manufacturer (Volvo)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	170	313	345	1,562	1,464	1,523	1,572	1,641	1,564	1,486
Alternative 1	170	313	345	1,530	1,564	1,652	2,315	2,373	2,287	2,195
Alternative 2	170	313	345	1,747	1,742	1,948	2,673	2,704	2,591	2,471
Alternative 3	170	313	345	2,219	2,205	2,418	3,141	3,128	2,978	2,816

Table A-8-20 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Total Fleet for Manufacturer (VWA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	405	103	511	557	2,142	2,207	2,185	2,144	2,103	2,022
Alternative 1	405	103	511	557	1,959	2,041	2,116	2,072	2,028	1,970
Alternative 2	405	103	511	557	1,972	2,171	2,348	2,260	2,174	2,108
Alternative 3	405	103	511	557	2,061	2,365	2,807	2,688	2,572	2,497

Table A-8-21 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Passenger Car Fleet for Manufacturer (BMW)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	111	755	806	899	1,075	1,401	1,705	1,657	1,595	1,550
Alternative 1	111	755	806	1,017	1,328	1,637	1,798	1,743	1,677	1,639
Alternative 2	111	755	806	987	1,245	1,906	2,453	2,374	2,277	2,216
Alternative 3	111	755	806	1,035	1,452	2,506	3,035	2,936	2,814	2,735

Table A-8-22 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Passenger Car Fleet for Manufacturer (Daimler)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	620	689	1,197	1,168	1,571	1,585	1,511	1,455	1,396	1,311
Alternative 1	620	689	1,197	1,205	2,280	2,254	2,310	2,159	2,070	1,971
Alternative 2	620	689	1,197	1,185	2,139	2,438	2,826	2,694	2,517	2,368
Alternative 3	620	689	1,197	1,223	2,378	2,807	3,357	3,176	2,902	2,718

Table A-8-23 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Passenger Car Fleet for Manufacturer (FCA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	1,219	1,766	2,405	2,464	2,431	2,333	2,378	2,254	2,232	2,118
Alternative 1	1,219	1,766	2,405	2,588	2,808	2,801	2,712	2,491	2,470	2,345
Alternative 2	1,219	1,766	2,405	2,588	2,766	2,985	3,156	2,918	2,924	2,767
Alternative 3	1,219	1,766	2,405	2,588	2,865	3,206	3,510	3,260	3,277	3,081

Table A-8-24 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Passenger Car Fleet for Manufacturer (Ford)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	516	698	953	1,118	1,050	1,171	1,280	1,229	1,190	1,134
Alternative 1	516	698	953	2,957	2,721	2,782	2,605	2,423	2,257	2,088
Alternative 2	516	698	953	3,534	3,240	3,261	3,153	2,944	2,751	2,540
Alternative 3	516	698	953	3,534	3,251	3,022	3,231	3,046	2,868	2,660

Table A-8-25 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Passenger Car Fleet for Manufacturer (GM)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	523	174	272	400	474	803	780	747	709	677
Alternative 1	523	174	272	590	1,079	1,678	1,743	1,654	1,580	1,506
Alternative 2	523	174	272	512	1,005	1,756	2,185	2,042	1,951	1,875
Alternative 3	523	174	272	627	1,161	2,172	2,682	2,497	2,378	2,267

Table A-8-26 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Passenger Car Fleet for Manufacturer (Honda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	0	14	170	269	284	373	638	607	575	542
Alternative 1	0	14	170	269	284	390	645	609	576	542
Alternative 2	0	14	170	516	620	895	1,344	1,222	1,181	1,119
Alternative 3	0	14	170	1,013	1,175	1,414	1,907	1,665	1,668	1,552

Table A-8-27 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Passenger Car Fleet for Manufacturer (Hyundai Kia-H)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	593	352	375	440	541	514	490	467	447	438
Alternative 1	593	352	375	440	725	977	1,172	1,151	1,123	1,090
Alternative 2	593	352	375	442	725	1,341	2,072	2,023	1,970	1,917
Alternative 3	593	352	375	446	924	1,782	2,689	2,616	2,540	2,449

Table A-8-28 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Passenger Car Fleet for Manufacturer (Hyundai Kia-K)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	223	294	306	297	456	488	467	449	432	413
Alternative 1	223	294	306	295	575	724	764	741	775	751
Alternative 2	223	294	306	297	844	1,181	1,655	1,611	1,618	1,543
Alternative 3	223	294	306	297	955	1,878	2,325	2,259	2,245	2,144

Table A-8-29 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Passenger Car Fleet for Manufacturer (JLR)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	0	56	53	449	1,172	1,114	1,063	1,130	1,086	1,043
Alternative 1	0	56	53	599	1,451	1,582	1,711	1,531	1,470	1,311
Alternative 2	0	56	53	600	1,378	1,812	2,268	2,076	2,002	1,732
Alternative 3	0	56	53	598	1,514	2,093	2,733	2,530	2,446	2,164

Table A-8-30 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Passenger Car Fleet for Manufacturer (Mazda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	709	1,951	2,038	2,075	2,021	2,129	2,049	1,963	1,891	1,810
Alternative 1	709	1,951	2,038	2,084	2,227	2,458	2,471	2,374	2,292	2,201
Alternative 2	709	1,951	2,038	2,085	2,177	2,961	3,035	2,918	2,817	2,771
Alternative 3	709	1,951	2,038	2,085	2,436	3,503	3,569	3,434	3,310	3,248

Table A-8-31 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Passenger Car Fleet for Manufacturer (Mitsubishi)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	404	92	227	580	632	525	500	475	456	434
Alternative 1	404	92	227	580	1,167	931	906	881	861	839
Alternative 2	404	92	227	580	1,080	1,508	1,468	1,432	1,400	1,368
Alternative 3	404	92	227	580	1,217	2,109	2,044	1,991	1,931	1,879

Table A-8-32 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Passenger Car Fleet for Manufacturer (Nissan)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	128	172	188	195	315	314	311	307	305	302
Alternative 1	128	172	188	449	659	698	679	662	714	694
Alternative 2	128	172	188	1,201	1,857	2,585	2,523	2,448	2,470	2,372
Alternative 3	128	172	188	1,217	2,165	2,982	3,026	2,969	2,968	2,903

Table A-8-33 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Passenger Car Fleet for Manufacturer (Subaru)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	134	144	688	740	656	625	661	635	613	590
Alternative 1	134	144	688	740	1,845	1,861	1,832	1,779	1,725	1,677
Alternative 2	134	144	688	740	1,845	2,117	2,400	2,329	2,256	2,192
Alternative 3	134	144	688	739	1,845	2,409	2,868	2,784	2,694	2,617

Table A-8-35 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Passenger Car Fleet for Manufacturer (Toyota)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	0	21	131	133	175	204	204	189	178	218
Alternative 1	0	21	131	133	388	421	421	428	431	472
Alternative 2	0	21	131	169	625	731	765	785	779	759
Alternative 3	0	21	131	226	951	1,115	1,206	1,259	1,243	1,215

Table A-8-36 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Passenger Car Fleet for Manufacturer (Volvo)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	592	1,194	1,263	1,072	1,085	1,234	1,654	1,676	1,625	1,580
Alternative 1	592	1,194	1,263	1,072	1,545	1,785	4,350	4,259	4,144	4,026
Alternative 2	592	1,194	1,263	1,071	1,476	2,012	4,883	4,770	4,608	4,446
Alternative 3	592	1,194	1,263	1,071	1,599	2,294	5,313	5,166	4,973	4,776

Table A-8-37 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Passenger Car Fleet for Manufacturer (VWA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	626	39	641	703	2,489	2,465	2,384	2,329	2,307	2,198
Alternative 1	626	39	641	702	1,650	1,693	1,839	1,799	1,798	1,751
Alternative 2	626	39	641	704	2,487	2,547	2,552	2,487	2,383	2,315
Alternative 3	626	39	641	702	2,281	2,437	2,861	2,789	2,651	2,588

Table A-8-38 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Light Truck Fleet for Manufacturer (BMW)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	0	270	625	1,258	1,312	1,261	1,215	1,183	1,146	1,101
Alternative 1	0	270	625	1,155	1,222	1,177	1,135	1,113	1,083	1,047
Alternative 2	0	270	625	1,239	1,298	1,246	1,484	1,462	1,405	1,343
Alternative 3	0	270	625	1,263	1,321	1,353	1,850	1,903	1,844	1,758

Table A-8-39 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Light Truck Fleet for Manufacturer (Daimler)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	274	250	287	436	419	730	842	824	788	753
Alternative 1	274	250	287	338	738	1,045	1,230	1,051	1,100	1,028
Alternative 2	274	250	287	338	563	1,119	1,551	1,365	1,413	1,335
Alternative 3	274	250	287	338	663	1,325	1,896	1,702	1,743	1,652

Table A-8-40 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Light Truck Fleet for Manufacturer (FCA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	246	6	596	854	942	926	962	1,006	1,064	1,059
Alternative 1	246	6	596	770	1,169	1,290	1,421	1,309	1,466	1,449
Alternative 2	246	6	596	770	1,007	1,351	1,718	1,600	1,749	1,726
Alternative 3	246	6	596	770	1,094	1,546	2,039	1,914	2,056	2,026

Table A-8-41 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Light Truck Fleet for Manufacturer (Ford)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	0	374	641	777	980	1,064	1,224	1,178	1,141	1,097
Alternative 1	0	374	641	725	899	936	1,015	976	946	906
Alternative 2	0	374	641	739	912	948	1,645	1,593	1,542	1,481
Alternative 3	0	374	641	804	1,433	1,553	2,492	2,420	2,335	2,270

Table A-8-42 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Light Truck Fleet for Manufacturer (GM)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	178	434	478	464	513	520	593	607	597	659
Alternative 1	178	434	478	464	1,410	1,604	1,730	1,727	1,696	1,690
Alternative 2	178	434	478	464	943	1,836	2,462	2,466	2,415	2,379
Alternative 3	178	434	478	464	1,217	2,432	3,223	3,203	3,124	3,042

Table A-8-43 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Light Truck Fleet for Manufacturer (Honda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	0	17	222	249	481	827	795	765	738	712
Alternative 1	0	17	222	249	382	848	815	785	756	729
Alternative 2	0	17	222	306	887	1,413	1,356	1,310	1,259	1,213
Alternative 3	0	17	222	618	1,923	2,454	2,347	2,255	2,159	2,074

Table A-8-44 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Light Truck Fleet for Manufacturer (Hyundai Kia-H)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	301	142	379	446	498	537	1,084	1,038	999	958
Alternative 1	301	142	379	446	959	1,072	1,997	1,927	1,865	1,801
Alternative 2	301	142	379	446	797	1,133	2,624	2,531	2,446	2,360
Alternative 3	301	142	379	446	884	1,352	3,294	3,176	3,064	2,953

Table A-8-45 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Light Truck Fleet for Manufacturer (Hyundai Kia-K)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	342	456	447	443	868	837	809	860	838	815
Alternative 1	342	456	447	443	1,557	1,506	1,463	1,545	1,509	1,473
Alternative 2	342	456	447	443	2,181	2,104	2,040	2,112	2,056	2,000
Alternative 3	342	456	447	443	2,900	2,797	2,712	2,706	2,631	2,557

Table A-8-46 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Light Truck Fleet for Manufacturer (JLR)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	100	79	416	597	738	763	781	841	820	804
Alternative 1	100	79	416	671	1,248	1,471	1,547	1,575	1,532	1,490
Alternative 2	100	79	416	671	1,087	1,544	1,868	1,889	1,838	1,790
Alternative 3	100	79	416	687	1,208	1,758	2,231	2,243	2,182	2,126

Table A-8-47 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Light Truck Fleet for Manufacturer (Mazda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	0	0	0	249	245	242	277	274	272	269
Alternative 1	0	0	0	249	345	431	495	489	483	478
Alternative 2	0	0	0	249	245	956	1,174	1,155	1,138	1,124
Alternative 3	0	0	0	249	270	1,051	1,561	1,533	1,505	1,482

Table A-8-48 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Light Truck Fleet for Manufacturer (Mitsubishi)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	44	0	111	242	312	279	274	270	266	263
Alternative 1	44	0	111	242	860	942	933	925	918	912
Alternative 2	44	0	111	242	661	1,670	1,644	1,622	1,604	1,587
Alternative 3	44	0	111	242	773	2,025	1,984	1,951	1,919	1,892

Table A-8-49 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Light Truck Fleet for Manufacturer (Nissan)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	26	347	451	460	602	638	626	613	642	630
Alternative 1	26	347	451	690	869	905	1,059	1,028	1,037	1,031
Alternative 2	26	347	451	890	1,951	1,937	2,379	2,281	2,239	2,209
Alternative 3	26	347	451	890	1,978	2,073	2,738	2,452	2,555	2,511

Table A-8-50 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Light Truck Fleet for Manufacturer (Subaru)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	0	18	113	448	518	563	543	523	506	492
Alternative 1	0	18	113	801	860	894	862	834	808	786
Alternative 2	0	18	113	801	860	894	862	834	808	786
Alternative 3	0	18	113	801	860	894	862	834	808	786

Table A-8-52 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Light Truck Fleet for Manufacturer (Toyota)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	105	73	312	359	510	485	673	650	668	651
Alternative 1	105	73	312	797	1,534	1,467	1,694	1,633	1,663	1,588
Alternative 2	105	73	312	1,047	1,563	1,482	1,731	1,656	1,682	1,611
Alternative 3	105	73	312	1,100	2,214	2,105	2,530	2,435	2,483	2,392

Table A-8-53 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Light Truck Fleet for Manufacturer (Volvo)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	27	0	3	1,751	1,612	1,638	1,539	1,626	1,538	1,446
Alternative 1	27	0	3	1,706	1,571	1,600	1,502	1,613	1,527	1,436
Alternative 2	27	0	3	2,007	1,846	1,923	1,802	1,890	1,784	1,673
Alternative 3	27	0	3	2,660	2,441	2,465	2,298	2,339	2,193	2,039

Table A-8-54 - Estimated Average Per Vehicle Technology and Civil Penalties Costs (\$), Light Truck Fleet for Manufacturer (VWA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	245	153	401	428	1,824	1,963	1,991	1,959	1,893	1,838
Alternative 1	245	153	401	428	2,242	2,363	2,377	2,334	2,254	2,189
Alternative 2	245	153	401	428	1,501	1,827	2,160	2,049	1,975	1,909
Alternative 3	245	153	401	428	1,862	2,300	2,757	2,597	2,499	2,412

9. Regulatory Costs per Vehicle, by Model Year

Table A-9-1 - Estimated Average Per Vehicle Regulatory Costs (\$), Total Fleet for Manufacturer (Total)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	203	367	611	768	969	1,083	1,169	1,160	1,140	1,120
Alternative 1	203	367	611	892	1,354	1,539	1,653	1,614	1,598	1,557
Alternative 2	203	367	611	991	1,464	1,877	2,236	2,177	2,145	2,080
Alternative 3	203	367	611	1,058	1,754	2,289	2,773	2,692	2,649	2,565

Table A-9-2 - Estimated Average Per Vehicle Regulatory Costs (\$), Passenger Car Fleet for Manufacturer (Total)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	265	369	586	694	873	1,008	1,076	1,058	1,028	1,001
Alternative 1	265	369	586	896	1,242	1,455	1,550	1,507	1,473	1,426
Alternative 2	265	369	586	1,055	1,521	1,968	2,264	2,198	2,157	2,073
Alternative 3	265	369	586	1,147	1,748	2,327	2,733	2,649	2,607	2,506

**Table A-9-3 - Estimated Average Per Vehicle Regulatory Costs (\$), Light Truck Fleet for Manufacturer
(Total)**

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	155	365	633	833	1,056	1,153	1,257	1,260	1,251	1,240
Alternative 1	155	365	633	888	1,456	1,616	1,748	1,715	1,717	1,684
Alternative 2	155	365	633	933	1,413	1,795	2,210	2,159	2,134	2,086
Alternative 3	155	365	633	980	1,760	2,255	2,810	2,730	2,687	2,619

Table A-9-4 - Estimated Average Per Vehicle Regulatory Costs (\$), Total Fleet for Manufacturer (BMW)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	70	611	811	1,130	1,328	1,555	1,747	1,704	1,649	1,604
Alternative 1	70	611	811	1,174	1,469	1,687	1,782	1,736	1,682	1,644
Alternative 2	70	611	811	1,182	1,439	1,889	2,334	2,271	2,188	2,126
Alternative 3	70	611	811	1,223	1,585	2,324	2,840	2,788	2,689	2,607

Table A-9-5 - Estimated Average Per Vehicle Regulatory Costs (\$), Total Fleet for Manufacturer (Daimler)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	437	436	794	952	1,208	1,474	1,576	1,655	1,618	1,583
Alternative 1	437	436	794	924	1,728	1,971	2,176	2,130	2,120	2,062
Alternative 2	437	436	794	913	1,570	2,099	2,594	2,553	2,498	2,412
Alternative 3	437	436	794	932	1,739	2,385	3,030	2,958	2,851	2,741

Table A-9-6 - Estimated Average Per Vehicle Regulatory Costs (\$), Total Fleet for Manufacturer (FCA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	380	475	1,139	1,408	1,484	1,459	1,495	1,510	1,553	1,527
Alternative 1	380	475	1,139	1,356	1,733	1,837	1,931	1,799	1,924	1,887
Alternative 2	380	475	1,139	1,356	1,589	1,916	2,249	2,108	2,232	2,185
Alternative 3	380	475	1,139	1,356	1,678	2,113	2,573	2,423	2,544	2,484

Table A-9-7 - Estimated Average Per Vehicle Regulatory Costs (\$), Total Fleet for Manufacturer (Ford)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	137	501	840	1,065	1,242	1,334	1,475	1,424	1,382	1,331
Alternative 1	137	501	840	1,558	1,673	1,716	1,721	1,638	1,568	1,488
Alternative 2	137	501	840	1,734	1,833	1,863	2,322	2,221	2,128	2,021
Alternative 3	137	501	840	1,781	2,204	2,218	2,942	2,833	2,719	2,609

Table A-9-8 - Estimated Average Per Vehicle Regulatory Costs (\$), Total Fleet for Manufacturer (GM)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	290	546	638	737	855	1,035	1,068	1,060	1,034	1,056
Alternative 1	290	546	638	803	1,651	2,045	2,144	2,104	2,051	2,014
Alternative 2	290	546	638	776	1,321	2,223	2,774	2,720	2,648	2,591
Alternative 3	290	546	638	816	1,554	2,757	3,444	3,361	3,260	3,160

Table A-9-9 - Estimated Average Per Vehicle Regulatory Costs (\$), Total Fleet for Manufacturer (Honda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	0	97	326	450	600	925	1,074	1,038	1,002	965
Alternative 1	0	97	326	450	563	945	1,086	1,046	1,009	972
Alternative 2	0	97	326	624	963	1,473	1,726	1,627	1,576	1,515
Alternative 3	0	97	326	1,050	1,700	2,192	2,451	2,261	2,218	2,107

Table A-9-10 - Estimated Average Per Vehicle Regulatory Costs (\$), Total Fleet for Manufacturer (Hyundai Kia-H)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	562	396	506	622	762	781	849	890	862	846
Alternative 1	562	396	506	622	972	1,251	1,555	1,594	1,557	1,516
Alternative 2	562	396	506	624	957	1,586	2,430	2,442	2,381	2,320
Alternative 3	562	396	506	628	1,145	2,006	3,053	3,041	2,956	2,859

Table A-9-11 - Estimated Average Per Vehicle Regulatory Costs (\$), Total Fleet for Manufacturer (Hyundai Kia-K)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	269	409	444	476	775	833	854	903	877	850
Alternative 1	269	409	444	474	1,087	1,217	1,273	1,328	1,330	1,295
Alternative 2	269	409	444	476	1,477	1,724	2,062	2,102	2,081	2,006
Alternative 3	269	409	444	476	1,797	2,422	2,735	2,735	2,693	2,595

Table A-9-12 - Estimated Average Per Vehicle Regulatory Costs (\$), Total Fleet for Manufacturer (JLR)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	96	84	468	734	982	1,073	1,154	1,218	1,191	1,168
Alternative 1	96	84	468	811	1,479	1,767	1,914	1,934	1,883	1,829
Alternative 2	96	84	468	811	1,322	1,849	2,248	2,260	2,203	2,137
Alternative 3	96	84	468	826	1,444	2,067	2,616	2,620	2,552	2,479

Table A-9-13 - Estimated Average Per Vehicle Regulatory Costs (\$), Total Fleet for Manufacturer (Mazda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	342	1,009	1,170	1,402	1,457	1,588	1,629	1,599	1,565	1,523
Alternative 1	342	1,009	1,170	1,407	1,610	1,844	1,945	1,908	1,867	1,819
Alternative 2	342	1,009	1,170	1,407	1,535	2,354	2,559	2,502	2,445	2,416
Alternative 3	342	1,009	1,170	1,407	1,678	2,674	3,016	2,944	2,871	2,829

Table A-9-14 - Estimated Average Per Vehicle Regulatory Costs (\$), Total Fleet for Manufacturer (Mitsubishi)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	209	119	300	582	685	645	635	617	603	587
Alternative 1	209	119	300	582	1,227	1,184	1,171	1,150	1,133	1,115
Alternative 2	209	119	300	582	1,081	1,839	1,810	1,777	1,748	1,720
Alternative 3	209	119	300	582	1,204	2,312	2,263	2,216	2,167	2,124

Table A-9-15 - Estimated Average Per Vehicle Regulatory Costs (\$), Total Fleet for Manufacturer (Nissan)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	97	291	385	445	621	717	759	751	749	737
Alternative 1	97	291	385	692	943	1,070	1,147	1,125	1,157	1,134
Alternative 2	97	291	385	1,288	2,109	2,719	2,847	2,765	2,764	2,679
Alternative 3	97	291	385	1,299	2,338	3,042	3,310	3,188	3,211	3,147

Table A-9-16 - Estimated Average Per Vehicle Regulatory Costs (\$), Total Fleet for Manufacturer (Subaru)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	28	185	470	802	910	1,024	1,087	1,112	1,084	1,058
Alternative 1	28	185	470	1,068	1,467	1,586	1,628	1,643	1,603	1,568
Alternative 2	28	185	470	1,068	1,466	1,649	1,769	1,779	1,737	1,699
Alternative 3	28	185	470	1,068	1,465	1,719	1,881	1,886	1,842	1,802

Table A-9-17 - Estimated Average Per Vehicle Regulatory Costs (\$), Total Fleet for Manufacturer (Tesla)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	0	35	49	49	48	50	49	48	48	47
Alternative 1	0	35	49	49	48	50	49	48	48	47
Alternative 2	0	35	49	49	48	50	49	49	48	47
Alternative 3	0	35	49	49	48	50	49	49	48	47

Table A-9-18 - Estimated Average Per Vehicle Regulatory Costs (\$), Total Fleet for Manufacturer (Toyota)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	49	131	347	424	646	705	886	863	852	859
Alternative 1	49	131	347	611	1,202	1,246	1,442	1,414	1,413	1,394
Alternative 2	49	131	347	739	1,351	1,434	1,664	1,640	1,635	1,583
Alternative 3	49	131	347	794	1,817	1,922	2,261	2,250	2,247	2,181

Table A-9-19 - Estimated Average Per Vehicle Regulatory Costs (\$), Total Fleet for Manufacturer (Volvo)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	170	369	434	1,718	1,712	1,837	1,956	2,028	1,952	1,867
Alternative 1	170	369	434	1,685	1,812	1,967	2,700	2,762	2,677	2,578
Alternative 2	170	369	434	1,902	1,990	2,263	3,059	3,094	2,982	2,855
Alternative 3	170	369	434	2,374	2,453	2,733	3,528	3,519	3,369	3,201

Table A-9-20 - Estimated Average Per Vehicle Regulatory Costs (\$), Total Fleet for Manufacturer (VWA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	405	406	836	920	2,539	2,636	2,644	2,596	2,547	2,459
Alternative 1	405	406	836	920	2,355	2,470	2,576	2,525	2,473	2,408
Alternative 2	405	406	836	921	2,368	2,601	2,809	2,714	2,620	2,547
Alternative 3	405	406	836	920	2,458	2,795	3,268	3,143	3,019	2,937

Table A-9-21 - Estimated Average Per Vehicle Regulatory Costs (\$), Passenger Car Fleet for Manufacturer (BMW)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	92	708	868	1,044	1,297	1,620	1,921	1,870	1,805	1,756
Alternative 1	92	708	868	1,163	1,550	1,856	2,014	1,956	1,886	1,846
Alternative 2	92	708	868	1,133	1,468	2,125	2,769	2,587	2,487	2,422
Alternative 3	92	708	868	1,181	1,674	2,756	3,463	3,148	3,024	2,941

Table A-9-22 - Estimated Average Per Vehicle Regulatory Costs (\$), Passenger Car Fleet for Manufacturer (Daimler)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	665	777	1,190	1,164	1,716	1,816	1,826	1,850	1,785	1,693
Alternative 1	665	777	1,190	1,206	2,644	2,681	2,739	2,626	2,579	2,454
Alternative 2	665	777	1,190	1,180	2,422	2,789	3,204	3,259	3,190	3,011
Alternative 3	665	777	1,190	1,225	2,714	3,196	3,749	3,773	3,715	3,496

Table A-9-23 - Estimated Average Per Vehicle Regulatory Costs (\$), Passenger Car Fleet for Manufacturer (FCA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	941	1,775	2,473	2,513	2,578	2,479	2,558	2,432	2,408	2,291
Alternative 1	941	1,775	2,473	2,697	3,186	3,238	3,282	2,911	2,901	2,738
Alternative 2	941	1,775	2,473	2,697	3,031	3,404	3,740	3,345	3,649	3,448
Alternative 3	941	1,775	2,473	2,697	3,153	3,669	4,120	3,728	4,235	4,018

Table A-9-24 - Estimated Average Per Vehicle Regulatory Costs (\$), Passenger Car Fleet for Manufacturer (Ford)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	284	447	1,034	1,282	1,212	1,331	1,437	1,383	1,342	1,284
Alternative 1	284	447	1,034	3,121	2,883	2,941	2,762	2,578	2,409	2,238
Alternative 2	284	447	1,034	3,699	3,402	3,421	3,310	3,099	2,903	2,690
Alternative 3	284	447	1,034	3,698	3,413	3,182	3,388	3,201	3,021	2,810

Table A-9-25 - Estimated Average Per Vehicle Regulatory Costs (\$), Passenger Car Fleet for Manufacturer (GM)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	413	396	565	713	845	1,207	1,178	1,139	1,095	1,057
Alternative 1	413	396	565	926	1,403	2,026	2,110	2,046	1,966	1,886
Alternative 2	413	396	565	848	1,339	2,065	2,474	2,434	2,337	2,255
Alternative 3	413	396	565	963	1,478	2,432	2,903	2,889	2,764	2,648

Table A-9-26 - Estimated Average Per Vehicle Regulatory Costs (\$), Passenger Car Fleet for Manufacturer (Honda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	0	117	300	438	492	810	1,068	1,031	993	954
Alternative 1	0	117	300	438	492	828	1,076	1,033	994	954
Alternative 2	0	117	300	685	829	1,332	1,757	1,647	1,599	1,531
Alternative 3	0	117	300	1,182	1,383	1,848	2,291	2,090	2,086	1,964

Table A-9-27 - Estimated Average Per Vehicle Regulatory Costs (\$), Passenger Car Fleet for Manufacturer (Hyundai Kia-H)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	592	409	536	620	766	778	774	823	797	783
Alternative 1	592	409	536	620	991	1,289	1,457	1,507	1,473	1,435
Alternative 2	592	409	536	623	978	1,661	2,357	2,379	2,320	2,262
Alternative 3	592	409	536	627	1,184	2,123	2,974	2,972	2,890	2,793

Table A-9-28 - Estimated Average Per Vehicle Regulatory Costs (\$), Passenger Car Fleet for Manufacturer (Hyundai Kia-K)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	291	345	379	411	609	677	692	745	724	701
Alternative 1	291	345	379	408	728	914	989	1,038	1,067	1,039
Alternative 2	291	345	379	411	997	1,371	1,880	1,907	1,910	1,831
Alternative 3	291	345	379	411	1,108	2,067	2,550	2,555	2,537	2,432

Table A-9-29 - Estimated Average Per Vehicle Regulatory Costs (\$), Passenger Car Fleet for Manufacturer (JLR)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	141	16	63	458	1,259	1,200	1,148	1,364	1,317	1,270
Alternative 1	141	16	63	608	1,688	1,672	1,721	1,794	1,728	1,609
Alternative 2	141	16	63	609	1,532	1,837	2,256	2,302	2,224	2,144
Alternative 3	141	16	63	607	1,657	2,129	2,719	2,755	2,667	2,569

Table A-9-30 - Estimated Average Per Vehicle Regulatory Costs (\$), Passenger Car Fleet for Manufacturer (Mazda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	573	1,981	2,160	2,278	2,283	2,453	2,415	2,340	2,262	2,175
Alternative 1	573	1,981	2,160	2,288	2,528	2,782	2,837	2,752	2,663	2,565
Alternative 2	573	1,981	2,160	2,288	2,427	3,285	3,401	3,296	3,187	3,136
Alternative 3	573	1,981	2,160	2,288	2,693	3,827	3,936	3,811	3,681	3,613

Table A-9-31 - Estimated Average Per Vehicle Regulatory Costs (\$), Passenger Car Fleet for Manufacturer (Mitsubishi)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	348	183	443	822	932	832	817	787	762	735
Alternative 1	348	183	443	822	1,430	1,238	1,223	1,193	1,168	1,141
Alternative 2	348	183	443	822	1,342	1,815	1,785	1,744	1,707	1,670
Alternative 3	348	183	443	822	1,461	2,416	2,362	2,303	2,238	2,180

Table A-9-32 - Estimated Average Per Vehicle Regulatory Costs (\$), Passenger Car Fleet for Manufacturer (Nissan)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	99	213	283	343	513	599	630	621	614	606
Alternative 1	99	213	283	597	857	983	998	976	1,023	998
Alternative 2	99	213	283	1,349	2,054	2,871	2,856	2,762	2,779	2,677
Alternative 3	99	213	283	1,365	2,363	3,298	3,429	3,283	3,277	3,207

Table A-9-33 - Estimated Average Per Vehicle Regulatory Costs (\$), Passenger Car Fleet for Manufacturer (Subaru)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	88	207	798	909	866	932	1,009	978	950	921
Alternative 1	88	207	798	909	2,055	2,127	2,180	2,121	2,062	2,008
Alternative 2	88	207	798	909	2,055	2,265	2,748	2,671	2,592	2,523
Alternative 3	88	207	798	909	2,055	2,412	3,216	3,126	3,030	2,948

Table A-9-34 - Estimated Average Per Vehicle Regulatory Costs (\$), Passenger Car Fleet for Manufacturer (Tesla)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	0	34	49	48	47	49	49	48	47	46
Alternative 1	0	34	49	48	47	49	49	48	47	46
Alternative 2	0	34	49	48	47	49	49	48	47	46
Alternative 3	0	34	49	48	47	49	49	48	47	46

Table A-9-35 - Estimated Average Per Vehicle Regulatory Costs (\$), Passenger Car Fleet for Manufacturer (Toyota)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	34	70	230	328	484	548	619	598	580	614
Alternative 1	34	70	230	328	698	765	836	836	833	868
Alternative 2	34	70	230	364	934	1,075	1,179	1,194	1,181	1,155
Alternative 3	34	70	230	420	1,260	1,459	1,620	1,667	1,645	1,610

Table A-9-36 - Estimated Average Per Vehicle Regulatory Costs (\$), Passenger Car Fleet for Manufacturer (Volvo)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	327	862	910	1,102	1,200	1,402	1,864	1,919	1,865	1,815
Alternative 1	327	862	910	1,103	1,366	1,614	4,295	4,467	4,348	4,228
Alternative 2	327	862	910	1,102	1,397	1,743	4,523	5,016	4,850	4,684
Alternative 3	327	862	910	1,102	1,445	1,873	4,683	5,412	5,214	5,014

Table A-9-37 - Estimated Average Per Vehicle Regulatory Costs (\$), Passenger Car Fleet for Manufacturer (VWA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	501	269	776	942	2,795	2,806	2,773	2,712	2,689	2,574
Alternative 1	501	269	776	930	1,915	1,984	2,233	2,186	2,180	2,126
Alternative 2	501	269	776	943	2,761	2,829	3,006	2,788	2,765	2,690
Alternative 3	501	269	776	930	2,545	2,699	3,343	3,095	3,017	2,947

Table A-9-38 - Estimated Average Per Vehicle Regulatory Costs (\$), Light Truck Fleet for Manufacturer (BMW)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	33	438	703	1,301	1,394	1,419	1,370	1,336	1,296	1,250
Alternative 1	33	438	703	1,197	1,303	1,334	1,291	1,266	1,234	1,196
Alternative 2	33	438	703	1,282	1,379	1,404	1,431	1,615	1,556	1,491
Alternative 3	33	438	703	1,306	1,402	1,448	1,574	2,057	1,995	1,907

Table A-9-39 - Estimated Average Per Vehicle Regulatory Costs (\$), Light Truck Fleet for Manufacturer (Daimler)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	233	115	396	731	659	1,097	1,294	1,430	1,422	1,450
Alternative 1	233	115	396	629	742	1,202	1,556	1,577	1,597	1,609
Alternative 2	233	115	396	634	657	1,358	1,935	1,787	1,733	1,740
Alternative 3	233	115	396	626	700	1,526	2,266	2,095	1,918	1,916

Table A-9-40 - Estimated Average Per Vehicle Regulatory Costs (\$), Light Truck Fleet for Manufacturer (FCA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	291	258	905	1,209	1,282	1,268	1,292	1,331	1,384	1,374
Alternative 1	291	258	905	1,114	1,466	1,578	1,678	1,588	1,736	1,721
Alternative 2	291	258	905	1,114	1,325	1,643	1,973	1,879	1,966	1,945
Alternative 3	291	258	905	1,114	1,408	1,830	2,291	2,186	2,231	2,198

Table A-9-41 - Estimated Average Per Vehicle Regulatory Costs (\$), Light Truck Fleet for Manufacturer (Ford)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	83	521	763	977	1,255	1,335	1,491	1,441	1,400	1,352
Alternative 1	83	521	763	925	1,174	1,207	1,282	1,239	1,205	1,161
Alternative 2	83	521	763	938	1,187	1,219	1,912	1,856	1,801	1,736
Alternative 3	83	521	763	1,004	1,708	1,824	2,759	2,683	2,594	2,525

Table A-9-42 - Estimated Average Per Vehicle Regulatory Costs (\$), Light Truck Fleet for Manufacturer (GM)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	231	621	676	750	861	942	1,008	1,015	999	1,055
Alternative 1	231	621	676	738	1,783	2,056	2,162	2,136	2,098	2,086
Alternative 2	231	621	676	738	1,311	2,309	2,935	2,874	2,818	2,776
Alternative 3	231	621	676	738	1,595	2,930	3,733	3,612	3,527	3,438

Table A-9-43 - Estimated Average Per Vehicle Regulatory Costs (\$), Light Truck Fleet for Manufacturer (Honda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	0	69	366	470	777	1,119	1,083	1,049	1,018	987
Alternative 1	0	69	366	470	679	1,141	1,103	1,069	1,035	1,004
Alternative 2	0	69	366	527	1,183	1,705	1,674	1,593	1,538	1,488
Alternative 3	0	69	366	838	2,219	2,751	2,711	2,538	2,438	2,349

Table A-9-44 - Estimated Average Per Vehicle Regulatory Costs (\$), Light Truck Fleet for Manufacturer (Hyundai Kia-H)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	312	290	231	638	722	803	1,577	1,543	1,514	1,483
Alternative 1	312	290	231	638	793	895	2,490	2,432	2,380	2,326
Alternative 2	312	290	231	638	764	883	3,117	3,036	2,961	2,885
Alternative 3	312	290	231	638	781	913	3,788	3,681	3,579	3,478

Table A-9-45 - Estimated Average Per Vehicle Regulatory Costs (\$), Light Truck Fleet for Manufacturer (Hyundai Kia-K)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	233	519	562	599	1,102	1,146	1,190	1,235	1,208	1,179
Alternative 1	233	519	562	599	1,792	1,816	1,844	1,921	1,879	1,837
Alternative 2	233	519	562	599	2,416	2,414	2,421	2,487	2,425	2,364
Alternative 3	233	519	562	599	3,135	3,107	3,093	3,081	3,000	2,921

Table A-9-46 - Estimated Average Per Vehicle Regulatory Costs (\$), Light Truck Fleet for Manufacturer (JLR)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	94	87	489	749	966	1,066	1,155	1,209	1,183	1,161
Alternative 1	94	87	489	822	1,468	1,773	1,925	1,942	1,893	1,843
Alternative 2	94	87	489	822	1,311	1,850	2,247	2,258	2,201	2,137
Alternative 3	94	87	489	838	1,432	2,063	2,610	2,612	2,546	2,473

Table A-9-47 - Estimated Average Per Vehicle Regulatory Costs (\$), Light Truck Fleet for Manufacturer (Mazda)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	127	67	171	492	580	656	767	778	778	779
Alternative 1	127	67	171	492	640	845	985	992	990	988
Alternative 2	127	67	171	492	594	1,370	1,664	1,659	1,645	1,633
Alternative 3	127	67	171	492	610	1,466	2,052	2,037	2,012	1,991

Table A-9-48 - Estimated Average Per Vehicle Regulatory Costs (\$), Light Truck Fleet for Manufacturer (Mitsubishi)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	91	63	172	363	457	471	463	456	449	442
Alternative 1	91	63	172	363	1,040	1,134	1,122	1,111	1,101	1,091
Alternative 2	91	63	172	363	841	1,862	1,832	1,808	1,786	1,767
Alternative 3	91	63	172	363	969	2,217	2,173	2,137	2,101	2,072

Table A-9-49 - Estimated Average Per Vehicle Regulatory Costs (\$), Light Truck Fleet for Manufacturer (Nissan)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	92	472	634	703	900	1,029	1,106	1,105	1,126	1,106
Alternative 1	92	472	634	933	1,167	1,296	1,539	1,520	1,521	1,507
Alternative 2	92	472	634	1,133	2,249	2,327	2,824	2,773	2,722	2,685
Alternative 3	92	472	634	1,133	2,276	2,386	3,005	2,943	3,038	2,987

Table A-9-50 - Estimated Average Per Vehicle Regulatory Costs (\$), Light Truck Fleet for Manufacturer (Subaru)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	12	178	369	768	925	1,056	1,115	1,161	1,135	1,111
Alternative 1	12	178	369	1,121	1,267	1,401	1,434	1,473	1,436	1,405
Alternative 2	12	178	369	1,121	1,267	1,441	1,434	1,473	1,436	1,405
Alternative 3	12	178	369	1,121	1,267	1,488	1,434	1,473	1,436	1,405

Table A-9-51 - Estimated Average Per Vehicle Regulatory Costs (\$), Light Truck Fleet for Manufacturer (Tesla)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	0	63	67	82	81	79	78	77	75	74
Alternative 1	0	63	67	82	81	79	78	77	75	74
Alternative 2	0	63	67	82	81	79	78	77	75	74
Alternative 3	0	63	67	82	81	79	78	77	75	74

Table A-9-52 - Estimated Average Per Vehicle Regulatory Costs (\$), Light Truck Fleet for Manufacturer (Toyota)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	67	205	495	551	868	927	1,272	1,251	1,260	1,233
Alternative 1	67	205	495	989	1,892	1,910	2,293	2,235	2,255	2,170
Alternative 2	67	205	495	1,239	1,921	1,925	2,331	2,257	2,274	2,194
Alternative 3	67	205	495	1,292	2,573	2,547	3,129	3,036	3,075	2,974

Table A-9-53 - Estimated Average Per Vehicle Regulatory Costs (\$), Light Truck Fleet for Manufacturer (Volvo)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	117	194	256	1,954	1,913	2,011	1,994	2,074	1,989	1,890
Alternative 1	117	194	256	1,909	1,987	2,106	2,063	2,074	1,992	1,894
Alternative 2	117	194	256	2,210	2,222	2,467	2,482	2,336	2,234	2,115
Alternative 3	117	194	256	2,863	2,846	3,066	3,078	2,785	2,643	2,482

Table A-9-54 - Estimated Average Per Vehicle Regulatory Costs (\$), Light Truck Fleet for Manufacturer (VWA)

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Alternative 0 (Baseline)	336	512	887	901	2,302	2,474	2,519	2,479	2,401	2,338
Alternative 1	336	512	887	911	2,758	2,920	2,900	2,850	2,762	2,689
Alternative 2	336	512	887	901	2,010	2,392	2,628	2,645	2,483	2,409
Alternative 3	336	512	887	911	2,379	2,882	3,201	3,186	3,022	2,927

10. Incremental Societal Impacts

Table A-10-1 - Incremental Total Societal Costs (\$b) by Year and Alternative for Total Fleet, Discounted at 3%

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	16.2	1.3	1.6	3.0	5.5	6.7	7.4	8.1	8.4	8.3	66.5
Alternative 2	35.0	2.9	3.5	5.6	8.9	10.7	12.2	13.7	14.4	14.1	121.1
Alternative 3	53.7	4.4	5.3	8.3	13.4	15.3	17.0	19.1	20.1	19.7	176.3

**Table A-10-2 - Incremental Total Societal Costs (\$b) by Year and Alternative for Passenger Car Fleet,
Discounted at 3%**

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	7.9	0.6	0.7	2.2	2.1	1.1	0.4	0.4	0.3	-0.1	15.5
Alternative 2	16.9	1.3	1.5	3.9	5.2	3.8	2.1	1.2	1.4	0.6	38.0
Alternative 3	25.9	1.9	2.4	5.4	6.3	4.0	2.0	1.1	1.5	0.7	51.0

**Table A-10-3 - Incremental Total Societal Costs (\$b) by Year and Alternative for Light Truck Fleet,
Discounted at 3%**

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	8.4	0.7	0.9	0.8	3.4	5.6	7.0	7.7	8.1	8.4	51.0
Alternative 2	18.1	1.6	1.9	1.7	3.7	6.9	10.2	12.5	13.0	13.4	83.1
Alternative 3	27.8	2.5	3.0	2.9	7.1	11.3	15.0	18.0	18.6	19.1	125.2

Table A-10-4 - Incremental Total Societal Costs (\$b) by Year and Alternative for Total Fleet, Discounted at 7%

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	11.6	0.9	1.0	2.5	4.7	5.5	5.7	5.9	5.9	5.5	49.3
Alternative 2	24.6	1.9	2.2	4.6	7.4	9.0	10.1	10.6	10.6	9.8	90.7
Alternative 3	37.6	2.9	3.4	6.6	11.2	13.0	14.3	14.9	14.9	14.0	132.8

**Table A-10-5 - Incremental Total Societal Costs (\$b) by Year and Alternative for Passenger Car Fleet,
Discounted at 7%**

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	5.7	0.4	0.5	1.9	1.9	1.3	0.8	0.7	0.6	0.3	14.1
Alternative 2	12.1	0.8	1.0	3.3	4.4	3.7	2.6	2.0	2.0	1.4	33.3
Alternative 3	18.6	1.3	1.6	4.5	5.4	4.2	3.0	2.3	2.4	1.8	45.0

**Table A-10-6 - Incremental Total Societal Costs (\$b) by Year and Alternative for Light Truck Fleet,
Discounted at 7%**

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	5.8	0.5	0.6	0.6	2.9	4.2	5.0	5.2	5.3	5.2	35.2
Alternative 2	12.4	1.1	1.2	1.3	3.0	5.3	7.5	8.6	8.6	8.5	57.4
Alternative 3	19.0	1.6	1.9	2.1	5.8	8.8	11.3	12.6	12.5	12.2	87.8

Table A-10-7 - Incremental Total Societal Benefits (\$b) by Year and Alternative for Total Fleet, Discounted at 3%

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	-9.5	-0.8	-1.0	2.7	12.6	15.4	16.0	15.7	16.2	15.2	82.6
Alternative 2	-20.5	-1.8	-2.1	3.5	13.6	21.2	27.5	27.1	27.4	25.5	121.4
Alternative 3	-31.5	-2.8	-3.3	4.4	21.1	30.8	39.6	38.8	39.0	36.6	172.9

**Table A-10-8 - Incremental Total Societal Benefits (\$b) by Year and Alternative for Passenger Car Fleet,
Discounted at 3%**

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	-4.3	-0.3	-0.3	2.0	5.5	8.0	8.6	8.6	8.8	8.6	45.1
Alternative 2	-9.2	-0.6	-0.7	2.6	8.2	13.3	16.4	16.9	17.3	16.4	80.5
Alternative 3	-14.1	-1.0	-1.1	3.3	11.6	18.3	22.5	23.3	23.7	22.8	109.5

**Table A-10-9 - Incremental Total Societal Benefits (\$b) by Year and Alternative for Light Truck Fleet,
Discounted at 3%**

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	-5.2	-0.6	-0.6	0.7	7.1	7.4	7.4	7.2	7.4	6.7	37.5
Alternative 2	-11.3	-1.2	-1.4	1.0	5.4	7.9	11.2	10.2	10.2	9.1	40.9
Alternative 3	-17.4	-1.9	-2.1	1.1	9.5	12.5	17.1	15.5	15.3	13.8	63.4

**Table A-10-10 - Incremental Total Societal Benefits (\$b) by Year and Alternative for Total Fleet,
Discounted at 7%**

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	-6.5	-0.6	-0.6	1.9	8.5	10.1	10.2	9.8	9.8	8.9	51.6
Alternative 2	-13.9	-1.2	-1.4	2.6	9.3	14.0	17.7	16.9	16.6	15.1	75.6
Alternative 3	-21.3	-1.8	-2.1	3.2	14.4	20.4	25.4	24.2	23.7	21.6	107.6

Table A-10-11 - Incremental Total Societal Benefits (\$b) by Year and Alternative for Passenger Car Fleet, Discounted at 7%

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	-3.0	-0.2	-0.2	1.4	3.7	5.3	5.5	5.4	5.4	5.1	28.4
Alternative 2	-6.3	-0.4	-0.5	1.8	5.6	8.8	10.5	10.6	10.5	9.7	50.4
Alternative 3	-9.7	-0.6	-0.8	2.4	8.0	12.2	14.5	14.6	14.5	13.6	68.5

Table A-10-12 - Incremental Total Societal Benefits (\$b) by Year and Alternative for Light Truck Fleet, Discounted at 7%

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	-3.5	-0.4	-0.4	0.5	4.8	4.8	4.7	4.4	4.4	3.9	23.2
Alternative 2	-7.6	-0.8	-0.9	0.7	3.7	5.2	7.1	6.3	6.1	5.3	25.2
Alternative 3	-11.6	-1.2	-1.4	0.8	6.4	8.2	10.9	9.6	9.2	8.1	39.1

**Table A-10-13 - Incremental Total Societal Net Benefits (\$b) by Year and Alternative for Total Fleet,
Discounted at 3%**

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	-25.7	-2.2	-2.5	-0.2	7.1	8.6	8.6	7.7	7.8	7.0	16.1
Alternative 2	-55.6	-4.7	-5.6	-2.1	4.7	10.5	15.3	13.4	13.0	11.4	0.3
Alternative 3	-85.2	-7.3	-8.6	-3.9	7.7	15.5	22.7	19.7	18.9	16.9	-3.4

Table A-10-14 - Incremental Total Societal Net Benefits (\$b) by Year and Alternative for Passenger Car Fleet, Discounted at 3%

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	-12.1	-0.9	-1.0	-0.2	3.4	6.8	8.2	8.2	8.5	8.7	29.6
Alternative 2	-26.2	-1.9	-2.3	-1.3	3.0	9.5	14.3	15.7	15.8	15.8	42.5
Alternative 3	-40.0	-2.9	-3.5	-2.1	5.4	14.3	20.6	22.2	22.3	22.2	58.5

Table A-10-15 - Incremental Total Societal Net Benefits (\$b) by Year and Alternative for Light Truck Fleet, Discounted at 3%

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	-13.6	-1.3	-1.5	-0.1	3.7	1.8	0.4	-0.5	-0.8	-1.7	-13.5
Alternative 2	-29.4	-2.8	-3.3	-0.7	1.7	1.0	1.0	-2.3	-2.9	-4.3	-42.1
Alternative 3	-45.2	-4.4	-5.1	-1.8	2.3	1.2	2.1	-2.5	-3.3	-5.3	-61.9

**Table A-10-16 - Incremental Total Societal Net Benefits (\$b) by Year and Alternative for Total Fleet,
Discounted at 7%**

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	-18.1	-1.4	-1.7	-0.5	3.8	4.6	4.5	3.9	3.9	3.4	2.3
Alternative 2	-38.5	-3.1	-3.6	-2.0	1.9	5.1	7.6	6.3	6.1	5.2	-15.1
Alternative 3	-58.9	-4.7	-5.6	-3.3	3.1	7.4	11.2	9.3	8.8	7.6	-25.2

Table A-10-17 - Incremental Total Societal Net Benefits (\$b) by Year and Alternative for Passenger Car Fleet, Discounted at 7%

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	-8.7	-0.6	-0.7	-0.4	1.8	4.0	4.7	4.6	4.8	4.7	14.3
Alternative 2	-18.5	-1.3	-1.5	-1.5	1.2	5.2	7.9	8.6	8.5	8.4	17.1
Alternative 3	-28.3	-1.9	-2.3	-2.1	2.5	8.0	11.5	12.3	12.0	11.8	23.5

Table A-10-18 - Incremental Total Societal Net Benefits (\$b) by Year and Alternative for Light Truck Fleet, Discounted at 7%

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	-9.4	-0.8	-1.0	-0.1	1.9	0.6	-0.3	-0.8	-0.9	-1.3	-12.0
Alternative 2	-20.0	-1.8	-2.1	-0.5	0.7	-0.1	-0.4	-2.3	-2.5	-3.1	-32.2
Alternative 3	-30.6	-2.8	-3.3	-1.2	0.6	-0.6	-0.4	-3.0	-3.3	-4.1	-48.7

11. Labor Impacts

Table A-11-1 - Estimated Labor Utilization (1000s of Person-Years), Total Fleet for Manufacturer (Total)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	942,950	942,950	942,950	942,950
2021	1,026,017	1,026,017	1,026,017	1,026,017
2022	1,158,854	1,158,854	1,158,854	1,158,854
2023	1,214,635	1,213,692	1,211,764	1,212,504
2024	1,206,772	1,206,201	1,204,685	1,206,445
2025	1,184,899	1,185,392	1,182,324	1,183,286
2026	1,156,206	1,157,314	1,153,583	1,153,317
2027	1,130,705	1,133,137	1,130,673	1,131,366
2028	1,112,697	1,115,773	1,114,287	1,115,476
2029	1,100,689	1,104,129	1,102,917	1,104,222

Table A-11-2 - Estimated Labor Utilization (1000s of Person-Years), Passenger Car Fleet for Manufacturer (Total)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	356,143	356,143	356,143	356,143
2021	399,615	399,615	399,615	399,615
2022	466,615	466,615	466,615	466,615
2023	499,964	501,213	500,774	501,787
2024	504,258	503,871	503,931	502,754
2025	501,443	498,175	495,488	491,786
2026	495,939	490,507	484,659	479,323
2027	488,982	483,127	475,050	469,025
2028	487,213	480,635	473,165	467,339
2029	486,748	479,263	471,337	465,166

Table A-11-3 - Estimated Labor Utilization (1000s of Person-Years), Light Truck Fleet for Manufacturer (Total)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	586,807	586,807	586,807	586,807
2021	626,402	626,402	626,402	626,402
2022	692,240	692,240	692,240	692,240
2023	714,671	712,480	710,990	710,718
2024	702,514	702,330	700,754	703,691
2025	683,456	687,217	686,836	691,500
2026	660,267	666,807	668,924	673,994
2027	641,723	650,010	655,624	662,341
2028	625,484	635,138	641,121	648,138
2029	613,941	624,866	631,580	639,056

Table A-11-4 - Estimated Labor Utilization (1000s of Person-Years), Domestic Car Fleet for Manufacturer (Total)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	230,372	230,372	230,372	230,372
2021	258,870	258,870	258,870	258,870
2022	302,553	302,553	302,553	302,553
2023	324,333	325,988	325,736	327,002
2024	327,086	327,542	327,544	327,394
2025	325,514	323,839	321,745	319,373
2026	322,186	318,672	314,439	310,833
2027	317,549	313,716	308,046	303,913
2028	316,391	312,058	306,914	302,907
2029	315,979	311,022	305,685	301,444

Table A-11-5 - Estimated Labor Utilization (1000s of Person-Years), Imported Car Fleet for Manufacturer (Total)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	125,770	125,770	125,770	125,770
2021	140,745	140,745	140,745	140,745
2022	164,062	164,062	164,062	164,062
2023	175,631	175,224	175,038	174,785
2024	177,172	176,330	176,387	175,359
2025	175,929	174,335	173,742	172,413
2026	173,753	171,835	170,220	168,490
2027	171,433	169,411	167,004	165,113
2028	170,822	168,577	166,251	164,432
2029	170,769	168,240	165,652	163,721

Table A-11-6 - Estimated Labor Utilization (1000s of Person-Years), Total Fleet for Manufacturer (BMW)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	14,023	14,023	14,023	14,023
2021	15,102	15,102	15,102	15,102
2022	16,862	16,862	16,862	16,862
2023	17,610	17,562	17,527	17,506
2024	17,381	17,265	17,232	17,156
2025	16,981	16,891	16,810	16,736
2026	16,473	16,401	16,281	16,173
2027	16,066	16,024	15,995	15,980
2028	15,745	15,718	15,697	15,693
2029	15,524	15,520	15,510	15,515

Table A-11-7 - Estimated Labor Utilization (1000s of Person-Years), Total Fleet for Manufacturer (Daimler)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	18,404	18,404	18,404	18,404
2021	19,929	19,929	19,929	19,929
2022	22,487	22,487	22,487	22,487
2023	23,629	23,567	23,512	23,478
2024	23,444	23,259	23,200	23,053
2025	23,242	23,046	22,867	22,657
2026	22,752	22,630	22,333	22,067
2027	22,317	22,216	21,942	21,698
2028	21,979	21,880	21,678	21,495
2029	21,768	21,678	21,484	21,313

Table A-11-8 - Estimated Labor Utilization (1000s of Person-Years), Total Fleet for Manufacturer (FCA)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	117,262	117,262	117,262	117,262
2021	126,270	126,270	126,270	126,270
2022	141,274	141,274	141,274	141,274
2023	146,614	146,144	145,809	145,592
2024	143,946	142,830	142,612	141,978
2025	139,715	139,195	138,611	138,036
2026	134,973	135,038	134,188	133,437
2027	131,351	132,075	131,902	131,519
2028	128,364	129,704	130,002	129,969
2029	126,037	127,770	128,228	128,352

Table A-11-9 - Estimated Labor Utilization (1000s of Person-Years), Total Fleet for Manufacturer (Ford)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	159,873	159,873	159,873	159,873
2021	171,651	171,651	171,651	171,651
2022	192,189	192,189	192,189	192,189
2023	199,411	200,573	200,347	200,214
2024	196,523	196,645	196,509	196,927
2025	191,609	192,110	191,333	191,596
2026	185,752	186,249	186,798	187,595
2027	180,703	181,471	182,683	183,837
2028	176,564	177,469	178,764	179,972
2029	173,604	174,739	176,159	177,530

Table A-11-10 - Estimated Labor Utilization (1000s of Person-Years), Total Fleet for Manufacturer (GM)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	200,151	200,151	200,151	200,151
2021	216,684	216,684	216,684	216,684
2022	241,119	241,119	241,119	241,119
2023	250,806	250,664	249,858	249,785
2024	247,872	250,667	248,321	248,262
2025	242,798	247,039	246,562	247,810
2026	235,550	240,387	241,236	242,490
2027	229,750	234,759	236,314	237,946
2028	225,102	230,091	231,727	233,353
2029	222,136	227,085	228,848	230,457

Table A-11-11 - Estimated Labor Utilization (1000s of Person-Years), Total Fleet for Manufacturer (Honda)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	116,010	116,010	116,010	116,010
2021	126,871	126,871	126,871	126,871
2022	144,687	144,687	144,687	144,687
2023	152,810	152,410	152,883	154,707
2024	152,663	151,196	152,678	155,112
2025	151,379	149,784	150,627	152,242
2026	148,725	146,880	147,072	147,947
2027	145,717	143,976	143,975	144,693
2028	143,861	142,101	142,099	142,767
2029	142,665	140,920	140,866	141,382

Table A-11-12 - Estimated Labor Utilization (1000s of Person-Years), Total Fleet for Manufacturer (Hyundai Kia-H)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	44,182	44,182	44,182	44,182
2021	48,806	48,806	48,806	48,806
2022	56,094	56,094	56,094	56,094
2023	59,505	59,350	59,212	59,126
2024	59,636	59,270	59,072	58,832
2025	58,851	58,629	58,556	58,101
2026	57,809	57,646	57,687	57,220
2027	56,911	56,743	56,596	56,069
2028	56,475	56,248	56,100	55,570
2029	56,261	55,965	55,789	55,229

Table A-11-13 - Estimated Labor Utilization (1000s of Person-Years), Total Fleet for Manufacturer (Hyundai Kia-K)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	30,441	30,441	30,441	30,441
2021	33,317	33,317	33,317	33,317
2022	37,780	37,780	37,780	37,780
2023	39,777	39,672	39,580	39,522
2024	39,834	39,889	40,150	40,255
2025	39,232	39,315	39,530	40,209
2026	38,369	38,378	38,315	38,811
2027	37,659	37,684	37,581	38,009
2028	37,202	37,208	37,110	37,521
2029	36,916	36,914	36,788	37,169

Table A-11-14 - Estimated Labor Utilization (1000s of Person-Years), Total Fleet for Manufacturer (JLR)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	2,498	2,498	2,498	2,498
2021	2,657	2,657	2,657	2,657
2022	2,944	2,944	2,944	2,944
2023	3,043	3,037	3,030	3,027
2024	2,992	2,984	2,980	2,968
2025	2,912	2,926	2,914	2,903
2026	2,814	2,836	2,818	2,803
2027	2,739	2,770	2,766	2,758
2028	2,672	2,706	2,704	2,700
2029	2,625	2,669	2,671	2,670

Table A-11-15 - Estimated Labor Utilization (1000s of Person-Years), Total Fleet for Manufacturer (Mazda)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	3,620	3,620	3,620	3,620
2021	3,906	3,906	3,906	3,906
2022	4,374	4,374	4,374	4,374
2023	4,570	4,558	4,548	4,541
2024	4,520	4,486	4,475	4,448
2025	4,431	4,398	4,369	4,334
2026	4,309	4,280	4,233	4,189
2027	4,213	4,189	4,149	4,110
2028	4,143	4,122	4,085	4,049
2029	4,096	4,079	4,046	4,013

Table A-11-16 - Estimated Labor Utilization (1000s of Person-Years), Total Fleet for Manufacturer (Mitsubishi)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	1,567	1,567	1,567	1,567
2021	1,680	1,680	1,680	1,680
2022	1,868	1,868	1,868	1,868
2023	1,940	1,935	1,931	1,928
2024	1,912	1,898	1,894	1,884
2025	1,866	1,856	1,845	1,833
2026	1,809	1,802	1,784	1,769
2027	1,765	1,761	1,749	1,737
2028	1,731	1,728	1,718	1,707
2029	1,708	1,708	1,699	1,690

Table A-11-17 - Estimated Labor Utilization (1000s of Person-Years), Total Fleet for Manufacturer (Nissan)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	60,047	60,047	60,047	60,047
2021	66,085	66,085	66,085	66,085
2022	75,507	75,507	75,507	75,507
2023	79,795	79,662	79,509	79,400
2024	79,880	79,450	79,831	79,844
2025	78,806	78,103	78,220	77,879
2026	77,262	76,529	76,257	75,639
2027	75,864	75,171	74,793	74,303
2028	75,109	74,444	74,115	73,639
2029	74,658	73,987	73,647	73,181

Table A-11-18 - Estimated Labor Utilization (1000s of Person-Years), Total Fleet for Manufacturer (Subaru)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	42,013	42,013	42,013	42,013
2021	45,601	45,601	45,601	45,601
2022	51,441	51,441	51,441	51,441
2023	54,076	53,987	53,862	53,784
2024	53,628	53,792	53,655	53,315
2025	52,709	52,796	52,384	51,899
2026	51,437	51,504	50,857	50,321
2027	50,372	50,483	49,882	49,391
2028	49,608	49,720	49,160	48,698
2029	49,111	49,244	48,715	48,283

Table A-11-19 - Estimated Labor Utilization (1000s of Person-Years), Total Fleet for Manufacturer (Tesla)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	22,828	22,828	22,828	22,828
2021	25,919	25,919	25,919	25,919
2022	30,621	30,621	30,621	30,621
2023	33,076	32,989	32,913	32,864
2024	33,517	33,147	33,000	32,664
2025	33,377	32,644	32,162	31,541
2026	33,123	32,172	31,323	30,549
2027	32,792	31,811	30,748	29,896
2028	32,866	31,822	30,774	29,921
2029	32,988	31,872	30,799	29,930

Table A-11-20 - Estimated Labor Utilization (1000s of Person-Years), Total Fleet for Manufacturer (Toyota)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	97,099	97,099	97,099	97,099
2021	107,309	107,309	107,309	107,309
2022	123,389	123,389	123,389	123,389
2023	130,811	130,468	130,166	129,975
2024	131,610	132,167	131,855	132,648
2025	129,846	129,734	128,742	128,905
2026	128,200	127,861	126,028	126,176
2027	125,954	125,586	123,529	123,584
2028	124,900	124,563	122,592	122,721
2029	124,332	123,854	121,826	121,919

Table A-11-21 - Estimated Labor Utilization (1000s of Person-Years), Total Fleet for Manufacturer (Volvo)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	2,460	2,460	2,460	2,460
2021	2,719	2,719	2,719	2,719
2022	3,126	3,126	3,126	3,126
2023	3,333	3,324	3,317	3,315
2024	3,337	3,307	3,296	3,272
2025	3,301	3,251	3,216	3,174
2026	3,245	3,188	3,128	3,073
2027	3,197	3,149	3,090	3,039
2028	3,175	3,124	3,067	3,015
2029	3,163	3,110	3,051	3,000

Table A-11-22 - Estimated Labor Utilization (1000s of Person-Years), Total Fleet for Manufacturer (VWA)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	10,472	10,472	10,472	10,472
2021	11,513	11,513	11,513	11,513
2022	13,095	13,095	13,095	13,095
2023	13,829	13,792	13,760	13,740
2024	14,076	13,951	13,924	13,826
2025	13,844	13,676	13,576	13,430
2026	13,603	13,534	13,245	13,059
2027	13,336	13,270	12,980	12,796
2028	13,202	13,125	12,895	12,686
2029	13,096	13,017	12,789	12,592

Table A-11-23 - Changes in Work Loss Days (thousand instances), Total Fleet through MY 2029

Category	Regulatory Alternative		
	1	2	3
Work Loss Days from Upstream Emissions	-26.8	-22.8	-31.5
Work Loss Days from Tailpipe Emissions	2.5	4.6	7.2
Total Work Loss Days	-24.3	-18.2	-24.3

Table A-11-24 - Changes in Work Loss Days (thousand instances), Passenger Car Fleet through MY 2029

Category	Regulatory Alternative		
	1	2	3
Work Loss Days from Upstream Emissions	-15.1	-23.7	-32.3
Work Loss Days from Tailpipe Emissions	-1.3	-2.2	-1.6
Total Work Loss Days	-16.4	-25.9	-33.9

Table A-11-25 - Changes in Work Loss Days (thousand instances), Light Truck Fleet through MY 2029

Category	Regulatory Alternative		
	1	2	3
Work Loss Days from Upstream Emissions	-11.7	0.8	0.8
Work Loss Days from Tailpipe Emissions	3.8	6.8	8.8
Total Work Loss Days	-7.9	7.6	9.6

12. Compliance Impacts

Table A-12-1 - Compliance Impacts and Cumulative Industry Costs by Model Year for Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Fuel Economy											
Average Required (mpg)	35.4	36.0	36.8	37.4	40.7	44.2	48.1	48.1	48.2	48.2	N/A
Change from Baseline (%)	0%	0%	0%	0%	7%	14%	22%	22%	22%	22%	N/A
Average Achieved (mpg)	34.3	35.9	38.2	40.5	43.2	45.1	47.6	48.3	48.9	49.2	N/A
Total Regulatory Costs											
Technology (non-Off-Cycle, non-AC) Costs (\$b)	0.0	2.9	7.0	13.1	19.4	23.9	27.8	27.2	26.6	25.6	0.0
Off-Cycle Technology Costs (\$b)	0.0	1.5	2.4	3.4	4.3	5.0	5.3	5.3	5.2	5.1	37.4
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5
Subtotal Technology Costs (\$b)	0.0	4.5	9.4	16.5	23.8	29.0	33.1	32.6	31.8	30.7	211.4
Total Civil Penalties (\$b)	2.8	0.8	0.4	0.2	0.7	1.6	2.2	1.2	0.9	0.8	11.5
Total Regulatory Costs (\$b)	2.8	5.4	10.1	17.1	24.9	31.0	35.8	34.2	33.2	31.9	226.5
Sales Impacts											
Sales Change from Baseline (m)	0.00	0.00	0.00	-0.09	-0.18	-0.28	-0.37	-0.34	-0.32	-0.30	-1.9

Table A-12-2 - Compliance Impacts and Cumulative Industry Costs by Model Year for Passenger Car Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Fuel Economy											
Average Required (mpg)	43.3	43.9	44.6	45.2	49.2	53.4	58.1	58.1	58.1	58.1	N/A
Change from Baseline (%)	0%	0%	0%	0%	7%	15%	23%	23%	23%	23%	N/A
Average Achieved (mpg)	41.7	43.6	46.6	49.7	53.9	57.1	59.6	60.5	61.3	61.4	N/A
Total Regulatory Costs											
Technology (non-Off-Cycle, non-AC) Costs (\$b)	0.0	1.3	3.2	6.9	10.1	12.6	14.1	13.7	13.5	12.9	0.0
Off-Cycle Technology Costs (\$b)	0.0	0.5	0.8	1.3	1.6	2.1	2.2	2.3	2.2	2.2	15.2
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Subtotal Technology Costs (\$b)	0.0	1.8	4.0	8.2	11.8	14.7	16.4	16.0	15.7	15.1	103.8
Total Civil Penalties (\$b)	1.8	0.8	0.3	0.2	0.3	0.5	0.7	0.2	0.0	0.0	4.9
Total Regulatory Costs (\$b)	1.6	2.4	4.5	8.6	12.3	15.5	17.4	16.5	16.1	15.5	110.4
Sales Impacts											
Sales Change from Baseline (m)	0.00	0.00	0.00	-0.04	-0.11	-0.24	-0.34	-0.37	-0.38	-0.39	-1.9

Table A-12-3 - Compliance Impacts and Cumulative Industry Costs by Model Year for Light Truck Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Fuel Economy											
Average Required (mpg)	31.0	31.5	31.9	32.4	35.1	38.2	41.5	41.5	41.5	41.5	N/A
Change from Baseline (%)	0%	0%	0%	0%	7%	14%	22%	22%	22%	22%	N/A
Average Achieved (mpg)	30.2	31.5	33.1	34.8	36.5	37.9	40.2	40.7	41.1	41.4	N/A
Total Regulatory Costs											
Technology (non-Off-Cycle, non-AC) Costs (\$b)	0.0	1.6	3.8	6.1	9.3	11.3	13.6	13.5	13.1	12.7	0.0
Off-Cycle Technology Costs (\$b)	0.0	1.0	1.6	2.1	2.6	2.9	3.1	3.1	2.9	2.9	22.2
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Subtotal Technology Costs (\$b)	0.0	2.7	5.4	8.3	12.0	14.3	16.7	16.6	16.1	15.6	107.6
Total Civil Penalties (\$b)	0.9	0.1	0.1	0.0	0.4	1.0	1.5	0.9	0.9	0.8	6.7
Total Regulatory Costs (\$b)	1.2	3.0	5.6	8.5	12.6	15.5	18.5	17.7	17.1	16.5	116.1
Sales Impacts											
Sales Change from Baseline (m)	0.00	0.00	0.00	-0.05	-0.07	-0.05	-0.03	0.04	0.06	0.09	0.0

Table A-12-6 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Total Fleet by Alternative for Manufacturer (Total)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	39.5	44.9	48.2	51.4
Percent Change from Baseline	0%	14%	22%	30%
Average Achieved (mpg)	44.2	46.8	49.2	51.7
Total Regulatory Costs				
Technology Application Costs (\$b)	11.9	18.2	25.6	32.1
Off-Cycle Technology Costs (\$b)	10.3	5.1	5.1	5.1
A/C Efficiency Technology Costs (\$b)	0.1	0.1	0.1	0.1
Subtotal Technology Costs (\$b)	22.2	23.4	30.8	37.3
Total Civil Penalties (\$b)	0.0	0.3	0.8	1.3
Total Regulatory Costs (\$b)	17.5	24.2	31.9	39.0
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.12	-0.30	-0.46

Table A-12-7 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Passenger Car Fleet by Alternative for Manufacturer (Total)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	47.3	53.2	58.1	62.0
Percent Change from Baseline	0%	12%	23%	31%
Average Achieved (mpg)	53.4	57.0	61.4	65.5
Total Regulatory Costs				
Technology Application Costs (\$b)	5.3	8.4	12.9	15.6
Off-Cycle Technology Costs (\$b)	4.6	2.3	2.3	2.3
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	9.9	10.7	15.2	18.0
Total Civil Penalties (\$b)	0.0	0.0	0.0	0.0
Total Regulatory Costs (\$b)	7.9	10.9	15.5	18.3
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.19	-0.39	-0.55

Table A-12-8 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Light Truck Fleet by Alternative for Manufacturer (Total)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	33.9	39.0	41.5	44.3
Percent Change from Baseline	0%	15%	22%	31%
Average Achieved (mpg)	37.7	39.8	41.4	43.2
Total Regulatory Costs				
Technology Application Costs (\$b)	6.6	9.9	12.7	16.5
Off-Cycle Technology Costs (\$b)	5.7	2.8	2.8	2.8
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	12.3	12.8	15.6	19.4
Total Civil Penalties (\$b)	0.0	0.3	0.8	1.3
Total Regulatory Costs (\$b)	9.7	13.3	16.5	20.7
Sales Impacts				
Sales Change from Baseline (m)	0.00	0.07	0.09	0.09

Table A-12-9 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Domestic Car Fleet by Alternative for Manufacturer (Total)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	46.4	52.2	57.0	60.9
Percent Change from Baseline	0%	12%	23%	31%
Average Achieved (mpg)	54.2	58.4	62.7	66.5
Total Regulatory Costs				
Technology Application Costs (\$b)	2.2	3.8	5.4	6.5
Off-Cycle Technology Costs (\$b)	2.1	1.0	1.0	1.0
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	4.3	4.8	6.4	7.5
Total Civil Penalties (\$b)	0.0	0.0	0.0	0.0
Total Regulatory Costs (\$b)	3.4	4.9	6.5	7.7
Sales Impacts				
Sales Change from Baseline (m)	0.00	0.00	0.00	0.00

Table A-12-10 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Imported Car Fleet by Alternative for Manufacturer (Total)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	48.1	54.1	59.1	63.1
Percent Change from Baseline	0%	12%	23%	31%
Average Achieved (mpg)	52.6	55.8	60.3	64.7
Total Regulatory Costs				
Technology Application Costs (\$b)	3.1	4.6	7.5	9.1
Off-Cycle Technology Costs (\$b)	2.5	1.3	1.3	1.3
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	5.6	5.9	8.8	10.4
Total Civil Penalties (\$b)	0.0	0.0	0.0	0.0
Total Regulatory Costs (\$b)	4.5	6.0	8.9	10.6
Sales Impacts				
Sales Change from Baseline (m)	0.00	0.00	0.00	0.00

Table A-12-11 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Total Fleet by Alternative for Manufacturer (BMW)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	42.2	47.6	51.5	54.9
Percent Change from Baseline	0%	13%	22%	30%
Average Achieved (mpg)	48.4	48.8	51.8	55.2
Total Regulatory Costs				
Technology Application Costs (\$b)	0.5	0.5	0.7	0.8
Off-Cycle Technology Costs (\$b)	0.1	0.1	0.1	0.1
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	0.7	0.6	0.8	0.9
Total Civil Penalties (\$b)	0.0	0.0	0.0	0.0
Total Regulatory Costs (\$b)	0.6	0.6	0.8	0.9
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.12	-0.30	-0.46

Table A-12-12 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Total Fleet by Alternative for Manufacturer (Daimler)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	39.8	45.1	48.6	51.8
Percent Change from Baseline	0%	13%	22%	30%
Average Achieved (mpg)	42.4	44.1	45.7	46.9
Total Regulatory Costs				
Technology Application Costs (\$b)	0.5	0.6	0.7	0.8
Off-Cycle Technology Costs (\$b)	0.4	0.2	0.2	0.2
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	0.8	0.8	0.9	0.9
Total Civil Penalties (\$b)	0.0	0.0	0.1	0.2
Total Regulatory Costs (\$b)	0.7	0.9	1.0	1.1
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.12	-0.30	-0.46

Table A-12-13 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Total Fleet by Alternative for Manufacturer (FCA)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	34.4	39.5	42.2	45.0
Percent Change from Baseline	0%	15%	23%	31%
Average Achieved (mpg)	36.4	37.8	38.1	38.3
Total Regulatory Costs				
Technology Application Costs (\$b)	2.0	2.3	2.4	2.4
Off-Cycle Technology Costs (\$b)	0.9	0.4	0.4	0.4
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	2.9	2.7	2.8	2.9
Total Civil Penalties (\$b)	0.0	0.3	0.6	1.0
Total Regulatory Costs (\$b)	2.4	3.0	3.5	3.9
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.12	-0.30	-0.46

Table A-12-14 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Total Fleet by Alternative for Manufacturer (Ford)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	35.4	40.3	43.1	46.0
Percent Change from Baseline	0%	14%	22%	30%
Average Achieved (mpg)	41.0	41.1	44.0	47.0
Total Regulatory Costs				
Technology Application Costs (\$b)	2.0	2.3	3.3	4.3
Off-Cycle Technology Costs (\$b)	0.7	0.4	0.4	0.4
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	2.8	2.7	3.6	4.7
Total Civil Penalties (\$b)	0.0	0.0	0.0	0.0
Total Regulatory Costs (\$b)	2.4	2.7	3.7	4.7
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.12	-0.30	-0.46

Table A-12-15 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Total Fleet by Alternative for Manufacturer (GM)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	36.3	41.1	44.1	47.0
Percent Change from Baseline	0%	13%	22%	30%
Average Achieved (mpg)	37.8	42.5	45.0	47.6
Total Regulatory Costs				
Technology Application Costs (\$b)	1.7	4.1	5.5	6.9
Off-Cycle Technology Costs (\$b)	1.9	0.9	0.9	0.9
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	3.6	5.0	6.4	7.8
Total Civil Penalties (\$b)	0.0	0.0	0.0	0.0
Total Regulatory Costs (\$b)	2.6	5.0	6.5	7.8
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.12	-0.30	-0.46

Table A-12-16 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Total Fleet by Alternative for Manufacturer (Honda)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	43.0	48.7	52.6	56.1
Percent Change from Baseline	0%	13%	22%	30%
Average Achieved (mpg)	49.7	49.5	52.6	56.8
Total Regulatory Costs				
Technology Application Costs (\$b)	1.0	1.0	1.8	2.6
Off-Cycle Technology Costs (\$b)	1.1	0.6	0.6	0.6
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	2.1	1.5	2.3	3.2
Total Civil Penalties (\$b)	0.0	0.0	0.0	0.0
Total Regulatory Costs (\$b)	1.5	1.5	2.3	3.2
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.12	-0.30	-0.46

Table A-12-17 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Total Fleet by Alternative for Manufacturer (Hyundai Kia-H)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	46.0	51.7	56.3	60.1
Percent Change from Baseline	0%	12%	22%	31%
Average Achieved (mpg)	47.9	52.5	57.2	61.3
Total Regulatory Costs				
Technology Application Costs (\$b)	0.4	1.0	1.7	2.1
Off-Cycle Technology Costs (\$b)	0.6	0.3	0.3	0.3
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	1.0	1.3	2.0	2.4
Total Civil Penalties (\$b)	0.0	0.0	0.0	0.0
Total Regulatory Costs (\$b)	0.8	1.3	2.0	2.5
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.12	-0.30	-0.46

Table A-12-18 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Total Fleet by Alternative for Manufacturer (Hyundai Kia-K)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	43.7	49.4	53.2	56.8
Percent Change from Baseline	0%	13%	22%	30%
Average Achieved (mpg)	46.7	50.4	54.7	58.0
Total Regulatory Costs				
Technology Application Costs (\$b)	0.4	0.7	1.2	1.6
Off-Cycle Technology Costs (\$b)	0.4	0.2	0.2	0.2
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	0.9	1.0	1.4	1.8
Total Civil Penalties (\$b)	0.0	0.0	0.0	0.0
Total Regulatory Costs (\$b)	0.6	1.0	1.4	1.8
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.12	-0.30	-0.46

Table A-12-19 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Total Fleet by Alternative for Manufacturer (JLR)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	35.9	41.2	44.0	47.0
Percent Change from Baseline	0%	15%	22%	31%
Average Achieved (mpg)	37.0	40.7	40.8	40.9
Total Regulatory Costs				
Technology Application Costs (\$b)	0.1	0.2	0.2	0.2
Off-Cycle Technology Costs (\$b)	0.1	0.1	0.1	0.1
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	0.2	0.3	0.3	0.3
Total Civil Penalties (\$b)	0.0	0.0	0.1	0.1
Total Regulatory Costs (\$b)	0.2	0.3	0.3	0.4
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.12	-0.30	-0.46

Table A-12-20 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Total Fleet by Alternative for Manufacturer (Mazda)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	42.8	48.7	52.4	55.9
Percent Change from Baseline	0%	14%	22%	31%
Average Achieved (mpg)	46.1	49.4	53.9	56.4
Total Regulatory Costs				
Technology Application Costs (\$b)	0.3	0.4	0.6	0.7
Off-Cycle Technology Costs (\$b)	0.2	0.1	0.1	0.1
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	0.5	0.5	0.7	0.8
Total Civil Penalties (\$b)	0.0	0.0	0.0	0.0
Total Regulatory Costs (\$b)	0.4	0.5	0.7	0.8
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.12	-0.30	-0.46

Table A-12-21 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Total Fleet by Alternative for Manufacturer (Mitsubishi)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	45.0	51.2	55.1	58.8
Percent Change from Baseline	0%	14%	23%	31%
Average Achieved (mpg)	46.2	51.8	56.4	58.8
Total Regulatory Costs				
Technology Application Costs (\$b)	0.0	0.1	0.2	0.2
Off-Cycle Technology Costs (\$b)	0.0	0.0	0.0	0.0
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	0.1	0.1	0.2	0.2
Total Civil Penalties (\$b)	0.0	0.0	0.0	0.0
Total Regulatory Costs (\$b)	0.1	0.1	0.2	0.3
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.12	-0.30	-0.46

Table A-12-22 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Total Fleet by Alternative for Manufacturer (Nissan)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	43.5	49.2	53.3	56.8
Percent Change from Baseline	0%	13%	22%	31%
Average Achieved (mpg)	46.1	50.4	55.4	58.6
Total Regulatory Costs				
Technology Application Costs (\$b)	0.5	1.0	2.8	3.3
Off-Cycle Technology Costs (\$b)	0.7	0.3	0.3	0.3
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	1.2	1.3	3.1	3.7
Total Civil Penalties (\$b)	0.0	0.0	0.0	0.0
Total Regulatory Costs (\$b)	0.9	1.4	3.2	3.7
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.12	-0.30	-0.46

Table A-12-23 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Total Fleet by Alternative for Manufacturer (Subaru)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	41.1	47.1	50.3	53.6
Percent Change from Baseline	0%	14%	22%	30%
Average Achieved (mpg)	50.4	52.5	53.6	54.4
Total Regulatory Costs				
Technology Application Costs (\$b)	0.4	0.9	1.0	1.0
Off-Cycle Technology Costs (\$b)	0.8	0.4	0.4	0.4
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	1.2	1.3	1.4	1.4
Total Civil Penalties (\$b)	0.0	0.0	0.0	0.0
Total Regulatory Costs (\$b)	0.9	1.3	1.4	1.5
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.12	-0.30	-0.46

Table A-12-24 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Total Fleet by Alternative for Manufacturer (Tesla)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	43.8	49.2	53.6	57.3
Percent Change from Baseline	0%	12%	22%	31%
Average Achieved (mpg)	759.2	758.2	757.3	756.5
Total Regulatory Costs				
Technology Application Costs (\$b)	0.0	0.0	0.0	0.0
Off-Cycle Technology Costs (\$b)	0.0	0.0	0.0	0.0
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	0.0	0.0	0.0	0.0
Total Civil Penalties (\$b)	0.0	0.0	0.0	0.0
Total Regulatory Costs (\$b)	0.0	0.0	0.0	0.0
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.12	-0.30	-0.46

Table A-12-25 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Total Fleet by Alternative for Manufacturer (Toyota)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	41.6	47.2	50.8	54.2
Percent Change from Baseline	0%	13%	22%	30%
Average Achieved (mpg)	47.0	51.1	52.8	56.5
Total Regulatory Costs				
Technology Application Costs (\$b)	0.8	2.0	2.3	3.5
Off-Cycle Technology Costs (\$b)	1.8	0.9	0.9	0.9
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	2.6	2.8	3.2	4.4
Total Civil Penalties (\$b)	0.0	0.0	0.0	0.0
Total Regulatory Costs (\$b)	1.8	2.9	3.3	4.5
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.12	-0.30	-0.46

Table A-12-26 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Total Fleet by Alternative for Manufacturer (Volvo)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	37.9	43.4	46.3	49.5
Percent Change from Baseline	0%	14%	22%	31%
Average Achieved (mpg)	45.2	46.1	48.2	51.3
Total Regulatory Costs				
Technology Application Costs (\$b)	0.2	0.3	0.3	0.3
Off-Cycle Technology Costs (\$b)	0.1	0.0	0.0	0.0
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	0.2	0.3	0.3	0.4
Total Civil Penalties (\$b)	0.0	0.0	0.0	0.0
Total Regulatory Costs (\$b)	0.2	0.3	0.3	0.4
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.12	-0.30	-0.46

Table A-12-27 - Compliance Impacts and Cumulative Industry Costs for MY 2029 Total Fleet by Alternative for Manufacturer (VWA)

Alternative	0 (Baseline)	1	2	3
Fuel Economy				
Average Required (mpg)	41.7	47.4	50.9	54.3
Percent Change from Baseline	0%	14%	22%	30%
Average Achieved (mpg)	49.7	49.6	51.6	53.5
Total Regulatory Costs				
Technology Application Costs (\$b)	1.0	1.0	1.1	1.2
Off-Cycle Technology Costs (\$b)	0.4	0.2	0.2	0.2
A/C Efficiency Technology Costs (\$b)	0.0	0.0	0.0	0.0
Subtotal Technology Costs (\$b)	1.5	1.2	1.3	1.4
Total Civil Penalties (\$b)	0.0	0.0	0.0	0.0
Total Regulatory Costs (\$b)	1.3	1.2	1.3	1.4
Sales Impacts				
Sales Change from Baseline (m)	0.00	-0.12	-0.30	-0.46

13. Powertrain Technology Penetration Rate, by Model Year

**Table A-13-1 - Powertrain Technology Penetration Rate (%) by Model Year for Manufacturer (Total)
Total Fleet, Alternative 0 (Baseline)**

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Non-Hybrid High Compression Engines	10	13	15	16	21	22	23	23	23	23
Cylinder Deactivation	8	9	9	10	10	10	10	10	10	11
Dynamic Cylinder Deactivation	3	3	3	3	3	2	2	2	2	2
Non-Hybrid Turbocharged Engines	34	34	37	38	38	37	41	42	43	45
Variable Geometry Turbo	2	2	2	2	1	1	1	1	1	1
Electric Variable Geometry Turbo	0	0	0	0	0	0	0	0	0	0
Diesel Engines	0	0	0	0	0	0	0	0	0	0
Compressed Natural Gas	0	0	0	0	0	0	0	0	0	0
12V Stop-Start (non-hybrid)	50	49	48	46	43	42	40	40	39	39
Mild Hybrid Powertrains	1.9	3.0	3.6	4.8	5.9	6.3	7.7	7.7	7.6	7.6
Strong Hybrid Powertrains Total	2.8	3.6	3.6	3.6	5.1	5.0	5.0	5.0	5.2	5.2
Plug-In Hybrid Powertrains	0.5	0.5	0.5	0.4	0.9	1.1	1.4	1.3	1.3	1.1
Battery Electric Vehicles (BEVs)	1.9	2.4	3.2	3.8	4.2	4.7	4.8	5.1	5.2	5.6
BEV 200 Mile Range	0.5	0.9	1.4	1.8	2.1	2.1	2.2	2.4	2.5	2.9
BEV 300 Mile Range	1.1	1.3	1.5	1.8	1.9	2.3	2.4	2.4	2.5	2.5
BEV 400 Mile Range	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
BEV 500 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manual Transmissions	1	1	1	1	1	1	1	1	1	1
5-Speed Automatic	1	1	1	0	0	0	0	0	0	0
6-Speed Automatic	16	13	6	3	1	1	0	0	0	0
7-Speed Automatic	0	0	0	0	0	0	0	0	0	0
8-Speed Automatic	27	26	24	23	20	19	18	18	18	18
9-Speed Automatic	11	11	6	3	2	1	0	0	0	0
10-Speed Automatic	10	14	26	33	37	38	40	41	40	40
DCT Transmissions	2	2	2	2	2	2	2	2	2	2
CVT Transmissions	25	26	26	27	27	27	27	27	27	28

**Table A-13-2 - Powertrain Technology Penetration Rate (%) by Model Year for Manufacturer (Total)
Total Fleet, Alternative 2**

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Non-Hybrid High Compression Engines	10	13	15	17	23	25	25	25	26	26
Cylinder Deactivation	8	9	9	9	9	8	9	9	9	9
Dynamic Cylinder Deactivation	3	3	3	3	3	3	3	3	3	3
Non-Hybrid Turbocharged Engines	34	34	37	37	36	33	36	37	38	39
Variable Geometry Turbo	2	2	2	2	1	1	1	1	1	1
Electric Variable Geometry Turbo	0	0	0	1	1	1	1	1	1	1
Diesel Engines	0	0	0	0	0	0	0	0	0	0
Compressed Natural Gas	0	0	0	0	0	0	0	0	0	0
12V Stop-Start (non-hybrid)	50	49	48	45	40	37	30	30	28	28
Mild Hybrid Powertrains	1.9	3.0	3.6	4.6	6.6	7.4	12.0	12.5	13.8	13.9
Strong Hybrid Powertrains Total	2.8	3.6	3.6	3.6	5.8	7.2	7.3	7.4	7.6	7.6
Plug-In Hybrid Powertrains	0.5	0.5	0.5	0.4	2.0	4.4	7.3	7.3	7.3	7.2
Battery Electric Vehicles (BEVs)	1.9	2.4	3.2	5.2	5.6	6.0	6.1	6.4	6.6	7.0
BEV 200 Mile Range	0.5	0.9	1.4	2.5	2.8	2.8	2.8	3.1	3.2	3.4
BEV 300 Mile Range	1.1	1.3	1.5	2.4	2.5	2.9	3.0	3.1	3.2	3.3
BEV 400 Mile Range	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
BEV 500 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manual Transmissions	1	1	1	1	1	1	1	1	1	1
5-Speed Automatic	1	1	1	0	0	0	0	0	0	0
6-Speed Automatic	16	13	6	3	1	1	0	0	0	0
7-Speed Automatic	0	0	0	0	0	0	0	0	0	0
8-Speed Automatic	27	26	24	22	13	7	5	5	4	4
9-Speed Automatic	11	11	6	3	2	1	0	0	0	0
10-Speed Automatic	10	14	26	33	41	45	46	46	47	46
DCT Transmissions	2	2	2	2	2	2	2	2	2	2
CVT Transmissions	25	26	26	27	27	26	25	25	25	25

**Table A-13-3 - Powertrain Technology Penetration Rate (%) by Model Year for Manufacturer (Total)
Passenger Car Fleet, Alternative 2**

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Non-Hybrid High Compression Engines	17	20	23	25	35	36	35	35	36	36
Cylinder Deactivation	2	2	2	2	2	2	2	2	2	2
Dynamic Cylinder Deactivation	0	0	0	0	0	0	0	0	0	0
Non-Hybrid Turbocharged Engines	36	36	39	38	36	35	34	35	35	35
Variable Geometry Turbo	1	1	1	1	1	1	1	1	0	0
Electric Variable Geometry Turbo	0	0	0	0	1	1	1	1	1	1
Diesel Engines	0	0	0	0	0	0	0	0	0	0
Compressed Natural Gas	0	0	0	0	0	0	0	0	0	0
12V Stop-Start (non-hybrid)	31	31	30	28	23	22	20	20	18	18
Mild Hybrid Powertrains	0.2	0.3	0.6	1.2	3.4	4.9	5.6	6.0	6.9	6.9
Strong Hybrid Powertrains Total	3.4	3.4	3.5	3.1	4.8	5.4	5.6	5.7	6.0	6.0
Plug-In Hybrid Powertrains	0.8	0.7	0.7	0.6	2.1	4.8	7.9	7.9	7.9	7.8
Battery Electric Vehicles (BEVs)	4.1	5.0	5.9	8.9	9.2	9.9	9.9	10.4	10.7	10.9
BEV 200 Mile Range	1.2	1.9	2.5	4.0	4.3	4.3	4.3	4.6	4.8	4.9
BEV 300 Mile Range	2.5	2.6	2.9	4.4	4.5	5.1	5.1	5.3	5.5	5.5
BEV 400 Mile Range	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
BEV 500 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manual Transmissions	2	2	2	2	2	2	2	2	2	2
5-Speed Automatic	0	0	0	0	0	0	0	0	0	0
6-Speed Automatic	18	14	7	2	0	0	0	0	0	0
7-Speed Automatic	0	0	0	0	0	0	0	0	0	0
8-Speed Automatic	20	20	20	21	14	7	5	4	4	4
9-Speed Automatic	5	5	2	1	0	0	0	0	0	0
10-Speed Automatic	3	6	14	16	23	28	30	30	30	30
DCT Transmissions	4	4	4	4	3	3	3	3	3	3
CVT Transmissions	40	40	40	41	40	39	37	37	37	37

**Table A-13-5 - Powertrain Technology Penetration Rate (%) by Model Year for Manufacturer (Total)
Domestic Car Fleet, Alternative 2**

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Non-Hybrid High Compression Engines	8	10	10	13	21	21	20	20	23	23
Cylinder Deactivation	3	3	4	4	3	3	5	5	4	4
Dynamic Cylinder Deactivation	0	0	0	0	0	0	0	0	0	0
Non-Hybrid Turbocharged Engines	42	41	46	45	45	43	44	45	45	45
Variable Geometry Turbo	1	1	1	1	1	1	1	1	0	0
Electric Variable Geometry Turbo	0	0	0	0	0	0	0	0	0	0
Diesel Engines	0	0	0	0	0	0	0	0	0	0
Compressed Natural Gas	0	0	0	0	0	0	0	0	0	0
12V Stop-Start (non-hybrid)	28	29	28	25	24	22	21	20	18	18
Mild Hybrid Powertrains	0.0	0.0	0.0	0.8	0.8	1.4	1.5	1.7	3.2	3.2
Strong Hybrid Powertrains Total	2.1	2.1	2.1	1.8	2.5	3.8	3.8	4.0	4.7	4.7
Plug-In Hybrid Powertrains	0.3	0.3	0.3	0.3	1.7	4.7	6.7	6.7	6.7	6.7
Battery Electric Vehicles (BEVs)	8.3	9.0	10.2	13.8	13.8	14.6	14.6	14.7	15.3	15.3
BEV 200 Mile Range	2.1	2.8	3.7	5.5	5.5	5.6	5.6	5.6	5.9	5.9
BEV 300 Mile Range	5.1	5.2	5.5	7.3	7.3	8.1	8.0	8.1	8.4	8.4
BEV 400 Mile Range	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9
BEV 500 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manual Transmissions	2	1	1	1	1	1	1	1	1	1
5-Speed Automatic	0	0	0	0	0	0	0	0	0	0
6-Speed Automatic	16	14	8	2	1	1	0	0	0	0
7-Speed Automatic	0	0	0	0	0	0	0	0	0	0
8-Speed Automatic	19	17	22	24	15	8	7	7	7	7
9-Speed Automatic	5	5	2	0	0	0	0	0	0	0
10-Speed Automatic	6	9	11	15	22	27	28	28	27	27
DCT Transmissions	1	2	1	1	1	1	1	1	1	1
CVT Transmissions	40	41	41	41	41	38	38	38	38	38

**Table A-13-6 - Powertrain Technology Penetration Rate (%) by Model Year for Manufacturer (Total)
Imported Car Fleet, Alternative 2**

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Non-Hybrid High Compression Engines	24	29	35	35	48	50	49	49	49	48
Cylinder Deactivation	0	0	0	0	0	0	0	0	0	0
Dynamic Cylinder Deactivation	0	0	0	0	0	0	0	0	0	0
Non-Hybrid Turbocharged Engines	31	32	33	32	28	27	26	26	26	26
Variable Geometry Turbo	1	1	1	1	0	0	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0	3	3	3	3	3	3
Diesel Engines	0	0	0	0	0	0	0	0	0	0
Compressed Natural Gas	0	0	0	0	0	0	0	0	0	0
12V Stop-Start (non-hybrid)	34	33	33	31	23	21	20	19	18	18
Mild Hybrid Powertrains	0.4	0.5	1.2	1.5	5.7	8.2	9.3	10.0	10.2	10.2
Strong Hybrid Powertrains Total	4.5	4.6	4.7	4.3	6.9	6.9	7.2	7.2	7.2	7.3
Plug-In Hybrid Powertrains	1.1	1.0	1.0	0.9	2.4	4.7	8.9	8.9	9.0	8.6
Battery Electric Vehicles (BEVs)	0.4	1.4	2.1	4.5	5.0	5.6	5.6	6.4	6.6	7.0
BEV 200 Mile Range	0.3	1.1	1.5	2.7	3.1	3.2	3.2	3.7	3.7	4.1
BEV 300 Mile Range	0.1	0.3	0.6	1.7	1.8	2.4	2.4	2.8	2.8	2.9
BEV 400 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manual Transmissions	3	3	2	2	2	2	2	2	2	2
5-Speed Automatic	0	0	0	0	0	0	0	0	0	0
6-Speed Automatic	19	14	6	3	0	0	0	0	0	0
7-Speed Automatic	1	1	1	0	0	0	0	0	0	0
8-Speed Automatic	21	23	18	18	13	6	3	2	1	0
9-Speed Automatic	5	4	3	3	1	0	0	0	0	0
10-Speed Automatic	0	3	16	18	24	29	32	31	33	33
DCT Transmissions	6	6	6	6	5	5	5	5	5	5
CVT Transmissions	39	40	40	40	40	40	37	37	37	37

**Table A-13-11 - Powertrain Technology Penetration Rate (%) by Model Year for Manufacturer (GM)
Total Fleet, Alternative 2**

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Non-Hybrid High Compression Engines	0	0	2	2	2	2	2	2	2	2
Cylinder Deactivation	19	19	19	18	17	14	9	9	8	8
Dynamic Cylinder Deactivation	16	16	16	15	15	15	17	17	17	17
Non-Hybrid Turbocharged Engines	41	43	43	43	45	35	44	46	47	47
Variable Geometry Turbo	0	0	0	0	0	0	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0	0	0	0	0	0	0
Diesel Engines	2	2	2	2	2	2	2	2	2	1
Compressed Natural Gas	0	0	0	0	0	0	0	0	0	0
12V Stop-Start (non-hybrid)	63	64	63	63	62	47	33	32	32	32
Mild Hybrid Powertrains	0.0	0.8	0.8	0.8	2.8	3.6	13.2	13.8	13.8	13.7
Strong Hybrid Powertrains Total	0.0	4.5	4.4	4.4	8.2	14.6	14.2	14.2	14.1	14.1
Plug-In Hybrid Powertrains	0.0	0.0	0.0	0.0	1.5	7.6	12.6	12.6	12.7	12.7
Battery Electric Vehicles (BEVs)	1.2	1.6	1.7	2.7	2.8	3.8	3.8	4.4	4.5	5.4
BEV 200 Mile Range	0.0	0.3	0.3	1.3	1.3	1.3	1.3	1.9	1.9	2.9
BEV 300 Mile Range	1.2	1.3	1.4	1.5	1.5	2.5	2.5	2.5	2.5	2.5
BEV 400 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manual Transmissions	0	0	0	0	0	0	0	0	0	0
5-Speed Automatic	0	0	0	0	0	0	0	0	0	0
6-Speed Automatic	34	28	5	3	0	0	0	0	0	0
7-Speed Automatic	0	0	0	0	0	0	0	0	0	0
8-Speed Automatic	14	11	34	34	21	3	2	0	0	0
9-Speed Automatic	29	28	8	7	4	0	0	0	0	0
10-Speed Automatic	14	18	38	39	52	61	57	59	58	57
DCT Transmissions	1	1	1	1	1	1	1	1	1	1
CVT Transmissions	7	8	8	9	9	9	9	9	9	9

**Table A-13-12 - Powertrain Technology Penetration Rate (%) by Model Year for Manufacturer (Honda)
Total Fleet, Alternative 2**

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Non-Hybrid High Compression Engines	0	4	10	10	10	10	8	8	8	8
Cylinder Deactivation	24	23	22	22	19	17	16	16	16	16
Dynamic Cylinder Deactivation	0	0	0	0	0	0	0	0	0	0
Non-Hybrid Turbocharged Engines	50	50	63	63	59	59	59	59	60	60
Variable Geometry Turbo	0	0	0	0	0	0	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0	0	0	0	0	0	0
Diesel Engines	0	0	0	0	0	0	0	0	0	0
Compressed Natural Gas	0	0	0	0	0	0	0	0	0	0
12V Stop-Start (non-hybrid)	43	42	40	34	27	25	25	25	24	24
Mild Hybrid Powertrains	0.0	0.0	0.0	7.1	7.8	7.8	7.8	7.8	7.7	7.7
Strong Hybrid Powertrains Total	5.1	5.2	5.2	3.6	6.5	5.2	5.2	5.1	5.0	5.0
Plug-In Hybrid Powertrains	0.2	0.2	0.2	0.2	3.0	4.4	6.9	6.9	6.9	6.8
Battery Electric Vehicles (BEVs)	0.0	0.0	0.0	2.5	2.5	4.4	4.4	4.5	4.7	4.7
BEV 200 Mile Range	0.0	0.0	0.0	2.5	2.5	2.5	2.6	2.7	2.9	2.9
BEV 300 Mile Range	0.0	0.0	0.0	0.0	0.0	1.8	1.8	1.8	1.8	1.8
BEV 400 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manual Transmissions	2	2	2	2	2	2	2	2	2	2
5-Speed Automatic	0	0	0	0	0	0	0	0	0	0
6-Speed Automatic	6	6	0	0	0	0	0	0	0	0
7-Speed Automatic	0	0	0	0	0	0	0	0	0	0
8-Speed Automatic	0	0	6	5	5	2	2	2	2	2
9-Speed Automatic	12	11	3	2	0	0	0	0	0	0
10-Speed Automatic	13	13	21	20	16	18	17	17	17	17
DCT Transmissions	2	2	3	3	3	3	1	1	1	1
CVT Transmissions	60	60	61	61	61	61	62	62	62	62

Table A-13-13 - Powertrain Technology Penetration Rate (%) by Model Year for Manufacturer (Hyundai Kia-H) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Non-Hybrid High Compression Engines	46	47	55	62	83	79	70	70	70	70
Cylinder Deactivation	0	0	0	0	0	0	0	0	0	0
Dynamic Cylinder Deactivation	0	0	0	0	0	0	0	0	0	0
Non-Hybrid Turbocharged Engines	13	14	14	14	14	10	9	9	9	9
Variable Geometry Turbo	0	0	0	0	0	0	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0	0	0	0	0	0	0
Diesel Engines	0	0	0	0	0	0	0	0	0	0
Compressed Natural Gas	0	0	0	0	0	0	0	0	0	0
12V Stop-Start (non-hybrid)	27	26	26	25	24	24	19	19	18	18
Mild Hybrid Powertrains	0.0	0.0	0.0	0.0	0.8	1.1	3.5	3.5	3.5	3.5
Strong Hybrid Powertrains Total	2.2	2.3	2.4	0.5	0.5	1.9	6.7	6.7	6.6	6.6
Plug-In Hybrid Powertrains	0.4	0.4	0.4	0.0	0.0	7.9	16.9	16.9	17.1	17.3
Battery Electric Vehicles (BEVs)	0.8	0.8	0.9	3.4	3.4	3.4	3.8	3.8	3.9	3.9
BEV 200 Mile Range	0.3	0.3	0.4	1.9	2.0	2.0	2.0	2.0	2.0	2.0
BEV 300 Mile Range	0.5	0.5	0.5	1.5	1.5	1.5	1.9	1.9	1.9	1.9
BEV 400 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manual Transmissions	1	1	1	1	1	1	1	1	1	1
5-Speed Automatic	0	0	0	0	0	0	0	0	0	0
6-Speed Automatic	23	23	7	7	0	0	0	0	0	0
7-Speed Automatic	0	0	0	0	0	0	0	0	0	0
8-Speed Automatic	41	40	23	13	0	0	0	0	0	0
9-Speed Automatic	0	0	0	0	0	0	0	0	0	0
10-Speed Automatic	0	0	31	40	60	50	45	45	44	44
DCT Transmissions	3	3	3	3	3	3	3	3	3	3
CVT Transmissions	29	30	31	32	32	32	24	25	25	25

Table A-13-14 - Powertrain Technology Penetration Rate (%) by Model Year for Manufacturer (Hyundai Kia-K) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Non-Hybrid High Compression Engines	46	69	69	69	72	84	79	86	86	86
Cylinder Deactivation	0	0	0	0	0	0	0	0	0	0
Dynamic Cylinder Deactivation	0	0	0	0	0	0	0	0	0	0
Non-Hybrid Turbocharged Engines	5	5	5	5	5	5	5	5	5	5
Variable Geometry Turbo	0	0	0	0	0	0	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0	0	0	0	0	0	0
Diesel Engines	0	0	0	0	0	0	0	0	0	0
Compressed Natural Gas	0	0	0	0	0	0	0	0	0	0
12V Stop-Start (non-hybrid)	45	45	45	44	20	20	20	20	20	20
Mild Hybrid Powertrains	0.0	0.0	0.0	0.0	11.6	11.9	12.0	12.0	12.1	12.2
Strong Hybrid Powertrains Total	0.9	0.9	0.9	0.9	11.7	12.8	12.1	12.1	11.9	11.8
Plug-In Hybrid Powertrains	0.3	0.3	0.3	0.3	0.3	1.2	6.6	6.6	6.6	5.7
Battery Electric Vehicles (BEVs)	0.2	0.3	0.3	0.3	2.6	2.6	2.6	2.6	2.6	3.6
BEV 200 Mile Range	0.2	0.3	0.3	0.3	2.1	2.1	2.1	2.1	2.2	3.1
BEV 300 Mile Range	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5	0.5	0.5
BEV 400 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manual Transmissions	1	1	1	1	1	1	1	1	1	1
5-Speed Automatic	0	0	0	0	0	0	0	0	0	0
6-Speed Automatic	37	0	0	0	0	0	0	0	0	0
7-Speed Automatic	0	0	0	0	0	0	0	0	0	0
8-Speed Automatic	24	46	45	44	22	10	10	8	0	0
9-Speed Automatic	0	0	0	0	0	0	0	0	0	0
10-Speed Automatic	0	13	13	13	22	33	33	35	43	42
DCT Transmissions	2	2	2	2	2	2	2	2	2	2
CVT Transmissions	35	36	38	39	38	38	33	33	34	34

**Table A-13-18 - Powertrain Technology Penetration Rate (%) by Model Year for Manufacturer (Nissan)
Total Fleet, Alternative 2**

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Non-Hybrid High Compression Engines	0	19	24	30	52	55	55	55	62	62
Cylinder Deactivation	0	0	3	3	3	3	3	3	3	3
Dynamic Cylinder Deactivation	0	0	0	0	0	0	0	0	0	0
Non-Hybrid Turbocharged Engines	2	4	11	9	9	9	9	9	11	11
Variable Geometry Turbo	0	0	0	0	0	0	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0	0	0	0	0	0	0
Diesel Engines	0	0	0	0	0	0	0	0	0	0
Compressed Natural Gas	0	0	0	0	0	0	0	0	0	0
12V Stop-Start (non-hybrid)	7	7	7	6	6	6	6	6	6	6
Mild Hybrid Powertrains	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Strong Hybrid Powertrains Total	0.0	0.0	0.0	0.0	0.6	4.0	4.0	4.0	4.1	4.1
Plug-In Hybrid Powertrains	0.0	0.0	0.0	0.0	1.4	7.7	8.7	8.7	8.8	7.8
Battery Electric Vehicles (BEVs)	1.1	1.2	1.2	4.2	4.7	4.7	4.8	4.8	4.8	5.9
BEV 200 Mile Range	1.1	1.2	1.2	3.7	3.8	3.8	3.8	3.8	3.8	4.3
BEV 300 Mile Range	0.0	0.0	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.6
BEV 400 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manual Transmissions	0	0	0	0	0	0	0	0	0	0
5-Speed Automatic	0	0	0	0	0	0	0	0	0	0
6-Speed Automatic	0	0	0	0	0	0	0	0	0	0
7-Speed Automatic	6	3	3	0	0	0	0	0	0	0
8-Speed Automatic	0	0	0	0	0	0	0	0	0	0
9-Speed Automatic	3	1	1	1	1	1	0	0	0	0
10-Speed Automatic	0	5	5	4	4	4	4	4	4	4
DCT Transmissions	0	0	0	0	0	0	0	0	0	0
CVT Transmissions	89	90	90	90	87	78	78	78	78	77

**Table A-13-19 - Powertrain Technology Penetration Rate (%) by Model Year for Manufacturer (Subaru)
Total Fleet, Alternative 2**

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Non-Hybrid High Compression Engines	0	0	0	0	24	43	48	48	48	48
Cylinder Deactivation	0	0	0	0	0	0	0	0	0	0
Dynamic Cylinder Deactivation	0	0	0	0	0	0	0	0	0	0
Non-Hybrid Turbocharged Engines	23	23	23	23	23	23	21	21	21	20
Variable Geometry Turbo	0	0	0	0	0	0	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	14	27	27	27	27	27	27
Diesel Engines	0	0	0	0	0	0	0	0	0	0
Compressed Natural Gas	0	0	0	0	0	0	0	0	0	0
12V Stop-Start (non-hybrid)	73	72	72	56	55	55	53	53	53	53
Mild Hybrid Powertrains	0.0	0.0	0.0	0.0	0.0	0.0	2.3	2.3	2.3	2.4
Strong Hybrid Powertrains Total	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.6	0.6
Plug-In Hybrid Powertrains	0.5	0.5	0.5	0.0	0.0	0.0	1.5	1.5	1.5	1.5
Battery Electric Vehicles (BEVs)	0.0	0.0	0.6	2.3	2.3	2.3	2.3	2.3	2.3	2.3
BEV 200 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
BEV 300 Mile Range	0.0	0.0	0.5	2.2	2.2	2.2	2.2	2.2	2.2	2.2
BEV 400 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manual Transmissions	6	7	7	6	6	6	5	5	5	5
5-Speed Automatic	0	0	0	0	0	0	0	0	0	0
6-Speed Automatic	0	0	0	0	0	0	0	0	0	0
7-Speed Automatic	0	0	0	0	0	0	0	0	0	0
8-Speed Automatic	0	0	0	0	0	0	0	0	0	0
9-Speed Automatic	0	0	0	0	0	0	0	0	0	0
10-Speed Automatic	0	0	0	0	0	0	0	0	0	0
DCT Transmissions	0	0	0	0	0	0	0	0	0	0
CVT Transmissions	93	93	92	92	92	92	91	91	91	91

**Table A-13-21 - Powertrain Technology Penetration Rate (%) by Model Year for Manufacturer (Toyota)
Total Fleet, Alternative 2**

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Non-Hybrid High Compression Engines	30	31	31	35	49	48	49	49	49	49
Cylinder Deactivation	0	0	6	6	6	6	7	7	7	7
Dynamic Cylinder Deactivation	0	0	0	0	0	0	0	0	0	0
Non-Hybrid Turbocharged Engines	4	4	3	3	3	3	18	21	24	23
Variable Geometry Turbo	0	0	0	0	0	0	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0	0	0	0	0	0	0
Diesel Engines	0	0	0	0	0	0	0	0	0	0
Compressed Natural Gas	0	0	0	0	0	0	0	0	0	0
12V Stop-Start (non-hybrid)	17	17	20	20	19	19	18	18	18	18
Mild Hybrid Powertrains	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Strong Hybrid Powertrains Total	13.3	13.3	13.2	13.8	9.9	9.9	10.3	10.3	10.3	10.4
Plug-In Hybrid Powertrains	1.2	1.2	1.3	1.3	5.3	5.9	5.9	5.9	5.8	5.8
Battery Electric Vehicles (BEVs)	0.0	0.0	0.5	2.8	3.8	4.0	4.0	4.0	4.0	3.9
BEV 200 Mile Range	0.0	0.0	0.0	2.3	3.4	3.4	3.3	3.3	3.3	3.3
BEV 300 Mile Range	0.0	0.0	0.5	0.5	0.5	0.7	0.7	0.7	0.7	0.6
BEV 400 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manual Transmissions	1	1	1	1	1	1	1	1	1	1
5-Speed Automatic	6	6	5	0	0	0	0	0	0	0
6-Speed Automatic	20	14	9	9	9	9	0	0	0	0
7-Speed Automatic	0	0	0	0	0	0	0	0	0	0
8-Speed Automatic	40	37	39	32	7	5	10	10	10	10
9-Speed Automatic	0	0	0	0	0	0	0	0	0	0
10-Speed Automatic	0	9	11	19	43	45	48	48	48	48
DCT Transmissions	0	0	0	0	0	0	0	0	0	0
CVT Transmissions	19	20	20	21	21	21	21	21	21	22

**Table A-14-2 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer
(Total) Total Fleet, Alternative 2**

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	31	28	23	20	14	11	7	5	5	4
Mass Reduction Level 1 (%)	14	15	16	17	19	18	20	19	18	18
Mass Reduction Level 2 (%)	21	21	19	19	10	10	8	8	6	6
Mass Reduction Level 3 (%)	25	28	33	32	34	33	29	30	31	31
Mass Reduction Level 4 (%)	8	8	9	12	22	28	35	37	39	40
Mass Reduction Level 5 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0	0	0	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,938	3,915	3,885	3,865	3,828	3,807	3,785	3,777	3,765	3,760
Diff. from Baseline - Fleet (pounds)	0	0	0	2	23	33	41	43	47	46

**Table A-14-3 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer
(Total) Passenger Car Fleet, Alternative 2**

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	33	30	25	23	13	9	8	5	5	5
Mass Reduction Level 1 (%)	13	13	15	15	20	18	17	18	18	18
Mass Reduction Level 2 (%)	20	20	18	19	6	6	5	4	3	3
Mass Reduction Level 3 (%)	29	32	35	31	32	31	25	25	25	24
Mass Reduction Level 4 (%)	5	5	6	12	28	36	44	46	48	49
Mass Reduction Level 5 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0	1	1	1	1	1	1
Avg Curb Weight - Fleet (pounds)	3,938	3,915	3,885	3,865	3,828	3,807	3,785	3,777	3,765	3,760
Diff. from Baseline - Fleet (pounds)	0	0	0	2	23	33	41	43	47	46

Table A-14-4 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (Total) Light Truck Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	30	26	20	18	16	12	6	5	4	4
Mass Reduction Level 1 (%)	14	16	18	19	19	18	22	20	19	19
Mass Reduction Level 2 (%)	22	22	20	18	13	13	11	11	10	9
Mass Reduction Level 3 (%)	23	25	31	33	36	36	33	34	36	36
Mass Reduction Level 4 (%)	11	11	11	12	16	21	28	29	31	32
Mass Reduction Level 5 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0	0	0	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,938	3,915	3,885	3,865	3,828	3,807	3,785	3,777	3,765	3,760
Diff. from Baseline - Fleet (pounds)	0	0	0	2	23	33	41	43	47	46

Table A-14-5 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (Total) Domestic Car Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	19	19	19	16	16	12	10	9	8	8
Mass Reduction Level 1 (%)	17	13	10	11	10	6	7	7	7	7
Mass Reduction Level 2 (%)	21	21	22	23	6	6	5	3	1	1
Mass Reduction Level 3 (%)	36	40	40	31	30	30	27	28	28	28
Mass Reduction Level 4 (%)	7	7	10	20	38	46	52	53	55	55
Mass Reduction Level 5 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0	0	0	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,938	3,915	3,885	3,865	3,828	3,807	3,785	3,777	3,765	3,760
Diff. from Baseline - Fleet (pounds)	0	0	0	2	23	33	41	43	47	46

Table A-14-6 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (Total) Imported Car Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	45	39	31	29	11	7	6	2	2	2
Mass Reduction Level 1 (%)	9	13	19	19	28	28	27	29	28	28
Mass Reduction Level 2 (%)	20	19	15	15	7	6	6	6	5	5
Mass Reduction Level 3 (%)	23	25	31	31	34	31	23	23	22	21
Mass Reduction Level 4 (%)	3	3	3	4	20	27	36	39	41	43
Mass Reduction Level 5 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	1	1	1	1	1	1	1
Avg Curb Weight - Fleet (pounds)	3,938	3,915	3,885	3,865	3,828	3,807	3,785	3,777	3,765	3,760
Diff. from Baseline - Fleet (pounds)	0	0	0	2	23	33	41	43	47	46

Table A-14-7 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (BMW) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	60	55	39	28	20	8	4	3	3	0
Mass Reduction Level 1 (%)	16	15	15	14	14	14	14	14	14	13
Mass Reduction Level 2 (%)	3	3	3	3	3	0	0	0	0	0
Mass Reduction Level 3 (%)	21	26	43	54	54	54	54	54	54	54
Mass Reduction Level 4 (%)	0	0	0	0	8	24	28	29	29	32
Mass Reduction Level 5 (%)	1	1	1	1	1	1	1	1	1	1
Mass Reduction Level 6 (%)	0	0	0	0	0	0	0	0	0	0
Avg Curb Weight - Fleet (pounds)	4,212	4,183	4,122	4,076	4,037	3,982	3,965	3,961	3,956	3,943
Diff. from Baseline - Fleet (pounds)	0	0	0	0	5	6	7	4	3	6

Table A-14-8 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (Daimler) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	39	34	33	33	28	21	2	2	2	2
Mass Reduction Level 1 (%)	8	8	8	8	4	11	30	26	26	25
Mass Reduction Level 2 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 3 (%)	49	55	55	56	45	45	45	41	41	41
Mass Reduction Level 4 (%)	1	1	1	1	21	21	21	28	29	29
Mass Reduction Level 5 (%)	2	2	2	2	2	2	2	2	2	2
Mass Reduction Level 6 (%)	0	0	0	0	0	0	0	0	0	0
Avg Curb Weight - Fleet (pounds)	4,177	4,149	4,135	4,126	4,078	4,064	4,029	4,012	4,007	4,004
Diff. from Baseline - Fleet (pounds)	0	0	0	0	-2	-7	-10	-7	-7	-9

Table A-14-9 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (FCA) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	45	44	30	23	23	23	8	8	4	4
Mass Reduction Level 1 (%)	46	40	37	44	44	44	51	39	31	31
Mass Reduction Level 2 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 3 (%)	1	8	25	25	25	25	34	46	57	57
Mass Reduction Level 4 (%)	7	7	7	7	7	7	7	7	7	7
Mass Reduction Level 5 (%)	1	1	1	1	1	1	1	1	1	1
Mass Reduction Level 6 (%)	0	0	0	0	0	0	0	0	0	0
Avg Curb Weight - Fleet (pounds)	4,497	4,485	4,429	4,415	4,413	4,413	4,380	4,361	4,333	4,332
Diff. from Baseline - Fleet (pounds)	0	0	0	-22	-22	-23	-12	6	18	17

Table A-14-10 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (Ford) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	35	35	31	27	22	22	22	22	22	22
Mass Reduction Level 1 (%)	7	7	3	3	6	6	6	6	6	6
Mass Reduction Level 2 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 3 (%)	16	16	20	20	23	23	7	7	7	7
Mass Reduction Level 4 (%)	42	42	46	50	50	50	65	65	65	65
Mass Reduction Level 5 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0	0	0	0	0	0	0
Avg Curb Weight - Fleet (pounds)	4,258	4,251	4,215	4,196	4,177	4,177	4,155	4,155	4,152	4,151
Diff. from Baseline - Fleet (pounds)	0	0	0	0	-1	-4	-1	-5	-6	-19

Table A-14-11 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (GM) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	20	14	7	4	4	4	4	0	0	0
Mass Reduction Level 1 (%)	22	22	28	29	29	10	8	10	10	10
Mass Reduction Level 2 (%)	5	5	5	5	1	1	0	0	0	0
Mass Reduction Level 3 (%)	52	59	59	60	62	62	52	49	48	48
Mass Reduction Level 4 (%)	1	1	1	2	4	23	36	41	43	43
Mass Reduction Level 5 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0	0	0	0	0	0	0
Avg Curb Weight - Fleet (pounds)	4,162	4,125	4,107	4,091	4,081	4,031	4,004	3,991	3,985	3,983
Diff. from Baseline - Fleet (pounds)	0	0	0	0	2	47	69	75	76	75

Table A-14-12 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (Honda) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 1 (%)	7	7	7	7	7	7	7	7	7	7
Mass Reduction Level 2 (%)	28	27	14	9	2	0	0	0	0	0
Mass Reduction Level 3 (%)	65	66	79	66	73	75	72	72	72	71
Mass Reduction Level 4 (%)	0	0	0	18	18	18	21	21	21	21
Mass Reduction Level 5 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0	0	0	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,481	3,467	3,441	3,404	3,393	3,390	3,384	3,384	3,379	3,375
Diff. from Baseline - Fleet (pounds)	0	0	0	22	21	18	17	14	14	12

Table A-14-13 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (Hyundai Kia-H) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	2	2	2	2	1	1	1	0	0	0
Mass Reduction Level 1 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 2 (%)	52	51	35	34	15	15	6	6	6	6
Mass Reduction Level 3 (%)	35	36	52	52	61	61	43	43	41	41
Mass Reduction Level 4 (%)	11	12	12	12	22	22	50	51	53	53
Mass Reduction Level 5 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0	0	0	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,366	3,354	3,331	3,322	3,290	3,290	3,249	3,247	3,239	3,237
Diff. from Baseline - Fleet (pounds)	0	0	0	0	25	20	48	47	49	48

Table A-14-14 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (Hyundai Kia-K) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	37	33	34	34	2	2	2	0	0	0
Mass Reduction Level 1 (%)	19	23	22	22	22	22	17	17	17	17
Mass Reduction Level 2 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 3 (%)	42	42	43	43	49	36	36	34	34	34
Mass Reduction Level 4 (%)	1	1	1	1	27	41	45	49	49	49
Mass Reduction Level 5 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0	0	0	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,658	3,644	3,633	3,627	3,499	3,481	3,471	3,459	3,456	3,454
Diff. from Baseline - Fleet (pounds)	0	0	0	0	108	122	129	135	135	135

Table A-14-15 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (JLR) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	25	25	25	25	25	12	12	12	12	12
Mass Reduction Level 1 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 2 (%)	46	46	46	28	20	20	13	13	13	0
Mass Reduction Level 3 (%)	0	0	0	17	26	26	33	33	33	46
Mass Reduction Level 4 (%)	29	29	29	30	30	43	43	43	43	43
Mass Reduction Level 5 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0	0	0	0	0	0	0
Avg Curb Weight - Fleet (pounds)	4,432	4,429	4,425	4,407	4,398	4,341	4,334	4,334	4,333	4,319
Diff. from Baseline - Fleet (pounds)	0	0	0	16	22	58	57	56	55	67

Table A-14-16 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (Mazda) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	64	64	63	63	62	19	9	9	9	9
Mass Reduction Level 1 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 2 (%)	2	2	2	2	2	0	10	10	10	10
Mass Reduction Level 3 (%)	30	31	31	32	32	32	29	29	29	13
Mass Reduction Level 4 (%)	3	0	0	0	0	46	48	48	48	64
Mass Reduction Level 5 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 6 (%)	0	3	3	3	3	3	3	3	3	4
Avg Curb Weight - Fleet (pounds)	3,548	3,533	3,525	3,519	3,516	3,338	3,310	3,310	3,309	3,288
Diff. from Baseline - Fleet (pounds)	0	0	0	0	-1	174	183	181	179	197

Table A-14-17 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (Mitsubishi) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	85	84	83	82	81	0	0	0	0	0
Mass Reduction Level 1 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 2 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 3 (%)	15	16	17	18	19	0	0	0	0	0
Mass Reduction Level 4 (%)	0	0	0	0	0	100	100	100	100	100
Mass Reduction Level 5 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0	0	0	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,153	3,141	3,127	3,118	3,113	2,806	2,804	2,804	2,801	2,798
Diff. from Baseline - Fleet (pounds)	0	0	0	0	-2	204	199	196	195	193

Table A-14-18 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (Nissan) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	47	25	19	17	15	4	4	4	2	2
Mass Reduction Level 1 (%)	0	21	27	26	26	37	37	37	39	39
Mass Reduction Level 2 (%)	39	39	40	40	18	18	18	15	9	6
Mass Reduction Level 3 (%)	14	15	15	8	9	9	9	9	9	9
Mass Reduction Level 4 (%)	0	0	0	6	29	29	29	32	38	41
Mass Reduction Level 5 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	2	4	4	4	4	4	4
Avg Curb Weight - Fleet (pounds)	3,604	3,563	3,543	3,514	3,454	3,441	3,439	3,433	3,412	3,400
Diff. from Baseline - Fleet (pounds)	0	0	0	19	71	67	64	67	79	87

Table A-14-19 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (Subaru) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	5	0	0	0	0	0	0	0	0	0
Mass Reduction Level 1 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 2 (%)	95	95	94	94	94	94	94	94	94	94
Mass Reduction Level 3 (%)	1	5	5	5	5	5	0	0	0	0
Mass Reduction Level 4 (%)	0	0	1	1	1	1	6	6	6	6
Mass Reduction Level 5 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0	0	0	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,591	3,574	3,567	3,562	3,560	3,560	3,552	3,552	3,550	3,548
Diff. from Baseline - Fleet (pounds)	0	0	0	0	-1	-3	2	0	0	-1

Table A-14-20 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (Tesla) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 1 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 2 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 3 (%)	17	17	16	16	16	15	15	15	15	15
Mass Reduction Level 4 (%)	83	83	84	84	84	85	85	85	85	85
Mass Reduction Level 5 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0	0	0	0	0	0	0
Avg Curb Weight - Fleet (pounds)	4,344	4,335	4,326	4,320	4,317	4,317	4,316	4,316	4,314	4,312
Diff. from Baseline - Fleet (pounds)	0	0	0	0	-1	-3	-6	-7	-8	-8

Table A-14-21 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (Toyota) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	53	53	45	44	21	20	11	7	7	7
Mass Reduction Level 1 (%)	0	0	8	8	31	31	41	44	45	45
Mass Reduction Level 2 (%)	46	46	46	47	15	14	9	7	0	0
Mass Reduction Level 3 (%)	1	1	1	1	1	1	1	1	1	1
Mass Reduction Level 4 (%)	0	0	0	0	32	33	39	41	48	47
Mass Reduction Level 5 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0	0	0	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,808	3,790	3,755	3,739	3,643	3,640	3,609	3,600	3,576	3,571
Diff. from Baseline - Fleet (pounds)	0	0	0	0	86	82	91	94	112	110

Table A-14-22 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (Volvo) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	19	20	21	22	23	23	23	0	0	0
Mass Reduction Level 1 (%)	20	20	19	19	19	19	19	19	19	18
Mass Reduction Level 2 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 3 (%)	61	60	59	59	58	58	56	79	79	79
Mass Reduction Level 4 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 5 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0	0	0	3	3	3	3
Avg Curb Weight - Fleet (pounds)	4,181	4,175	4,171	4,168	4,166	4,166	4,153	4,087	4,084	4,082
Diff. from Baseline - Fleet (pounds)	0	0	0	0	-1	-2	5	35	36	36

Table A-14-23 - Mass Reduction Penetration Rate and Curb Weights by Model Year for Manufacturer (VWA) Total Fleet, Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mass Reduction Level 0 (%)	38	38	37	37	37	11	7	7	1	1
Mass Reduction Level 1 (%)	56	56	57	57	25	42	39	35	38	35
Mass Reduction Level 2 (%)	0	0	0	0	0	0	0	0	0	0
Mass Reduction Level 3 (%)	5	5	5	5	5	5	5	5	5	5
Mass Reduction Level 4 (%)	0	0	0	0	33	41	47	52	55	58
Mass Reduction Level 5 (%)	0	0	1	1	1	1	1	1	1	1
Mass Reduction Level 6 (%)	0	0	0	0	0	0	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,848	3,834	3,819	3,809	3,720	3,655	3,628	3,613	3,595	3,583
Diff. from Baseline - Fleet (pounds)	0	0	0	0	-2	-4	-6	-9	-10	-12

15. Powertrain Technology Penetration Rate, by Alternative

Table A-15-1 - Powertrain Technology Penetration Rate (%) for Manufacturer (Total), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	23	26	26	25
Cylinder Deactivation	11	10	9	8
Dynamic Cylinder Deactivation	2	2	3	3
Non-Hybrid Turbocharged Engines	45	45	39	37
Variable Geometry Turbo	1	1	1	1
Electric Variable Geometry Turbo	0	1	1	1
Diesel Engines	0	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	39	32	28	23
Mild Hybrid Powertrains	7.6	11.9	13.9	18.4
Strong Hybrid Powertrains Total	5.1	7.7	7.6	9.2
Plug-In Hybrid Powertrains	1.1	2.5	7.2	10.8
Battery Electric Vehicles (BEVs)	5.6	6.3	7.0	7.5
BEV 200 Mile Range	2.9	3.2	3.4	3.4
BEV 300 Mile Range	2.5	2.8	3.3	3.8
BEV 400 Mile Range	0.3	0.3	0.3	0.3
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	1	1	1	1
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	18	9	4	2
9-Speed Automatic	0	0	0	0
10-Speed Automatic	40	45	46	44
DCT Transmissions	0	0	0	0
CVT Transmissions	28	27	25	24

**Table A-15-2 - Powertrain Technology Penetration Rate (%) for Manufacturer (Total), MY 2029
Passenger Car Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	32	36	36	35
Cylinder Deactivation	2	2	2	2
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	45	42	35	32
Variable Geometry Turbo	0	0	0	0
Electric Variable Geometry Turbo	0	2	1	1
Diesel Engines	0	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	23	20	18	14
Mild Hybrid Powertrains	3.6	5.4	6.9	13.8
Strong Hybrid Powertrains Total	4.6	5.5	6.0	9.1
Plug-In Hybrid Powertrains	1.5	2.8	7.8	10.1
Battery Electric Vehicles (BEVs)	8.7	9.8	10.9	12.1
BEV 200 Mile Range	4.3	4.7	4.9	5.3
BEV 300 Mile Range	3.9	4.7	5.5	6.4
BEV 400 Mile Range	0.4	0.5	0.5	0.5
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	2	2	2	2
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	18	10	4	0
9-Speed Automatic	0	0	0	0
10-Speed Automatic	21	26	30	30
DCT Transmissions	0	0	0	0
CVT Transmissions	41	41	37	35

Table A-15-3 - Powertrain Technology Penetration Rate (%) for Manufacturer (Total), MY 2029 Light Truck Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	15	17	16	15
Cylinder Deactivation	19	17	15	14
Dynamic Cylinder Deactivation	5	5	5	5
Non-Hybrid Turbocharged Engines	45	48	43	41
Variable Geometry Turbo	2	2	2	2
Electric Variable Geometry Turbo	0	1	1	1
Diesel Engines	0	0	0	1
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	55	43	37	31
Mild Hybrid Powertrains	11.5	18.2	20.5	22.7
Strong Hybrid Powertrains Total	5.7	9.8	9.0	9.4
Plug-In Hybrid Powertrains	0.8	2.1	6.7	11.5
Battery Electric Vehicles (BEVs)	2.6	2.9	3.3	3.3
BEV 200 Mile Range	1.4	1.8	2.0	1.8
BEV 300 Mile Range	1.1	1.1	1.2	1.4
BEV 400 Mile Range	0.1	0.1	0.1	0.1
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	0	0	0	0
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	17	8	4	3
9-Speed Automatic	0	0	0	0
10-Speed Automatic	59	62	62	58
DCT Transmissions	0	0	0	0
CVT Transmissions	14	14	14	14

**Table A-15-4 - Powertrain Technology Penetration Rate (%) for Manufacturer (Total), MY 2029
Domestic Car Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	19	26	23	22
Cylinder Deactivation	4	5	4	4
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	49	47	45	41
Variable Geometry Turbo	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0
Diesel Engines	0	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	23	19	18	12
Mild Hybrid Powertrains	0.9	1.9	3.2	7.8
Strong Hybrid Powertrains Total	2.4	2.9	4.7	8.7
Plug-In Hybrid Powertrains	1.9	3.0	6.7	8.0
Battery Electric Vehicles (BEVs)	12.3	14.5	15.3	16.6
BEV 200 Mile Range	4.9	5.5	5.9	6.1
BEV 300 Mile Range	6.5	8.0	8.4	9.6
BEV 400 Mile Range	0.9	0.9	0.9	1.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	1	1	1	1
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	20	15	7	0
9-Speed Automatic	0	0	0	0
10-Speed Automatic	20	21	27	31
DCT Transmissions	0	0	0	0
CVT Transmissions	42	42	38	34

**Table A-15-5 - Powertrain Technology Penetration Rate (%) for Manufacturer (Total), MY 2029
Imported Car Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	43	45	48	47
Cylinder Deactivation	0	0	0	0
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	42	37	26	24
Variable Geometry Turbo	1	0	0	0
Electric Variable Geometry Turbo	0	3	3	3
Diesel Engines	0	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	23	21	18	15
Mild Hybrid Powertrains	6.2	8.5	10.2	19.3
Strong Hybrid Powertrains Total	6.5	7.9	7.3	9.4
Plug-In Hybrid Powertrains	1.1	2.6	8.6	12.0
Battery Electric Vehicles (BEVs)	5.3	5.5	7.0	7.9
BEV 200 Mile Range	3.8	3.9	4.1	4.5
BEV 300 Mile Range	1.5	1.6	2.9	3.4
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	3	2	2	2
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	16	5	0	0
9-Speed Automatic	0	0	0	0
10-Speed Automatic	22	31	33	29
DCT Transmissions	0	0	0	0
CVT Transmissions	41	40	37	35

Table A-15-6 - Powertrain Technology Penetration Rate (%) for Manufacturer (BMW), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	0	0	0	0
Cylinder Deactivation	0	0	0	0
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	91	92	86	79
Variable Geometry Turbo	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0
Diesel Engines	0	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	59	57	42	36
Mild Hybrid Powertrains	31.4	34.5	43.5	41.6
Strong Hybrid Powertrains Total	0.0	0.1	0.2	1.3
Plug-In Hybrid Powertrains	4.4	3.0	7.9	14.5
Battery Electric Vehicles (BEVs)	4.9	5.6	6.0	6.9
BEV 200 Mile Range	3.0	3.5	3.9	4.1
BEV 300 Mile Range	1.9	2.0	2.1	2.9
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	1	0	0	0
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	0	0	0	0
9-Speed Automatic	0	0	0	0
10-Speed Automatic	82	84	78	71
DCT Transmissions	0	0	0	0
CVT Transmissions	0	0	0	0

**Table A-15-7 - Powertrain Technology Penetration Rate (%) for Manufacturer (Daimler), MY 2029
Total Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	0	0	0	0
Cylinder Deactivation	0	0	0	0
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	92	87	84	82
Variable Geometry Turbo	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0
Diesel Engines	0	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	45	33	30	26
Mild Hybrid Powertrains	42.4	49.6	49.5	50.1
Strong Hybrid Powertrains Total	2.2	1.7	1.7	3.9
Plug-In Hybrid Powertrains	3.4	8.7	8.1	8.4
Battery Electric Vehicles (BEVs)	5.0	4.5	8.0	9.6
BEV 200 Mile Range	4.3	3.2	3.2	3.2
BEV 300 Mile Range	0.0	0.6	4.1	5.7
BEV 400 Mile Range	0.7	0.7	0.7	0.7
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	0	0	0	0
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	0	0	0	0
9-Speed Automatic	0	0	0	0
10-Speed Automatic	73	70	67	66
DCT Transmissions	0	0	0	0
CVT Transmissions	0	0	0	0

Table A-15-8 - Powertrain Technology Penetration Rate (%) for Manufacturer (FCA), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	2	2	2	2
Cylinder Deactivation	40	39	39	38
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	34	48	48	47
Variable Geometry Turbo	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0
Diesel Engines	1	1	1	1
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	62	46	45	45
Mild Hybrid Powertrains	10.3	22.7	23.2	23.3
Strong Hybrid Powertrains Total	0.0	0.1	0.2	0.2
Plug-In Hybrid Powertrains	0.4	0.4	0.4	0.4
Battery Electric Vehicles (BEVs)	3.9	4.2	4.9	5.5
BEV 200 Mile Range	2.8	3.1	3.1	3.1
BEV 300 Mile Range	1.1	1.1	1.8	2.5
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	1	1	1	1
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	2	3	3	3
9-Speed Automatic	0	0	0	0
10-Speed Automatic	93	92	91	91
DCT Transmissions	0	0	0	0
CVT Transmissions	0	0	0	0

Table A-15-9 - Powertrain Technology Penetration Rate (%) for Manufacturer (Ford), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	5	5	5	5
Cylinder Deactivation	7	7	7	7
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	73	69	63	60
Variable Geometry Turbo	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0
Diesel Engines	0	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	45	53	35	31
Mild Hybrid Powertrains	26.1	15.4	28.9	30.0
Strong Hybrid Powertrains Total	10.3	10.9	8.2	7.4
Plug-In Hybrid Powertrains	2.3	1.8	8.1	12.2
Battery Electric Vehicles (BEVs)	4.4	7.5	9.0	9.0
BEV 200 Mile Range	3.2	3.1	3.1	3.0
BEV 300 Mile Range	1.2	4.3	6.0	6.0
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	1	1	1	1
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	12	28	17	2
9-Speed Automatic	0	0	0	0
10-Speed Automatic	70	52	57	69
DCT Transmissions	0	0	0	0
CVT Transmissions	0	0	0	0

Table A-15-10 - Powertrain Technology Penetration Rate (%) for Manufacturer (GM), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	2	2	2	2
Cylinder Deactivation	18	12	8	7
Dynamic Cylinder Deactivation	15	15	17	16
Non-Hybrid Turbocharged Engines	59	61	47	45
Variable Geometry Turbo	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0
Diesel Engines	0	1	1	2
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	61	34	32	16
Mild Hybrid Powertrains	1.4	17.2	13.7	22.4
Strong Hybrid Powertrains Total	4.4	18.8	14.0	15.1
Plug-In Hybrid Powertrains	0.2	2.1	12.7	19.4
Battery Electric Vehicles (BEVs)	5.0	5.5	5.4	5.4
BEV 200 Mile Range	2.3	2.9	2.9	2.9
BEV 300 Mile Range	2.6	2.6	2.5	2.5
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	0	0	0	0
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	36	0	0	0
9-Speed Automatic	0	0	0	0
10-Speed Automatic	43	63	57	50
DCT Transmissions	0	0	0	0
CVT Transmissions	10	10	9	9

Table A-15-11 - Powertrain Technology Penetration Rate (%) for Manufacturer (Honda), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	8	8	8	8
Cylinder Deactivation	18	18	16	15
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	65	65	60	53
Variable Geometry Turbo	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0
Diesel Engines	0	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	28	31	24	25
Mild Hybrid Powertrains	5.8	4.2	7.7	4.5
Strong Hybrid Powertrains Total	3.9	2.9	5.0	5.7
Plug-In Hybrid Powertrains	2.7	3.4	6.8	10.3
Battery Electric Vehicles (BEVs)	3.6	3.5	4.7	8.1
BEV 200 Mile Range	1.7	1.7	2.9	3.1
BEV 300 Mile Range	1.9	1.8	1.8	5.0
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	2	2	2	2
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	0	0	2	0
9-Speed Automatic	0	0	0	0
10-Speed Automatic	24	25	17	15
DCT Transmissions	0	0	0	0
CVT Transmissions	63	62	62	58

Table A-15-12 - Powertrain Technology Penetration Rate (%) for Manufacturer (Hyundai Kia-H), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	82	79	70	66
Cylinder Deactivation	0	0	0	0
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	14	9	9	8
Variable Geometry Turbo	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0
Diesel Engines	0	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	23	20	18	14
Mild Hybrid Powertrains	0.0	1.8	3.5	23.3
Strong Hybrid Powertrains Total	0.5	12.4	6.6	10.2
Plug-In Hybrid Powertrains	0.0	1.5	17.3	21.0
Battery Electric Vehicles (BEVs)	4.0	3.9	3.9	4.9
BEV 200 Mile Range	2.1	2.0	2.0	3.0
BEV 300 Mile Range	1.9	1.9	1.9	1.9
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	1	1	1	1
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	10	0	0	0
9-Speed Automatic	0	0	0	0
10-Speed Automatic	47	46	44	40
DCT Transmissions	0	0	0	0
CVT Transmissions	34	33	25	20

Table A-15-13 - Powertrain Technology Penetration Rate (%) for Manufacturer (Hyundai Kia-K), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	91	91	86	78
Cylinder Deactivation	0	0	0	0
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	6	5	5	4
Variable Geometry Turbo	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0
Diesel Engines	0	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	42	40	20	15
Mild Hybrid Powertrains	0.0	0.3	12.2	20.7
Strong Hybrid Powertrains Total	0.8	2.8	11.8	28.4
Plug-In Hybrid Powertrains	0.2	0.9	5.7	8.5
Battery Electric Vehicles (BEVs)	2.7	2.7	3.6	3.6
BEV 200 Mile Range	2.3	2.2	3.1	3.1
BEV 300 Mile Range	0.4	0.4	0.5	0.5
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	1	1	1	1
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	32	0	0	0
9-Speed Automatic	0	0	0	0
10-Speed Automatic	21	51	42	24
DCT Transmissions	0	0	0	0
CVT Transmissions	40	39	34	33

Table A-15-14 - Powertrain Technology Penetration Rate (%) for Manufacturer (JLR), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	0	0	0	0
Cylinder Deactivation	0	0	0	0
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	95	93	93	93
Variable Geometry Turbo	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0
Diesel Engines	1	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	69	14	14	7
Mild Hybrid Powertrains	26.5	78.7	78.8	86.3
Strong Hybrid Powertrains Total	0.0	0.0	0.0	0.0
Plug-In Hybrid Powertrains	0.7	0.7	0.7	0.7
Battery Electric Vehicles (BEVs)	3.9	6.2	6.3	6.3
BEV 200 Mile Range	2.5	4.8	4.9	4.9
BEV 300 Mile Range	1.4	1.4	1.4	1.4
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	0	0	0	0
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	0	0	0	0
9-Speed Automatic	0	0	0	0
10-Speed Automatic	95	93	93	93
DCT Transmissions	0	0	0	0
CVT Transmissions	0	0	0	0

Table A-15-15 - Powertrain Technology Penetration Rate (%) for Manufacturer (Mazda), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	68	68	68	66
Cylinder Deactivation	0	0	0	0
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	0	0	0	0
Variable Geometry Turbo	27	22	23	20
Electric Variable Geometry Turbo	0	0	0	0
Diesel Engines	0	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	0	0	0	0
Mild Hybrid Powertrains	0.0	0.0	17.1	23.0
Strong Hybrid Powertrains Total	0.0	5.2	3.4	3.3
Plug-In Hybrid Powertrains	0.0	0.0	0.0	5.5
Battery Electric Vehicles (BEVs)	5.1	5.0	5.0	4.9
BEV 200 Mile Range	4.1	4.0	3.9	3.9
BEV 300 Mile Range	1.1	1.0	1.0	1.0
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	0	0	0	0
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	84	49	0	0
9-Speed Automatic	0	0	0	0
10-Speed Automatic	11	40	91	86
DCT Transmissions	0	0	0	0
CVT Transmissions	0	0	0	0

**Table A-15-16 - Powertrain Technology Penetration Rate (%) for Manufacturer (Mitsubishi), MY 2029
Total Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	2	78	78	78
Cylinder Deactivation	0	2	2	2
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	18	19	0	0
Variable Geometry Turbo	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0
Diesel Engines	0	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	0	0	2	0
Mild Hybrid Powertrains	0.0	0.0	0.0	20.5
Strong Hybrid Powertrains Total	0.0	0.0	0.0	0.0
Plug-In Hybrid Powertrains	0.0	0.0	0.0	4.8
Battery Electric Vehicles (BEVs)	1.6	1.6	1.6	1.7
BEV 200 Mile Range	0.5	0.5	0.5	0.5
BEV 300 Mile Range	1.1	1.1	1.1	1.1
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	1	1	1	1
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	2	0	0	0
9-Speed Automatic	0	0	0	0
10-Speed Automatic	0	2	2	2
DCT Transmissions	0	0	0	0
CVT Transmissions	95	95	95	90

Table A-15-17 - Powertrain Technology Penetration Rate (%) for Manufacturer (Nissan), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	49	72	62	62
Cylinder Deactivation	3	3	3	3
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	13	11	11	10
Variable Geometry Turbo	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0
Diesel Engines	0	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	6	6	6	6
Mild Hybrid Powertrains	0.0	1.1	0.0	9.1
Strong Hybrid Powertrains Total	0.0	0.9	4.1	7.4
Plug-In Hybrid Powertrains	0.0	0.4	7.8	11.1
Battery Electric Vehicles (BEVs)	1.8	4.0	5.9	6.3
BEV 200 Mile Range	1.4	3.5	4.3	4.2
BEV 300 Mile Range	0.5	0.5	1.6	2.1
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	0	0	0	0
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	0	0	0	0
9-Speed Automatic	0	0	0	0
10-Speed Automatic	8	5	4	4
DCT Transmissions	0	0	0	0
CVT Transmissions	89	89	77	71

**Table A-15-18 - Powertrain Technology Penetration Rate (%) for Manufacturer (Subaru), MY 2029
Total Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	47	48	48	47
Cylinder Deactivation	0	0	0	0
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	50	23	20	20
Variable Geometry Turbo	0	0	0	0
Electric Variable Geometry Turbo	0	27	27	27
Diesel Engines	0	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	68	55	53	50
Mild Hybrid Powertrains	0.0	0.0	2.4	6.2
Strong Hybrid Powertrains Total	0.0	0.0	0.6	2.0
Plug-In Hybrid Powertrains	0.0	0.0	1.5	2.3
Battery Electric Vehicles (BEVs)	2.3	2.3	2.3	2.3
BEV 200 Mile Range	0.1	0.1	0.1	0.0
BEV 300 Mile Range	2.2	2.2	2.2	2.2
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	6	6	5	4
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	0	0	0	0
9-Speed Automatic	0	0	0	0
10-Speed Automatic	0	0	0	0
DCT Transmissions	0	0	0	0
CVT Transmissions	91	92	91	89

Table A-15-19 - Powertrain Technology Penetration Rate (%) for Manufacturer (Tesla), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	0	0	0	0
Cylinder Deactivation	0	0	0	0
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	0	0	0	0
Variable Geometry Turbo	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0
Diesel Engines	0	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	0	0	0	0
Mild Hybrid Powertrains	0.0	0.0	0.0	0.0
Strong Hybrid Powertrains Total	0.0	0.0	0.0	0.0
Plug-In Hybrid Powertrains	0.0	0.0	0.0	0.0
Battery Electric Vehicles (BEVs)	100.0	100.0	100.0	100.0
BEV 200 Mile Range	25.3	25.2	25.1	25.1
BEV 300 Mile Range	60.1	59.9	59.7	59.6
BEV 400 Mile Range	14.6	14.9	15.1	15.3
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	0	0	0	0
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	0	0	0	0
9-Speed Automatic	0	0	0	0
10-Speed Automatic	0	0	0	0
DCT Transmissions	0	0	0	0
CVT Transmissions	0	0	0	0

**Table A-15-20 - Powertrain Technology Penetration Rate (%) for Manufacturer (Toyota), MY 2029
Total Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	33	37	49	46
Cylinder Deactivation	5	6	7	6
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	38	38	23	24
Variable Geometry Turbo	0	0	0	0
Electric Variable Geometry Turbo	0	0	0	0
Diesel Engines	0	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	17	13	18	13
Mild Hybrid Powertrains	0.0	3.0	0.0	1.9
Strong Hybrid Powertrains Total	12.6	10.6	10.4	10.5
Plug-In Hybrid Powertrains	0.0	4.5	5.8	10.7
Battery Electric Vehicles (BEVs)	3.6	3.9	3.9	4.0
BEV 200 Mile Range	3.0	3.3	3.3	3.3
BEV 300 Mile Range	0.6	0.6	0.6	0.7
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	1	1	1	1
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	44	30	10	9
9-Speed Automatic	0	0	0	0
10-Speed Automatic	16	28	48	44
DCT Transmissions	0	0	0	0
CVT Transmissions	22	22	22	21

Table A-15-21 - Powertrain Technology Penetration Rate (%) for Manufacturer (Volvo), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	0	0	0	0
Cylinder Deactivation	0	0	0	0
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	51	51	50	46
Variable Geometry Turbo	12	6	6	6
Electric Variable Geometry Turbo	0	0	0	0
Diesel Engines	0	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	63	56	42	47
Mild Hybrid Powertrains	0.0	0.0	13.1	4.4
Strong Hybrid Powertrains Total	24.5	31.3	29.4	28.4
Plug-In Hybrid Powertrains	5.6	5.5	5.4	5.4
Battery Electric Vehicles (BEVs)	6.7	6.6	9.7	14.6
BEV 200 Mile Range	2.7	3.0	2.7	2.7
BEV 300 Mile Range	4.0	3.6	7.0	11.9
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	0	0	0	0
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	0	0	0	0
9-Speed Automatic	0	0	0	0
10-Speed Automatic	63	56	56	52
DCT Transmissions	0	0	0	0
CVT Transmissions	0	0	0	0

Table A-15-22 - Powertrain Technology Penetration Rate (%) for Manufacturer (VWA), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Non-Hybrid High Compression Engines	4	3	4	4
Cylinder Deactivation	0	0	0	0
Dynamic Cylinder Deactivation	0	0	0	0
Non-Hybrid Turbocharged Engines	38	50	38	34
Variable Geometry Turbo	19	20	20	18
Electric Variable Geometry Turbo	0	0	0	0
Diesel Engines	0	0	0	0
Compressed Natural Gas	0	0	0	0
12V Stop-Start (non-hybrid)	42	39	40	25
Mild Hybrid Powertrains	15.6	30.9	20.1	29.3
Strong Hybrid Powertrains Total	24.7	9.4	23.4	26.8
Plug-In Hybrid Powertrains	8.7	11.6	7.3	11.1
Battery Electric Vehicles (BEVs)	5.8	6.3	7.0	5.6
BEV 200 Mile Range	4.4	5.0	5.7	4.3
BEV 300 Mile Range	1.3	1.4	1.4	1.4
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0
Manual Transmissions	3	3	3	3
5-Speed Automatic	0	0	0	0
6-Speed Automatic	0	0	0	0
7-Speed Automatic	0	0	0	0
8-Speed Automatic	14	12	0	0
9-Speed Automatic	0	0	0	0
10-Speed Automatic	25	38	38	36
DCT Transmissions	0	0	0	0
CVT Transmissions	0	0	0	0

16. Mass Reduction Penetration Rate, by Model Year

**Table A-16-1 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (Total), MY 2029
Total Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	8	4	4	2
Mass Reduction Level 1 (%)	25	21	18	12
Mass Reduction Level 2 (%)	17	6	6	6
Mass Reduction Level 3 (%)	37	41	31	37
Mass Reduction Level 4 (%)	13	27	40	43
Mass Reduction Level 5 (%)	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,805	3,775	3,760	3,746
Diff. from Baseline - Fleet (pounds)	0	31	46	59
Avg Curb Weight - Passenger Car (pounds)	3,319	3,272	3,243	3,216
Diff. from Baseline - Passenger Car (pounds)	0	47	76	103
Avg Curb Weight - Light Truck (pounds)	4,295	4,263	4,248	4,236
Diff. from Baseline - Light Trucks (pounds)	0	31	47	59

**Table A-16-2 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (Total), MY 2029
Passenger Car Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	12	5	5	1
Mass Reduction Level 1 (%)	21	21	18	8
Mass Reduction Level 2 (%)	18	4	3	3
Mass Reduction Level 3 (%)	37	40	24	34
Mass Reduction Level 4 (%)	13	30	49	53
Mass Reduction Level 5 (%)	0	0	0	0
Mass Reduction Level 6 (%)	0	0	1	1
Avg Curb Weight - Fleet (pounds)	3,805	3,775	3,760	3,746
Diff. from Baseline - Fleet (pounds)	0	31	46	59
Avg Curb Weight - Passenger Car (pounds)	3,319	3,272	3,243	3,216
Diff. from Baseline - Passenger Car (pounds)	0	47	76	103
Avg Curb Weight - Light Truck (pounds)	4,295	4,263	4,248	4,236
Diff. from Baseline - Light Trucks (pounds)	0	31	47	59

**Table A-16-3 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (Total), MY 2029
Light Truck Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	4	4	4	3
Mass Reduction Level 1 (%)	29	21	19	15
Mass Reduction Level 2 (%)	16	9	9	9
Mass Reduction Level 3 (%)	37	42	36	39
Mass Reduction Level 4 (%)	14	24	32	34
Mass Reduction Level 5 (%)	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,805	3,775	3,760	3,746
Diff. from Baseline - Fleet (pounds)	0	31	46	59
Avg Curb Weight - Passenger Car (pounds)	3,319	3,272	3,243	3,216
Diff. from Baseline - Passenger Car (pounds)	0	47	76	103
Avg Curb Weight - Light Truck (pounds)	4,295	4,263	4,248	4,236
Diff. from Baseline - Light Trucks (pounds)	0	31	47	59

**Table A-16-4 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (Total), MY 2029
Domestic Car Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	0	8	8	0
Mass Reduction Level 1 (%)	24	7	7	7
Mass Reduction Level 2 (%)	22	2	1	1
Mass Reduction Level 3 (%)	41	53	28	36
Mass Reduction Level 4 (%)	12	29	55	55
Mass Reduction Level 5 (%)	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,805	3,775	3,760	3,746
Diff. from Baseline - Fleet (pounds)	0	31	46	59
Avg Curb Weight - Passenger Car (pounds)	3,319	3,272	3,243	3,216
Diff. from Baseline - Passenger Car (pounds)	0	47	76	103
Avg Curb Weight - Light Truck (pounds)	4,295	4,263	4,248	4,236
Diff. from Baseline - Light Trucks (pounds)	0	31	47	59

**Table A-16-5 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (Total), MY 2029
Imported Car Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	22	2	2	2
Mass Reduction Level 1 (%)	18	33	28	9
Mass Reduction Level 2 (%)	14	5	5	5
Mass Reduction Level 3 (%)	33	28	21	32
Mass Reduction Level 4 (%)	13	32	43	51
Mass Reduction Level 5 (%)	0	0	0	0
Mass Reduction Level 6 (%)	0	0	1	1
Avg Curb Weight - Fleet (pounds)	3,805	3,775	3,760	3,746
Diff. from Baseline - Fleet (pounds)	0	31	46	59
Avg Curb Weight - Passenger Car (pounds)	3,319	3,272	3,243	3,216
Diff. from Baseline - Passenger Car (pounds)	0	47	76	103
Avg Curb Weight - Light Truck (pounds)	4,295	4,263	4,248	4,236
Diff. from Baseline - Light Trucks (pounds)	0	31	47	59

**Table A-16-6 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (BMW), MY 2029
Total Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	0	0	0	0
Mass Reduction Level 1 (%)	13	13	13	0
Mass Reduction Level 2 (%)	0	0	0	0
Mass Reduction Level 3 (%)	71	54	54	68
Mass Reduction Level 4 (%)	16	32	32	31
Mass Reduction Level 5 (%)	1	1	1	1
Mass Reduction Level 6 (%)	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,949	3,936	3,943	3,924
Diff. from Baseline - Fleet (pounds)	0	13	6	25
Avg Curb Weight - Passenger Car (pounds)	3,646	3,615	3,614	3,614
Diff. from Baseline - Passenger Car (pounds)	0	31	32	32
Avg Curb Weight - Light Truck (pounds)	4,650	4,650	4,650	4,573
Diff. from Baseline - Light Trucks (pounds)	0	0	0	78

**Table A-16-7 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (Daimler), MY
2029 Total Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	2	2	2	2
Mass Reduction Level 1 (%)	25	25	25	26
Mass Reduction Level 2 (%)	0	0	0	0
Mass Reduction Level 3 (%)	46	41	41	41
Mass Reduction Level 4 (%)	26	30	29	29
Mass Reduction Level 5 (%)	2	2	2	2
Mass Reduction Level 6 (%)	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,995	3,997	4,004	4,010
Diff. from Baseline - Fleet (pounds)	0	-1	-9	-15
Avg Curb Weight - Passenger Car (pounds)	3,609	3,596	3,597	3,598
Diff. from Baseline - Passenger Car (pounds)	0	13	12	11
Avg Curb Weight - Light Truck (pounds)	4,460	4,460	4,460	4,460
Diff. from Baseline - Light Trucks (pounds)	0	0	0	0

**Table A-16-8 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (FCA), MY 2029
Total Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	4	4	4	4
Mass Reduction Level 1 (%)	51	31	31	31
Mass Reduction Level 2 (%)	0	0	0	0
Mass Reduction Level 3 (%)	33	57	57	57
Mass Reduction Level 4 (%)	12	7	7	7
Mass Reduction Level 5 (%)	1	1	1	1
Mass Reduction Level 6 (%)	0	0	0	0
Avg Curb Weight - Fleet (pounds)	4,350	4,331	4,332	4,334
Diff. from Baseline - Fleet (pounds)	0	19	17	16
Avg Curb Weight - Passenger Car (pounds)	3,693	3,666	3,659	3,654
Diff. from Baseline - Passenger Car (pounds)	0	27	34	39
Avg Curb Weight - Light Truck (pounds)	4,482	4,460	4,460	4,460
Diff. from Baseline - Light Trucks (pounds)	0	22	21	21

**Table A-16-9 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (Ford), MY 2029
Total Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	2	23	22	2
Mass Reduction Level 1 (%)	27	6	6	0
Mass Reduction Level 2 (%)	0	0	0	0
Mass Reduction Level 3 (%)	22	22	7	31
Mass Reduction Level 4 (%)	49	49	65	67
Mass Reduction Level 5 (%)	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0
Avg Curb Weight - Fleet (pounds)	4,131	4,166	4,151	4,081
Diff. from Baseline - Fleet (pounds)	0	-35	-19	50
Avg Curb Weight - Passenger Car (pounds)	3,459	3,531	3,502	3,359
Diff. from Baseline - Passenger Car (pounds)	0	-72	-43	100
Avg Curb Weight - Light Truck (pounds)	4,433	4,444	4,427	4,383
Diff. from Baseline - Light Trucks (pounds)	0	-11	6	50

**Table A-16-10 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (GM), MY 2029
Total Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	0	0	0	0
Mass Reduction Level 1 (%)	32	10	10	10
Mass Reduction Level 2 (%)	5	1	0	0
Mass Reduction Level 3 (%)	58	61	48	50
Mass Reduction Level 4 (%)	4	28	43	41
Mass Reduction Level 5 (%)	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0
Avg Curb Weight - Fleet (pounds)	4,058	4,001	3,983	3,989
Diff. from Baseline - Fleet (pounds)	0	57	75	69
Avg Curb Weight - Passenger Car (pounds)	3,230	3,143	3,130	3,134
Diff. from Baseline - Passenger Car (pounds)	0	86	100	95
Avg Curb Weight - Light Truck (pounds)	4,533	4,481	4,452	4,452
Diff. from Baseline - Light Trucks (pounds)	0	52	81	81

Table A-16-11 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (Honda), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	0	0	0	0
Mass Reduction Level 1 (%)	7	7	7	7
Mass Reduction Level 2 (%)	0	0	0	0
Mass Reduction Level 3 (%)	93	93	71	72
Mass Reduction Level 4 (%)	0	0	21	21
Mass Reduction Level 5 (%)	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,388	3,396	3,375	3,382
Diff. from Baseline - Fleet (pounds)	0	-9	12	6
Avg Curb Weight - Passenger Car (pounds)	3,094	3,096	3,053	3,054
Diff. from Baseline - Passenger Car (pounds)	0	-2	41	39
Avg Curb Weight - Light Truck (pounds)	3,930	3,930	3,930	3,930
Diff. from Baseline - Light Trucks (pounds)	0	0	0	0

Table A-16-12 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (Hyundai Kia-H), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	0	0	0	0
Mass Reduction Level 1 (%)	2	0	0	0
Mass Reduction Level 2 (%)	23	6	6	6
Mass Reduction Level 3 (%)	62	40	41	23
Mass Reduction Level 4 (%)	14	54	53	71
Mass Reduction Level 5 (%)	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,285	3,230	3,237	3,216
Diff. from Baseline - Fleet (pounds)	0	55	48	68
Avg Curb Weight - Passenger Car (pounds)	3,196	3,133	3,139	3,115
Diff. from Baseline - Passenger Car (pounds)	0	63	57	81
Avg Curb Weight - Light Truck (pounds)	4,184	4,184	4,184	4,184
Diff. from Baseline - Light Trucks (pounds)	0	0	0	0

Table A-16-13 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (Hyundai Kia-K), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	23	0	0	0
Mass Reduction Level 1 (%)	32	39	17	17
Mass Reduction Level 2 (%)	0	0	0	0
Mass Reduction Level 3 (%)	44	44	34	34
Mass Reduction Level 4 (%)	1	18	49	49
Mass Reduction Level 5 (%)	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,589	3,518	3,454	3,458
Diff. from Baseline - Fleet (pounds)	0	71	135	131
Avg Curb Weight - Passenger Car (pounds)	3,408	3,347	3,245	3,246
Diff. from Baseline - Passenger Car (pounds)	0	61	163	162
Avg Curb Weight - Light Truck (pounds)	3,988	3,881	3,881	3,881
Diff. from Baseline - Light Trucks (pounds)	0	108	108	108

**Table A-16-14 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (JLR), MY 2029
Total Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	12	12	12	12
Mass Reduction Level 1 (%)	13	0	0	0
Mass Reduction Level 2 (%)	36	0	0	0
Mass Reduction Level 3 (%)	9	46	46	46
Mass Reduction Level 4 (%)	30	43	43	43
Mass Reduction Level 5 (%)	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0
Avg Curb Weight - Fleet (pounds)	4,387	4,318	4,319	4,321
Diff. from Baseline - Fleet (pounds)	0	69	67	66
Avg Curb Weight - Passenger Car (pounds)	3,483	3,483	3,483	3,483
Diff. from Baseline - Passenger Car (pounds)	0	0	0	0
Avg Curb Weight - Light Truck (pounds)	4,445	4,369	4,369	4,369
Diff. from Baseline - Light Trucks (pounds)	0	76	76	76

Table A-16-15 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (Mazda), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	51	9	9	9
Mass Reduction Level 1 (%)	10	52	0	0
Mass Reduction Level 2 (%)	2	2	10	0
Mass Reduction Level 3 (%)	33	33	13	23
Mass Reduction Level 4 (%)	0	0	64	64
Mass Reduction Level 5 (%)	0	0	0	0
Mass Reduction Level 6 (%)	4	4	4	3
Avg Curb Weight - Fleet (pounds)	3,485	3,434	3,288	3,282
Diff. from Baseline - Fleet (pounds)	0	52	197	203
Avg Curb Weight - Passenger Car (pounds)	3,255	3,221	3,101	3,102
Diff. from Baseline - Passenger Car (pounds)	0	34	153	153
Avg Curb Weight - Light Truck (pounds)	3,749	3,671	3,491	3,475
Diff. from Baseline - Light Trucks (pounds)	0	78	258	275

**Table A-16-16 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (Mitsubishi), MY
2029 Total Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	0	0	0	0
Mass Reduction Level 1 (%)	79	80	0	0
Mass Reduction Level 2 (%)	0	0	0	0
Mass Reduction Level 3 (%)	21	20	0	0
Mass Reduction Level 4 (%)	0	0	100	100
Mass Reduction Level 5 (%)	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0
Avg Curb Weight - Fleet (pounds)	2,991	2,999	2,798	2,803
Diff. from Baseline - Fleet (pounds)	0	-8	193	188
Avg Curb Weight - Passenger Car (pounds)	2,708	2,719	2,557	2,563
Diff. from Baseline - Passenger Car (pounds)	0	-11	151	145
Avg Curb Weight - Light Truck (pounds)	3,267	3,267	3,025	3,025
Diff. from Baseline - Light Trucks (pounds)	0	0	242	242

Table A-16-17 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (Nissan), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	2	2	2	2
Mass Reduction Level 1 (%)	42	38	39	15
Mass Reduction Level 2 (%)	42	6	6	6
Mass Reduction Level 3 (%)	15	50	9	9
Mass Reduction Level 4 (%)	0	4	41	65
Mass Reduction Level 5 (%)	0	0	0	0
Mass Reduction Level 6 (%)	0	0	4	4
Avg Curb Weight - Fleet (pounds)	3,487	3,461	3,400	3,344
Diff. from Baseline - Fleet (pounds)	0	27	87	143
Avg Curb Weight - Passenger Car (pounds)	3,233	3,196	3,118	3,070
Diff. from Baseline - Passenger Car (pounds)	0	37	115	163
Avg Curb Weight - Light Truck (pounds)	4,208	4,188	4,154	4,065
Diff. from Baseline - Light Trucks (pounds)	0	20	53	143

Table A-16-18 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (Subaru), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	0	0	0	0
Mass Reduction Level 1 (%)	0	0	0	0
Mass Reduction Level 2 (%)	93	94	94	94
Mass Reduction Level 3 (%)	6	6	0	0
Mass Reduction Level 4 (%)	1	1	6	6
Mass Reduction Level 5 (%)	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,547	3,551	3,548	3,551
Diff. from Baseline - Fleet (pounds)	0	-4	-1	-4
Avg Curb Weight - Passenger Car (pounds)	3,218	3,218	3,191	3,191
Diff. from Baseline - Passenger Car (pounds)	0	0	26	26
Avg Curb Weight - Light Truck (pounds)	3,676	3,676	3,676	3,676
Diff. from Baseline - Light Trucks (pounds)	0	0	0	0

**Table A-16-19 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (Tesla), MY 2029
Total Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	0	0	0	0
Mass Reduction Level 1 (%)	0	0	0	0
Mass Reduction Level 2 (%)	0	0	0	0
Mass Reduction Level 3 (%)	15	15	15	15
Mass Reduction Level 4 (%)	85	85	85	85
Mass Reduction Level 5 (%)	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0
Avg Curb Weight - Fleet (pounds)	4,304	4,308	4,312	4,315
Diff. from Baseline - Fleet (pounds)	0	-4	-8	-11
Avg Curb Weight - Passenger Car (pounds)	4,276	4,280	4,282	4,285
Diff. from Baseline - Passenger Car (pounds)	0	-3	-6	-8
Avg Curb Weight - Light Truck (pounds)	5,553	5,553	5,553	5,553
Diff. from Baseline - Light Trucks (pounds)	0	0	0	0

**Table A-16-20 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (Toyota), MY
2029 Total Fleet by Alternative**

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	35	7	7	7
Mass Reduction Level 1 (%)	17	45	45	18
Mass Reduction Level 2 (%)	47	0	0	0
Mass Reduction Level 3 (%)	1	1	1	28
Mass Reduction Level 4 (%)	0	47	47	48
Mass Reduction Level 5 (%)	0	0	0	0
Mass Reduction Level 6 (%)	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,681	3,562	3,571	3,549
Diff. from Baseline - Fleet (pounds)	0	119	110	132
Avg Curb Weight - Passenger Car (pounds)	3,266	3,126	3,127	3,077
Diff. from Baseline - Passenger Car (pounds)	0	140	139	189
Avg Curb Weight - Light Truck (pounds)	4,317	4,206	4,206	4,206
Diff. from Baseline - Light Trucks (pounds)	0	111	111	111

Table A-16-21 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (Volvo), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	0	0	0	0
Mass Reduction Level 1 (%)	43	18	18	19
Mass Reduction Level 2 (%)	0	0	0	0
Mass Reduction Level 3 (%)	54	79	79	79
Mass Reduction Level 4 (%)	2	0	0	0
Mass Reduction Level 5 (%)	0	0	0	0
Mass Reduction Level 6 (%)	0	3	3	3
Avg Curb Weight - Fleet (pounds)	4,117	4,077	4,082	4,086
Diff. from Baseline - Fleet (pounds)	0	40	36	32
Avg Curb Weight - Passenger Car (pounds)	3,801	3,682	3,684	3,686
Diff. from Baseline - Passenger Car (pounds)	0	120	117	115
Avg Curb Weight - Light Truck (pounds)	4,252	4,241	4,243	4,244
Diff. from Baseline - Light Trucks (pounds)	0	11	10	8

Table A-16-22 - Mass Reduction Penetration Rate and Curb Weights for Manufacturer (VWA), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Mass Reduction Level 0 (%)	3	1	1	1
Mass Reduction Level 1 (%)	33	30	35	31
Mass Reduction Level 2 (%)	0	0	0	0
Mass Reduction Level 3 (%)	4	10	5	5
Mass Reduction Level 4 (%)	59	58	58	63
Mass Reduction Level 5 (%)	1	1	1	1
Mass Reduction Level 6 (%)	0	0	0	0
Avg Curb Weight - Fleet (pounds)	3,571	3,569	3,583	3,576
Diff. from Baseline - Fleet (pounds)	0	2	-12	-4
Avg Curb Weight - Passenger Car (pounds)	3,222	3,201	3,215	3,188
Diff. from Baseline - Passenger Car (pounds)	0	20	7	33
Avg Curb Weight - Light Truck (pounds)	3,938	3,938	3,938	3,938
Diff. from Baseline - Light Trucks (pounds)	0	0	0	0

17. Electrification Rates

Table A-17-1 - Electrification Rates (%) for Manufacturer (Total), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	7.6	11.9	13.9	18.4
Strong Hybrid Powertrains Total	5.1	7.7	7.6	9.2
Plug-In Hybrid Powertrains	1.1	2.5	7.2	10.8
Battery Electric Vehicles (BEVs)	5.6	6.3	7.0	7.5
BEV 200 Mile Range	2.9	3.2	3.4	3.4
BEV 300 Mile Range	2.5	2.8	3.3	3.8
BEV 400 Mile Range	0.3	0.3	0.3	0.3
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-2 - Electrification Rates (%) for Manufacturer (Total), MY 2029 Passenger Car Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	3.6	5.4	6.9	13.8
Strong Hybrid Powertrains Total	4.6	5.5	6.0	9.1
Plug-In Hybrid Powertrains	1.5	2.8	7.8	10.1
Battery Electric Vehicles (BEVs)	8.7	9.8	10.9	12.1
BEV 200 Mile Range	4.3	4.7	4.9	5.3
BEV 300 Mile Range	3.9	4.7	5.5	6.4
BEV 400 Mile Range	0.4	0.5	0.5	0.5
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-3 - Electrification Rates (%) for Manufacturer (Total), MY 2029 Light Truck Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	11.5	18.2	20.5	22.7
Strong Hybrid Powertrains Total	5.7	9.8	9.0	9.4
Plug-In Hybrid Powertrains	0.8	2.1	6.7	11.5
Battery Electric Vehicles (BEVs)	2.6	2.9	3.3	3.3
BEV 200 Mile Range	1.4	1.8	2.0	1.8
BEV 300 Mile Range	1.1	1.1	1.2	1.4
BEV 400 Mile Range	0.1	0.1	0.1	0.1
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-4 - Electrification Rates (%) for Manufacturer (Total), MY 2029 Domestic Car Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	0.9	1.9	3.2	7.8
Strong Hybrid Powertrains Total	2.4	2.9	4.7	8.7
Plug-In Hybrid Powertrains	1.9	3.0	6.7	8.0
Battery Electric Vehicles (BEVs)	12.3	14.5	15.3	16.6
BEV 200 Mile Range	4.9	5.5	5.9	6.1
BEV 300 Mile Range	6.5	8.0	8.4	9.6
BEV 400 Mile Range	0.9	0.9	0.9	1.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-5 - Electrification Rates (%) for Manufacturer (Total), MY 2029 Imported Car Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	6.2	8.5	10.2	19.3
Strong Hybrid Powertrains Total	6.5	7.9	7.3	9.4
Plug-In Hybrid Powertrains	1.1	2.6	8.6	12.0
Battery Electric Vehicles (BEVs)	5.3	5.5	7.0	7.9
BEV 200 Mile Range	3.8	3.9	4.1	4.5
BEV 300 Mile Range	1.5	1.6	2.9	3.4
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-6 - Electrification Rates (%) for Manufacturer (BMW), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	31.4	34.5	43.5	41.6
Strong Hybrid Powertrains Total	0.0	0.1	0.2	1.3
Plug-In Hybrid Powertrains	4.4	3.0	7.9	14.5
Battery Electric Vehicles (BEVs)	4.9	5.6	6.0	6.9
BEV 200 Mile Range	3.0	3.5	3.9	4.1
BEV 300 Mile Range	1.9	2.0	2.1	2.9
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-7 - Electrification Rates (%) for Manufacturer (Daimler), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	42.4	49.6	49.5	50.1
Strong Hybrid Powertrains Total	2.2	1.7	1.7	3.9
Plug-In Hybrid Powertrains	3.4	8.7	8.1	8.4
Battery Electric Vehicles (BEVs)	5.0	4.5	8.0	9.6
BEV 200 Mile Range	4.3	3.2	3.2	3.2
BEV 300 Mile Range	0.0	0.6	4.1	5.7
BEV 400 Mile Range	0.7	0.7	0.7	0.7
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-8 - Electrification Rates (%) for Manufacturer (FCA), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	10.3	22.7	23.2	23.3
Strong Hybrid Powertrains Total	0.0	0.1	0.2	0.2
Plug-In Hybrid Powertrains	0.4	0.4	0.4	0.4
Battery Electric Vehicles (BEVs)	3.9	4.2	4.9	5.5
BEV 200 Mile Range	2.8	3.1	3.1	3.1
BEV 300 Mile Range	1.1	1.1	1.8	2.5
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-9 - Electrification Rates (%) for Manufacturer (Ford), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	26.1	15.4	28.9	30.0
Strong Hybrid Powertrains Total	10.3	10.9	8.2	7.4
Plug-In Hybrid Powertrains	2.3	1.8	8.1	12.2
Battery Electric Vehicles (BEVs)	4.4	7.5	9.0	9.0
BEV 200 Mile Range	3.2	3.1	3.1	3.0
BEV 300 Mile Range	1.2	4.3	6.0	6.0
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-10 - Electrification Rates (%) for Manufacturer (GM), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	1.4	17.2	13.7	22.4
Strong Hybrid Powertrains Total	4.4	18.8	14.0	15.1
Plug-In Hybrid Powertrains	0.2	2.1	12.7	19.4
Battery Electric Vehicles (BEVs)	5.0	5.5	5.4	5.4
BEV 200 Mile Range	2.3	2.9	2.9	2.9
BEV 300 Mile Range	2.6	2.6	2.5	2.5
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-11 - Electrification Rates (%) for Manufacturer (Honda), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	5.8	4.2	7.7	4.5
Strong Hybrid Powertrains Total	3.9	2.9	5.0	5.7
Plug-In Hybrid Powertrains	2.7	3.4	6.8	10.3
Battery Electric Vehicles (BEVs)	3.6	3.5	4.7	8.1
BEV 200 Mile Range	1.7	1.7	2.9	3.1
BEV 300 Mile Range	1.9	1.8	1.8	5.0
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-12 - Electrification Rates (%) for Manufacturer (Hyundai Kia-H), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	0.0	1.8	3.5	23.3
Strong Hybrid Powertrains Total	0.5	12.4	6.6	10.2
Plug-In Hybrid Powertrains	0.0	1.5	17.3	21.0
Battery Electric Vehicles (BEVs)	4.0	3.9	3.9	4.9
BEV 200 Mile Range	2.1	2.0	2.0	3.0
BEV 300 Mile Range	1.9	1.9	1.9	1.9
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-13 - Electrification Rates (%) for Manufacturer (Hyundai Kia-K), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	0.0	0.3	12.2	20.7
Strong Hybrid Powertrains Total	0.8	2.8	11.8	28.4
Plug-In Hybrid Powertrains	0.2	0.9	5.7	8.5
Battery Electric Vehicles (BEVs)	2.7	2.7	3.6	3.6
BEV 200 Mile Range	2.3	2.2	3.1	3.1
BEV 300 Mile Range	0.4	0.4	0.5	0.5
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-14 - Electrification Rates (%) for Manufacturer (JLR), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	26.5	78.7	78.8	86.3
Strong Hybrid Powertrains Total	0.0	0.0	0.0	0.0
Plug-In Hybrid Powertrains	0.7	0.7	0.7	0.7
Battery Electric Vehicles (BEVs)	3.9	6.2	6.3	6.3
BEV 200 Mile Range	2.5	4.8	4.9	4.9
BEV 300 Mile Range	1.4	1.4	1.4	1.4
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-15 - Electrification Rates (%) for Manufacturer (Mazda), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	0.0	0.0	17.1	23.0
Strong Hybrid Powertrains Total	0.0	5.2	3.4	3.3
Plug-In Hybrid Powertrains	0.0	0.0	0.0	5.5
Battery Electric Vehicles (BEVs)	5.1	5.0	5.0	4.9
BEV 200 Mile Range	4.1	4.0	3.9	3.9
BEV 300 Mile Range	1.1	1.0	1.0	1.0
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-16 - Electrification Rates (%) for Manufacturer (Mitsubishi), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	0.0	0.0	0.0	20.5
Strong Hybrid Powertrains Total	0.0	0.0	0.0	0.0
Plug-In Hybrid Powertrains	0.0	0.0	0.0	4.8
Battery Electric Vehicles (BEVs)	1.6	1.6	1.6	1.7
BEV 200 Mile Range	0.5	0.5	0.5	0.5
BEV 300 Mile Range	1.1	1.1	1.1	1.1
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-17 - Electrification Rates (%) for Manufacturer (Nissan), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	0.0	1.1	0.0	9.1
Strong Hybrid Powertrains Total	0.0	0.9	4.1	7.4
Plug-In Hybrid Powertrains	0.0	0.4	7.8	11.1
Battery Electric Vehicles (BEVs)	1.8	4.0	5.9	6.3
BEV 200 Mile Range	1.4	3.5	4.3	4.2
BEV 300 Mile Range	0.5	0.5	1.6	2.1
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-18 - Electrification Rates (%) for Manufacturer (Subaru), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	0.0	0.0	2.4	6.2
Strong Hybrid Powertrains Total	0.0	0.0	0.6	2.0
Plug-In Hybrid Powertrains	0.0	0.0	1.5	2.3
Battery Electric Vehicles (BEVs)	2.3	2.3	2.3	2.3
BEV 200 Mile Range	0.1	0.1	0.1	0.0
BEV 300 Mile Range	2.2	2.2	2.2	2.2
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-19 - Electrification Rates (%) for Manufacturer (Tesla), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	0.0	0.0	0.0	0.0
Strong Hybrid Powertrains Total	0.0	0.0	0.0	0.0
Plug-In Hybrid Powertrains	0.0	0.0	0.0	0.0
Battery Electric Vehicles (BEVs)	100.0	100.0	100.0	100.0
BEV 200 Mile Range	25.3	25.2	25.1	25.1
BEV 300 Mile Range	60.1	59.9	59.7	59.6
BEV 400 Mile Range	14.6	14.9	15.1	15.3
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-20 - Electrification Rates (%) for Manufacturer (Toyota), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	0.0	3.0	0.0	1.9
Strong Hybrid Powertrains Total	12.6	10.6	10.4	10.5
Plug-In Hybrid Powertrains	0.0	4.5	5.8	10.7
Battery Electric Vehicles (BEVs)	3.6	3.9	3.9	4.0
BEV 200 Mile Range	3.0	3.3	3.3	3.3
BEV 300 Mile Range	0.6	0.6	0.6	0.7
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-21 - Electrification Rates (%) for Manufacturer (Volvo), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	0.0	0.0	13.1	4.4
Strong Hybrid Powertrains Total	24.5	31.3	29.4	28.4
Plug-In Hybrid Powertrains	5.6	5.5	5.4	5.4
Battery Electric Vehicles (BEVs)	6.7	6.6	9.7	14.6
BEV 200 Mile Range	2.7	3.0	2.7	2.7
BEV 300 Mile Range	4.0	3.6	7.0	11.9
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

Table A-17-22 - Electrification Rates (%) for Manufacturer (VWA), MY 2029 Total Fleet by Alternative

Alternative	0 (Baseline)	1	2	3
Strong Hybrid	15.6	30.9	20.1	29.3
Strong Hybrid Powertrains Total	24.7	9.4	23.4	26.8
Plug-In Hybrid Powertrains	8.7	11.6	7.3	11.1
Battery Electric Vehicles (BEVs)	5.8	6.3	7.0	5.6
BEV 200 Mile Range	4.4	5.0	5.7	4.3
BEV 300 Mile Range	1.3	1.4	1.4	1.4
BEV 400 Mile Range	0.0	0.0	0.0	0.0
BEV 500 Mile Range	0.0	0.0	0.0	0.0
Fuel Cell Vehicles (FCVs)	0.0	0.0	0.0	0.0

18. Required and Achieved CAFE Levels, Comparison

Table A-18-1 - Required and Achieved CAFE Levels (mpg) for Total Fleet for Alternative 2

Model Year	Total		
	Required	Achieved	Difference
2020	35.4	34.3	-1.1
2021	36.0	35.9	-0.1
2022	36.8	38.2	1.4
2023	37.4	40.5	3.1
2024	40.7	43.2	2.5
2025	44.2	45.1	0.9
2026	48.1	47.6	-0.5
2027	48.1	48.3	0.2
2028	48.2	48.9	0.7
2029	48.2	49.2	1.0

Table A-18-2 - Required and Achieved CAFE Levels (mpg) for Passenger Car Fleet for Alternative 2

Model Year	Total		
	Required	Achieved	Difference
2020	43.3	41.7	-1.6
2021	43.9	43.6	-0.3
2022	44.6	46.6	2.0
2023	45.2	49.7	4.5
2024	49.2	53.9	4.8
2025	53.4	57.1	3.7
2026	58.1	59.6	1.5
2027	58.1	60.5	2.4
2028	58.1	61.3	3.2
2029	58.1	61.4	3.4

Table A-18-3 - Required and Achieved CAFE Levels (mpg) for Light Truck Fleet for Alternative 2

Model Year	Total		
	Required	Achieved	Difference
2020	31.0	30.2	-0.8
2021	31.5	31.5	0.0
2022	31.9	33.1	1.1
2023	32.4	34.8	2.4
2024	35.1	36.5	1.4
2025	38.2	37.9	-0.3
2026	41.5	40.2	-1.4
2027	41.5	40.7	-0.8
2028	41.5	41.1	-0.4
2029	41.5	41.4	-0.2

Table A-18-4 - Required and Achieved CAFE Levels (mpg) for Total Fleet for Alternative 2, Part 1 of 5

Model Year	BMW			Daimler			FCA			Ford		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	37.7	34.6	-3.1	35.6	31.5	-4.1	31.3	28.4	-2.9	31.8	31.6	-0.2
2021	38.4	36.3	-2.1	36.3	33.5	-2.8	31.7	29.5	-2.2	32.4	33.0	0.6
2022	39.2	39.7	0.5	37.0	34.7	-2.3	32.3	32.2	-0.1	33.0	35.1	2.2
2023	39.9	43.5	3.6	37.6	36.6	-1.0	32.8	33.9	1.0	33.6	38.9	5.3
2024	43.4	45.3	1.8	41.0	39.8	-1.2	35.7	34.3	-1.3	36.4	40.1	3.8
2025	47.3	48.5	1.2	44.6	41.3	-3.4	38.8	34.4	-4.5	39.6	40.6	1.0
2026	51.4	50.2	-1.2	48.5	42.5	-5.9	42.2	35.4	-6.8	43.0	43.7	0.7
2027	51.4	51.5	0.1	48.5	44.9	-3.6	42.2	36.2	-5.9	43.0	43.8	0.8
2028	51.5	51.5	0.1	48.6	45.5	-3.1	42.2	37.7	-4.5	43.1	44.0	0.9
2029	51.5	51.8	0.2	48.6	45.7	-2.9	42.2	38.1	-4.1	43.1	44.0	0.9

Table A-18-5 - Required and Achieved CAFE Levels (mpg) for Total Fleet for Alternative 2, Part 2 of 5

Model Year	GM			Honda			Hyundai Kia-H			Hyundai Kia-K		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	32.7	30.9	-1.8	38.6	40.3	1.8	41.6	37.7	-3.9	38.9	36.3	-2.6
2021	33.2	32.4	-0.8	39.3	41.3	2.0	42.3	39.0	-3.3	39.7	40.6	0.9
2022	33.9	33.9	0.0	40.1	44.5	4.4	43.1	42.1	-0.9	40.5	41.4	0.9
2023	34.4	34.5	0.1	40.7	46.5	5.7	43.8	44.0	0.2	41.3	41.8	0.6
2024	37.1	37.0	-0.1	44.4	48.6	4.2	47.6	47.8	0.2	44.9	49.3	4.3
2025	40.4	40.4	-0.1	48.2	50.9	2.7	51.7	50.7	-1.0	48.8	51.5	2.7
2026	44.0	43.6	-0.4	52.5	52.2	-0.3	56.2	56.3	0.1	53.1	53.1	0.0
2027	44.0	44.4	0.4	52.5	52.3	-0.2	56.2	56.8	0.6	53.1	54.1	1.0
2028	44.0	44.5	0.5	52.5	52.6	0.0	56.2	57.0	0.8	53.2	54.5	1.3
2029	44.1	45.0	0.9	52.6	52.6	0.0	56.3	57.2	0.9	53.2	54.7	1.5

Table A-18-6 - Required and Achieved CAFE Levels (mpg) for Total Fleet for Alternative 2, Part 3 of 5

Model Year	JLR			Mazda			Mitsubishi			Nissan		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	32.6	28.9	-3.7	38.7	36.4	-2.3	40.7	38.7	-2.0	39.2	37.6	-1.6
2021	33.1	30.1	-3.1	39.3	37.7	-1.6	41.3	39.4	-1.9	39.9	40.1	0.2
2022	33.7	31.6	-2.0	40.0	38.7	-1.3	42.1	39.8	-2.3	40.6	42.3	1.7
2023	34.2	34.0	-0.3	40.7	43.7	3.0	42.7	40.1	-2.6	41.3	45.2	3.9
2024	37.3	36.4	-0.9	44.3	44.5	0.2	46.5	40.2	-6.3	45.0	48.4	3.4
2025	40.5	37.6	-2.9	48.1	50.8	2.6	50.6	56.2	5.7	48.9	52.0	3.1
2026	43.9	38.3	-5.6	52.3	53.5	1.2	55.0	56.3	1.3	53.2	53.2	0.0
2027	43.9	39.2	-4.8	52.3	53.6	1.2	55.0	56.3	1.3	53.2	53.6	0.4
2028	44.0	39.2	-4.8	52.4	53.6	1.2	55.0	56.4	1.3	53.2	54.9	1.7
2029	44.0	40.8	-3.2	52.4	53.9	1.5	55.1	56.4	1.3	53.3	55.4	2.1

Table A-18-7 - Required and Achieved CAFE Levels (mpg) for Total Fleet for Alternative 2, Part 4 of 5

Model Year	Subaru			Tesla			Toyota			Volvo		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	37.0	38.7	1.6	40.5	720.6	680.1	37.1	36.7	-0.5	34.3	33.1	-1.2
2021	37.7	39.9	2.2	40.4	747.7	707.3	37.9	38.1	0.2	34.9	33.4	-1.5
2022	38.3	42.4	4.1	41.1	750.2	709.1	38.6	40.1	1.5	35.5	33.6	-1.9
2023	39.0	46.5	7.5	41.8	755.2	713.4	39.3	43.2	3.9	36.0	42.1	6.1
2024	42.5	49.8	7.3	45.4	756.0	710.6	42.9	47.4	4.5	39.2	42.3	3.2
2025	46.2	51.4	5.2	49.3	756.0	706.7	46.6	48.1	1.5	42.6	43.5	0.9
2026	50.2	53.3	3.1	53.6	756.2	702.6	50.7	51.6	0.9	46.3	44.5	-1.8
2027	50.2	53.6	3.4	53.6	756.3	702.7	50.7	52.0	1.3	46.3	48.1	1.8
2028	50.3	53.6	3.3	53.6	756.9	703.3	50.8	52.7	1.9	46.3	48.2	1.9
2029	50.3	53.6	3.3	53.6	757.3	703.7	50.8	52.8	1.9	46.3	48.2	1.9

Table A-18-8 - Required and Achieved CAFE Levels (mpg) for Total Fleet for Alternative 2, Part 5 of 5

Model Year	VWA			Total		
	Required	Achieved	Difference	Required	Achieved	Difference
2020	37.1	33.1	-4.0	35.4	34.3	-1.1
2021	37.9	34.9	-3.0	36.0	35.9	-0.1
2022	38.7	37.0	-1.7	36.8	38.2	1.4
2023	39.4	38.2	-1.2	37.4	40.5	3.1
2024	42.9	44.2	1.3	40.7	43.2	2.5
2025	46.6	47.0	0.4	44.2	45.1	0.9
2026	50.7	48.5	-2.2	48.1	47.6	-0.5
2027	50.8	49.9	-0.9	48.1	48.3	0.2
2028	50.8	51.4	0.5	48.2	48.9	0.7
2029	50.9	51.6	0.7	48.2	49.2	1.0

**Table A-18-9 - Required and Achieved CAFE Levels (mpg) for Passenger Car Fleet for Alternative 2,
Part 1 of 5**

Model Year	BMW			Daimler			FCA			Ford		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	42.5	36.6	-5.9	41.4	33.9	-7.5	41.6	30.7	-10.9	42.2	36.9	-5.3
2021	43.1	38.4	-4.7	42.0	36.9	-5.1	42.0	38.4	-3.6	42.8	37.3	-5.5
2022	43.8	42.2	-1.6	42.7	38.7	-4.0	42.5	41.6	-1.0	43.5	42.9	-0.6
2023	44.4	46.1	1.7	43.3	39.5	-3.8	43.0	45.5	2.5	44.1	57.5	13.4
2024	48.3	48.4	0.1	47.1	47.1	0.0	46.8	47.2	0.5	47.9	57.5	9.5
2025	52.5	53.9	1.4	51.2	48.6	-2.6	50.9	47.5	-3.4	52.2	59.0	6.8
2026	57.1	57.1	0.0	55.6	48.9	-6.7	55.2	51.0	-4.2	56.7	61.0	4.3
2027	57.1	57.2	0.1	55.6	54.0	-1.6	55.2	51.0	-4.2	56.7	61.1	4.4
2028	57.1	57.2	0.1	55.6	55.6	0.0	55.1	56.2	1.1	56.7	61.1	4.4
2029	57.1	57.5	0.4	55.6	55.7	0.1	55.1	56.3	1.2	56.7	61.0	4.3

**Table A-18-10 - Required and Achieved CAFE Levels (mpg) for Passenger Car Fleet for Alternative 2,
Part 2 of 5**

Model Year	GM			Honda			Hyundai Kia-H			Hyundai Kia-K		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	43.9	40.0	-3.9	43.6	45.0	1.4	43.3	39.1	-4.3	44.0	41.4	-2.6
2021	44.5	41.2	-3.3	44.3	45.9	1.6	44.0	40.6	-3.5	44.7	45.8	1.1
2022	45.2	43.7	-1.6	45.0	48.9	3.9	44.7	44.3	-0.5	45.4	47.0	1.6
2023	45.8	46.1	0.3	45.6	52.1	6.5	45.5	45.8	0.3	46.1	47.2	1.1
2024	49.8	49.2	-0.6	49.6	53.3	3.7	49.4	50.3	0.9	50.1	52.8	2.7
2025	54.2	53.9	-0.3	53.9	55.6	1.7	53.7	53.9	0.2	54.5	56.5	2.0
2026	58.9	57.0	-1.9	58.6	58.1	-0.5	58.3	58.4	0.1	59.2	59.2	0.0
2027	58.9	59.0	0.1	58.6	58.2	-0.4	58.3	59.0	0.7	59.2	59.7	0.5
2028	58.9	59.0	0.1	58.6	58.7	0.1	58.3	59.2	0.9	59.2	60.2	1.0
2029	58.9	59.1	0.2	58.6	58.7	0.1	58.3	59.4	1.1	59.2	60.6	1.4

**Table A-18-11 - Required and Achieved CAFE Levels (mpg) for Passenger Car Fleet for Alternative 2,
Part 3 of 5**

Model Year	JLR			Mazda			Mitsubishi			Nissan		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	42.1	35.7	-6.4	43.9	38.6	-5.4	46.5	42.3	-4.2	43.2	41.7	-1.5
2021	42.7	36.9	-5.8	44.6	41.3	-3.3	47.2	44.0	-3.2	43.9	43.3	-0.6
2022	43.3	37.0	-6.3	45.2	43.1	-2.1	48.0	44.6	-3.4	44.5	45.5	1.0
2023	44.0	39.4	-4.6	45.9	48.2	2.2	48.8	45.0	-3.8	45.1	48.3	3.2
2024	47.8	47.2	-0.6	50.0	49.6	-0.3	53.1	45.2	-7.9	49.1	52.9	3.8
2025	52.0	47.2	-4.8	54.3	56.9	2.6	57.7	63.0	5.3	53.4	58.1	4.7
2026	56.5	47.2	-9.3	59.0	59.4	0.4	62.7	63.1	0.4	58.0	58.4	0.4
2027	56.5	49.4	-7.1	59.0	59.4	0.4	62.7	63.1	0.4	58.0	58.7	0.7
2028	56.5	49.4	-7.1	59.0	59.4	0.4	62.7	63.2	0.5	58.0	60.3	2.3
2029	56.5	53.5	-3.0	59.0	60.0	1.0	62.8	63.3	0.5	58.0	60.6	2.6

**Table A-18-12 - Required and Achieved CAFE Levels (mpg) for Passenger Car Fleet for Alternative 2,
Part 4 of 5**

Model Year	Subaru			Tesla			Toyota			Volvo		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	44.9	38.1	-6.8	40.9	725.7	684.8	43.6	46.0	2.4	40.9	35.7	-5.2
2021	45.5	40.1	-5.4	40.8	752.4	711.6	44.3	47.1	2.8	41.5	36.4	-5.1
2022	46.2	44.3	-1.9	41.4	754.6	713.2	45.0	49.1	4.2	42.2	36.5	-5.7
2023	46.9	46.0	-0.9	42.1	755.9	713.8	45.6	50.0	4.3	42.8	40.7	-2.1
2024	51.0	52.4	1.4	45.7	756.7	711.0	49.7	56.3	6.6	46.5	41.0	-5.5
2025	55.5	52.7	-2.8	49.7	756.7	707.0	53.9	57.4	3.5	50.5	42.5	-8.0
2026	60.3	60.3	0.0	54.0	756.9	702.9	58.6	58.6	0.0	54.9	45.5	-9.4
2027	60.3	60.3	0.0	54.0	757.0	703.0	58.6	59.5	0.9	54.9	54.9	0.0
2028	60.3	60.3	0.0	54.0	757.6	703.6	58.6	59.8	1.2	54.9	55.0	0.1
2029	60.3	60.3	0.0	54.0	758.0	704.0	58.6	59.9	1.3	54.9	55.1	0.1

**Table A-18-13 - Required and Achieved CAFE Levels (mpg) for Passenger Car Fleet for Alternative 2,
Part 5 of 5**

Model Year	VWA			Total		
	Required	Achieved	Difference	Required	Achieved	Difference
2020	43.6	37.6	-6.0	43.3	41.7	-1.6
2021	44.3	38.6	-5.7	43.9	43.6	-0.3
2022	45.0	40.7	-4.3	44.6	46.6	2.0
2023	45.7	42.9	-2.9	45.2	49.7	4.5
2024	49.7	53.5	3.8	49.2	53.9	4.8
2025	54.0	54.9	0.9	53.4	57.1	3.7
2026	58.7	56.6	-2.1	58.1	59.6	1.5
2027	58.7	56.7	-2.0	58.1	60.5	2.4
2028	58.7	60.6	1.9	58.1	61.3	3.2
2029	58.7	60.9	2.2	58.1	61.4	3.4

Table A-18-14 - Required and Achieved CAFE Levels (mpg) for Light Truck Fleet for Alternative 2, Part 1 of 5

Model Year	BMW			Daimler			FCA			Ford		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	31.7	31.7	0.0	31.7	29.7	-2.0	30.1	28.1	-2.0	29.2	30.0	0.8
2021	32.2	33.1	0.9	32.2	30.8	-1.4	30.5	28.4	-2.1	29.7	31.6	1.9
2022	32.6	35.7	3.1	32.6	31.4	-1.2	31.0	31.0	0.0	30.1	32.8	2.7
2023	33.1	39.1	6.0	33.1	34.0	0.9	31.5	32.4	0.9	30.6	34.4	3.8
2024	36.0	40.0	4.0	36.0	34.1	-1.9	34.2	32.7	-1.5	33.1	35.7	2.6
2025	39.2	40.2	1.0	39.2	35.5	-3.7	37.2	32.7	-4.5	36.0	36.0	0.0
2026	42.6	40.2	-2.4	42.6	37.3	-5.3	40.4	33.5	-6.9	39.1	39.1	0.0
2027	42.6	42.6	0.0	42.6	37.9	-4.7	40.4	34.4	-6.0	39.1	39.2	0.1
2028	42.6	42.6	0.0	42.6	37.9	-4.7	40.4	35.5	-4.9	39.1	39.3	0.2
2029	42.6	42.6	0.0	42.6	38.1	-4.5	40.4	35.9	-4.5	39.1	39.3	0.2

**Table A-18-15 - Required and Achieved CAFE Levels (mpg) for Light Truck Fleet for Alternative 2, Part
2 of 5**

Model Year	GM			Honda			Hyundai Kia-H			Hyundai Kia-K		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	29.1	27.8	-1.3	33.3	35.3	2.0	31.3	29.1	-2.2	32.8	30.3	-2.5
2021	29.5	29.3	-0.2	33.8	36.0	2.2	31.7	29.3	-2.4	33.3	34.0	0.7
2022	30.0	30.4	0.4	34.3	39.1	4.8	32.2	29.3	-2.9	33.9	34.1	0.2
2023	30.4	30.5	0.1	34.8	39.6	4.8	32.7	32.2	-0.5	34.4	34.4	0.0
2024	32.7	32.7	0.0	37.8	42.4	4.6	35.6	32.4	-3.2	37.4	43.6	6.2
2025	35.6	35.6	0.0	41.1	44.7	3.6	38.6	32.5	-6.1	40.6	43.9	3.3
2026	38.7	38.7	0.0	44.7	44.7	0.0	42.0	42.0	0.0	44.1	44.1	0.0
2027	38.7	39.2	0.5	44.7	44.7	0.0	42.0	42.1	0.1	44.1	45.7	1.6
2028	38.7	39.3	0.6	44.7	44.7	0.0	42.0	42.1	0.1	44.1	45.7	1.6
2029	38.7	39.8	1.1	44.7	44.7	0.0	42.0	42.1	0.1	44.1	45.7	1.6

Table A-18-16 - Required and Achieved CAFE Levels (mpg) for Light Truck Fleet for Alternative 2, Part 3 of 5

Model Year	JLR			Mazda			Mitsubishi			Nissan		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	32.3	28.7	-3.6	34.8	34.5	-0.3	36.8	36.1	-0.7	32.5	30.9	-1.6
2021	32.8	29.8	-3.0	35.3	34.8	-0.5	37.3	36.2	-1.1	33.0	34.3	1.3
2022	33.3	31.4	-1.9	35.8	35.1	-0.7	37.9	36.3	-1.6	33.5	36.1	2.6
2023	33.8	33.7	-0.1	36.4	39.8	3.4	38.4	36.5	-1.9	34.0	38.8	4.8
2024	36.8	35.9	-0.9	39.6	40.2	0.6	41.8	36.5	-5.3	37.0	39.8	2.8
2025	40.0	37.2	-2.8	43.0	45.6	2.6	45.4	51.2	5.8	40.2	40.9	0.7
2026	43.4	37.9	-5.5	46.7	48.4	1.7	49.4	51.2	1.8	43.7	43.2	-0.5
2027	43.4	38.7	-4.7	46.7	48.5	1.8	49.4	51.2	1.8	43.7	43.7	0.0
2028	43.4	38.7	-4.7	46.7	48.5	1.8	49.4	51.2	1.8	43.7	44.4	0.7
2029	43.4	40.2	-3.2	46.7	48.5	1.8	49.4	51.2	1.8	43.7	45.0	1.3

Table A-18-17 - Required and Achieved CAFE Levels (mpg) for Light Truck Fleet for Alternative 2, Part 4 of 5

Model Year	Subaru			Tesla			Toyota			Volvo		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	35.4	38.8	3.4	30.6	588.5	557.9	31.8	29.8	-2.0	32.5	32.3	-0.2
2021	35.9	39.8	3.9	31.1	617.1	586.0	32.3	31.0	-1.3	33.0	32.4	-0.6
2022	36.4	41.9	5.5	31.6	617.1	585.5	32.7	32.4	-0.3	33.5	32.6	-0.9
2023	37.0	46.7	9.7	32.0	728.4	696.4	33.2	36.6	3.4	34.0	42.7	8.7
2024	40.2	49.0	8.8	34.8	728.3	693.5	36.1	39.0	2.9	36.9	42.9	6.0
2025	43.7	51.0	7.3	37.8	728.4	690.6	39.3	39.3	0.0	40.2	43.9	3.7
2026	47.5	51.3	3.8	41.1	728.3	687.2	42.7	44.2	1.5	43.6	44.1	0.5
2027	47.5	51.6	4.1	41.1	728.3	687.2	42.7	44.2	1.5	43.6	45.9	2.3
2028	47.5	51.6	4.1	41.1	728.3	687.2	42.7	45.1	2.4	43.6	45.9	2.3
2029	47.5	51.6	4.1	41.1	728.3	687.2	42.7	45.1	2.4	43.6	45.9	2.3

Table A-18-18 - Required and Achieved CAFE Levels (mpg) for Light Truck Fleet for Alternative 2, Part 5 of 5

Model Year	VWA			Total		
	Required	Achieved	Difference	Required	Achieved	Difference
2020	33.5	30.5	-3.0	31.0	30.2	-0.8
2021	34.1	32.5	-1.6	31.5	31.5	0.0
2022	34.6	34.3	-0.3	31.9	33.1	1.1
2023	35.1	34.9	-0.2	32.4	34.8	2.4
2024	38.2	38.2	0.0	35.1	36.5	1.4
2025	41.5	41.6	0.1	38.2	37.9	-0.3
2026	45.1	42.9	-2.2	41.5	40.2	-1.4
2027	45.1	44.9	-0.2	41.5	40.7	-0.8
2028	45.1	44.9	-0.2	41.5	41.1	-0.4
2029	45.1	44.9	-0.2	41.5	41.4	-0.2

**Table A-18-19 - Required and Achieved CAFE Levels (mpg) for Domestic Car Fleet for Alternative 2,
Part 1 of 5**

Model Year	BMW			Daimler			FCA			Ford		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	0.0	0.0	0.0	0.0	0.0	0.0	40.9	29.9	-11.0	41.9	36.8	-5.1
2021	0.0	0.0	0.0	0.0	0.0	0.0	41.3	38.7	-2.6	42.5	37.2	-5.3
2022	0.0	0.0	0.0	0.0	0.0	0.0	41.8	38.9	-2.9	43.2	43.2	0.0
2023	0.0	0.0	0.0	0.0	0.0	0.0	42.3	43.2	0.9	43.8	54.4	10.6
2024	0.0	0.0	0.0	0.0	0.0	0.0	46.0	44.6	-1.4	47.6	54.4	6.8
2025	0.0	0.0	0.0	0.0	0.0	0.0	50.0	44.8	-5.2	51.8	55.8	4.0
2026	0.0	0.0	0.0	0.0	0.0	0.0	54.3	48.4	-5.9	56.3	57.8	1.5
2027	0.0	0.0	0.0	0.0	0.0	0.0	54.3	48.4	-5.9	56.3	57.9	1.6
2028	0.0	0.0	0.0	0.0	0.0	0.0	54.2	54.2	0.0	56.3	57.9	1.6
2029	0.0	0.0	0.0	0.0	0.0	0.0	54.2	54.3	0.1	56.3	57.8	1.5

**Table A-18-20 - Required and Achieved CAFE Levels (mpg) for Domestic Car Fleet for Alternative 2,
Part 2 of 5**

Model Year	GM			Honda			Hyundai Kia-H			Hyundai Kia-K		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	42.9	39.8	-3.1	43.2	44.7	1.5	47.3	52.4	5.1	0.0	0.0	0.0
2021	43.5	40.3	-3.2	43.9	45.7	1.8	48.0	52.5	4.5	0.0	0.0	0.0
2022	44.2	42.2	-2.0	44.6	48.2	3.6	48.7	53.0	4.3	0.0	0.0	0.0
2023	44.8	45.2	0.4	45.2	52.0	6.8	49.5	65.5	16.0	0.0	0.0	0.0
2024	48.7	48.7	0.0	49.2	53.4	4.2	53.8	65.9	12.1	0.0	0.0	0.0
2025	53.0	54.5	1.5	53.5	55.1	1.6	58.4	66.2	7.8	0.0	0.0	0.0
2026	57.6	57.6	0.0	58.1	58.1	0.0	63.5	66.4	2.9	0.0	0.0	0.0
2027	57.6	57.7	0.1	58.1	58.1	0.0	63.5	66.9	3.4	0.0	0.0	0.0
2028	57.6	57.7	0.1	58.1	58.2	0.1	63.5	66.9	3.4	0.0	0.0	0.0
2029	57.6	57.8	0.2	58.1	58.2	0.1	63.5	66.9	3.4	0.0	0.0	0.0

**Table A-18-21 - Required and Achieved CAFE Levels (mpg) for Domestic Car Fleet for Alternative 2,
Part 3 of 5**

Model Year	JLR			Mazda			Mitsubishi			Nissan		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	0.0	0.0	0.0	45.0	38.5	-6.5	0.0	0.0	0.0	43.0	43.2	0.2
2021	0.0	0.0	0.0	45.7	38.9	-6.8	0.0	0.0	0.0	43.7	43.7	0.0
2022	0.0	0.0	0.0	46.4	39.2	-7.2	0.0	0.0	0.0	44.3	45.6	1.3
2023	0.0	0.0	0.0	47.1	44.4	-2.7	0.0	0.0	0.0	45.0	46.9	1.9
2024	0.0	0.0	0.0	51.2	44.7	-6.5	0.0	0.0	0.0	48.9	51.6	2.7
2025	0.0	0.0	0.0	55.6	63.3	7.7	0.0	0.0	0.0	53.2	58.3	5.1
2026	0.0	0.0	0.0	60.5	63.6	3.1	0.0	0.0	0.0	57.8	58.5	0.7
2027	0.0	0.0	0.0	60.5	63.6	3.1	0.0	0.0	0.0	57.8	58.8	1.0
2028	0.0	0.0	0.0	60.5	63.5	3.0	0.0	0.0	0.0	57.8	60.8	3.0
2029	0.0	0.0	0.0	60.5	63.5	3.0	0.0	0.0	0.0	57.8	60.9	3.1

**Table A-18-22 - Required and Achieved CAFE Levels (mpg) for Domestic Car Fleet for Alternative 2,
Part 4 of 5**

Model Year	Subaru			Tesla			Toyota			Volvo		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	0.0	0.0	0.0	40.9	725.7	684.8	42.1	43.8	1.7	41.0	36.4	-4.6
2021	0.0	0.0	0.0	40.8	752.4	711.6	42.8	45.7	2.9	41.6	36.4	-5.2
2022	0.0	0.0	0.0	41.4	754.6	713.2	43.4	46.0	2.6	42.3	36.4	-5.9
2023	0.0	0.0	0.0	42.1	755.9	713.8	44.1	47.6	3.5	42.9	40.6	-2.3
2024	0.0	0.0	0.0	45.7	756.7	711.0	47.9	54.3	6.4	46.7	40.9	-5.8
2025	0.0	0.0	0.0	49.7	756.7	707.0	52.1	56.2	4.1	50.7	42.8	-7.9
2026	0.0	0.0	0.0	54.0	756.9	702.9	56.6	56.6	0.0	55.1	42.9	-12.2
2027	0.0	0.0	0.0	54.0	757.0	703.0	56.6	58.2	1.6	55.1	55.1	0.0
2028	0.0	0.0	0.0	54.0	757.6	703.6	56.6	58.2	1.6	55.1	55.1	0.0
2029	0.0	0.0	0.0	54.0	758.0	704.0	56.6	58.2	1.6	55.1	55.1	0.0

**Table A-18-23 - Required and Achieved CAFE Levels (mpg) for Domestic Car Fleet for Alternative 2,
Part 5 of 5**

Model Year	VWA			Total		
	Required	Achieved	Difference	Required	Achieved	Difference
2020	41.2	33.9	-7.3	42.5	43.2	0.7
2021	41.9	34.5	-7.4	43.1	44.9	1.8
2022	42.7	34.8	-7.9	43.7	47.6	3.8
2023	43.4	35.6	-7.8	44.4	51.9	7.5
2024	47.2	41.8	-5.4	48.2	55.1	6.9
2025	51.3	41.9	-9.4	52.5	58.8	6.3
2026	55.8	45.2	-10.6	57.0	61.0	4.0
2027	55.8	45.2	-10.6	57.0	61.4	4.4
2028	55.8	64.4	8.6	57.0	62.6	5.6
2029	55.8	64.6	8.8	57.0	62.7	5.7

**Table A-18-24 - Required and Achieved CAFE Levels (mpg) for Imported Car Fleet for Alternative 2,
Part 1 of 5**

Model Year	BMW			Daimler			FCA			Ford		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	42.5	36.6	-5.9	41.4	33.9	-7.5	44.8	34.4	-10.4	48.0	38.8	-9.2
2021	43.1	38.4	-4.7	42.0	36.9	-5.1	45.5	37.0	-8.5	48.7	38.8	-9.9
2022	43.8	42.2	-1.6	42.7	38.7	-4.0	46.1	60.1	14.0	49.5	39.0	-10.5
2023	44.4	46.1	1.7	43.3	39.5	-3.8	46.7	60.3	13.6	50.2	1517.4	1467.2
2024	48.3	48.4	0.1	47.1	47.1	0.0	50.8	65.1	14.3	54.6	1517.4	1462.8
2025	52.5	53.9	1.4	51.2	48.6	-2.6	55.2	65.4	10.2	59.3	1517.4	1458.1
2026	57.1	57.1	0.0	55.6	48.9	-6.7	60.0	68.0	8.0	64.5	1517.4	1452.9
2027	57.1	57.2	0.1	55.6	54.0	-1.6	60.0	68.0	8.0	64.5	1517.4	1452.9
2028	57.1	57.2	0.1	55.6	55.6	0.0	59.9	68.0	8.1	64.5	1517.4	1452.9
2029	57.1	57.5	0.4	55.6	55.7	0.1	59.9	67.9	8.0	64.5	1517.4	1452.9

**Table A-18-25 - Required and Achieved CAFE Levels (mpg) for Imported Car Fleet for Alternative 2,
Part 2 of 5**

Model Year	GM			Honda			Hyundai Kia-H			Hyundai Kia-K		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	46.8	40.4	-6.4	45.4	46.4	1.0	43.2	38.7	-4.5	44.0	41.4	-2.6
2021	47.5	43.7	-3.8	46.1	46.9	0.8	43.9	40.2	-3.7	44.7	45.8	1.1
2022	48.3	48.3	0.0	46.8	52.2	5.4	44.6	44.0	-0.6	45.4	47.0	1.6
2023	49.1	49.0	-0.1	47.4	52.5	5.1	45.3	45.2	-0.1	46.1	47.2	1.1
2024	53.3	50.8	-2.5	51.6	52.9	1.3	49.2	49.8	0.6	50.1	52.8	2.7
2025	58.0	52.2	-5.8	56.0	57.9	1.9	53.5	53.5	0.0	54.5	56.5	2.0
2026	63.0	55.5	-7.5	60.9	57.9	-3.0	58.1	58.1	0.0	59.2	59.2	0.0
2027	63.0	63.0	0.0	60.9	58.8	-2.1	58.1	58.7	0.6	59.2	59.7	0.5
2028	63.0	63.0	0.0	60.9	60.9	0.0	58.1	58.9	0.8	59.2	60.2	1.0
2029	63.0	63.1	0.1	60.9	60.9	0.0	58.1	59.1	1.0	59.2	60.6	1.4

**Table A-18-26 - Required and Achieved CAFE Levels (mpg) for Imported Car Fleet for Alternative 2,
Part 3 of 5**

Model Year	JLR			Mazda			Mitsubishi			Nissan		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	42.1	35.7	-6.4	43.8	38.6	-5.2	46.5	42.3	-4.2	43.6	38.2	-5.4
2021	42.7	36.9	-5.8	44.4	41.6	-2.8	47.2	44.0	-3.2	44.3	42.2	-2.1
2022	43.3	37.0	-6.3	45.1	43.7	-1.4	48.0	44.6	-3.4	45.0	45.1	0.1
2023	44.0	39.4	-4.6	45.8	48.7	2.9	48.8	45.0	-3.8	45.6	53.2	7.6
2024	47.8	47.2	-0.6	49.8	50.3	0.5	53.1	45.2	-7.9	49.6	57.1	7.5
2025	52.0	47.2	-4.8	54.1	56.2	2.1	57.7	63.0	5.3	53.9	57.5	3.6
2026	56.5	47.2	-9.3	58.8	58.9	0.1	62.7	63.1	0.4	58.6	57.9	-0.7
2027	56.5	49.4	-7.1	58.8	58.9	0.1	62.7	63.1	0.4	58.6	58.5	-0.1
2028	56.5	49.4	-7.1	58.8	58.9	0.1	62.7	63.2	0.5	58.6	58.7	0.1
2029	56.5	53.5	-3.0	58.8	59.6	0.8	62.8	63.3	0.5	58.6	59.7	1.1

**Table A-18-27 - Required and Achieved CAFE Levels (mpg) for Imported Car Fleet for Alternative 2,
Part 4 of 5**

Model Year	Subaru			Tesla			Toyota			Volvo		
	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference	Required	Achieved	Difference
2020	44.9	38.1	-6.8	0.0	0.0	0.0	44.2	46.9	2.7	40.8	35.1	-5.7
2021	45.5	40.1	-5.4	0.0	0.0	0.0	44.9	47.6	2.7	41.4	36.4	-5.0
2022	46.2	44.3	-1.9	0.0	0.0	0.0	45.6	50.5	4.9	42.0	36.6	-5.4
2023	46.9	46.0	-0.9	0.0	0.0	0.0	46.3	51.0	4.7	42.6	40.8	-1.8
2024	51.0	52.4	1.4	0.0	0.0	0.0	50.4	57.1	6.7	46.3	41.1	-5.2
2025	55.5	52.7	-2.8	0.0	0.0	0.0	54.7	57.9	3.2	50.3	42.2	-8.1
2026	60.3	60.3	0.0	0.0	0.0	0.0	59.5	59.5	0.0	54.7	48.8	-5.9
2027	60.3	60.3	0.0	0.0	0.0	0.0	59.5	60.1	0.6	54.7	54.7	0.0
2028	60.3	60.3	0.0	0.0	0.0	0.0	59.5	60.5	1.0	54.7	54.9	0.2
2029	60.3	60.3	0.0	0.0	0.0	0.0	59.5	60.6	1.1	54.7	55.0	0.3

**Table A-18-28 - Required and Achieved CAFE Levels (mpg) for Imported Car Fleet for Alternative 2,
Part 5 of 5**

Model Year	VWA			Total		
	Required	Achieved	Difference	Required	Achieved	Difference
2020	44.1	38.4	-5.7	44.0	40.4	-3.6
2021	44.8	39.5	-5.3	44.6	42.5	-2.1
2022	45.5	42.1	-3.4	45.3	45.8	0.5
2023	46.2	44.6	-1.6	46.0	47.8	1.8
2024	50.2	56.5	6.3	50.0	52.9	2.9
2025	54.5	58.3	3.8	54.4	55.7	1.4
2026	59.3	59.4	0.1	59.1	58.4	-0.7
2027	59.3	59.6	0.3	59.1	59.7	0.6
2028	59.3	59.9	0.6	59.1	60.1	1.0
2029	59.3	60.3	1.0	59.1	60.3	1.3

19. Regulatory Costs, Comparison

Table A-19-1 - Regulatory Costs (\$b) for Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Total		
	Alternative 0 (Baseline)	Alternative 2	Difference
2020	2.8	2.8	0.0
2021	5.4	5.4	0.0
2022	10.1	10.1	0.0
2023	13.3	17.1	3.8
2024	16.6	24.9	8.3
2025	18.2	31.0	12.8
2026	19.2	35.8	16.7
2027	18.6	34.2	15.6
2028	18.0	33.2	15.2
2029	17.5	31.9	14.4

Table A-19-2 - Regulatory Costs (\$b) for Passenger Car Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Total		
	Alternative 0 (Baseline)	Alternative 2	Difference
2020	1.6	1.6	0.0
2021	2.4	2.4	0.0
2022	4.5	4.5	0.0
2023	5.7	8.6	2.9
2024	7.2	12.3	5.2
2025	8.2	15.5	7.3
2026	8.6	17.4	8.7
2027	8.3	16.5	8.2
2028	8.1	16.1	8.1
2029	7.9	15.5	7.6

Table A-19-3 - Regulatory Costs (\$b) for Light Truck Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Total		
	Alternative 0 (Baseline)	Alternative 2	Difference
2020	1.2	1.2	0.0
2021	3.0	3.0	0.0
2022	5.6	5.6	0.0
2023	7.6	8.5	0.9
2024	9.5	12.6	3.1
2025	10.0	15.5	5.5
2026	10.5	18.5	7.9
2027	10.3	17.7	7.4
2028	9.9	17.1	7.1
2029	9.7	16.5	6.8

**Table A-19-4 - Regulatory Costs (\$b) for Total Fleet Between Alternative 0 (Baseline) and Alternative 2,
Part 1 of 5**

Model Year	BMW			Daimler			FCA			Ford		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	0.0	0.0	0.0	0.2	0.2	0.0	0.6	0.6	0.0	0.2	0.2	0.0
2021	0.2	0.2	0.0	0.2	0.2	0.0	0.8	0.8	0.0	0.9	0.9	0.0
2022	0.3	0.3	0.0	0.4	0.4	0.0	2.0	2.0	0.0	1.7	1.7	0.0
2023	0.4	0.5	0.0	0.4	0.4	0.0	2.6	2.5	-0.1	2.2	3.6	1.4
2024	0.5	0.6	0.0	0.6	0.7	0.2	2.7	2.8	0.2	2.5	3.7	1.2
2025	0.6	0.7	0.1	0.7	0.9	0.3	2.6	3.3	0.8	2.7	3.7	1.0
2026	0.7	0.9	0.2	0.7	1.1	0.4	2.5	3.8	1.2	2.9	4.4	1.6
2027	0.6	0.8	0.2	0.7	1.1	0.4	2.5	3.5	1.0	2.7	4.2	1.5
2028	0.6	0.8	0.2	0.7	1.1	0.4	2.5	3.6	1.1	2.6	3.9	1.4
2029	0.6	0.8	0.2	0.7	1.0	0.3	2.4	3.5	1.1	2.4	3.7	1.2

**Table A-19-5 - Regulatory Costs (\$b) for Total Fleet Between Alternative 0 (Baseline) and Alternative 2,
Part 2 of 5**

Model Year	GM			Honda			Hyundai Kia-H			Hyundai Kia-K		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	0.7	0.7	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.2	0.2	0.0
2021	1.4	1.4	0.0	0.1	0.1	0.0	0.3	0.3	0.0	0.3	0.3	0.0
2022	1.8	1.8	0.0	0.5	0.5	0.0	0.5	0.5	0.0	0.3	0.3	0.0
2023	2.1	2.2	0.1	0.8	1.1	0.3	0.6	0.6	0.0	0.4	0.4	0.0
2024	2.4	3.7	1.3	1.0	1.6	0.6	0.7	0.9	0.2	0.6	1.2	0.5
2025	2.8	6.0	3.2	1.5	2.4	0.9	0.7	1.5	0.7	0.7	1.3	0.7
2026	2.8	7.3	4.4	1.8	2.7	1.0	0.8	2.2	1.4	0.7	1.5	0.9
2027	2.7	7.0	4.2	1.7	2.5	0.9	0.8	2.2	1.4	0.7	1.5	0.9
2028	2.6	6.7	4.1	1.6	2.4	0.8	0.8	2.1	1.3	0.7	1.5	0.8
2029	2.6	6.5	3.8	1.5	2.3	0.8	0.8	2.0	1.3	0.6	1.4	0.8

**Table A-19-6 - Regulatory Costs (\$b) for Total Fleet Between Alternative 0 (Baseline) and Alternative 2,
Part 3 of 5**

Model Year	JLR			Mazda			Mitsubishi			Nissan		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0
2021	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.3	0.0
2022	0.1	0.1	0.0	0.4	0.4	0.0	0.0	0.0	0.0	0.5	0.5	0.0
2023	0.1	0.1	0.0	0.5	0.5	0.0	0.1	0.1	0.0	0.6	1.7	1.1
2024	0.2	0.2	0.1	0.5	0.5	0.0	0.1	0.1	0.1	0.8	2.8	2.0
2025	0.2	0.3	0.1	0.5	0.7	0.2	0.1	0.2	0.2	0.9	3.5	2.6
2026	0.2	0.3	0.2	0.5	0.8	0.3	0.1	0.2	0.1	1.0	3.6	2.6
2027	0.2	0.3	0.2	0.5	0.7	0.3	0.1	0.2	0.1	0.9	3.4	2.4
2028	0.2	0.3	0.1	0.5	0.7	0.3	0.1	0.2	0.1	0.9	3.4	2.4
2029	0.2	0.3	0.1	0.4	0.7	0.3	0.1	0.2	0.1	0.9	3.2	2.3

**Table A-19-7 - Regulatory Costs (\$b) for Total Fleet Between Alternative 0 (Baseline) and Alternative 2,
Part 4 of 5**

Model Year	Subaru			Tesla			Toyota			Volvo		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
2021	0.1	0.1	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0
2022	0.4	0.4	0.0	0.0	0.0	0.0	0.8	0.8	0.0	0.1	0.1	0.0
2023	0.8	1.0	0.2	0.0	0.0	0.0	1.0	1.7	0.7	0.2	0.2	0.0
2024	0.8	1.4	0.5	0.0	0.0	0.0	1.5	3.1	1.6	0.2	0.3	0.0
2025	0.9	1.5	0.5	0.0	0.0	0.0	1.6	3.2	1.6	0.2	0.3	0.0
2026	1.0	1.5	0.6	0.0	0.0	0.0	2.0	3.6	1.6	0.2	0.4	0.1
2027	1.0	1.5	0.6	0.0	0.0	0.0	1.9	3.5	1.6	0.2	0.4	0.1
2028	0.9	1.5	0.5	0.0	0.0	0.0	1.8	3.4	1.6	0.2	0.3	0.1
2029	0.9	1.4	0.5	0.0	0.0	0.0	1.8	3.3	1.5	0.2	0.3	0.1

**Table A-19-8 - Regulatory Costs (\$b) for Total Fleet Between Alternative 0 (Baseline) and Alternative 2,
Part 5 of 5**

Model Year	VWA			Total		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	0.2	0.2	0.0	2.8	2.8	0.0
2021	0.2	0.2	0.0	5.4	5.4	0.0
2022	0.4	0.4	0.0	10.1	10.1	0.0
2023	0.5	0.5	0.0	13.3	17.1	3.8
2024	1.4	1.3	-0.1	16.6	24.9	8.3
2025	1.4	1.4	0.0	18.2	31.0	12.8
2026	1.4	1.5	0.0	19.2	35.8	16.7
2027	1.4	1.4	0.0	18.6	34.2	15.6
2028	1.3	1.3	0.0	18.0	33.2	15.2
2029	1.3	1.3	0.0	17.5	31.9	14.4

Table A-19-9 - Regulatory Costs (\$b) for Passenger Car Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 1 of 5

Model Year	BMW			Daimler			FCA			Ford		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	0.0	0.0	0.0	0.1	0.1	0.0	0.2	0.2	0.0	0.1	0.1	0.0
2021	0.1	0.1	0.0	0.1	0.1	0.0	0.4	0.4	0.0	0.2	0.2	0.0
2022	0.2	0.2	0.0	0.3	0.3	0.0	0.7	0.7	0.0	0.6	0.6	0.0
2023	0.3	0.3	0.0	0.3	0.3	0.0	0.7	0.8	0.0	0.8	2.2	1.4
2024	0.3	0.4	0.0	0.4	0.6	0.2	0.7	0.8	0.1	0.7	2.0	1.3
2025	0.4	0.5	0.1	0.4	0.7	0.2	0.7	0.9	0.2	0.8	2.0	1.2
2026	0.5	0.7	0.2	0.4	0.7	0.3	0.7	1.0	0.3	0.8	1.9	1.0
2027	0.5	0.6	0.1	0.4	0.7	0.3	0.7	0.9	0.2	0.8	1.7	0.9
2028	0.5	0.6	0.1	0.4	0.7	0.3	0.6	0.9	0.3	0.8	1.6	0.8
2029	0.5	0.6	0.1	0.4	0.7	0.3	0.6	0.9	0.3	0.7	1.5	0.7

Table A-19-10 - Regulatory Costs (\$b) for Passenger Car Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 2 of 5

Model Year	GM			Honda			Hyundai Kia-H			Hyundai Kia-K		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	0.3	0.3	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.1	0.1	0.0
2021	0.3	0.3	0.0	0.1	0.1	0.0	0.3	0.3	0.0	0.1	0.1	0.0
2022	0.5	0.5	0.0	0.3	0.3	0.0	0.4	0.4	0.0	0.2	0.2	0.0
2023	0.7	0.8	0.1	0.5	0.7	0.3	0.5	0.5	0.0	0.2	0.2	0.0
2024	0.8	1.3	0.5	0.5	0.9	0.3	0.7	0.8	0.2	0.3	0.5	0.2
2025	1.2	2.0	0.8	0.9	1.4	0.5	0.7	1.4	0.7	0.4	0.7	0.3
2026	1.1	2.3	1.2	1.1	1.7	0.6	0.7	1.9	1.3	0.4	0.9	0.6
2027	1.1	2.2	1.1	1.1	1.6	0.5	0.7	1.9	1.2	0.4	0.9	0.5
2028	1.0	2.1	1.1	1.0	1.6	0.5	0.7	1.8	1.2	0.4	0.9	0.6
2029	1.0	2.0	1.0	1.0	1.5	0.5	0.6	1.8	1.1	0.4	0.9	0.5

Table A-19-11 - Regulatory Costs (\$b) for Passenger Car Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 3 of 5

Model Year	JLR			Mazda			Mitsubishi			Nissan		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0
2021	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.2	0.2	0.0
2022	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.3	0.0
2023	0.0	0.0	0.0	0.4	0.4	0.0	0.1	0.1	0.0	0.3	1.3	1.0
2024	0.0	0.0	0.0	0.4	0.4	0.0	0.1	0.1	0.0	0.5	2.0	1.5
2025	0.0	0.0	0.0	0.4	0.5	0.1	0.1	0.1	0.1	0.6	2.7	2.1
2026	0.0	0.0	0.0	0.4	0.5	0.1	0.1	0.1	0.1	0.6	2.6	2.0
2027	0.0	0.0	0.0	0.4	0.5	0.1	0.0	0.1	0.1	0.6	2.4	1.9
2028	0.0	0.0	0.0	0.4	0.5	0.1	0.0	0.1	0.1	0.6	2.4	1.9
2029	0.0	0.0	0.0	0.3	0.5	0.1	0.0	0.1	0.1	0.6	2.3	1.8

Table A-19-12 - Regulatory Costs (\$b) for Passenger Car Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 4 of 5

Model Year	Subaru			Tesla			Toyota			Volvo		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2021	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
2022	0.2	0.2	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0
2023	0.2	0.2	0.0	0.0	0.0	0.0	0.4	0.5	0.0	0.0	0.0	0.0
2024	0.2	0.5	0.3	0.0	0.0	0.0	0.6	1.2	0.6	0.0	0.1	0.0
2025	0.2	0.5	0.3	0.0	0.0	0.0	0.7	1.4	0.7	0.1	0.1	0.0
2026	0.2	0.6	0.4	0.0	0.0	0.0	0.8	1.5	0.7	0.1	0.2	0.1
2027	0.2	0.6	0.4	0.0	0.0	0.0	0.8	1.5	0.7	0.1	0.2	0.1
2028	0.2	0.6	0.3	0.0	0.0	0.0	0.8	1.4	0.7	0.1	0.2	0.1
2029	0.2	0.6	0.3	0.0	0.0	0.0	0.8	1.4	0.6	0.1	0.2	0.1

Table A-19-13 - Regulatory Costs (\$b) for Passenger Car Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 5 of 5

Model Year	VWA			Total		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	0.1	0.1	0.0	1.6	1.6	0.0
2021	0.1	0.1	0.0	2.4	2.4	0.0
2022	0.2	0.2	0.0	4.5	4.5	0.0
2023	0.2	0.2	0.0	5.7	8.6	2.9
2024	0.7	0.7	0.0	7.2	12.3	5.2
2025	0.7	0.7	0.0	8.2	15.5	7.3
2026	0.7	0.7	0.0	8.6	17.4	8.7
2027	0.7	0.7	0.0	8.3	16.5	8.2
2028	0.7	0.7	0.0	8.1	16.1	8.1
2029	0.7	0.7	0.0	7.9	15.5	7.6

Table A-19-14 - Regulatory Costs (\$b) for Light Truck Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 1 of 5

Model Year	BMW			Daimler			FCA			Ford		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.1	0.1	0.0
2021	0.1	0.1	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.7	0.7	0.0
2022	0.1	0.1	0.0	0.1	0.1	0.0	1.4	1.4	0.0	1.1	1.1	0.0
2023	0.2	0.2	0.0	0.2	0.1	0.0	1.9	1.7	-0.2	1.4	1.4	-0.1
2024	0.2	0.2	0.0	0.1	0.1	0.0	1.9	2.0	0.1	1.8	1.7	-0.1
2025	0.2	0.2	0.0	0.2	0.3	0.1	1.9	2.4	0.5	1.9	1.7	-0.2
2026	0.2	0.2	0.0	0.3	0.4	0.1	1.8	2.8	1.0	2.0	2.6	0.6
2027	0.2	0.2	0.0	0.3	0.4	0.1	1.8	2.6	0.8	1.9	2.5	0.6
2028	0.1	0.2	0.0	0.3	0.3	0.1	1.9	2.7	0.8	1.8	2.3	0.5
2029	0.1	0.2	0.0	0.3	0.3	0.1	1.8	2.6	0.8	1.7	2.2	0.5

Table A-19-15 - Regulatory Costs (\$b) for Light Truck Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 2 of 5

Model Year	GM			Honda			Hyundai Kia-H			Hyundai Kia-K		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0
2021	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0
2022	1.2	1.2	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.2	0.0
2023	1.4	1.4	0.0	0.3	0.3	0.0	0.1	0.1	0.0	0.2	0.2	0.0
2024	1.6	2.4	0.8	0.5	0.8	0.3	0.1	0.1	0.0	0.3	0.6	0.3
2025	1.7	4.1	2.4	0.7	1.1	0.4	0.1	0.1	0.0	0.3	0.6	0.3
2026	1.7	5.0	3.3	0.6	1.0	0.4	0.1	0.3	0.1	0.3	0.6	0.3
2027	1.7	4.8	3.1	0.6	0.9	0.3	0.1	0.3	0.1	0.3	0.6	0.3
2028	1.6	4.6	3.0	0.6	0.9	0.3	0.1	0.2	0.1	0.3	0.6	0.3
2029	1.7	4.5	2.8	0.5	0.8	0.3	0.1	0.2	0.1	0.3	0.6	0.3

Table A-19-16 - Regulatory Costs (\$b) for Light Truck Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 3 of 5

Model Year	JLR			Mazda			Mitsubishi			Nissan		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0
2022	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0
2023	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.3	0.4	0.2
2024	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.3	0.8	0.5
2025	0.2	0.3	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.4	0.8	0.5
2026	0.2	0.3	0.2	0.1	0.2	0.1	0.0	0.1	0.1	0.4	1.0	0.6
2027	0.2	0.3	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.4	0.9	0.6
2028	0.2	0.3	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.4	0.9	0.5
2029	0.2	0.3	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.4	0.9	0.5

Table A-19-17 - Regulatory Costs (\$b) for Light Truck Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 4 of 5

Model Year	Subaru			Tesla			Toyota			Volvo		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
2021	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0
2022	0.3	0.3	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0
2023	0.5	0.8	0.2	0.0	0.0	0.0	0.5	1.2	0.7	0.2	0.2	0.0
2024	0.6	0.9	0.2	0.0	0.0	0.0	0.8	1.9	1.0	0.2	0.2	0.0
2025	0.7	1.0	0.3	0.0	0.0	0.0	0.9	1.8	0.9	0.2	0.2	0.0
2026	0.7	0.9	0.2	0.0	0.0	0.0	1.2	2.1	1.0	0.2	0.2	0.0
2027	0.7	0.9	0.2	0.0	0.0	0.0	1.1	2.0	0.9	0.2	0.2	0.0
2028	0.7	0.9	0.2	0.0	0.0	0.0	1.1	2.0	0.9	0.2	0.2	0.0
2029	0.7	0.9	0.2	0.0	0.0	0.0	1.0	1.9	0.8	0.2	0.2	0.0

Table A-19-18 - Regulatory Costs (\$b) for Light Truck Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 5 of 5

Model Year	VWA			Total		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	0.1	0.1	0.0	1.2	1.2	0.0
2021	0.1	0.1	0.0	3.0	3.0	0.0
2022	0.3	0.3	0.0	5.6	5.6	0.0
2023	0.3	0.3	0.0	7.6	8.5	0.9
2024	0.7	0.6	-0.1	9.5	12.6	3.1
2025	0.7	0.7	0.0	10.0	15.5	5.5
2026	0.7	0.7	0.0	10.5	18.5	7.9
2027	0.7	0.7	0.0	10.3	17.7	7.4
2028	0.6	0.6	0.0	9.9	17.1	7.1
2029	0.6	0.6	0.0	9.7	16.5	6.8

20. Vehicle Price Increase

Table A-20-1 - Comparison of Average Vehicle Price Increase (dollars) for Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Total		
	Alternative 0 (Baseline)	Alternative 2	Difference
2020	203	203	0
2021	367	367	0
2022	611	611	0
2023	768	991	223
2024	969	1,464	496
2025	1,083	1,877	794
2026	1,169	2,236	1,067
2027	1,160	2,177	1,017
2028	1,140	2,145	1,005
2029	1,120	2,080	960

Table A-20-2 - Comparison of Average Vehicle Price Increase (dollars) for Passenger Car Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Total		
	Alternative 0 (Baseline)	Alternative 2	Difference
2020	265	265	0
2021	369	369	0
2022	586	586	0
2023	694	1,055	361
2024	873	1,521	648
2025	1,008	1,968	959
2026	1,076	2,264	1,188
2027	1,058	2,198	1,140
2028	1,028	2,157	1,129
2029	1,001	2,073	1,073

Table A-20-3 - Comparison of Average Vehicle Price Increase (dollars) for Light Truck Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Total		
	Alternative 0 (Baseline)	Alternative 2	Difference
2020	155	155	0
2021	365	365	0
2022	633	633	0
2023	833	933	100
2024	1,056	1,413	356
2025	1,153	1,795	642
2026	1,257	2,210	954
2027	1,260	2,159	899
2028	1,251	2,134	883
2029	1,240	2,086	846

Table A-20-4 - Comparison of Average Vehicle Price Increase (dollars) for Total Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 1 of 5

Model Year	BMW			Daimler			FCA			Ford		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	70	70	0	437	437	0	380	380	0	137	137	0
2021	611	611	0	436	436	0	475	475	0	501	501	0
2022	811	811	0	794	794	0	1,139	1,139	0	840	840	0
2023	1,130	1,182	52	952	913	-39	1,408	1,356	-52	1,065	1,734	669
2024	1,328	1,439	110	1,208	1,570	362	1,484	1,589	106	1,242	1,833	591
2025	1,555	1,889	334	1,474	2,099	625	1,459	1,916	457	1,334	1,863	529
2026	1,747	2,334	587	1,576	2,594	1,018	1,495	2,249	754	1,475	2,322	848
2027	1,704	2,271	567	1,655	2,553	898	1,510	2,108	598	1,424	2,221	798
2028	1,649	2,188	539	1,618	2,498	880	1,553	2,232	679	1,382	2,128	746
2029	1,604	2,126	523	1,583	2,412	829	1,527	2,185	657	1,331	2,021	690

Table A-20-5 - Comparison of Average Vehicle Price Increase (dollars) for Total Fleet Between Alternative 0 (Baseline) and Alternative 2 Part 2 of 5

Model Year	GM			Honda			Hyundai Kia-H			Hyundai Kia-K		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	290	290	0	0	0	0	562	562	0	269	269	0
2021	546	546	0	97	97	0	396	396	0	409	409	0
2022	638	638	0	326	326	0	506	506	0	444	444	0
2023	737	776	39	450	624	174	622	624	2	476	476	0
2024	855	1,321	466	600	963	363	762	957	196	775	1,477	702
2025	1,035	2,223	1,188	925	1,473	548	781	1,586	805	833	1,724	891
2026	1,068	2,774	1,705	1,074	1,726	652	849	2,430	1,581	854	2,062	1,207
2027	1,060	2,720	1,661	1,038	1,627	589	890	2,442	1,552	903	2,102	1,199
2028	1,034	2,648	1,614	1,002	1,576	575	862	2,381	1,519	877	2,081	1,204
2029	1,056	2,591	1,535	965	1,515	550	846	2,320	1,474	850	2,006	1,156

Table A-20-6 - Comparison of Average Vehicle Price Increase (dollars) for Total Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 3 of 5

Model Year	JLR			Mazda			Mitsubishi			Nissan		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	96	96	0	342	342	0	209	209	0	97	97	0
2021	84	84	0	1,009	1,009	0	119	119	0	291	291	0
2022	468	468	0	1,170	1,170	0	300	300	0	385	385	0
2023	734	811	77	1,402	1,407	5	582	582	0	445	1,288	843
2024	982	1,322	341	1,457	1,535	78	685	1,081	396	621	2,109	1,488
2025	1,073	1,849	776	1,588	2,354	766	645	1,839	1,194	717	2,719	2,002
2026	1,154	2,248	1,094	1,629	2,559	930	635	1,810	1,175	759	2,847	2,088
2027	1,218	2,260	1,042	1,599	2,502	903	617	1,777	1,160	751	2,765	2,014
2028	1,191	2,203	1,012	1,565	2,445	881	603	1,748	1,145	749	2,764	2,014
2029	1,168	2,137	970	1,523	2,416	893	587	1,720	1,133	737	2,679	1,942

Table A-20-7 - Comparison of Average Vehicle Price Increase (dollars) for Total Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 4 of 5

Model Year	Subaru			Tesla			Toyota			Volvo		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	28	28	0	0	0	0	49	49	0	170	170	0
2021	185	185	0	35	35	0	131	131	0	369	369	0
2022	470	470	0	49	49	0	347	347	0	434	434	0
2023	802	1,068	266	49	49	0	424	739	316	1,718	1,902	185
2024	910	1,466	556	48	48	0	646	1,351	705	1,712	1,990	279
2025	1,024	1,649	625	50	50	0	705	1,434	728	1,837	2,263	426
2026	1,087	1,769	682	49	49	0	886	1,664	777	1,956	3,059	1,102
2027	1,112	1,779	667	48	49	0	863	1,640	778	2,028	3,094	1,065
2028	1,084	1,737	653	48	48	0	852	1,635	783	1,952	2,982	1,030
2029	1,058	1,699	642	47	47	0	859	1,583	724	1,867	2,855	988

Table A-20-8 - Comparison of Average Vehicle Price Increase (dollars) for Total Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 5 of 5

Model Year	VWA			Total		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	405	405	0	203	203	0
2021	406	406	0	367	367	0
2022	836	836	0	611	611	0
2023	920	921	0	768	991	223
2024	2,539	2,368	-171	969	1,464	496
2025	2,636	2,601	-35	1,083	1,877	794
2026	2,644	2,809	165	1,169	2,236	1,067
2027	2,596	2,714	118	1,160	2,177	1,017
2028	2,547	2,620	74	1,140	2,145	1,005
2029	2,459	2,547	88	1,120	2,080	960

Table A-20-9 - Comparison of Average Vehicle Price Increase (dollars) for Passenger Car Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 1 of 5

Model Year	BMW			Daimler			FCA			Ford		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	92	92	0	665	665	0	941	941	0	284	284	0
2021	708	708	0	777	777	0	1,775	1,775	0	447	447	0
2022	868	868	0	1,190	1,190	0	2,473	2,473	0	1,034	1,034	0
2023	1,044	1,133	88	1,164	1,180	16	2,513	2,697	184	1,282	3,699	2,416
2024	1,297	1,468	171	1,716	2,422	705	2,578	3,031	453	1,212	3,402	2,189
2025	1,620	2,125	505	1,816	2,789	973	2,479	3,404	924	1,331	3,421	2,090
2026	1,921	2,769	849	1,826	3,204	1,378	2,558	3,740	1,182	1,437	3,310	1,873
2027	1,870	2,587	717	1,850	3,259	1,409	2,432	3,345	913	1,383	3,099	1,716
2028	1,805	2,487	682	1,785	3,190	1,405	2,408	3,649	1,241	1,342	2,903	1,561
2029	1,756	2,422	666	1,693	3,011	1,318	2,291	3,448	1,157	1,284	2,690	1,406

Table A-20-10 - Comparison of Average Vehicle Price Increase (dollars) for Passenger Car Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 2 of 5

Model Year	GM			Honda			Hyundai Kia-H			Hyundai Kia-K		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	413	413	0	0	0	0	592	592	0	291	291	0
2021	396	396	0	117	117	0	409	409	0	345	345	0
2022	565	565	0	300	300	0	536	536	0	379	379	0
2023	713	848	134	438	685	247	620	623	3	411	411	0
2024	845	1,339	494	492	829	336	766	978	212	609	997	388
2025	1,207	2,065	858	810	1,332	522	778	1,661	882	677	1,371	694
2026	1,178	2,474	1,297	1,068	1,757	688	774	2,357	1,583	692	1,880	1,188
2027	1,139	2,434	1,295	1,031	1,647	616	823	2,379	1,556	745	1,907	1,162
2028	1,095	2,337	1,243	993	1,599	606	797	2,320	1,523	724	1,910	1,186
2029	1,057	2,255	1,197	954	1,531	577	783	2,262	1,479	701	1,831	1,130

Table A-20-11 - Comparison of Average Vehicle Price Increase (dollars) for Passenger Car Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 3 of 5

Model Year	JLR			Mazda			Mitsubishi			Nissan		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	141	141	0	573	573	0	348	348	0	99	99	0
2021	16	16	0	1,981	1,981	0	183	183	0	213	213	0
2022	63	63	0	2,160	2,160	0	443	443	0	283	283	0
2023	458	609	151	2,278	2,288	10	822	822	0	343	1,349	1,006
2024	1,259	1,532	272	2,283	2,427	144	932	1,342	410	513	2,054	1,541
2025	1,200	1,837	637	2,453	3,285	832	832	1,815	983	599	2,871	2,272
2026	1,148	2,256	1,108	2,415	3,401	986	817	1,785	968	630	2,856	2,225
2027	1,364	2,302	938	2,340	3,296	955	787	1,744	957	621	2,762	2,141
2028	1,317	2,224	908	2,262	3,187	926	762	1,707	944	614	2,779	2,165
2029	1,270	2,144	874	2,175	3,136	961	735	1,670	934	606	2,677	2,070

Table A-20-12 - Comparison of Average Vehicle Price Increase (dollars) for Passenger Car Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 4 of 5

Model Year	Subaru			Tesla			Toyota			Volvo		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	88	88	0	0	0	0	34	34	0	327	327	0
2021	207	207	0	34	34	0	70	70	0	862	862	0
2022	798	798	0	49	49	0	230	230	0	910	910	0
2023	909	909	0	48	48	0	328	364	36	1,102	1,102	0
2024	866	2,055	1,189	47	47	0	484	934	450	1,200	1,397	197
2025	932	2,265	1,333	49	49	0	548	1,075	527	1,402	1,743	341
2026	1,009	2,748	1,739	49	49	0	619	1,179	560	1,864	4,523	2,659
2027	978	2,671	1,694	48	48	0	598	1,194	596	1,919	5,016	3,097
2028	950	2,592	1,643	47	47	0	580	1,181	601	1,865	4,850	2,986
2029	921	2,523	1,602	46	46	0	614	1,155	541	1,815	4,684	2,869

Table A-20-13 - Comparison of Average Vehicle Price Increase (dollars) for Passenger Car Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 5 of 5

Model Year	VWA			Total		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	501	501	0	265	265	0
2021	269	269	0	369	369	0
2022	776	776	0	586	586	0
2023	942	943	1	694	1,055	361
2024	2,795	2,761	-35	873	1,521	648
2025	2,806	2,829	23	1,008	1,968	959
2026	2,773	3,006	233	1,076	2,264	1,188
2027	2,712	2,788	76	1,058	2,198	1,140
2028	2,689	2,765	76	1,028	2,157	1,129
2029	2,574	2,690	117	1,001	2,073	1,073

Table A-20-14 - Comparison of Average Vehicle Price Increase (dollars) for Light Truck Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 1 of 5

Model Year	BMW			Daimler			FCA			Ford		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	33	33	0	233	233	0	291	291	0	83	83	0
2021	438	438	0	115	115	0	258	258	0	521	521	0
2022	703	703	0	396	396	0	905	905	0	763	763	0
2023	1,301	1,282	-19	731	634	-97	1,209	1,114	-95	977	938	-39
2024	1,394	1,379	-14	659	657	-2	1,282	1,325	43	1,255	1,187	-68
2025	1,419	1,404	-15	1,097	1,358	261	1,268	1,643	375	1,335	1,219	-116
2026	1,370	1,431	61	1,294	1,935	641	1,292	1,973	681	1,491	1,912	421
2027	1,336	1,615	278	1,430	1,787	357	1,331	1,879	548	1,441	1,856	415
2028	1,296	1,556	259	1,422	1,733	311	1,384	1,966	582	1,400	1,801	401
2029	1,250	1,491	241	1,450	1,740	290	1,374	1,945	570	1,352	1,736	384

Table A-20-15 - Comparison of Average Vehicle Price Increase (dollars) for Light Truck Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 2 of 5

Model Year	GM			Honda			Hyundai Kia-H			Hyundai Kia-K		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	231	231	0	0	0	0	312	312	0	233	233	0
2021	621	621	0	69	69	0	290	290	0	519	519	0
2022	676	676	0	366	366	0	231	231	0	562	562	0
2023	750	738	-12	470	527	57	638	638	0	599	599	0
2024	861	1,311	450	777	1,183	406	722	764	41	1,102	2,416	1,313
2025	942	2,309	1,367	1,119	1,705	586	803	883	80	1,146	2,414	1,268
2026	1,008	2,935	1,927	1,083	1,674	591	1,577	3,117	1,540	1,190	2,421	1,230
2027	1,015	2,874	1,859	1,049	1,593	544	1,543	3,036	1,493	1,235	2,487	1,252
2028	999	2,818	1,818	1,018	1,538	520	1,514	2,961	1,447	1,208	2,425	1,218
2029	1,055	2,776	1,721	987	1,488	501	1,483	2,885	1,402	1,179	2,364	1,185

Table A-20-16 - Comparison of Average Vehicle Price Increase (dollars) for Light Truck Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 3 of 5

Model Year	JLR			Mazda			Mitsubishi			Nissan		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	94	94	0	127	127	0	91	91	0	92	92	0
2021	87	87	0	67	67	0	63	63	0	472	472	0
2022	489	489	0	171	171	0	172	172	0	634	634	0
2023	749	822	73	492	492	0	363	363	0	703	1,133	429
2024	966	1,311	345	580	594	13	457	841	384	900	2,249	1,349
2025	1,066	1,850	784	656	1,370	714	471	1,862	1,391	1,029	2,327	1,299
2026	1,155	2,247	1,093	767	1,664	897	463	1,832	1,369	1,106	2,824	1,718
2027	1,209	2,258	1,049	778	1,659	881	456	1,808	1,352	1,105	2,773	1,668
2028	1,183	2,201	1,019	778	1,645	867	449	1,786	1,337	1,126	2,722	1,596
2029	1,161	2,137	976	779	1,633	855	442	1,767	1,325	1,106	2,685	1,579

Table A-20-17 - Comparison of Average Vehicle Price Increase (dollars) for Light Truck Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 4 of 5

Model Year	Subaru			Tesla			Toyota			Volvo		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	12	12	0	0	0	0	67	67	0	117	117	0
2021	178	178	0	63	63	0	205	205	0	194	194	0
2022	369	369	0	67	67	0	495	495	0	256	256	0
2023	768	1,121	353	82	82	0	551	1,239	688	1,954	2,210	256
2024	925	1,267	342	81	81	0	868	1,921	1,053	1,913	2,222	310
2025	1,056	1,441	385	79	79	0	927	1,925	997	2,011	2,467	456
2026	1,115	1,434	319	78	78	0	1,272	2,331	1,059	1,994	2,482	488
2027	1,161	1,473	311	77	77	0	1,251	2,257	1,006	2,074	2,336	262
2028	1,135	1,436	301	75	75	0	1,260	2,274	1,014	1,989	2,234	245
2029	1,111	1,405	294	74	74	0	1,233	2,194	960	1,890	2,115	226

Table A-20-18 - Comparison of Average Vehicle Price Increase (dollars) for Light Truck Fleet Between Alternative 0 (Baseline) and Alternative 2, Part 5 of 5

Model Year	VWA			Total		
	Alternative 0 (Baseline)	Alternative 2	Difference	Alternative 0 (Baseline)	Alternative 2	Difference
2020	336	336	0	155	155	0
2021	512	512	0	365	365	0
2022	887	887	0	633	633	0
2023	901	901	0	833	933	100
2024	2,302	2,010	-293	1,056	1,413	356
2025	2,474	2,392	-82	1,153	1,795	642
2026	2,519	2,628	109	1,257	2,210	954
2027	2,479	2,645	166	1,260	2,159	899
2028	2,401	2,483	82	1,251	2,134	883
2029	2,338	2,409	70	1,240	2,086	846

21. Technology Costs, Price Increase, Sales, and Labor Utilization

Table A-21-1 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (Total) Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	203	203	0	0%	13.6	13.6	0.0	0.0%	943	943	0.0	0.0%
2021	3	3	0	0%	367	367	0	0%	14.7	14.7	0.0	0.0%	1,026	1,026	0.0	0.0%
2022	7	7	0	0%	611	611	0	0%	16.6	16.6	0.0	0.0%	1,159	1,159	0.0	0.0%
2023	9	13	4	42%	768	991	223	29%	17.3	17.2	-0.1	-0.5%	1,215	1,212	-2.9	-0.2%
2024	12	19	8	66%	969	1,464	496	51%	17.2	17.0	-0.2	-1.0%	1,207	1,205	-2.1	-0.2%
2025	13	24	11	91%	1,083	1,877	794	73%	16.8	16.5	-0.3	-1.7%	1,185	1,182	-2.6	-0.2%
2026	13	28	15	110%	1,169	2,236	1,067	91%	16.4	16.0	-0.4	-2.3%	1,156	1,154	-2.6	-0.2%
2027	13	27	15	115%	1,160	2,177	1,017	88%	16.0	15.7	-0.3	-2.1%	1,131	1,131	0.0	0.0%
2028	12	27	14	118%	1,140	2,145	1,005	88%	15.8	15.5	-0.3	-2.0%	1,113	1,114	1.6	0.1%
2029	12	26	14	115%	1,120	2,080	960	86%	15.7	15.4	-0.3	-1.9%	1,101	1,103	2.2	0.2%

Table A-21-2 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (Total) Passenger Car Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	265	265	0	0%	5.9	5.9	0.0	0.0%	356	356	0.0	0.0%
2021	1	1	0	0%	369	369	0	0%	6.6	6.6	0.0	0.0%	400	400	0.0	0.0%
2022	3	3	0	0%	586	586	0	0%	7.7	7.7	0.0	0.0%	467	467	0.0	0.0%
2023	4	7	3	74%	694	1,055	361	52%	8.2	8.1	0.0	-0.5%	500	501	0.8	0.2%
2024	5	10	5	96%	873	1,521	648	74%	8.2	8.1	-0.1	-1.4%	504	504	-0.3	-0.1%
2025	6	13	7	120%	1,008	1,968	959	95%	8.1	7.9	-0.2	-2.9%	501	495	-6.0	-1.2%
2026	6	14	8	134%	1,076	2,264	1,188	110%	8.0	7.7	-0.3	-4.3%	496	485	-11.3	-2.3%
2027	6	14	8	140%	1,058	2,198	1,140	108%	7.9	7.5	-0.4	-4.7%	489	475	-13.9	-2.8%
2028	5	13	8	145%	1,028	2,157	1,129	110%	7.9	7.5	-0.4	-4.8%	487	473	-14.0	-2.9%
2029	5	13	8	142%	1,001	2,073	1,073	107%	7.9	7.5	-0.4	-5.0%	487	471	-15.4	-3.2%

Table A-21-3 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (Total) Light Truck Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	155	155	0	0%	7.7	7.7	0.0	0.0%	587	587	0.0	0.0%
2021	2	2	0	0%	365	365	0	0%	8.1	8.1	0.0	0.0%	626	626	0.0	0.0%
2022	4	4	0	0%	633	633	0	0%	8.9	8.9	0.0	0.0%	692	692	0.0	0.0%
2023	5	6	1	18%	833	933	100	12%	9.2	9.1	0.0	-0.5%	715	711	-3.7	-0.5%
2024	7	9	3	42%	1,056	1,413	356	34%	9.0	8.9	-0.1	-0.7%	703	701	-1.8	-0.3%
2025	7	11	5	66%	1,153	1,795	642	56%	8.7	8.7	0.0	-0.5%	683	687	3.4	0.5%
2026	7	14	6	90%	1,257	2,210	954	76%	8.4	8.4	0.0	-0.3%	660	669	8.7	1.3%
2027	7	13	7	94%	1,260	2,159	899	71%	8.1	8.2	0.0	0.5%	642	656	13.9	2.2%
2028	7	13	6	95%	1,251	2,134	883	71%	7.9	8.0	0.1	0.8%	625	641	15.6	2.5%
2029	7	13	6	94%	1,240	2,086	846	68%	7.8	7.9	0.1	1.2%	614	632	17.6	2.9%

Table A-21-4 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (BMW) Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	70	70	0	0%	0.3	0.3	0.0	0.0%	14	14	0.0	0.0%
2021	0	0	0	0%	611	611	0	0%	0.3	0.3	0.0	0.0%	15	15	0.0	0.0%
2022	0	0	0	0%	811	811	0	0%	0.4	0.4	0.0	0.0%	17	17	0.0	0.0%
2023	0	0	0	5%	1,130	1,182	52	5%	0.4	0.4	0.0	-0.5%	18	18	-0.1	-0.5%
2024	0	0	0	8%	1,328	1,439	110	8%	0.4	0.4	0.0	-1.2%	17	17	-0.1	-0.9%
2025	1	1	0	22%	1,555	1,889	334	21%	0.4	0.4	0.0	-2.5%	17	17	-0.2	-1.0%
2026	1	1	0	27%	1,747	2,334	587	34%	0.4	0.4	0.0	-3.5%	16	16	-0.2	-1.2%
2027	1	1	0	32%	1,704	2,271	567	33%	0.4	0.4	0.0	-3.8%	16	16	-0.1	-0.4%
2028	1	1	0	32%	1,649	2,188	539	33%	0.4	0.4	0.0	-3.8%	16	16	0.0	-0.3%
2029	1	1	0	32%	1,604	2,126	523	33%	0.4	0.4	0.0	-3.9%	16	16	0.0	-0.1%

Table A-21-5 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (Daimler) Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Mode 1 Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	437	437	0	0%	0.4	0.4	0.0	0.0%	18	18	0.0	0.0%
2021	0	0	0	0%	436	436	0	0%	0.4	0.4	0.0	0.0%	20	20	0.0	0.0%
2022	0	0	0	0%	794	794	0	0%	0.4	0.4	0.0	0.0%	22	22	0.0	0.0%
2023	0	0	0	-7%	952	913	-39	-4%	0.5	0.5	0.0	-0.5%	24	24	-0.1	-0.5%
2024	0	1	0	23%	1,208	1,570	362	30%	0.5	0.5	0.0	-1.1%	23	23	-0.2	-1.0%
2025	1	1	0	18%	1,474	2,099	625	42%	0.5	0.5	0.0	-1.9%	23	23	-0.4	-1.6%
2026	1	1	0	22%	1,576	2,594	1,018	65%	0.4	0.4	0.0	-2.7%	23	22	-0.4	-1.8%
2027	1	1	0	46%	1,655	2,553	898	54%	0.4	0.4	0.0	-2.7%	22	22	-0.4	-1.7%
2028	0	1	0	52%	1,618	2,498	880	54%	0.4	0.4	0.0	-2.6%	22	22	-0.3	-1.4%
2029	0	1	0	52%	1,583	2,412	829	52%	0.4	0.4	0.0	-2.6%	22	21	-0.3	-1.3%

Table A-21-6 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (FCA) Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	380	380	0	0%	1.5	1.5	0.0	0.0%	117	117	0.0	0.0%
2021	0	0	0	0%	475	475	0	0%	1.6	1.6	0.0	0.0%	126	126	0.0	0.0%
2022	2	2	0	0%	1,139	1,139	0	0%	1.8	1.8	0.0	0.0%	141	141	0.0	0.0%
2023	2	2	0	-4%	1,408	1,356	-52	-4%	1.8	1.8	0.0	-0.5%	147	146	-0.8	-0.5%
2024	2	2	0	-7%	1,484	1,589	106	7%	1.8	1.8	0.0	-0.8%	144	143	-1.3	-0.9%
2025	2	2	0	-8%	1,459	1,916	457	31%	1.7	1.7	0.0	-0.8%	140	139	-1.1	-0.8%
2026	2	2	0	-3%	1,495	2,249	754	50%	1.7	1.7	0.0	-0.9%	135	134	-0.8	-0.6%
2027	2	2	0	4%	1,510	2,108	598	40%	1.6	1.6	0.0	-0.3%	131	132	0.6	0.4%
2028	2	2	0	18%	1,553	2,232	679	44%	1.6	1.6	0.0	0.0%	128	130	1.6	1.3%
2029	2	2	0	21%	1,527	2,185	657	43%	1.6	1.6	0.0	0.3%	126	128	2.2	1.7%

Table A-21-7 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (Ford) Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	137	137	0	0%	1.7	1.7	0.0	0.0%	160	160	0.0	0.0%
2021	1	1	0	0%	501	501	0	0%	1.8	1.8	0.0	0.0%	172	172	0.0	0.0%
2022	1	1	0	0%	840	840	0	0%	2.0	2.0	0.0	0.0%	192	192	0.0	0.0%
2023	2	3	1	76%	1,065	1,734	669	63%	2.1	2.1	0.0	-0.5%	199	200	0.9	0.5%
2024	2	3	1	58%	1,242	1,833	591	48%	2.1	2.0	0.0	-0.9%	197	197	0.0	0.0%
2025	2	3	1	47%	1,334	1,863	529	40%	2.0	2.0	0.0	-1.1%	192	191	-0.3	-0.1%
2026	2	4	2	66%	1,475	2,322	848	57%	1.9	1.9	0.0	-1.3%	186	187	1.0	0.6%
2027	2	4	1	65%	1,424	2,221	798	56%	1.9	1.9	0.0	-0.9%	181	183	2.0	1.1%
2028	2	3	1	63%	1,382	2,128	746	54%	1.9	1.8	0.0	-0.7%	177	179	2.2	1.2%
2029	2	3	1	61%	1,331	2,021	690	52%	1.8	1.8	0.0	-0.5%	174	176	2.6	1.5%

Table A-21-8 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (GM) Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	290	290	0	0%	2.3	2.3	0.0	0.0%	200	200	0.0	0.0%
2021	1	1	0	0%	546	546	0	0%	2.5	2.5	0.0	0.0%	217	217	0.0	0.0%
2022	1	1	0	0%	638	638	0	0%	2.8	2.8	0.0	0.0%	241	241	0.0	0.0%
2023	1	1	0	12%	737	776	39	5%	2.9	2.8	0.0	-0.5%	251	250	-0.9	-0.4%
2024	1	3	1	86%	855	1,321	466	54%	2.8	2.8	0.0	-0.9%	248	248	0.4	0.2%
2025	2	5	3	178%	1,035	2,223	1,188	115%	2.7	2.7	0.0	-1.1%	243	247	3.8	1.5%
2026	2	6	4	242%	1,068	2,774	1,705	160%	2.7	2.6	0.0	-1.3%	236	241	5.7	2.4%
2027	2	6	4	250%	1,060	2,720	1,661	157%	2.6	2.6	0.0	-0.8%	230	236	6.6	2.9%
2028	2	6	4	251%	1,034	2,648	1,614	156%	2.5	2.5	0.0	-0.6%	225	232	6.6	2.9%
2029	2	5	4	229%	1,056	2,591	1,535	145%	2.5	2.5	0.0	-0.4%	222	229	6.7	3.0%

Table A-21-9 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (Honda) Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	0	0	0	0%	1.3	1.3	0.0	0.0%	116	116	0.0	0.0%
2021	0	0	0	0%	97	97	0	0%	1.4	1.4	0.0	0.0%	127	127	0.0	0.0%
2022	0	0	0	0%	326	326	0	0%	1.6	1.6	0.0	0.0%	145	145	0.0	0.0%
2023	0	1	0	66%	450	624	174	39%	1.7	1.7	0.0	-0.5%	153	153	0.1	0.0%
2024	1	1	1	99%	600	963	363	61%	1.7	1.7	0.0	-1.2%	153	153	0.0	0.0%
2025	1	2	1	97%	925	1,473	548	59%	1.7	1.6	0.0	-2.2%	151	151	-0.8	-0.5%
2026	1	2	1	82%	1,074	1,726	652	61%	1.6	1.6	-0.1	-3.2%	149	147	-1.7	-1.1%
2027	1	2	1	83%	1,038	1,627	589	57%	1.6	1.6	-0.1	-3.3%	146	144	-1.7	-1.2%
2028	1	2	1	85%	1,002	1,576	575	57%	1.6	1.5	-0.1	-3.3%	144	142	-1.8	-1.2%
2029	1	2	1	85%	965	1,515	550	57%	1.6	1.5	-0.1	-3.3%	143	141	-1.8	-1.3%

Table A-21-10 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (Hyundai Kia-H) Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Mode 1 Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	562	562	0	0%	0.7	0.7	0.0	0.0%	44	44	0.0	0.0%
2021	0	0	0	0%	396	396	0	0%	0.8	0.8	0.0	0.0%	49	49	0.0	0.0%
2022	0	0	0	0%	506	506	0	0%	0.9	0.9	0.0	0.0%	56	56	0.0	0.0%
2023	0	0	0	0%	622	624	2	0%	1.0	1.0	0.0	-0.5%	60	59	-0.3	-0.5%
2024	1	1	0	30%	762	957	196	26%	1.0	1.0	0.0	-1.2%	60	59	-0.6	-0.9%
2025	0	1	1	144%	781	1,586	805	103%	1.0	0.9	0.0	-2.2%	59	59	-0.3	-0.5%
2026	1	2	1	278%	849	2,430	1,581	186%	0.9	0.9	0.0	-3.0%	58	58	-0.1	-0.2%
2027	0	2	1	286%	890	2,442	1,552	175%	0.9	0.9	0.0	-3.1%	57	57	-0.3	-0.6%
2028	0	2	1	293%	862	2,381	1,519	176%	0.9	0.9	0.0	-3.1%	56	56	-0.4	-0.7%
2029	0	2	1	291%	846	2,320	1,474	174%	0.9	0.9	0.0	-3.1%	56	56	-0.5	-0.8%

**Table A-21-11 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (Hyundai Kia-K)
Total Fleet Between Alternative 0 (Baseline) and Alternative 2**

Model Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	269	269	0	0%	0.6	0.6	0.0	0.0%	30	30	0.0	0.0%
2021	0	0	0	0%	409	409	0	0%	0.7	0.7	0.0	0.0%	33	33	0.0	0.0%
2022	0	0	0	0%	444	444	0	0%	0.8	0.8	0.0	0.0%	38	38	0.0	0.0%
2023	0	0	0	0%	476	476	0	0%	0.8	0.8	0.0	-0.5%	40	40	-0.2	-0.5%
2024	0	1	1	115%	775	1,477	702	91%	0.8	0.8	0.0	-1.2%	40	40	0.3	0.8%
2025	0	1	1	141%	833	1,724	891	107%	0.8	0.8	0.0	-2.5%	39	40	0.3	0.8%
2026	0	1	1	197%	854	2,062	1,207	141%	0.8	0.7	0.0	-3.6%	38	38	-0.1	-0.1%
2027	0	1	1	195%	903	2,102	1,199	133%	0.8	0.7	0.0	-3.8%	38	38	-0.1	-0.2%
2028	0	1	1	203%	877	2,081	1,204	137%	0.8	0.7	0.0	-3.8%	37	37	-0.1	-0.2%
2029	0	1	1	202%	850	2,006	1,156	136%	0.8	0.7	0.0	-3.9%	37	37	-0.1	-0.3%

Table A-21-12 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (JLR) Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	96	96	0	0%	0.1	0.1	0.0	0.0%	2	2	0.0	0.0%
2021	0	0	0	0%	84	84	0	0%	0.1	0.1	0.0	0.0%	3	3	0.0	0.0%
2022	0	0	0	0%	468	468	0	0%	0.2	0.2	0.0	0.0%	3	3	0.0	0.0%
2023	0	0	0	13%	734	811	77	11%	0.2	0.2	0.0	-0.5%	3	3	0.0	-0.4%
2024	0	0	0	29%	982	1,322	341	35%	0.2	0.2	0.0	-0.8%	3	3	0.0	-0.4%
2025	0	0	0	53%	1,073	1,849	776	72%	0.2	0.2	0.0	-0.7%	3	3	0.0	0.1%
2026	0	0	0	51%	1,154	2,248	1,094	95%	0.2	0.2	0.0	-0.6%	3	3	0.0	0.1%
2027	0	0	0	56%	1,218	2,260	1,042	86%	0.1	0.1	0.0	0.1%	3	3	0.0	1.0%
2028	0	0	0	56%	1,191	2,203	1,012	85%	0.1	0.1	0.0	0.3%	3	3	0.0	1.2%
2029	0	0	0	76%	1,168	2,137	970	83%	0.1	0.1	0.0	0.7%	3	3	0.0	1.8%

Table A-21-13 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (Mazda) Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	342	342	0	0%	0.3	0.3	0.0	0.0%	4	4	0.0	0.0%
2021	0	0	0	0%	1,009	1,009	0	0%	0.3	0.3	0.0	0.0%	4	4	0.0	0.0%
2022	0	0	0	0%	1,170	1,170	0	0%	0.3	0.3	0.0	0.0%	4	4	0.0	0.0%
2023	0	0	0	0%	1,402	1,407	5	0%	0.3	0.3	0.0	-0.5%	5	5	0.0	-0.5%
2024	0	0	0	4%	1,457	1,535	78	5%	0.3	0.3	0.0	-1.0%	5	4	0.0	-1.0%
2025	0	1	0	60%	1,588	2,354	766	48%	0.3	0.3	0.0	-1.5%	4	4	-0.1	-1.4%
2026	0	1	0	74%	1,629	2,559	930	57%	0.3	0.3	0.0	-1.9%	4	4	-0.1	-1.8%
2027	0	1	0	75%	1,599	2,502	903	56%	0.3	0.3	0.0	-1.7%	4	4	-0.1	-1.5%
2028	0	1	0	75%	1,565	2,445	881	56%	0.3	0.3	0.0	-1.6%	4	4	-0.1	-1.4%
2029	0	1	0	79%	1,523	2,416	893	59%	0.3	0.3	0.0	-1.4%	4	4	-0.1	-1.2%

Table A-21-14 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (Mitsubishi) Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	209	209	0	0%	0.1	0.1	0.0	0.0%	2	2	0.0	0.0%
2021	0	0	0	0%	119	119	0	0%	0.1	0.1	0.0	0.0%	2	2	0.0	0.0%
2022	0	0	0	0%	300	300	0	0%	0.1	0.1	0.0	0.0%	2	2	0.0	0.0%
2023	0	0	0	-1%	582	582	0	0%	0.1	0.1	0.0	-0.5%	2	2	0.0	-0.5%
2024	0	0	0	-2%	685	1,081	396	58%	0.1	0.1	0.0	-0.9%	2	2	0.0	-0.9%
2025	0	0	0	296%	645	1,839	1,194	185%	0.1	0.1	0.0	-1.2%	2	2	0.0	-1.1%
2026	0	0	0	300%	635	1,810	1,175	185%	0.1	0.1	0.0	-1.4%	2	2	0.0	-1.4%
2027	0	0	0	309%	617	1,777	1,160	188%	0.1	0.1	0.0	-1.0%	2	2	0.0	-0.9%
2028	0	0	0	316%	603	1,748	1,145	190%	0.1	0.1	0.0	-0.8%	2	2	0.0	-0.8%
2029	0	0	0	324%	587	1,720	1,133	193%	0.1	0.1	0.0	-0.6%	2	2	0.0	-0.6%

Table A-21-15 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (Nissan) Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	97	97	0	0%	1.0	1.0	0.0	0.0%	60	60	0.0	0.0%
2021	0	0	0	0%	291	291	0	0%	1.1	1.1	0.0	0.0%	66	66	0.0	0.0%
2022	0	0	0	0%	385	385	0	0%	1.3	1.3	0.0	0.0%	76	76	0.0	0.0%
2023	0	1	1	310%	445	1,288	843	190%	1.3	1.3	0.0	-0.5%	80	80	-0.3	-0.4%
2024	1	2	2	371%	621	2,109	1,488	240%	1.3	1.3	0.0	-1.1%	80	80	0.0	-0.1%
2025	1	3	3	485%	717	2,719	2,002	279%	1.3	1.3	0.0	-2.1%	79	78	-0.6	-0.7%
2026	1	3	3	501%	759	2,847	2,088	275%	1.3	1.2	0.0	-2.9%	77	76	-1.0	-1.3%
2027	0	3	2	499%	751	2,765	2,014	268%	1.3	1.2	0.0	-3.0%	76	75	-1.1	-1.4%
2028	0	3	2	493%	749	2,764	2,014	269%	1.2	1.2	0.0	-2.9%	75	74	-1.0	-1.3%
2029	0	3	2	483%	737	2,679	1,942	264%	1.2	1.2	0.0	-2.9%	75	74	-1.0	-1.4%

Table A-21-16 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (Subaru) Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	28	28	0	0%	0.8	0.8	0.0	0.0%	42	42	0.0	0.0%
2021	0	0	0	0%	185	185	0	0%	0.8	0.8	0.0	0.0%	46	46	0.0	0.0%
2022	0	0	0	0%	470	470	0	0%	0.9	0.9	0.0	0.0%	51	51	0.0	0.0%
2023	0	1	0	50%	802	1,068	266	33%	0.9	0.9	0.0	-0.5%	54	54	-0.2	-0.4%
2024	1	1	1	99%	910	1,466	556	61%	0.9	0.9	0.0	-1.0%	54	54	0.0	0.1%
2025	1	1	0	90%	1,024	1,649	625	61%	0.9	0.9	0.0	-1.4%	53	52	-0.3	-0.6%
2026	1	1	1	114%	1,087	1,769	682	63%	0.9	0.9	0.0	-1.8%	51	51	-0.6	-1.1%
2027	0	1	1	116%	1,112	1,779	667	60%	0.9	0.9	0.0	-1.5%	50	50	-0.5	-1.0%
2028	0	1	1	118%	1,084	1,737	653	60%	0.8	0.8	0.0	-1.4%	50	49	-0.4	-0.9%
2029	0	1	1	120%	1,058	1,699	642	61%	0.8	0.8	0.0	-1.2%	49	49	-0.4	-0.8%

Table A-21-17 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (Tesla) Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	0	0	0	0%	0.2	0.2	0.0	0.0%	23	23	0.0	0.0%
2021	0	0	0	0%	35	35	0	0%	0.2	0.2	0.0	0.0%	26	26	0.0	0.0%
2022	0	0	0	0%	49	49	0	0%	0.3	0.3	0.0	0.0%	31	31	0.0	0.0%
2023	0	0	0	0%	49	49	0	0%	0.3	0.3	0.0	-0.5%	33	33	-0.2	-0.5%
2024	0	0	0	0%	48	48	0	0%	0.3	0.3	0.0	-1.5%	34	33	-0.5	-1.5%
2025	0	0	0	0%	50	50	0	0%	0.3	0.3	0.0	-3.6%	33	32	-1.2	-3.6%
2026	0	0	0	0%	49	49	0	0%	0.3	0.3	0.0	-5.4%	33	31	-1.8	-5.4%
2027	0	0	0	0%	48	49	0	0%	0.3	0.3	0.0	-6.2%	33	31	-2.0	-6.2%
2028	0	0	0	0%	48	48	0	0%	0.3	0.3	0.0	-6.4%	33	31	-2.1	-6.4%
2029	0	0	0	0%	47	47	0	0%	0.3	0.3	0.0	-6.6%	33	31	-2.2	-6.6%

Table A-21-18 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (Toyota) Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	49	49	0	0%	1.8	1.8	0.0	0.0%	97	97	0.0	0.0%
2021	0	0	0	0%	131	131	0	0%	1.9	1.9	0.0	0.0%	107	107	0.0	0.0%
2022	0	0	0	0%	347	347	0	0%	2.2	2.2	0.0	0.0%	123	123	0.0	0.0%
2023	1	1	1	136%	424	739	316	74%	2.3	2.3	0.0	-0.5%	131	130	-0.6	-0.5%
2024	1	2	2	219%	646	1,351	705	109%	2.3	2.3	0.0	-1.1%	132	132	0.2	0.2%
2025	1	2	2	220%	705	1,434	728	103%	2.3	2.2	0.0	-2.1%	130	129	-1.1	-0.9%
2026	1	3	2	187%	886	1,664	777	88%	2.2	2.2	-0.1	-3.0%	128	126	-2.2	-1.7%
2027	1	2	2	197%	863	1,640	778	90%	2.2	2.1	-0.1	-3.0%	126	124	-2.4	-1.9%
2028	1	2	2	199%	852	1,635	783	92%	2.2	2.1	-0.1	-3.0%	125	123	-2.3	-1.8%
2029	1	2	1	177%	859	1,583	724	84%	2.1	2.1	-0.1	-3.0%	124	122	-2.5	-2.0%

Table A-21-19 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (Volvo) Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	170	170	0	0%	0.1	0.1	0.0	0.0%	2	2	0.0	0.0%
2021	0	0	0	0%	369	369	0	0%	0.1	0.1	0.0	0.0%	3	3	0.0	0.0%
2022	0	0	0	0%	434	434	0	0%	0.1	0.1	0.0	0.0%	3	3	0.0	0.0%
2023	0	0	0	12%	1,718	1,902	185	11%	0.1	0.1	0.0	-0.5%	3	3	0.0	-0.5%
2024	0	0	0	11%	1,712	1,990	279	16%	0.1	0.1	0.0	-1.0%	3	3	0.0	-1.2%
2025	0	0	0	12%	1,837	2,263	426	23%	0.1	0.1	0.0	-1.5%	3	3	-0.1	-2.6%
2026	0	0	0	51%	1,956	3,059	1,102	56%	0.1	0.1	0.0	-1.9%	3	3	-0.1	-3.6%
2027	0	0	0	63%	2,028	3,094	1,065	53%	0.1	0.1	0.0	-1.6%	3	3	-0.1	-3.3%
2028	0	0	0	64%	1,952	2,982	1,030	53%	0.1	0.1	0.0	-1.5%	3	3	-0.1	-3.4%
2029	0	0	0	64%	1,867	2,855	988	53%	0.1	0.1	0.0	-1.3%	3	3	-0.1	-3.5%

Table A-21-20 - Comparison of Technology Costs, Average Price Increase, Sales, and Labor Utilization for Manufacturer (VWA) Total Fleet Between Alternative 0 (Baseline) and Alternative 2

Model Year	Technology Costs Increase (\$b)				Avg. Vehicle Price Increase (\$)				Annual Sales (million vehicles)				Labor (person years)			
	Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative		Standards		Change from Alternative	
	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent	Alternative 0 (Baseline)	Alternative 2	Absolute	Percent
2020	0	0	0	0%	405	405	0	0%	0.4	0.4	0.0	0.0%	10	10	0.0	0.0%
2021	0	0	0	0%	406	406	0	0%	0.5	0.5	0.0	0.0%	12	12	0.0	0.0%
2022	0	0	0	0%	836	836	0	0%	0.5	0.5	0.0	0.0%	13	13	0.0	0.0%
2023	0	0	0	0%	920	921	0	0%	0.6	0.6	0.0	-0.5%	14	14	-0.1	-0.5%
2024	1	1	0	-10%	2,539	2,368	-171	-7%	0.6	0.6	0.0	-1.2%	14	14	-0.2	-1.1%
2025	1	1	0	-6%	2,636	2,601	-35	-1%	0.5	0.5	0.0	-2.1%	14	14	-0.3	-1.9%
2026	1	1	0	-6%	2,644	2,809	165	6%	0.5	0.5	0.0	-3.0%	14	13	-0.4	-2.6%
2027	1	1	0	-2%	2,596	2,714	118	5%	0.5	0.5	0.0	-3.0%	13	13	-0.4	-2.7%
2028	1	1	0	0%	2,547	2,620	74	3%	0.5	0.5	0.0	-3.0%	13	13	-0.3	-2.3%
2029	1	1	0	1%	2,459	2,547	88	4%	0.5	0.5	0.0	-3.0%	13	13	-0.3	-2.3%

22. CAFE Compliance Credits

Table A-22-1 - CAFE Compliance Credits (in millions) Earned by Manufacturers, Total Fleet by Model Year for Alternative 0 (Baseline)

Manufacturer	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
BMW	-11	-9	0	11	15	21	23	23	23	23
Daimler	-17	-13	-12	-6	4	7	8	9	9	11
FCA	-49	-37	0	23	27	17	23	28	37	38
Ford	-14	-3	35	75	84	82	99	99	99	98
GM	-50	-31	-7	-4	8	20	18	23	23	37
Honda	21	26	69	80	87	103	109	107	107	107
Hyundai Kia-H	-29	-27	-6	4	21	16	14	17	17	19
Hyundai Kia-K	-15	6	8	6	22	24	19	23	23	23
JLR	-5	-5	-3	-1	1	1	1	1	1	2
Mazda	-7	-5	-4	9	9	10	10	10	10	9
Mitsubishi	-3	-3	-3	-4	-5	2	1	1	1	2
Nissan	-15	0	19	19	34	32	26	26	28	29
Subaru	9	15	34	59	73	79	77	76	74	73
Tesla	1,335	1,575	1,864	2,024	2,052	2,043	2,028	2,009	2,016	2,024
Toyota	6	18	50	62	69	60	84	95	104	125
Volvo	-2	-2	-3	7	6	6	7	8	8	8
VWA	-18	-16	-11	-7	31	37	39	40	43	46

Table A-22-2 - CAFE Compliance Credits (in millions) Earned by Manufacturers, Total Fleet by Model Year for Alternative 1

Manufacturer	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
BMW	-11	-9	0	12	3	6	4	4	4	5
Daimler	-17	-13	-12	-7	-7	-7	-9	-4	-4	-3
FCA	-49	-37	0	23	-40	-60	-59	-45	-27	-21
Ford	-14	-3	35	119	57	40	28	28	27	26
GM	-50	-31	-7	9	-8	18	12	25	27	36
Honda	21	26	69	80	19	22	12	13	13	13
Hyundai Kia-H	-29	-27	-6	4	0	-2	2	7	7	8
Hyundai Kia-K	-15	6	8	6	8	9	0	5	7	7
JLR	-5	-5	-3	-1	-3	-4	-4	-3	-3	-1
Mazda	-7	-5	-4	9	-2	3	2	2	2	2
Mitsubishi	-3	-3	-3	-4	-11	3	1	1	1	1
Nissan	-15	0	19	42	18	15	2	3	14	15
Subaru	9	15	34	67	52	52	44	44	43	43
Tesla	1,335	1,575	1,864	2,019	2,019	1,984	1,953	1,932	1,934	1,938
Toyota	6	18	50	80	45	19	34	47	59	80
Volvo	-2	-2	-3	7	1	1	0	3	3	3
VWA	-18	-16	-11	-8	0	2	3	5	8	12

Table A-22-3 - CAFE Compliance Credits (in millions) Earned by Manufacturers, Total Fleet by Model Year for Alternative 2

Manufacturer	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
BMW	-11	-9	0	12	5	5	-3	0	0	1
Daimler	-17	-13	-12	-7	-4	-14	-26	-13	-9	-9
FCA	-49	-37	0	23	-19	-73	-107	-92	-63	-56
Ford	-14	-3	35	612	558	490	458	451	442	436
GM	-50	-31	-7	5	-6	-4	-18	9	10	19
Honda	21	26	69	99	67	39	-6	-4	1	1
Hyundai Kia-H	-29	-27	-6	4	6	-3	1	6	7	9
Hyundai Kia-K	-15	6	8	6	31	19	0	6	9	11
JLR	-5	-5	-3	-1	-1	-5	-9	-7	-7	-5
Mazda	-7	-5	-4	9	0	8	3	3	3	4
Mitsubishi	-3	-3	-3	-4	-9	7	1	1	1	1
Nissan	-15	0	19	50	47	46	1	6	23	27
Subaru	9	15	34	66	64	43	25	26	25	25
Tesla	1,335	1,575	1,864	2,014	2,012	1,949	1,888	1,853	1,856	1,859
Toyota	6	18	50	91	115	44	14	24	35	36
Volvo	-2	-2	-3	7	4	1	-3	2	2	2
VWA	-18	-16	-11	-7	12	5	-10	-4	4	5

Table A-22-4 - CAFE Compliance Credits (in millions) Earned by Manufacturers, Total Fleet by Model Year for Alternative 3

Manufacturer	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
BMW	-11	-9	0	13	4	5	-6	0	0	1
Daimler	-17	-13	-12	-6	-6	-20	-38	-25	-15	-14
FCA	-49	-37	0	23	-32	-102	-154	-138	-102	-94
Ford	-14	-3	35	613	559	468	450	446	438	435
GM	-50	-31	-7	11	-9	-2	-28	10	14	14
Honda	21	26	69	132	104	60	-3	-1	9	10
Hyundai Kia-H	-29	-27	-6	5	6	-5	0	4	6	11
Hyundai Kia-K	-15	6	8	6	33	28	0	4	8	9
JLR	-5	-5	-3	0	-3	-7	-13	-11	-11	-9
Mazda	-7	-5	-4	9	0	7	1	1	1	2
Mitsubishi	-3	-3	-3	-4	-10	8	0	0	0	0
Nissan	-15	0	19	50	47	40	-22	-6	16	24
Subaru	9	15	34	66	55	24	4	6	6	6
Tesla	1,335	1,575	1,864	2,011	1,988	1,905	1,830	1,791	1,794	1,795
Toyota	6	18	50	97	151	58	15	27	42	42
Volvo	-2	-2	-3	10	5	1	-4	2	2	2
VWA	-18	-16	-11	-8	5	-4	-15	-7	-4	-3

23. Consumer Impacts

Table A-23-1 - Average Impacts to Consumers Relative to Alternative 0 (Baseline) for the Total Fleet, Alternative 2 at a 3% Discount Rate (dollars), per Vehicle Model Year

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Price Increase	0	0	0	223	496	794	1,067	1,017	1,005	960
Implicit Opportunity Cost	0	0	0	0	0	0	0	0	0	0
Increase in Financing Cost	0	0	0	23	54	90	123	121	120	117
Increase in Insurance Cost	0	0	0	26	60	101	138	136	135	131
Increase in Taxes/Fees	0	0	0	12	28	47	64	63	63	61
Lost Consumer Surplus	0	0	0	0	2	6	10	9	8	7
Total Consumer Cost	0	0	0	285	640	1,037	1,402	1,345	1,331	1,276
Fuel Savings	76	82	87	-85	-376	-611	-845	-904	-973	-937
Mobility Benefit	0	1	2	11	50	74	98	109	123	125
Refueling Benefit	4	4	4	45	30	14	-2	4	0	-1
Total Consumer Benefit	-79	-85	-89	50	396	671	945	1,009	1,096	1,063
Net Consumer Benefit	-79	-85	-89	-236	-243	-366	-457	-336	-235	-213
Payback	0.0	0.0	0.0	1.5	2.0	2.4	3.5	2.5	2.0	2.5

Table A-23-2 - Average Impacts to Consumers Relative to Alternative 0 (Baseline) for the Passenger Car Fleet, Alternative 2 at a 3% Discount Rate (dollars), per Vehicle Model Year

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Price Increase	0	0	0	361	648	959	1,188	1,140	1,129	1,073
Implicit Opportunity Cost	0	0	0	0	0	0	0	0	0	0
Increase in Financing Cost	0	0	0	38	68	99	123	117	116	110
Increase in Insurance Cost	0	0	0	42	76	112	138	131	130	123
Increase in Taxes/Fees	0	0	0	20	35	52	64	61	60	57
Lost Consumer Surplus	0	0	0	0	2	6	10	9	8	7
Total Consumer Cost	0	0	0	461	829	1,228	1,522	1,458	1,443	1,370
Fuel Savings	59	63	66	-173	-509	-789	-962	-1,024	-1,099	-1,053
Mobility Benefit	1	1	2	14	56	85	103	111	122	118
Refueling Benefit	3	4	4	40	23	7	-4	-2	0	7
Total Consumer Benefit	-62	-65	-68	146	542	868	1,069	1,137	1,221	1,164
Net Consumer Benefit	-62	-65	-68	-315	-287	-360	-454	-322	-222	-206
Payback	0.0	0.0	0.0	2.0	3.0	4.0	4.0	3.0	3.0	3.0

Table A-23-3 - Average Impacts to Consumers Relative to Alternative 0 (Baseline) for the Light Truck Fleet, Alternative 2 at a 3% Discount Rate (dollars), per Vehicle Model Year

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Price Increase	0	0	0	100	356	642	954	899	883	846
Implicit Opportunity Cost	0	0	0	0	0	0	0	0	0	0
Increase in Financing Cost	0	0	0	11	37	67	100	94	93	89
Increase in Insurance Cost	0	0	0	12	42	76	112	106	104	100
Increase in Taxes/Fees	0	0	0	5	19	35	52	49	48	46
Lost Consumer Surplus	0	0	0	0	2	6	10	9	8	7
Total Consumer Cost	0	0	0	129	457	825	1,228	1,157	1,135	1,087
Fuel Savings	89	97	104	-6	-275	-524	-862	-958	-1,035	-1,027
Mobility Benefit	0	0	1	8	44	64	94	108	125	133
Refueling Benefit	4	4	5	49	36	19	-1	9	-1	-11
Total Consumer Benefit	-93	-100	-108	-36	283	569	957	1,057	1,160	1,170
Net Consumer Benefit	-93	-100	-108	-165	-175	-256	-272	-99	25	83
Payback	0.0	0.0	0.0	1.0	1.0	1.0	3.0	2.0	1.0	2.0

Table A-23-4 - Average Impacts to Consumers Relative to Alternative 0 (Baseline) for the Total Fleet, Alternative 2 at a 7% Discount Rate (dollars), per Vehicle Model Year

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Price Increase	0	0	0	223	496	794	1,067	1,017	1,005	960
Implicit Opportunity Cost	0	0	0	0	0	0	0	0	0	0
Increase in Financing Cost	0	0	0	21	49	82	112	111	110	107
Increase in Insurance Cost	0	0	0	22	50	84	114	113	112	109
Increase in Taxes/Fees	0	0	0	12	28	47	64	63	63	61
Lost Consumer Surplus	0	0	0	0	2	6	10	9	8	7
Total Consumer Cost	0	0	0	279	625	1,012	1,368	1,312	1,298	1,244
Fuel Savings	48	53	58	-71	-294	-475	-654	-700	-754	-726
Mobility Benefit	0	1	1	8	38	56	75	83	94	96
Refueling Benefit	2	3	3	35	23	10	-2	3	0	-1
Total Consumer Benefit	-50	-55	-60	44	309	520	731	780	848	823
Net Consumer Benefit	-50	-55	-60	-235	-316	-492	-638	-531	-450	-421
Payback	0.0	-0.4	0.0	3.8	6.3	45.9	46.6	46.1	5.4	3.9

Table A-23-5 - Average Impacts to Consumers Relative to Alternative 0 (Baseline) for the Passenger Car Fleet, Alternative 2 at a 7% Discount Rate (dollars), per Vehicle Model Year

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Price Increase	0	0	0	361	648	959	1,188	1,140	1,129	1,073
Implicit Opportunity Cost	0	0	0	0	0	0	0	0	0	0
Increase in Financing Cost	0	0	0	35	62	91	113	107	106	101
Increase in Insurance Cost	0	0	0	35	63	93	115	109	108	102
Increase in Taxes/Fees	0	0	0	20	35	52	64	61	60	57
Lost Consumer Surplus	0	0	0	0	2	6	10	9	8	7
Total Consumer Cost	0	0	0	451	811	1,201	1,489	1,427	1,412	1,340
Fuel Savings	38	42	46	-136	-397	-613	-748	-796	-856	-820
Mobility Benefit	1	1	1	10	43	66	79	86	94	91
Refueling Benefit	2	2	3	31	18	5	-3	-2	0	5
Total Consumer Benefit	-40	-44	-47	115	422	674	830	884	950	906
Net Consumer Benefit	-40	-44	-47	-335	-389	-527	-659	-543	-462	-433
Payback	0.0	-1.0	0.0	7.0	11.0	92.0	92.0	93.0	8.0	6.0

Table A-23-6 - Average Impacts to Consumers Relative to Alternative 0 (Baseline) for the Light Truck Fleet, Alternative 2 at a 7% Discount Rate (dollars), per Vehicle Model Year

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Price Increase	0	0	0	100	356	642	954	899	883	846
Implicit Opportunity Cost	0	0	0	0	0	0	0	0	0	0
Increase in Financing Cost	0	0	0	10	34	62	92	86	85	81
Increase in Insurance Cost	0	0	0	10	35	63	93	88	86	83
Increase in Taxes/Fees	0	0	0	5	19	35	52	49	48	46
Lost Consumer Surplus	0	0	0	0	2	6	10	9	8	7
Total Consumer Cost	0	0	0	126	447	807	1,201	1,131	1,110	1,063
Fuel Savings	56	62	69	-13	-215	-404	-660	-734	-792	-786
Mobility Benefit	0	0	1	6	33	48	71	82	95	101
Refueling Benefit	2	3	3	38	28	15	-1	7	0	-8
Total Consumer Benefit	-58	-65	-72	-19	220	437	732	808	887	895
Net Consumer Benefit	-58	-65	-72	-145	-228	-370	-469	-322	-223	-168
Payback	0.0	0.0	0.0	1.0	2.0	4.0	5.0	3.0	3.0	2.0

24. Environmental Impacts

Table A-24-1 - Incremental Change in Criteria Emissions Relative to Alternative 0 (Baseline) from the MY 2029 Total Fleet in Calendar Year 2030, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	-0.14	-0.01	-0.02
VOC Upstream	-1.10	-2.10	-3.04
NOx Upstream	-0.29	-0.09	-0.13
SO2 Upstream	-0.05	0.31	0.44
PM Upstream	-0.02	-0.01	-0.01
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	-0.72	-2.82	-4.47
VOC Tailpipe	-0.02	-0.06	-0.09
NOx Tailpipe	-0.02	-0.07	-0.10
SO2 Tailpipe	-0.02	-0.04	-0.06
PM Tailpipe	0.00	-0.01	-0.01
Fleetwide Change in Total Emissions			
CO Total	-0.86	-2.83	-4.49
VOC Total	-1.11	-2.16	-3.13
NOx Total	-0.30	-0.15	-0.24

Table A-24-2 - Incremental Change in Criteria Emissions Relative to Alternative 0 (Baseline) from the MY 2029 Passenger Car Fleet in Calendar Year 2030, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	-0.08	-0.10	-0.15
VOC Upstream	-0.66	-1.32	-1.85
NOx Upstream	-0.17	-0.22	-0.32
SO2 Upstream	-0.03	0.05	0.06
PM Upstream	-0.01	-0.02	-0.02
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	-1.04	-2.60	-3.61
VOC Tailpipe	-0.02	-0.06	-0.08
NOx Tailpipe	-0.02	-0.06	-0.08
SO2 Tailpipe	-0.01	-0.03	-0.04
PM Tailpipe	0.00	-0.01	-0.01
Fleetwide Change in Total Emissions			
CO Total	-1.12	-2.70	-3.76
VOC Total	-0.68	-1.38	-1.93
NOx Total	-0.19	-0.29	-0.40

Table A-24-3 - Incremental Change in Criteria Emissions Relative to Alternative 0 (Baseline) from the MY 2029 Light Truck Fleet in Calendar Year 2030, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	-0.06	0.09	0.12
VOC Upstream	-0.44	-0.77	-1.19
NOx Upstream	-0.12	0.14	0.18
SO2 Upstream	-0.02	0.27	0.38
PM Upstream	-0.01	0.01	0.02
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	0.32	-0.22	-0.85
VOC Tailpipe	0.01	0.00	-0.01
NOx Tailpipe	0.01	-0.01	-0.02
SO2 Tailpipe	-0.01	-0.02	-0.02
PM Tailpipe	0.00	0.00	0.00
Fleetwide Change in Total Emissions			
CO Total	0.26	-0.13	-0.73
VOC Total	-0.43	-0.77	-1.20
NOx Total	-0.11	0.13	0.16

Table A-24-4 - Incremental Change in Criteria Emissions Relative to Alternative 0 (Baseline) from the MY 2029 Total Fleet in Calendar Year 2035, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	-0.11	0.01	0.01
VOC Upstream	-0.86	-1.64	-2.37
NOx Upstream	-0.22	-0.05	-0.08
SO2 Upstream	-0.04	0.24	0.35
PM Upstream	-0.02	0.00	0.00
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	-0.82	-3.19	-5.06
VOC Tailpipe	-0.03	-0.12	-0.19
NOx Tailpipe	-0.02	-0.07	-0.11
SO2 Tailpipe	-0.02	-0.04	-0.05
PM Tailpipe	0.00	-0.01	-0.01
Fleetwide Change in Total Emissions			
CO Total	-0.92	-3.18	-5.05
VOC Total	-0.89	-1.76	-2.57
NOx Total	-0.24	-0.12	-0.19

Table A-24-5 - Incremental Change in Criteria Emissions Relative to Alternative 0 (Baseline) from the MY 2029 Passenger Car Fleet in Calendar Year 2035, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	-0.07	-0.08	-0.11
VOC Upstream	-0.52	-1.04	-1.45
NOx Upstream	-0.13	-0.17	-0.24
SO2 Upstream	-0.02	0.03	0.04
PM Upstream	-0.01	-0.01	-0.02
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	-1.21	-3.02	-4.18
VOC Tailpipe	-0.05	-0.12	-0.16
NOx Tailpipe	-0.03	-0.07	-0.09
SO2 Tailpipe	-0.01	-0.02	-0.03
PM Tailpipe	0.00	-0.01	-0.01
Fleetwide Change in Total Emissions			
CO Total	-1.27	-3.09	-4.29
VOC Total	-0.57	-1.16	-1.61
NOx Total	-0.16	-0.24	-0.33

Table A-24-6 - Incremental Change in Criteria Emissions Relative to Alternative 0 (Baseline) from the MY 2029 Light Truck Fleet in Calendar Year 2035, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	-0.04	0.08	0.12
VOC Upstream	-0.34	-0.60	-0.92
NOx Upstream	-0.09	0.12	0.17
SO2 Upstream	-0.02	0.21	0.30
PM Upstream	-0.01	0.01	0.02
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	0.39	-0.17	-0.88
VOC Tailpipe	0.02	-0.01	-0.03
NOx Tailpipe	0.01	0.00	-0.02
SO2 Tailpipe	-0.01	-0.01	-0.02
PM Tailpipe	0.00	0.00	0.00
Fleetwide Change in Total Emissions			
CO Total	0.35	-0.09	-0.76
VOC Total	-0.32	-0.60	-0.95
NOx Total	-0.08	0.12	0.14

Table A-24-7 - Incremental Change in Criteria Emissions Relative to Alternative 0 (Baseline) from the MY 2029 Total Fleet in Calendar Year 2040, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	-0.08	-0.01	-0.01
VOC Upstream	-0.61	-1.16	-1.68
NOx Upstream	-0.16	-0.06	-0.09
SO2 Upstream	-0.04	0.14	0.20
PM Upstream	-0.01	0.00	-0.01
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	-0.88	-3.34	-5.30
VOC Tailpipe	-0.03	-0.11	-0.18
NOx Tailpipe	-0.01	-0.06	-0.09
SO2 Tailpipe	-0.01	-0.02	-0.04
PM Tailpipe	0.00	-0.01	-0.01
Fleetwide Change in Total Emissions			
CO Total	-0.96	-3.34	-5.31
VOC Total	-0.64	-1.27	-1.86
NOx Total	-0.17	-0.12	-0.18

Table A-24-8 - Incremental Change in Criteria Emissions Relative to Alternative 0 (Baseline) from the MY 2029 Passenger Car Fleet in Calendar Year 2040, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	-0.05	-0.06	-0.08
VOC Upstream	-0.36	-0.72	-1.01
NOx Upstream	-0.10	-0.13	-0.18
SO2 Upstream	-0.02	0.01	0.01
PM Upstream	-0.01	-0.01	-0.01
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	-1.24	-3.10	-4.31
VOC Tailpipe	-0.04	-0.10	-0.14
NOx Tailpipe	-0.02	-0.05	-0.07
SO2 Tailpipe	-0.01	-0.02	-0.02
PM Tailpipe	0.00	-0.01	-0.01
Fleetwide Change in Total Emissions			
CO Total	-1.29	-3.16	-4.39
VOC Total	-0.40	-0.82	-1.15
NOx Total	-0.12	-0.18	-0.25

Table A-24-9 - Incremental Change in Criteria Emissions Relative to Alternative 0 (Baseline) from the MY 2029 Light Truck Fleet in Calendar Year 2040, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	-0.03	0.05	0.07
VOC Upstream	-0.25	-0.44	-0.68
NOx Upstream	-0.07	0.07	0.09
SO2 Upstream	-0.02	0.13	0.19
PM Upstream	-0.01	0.01	0.01
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	0.37	-0.24	-0.99
VOC Tailpipe	0.01	-0.01	-0.03
NOx Tailpipe	0.01	-0.01	-0.02
SO2 Tailpipe	-0.01	-0.01	-0.01
PM Tailpipe	0.00	0.00	0.00
Fleetwide Change in Total Emissions			
CO Total	0.33	-0.19	-0.91
VOC Total	-0.24	-0.45	-0.71
NOx Total	-0.06	0.06	0.07

Table A-24-10 - Incremental Change in Criteria Emissions Relative to Alternative 0 (Baseline) Over Lifetimes of Vehicles Through 2029 for the Total Fleet, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	-7.63	4.15	6.83
VOC Upstream	-79.32	-132.26	-189.50
NOx Upstream	-16.17	2.29	4.85
SO2 Upstream	-0.09	25.37	37.67
PM Upstream	-1.31	0.32	0.59
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	258.54	490.58	738.35
VOC Tailpipe	28.81	58.96	89.77
NOx Tailpipe	22.07	46.32	70.77
SO2 Tailpipe	-1.70	-2.93	-4.19
PM Tailpipe	0.37	0.59	0.85
Fleetwide Change in Total Emissions			
CO Total	250.91	494.72	745.18
VOC Total	-50.51	-73.30	-99.73
NOx Total	5.90	48.61	75.61

Table A-24-11 - Incremental Change in Criteria Emissions Relative to Alternative 0 (Baseline) Over Lifetimes of Vehicles Through 2029 for the Light Truck Fleet, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	-3.50	8.69	13.15
VOC Upstream	-33.76	-48.93	-76.16
NOx Upstream	-7.32	13.25	20.00
SO2 Upstream	-0.40	20.23	30.89
PM Upstream	-0.59	1.18	1.78
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	212.80	386.24	536.11
VOC Tailpipe	18.60	36.98	54.57
NOx Tailpipe	15.39	31.78	47.70
SO2 Tailpipe	-0.73	-1.13	-1.74
PM Tailpipe	0.39	0.62	0.77
Fleetwide Change in Total Emissions			
CO Total	209.30	394.93	549.26
VOC Total	-15.16	-11.95	-21.59
NOx Total	8.07	45.03	67.70

Table A-24-12 - Incremental Change in Criteria Emissions Relative to Alternative 0 (Baseline) Over Lifetimes of Vehicles Through 2029 for the Passenger Car Fleet, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	-4.13	-4.54	-6.32
VOC Upstream	-45.56	-83.33	-113.34
NOx Upstream	-8.85	-10.96	-15.15
SO2 Upstream	0.31	5.14	6.78
PM Upstream	-0.71	-0.86	-1.19
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	45.74	104.34	202.24
VOC Tailpipe	10.21	21.97	35.20
NOx Tailpipe	6.68	14.53	23.07
SO2 Tailpipe	-0.97	-1.80	-2.45
PM Tailpipe	-0.02	-0.02	0.08
Fleetwide Change in Total Emissions			
CO Total	41.62	99.79	195.91
VOC Total	-35.35	-61.36	-78.14
NOx Total	-2.16	3.58	7.92

Table A-24-13 - Total Criteria Emissions from the MY 2029 Total Fleet in Calendar Year 2030, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	6.0	6.2	6.1
VOC Upstream	20.8	19.8	18.9
NOx Upstream	11.3	11.5	11.5
SO2 Upstream	6.2	6.6	6.7
PM Upstream	0.9	1.0	1.0
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	60.4	58.3	56.7
VOC Tailpipe	1.3	1.2	1.2
NOx Tailpipe	1.3	1.3	1.3
SO2 Tailpipe	0.4	0.4	0.4
PM Tailpipe	0.2	0.1	0.1
Fleetwide Change in Total Emissions			
CO Total	66.5	64.5	62.8
VOC Total	22.1	21.0	20.1
NOx Total	12.6	12.8	12.7

Table A-24-14 - Total Criteria Emissions from the MY 2029 Passenger Car Fleet in Calendar Year 2030, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	2.6	2.6	2.5
VOC Upstream	8.1	7.5	7.0
NOx Upstream	4.8	4.8	4.7
SO2 Upstream	2.8	2.9	2.9
PM Upstream	0.4	0.4	0.4
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	27.7	26.1	25.1
VOC Tailpipe	0.6	0.6	0.5
NOx Tailpipe	0.6	0.6	0.6
SO2 Tailpipe	0.2	0.1	0.1
PM Tailpipe	0.1	0.1	0.1
Fleetwide Change in Total Emissions			
CO Total	30.3	28.7	27.6
VOC Total	8.8	8.0	7.5
NOx Total	5.4	5.4	5.2

Table A-24-15 - Total Criteria Emissions from the MY 2029 Light Truck Fleet in Calendar Year 2030, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	3.4	3.6	3.6
VOC Upstream	12.6	12.3	11.9
NOx Upstream	6.5	6.7	6.8
SO2 Upstream	3.4	3.7	3.8
PM Upstream	0.5	0.6	0.6
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	32.7	32.2	31.6
VOC Tailpipe	0.7	0.7	0.7
NOx Tailpipe	0.7	0.7	0.7
SO2 Tailpipe	0.3	0.2	0.2
PM Tailpipe	0.1	0.1	0.1
Fleetwide Change in Total Emissions			
CO Total	36.2	35.8	35.2
VOC Total	13.3	13.0	12.6
NOx Total	7.2	7.4	7.5

Table A-24-16 - Total Criteria Emissions from the MY 2029 Total Fleet in Calendar Year 2035, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	4.8	4.9	4.9
VOC Upstream	16.6	15.8	15.1
NOx Upstream	8.9	9.1	9.1
SO2 Upstream	4.9	5.2	5.3
PM Upstream	0.7	0.8	0.8
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	71.1	68.7	66.9
VOC Tailpipe	2.9	2.8	2.8
NOx Tailpipe	1.7	1.6	1.6
SO2 Tailpipe	0.3	0.3	0.3
PM Tailpipe	0.2	0.2	0.2
Fleetwide Change in Total Emissions			
CO Total	75.9	73.6	71.8
VOC Total	19.5	18.6	17.8
NOx Total	10.6	10.7	10.6

Table A-24-17 - Total Criteria Emissions from the MY 2029 Passenger Car Fleet in Calendar Year 2035, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	2.1	2.0	2.0
VOC Upstream	6.5	6.0	5.6
NOx Upstream	3.8	3.8	3.7
SO2 Upstream	2.2	2.3	2.3
PM Upstream	0.3	0.3	0.3
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	33.0	31.2	30.0
VOC Tailpipe	1.3	1.2	1.2
NOx Tailpipe	0.7	0.7	0.7
SO2 Tailpipe	0.1	0.1	0.1
PM Tailpipe	0.1	0.1	0.1
Fleetwide Change in Total Emissions			
CO Total	35.0	33.2	32.0
VOC Total	7.8	7.2	6.8
NOx Total	4.5	4.5	4.4

Table A-24-18 - Total Criteria Emissions from the MY 2029 Light Truck Fleet in Calendar Year 2035, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	2.7	2.9	2.9
VOC Upstream	10.0	9.8	9.5
NOx Upstream	5.1	5.3	5.4
SO2 Upstream	2.7	2.9	3.0
PM Upstream	0.4	0.4	0.5
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	38.1	37.6	36.9
VOC Tailpipe	1.6	1.6	1.6
NOx Tailpipe	0.9	0.9	0.9
SO2 Tailpipe	0.2	0.2	0.2
PM Tailpipe	0.1	0.1	0.1
Fleetwide Change in Total Emissions			
CO Total	40.9	40.4	39.8
VOC Total	11.7	11.4	11.0
NOx Total	6.0	6.2	6.3

Table A-24-19 - Total Criteria Emissions from the MY 2029 Total Fleet in Calendar Year 2040, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	3.3	3.4	3.4
VOC Upstream	11.6	11.1	10.6
NOx Upstream	6.2	6.3	6.3
SO2 Upstream	3.4	3.6	3.6
PM Upstream	0.5	0.5	0.5
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	71.8	69.4	67.4
VOC Tailpipe	2.5	2.5	2.4
NOx Tailpipe	1.3	1.3	1.2
SO2 Tailpipe	0.2	0.2	0.2
PM Tailpipe	0.2	0.2	0.2
Fleetwide Change in Total Emissions			
CO Total	75.2	72.8	70.8
VOC Total	14.2	13.5	12.9
NOx Total	7.5	7.6	7.5

Table A-24-20 - Total Criteria Emissions from the MY 2029 Passenger Car Fleet in Calendar Year 2040, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	1.4	1.4	1.4
VOC Upstream	4.5	4.1	3.8
NOx Upstream	2.6	2.5	2.5
SO2 Upstream	1.5	1.5	1.5
PM Upstream	0.2	0.2	0.2
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	33.1	31.3	30.0
VOC Tailpipe	1.1	1.1	1.0
NOx Tailpipe	0.6	0.5	0.5
SO2 Tailpipe	0.1	0.1	0.1
PM Tailpipe	0.1	0.1	0.1
Fleetwide Change in Total Emissions			
CO Total	34.5	32.6	31.4
VOC Total	5.6	5.2	4.9
NOx Total	3.1	3.1	3.0

Table A-24-21 - Total Criteria Emissions from the MY 2029 Light Truck Fleet in Calendar Year 2040, by Alternative (1,000 metric tons)

Alternative	1	2	3
Fleetwide Change in Upstream Emissions			
CO Upstream	1.9	2.0	2.0
VOC Upstream	7.2	7.0	6.7
NOx Upstream	3.6	3.7	3.8
SO2 Upstream	1.9	2.1	2.1
PM Upstream	0.3	0.3	0.3
Fleetwide Change in Tailpipe Emissions			
CO Tailpipe	38.7	38.1	37.4
VOC Tailpipe	1.4	1.4	1.4
NOx Tailpipe	0.8	0.7	0.7
SO2 Tailpipe	0.1	0.1	0.1
PM Tailpipe	0.1	0.1	0.1
Fleetwide Change in Total Emissions			
CO Total	40.7	40.1	39.4
VOC Total	8.6	8.4	8.1
NOx Total	4.4	4.5	4.5

25. Electrification Costs

Table A-25-1 - Incremental Electrification Costs for Manufacturer (Total), MY 2029 Total Fleet

	Alternative		
	1	2	3
Retrievable Electrification Costs (\$b)	0.2	0.5	0.5
Electrification Tax Credits (\$b)	0.0	0.0	0.0
Irretrievable Electrification Costs (\$b)	0.0	0.1	0.1
Total Electrification Costs (\$b)	0.1	0.4	0.4

Table A-25-2 - Incremental Electrification Costs for Manufacturer (Total), MY 2029 Passenger Car Fleet

	Alternative		
	1	2	3
Retrievable Electrification Costs (\$b)	0.3	0.5	0.5
Electrification Tax Credits (\$b)	0.0	0.0	0.0
Irretrievable Electrification Costs (\$b)	0.0	0.1	0.1
Total Electrification Costs (\$b)	0.2	0.4	0.4

Table A-25-3 - Incremental Electrification Costs for Manufacturer (Total), MY 2029 Light Truck Fleet

	Alternative		
	1	2	3
Retrievable Electrification Costs (\$b)	-0.1	0.0	0.0
Electrification Tax Credits (\$b)	0.0	0.0	0.0
Irretrievable Electrification Costs (\$b)	0.0	0.0	0.0
Total Electrification Costs (\$b)	-0.1	0.0	0.0

Table A-25-4 - Total Electrification Costs for Manufacturer (Total), MY 2029 Total Fleet

	Alternative		
	1	2	3
Retrievable Electrification Costs (\$b)	0.4	0.7	0.7
Electrification Tax Credits (\$b)	0.0	0.0	0.0
Irretrievable Electrification Costs (\$b)	0.1	0.1	0.1
Total Electrification Costs (\$b)	0.3	0.6	0.6

Table A-25-5 - Total Electrification Costs for Manufacturer (Total), MY 2029 Passenger Car Fleet

	Alternative		
	1	2	3
Retrievable Electrification Costs (\$b)	0.4	0.6	0.6
Electrification Tax Credits (\$b)	0.0	0.0	0.0
Irretrievable Electrification Costs (\$b)	0.1	0.1	0.1
Total Electrification Costs (\$b)	0.3	0.5	0.5

Table A-25-6 - Total Electrification Costs for Manufacturer (Total), MY 2029 Light Truck Fleet

	Alternative		
	1	2	3
Retrievable Electrification Costs (\$b)	0.0	0.1	0.1
Electrification Tax Credits (\$b)	0.0	0.0	0.0
Irretrievable Electrification Costs (\$b)	0.0	0.0	0.0
Total Electrification Costs (\$b)	0.0	0.1	0.1

26. Fleet Characteristics

Table A-26-1 - Changes in Fleet Characteristics for Model Years 2020-2029 for Alternative 1

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total	Avg.
Changes in Fleet Size, Usage and Fuel Consumption												
Changes in Fleet Size (m)	0.0	0.0	0.0	-0.8	-2.3	-2.5	-2.5	-2.1	-2.0	-1.8	-14.0	-1.4
Light Truck Share (%)	59%	58%	56%	55%	55%	55%	54%	54%	54%	53%	N/A	55%
Pass. Car Share (%)	41%	42%	44%	45%	45%	45%	46%	46%	46%	47%	N/A	45%
VMT from Rebound (b)	0.0	0.1	0.2	1.8	9.6	13.2	14.4	15.4	16.8	16.8	88.4	8.8
Fuel Volume - Total (b gallons)	0.2	0.3	0.3	-1.1	-4.1	-4.9	-5.1	-5.1	-5.2	-5.0	-29.5	-3.0
Fuel Volume - Lt. Truck (b gallons)	0.2	0.2	0.2	-0.3	-2.2	-2.3	-2.3	-2.2	-2.2	-2.0	-13.0	-1.3
Fuel Volume - Pass. Car (b gallons)	0.1	0.1	0.1	-0.8	-1.8	-2.6	-2.8	-2.9	-3.0	-2.9	-16.6	-1.7
Changes in Fatalities by Source												
Fatalities from Rebound Miles	0	1	1	9	50	67	73	78	85	85	449	45
Fatalities from Curb Weight Change	0	0	0	0	10	6	10	12	12	13	64	6
Total Changes in Fatalities	41	46	54	16	-21	-13	1	30	46	58	259	26
Changes in Non-Fatal Safety Impacts												
Injuries from Rebound Miles (thousands)	0.0	0.0	0.1	0.8	4.0	5.4	6.0	6.4	7.0	7.0	37	4
Injuries from Curb Weight (thousands)	0.0	0.0	0.0	0.0	0.9	0.5	0.9	1.1	1.1	1.1	5.5	0.6
Total Change in Injuries (thousands)	2.9	3.3	4.0	1.1	-2.1	-1.6	-0.4	2.1	3.4	4.5	17.3	1.7
Property Damage from Rebound Miles (thousands)	0.1	0.1	0.3	2.9	15.1	20.8	22.8	24.3	26.6	26.6	139.7	14.0
Property Damage from Curb Weight (thousands)	0.0	0.0	0.0	0.0	3.3	2.1	3.3	4.1	4.1	4.3	21.2	2.1
Total Property Damaged Vehicles (thousands)	10.9	12.6	15.2	3.8	-8.2	-6.3	-1.8	7.9	13.0	17.1	64.4	6.4

Table A-26-2 - Changes in Fleet Characteristics for Model Years 2020-2029 for Alternative 2

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total	Avg.
Changes in Fleet Size, Usage and Fuel Consumption												
Changes in Fleet Size (m)	0.0	0.0	0.0	-1.5	-3.1	-4.7	-6.1	-5.4	-5.1	-4.7	-30.8	-3.1
Light Truck Share (%)	59%	58%	56%	55%	55%	55%	55%	55%	54%	54%	N/A	55%
Pass. Car Share (%)	41%	42%	44%	45%	45%	45%	45%	45%	46%	46%	N/A	45%
VMT from Rebound (b)	0.1	0.2	0.3	2.6	10.8	15.9	19.5	21.1	23.1	22.8	116.5	11.6
Fuel Volume - Total (b gallons)	0.5	0.6	0.7	-1.5	-4.6	-7.1	-9.4	-9.4	-9.5	-8.9	-48.6	-4.9
Fuel Volume - Lt. Truck (b gallons)	0.4	0.4	0.5	-0.5	-1.9	-2.8	-4.0	-3.6	-3.6	-3.2	-18.2	-1.8
Fuel Volume - Pass. Car (b gallons)	0.2	0.2	0.2	-1.0	-2.7	-4.4	-5.5	-5.7	-5.9	-5.8	-30.4	-3.0
Changes in Fatalities by Source												
Fatalities from Rebound Miles	1	1	2	13	55	80	98	105	115	113	582	58
Fatalities from Curb Weight Change	0	0	0	4	19	15	17	20	20	21	115	12
Total Changes in Fatalities	93	104	121	51	20	-51	-110	-54	-21	3	157	16
Changes in Non-Fatal Safety Impacts												
Injuries from Rebound Miles (thousands)	0.0	0.1	0.2	1.1	4.5	6.6	8.1	8.8	9.6	9.5	49	5
Injuries from Curb Weight (thousands)	0.0	0.0	0.0	0.3	1.6	1.3	1.5	1.8	1.7	1.8	10.0	1.0
Total Change in Injuries (thousands)	6.4	7.4	8.9	3.5	1.1	-4.8	-9.6	-4.9	-2.0	0.2	6.3	0.6
Property Damage from Rebound Miles (thousands)	0.2	0.3	0.6	4.1	17.3	25.3	31.1	33.6	36.7	36.2	185.5	18.5
Property Damage from Curb Weight (thousands)	0.0	0.0	0.0	1.3	6.2	4.9	5.8	6.7	6.6	7.0	38.5	3.8
Total Property Damaged Vehicles (thousands)	24.0	27.9	33.6	12.8	3.7	-18.6	-36.9	-18.8	-7.6	0.7	20.6	2.1

Table A-26-3 - Changes in Fleet Characteristics for Model Years 2020-2029 for Alternative 3

Model Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total	Avg.
Changes in Fleet Size, Usage and Fuel Consumption												
Changes in Fleet Size (m)	0.0	0.0	-0.1	-2.0	-5.0	-7.4	-9.4	-8.4	-7.9	-7.3	-47.5	-4.8
Light Truck Share (%)	59%	58%	56%	55%	55%	55%	55%	55%	55%	54%	N/A	56%
Pass. Car Share (%)	41%	42%	44%	45%	45%	45%	45%	45%	45%	46%	N/A	44%
VMT from Rebound (b)	0.1	0.3	0.5	3.9	15.7	21.5	26.5	28.5	31.0	31.3	159.3	15.9
Fuel Volume - Total (b gallons)	0.8	0.9	1.1	-1.8	-7.0	-10.4	-13.6	-13.5	-13.6	-12.9	-69.9	-7.0
Fuel Volume - Lt. Truck (b gallons)	0.6	0.6	0.7	-0.5	-3.3	-4.4	-6.1	-5.6	-5.4	-4.8	-28.2	-2.8
Fuel Volume - Pass. Car (b gallons)	0.3	0.3	0.4	-1.3	-3.8	-6.0	-7.5	-7.9	-8.2	-8.0	-41.7	-4.2
Changes in Fatalities by Source												
Fatalities from Rebound Miles	1	2	3	19	81	108	133	142	154	155	799	80
Fatalities from Curb Weight Change	0	0	0	4	22	18	23	25	25	25	142	14
Total Changes in Fatalities	142	159	186	98	7	-103	-194	-118	-72	-35	71	7
Changes in Non-Fatal Safety Impacts												
Injuries from Rebound Miles (thousands)	0.1	0.1	0.2	1.6	6.6	9.0	11.1	11.9	12.9	13.0	66	7
Injuries from Curb Weight (thousands)	0.0	0.0	0.0	0.3	1.9	1.6	2.0	2.2	2.2	2.2	12.4	1.2
Total Change in Injuries (thousands)	9.8	11.4	13.7	7.0	-0.3	-9.3	-16.6	-10.2	-6.0	-2.7	-3.3	-0.3
Property Damage from Rebound Miles (thousands)	0.3	0.5	0.9	6.3	25.3	34.3	42.3	45.4	49.1	49.5	253.7	25.4
Property Damage from Curb Weight (thousands)	0.0	0.0	0.0	1.3	7.3	6.1	7.8	8.4	8.3	8.2	47.4	4.7
Total Property Damaged Vehicles (thousands)	36.9	42.8	51.6	25.9	-1.7	-36.4	-64.0	-39.2	-23.1	-10.5	-17.7	-1.8

27. Liquid Fuel and Electricity Consumption

Table A-27-1 - Change in Liquid Fuel Consumed (b Gallons), Total Fleet, Undiscounted Over the Lifetime of the Model Year

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	1176.8	0.3	0.3	-1.1	-4.1	-4.9	-5.1	-5.1	-5.2	-5.0	1147.0
Alternative 2	1180.2	0.6	0.7	-1.5	-4.6	-7.1	-9.4	-9.4	-9.5	-8.9	1131.0
Alternative 3	1183.4	0.9	1.1	-1.8	-7.0	-10.4	-13.6	-13.5	-13.6	-12.9	1112.7

Table A-27-2 - Change in Liquid Fuel Consumed (b Gallons), Passenger Car Fleet, Undiscounted Over the Lifetime of the Model Year

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	465.5	0.1	0.1	-0.8	-1.8	-2.6	-2.8	-2.9	-3.0	-2.9	448.8
Alternative 2	467.0	0.2	0.2	-1.0	-2.7	-4.4	-5.5	-5.7	-5.9	-5.8	436.4
Alternative 3	468.4	0.3	0.4	-1.3	-3.8	-6.0	-7.5	-7.9	-8.2	-8.0	426.4

Table A-27-3 - Change in Liquid Fuel Consumed (b Gallons), Light Truck Fleet, Undiscounted Over the Lifetime of the Model Year

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	711.3	0.2	0.2	-0.3	-2.2	-2.3	-2.3	-2.2	-2.2	-2.0	698.2
Alternative 2	713.2	0.4	0.5	-0.5	-1.9	-2.8	-4.0	-3.6	-3.6	-3.2	694.6
Alternative 3	715.0	0.6	0.7	-0.5	-3.3	-4.4	-6.1	-5.6	-5.4	-4.8	686.3

Table A-27-4 - Change in Electricity (G-Wh) Consumed, Total Fleet, Undiscounted Over the Lifetime of the Model Year

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	38.3	0.1	0.1	8.7	13.4	13.1	14.2	14.4	13.4	12.8	128.6
Alternative 2	38.4	0.1	0.2	13.6	21.3	34.1	50.2	51.9	51.8	49.7	311.3
Alternative 3	38.5	0.2	0.3	17.1	33.5	53.0	72.0	74.5	75.3	71.1	435.4

Table A-27-5 - Change in Electricity (G-Wh) Consumed, Passenger Car Fleet, Undiscounted Over the Lifetime of the Model Year

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	33.4	0.0	0.1	6.5	7.7	7.4	8.2	8.0	7.7	7.8	86.8
Alternative 2	33.5	0.1	0.1	8.9	11.1	15.7	19.7	20.7	21.8	21.6	153.2
Alternative 3	33.6	0.2	0.2	11.0	14.2	21.4	26.6	28.1	30.0	30.0	195.2

Table A-27-6 - Change in Electricity (G-Wh) Consumed, Light Truck Fleet, Undiscounted Over the Lifetime of the Model Year

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Alternative 1	5.0	0.0	0.0	2.2	5.7	5.7	6.0	6.4	5.7	5.0	41.7
Alternative 2	5.0	0.0	0.0	4.7	10.1	18.4	30.5	31.3	30.0	28.0	158.1
Alternative 3	5.0	0.0	0.1	6.1	19.2	31.6	45.5	46.5	45.3	41.0	240.2

28. Vehicle-Mass-Related Fatality Impacts

Table A-28-1 - Vehicle-Mass-Related Fatality Impacts over the Lifetime of MY 1981-2029 for Total Fleet, Compared to Alternative 0 (Baseline) - Fatalities Undiscounted, Dollars Discounted at 3% and 7%

Category	Regulatory Alternative		
	1	2	3
Fatalities	1,019	1,822	2,624
Fatality Costs (\$ Billion, 3% Discount Rate)	7.8	14.5	21.1
Fatality Costs (\$ Billion, 7% Discount Rate)	5.2	9.9	14.7
Non-Fatal Crash Costs (\$ Billion, 3% Discount Rate)	4.9	8.0	11.1
Non-Fatal Crash Costs (\$ Billion, 7% Discount Rate)	3.3	5.6	7.9
Total Crash Costs (\$ Billion, 3% Discount Rate)	12.7	22.4	32.2
Total Crash Costs (\$ Billion, 7% Discount Rate)	8.6	15.5	22.5

Table A-28-2 - Vehicle-Mass-Related Fatality Impacts over the Lifetime of MY 1981-2029 for Passenger Car Fleet, Compared to Alternative 0 (Baseline) - Fatalities Undiscounted, Dollars Discounted at 3% and 7%

Category	Regulatory Alternative		
	1	2	3
Fatalities	-73	-43	-31
Fatality Costs (\$ Billion, 3% Discount Rate)	0.1	1.0	1.7
Fatality Costs (\$ Billion, 7% Discount Rate)	0.5	1.5	2.4
Non-Fatal Crash Costs (\$ Billion, 3% Discount Rate)	-1.5	-2.4	-3.4
Non-Fatal Crash Costs (\$ Billion, 7% Discount Rate)	-0.7	-1.1	-1.5
Total Crash Costs (\$ Billion, 3% Discount Rate)	-1.4	-1.4	-1.6
Total Crash Costs (\$ Billion, 7% Discount Rate)	-0.2	0.4	1.0

Table A-28-3 - Vehicle-Mass-Related Fatality Impacts over the Lifetime of MY 1981-2029 for Light Truck Fleet, Compared to Alternative 0 (Baseline) - Fatalities Undiscounted, Dollars Discounted at 3% and 7%

Category	Regulatory Alternative		
	1	2	3
Fatalities	1,093	1,865	2,655
Fatality Costs (\$ Billion, 3% Discount Rate)	7.7	13.5	19.4
Fatality Costs (\$ Billion, 7% Discount Rate)	4.7	8.4	12.2
Non-Fatal Crash Costs (\$ Billion, 3% Discount Rate)	6.4	10.4	14.5
Non-Fatal Crash Costs (\$ Billion, 7% Discount Rate)	4.1	6.6	9.3
Total Crash Costs (\$ Billion, 3% Discount Rate)	14.1	23.8	33.9
Total Crash Costs (\$ Billion, 7% Discount Rate)	8.8	15.1	21.6

Table A-28-4 - Vehicle-Mass-Related Fatality Impacts for CY 2039-2048 for Total Fleet, Compared to Alternative 0 (Baseline) - Fatalities Undiscounted, Dollars Discounted at 3% and 7%

Category	Regulatory Alternative		
	1	2	3
Fatalities	740	964	1,227
Fatality Costs (\$ Billion, 3% Discount Rate)	4.1	5.4	6.9
Fatality Costs (\$ Billion, 7% Discount Rate)	1.8	2.3	3.0
Non-Fatal Crash Costs (\$ Billion, 3% Discount Rate)	4.7	6.5	8.5
Non-Fatal Crash Costs (\$ Billion, 7% Discount Rate)	2.0	2.8	3.6
Total Crash Costs (\$ Billion, 3% Discount Rate)	8.8	11.9	15.4
Total Crash Costs (\$ Billion, 7% Discount Rate)	3.8	5.1	6.6

Table A-28-5 - Vehicle-Mass-Related Fatality Impacts for CY 2039-2048 for Passenger Car Fleet, Compared to Alternative 0 (Baseline) - Fatalities Undiscounted, Dollars Discounted at 3% and 7%

Category	Regulatory Alternative		
	1	2	3
Fatalities	-950	-1,638	-2,220
Fatality Costs (\$ Billion, 3% Discount Rate)	-5.2	-9.0	-12.2
Fatality Costs (\$ Billion, 7% Discount Rate)	-2.2	-3.8	-5.2
Non-Fatal Crash Costs (\$ Billion, 3% Discount Rate)	-6.2	-10.5	-13.9
Non-Fatal Crash Costs (\$ Billion, 7% Discount Rate)	-2.6	-4.4	-5.9
Total Crash Costs (\$ Billion, 3% Discount Rate)	-11.4	-19.5	-26.1
Total Crash Costs (\$ Billion, 7% Discount Rate)	-4.8	-8.3	-11.1

Table A-28-6 - Vehicle-Mass-Related Fatality Impacts for CY 2039-2048 for Light Truck Fleet, Compared to Alternative 0 (Baseline) - Fatalities Undiscounted, Dollars Discounted at 3% and 7%

Category	Regulatory Alternative		
	1	2	3
Fatalities	1,690	2,602	3,447
Fatality Costs (\$ Billion, 3% Discount Rate)	9.3	14.4	19.1
Fatality Costs (\$ Billion, 7% Discount Rate)	4.0	6.1	8.2
Non-Fatal Crash Costs (\$ Billion, 3% Discount Rate)	10.9	16.9	22.4
Non-Fatal Crash Costs (\$ Billion, 7% Discount Rate)	4.7	7.2	9.6
Total Crash Costs (\$ Billion, 3% Discount Rate)	20.2	31.3	41.5
Total Crash Costs (\$ Billion, 7% Discount Rate)	8.6	13.4	17.8

Table A-28-7 - Incremental Vehicle-Mass-Related Fatality Impacts by Model Year and Fleet, Alternative 1 Compared to Alternative 0 (Baseline), Undiscounted

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Passenger Cars	353	19	23	8	-23	-68	-94	-91	-95	-104	-73
Light Trucks	449	28	32	8	2	55	95	121	141	162	1093
Total	802	46	54	16	-21	-13	1	30	46	58	1019

Table A-28-8 - Incremental Vehicle-Mass-Related Fatality Impacts by Model Year and Fleet, Alternative 2 Compared to Alternative 0 (Baseline), Undiscounted

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Passenger Cars	771	42	50	25	2	-101	-189	-212	-210	-221	-43
Light Trucks	987	62	71	26	18	50	79	158	189	224	1865
Total	1758	104	121	51	20	-51	-110	-54	-21	3	1822

Table A-28-9 - Incremental Vehicle-Mass-Related Fatality Impacts by Model Year and Fleet, Alternative 3 Compared to Alternative 0 (Baseline), Undiscounted

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Passenger Cars	1179	64	77	46	-18	-169	-280	-310	-304	-316	-31
Light Trucks	1516	95	109	52	25	65	86	192	233	281	2655
Total	2695	159	186	98	7	-103	-194	-118	-72	-35	2624

Table A-28-10 - Incremental Vehicle-Mass-Related Fatality Costs (\$ billion) by Model Year and Fleet, Alternative 1 Compared to Alternative 0 (Baseline), 3% Discount Rate

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Passenger Cars	2.9	0.1	0.2	0.1	-0.2	-0.5	-0.7	-0.6	-0.6	-0.7	0.1
Light Trucks	3.5	0.2	0.2	0.1	0.0	0.4	0.6	0.8	0.9	1.0	7.7
Total	6.4	0.3	0.4	0.1	-0.2	-0.1	0.0	0.2	0.3	0.3	7.8

Table A-28-11 - Incremental Vehicle-Mass-Related Fatality Costs (\$ billion) by Model Year and Fleet, Alternative 2 Compared to Alternative 0 (Baseline), 3% Discount Rate

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Passenger Cars	6.3	0.3	0.4	0.2	0.0	-0.7	-1.3	-1.4	-1.4	-1.4	1.0
Light Trucks	7.7	0.4	0.5	0.2	0.1	0.3	0.5	1.0	1.2	1.4	13.5
Total	14.0	0.8	0.9	0.4	0.1	-0.4	-0.8	-0.4	-0.1	0.0	14.5

Table A-28-12 - Incremental Vehicle-Mass-Related Fatality Costs (\$ billion) by Model Year and Fleet, Alternative 3 Compared to Alternative 0 (Baseline), 3% Discount Rate

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Passenger Cars	9.6	0.5	0.6	0.3	-0.1	-1.2	-1.9	-2.1	-2.0	-2.0	1.7
Light Trucks	11.8	0.7	0.8	0.4	0.2	0.4	0.6	1.3	1.5	1.8	19.4
Total	21.4	1.2	1.4	0.7	0.0	-0.7	-1.3	-0.8	-0.5	-0.2	21.1

Table A-28-13 - Incremental Vehicle-Mass-Related Fatality Costs (\$ billion) by Model Year and Fleet, Alternative 1 Compared to Alternative 0 (Baseline), 7% Discount Rate

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Passenger Cars	2.1	0.1	0.1	0.0	-0.1	-0.3	-0.4	-0.3	-0.3	-0.3	0.5
Light Trucks	2.4	0.1	0.1	0.0	0.0	0.2	0.4	0.4	0.5	0.5	4.7
Total	4.5	0.2	0.2	0.1	-0.1	-0.1	0.0	0.1	0.1	0.2	5.2

Table A-28-14 - Incremental Vehicle-Mass-Related Fatality Costs (\$ billion) by Model Year and Fleet, Alternative 2 Compared to Alternative 0 (Baseline), 7% Discount Rate

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Passenger Cars	4.5	0.2	0.2	0.1	0.0	-0.4	-0.8	-0.8	-0.7	-0.7	1.5
Light Trucks	5.2	0.3	0.3	0.1	0.1	0.2	0.3	0.6	0.7	0.7	8.4
Total	9.7	0.5	0.5	0.2	0.1	-0.2	-0.5	-0.2	-0.1	0.0	9.9

Table A-28-15 - Incremental Vehicle-Mass-Related Fatality Costs (\$ billion) by Model Year and Fleet, Alternative 3 Compared to Alternative 0 (Baseline), 7% Discount Rate

Model Year	1981-2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Passenger Cars	6.8	0.3	0.4	0.2	-0.1	-0.7	-1.1	-1.2	-1.1	-1.0	2.4
Light Trucks	8.0	0.4	0.5	0.2	0.1	0.3	0.3	0.7	0.8	0.9	12.2
Total	14.8	0.7	0.8	0.4	0.0	-0.5	-0.8	-0.5	-0.3	-0.1	14.7

29. Sales Impacts

Table A-29-1 - Estimated Sales Impacts by Alternative, Total Fleet for Manufacturer (Total)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	13,592,551	0	0	0
2021	14,721,140	0	0	0
2022	16,553,054	0	0	0
2023	17,327,401	-45,485	-85,453	-110,707
2024	17,169,460	-135,347	-178,526	-286,601
2025	16,822,903	-152,457	-282,799	-436,179
2026	16,391,607	-155,444	-370,869	-564,643
2027	16,043,987	-136,193	-336,483	-514,869
2028	15,807,750	-131,333	-318,662	-487,368
2029	15,654,493	-121,804	-299,018	-458,067

Table A-29-2 - Estimated Sales Impacts by Alternative, Passenger Car Fleet for Manufacturer (Total)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	5,929,602	0	0	0
2021	6,603,312	0	0	0
2022	7,650,859	0	0	0
2023	8,166,026	-21,420	-40,300	-52,178
2024	8,205,815	-80,948	-111,329	-181,996
2025	8,122,538	-139,900	-237,302	-359,919
2026	8,006,941	-174,002	-343,007	-496,156
2027	7,894,417	-175,183	-374,507	-536,945
2028	7,863,731	-183,975	-378,578	-539,525
2029	7,855,337	-193,438	-390,110	-551,815

Table A-29-3 - Estimated Sales Impacts by Alternative, Light Truck Fleet for Manufacturer (Total)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	7,662,949	0	0	0
2021	8,117,828	0	0	0
2022	8,902,195	0	0	0
2023	9,161,375	-24,065	-45,153	-58,529
2024	8,963,645	-54,399	-67,197	-104,605
2025	8,700,365	-12,557	-45,497	-76,260
2026	8,384,666	18,558	-27,862	-68,487
2027	8,149,570	38,990	38,024	22,076
2028	7,944,019	52,642	59,916	52,157
2029	7,799,156	71,634	91,092	93,748

Table A-29-4 - Estimated Sales Impacts by Alternative, Domestic Car Fleet for Manufacturer (Total)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	2,780,461	0	0	0
2021	3,110,530	0	0	0
2022	3,621,106	0	0	0
2023	3,876,485	-10,151	-19,120	-24,754
2024	3,903,623	-39,650	-54,806	-89,758
2025	3,869,846	-71,264	-120,129	-181,958
2026	3,821,270	-89,772	-174,920	-252,073
2027	3,771,546	-91,068	-193,294	-276,069
2028	3,762,797	-96,018	-196,112	-278,391
2029	3,763,438	-101,537	-203,081	-286,109

Table A-29-5 - Estimated Sales Impacts by Alternative, Imported Car Fleet for Manufacturer (Total)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	3,149,141	0	0	0
2021	3,492,782	0	0	0
2022	4,029,753	0	0	0
2023	4,289,541	-11,269	-21,180	-27,424
2024	4,302,192	-41,298	-56,523	-92,238
2025	4,252,692	-68,636	-117,173	-177,961
2026	4,185,671	-84,230	-168,087	-244,083
2027	4,122,871	-84,115	-181,213	-260,876
2028	4,100,934	-87,957	-182,466	-261,134
2029	4,091,899	-91,901	-187,029	-265,706

Table A-29-6 - Estimated Sales Impacts by Alternative, Total Fleet for Manufacturer (BMW)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	296,063	0	0	0
2021	326,079	0	0	0
2022	373,430	0	0	0
2023	395,624	-1,039	-1,953	-2,538
2024	395,438	-3,609	-4,901	-7,950
2025	389,945	-5,542	-9,600	-14,614
2026	382,739	-6,601	-13,551	-19,831
2027	376,348	-6,471	-14,202	-20,632
2028	373,359	-6,689	-14,171	-20,460
2029	371,765	-6,892	-14,351	-20,579

Table A-29-7 - Estimated Sales Impacts by Alternative, Total Fleet for Manufacturer (Daimler)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	363,906	0	0	0
2021	396,285	0	0	0
2022	448,299	0	0	0
2023	471,155	-1,244	-2,338	-3,018
2024	468,227	-3,893	-5,193	-8,365
2025	459,756	-4,963	-8,940	-13,711
2026	449,073	-5,430	-12,097	-18,106
2027	440,240	-5,034	-11,741	-17,528
2028	434,782	-5,035	-11,412	-16,965
2029	431,378	-4,937	-11,126	-16,480

Table A-29-8 - Estimated Sales Impacts by Alternative, Total Fleet for Manufacturer (FCA)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	1,504,790	0	0	0
2021	1,603,556	0	0	0
2022	1,770,518	0	0	0
2023	1,830,678	-4,811	-9,003	-11,699
2024	1,797,496	-11,804	-14,885	-23,485
2025	1,749,331	-6,270	-14,846	-23,813
2026	1,691,117	-1,884	-14,898	-26,470
2027	1,646,984	1,614	-4,354	-11,934
2028	1,610,382	3,750	-651	-6,787
2029	1,584,971	6,767	4,445	82

Table A-29-9 - Estimated Sales Impacts by Alternative, Total Fleet for Manufacturer (Ford)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	1,686,149	0	0	0
2021	1,806,115	0	0	0
2022	2,005,917	0	0	0
2023	2,082,382	-5,474	-10,285	-13,322
2024	2,050,813	-14,409	-18,494	-29,325
2025	2,000,294	-10,800	-22,504	-35,395
2026	1,938,786	-7,546	-25,988	-42,481
2027	1,891,337	-4,084	-16,593	-29,386
2028	1,854,050	-2,281	-13,086	-24,372
2029	1,828,596	402	-8,446	-17,976

Table A-29-10 - Estimated Sales Impacts by Alternative, Total Fleet for Manufacturer (GM)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	2,315,296	0	0	0
2021	2,478,493	0	0	0
2022	2,750,751	0	0	0
2023	2,854,217	-7,485	-14,065	-18,201
2024	2,809,925	-19,549	-25,081	-39,662
2025	2,740,033	-14,223	-29,975	-47,124
2026	2,654,933	-9,435	-34,206	-56,143
2027	2,589,429	-4,575	-20,885	-37,624
2028	2,537,595	-1,982	-15,929	-30,606
2029	2,502,146	1,792	-9,373	-21,647

Table A-29-11 - Estimated Sales Impacts by Alternative, Total Fleet for Manufacturer (Honda)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	1,293,078	0	0	0
2021	1,417,276	0	0	0
2022	1,614,602	0	0	0
2023	1,704,727	-4,467	-8,412	-10,893
2024	1,699,787	-14,904	-20,092	-32,552
2025	1,673,103	-21,293	-37,459	-57,214
2026	1,638,806	-24,626	-52,075	-76,880
2027	1,609,369	-23,696	-53,127	-77,947
2028	1,593,610	-24,246	-52,527	-76,677
2029	1,584,453	-24,590	-52,517	-76,195

Table A-29-12 - Estimated Sales Impacts by Alternative, Total Fleet for Manufacturer (Hyundai Kia-H)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	741,548	0	0	0
2021	811,289	0	0	0
2022	922,427	0	0	0
2023	972,669	-2,551	-4,807	-6,219
2024	968,953	-8,367	-11,255	-18,211
2025	953,108	-11,626	-20,566	-31,455
2026	932,852	-13,274	-28,409	-42,077
2027	915,650	-12,658	-28,633	-42,177
2028	906,031	-12,889	-28,196	-41,340
2029	900,302	-12,980	-28,028	-40,868

Table A-29-13 - Estimated Sales Impacts by Alternative, Total Fleet for Manufacturer (Hyundai Kia-K)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	596,735	0	0	0
2021	657,543	0	0	0
2022	753,380	0	0	0
2023	798,376	-2,097	-3,943	-5,105
2024	798,186	-7,301	-9,915	-16,116
2025	787,173	-11,239	-19,489	-29,651
2026	772,734	-13,396	-27,523	-40,269
2027	759,895	-13,139	-28,894	-41,976
2028	754,019	-13,606	-28,856	-41,675
2029	750,918	-14,025	-29,243	-41,932

Table A-29-14 - Estimated Sales Impacts by Alternative, Total Fleet for Manufacturer (JLR)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	138,251	0	0	0
2021	146,929	0	0	0
2022	161,724	0	0	0
2023	166,866	-442	-821	-1,066
2024	163,574	-1,038	-1,288	-2,030
2025	159,009	-422	-1,113	-1,819
2026	153,503	60	-973	-1,884
2027	149,367	404	97	-420
2028	145,845	618	464	91
2029	143,381	928	972	776

Table A-29-15 - Estimated Sales Impacts by Alternative, Total Fleet for Manufacturer (Mazda)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	260,417	0	0	0
2021	280,945	0	0	0
2022	314,543	0	0	0
2023	328,307	-863	-1,614	-2,094
2024	324,621	-2,458	-3,205	-5,146
2025	317,580	-2,480	-4,722	-7,344
2026	308,879	-2,337	-5,997	-9,323
2027	301,985	-1,913	-5,063	-7,993
2028	297,019	-1,752	-4,642	-7,376
2029	293,729	-1,486	-4,145	-6,660

Table A-29-16 - Estimated Sales Impacts by Alternative, Total Fleet for Manufacturer (Mitsubishi)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	112,715	0	0	0
2021	120,841	0	0	0
2022	134,347	0	0	0
2023	139,574	-380	-698	-906
2024	137,521	-976	-1,263	-1,997
2025	134,191	-775	-1,593	-2,470
2026	130,126	-588	-1,870	-2,991
2027	126,982	-369	-1,280	-2,151
2028	124,536	-260	-1,057	-1,825
2029	122,875	-98	-766	-1,427

Table A-29-17 - Estimated Sales Impacts by Alternative, Total Fleet for Manufacturer (Nissan)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	1,030,570	0	0	0
2021	1,125,551	0	0	0
2022	1,277,331	0	0	0
2023	1,345,235	-3,517	-6,623	-8,586
2024	1,338,891	-11,378	-15,259	-24,667
2025	1,316,135	-15,352	-27,322	-41,845
2026	1,287,198	-17,279	-37,483	-55,731
2027	1,262,876	-16,319	-37,293	-55,202
2028	1,248,720	-16,518	-36,556	-53,882
2029	1,240,132	-16,490	-36,100	-52,953

Table A-29-18 - Estimated Sales Impacts by Alternative, Total Fleet for Manufacturer (Subaru)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	751,468	0	0	0
2021	809,262	0	0	0
2022	904,242	0	0	0
2023	942,550	-2,474	-4,648	-6,016
2024	931,061	-6,924	-9,025	-14,390
2025	910,184	-6,577	-12,751	-19,812
2026	884,502	-5,915	-15,913	-24,883
2027	864,296	-4,614	-12,839	-20,551
2028	849,403	-4,078	-11,559	-18,659
2029	839,443	-3,207	-9,959	-16,393

Table A-29-19 - Estimated Sales Impacts by Alternative, Total Fleet for Manufacturer (Tesla)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	196,000	0	0	0
2021	222,393	0	0	0
2022	262,668	0	0	0
2023	283,732	-746	-1,398	-1,817
2024	287,517	-3,174	-4,433	-7,314
2025	286,305	-6,289	-10,421	-15,751
2026	284,131	-8,162	-15,440	-22,076
2027	281,300	-8,416	-17,540	-24,847
2028	281,934	-8,956	-17,947	-25,265
2029	282,987	-9,577	-18,782	-26,237

Table A-29-20 - Estimated Sales Impacts by Alternative, Total Fleet for Manufacturer (Toyota)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	1,774,456	0	0	0
2021	1,939,600	0	0	0
2022	2,203,148	0	0	0
2023	2,321,647	-6,084	-11,443	-14,827
2024	2,311,704	-19,821	-26,583	-43,006
2025	2,273,122	-27,109	-48,087	-73,590
2026	2,223,945	-30,725	-66,193	-98,229
2027	2,182,414	-29,169	-66,277	-97,880
2028	2,158,679	-29,608	-65,116	-95,708
2029	2,144,413	-29,699	-64,523	-94,332

Table A-29-21 - Estimated Sales Impacts by Alternative, Total Fleet for Manufacturer (Volvo)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	103,970	0	0	0
2021	112,096	0	0	0
2022	125,415	0	0	0
2023	130,837	-343	-640	-830
2024	129,322	-969	-1,254	-2,024
2025	126,498	-970	-1,846	-2,864
2026	122,988	-900	-2,326	-3,625
2027	120,229	-736	-1,934	-3,079
2028	118,221	-666	-1,770	-2,838
2029	116,882	-554	-1,566	-2,548

Table A-29-22 - Estimated Sales Impacts by Alternative, Total Fleet for Manufacturer (VWA)

Model Year	Regulatory Alternative			
	0 (Baseline)	1	2	3
2020	427,139	0	0	0
2021	466,887	0	0	0
2022	530,312	0	0	0
2023	558,825	-1,468	-2,762	-3,570
2024	556,424	-4,773	-6,400	-10,361
2025	547,136	-6,527	-11,565	-17,707
2026	535,295	-7,406	-15,927	-23,644
2027	525,286	-7,018	-15,925	-23,542
2028	519,565	-7,135	-15,651	-23,024
2029	516,122	-7,158	-15,510	-22,698

30. Regulatory Costs per Vehicle, by Vehicle Type

Table A-30-1 - Estimated Average Per Vehicle Regulatory Costs (\$) for MY 2029, by Alternative for Manufacturer (Total)

	Passenger Cars	Light Trucks	Total Fleet
Alternative 0 (Baseline)	1,001	1,240	1,120
Alternative 1	1,426	1,684	1,557
Alternative 2	2,073	2,086	2,080
Alternative 3	2,506	2,619	2,565

Table A-30-2 - Estimated Average Per Vehicle Regulatory Costs (\$) for MY 2029, by Alternative for Manufacturer (BMW)

	Passenger Cars	Light Trucks	Total Fleet
Alternative 0 (Baseline)	1,756	1,250	1,604
Alternative 1	1,846	1,196	1,644
Alternative 2	2,422	1,491	2,126
Alternative 3	2,941	1,907	2,607

Table A-30-3 - Estimated Average Per Vehicle Regulatory Costs (\$) for MY 2029, by Alternative for Manufacturer (Daimler)

	Passenger Cars	Light Trucks	Total Fleet
Alternative 0 (Baseline)	1,693	1,450	1,583
Alternative 1	2,454	1,609	2,062
Alternative 2	3,011	1,740	2,412
Alternative 3	3,496	1,916	2,741

Table A-30-4 - Estimated Average Per Vehicle Regulatory Costs (\$) for MY 2029, by Alternative for Manufacturer (FCA)

	Passenger Cars	Light Trucks	Total Fleet
Alternative 0 (Baseline)	2,291	1,374	1,527
Alternative 1	2,738	1,721	1,887
Alternative 2	3,448	1,945	2,185
Alternative 3	4,018	2,198	2,484

Table A-30-5 - Estimated Average Per Vehicle Regulatory Costs (\$) for MY 2029, by Alternative for Manufacturer (Ford)

	Passenger Cars	Light Trucks	Total Fleet
Alternative 0 (Baseline)	1,284	1,352	1,331
Alternative 1	2,238	1,161	1,488
Alternative 2	2,690	1,736	2,021
Alternative 3	2,810	2,525	2,609

Table A-30-6 - Estimated Average Per Vehicle Regulatory Costs (\$) for MY 2029, by Alternative for Manufacturer (GM)

	Passenger Cars	Light Trucks	Total Fleet
Alternative 0 (Baseline)	1,057	1,055	1,056
Alternative 1	1,886	2,086	2,014
Alternative 2	2,255	2,776	2,591
Alternative 3	2,648	3,438	3,160

Table A-30-7 - Estimated Average Per Vehicle Regulatory Costs (\$) for MY 2029, by Alternative for Manufacturer (Honda)

	Passenger Cars	Light Trucks	Total Fleet
Alternative 0 (Baseline)	954	987	965
Alternative 1	954	1,004	972
Alternative 2	1,531	1,488	1,515
Alternative 3	1,964	2,349	2,107

Table A-30-8 - Estimated Average Per Vehicle Regulatory Costs (\$) for MY 2029, by Alternative for Manufacturer (Hyundai Kia-H)

	Passenger Cars	Light Trucks	Total Fleet
Alternative 0 (Baseline)	783	1,483	846
Alternative 1	1,435	2,326	1,516
Alternative 2	2,262	2,885	2,320
Alternative 3	2,793	3,478	2,859

Table A-30-9 - Estimated Average Per Vehicle Regulatory Costs (\$) for MY 2029, by Alternative for Manufacturer (Hyundai Kia-K)

	Passenger Cars	Light Trucks	Total Fleet
Alternative 0 (Baseline)	701	1,179	850
Alternative 1	1,039	1,837	1,295
Alternative 2	1,831	2,364	2,006
Alternative 3	2,432	2,921	2,595

Table A-30-10 - Estimated Average Per Vehicle Regulatory Costs (\$) for MY 2029, by Alternative for Manufacturer (JLR)

	Passenger Cars	Light Trucks	Total Fleet
Alternative 0 (Baseline)	1,270	1,161	1,168
Alternative 1	1,609	1,843	1,829
Alternative 2	2,144	2,137	2,137
Alternative 3	2,569	2,473	2,479

Table A-30-11 - Estimated Average Per Vehicle Regulatory Costs (\$) for MY 2029, by Alternative for Manufacturer (Mazda)

	Passenger Cars	Light Trucks	Total Fleet
Alternative 0 (Baseline)	2,175	779	1,523
Alternative 1	2,565	988	1,819
Alternative 2	3,136	1,633	2,416
Alternative 3	3,613	1,991	2,829

Table A-30-12 - Estimated Average Per Vehicle Regulatory Costs (\$) for MY 2029, by Alternative for Manufacturer (Mitsubishi)

	Passenger Cars	Light Trucks	Total Fleet
Alternative 0 (Baseline)	735	442	587
Alternative 1	1,141	1,091	1,115
Alternative 2	1,670	1,767	1,720
Alternative 3	2,180	2,072	2,124

Table A-30-13 - Estimated Average Per Vehicle Regulatory Costs (\$) for MY 2029, by Alternative for Manufacturer (Nissan)

	Passenger Cars	Light Trucks	Total Fleet
Alternative 0 (Baseline)	606	1,106	737
Alternative 1	998	1,507	1,134
Alternative 2	2,677	2,685	2,679
Alternative 3	3,207	2,987	3,147

Table A-30-14 - Estimated Average Per Vehicle Regulatory Costs (\$) for MY 2029, by Alternative for Manufacturer (Subaru)

	Passenger Cars	Light Trucks	Total Fleet
Alternative 0 (Baseline)	921	1,111	1,058
Alternative 1	2,008	1,405	1,568
Alternative 2	2,523	1,405	1,699
Alternative 3	2,948	1,405	1,802

Table A-30-15 - Estimated Average Per Vehicle Regulatory Costs (\$) for MY 2029, by Alternative for Manufacturer (Tesla)

	Passenger Cars	Light Trucks	Total Fleet
Alternative 0 (Baseline)	46	74	47
Alternative 1	46	74	47
Alternative 2	46	74	47
Alternative 3	46	74	47

Table A-30-16 - Estimated Average Per Vehicle Regulatory Costs (\$) for MY 2029, by Alternative for Manufacturer (Toyota)

	Passenger Cars	Light Trucks	Total Fleet
Alternative 0 (Baseline)	614	1,233	859
Alternative 1	868	2,170	1,394
Alternative 2	1,155	2,194	1,583
Alternative 3	1,610	2,974	2,181

Table A-30-17 - Estimated Average Per Vehicle Regulatory Costs (\$) for MY 2029, by Alternative for Manufacturer (Volvo)

	Passenger Cars	Light Trucks	Total Fleet
Alternative 0 (Baseline)	1,815	1,890	1,867
Alternative 1	4,228	1,894	2,578
Alternative 2	4,684	2,115	2,855
Alternative 3	5,014	2,482	3,201

Table A-30-18 - Estimated Average Per Vehicle Regulatory Costs (\$) for MY 2029, by Alternative for Manufacturer (VWA)

	Passenger Cars	Light Trucks	Total Fleet
Alternative 0 (Baseline)	2,574	2,338	2,459
Alternative 1	2,126	2,689	2,408
Alternative 2	2,690	2,409	2,547
Alternative 3	2,947	2,927	2,937

Table A-30-19 - Estimated Average Per Vehicle Fuel Costs (\$) for MY 2029 Total Fleet, by Alternative

	Lifetime Fuel Expenditures		Lifetime Increase	
	7% Discount Rate	3% Discount Rate	7% Discount Rate	3% Discount Rate
Alternative 0 (Baseline)	12,001	15,510	0	0
Alternative 1	11,552	14,929	-449	-581
Alternative 2	11,275	14,573	-726	-937
Alternative 3	10,969	14,178	-1,032	-1,332

Table A-30-20 - Estimated Average Per Vehicle Fuel Costs (\$) for MY 2029 Passenger Car Fleet, by Alternative

	Lifetime Fuel Expenditures		Lifetime Increase	
	7% Discount Rate	3% Discount Rate	7% Discount Rate	3% Discount Rate
Alternative 0 (Baseline)	9,571	12,237	0	0
Alternative 1	9,150	11,696	-421	-541
Alternative 2	8,751	11,183	-820	-1,053
Alternative 3	8,410	10,746	-1,160	-1,490

Table A-30-21 - Estimated Average Per Vehicle Fuel Costs (\$) for MY 2029 Light Truck Fleet, by Alternative

	Lifetime Fuel Expenditures		Lifetime Increase	
	7% Discount Rate	3% Discount Rate	7% Discount Rate	3% Discount Rate
Alternative 0 (Baseline)	14,449	18,807	0	0
Alternative 1	13,891	18,077	-559	-730
Alternative 2	13,663	17,780	-786	-1,027
Alternative 3	13,337	17,353	-1,113	-1,454

31. Change in Safety Parameters

Table A-31-1 - Change in Safety Parameters from Alternative 0 (Baseline) for MY 1981-2029 for Total Fleet, 3% Percent Discount Rate, by Alternative

Alternative	1	2	3
Fatalities			
Fatalities From Mass Changes	64	115	142
Fatalities from Rebound Effect	449	584	801
Fatalities from Sales/Scrappage	506	1,123	1,681
Total Changes in Fatalities	1,019	1,822	2,624
Fatality Costs (\$b)			
Fatality Costs From Mass Changes	0.4	0.8	1.0
Fatality Costs From Rebound Effect	3.0	3.9	5.4
Fatality Costs from Sales/Scrappage	4.4	9.8	14.8
Total - Fatality Costs (\$b)	7.8	14.5	21.1
Non-Fatal Crash Costs (\$b)			
Non-Fatal Crash Costs From Mass Changes	0.5	0.9	1.1
Non-Fatal Crash Costs From Rebound Effect	3.2	4.3	5.9
Non-Fatal Crash Costs from Sales/Scrappage	1.2	2.8	4.1
Total - Non-Fatal Crash Costs (\$b)	4.9	8.0	11.1
Property Damage Costs (\$b)			
Property Damage Costs From Mass Changes	0.1	0.2	0.2
Property Damage Costs From Rebound Effect	0.7	0.9	1.2
Property Damage Costs From Sales/Scrappage	0.2	0.5	0.7
Total - Property Damage Costs (\$b)	1.0	1.6	2.2
Societal Crash Costs (\$b)			
Crash Costs from Mass Changes	1.0	1.9	2.3
Crash Costs from Rebound Effect	6.9	9.1	12.5
Crash Costs from Sales/Scrappage	5.8	13.0	19.6
Total - Societal Crash Costs (\$b)	13.7	24.0	34.4

Table A-31-2 - Change in Safety Parameters from Alternative 0 (Baseline) for MY 1981-2029 for Passenger Car Fleet, 3% Percent Discount Rate, by Alternative

Alternative	1	2	3
Fatalities			
Fatalities From Mass Changes	77	147	186
Fatalities from Rebound Effect	174	305	418
Fatalities from Sales/Scrappage	-324	-495	-635
Total Changes in Fatalities	-73	-43	-31
Fatality Costs (\$b)			
Fatality Costs From Mass Changes	0.5	1.0	1.3
Fatality Costs From Rebound Effect	1.2	2.1	2.8
Fatality Costs from Sales/Scrappage	-1.6	-2.1	-2.4
Total - Fatality Costs (\$b)	0.1	1.0	1.7
Non-Fatal Crash Costs (\$b)			
Non-Fatal Crash Costs From Mass Changes	0.6	1.1	1.4
Non-Fatal Crash Costs From Rebound Effect	1.3	2.3	3.2
Non-Fatal Crash Costs from Sales/Scrappage	-3.4	-5.9	-8.0
Total - Non-Fatal Crash Costs (\$b)	-1.5	-2.4	-3.4
Property Damage Costs (\$b)			
Property Damage Costs From Mass Changes	0.1	0.2	0.3
Property Damage Costs From Rebound Effect	0.3	0.5	0.7
Property Damage Costs From Sales/Scrappage	-0.7	-1.3	-1.7
Total - Property Damage Costs (\$b)	-0.3	-0.5	-0.8
Societal Crash Costs (\$b)			
Crash Costs from Mass Changes	1.2	2.4	3.0
Crash Costs from Rebound Effect	2.8	4.9	6.7
Crash Costs from Sales/Scrappage	-5.8	-9.2	-12.1
Total - Societal Crash Costs (\$b)	-1.7	-1.9	-2.4

Table A-31-3 - Change in Safety Parameters from Alternative 0 (Baseline) for MY 1981-2029 for Light Truck Fleet, 3% Percent Discount Rate, by Alternative

Alternative	1	2	3
Fatalities			
Fatalities From Mass Changes	-13	-31	-45
Fatalities from Rebound Effect	276	278	383
Fatalities from Sales/Scrappage	830	1,618	2,316
Total Changes in Fatalities	1,093	1,865	2,655
Fatality Costs (\$b)			
Fatality Costs From Mass Changes	-0.1	-0.2	-0.3
Fatality Costs From Rebound Effect	1.8	1.8	2.5
Fatality Costs from Sales/Scrappage	6.0	11.9	17.2
Total - Fatality Costs (\$b)	7.7	13.5	19.4
Non-Fatal Crash Costs (\$b)			
Non-Fatal Crash Costs From Mass Changes	-0.1	-0.2	-0.3
Non-Fatal Crash Costs From Rebound Effect	1.9	2.0	2.7
Non-Fatal Crash Costs from Sales/Scrappage	4.6	8.6	12.1
Total - Non-Fatal Crash Costs (\$b)	6.4	10.4	14.5
Property Damage Costs (\$b)			
Property Damage Costs From Mass Changes	0.0	0.0	-0.1
Property Damage Costs From Rebound Effect	0.4	0.4	0.6
Property Damage Costs From Sales/Scrappage	0.9	1.7	2.4
Total - Property Damage Costs (\$b)	1.3	2.1	2.9
Societal Crash Costs (\$b)			
Crash Costs from Mass Changes	-0.2	-0.5	-0.7
Crash Costs from Rebound Effect	4.1	4.2	5.7
Crash Costs from Sales/Scrappage	11.6	22.2	31.7
Total - Societal Crash Costs (\$b)	15.4	25.9	36.8

Table A-31-4 - Change in Safety Parameters from Alternative 0 (Baseline) for MY 1981-2029 for Total Fleet, 7% Percent Discount Rate, by Alternative

Alternative	1	2	3
Fatalities			
Fatalities From Mass Changes	64	115	142
Fatalities from Rebound Effect	449	584	801
Fatalities from Sales/Scrappage	506	1,123	1,681
Total Changes in Fatalities	1,019	1,822	2,624
Fatality Costs (\$b)			
Fatality Costs From Mass Changes	0.3	0.5	0.6
Fatality Costs From Rebound Effect	1.7	2.2	3.1
Fatality Costs from Sales/Scrappage	3.3	7.2	11.0
Total - Fatality Costs (\$b)	5.2	9.9	14.7
Non-Fatal Crash Costs (\$b)			
Non-Fatal Crash Costs From Mass Changes	0.3	0.6	0.7
Non-Fatal Crash Costs From Rebound Effect	2.0	2.7	3.7
Non-Fatal Crash Costs from Sales/Scrappage	1.0	2.3	3.5
Total - Non-Fatal Crash Costs (\$b)	3.3	5.6	7.9
Property Damage Costs (\$b)			
Property Damage Costs From Mass Changes	0.1	0.1	0.1
Property Damage Costs From Rebound Effect	0.4	0.6	0.8
Property Damage Costs From Sales/Scrappage	0.2	0.4	0.6
Total - Property Damage Costs (\$b)	0.7	1.1	1.5
Societal Crash Costs (\$b)			
Crash Costs from Mass Changes	0.6	1.2	1.4
Crash Costs from Rebound Effect	4.1	5.5	7.5
Crash Costs from Sales/Scrappage	4.5	9.9	15.1
Total - Societal Crash Costs (\$b)	9.2	16.6	24.0

Table A-31-5 - Change in Safety Parameters from Alternative 0 (Baseline) for MY 1981-2029 for Passenger Car Fleet, 7% Percent Discount Rate, by Alternative

Alternative	1	2	3
Fatalities			
Fatalities From Mass Changes	77	147	186
Fatalities from Rebound Effect	174	305	418
Fatalities from Sales/Scrappage	-324	-495	-635
Total Changes in Fatalities	-73	-43	-31
Fatality Costs (\$b)			
Fatality Costs From Mass Changes	0.3	0.6	0.7
Fatality Costs From Rebound Effect	0.7	1.2	1.7
Fatality Costs from Sales/Scrappage	-0.5	-0.3	0.0
Total - Fatality Costs (\$b)	0.5	1.5	2.4
Non-Fatal Crash Costs (\$b)			
Non-Fatal Crash Costs From Mass Changes	0.4	0.7	0.9
Non-Fatal Crash Costs From Rebound Effect	0.8	1.5	2.0
Non-Fatal Crash Costs from Sales/Scrappage	-2.0	-3.3	-4.4
Total - Non-Fatal Crash Costs (\$b)	-0.7	-1.1	-1.5
Property Damage Costs (\$b)			
Property Damage Costs From Mass Changes	0.1	0.2	0.2
Property Damage Costs From Rebound Effect	0.2	0.3	0.4
Property Damage Costs From Sales/Scrappage	-0.4	-0.7	-1.0
Total - Property Damage Costs (\$b)	-0.2	-0.3	-0.4
Societal Crash Costs (\$b)			
Crash Costs from Mass Changes	0.8	1.5	1.9
Crash Costs from Rebound Effect	1.7	3.0	4.1
Crash Costs from Sales/Scrappage	-2.9	-4.3	-5.4
Total - Societal Crash Costs (\$b)	-0.4	0.2	0.6

Table A-31-6 - Change in Safety Parameters from Alternative 0 (Baseline) for MY 1981-2029 for Light Truck Fleet, 7% Percent Discount Rate, by Alternative

Alternative	1	2	3
Fatalities			
Fatalities From Mass Changes	-13	-31	-45
Fatalities from Rebound Effect	276	278	383
Fatalities from Sales/Scrappage	830	1,618	2,316
Total Changes in Fatalities	1,093	1,865	2,655
Fatality Costs (\$b)			
Fatality Costs From Mass Changes	-0.1	-0.1	-0.2
Fatality Costs From Rebound Effect	1.0	1.0	1.4
Fatality Costs from Sales/Scrappage	3.8	7.5	11.0
Total - Fatality Costs (\$b)	4.7	8.4	12.2
Non-Fatal Crash Costs (\$b)			
Non-Fatal Crash Costs From Mass Changes	-0.1	-0.1	-0.2
Non-Fatal Crash Costs From Rebound Effect	1.2	1.2	1.7
Non-Fatal Crash Costs from Sales/Scrappage	3.0	5.6	7.9
Total - Non-Fatal Crash Costs (\$b)	4.1	6.6	9.3
Property Damage Costs (\$b)			
Property Damage Costs From Mass Changes	0.0	0.0	0.0
Property Damage Costs From Rebound Effect	0.2	0.3	0.3
Property Damage Costs From Sales/Scrappage	0.6	1.1	1.6
Total - Property Damage Costs (\$b)	0.8	1.3	1.9
Societal Crash Costs (\$b)			
Crash Costs from Mass Changes	-0.1	-0.3	-0.4
Crash Costs from Rebound Effect	2.4	2.5	3.4
Crash Costs from Sales/Scrappage	7.4	14.2	20.4
Total - Societal Crash Costs (\$b)	9.7	16.4	23.4

Table A-31-7 - Change in Safety Parameters from Alternative 0 (Baseline) for CY 2039-2048 for Total Fleet, 3% Percent Discount Rate, by Alternative

Alternative	1	2	3
Fatalities			
Fatalities From Mass Changes	70	149	206
Fatalities from Rebound Effect	716	964	1,283
Fatalities from Sales/Scrappage	-45	-149	-262
Total Changes in Fatalities	740	964	1,227
Fatality Costs (\$b)			
Fatality Costs From Mass Changes	0.4	0.8	1.1
Fatality Costs From Rebound Effect	4.0	5.3	7.1
Fatality Costs from Sales/Scrappage	-0.2	-0.8	-1.4
Total - Fatality Costs (\$b)	4.1	5.4	6.9
Non-Fatal Crash Costs (\$b)			
Non-Fatal Crash Costs From Mass Changes	0.4	0.9	1.3
Non-Fatal Crash Costs From Rebound Effect	4.5	6.1	8.1
Non-Fatal Crash Costs from Sales/Scrappage	-0.2	-0.6	-0.9
Total - Non-Fatal Crash Costs (\$b)	4.7	6.5	8.5
Property Damage Costs (\$b)			
Property Damage Costs From Mass Changes	0.1	0.2	0.3
Property Damage Costs From Rebound Effect	0.9	1.3	1.7
Property Damage Costs From Sales/Scrappage	0.0	-0.1	-0.2
Total - Property Damage Costs (\$b)	1.0	1.4	1.8
Societal Crash Costs (\$b)			
Crash Costs from Mass Changes	0.9	1.9	2.7
Crash Costs from Rebound Effect	9.4	12.7	16.9
Crash Costs from Sales/Scrappage	-0.5	-1.4	-2.5
Total - Societal Crash Costs (\$b)	9.8	13.2	17.1

Table A-31-8 - Change in Safety Parameters from Alternative 0 (Baseline) for CY 2039-2048 for Passenger Car Fleet, 3% Percent Discount Rate, by Alternative

Alternative	1	2	3
Fatalities			
Fatalities From Mass Changes	107	223	304
Fatalities from Rebound Effect	253	421	610
Fatalities from Sales/Scrappage	-1,310	-2,282	-3,135
Total Changes in Fatalities	-950	-1,638	-2,220
Fatality Costs (\$b)			
Fatality Costs From Mass Changes	0.6	1.2	1.7
Fatality Costs From Rebound Effect	1.4	2.3	3.4
Fatality Costs from Sales/Scrappage	-7.2	-12.6	-17.3
Total - Fatality Costs (\$b)	-5.2	-9.0	-12.2
Non-Fatal Crash Costs (\$b)			
Non-Fatal Crash Costs From Mass Changes	0.7	1.4	1.9
Non-Fatal Crash Costs From Rebound Effect	1.6	2.6	3.8
Non-Fatal Crash Costs from Sales/Scrappage	-8.5	-14.5	-19.7
Total - Non-Fatal Crash Costs (\$b)	-6.2	-10.5	-13.9
Property Damage Costs (\$b)			
Property Damage Costs From Mass Changes	0.1	0.3	0.4
Property Damage Costs From Rebound Effect	0.3	0.5	0.8
Property Damage Costs From Sales/Scrappage	-1.7	-3.0	-4.0
Total - Property Damage Costs (\$b)	-1.3	-2.1	-2.9
Societal Crash Costs (\$b)			
Crash Costs from Mass Changes	1.4	2.9	4.0
Crash Costs from Rebound Effect	3.3	5.5	8.0
Crash Costs from Sales/Scrappage	-17.4	-30.0	-41.0
Total - Societal Crash Costs (\$b)	-12.7	-21.6	-29.0

Table A-31-9 - Change in Safety Parameters from Alternative 0 (Baseline) for CY 2039-2048 for Light Truck Fleet, 3% Percent Discount Rate, by Alternative

Alternative	1	2	3
Fatalities			
Fatalities From Mass Changes	-37	-73	-98
Fatalities from Rebound Effect	462	543	672
Fatalities from Sales/Scrappage	1,265	2,132	2,873
Total Changes in Fatalities	1,690	2,602	3,447
Fatality Costs (\$b)			
Fatality Costs From Mass Changes	-0.2	-0.4	-0.5
Fatality Costs From Rebound Effect	2.6	3.0	3.7
Fatality Costs from Sales/Scrappage	7.0	11.8	15.9
Total - Fatality Costs (\$b)	9.3	14.4	19.1
Non-Fatal Crash Costs (\$b)			
Non-Fatal Crash Costs From Mass Changes	-0.2	-0.5	-0.6
Non-Fatal Crash Costs From Rebound Effect	2.9	3.5	4.3
Non-Fatal Crash Costs from Sales/Scrappage	8.2	13.9	18.7
Total - Non-Fatal Crash Costs (\$b)	10.9	16.9	22.4
Property Damage Costs (\$b)			
Property Damage Costs From Mass Changes	0.0	-0.1	-0.1
Property Damage Costs From Rebound Effect	0.6	0.7	0.9
Property Damage Costs From Sales/Scrappage	1.7	2.9	3.9
Total - Property Damage Costs (\$b)	2.2	3.5	4.6
Societal Crash Costs (\$b)			
Crash Costs from Mass Changes	-0.5	-1.0	-1.3
Crash Costs from Rebound Effect	6.0	7.2	8.9
Crash Costs from Sales/Scrappage	16.9	28.6	38.5
Total - Societal Crash Costs (\$b)	22.5	34.8	46.1

Table A-31-10 - Change in Safety Parameters from Alternative 0 (Baseline) for CY 2039-2048 for Total Fleet, 7% Percent Discount Rate, by Alternative

Alternative	1	2	3
Fatalities			
Fatalities From Mass Changes	70	149	206
Fatalities from Rebound Effect	716	964	1,283
Fatalities from Sales/Scrappage	-45	-149	-262
Total Changes in Fatalities	740	964	1,227
Fatality Costs (\$b)			
Fatality Costs From Mass Changes	0.2	0.4	0.5
Fatality Costs From Rebound Effect	1.7	2.3	3.0
Fatality Costs from Sales/Scrappage	-0.1	-0.3	-0.5
Total - Fatality Costs (\$b)	1.8	2.3	3.0
Non-Fatal Crash Costs (\$b)			
Non-Fatal Crash Costs From Mass Changes	0.2	0.4	0.6
Non-Fatal Crash Costs From Rebound Effect	1.9	2.6	3.5
Non-Fatal Crash Costs from Sales/Scrappage	-0.1	-0.2	-0.4
Total - Non-Fatal Crash Costs (\$b)	2.0	2.8	3.6
Property Damage Costs (\$b)			
Property Damage Costs From Mass Changes	0.0	0.1	0.1
Property Damage Costs From Rebound Effect	0.4	0.5	0.7
Property Damage Costs From Sales/Scrappage	0.0	0.0	-0.1
Total - Property Damage Costs (\$b)	0.4	0.6	0.8
Societal Crash Costs (\$b)			
Crash Costs from Mass Changes	0.4	0.8	1.2
Crash Costs from Rebound Effect	4.0	5.5	7.2
Crash Costs from Sales/Scrappage	-0.2	-0.6	-1.0
Total - Societal Crash Costs (\$b)	4.2	5.7	7.4

Table A-31-11 - Change in Safety Parameters from Alternative 0 (Baseline) for CY 2039-2048 for Passenger Car Fleet, 7% Percent Discount Rate, by Alternative

Alternative	1	2	3
Fatalities			
Fatalities From Mass Changes	107	223	304
Fatalities from Rebound Effect	253	421	610
Fatalities from Sales/Scrappage	-1,310	-2,282	-3,135
Total Changes in Fatalities	-950	-1,638	-2,220
Fatality Costs (\$b)			
Fatality Costs From Mass Changes	0.3	0.5	0.7
Fatality Costs From Rebound Effect	0.6	1.0	1.5
Fatality Costs from Sales/Scrappage	-3.1	-5.3	-7.4
Total - Fatality Costs (\$b)	-2.2	-3.8	-5.2
Non-Fatal Crash Costs (\$b)			
Non-Fatal Crash Costs From Mass Changes	0.3	0.6	0.8
Non-Fatal Crash Costs From Rebound Effect	0.7	1.1	1.7
Non-Fatal Crash Costs from Sales/Scrappage	-3.6	-6.2	-8.4
Total - Non-Fatal Crash Costs (\$b)	-2.6	-4.4	-5.9
Property Damage Costs (\$b)			
Property Damage Costs From Mass Changes	0.1	0.1	0.2
Property Damage Costs From Rebound Effect	0.1	0.2	0.3
Property Damage Costs From Sales/Scrappage	-0.7	-1.3	-1.7
Total - Property Damage Costs (\$b)	-0.5	-0.9	-1.2
Societal Crash Costs (\$b)			
Crash Costs from Mass Changes	0.6	1.3	1.7
Crash Costs from Rebound Effect	1.4	2.4	3.5
Crash Costs from Sales/Scrappage	-7.4	-12.8	-17.5
Total - Societal Crash Costs (\$b)	-5.4	-9.2	-12.3

Table A-31-12 - Change in Safety Parameters from Alternative 0 (Baseline) for CY 2039-2048 for Light Truck Fleet, 7% Percent Discount Rate, by Alternative

Alternative	1	2	3
Fatalities			
Fatalities From Mass Changes	-37	-73	-98
Fatalities from Rebound Effect	462	543	672
Fatalities from Sales/Scrappage	1,265	2,132	2,873
Total Changes in Fatalities	1,690	2,602	3,447
Fatality Costs (\$b)			
Fatality Costs From Mass Changes	-0.1	-0.2	-0.2
Fatality Costs From Rebound Effect	1.1	1.3	1.6
Fatality Costs from Sales/Scrappage	3.0	5.0	6.8
Total - Fatality Costs (\$b)	4.0	6.1	8.2
Non-Fatal Crash Costs (\$b)			
Non-Fatal Crash Costs From Mass Changes	-0.1	-0.2	-0.3
Non-Fatal Crash Costs From Rebound Effect	1.2	1.5	1.8
Non-Fatal Crash Costs from Sales/Scrappage	3.5	5.9	8.0
Total - Non-Fatal Crash Costs (\$b)	4.7	7.2	9.6
Property Damage Costs (\$b)			
Property Damage Costs From Mass Changes	0.0	0.0	-0.1
Property Damage Costs From Rebound Effect	0.3	0.3	0.4
Property Damage Costs From Sales/Scrappage	0.7	1.2	1.7
Total - Property Damage Costs (\$b)	1.0	1.5	2.0
Societal Crash Costs (\$b)			
Crash Costs from Mass Changes	-0.2	-0.4	-0.6
Crash Costs from Rebound Effect	2.6	3.1	3.8
Crash Costs from Sales/Scrappage	7.2	12.2	16.5
Total - Societal Crash Costs (\$b)	9.6	14.9	19.7

Table A-31-13 - Change in Non-Fatal Safety Parameters from Alternative 0 (Baseline) for MY 1981-2029 for Total Fleet, by Alternative

Alternative	1	2	3
Non-Fatal Injuries			
Non-Fatal Injuries From Mass Changes	5,537	10,048	12,377
Non-Fatal Injuries from Rebound Effect	36,587	48,618	66,522
Non-Fatal Injuries from Sales/Scrappage	9,723	22,269	32,249
Total Changes in Non-Fatal Injuries	51,847	80,936	111,147
Property Damaged Vehicles			
Property Damaged Vehicles From Mass Changes	21,195	38,471	47,389
Property Damaged Vehicles from Rebound Effect	139,798	185,800	254,194
Property Damaged Vehicles from Sales/Scrappage	29,900	69,638	99,711
Total Changes in Property Damaged Vehicles	190,892	293,909	401,294

Table A-31-14 - Change in Non-Fatal Safety Parameters from Alternative 0 (Baseline) for MY 1981-2029 for Passenger Car Fleet, by Alternative

Alternative	1	2	3
Non-Fatal Injuries			
Non-Fatal Injuries From Mass Changes	6,677	12,655	16,076
Non-Fatal Injuries from Rebound Effect	14,817	26,071	35,700
Non-Fatal Injuries from Sales/Scrappage	-41,276	-72,132	-99,478
Total Changes in Non-Fatal Injuries	-19,783	-33,406	-47,701
Property Damaged Vehicles			
Property Damaged Vehicles From Mass Changes	25,550	48,428	61,518
Property Damaged Vehicles from Rebound Effect	56,680	99,714	136,539
Property Damaged Vehicles from Sales/Scrappage	-161,165	-282,869	-391,124
Total Changes in Property Damaged Vehicles	-78,935	-134,726	-193,066

Table A-31-15 - Change in Non-Fatal Safety Parameters from Alternative 0 (Baseline) for MY 1981-2029 for Light Truck Fleet, by Alternative

Alternative	1	2	3
Non-Fatal Injuries			
Non-Fatal Injuries From Mass Changes	-1,140	-2,607	-3,700
Non-Fatal Injuries from Rebound Effect	21,770	22,548	30,822
Non-Fatal Injuries from Sales/Scrappage	51,000	94,401	131,726
Total Changes in Non-Fatal Injuries	71,630	114,341	158,849
Property Damaged Vehicles			
Property Damaged Vehicles From Mass Changes	-4,355	-9,956	-14,128
Property Damaged Vehicles from Rebound Effect	83,118	86,086	117,654
Property Damaged Vehicles from Sales/Scrappage	191,064	352,506	490,835
Total Changes in Property Damaged Vehicles	269,827	428,635	594,361

**Table A-31-16 - Change in Non-Fatal Safety Parameters from Alternative 0 (Baseline) for CY 2039-2048
for Total Fleet, by Alternative**

Alternative	1	2	3
Non-Fatal Injuries			
Non-Fatal Injuries From Mass Changes	6,015	13,547	19,034
Non-Fatal Injuries from Rebound Effect	65,878	90,141	119,447
Non-Fatal Injuries from Sales/Scrappage	-3,068	-8,325	-13,681
Total Changes in Non-Fatal Injuries	68,825	95,363	124,801
Property Damaged Vehicles			
Property Damaged Vehicles From Mass Changes	22,822	51,632	72,653
Property Damaged Vehicles from Rebound Effect	251,458	344,542	456,442
Property Damaged Vehicles from Sales/Scrappage	-9,866	-26,225	-43,164
Total Changes in Property Damaged Vehicles	264,413	369,949	485,931

Table A-31-17 - Change in Non-Fatal Safety Parameters from Alternative 0 (Baseline) for CY 2039-2048 for Passenger Car Fleet, by Alternative

Alternative	1	2	3
Non-Fatal Injuries			
Non-Fatal Injuries From Mass Changes	9,555	20,480	28,253
Non-Fatal Injuries from Rebound Effect	23,365	38,356	56,084
Non-Fatal Injuries from Sales/Scrappage	-125,137	-213,758	-290,084
Total Changes in Non-Fatal Injuries	-92,217	-154,921	-205,746
Property Damaged Vehicles			
Property Damaged Vehicles From Mass Changes	36,364	78,129	107,867
Property Damaged Vehicles from Rebound Effect	89,180	146,258	213,949
Property Damaged Vehicles from Sales/Scrappage	-478,336	-815,211	-1,104,802
Total Changes in Property Damaged Vehicles	-352,792	-590,824	-782,985

Table A-31-18 - Change in Non-Fatal Safety Parameters from Alternative 0 (Baseline) for CY 2039-2048 for Light Truck Fleet, by Alternative

Alternative	1	2	3
Non-Fatal Injuries			
Non-Fatal Injuries From Mass Changes	-3,540	-6,933	-9,219
Non-Fatal Injuries from Rebound Effect	42,513	51,784	63,363
Non-Fatal Injuries from Sales/Scrappage	122,069	205,433	276,403
Total Changes in Non-Fatal Injuries	161,042	250,284	330,547
Property Damaged Vehicles			
Property Damaged Vehicles From Mass Changes	-13,543	-26,497	-35,214
Property Damaged Vehicles from Rebound Effect	162,278	198,284	242,493
Property Damaged Vehicles from Sales/Scrappage	468,470	788,986	1,061,637
Total Changes in Property Damaged Vehicles	617,205	960,774	1,268,916