Developing a Methodology to Allocate AB 118 Program Funds for LDVs

AB 118 Advisory Committee Meeting

September 2, 2008

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Special Projects Office
Fuels & Transportation Division

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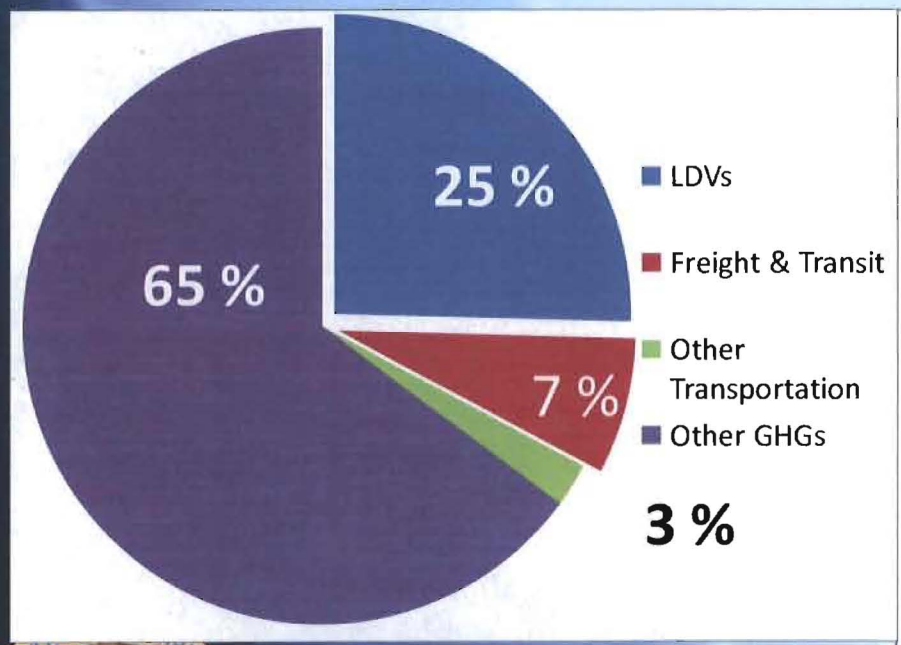
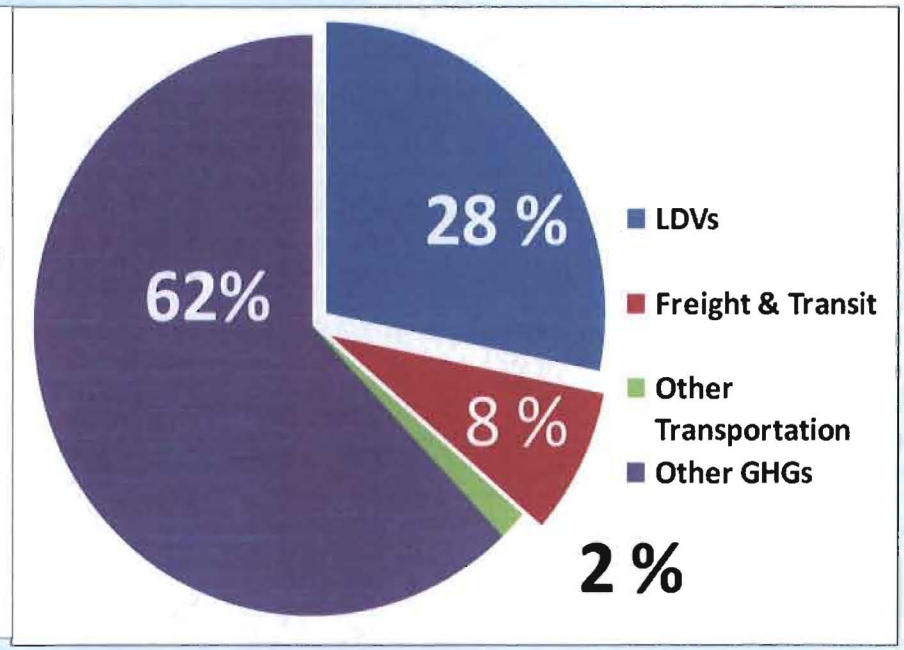
California's GHG Emissions

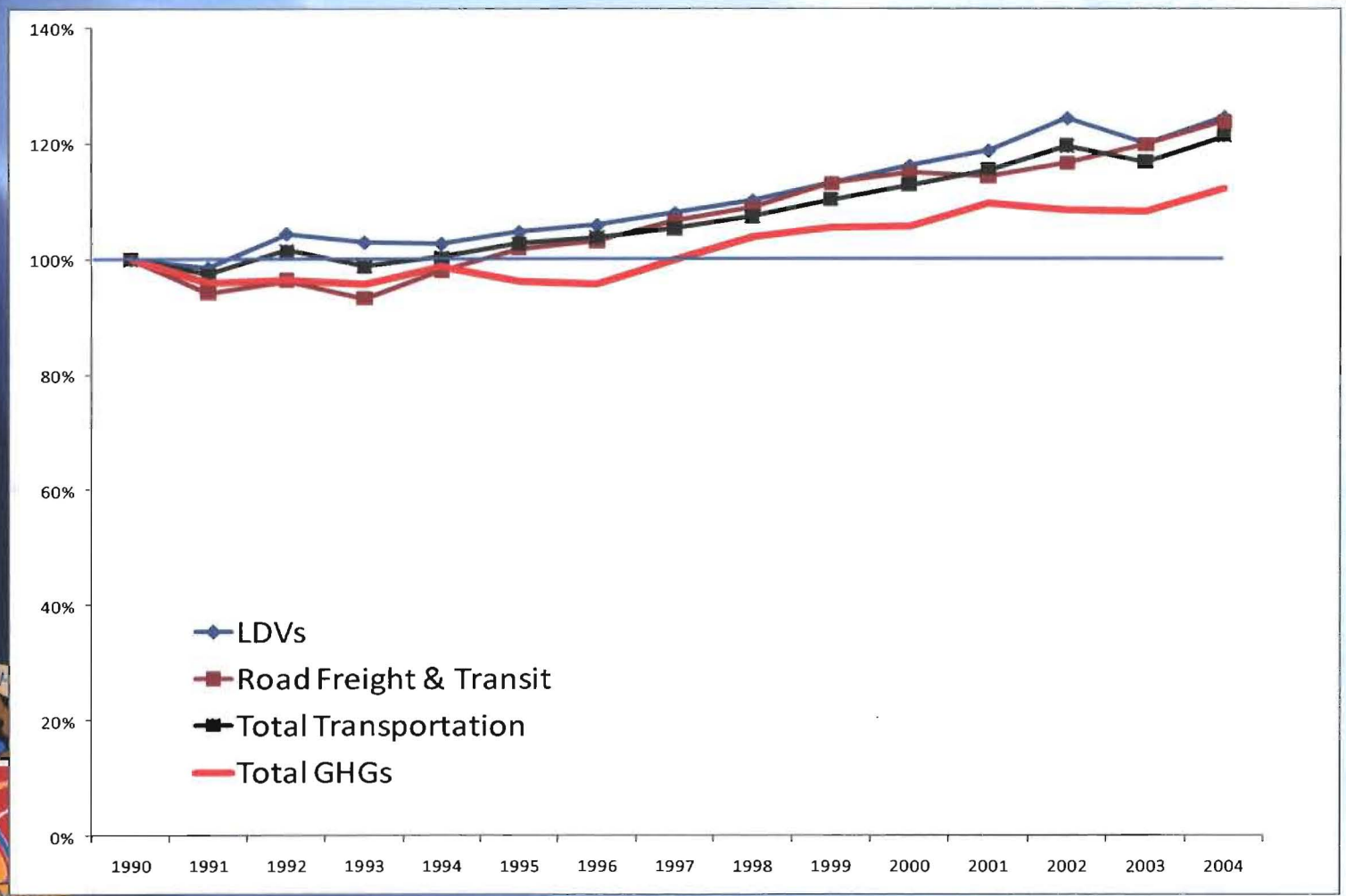
1990



2004



California's GHG Emissions Trends



2050 Vision Analysis

- Can AB 118 funding be focused to put California's light-duty vehicle fleet on a path towards accomplishing an 80% reduction in greenhouse gas emissions?
- Challenge: Work backwards from the "2050 Vision" in the State Alternative Fuels Plan to find a starting point that would lead to the outcome expressed in the "2050 Vision"

2050 Vision Analysis

- Begin with vehicle attributes from 2050 Vision:
  - Most vehicles get 60 mpg; electric get 80 mpg
  - Electric drive vehicle fuels are 40% of fuel mix; biofuels are 30% and other fuels are 30%
  - Per-person VMT reduced from 10,300 under Business-As-Usual to 8,200 under 2050 Vision

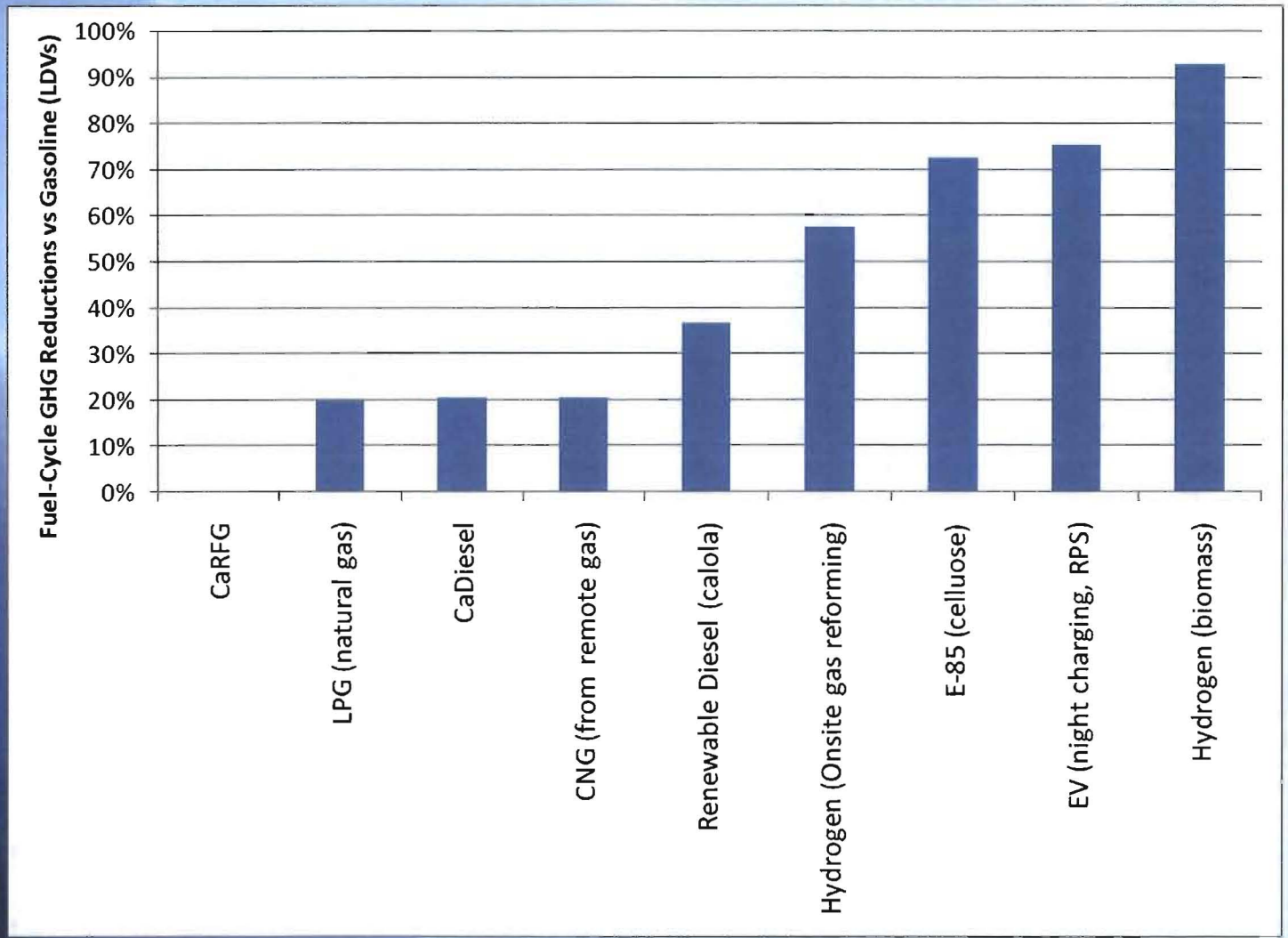
2050 Vision Analysis

- Extend CEC-adopted forecast to 2050
  - Population data from DOF
  - Hold miles/gallon fuel economy at 2030 levels from forecast out to 2050
  - Extend per-person VMT from forecast period to 2050 value of 10,300 from BAU under 2050 Vision
  - Likewise, extend new vehicle purchases

2050 Vision Analysis

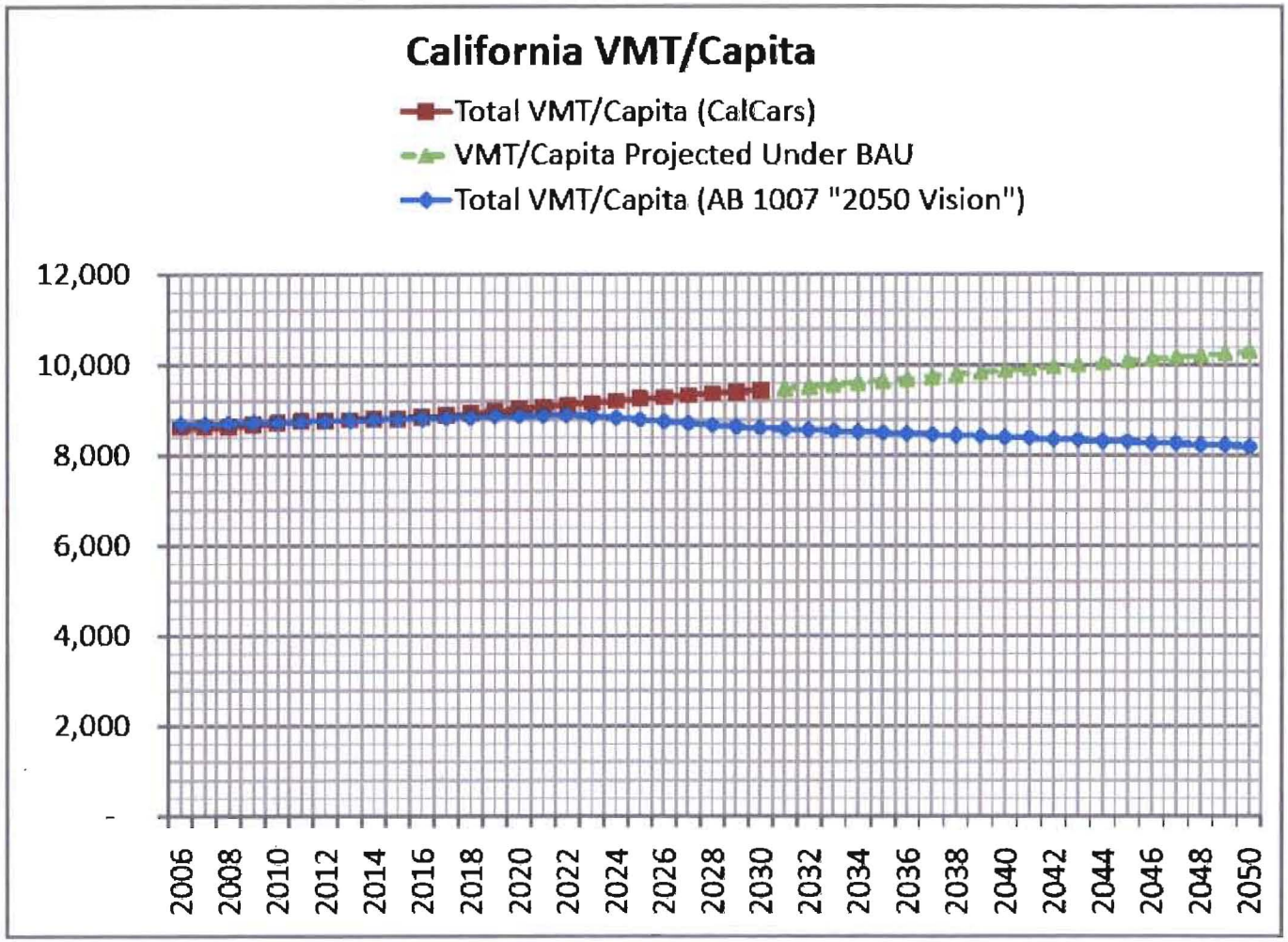
- Break new vehicles into 3 groups:
  - Low Carbon (LC) vehicles at 60 mpg and 10% carbon reduction
  - Ultra-Low Carbon (ULC) vehicles at 60 mpg and 80% carbon reduction
  - Super-Ultra-Low Carbon (SULC) vehicles at 80 mpg and 90% carbon reduction

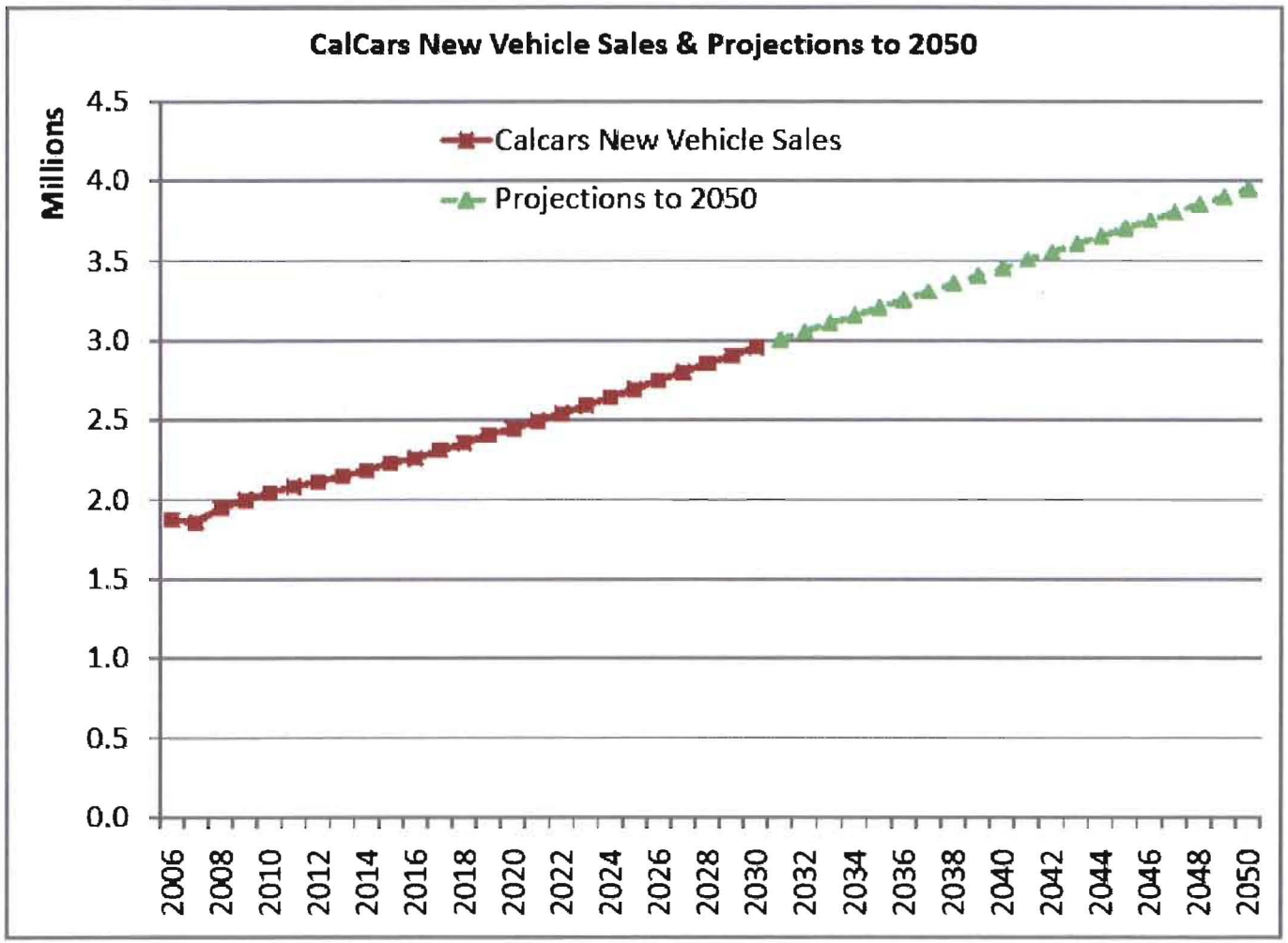
Fuel Cycle GHGs for LDVs

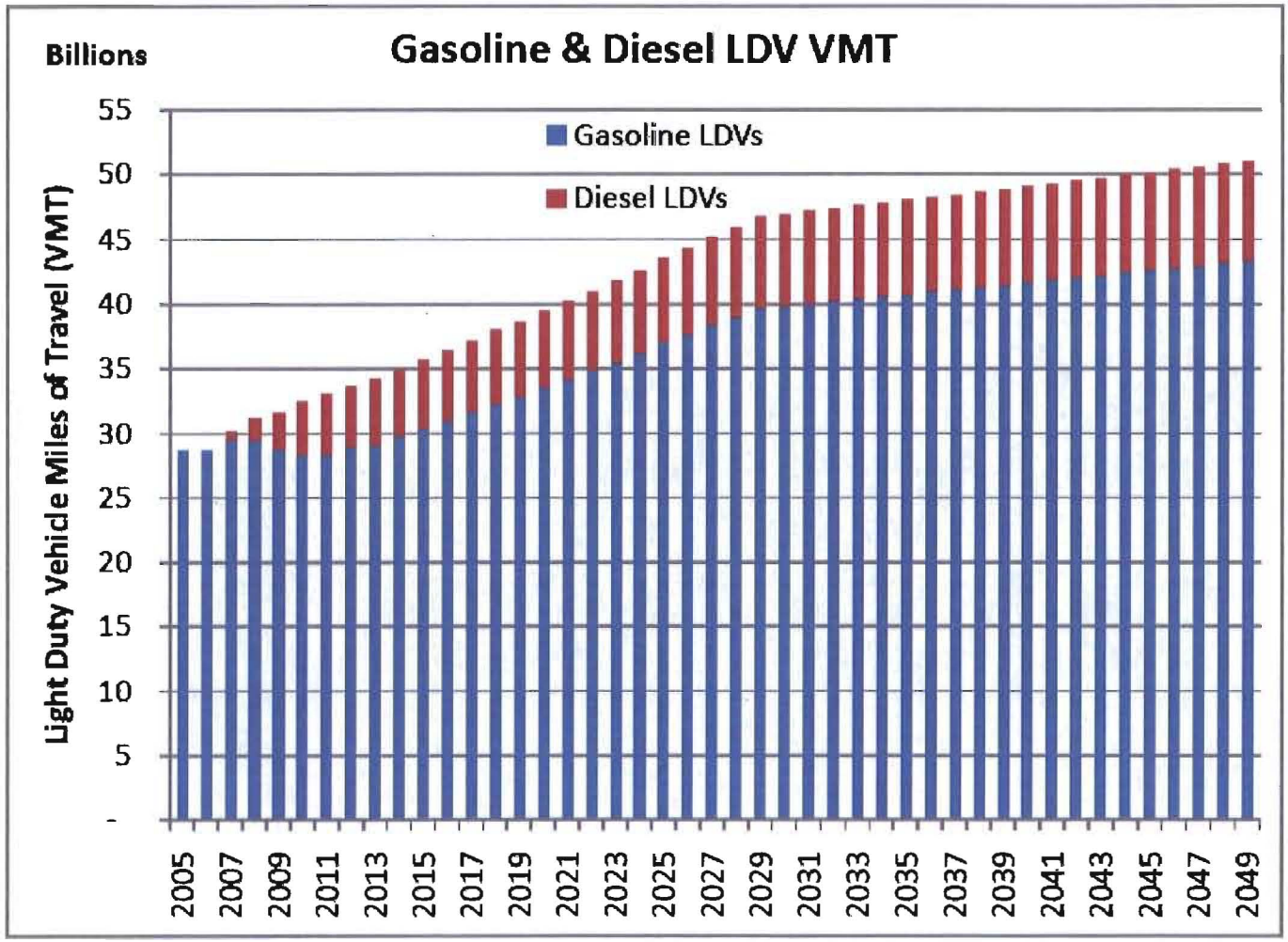


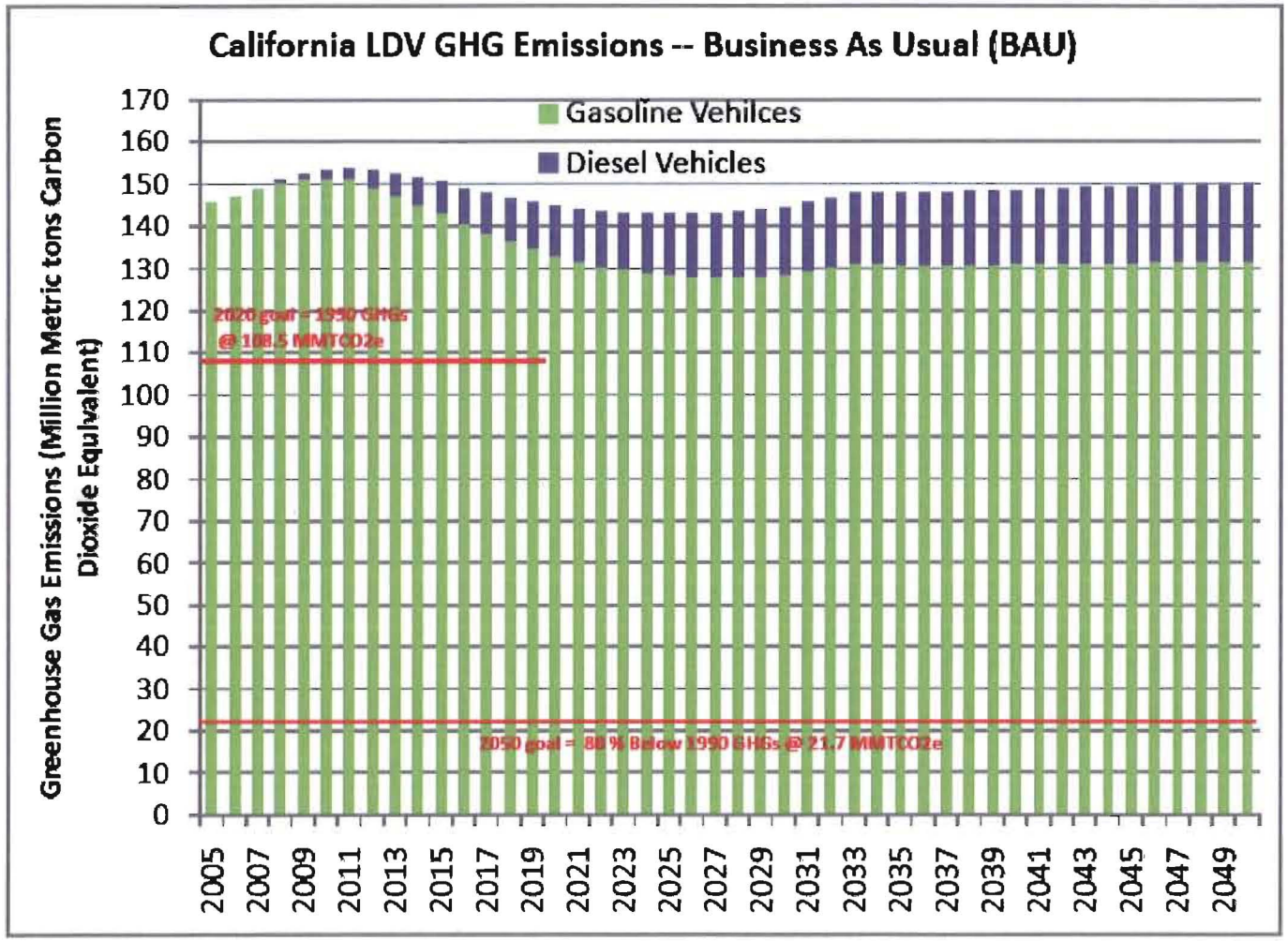
2050 Vision Analysis

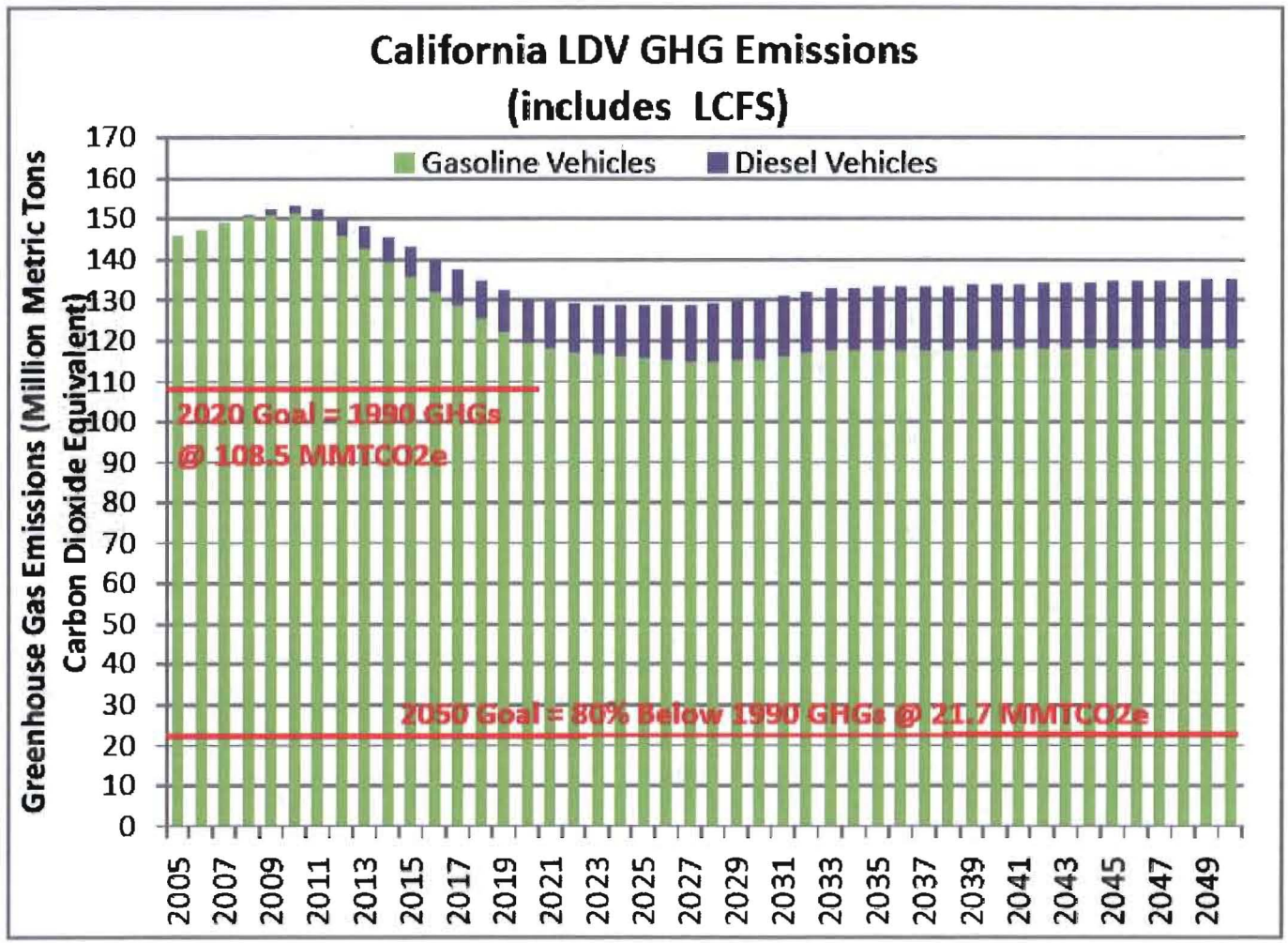
- Add Alternative Fuel Vehicles to the mix using "Story Lines" from State Alternative Fuels Plan, updated by staff.
- Non-petroleum alternative fuels restricted to replacing gasoline and diesel in LC vehicles
- Biofuels used for ULC and SULC vehicles
- Electric drive vehicles for SULCs


California VMT/Capita
Total VMT/Capita (CalCars)
VMT/Capita Projected Under BAU
Total VMT/Capita (AB 1007 "2050 Vision")
12,000
10,000
8,000
6,000
4,000
2,000
-
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
2050


CalCars New Vehicle Sales & Projections to 2050
Millions
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Calcars New Vehicle Sales
Projections to 2050
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
2050


Gasoline & Diesel LDV VMT
Billions
Light Duty Vehicle Miles of Travel (VMT)
Gasoline LDVs
Diesel LDVs
55
50
45
40
35
30
25
20
15
10
5
-
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
2045
2047
2049


California LDV GHG Emissions -- Business As Usual (BAU)
Greenhouse Gas Emissions (Million Metric tons Carbon Dioxide Equivalent)
Gasoline Vehilces
Diesel Vehicles
2020 goal = 1990 GHGs @ 108.5 MMTCO2e
2050 goal = 80 % Below 1990 GHGs @ 21.7 MMTCO2e
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
2045
2047
2049


California LDV GHG Emissions
(includes LCFS)
Greenhouse Gas Emissions (Million Metric Tons Carbon Dioxide Equivalent)
Gasoline Vehicles
Diesel Vehicles
2020 Goal = 1990 GHGs
@ 108.5 MMTCO2e
2050 Goal = 80% Below 1990 GHGs @ 21.7 MMTCO2e
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
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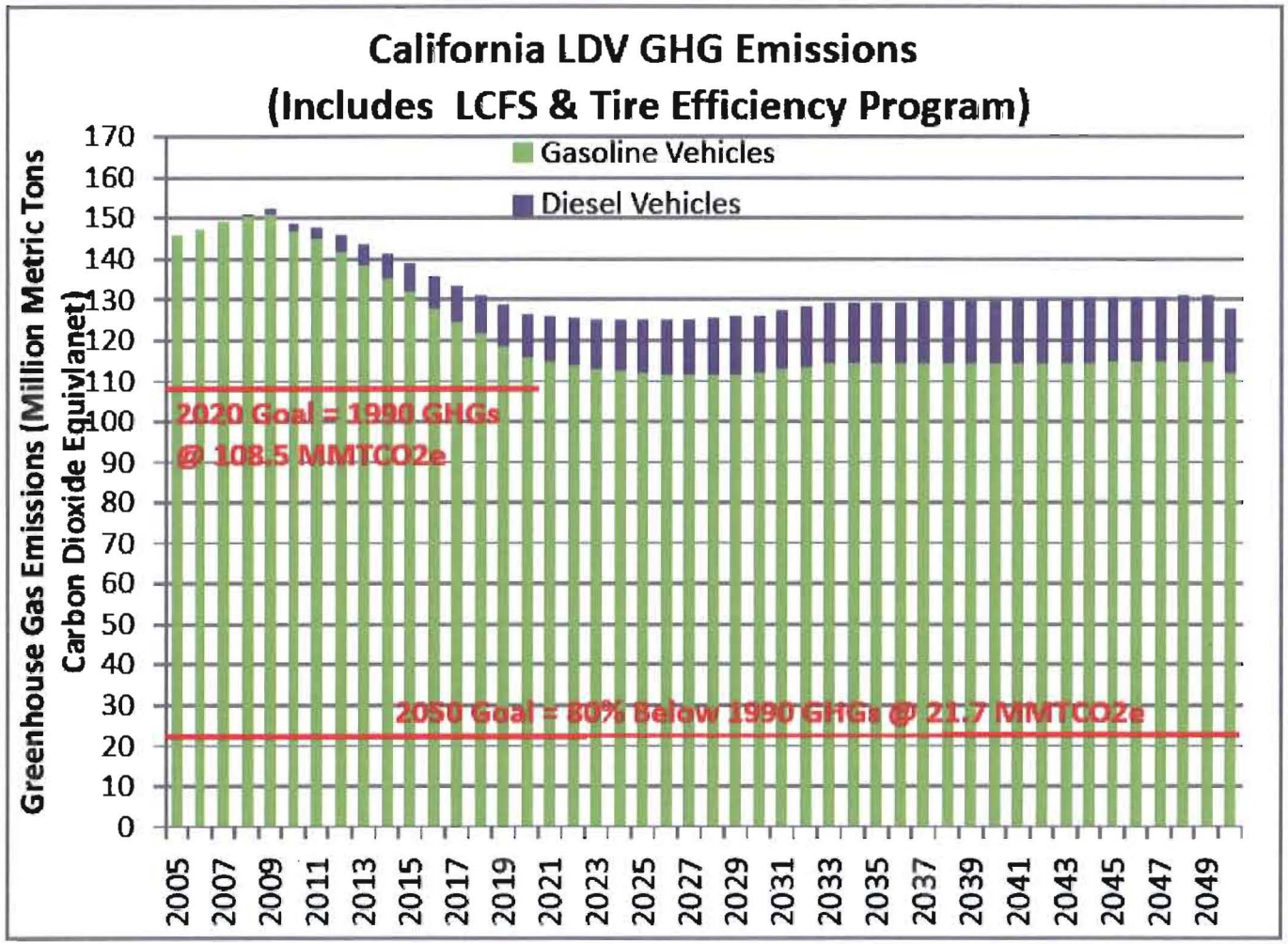
2049


California LDV GHG Emissions
(Includes LCFS & Tire Efficiency Program)
Greenhouse Gas Emissions (Million Metric Tons Carbon Dioxide Equivlanet)
Gasoline Vehicles
Diesel Vehicles
2020 Goal = 1990 GHGs
@ 108.5 MMTCO2e
2050 Goal = 80% Below 1990 GHGs @ 21.7 MMTCO2e
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
2005
2007
2009
2011
2013
2015
2017
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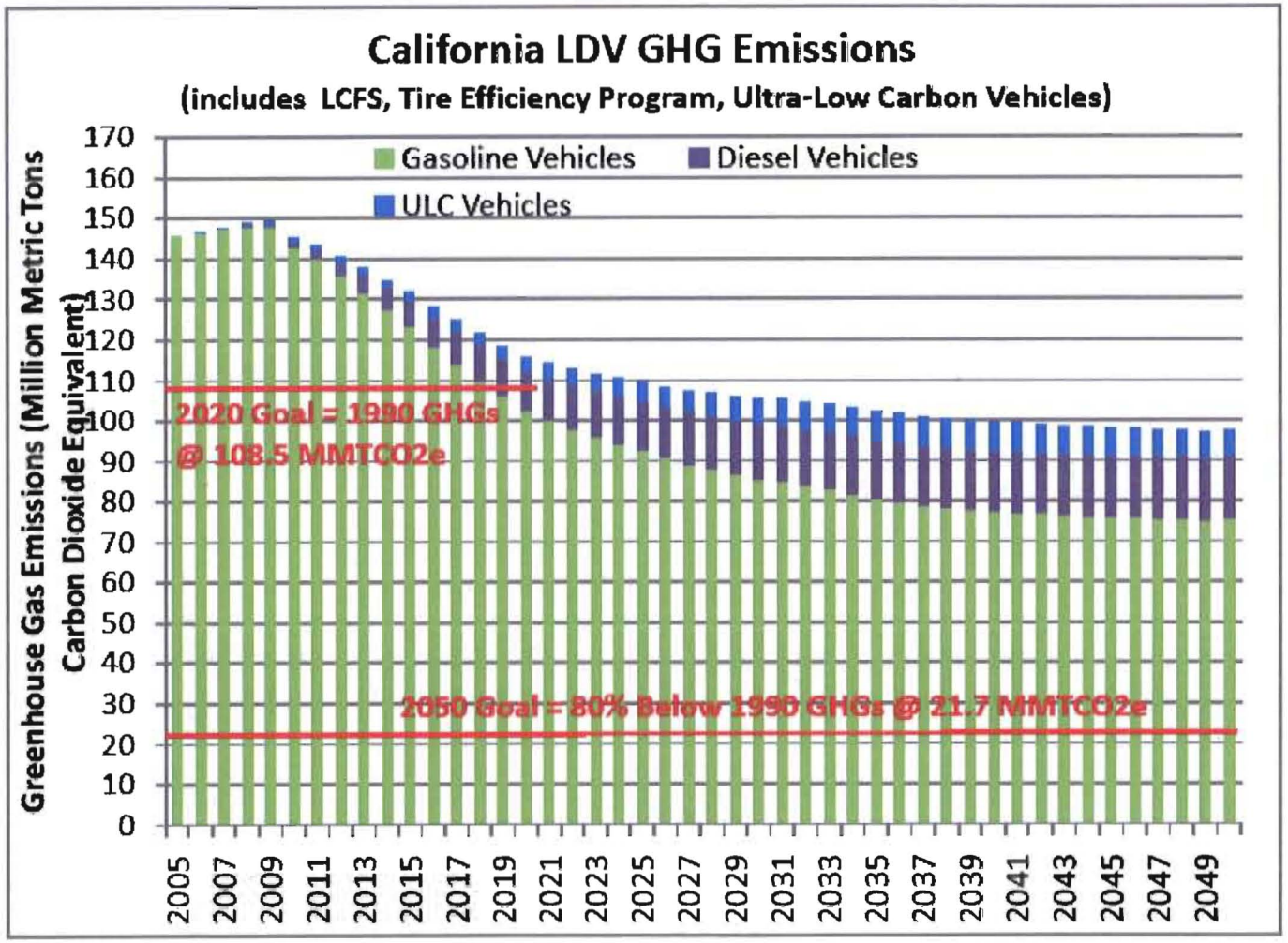
California LDV GHG Emissions
(includes LCFS, Tire Efficiency Program, Ultra-Low Carbon Vehicles)
Greenhouse Gas Emissions (Million Metric Tons Carbon Dioxide Equivalent)
Gasoline Vehicles
Diesel Vehicles
ULC Vehicles
2020 Goal = 1990 GHGs @ 108.5 MMTCO2e
2050 Goal = 80% Below 1990 GHGs @ 21.7 MMTCO2e
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
2005
2007
2009
2011
2013
2015
2017
2019
2021
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2029
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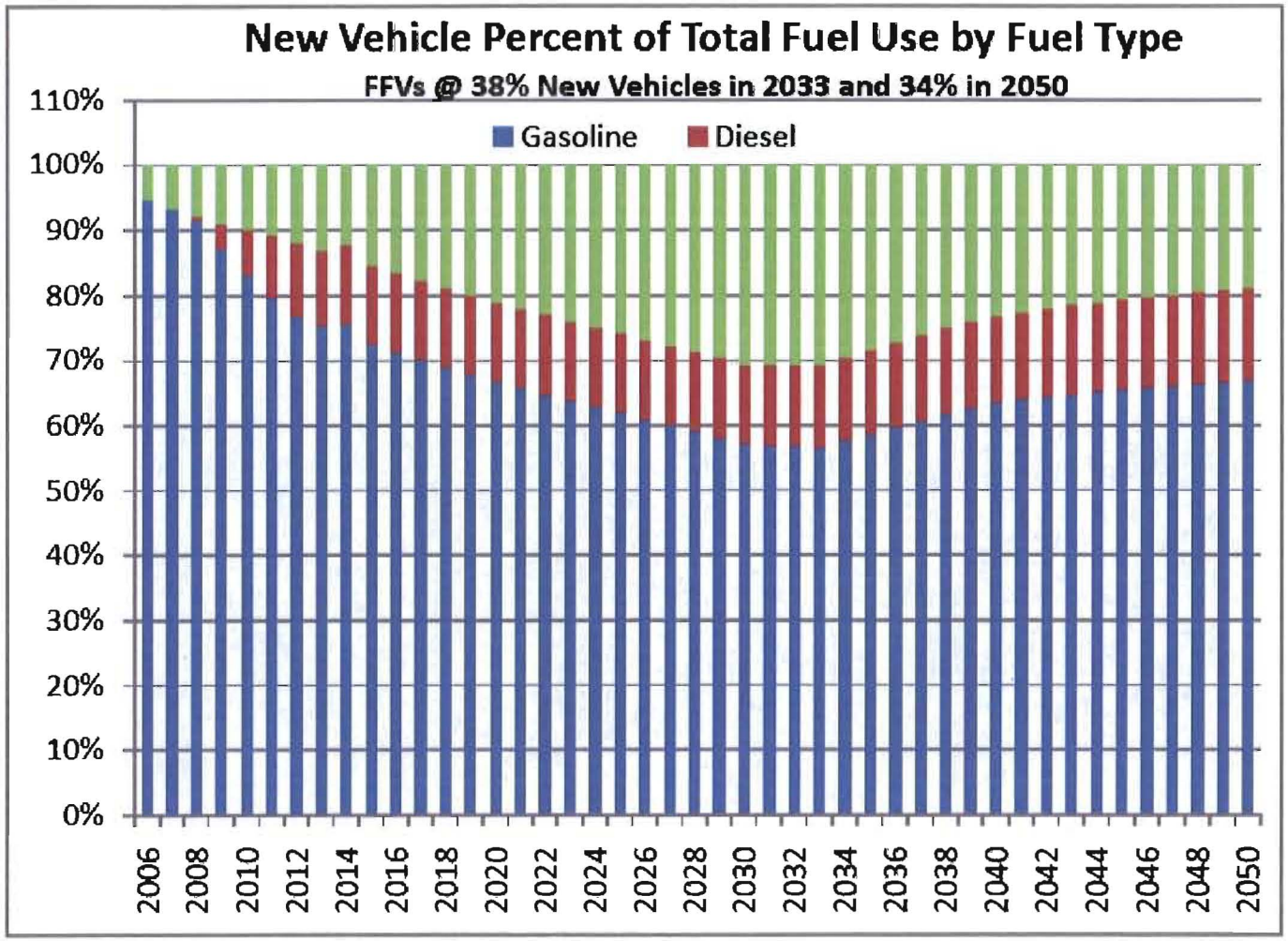
2049


New Vehicle Percent of Total Fuel Use by Fuel Type
FFVs @ 38% New Vehicles in 2033 and 34% in 2050
Gasoline
Diesel
110%
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
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2050

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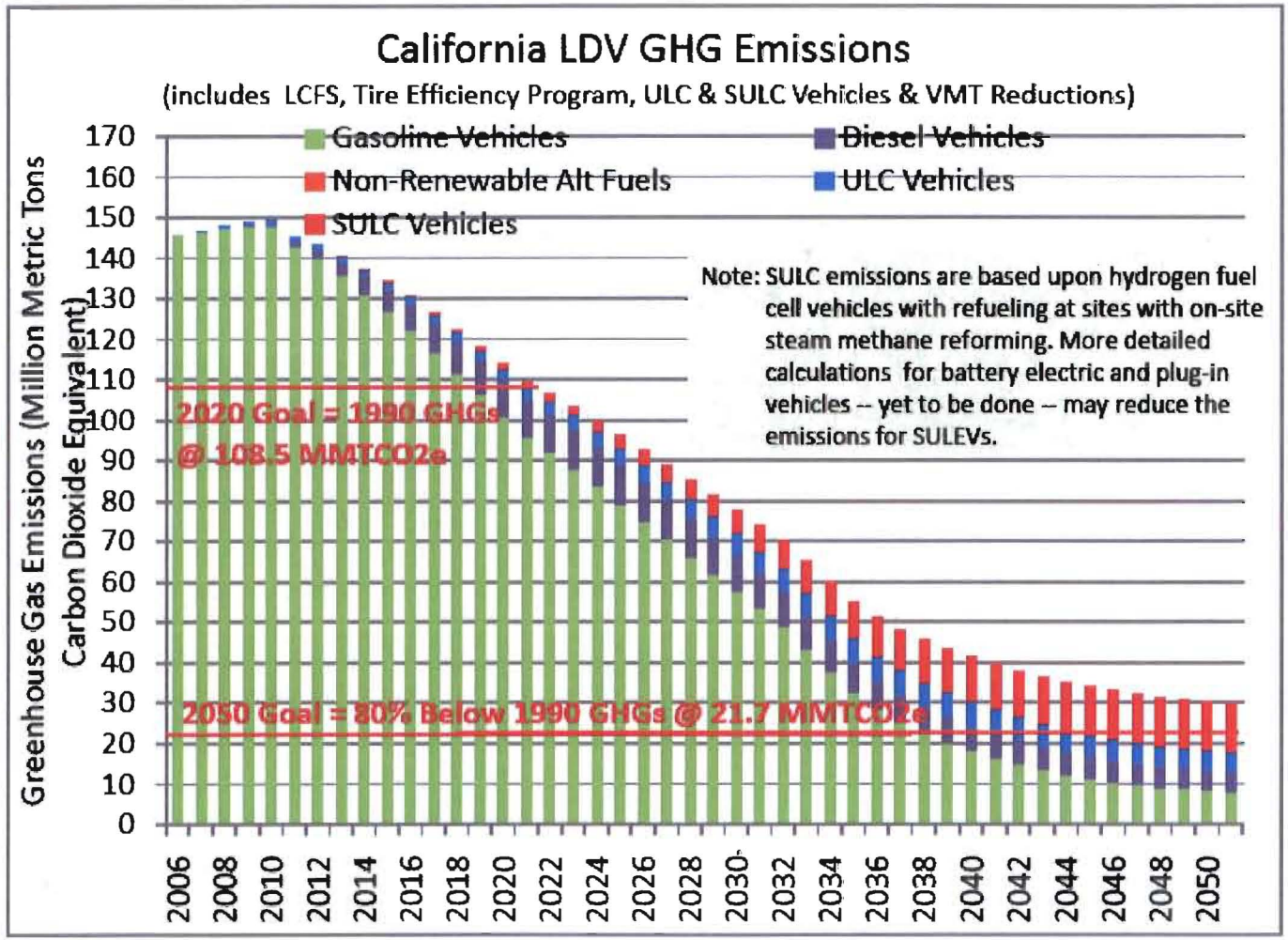
California LDV GHG Emissions
(includes LCFS, Tire Efficiency Program, ULC & SULC Vehicles & VMT Reductions)
Gasoline Vehicles
Diesel Vehicles
Non-Renewable Alt Fuels
ULC Vehicles
SULC Vehicles
Note: SULC emissions are based upon hydrogen fuel cell vehicles with refueling at sites with on-site steam methane reforming. More detailed calculations for battery electric and plug-in vehicles -- yet to be done -- may reduce the emissions for SULEVs.
2020 Goal = 1990 GHGs @ 108.5 MMTCO2e
2050 Goal = 80% Below 1990 GHGs @ 21.7 MMTCO2e
Greenhouse Gas Emissions (Million Metric Tons Carbon Dioxide Equivalent)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
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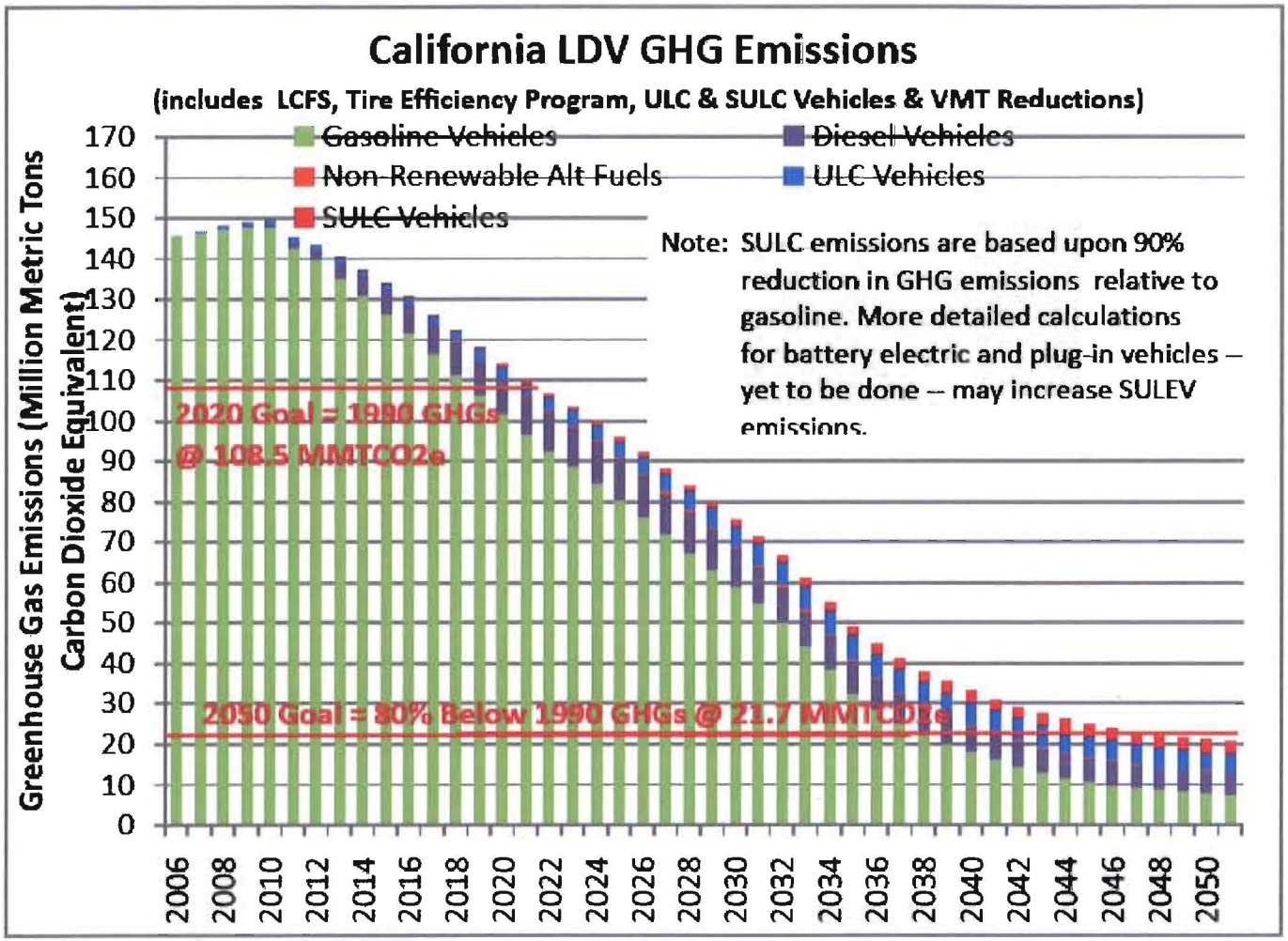
2046
2048
2050


California LDV GHG Emissions
(includes LCFS, Tire Efficiency Program, ULC & SULC Vehicles & VMT Reductions)
Gasoline Vehicles
Diesel Vehicles
Non-Renewable Alt Fuels
ULC Vehicles
SULC Vehicles
Note: SULC emissions are based upon 90% reduction in GHG emissions relative to gasoline. More detailed calculations for battery electric and plug-in vehicles – yet to be done – may increase SULEV emissions.
2020 Goal = 1990 GHGs @ 108.5 MMTCO2e
2050 Goal = 80% Below 1990 GHGs @ 21.7 MMTCO2e
Greenhouse Gas Emissions (Million Metric Tons Carbon Dioxide Equivalent)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
2006
2008
2010
2012
2014
2016
2018
2020
2022
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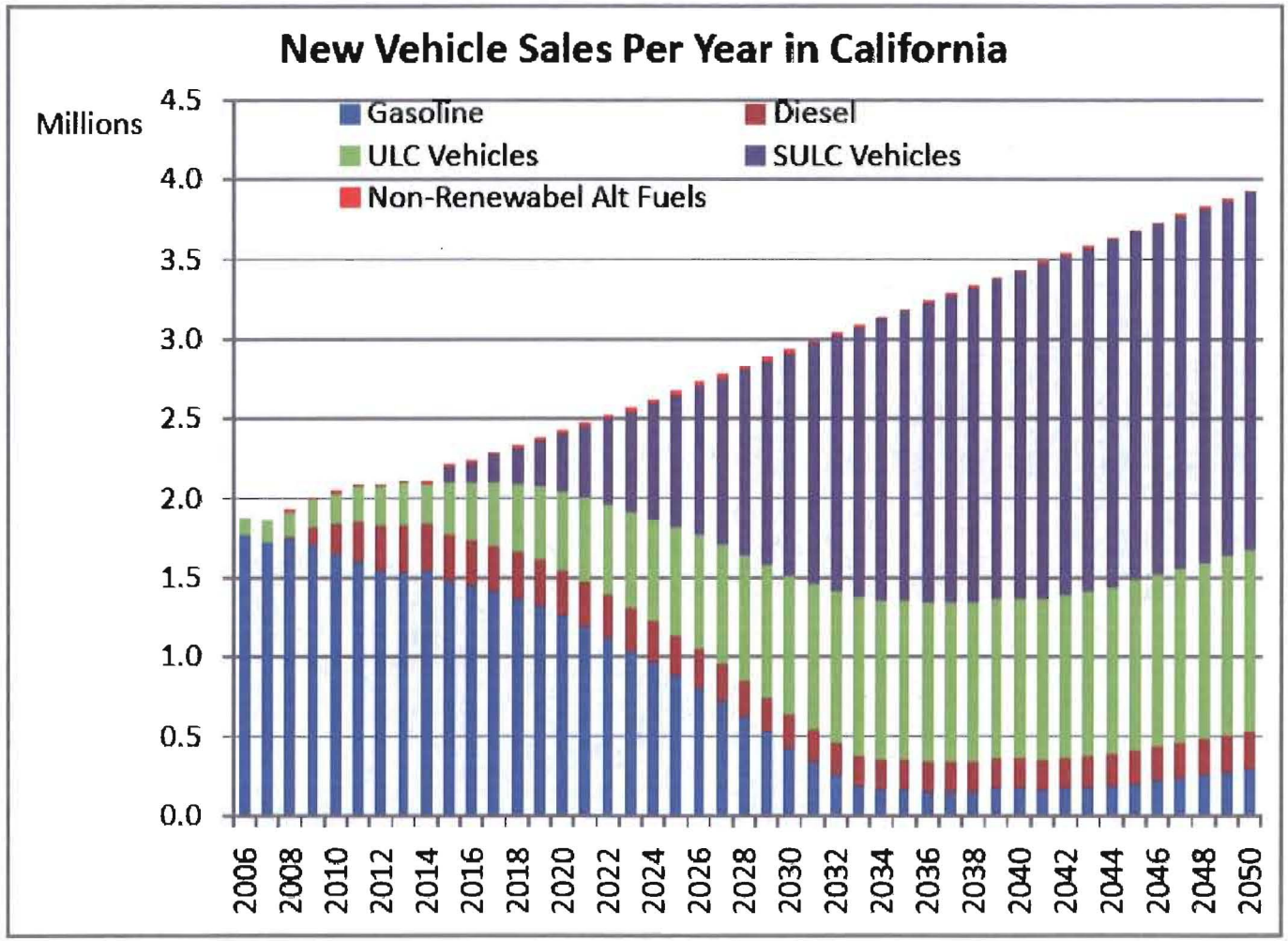
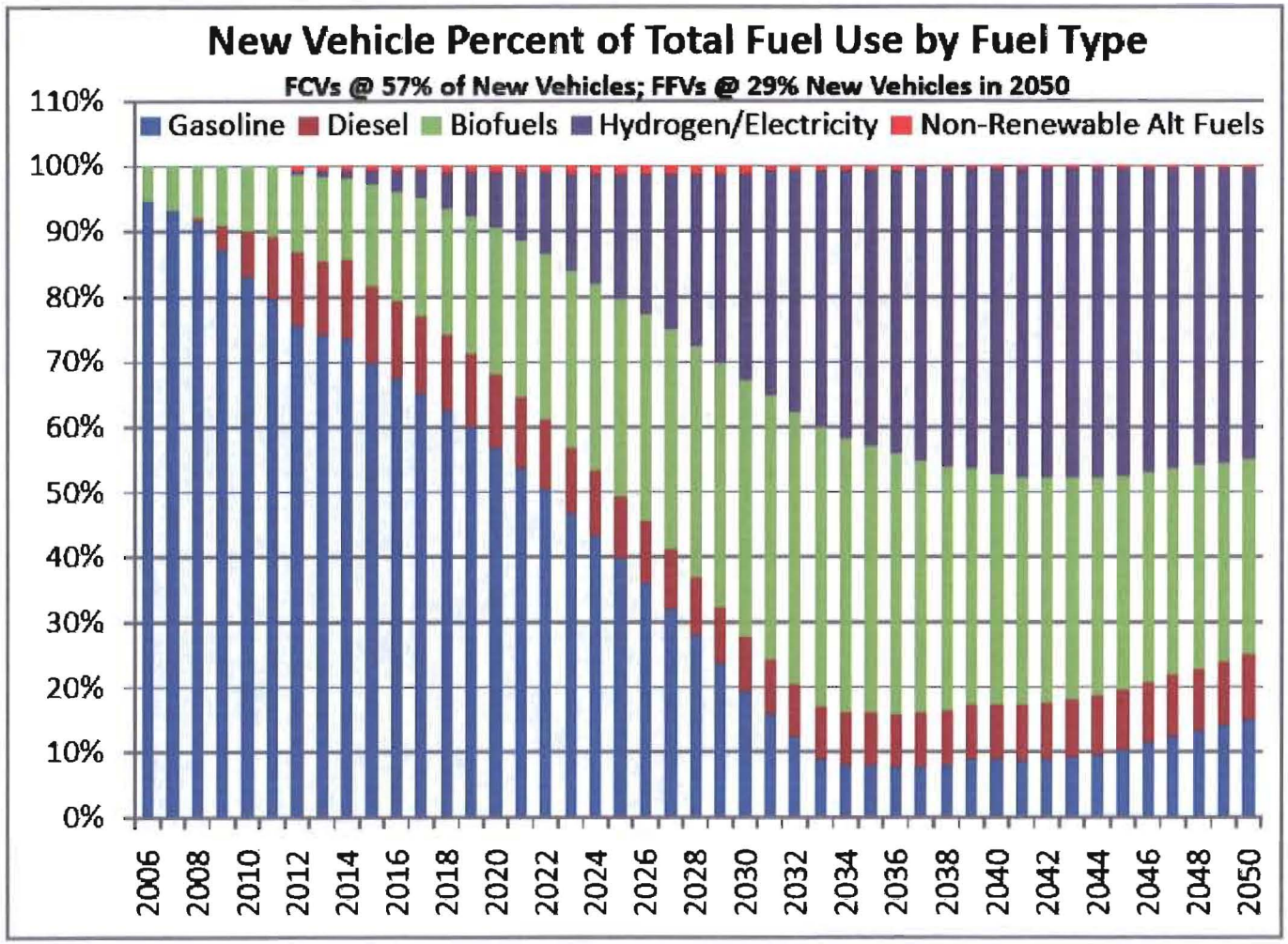
2050


New Vehicle Sales Per Year in California
Millions
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Gasoline
Diesel
ULC Vehicles
SULC Vehicles
Non-Renewabel Alt Fuels
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
2050


New Vehicle Percent of Total Fuel Use by Fuel Type
FCVs @ 57% of New Vehicles; FFVs @ 29% New Vehicles in 2050
Gasoline
Diesel
Biofuels
Hydrogen/Electricity
Non-Renewable Alt Fuels
110%
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
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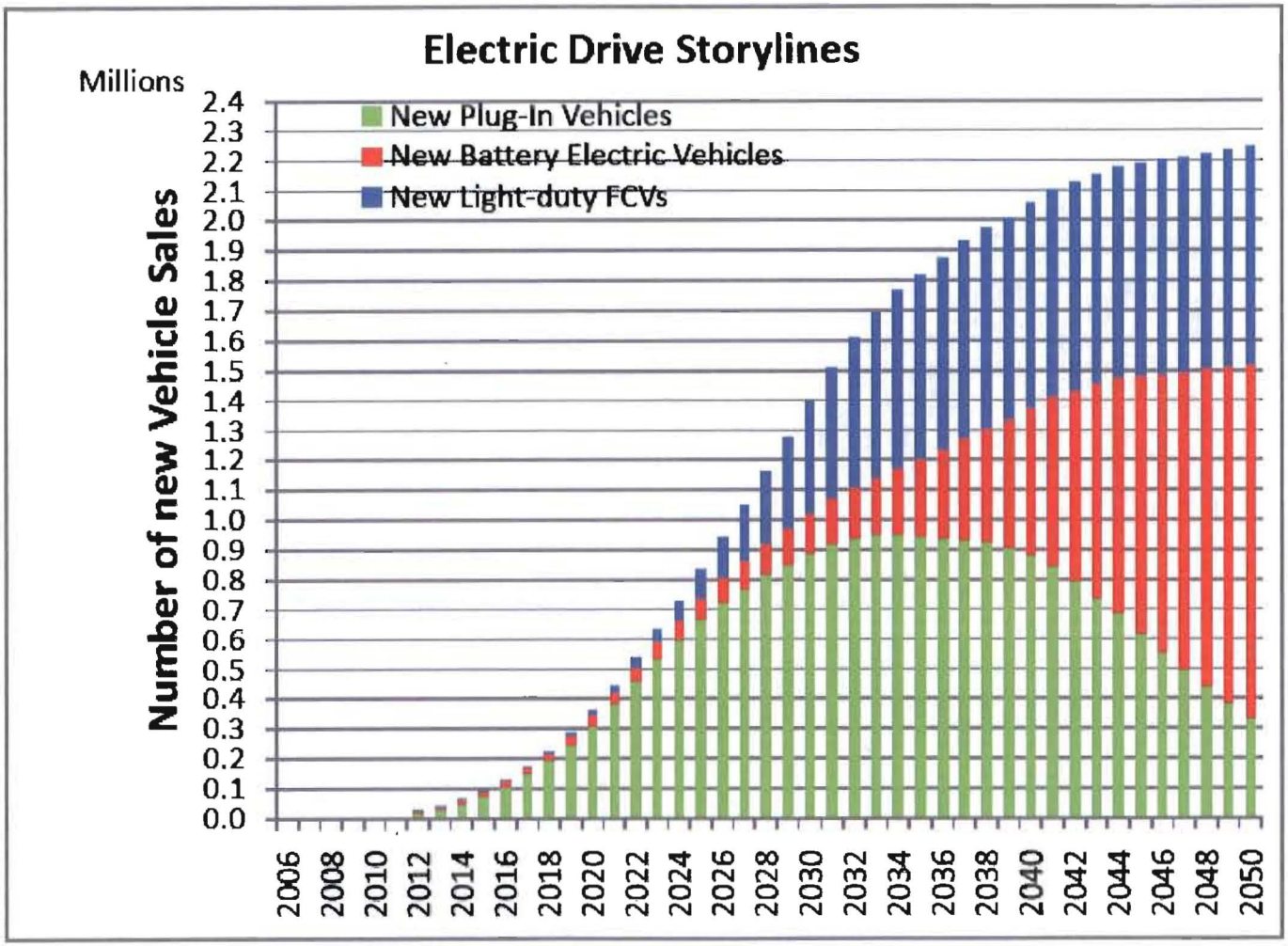
Electric Drive Storylines
Millions
Number of new Vehicle Sales
New Plug-In Vehicles
New Battery Electric Vehicles
New Light-duty FCVs
2.4
2.3
2.2
2.1
2.0
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
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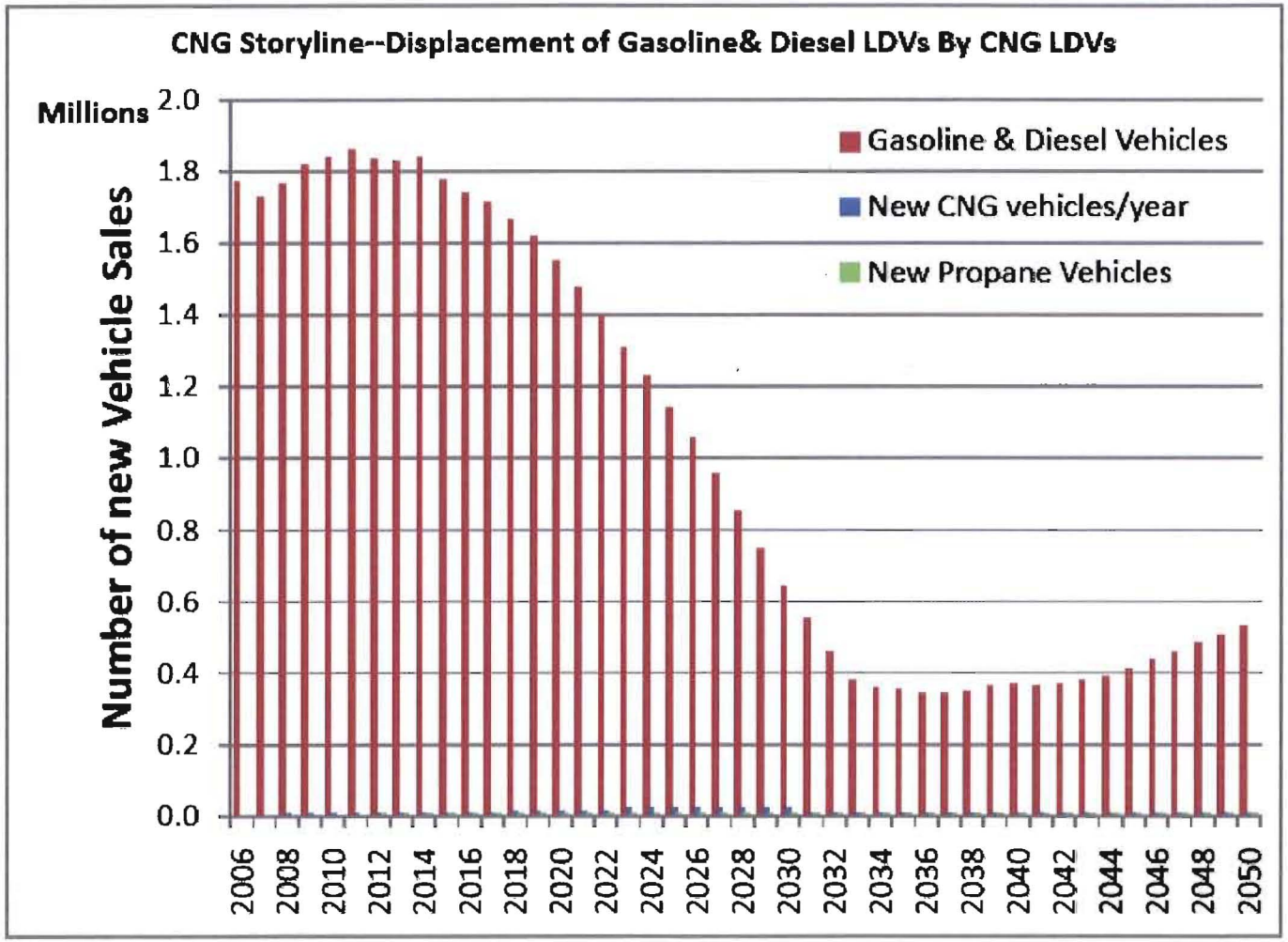
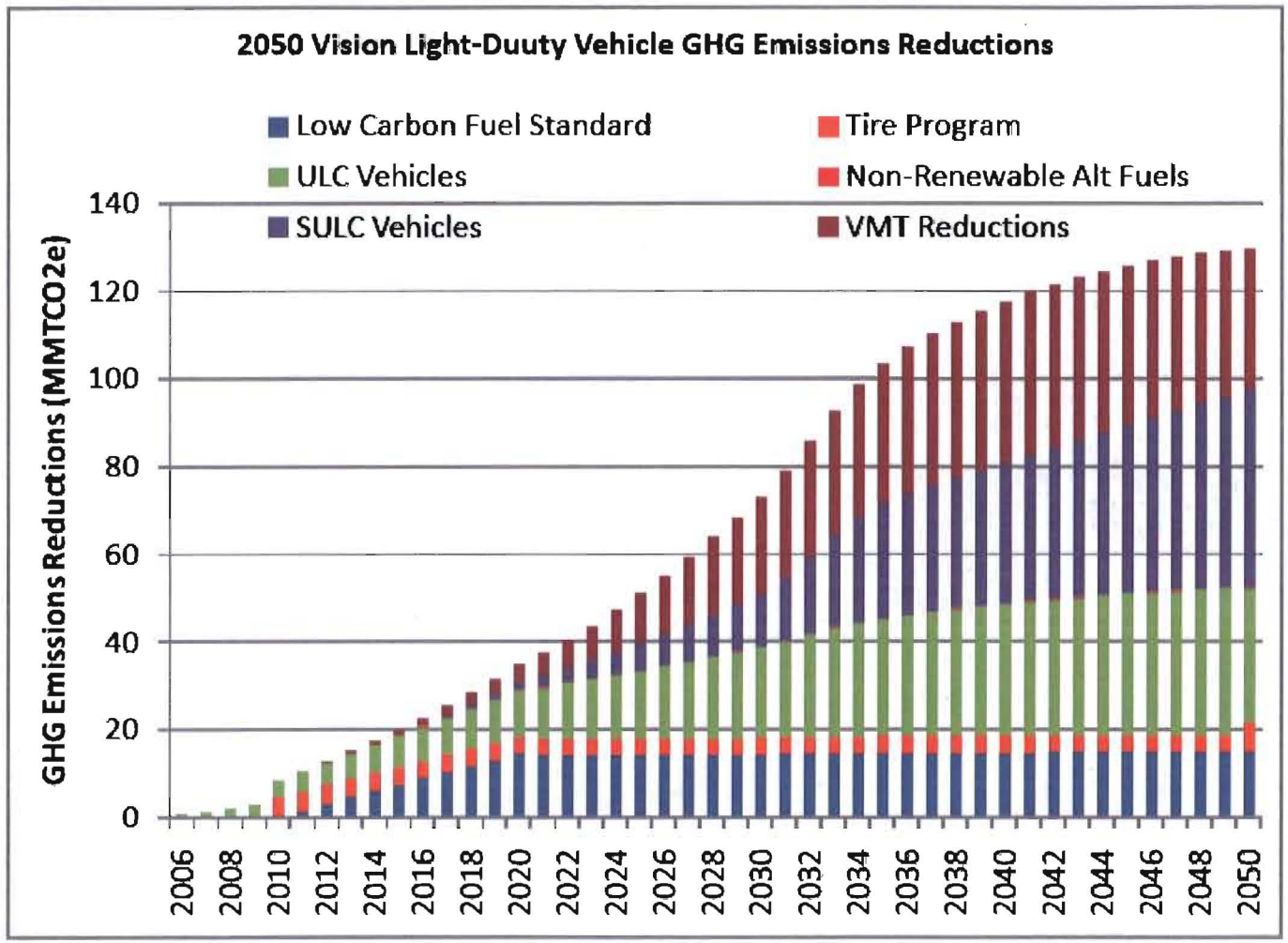
2050

9/1/2008


CNG Storyline--Displacement of Gasoline& Diesel LDVs By CNG LDVs
Millions
Number of new Vehicle Sales
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Gasoline & Diesel Vehicles
New CNG vehicles/year
New Propane Vehicles
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
2050

9/1/2008


2050 Vision Light-Duuty Vehicle GHG Emissions Reductions
Low Carbon Fuel Standard
Tire Program
ULC Vehicles
Non-Renewable Alt Fuels
SULC Vehicles
VMT Reductions
GHG Emissions Reductions (MMTCO2e)
0
20
40
60
80
100
120
140
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
2048
2050

Thank You For Your Attention!

Any Remaining Questions???

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