

## Appendix C

# **Graphic Presentation of Changes in Per-Mile Fuel-Cycle Energy Use and Emissions by Use of Alternative-Transportation Fuels and Advanced Vehicle Technologies: Light-Duty Trucks 1 and Light-Duty Trucks 2**

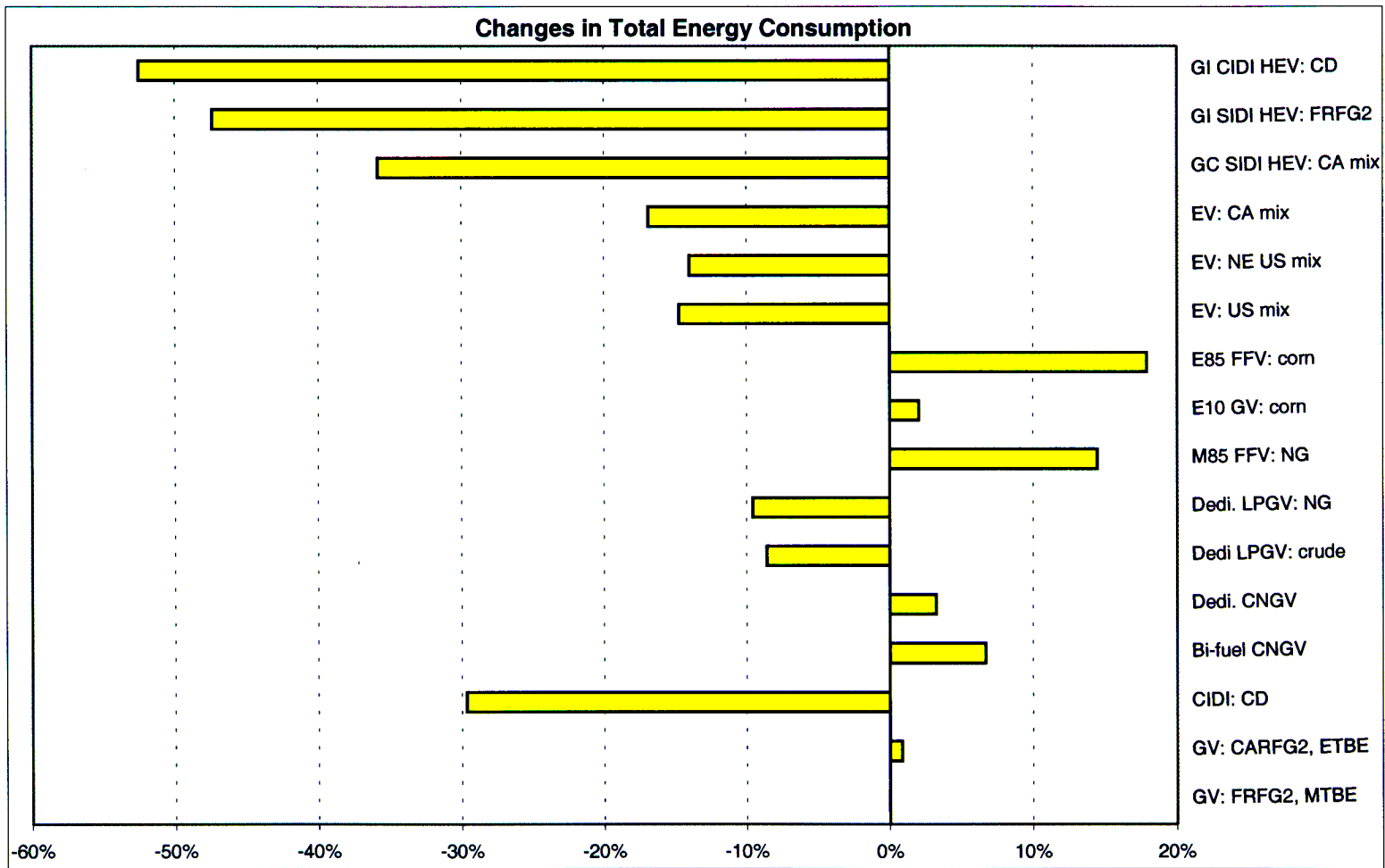
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This appendix graphically shows changes in fuel-cycle energy use and emissions by transportation fuels and advanced vehicle technologies relative to baseline gasoline vehicles. Changes for passenger cars are presented and discussed in Volume 1 of this report. This appendix presents charts for LDT1 and LDT2. The charts are in the following order: near-term LDT1, near-term LDT2, long-term LDT1, and long-term LDT2.

Acronyms, initialisms, and abbreviations are defined on pages xv–xviii of Volume 1.

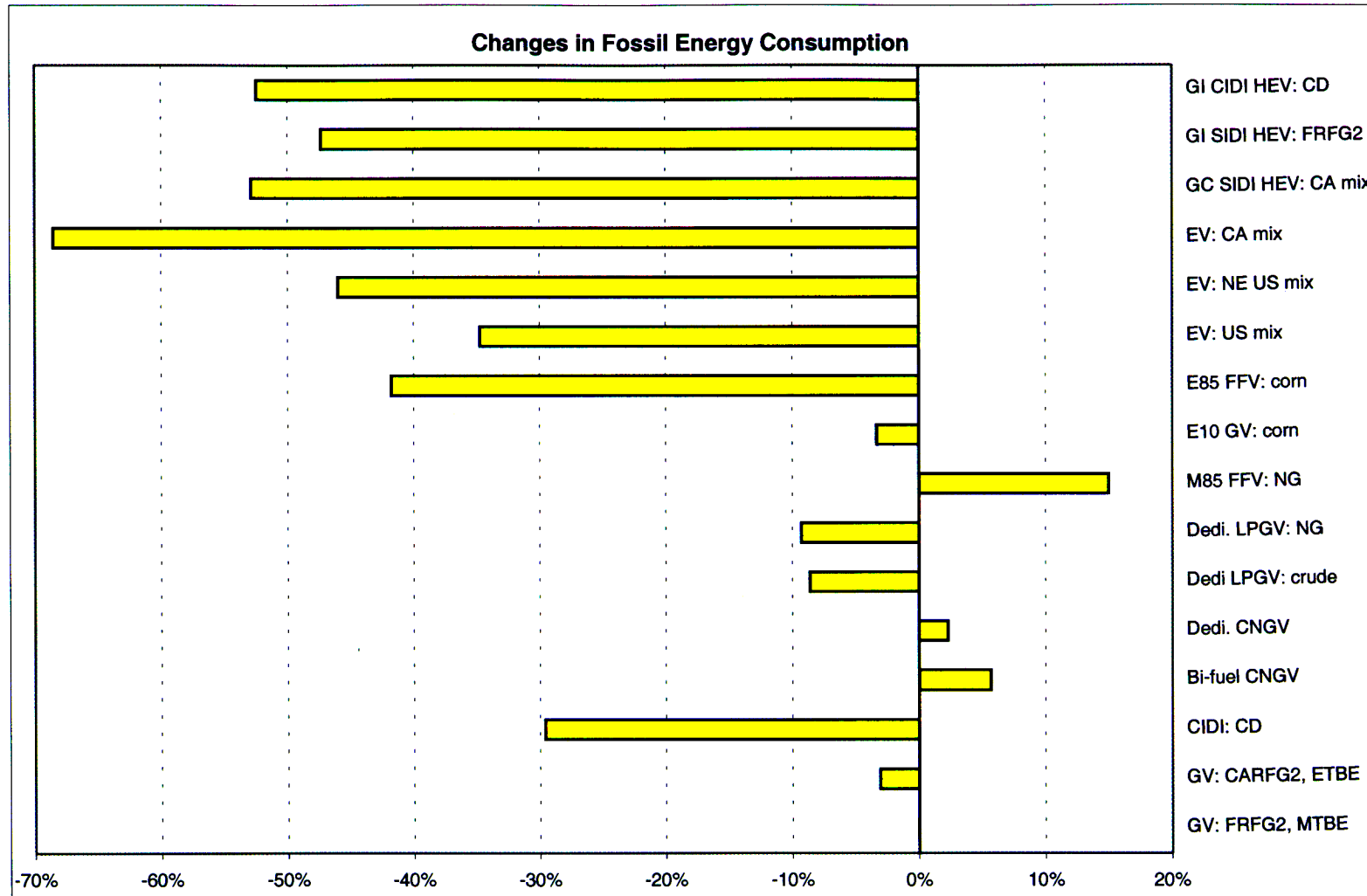


## **1 Near-Term Technologies**



**Figure C-1.1 Changes in Fuel-Cycle Total Energy Consumption Relative to GVs Fueled with CG, Light-Duty Trucks 1: Near-Term Technologies**

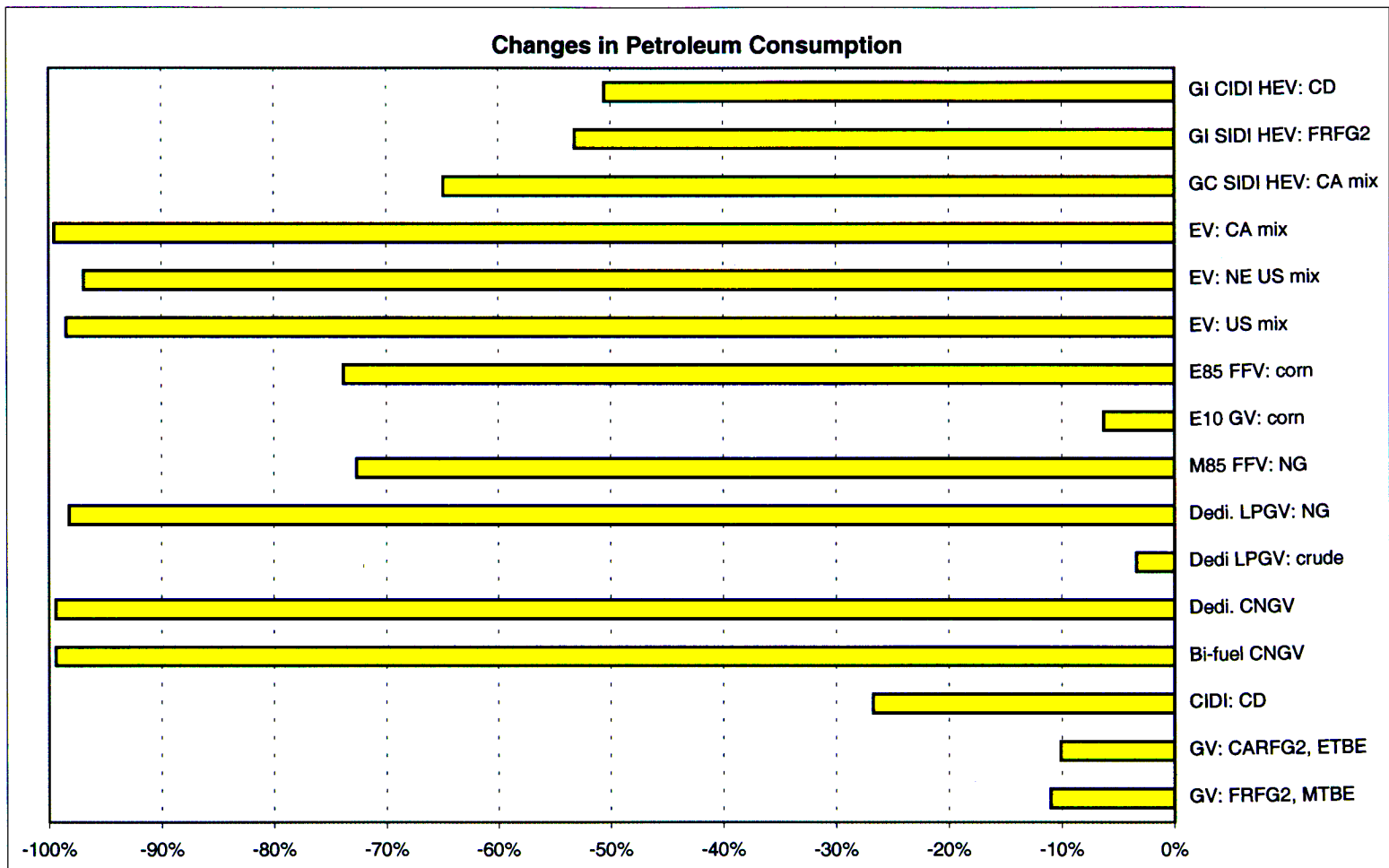




**Figure C-1.2 Changes in Fuel-Cycle Fossil Energy Consumption Relative to GVs Fueled with CG, Light-Duty Trucks 1: Near-Term Technologies**

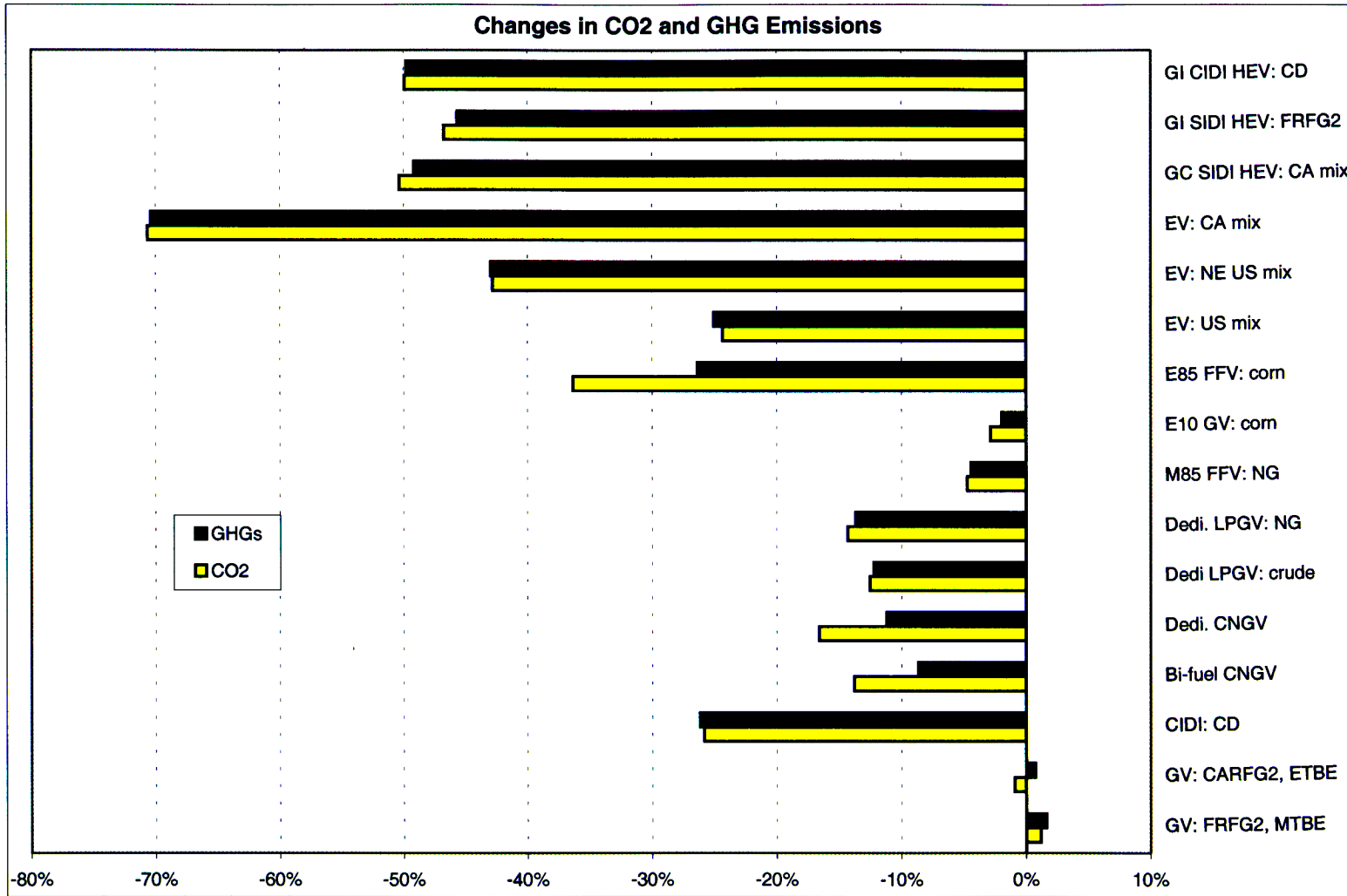






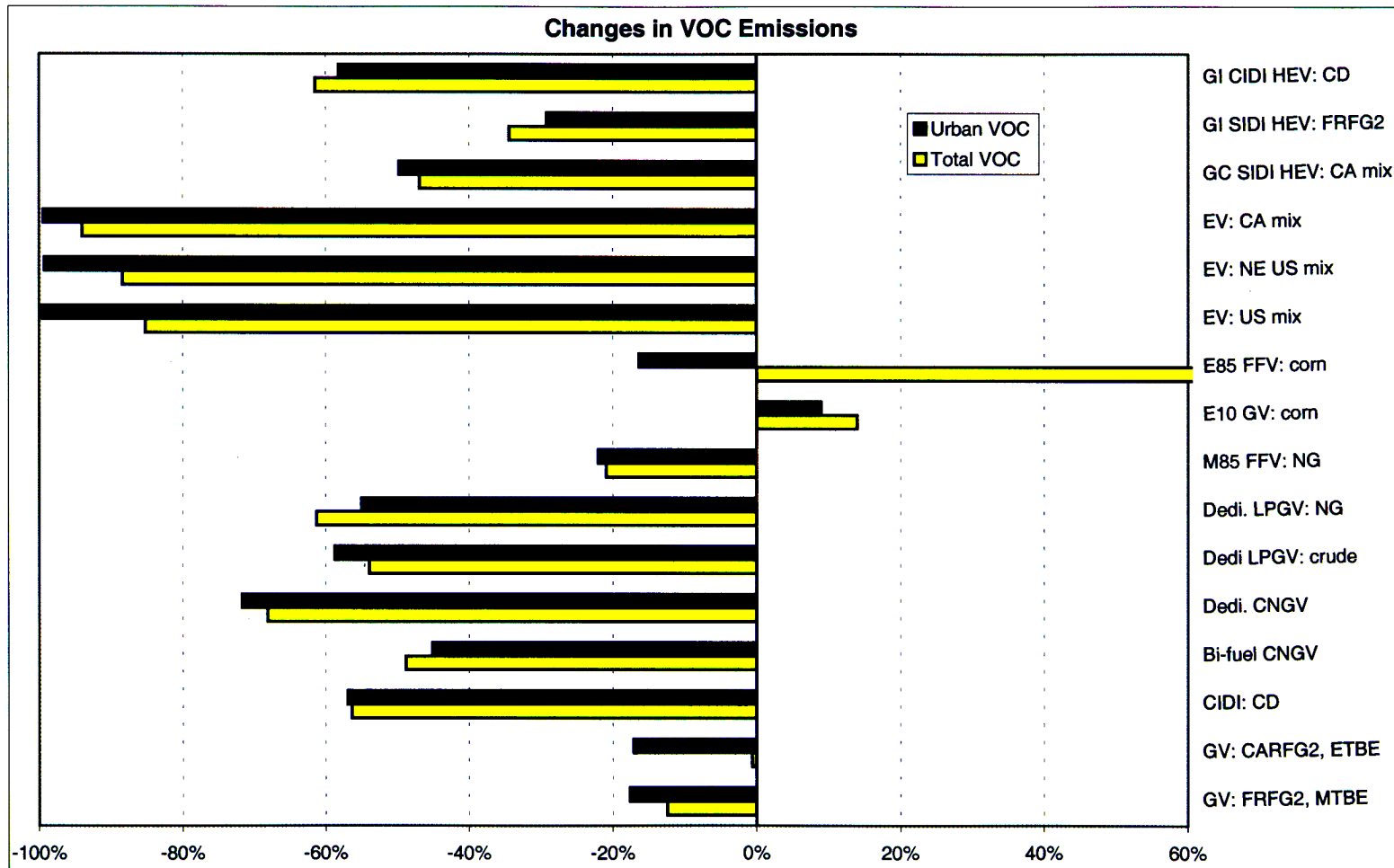
**Figure C-1.3 Changes in Fuel-Cycle Petroleum Consumption Relative to GVs Fueled with CG, Light-Duty Trucks 1: Near-Term Technologies**





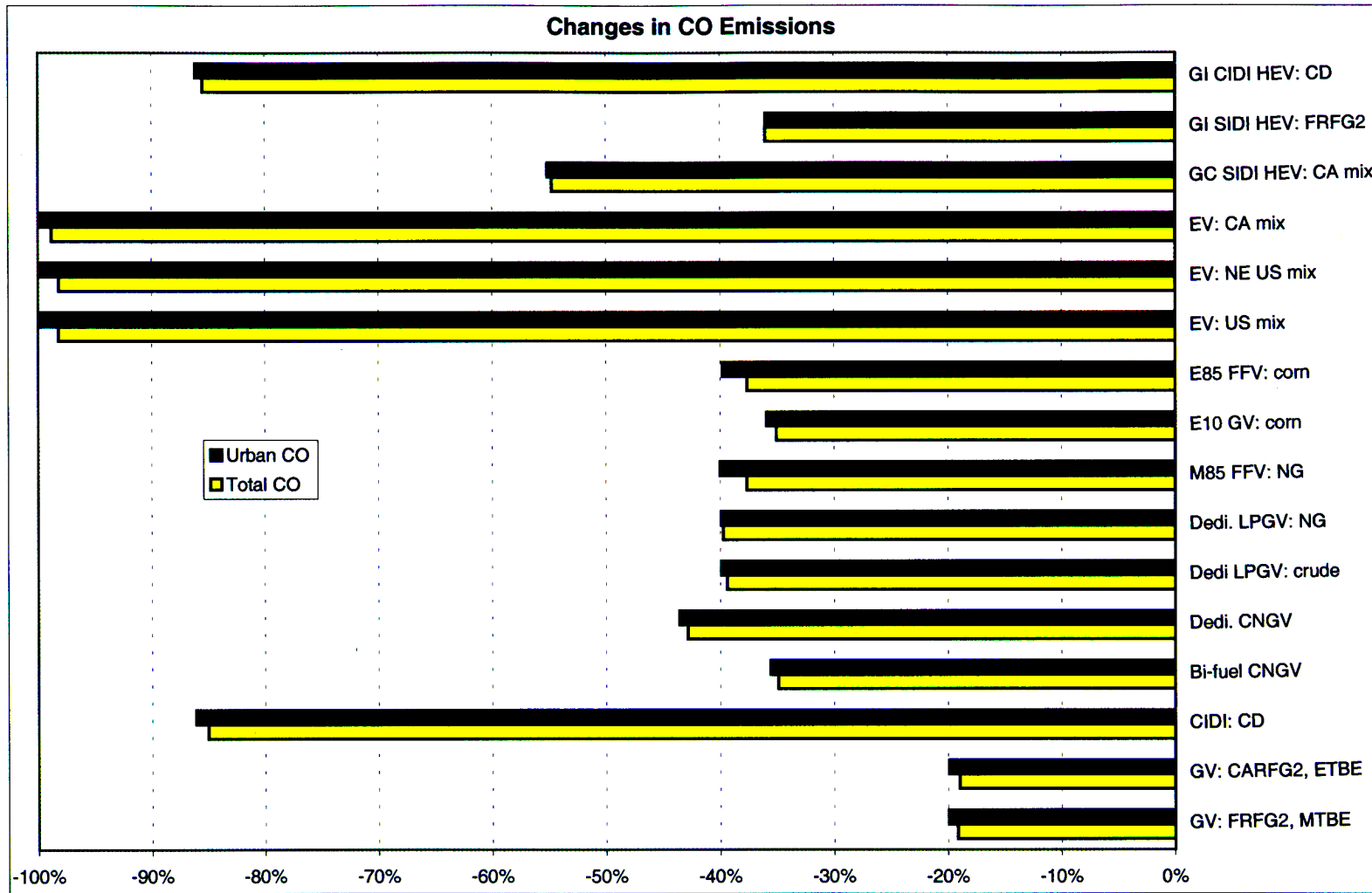
**Figure C-1.4 Changes in Fuel-Cycle CO<sub>2</sub> and GHG Emissions Relative to GVs Fueled with CG, Light-Duty Trucks 1: Near-Term Technologies**





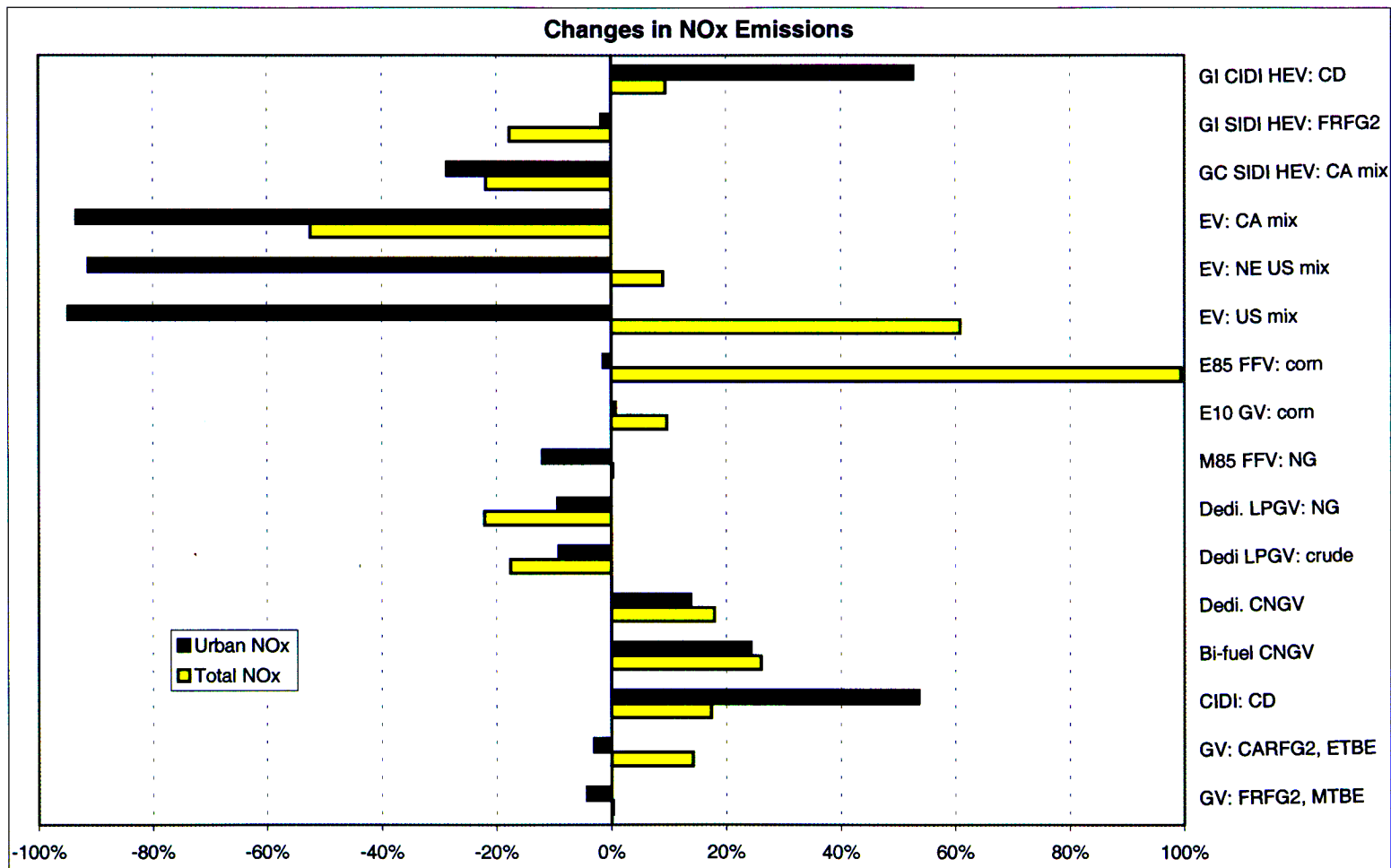
**Figure C-1.5 Changes in Fuel-Cycle VOC Emissions Relative to GVs Fueled with CG, Light-Duty Trucks 1: Near-Term Technologies**





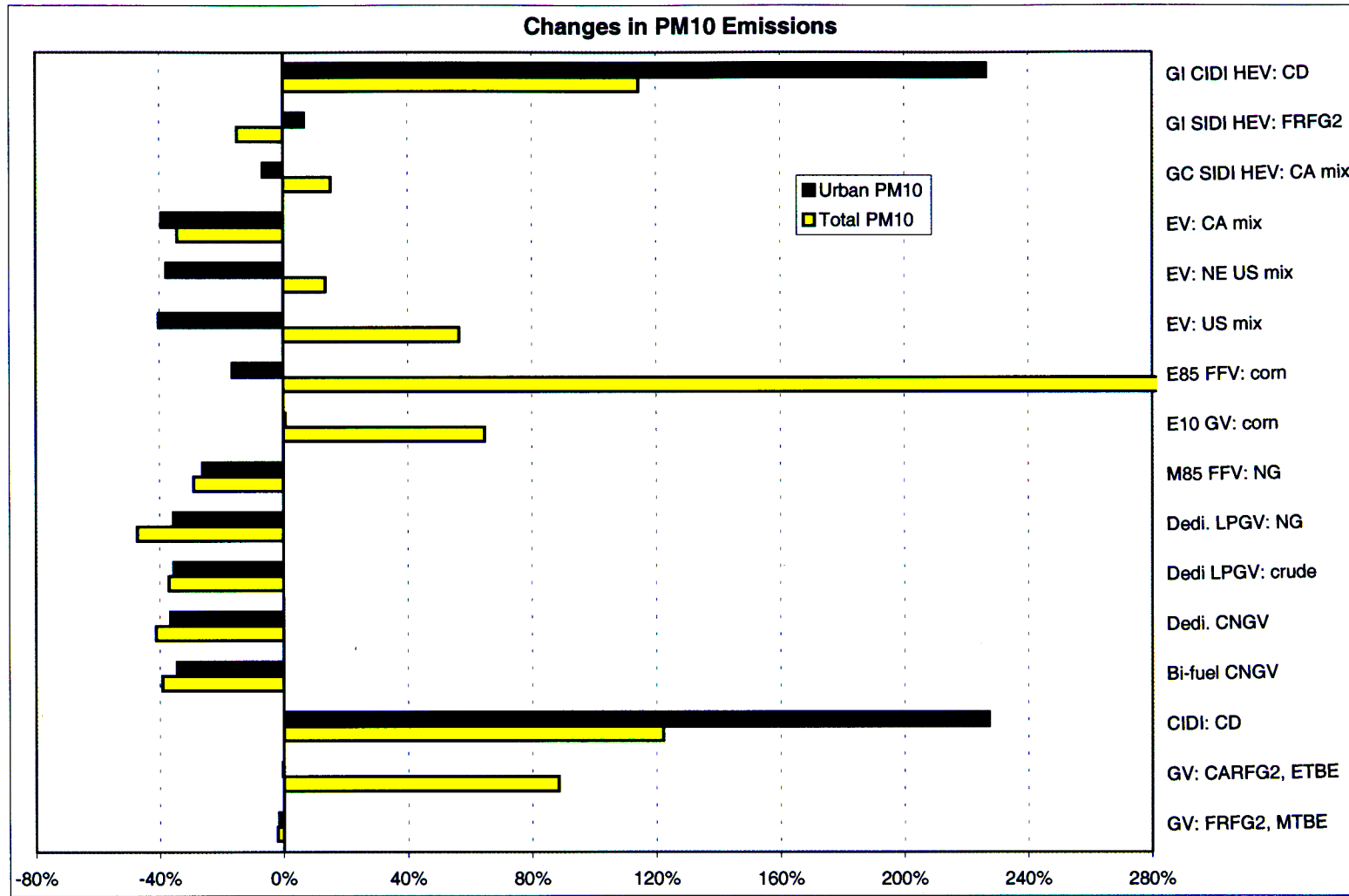
**Figure C-1.6 Changes in Fuel-Cycle CO Emissions Relative to GVs Fueled with CG, Light-Duty Trucks 1: Near-Term Technologies**





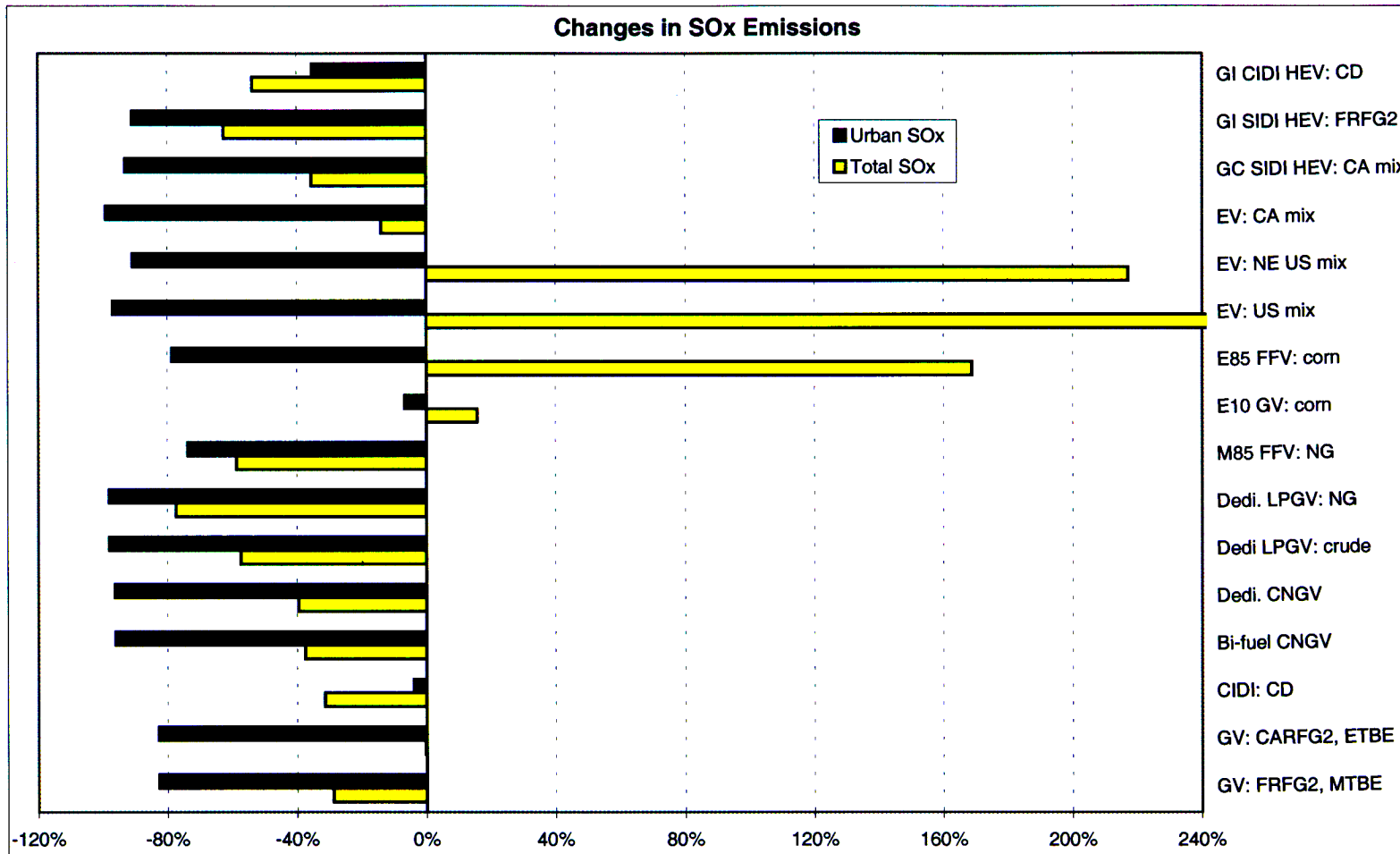
**Figure C-1.7 Changes in Fuel-Cycle NO<sub>x</sub> Emissions Relative to GVs Fueled with CG, Light-Duty Trucks 1: Near-Term Technologies**





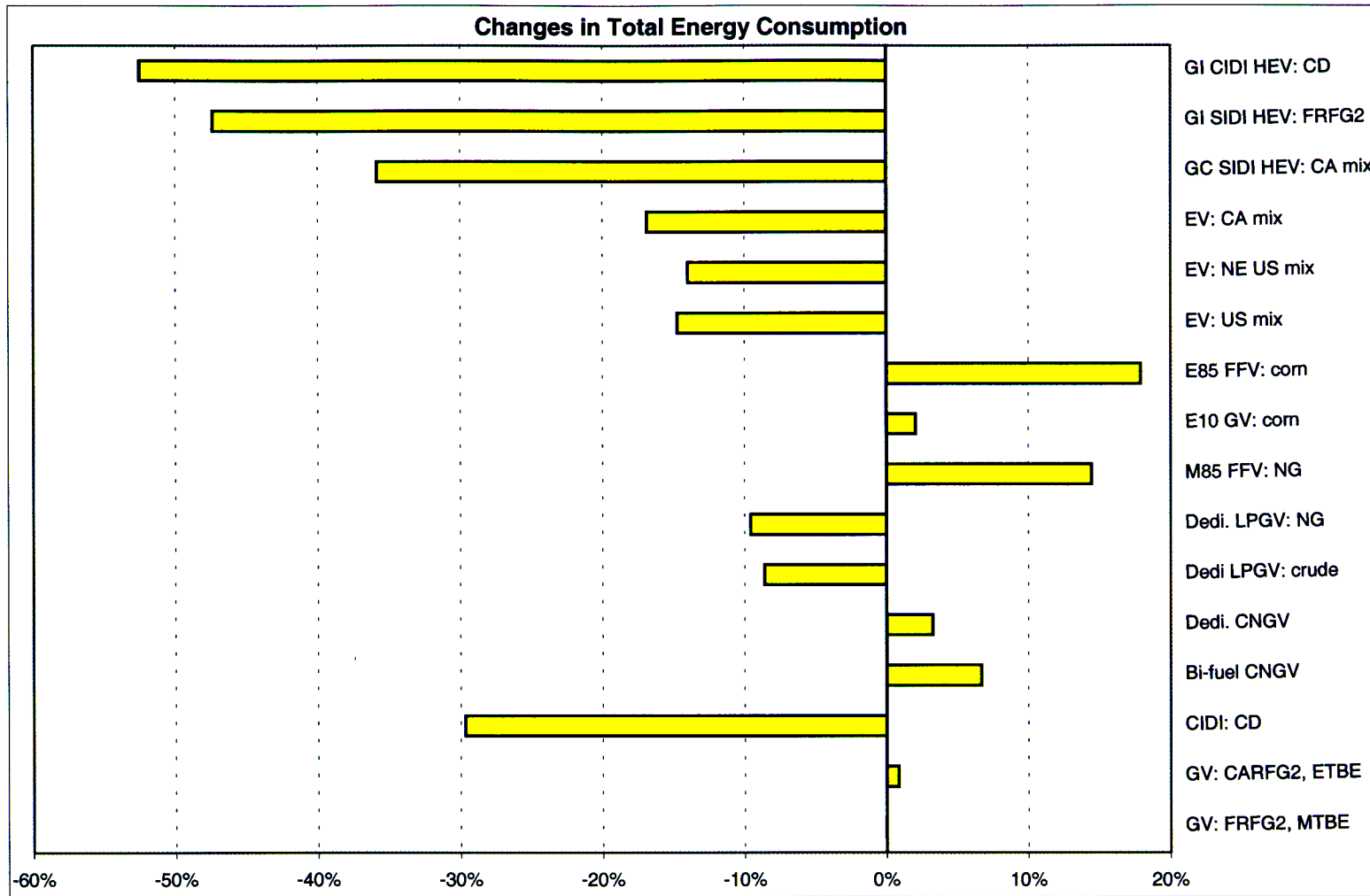
**Figure C-1.8 Changes in Fuel-Cycle PM<sub>10</sub> Emissions Relative to GVs Fueled with CG, Light-Duty Trucks 1: Near-Term Technologies**





**Figure C-1.9 Changes in Fuel-Cycle SO<sub>x</sub> Emissions Relative to GVs Fueled with CG, Light-Duty Trucks 1: Near-Term Technologies**

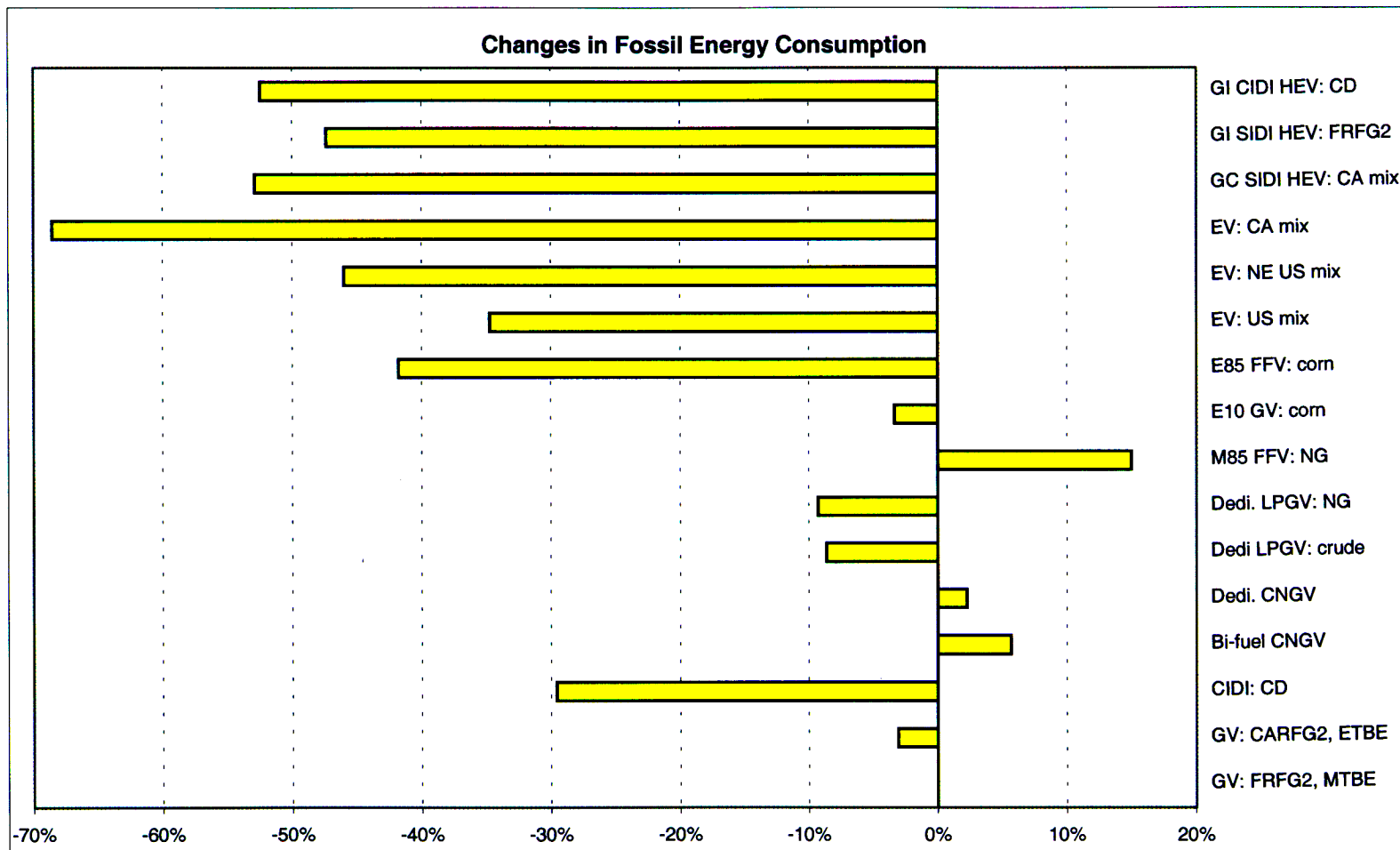




**Figure C-1.10 Changes in Fuel-Cycle Total Energy Consumption Relative to GVs Fueled with CG, Light-Duty Trucks 2: Near-Term Technologies**

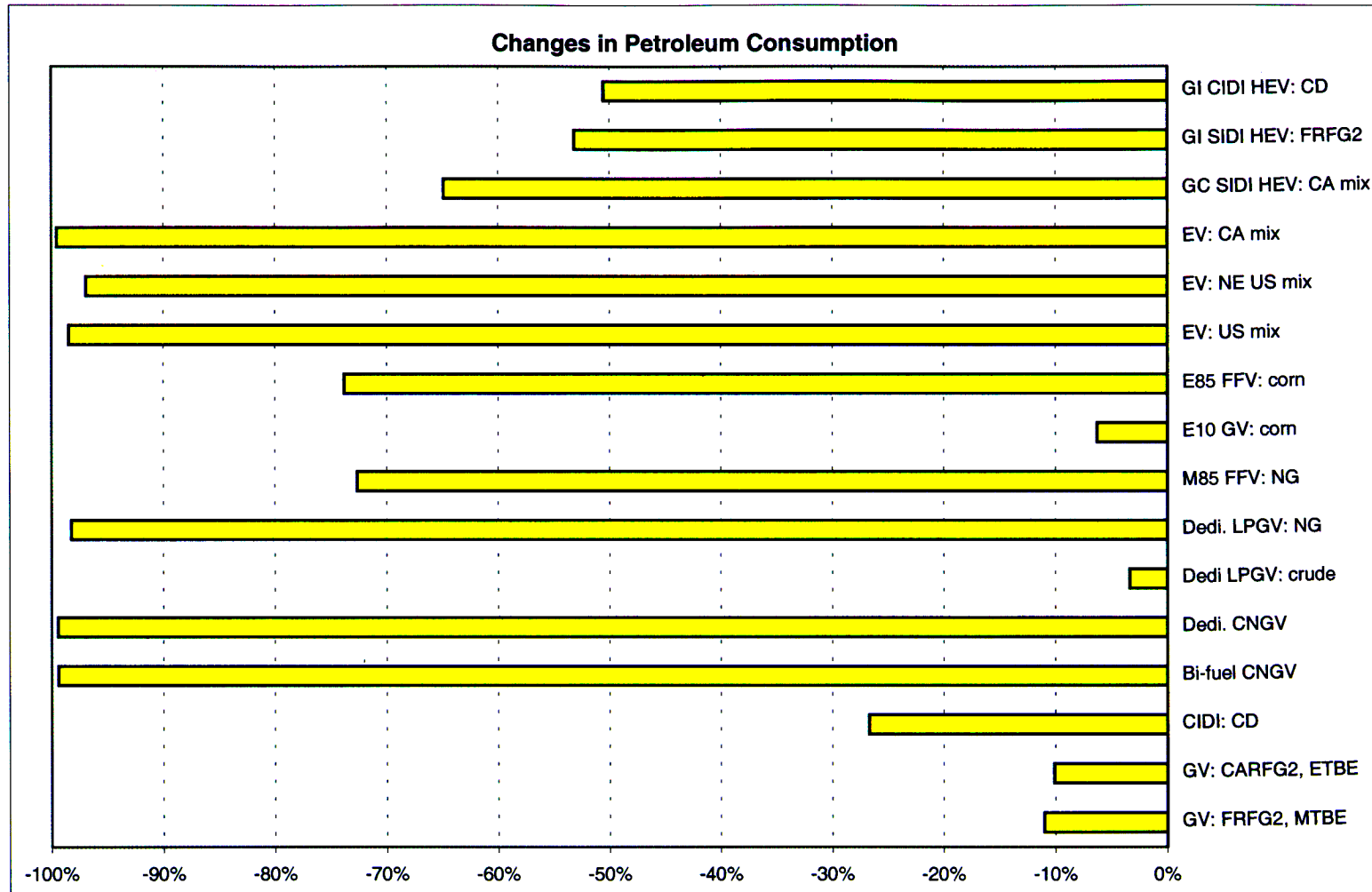






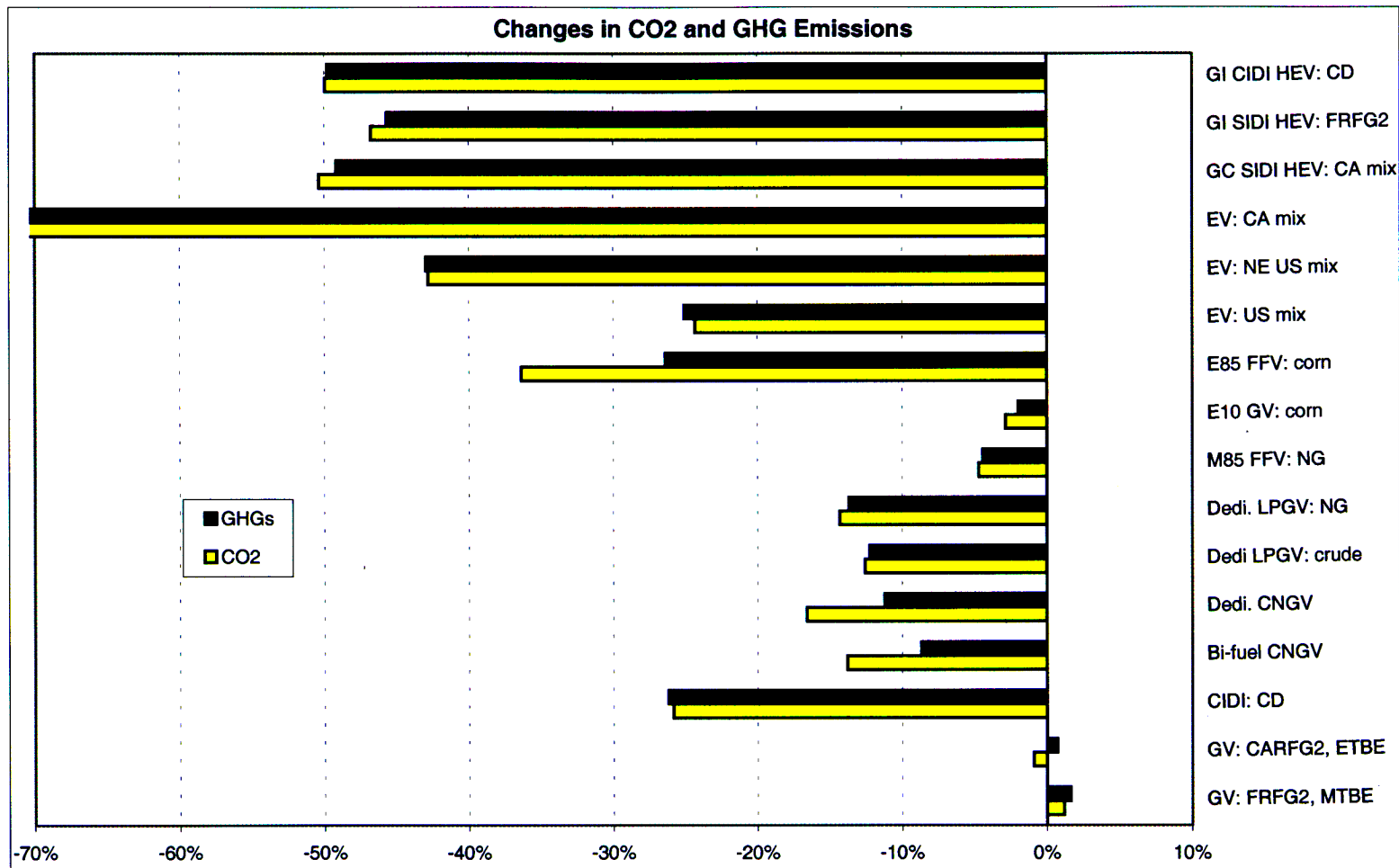
**Figure C-1.11 Changes in Fuel-Cycle Fossil Energy Use Relative to GVs Fueled with CG, Light-Duty Trucks 2: Near-Term Technologies**





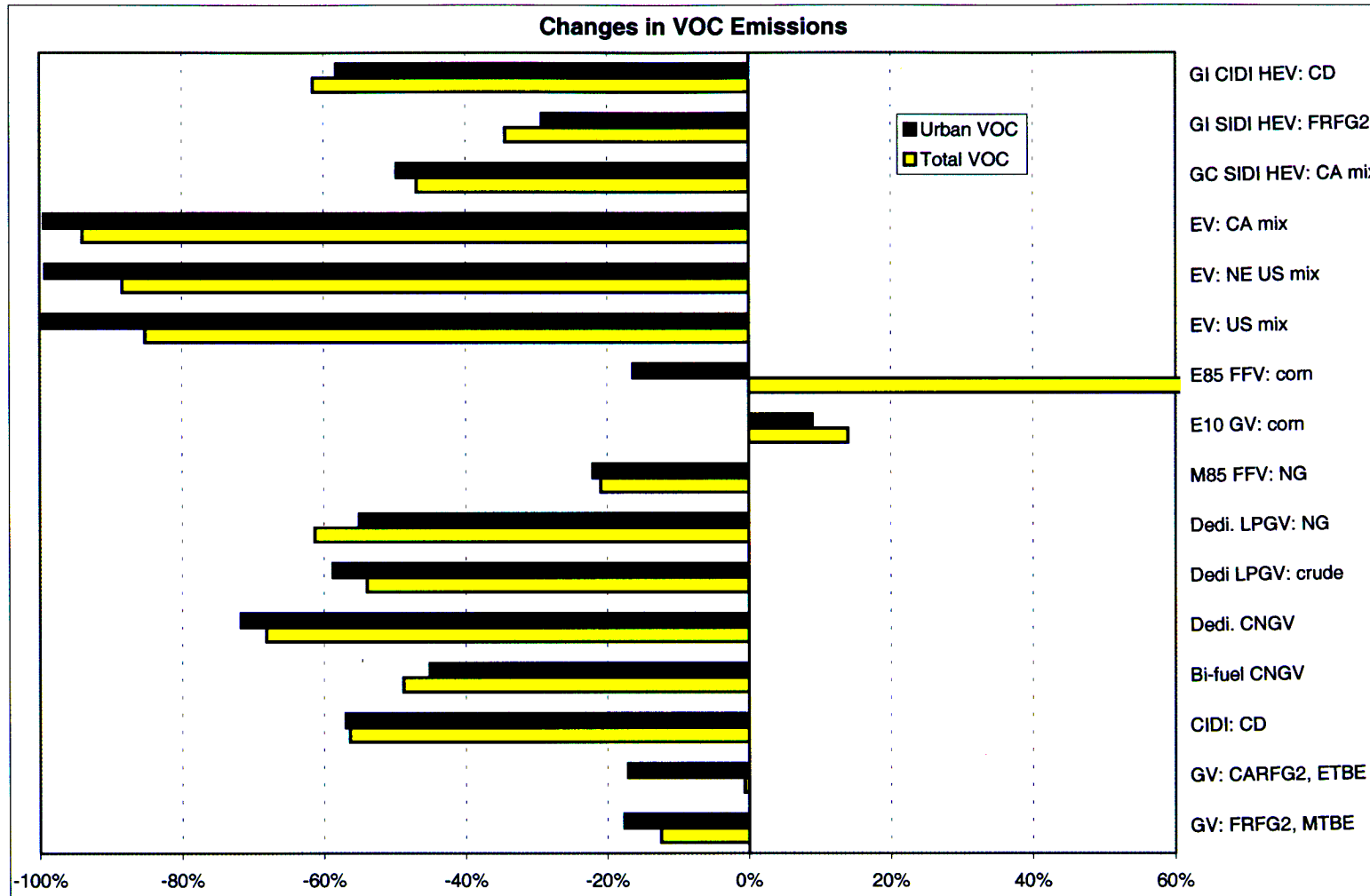
**Figure C-1.12 Changes in Fuel-Cycle Petroleum Consumption Relative to GVs Fueled with CG, Light-Duty Trucks 2: Near-Term Technologies**





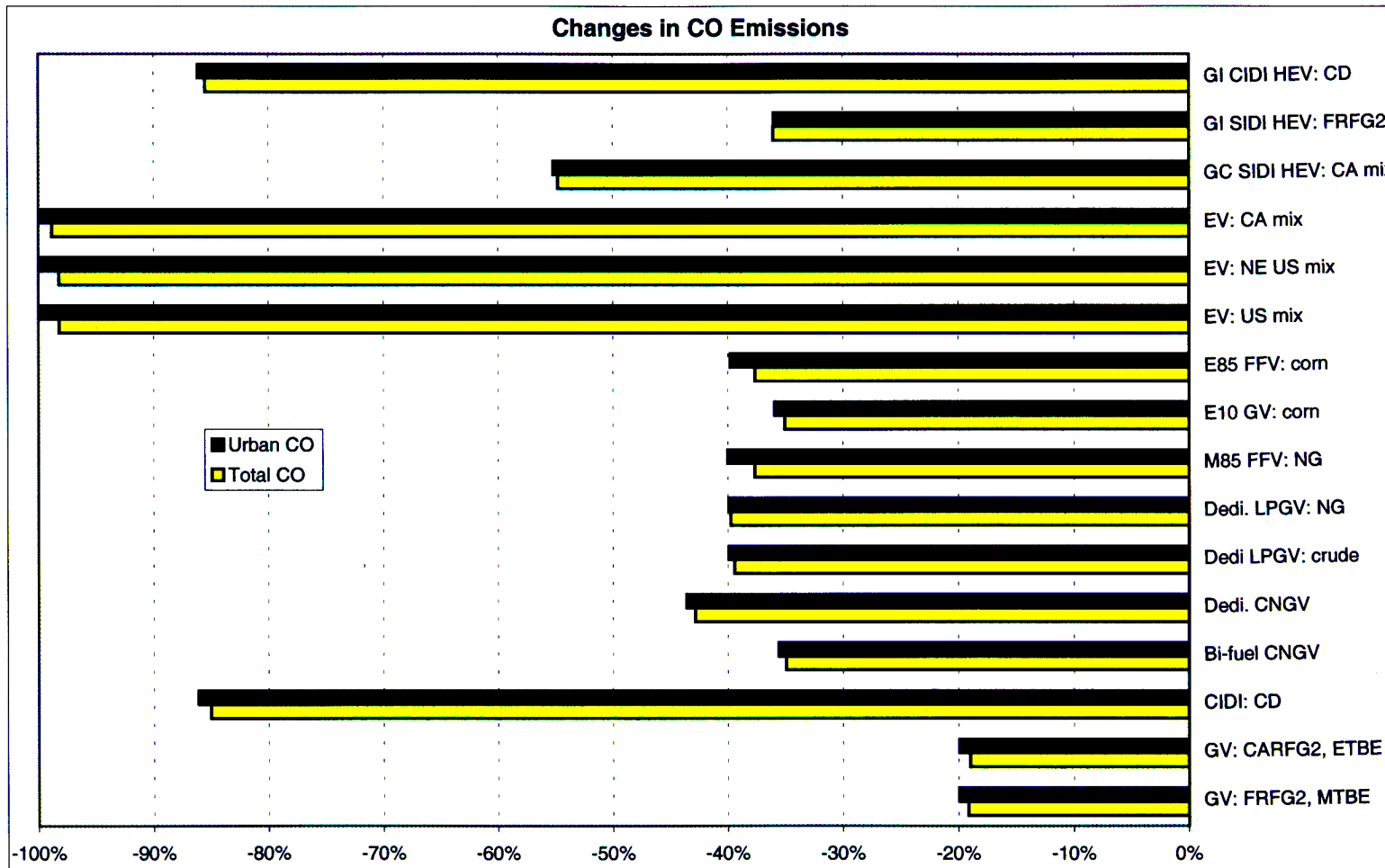
**Figure C-1.13 Changes in Fuel-Cycle CO<sub>2</sub> and GHG Emissions Relative to GVs Fueled with CG, Light-Duty Trucks 2: Near-Term Technologies**





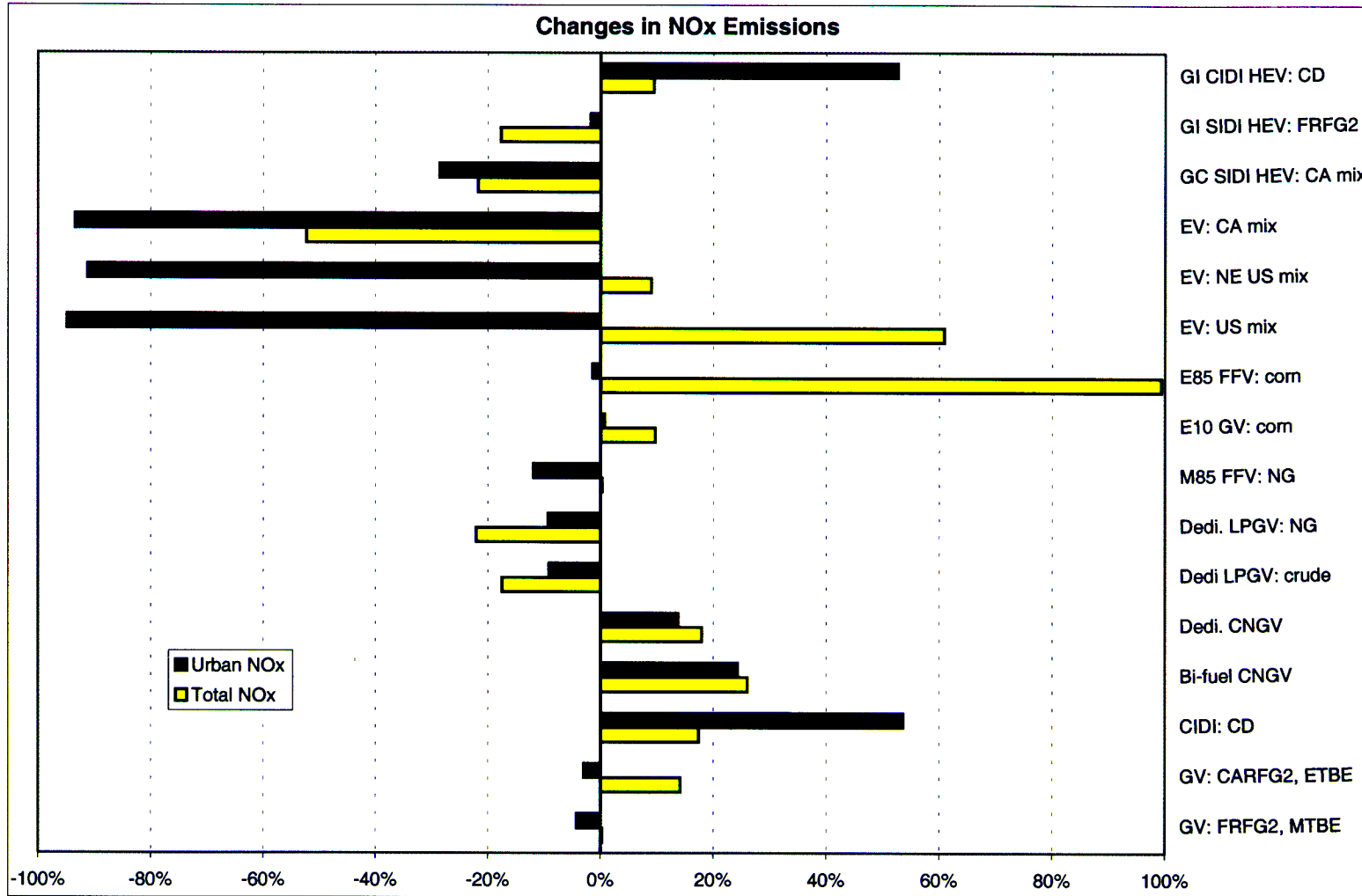
**Figure C-1.14 Changes in Fuel-Cycle VOC Emissions Relative to GVs Fueled with CG, Light-Duty Trucks 2: Near-Term Technologies**





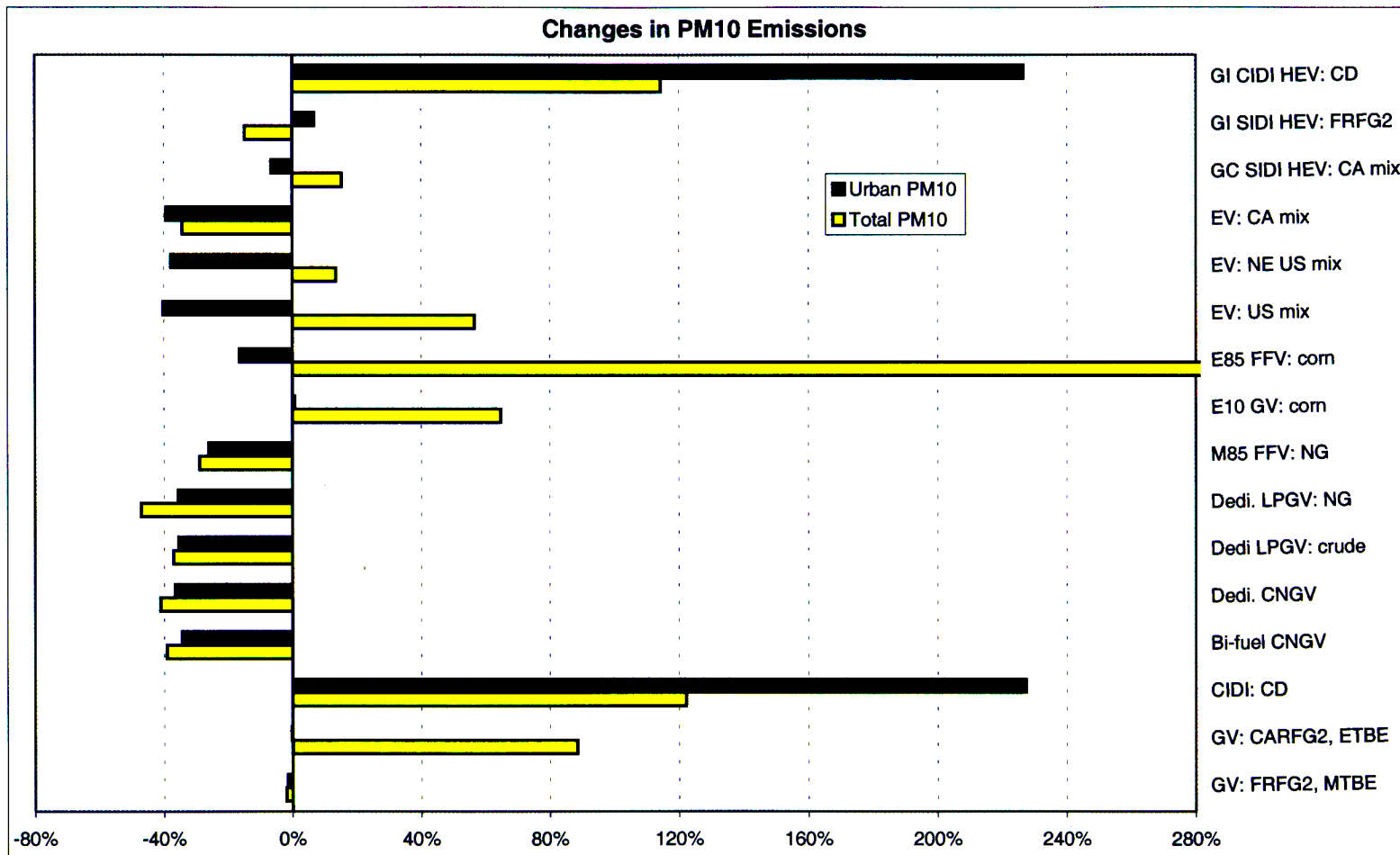
**Figure C-1.15 Changes in Fuel-Cycle CO Emissions Relative to GVs Fueled with CG, Light-Duty Trucks 2: Near-Term Technologies**





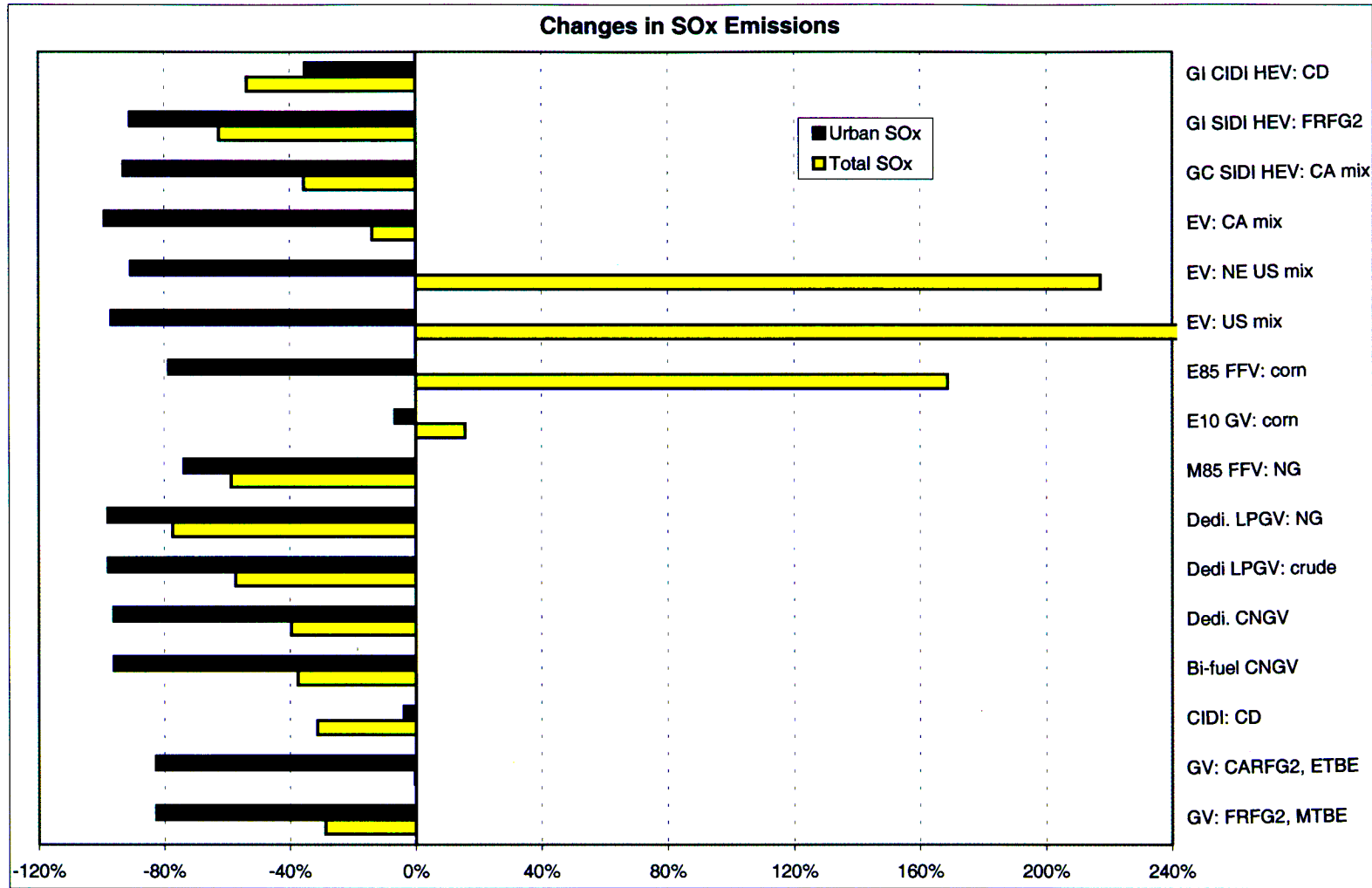
**Figure C-1.16 Changes in Fuel-Cycle NO<sub>x</sub> Emissions Relative to GVs Fueled with CG, Light-Duty Trucks 2: Near-Term Technologies**





**Figure C-1.17 Changes in Fuel-Cycle PM<sub>10</sub> Emissions Relative to GVs Fueled with CG, Light-Duty Trucks 2: Near-Term Technologies**





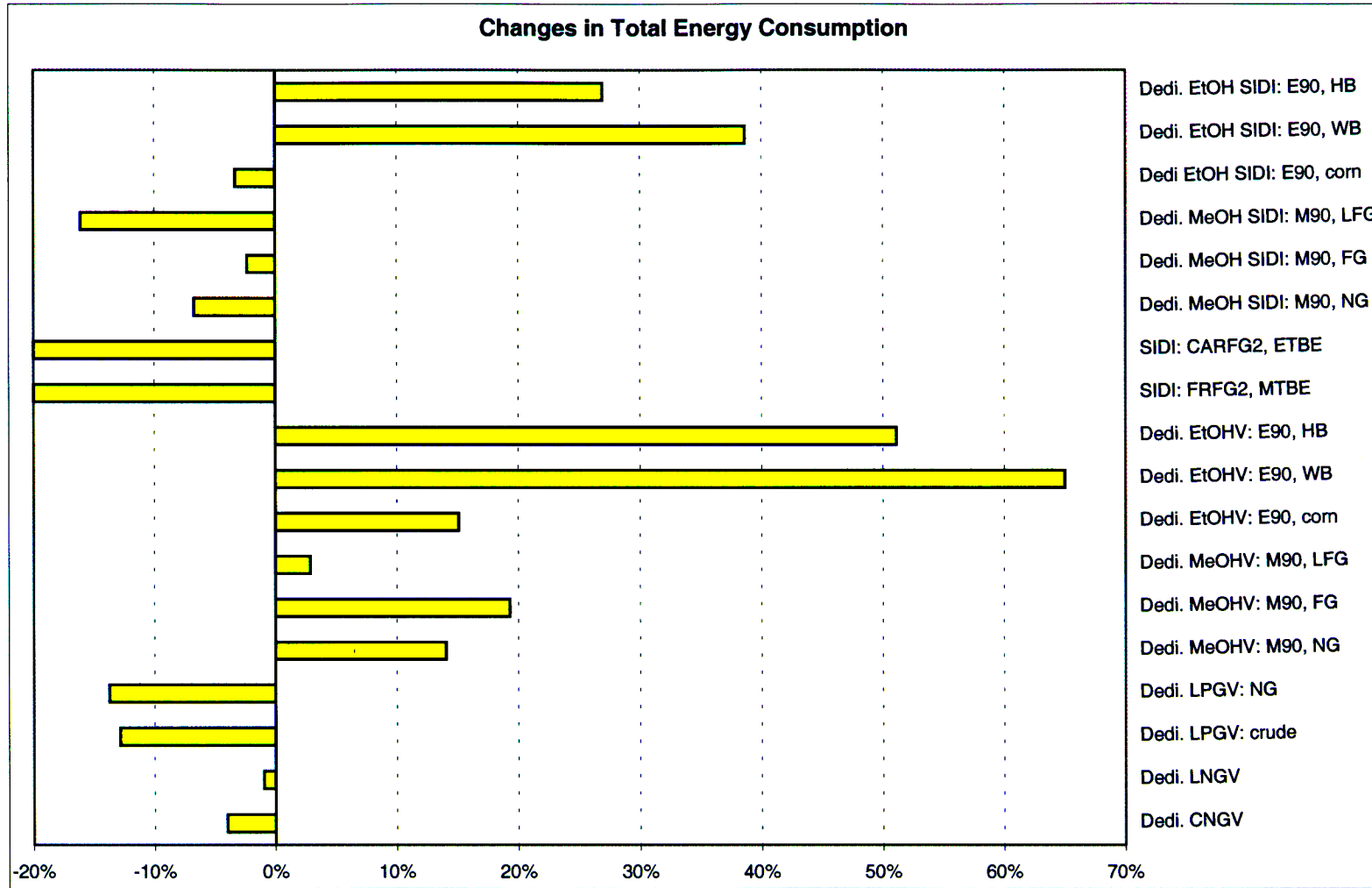
**Figure C-1.18 Changes in Fuel-Cycle SO<sub>x</sub> Emissions Relative to GVs Fueled with CG, Light-Duty Trucks 2: Near-Term Technologies**





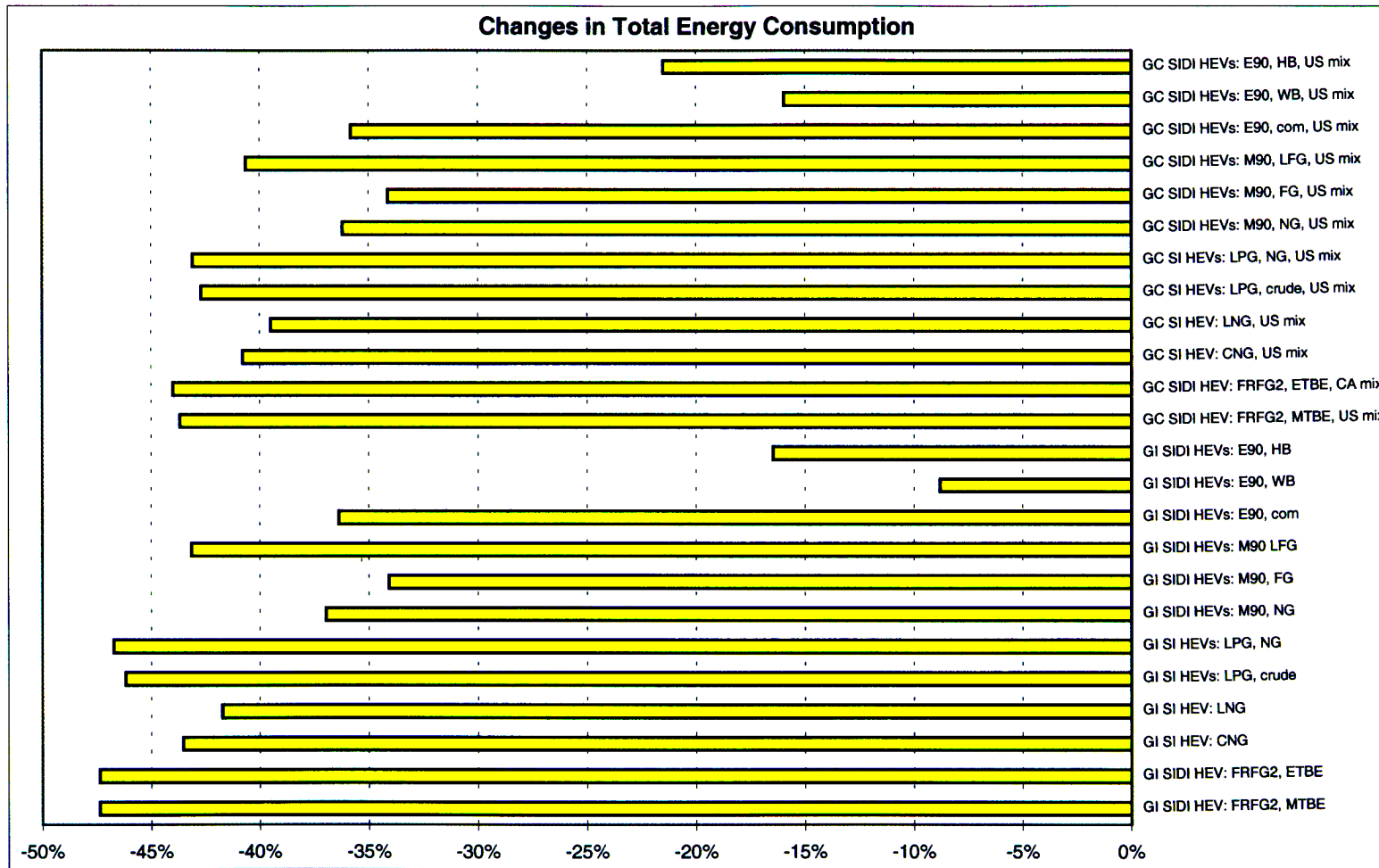


## **2 Long-Term Technologies**



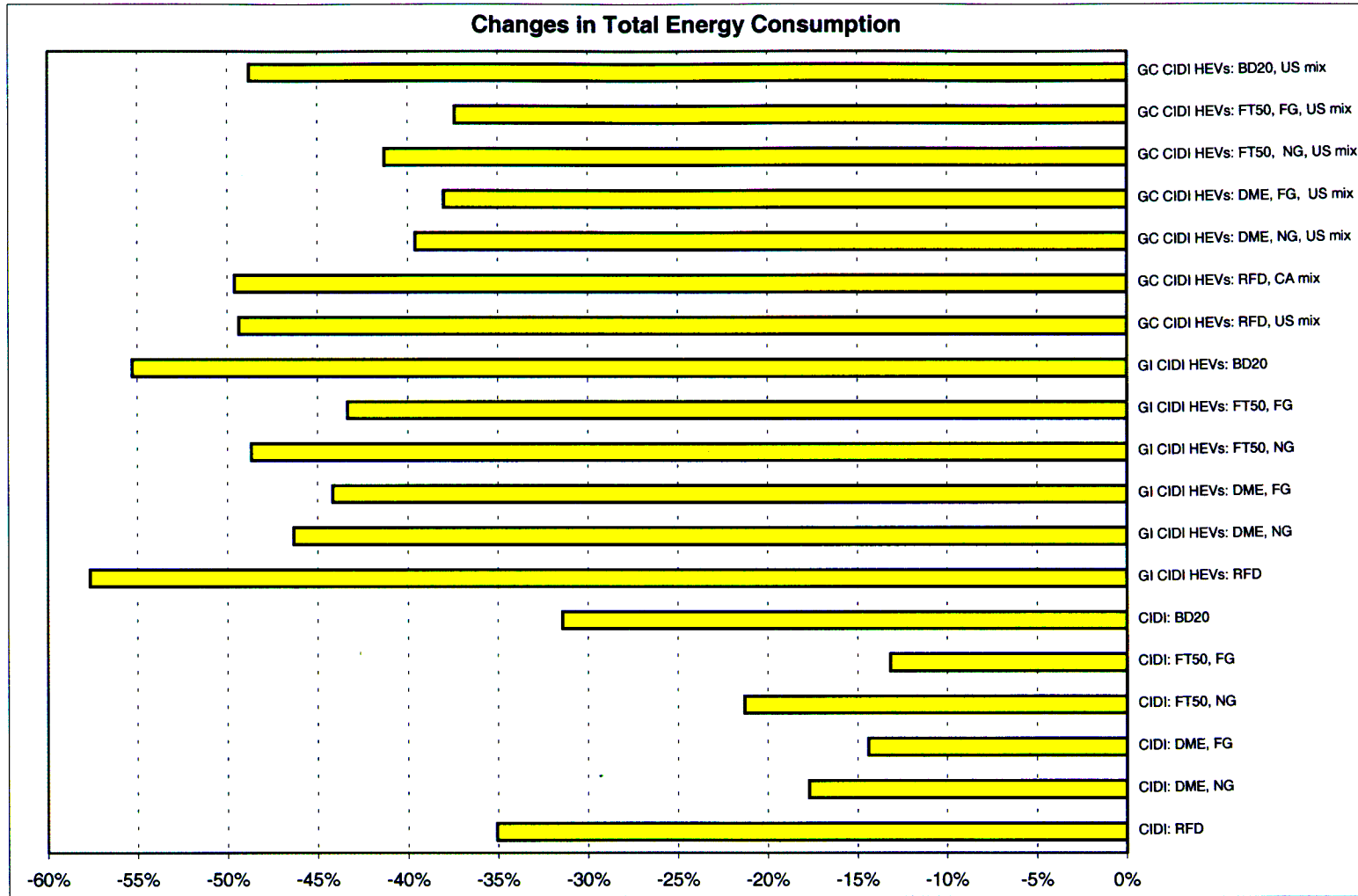
**Figure C-2.1 Changes in Fuel-Cycle Total Energy Consumption Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term SI and SIDI Vehicles**





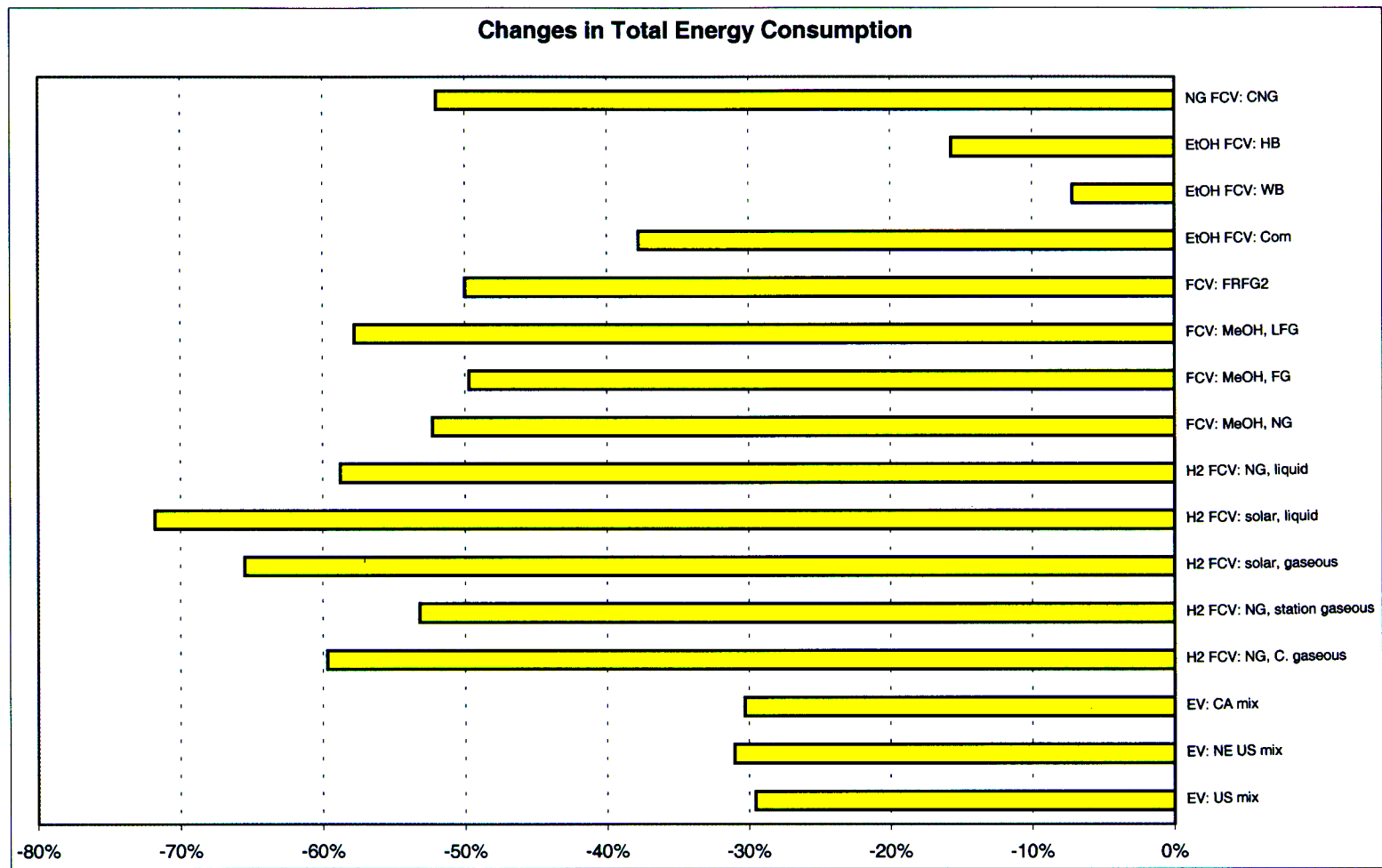
**Figure C-2.2 Changes in Fuel-Cycle Total Energy Consumption Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term SI and SIDI Hybrid Electric Vehicles**





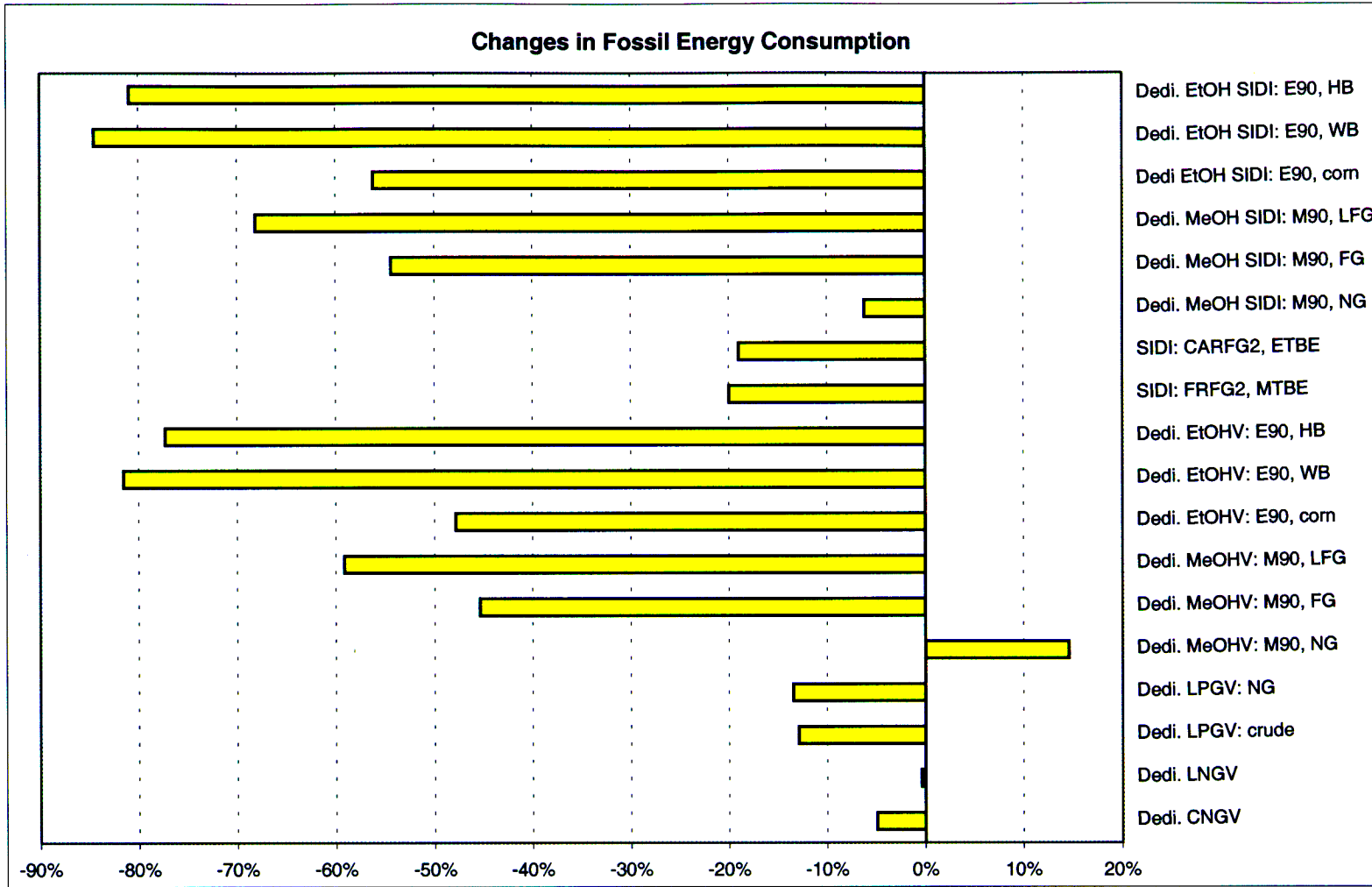
**Figure C-2.3 Changes in Fuel-Cycle Total Energy Use Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term CIDI Vehicles and CIDI Hybrid Electric Vehicles**





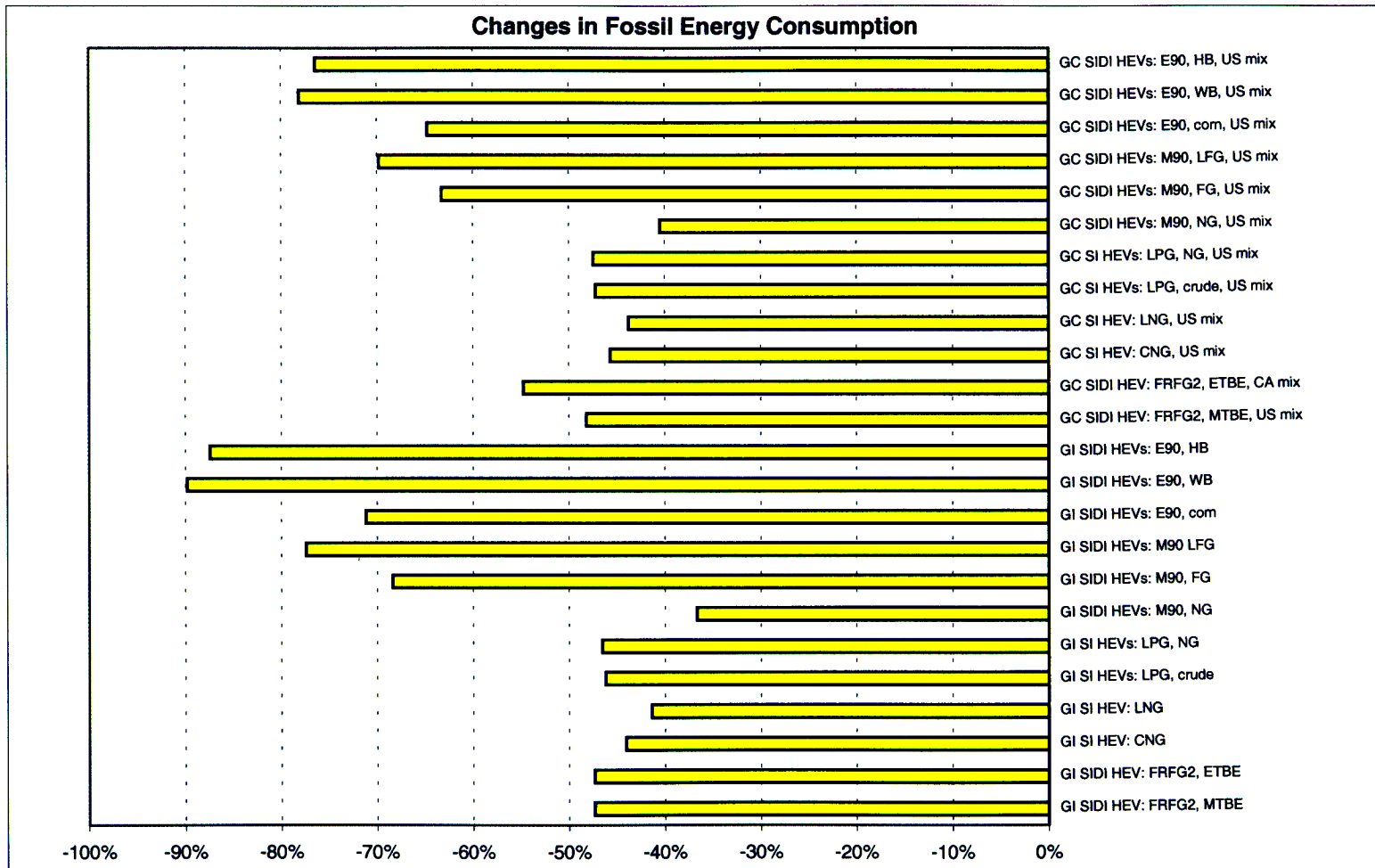
**Figure C-2.4 Changes in Fuel-Cycle Total Energy Consumption Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term Electric Vehicles and Fuel-Cell Vehicles**





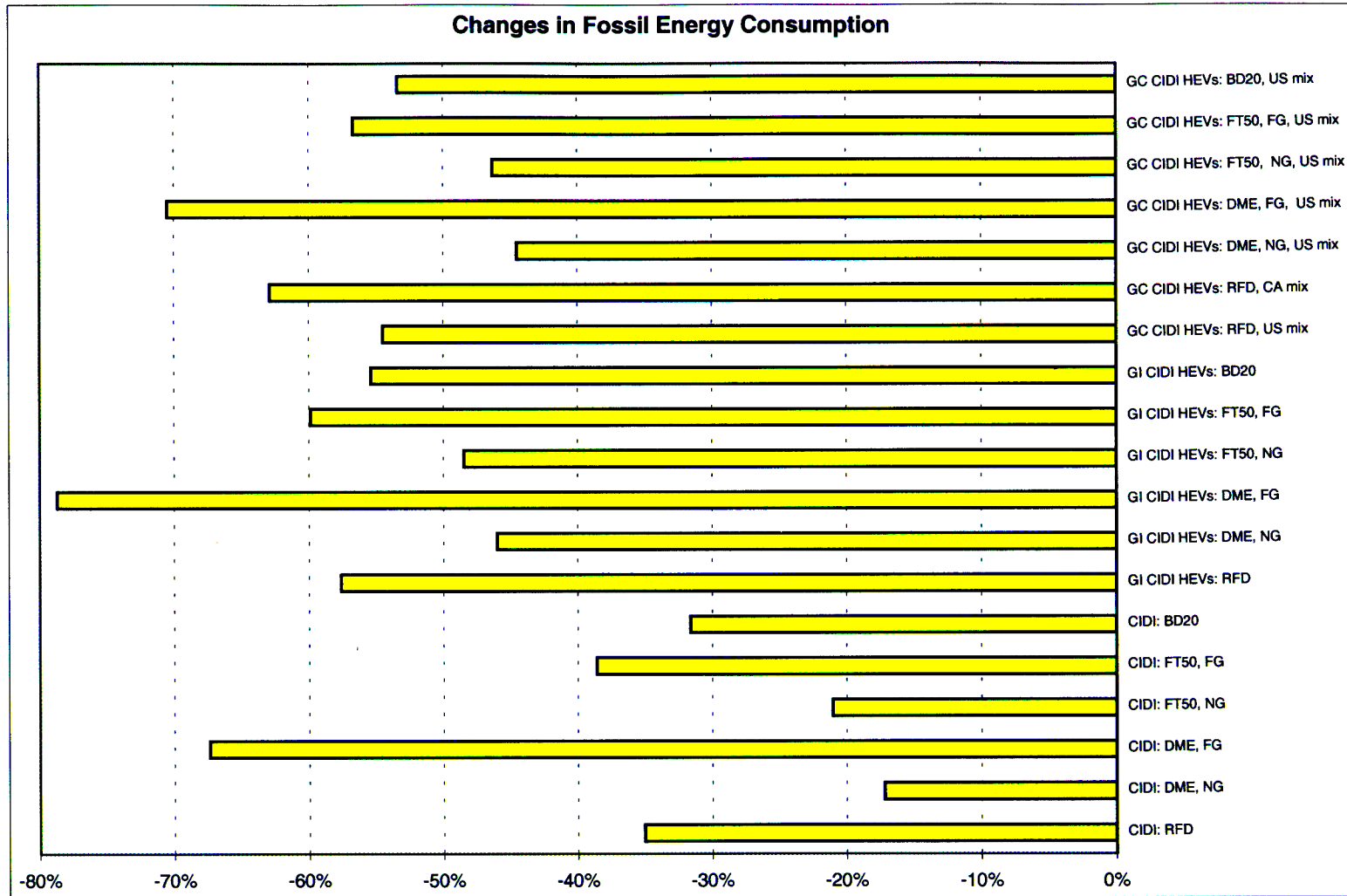
**Figure C-2.5 Changes in Fuel-Cycle Fossil Energy Consumption Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term SI and SIDI Vehicles**





**Figure C-2.6 Changes in Fuel-Cycle Fossil Energy Use Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term SI and SIDI Hybrid Electric Vehicles**

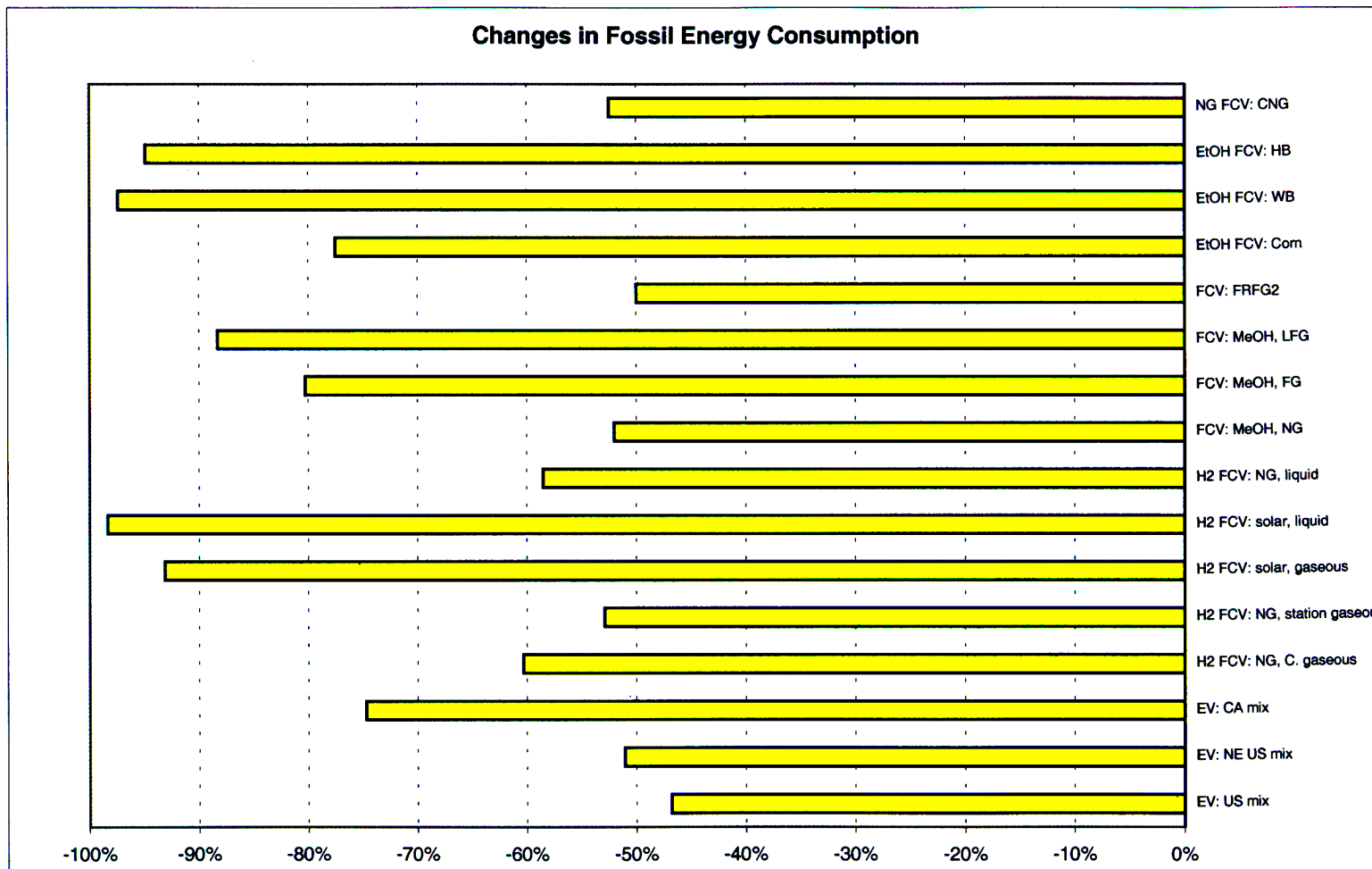




**Figure C-2.7 Changes in Fuel-Cycle Fossil Energy Use Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term CIDI Vehicles and CIDI Hybrid Electric Vehicles**

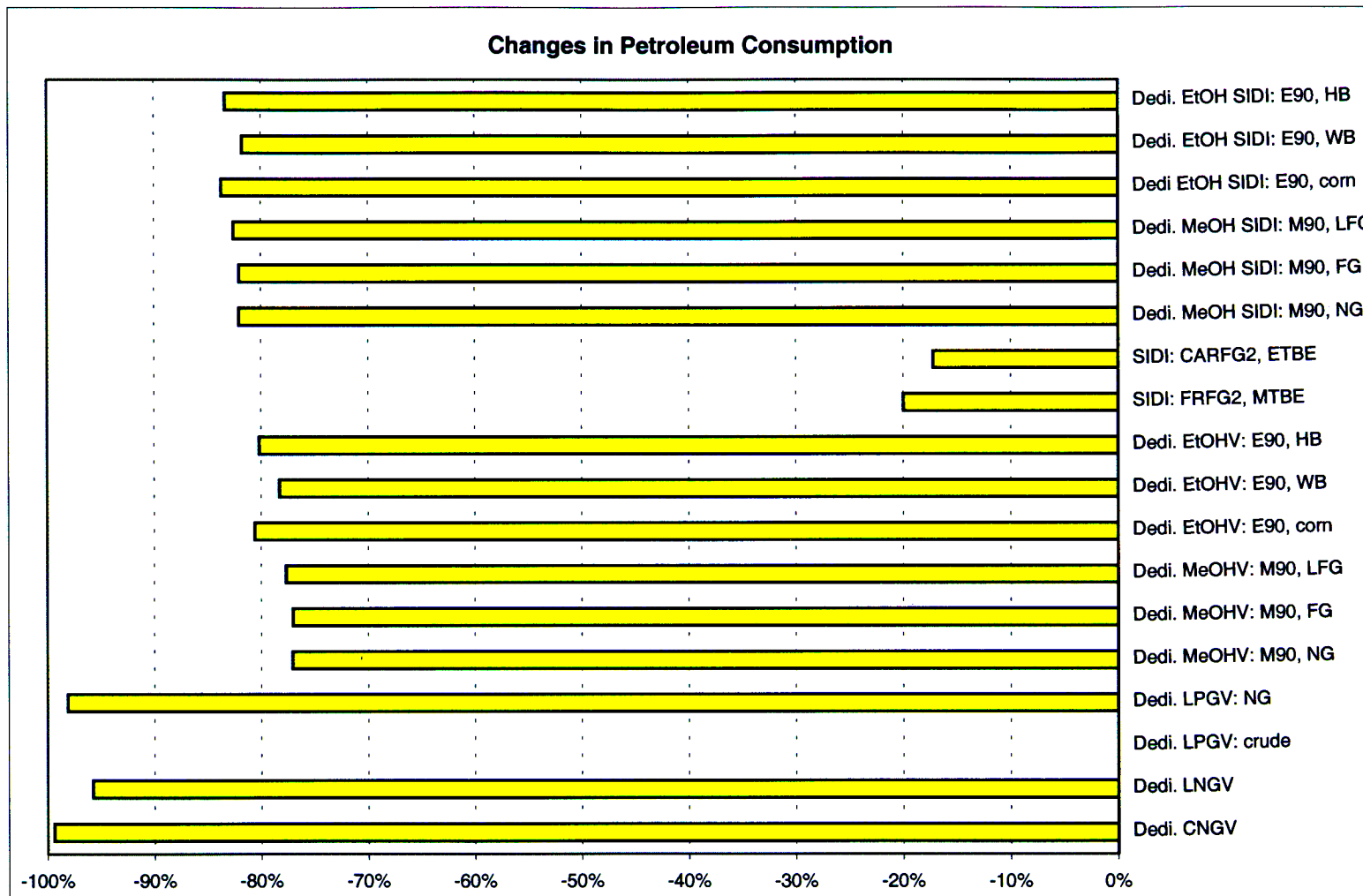






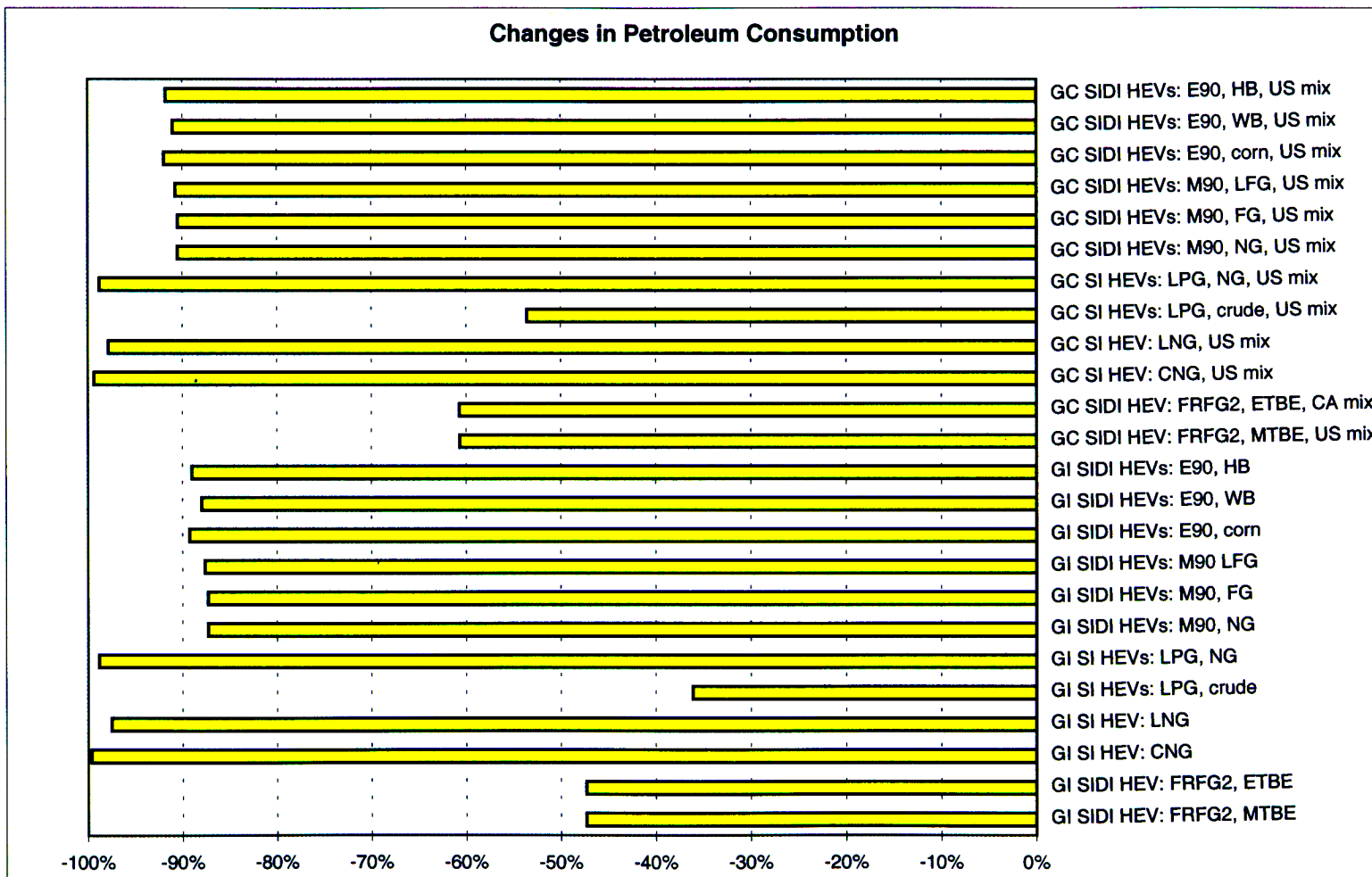
**Figure C-2.8 Changes in Fuel-Cycle Fossil Energy Consumption Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term Electric Vehicles and Fuel-Cell Vehicles**





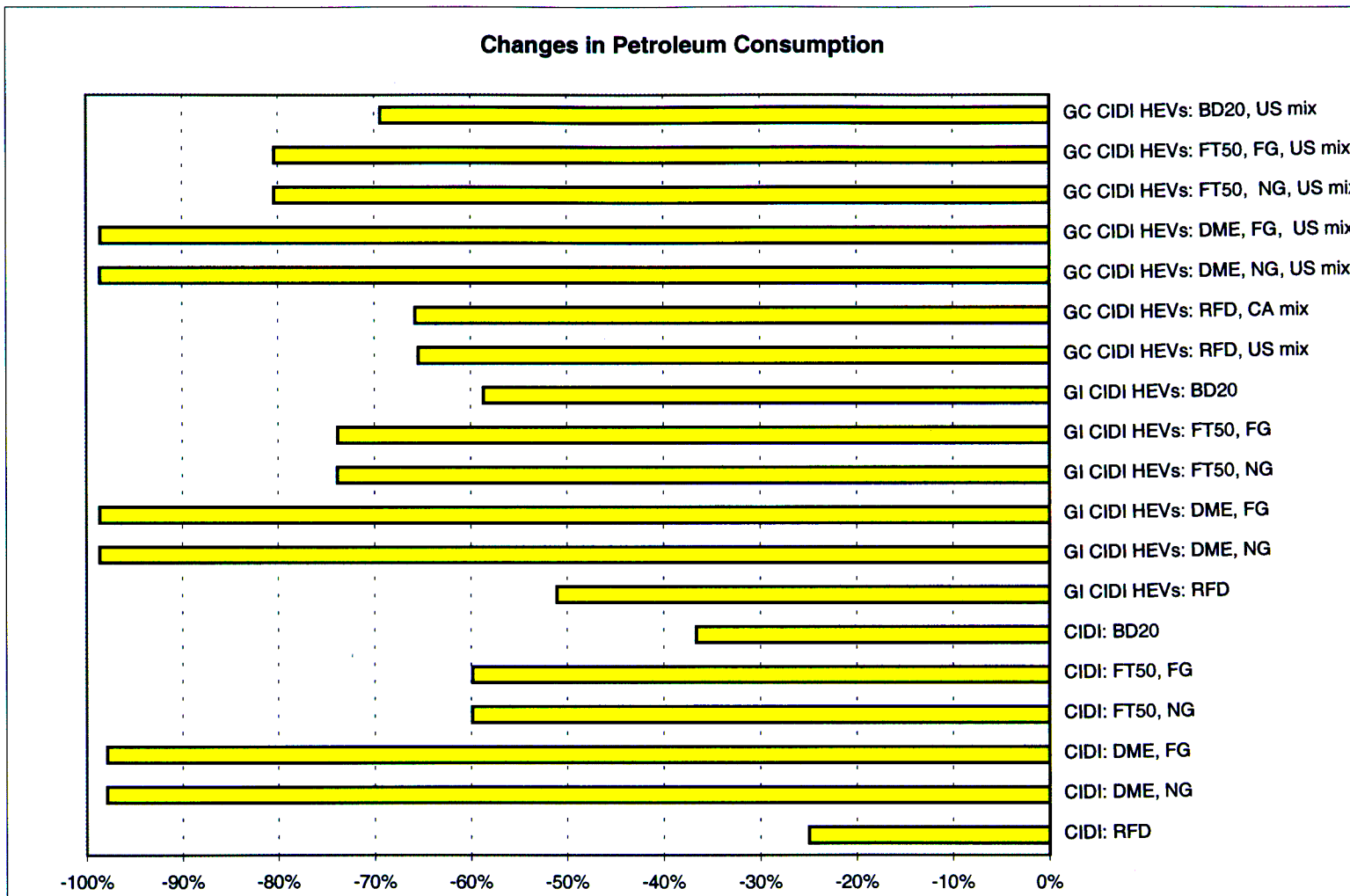
**Figure C-2.9 Changes in Fuel-Cycle Petroleum Use Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term SI and SIDI Vehicles**



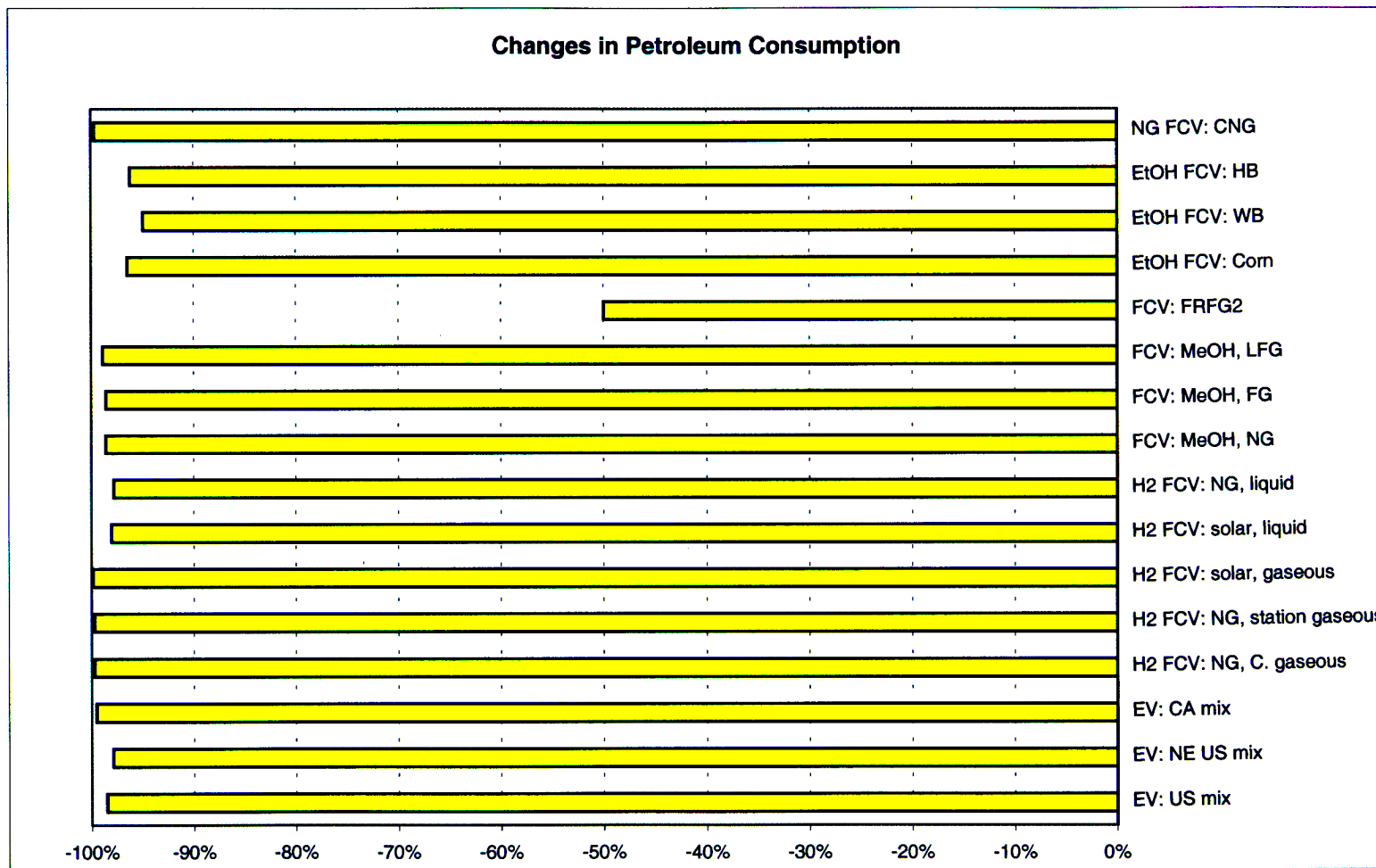


**Figure C-2.10 Changes in Fuel-Cycle Petroleum Consumption Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term SI and SIDI Hybrid Electric Vehicles**



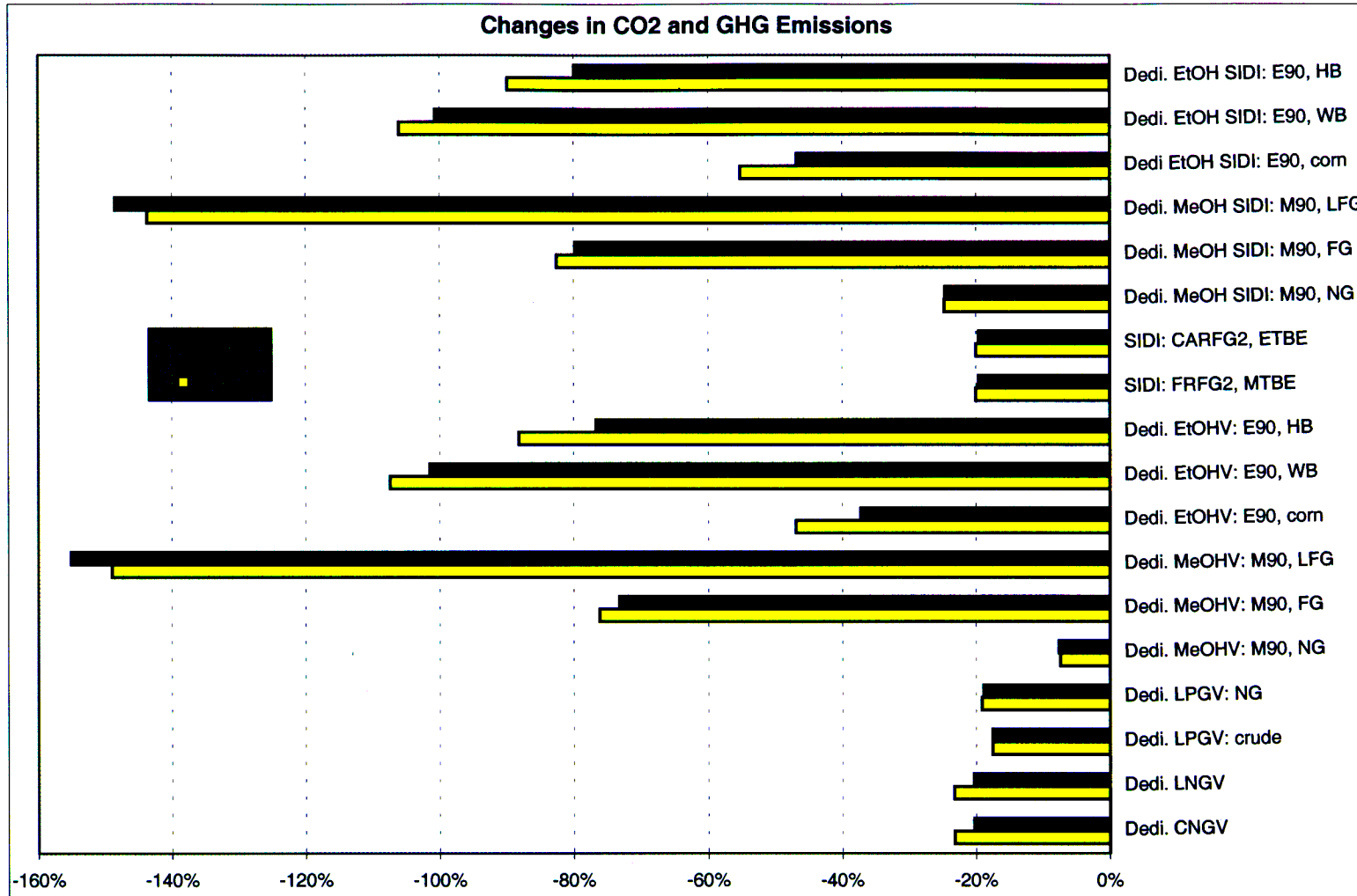


**Figure C-2.11 Changes in Fuel-Cycle Petroleum Consumption Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term CIDI Vehicles and CIDI Hybrid Electric Vehicles**



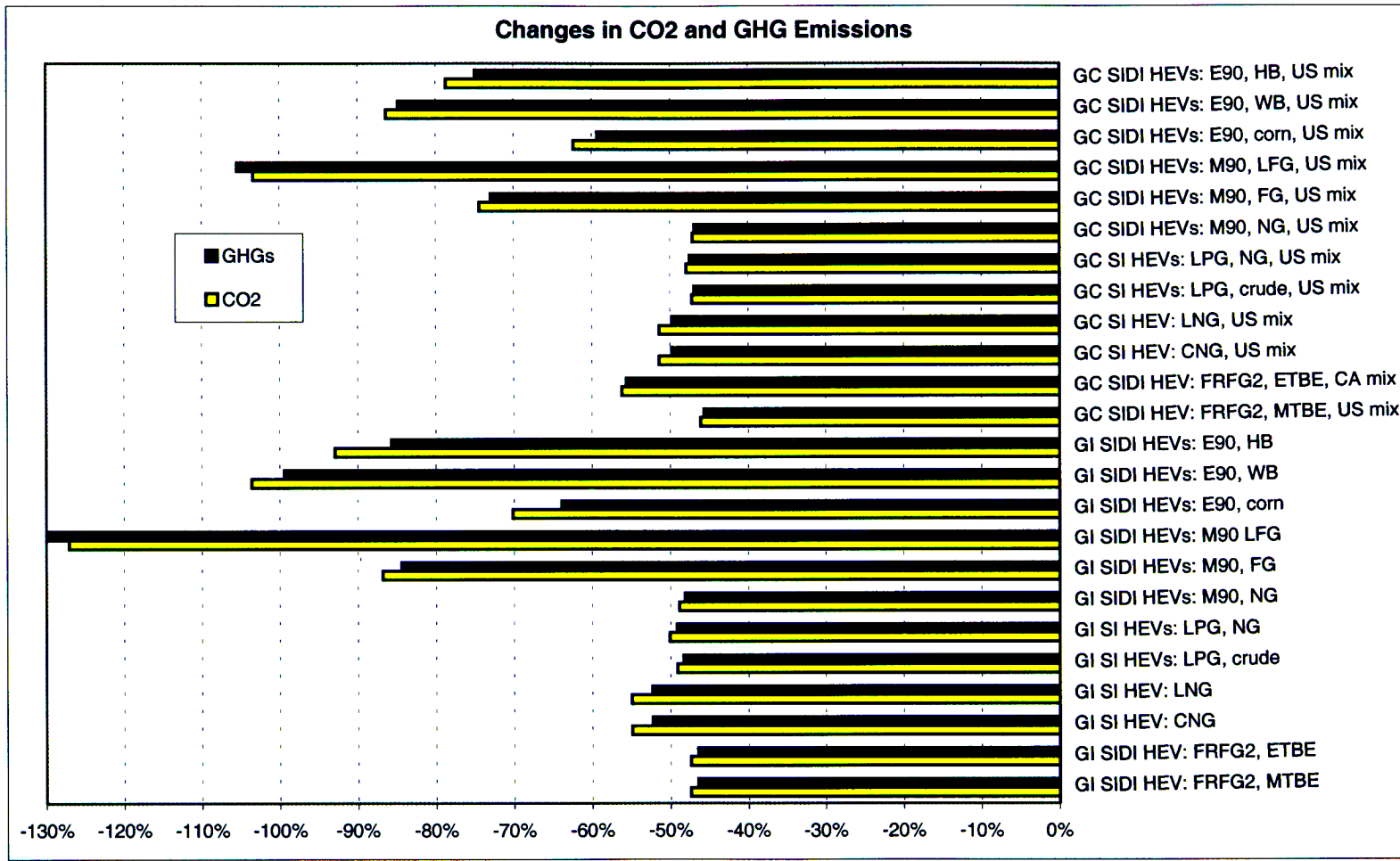
**Figure C-2.12 Changes in Fuel-Cycle Petroleum Consumption Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term Electric Vehicles and Fuel-Cell Vehicles**





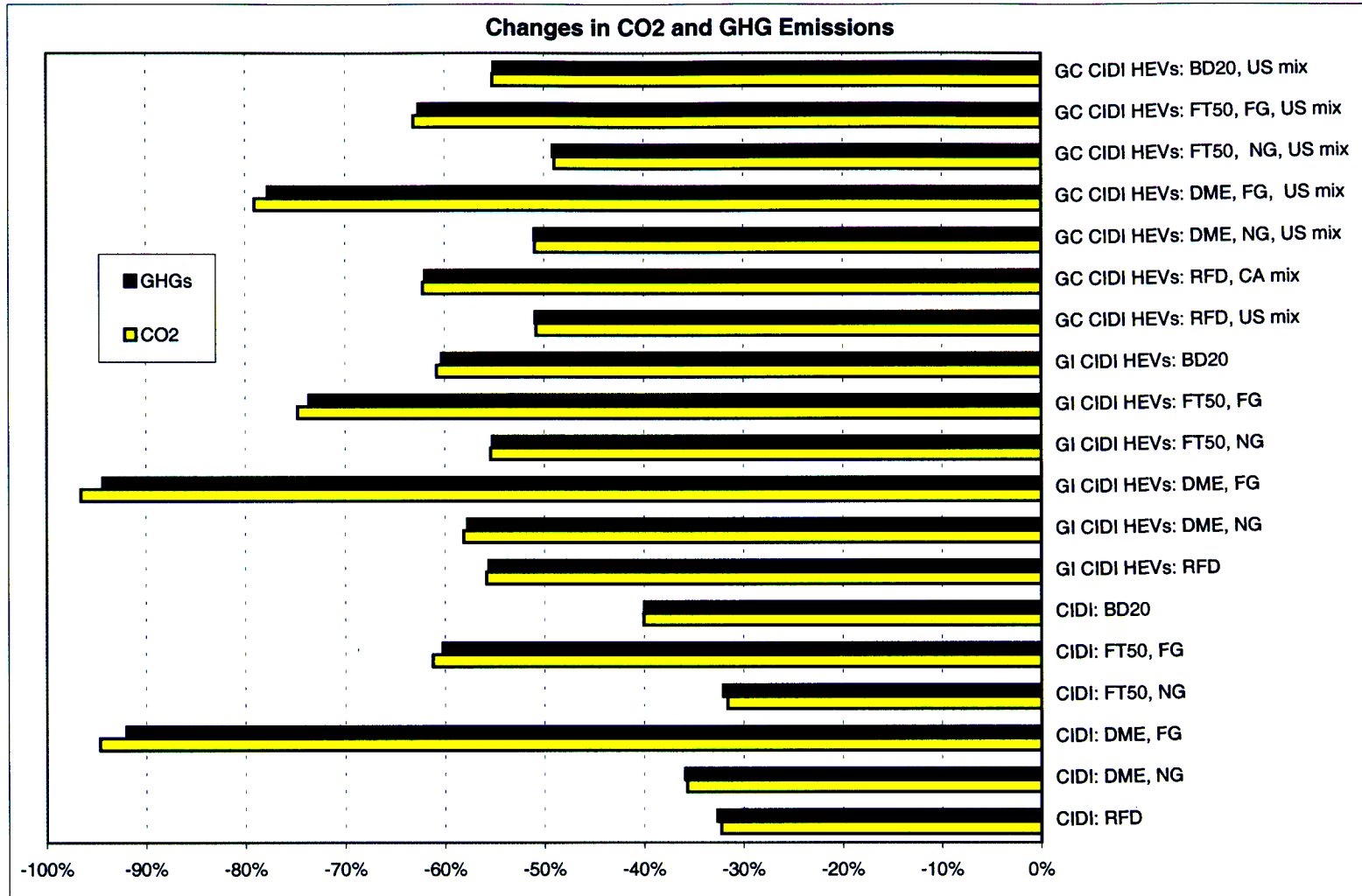
**Figure C-2.13 Changes in Fuel-Cycle CO<sub>2</sub> and GHG Emissions Relative to GV's Fueled with RFG, Light-Duty Trucks 1: Long-Term SI and SIDI Vehicles**





**Figure C-2.14 Changes in Fuel-Cycle CO<sub>2</sub> and GHG Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term SI and SIDI Hybrid Electric Vehicles**

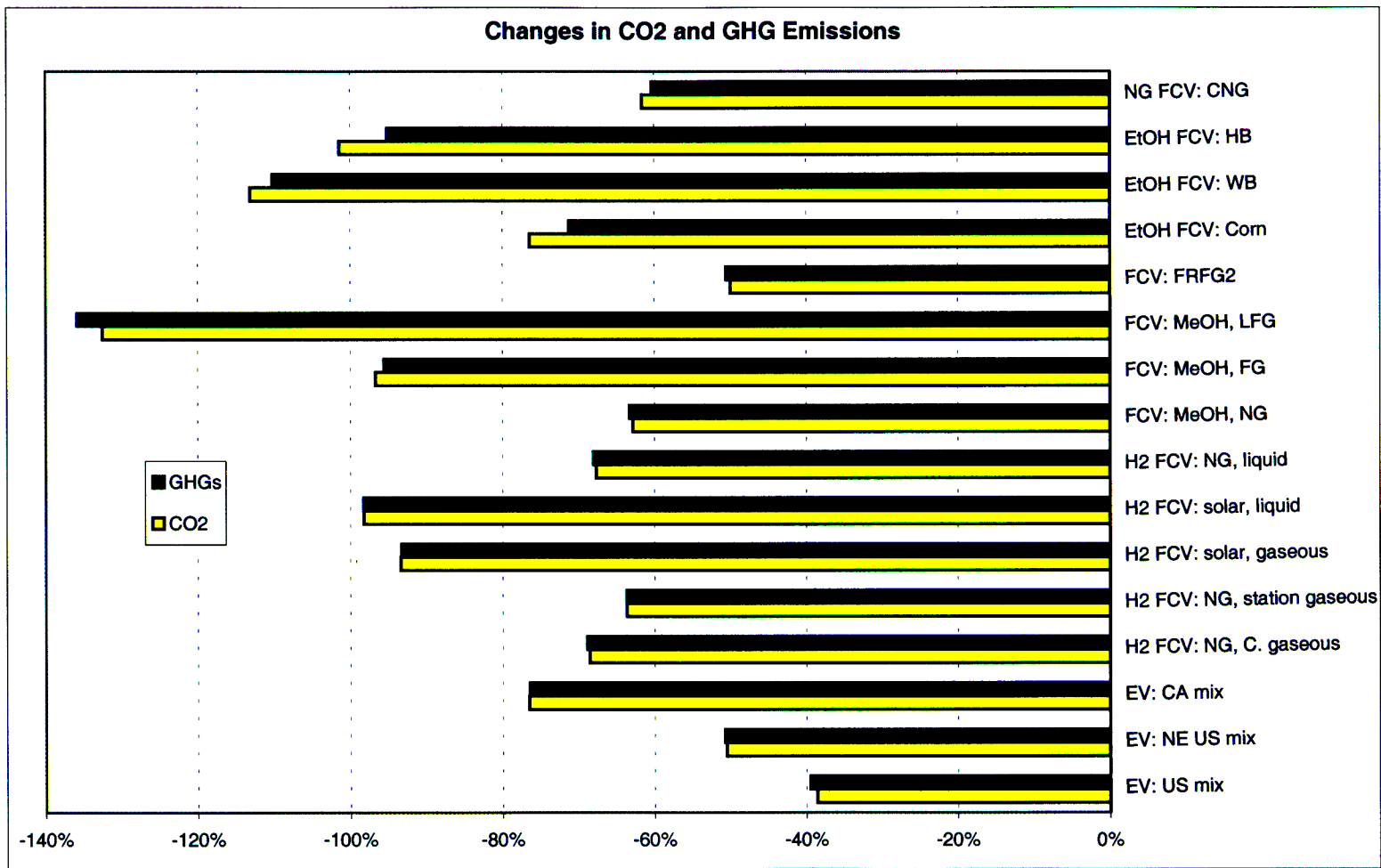




**Figure C-2.15 Changes in Fuel-Cycle CO<sub>2</sub> and GHG Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term CIDI Vehicles and CIDI Hybrid Electric Vehicles**

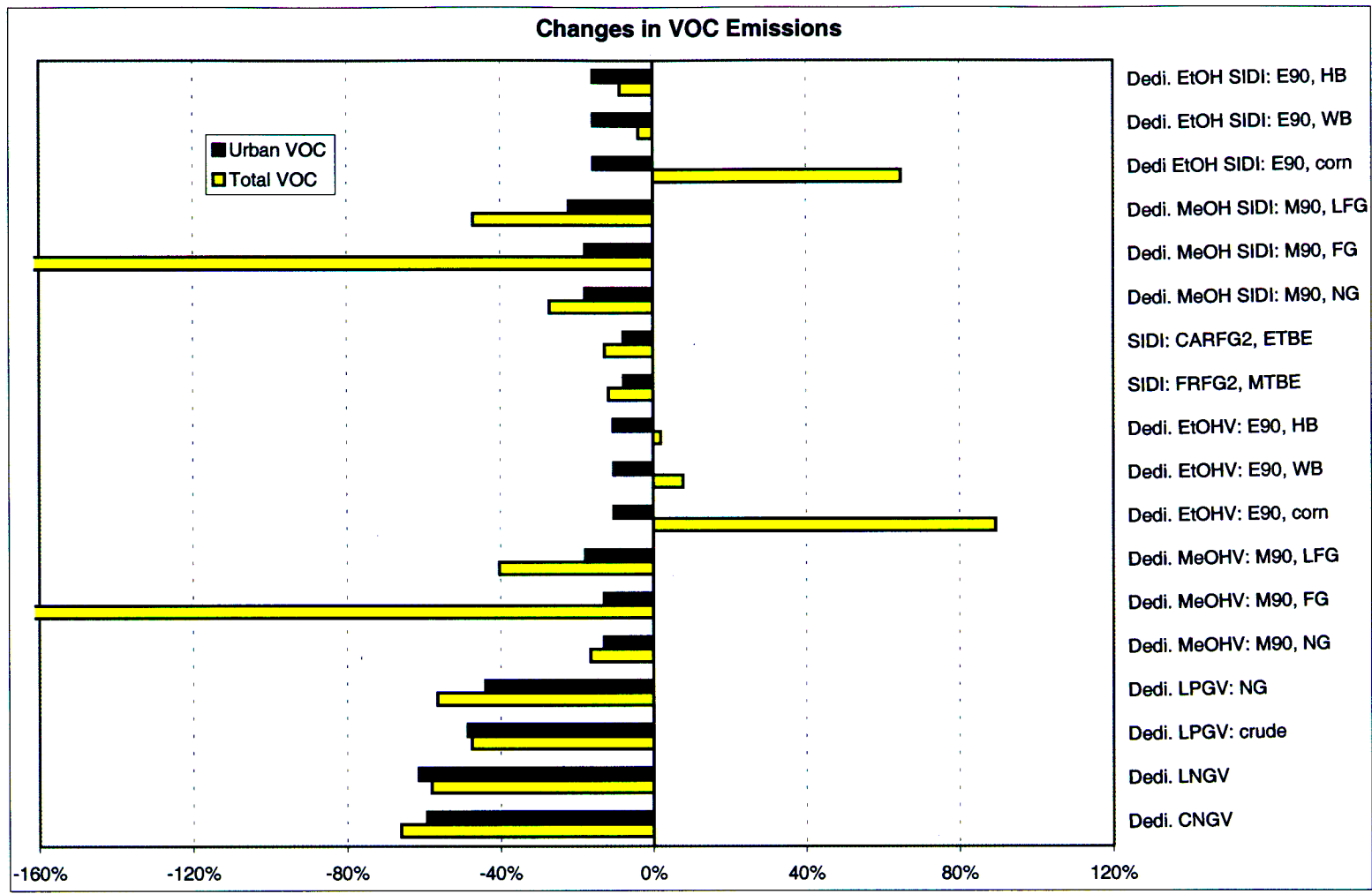






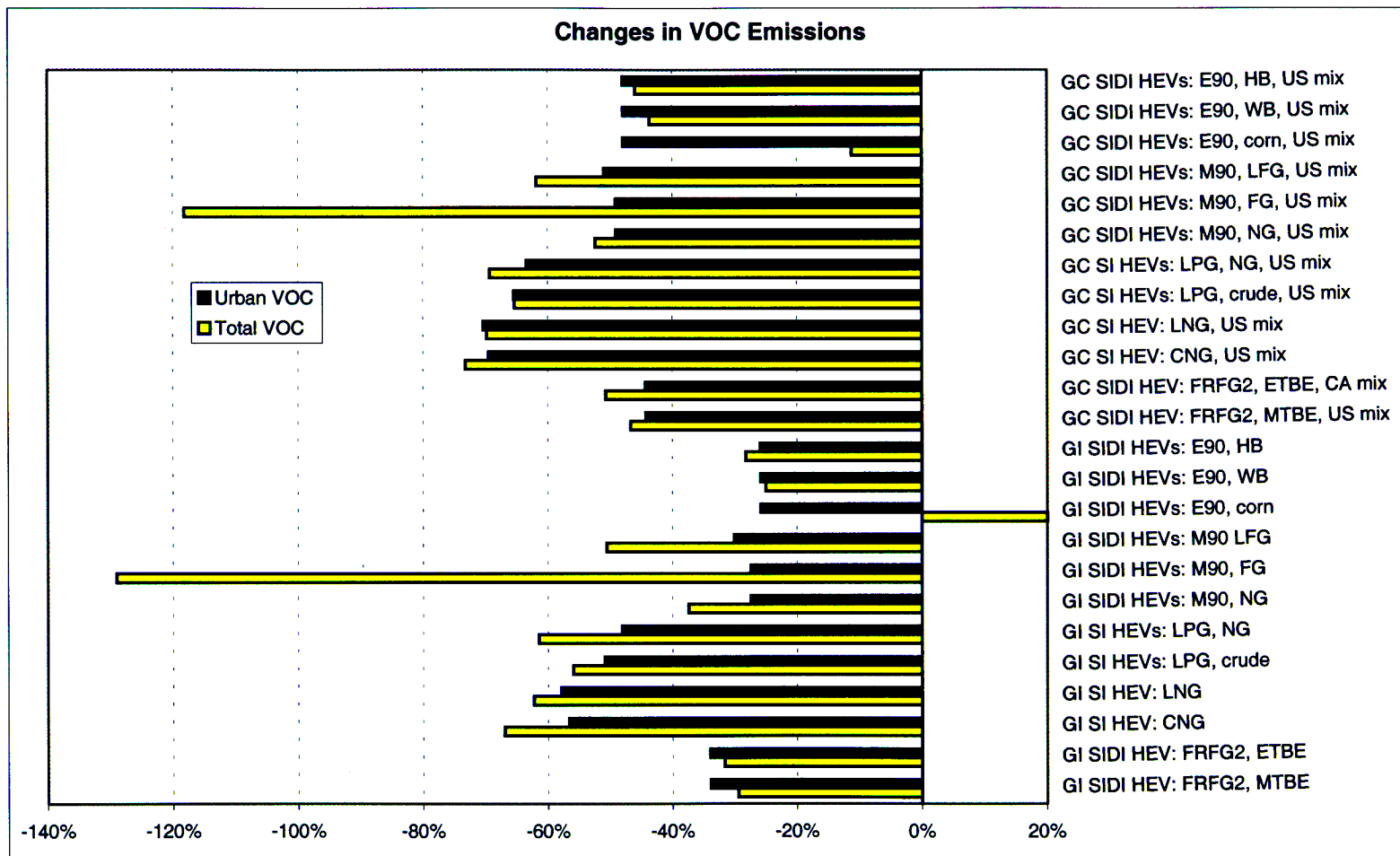
**Figure C-2.16 Changes in Fuel-Cycle CO<sub>2</sub> and GHG Emissions Relative to GV's Fueled with RFG, Light-Duty Trucks 1: Long-Term Electric Vehicles and Fuel-Cell Vehicles**





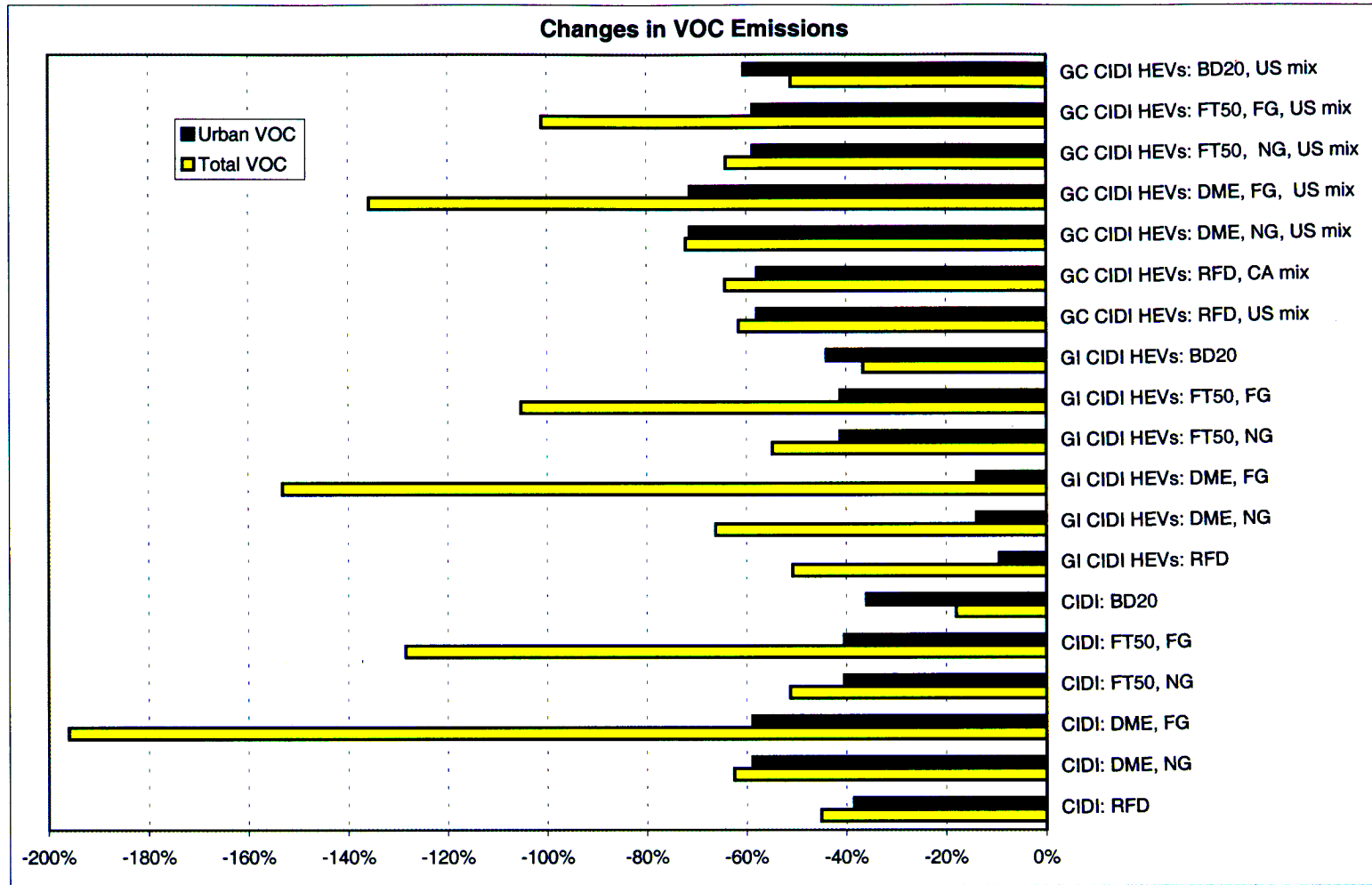
**Figure C-2.17 Changes in Fuel-Cycle VOC Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term SI and SIDI Vehicles**





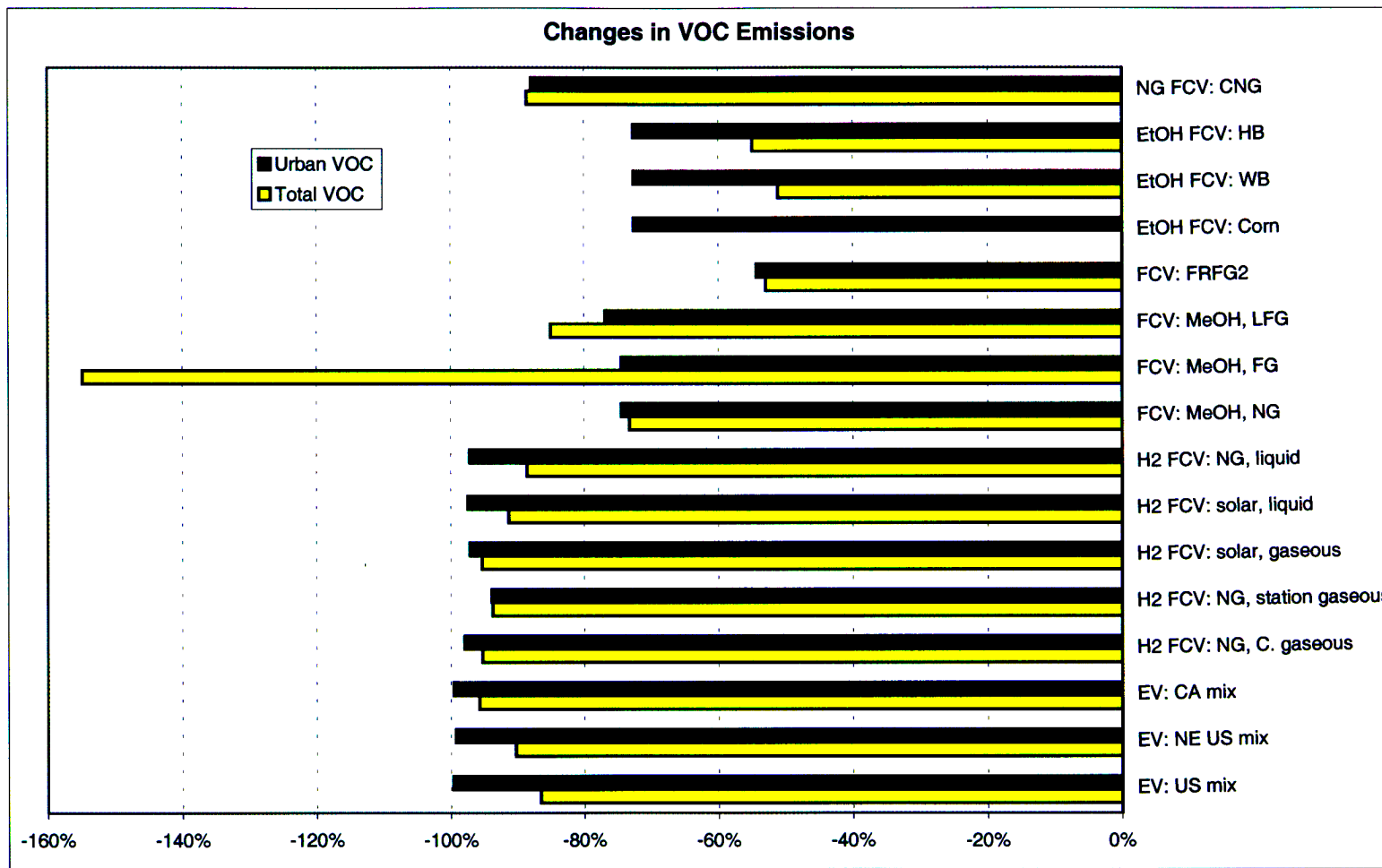
**Figure C-2.18 Changes in Fuel-Cycle VOC Emissions Relative to GV's Fueled with RFG, Light-Duty Trucks 1: Long-Term SI and SIDI Hybrid Electric Vehicles**





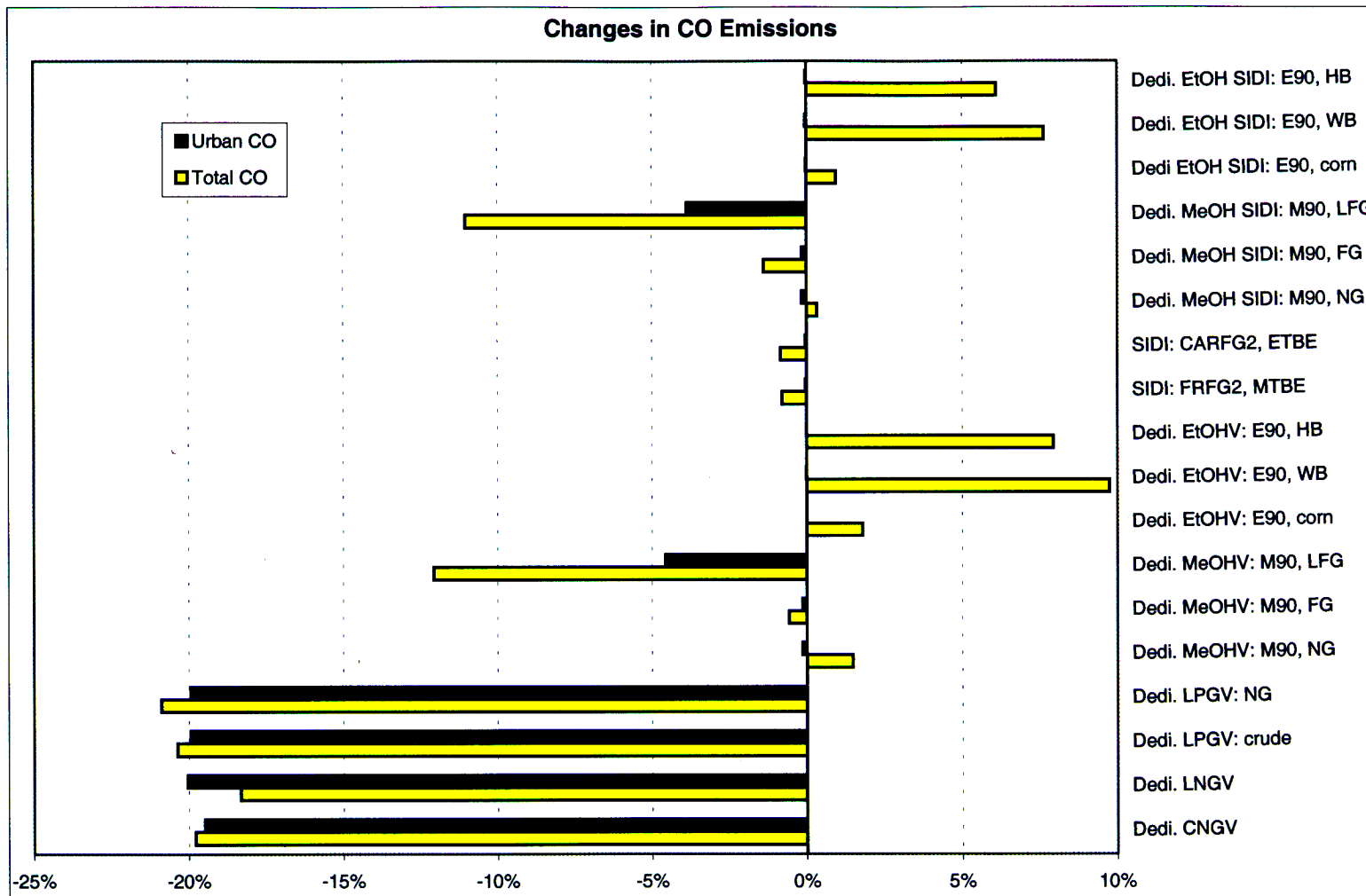
**Figure C-2.19 Changes in Fuel-Cycle VOC Emissions Relative to GV's Fueled with RFG, Light-Duty Trucks 1: Long-Term CIDI Vehicles and CIDI Hybrid Electric Vehicles**





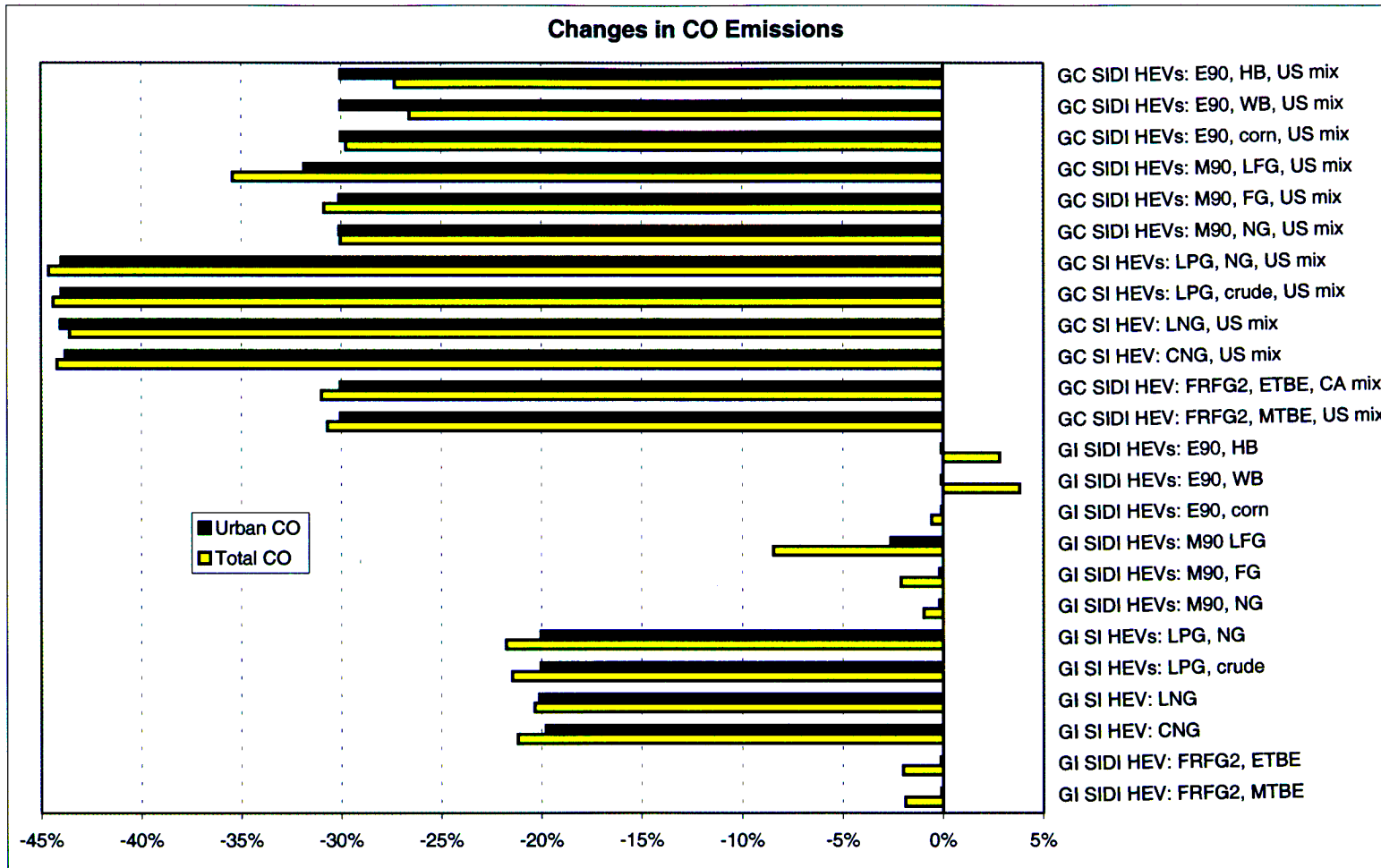
**Figure C-2.20 Changes in Fuel-Cycle VOC Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term Electric Vehicles and Fuel-Cell Vehicles**





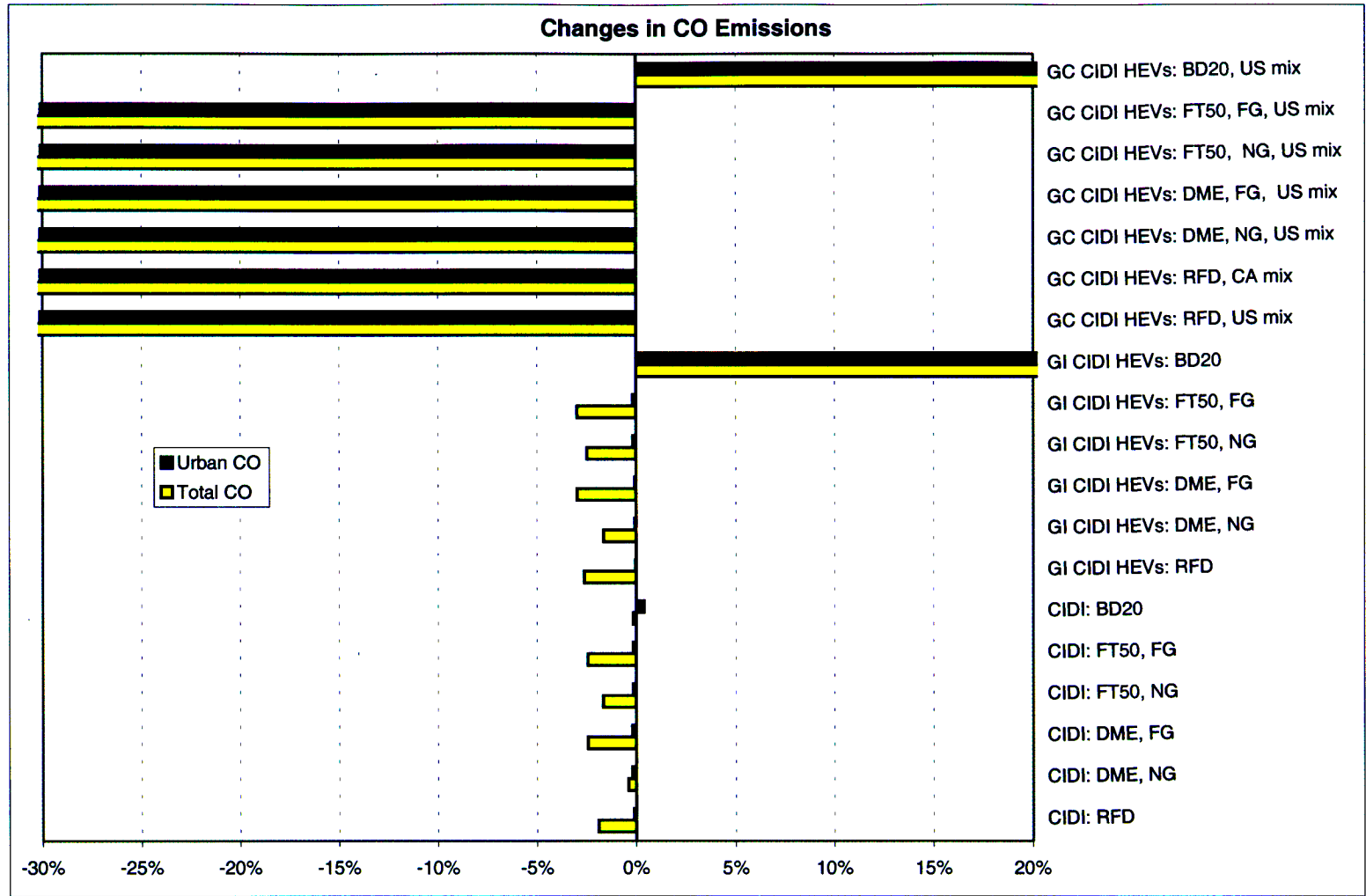
**Figure C-2.21 Changes in Fuel-Cycle CO Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term SI and SIDI Vehicles**





**Figure C-2.22 Changes in Fuel-Cycle CO Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term SI and SIDI Hybrid Electric Vehicles**

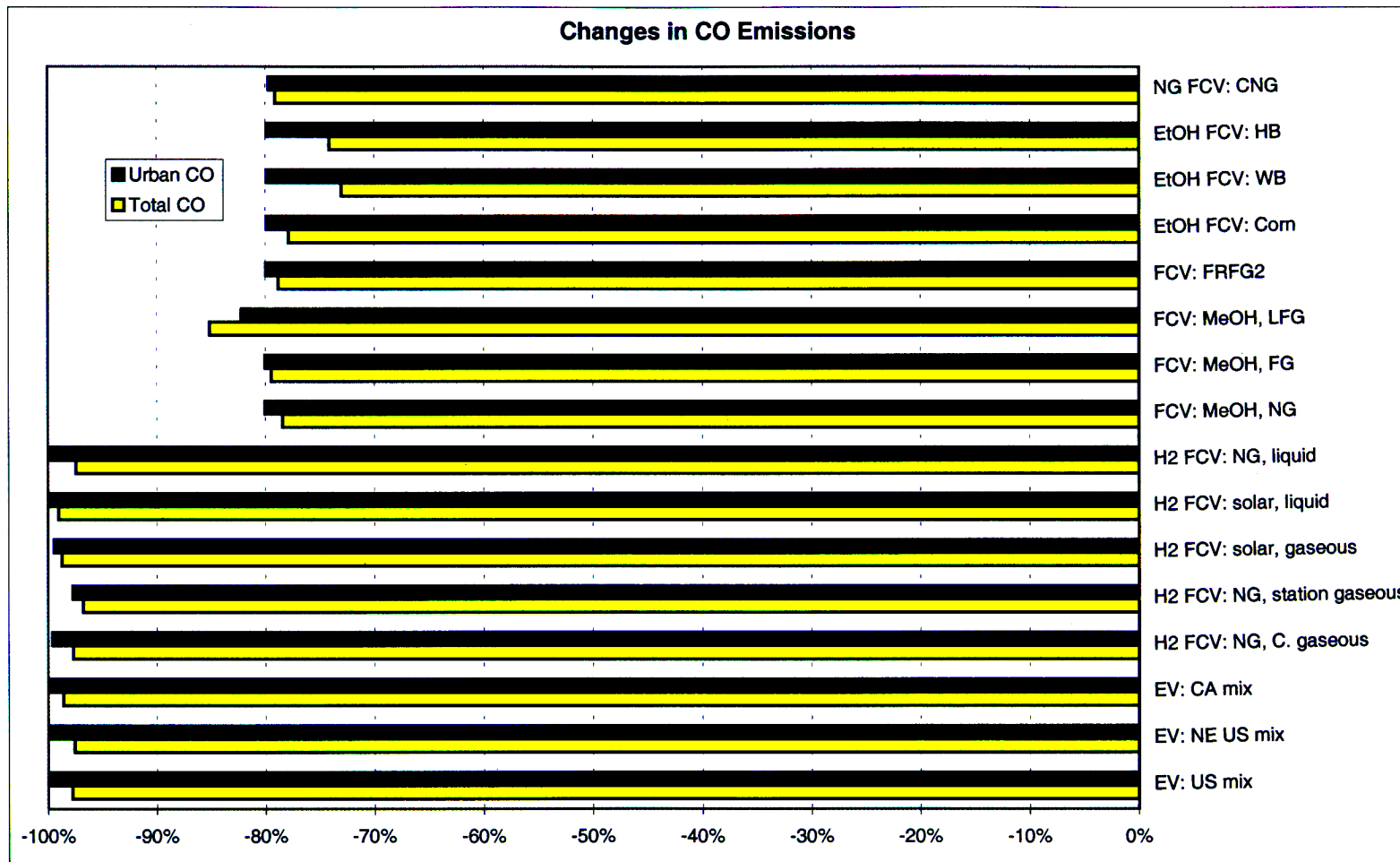




**Figure C-2.23 Changes in Fuel-Cycle CO Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term CIDI Vehicles and CIDI Hybrid Electric Vehicles**

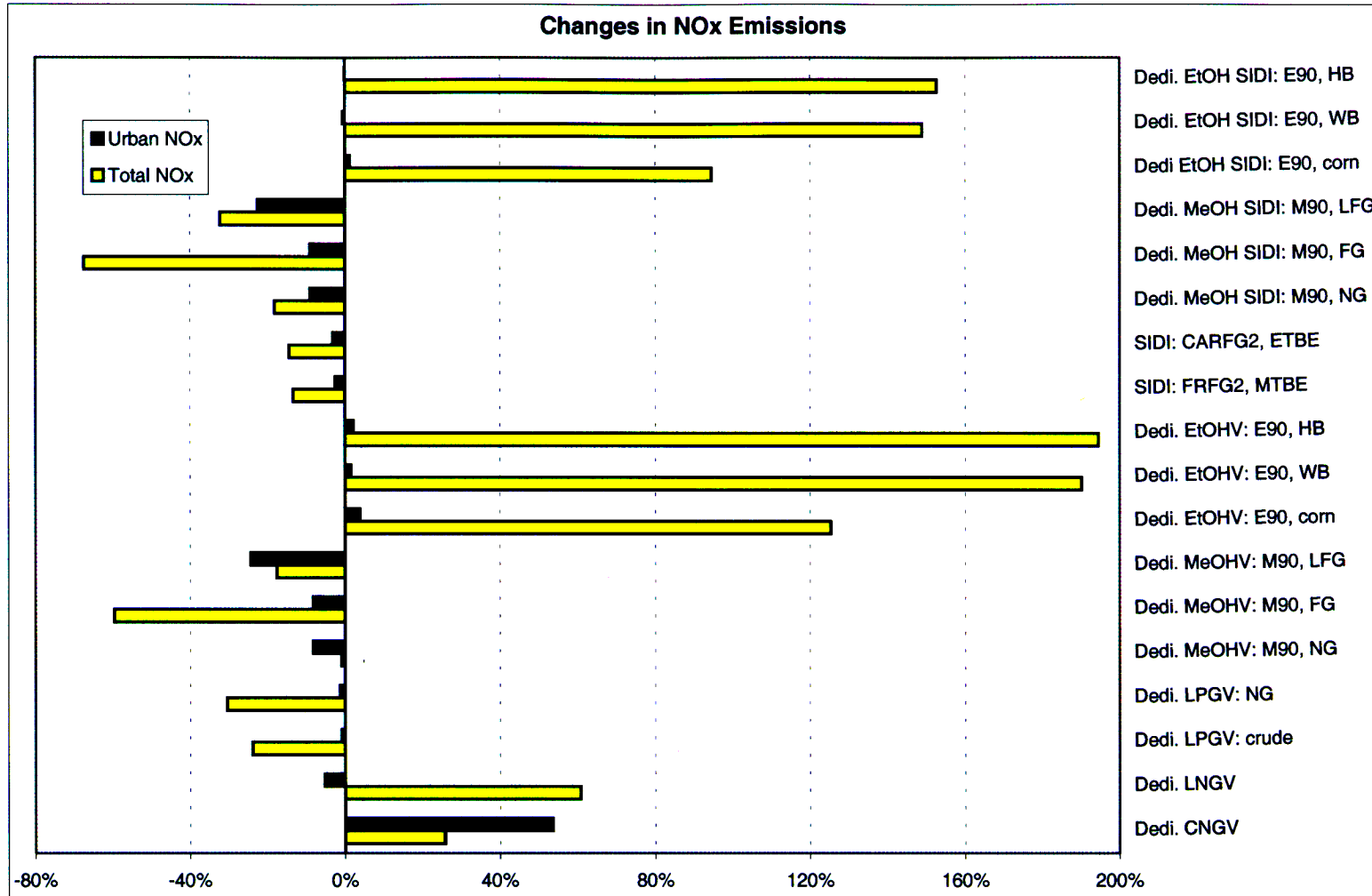






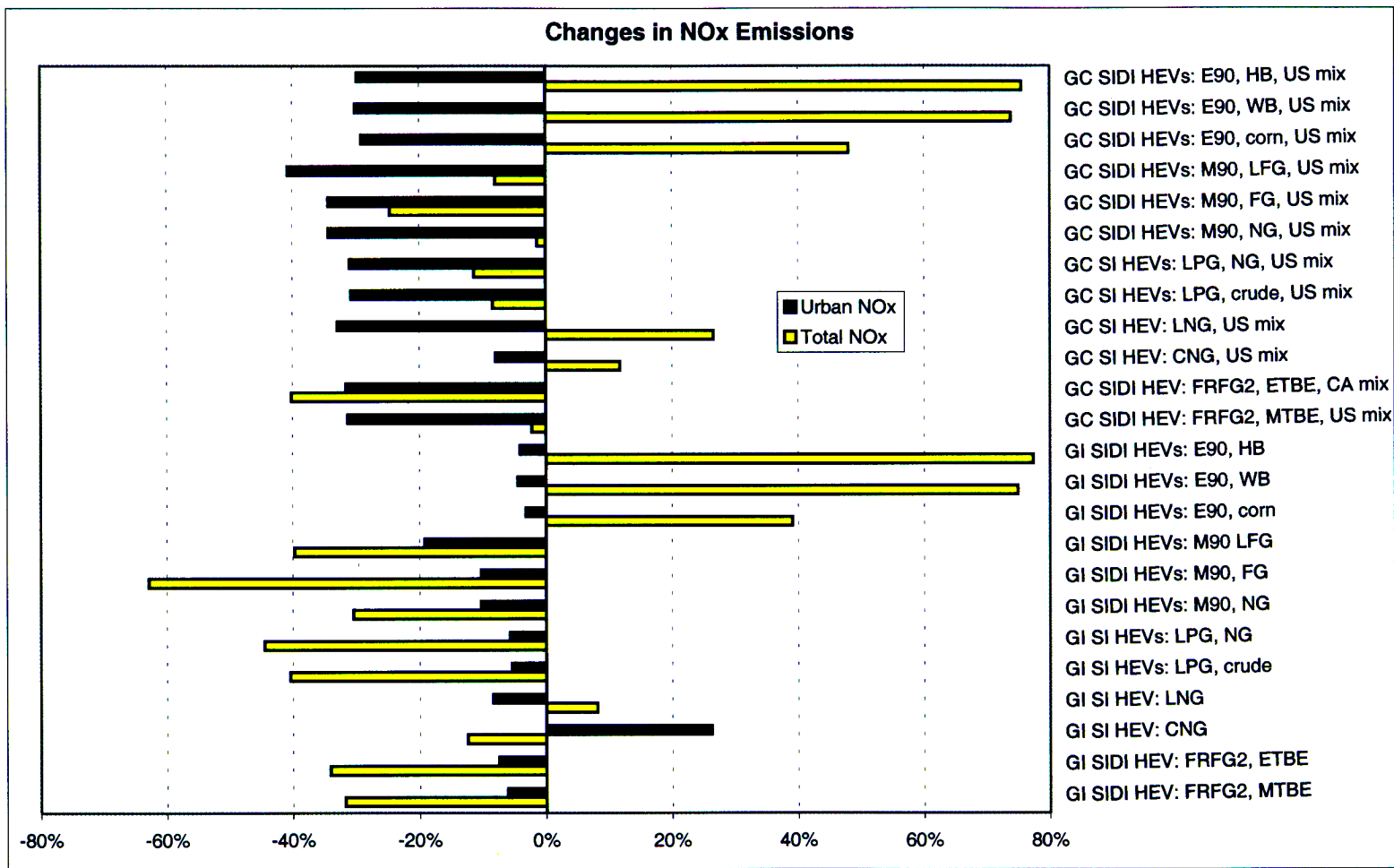
**Figure C-2.24 Changes in Fuel-Cycle CO Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term Electric Vehicles and Fuel-Cell Vehicles**





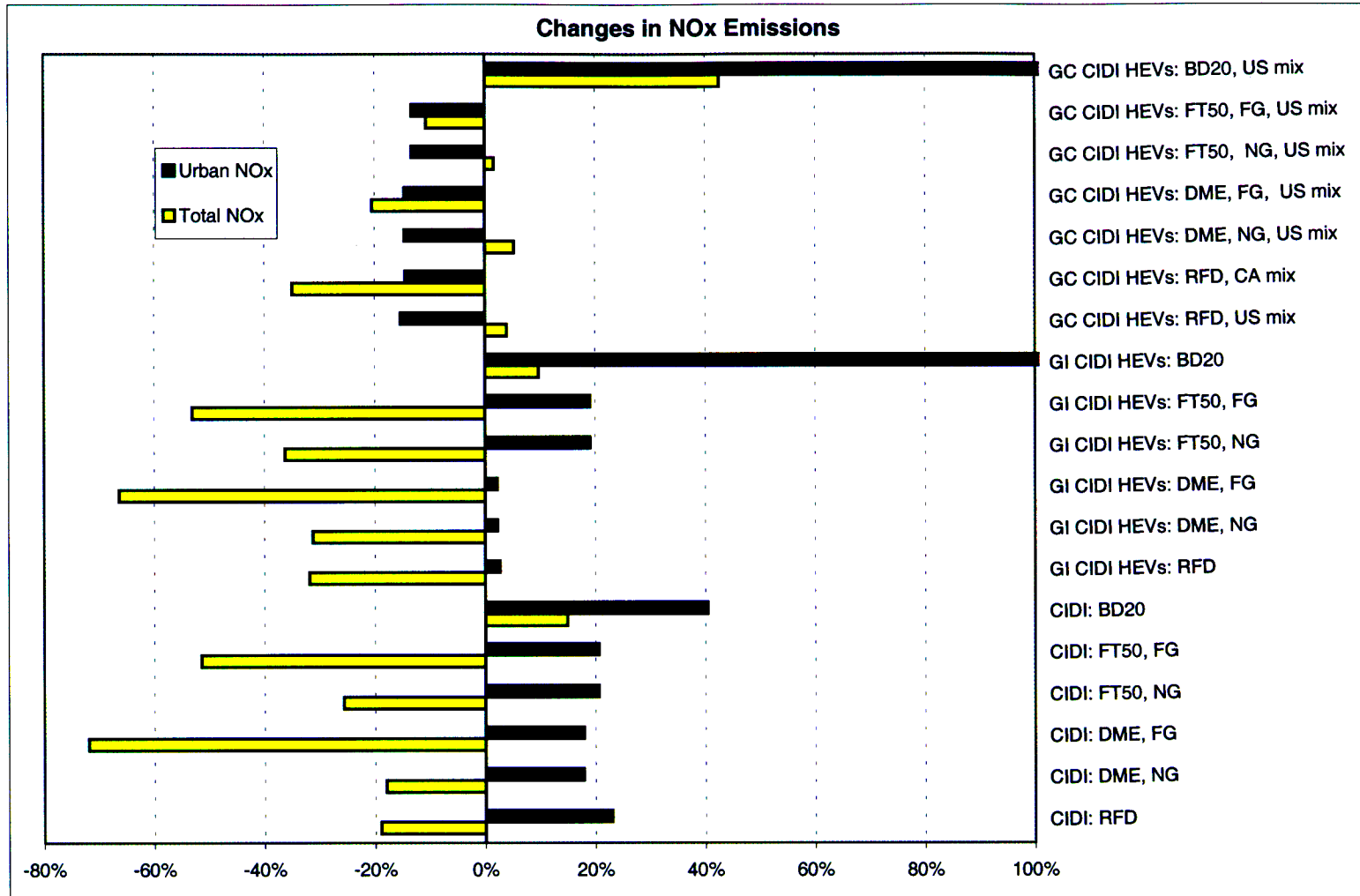
**Figure C-2.25 Changes in Fuel-Cycle NO<sub>x</sub> Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term SI and SIDI Vehicles**





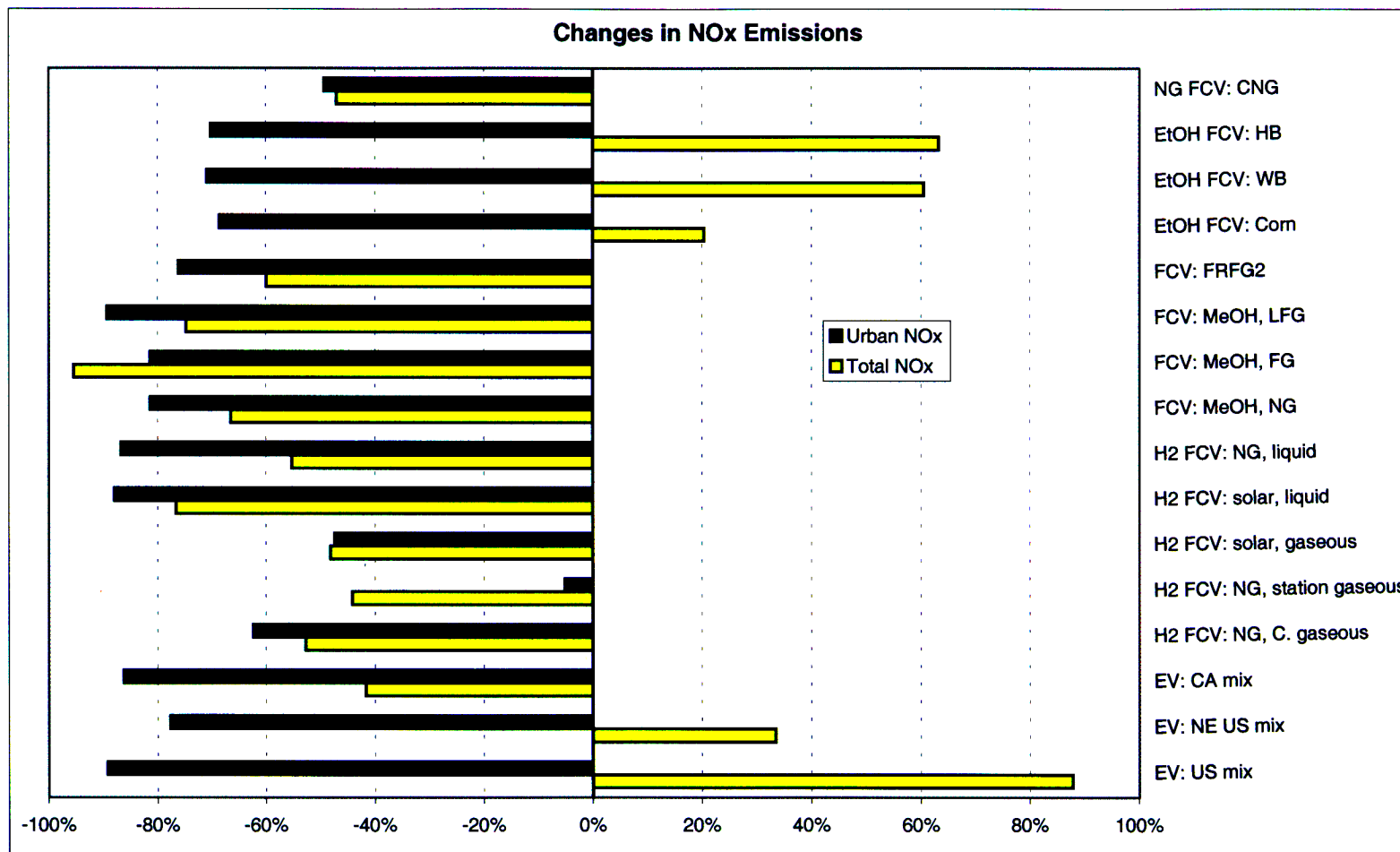
**Figure C-2.26 Changes in Fuel-Cycle NO<sub>x</sub> Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term SI and SIDI Hybrid Electric Vehicles**





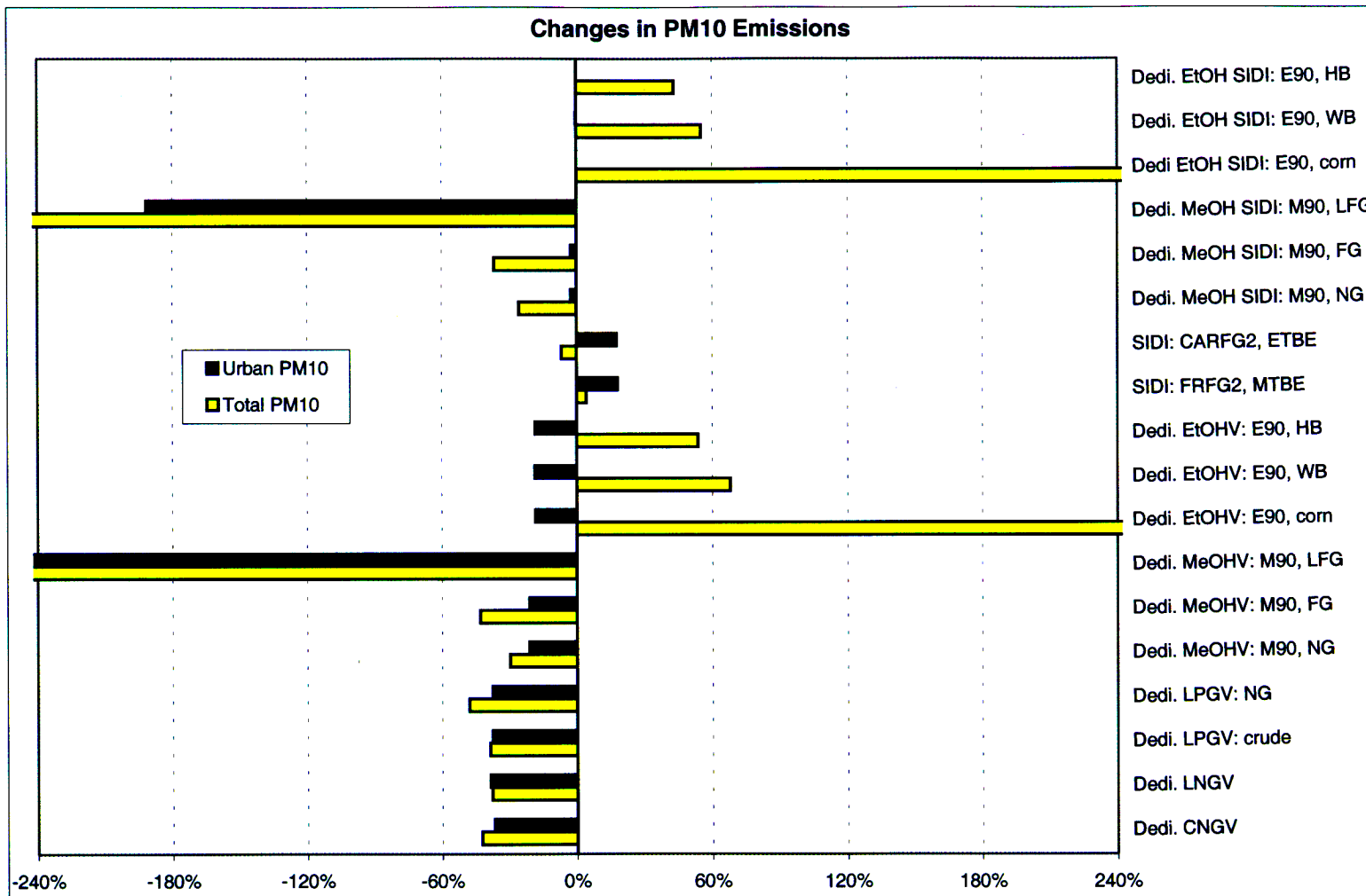
**Figure C-2.27 Changes in Fuel-Cycle NO<sub>x</sub> Emissions Relative to GV's Fueled with RFG, Light-Duty Trucks 1: Long-Term CIDI Vehicles and CIDI Hybrid Electric Vehicles**





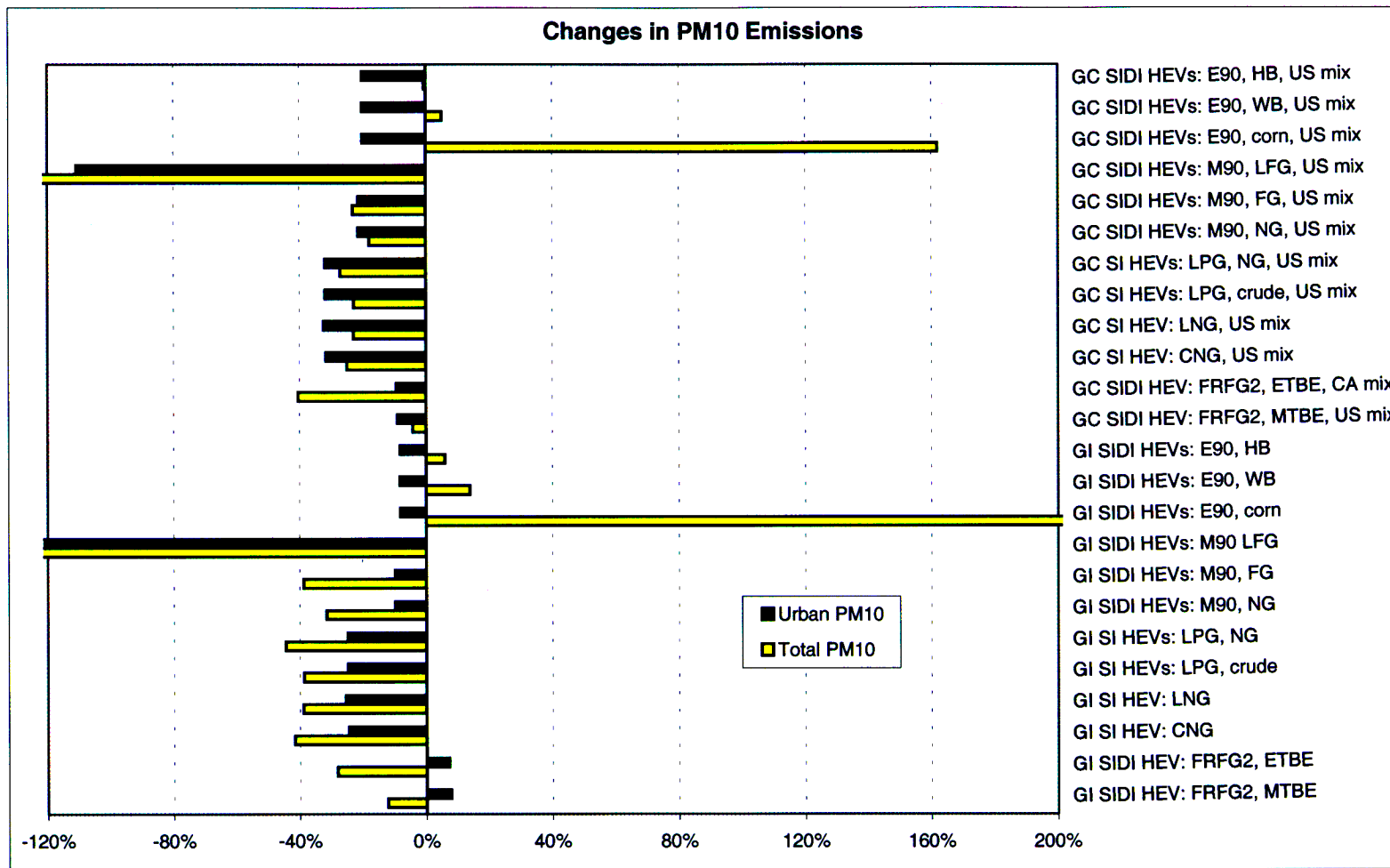
**Figure C-2.28 Changes in Fuel-Cycle NO<sub>x</sub> Emissions Relative to GV's Fueled with RFG, Light-Duty Trucks 1: Long-Term Electric Vehicles and Fuel-Cell Vehicles**





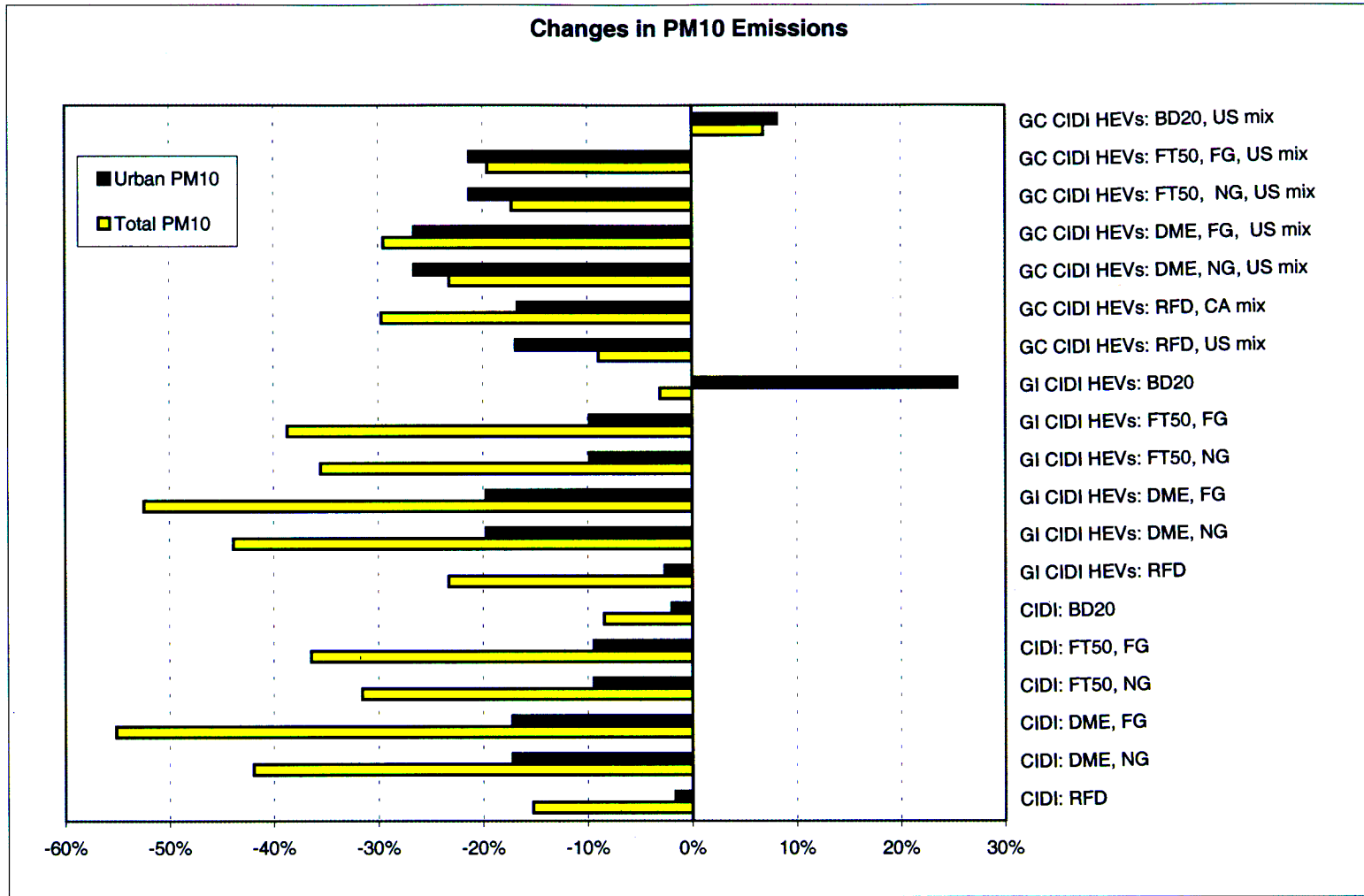
**Figure C-2.29 Changes in Fuel-Cycle PM<sub>10</sub> Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term SI and SIDI Vehicles**





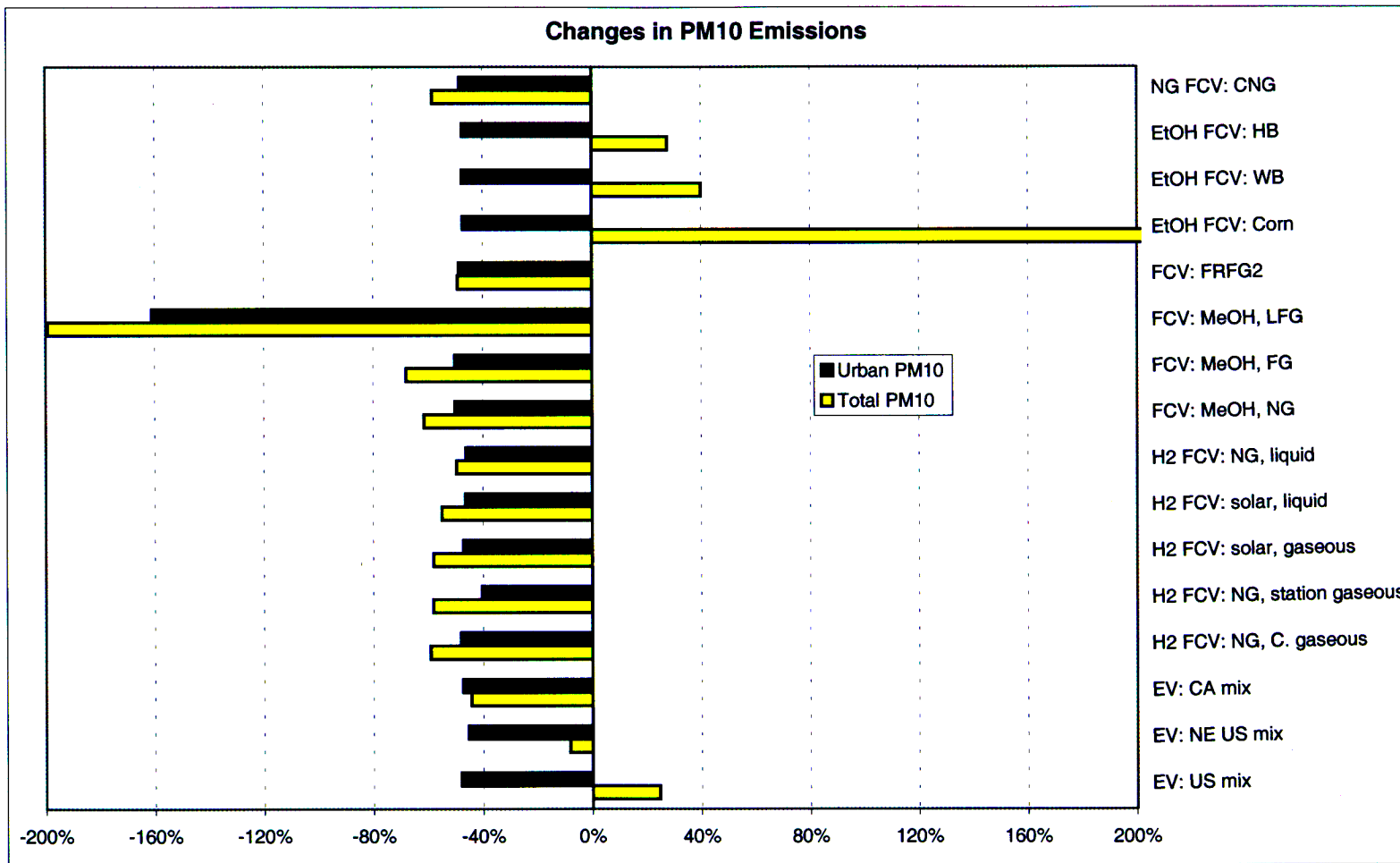
**Figure C-2.30 Changes in Fuel-Cycle PM<sub>10</sub> Emissions Relative to GV's Fueled with RFG, Light-Duty Trucks 1: Long-Term SI and SIDI Hybrid Electric Vehicles**





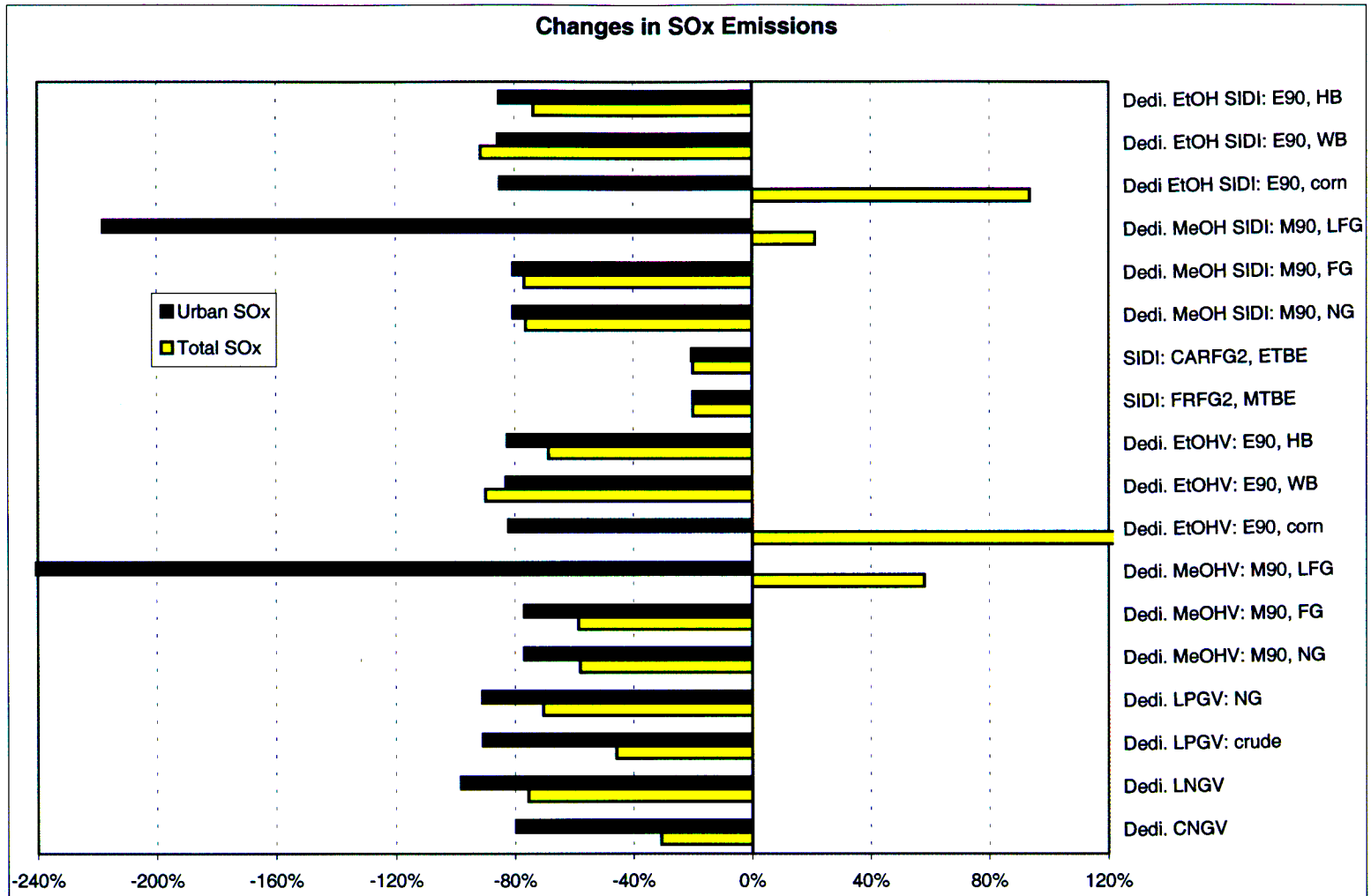
**Figure C-2.31 Changes in Fuel-Cycle PM<sub>10</sub> Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term CIDI Vehicles and CIDI Hybrid Electric Vehicles**





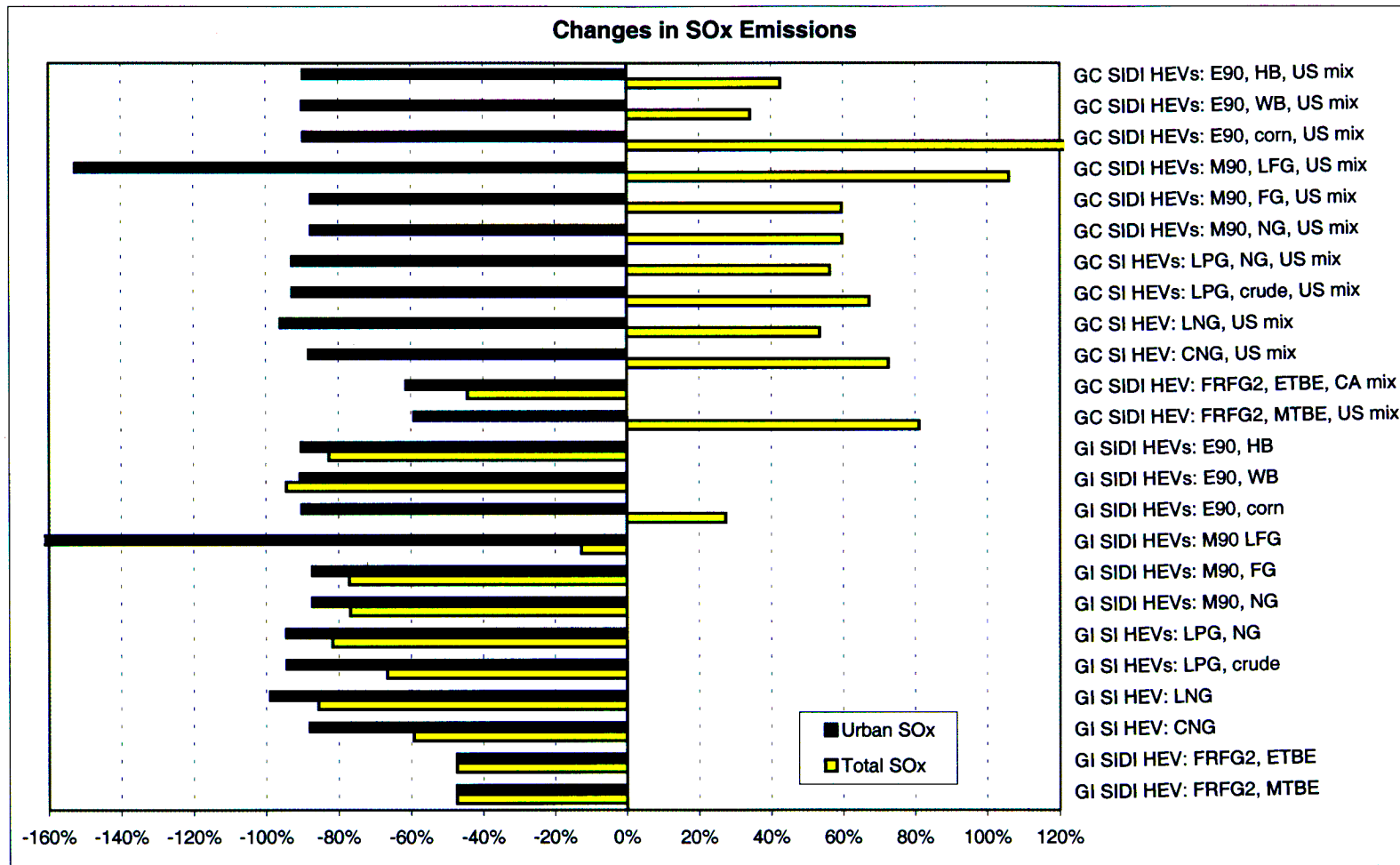
**Figure C-2.32 Changes in Fuel-Cycle PM<sub>10</sub> Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term Electric Vehicles and Fuel-Cell Vehicles**





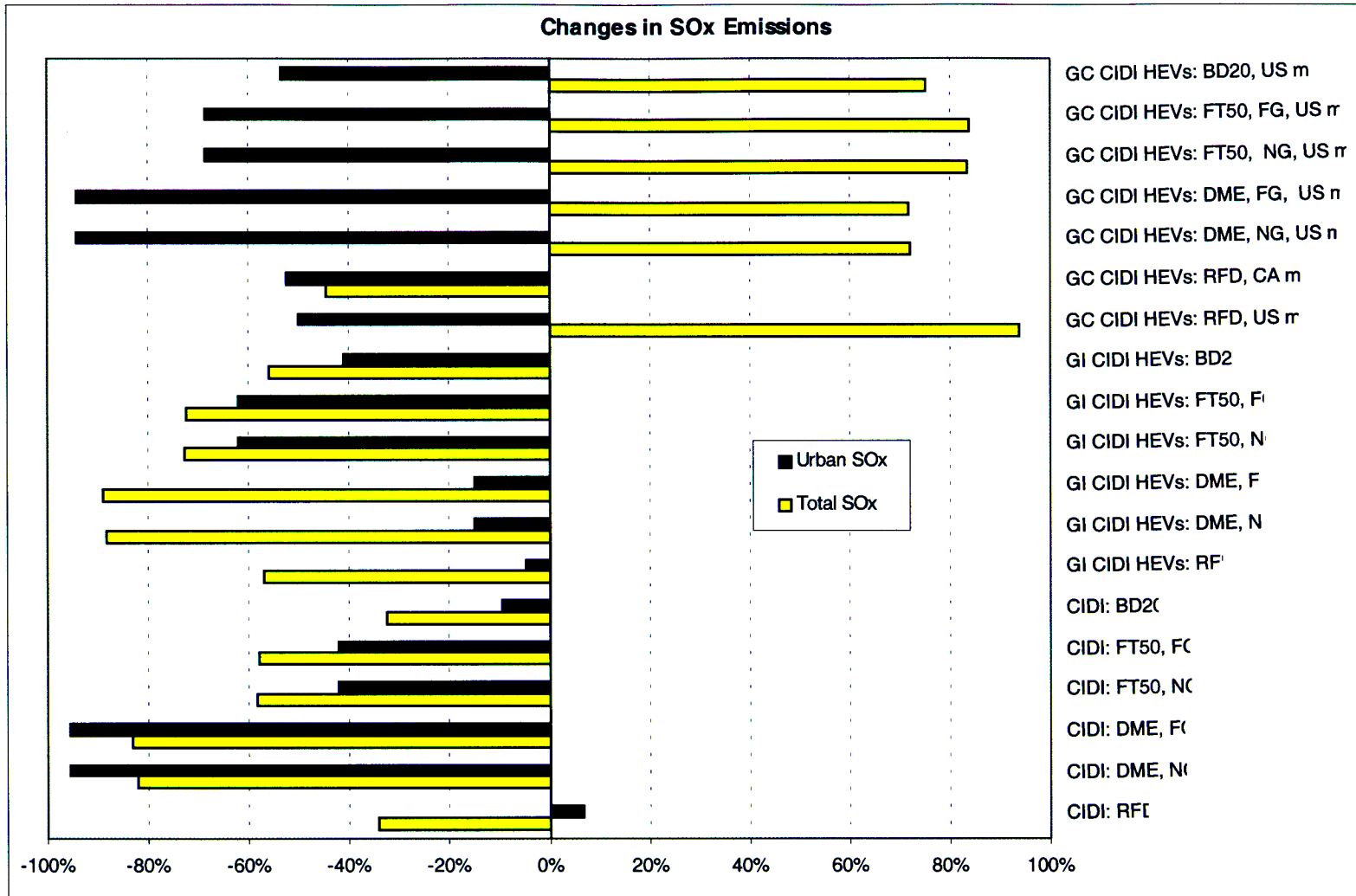
**Figure C-2.33 Changes in Fuel-Cycle SO<sub>x</sub> Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term SI and SIDI Vehicles**





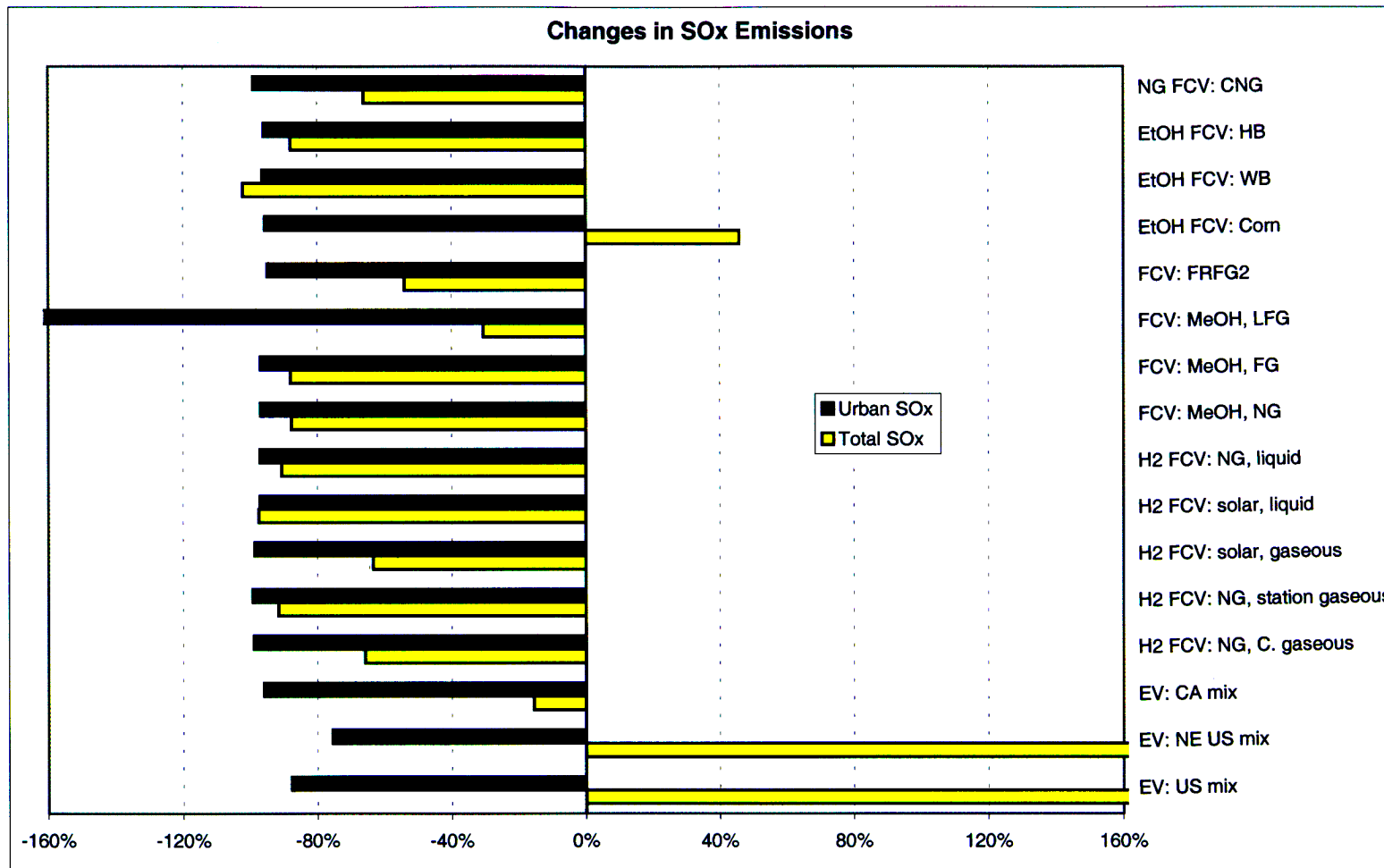
**Figure C-2.34 Changes in Fuel-Cycle SO<sub>x</sub> Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term SI and SIDI Hybrid Electric Vehicles**





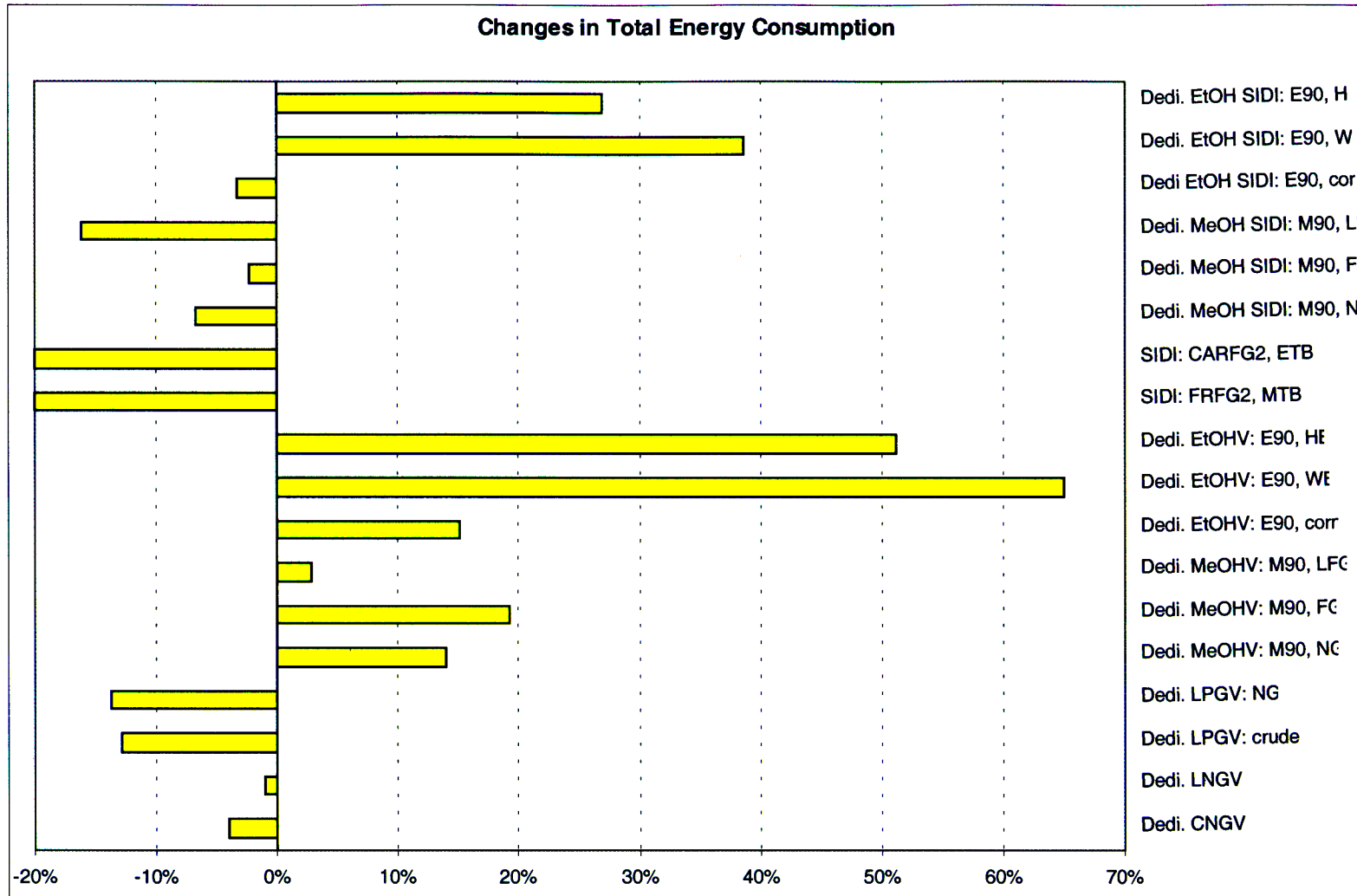
**Figure C-2.35 Changes in Fuel-Cycle SO<sub>x</sub> Emissions Relative to GV's Fueled with RFG, Light-Duty Trucks 1: Long-Term CIDI Vehicles and CIDI Hybrid Electric Vehicles**





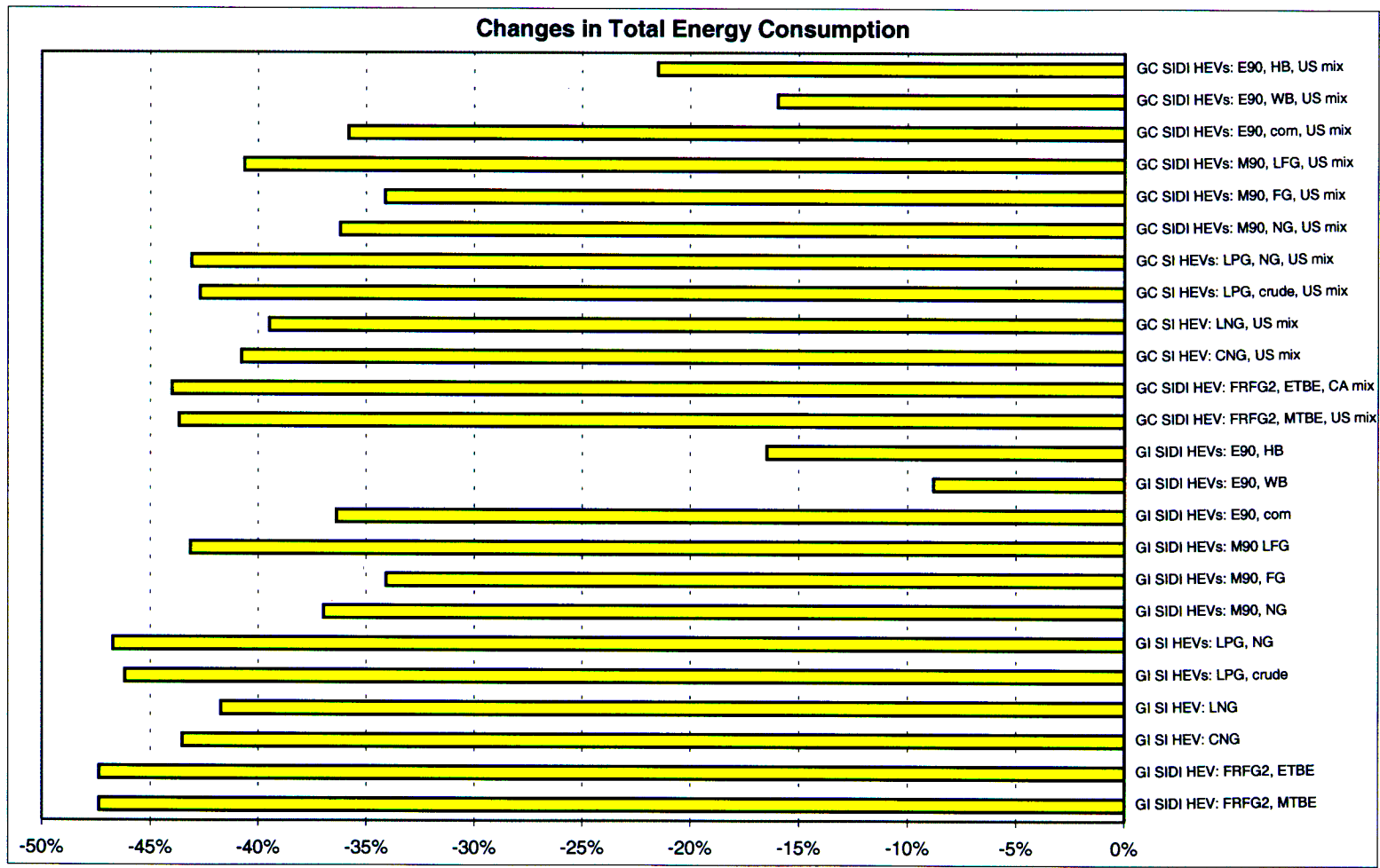
**Figure C-2.36 Changes in Fuel-Cycle SO<sub>x</sub> Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 1: Long-Term Electric Vehicles and Fuel-Cell Vehicles**





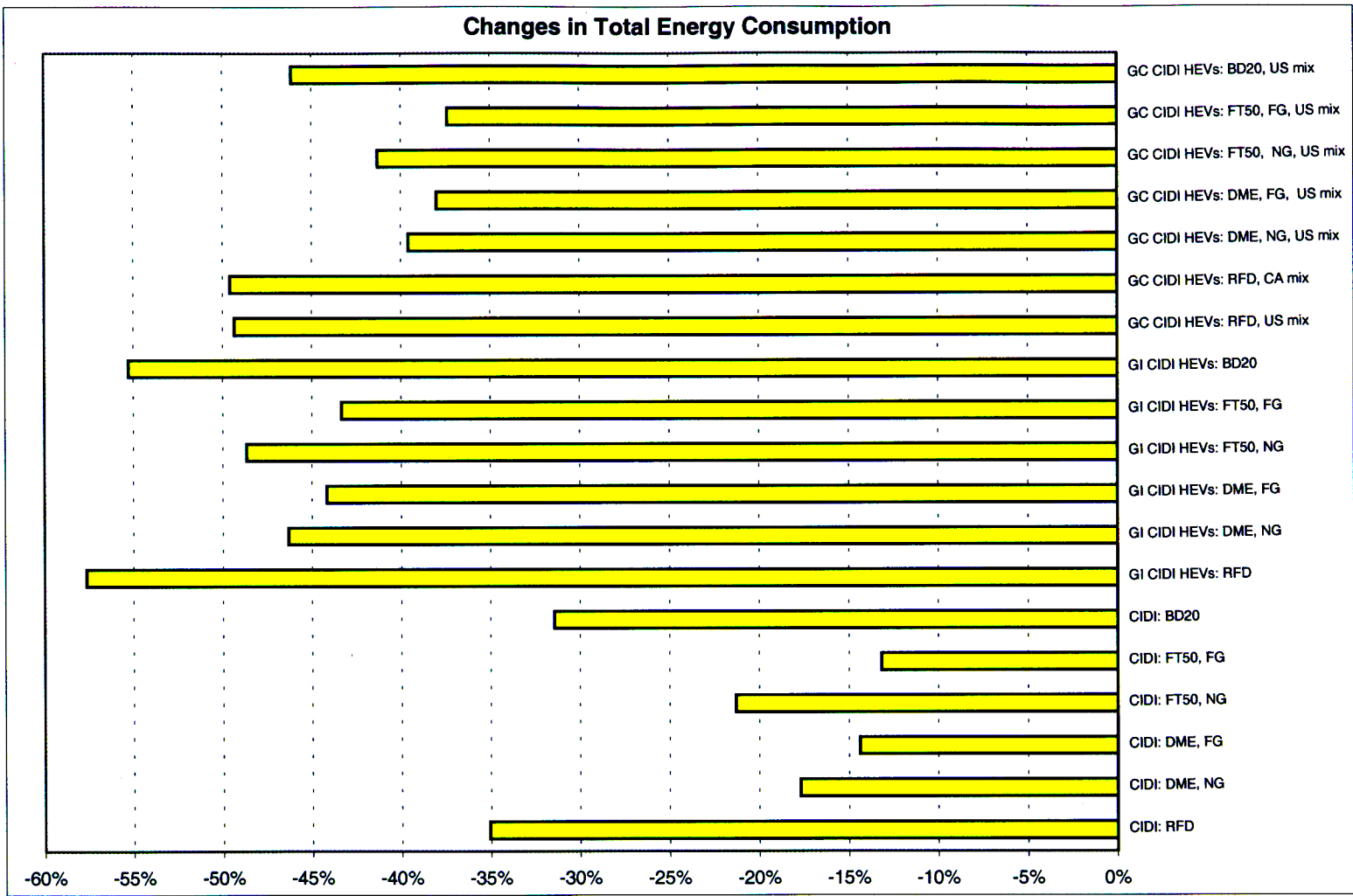
**Figure C-2.37 Changes in Fuel-Cycle Total Energy Consumption Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term SI and SIDI Vehicles**





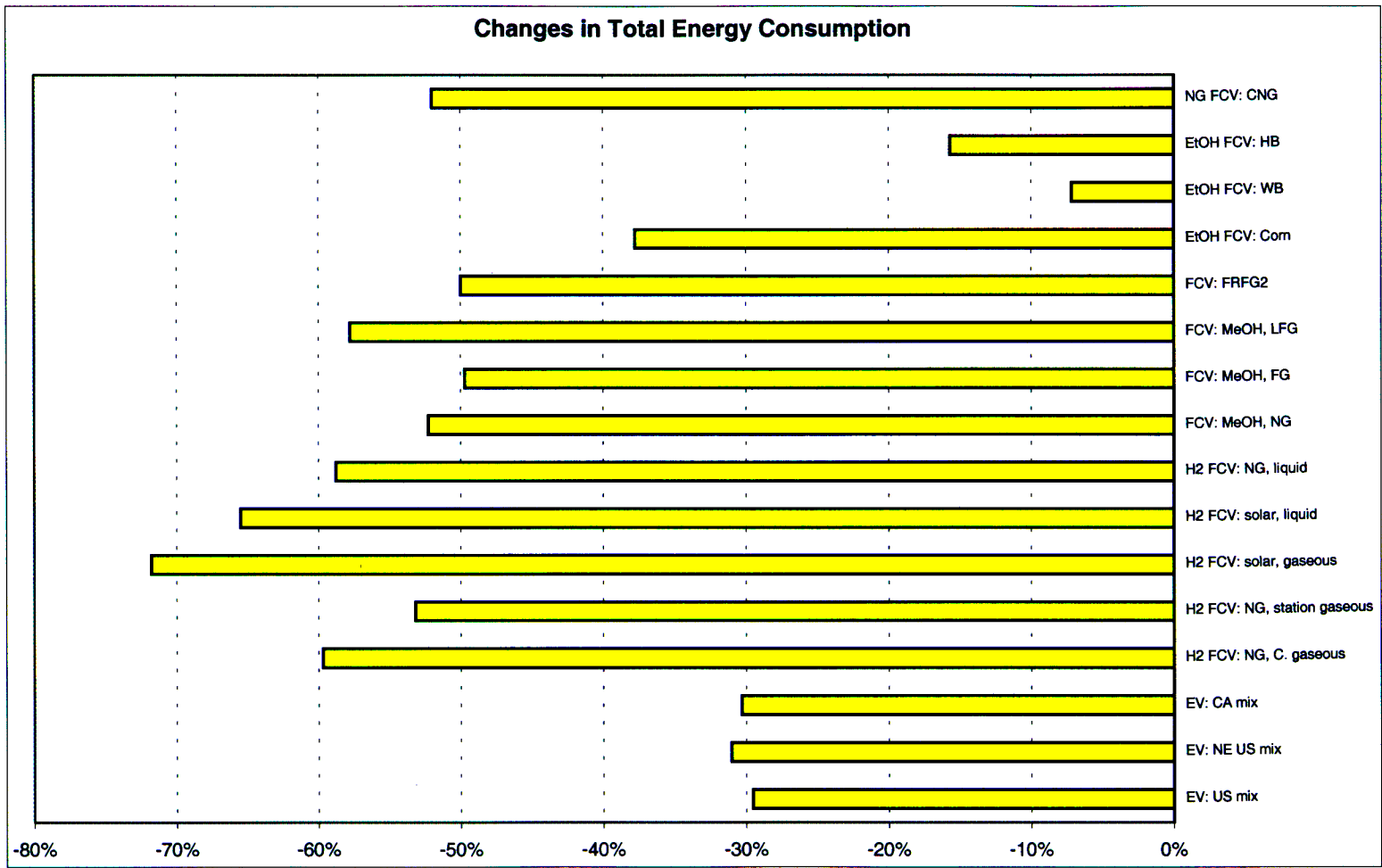
**Figure C-2.38 Changes in Fuel-Cycle Total Energy Consumption Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term SI and SIDI Hybrid Electric Vehicles**





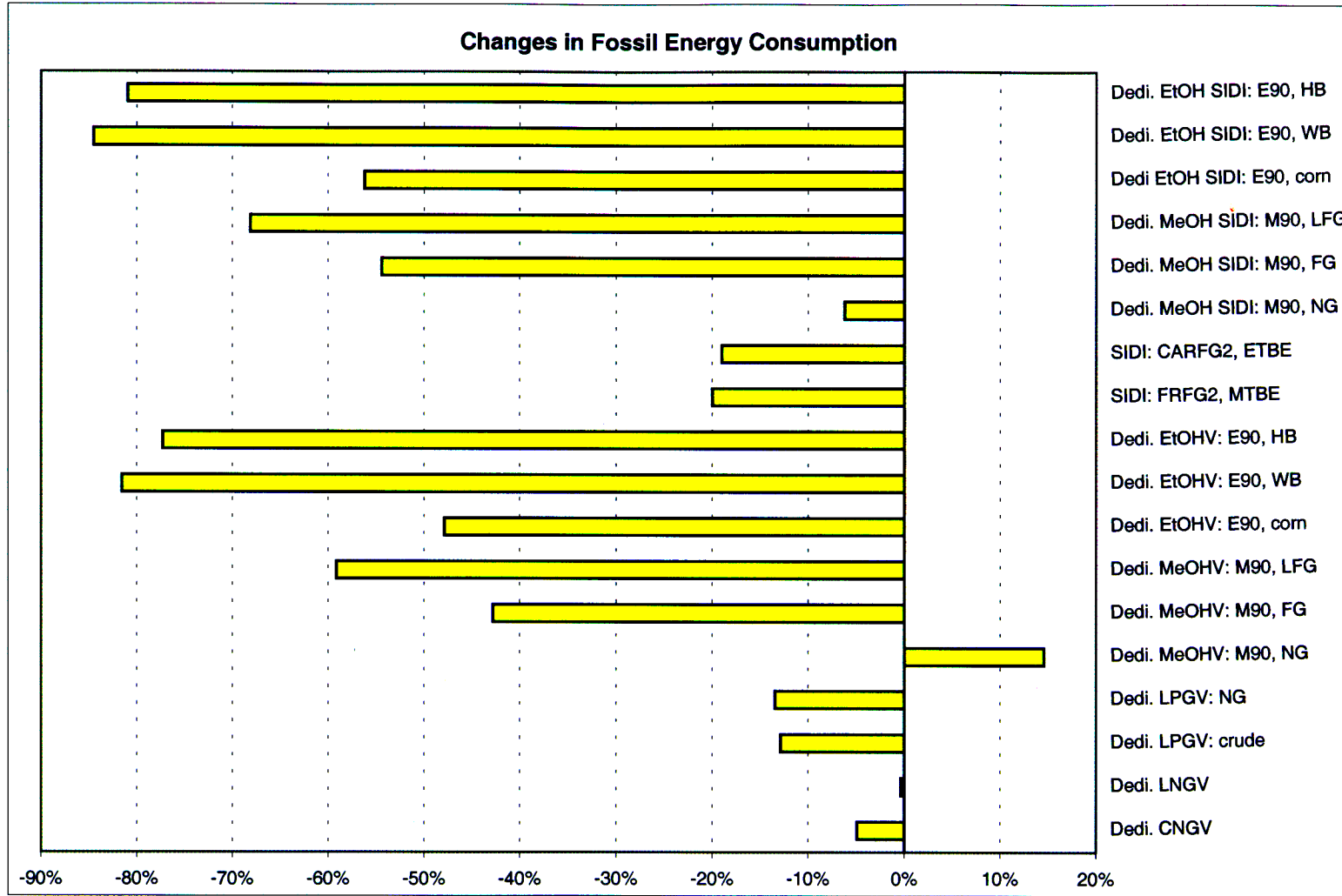
**Figure C-2.39 Changes in Fuel-Cycle Total Energy Consumption Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term CIDI Vehicles and CIDI Hybrid Electric Vehicles**





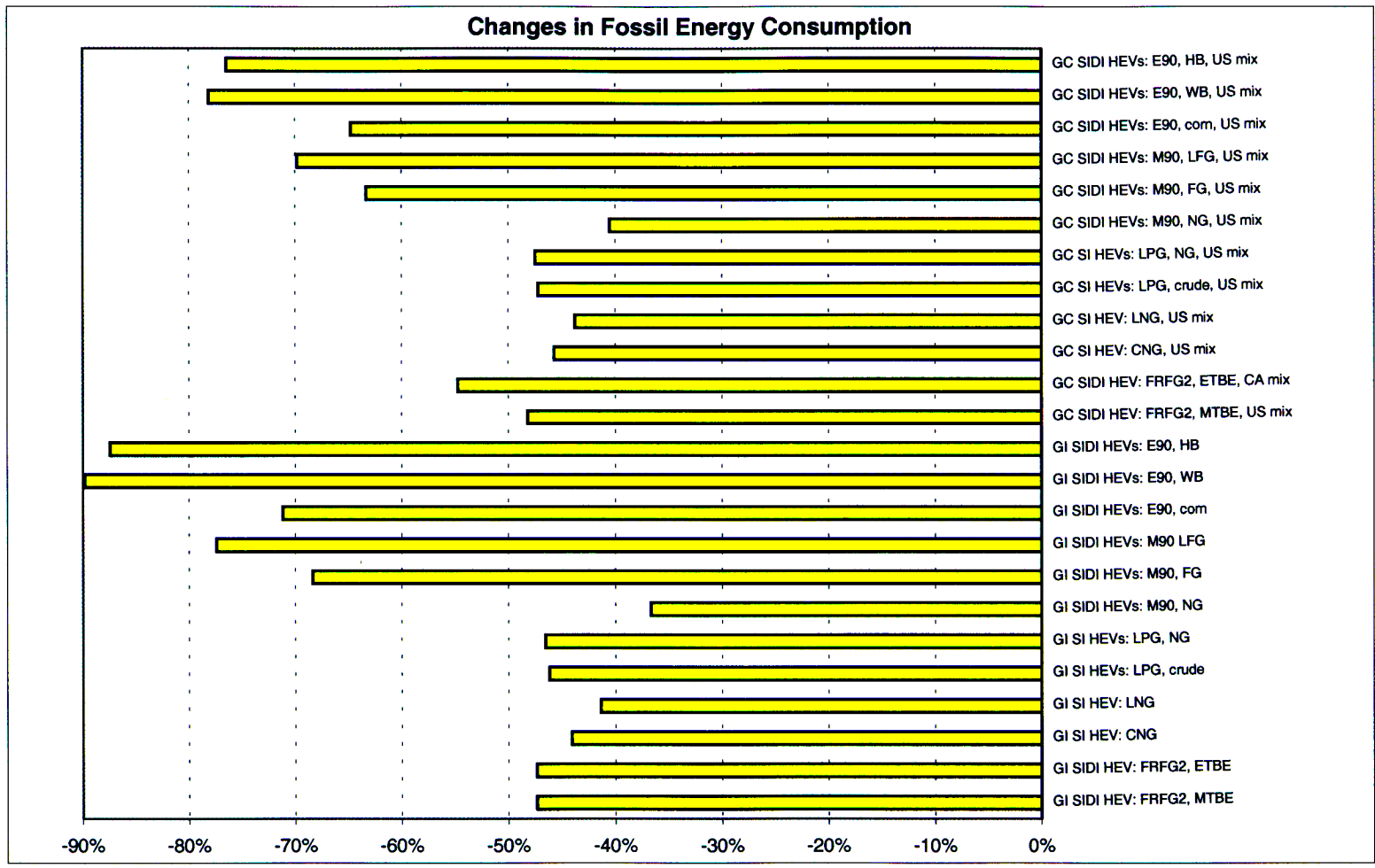
**Figure C-2.40 Changes in Fuel-Cycle Total Energy Consumption Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term Electric Vehicles and Fuel-Cell Vehicles**





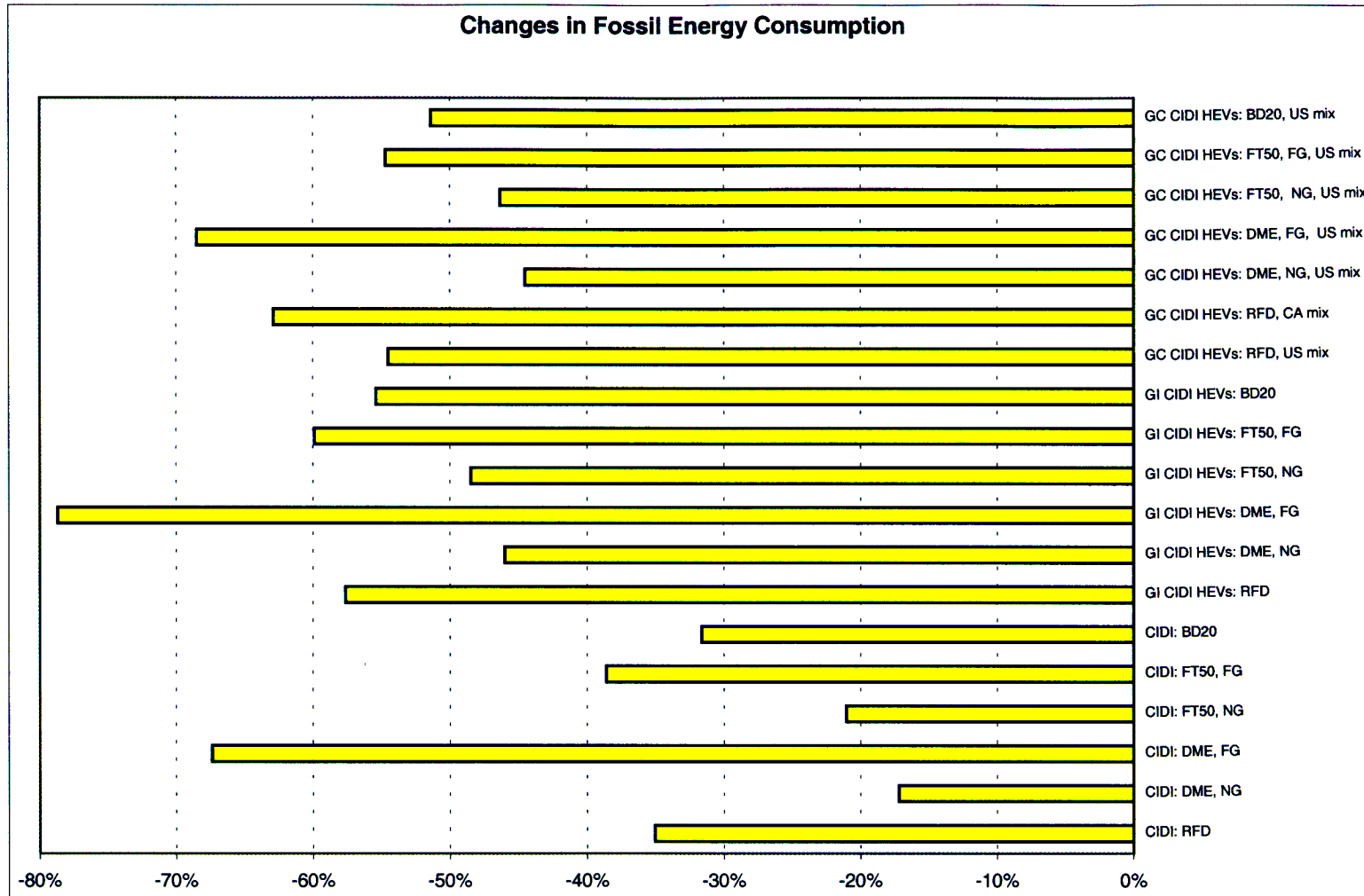
**Figure C-2.41 Changes in Fuel-Cycle Fossil Energy Consumption Relative to GV's Fueled with RFG, Light-Duty Trucks 2: Long-Term SI and SIDI Vehicles**





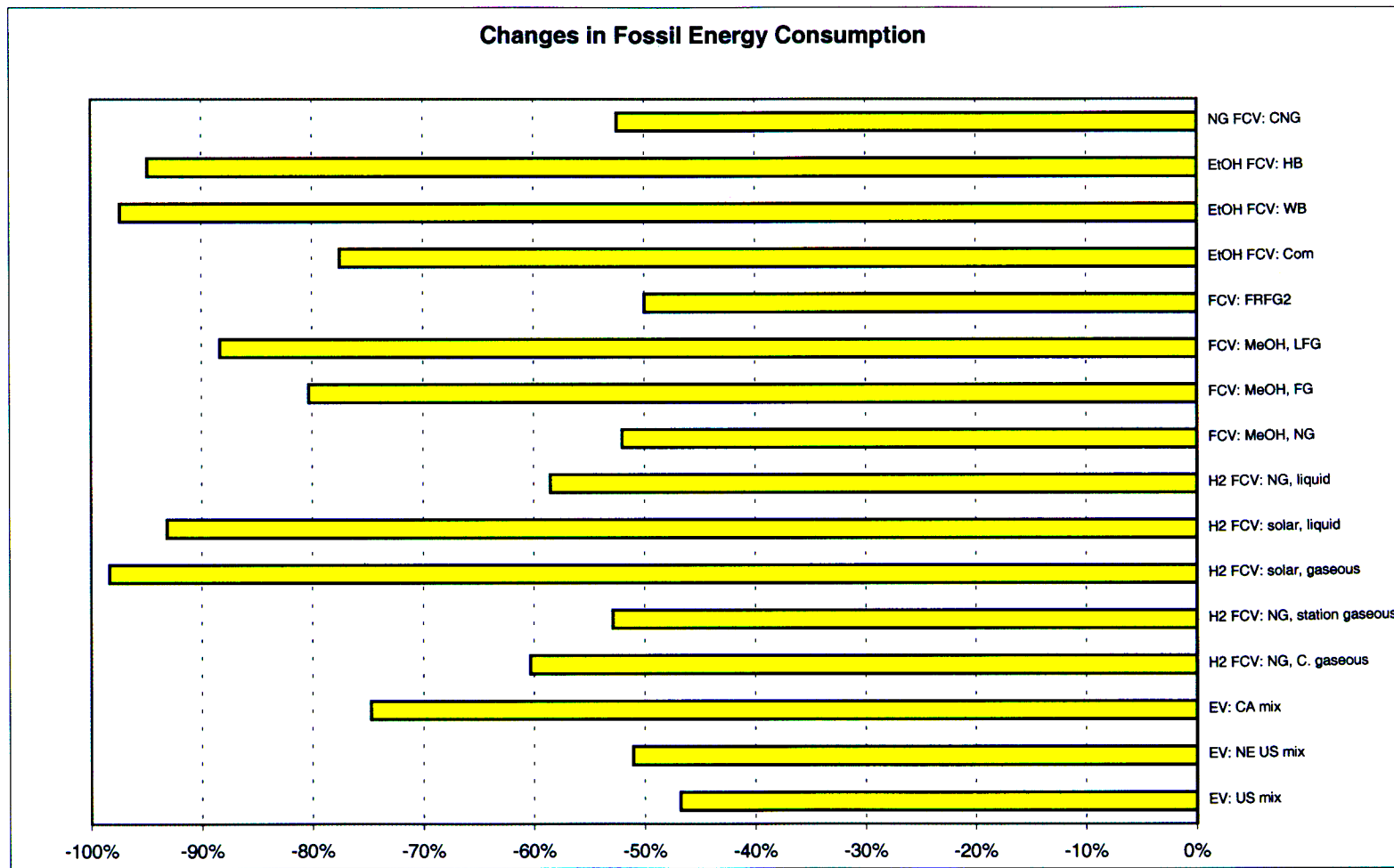
**Figure C-2.42 Changes in Fuel-Cycle Fossil Energy Consumption Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term SI and SIDI Hybrid Electric Vehicles**





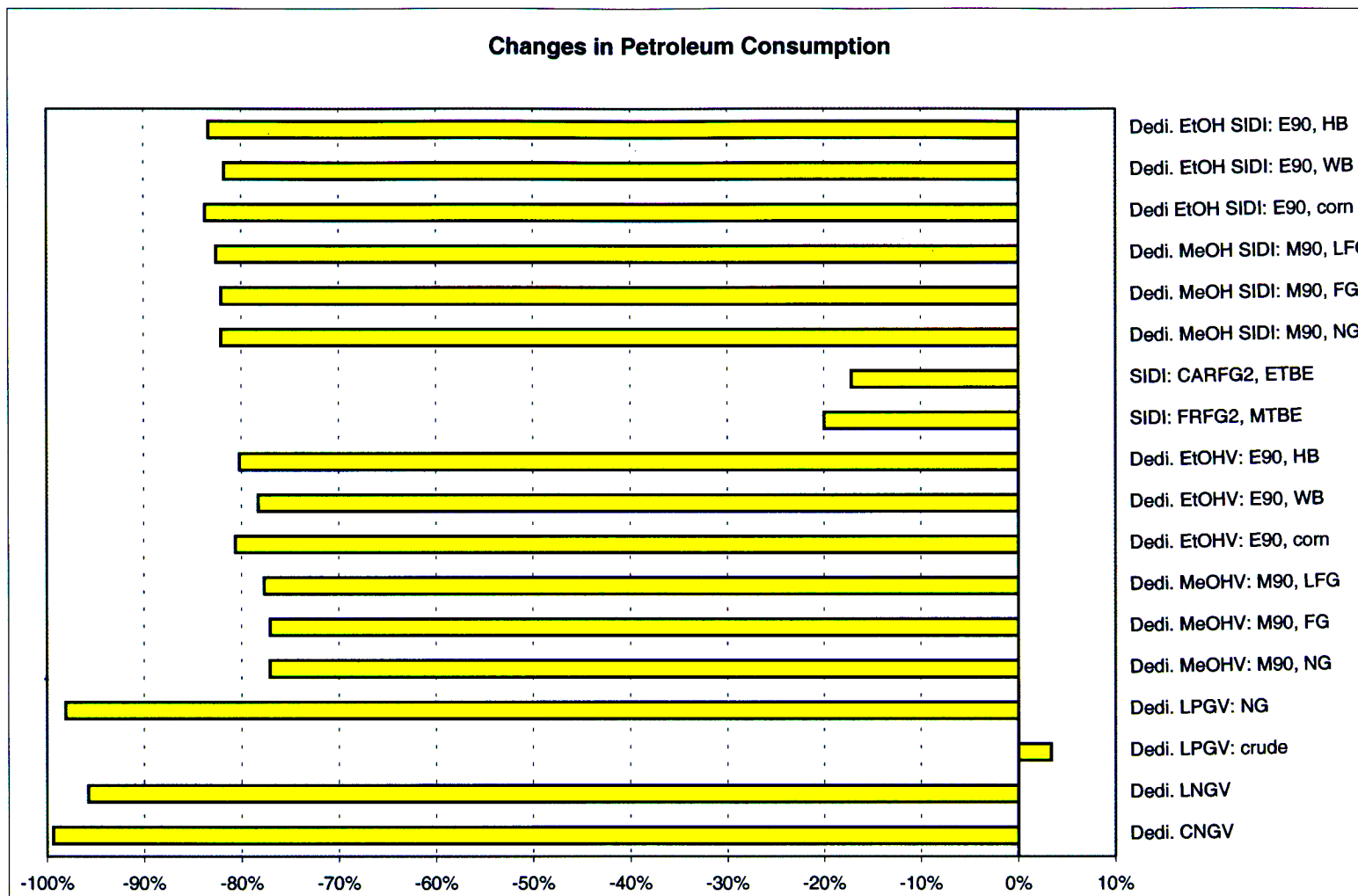
**Figure C-2.43 Changes in Fuel-Cycle Fossil Energy Consumption Relative to GV's Fueled with RFG, Light-Duty Trucks 2: Long-Term CIDI Vehicles and CIDI Hybrid Electric Vehicles**



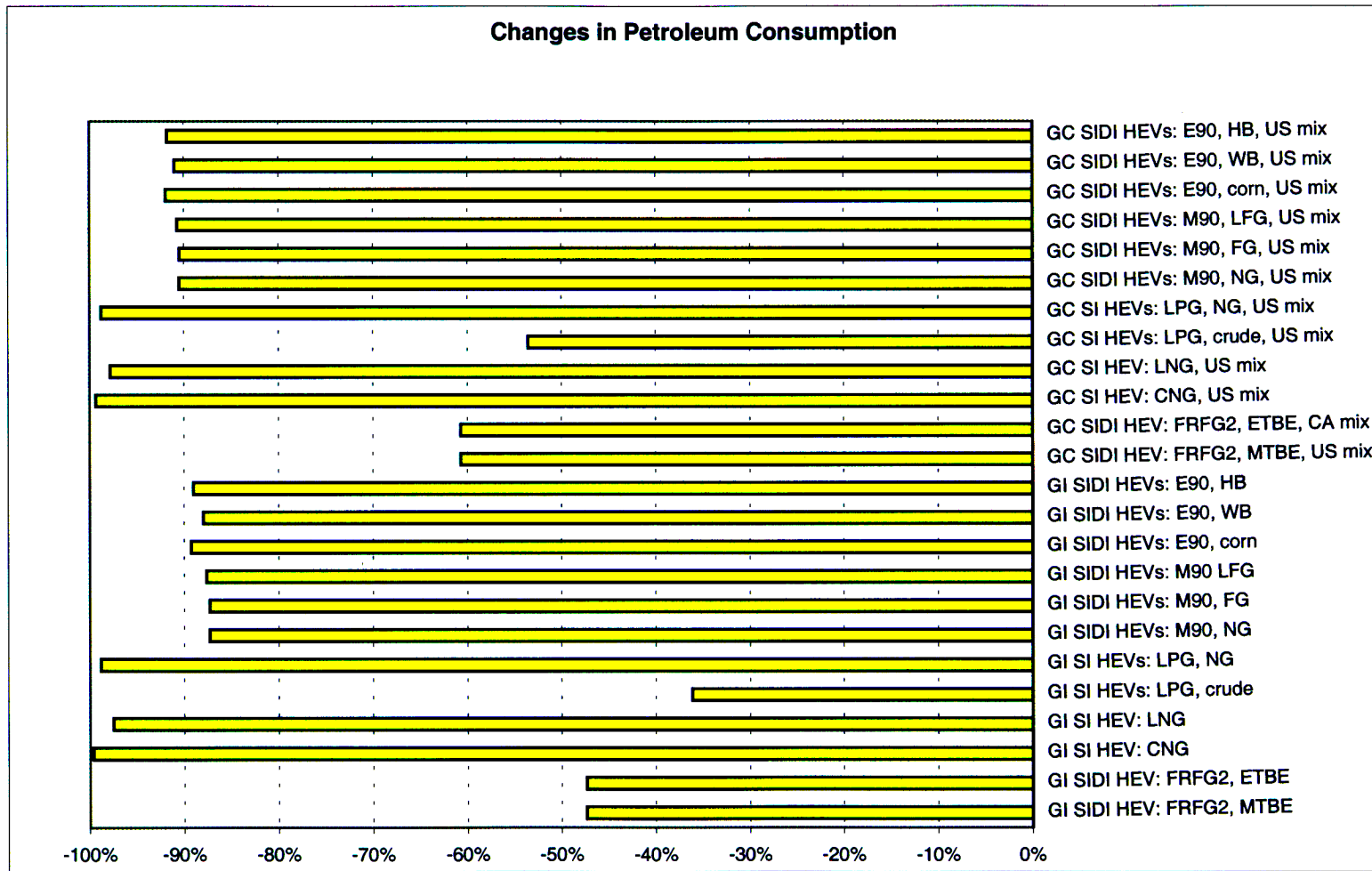


**Figure C-2.44 Changes in Fuel-Cycle Fossil Energy Consumption Relative to GV's Fueled with RFG, Light-Duty Trucks 2: Long-Term Electric Vehicles and Fuel-Cell Vehicles**



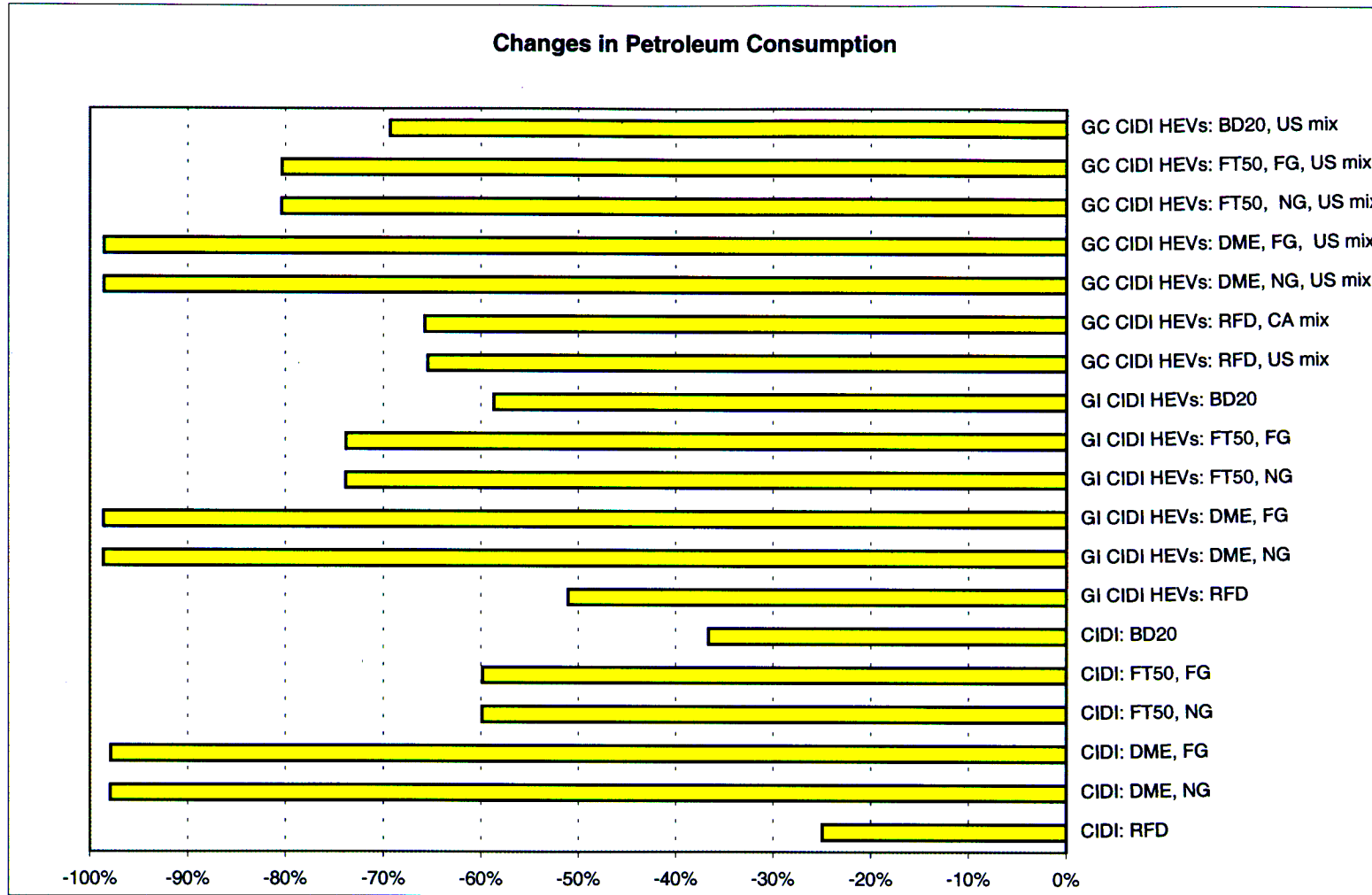


**Figure C-2.45 Changes in Fuel-Cycle Petroleum Consumption Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term SI and SIDI Vehicles**



**Figure C-2.46 Changes in Fuel-Cycle Petroleum Consumption Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term SI and SIDI Hybrid Electric Vehicles**

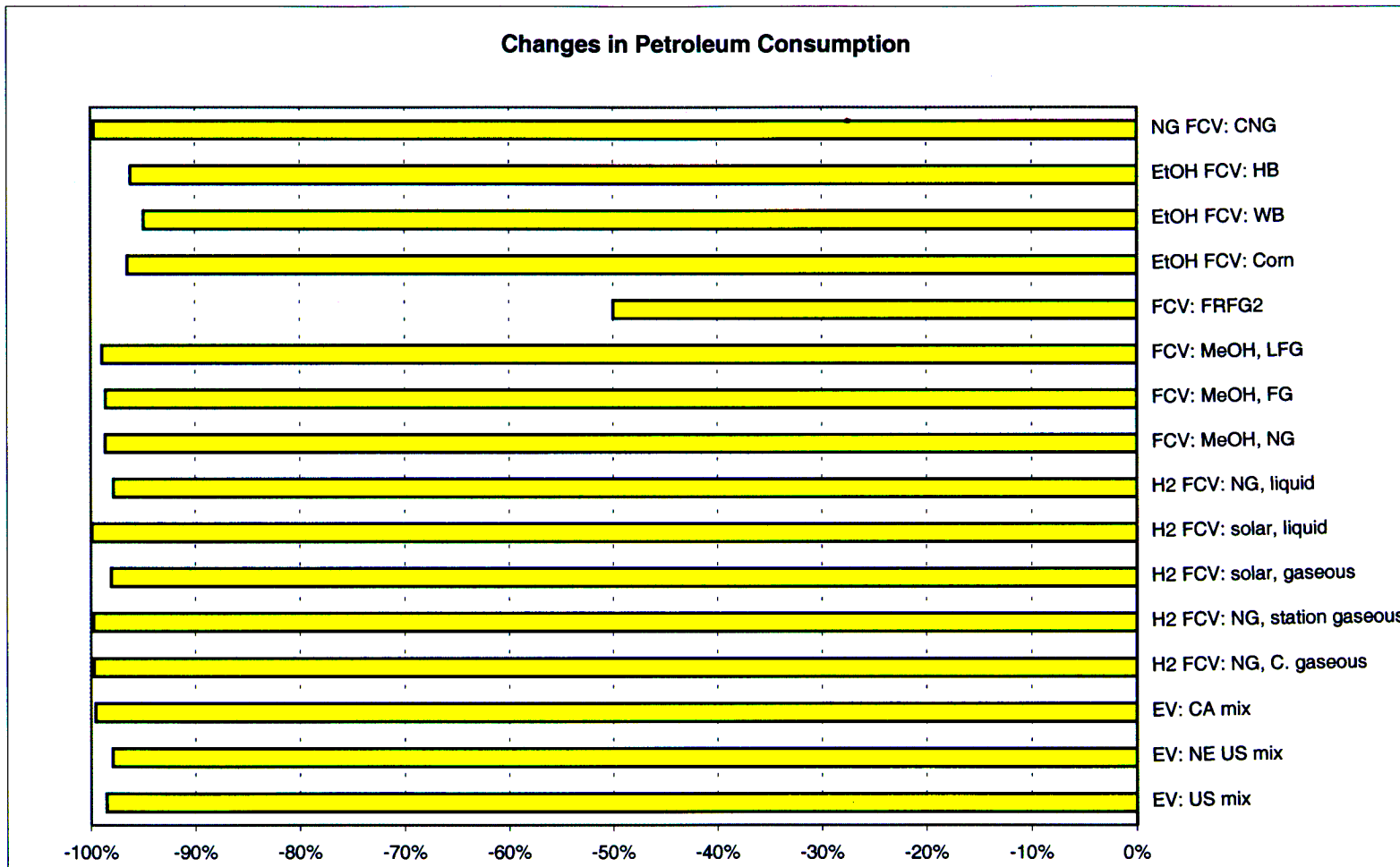




**Figure C-2.47 Changes in Fuel-Cycle Petroleum Consumption Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term CIDI Vehicles and CIDI Hybrid Electric Vehicles**

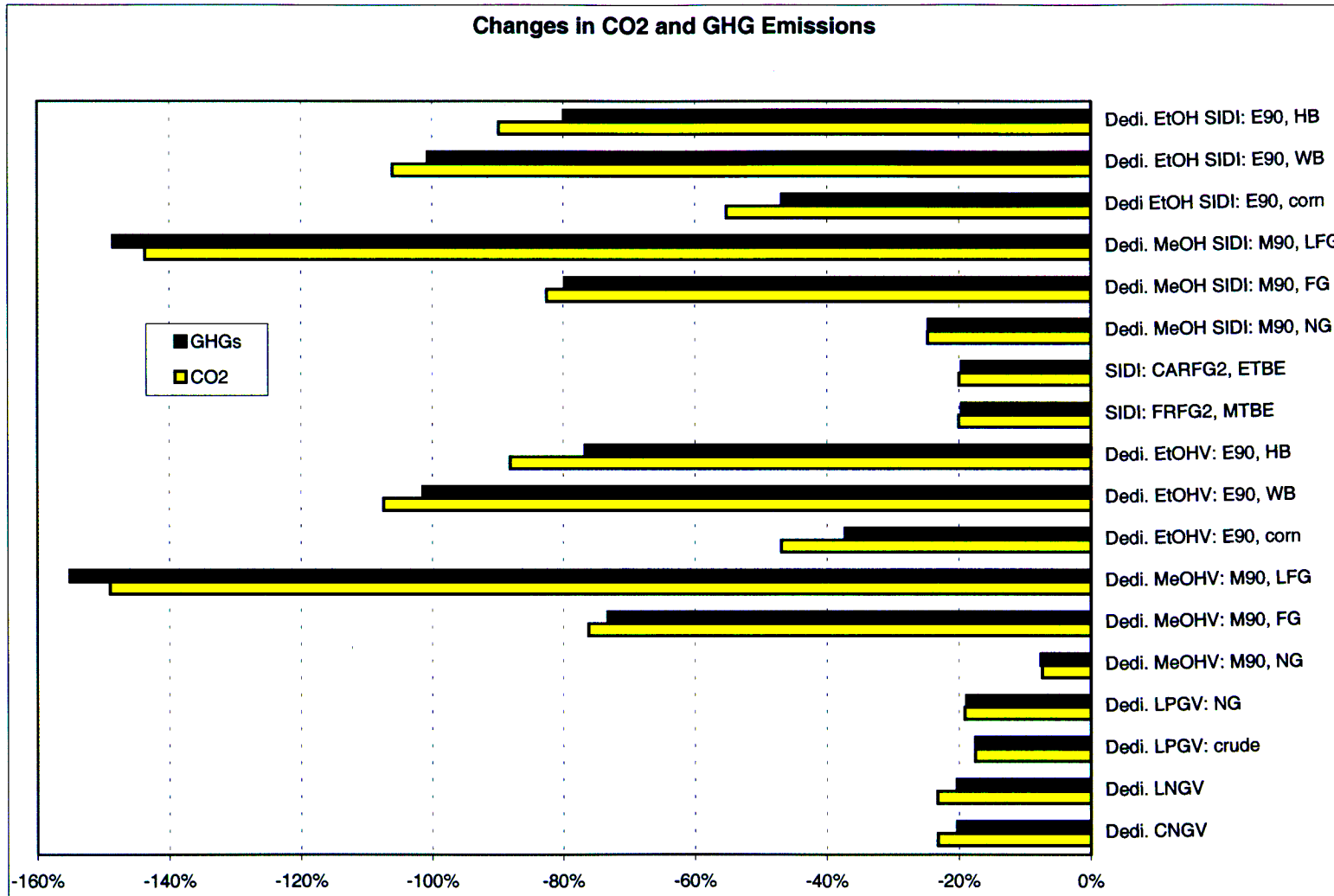






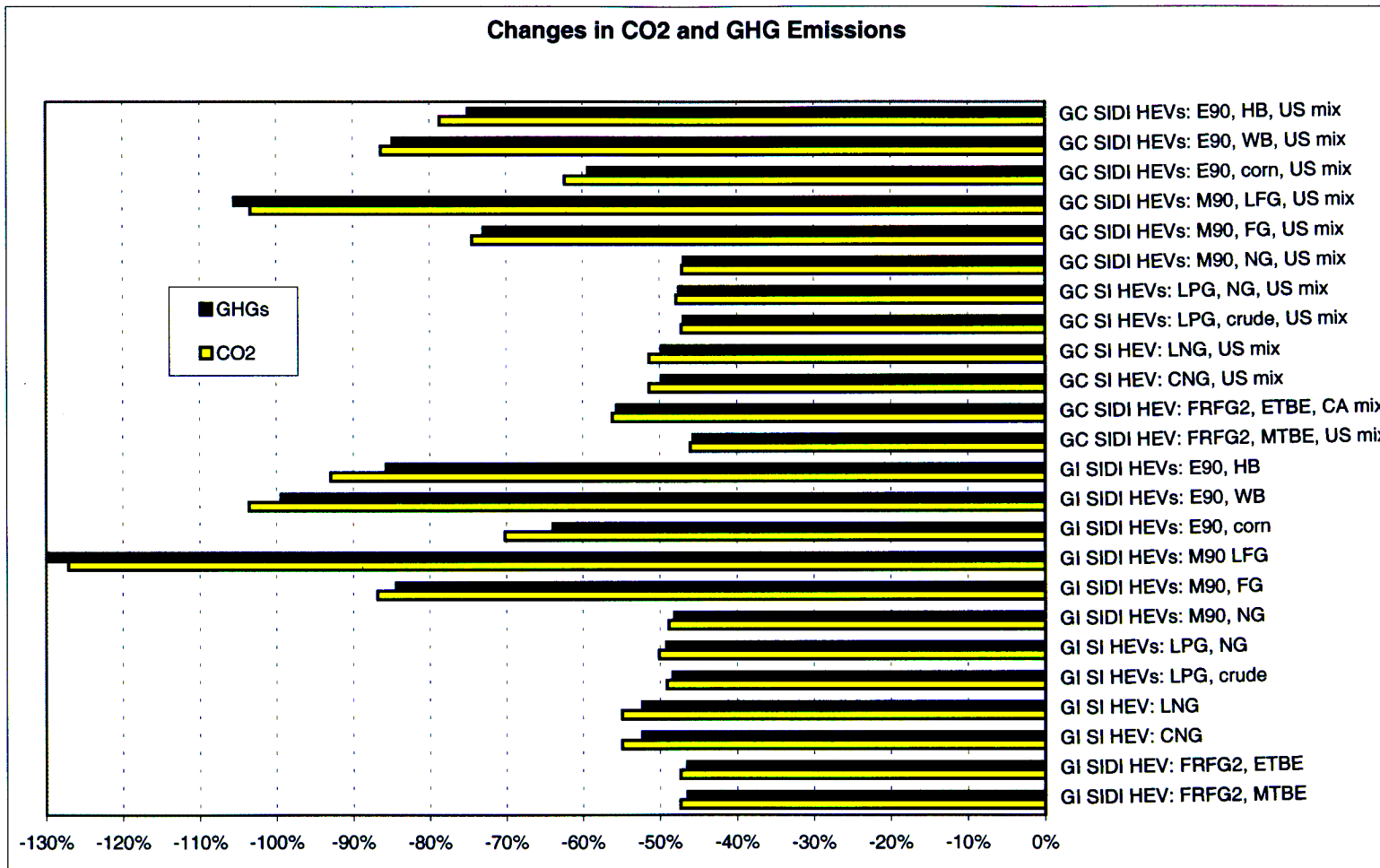
**Figure C-2.48 Changes in Fuel-Cycle Petroleum Consumption Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term Electric Vehicles and Fuel-Cell Vehicles**





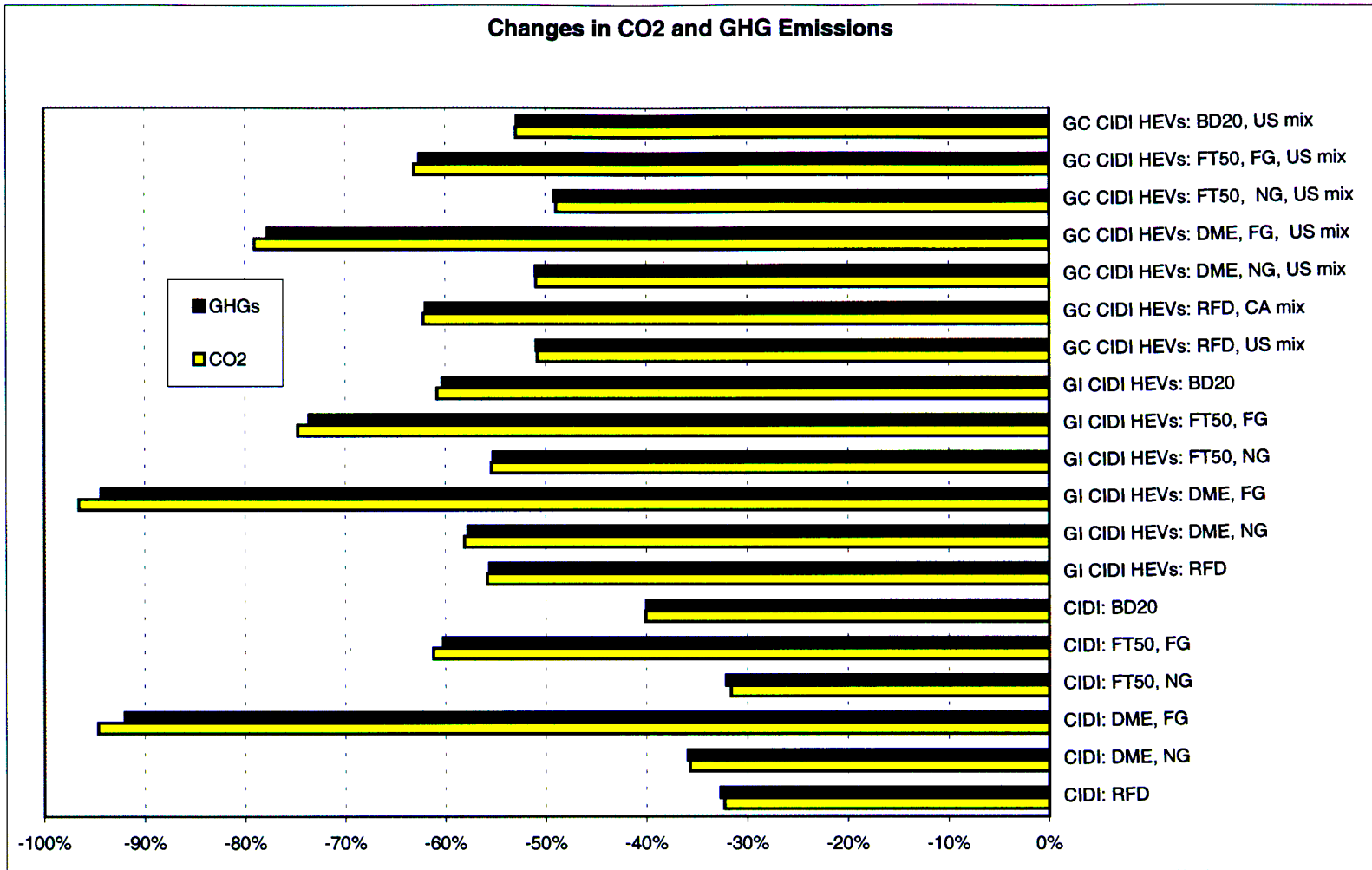
**Figure C-2.49 Changes in Fuel-Cycle CO<sub>2</sub> and GHG Emissions Relative to GV's Fueled with RFG, Light-Duty Trucks 2: Long-Term SI and SIDI Vehicles**



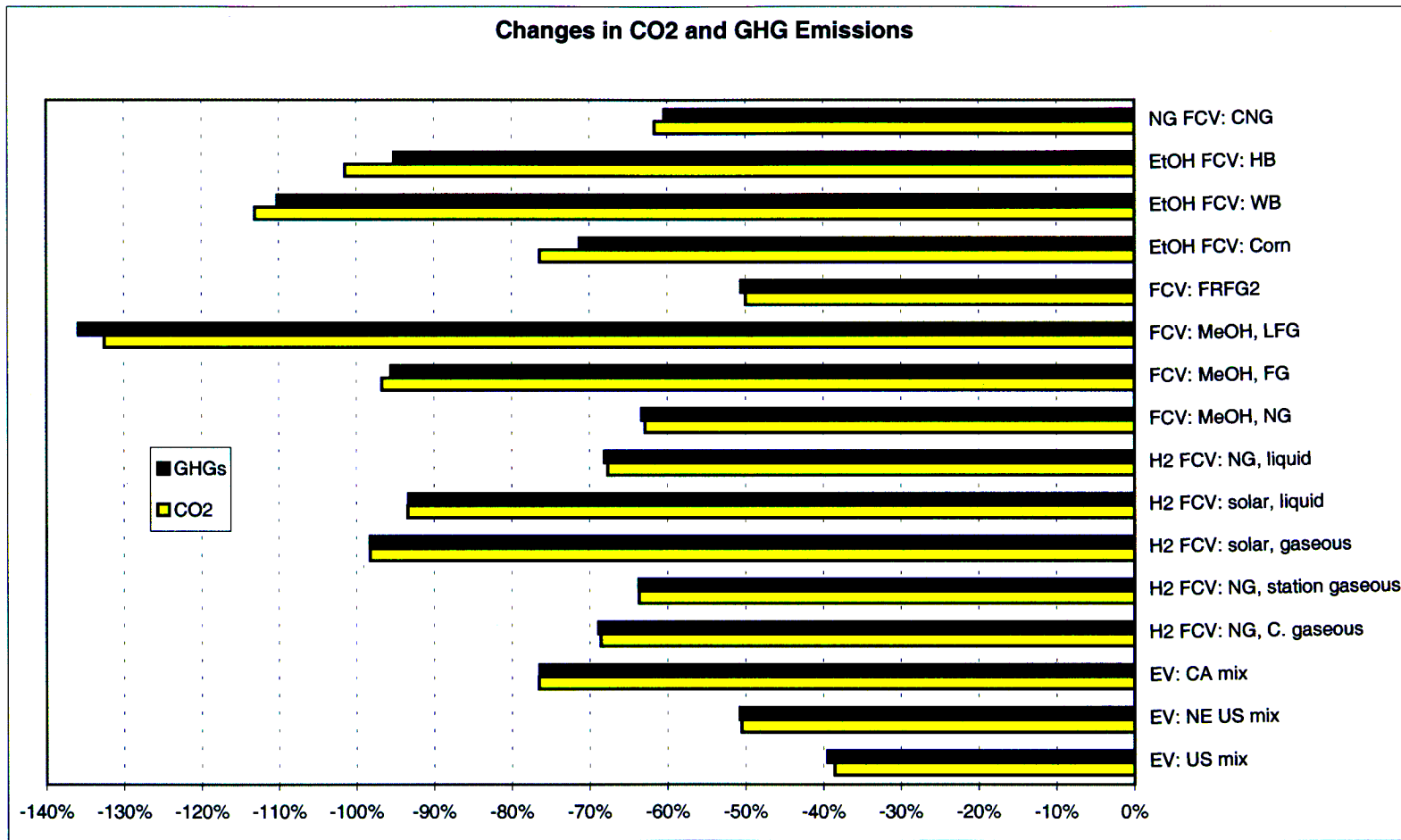


**Figure C-2.50 Changes in Fuel-Cycle CO<sub>2</sub> and GHG Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term SI and SIDI Hybrid Electric Vehicles**



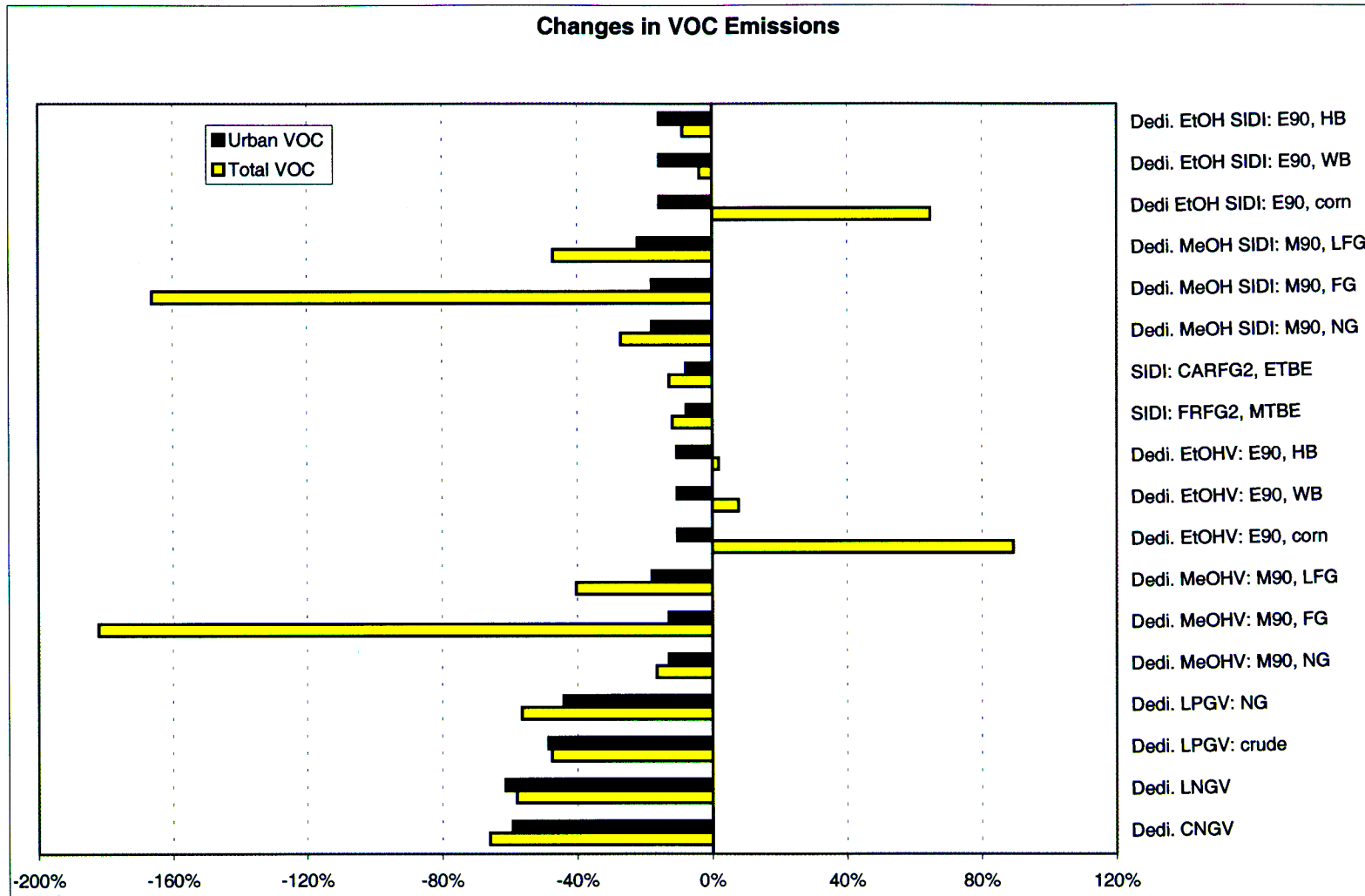


**Figure C-2.51 Changes in Fuel-Cycle CO<sub>2</sub> and GHG Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term CIDI Vehicles and CIDI Hybrid Electric Vehicles**

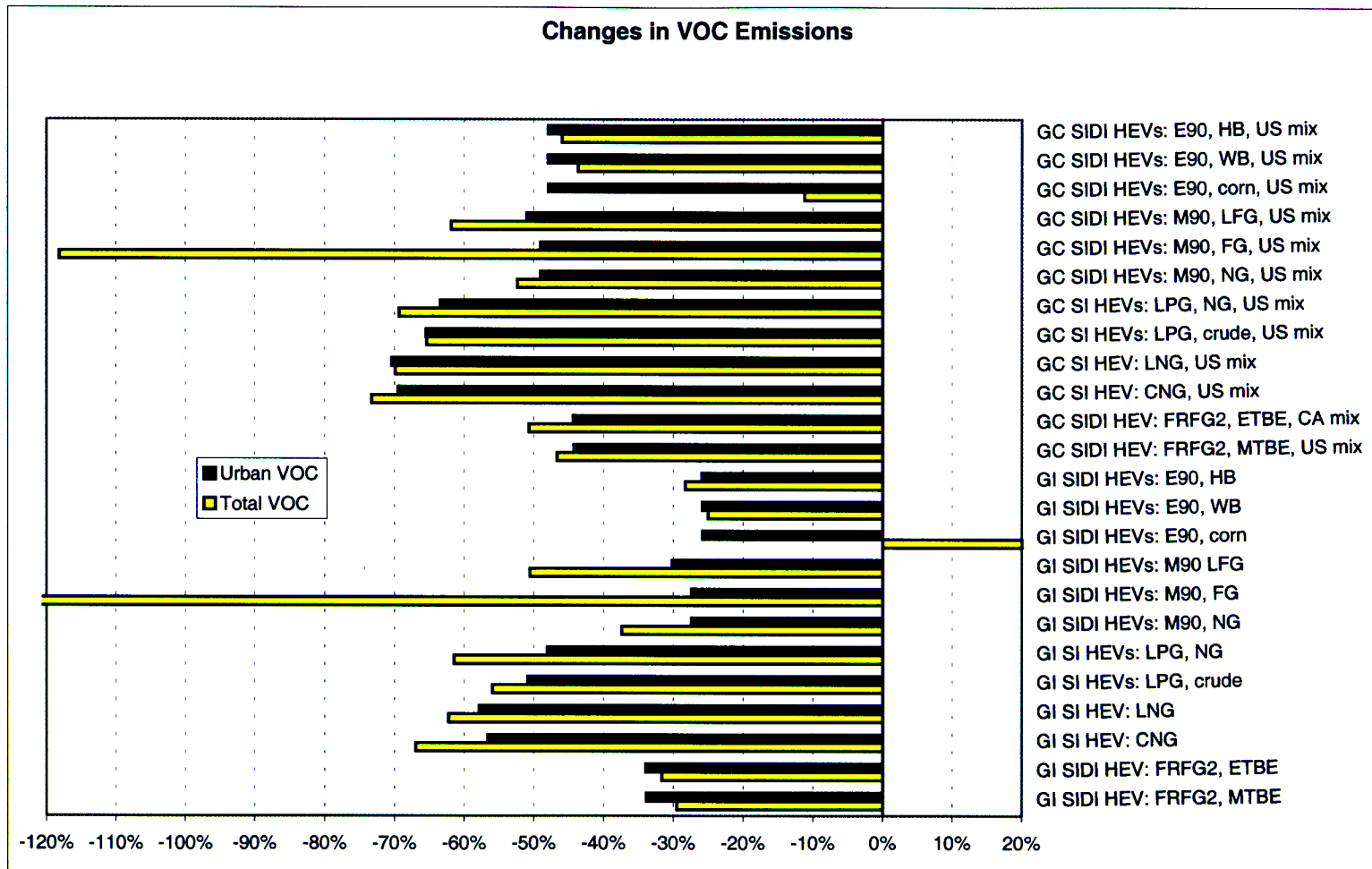


**Figure C-2.52 Changes in Fuel-Cycle CO<sub>2</sub> and GHG Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term Electric Vehicles and Fuel-Cell Vehicles**



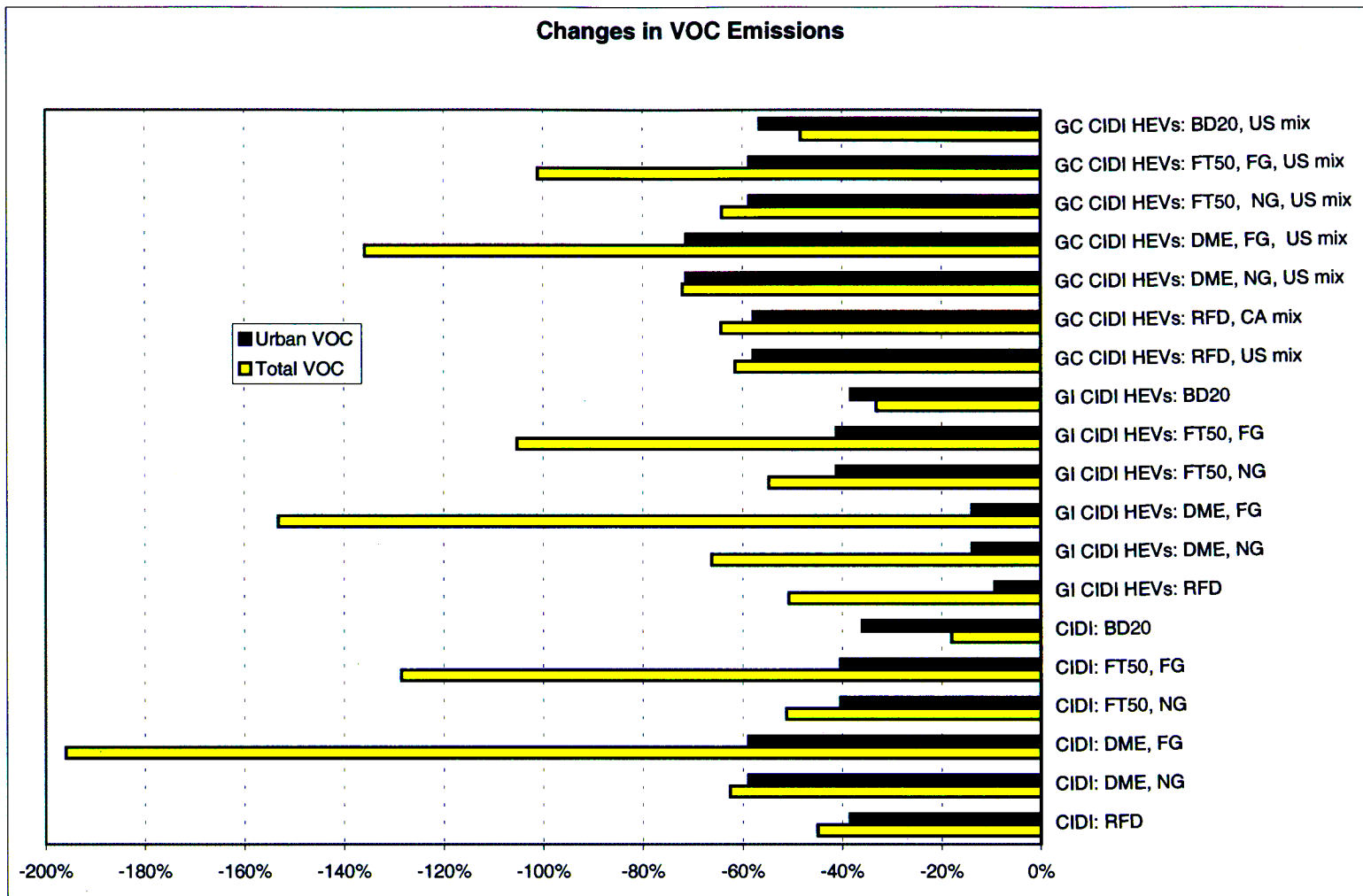


**Figure C-2.53 Changes in Fuel-Cycle VOC Emissions Relative to GV's Fueled with RFG, Light-Duty Trucks 2: Long-Term SI and SIDI Vehicles**



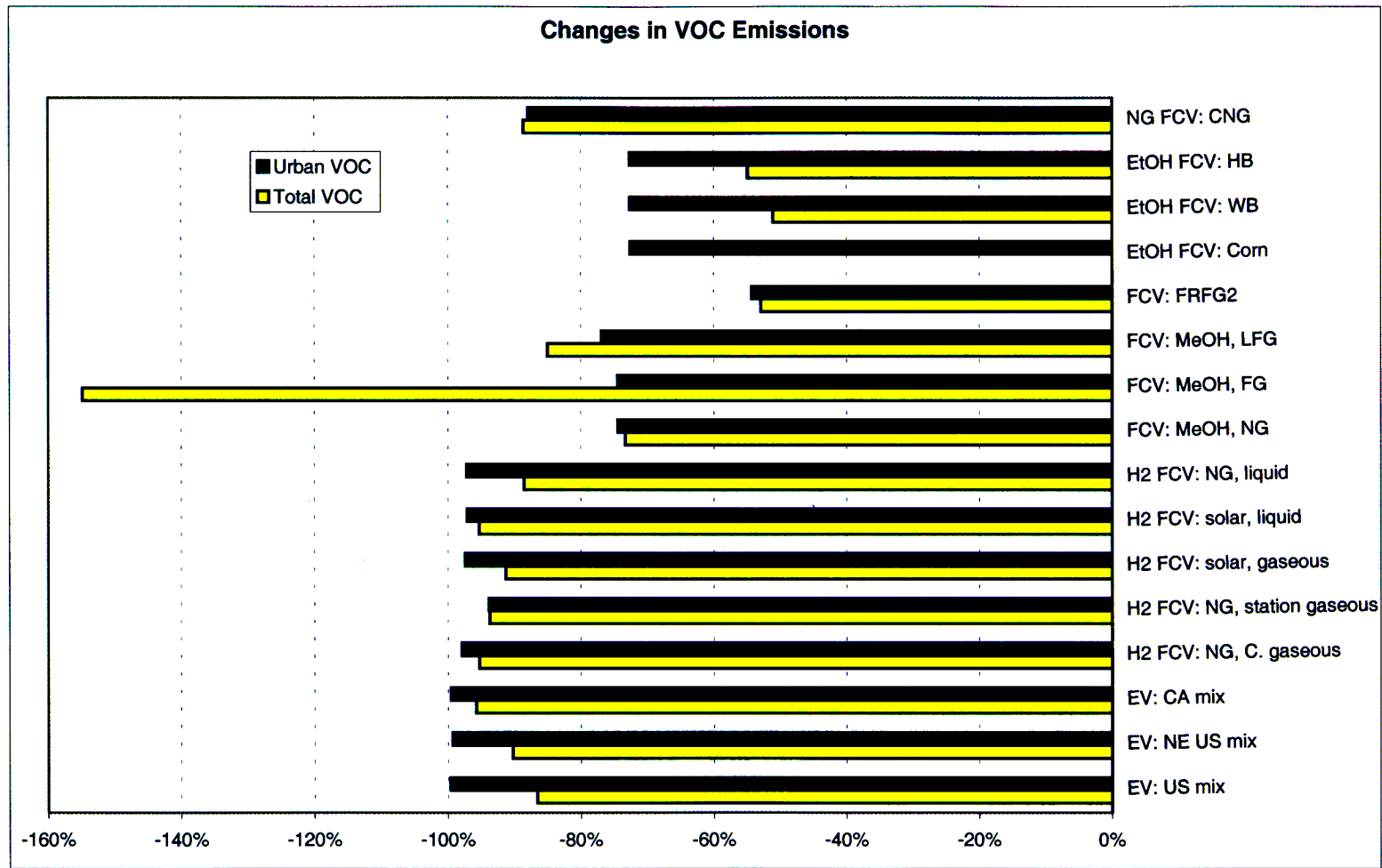
**Figure C-2.54 Changes in Fuel-Cycle VOC Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term SI and SIDI Hybrid Electric Vehicles**





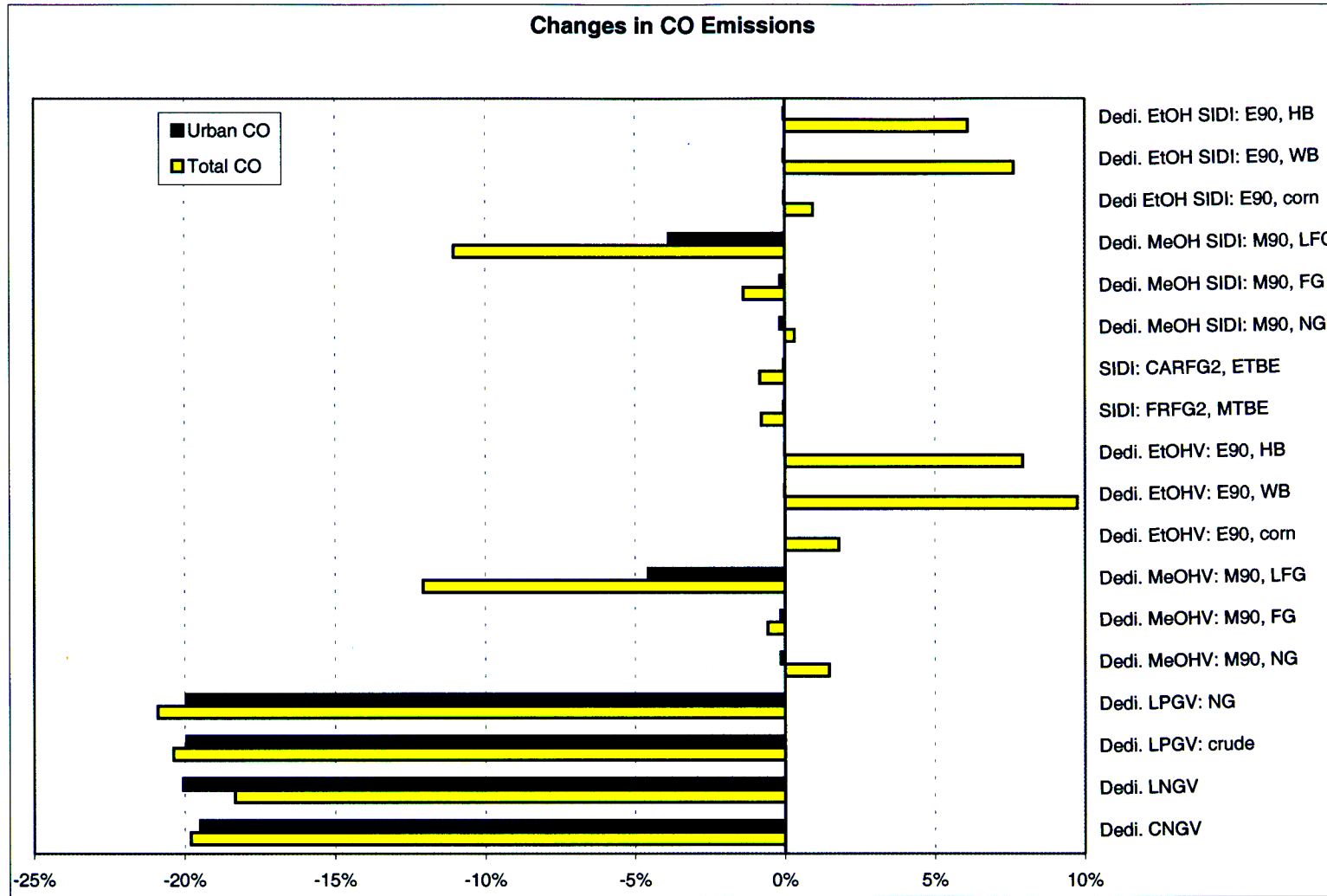
**Figure C-2.55 Changes in Fuel-Cycle VOC Emissions Relative to GV's Fueled with RFG, Light-Duty Trucks 2: Long-Term CIDI Vehicles and CIDI Hybrid Electric Vehicles**





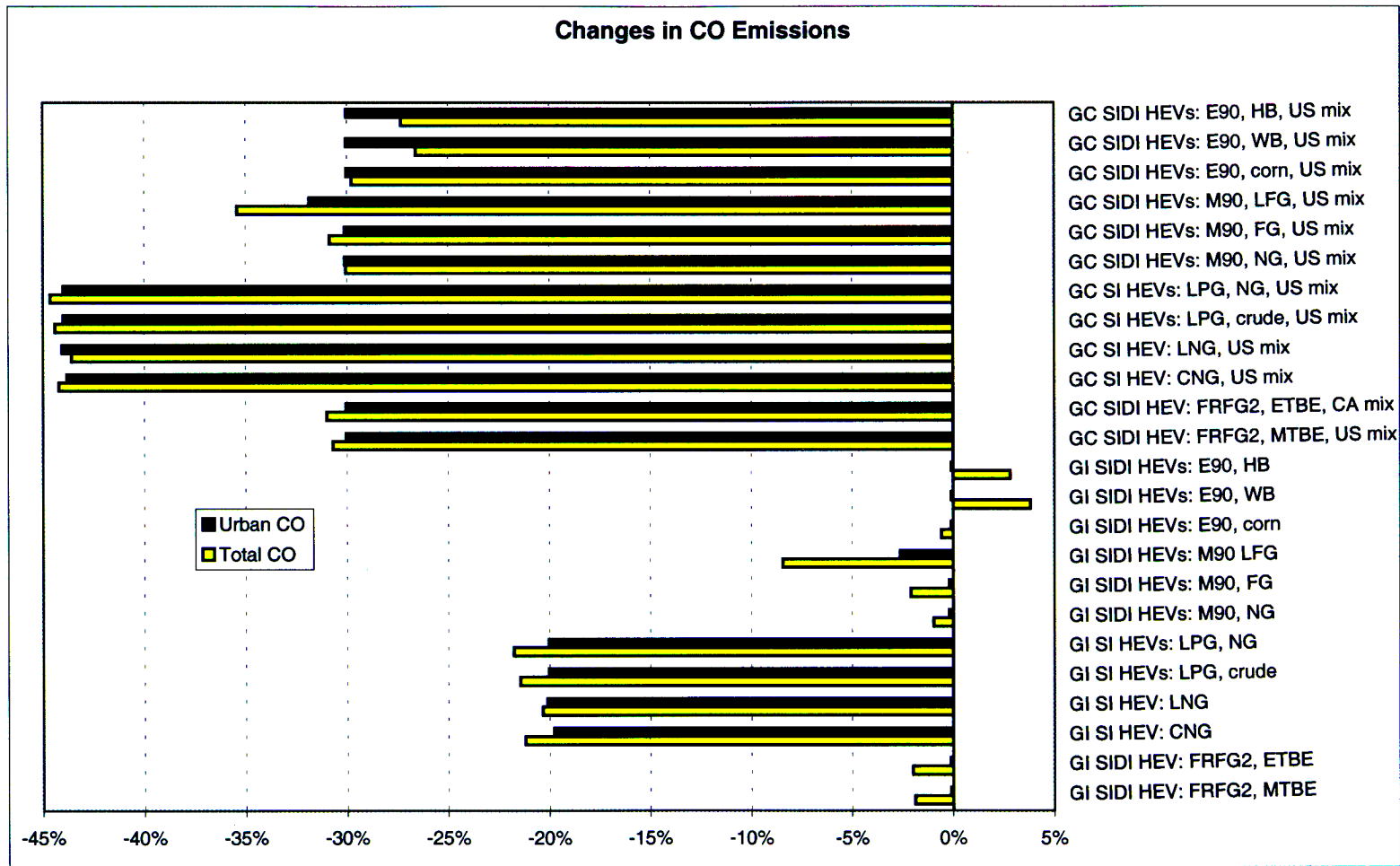
**Figure C-2.56 Changes in Fuel-Cycle VOC Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term Electric Vehicles and Fuel-Cell Vehicles**





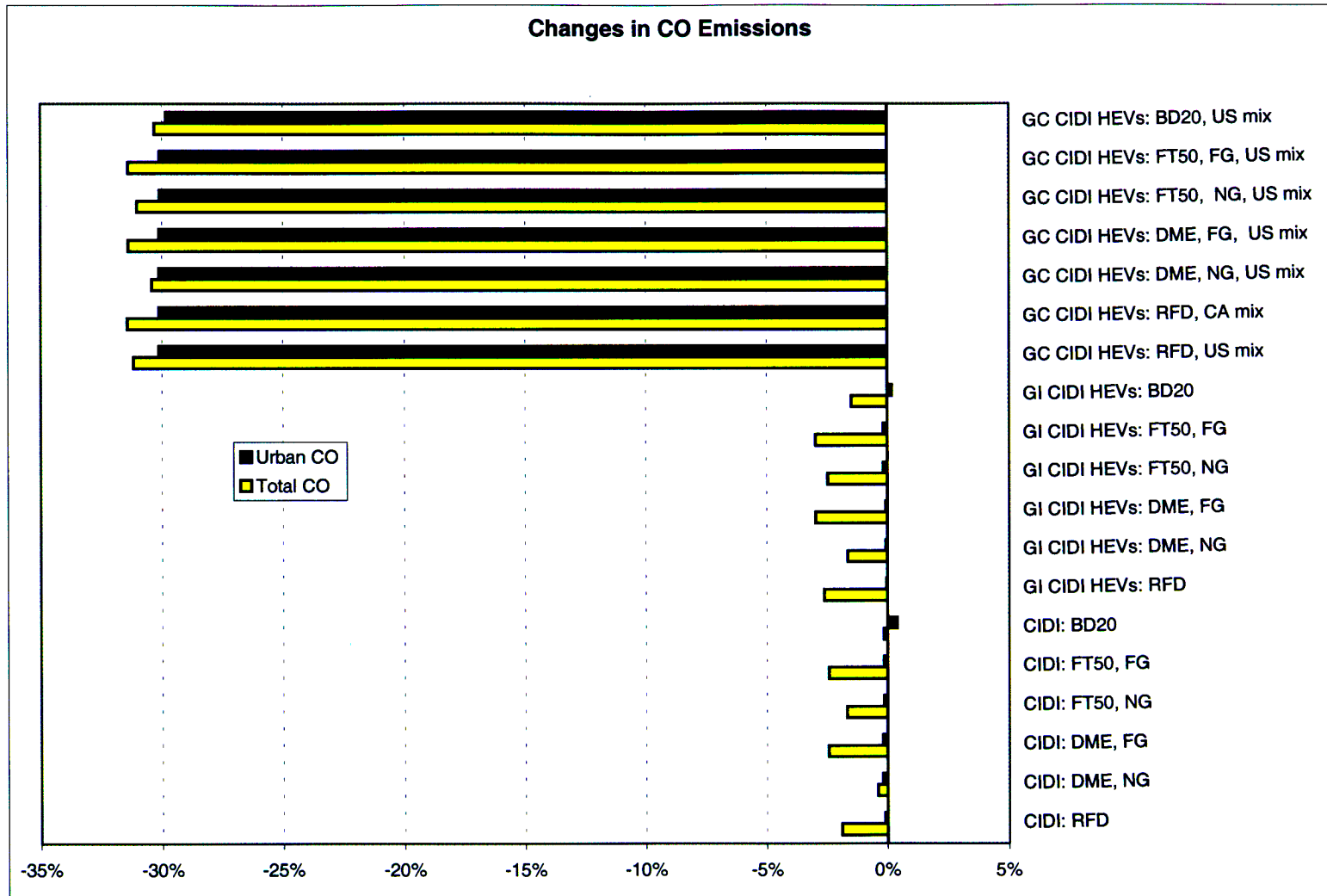
**Figure C-2.57 Changes in Fuel-Cycle CO Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term SI and SIDI Vehicles**



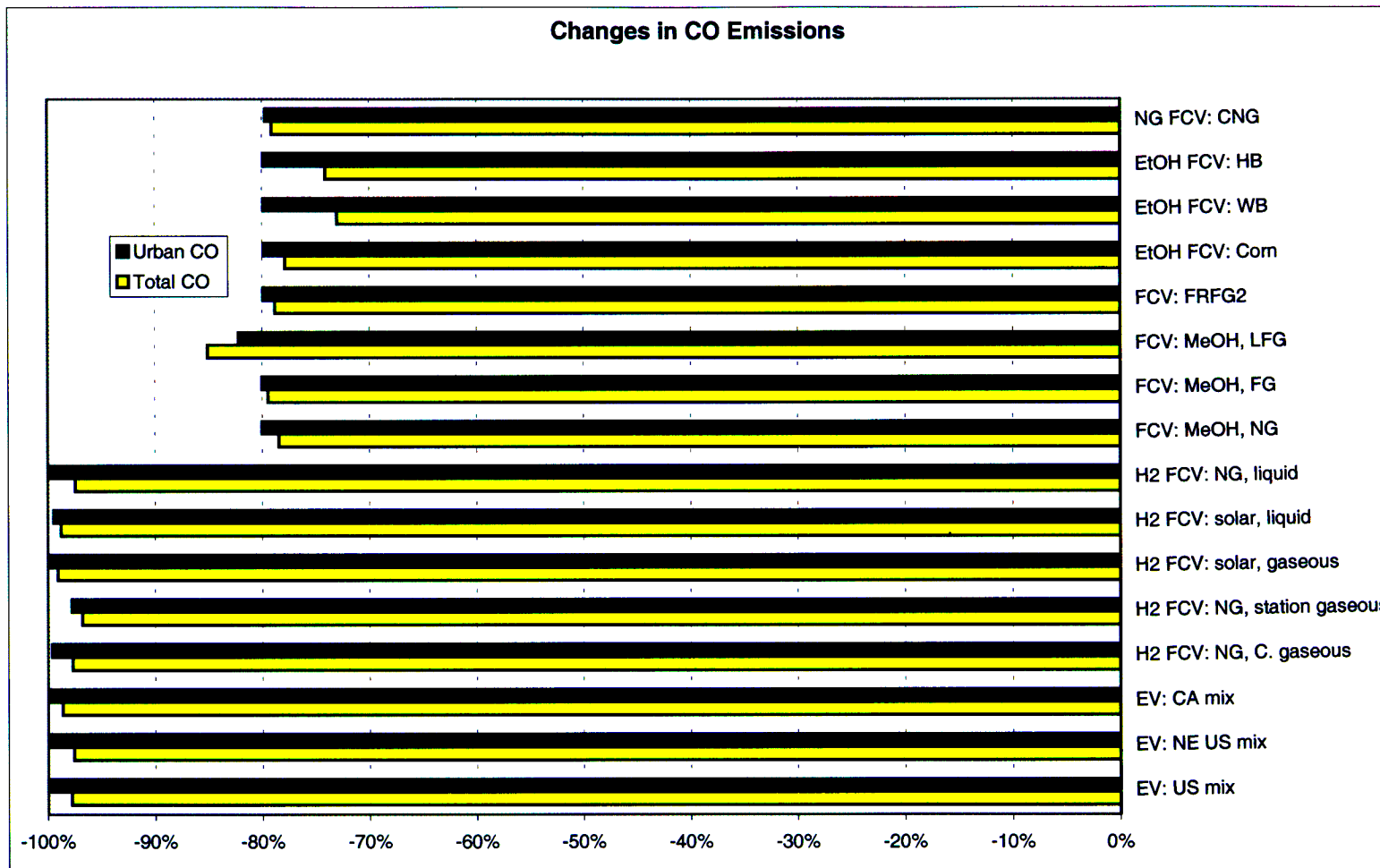


**Figure C-2.58 Changes in Fuel-Cycle CO Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term SI and SIDI Hybrid Electric Vehicles**

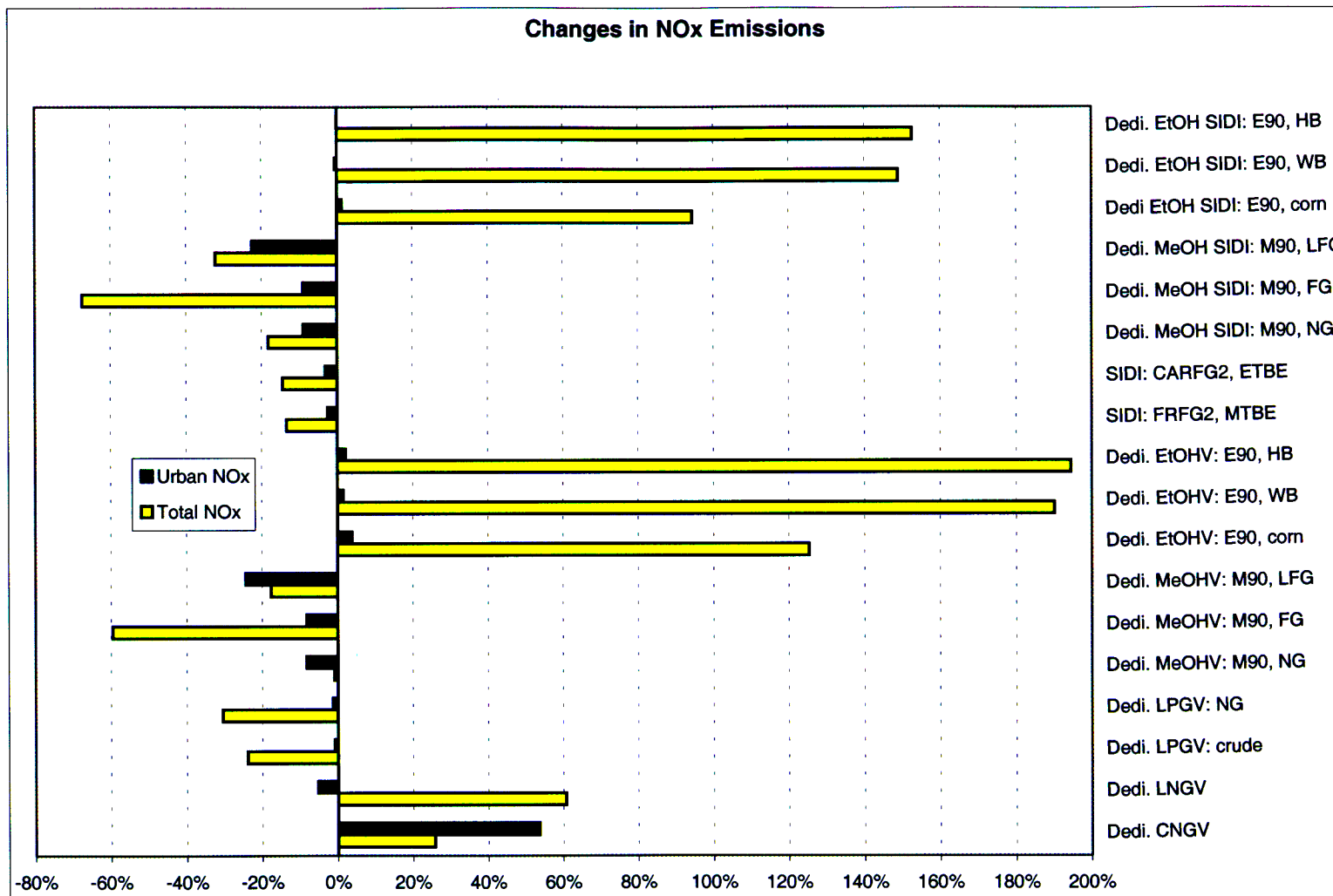




**Figure C-2.59 Changes in Fuel-Cycle CO Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term CIDI Vehicles and CIDI Hybrid Electric Vehicles**

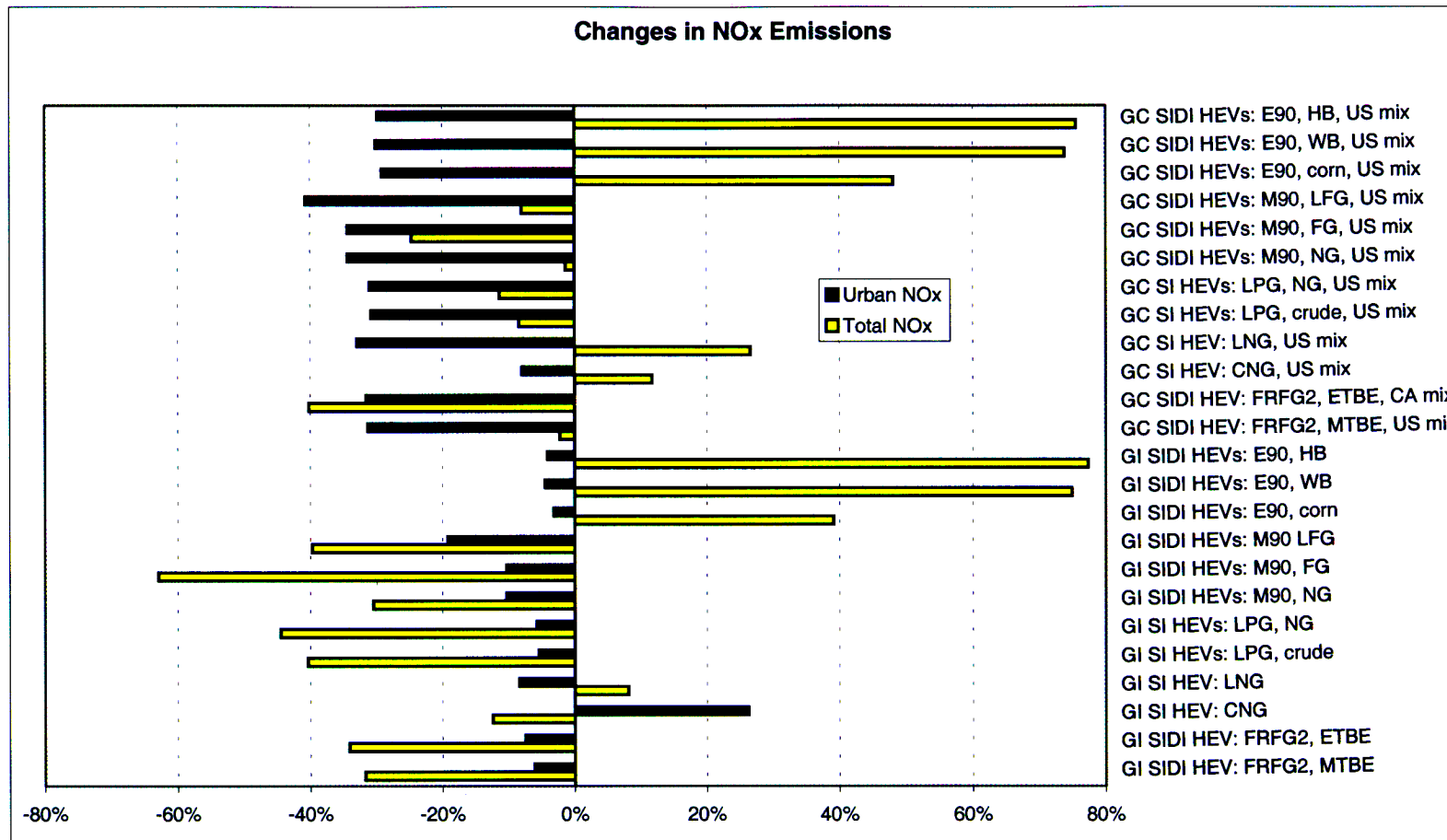


**Figure C-2.60 Changes in Fuel-Cycle CO Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term Electric Vehicles and Fuel-Cell Vehicles**



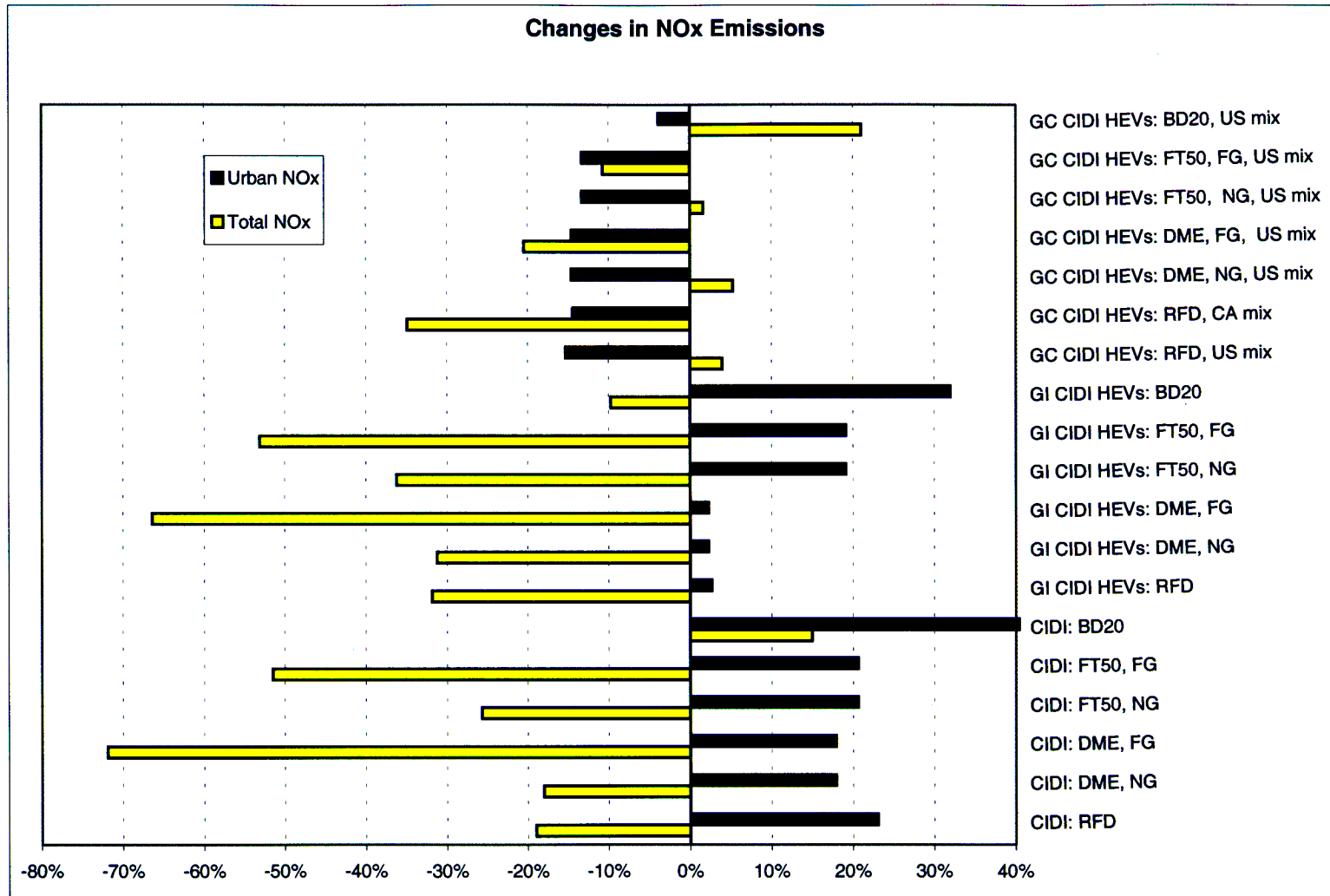
**Figure C-2.61 Changes in Fuel-Cycle NO<sub>x</sub> Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term SI and SIDI Vehicles**





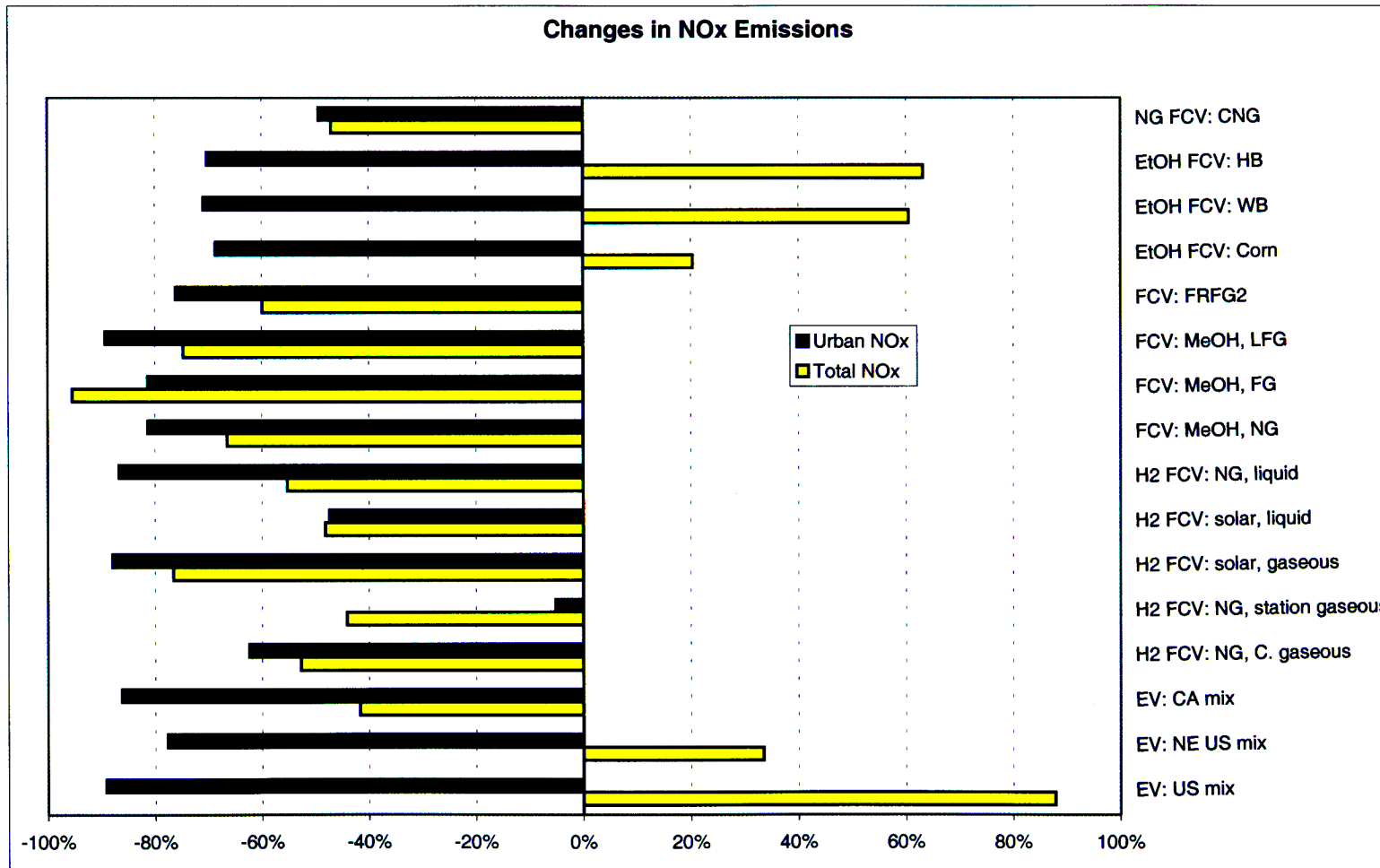
**Figure C-2.62 Changes in Fuel-Cycle NO<sub>x</sub> Emissions Relative to GV<sub>s</sub> Fueled with RFG, Light-Duty Trucks 2: Long-Term SI and SIDI Hybrid Electric Vehicles**





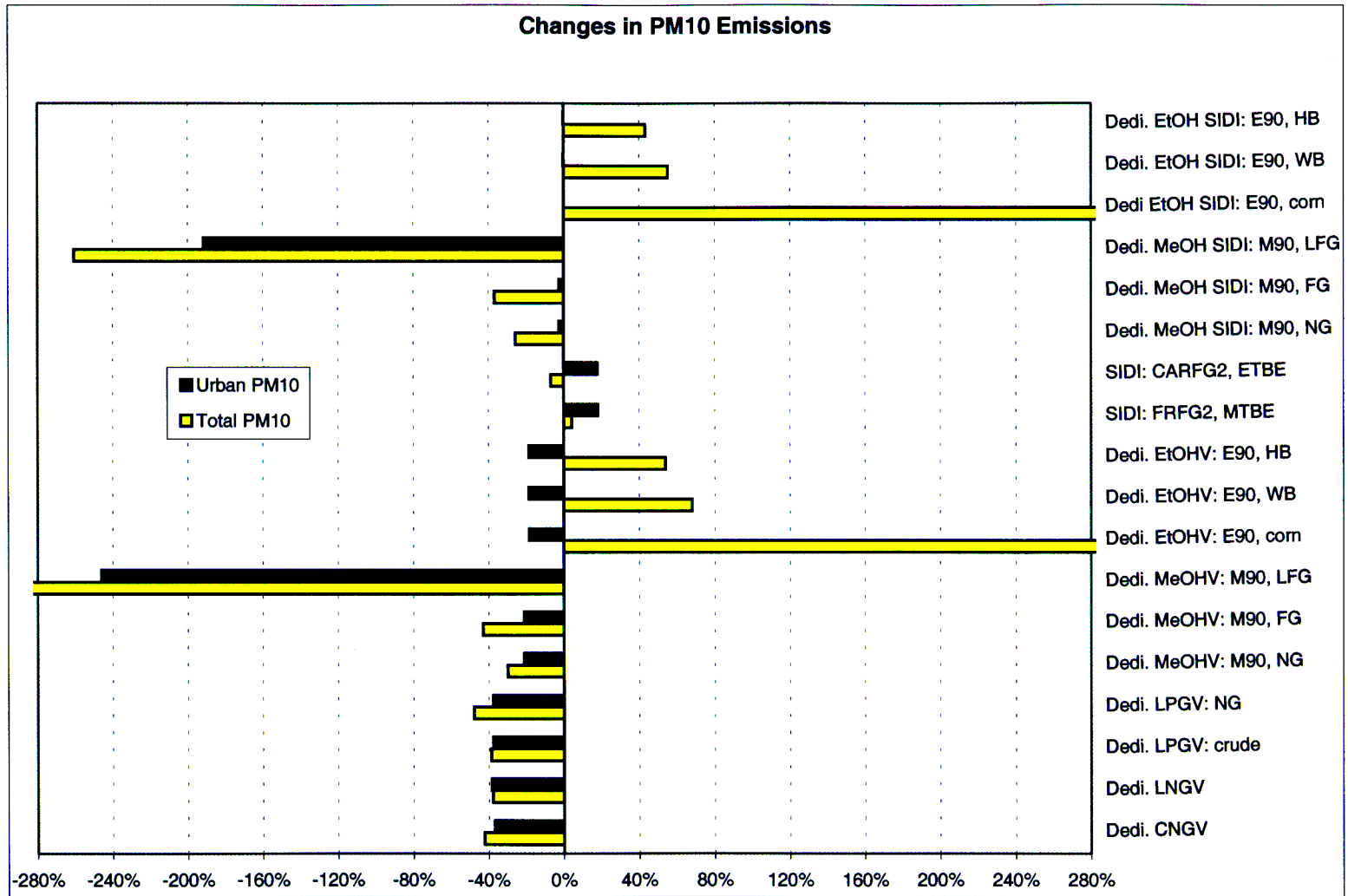
**Figure C-2.63 Changes in Fuel-Cycle NO<sub>x</sub> Emissions Relative to GV's Fueled with RFG, Light-Duty Trucks 2: Long-Term CIDI Vehicles and CIDI Hybrid Electric Vehicles**





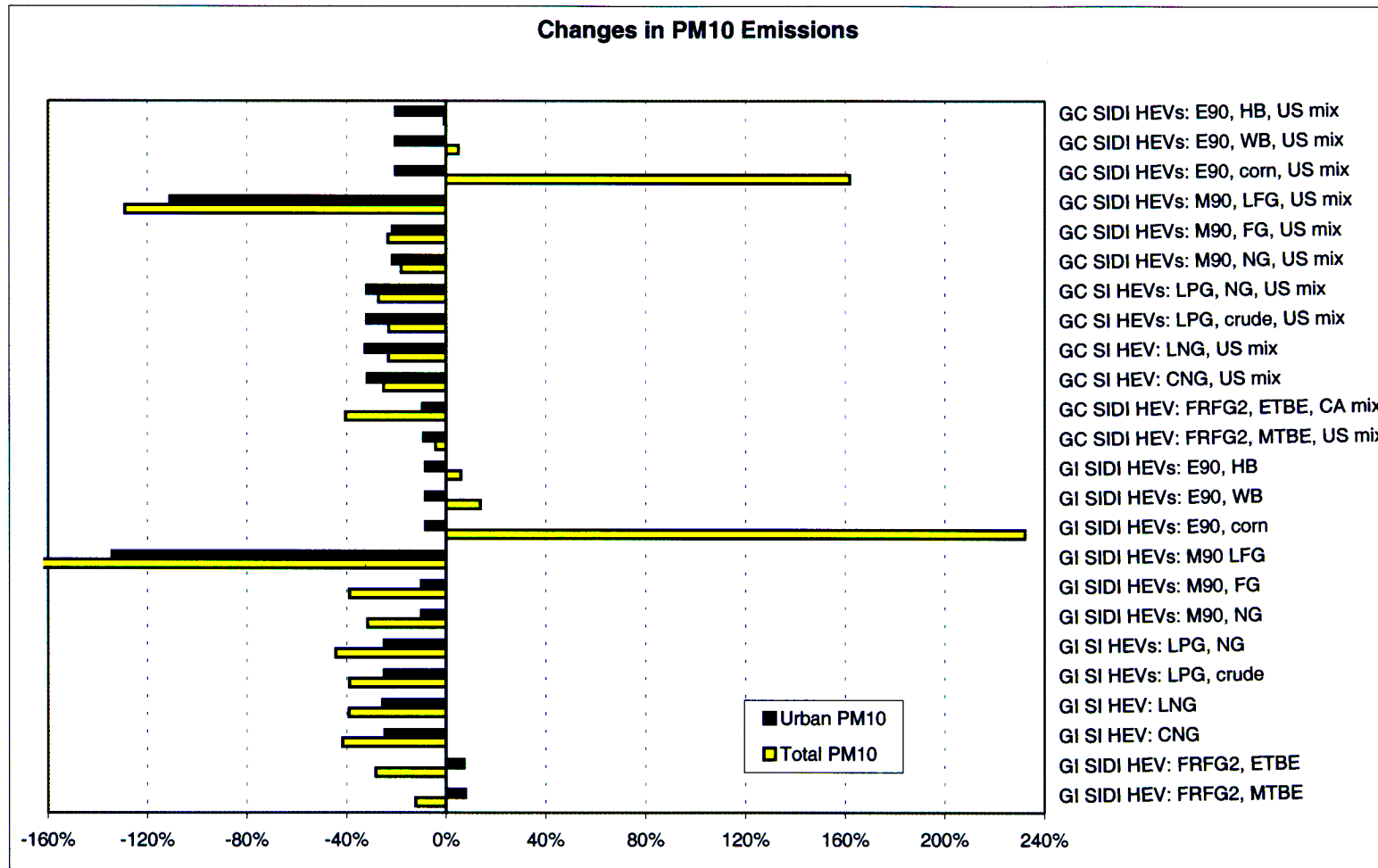
**Figure C-2.64 Changes in Fuel-Cycle NO<sub>x</sub> Emissions Relative to GV's Fueled with RFG, Light-Duty Trucks 2: Long-Term Electric Vehicles and Fuel-Cell Vehicles**





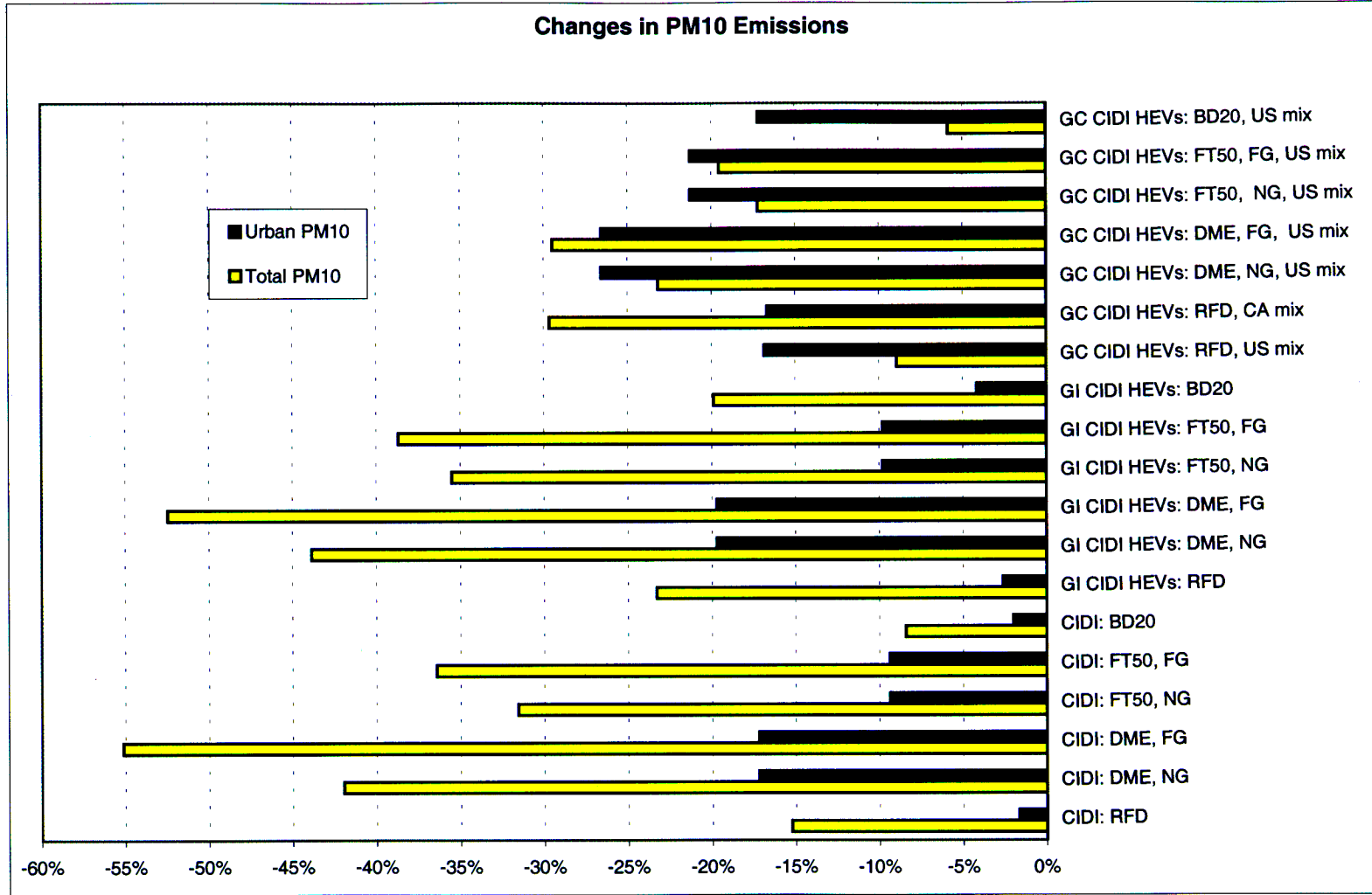
**Figure C-2.65 Changes in Fuel-Cycle PM<sub>10</sub> Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term SI and SIDI Vehicles**





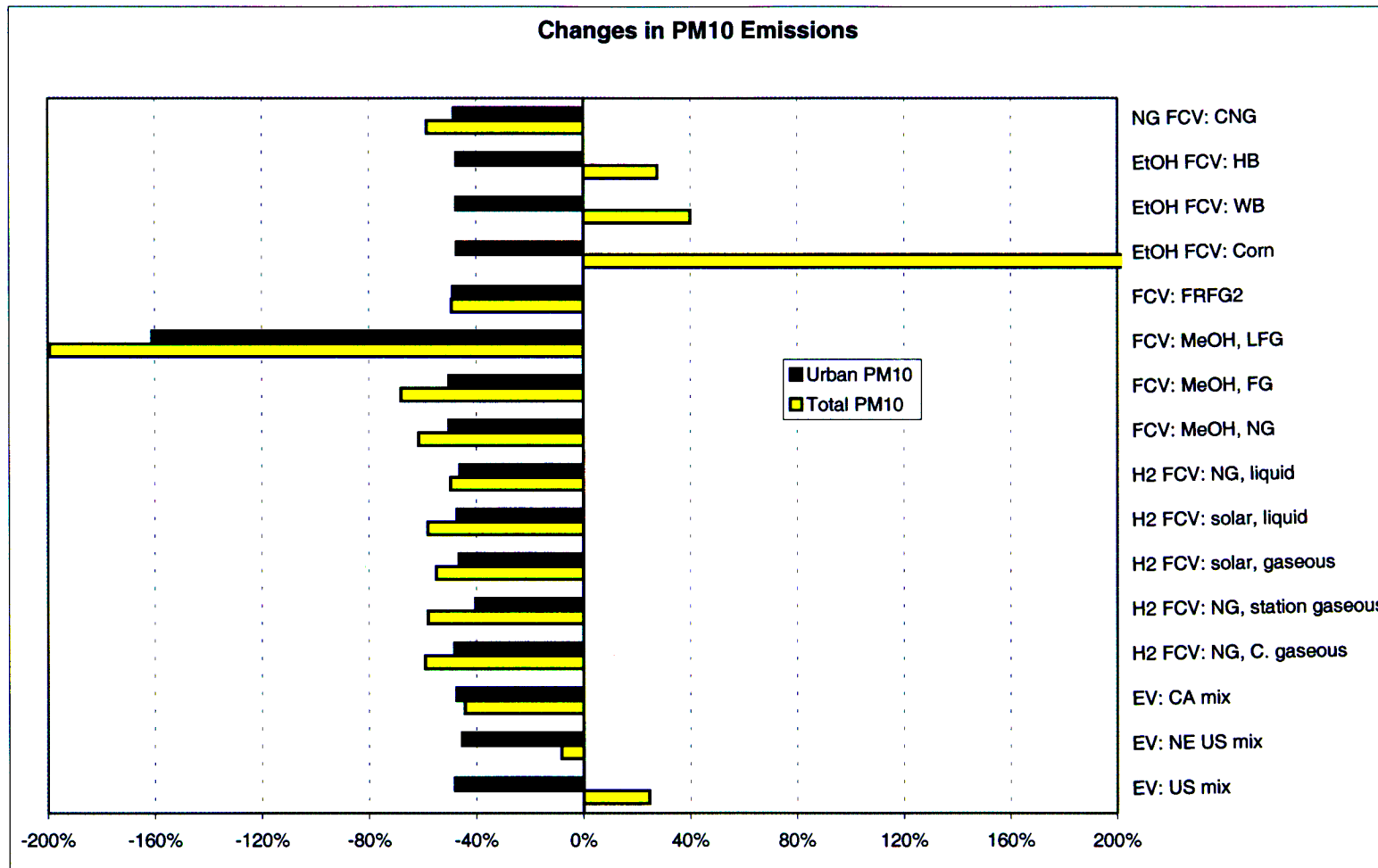
**Figure C-2.66 Changes in Fuel-Cycle PM<sub>10</sub> Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term SI and SIDI Hybrid Electric Vehicles**





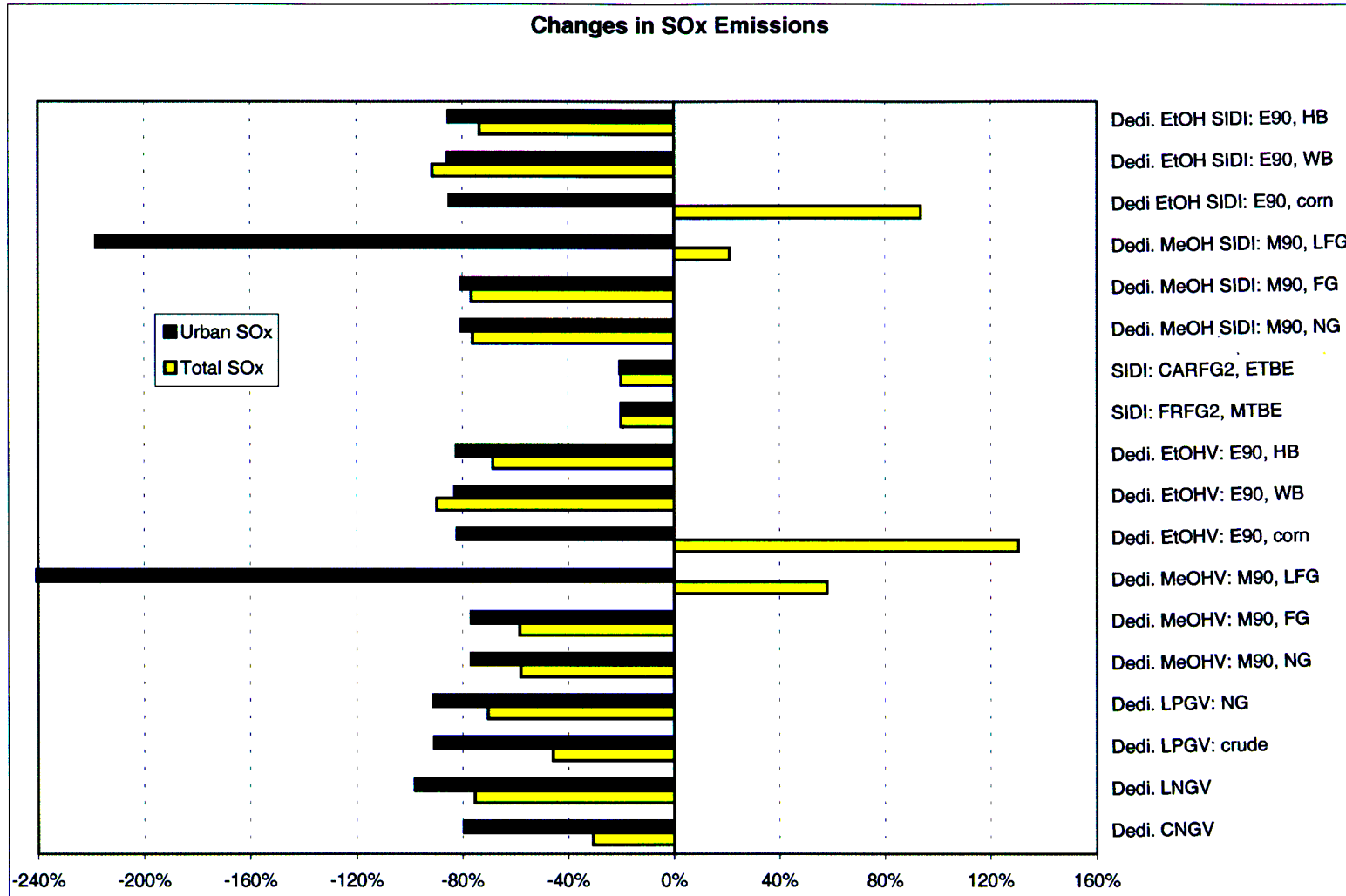
**Figure C-2.67 Changes in Fuel-Cycle PM<sub>10</sub> Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term CIDI Vehicles and CIDI Hybrid Electric Vehicles**



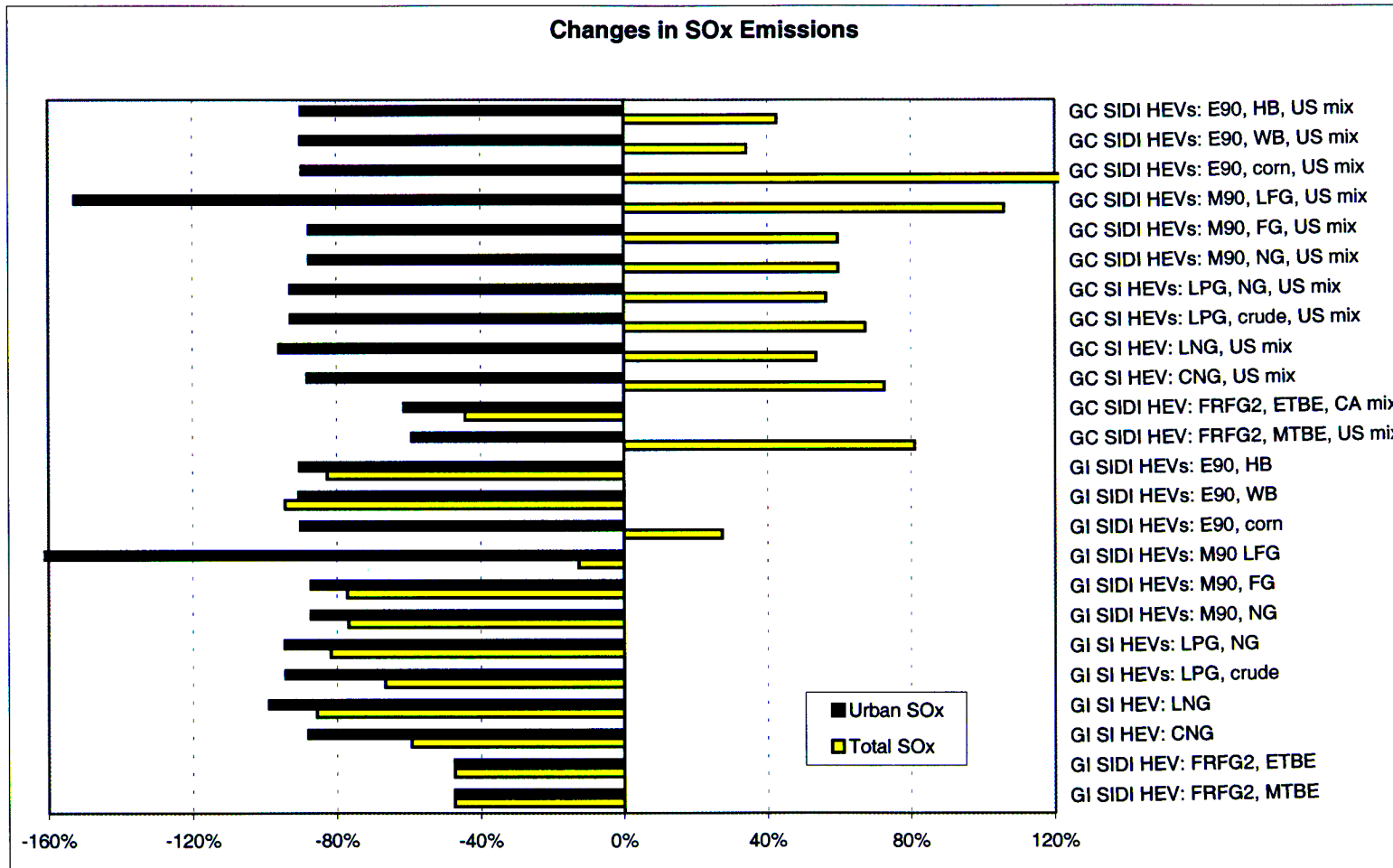


**Figure C-2.68 Changes in Fuel-Cycle PM<sub>10</sub> Emissions Relative to GV's Fueled with RFG, Light-Duty Trucks 2: Long-Term Electric Vehicles and Fuel-Cell Vehicles**



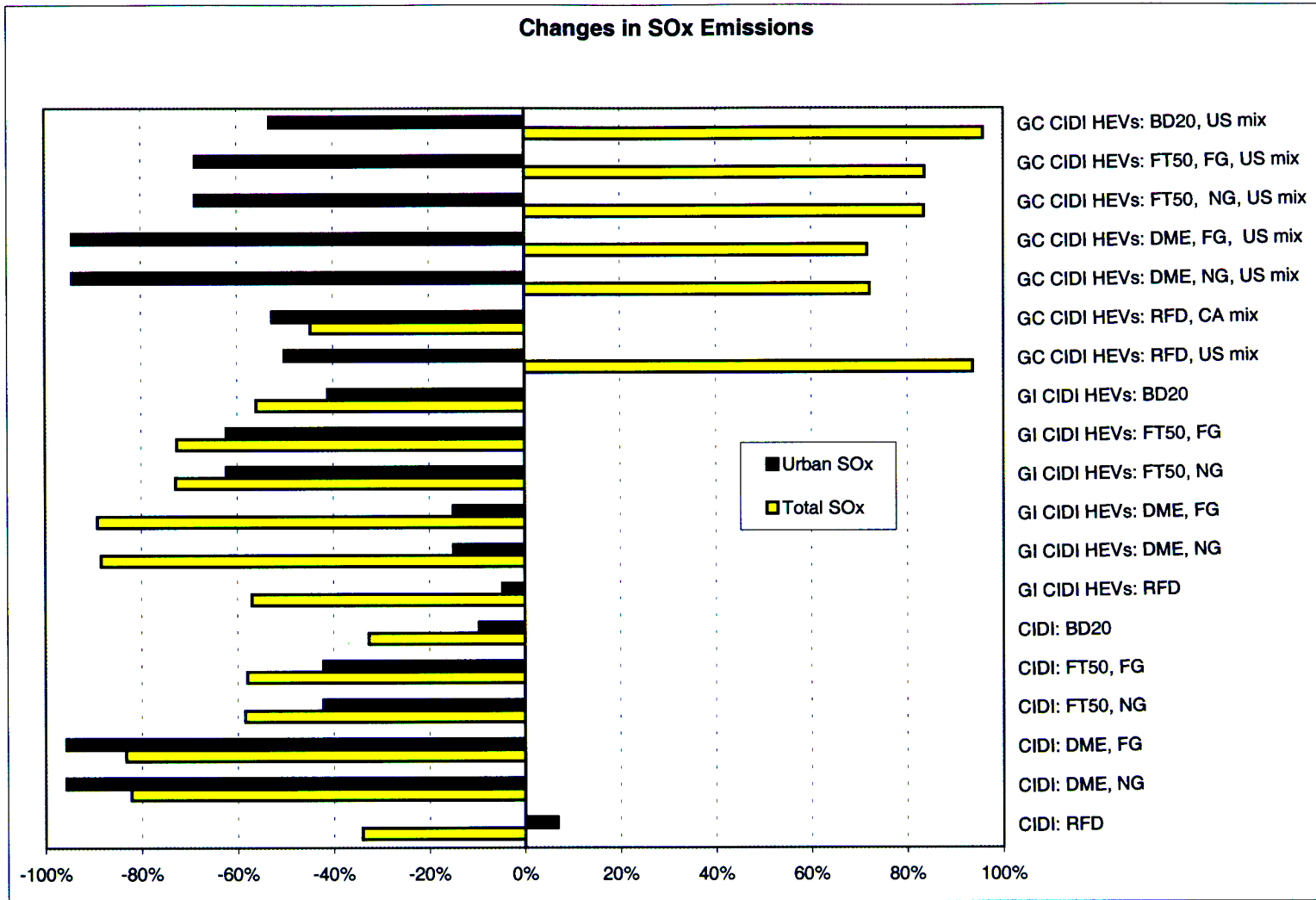


**Figure C-2.69 Changes in Fuel-Cycle SO<sub>x</sub> Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term SI and SIDI Vehicles**



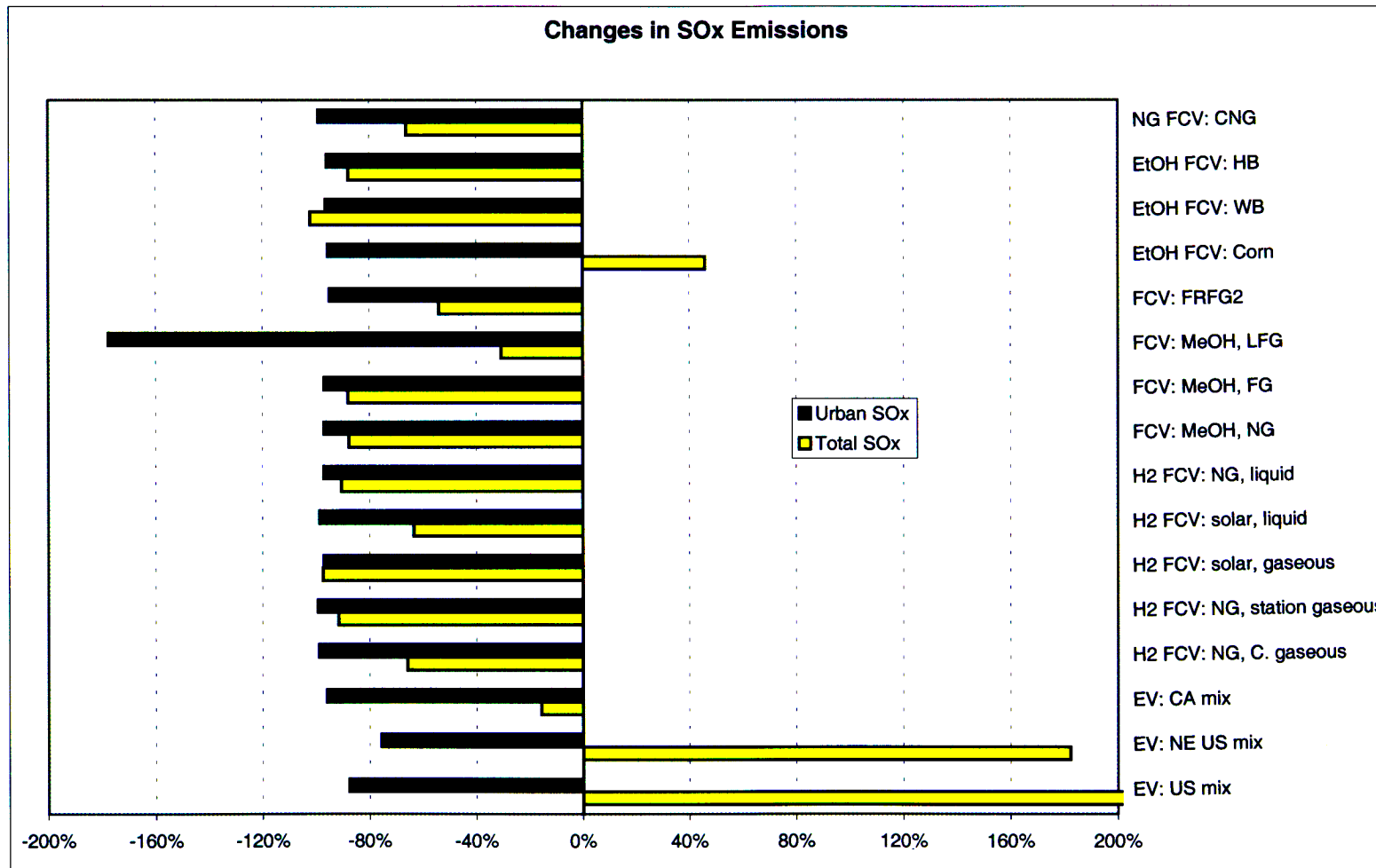
**Figure C-2.70 Changes in Fuel-Cycle SO<sub>x</sub> Emissions Relative to GV's Fueled with RFG, Light-Duty Trucks 2: Long-Term SI and SIDI Hybrid Electric Vehicles**





**Figure C-2.71 Changes in Fuel-Cycle SO<sub>x</sub> Emissions Relative to GV<sub>s</sub> Fueled with RFG, Light-Duty Trucks 2: Long-Term CIDI Vehicles and CIDI Hybrid Electric Vehicles**





**Figure C-2.72 Changes in Fuel-Cycle SO<sub>x</sub> Emissions Relative to GVs Fueled with RFG, Light-Duty Trucks 2: Long-Term Electric Vehicles and Fuel-Cell Vehicles**



