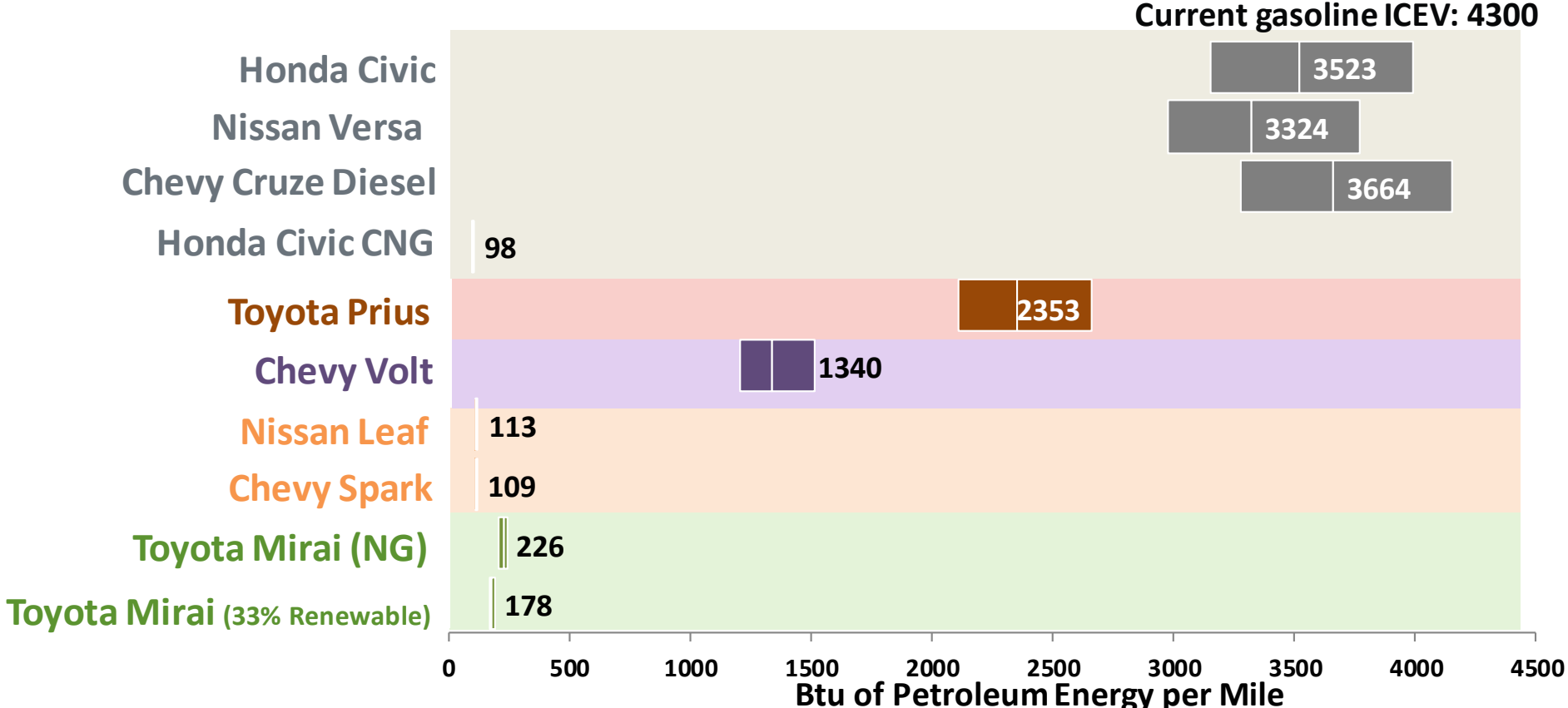


Life-Cycle Petroleum Use- Today's Cars

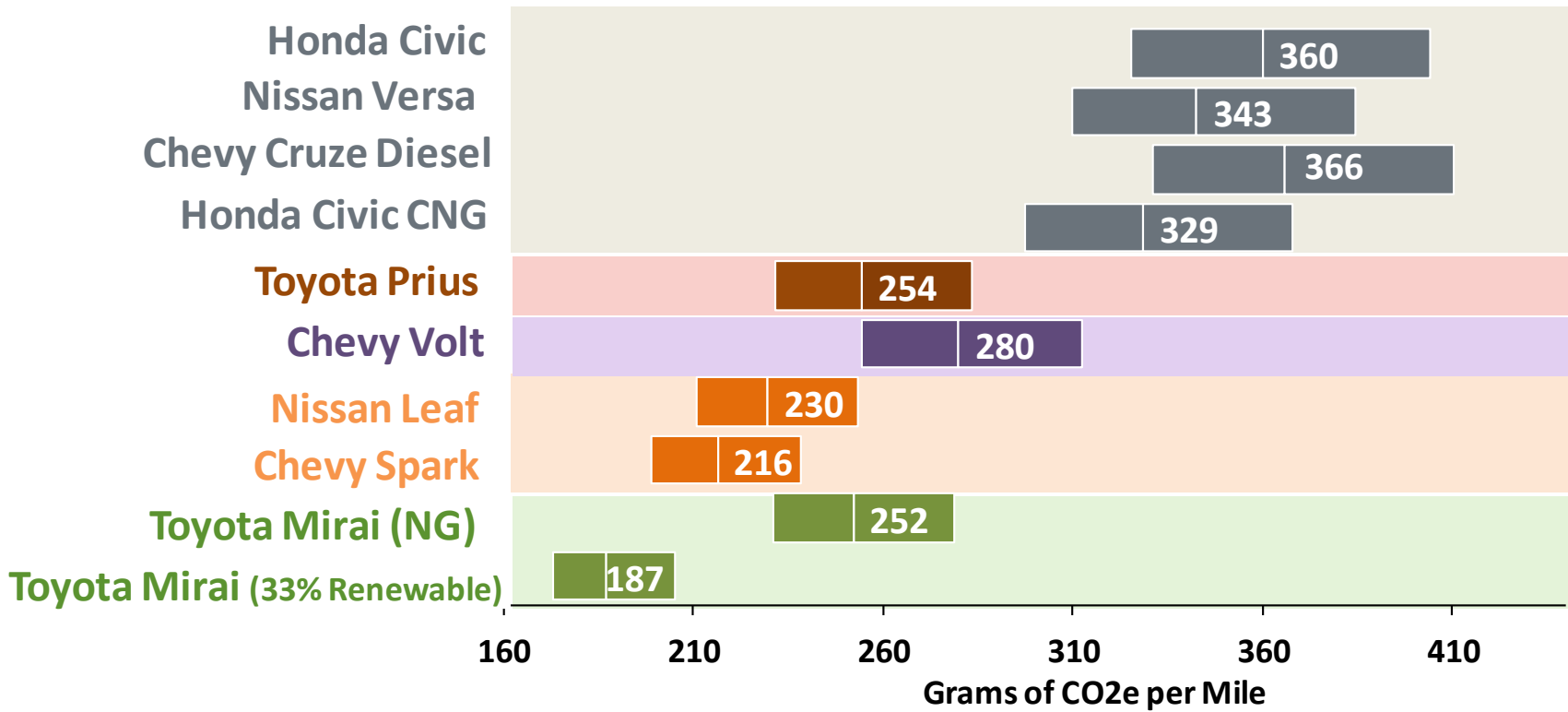
Low, Medium & High Petroleum Energy/Mile for 2015 Technology



Low, Medium & High GHGs/Mile for 2015 Technology



Current gasoline ICEV: 450



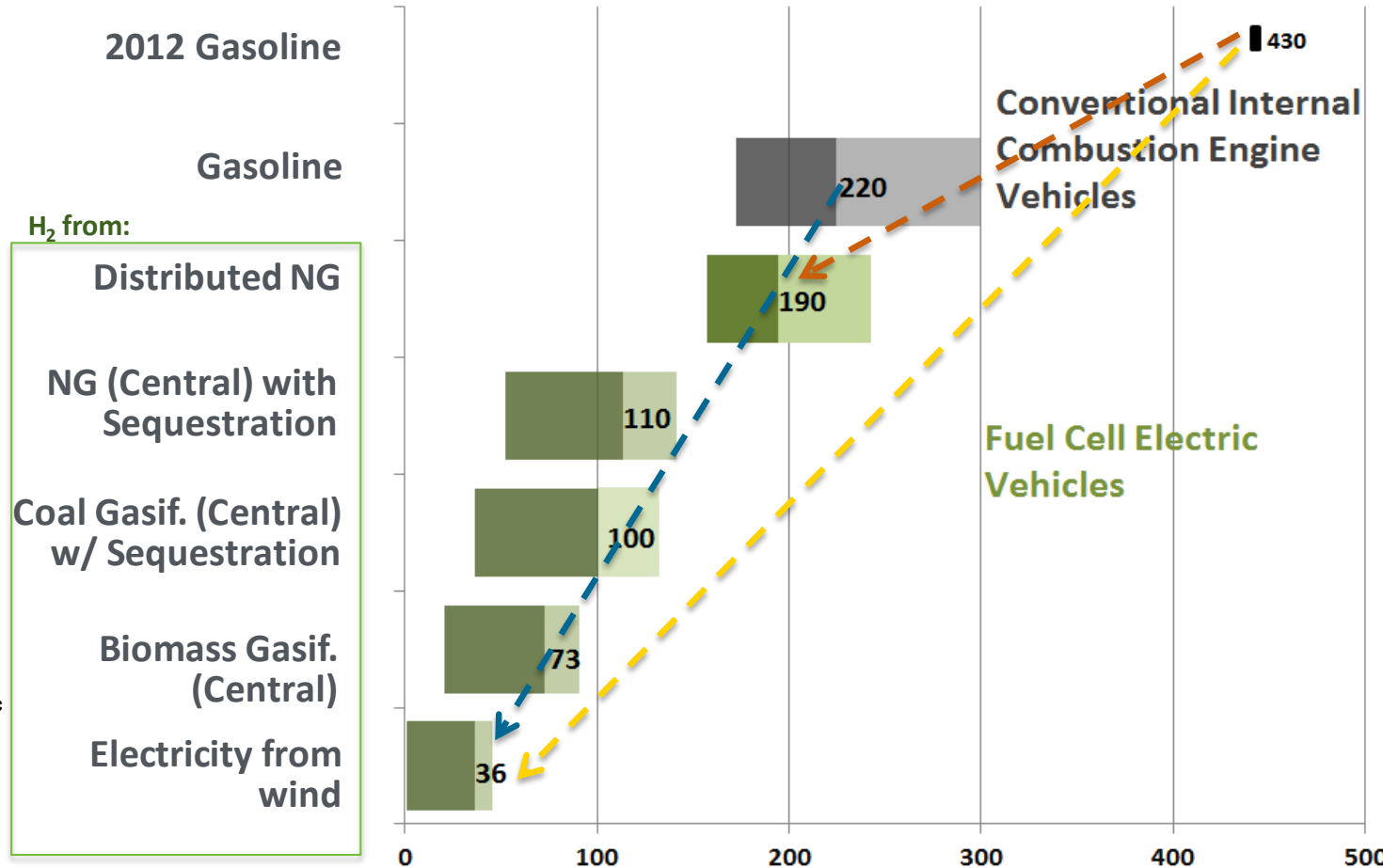
Comparison of Emissions for Fuel Cell Pathways

>50%
 with H₂ from Distributed Natural Gas*

>80%
 with H₂ from Renewables* (Wind)

>90%
 with H₂ from Renewables** (Wind)

Well-to-Wheels CO₂ Emissions (in grams per mile) for 2035 Vehicles Technologies, *except where indicated*



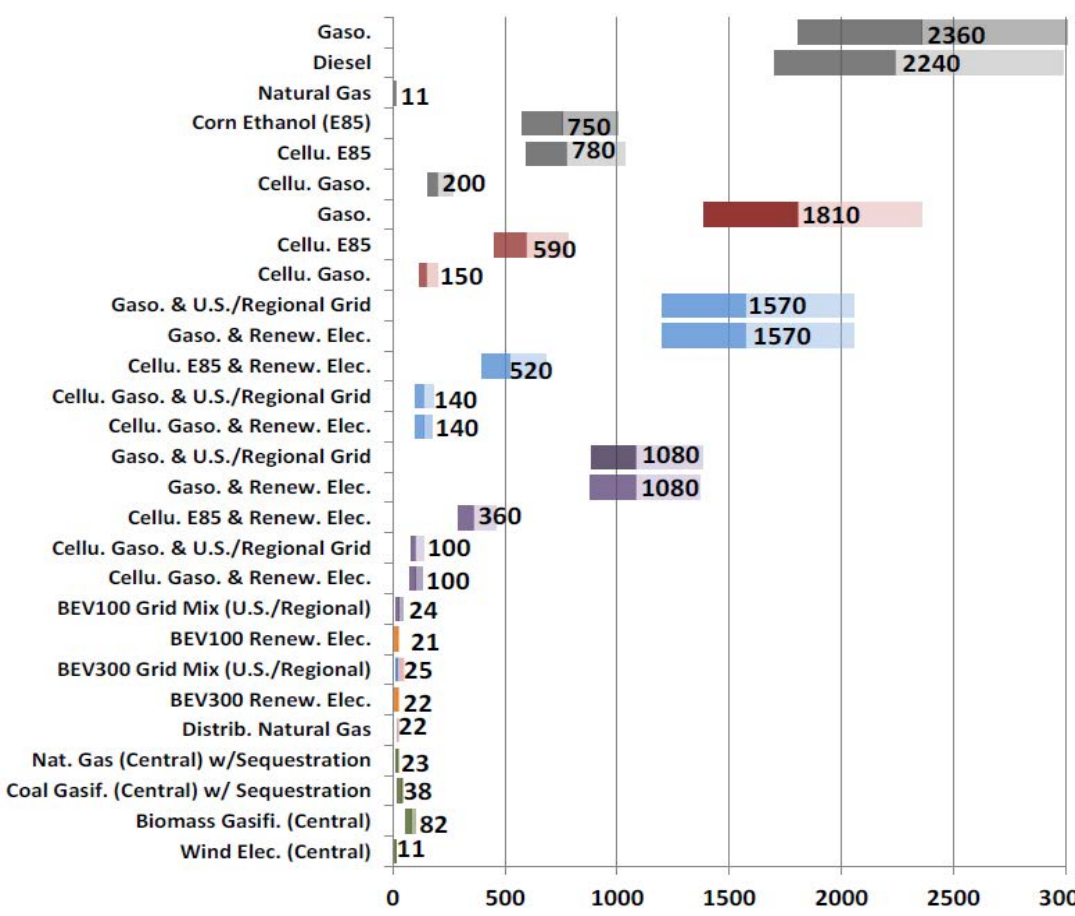
*Compared to 2035 gasoline vehicle
 **Compared to 2012 gasoline vehicle

Source: http://hydrogen.energy.gov/pdfs/13005_well_to_wheels_ghg_oil_ldvs.pdf
 Advanced 2035 technologies

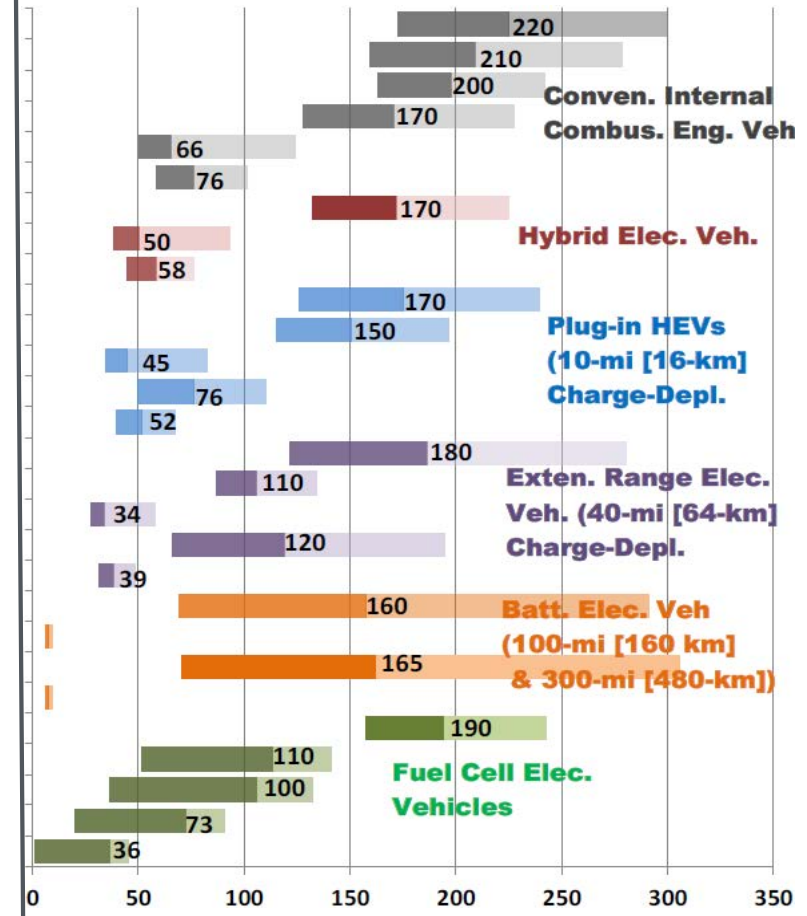
Substantial GHG reductions with H₂ produced from renewables

Well-to-Wheels Analysis: Petroleum Use and Emissions

Petroleum Use, BTUs/Mile



GHG Emissions, gCO₂/Mile

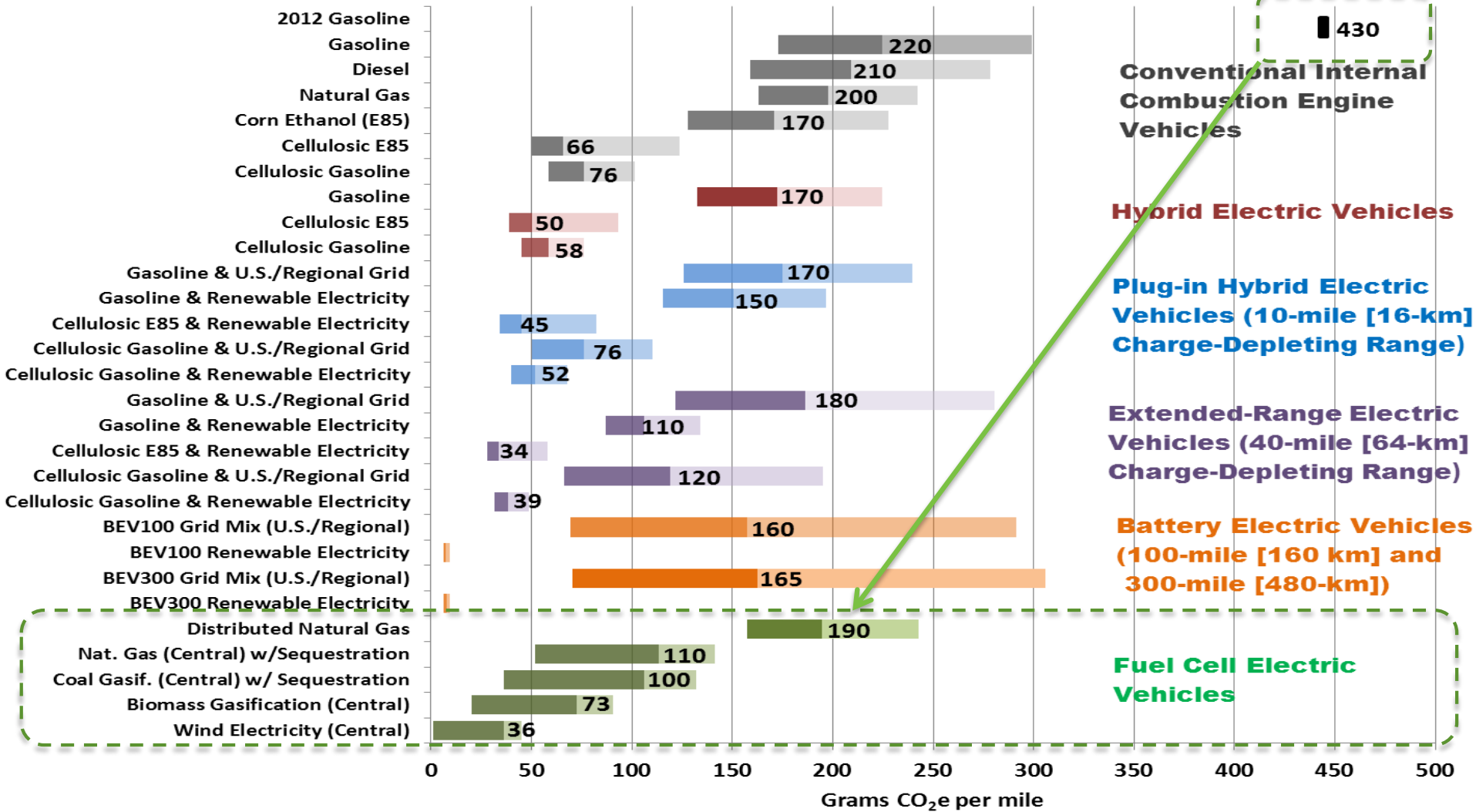


Program Record #13005: http://www.hydrogen.energy.gov/pdfs/13005_well_to_wheels_ghg_oil_ldvs.pdf

Electric Drive With Low Carbon Fuels - Pathway with lowest emissions and petroleum use

Well-to-Wheels Emissions Projections

Low, Medium & High GHGs/mile for 2035 Technology, Except Where Indicated



Low/medium/high: sensitivity to uncertainties associated with projected fuel economy of vehicles and selected attributes of fuels pathways, e.g., electricity credit for biofuels, electric generation mix, etc.

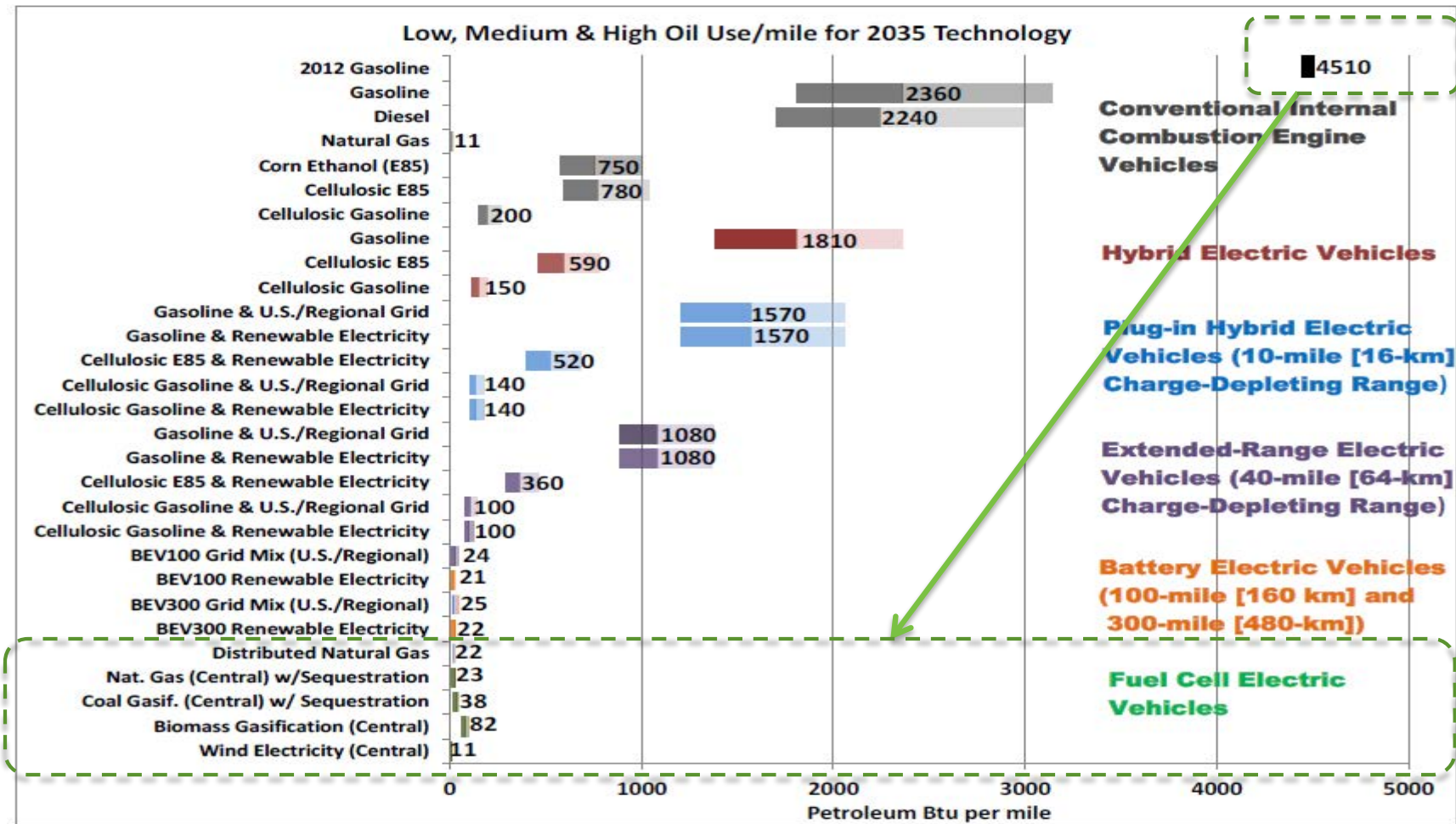
H₂ from Distributed Natural Gas can reduce CO₂ emissions by 50%

Source: http://hydrogen.energy.gov/pdfs/13005_well_to_wheels_ghg_oil_ldvs.pdf

Well-to-Wheels Petroleum Energy Use

Well-to-Wheels Petroleum Energy Use for 2035 Mid-Size Car

(BTUs per mile)



Low/medium/high: sensitivity to uncertainties associated with projected fuel economy of vehicles and selected attributes of fuels pathways, e.g., electricity credit for biofuels, electric generation mix, etc.

Hydrogen from Distributed NG can reduce petroleum use by nearly **100%**

Source: http://hydrogen.energy.gov/pdfs/13005_well_to_wheels_ghg_oil_ldvs.pdf