



# Study Recommendations

Transportation Workshop  
for Minnesota Legislators

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# Take Home Points

- We can reduce emissions in the transportation sector
  - More efficient vehicles
  - Low-carbon fuels
  - Land use and system change—including driver behavior
  
- We must start now

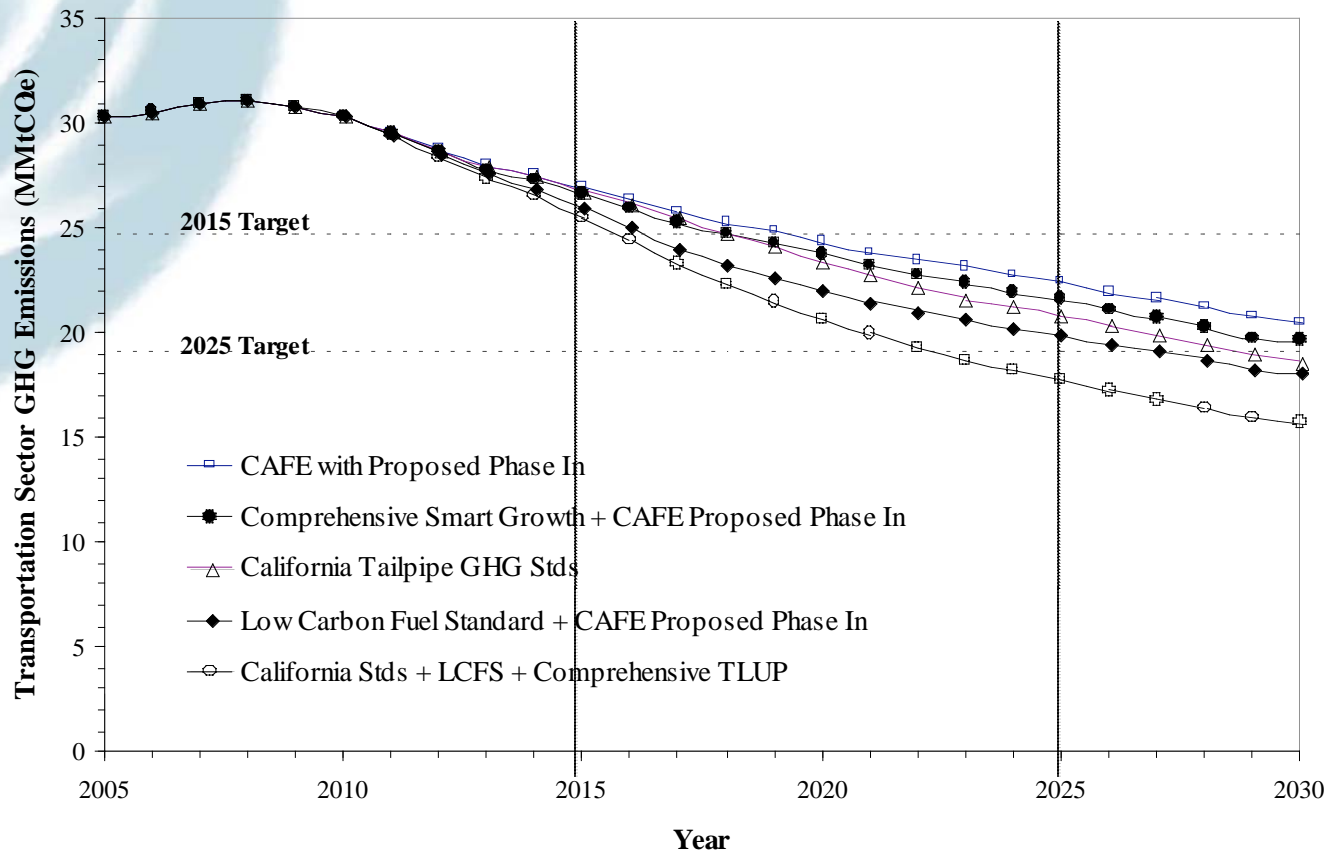


# Combined Reduction Strategies to Meet 2015 and 2025 Goals

- A few examples of combinations modeled – others possible
  - Focused on Light-duty vehicles (largest GHG producer)
  - Further reductions can be achieved with contributions from heavy duty on-road, aircraft
- Goals can be met with combination of California GHG standards, Low Carbon Fuel Standard and comprehensive transportation and land use planning
- VMT growth assumption key – goals are not met if higher VMT growth resumes



# Estimated Contributions to Minnesota Transportation GHG Reduction Goals



Transportation reduction goals:

- 5.6 MMtCO<sub>2</sub>e in 2015
- 11.2 MMT co<sub>2</sub>e in 2025



# Vehicles

- **Adopt other state emission standards**
  - Advantages: GHG reductions, MN consumer savings, better insulation from oil price fluxes
  - Challenges: Less revenue for gas tax
- **Economic incentives to purchase more efficient vehicles**
  - Advantages: GHG reductions, better insulation of state from future energy price flux
  - Challenges: “Vehicle purchase area,” better with other states
  - Considerations: Stratified system with pivot points for large and small cars





# Fuels

- Better biofuels not more biofuels (factor in GHG emissions over fuel lifecycle)
  - Advantages: Biofuels can reduce greenhouse gas emissions
  - Disadvantages: Not all biofuels do reduce emissions, establishing a life-cycle framework is hard, land use considerations for biofuels and food considerations



# Land Use and System Change

- System Change: Driver behavior for better gas mileage
  - Advantages: Easy addition to drivers education, technologies for providing information
- Strategies to reduce Vehicle Miles Traveled (VMT)
  - Short term: Pay as you drive insurance, general transit improvements, employer and municipal parking plans
  - Mid-term: Light-rail transit, bus-rapid transit, commuter-rail
  - Ongoing: Integrated land use and transportation development, “Smart Growth”
    - Advantages: Ancillary benefits—air quality, livability, can be started today for on-going benefits
    - Challenges: Difficult to quantify results



# Promising Technologies and Strategies for 2050 Reduction Goal

- Electric and hybrid electric plug-in vehicles—require cleaner electricity for charging
- Freight mode switching
- Second generation biofuels
- Land use and system shifts



# Future Research Related to GHG Emissions and Transportation Sector

- Economic analysis
- Role of fuel prices in reducing VMT
- Role of driver education in improving fuel economy
- Impact of electrical generation and coal use
- Ancillary benefits of changes, including health affects



# Conclusions

- **We can meet 2015 and 2025 transportation GHG reduction goals**
  - More efficient vehicles
  - Low-carbon fuels
  - Land use and system change—including driver behavior
- **We must start now**
  - Many policies are most effective when implemented in conjunction with other states
- **Lifecycle analysis is necessary to assess transportation GHG strategies**
  - Production methods and land-use impacts of biofuels must be considered
  - Electricity generation must be clean to realize overall reductions from electric vehicles
- **Fuel efficiency improvements benefit Minnesota citizens**
  - Protection from oil price volatility
  - Other studies show economic benefits for GHG reduction policies
  - Fuel economy standards more stringent than either CAFE or California are possible with available technology. EU, China, Japan, and Australia have all set more aggressive goals.
- **Linking land use and transportation planning is key for VMT reduction**

