

Sustainability, Transportation, and Climate Change



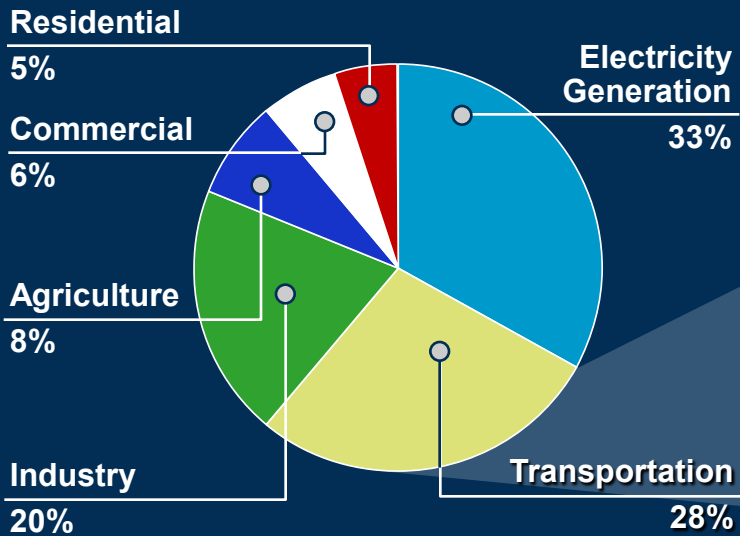
*Toward A Sustainable Future
Vision Bergen: Blueprint for Our Future
May 18, 2010*

presented by
Joanne R. Potter
Cambridge Systematics, Inc.

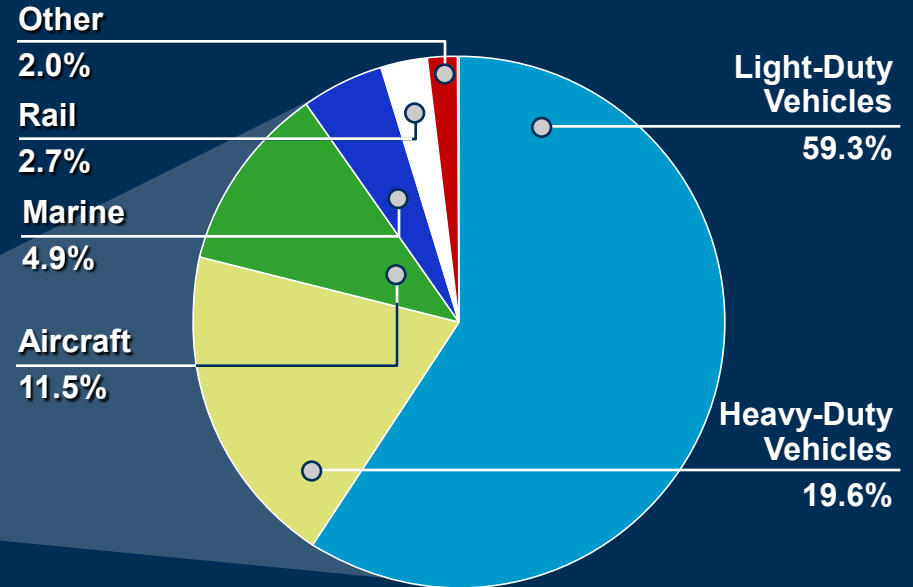
Transportation leadership you can trust.

Transportation's Contribution to U.S. GHGs

U.S. GHG Emissions by End Use Economic Sector 2006



U.S. GHG Emissions Breakdown by Mode



Source: Environmental Protection Agency (EPA). "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2007," April 2009, <http://epa.gov/climatechange/emissions/usinventory.html>.

Action on Transportation and Climate Change

- **States, regions and cities leading the way**
 - **Climate Action Plans**
 - **GHG reduction targets**
- **U.S. DOT Report to Congress on Transportation and Climate Change - Earth Day 2010**
- **Federal transportation authorization bill likely to include provisions for considering GHG emissions**
- **Energy legislation will address national GHG reduction targets and include funding for MPO/state target setting**

Filling the Gap – Moving Cooler



Study Objective:

- Examine the **potential** of VMT and travel efficiency strategies to reduce GHG emissions
- Moving Cooler targets 2 of the 4 “legs”
- McKenzie study addresses vehicle technology and fuels

Focus of Analysis

- **Estimates GHG reductions and direct implementation costs**
- **Not a full cost-benefit analysis – therefore not a complete basis for decisions**
- **Allows comparison to McKinsey Report findings on fuels and technology**
- **Political feasibility not assessed**

Wide Range of Strategies Examined

- Pricing, tolls, Pay As You Drive (PAYD) insurance, VMT fees, carbon/fuel taxes
- Land use and smart growth
- Nonmotorized transportation
- Public transportation improvements
- Regional ride-sharing, commute measures
- Regulatory measures
- Operational/ITS strategies
- Capacity/bottleneck relief
- Freight sector strategies

Analytic Approach

1. Establish baseline
2. Select strategies and define parameters
3. Estimate the GHG reduction of each individual strategy
4. “Bundle” the strategies and examine the combined impacts

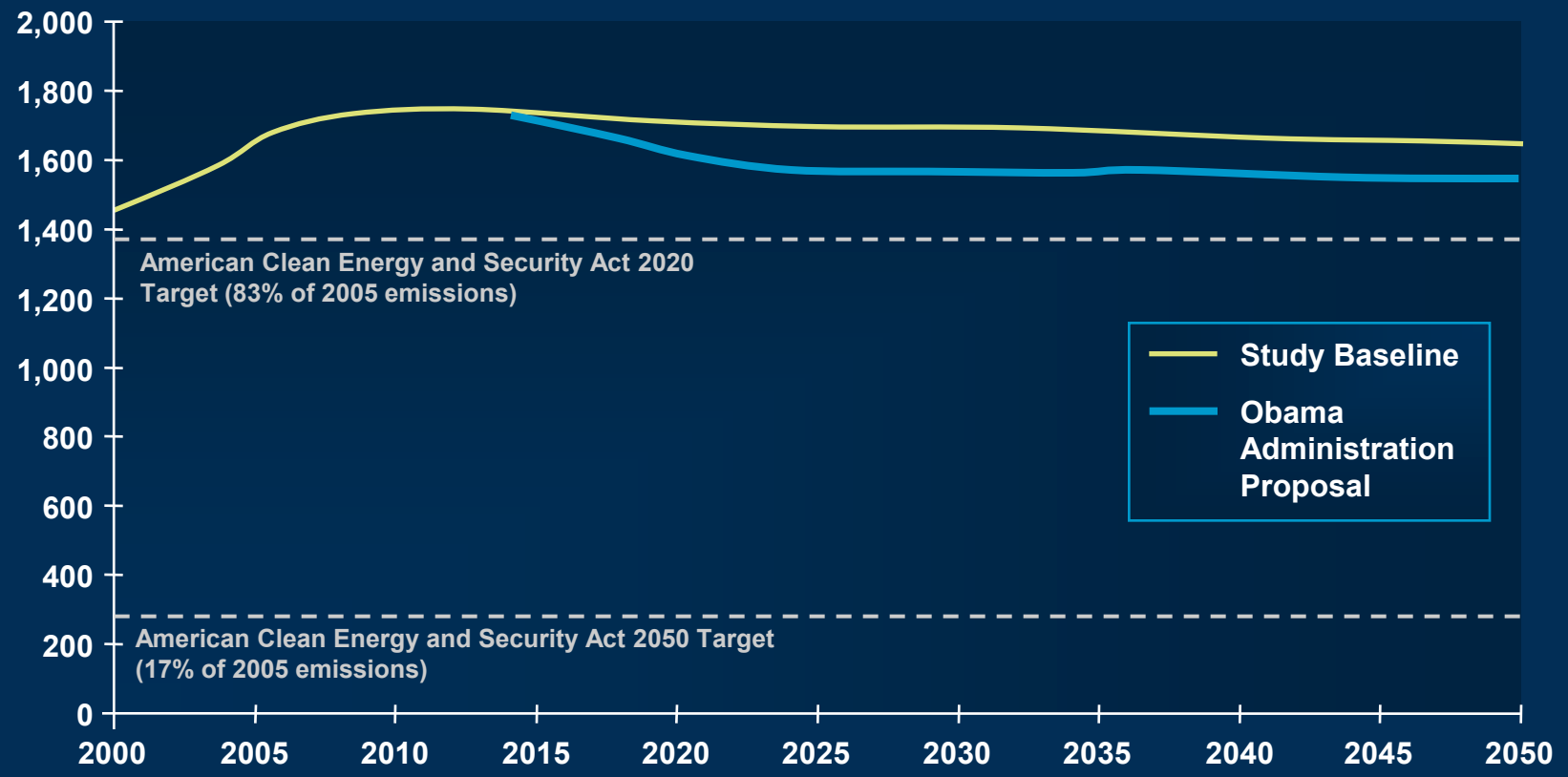
Assumptions for Baseline

- **Travel continues to grow**
 - Vehicle miles traveled (VMT) growth of 1.4% per year
 - Transit ridership growth 2.4%/year
- **Fuel prices increase**
 - 1.2% per year, beginning at \$3.70/gallon in 2009*
- **Fuel economy improves steadily**
 - Light-duty vehicles at 1.91% annually
 - Heavy-duty vehicles at 0.61% annually

*AEO high fuel price scenario.

Moving Cooler Baseline to 2050

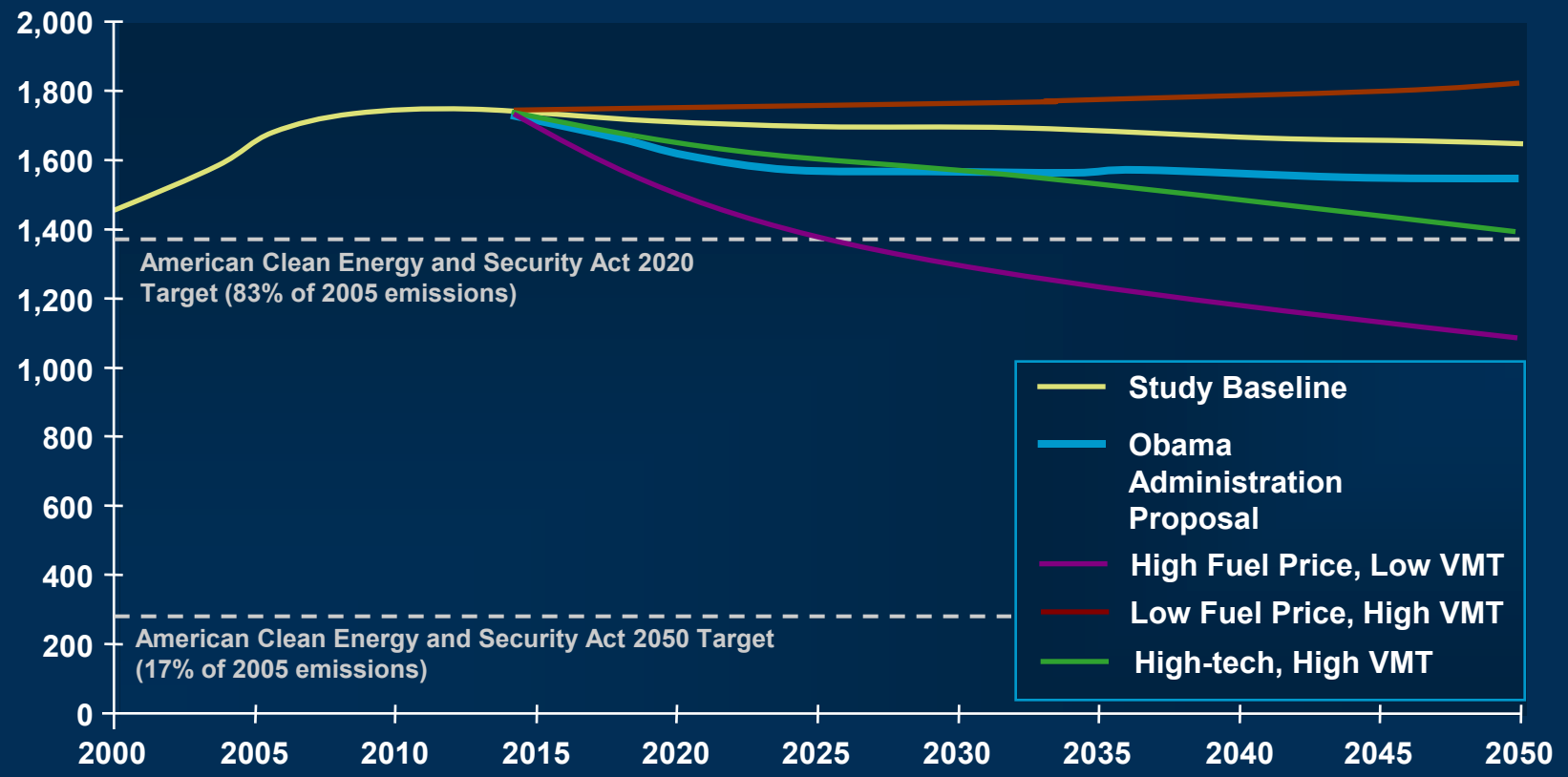
National On-Road GHG Emissions (mmt)



Note: This figure displays National On-Road GHG emissions as estimated in the Moving Cooler baseline, compared with GHG emission estimates based on President Obama’s May 19, 2009, national fuel efficiency standard proposal of 35.5 mpg in 2016. Both emission forecasts assume an annual VMT growth rate of 1.4 percent. The American Clean Energy and Security Act (H.R. 2454) identifies GHG reduction targets in 2012, 2020, 2030, and 2050. The 2020 and 2050 targets applied to the on-road mobile transportation sector are shown here.

Moving Cooler Sensitivity Tests to 2050

National On-Road GHG Emissions (mmt)



- High Fuel Price/Low VMT: Fuel prices increase dramatically, resulting in lower VMT and improved vehicle technology.
- Low Fuel Price/High VMT: Lower fuel prices drive higher VMT growth and less investment in improved technology.
- High-technology/High VMT: Technology progresses rapidly, leading to decreased driving cost and higher VMT.

Findings

Individual Strategies

- Individual strategies achieve varying levels of GHG reductions
 - <0.5% to over 4.0% cumulatively to 2050

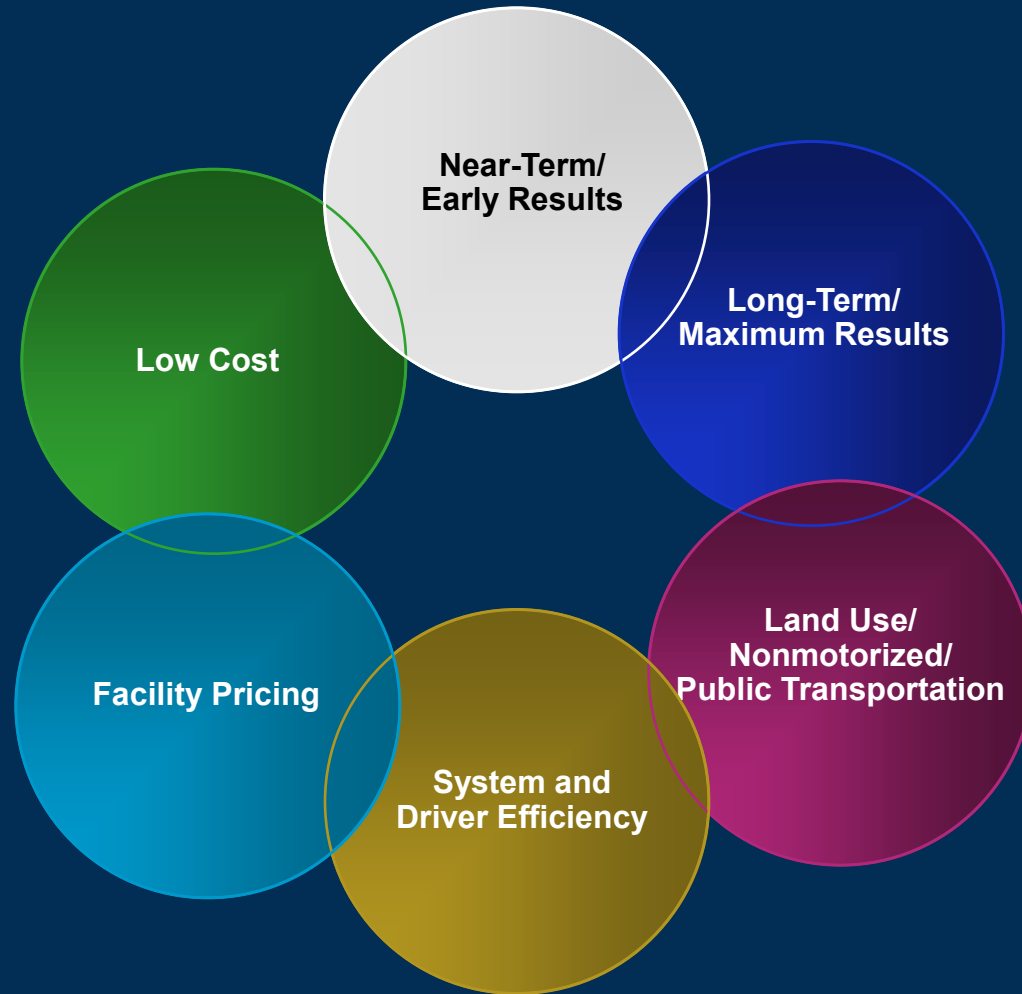
Example Findings

Individual Strategies

Strategy	Cumulative Percent GHG Reduction from Baseline (2050)
VMT Fees	0.4-4.9%
Speed Limit Reductions	1.7-3.5%
PAYD Insurance	1.1-3.2%
Congestion Pricing	0.8-1.8%
Eco-Driving	1.0-2.6%
Land Use/Smart Growth	0.2-2.0%
Urban Public Transit LOS/Expansion	0.3-1.1%
Employer-Based Commute/Parking Pricing	0.4-1.7%
Operational and ITS Improvements	0.3-0.7%

Strategy Bundles

Illustrative Analysis



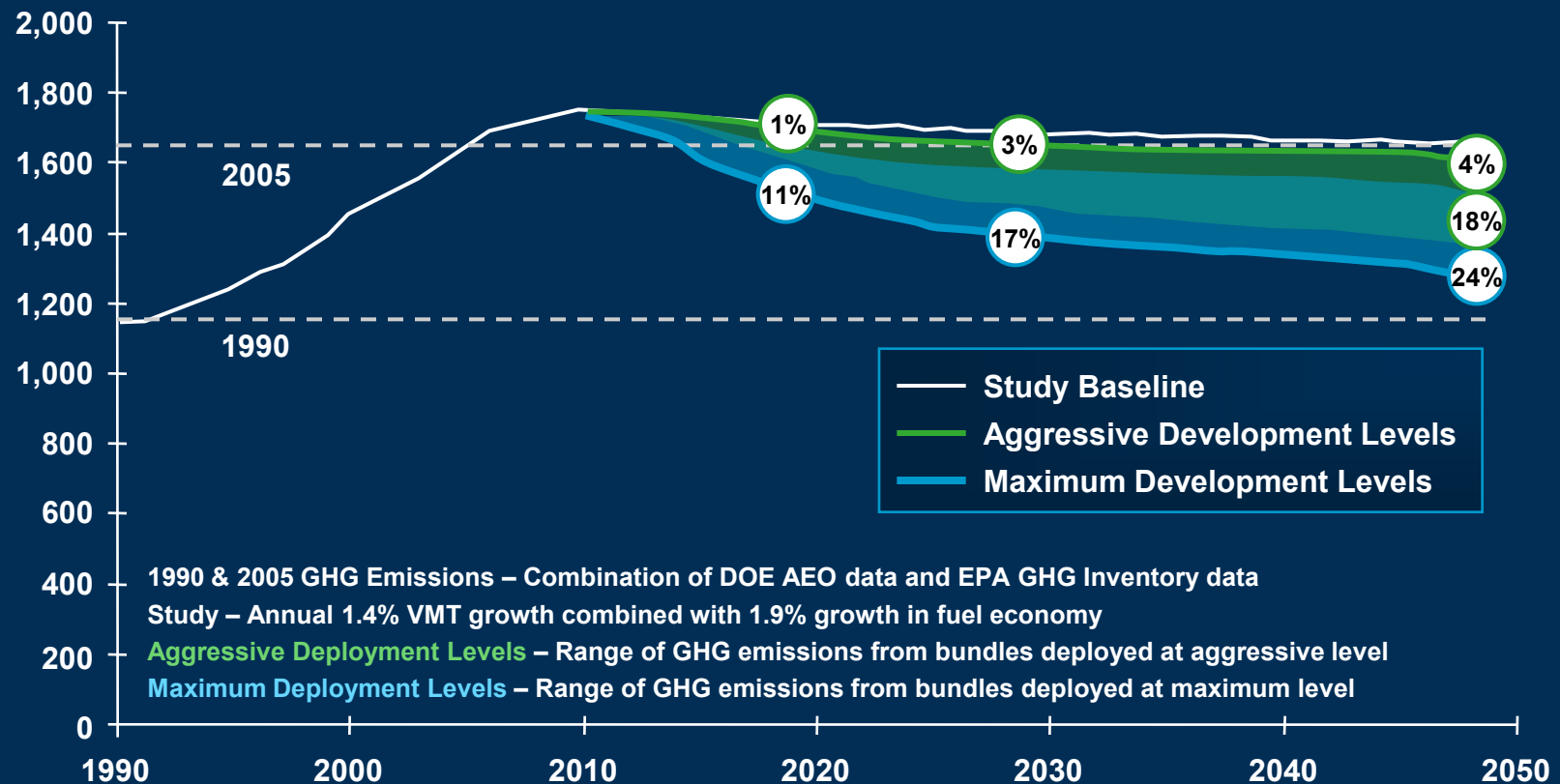
Example: Land Use / Transit / Nonmotorized Bundle

- **Urban transit**
 - Fare reduction
 - Increased transit service
 - Urban transit expansion
- **Land use – increased density**
- **Pedestrian/bicycle**
- **Parking pricing/parking restrictions**
- **Congestion pricing**
- **High-speed rail/intercity passenger rail expansion**
- **HOV expansion**
- **Car sharing**
- **Signal enhancement**
- **Traveler information**
- **Urban consolidation centers (freight)**

Range of Annual GHG Reductions of Six Strategy Bundles

Aggressive and Maximum Deployment

Total Surface Transportation Sector GHG Emissions (mmt)

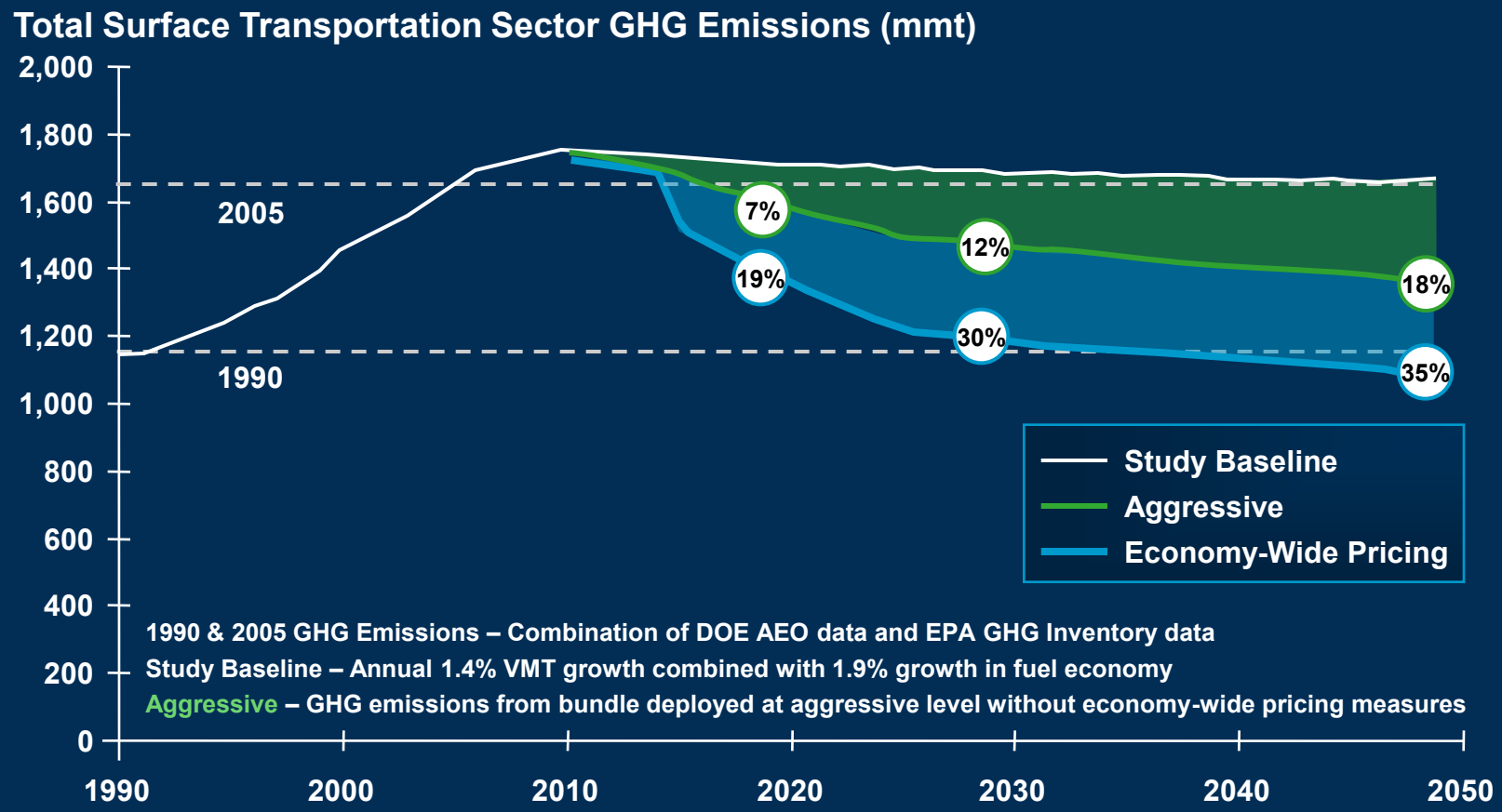


Note: This figure displays the GHG emission range across the six bundles for the aggressive and maximum deployment scenarios. The percent reductions are on an annual basis from the Study Baseline. The 1990 and 2005 baseline are included for reference.

Economy-Wide Pricing

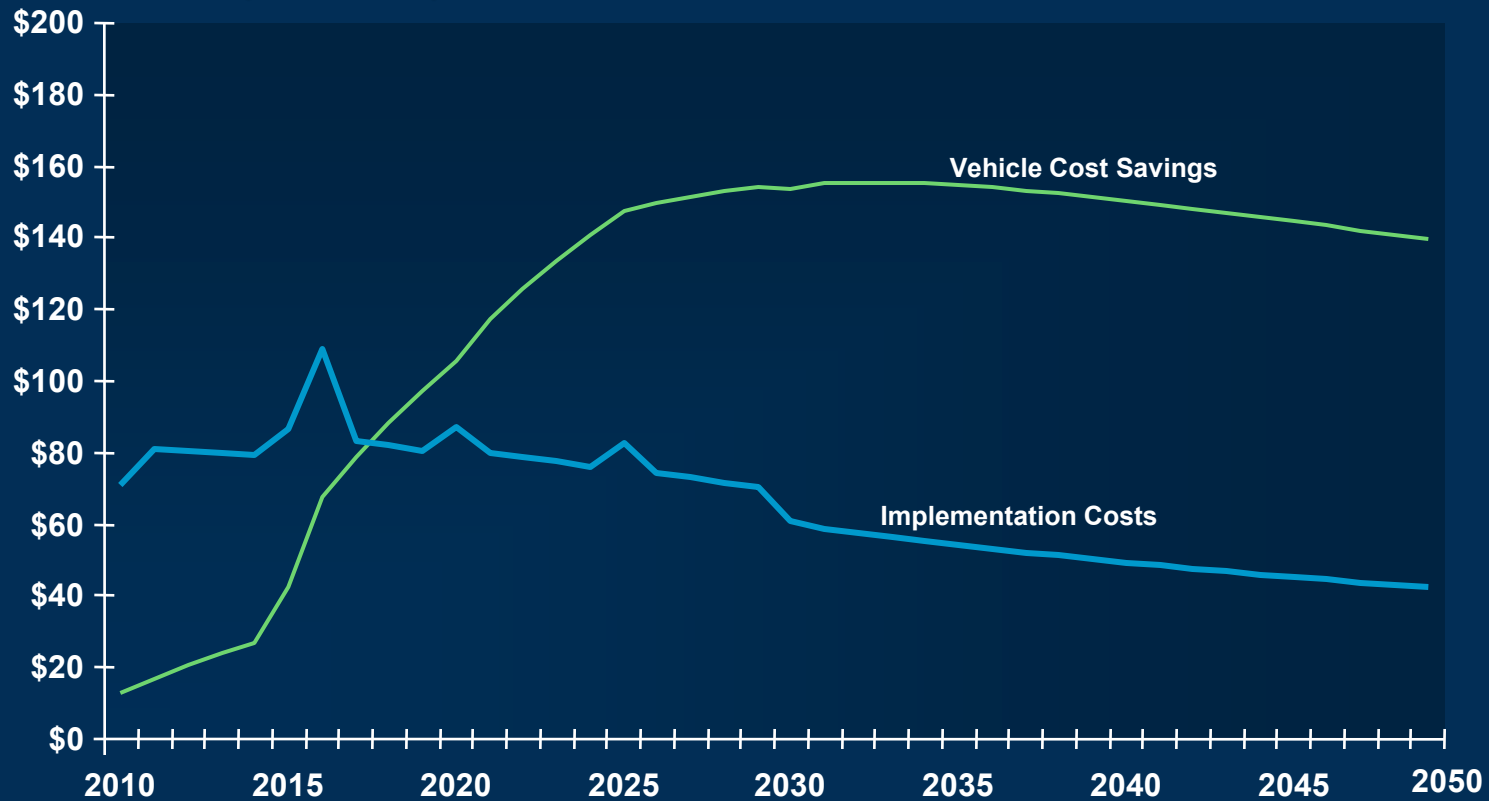
- **Mechanisms – Carbon pricing, VMT fee, and/or PAYD insurance**
- **Strong economy-wide pricing measures added to bundles achieve additional GHG reductions**
 - **Aggressive deployment – additional fee (in current dollars) starting at the equivalent of \$0.60 per gallon in 2015 and increasing to \$1.25 per gallon in 2050 could result in an additional 17% reduction in GHG emissions in 2050**
- **Two factors would drive this increased reduction**
 - **Reduction in vehicle-miles traveled (VMT)**
 - **More rapid technology advances**

Economy-Wide Pricing



Direct Vehicle Costs and Costs of Implementing Strategy Bundles

2008 Dollars (in Billions)



Note: This figure displays estimated annual implementation costs (capital, maintenance, operations, and administrative) and annual vehicle cost savings [reduction in the costs of owning and operating a vehicle from reduced vehicle-miles traveled (VMT) and delay. Vehicle cost savings DO NOT include other costs and benefits that could be experienced as a consequence of implementing each bundle, such as changes in travel time, safety, user fees, environmental quality, and public health.

Near-Term and Long-Range Strategies

- Some strategies are effective in achieving **near-term** reductions, reducing the cumulative GHG challenge in later years
- Investments in land use and improved travel options involved **longer timeframes** but would have enduring benefits

Scale of Implementation

- Both national level and state/regional/local strategies are important
- GHG reductions should be viewed relative to the **scale of potential implementation**
 - While effect on national emissions may be modest, some strategies may be more beneficial at regional scales

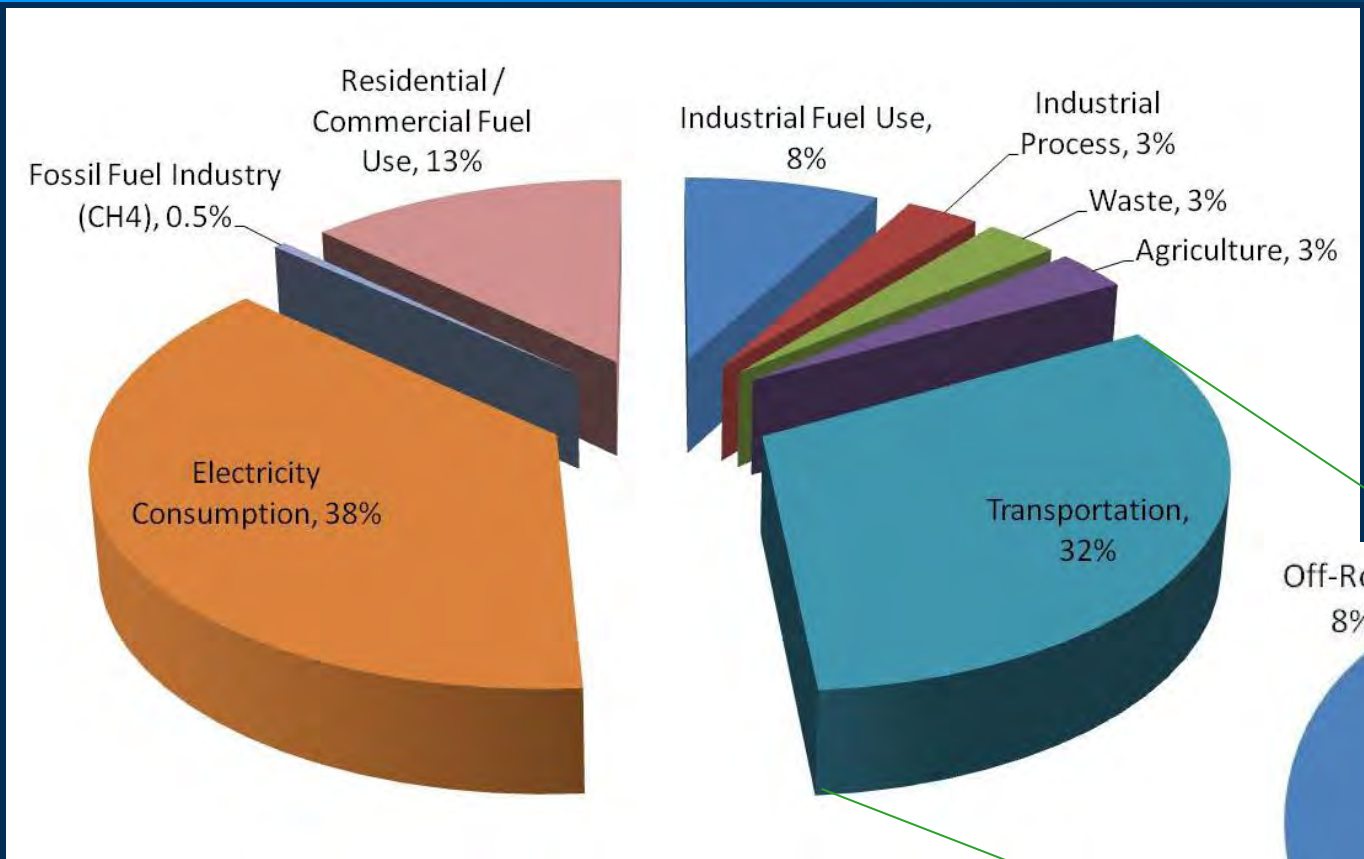
Other Societal Goals

- **Many strategies contribute to other social, economic and environmental goals while reducing GHGs**
- **Some strategies have significant equity implications that should be examined and addressed**

Next Steps – Policy and Practice

- **Regionally-tailored strategy packages**
- **Climate action planning and implementation**
- **Performance tracking and adaptive management of action plans**

Maryland GHG Emission Sources



Maryland's Response to Climate Change

Moving Cooler

April 2007

Governor O'Malley's
Executive Order

25% reduction by 2020 from 2006 baseline

Established Maryland Commission on Climate Change:

16 agency heads

6 General Assembly members

Private sector; NGOs

Local governments

August 2008

Climate Action Plan
(CAP)

42 Policy Options Across All Sectors

8 Transportation and Land Use Policy Options

Land Use

Transit

Intercity Travel

Bike / Ped

PAYD

Pricing

Technologies

GHG Impact Analysis

May 2009

2009 GHG Emission
Reduction Act

Established agency implementation requirements and set
the 2020 target (25% below 2006)

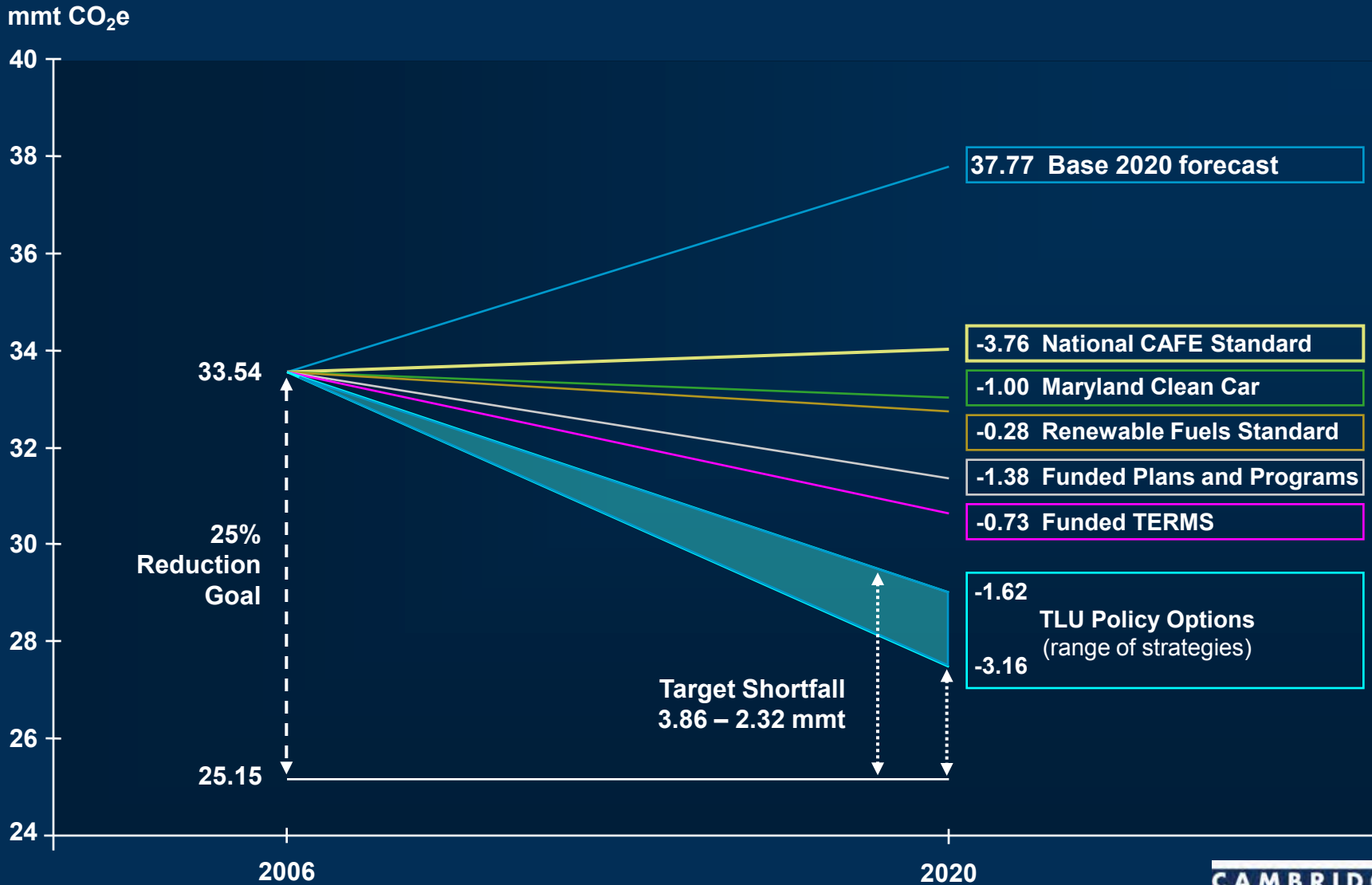


Maryland Department of
Transportation

CAMBRIDGE
SYSTEMATICS

Maryland DOT Climate Action Implementation Plan

Preliminary GHG Emissions Modeling Results



For More Information...

<http://movingcooler.info>

<http://www.uli.org/Books>

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