

Vehicle Emissions and Public Health in California

Louise Bedsworth



California Has Ambitious Goals to Reduce Emissions

- Goals and timelines
 - Reduce greenhouse gas emissions by 2020
 - Meet federal air quality standards by 2024
 - Reduce petroleum dependence
- In meeting these goals, need to balance all three objectives
- Funded in part by a grant from The California Wellness Foundation

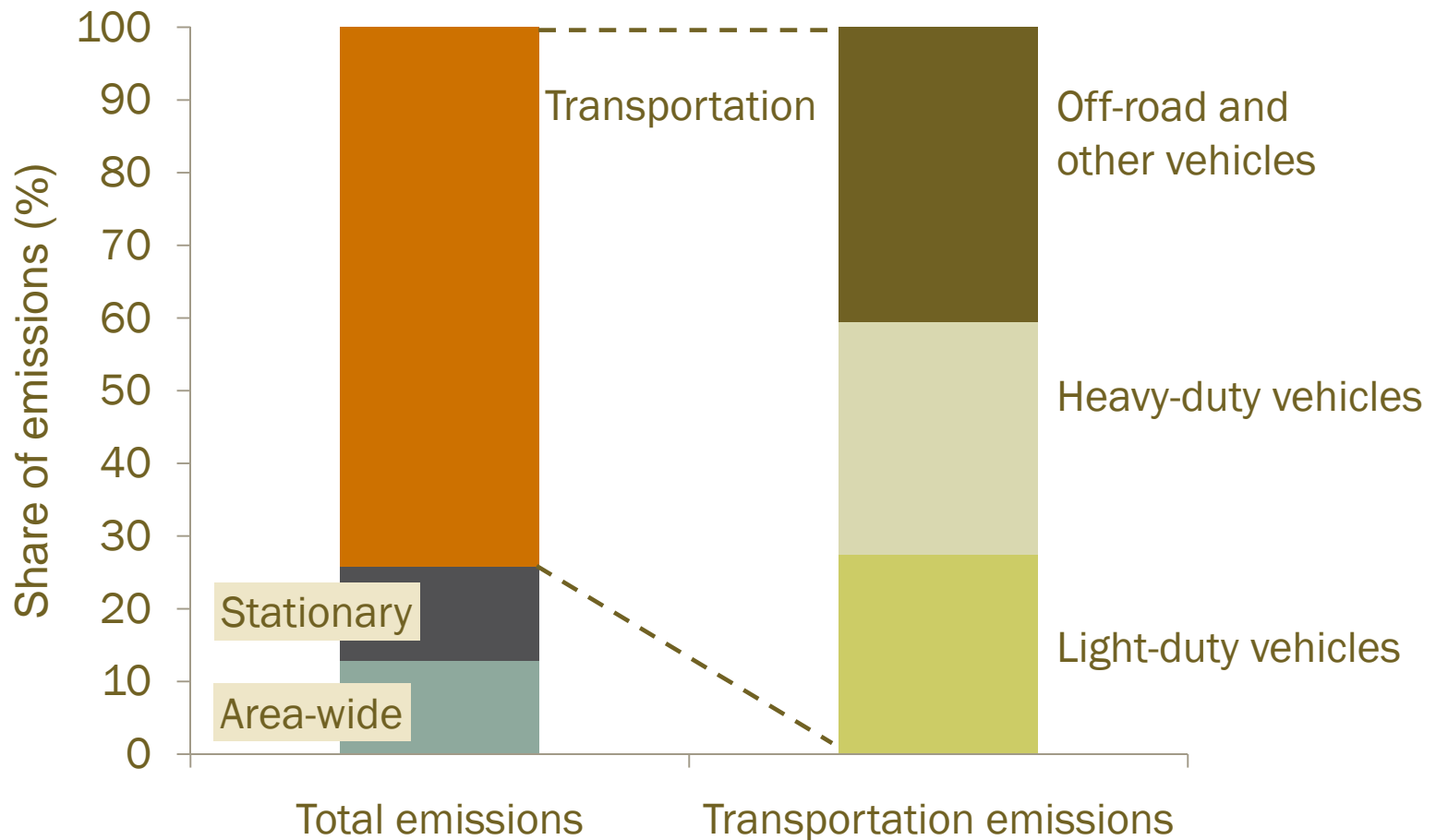


Outline

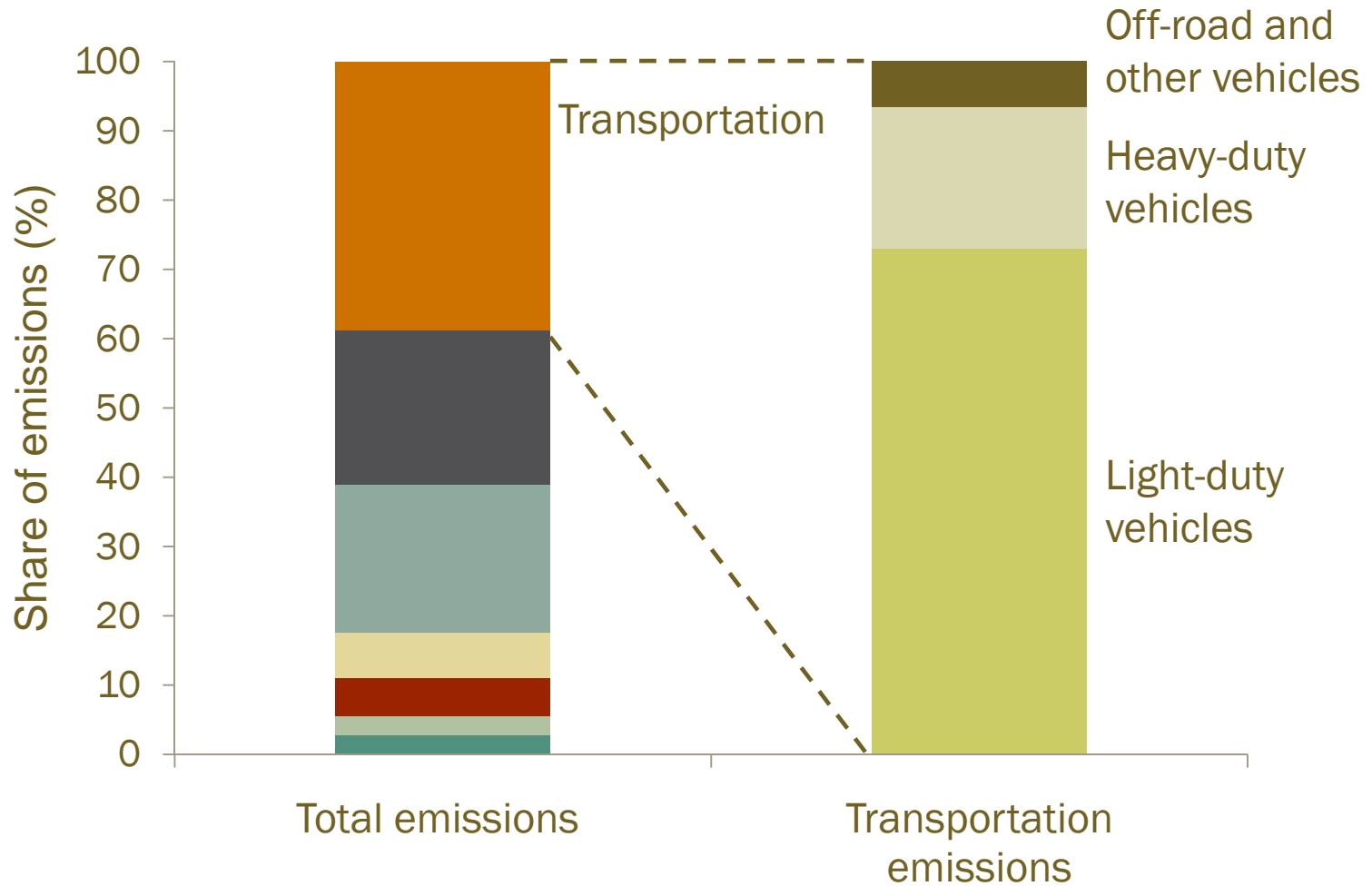
- **Transportation and the environment**
- California's policy framework
- Technologies and approaches
- Evaluating policy options
- Discussion



Transportation Is the Largest Share of Smog-Forming Emissions...



...And Greenhouse Gas Emissions



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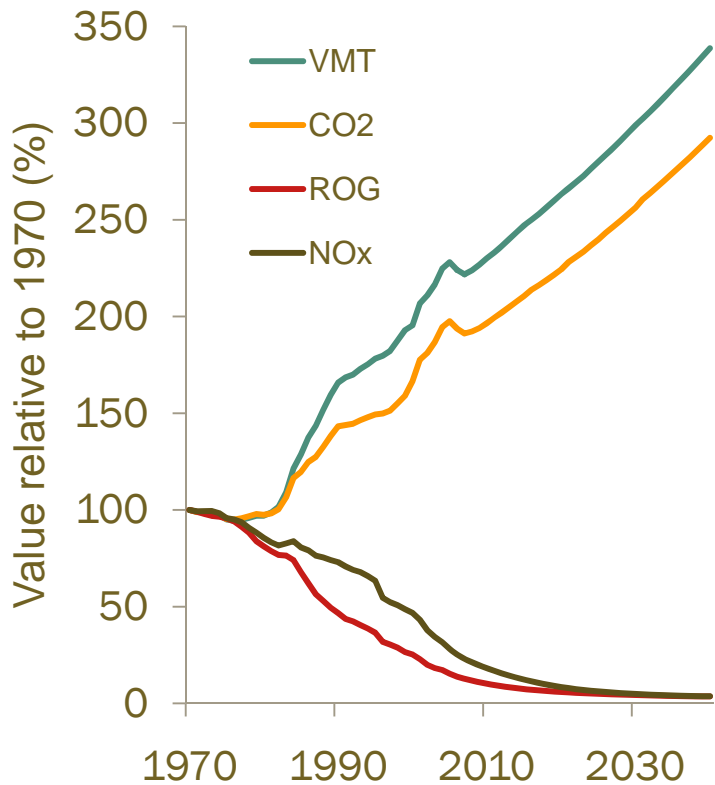
State's Air Quality Has Improved, But Significant Challenges Remain

- Over 90% of state's population lives in areas out of attainment with air quality standards
- More stringent standards will increase number of areas out of compliance
- Looming deadlines
 - Federal air quality standards met by 2024
 - Greenhouse gas emissions reduced by 2020

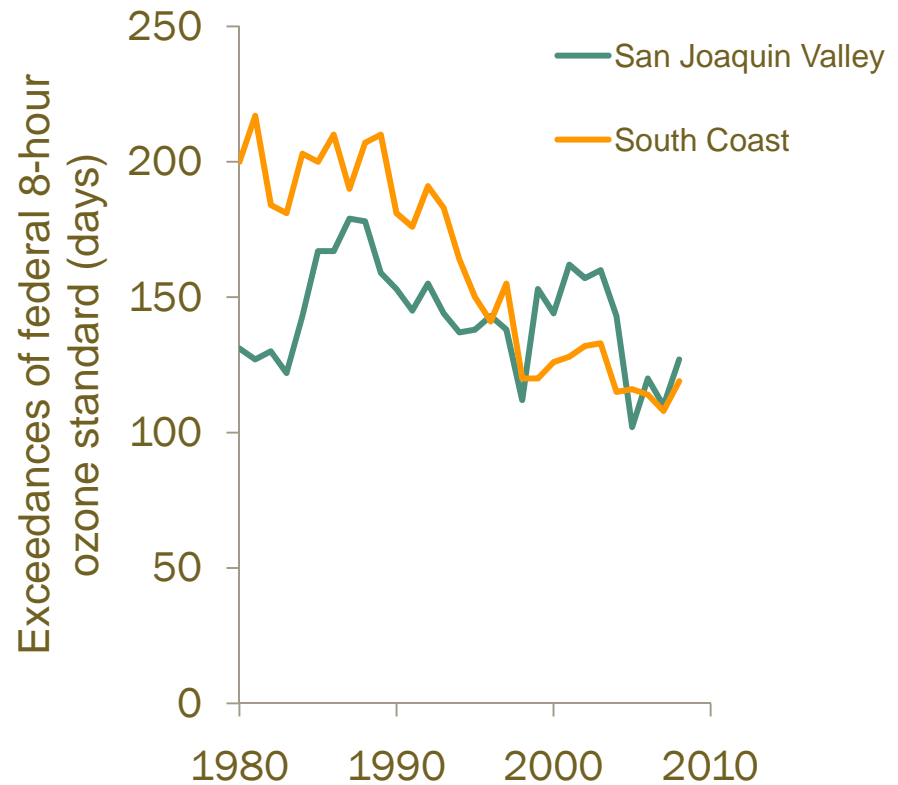


Smog-forming Emissions Have Declined, But Air Quality Still Poor

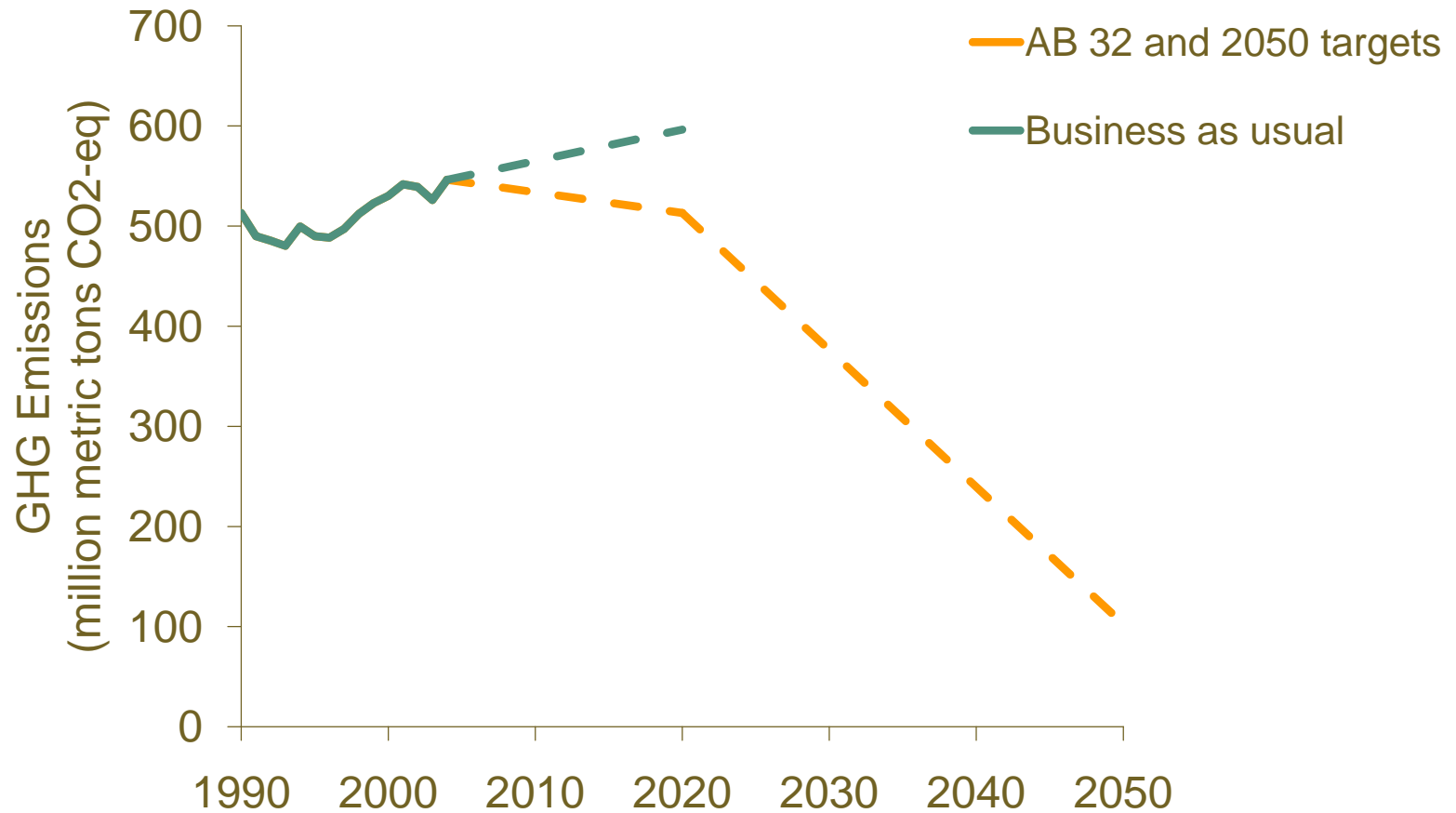
Smog-forming emissions from passenger vehicles



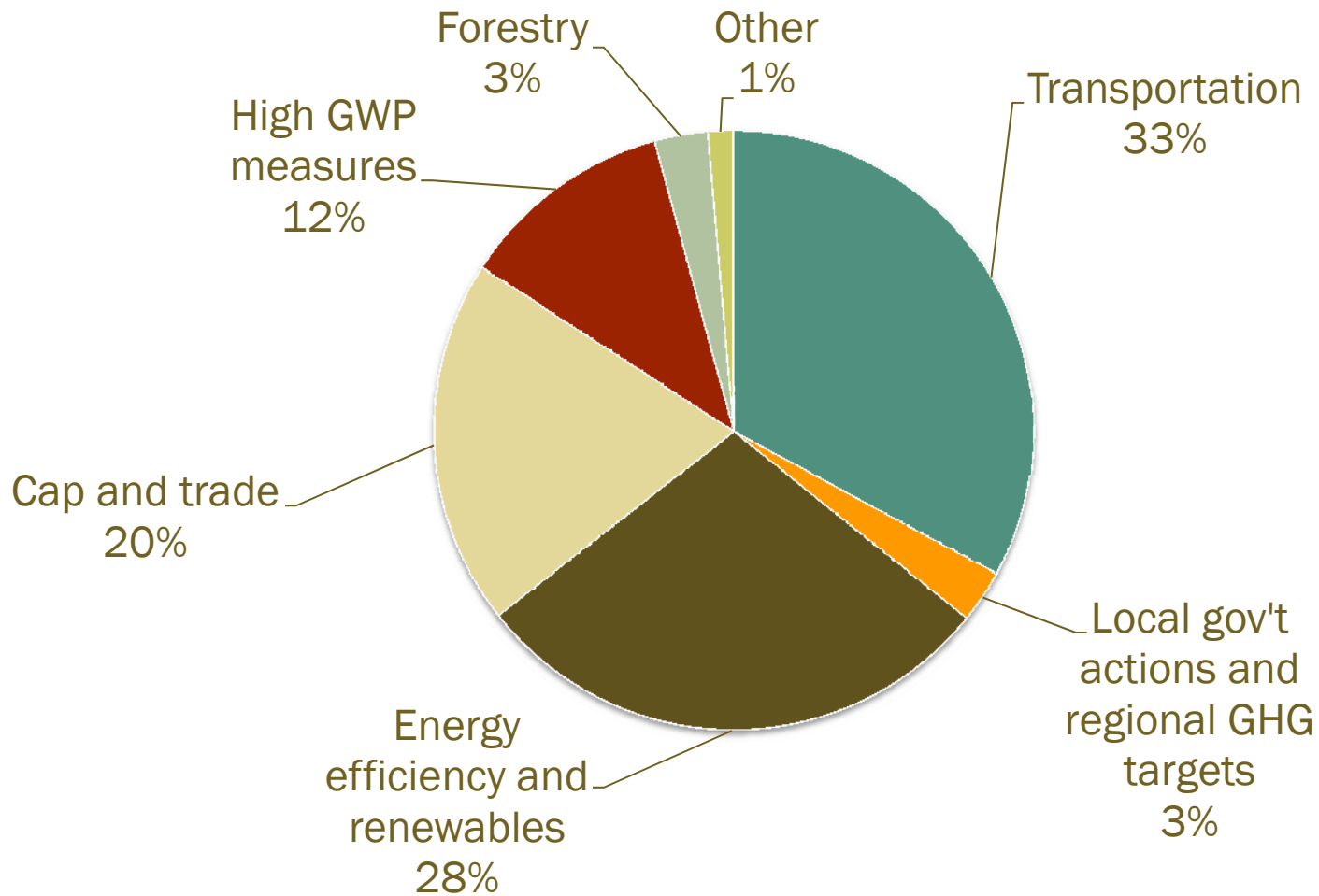
Progress in improving air quality



Significant Reductions in Greenhouse Gas Emissions Needed



Transportation: Largest Share of Reductions in the Scoping Plan



Meeting Climate and Air Quality Goals Is Important for Public Health

- Meeting air quality standards
 - Cardiovascular health
 - Respiratory health
- Reducing greenhouse gas emissions
 - Increase in heat-related illness and death
 - Impacts on air quality
 - Wildfire
 - Displacement: flood, sea level rise



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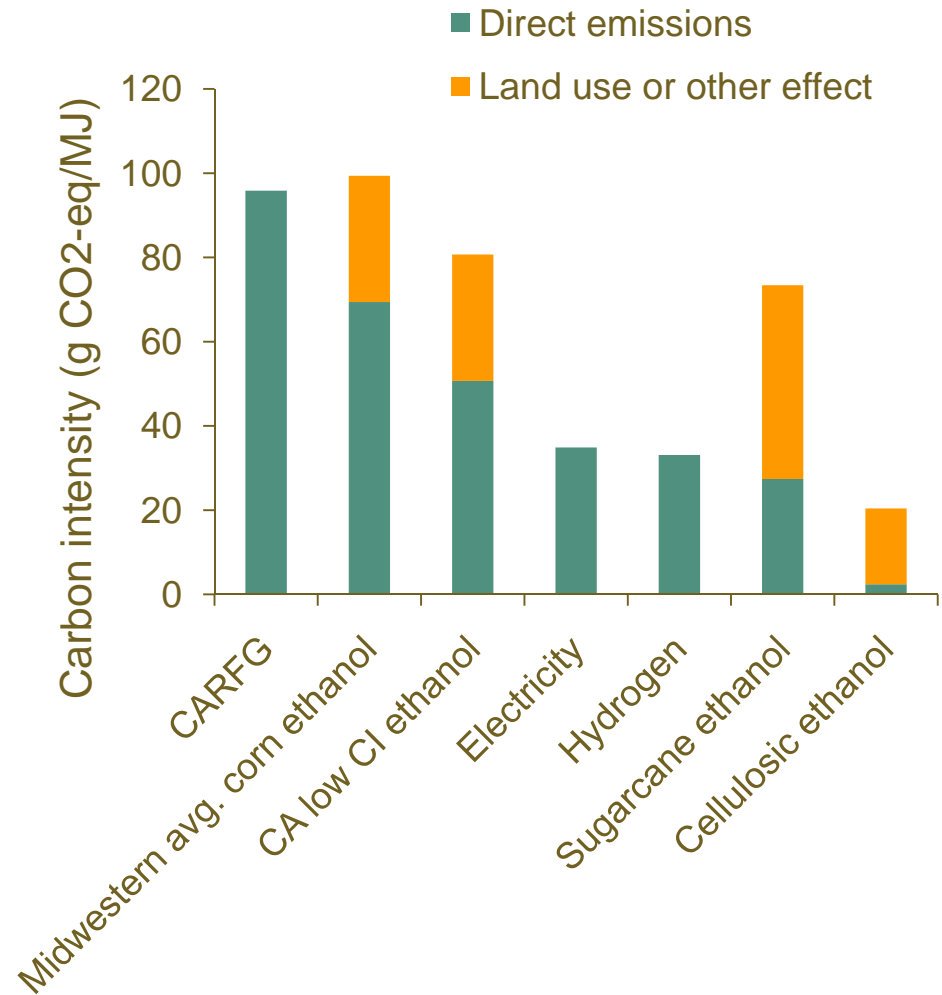
Improving Vehicles Is One Way to Reduce Emissions...

- Reducing smog-forming emissions
 - Low- and zero-emission vehicles
 - Reduced evaporative emissions
- Improving vehicle efficiency
 - Improved conventional vehicle technology
 - Hybrid-electric vehicles



...As Is Improving Vehicle Fuels...

- Cleaner burning gasoline
- Low carbon fuels
 - Gasoline blends
 - Biofuels
 - Electricity
 - Hydrogen



Source: CARB, 2009

...And Reducing Vehicle Travel

- Changes in the built environment
 - Transit-oriented development
 - Mixed-use, increased density
- Investment in transit and transportation infrastructure
- Pricing policies
 - Congestion pricing
 - Parking pricing



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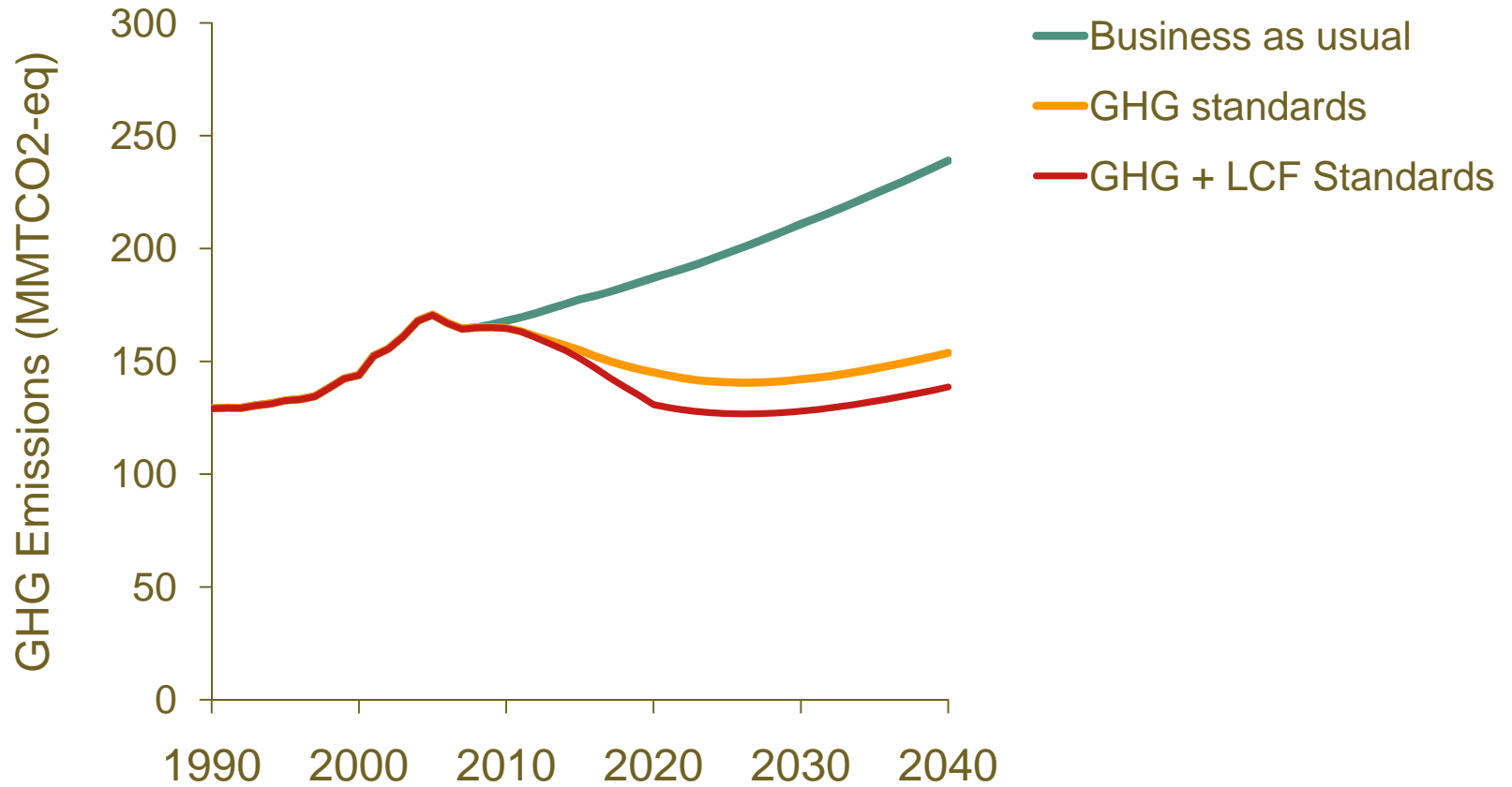


Best Policies Will Consider Multiple Criteria

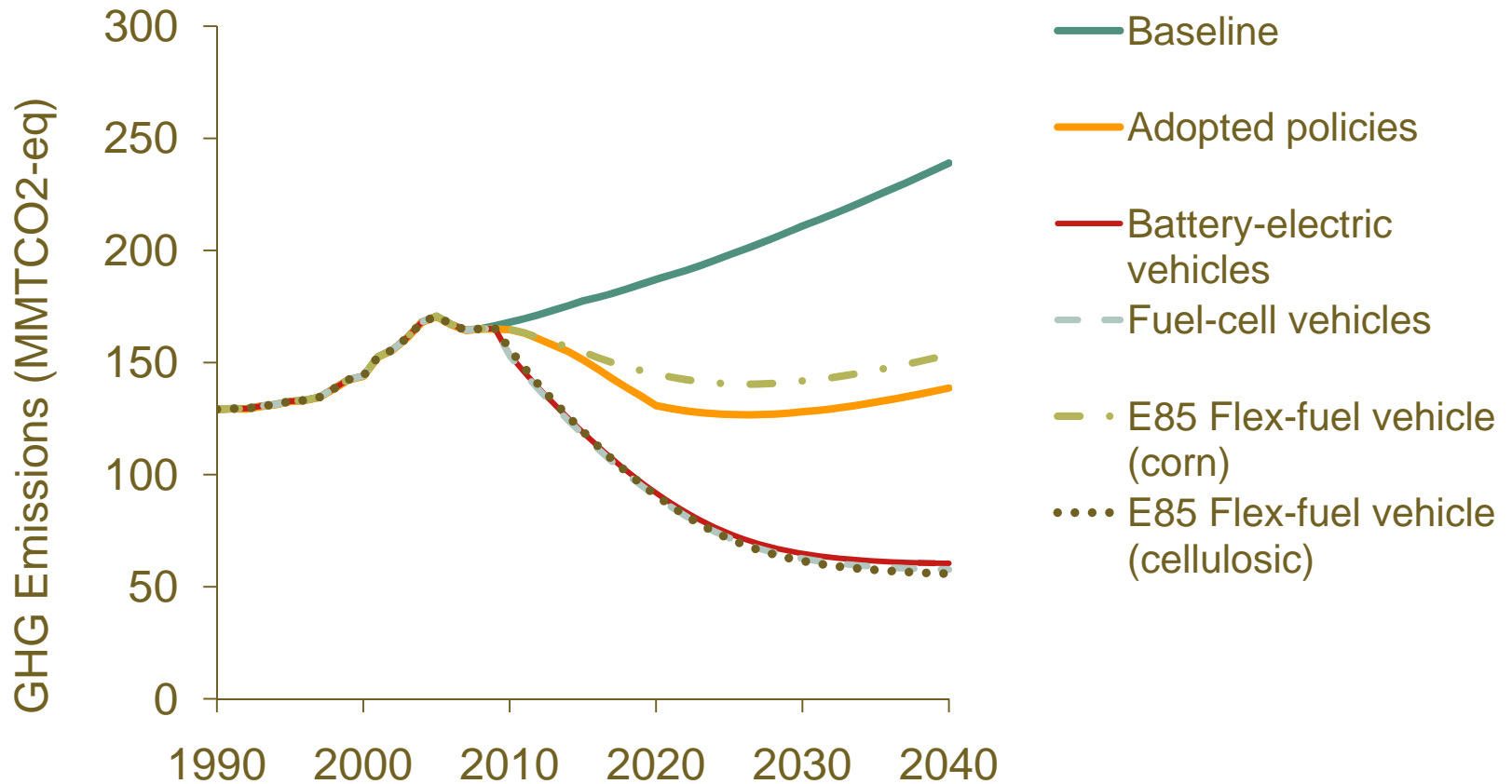
- Three metrics
 - GHG emission reductions
 - Health benefits
 - Cost
- Comparison scenario
 - Year: 2020
 - New technology introduced in model year 2010
 - 100% new market penetration



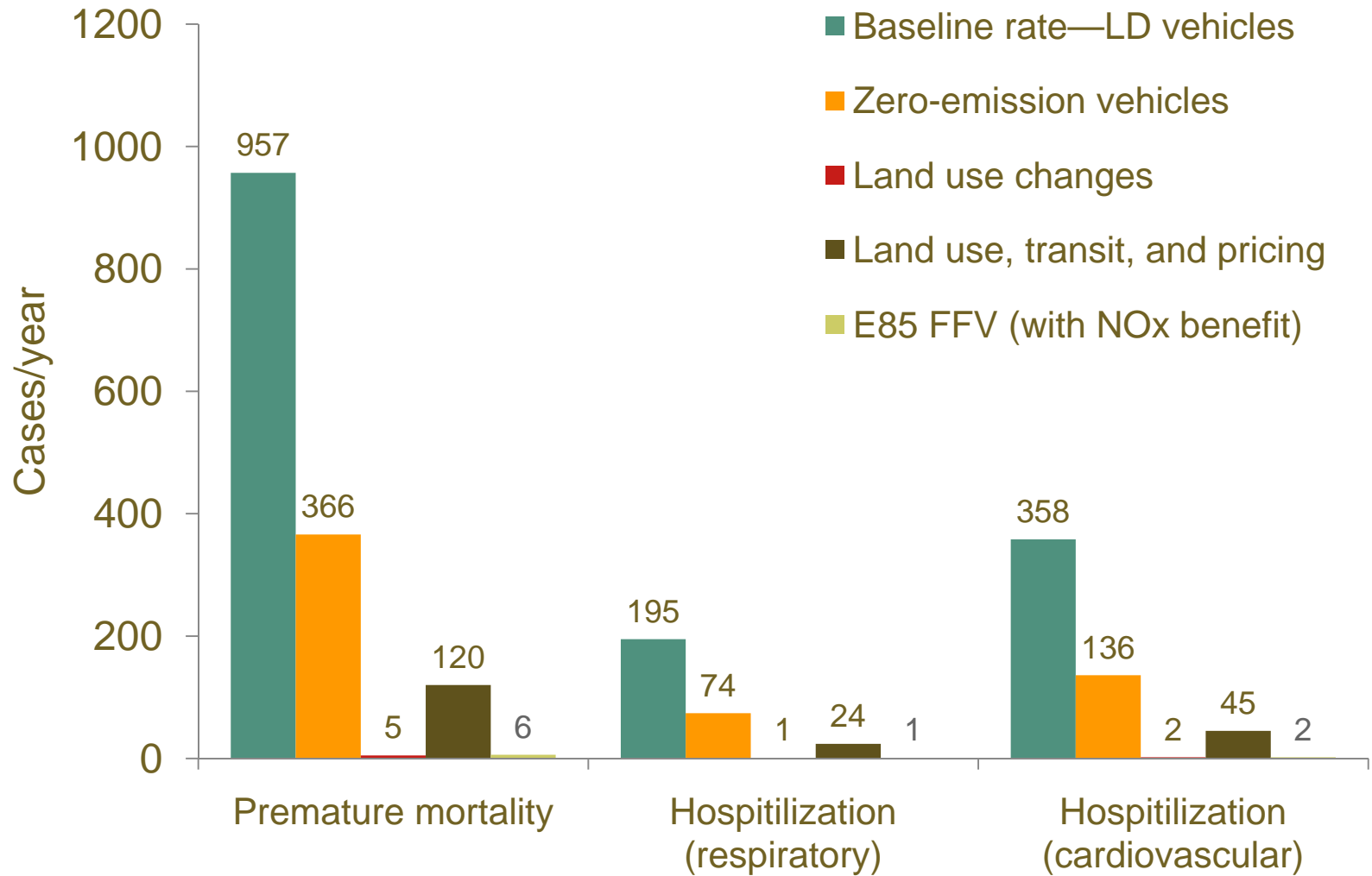
Current Policies Are A First Step



Largest GHG Reductions from Advanced Technology



Largest Health Benefits from Zero-Emission Technologies



VMT Reductions Provide Additional Benefits with All Technologies



Largest Benefits Come with Highest Cost and Uncertainty

- Improved vehicle efficiency can reduce greenhouse gas emissions and can pay for themselves
- FFV have lowest technology cost, but provide little health benefit
- Zero-emission vehicles have potentially high cost
 - At low technology cost, can pay for themselves



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All Options Involve Tradeoffs

	Public Health Benefits	GHG Reductions	Technology Uncertainty
1	Zero-Emission Vehicles	Zero-Emission Vehicles E85 (Cellulosic)	E85 (Corn)
2	Aggressive VMT Reduction	VMT Reductions	E85 (Cellulosic)
3	E85 (Corn, Cellulosic)	E85 (Corn)	Zero-Emission Vehicles

- Costs of battery-electric vehicles high, but benefits could be large
- Need to continue to push for advanced technology



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Notes on the use of these slides

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Thank you for your interest in this work.

