

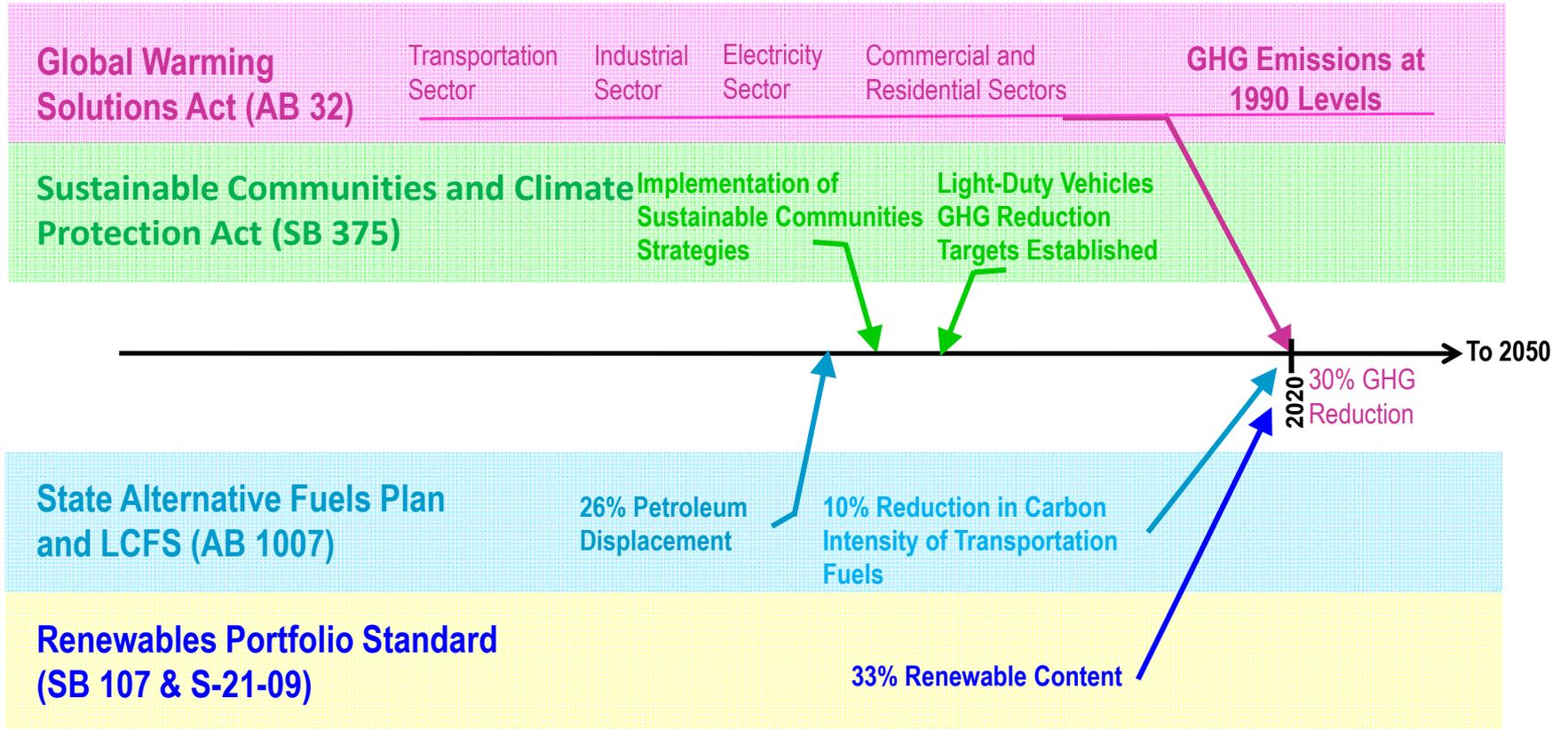
Transportation Research Area

Smart Infrastructure Advisory Group Meeting

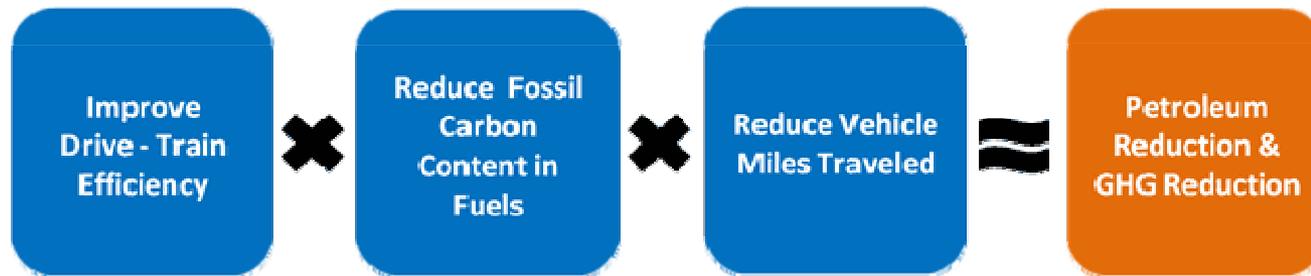
June 21, 2011

Philip Misemer, Transportation Subject Area Lead

Goals



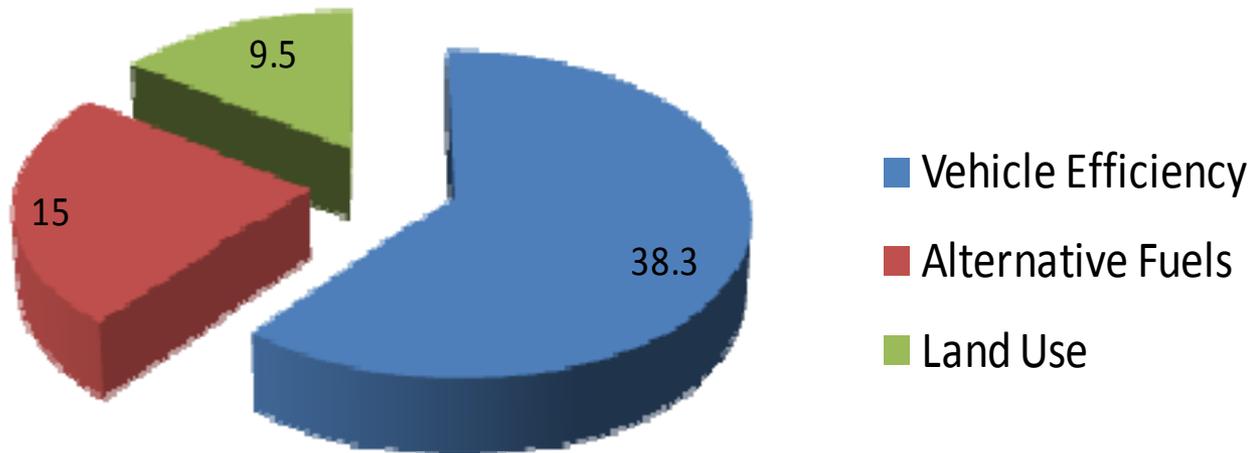
General Approach



National and state transportation research policy identifies three main components: vehicles (making vehicles more efficient), fuels (lowering the fossil carbon content and environmental impact of fuels), and vehicle miles traveled (reducing the use of personal vehicles). The PIER Transportation research area also uses these components in its framework under the focus areas of **Vehicle Technologies**, **Alternative Fuels**, and **Transportation Systems**. These three focus areas will fund research that reduces petroleum consumption and greenhouse gas emissions while assisting economic development within California.

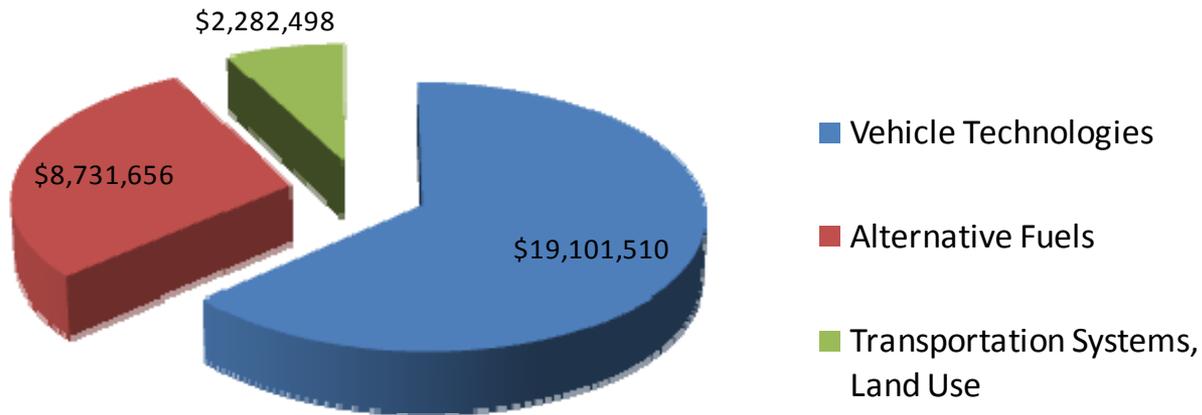
The Transportation Energy Focus Areas

2020 Potential GHG Reduction Targets from various sectors
In Million Megatons



Current Research Portfolio: Transport.

PIER Transportation Active Projects
2007 - 2010: \$30.1 Million



Research Initiatives: Transport.

Electric Fuel: Standardized PEV Battery Systems

- Standardizing aspects of the battery systems can reduce costs of PEV ownership. This initiative will inform the development of standardized PEV battery modules.
 - Determine optimal designs for PEV battery modules.
 - Analyze the potential costs savings from these designs.
 - Facilitate input from OEMs, battery manufacturers, and standards orgs.
 - Follow-on R&D will demonstrate modules in PEV's and storage applications.
- The State Alternative Fuels Plan identifies petroleum and GHG reductions of 376 million gge and 6.7 MMT from electricity by 2022. Automotive grade li-ion batteries remain expensive, severely limiting market growth for plug-in electric vehicles (PEVs).

Research Initiatives: Transport.

Electric Fuel: Advanced PEV Battery Recycling

This solicitation will characterize and develop advanced methods and approaches for recycling automotive lithium batteries at their end-of-life. This research will:

- Evaluate the state of lithium battery recycling for various chemistries and manufacturers,
 - Demonstrate methods to optimize the process for efficiency, and investigate additional methods for recycling.
 - Determine materials that can be regained using advanced recycling techniques and the potential impact this would have in reducing the cost of PEV ownership.
 - Analyze the impacts of automotive grade lithium battery recycling on labor, toxicity, energy inputs, sources, energy security, and green jobs.
 - Analyze potential costs and feasibility for recycling automotive grade lithium batteries in California.
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- The SAFP identifies petroleum and GHG reductions of 376 million gge and 6.7 MMT from electric vehicles by 2022. The automotive grade li-ion battery recycling market is expected to be approximately \$2 billion by 2022. There is currently only one facility being developed in U.S. (Ohio) to recycle PEV li-ion batteries.

Research Initiatives: Transport.

Transportation Energy for Sustainable Communities: California PECAS Model Calibration

- The CalPECAS model is currently running and is populated with data that would support forecasting a range of policy and investment variables and both forecast for the whole state and for the state disaggregated into smaller geographic units. This model is currently operating at UC Davis. The model requires calibration in order to fulfill its capacity but once calibrated it is ready to serve the policy and investment exploration needs of a wide variety of stakeholders.
- As California implements AB 32 a great number of steps will be proposed, debated and eventually taken in policy development and capital investment. Each of these proposed policies and investments will have a probable range of economic effects on industries by industry type, households by household income classes, and regions by type and location (urban or rural, north or south, coastal or inland). Each will affect the energy cost and consumption and each will have environmental consequences for land, air and water resources.

Research Initiatives: Transport.

Transportation Energy for Sustainable Communities: Future Transportation Pattern Scenarios in California; Determining VMT Variation in Scenarios Involving Transportation and Land Use Modifications using the California Statewide Travel Demand Model as a Complementary Analysis Tool in CALCARS

- The availability of reliable transportation energy forecasts has become increasingly important to forecast future modifications in the sector, support policy making in the field of energy conservation and environmental regulations, and assist stakeholders in the relevant decisions towards development of alternative technologies and investments in the diversification of energy sources.
- This initiative would develop a business process analysis with the Energy Commission's transportation forecasting unit for specific inputs, scenarios and outputs useful in consideration of overall transport energy forecasts such as a statewide model that is consistent across all regions needed for statewide policy and investment decisions, improved scenario-based approaches needed to test VMT, fuel, and GHG impacts of technological, policy and exogenous uncertainties and case studies needed to assist regional and local jurisdictions in implementing measures to achieve the objectives of SB 375.

Transportation Research: Questions

- Are there additional opportunities to coordinate PEV integration with smart grid research in ESI?
- What additional research may be needed to develop synergies between PEV battery production and the general need for DES?

PIER Transportation Advisory Group Workshop

Thank You!