

Economic Impacts Committee

James Bushnell, Larry Goulder, Chris Knittel,
Steve Levy, Nancy Ryan, Nancy Sidhu,
James Sweeney

Econ Impacts Committee: Mission and General Approach

- Collect and assess current estimates of economic impacts of AB 32 measures
 - Economic Impacts
 - Aggregate estimates
 - Individual Industries, regions, income groups
 - Environmental Impacts
 - Effectiveness at CO2 reduction
 - Co-pollutants; criteria pollutants etc.
- Participate in ongoing modeling efforts
 - Offer feedback and advice where possible

General Approach

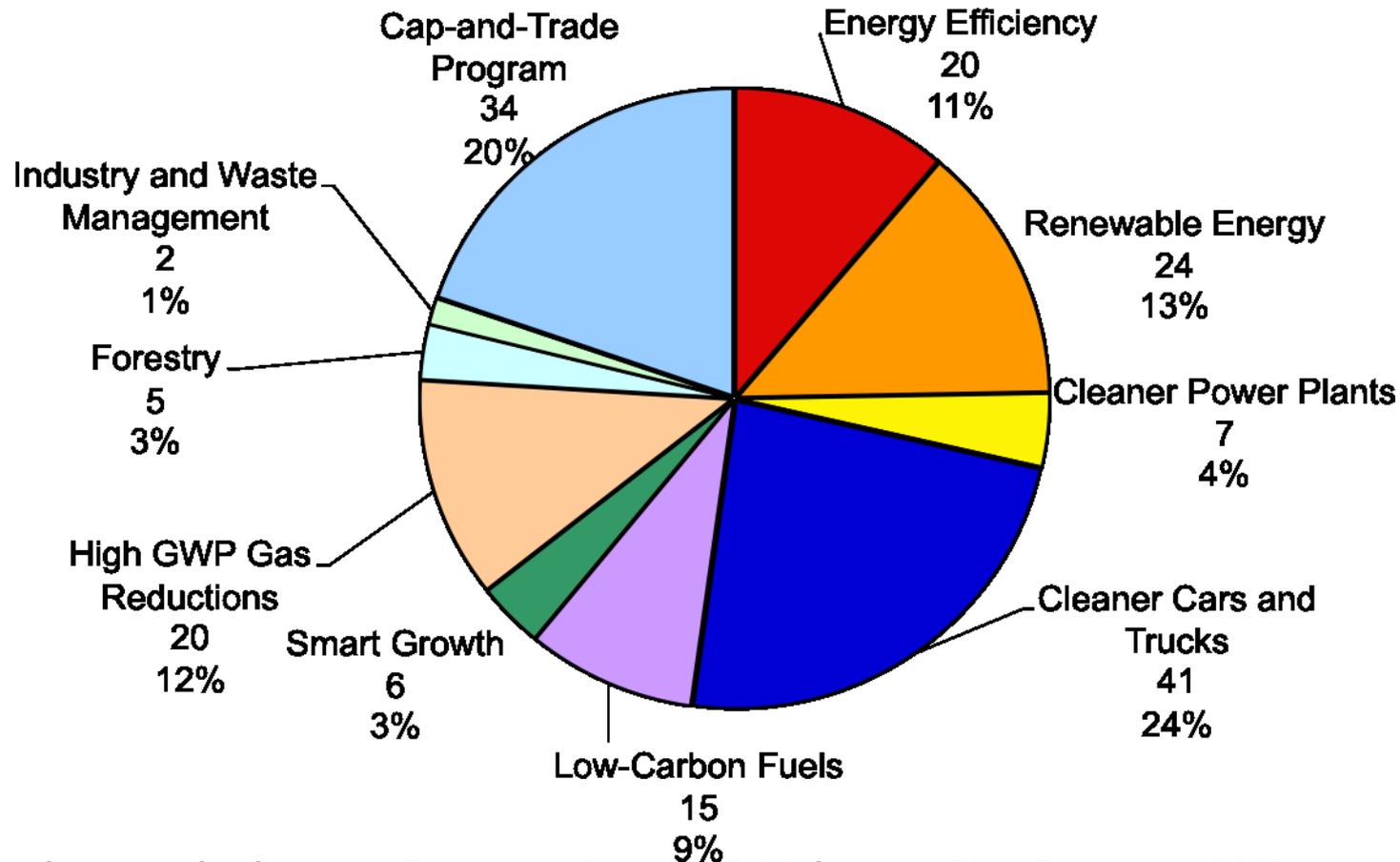
- Focus on modeling on two levels
 - Aggregate Modeling that generates economy-wide estimates of impacts
 - “Measure” specific analyses that have generated estimates of impacts for key regulations or policy measures
 - These estimates can be thought of as inputs to the aggregate modeling

CARB-led Modeling Efforts

- 2008 Scoping plan analysis
 - Only current “official” estimates of impacts available
- 2009 (current) analysis
 - Energy 2020 simulation of energy sectors
 - Interacted with EDRAM for interpreting economy-wide impacts
 - Ongoing – report to ARB in mid December
 - Final results in Jan 2010
 - Also parallel (non-CARB) effort by CRA

AB 32 Strategies to Cut Pollution

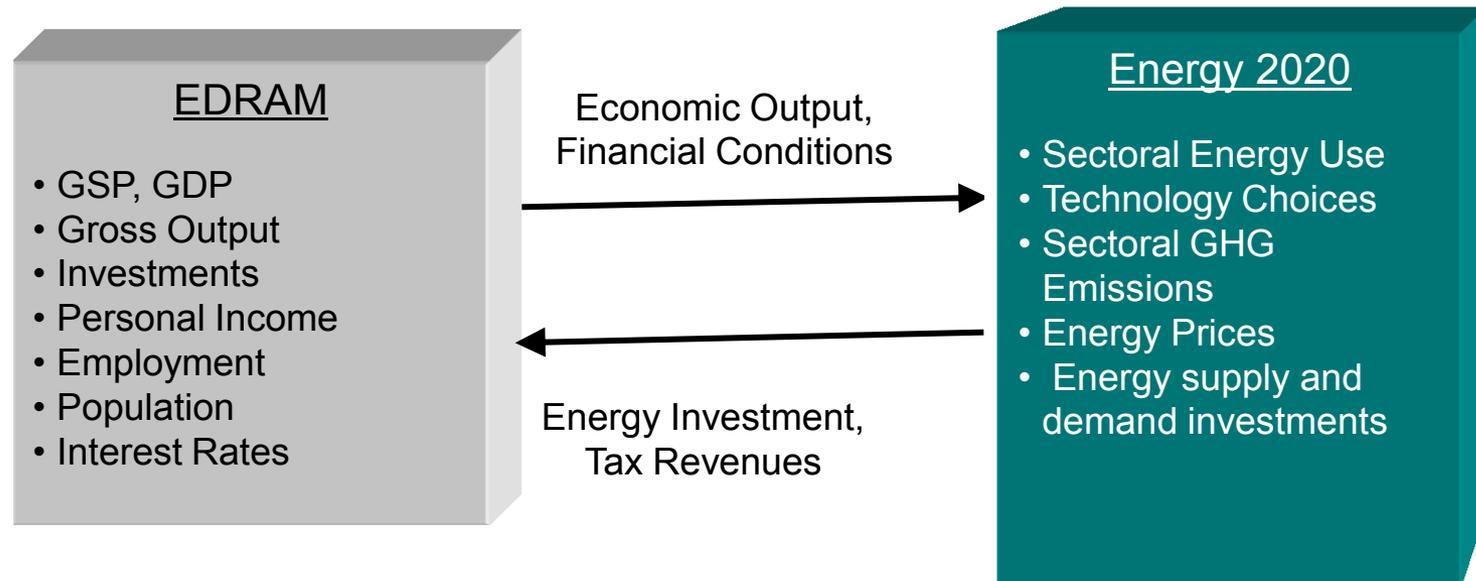
Summary of Key Emission Reduction Strategies (Measure, MMTCO₂e reduction, Percent of Total)



Sources: California Air Resources Board, *AB 32 Scoping Plan*, December 2008

Note: Emission reduction estimates will continue to be revised as policies and programs are updated.

Integration of Models - California



Source: ICF

Sources for Key Inputs

Input Category	Data for California	Data for Other West
Population and Macroeconomic Data	Census EDRAM	Census EIA, BEA
Fuel Prices	CA state sources E3 for electric sector EIA for other	EIA
Energy Use and Consumption	CEC/ARB GHG Inventory	EIA State Energy Consumption, Price, and Expenditure Estimates (SEDS)
Emissions	CEC/ARB GHG Inventory	EPA
Electricity Generation Capacity and Operational Data	FERC and NERC CPUC GHG Modeling process	

Source: ICF

Reference Projection

➤ Key policies and assumptions included:

- ❖ AEO 2009 Reference Price forecast
- ❖ Economic forecast including downturn
- ❖ 2007 EISA requirements
- ❖ RPS requirements for all states modeled
- ❖ RPS for CA at 20% of electricity sales
- ❖ Low Carbon Fuel Standard

Source: ICF

Reference Projection – Policies Included

Policy	Region	Goal
2007 EISA	All states	This policy affects devices and processes. See below New vehicles reach 35.5 mpg by 2020 under EISA CAFÉ provisions.
Pavley Vehicle Standard	CA only	35.5 mpg in 2016. Replaces EISA above
Low Carbon Fuel Standard	CA only	10% reduction in carbon content of fuel by 2020 replaces EISA above
Renewable Portfolio Standard	All states that have an RPS	California 20% attainment

Source: ICF

Complementary Policies Modeled

Policy	Region	Goal
Pavley Vehicle Standards II	California	42.5 mpg average new vehicle efficiency by 2020.
Renewable Portfolio Standard	California specific increase	20%-33% attainment
Energy efficiency	California	<ul style="list-style-type: none">• 10% in electricity use in 2020 or about a 1% per year reduction in electricity consumption.• 4% of projected natural gas use in 2020.
Combined Heat and Power	California	Increase CHP use by 30,000 GWh

Source: ICF

Complementary Policies Modeled

Policy	Region	Goal
VMT Reduction Measure	California	VMT decrease of 5% by 2020
Heavy Duty Vehicle Efficiency	California	Increase in Freight Ground end use efficiency to reflect Smart Way Truck Efficiency (~1.4 MMT reduction) Establish Medium and Heavy Duty Vehicle Hybrids as a Technology (~0.5 MMT reduction)
Ship Electrification at Ports	California	On-shore electricity used in place of diesel engines (~0.2 MMT)

Source: ICF

Measure Specific Studies

- Low Carbon Fuel Standard
 - CARB proceeding to develop detailed regulation by March 2010
 - Modeling analysis in appendix to ISOR
 - http://www.arb.ca.gov/fuels/lcfs/030409lcfs_isor_vol2.pdf
- Pavley I and II
 - Pavley I now considered baseline to AB 32 based upon 2007 EISA
 - Pavley II – as yet undefined incremental requirement for vehicle fuel efficiency

Measure Specific Studies

- Renewable Portfolio Standard(s)
 - 20% taken as baseline
 - Legislation and/or rulemaking likely for 33%
 - CPUC proceeding has been developing analysis of impacts led by E3
 - <http://www.cpuc.ca.gov/PUC/energy/Renewables/hot/33implementation.htm>
- Energy Efficiency Programs
 - Baseline taken from 2007 IEPR (CEC forecast)
 - Additional measure specific savings taken off that baseline
 - Some question as to how much of those savings were already included in the baseline forecast

A Note on Baselines

- In several cases important savings or economic changes are taken as a “given” in the modeling and/or cost benefit analysis
 - Bio-fuel refining capacity
 - Vehicles compliant with Pavley I or EISA
- These measures will create economic impacts *but* those impacts are not considered to be due to AB 32 and related policies
- How should we think about such impacts?

Some Issues Identified by the Committee

- Modeling of “income effect” of permit or auction revenue allocation
- Role of electric vehicles in Energy 2020
- Treatment of LCFS as a tax in Energy 2020
- Treatment of CO2 content of electricity imports in Energy 2020
- Energy Efficiency baselines (mentioned above)
- Electricity Rate Design and policy
 - Electricity prices in models are crude (average prices)
 - Distributional impacts from power sector could be driven by electricity regulatory policy
- Interaction with other state & federal policies
 - Where to draw the “borders” for emissions and economic impacts
 - What measures to take as exogenous (i.e. “free”) to CA
- Sensitivity analysis to shortfalls in several of these measures would be prudent