



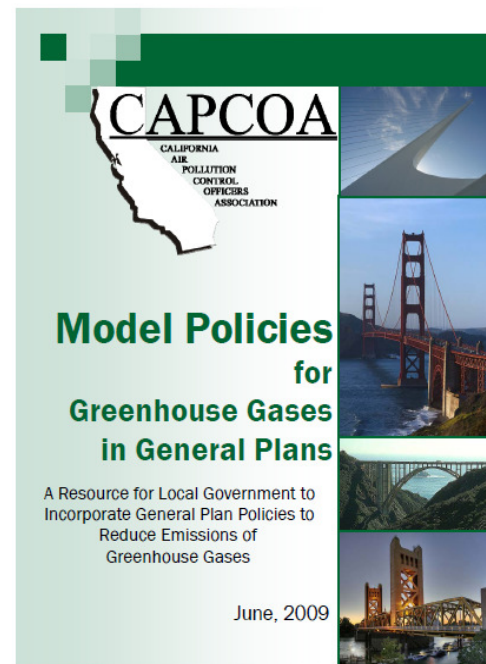
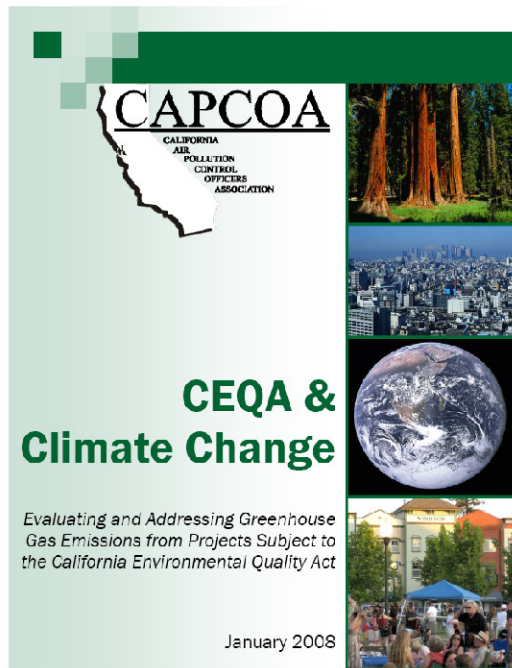
Quantifying GHG Mitigation Measures

NACAA Fall Meeting

October 20, 2010

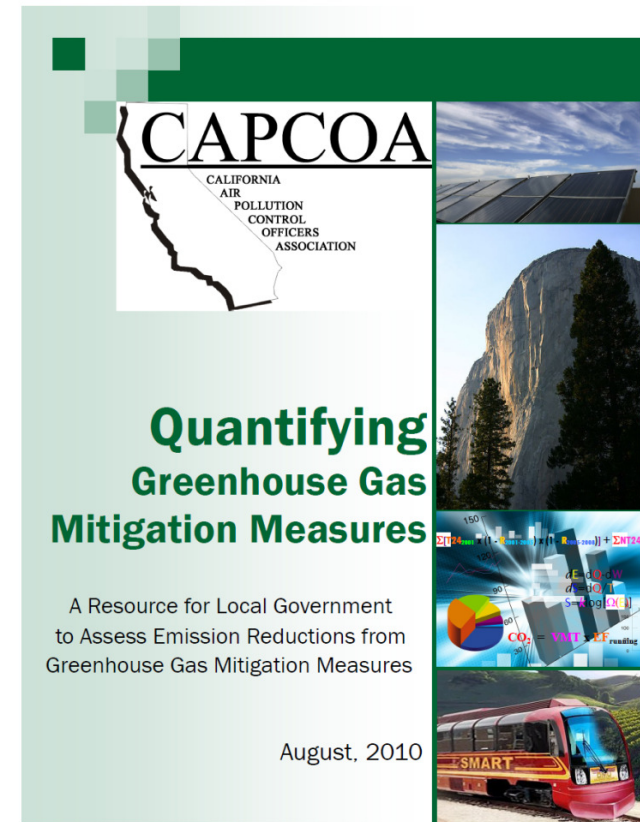
Barbara Lee, Northern Sonoma County APCD

CAPCOA's First Two GHG Reports



GHG Quantification Project

- Originated with list of measures districts had been asked to quantify
- Funded by seven California air districts, NACAA, and NESCAUM
- Environ, and Fehr & Peers hired for technical analysis
- Work began Dec. 2009
- Report released Aug. 2010





Structure of Report

- Ch. 1 Introduction
 - Ch. 2 The Purpose of Quantifying Mitigation Measures
 - Ch. 3 Quantification Concepts
 - Ch. 4 Quantification Approaches & Methods
 - Ch. 5 Discussion of Select Quantified Measures
 - Ch. 6 Understanding & Using Fact Sheets
 - Ch. 7 Quantification Fact Sheets for Individual Measures
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- Technical Appendices, including Baseline Methodology




Organization of Measures

- Measures are organized in categories:
Energy, Transportation, Water, Area Landscaping, Solid Waste, Vegetation, Construction, Miscellaneous, General Plan
- Some categories have subcategories
- Measure numbers reflect the category/subcategory
- Measures are cross-referenced to earlier reports
- Measures are either fully quantified (most), best management practices, or designated as General Plan measures
- Quantification of each measure is described in a Fact Sheet format

Fact Sheets

- Each measure has a Fact Sheet
- Fact Sheets are color coded
- Each Fact Sheet provides:
 - Category & subcategory
 - Cross reference to prior reports
 - Measure number, name, and description
 - Range of effectiveness
 - Applicability, assumptions & limitations (including grouping)
 - Data inputs & equations
 - Baseline methodology
 - Sample calculation
 - Literature review



Energy

CEQA MM-05
MFR EC-2

BE-1 Building Energy

2.0 Energy

2.1 Building Energy Use

To determine overall reductions, the ratio of building energy associated GHG emissions to the other project categories needs to be determined. This percent contribution to the total is multiplied by the percentage reduction.

2.1.1 Buildings Exceed Title 24 Building Envelope Energy Efficiency Standards By X%¹

(X is equal to the percentage improvement selected by Applicant such as 5%, 10%, or 20%)

Range of Effectiveness:
For a 10% improvement beyond Title 24 the range of effectiveness is:

| | Electricity | Natural Gas |
|-----------------|-------------|-------------|
| Non-residential | 0.2 – 6.5% | 0.7 – 10% |
| Residential | 0.3 – 2.6% | 7.5 – 9.1% |

This is dependent on building type and climate zones.

Measure Description:
Greenhouse gases (GHGs) are emitted as a result of activities in residential and commercial buildings when electricity and natural gas are used as energy sources. New California buildings must be designed to meet the building energy efficiency standards of Title 24, also known as the California Building Standards Code. Title 24 Part 6 regulates energy uses including space heating and cooling, hot water heating, and ventilation². By committing to a percent improvement over Title 24, a development reduces its energy use and resulting GHG emissions.

¹ Compliance with Title 24 is determined from the total daily valuation (TDV) of energy use in the built-environment (on a per square foot per year basis). TDV energy use is a parameter that reflects the burden that a building imposes on an electricity supply system. In general, there is a larger electricity demand and, hence, stress on the supply system during the day (peak times) than at night (off peak). Since a TDV analysis requires significant knowledge about the actual building which is not typically available during the CEQA process, the estimate of the energy and GHG savings from an improvement over Title 24 energy use from a TDV basis is proportional to the actual energy use.

² Hardwired lighting is part of Title 24 part 6. However, it is not part of the building envelope energy use and therefore not considered as part of this mitigation measure.

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BE-1



Categories – Example: Energy

| Energy | | |
|--|-------------------------------|--|
| DC | AC | LC |
| Building Energy | Alternative Energy | Lighting |
| Exceed Title 24 | Onsite Renewable Energy | Install High Efficacy Lighting |
| Install Energy Efficient Appliances | Utilize Combined Heat & Power | Limit Outdoor Lighting |
| Install Programmable Thermostats Reduction: Grouped | Establish Methane Recovery | Replace Traffic Lights with LED Reduction: Additional |
| Obtain 3rd Party Commissioning Reduction: Grouped | | |

Non-Transportation Categories & Subcategories

| Energy | | | Water | | Area Landscaping | Solid Waste | Vegetation | Construction | Miscellaneous | General Plans |
|---|-------------------------------|---|--|--|---|---|--------------------------|--|--|---|
| BE | AE | LE | WSW | WUW | A | SW | V | C | Misc | GP |
| Building Energy | Alternative Energy | Lighting | Water Supply | Water Use | Landscaping Equipment | Solid Waste | Vegetation | Construction | Miscellaneous | General Plans |
| Exceed Title 24 | Onsite Renewable Energy | Install High Efficacy Lighting | Adopt a Water Conservation Strategy | | Prohibit gas Powered Landscape Equipment | Institute or Extend Recycling & Composting Services | Plant Urban Trees | Use Alternative Fuels for Construction Equipment | Establish Carbon Sequestration | Fund Incentives for Energy Efficiency |
| Install Energy Efficient Appliances | Utilize Combined Heat & Power | Limit Outdoor Lighting | OR | | Implement Lawnmower Exchange Program Reduction: Grouped | Recycle Demolished Construction Material | New Vegetated Open Space | Use Electric or Hybrid Construction Equipment | Establish Off-site Mitigation | Establish a Local Farmer's Market |
| Install Programmable Thermostats Reduction: Grouped | Establish Methane Recovery | Replace Traffic Lights with LED Reduction: Additional | Use Reclaimed Water | Install Low-Flow Fixtures | Electric Yard Equipment Compatibility Reduction Grouped | | | Limit Construction Equipment Idling | Implement an Innovative Strategy | Establish Community Gardens |
| Obtain 3rd Party Commissioning Reduction: Grouped | | | Use Graywater | Design Water-Efficient Landscapes | | | | Institute a Heavy-Duty Off-Road Vehicle Plan | Use Local and Sustainable Building Materials | Plant Urban Shade Trees |
| | | | Use Locally Sourced Water | Use Water-Efficient Irrigation | | | | Implement a Construction Vehicle Inventory Tracking System | Require BMP in Agriculture and Animal Operations | Implement Strategies to Reduce Urban Heat-Island Effect |
| | | | | Reduce Turf | | | | | Require Environmentally Responsible Purchasing | |
| | | | | Plant Native or Drought-Resistant Vegetation | | | | | | |

Note: Strategies in bold text are primary strategies with reported VMT reductions; non-bolded strategies are support or grouped strategies.

Transportation Categories & Subcategories

| Transportation Measures (Five Subcategories) Global Maximum Reduction (all VMT): urban = 75%; compact infill = 40%; suburban center or suburban with NEV = 20%; suburban = 15% | | | | | Global Cap for Road Pricing needs further study | |
|--|--|----------------------------------|----------------------------------|--|---|-------------------------------------|
| Transportation Measures (Four Categories) Cross-Category Max Reduction (all VMT): urban = 70%; compact infill = 35%; suburban center or suburban with NEV = 15%; suburban = 10% | | | | Max Reduction = 15% overall; work VMT = 25%; school VMT = 85%; | Max Reduction = 25% (all VMT) | |
| Land Use / Location | Neighborhood / Site Enhancement | Parking Policy / Pricing | Transit System Improvements | Commute Trip Reduction (assumes mixed use) Max Reduction = 25% (work VMT) | Road Pricing Management | Vehicles |
| Max Reduction: urban = 65%, compact infill = 30%, suburban center = 10%, suburban = 5% | Max Reduction: without NEV = 5%; with NEV = 15% | Max Reduction = 20% | Max Reduction = 10% | | Max Reduction = 25% | |
| Density (30%) | Pedestrian Network (2%) | Parking Supply Limits (12.5%) | Network Expansion (8.2%) | CTR Program Required = 21% work VMT Voluntary = 4.2% work VMT | Cordon Pricing (22%) | Electrify Loading Docks |
| Design (21.3%) | Traffic Calming (1%) | Unbundled Parking Costs (13%) | Service Frequency / Speed (2.5%) | Transit Fare Subsidy (20% work VMT) | Traffic Flow Improvements (45% CO2) | Utilize Alternative Fueled Vehicles |
| Location Efficiency (85%) | NEV Network (14.4) <NEV Parking> | On-Street Market Pricing (5.5%) | Bus Rapid Transit (3.2%) | Employee Parking Cash-out (7.7% work VMT) | Required Contributions by Project | Utilize Electric or Hybrid Vehicles |
| Diversity (30%) | Car Share Program (0.7%) | Residential Area Parking Permits | Access Improvements | Workplace Parking Pricing (19.7% work VMT) | | |
| Destination Accessibility (20%) | Bicycle Network <Lanes> <Parking> <Land Dedication for Trails> | | Station Bike Parking | Alternative Work Schedules & Telecommute (5.5% work VMT) | | |
| Transit Accessibility (25%) | Urban Non-Motorized Zones | | Local Shuttles | CTR Marketing (5.5% work VMT) | | |
| BMR Housing (1.2%) | | | Park & Ride Lots* | Employer-Sponsored Vanpool/Shuttle (13.4% work VMT) | | |
| Orientation Toward Non-Auto Corridor | | | | Ride Share Program (15% work VMT) | | |
| Proximity to Bike Path | | | | Bike Share Program | | |
| | | | | End of Trip Facilities | | |
| | | | | Preferential Parking Permit | | |
| | | | | School Pool (15.8% school VMT) | | |
| | | | | School Bus (8.3% school VMT) | | |

Note: Strategies in bold text are primary strategies with reported VMT reductions; non-bolded strategies are support or grouped strategies.



Rules for Combining Measures

- Combinations **between** Categories
 - Must include relative contribution of category to total emissions
 - Category contribution to total reduction = (relative contribution) x (category reduction)
 - Add up each category contribution



Rules for Transportation Measures

- Cross-category Maximum
 - Global Maximum
- VMT caps based on land use characteristics:
Urban, Compact Infill,
Suburban Center, Suburban
- Subcategory rules for: Land-use/Location, Neighborhood/Site Enhancements, Parking, Transit System, Commuter Trip Reduction, and Road-pricing/Management
 - Additional rules for: Rural implementation, and different Baseline derivation




More About Using Fact Sheets

- Quick reference tables for each category
 - Shows grouping of measures, range of effectiveness, and if considered BMP or GP
- Step-by-step instructions
- Example use of a fact sheet with a measure
- Instructions for use outside of California



Project Review & Next Steps

- Baseline Methodology, and all measures reviewed by Project Oversight Panel
 - External technical review by CA Energy Commission and third party transportation consultant
 - External review of Report by local planner
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- Planning collaborative “how-to” workshops in several locations in California