AB 32 Background

- Global Warming Solutions Act of 2006
  - Implemented by the California Air Resources Board (CARB)
- Reduce State’s GHG emissions to 1990 levels by 2020
  - 1990 State GHG emissions established by CARB as 427 million metric tons (MMT) carbon dioxide equivalents (CO$_2$e)
- Estimated State GHG emissions in 2020 without AB 32
  - 596 MMT CO$_2$e (CARB 2008 Scoping Plan estimate)
    - 169 MMT reduction needed (28% reduction)
  - 545 MMT CO$_2$e (CARB 2010 revised estimate)
    - 118 MMT reduction needed (22% reduction)
    - Considers economic downturn
Global Warming Potentials (GWPs) Used in Cap and Trade Regulation are from 40 CFR Part 98, Subpart A

<table>
<thead>
<tr>
<th>GHG</th>
<th>GWP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Dioxide, CO₂</td>
<td>1</td>
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<tr>
<td>Methane, CH₄</td>
<td>21</td>
</tr>
<tr>
<td>Nitrous Oxide, N₂O</td>
<td>310</td>
</tr>
<tr>
<td>Sulfur Hexafluoride, SF₆</td>
<td>23,900</td>
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<tr>
<td>Hydrofluorocarbons, HFCs</td>
<td>12 – 11,700</td>
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<tr>
<td>Perfluorocarbons, PFCs</td>
<td>6,500 – 17,340</td>
</tr>
<tr>
<td>Other fluorinated GHGs</td>
<td>11 – 17,200</td>
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</tbody>
</table>
California’s GHG Emissions

Chart represents average 2002 – 2004 emissions
AB 32 Scoping Plan

- Scoping Plan approved by CARB on Dec. 12, 2008
  - 69 GHG control measures
- Scoping Plan measures with > 10 MMT CO$_2$e reductions

<table>
<thead>
<tr>
<th>Measure</th>
<th>GHG reductions (MMT/yr CO$_2$e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavley and Advanced Clean Cars regulations (new light-duty vehicles)</td>
<td>30</td>
</tr>
<tr>
<td>Renewable electricity standards (increase from 12% to 33% renewables by 2020)</td>
<td>23</td>
</tr>
<tr>
<td>Cap-and-trade regulation</td>
<td>18 – 27</td>
</tr>
<tr>
<td>Energy efficiency measures</td>
<td>17</td>
</tr>
<tr>
<td>Low carbon fuel standard</td>
<td>15</td>
</tr>
</tbody>
</table>

GHG reductions are July 2011 CARB estimates
California GHG Emissions in 2020 and AB 32 Scoping Plan Control Measures

Discrete Early Action Measures

Nine measures adopted by Jan. 1, 2010

- Low Carbon Fuel Standard
- Landfill methane capture
- Automobile air conditioning -- non-professional
- Sulfur hexafluoride – non-electric
- High GWP consumer products
- Tractor trailer efficiency measure
- Tire pressure program
- Port shore power
- Semiconductor operations
Semiconductor Operations Rule

- Air districts identified in regulation as implementing agency
- Regulates fluorinated gases used in chemical vapor deposition and etching operations
- Reporting
  - Annual reports due beginning Mar. 1, 2011
- Emission standards
  - Tiered standards based on annual production levels
    - 0.2, 0.3, or 0.5 kilogram CO$_2$e emitted per cm$^2$ wafer produced
  - Process optimization, alternative chemistries, and/or abatement
- Compliance with standards required by Jan. 1, 2012 (2 years later if upgrading equipment to produce 200 mm or larger wafers)
- 14 Bay Area facilities are subject to emission standards
- 24 additional Bay Area facilities are subject to emissions reporting only
Sustainable Communities
Strategy: SB 375

- Sustainable Communities and Climate Protection Act of 2008
- Estimated GHG Reductions:
  - 3 MMT CO$_2$e by 2020
  - 15 MMT CO$_2$e by 2035
- CARB sets GHG reduction goals for the 18 California Metropolitan Planning Organizations (MPOs)
  - Per capita GHG reduction from passenger vehicles
  - Bay Area goals set at 7% for 2020, and 15% by 2035
- MPOs must include a Sustainable Communities Strategy (SCS) in their Regional Transportation Plan (RTP)
  - Land use, housing and transportation planning
Mandatory Reporting Regulation

- Requires annual reporting of GHG emissions
- Industrial facilities
  - Applicability threshold for full reporting: 25,000 MT/yr CO$_2$e
  - Applicability threshold for abbreviated reporting: 10,000 MT/yr CO$_2$e
  - Certain source categories must report regardless of emissions
- Suppliers of transportation fuels, natural gas, natural gas liquids, and carbon dioxide
  - Applicability threshold: 10,000 MT/yr CO$_2$e
- Electricity retail providers and marketers
  - All imported and exported electricity
- Verification program
  - CARB accreditation of verification bodies
Cap-and-Trade Regulation

- Dec. 17, 2010
  - Cap-and-trade regulation approved by CARB Board with a series of modifications to be made prior to Oct. 28, 2011

- Oct. 20, 2011
  - CARB Board adopted final cap-and-trade regulation
  - Certified CEQA-document with finding of overriding considerations and Adaptive Management Plan
  - Delayed first year for which emission allowances are due from 2012 to 2013
Cap-and-Trade Regulation (cont.)

- Market-based measure provides flexibility in reducing emissions
  - Affected facilities are not subject to specific emission limits, but must turn in “compliance instruments” equal to their actual emissions
  - Compliance instruments = Allowances and offsets

- Scope
  - Starts in 2013 for large industrial facilities and electricity providers (including power importers) with emissions greater than 25,000 MMT per year CO$_2$e
  - Starts in 2015 for distributors of transportation fuels, natural gas and other fuels
Cap-and-Trade Regulation (cont.)

- **The Cap**
  - Initial cap set at emissions forecast for 2012
  - Cap reduced by 2% per year in 2013 and 2014
  - Cap reduced by 3% per year from 2015 to 2020

- **Allowances**
  - Represent a “permit” to emit 1 metric ton of CO₂e
  - Issued by CARB each year in an amount equal to the cap
  - Mainly free at program start
    - Free allowances based on efficiency benchmark for each industry
    - More free allowances for industries with high risk of “leakage”
  - Increasing auction percentage over time
  - No allowances need to be turned in for biomass-based CO₂
Baseline Emissions, Cap Level, and Abatement Required to Achieve the Cap

Source: Proposed Regulation to Implement the California Cap-and-Trade Program, Staff Report, CARB, Oct. 28, 2010
Cap-and-Trade Regulation (cont.)

- **Offsets**
  - GHG emission reduction credits from sources outside of the cap
  - Limited to emission reduction projects in U.S.
  - May be used for up to 8 percent of a facility’s compliance obligations
  - Must be independently verified based on CARB-approved protocols
  - Approved offset protocols
    - Livestock methane capture and control
    - Destruction of Ozone Depleting Substances
    - U.S. forest projects
    - Urban forest projects
Costs of GHG Allowances / Offsets

- CARB estimates that GHG allowances will likely sell for approximately $20 per MT CO$_2$e
  - Worst-case cost estimates are $100 per MT CO$_2$e

- Cost Containment Measures
  - 3-year compliance periods
  - Banking of allowances
  - Offsets
  - Allowance Price Containment Reserve
  - Potential linkage to other GHG trading systems
Recent Activity on Cap-and-Trade

Jan. 31, 2012: Registration deadline for covered entities

Feb. 3, 2012: CARB workshop to discuss draft amendments to link California and Quebec cap-and-trade programs

Auction of allowances
- Auction system to be launched and tested over next several months, with simulated “practice” auction to be held in August
- First auction of allowances scheduled for Nov. 14, 2012
- Quarterly auctions thereafter

First allowances due to be turned in by Nov. 2014 based on 2013 actual GHG emissions