How will AB 32 - Global Warming Solutions Act - Affect California Agriculture?

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Selected Slides Courtesy of:

CA Air Resources Board
CA Environmental Protection Agency
California Energy Commission
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CA Farm Bureau Federation
Presentation Overview

- Climate Change and impacts on CA agriculture
- AB 32 – Global Warming Solutions Act
- California Agriculture and AB 32
- Climate Change Adaptation Strategies
- Conclusions
Threats of Global Warming

- Slow-moving environmental disaster
- 2.5-4 times as many heat wave days
- Increased temperatures (5.5-8° F)
- 70-80% Loss of snowpack
- Rising sea levels (14-22”)
California Agriculture - Threats

- Water-Shortages/Reliability
- Flooding
- Levee failure
- Drought
- Fire
- Increased temperatures & duration & frequency of extreme heat events
- Reduced pollination
- Loss of chill hours
California Agriculture – Threats (cont.)

- Degradation of air quality
- Invasive species & diseases-Expanded Ranges
- Worker health and productivity
- Loss of micro-climates
- Cost of inputs and regulations
- Increased plant/animal stress
- Yield & variety losses
California’s Emissions
Courtesy California Environmental Protection Agency

- Transportation (39%)
- Electricity Generation (23%)
- Refineries (7%)
- Landfills (1%)
- Oil & Gas Extraction (3%)
- Other Industrial (9%)
- Commercial (3%)
- Residential (7%)
- Agriculture (6%)
- Cement (2%)
2004 CA Ag GHG Emissions = 28 MMT CO2

- Manure Management (6.9)
- Enteric Fermentation (7)
- Rice Cultivation (0.6)
- Energy Use/Fuel Combustion (4.9)
- Ag Residue Burning (0.08)
- Ag Soil Management (8.3)

Courtesy: CA Air Resources Board
Climate Change Policies and Initiatives

- Set GHG reduction targets, called for Climate Action Team
  **Jun 2005**
- Signed AB 32 - GHG reduction plan 1990 by 2020
  **Sep 2006**
- Signed AB 32 - GHG reduction plan 1990 by 2020
  **Sep 2006**
- Executive Order S-01-07
  World’s 1st Low Carbon Fuel Standard
- Set Regional Goal of 15% below 2005 levels
  **Aug 2007**
- 2006 AB 1007 Alternative Fuels Report
  **Published 2007**
- Apr 2006 CAT released GHG reduction blueprint
- Oct 2007 Signed Intl’ Carbon Action Partnership
- Feb 2007 Signed Western Climate Initiative
GLOBAL WARMING SOLUTIONS ACT OF 2006
BY 2020, 30% REDUCTION TO 1990 LEVELS
BY 2050, 80% REDUCTION TO 1990 LEVELS

“I SAY THE DEBATE IS OVER! “
**Magnitude of the Challenge**

**ARB Emissions Inventory**

- **1990 Emission Baseline**
- **~173 MMT CO₂E Reduction**
- **80% Reduction**
  - **~341 MMTCO₂E**
What is 1 Million Metric Tons (Mmt) CO₂?

• CA – 2020 goal – reduce to 1990 levels – 174 Mmt.
  • 179,000 cars and light truck.
  • Electricity for 193,000 CA homes.
  • 833,000 ac of conifer forest absorbing CO₂.
  • 13 million light bulbs replaced by CFLs.
  • Everyone in CA walking up 1 flight of stairs each day.
What Is The California Global Warming Solutions Act of 2006 (AB 32)?

- Sets in statute 2020 GHG emissions limit at 1990 level
  - Acknowledges that 2020 is not the endpoint
- Air Resources Board to monitor/regulate GHG sources
- In collaboration with other state agencies, ARB developed Scoping Plan adopted by ARB December 11, 2008.

Courtesy Air Resources Board
2007
Publish list of early actions

2008
Mandatory reporting & 1990 Baseline

2009
Early action regulations enforceable

2010
Adopt scoping plan

2011
Adopt enforceable early action regulations

2012
Adopt GHG reduction measures enforceable

2020
Reduce GHG emissions to 1990 levels

Identification/implementation of further emission reduction strategies
Scoping Plan

• Describes how California will reduce GHG emission levels to 1990 levels by 2020
• Not a regulation, but basis for regs.
• Identifies measures for future adoption or implementation
• Uses sector based approach
Scoping Plan Sectors

- Agriculture
- Electricity
- Forest
- High Global Warming Potential Gases
- Land Use & Local Government
- Manufacturing
- Oil & Gas/Refining
- Transportation
- Waste Management & Landfills
- Water
GHG Reduction Measures and the Scoping Plan

- Scoping plan will identify mix of measures and approaches to achieve 2020 target
- Every sector is was examined for potential areas for reductions
- Regulations, voluntary approaches and incentives included.
- Some sectors are viewed primarily as source of voluntary reductions for use in emission trading
Defining the Agriculture Sector for the Scoping Plan

• Energy crops

• Management of on-farm residual biomass such as prunings, straw, or manure

• Animal Agriculture: Production of meat, eggs, and milk
Defining Agriculture for the Scoping Plan – Most Pertinent to Veg. Crops

- Application and management of water
- Use of fertilizers and crop protection materials
- Field Tillage and Harvesting Operations
- Fuel efficiency of on-farm equipment
- Carbon sequestration in soils and crops
Near-term and longer-term strategy development prioritization based on the following elements:

– Availability of data for quantifiable reductions
– Estimated reduction potential
– Co-benefits
– Voluntary win-win opportunities offering cost savings for agricultural producers
Near-Term Focus

• Livestock and Confined Animal Facilities
  – Reduction of methane production at source
  – Energy recovery from methane capture

• Agricultural Biomass Utilization

• Voluntary win-win strategies offering cost savings to the producer
  – Tractor tire inflation program
  – Agricultural irrigation pump efficiency program
Longer-Term Focus

- Enteric fermentation
- Dedicated bio-fuel crops
- Composting
Longer-Term Focus: Of Interest to Vegetable Crops

- Fertilizer (Nitrogen) use efficiency
- Water Use Efficiency
- Use of renewable energy; e.g. solar
- Farmscape and soil carbon sequestration (food safety?)
- Restrictions on fuel emissions/efficiency
- Reduction of refrigerant emissions
• Reduce GHG emissions through more efficient agricultural practices

• Potential Approaches
  – Crop Management
  – Water Management
  – Pump Efficiency and Electrification
  – Conservation Tillage
  – Fertilizer Use Efficiency
Agricultural Sector Response:

• Explore improved agricultural practices and their impacts

• Potential Approaches
  – Life Cycle Analysis
  – Best Practice Protocols
  – Fertilizer N₂O Emissions
Research on GHG Emissions from Nitrogen Fertilizers

ARB wants to better understand nitrous oxide (N2O) emissions from agricultural ecosystems under California specific conditions.

**Two phase research project** - 1st phase data used to develop CA specific baseline emissions & validate N2O emission models.

Second phase will look at improved fertilizer management practices.

ARB's estimates N2O at 15.6 MMTCO2E, 2.8 % of CA total GHG emissions. Ag soil is 50 % of that total.

4.9 MMTCO2E of N2O emissions from ag soil results from application of organic and synthetic fertilizers.

Joint research by ARB/CEC/CDFA with research teams from CSUF/UCD w/ multiple crops in dif climates to begin early 2009.

www.arb.ca.gov/ag/fertilizer/fertilizer.htm
Agricultural Sector Response

• Farm GHG assessments and audits
  – Winegrape grower’s energy audits; solar installations; GHG footprint calculation; development of industry GHG protocol and calculator.
  – Rice Industry research to ID GHG emissions and develop reduction practices.
Exposure to Change

Agricultural Vulnerabilities to Climate Change

Response

Regional planning issues
- Urbanization & land use change
- GHG emission mgmt
- Institutions & time frame

Local production issues
- Crop yields & crop mix
- Agricultural economics
- Resources (water, fertility, energy, biodiversity etc.)

Mitigation of GHG emissions
- Less fossil fuel use
- Reduced net GHG emission from agriculture
- Changing fertilizer practices

Adaptation for agricultural sustainability
- Agricultural technology
- Land use for ecosystem services
- Public investment in resource mgmt
- Institutions for risk mgmt
Conclusions

• AB 32 addresses agriculture. In the near term it is focused on:

• Vehicle efficiency standards; water use efficiency; renewable energy; and, methane capture at large dairies.

• Future GHG reduction opportunities: N2O emissions and farm-level efficiency improvements.
For More information:

• AB 32 Scoping Plan:

http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm