

Discussion of Focus Areas

- Identify what the state agencies envision for sector by 2050
- Identify challenges to meeting the long-term vision
- Make recommendations on how to overcome hurdles
- Set priorities for the next five years

Energy

(generation, transmission, and efficiency)

2013 Update to AB 32 Scoping Plan

Sekita Grant
California Energy Commission

Participating State Agencies

- California Energy Commission
- Air Resources Board
- CalEPA
- California Independent Systems Operator
- California Public Utilities Commission
- California Resources Agency
- Department of General Services
- Department Of Transportation
- Department of Water Resources
- Natural Resources Agency
- State Water Resources Control Board

Energy Sector Description

- Focus on Electricity and Natural Gas Systems
- Roughly 40 % of Statewide GHG emissions come from electricity and natural gas systems

Actions for 2020

- Renewable Portfolio Standard, 12% - 20%
- Renewable Portfolio Standard, 20% - 33%
- Energy Efficiency and Conservation - building and appliance efficiency
- Energy Efficiency and Conservation - increased combined heat and power (CHP) generation
- Solar Hot Water (AB 1470)
- Million Solar Roofs
- Energy Efficiency and Co-benefits Audits for Large Industrial Sources
- Cap-and-Trade

Vision for 2050

- Near zero net energy buildings
- Low carbon generation (e.g. renewables)
- Sustainable bioenergy systems
- Localized, renewable generation
- Solar space and water heating to displace natural gas and electricity
- Highly flexible and robust distribution and transmission infrastructure

Challenges - Load Reduction

- Energy Efficiency
 - Energy efficiency retrofits of existing buildings
 - Lack of incentives for rented / leased spaces
 - Energy efficiency advancements given federal preemption
- Demand Response
 - Most demand response does not participate in the CA ISO wholesale energy market, is not visible or dispatchable to CA ISO
 - Enabling technologies needed for automatic control, auto demand response
 - Lack of consumer awareness and price information

Challenges - Renewables

- Renewable Energy
 - Cost
 - Planning, permitting and the environment
 - Transmission
 - Integration
 - Research and development
- Integrating Renewable Resources
 - Shift away from natural gas power plants as the primary mechanism to integrate renewables
 - Technology advancements for storage, auto demand response, smart grid

Challenges - Bioenergy

- Sustainable feedstock
- Distance of biomass resources to pipeline infrastructure
- Lack of a fully commercialized biogas industry
- Better understanding of co-benefits

Challenges – Local Generation

- Distributed Generation
 - Modernization of the distribution grid
 - Visibility to CA ISO
 - Interconnection
 - Rate Design
 - Net Metering
- Combined Heat and Power
 - Cost issues, including non-bypassable charges
 - Interconnection
 - Limited room for baseload resources
 - Cap-and-Trade implications

Challenges – Solar Thermal

- Solar Thermal for Space and Water Heating
 - Existing building retrofits
 - Technology advancements

Challenges – Traditional

- Natural Gas with Carbon Capture Utilization and Storage (CCUS)
 - Development of CCUS technology, particularly with natural gas generation
- Nuclear
 - Existing Moratorium
 - Safety
 - Waste disposal
 - Seismic concerns

Transportation

(Fuels, Infrastructure, and Land Use)

2013 Update to AB 32 Scoping Plan

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California Air Resources Board

Participating State Agencies

- Air Resources Board
- Business, Transportation and Housing Agency
- Department of Food and Agriculture
- Department of Public Health
- CalEPA
- California Energy Commission
- California Public Utilities Commission
- Caltrans
- Governor's Office of Planning and Research
- High-Speed Rail Authority
- Housing and Community Development
- Strategic Growth Council

Transportation Sector Description

- Transportation is largest GHG emission sector includes:
 - Sustainable communities and personal transportation
 - Sustainable freight transportation system
 - Fuels and Energy

Actions for 2020

- Low Carbon Fuel Standard
- 1st GHG Standards for cars (Pavley 1)
- 2nd GHG Standards for cars (Advanced Clean Cars)
- Sustainable Communities Strategy (SB 375)
- Tire Pressure Program
- Shore Power for Ships
- Heavy Duty Aerodynamic Trucks
- Medium/Heavy Duty Hybridization (Hybrid Trucks)
- Freight Strategy
- Fuels under cap (Cap-and-Trade)

Vision for 2050

- Executive Order B-16-2012 targets 80 percent reduction of transportation-related GHG emissions by 2050
- Federal health-based air quality standard attainment deadlines will drive this level of reductions by 2032
- Fundamental transformation of transportation system needed to meet goals

Vision for 2050

Sustainable Communities and Personal Transportation

- Sustainable communities with range of mobility choices
- Easy and equitable access to public transit
- Development/infrastructure supporting active transportation
- Improved public transit and rail utilizing zero-emission technologies
- Operational efficiencies and VMT reduction strategies
- Widespread use of zero-emission passenger cars

Vision for 2050

Sustainable Freight Transportation System

- Goods move more efficiently and with zero- or near-zero emissions
 - Supporting infrastructure in place
- System provides acceptable velocity and expanded capacity
- System integrates with the national and international freight transportation system

Vision for 2050

Fuels and Energy

- Widespread use of electricity and hydrogen as transportation fuels
- Low-carbon, renewable natural gas and other fuels where internal combustion engines remain
- Potential vehicle to grid approaches
- Close relationship between evolution of transportation sector and future energy needs

Challenges

- Transformation reliant on technology advancement
- Time and cost to build supporting infrastructure
 - Challenge to match infrastructure development with anticipated technology roll out
- Electrification of transportation sector increases demand for electricity, impacting energy sector
- Must maintain California competitiveness

Next Steps

- Scoping Plan will identify steps to start transformation of transportation sector
- Focus on policy priorities and actions for State agencies over next five years
 - Near-term decisions to put California on right path for 2030-2050
- Close coordination and partnerships at local, regional, State, and national level needed

Agriculture

2013 Update to AB 32 Scoping Plan

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California Department of Food and Agriculture

Participating State Agencies

- California Department of Food and Agriculture
- Air Resources Board
- CalEPA
- California Energy Commission
- CalRecycle
- Department of Conservation
- Department of Fish and Wildlife
- Department of Health Care Services
- Department of Pesticide Regulation
- Department of Water Resources
- Natural Resources Agency
- State Water Resources Control Board

Sector Description

Divided into three main categories:

- Crop production
- Animal agriculture
- Other considerations

Sector Vision

- Climate Change will profoundly impact agriculture operations in California
- Agriculture can contribute to improving the climate by reducing and storing GHG
- California Agriculture must retain:
 - Crop diversity
 - Animal production diversity
 - Social benefits
 - Farm diversity
 - High degree of operational efficiency as compared to other countries
 - Ability to feed a growing population with limited lands and water resources

Opportunity Areas for GHG Reductions for 2050

- Crop Production Category
 - Soil Quality and Health
 - Agricultural Land Conservation (CO₂)
 - Conservation Tillage (CO₂)
 - Carbon Sequestration (CO₂)
 - Biofuels (CO₂)
 - Irrigation and Water Conservation
 - Irrigation Methodologies (N₂O)
 - Water Supply
 - Nitrogen Management
 - Fertilizer technologies (N₂O)
 - Nitrification Inhibitors (N₂O)

Opportunity Areas for GHG Reductions for 2050

- Animal Production Category
 - Manure Management
 - Dairy digesters (CH₄)
 - Organic soil amendments (N₂O)
 - Animal feed (CH₄)
- Rangelands
 - Carbon sequestration (CO₂)

Addressing Informational/ Feasibility Gaps

- Research
- Technological Aspects
- Modeling
- Agricultural Support Services
- Incentives and Ecosystem Services

Water

2013 Update to AB 32 Scoping Plan

**Frances Spivy-Weber
State Water Resources Control Board**

Participating State Agencies

- State Water Resources Control Board
- Air Resources Board
- California Energy Commission
- California Public Utilities Commission
- Department of Water Resources

Sector Description

- Surface and Groundwater
 - Drinking Water Systems
 - Irrigation Systems
 - Storage and Distribution Network
- Stormwater systems
- Wastewater Treatment Systems
- Water sector uses large amounts of energy
 - About 20% of State's electricity
 - About 30% of State's natural gas

Actions for 2020

- Water Use Efficiency
- Increased use of Recycled Water
- Water System Energy Efficiency
- Stormwater Capture and Reuse
- Increase Renewable Energy Production in the Water Sector
- Funding (Public Goods Charge)

These strategies have a collective goal of reducing GHG emissions by 4.8 MMCO₂E by 2020, which is 6% of the 80 MMCO₂E remaining to meet the statewide 2020 goal.

Vision for 2050

- Full utilization of local and low-carbon water supplies
- Maintain and improve water quality
- Increase conservation and reuse through recycling, rainwater and stormwater capture, water-efficient landscaping, highly efficient irrigation systems
- Widespread use of wastewater as a resource for energy production and environmental protection

Potential Actions for 2050 Goal

- Funding programs that capture multiple benefits, including energy efficiency, water quality, and water supply
- Improved data collection and dissemination, leading to more regionally targeted conservation and efficiency goals and standards
- Sustained increases in water conservation and energy efficiency
- Additional use of wastewater for energy production
- Increasing use of recycled water, stormwater, and greywater
- New business models that allow for robust conservation while keeping rates affordable for low-use and low-income consumers

Challenges

- Conflicting goals and missions
 - Water supply reliability vs. conservation and low-energy supplies
- Need for data-driven standards and incentives to achieve additional water conservation and energy efficiency gains
 - Artificially low water prices in certain areas that don't incentivize conservation

Waste

2013 Update to AB 32 Scoping Plan

**Howard Levenson
CalRecycle**

Participating State Agencies

- CalRecycle
- Air Resources Board
- CalFire
- California Energy Commission
- California Public Utilities Commission
- Department of Food and Agriculture
- Department of General Services
- Department of Toxics Substances Control
- State Water Resources Control Board

Sector Description

- Recycling, Reuse, Remanufacturing
- Composting and Anaerobic Digestion
- Biomass Conversion
- Municipal Solid Waste Thermal Technologies
- Landfilling of Waste
- State Procurement

Setting Stage for 2020 and Beyond

- AB 341 75% diversion plan = primary foundation for reducing emissions
- To achieve 75% diversion, need to move 22 million tons from landfills
- This will result in 20 – 30 MMTCO₂e reduction
- Key consideration – don't need to wait for technology development
- Technology deployment is key barrier

Vision for 2020 and Beyond

- Take ownership of waste generated in California
- Maximize recycling and diversion from landfills
- Build infrastructure for low-carbon system in California
- Improve sustainability of California infrastructure
- Reduce volume of waste generated
- 2035: Net-Zero (direct GHG – avoided GHG = 0)
 - Pre-2020 efforts can achieve significant GHG reductions
 - Will strongly influence post-2020 actions
- 2050: Reduce direct emissions by 25%

Potential Actions: Plan Focus

- Key activities – reduce waste, maximize recycling, shift materials to non-disposal
- Reducing waste generated – get individuals and manufacturers/ producers to take more responsibility for products and for waste
- Increasing recycling and use of collected materials in manufacturing, composting, digestion
 - To meet 75% goal, need much larger recycling manufacturing and composting/anaerobic digestion infrastructure
- Expanding and creating markets for recycled materials and products
- Determining role of thermal processes and energy recovery

Potential Actions: Implementation Mechanisms

- Voluntary measures
- Financial incentives for recycling manufacturing & composting / anaerobic digestion infrastructure
- Direct regulation by ARB
- Extended producer responsibility
- State procurement requirements

Potential Actions:

Examples of Specific Actions Being Considered

- Move toward phasing organics out of landfills
- Leverage State incentive funding for infrastructure, incl. disadvantaged communities
- Develop new emission reduction factors
- Investigate additional LCFS pathways
- Increase funding for biomethane projects
- Leverage State procurement

Potential Actions:

Examples of Specific Actions Being Considered (cont.)

- Develop performance standards for material recovery facilities
- Develop programmatic EIRs
- Consider expanded Renewable Portfolio Standard eligibility
- Establish biogas injection standards
- Evaluate need to place specific sources (landfills, thermal) under direct regulation or Cap-and-Trade
- Enhance and expand Extended Producer Response for packaging

Challenges

- How to get consumers and producers to take responsibility for waste/products
- How to overcome barriers to building infrastructure in CA
 - Economic – cheap landfilling, lack of financial incentives and offsets
 - Siting and timely permitting – local planning and land use issues, cross-media regulatory issues re: air and water
- How to grow markets for products – whether recycled-content or biofuel, etc.
- Tracking and accounting

Next Steps

- ARB/CalRecycle – Stakeholder input on 6 technical papers and draft implementation matrix
 - Recycling, Reuse, and Remanufacturing
 - Composting and Anaerobic Digestion
 - Biomass Conversion
 - Municipal Solid Waste Thermal Technologies
 - Landfilling of Waste
 - Procurement

Natural and Working Lands

2013 Update to AB 32 Scoping Plan

David Mallory

California Air Resources Board

Participating State Agencies

- Natural Resources Agency
- Air Resources Board
- CalFire
- Department of Conservation
- Department of Fish and Wildlife
- Department of Food and Agriculture
- Department of Parks and Recreation
- Department of Water Resources

Sector Description

- Forests, Woodlands, and Urban Forests
- Grasslands and Shrublands (Including Rangelands)
- Wetlands

Actions for 2020

- Sustainable Forest Target
 - Maintain current net forest sink
- Opportunities for additional reductions
 - Forest Management
 - Forest Conservation
 - Afforestation/Reforestation
 - Urban Forestry
 - Fuels Management/Biomass

2050 Vision

Reduce GHG emissions, and maintain and enhance the capacity of natural and working lands to sequester and store carbon.

Overlying Principles

- Maintain and enhance net-carbon sequestration
- Reduce GHG emissions
- Policy efforts, strategic investment, and research focused on conservation, restoration, and effective management practices
- Resiliency and adaptation
- Commitment to monitoring trends, tracking progress and evaluating effectiveness of state strategies

Pathways to 2050 Vision: Considerations

- Current trends
- Research gaps
- Existing policy and future needs or enhancements
- Ownership
- Co-benefits
- Funding needs
- Challenges
- Timing: long-term planning horizon

Pathways to 2050 Vision: Strategic Prioritization

Establish priorities to achieve climate benefits across state and federal lands:

- Sequestration or GHG reduction potential
- Leveraging cost-effectiveness and outcomes with synergies and integration with other sectors
- Co-benefits
- Adaptation goals and needs
- Risk-reduction
- Disadvantaged communities/communities of opportunity

Challenges and Questions

- What data are available and what more are needed to assess baseline sequestration and GHG emissions?
- What areas can be leveraged most effectively with the needs and goals of other sectors?
- How do we assess the value (market and nonmarket) of conservation and restoration of natural working lands?
- What funding streams are needed and what are potential sources?
- Monitoring, research, and modeling — what and how much is needed?

Open Discussion

- Public Comments / Questions
 - To allow consideration in development of draft Scoping plan, please provide comments by August 5th
 - Please submit comments to:
<http://www.arb.ca.gov/cc/scopingplan/2013comments.htm>

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