Fuels and Infrastructure for a Carbon Neutral Economy

Panel 1: Fuels
Webinar Logistics

- **Presentation and link to submit and view informal comments:**
  https://ww2.arb.ca.gov/our-work/programs/carbon-neutrality/carbon-neutrality-meetings-workshops
  - Comment docket open July 15-28

- **Register** to participate in workshop:
  https://attendee.gotowebinar.com/register/8003673200991275787

- Click the “Raise Hand” button in the gotowebinar control panel to signal that you’d like to ask a question during the Q&A sessions
California GHG Emissions Reduction Targets

Source: CARB, 2017
Mid-Century Carbon Neutrality (CO2e)

Step 1: Strive for zero emissions from all sources
- Fossil Energy
- Industrial Processes
- Natural and working lands

Step 2: Maximize Sequestration
- Carbon capture and sequestration
- Direct air capture
- Natural and working lands

Sources = Sinks
Achieving Carbon Neutrality

Several multi-agency efforts focused on path to carbon neutrality in specific sectors

• SB 100 - Zero carbon electricity retail sales by 2045
• AB 74 - Transportation carbon neutrality
  • Studies will evaluate how to reduce demand for fossil fuels in the sector and how to manage the subsequent decline for supply

To achieve our climate and air quality goals, we must reduce and replace fossil fuel consumption across all sectors
Reduce and Replace Fossil Fuels

Efficiency improvements - reduce energy consumption through incremental process improvements

Non-combustion technology

- Electrification suitable for many end-uses
- Other non-combustion technologies available, like solar steam

Fuel switching - replace fossil fuels with low-carbon energy resources

- Alternative low-carbon fuels will be needed in targeted industries

How are fossil fuels used today?
CA Fossil Fuel Consumption, 2017

Coal/Coke

Natural Gas

Petroleum

Industry
- Cement
- Steel
- Chemicals
- Refineries/oil & gas extraction
- Other

Power
- Electricity generation units

Residential/Commercial
- Home heating
- Cooking

Transportation
- Vehicle fuel (gasoline, diesel, jet)

Source: 2019 California GHG Inventory, Fuel Combustion
Fuels Panel Discussion

What alternative low-carbon fuels and technologies are commercially available today, or are on the horizon?

What is the optimal distribution of these fuels across all sectors?

How can alternative fuels become the fuels of choice to replace fossil fuels?
Fuels Panel

Chris Bataille, Professor, Simon Fraser University

Janice Lin, Founder and CEO, Green Hydrogen Coalition

Sam Wade, Director of State Regulatory Affairs, Coalition for Renewable Natural Gas

Mary Solecki, Partner, AJW
Fuels and Infrastructure for a Carbon Neutral Economy

Panel 2: Infrastructure
Webinar Logistics

- **Presentation and link to submit and view informal comments:**
  https://ww2.arb.ca.gov/our-work/programs/carbon-neutrality/carbon-neutrality-meetings-workshops
  - Comment docket open July 15 – August 5

- **Register** to participate in workshop:
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Mid-Century Carbon Neutrality (CO2e)

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Sources = Sinks

Sources

Sinks
Transitioning Infrastructure Assets

- Natural Gas Pipeline
- Natural Gas Storage
- Oil and Gas Terminals
- Electricity Transmission and Distribution
- Industrial equipment (e.g., boilers and turbines)
- Oil Refineries

• How can we re-purpose our existing infrastructure for a carbon neutral future? What new infrastructure is needed?
• What steps can we take now to invest in a sustainable future?
How do we prepare our energy workforce for the transition to carbon neutrality?

Infrastructure Panel

Betony Jones, Inclusive Economics

Melanie Kenderdine, Energy Futures Initiative

Jean Spencer and James McGarry, California Public Utilities Commission

Jack Brouwer, National Fuel Cell Research Center

Greg Huynh, Los Angeles Department of Water and Power
Additional Resources

CARB, 2017:  California’s 2017 Climate Change Scoping Plan

Data from 2019 California GHG Inventory, Fuel Combustion.  
https://ww3.arb.ca.gov/cc/inventory/data/tables/fuel_activity_inventory_by_sector_all_00-17.xlsx

Data from  US Energy + Employment Report 2020 (NASEO and EFI, 2020)