Agenda Item 3
Zero Emission Technology for Stationary and Mobile Sources

2022 Air Quality Management Plan (AQMP) Control Measures Workshop – Morning Session

November 10, 2021
2022 AQMP focuses on attaining the 70 ppb 8-hour ozone National Ambient Air Quality Standard (NAAQS)

- South Coast Air Basin’s (SCAB) attainment due – 2037
- Coachella Valley’s attainment due – 2032

To attain the 70 ppb standard in 2037, ~70% reductions are needed beyond the baseline
Hurdles to Developing Controls

<table>
<thead>
<tr>
<th>Percent of Carrying Capacity</th>
<th>Example Emission Sources</th>
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</thead>
<tbody>
<tr>
<td>~67%</td>
<td>Stationary &amp; Area</td>
</tr>
<tr>
<td>~40%</td>
<td>Aircraft</td>
</tr>
<tr>
<td>~40%</td>
<td>Ocean Going Vessels</td>
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</tbody>
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Some emission sources are difficult to identify new control measures using traditional approaches, yet they make up a substantial part of the inventory.
Historic and Projected Baseline NOx Emissions in South Coast

Total NOx Emissions by Major Emission Category

- Stationary Point (112 tpd in 2000)
- Stationary Area (21 tpd in 2000)
- On-Road (575 tpd in 2000)
- Off-Road (267 tpd in 2000)

Percent Remaining Emissions by Major Emission Category

- Stationary Point (112 tpd in 2000)
- Stationary Area (21 tpd in 2000)
- On-Road (575 tpd in 2000)
- Off-Road (267 tpd in 2000)
Air quality regulation and planning traditionally relies on additional tailpipe/exhaust stack controls, new engines technology, or fuel improvements tailored to individual use cases.

It is not clear how this traditional approach can result in additional ~70% control in South Coast.
Overcoming the Hurdles

• Only viable solution to achieving 70 ppb ozone standard requires significant push to zero emissions technology
• This approach requires economy-wide transition to different fuels
Key Questions on a Zero Emissions Approach

- Which fuels for which applications?
- What does the pathway look like through time?
- How can this be made most affordable?
  - Ensures adoption at scale, and available equitably across society
Potential Approach for 2022 AQMP

Traditional control measure development

• Maximize implementation of *existing* zero and low NOx technologies
• *New* zero emissions and ultra-low NOx technologies still need to be invented for many use cases (stationary and mobile)

Use flexibility provided by Clean Air Act 182(e)(5)

New analyses and processes needed

• Technology development
• New funding and programs needed for research, development demonstration, and deployment
• Analysis of fuels switch broadly across sectors
• Costs of different fuel mixes
• Identification of new regulations, policies, incentives

Include preliminary analysis in 2022 AQMP and establish future workplans
Widespread Deployment of Zero Emission Technology Needed for All Sectors

Residential

Commercial

Industrial / Large Combustion Sources

Mobile - On-Road

Mobile - Off-Road
Deployment Path for ZE Technologies

Zero Emission Technology

- Not Yet Available
- Available Now / Near Term

Technology Pathway

- New ZE Technology
- Lower Cost
- Accelerated Turnover

Policy Pathway

Widespread Adoption

Continued improvement of remaining combustion equipment/vehicles
Technology Pathway

Every ZE Technology is currently at a different point along this pathway.
Policy Pathway

Market Assessment  Policy Development  Incentives & Mandates

ZE Policies are also at different points along this pathway.
Policy Pathway: Infrastructure

• Existing infrastructure is currently not sufficient for widespread adoption of ZE technologies
• ZE Infrastructure will not only be needed for mobile sources but also for stationary sources
• ZE technology and infrastructure needs assessment of each sector to inform policy decision making
Policy Pathway: Policy Coordination

- Widespread adoption of fuel switch policies and technologies will be helped by having a realistic picture of market needs
- To achieve district-wide fuel switch, policy drivers and coordination with other agencies will be needed
  - CARB, CEC, CPUC, CalSTA, EPA, Local Utilities, SCAG, Local Governments, etc.

Example Incentives:
- South Coast AQMD’s Residential EV Charging Incentive Program
- CARB’s HVIP Program
- FTA’s Low or No Emission Vehicle Program

Example Mandates:
- South Coast AQMD’s WAIRE Program
- CARB’s Advanced Clean Truck and Fleet Rules
- CEC’s Building Energy Efficiency Standards
Next Steps

• Next series of Mobile Source Working Group meetings in December 2021 / January 2022
  • Aircraft
  • Construction and Industrial Equipment
  • Heavy-Duty Trucks
  • Ocean-Going Vessels
  • Zero Emission Infrastructure