

# 2016 AQMP White Papers

## “Off-Road Equipment White Paper” Preliminary Draft



Working Group Meeting No. 4

June 26, 2015

# Preliminary Draft Document Outline

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- Introduction
- Background
  - Attainment Challenges
  - Air Quality Impacts of Off-Road Equipment
  - Emissions Reduction Progress to Date
- NOx Emission Reduction Scenarios
  - Equal Share
  - 100 Percent Existing Standards
- Initial Observations
- Recommendations
- Appendix A – Current Emissions Control Programs
- Appendix B – Potential Emission Reduction Technologies and Efficiency Measures

# Remaining NOx Emissions in 2023

Source	Baseline	Percent of Equipment at Most Stringent Level of Existing Standard (%)	Equal Share	100% Existing Standards
Construction and Mining	15.11	81	5.29	4.43
Commercial Equipment	6.79	86	2.38	4.70
Industrial Equipment	7.55	85	2.65	6.84
Lawn and Garden Equipment	4.82	87	1.69	3.95
Transportation Refrigeration Units	4.05	97	1.42	4.01
Airport Ground Support Equipment	1.41	83	0.49	0.94
Oil Drilling/Workover Equipment	0.73	68	0.26	0.15
<b>Total</b>	40.46	--	14.18	25.02

# Remaining NOx Emissions in 2032

Source	Baseline	Percent of Equipment at Most Stringent Level of Existing Standard (%)	Equal Share	100% Existing Standards
Construction and Mining	8.35	94	2.34	4.41
Commercial Equipment	5.09	99	1.43	5.09
Industrial Equipment	6.37	97	1.78	6.05
Lawn and Garden Equipment	6.44	98	1.81	6.19
Transportation Refrigeration Units	4.87	100	1.36	4.87
Airport Ground Support Equipment	0.99	96	0.28	0.86
Oil Drilling/Workover Equipment	0.92	82	0.26	0.35
<b>Total</b>	<b>33.03</b>	<b>--</b>	<b>9.26</b>	<b>27.82</b>

# Initial Observations and Recommendations

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- SCAQMD staff's initial thoughts
- Provided to set framework for discussion with Working Group

# Initial Observations – Emission Reduction Scenarios

- Focus on off-road equipment, but all categories need to reduce emissions to attain standards
- Off-Road category would not meet “equal share” reduction targets if all equipment at lowest emission standards
- Construction and mining equipment largest contributor to off-road category NOx emissions
- Potential for further emission reductions through combination of regulatory actions such as new emission standards, accelerated research and demonstration of new control technologies or advanced zero-emission technologies, and incentives programs

# Initial Observations – Emission Reduction Scenarios

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- Not all categories will be able to achieve “equal share” reductions
- Accelerating deployment of commercially available zero-emission equipment needed to meet “equal share” reductions
- Other categories will need to reduce emissions beyond “equal share” to cover those unable to meet their “equal share”
- New lower exhaust emission standards needed
- Most effective strategies - combination of advanced technology deployment, incentives (including funding) programs, and infrastructure enhancements

# Initial Observations – Advanced Technologies

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- Fleet purchases should be cleanest possible because of equipment's long useful life
- Need to commercialize near-zero and zero emission equipment as early as possible
- Need to conduct R&D programs for larger off-road equipment
- Hybridization and alternative fuels will play role in further emission reductions from GSE
- Advancing cleaner fuels and renewable fuels will help reduce both criteria and GHG emissions



# Initial Observations – Efficiency Measures

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- Operational efficiencies through industry best practices can reduce fuel use and emissions
- Intelligent Transportation Systems and connected vehicle/equipment can improve operational efficiencies and reduce emissions
- Emission reductions from operational efficiencies should be quantified and recognized as part of the 2016 AQMP development

# Recommendations

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- Cleaner off-road engine RD&D programs need to be initiated and funding identified
- CARB and U.S. EPA need to establish new cleaner off-road engine NOx standards as soon as possible
- Sustained incentive (monetary and non-monetary) programs
- Sustained public funding to maximize deployment of zero- and near-zero emissions technologies
- New mechanisms (regulations, monetary and non-monetary incentives) to increase deployment of zero- and near-zero technology
- Support use of renewable fuels

# Recommendations – Operational Efficiencies

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- Work with off-road equipment stakeholders to develop industry best practices
- Work with off-road equipment stakeholders to identify technologies that improve operations and reduce emissions at construction and mining sites, warehouse distribution centers, and ports, rail, and intermodal yards
- Develop methodologies to quantify emission reductions from implementing best practices

# Next Steps

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- Incorporate Working Group members/ stakeholders input and comments (July – August 2015)
- Present to the SCAQMD Governing Board with other White Papers (September 2015)
- Additional discussions part of the control measure development for 2016 AQMP