Challenges Facing Effective Deployment of Zero-Emissions Powertrains for Non-Road Equipment

NREL Off-Road Decarbonization and Energy Systems Integration Workshop: Challenges and Opportunities

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Mission
Advancing the interests of manufacturers of internal combustion engines, and also commercial vehicles, through advocacy and expertise

Vision
Sound, cost-effective policy that assures clean and safe products for society

MEMBER COMPANIES

AGCO Corporation
American Honda Motor Company, Inc.
Blue Bird
Briggs & Stratton Corporation
Caterpillar Inc.
Cummins Inc.
Cummins Power Systems
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MTU America Inc.
Navistar, Inc.
PACCAR Inc
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Yanmar America Corporation

Product Sectors
• Highway Commercial Vehicles and Engines
• Non-road Engines
• Marine Engines
• Stationary Engines
• Locomotive Engines
• Grounds Care & Utilities Engines

U.S. and International Markets
Government Advocacy & Regulation Development
• Criteria Emissions
• Greenhouse gases
• Commercial vehicle safety
• Advanced powertrains and automation
Standards
Engine fluids
Challenges/Questions: Nonroad Zero Emissions

• Tremendous variety of equipment and applications makes identification of workable zero-emissions solutions a complex matter.

• Highway policies do not fully inform nonroad applications
  – Mobile Infrastructure, instantaneous power demand, etc.

• Evaluating only “tailpipe” emissions provides a limited view of environmental outcomes from policy decisions when economy-wide reductions are the target.

• What role can low carbon fuels play, especially where only combustion engine technology will be capable for the near future?

• A zero-emissions transition is successful only with market success. Fitness for use must be confirmed
Closing Knowledge Gaps

• How can we build the necessary knowledge to inform policy decisions?
• For each technology option, including Low Carbon Fuels, *by application*, determine:
  – Holistic view of CO$_2$ benefits, by application (well-to-wheels, and more)
    • Criteria emissions co-benefits
  – Fitness for use associated with each option
  – Infrastructure requirements and complexities

• What research is needed to close these knowledge gaps? Output should be a reference to inform policy decisions. Such a reference should:
  – Be comprehensive >> holistic analysis of multiple equipment types
  – Provide quantified, comparative information and tools >> maximum utility
  – Be a collaborative effort, with diverse contributors >> a trusted reference
Thank you!