Abstracts

PLENARY SESSION – Diesel Efficiency and Emissions Policy

View From the Bridge

Chair: **John Fairbanks, U.S. Department of Energy**

Diesel Engines: What Role Can They Play in an Emission Constrained World?

Tom Cackette
California Air Resources Board

Diesel engines move the goods our society and economy depend on, but not without a cost. Emissions from Diesel engines cause serious public health effects, including premature death. Soon new heavy-duty on and off-road engines will be equipped with exhaust emission controls that will greatly reduce the health damage caused by the emissions from these Diesel. Programs to retrofit some of these technologies onto existing engines are underway, which will accelerate the reduction in harmful emissions.

While diesel passenger vehicles are widely available and popular in Europe, they are currently but a niche product in the United States. Urban emission requirements currently stand in the way of their expanded use. However the same exhaust emissions controls that will clean up heavy-duty engines offer the passenger diesel an opportunity to comply with stringent emission limits.

California is also moving ahead to establish the first emission limits for motor vehicle greenhouse gases this fall. Diesel engines have an advantage of lower greenhouse gases compared to current gasoline engines, but technologies to reduce greenhouse gases from gasoline engines are available and cost effective. The question remains whether passenger diesels will be able to turn their low greenhouse emissions into a larger market.

This presentation will review where the Diesel engine stands in the regulatory world of urban and global pollution control, and will explore what the future may hold.

Diesel-Cycle and Alternative Diesel Fuels are Key to California's Energy Economy
A Policy Perspective

James D. Boyd, Commissioner California Energy Commission

The Energy Commission is the state's primary energy policy-making agency, responsible for addressing the energy challenges facing California. With a strong economy and rapidly growing population, California's energy providers are faced with the daunting task of ensuring reliable, clean and affordable energy and transportation fuels. The implications of future vehicle emission regulations can have a profound impact on our citizens' lifestyle. Balancing environmental and energy policies with the public's desire for affordable transportation must be done in a coordinated manner.

For over four decades environmental concerns have driven investments, however, on the not-too-distant horizon we see significant, growing energy concerns. There have been early warning signs that a storm is brewing on energy markets and this is especially evident by the higher prices and greater price volatility; statewide, nationwide and worldwide. Fundamental energy issues are poised to significantly impact California's economic stability. Some of these include:

- California's gasoline and diesel demand continues to grow, 1.6 percent annually for gasoline and 3.4 percent annually for diesel.
- California's fuel demand surpasses refinery capacity, requiring higher-priced imports to meet demand and augmented marine and pipeline infrastructure to handle these imports.
- Regulations on fuels and engines may adversely impact the production of fuels and increase fuel demand, thereby increasing the prospects of fuel supply shortages, which will drive prices even higher.

The Legislature has sought ways for California to head off future energy crises and the Energy Commission and California Air Resources Board (CARB) have responded with several assessments of California's future energy demand, in the Integrated Energy Policy Report and AB 2076 process. Through a rigorous analytical effort, the Energy Commission and CARB have recommended policies and strategies to ensure that energy and environmental objectives are balanced. One strategy to meet our near-term energy needs is through increased use of light and medium-duty diesel vehicles. Using Fischer-Tropsch Diesel as a nominal 33 percent blend is another significant strategy.

The Energy Commission is studying numerous conservation and petroleum displacement technologies. We are seeking ways that government can assist a variety of markets and remove barriers to the expanded use of cleaner, more efficient fuels and vehicle technologies.

Today, Europe sets a strong example for California and the nation to follow. Advanced clean diesel engines, which meet 2007 emission standards, are an example of a viable solution that could alleviate our growing energy appetite while maintaining environmental progress.

To curb California's unfettered appetite for transportation fuels, the Energy Commission and other agencies will need to move forward in a bold manner, "leaving no stone unturned." Expanding energy conservation efforts and increasing the use of alternative fuels now will minimize the potential energy disruptions that are, without a doubt, looming down the road.

Assessment of Future IC Engine and Fuels Cell Powered Vehicles, and Their Potential U.S. Impacts

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A recent evaluation of the performance of various promising powertrains in light-duty vehicles will be reviewed. The various vehicles' operating characteristics were evaluated with a propulsion system in vehicle simulation. These tank-to-wheel assessments were combined with well-to-tank assessments to provide inputs for fleet impact calculations. Scenarios for development lead times, production capacity growth, and penetration into future in-use light-duty vehicle fleets were then prepared for United States fleet impact projections.

Boosted downsized gasoline engines, low emission Diesel engines, and gasoline/electric hybrids were judged to be about one development cycle away from market competitiveness. Fuel cells appear to be several cycles, at least 10-15 years, away from market competitiveness. The more varied the technology from current technology, the slower the production capacity growth and the in-use fleet penetration will be.

The future reduction of light-duty fuel consumption and greenhouse gas emissions are dependent upon new technology. Since the time scale for significant petroleum reduction with the emergence of hydrogen fuel-cell vehicles is some 50 years in the future, the importance of promoting and achieving nearer term improvements in mainstream technologies is clear. For example, to slow the growth of the in-use fleet's petroleum consumption and greenhouse gas emissions new technologies must continually be incorporated.

The impact of combining several fiscal and regulatory policies into an integrated strategy to promote such nearer term technology improvements will also be explored. Fleet-based analysis of several integrated strategies indicate their potential for providing both market "pull" and technology "push" in the nearer term, as well as creating conditions more conducive to introducing hydrogen and fuel cell technology.