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THE PROBLEM The threats of air pollution from transportation have long been clear, and scientists no longer doubt that if current trends continue, anthropogenic emissions of carbon dioxide (CO_2) will lead to climate change (sometimes called "global warming"). Current regulations, while effective in stimulating research, development and deployment of technologies that improve air quality, have often resulted in increased CO_2 emissions. Transportation accounts for almost a third of all U.S. CO_2 emissions and is rising rapidly, while unhealthful air quality continues to require further reductions in pollutant emissions. Achieving joint reductions in CO_2 emissions and air pollution while continuing to improve the performance and safety of our transportation systems poses a difficult challenge.

BACKGROUND Regulation over the past 30 years has been very successful in helping to improve the nation's air quality by forcing the development and introduction of new technologies such as electronic engine controls, cleaner fuels and catalytic converters. However, continued health threats from vehicle-caused air pollution, such as fine particles from diesel engines, require further emissions reductions, which are possible with current technologies.

Reducing CO_2 emissions will not be so easy, however, because CO_2 is the intentional product of burning fuel for energy, while conventional pollutants are the result of unintended fuel contaminants or by-products of combustion. Worse, many technologies that reduce conventional air pollutants actually increase CO_2 emissions. For instance, fine particles can be reduced from diesel exhaust with low-sulfur fuels, but manufacturing such fuels from petroleum raises overall CO_2 emissions. Until consensus on the need for CO_2 controls is reached, the United States should ensure that transportation R&D investments and regulatory measures introduced today will not frustrate future efforts of mitigate CO_2 emissions.

THE SOLUTION In the long run, achieving the cuts in air pollution and CO_2 emissions necessary for a healthy environment and stable climate will require the introduction of new low-lifecycle-CO_2 fuels. Obvious choices include ethanol, biodiesel, natural gas and hydrogen. However, all these fuels have limitations; they are expensive and their benefits are very sensitive to how they are made and distributed. Thus, we cannot be sure today which alternative fuel (or fuels) will be best in the long run.

Nonetheless, introducing non-petroleum-based fuels into the U.S. transportation system would have significant public policy benefits. Fuels based on abundant domestic resources would help diversify transportation energy supply and reduce oil imports. Lower demand for diesel fuel would reduce the cost of home heating fuel, an important issue in the Northeast. Clean, low-lifecycle-CO_2 substitutes for diesel fuel would avoid the tradeoff in petroleum desulfurization mentioned above. But a targeted approach is needed.

Light-duty vehicles require new fuels that are easiest to introduce into the current fleet, such as ethanol made from energy crops. The focus for introducing gaseous transportation fuels should be on heavy-duty vehicles, such as buses and trucks. These vehicles virtually all use diesel engines, so switching to ultra-clean gaseous fuels would gain maximum air pollution benefits. Heavy-duty vehicles refuel at a small number of stations, minimizing the cost of a new infrastructure, and they are used intensively over very long lives, minimizing the effect of increased vehicle cost.

Effective government action on emissions from transportation must efficiently address air pollution and climate concerns simultaneously. Government should:

- Support research, development and deployment of new low-lifecycle CO_2 vehicle fuels, especially in niche markets.
- Complete the rulemaking process for alternative fuel vehicles under the Energy Policy Act, including market-based programs that provide flexibility in compliance.
- Prevent the introduction of new pollution-control technologies that require expensive, long-lasting investments but fail to offer significant CO_2 reductions.
- Require environmental regulators to evaluate and publish the lifecycle greenhouse gas emissions that will result from existing and proposed policies as well as all new fuels and vehicle technologies.
- Ensure cooperation between the vehicle fuel programs across DOE.

FURTHER READING

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