

Major progress in technology needed for 25 percent renewable energy use to be affordable

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Dramatic progress in renewable energy technology is needed if the United States desires to produce 25 percent of its electricity and motor vehicle fuel from renewable sources by 2025 without significantly increasing consumer costs, according to a RAND Corporation study issued today.

Produced by the RAND Environment, Energy and Economic Development program, the study provides a "snapshot" of the nation's potential energy expenditures if a requirement was imposed that 25 percent of electricity and motor vehicle fuels used in the United States by 2025 would come from renewable resources (a goal activists have described as "25 x '25").

The study finds that biomass resources and wind power have the greatest potential to contribute toward reaching the 25 x '25 goal.

The study replaces a report withdrawn by RAND in 2006 because of errors RAND identified in the computer model and numerical assumptions on which the findings were based. The new report finds that meeting the 25 x '25 goals would be more challenging than outlined in the earlier version of the report. RAND is a nonprofit research organization.

The Energy Future Coalition, a nonprofit environmental organization,

asked RAND to assess the economic and other impacts of meeting the 25 x '25 goal. The RAND study considered technological and economic factors that would affect the costs of renewable energy as well as non-renewable fossil fuels.

The report comes as sharply higher prices for oil, concerns about energy security and growing worries about global warming have increased interest in expanding renewable energy in the United States. Substituting renewable energy for fossil fuels would reduce carbon dioxide emissions, the most prevalent greenhouse gas associated with global warming.

Currently, renewable energy provides 9.5 percent of total U.S. electricity supply, mostly hydroelectric power, and 1.6 percent of motor vehicle fuel.

"Expanding the use of renewable fuels will lower the long-term price of crude oil and reduce carbon dioxide emissions that are contributing to global warming," said lead author Michael Toman, director of the RAND Environment, Energy and Economic Development program. "However, to reap these benefits will require a major investment in improving and increasing the use of renewable energy technology."

Wind power, solar power, hydropower, and the burning of agricultural waste are all examples of renewable energy sources that can be used to produce electricity. Biomass resources like stalks from food crops, wood material and grasses also can be turned into ethanol or gasoline that can power motor vehicles.

The study finds, however, that a large, inexpensive and easily converted biomass supply is essential if it is to be used as a renewable resource and still have a limited impact on consumers' wallets. Developing such a supply would require harvesting energy crops at a scale that greatly

exceeds current production.

"Without increased biomass availability, expanded renewable energy use could impose economic burdens and result in environmental setbacks due to land conversion," Toman said.

While the 25 x '25 goal would significantly reduce carbon dioxide emissions, Toman said a broader package of policy options that includes, but does not rely solely upon, increased use of renewable energy could produce equal benefits with less cost.

Among the study's other key findings:

- Renewable energy technology will have to improve at the very significant pace envisioned by some renewable energy supporters in order to enjoy low-cost impacts.
- Significant increases in the use of wind power are possible, but only with substantial technical advances to facilitate greater use of less-productive locations.
- More moderate renewable energy targets – such as 15 or 20 percent – reduce expenditure impacts more than proportionately, though carbon dioxide reductions also are less significant.
- The federal government's policy approach to pricing of renewable motor fuels will significantly affect fuel demand and society's total energy expenditures.

"In particular, passing the cost of more-expensive renewable fuels to gas pump prices will result in improved energy efficiency, though it will cost consumers more," Toman said. "Subsidizing more-expensive fuels will save people money at the pump, but only because the expense is shifted to the federal budget."

The study does not address the transition and adjustment costs associated

with initiating such a significant shift from fossil fuels to renewable energy technologies.

Source: RAND Corporation

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