The U.S. transportation energy system is undergoing rapid changes, from historic increases in fuel efficiency to renewed domestic production of oil and natural gas to new routes for moving energy around the nation and the world. This issue of TR News addresses these changes with a clear understanding that transportation services are essential to meeting the economic and social goals of our nation. At the same time, as recognized in the most recent edition of the Transportation Research Board’s Critical Issues in Transportation, the transportation sector exerts large-scale, unsustainable impacts on the environment and the climate (1).

Navigating these changes compels a shift in direction toward a more sustainable transportation future focused on significant reductions in fossil fuel use—a direction that nevertheless provides reliable and secure transportation services in a fiscally responsible way.

A New Reality

Fossil fuels supply more than 80 percent of the primary energy used in the United States (1, MT-6). Petroleum accounts for 36 percent of the nation's primary energy use and for 92 percent of energy use in the transportation sector (2, MT-55; 3). This fossil fuel–dominated foundation supports the nation’s understanding of oil and natural gas resources. Technology and world events, however, are reshaping this foundation by challenging the long-held views that fossil resources are running out and that the United States increasingly must depend on imports.

The new reality is that technological advances in oil and natural gas drilling have reshaped U.S. domestic energy supplies. Today approximately 30 percent of the petroleum consumed in the United States is imported, yet only 10 years ago approximately 60 percent was imported (2, Figure IF2.2).

U.S. domestic production, along with the continued development of Canadian oil sands, has disrupted
the traditional patterns of oil and natural gas pricing and shipments. Including natural gas liquids, the United States is now the world’s largest producer of oil, at 12 million barrels per day, exceeding the output of the next highest producers, Russia and Saudi Arabia. The United States, however, still produces less crude oil than both of those countries (4).

The public and even some in the transportation community have not fully grasped these developments, which are known to energy specialists and have national and international importance. This remarkable achievement in oil production should be celebrated for the beneficial effects on the U.S. economy in terms of jobs, balance of payments, and energy security.

Readjusting Markets
The public recognizes that gasoline and diesel prices continue to fall, with gasoline as low as $2 per gallon and diesel fuel close to $3 gallon for the first time since the financial crisis. The lower prices result from a combination of higher U.S. production, a depressed world demand that reflects a weak economic output, and an absence of supply restrictions from the Organization of the Petroleum Exporting Countries (OPEC).

The likelihood of continued high levels of U.S. domestic crude production has encouraged groups such as the American Petroleum Institute to push for easing of the 1970s-era rule that prohibits the export of domestically produced oil, except to Canada. To critics, this ban creates distortions in the domestic and international markets for oil, limits investment in the U.S. oil industry, and provides no benefits. Supporters note that the ban keeps domestically produced oil available for use in the United States. If the limits on exports cause domestic crudes to sell at lower prices, lifting the ban may raise the price of certain streams of domestically produced oil. If the higher prices for these domestic streams lead to additional U.S. production, the global price of oil could drop and with it the price of gasoline. The outcome depends on a host of factors, including the reaction of OPEC and the investments by domestic producers in future output, based on expectations for oil prices.

The United States is already a major exporter of refined products, including diesel, gasoline, and jet fuel. U.S. exports of refined products are now about 3.4 million barrels per day, up from about 1 million barrels per day in 2006 (5). This makes the United States one of the world’s largest exporters of refined products. The export of refined products reflects, in part, the decline in U.S. demand for gasoline.

Renewable Fuels
must blend renewable fuels into gasoline and diesel fuel in proportion to the volumes sold. Renewable biofuels—including corn-based ethanol, biomass-based diesel, and advanced biofuels—must meet four interconnected requirements. Because of technical difficulties in scaling up production, as well as regulatory uncertainty and other reasons, the volumes of advanced or cellulosic biofuels are well below the legislated target.

The fuel economy of vehicles also affects the impact of the renewable fuel requirements. EPA and the National Highway Traffic Safety Administration have issued harmonized fuel economy and greenhouse gas (GHG) emissions standards under the Corporate Average Fuel Economy (CAFE) regulations. The regulations are expected to increase the fleet average fuel economy of light-duty vehicles—cars, vans, and SUVs up to 10,000 pounds in gross vehicle weight—to 48 or 49 miles per gallon by 2025; flexible compliance measures include credits for improved air conditioning systems that leak fewer GHGs. Together, these standards contribute to a declining demand for gasoline but an increase in vehicle miles traveled. Because of increasing activity in the freight sector, U.S. consumption of diesel fuel is projected to rise (1, MT-30).

The improvement in fuel economy will reduce the demand for gasoline and thereby reduce the number of gallons of ethanol that can be used in E10—the mixture of 10 percent ethanol and 90 percent petroleum gasoline—compatible with all gasoline-powered vehicles. EPA has approved a higher blend of ethanol in gasoline, E15 with 15 percent ethanol, for model year 2007 and newer vehicles. Additionally, blends of ethanol with gasoline up to 85 percent, or E85, can be used in cars specifically designed for this fuel. Retail availability of E15 and E85, however, is limited, reducing the market potential. As a result, EPA has reduced the total amount of ethanol renewable fuel below the levels required by law for this year and possibly beyond.

**Toward a Sustainable System**

The improving fuel economy also has reduced the funds available for federal and state surface transportation programs—fuel excise taxes supply most of the revenues. The Congressional Budget Office estimates that CAFE regulations will reduce the fuel tax revenues going into the Highway Trust Fund by 21 percent by 2040 (6). Although the Energy Information Administration’s Annual Energy Outlook has projected that sales of electric and natural gas vehicles will be modest, increasing adoption of alternate-fuel vehicles will accentuate the loss of gasoline tax revenue. But additional policies to accelerate reductions in GHG emissions from the transportation sector could change this dynamic.

With the current fluctuations in energy markets, the only certainty is that change will come. Oil and natural gas prices are likely to rise significantly from their current lows, but how high and when cannot be known. For the next few decades, however, fossil fuels will continue to dominate the transportation sector, which therefore will continue as a source of GHG emissions and challenges to air quality. The goal is to produce a more resilient and sustainable transportation system while improving the reliability and safety that the nation needs and expects.

**References**