

Energy Legislation

a report by

Christine Ehlig-Economides¹ and Michael J Economides²

1. Texas A&M University, Member National Academy of Engineering; 2. University of Houston

The Great Energy Deception

An adequate energy supply is vital to national economic and political wellbeing. However, few issues have degenerated into more ideologically driven misinformation than energy. The correlation between energy consumption and wealth is unambiguous. *Figure 1* makes this clear. The US, the richest major nation in the world, is also the biggest energy consumer per capita.

Too many people focus on what they consider desirable and how the world should be, rather than taking the world as it is. As such, they ignore the gap between what is theoretically possible in their most perfect of worlds and what is practical at a given time.

This is one reason why governments continually fail to make any significant difference when it comes to the world's energy mix. It is also why the recent legislative push towards alternative fuels, including renewable biofuels such as ethanol, is likely to fail.

The US needs to diversify its energy supply to make it less reliant on any one energy provider. However, it is unacceptable for political leaders, various interest groups and the media to ignore the economic and logistical problems in pursuit of unachievable goals such as 'energy independence' or a 'fossil fuel-free' society. More than lip service needs to be given to the huge costs involved in making the changes proposed, as well as to the minuscule odds of achieving such expansive ends, no matter how much is spent.

Energy policy needs to be more than wishful thinking. Yet that is exactly what it has been for more than 30 years as policy makers fail to understand fully the inherent advantages of fossil fuels over alternatives and what is required to replace them.

Fossil Fuels Past, Present and Future

Fossil fuels currently meet about 86% of the world's energy needs, and this has not changed over time (see *Figure 2*).

Thirty years ago, when worldwide energy demand was 60%

of current levels, fossil fuels were the source of nearly 90% of the world's energy supply. Today, the Energy Information Administration of the US Department of Energy forecasts that this is not likely to change in the future, with 86.5% of the total energy mix coming from fossil fuels in 2030 despite – or perhaps because of – an expected increase in total energy demand of 62% by then.

All of this is despite programmes going back 30 years that have subsidised alternative forms of energy at substantial costs to US taxpayers. Why is it so difficult? One must first consider the advantages of fossil fuels.

The Advantages of Fossil Fuels

"We hold these truths to be self-evident, that all men are created equal," reads the beginning of the Declaration of Independence. Unfortunately, for those wistfully seeking 'energy independence', or, more precisely, 'fossil fuel independence', all potential fuels are not created equal. Fossil fuels have distinct advantages as a source of energy over their counterparts.

One advantage is abundance. Coal is America's most abundant energy resource, with supplies capable of meeting electricity needs for more than 250 years. Similarly, despite high prices for oil, it is not likely to run out any time soon. Geopolitical factors – including production quotas among major oil-exporting countries and supply bottlenecks in major importing countries – have fed recent price increases.

This abundance produces a second advantage – price. Ethanol, for example, continues to cost significantly more than gasoline on an energy equivalent basis, despite a 52-cent-per-gallon tax credit for its production. Coal is still half as costly as nuclear for electricity generation. Wind and solar are too intermittent to serve as base-load power generators, and cost 2–5 times as much per kilowatt hour of electricity generation when reliability is factored in.

Fossil fuels – in particular natural gas and oil – have enormous versatility. By-products from fossil fuels not only help defray their costs as fuels, but also make fossil fuels essential to a wide variety of industries. Only biofuels can provide similar by-products.

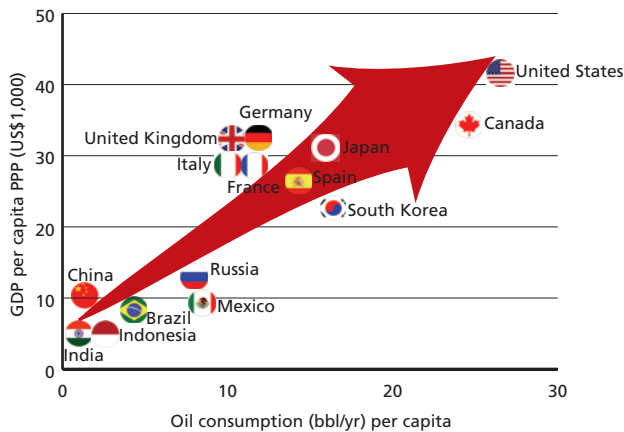
A further factor in the inequality of fuels is that non-fossil fuels are not easily interchangeable.

Energy Interchangeability versus Inflexibility

Fossil fuels – such as oil, natural gas and coal – can be used interchangeably, although with reduced levels of efficiency depending on the use. Coal is best used for electricity production as it is cheapest. However, it can also be pulverised to produce

Michael J Economides is a Professor at the Cullen College of Engineering, University of Houston, and the Managing Partner of a petroleum engineering and petroleum strategy consulting firm. He is also the Editor-in-Chief of the *Energy Tribune*. Publications include authoring or co-authoring 11 professional textbooks and books, including *The Color Of Oil* and almost 200 journal papers and articles. Professor Economides undertakes a wide range of industrial consulting, including major retainers by oil companies at the national level and by Fortune 500 companies. He has had professional activities in over 70 countries. In addition to his technical interests, he has written extensively in wide circulation media on a broad range of issues associated with energy, energy economics and geopolitical issues. He also appears regularly as a guest and expert commentator on national and international television programmes.

Figure 1: World Energy Consumption and Wealth



a natural gas to heat homes and through liquefaction can, at a push, provide motor fuel for vehicles whose engines are modified to use it. Natural gas can be fired up to heat a home or a boiler for electricity. It can be re-formed from a gas into a liquid through a well-known conversion process to fuel motor vehicles. Oil can be distilled into gasoline for transportation or burned directly to produce electricity – although virtually none is used to produce electricity since coal and natural gas are so much cheaper.

Alternative fuels – such as solar, wind, geothermal and nuclear – can provide electricity, in most cases at considerably higher costs, but they cannot provide liquid fuels for transportation. Their use for transportation would require motor vehicles to be equipped with battery packs, which tend to increase costs.

Furthermore, to replace current motor fuels with electricity would require a substantial boost in electricity production, for which the lowest cost and most easily built plants would use coal and natural gas.

It is precisely because of these reasons that many lawmakers and groups interested in achieving energy independence with reduced fossil fuel use are backing the use of so-called biofuels – such as ethanol – for transportation.

However, in pursuing biofuels, proponents are ignoring many shortcomings that make them inadequate and even potentially economically and environmentally hazardous if used as anything more than a supplement to existing gasoline stocks.

Biofuels – You Have to Know Their Limitations

Current production of ethanol comes 90% from corn and 10% from grain sorghum, barley, wheat, cheese whey and potatoes. Corn is a low-cost source of starch that can be converted to sugar and fermented and distilled into alcohol.

The ethanol it provides now acts as a replacement for methyl tertiary butyl ether (MTBE), a gasoline additive from petroleum and natural gas that helps reduce certain vehicle emissions. MTBE has been abandoned to avoid groundwater contamination, only to be replaced by ethanol, which siphons off groundwater for irrigation.

The blend of ethanol in gasoline amounts to 10% of the total liquid volume, giving the blend the name E10.

A single bushel of corn produces 2.7 gallons of ethanol. From September 2005 until the end of August 2006, an estimated 1.6 billion bushels of corn were used to produce 4.3 billion gallons of ethanol. In the same year, motorists used about 140 billion gallons of gasoline. In all, US farmers produce just over 11 billion bushels of corn. If the US turned all of its corn into ethanol, it would supply only 27.6 billion gallons, about 20% of the gasoline motorists consume.

There is another problem. Ethanol has a fifth less energy content than gasoline. Just a 6% additive to gasoline requires 9.3 billion gallons of ethanol, or about a third of the total corn crop.

So what is the answer? Proponents point to ethanol from biowastes or energy crops such as switchgrass – so-called cellulosic ethanol – as offering promise in the future. However, as key studies show, “technologies to convert cellulose to ethanol at competitive costs seem distant.” Furthermore, “the enzyme that will convert these plants to starch, and thus ethanol, has yet to be discovered.”

The other bioenergy product, biodiesel, also offers promise as a replacement for diesel fuel. However, in the US, as with corn ethanol, biodiesel comes from a primary food and feed crop – soy beans – or from recycled cooking oil – so-called yellow grease – which is already used as an animal feed additive and in soaps and detergents. Globally, an expansion of palm oil production for biodiesel is threatening tropical forests in many parts of the world.

Meanwhile, the current expansion of corn-based ethanol production has led to projections for “consumer prices for red meats, poultry and eggs [to] exceed the general inflation rate in 2008–10 as the livestock sector adjusts to higher feed costs. ... As a result, overall retail food prices [are expected to] rise faster than the general inflation rate in those years.”

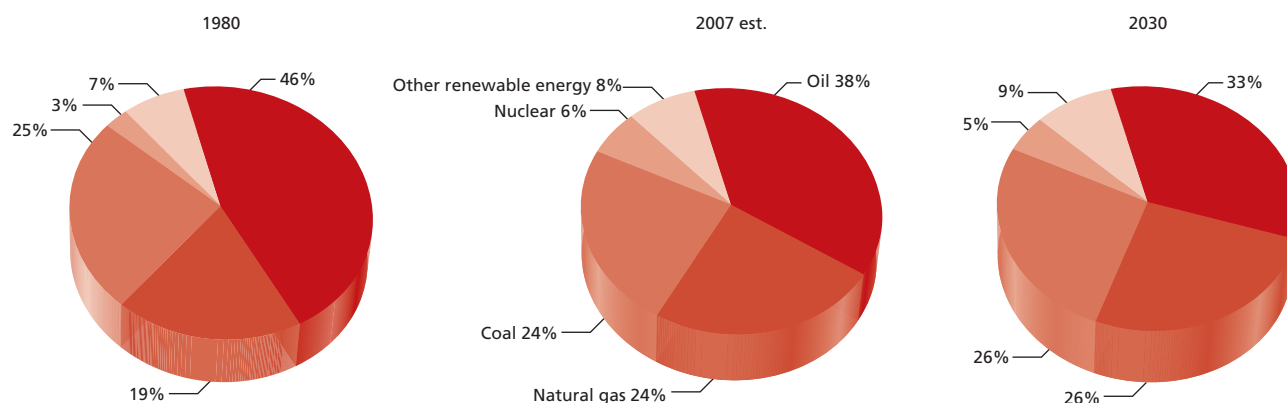
Thus, under current standards, bioenergy fuels threaten both our water and food supplies, and risk raising prices substantially for both – something that most proponents are ignoring.

The Pitfalls of Proposed Legislation

The previous remarks are offered as background to reveal the merits or flaws in proposed legislation relating to ethanol and to a renewable fuels standard (RFS).

Legislation pertaining to liquid fuels for transportation targets 22 billion gallons per year, an amount capable of replacing 25% of gasoline at the current consumption rate. In fact, “approximately 4.0 billion gallons of ethanol fuel were consumed in the United States in 2005, mainly blended into E10 gasohol (a blend of 10% ethanol and 90% gasoline). ... Under the RFS legislation, gasoline will be required to contain 7.5 billion gallons of renewable fuel annually by 2012. It is expected that most of this requirement will be met with ethanol.”² The total corn crop would have to be

Figure 2: Fossil Fuel Dominance in the Global Energy Mix



approximately doubled to produce the target amount of fuel, and it is doubtful whether there is sufficient farm land and groundwater to grow so much corn.

The costs for ethanol are being passed on not only to consumers, as noted above, but also to taxpayers:

"In total, subsidies provided for liquid biofuels currently fall somewhere within the range of US\$5.1–6.8 billion for ethanol, and US\$0.4–0.5 billion for biodiesel. Because the

basis using advanced technologies. But that is not the case: they are being produced using mature technologies that, notwithstanding progressive improvements, have been around for decades."

Incredibly, still more aggressive legislation targets greenhouse gas emissions in transportation fuels. Biofuels emit carbon dioxide, but – if they are produced using only energy from biofuels – they take about the same amount of carbon dioxide out of the atmosphere as they emit. The key question for biofuels is whether they can be

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bulk of subsidies are tied to output and output is increasing at double-digit rates of growth, the cost of these programmes will continue to climb. High levels of legislative activity, especially at the state level, compound the problem with new exemptions, purchase mandates, and subsidies appearing every month. ... Per unit of energy produced, the subsidies generated by policies supporting liquid biofuels are higher than those going to most other fuels on a thermal-equivalent basis – per million British thermal units (MMBtu) – with their petroleum-product equivalents, in the neighborhood of US\$1.05 to US\$1.38 per gallon for ethanol and US\$1.54 to US\$1.96 for biodiesel. Subsidies as a share of market price were above 40% as of mid-2006, and will rise as gasoline and diesel prices fall. Such high rates of subsidisation might be considered reasonable if the industry was new, and ethanol and biodiesel were being made on a small-scale, experimental

produced without jeopardising food or water supplies, and the answer is no.

Until there is a cost-effective alternative to corn, ethanol production should be limited to that required as a gasoline additive. From whatever source, ethanol requires an alternative transport infrastructure that is not required by gas to liquid (GTL) or coal to liquid (CTL), both of which can share use of existing pipelines used for diesel or gasoline. It is doubtful that proposed legislation for a dedicated ethanol pipeline infrastructure can be justified for the amount of ethanol envisaged in the RFS legislation.

The proposed biofuels legislation is ideologically tainted and totally misplaced. It rests upon wishful thinking about mainstream energy realities, such as the public's and the economy's need for adequate and affordable supplies of energy. ■