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Without the Protocol: A Century of Chaos?

Note to readers: I have begun work on a book titled The Oil Depletion Protocol: A Plan for Averting Oil Wars, Terrorism, and Global Economic Collapse *(New Society, June 2006). As with previous books, I will be publishing draft chapters as MuseLetter issues. I would like to gratefully acknowledge the contribution of Jennifer Bresee to the researching and drafting of sections of this book chapter. Please do not re-post any of these chapters online, as they are not final versions and are copyrighted.*

It should be clear by now that very good arguments can be made for the Oil Depletion Protocol. However, the Protocol is an essentially restrictive measure, and, given all nations' preference for continued economic expansion (which usually implies growth in energy usage), this agreement is unlikely to be readily accepted *unless it is understood to be preferable to economic, social, or geopolitical harms* that would far outweigh the pain or inconvenience of foregoing at least the portion of conventional economic growth that is based on the increased use of oil. Calculations of costs versus benefits-from-harm-avoidance are inherent in most regulations—which are by their very nature restrictive (and therefore costly to someone), but which are often accepted in any case because they are seen as necessary to the prevention of even more costly later problems.

So to properly make the case for the global Oil Depletion Protocol, it is necessary to set forth a picture of what will likely happen if the Protocol is not adopted. This effort will fail if our picture is unrealistic or exaggerated in any way, and so we have sought to describe consequences conservatively and, where possible, to provide credible and substantiated estimates of ranges of impacts.

The Global Economy

Without the Protocol, as oil production declines, prices will almost certainly rise, though probably in unpredictable increments (in other words, prices will become more volatile). It is just as clear that uncontrollably and unpredictably rising oil costs (and energy costs in general) will damage the global economy. But how much and in what ways?

We can perhaps begin to answer these questions by examining past instances of dramatically rising oil prices—of which the most dramatic were the oil shocks of the 1970s.

The 1973 Arab OPEC oil embargo produced economic chaos in the West. The price of oil shot up from $2.90 per barrel in mid-1973 to $11.65 in December of that year, raising the price of many other goods. In the US, the retail price of a gallon of gasoline rose from an average of 38.5 cents in May 1973 to 55.1 cents in June 1974. Uncertainty as to the reliability of supply changed buying habits, as drivers who would previously have cruised happily on a quarter of a tank now lined up to top off a half-full tank. Oil scarcity was exacerbated by panic buying and hoarding on the part of both oil companies and consumers, behavior that drove up both demand and price.

During one six-week period the embargo period, shares on the New York Stock Exchange lost a total of $97 billion in value. Petroleum-importing industrial countries (other than those within the communist bloc) suffered sudden inflation and economic recession. In most of the affected nations, including the United States, the impact was mostly borne by the unemployed, marginalized social groups, and the youngest and oldest workers. During

the winter season, many schools and closed to save on heating expenses; factories cut production and laid off workers. In France, the economic crisis triggered by the embargo signalled the end of the *Trente Glorieuses*—30 years of high economic growth. (Unlike other oil-importing industrial nations, Japan fared relatively well during this time, as that nation's automakers designed and produced increasingly popular small, energy-efficient vehicles. Japan's cities, moreover, had relatively high population densities and excellent public transportation infrastructure. In response to the 1973 oil crisis, much of the Japanese economy began to shift away from oil-intensive heavy industrial production and toward the manufacturing of electronics.)

Western nations' central banks sharply cut interest rates to encourage growth; the result was a persisting "stagflation" that crippled economies for years. Many economists regard the period of the oil shocks of the 1970s as comprising the worst global economic crisis since the Great Depression.

Will future energy crises follow a similar pattern? In some respects, many nations today appear better prepared to resist the effects of high oil prices: their economies now use oil more efficiently, and oil costs represents a smaller fraction of their GDP. However, the fact that some nations use oil more efficiently than they did 30 years ago does not necessarily mean that having a few percent less oil available would be less damaging to their economies, if oil is still just as important to the goods and services required. In fact, shortages or sharp price hikes might actually hurt more, given the fact that easy efficiency gains have already been made. Further increases in efficiency may be costly and may require time to implement. Moreover, the shortages of the 1970s were temporary and political in origin, whereas Peak Oil implies shortages that are imposed by nature and that are ongoing and cumulative.

The Hirsch Report predicts, for industrialized nations,

> . . . increased costs for the production of goods and services, as well as inflation, unemployment, reduced demand for products other than oil, and lower capital investment. Tax revenues decline and budget deficits increase, driving up interest rates. These effects will be greater the more abrupt and severe the oil price increase and will be exacerbated by the impact on consumer and business confidence.

Elsewhere, the Report's authors note that

> Higher oil price volatility can lead to reduction in investment in other parts of the economy, leading in turn to a long-term reduction in supply of various goods, higher prices, and further reduced macroeconomic activity. Increasing volatility has the potential to increase both economic disruption and transaction costs for both consumers and producers, adding to inflation and reducing economic growth rates.

The Hirsch Report also concludes that, in the post-peak economic environment, less-industrialized nations "will likely be even worse off." A recent study by **Karim Jaufeerally** on the likely impacts to one small less-industrialized country, Mauritius, **noted that with oil prices "a**t US $110 per barrel . . . the Mauritian economy will be in severe trouble."

One of the most significant world economic developments since the 1970s has been the globalization of trade, a trend that Peak Oil may reverse. According to a recent paper by economists Jeff Rubin and Benjamin Tal at the Canadian Imperial Bank of Commerce (CIBC), as oil prices raise shipping costs North American retailers will find goods from Asia—such as apparel, furniture, footwear, metal goods, textiles, and industrial

machinery—less attractive. Overall transport costs will be about 130 per cent higher with oil at $100 than at $30 a barrel, according to the report. "All of a sudden," the economists write, "proximity to major markets becomes far more important in determining comparative advantage. Distance translates directly into costs."

If oil prices rise rapidly, companies will find it difficult to pass along their higher costs to buyers quickly enough to offset their own losses. Larger companies with bigger inventories will be able to afford to put off price hikes longer, so smaller producers will go bankrupt first. When retail prices for manufactured goods do go up, they will destroy demand, so producers will be hit both ways: their costs will balloon while their volume of sales shrinks. The end result may be a consolidation of industries, leaving only a few large companies in place.

Secondary economic effects, caused by the interaction of high oil prices with unrelated problems having to do with currency values, financial derivatives, or debt bubbles, are more difficult to predict with any assurance, but could be profound.

Transportation

Transportation as a whole (including freight) currently accounts for over 60 percent of all oil consumed globally; conversely, the world's transportation systems are over 90 percent dependent on petroleum.

Increases in oil prices will not affect all transportation modes equally. The energy intensity of transport by rail, ships, trucks, cars, planes is quite variable, with transport by plane the most energy intensive, followed in order by car, truck, rail, and ship. Altogether, the transport of goods by plane is up to 50 times more energy-intensive than transport by ship.

Personal/Local Transportation: **The most familiar, easily observable role of oil in daily life, at least for people living in the industrialized world, is as a fuel for personal transportation. When the price of oil rises, people feel the direct impact at the gas pump, with the most obvious effect of high oil prices being more and louder grumbling about the cost of daily commutes. But, because transportation of people and goods is so vital to economic activity, and because transportation is so oil-intensive, high oil prices generate many more problems than commuter disgruntlement.**

The design of many modern cities, suburbs, and towns requires the use of motorized transport. Especially for residents of suburbs or rural areas, a personal car has become a vital tool for getting to and from sources of employment, education, socialization, food, clothing, and medicine.

Since most households now have two workers instead of one, living close to the sites of both jobs is often not possible in the standard suburban setting, and therefore most workers commute long distances to the workplace. Two workers traveling to two separate workplaces require two separate cars. With two cars, there is more opportunity, for example, for one partner to take a two-mile detour to rent a movie for the evening while the other detours to the mall to pick up groceries. With more workers per household, travel for all reasons has increased.

The prevalence of single-occupant vehicles on the commute to work seems to roughly correlate with city sprawl. The prevalence of alternatives to single-occupant vehicles seems to roughly correlate with city density.

The working poor are more careful with transportation dollars (and transportation energy) than more affluent suburbanites. They spend, on average, far less than middle- and upper-class workers on transportation. However, if expenditures on transportation are taken as a percentage of income, poor workers spend considerably more of their incomes on transportation than other workers, especially where they use a personal car. Thus the working poor are more reliant on cheap fuel for the maintenance of their income and expense balance than are the middle and upper classes. Given a full range of options, the working poor tend to use alternative forms of transportation such as public transit, carpooling, bicycling, and walking. But with many poor communities pushed out of core urban centers due to gentrification, alternative transportation options are not always available.

Oil demand is not elastic. As with demand for food or water, price signals can suppress demand for energy only so far. After suburbanites cut back on fuel use by curtailing frivolous trips, whatever trips remain are essential, and unless settlement patterns are radically altered (a project requiring years of planning and expensive effort), many people will still need to make these essential trips with cars. Thus the design of settlements creates a low threshold of fuel costliness that cannot be crossed without severely damaging the economy as a whole.

The cost of gasoline, when adjusted for inflation or other skewing factors, fell steadily between 1983 and 2001. While the cost of fuel drifted lower, the cost of other goods rose, taking a larger percentage of consumers' budgets. The cost of other goods, and other types of energy such as electricity and natural gas, took up the slack left by the lowered cost of oil and in general maintained the average worker in most OECD countries in an equilibrium position between income and expenditures. With expensive goods and climbing oil prices, more and more households will likely fall out of that equilibrium. An increase in oil prices will likewise contribute to the destabilization of working-class and poor communities, many of which have already been forced out of city centers with easy access to public transit and into sprawling suburban developments.

Increasing vehicle fuel economy is an obvious strategy for dealing with high fuel prices, but it is not a panacea. In the US, improvements in fuel economy slowed the exponential expansion of energy demand between 1988 and 1991, but investment in fuel economy as a strategy to mitigate oil dependence has had far less of as dampening effect on energy consumption from 1991 into the present. Evidently, most of the "low-hanging fruits" of energy efficiency have already been plucked.

Meanwhile, the design of existing settlements limits transit options. Public transit is not currently an effective means of transportation in locales characterized by urban sprawl: efficient, cost-effective public transit requires hubs of activity around which to build a network of transit connections, and sprawling settlements lack such hubs.

Public transit ridership seems broadly to grow and shrink with fuel availability, and also seems to grow and shrink with national economic health. Where public transit does exist in suburban areas, it typically consists of buses. However, buses are the least efficient of all public transit modes. A bus filled with passengers uses 84 percent as much fuel as those passengers would collectively use to go the same distance in private vehicles. Commuter rail uses 31 percent as much fuel as the equivalent number of single-occupant vehicles, light rail 22 percent as much, and heavy rail only 17 percent as much. Like private commuters, public transit systems are vulnerable to oil price increases.

Trucking/Other Freight: With higher fuel prices the extra cost of shipping goods will ultimately be added to the price of the goods. Currently freight companies, particularly

trucking companies, are suffering financially while the price of shipping comes in balance with the price of fuel. In the US alone, each $1 increase in the price of oil translates to an $823,000,000 increase in costs to the trucking industry. Many trucking companies have added a fuel surcharge to their commercial deliveries, but that surcharge often does not cover all of the added cost of fuel for the shipment.

Many industries and retailers are currently feeling the pinch of high freight charges due to high fuel prices, but have managed to absorb much of the added cost internally, passing only a fraction of the cost on to customers. For a typical retail product, the producer may sell to a distributor at a price that reflects only a modest added cost resulting from oil price increases (unless the product incorporates oils in its production, in which case the product becomes more expensive). The global and/or national distributor then sells to regional hubs at an added cost (the fuel surcharge) on top of that, but the added charge may only cover part of the added cost from recent fuel price hikes. The regional distributors then sell to retailers at another added cost (another fuel surcharge) on top of the previous markup, but again one that may not entirely cover the actual extra cost of fuel. The retailer sells to customers and tacks on another added cost, but one that, yet again, usually does not completely cover the added cost of fuel. Every party in the distribution network, from the global level to the corner store to the customer, pays higher prices and absorbs higher costs due to high fuel prices.

Some vital businesses, such as supermarkets, have such thin margins for profitability that they cannot absorb these added costs while maintaining normal levels of service. Supermarkets will have to either pass the added costs on to customers or drastically change their business models to take advantage of local resources, if they wish to stay in business. Food in general, and particularly perishable goods that have to be shipped within a certain timeframe—such as milk, meat and vegetables—will likely become much more expensive in response to high fuel prices. Goods that require petroleum in their manufacture as well as distribution—such as tires, chemicals, and plastic products—will also likely cost proportionally more. Thus high fuel prices threaten the availability and affordability of nearly all goods used in modern life, save those produced locally and without the use of petroleum, and will particularly impact the price and availability of essentials like food.

Air transport: Commercial airlines have been facing a crisis in profitability for years. Among the many causes of the industry's decline is fuel cost. Fuel is the largest cost involved in air transport, both passenger and shipping. For passenger airlines, a one-cent increase in the price of jet fuel leads to an extra cost of one million dollars per year, and a one-dollar increase in crude oil prices per barrel leads to an extra cost of $50 million per year.

Airfares have not risen substantially in recent years despite increases in fuel costs, because customers have not been willing to fly with higher fares—given other high-profile risks associated with the air travel industry, such as terrorism. But the price of air transportation will inevitably increase, as airlines need a certain baseline level of funds to maintain their fleets and pay workers. Before the price of air travel comes in balance with fuel cost, many more commercial air carriers will likely file for bankruptcy, and in the end airfreight and commercial air travel will become much more expensive.

Food and Agriculture

Recent and current trends in global food production are closely related to the increased use of inexpensive fossil fuels. These include:

Arable cropland: For millennia, the total amount of arable cropland gradually increased due to the clearing of forests and the irrigation of land that would otherwise be too arid for cultivation. That amount has reached a maximum within the past two decades and is now decreasing because of the salinization of irrigated soils and the relentless growth of cities, with their buildings, roads, and parking lots. Irrigation has become more widespread because of the availability of cheap energy to operate pumps, while urbanization is largely a result of cheap fuel-fed transportation and the flushing of the peasantry from the countryside as a consequence of their inability to buy or to compete with fuel-fed agricultural machinery.

Topsoil: The world's existing soils were generated over thousands and in some cases millions of years at a rate averaging an inch per 500 years. The amount of soil available to farmers is now decreasing at an alarming rate, due mostly to wind and water erosion. In the US Great Plains, roughly half the quantity in place at the beginning of the last century is now gone. In Australia, after two centuries of European land-use, more than 70 percent of land has become seriously degraded. Erosion is largely a function of tillage, which fractures and loosens soil; thus, as the introduction of fuel-fed tractors has increased the ease of tillage, the rate of soil loss has increased dramatically.

The number of farmers as a percentage of the population: In the US at the turn of the last century, 70 percent of the population lived in rural areas and farmed. Today less than two percent of Americans farm for a living. This change came about primarily because fuel-fed farm machinery replaced labor, which meant that fewer farmers were needed. Another way of saying this is that economies of scale (driven by mechanization) gave an advantage to ever-larger farms. But the loss of farmers also meant a gradual loss of knowledge of how to farm and a loss of rural farming culture. Many farmers today merely follow the directions on bags of fertilizer or pesticide, and live so far from their neighbors that their children have no desire to continue the agricultural way of life.

In addition, four related trends spell trouble for the continuance of current fuel-based agricultural production:

Grain production per capita: A total of 2,029 million tons of grain were produced globally in 2004; this was a record in absolute numbers. But for the past two decades population has grown faster than grain production, so there is actually less available on a per-head basis. In addition, grain stocks are being drawn down: According to Lester Brown of the Earth Policy Institute, "in each of the last four . . . years production fell short of consumption. The shortfalls of nearly 100 million tons in 2002 and again in 2003 were the largest on record." This trend suggests that the strategy of boosting food production by the use of fossil fuels is already yielding diminishing returns.

Global climate: This is being increasingly destabilized as a result of the famous greenhouse effect, resulting in problems for farmers that are relatively minor now but that are likely to grow to catastrophic proportions within the next decade or two. Global warming is now almost universally acknowledged as resulting from CO2 emissions from the burning of fossil fuels.

Available fresh water: In the US, 85 percent of fresh water use goes toward agricultural production, requiring the drawing down of ancient aquifers at far above their recharge rates. Globally, as water tables fall, ever more powerful pumps must be used to lift irrigation water, requiring ever more energy usage. By 2020, according to the WorldWatch Institute and the UN, virtually every country will face shortages of fresh water.

The effectiveness of pesticides and herbicides: In the US, over the past two decades pesticide use has increased 33-fold, yet, each year a greater amount of crops is lost to pests, which are

evolving immunities faster than chemists can invent new poisons. Like falling grain production per capita, this trend suggests a declining return from injecting the process of agricultural production with still more fossil fuels.

Now, let us add to this picture the inevitable peak in world oil production, which will make machinery more expensive to operate, fertilizers and other agricultural chemicals more expensive to produce and purchase, and the transportation of both chemical inputs and agricultural products more costly. While the adoption of fossil fuels created a range of problems for global food production (as it also substantially increased the amount of food available), the decline in the availability of cheap oil will not immediately solve those problems; in fact, over the short term it will exacerbate them, bringing simmering crises to a boil.

That is because the scale of our dependency on fossil fuels has grown to such enormous proportions.

In the US, agriculture is directly responsible for well over 10 percent of all national energy consumption. Over 400 gallons of oil equivalent are expended to feed each American each year. About a third of that amount (though mostly in the form of natural gas) goes toward fertilizer production, 20 percent to operate machinery, 16 percent for transportation, 13 percent for irrigation, 8 percent for livestock raising (not including the feed), and 5 percent for pesticide production. This does not include energy costs for packaging, refrigeration, transportation to retailers, or cooking.

Trucks move most of the world's food, even though trucking is many times more energy-intensive than moving food by train or ship. Refrigerated jets move a small but growing proportion of food, almost entirely to wealthy industrial nations, at up to 50 times the energy cost of sea transport.

Processed foods make up three-quarters of global food sales by price (though not by quantity). This adds dramatically to energy costs: for example, a one-pound box of breakfast cereal may require over 7,000 kilocalories of energy for processing, while the cereal itself provides only 1,100 kilocalories of food energy.

Over all—including energy costs for farm machinery, transportation, and processing, and oil and natural gas used as feedstocks for agricultural chemicals—the modern food system consumes roughly ten calories of fossil-fuel energy for every calorie of food energy produced.

But the single most telling gauge of our dependency is the size of the global population. Without fossil fuels powering agricultural machinery, producing fertilizer, pumping water, and transporting food, the stupendous growth in human numbers that has occurred over the past century would have been impossible. Perhaps the most important challenge we will face in the coming century will be that of continuing to support our existing (and still growing) population as the availability of cheap oil declines.

In the US, in the winter of 2005-2006, during the run-up in gasoline, diesel, and natural gas prices following hurricanes Katrina and Rita, thousands of farmers across the nation agonized over whether they could afford to plant the next year's crop. This may be only a small indication of what is in store.

Facing steep and unpredictable prices for fuels and fertilizer, more and more farmers will likely go bankrupt. Eventually, increasing food production costs must be passed on to consumers, and food will become more expensive relative to the buying power of citizens. This raises the specter of increasing levels of hunger and malnourishment, perhaps even in relatively wealthy nations.

War and Geopolitics

During the 20th century, as petroleum came to be seen as a strategic resource, competition for oil erupted into conflict on many occasions.

During the latter years of the 19th century and the early decades of the 20th, Baku on the Caspian Sea was a main source of the world's oil exports. It became an international city, featuring grand villas built by locals and foreigners who benefited from the region's oil riches. During World War I, Baku's oil was a target for the German army; and in 1918–1919 the region was briefly occupied by the British. Soon it was taken by the newly formed USSR, so that Caspian oil could fuel Soviet industrialization.

The Japanese attack on Pearl Harbor was triggered, at least in part, by the United States' decision to cut off oil exports to Japan in 1941, an action taken in response to the Japanese invasion of China. Japan, which had been almost completely reliant on imported oil, mainly from the United States, concluded that it would have to obtain its oil elsewhere. This was a factor in its invasion of the oil-rich Dutch East Indies

Historians of the Second World War now generally agree that Adolf Hitler planned to capture the oil fields of Romania by 1939 so that Germany would have a supply of oil. The next stages of the strategy included capture the oil fields of Persia by 1941, and those of Russia in 1942. By that time, it was believed, the Third Reich would have enough fuel for the prosecution of a war with the United States. However, America entered the war before these goals could be accomplished, and the allies managed to deny Hitler access to precious petroleum.

For the past several decades the West has sought to secure the Middle East as a main source of fuels. Decades before oil was discovered there, Britain became involved diplomatically in the Gulf region as a result of maritime interests. Then, with the discovery of several important Gulf oil fields in the 1930s, the region's perceived strategic value increased significantly, and other powers—including Germany, Russia, and the United States—began to exercise influence there as well.

Oil played a part in a 1953 coup in Iran organized by the US and Britain against the elected prime minister, Mohammed Mossadegh, who had nationalized the assets of the British-owned Anglo Iranian oil company (the forerunner of British Petroleum, or BP).

The Arab oil embargo of 1973 demonstrated the possibility of using the withholding oil supplies as a form of economic warfare; during the embargo, the US was so concerned about restoring access to Arabian Gulf oil that it contemplated invading and occupying the Middle East, as has been revealed by documents recently released from the British National Archives.

Military operations against Iraq undertaken by the United States and its allies as a result of Saddam Hussein's invasion of Kuwait in 1991 (which was itself motivated in no small part by conflicts over ownership of oil fields) were in large part driven by the need to maintain secure access to Middle Eastern oil—not just for the US, but for Europe and Japan as well—and also to prevent Hussein from expanding his control over oil flows from the region. Moreover, although the more recent American-British invasion of Iraq was ostensibly undertaken to find banned weapons, oil was unquestionably a factor—as US Vice President Dick Cheney made clear in a statement in August 2002, in which he warned that "Saddam Hussein could then be expected to seek domination of the entire Middle East [and] take control of a great proportion of the world's energy supplies. . . ."

Competition for the wealth provided by oil has been a source of civil conflict within nations, with historic or current instances occurring in Nigeria, Sudan, and Colombia. Petroleum wealth has also fueled internal abuses of power; in this regard, Saddam Hussein offers the prime example: it was his country's oil revenues that enabled him to assemble one of the largest armies in the Gulf region.

In the future, as oil grows more scarce and valuable, conflicts over oil are likely to become more frequent and deadly, both within and between nations. Currently, militarily powerful oil-importing nations maintain bases in many oil-producing regions, and in sensitive or disputed transshipment or pipeline areas. United Press International recently quoted a top US energy official as saying that "more than half of the US defense budget goes to protecting energy coming from unstable areas of the world." Possible future sites of conflict include most of the places where sizable exploitable oil deposits remain—the South China Sea, West Africa, South America, the Middle East, and Central Asia.

Competition between major oil importers is almost certain to escalate as global production rates falter. One recent study paper by an American military analyst (Major Chris Jeffries, Assistant Professor at the US Air Force Academy) even suggests that eventually the United States and Europe might come into open conflict over dwindling Middle East oil supplies.

Other scenarios are easier to imagine—such as ones in which a major oil-exporting nation decides to withhold its resources from the world market in order to drive up prices or to obtain a political advantage; or in which a major producer, or group of producers, decides to embargo a major importer, or to favor one importer over another, for political reasons.

It hardly needs to be stressed that modern weaponry could make future oil wars extremely destructive and lethal. Ironically, a large-scale open conflict would almost certainly use and destroy large quantities of the very substance being fought over (during the Iraq war of 1991, roughly 11 million barrels of oil were drained into the Arabian Gulf while up to 190 oil wells in Kuwait were set ablaze, with nearly a billion barrels of crude consumed by fire). In the end, no one could be said to win such a war.

Terrorism

The term ***terrorism*** is generally understood to mean political violence that is part of a strategy of coordinated attacks falling outside the bounds of conventional warfare. While this kind of violence has a long history, widespread concern about it has mounted over the past few decades as a result of several spectacular and deadly incidents, notably those in New York and Washington on September 11, 2001.

There is considerable controversy regarding the causes of terrorism. Academic inquiries have centered on four classes of explanation:

- *sociological explanations*, which focus on the position of the perpetrators in society (e.g., poverty and powerlessness);
- *conflict theory,* which examines their relationship to those in power (e.g., lack of legitimate means of dissent);
- *ideological explanations*, which focus on the differences in religion or political ideology; and
- *media theory explanations,* which treat terrorist acts as a means of communication.

Poor governance by regimes that provide few legitimate political outlets for opposition appears in many cases to be a significant contributing factor. Futher, a combination of poor governance and weak economic management may result in under-employment among people who are young and relatively well-educated, whose political frustrations are then exploited by religious extremist groups. Also, nations with weak governments can provide attractive havens for terrorists.

However, these general explanations must be seen in context. The instances of terrorism that especially concern Western nations today seem to be associated with mostly Arab and Muslim countries, some of which happen to be important producers and exporters of oil. It would be shortsighted not to view such instances of terrorism within in light of the long history of interference by Western nations in the politics in these nations. Given the deep-seated sense of grievance felt by many people in these relatively poor, resource-exporting countries on one hand, and the growing dependence and therefore vulnerability among people in relatively wealthy industrialized (and militarily powerful) resource-importing nations on the other, the occasional eruption of asymmetrical and unconventional forms of conflict should perhaps come as no surprise.

It is certainly not our intent here to condone terrorist methods; rather, it is merely to show how the motivation for some terrorist incidents may be related to historic, current, and future aspects of the global oil trade, and to suggest how the motivation for at least some future terrorist acts may be removed or reduced by systematically altering the nature of that trade.

Let us consider the published statements of Osama bin Laden as an expression of the sentiment motivating the sorts of terrorist incidents we are discussing. Bin Laden has consistently decried the presence of American troops in Saudi Arabia, as well as Israel's occupation of Palestine and control of the city of Jerusalem. Bin Laden told ABC News in 1998, "In today's wars there are no morals. [Western nations] *rip us of our wealth and of our resources and of our oil* [emphasis added]. Our religion is under attack. They kill and murder our brothers. They compromise our honor and our dignity. . . ." More recently he has said that "One of the most important reasons that made our enemies control our land is the pilfering of our oil. . . .

Moreover, if bin Laden and Al Qaeda see oil as a source of the resentment they evidently hold toward the West, they also view the West's dependence on Middle Eastern oil as a vulnerability they can exploit. Bin Laden says, for example, "Be active and prevent them from reaching the oil, and mount your operations accordingly, particularly in Iraq and the Gulf, for this is their fate."

According to Middle Eastern analyst Christopher M. Blanchard, writing for the US Congressional Research Service,

> Bin Laden's statements reveal sophisticated consideration of the economic and military vulnerabilities of the United States and its allies, particularly with regard to the role of Middle Eastern oil as "the basis of industry" in the global economy. Bin Laden has called for Muslim societies to become more self-sufficient economically and has urged Arab governments to preserve oil as "a great and important economic power for the coming Islamic state." Bin Laden also has described economic boycotts as "extremely effective" weapons. Bin Laden's recent descriptions of Al Qaeda's "bleed-until-bankruptcy plan" and his discussion of the U.S. economy and the decreasing value of the U.S. dollar fit his established pattern of citing the economic effects of terrorist attacks as proof of Al Qaeda's success. Recent

> statements urging attacks on oil pipelines and military supply lines could indicate a shift in Al Qaeda's strategic and tactical planning in favor of a more protracted attritional conflict characterized by disruptive attacks on economic and critical infrastructure.

The International Energy Agency forecasts that the proportion of the global oil supply coming from OPEC nations can only increase in the years ahead. As the price of oil escalates, and as increasing amounts of wealth are therefore transferred to oil exporters from oil importers, the latter may be ever more highly motivated to try to control political and economic affairs in oil-rich regions. For people living in these regions (which happen to be ones in which high national oil revenues are typically not reflected in per-capita incomes), such external efforts to exert control may be seen as further cause for resentment and therefore for terrorist actions. But if competition for oil fuels further terrorism, increasing instances of terrorism will in turn trigger more oil price volatility (already many analysts believe that the world price of petroleum includes a "terrorism premium" of $10 or more per barrel), and therefore more competition for the resource wherever it exists, setting up a self-reinforcing feedback loop. Thus even if terrorism does not have its ultimate origin in resource disputes, its proximate causes will likely proliferate and deepen, given current trends having to do with our society's petroleum dependency and oil's increasing scarcity.

With the Protocol

Taken together, these extrapolated trends and potentials are nothing less than horrifying. As global oil production enters its inevitable decline, we must contemplate the likelihood that the remainder of the current century will be filled with dramatically heightened risks of resource wars, terrorism, economic collapse, and widespread, deepening hunger.

We must stress once again that our assessment is not exaggerated. Every forecast or scenario described above is drawn from the work of numerous competent, independent analysts inside and outside government, from various nations, and from a range of political backgrounds.

Even though the future without an Oil Depletion Protocol is likely to be perilous, there is no guarantee that acceptance of the Protocol will avert all of the dangers described above. Nevertheless, many of the worst of them may be avoided or ameliorated significantly. Clearly, a cooperative effort by the world's nations will accomplish more toward easing the inevitably painful transition away from petroleum than will ruthless competition for what remains of a resource that is becoming ever scarcer.

The global economy: If substitutes for oil cannot be developed quickly enough (and this is a strong likelihood, as documented in the Hirsch Report), the only way to maintain price stability in a post-Peak world will be some method of global rationing, of which the Oil Depletion Protocol would be the simplest and most straightforward. If the Protocol were generally adopted, oil prices would likely relatively remain high by historic standards, but would also be comparatively stable and predictable. This would facilitate long-range planning, which will be essential to the economic survival of entire industries and companies of all sizes, as well as cities and nations. Knowing how much fuel they will have available, and at approximately what price, nations would be able to forge strategies for a gradual transition to a petroleum-free future.

Transportation: The effects of the Protocol for the transportation sector follow from those noted immediately above: stable prices and an assurance of predictably declining future

supply would enable individuals to plan their modes of travel, and would create strong incentives for cities and nations to begin a transition to the production of more efficient vehicles and a switch to less energy-intensive means of transportation. Industries and companies that rely upon transport of raw materials and manufactured goods—and transport companies—would also be able to plan more effectively. National governments would be motivated to assist with the transition by subsidizing more-efficient transport modes.

Food and agriculture: With stable prices of predictably diminishing oil, countries would be faced with the difficult but manageable challenge of converting their food production to a non-petroleum regime. This would mean gradually reducing fossil-fuel inputs, and also minimizing the transport of food. These are tasks that will require many years of sustained effort, which would be made enormously easier if fuel prices could be controlled in the meantime.

War and geopolitics: General adoption of the Oil Depletion Protocol would entail nations agreeing to produce, sell, and use less oil on a yearly basis, with all amounts monitored and reported transparently. This would remove all incentives to engage in geopolitical maneuvering for advantage, in either the export or the import sphere. Reduced competition would mean a substantially reduced likelihood of conflict—between importing nations, between importers and exporters, and within oil-rich nations over internal control of resource wealth.

Terrorism: The general adoption of the Oil Depletion Protocol would probably not bring an immediate end to terrorism. Some terrorism that is not related even indirectly to oil will not be affected at all. However, with a reduction in the need for petroleum-importing nations to control political events in exporting nations, there is likely to be a gradual lessening of some important historic causes of the most spectacular and worrisome recent instances of terrorism. Clearly, reducing terrorism by eliminating its causes would be far cheaper and more effective in every respect than trying to do away with it by killing or imprisoning the people who are drawn to join or support terrorist groups.

In sum, without the Oil Depletion Protocol the possible consequences of Peak Oil for every sector of every society are likely to be profound, unprecedented, and overwhelmingly damaging. While the Protocol cannot insulate companies, industries, individual countries, or the world as a whole from all of those potential deleterious impacts, it has the potential to reduce risks to such a degree as to more than justify the considerable efforts that will be required to overcome the political and social resistance to its adoption.