chapter 2

Wreck the Economy?

The Kyoto treaty would have wrecked our economy, if I can be blunt.

—President George W. Bush, 2005

If I may be blunt myself, of all the fears concerning climate change and addiction to oil, the fear of wrecking our economy is most paralyzing but least substantial. Even if the costs were greater than they actually are, for America to turn away in fear from the challenges of climate and addiction would dishonor our heritage and lay our own responsibilities at the feet of future generations.

The irony of America's recent energy policy is that, by taking little responsibility for our energy use, we have once again handed the power of the oil market to the Organization of Petroleum Exporting Countries (OPEC). The connection is straightforward. The Kyoto Protocol calls on nations to reduce their use of fossil fuel, mainly coal and oil. Reducing the use of oil makes oil less scarce and reduces its price. In fact, as I mention in the previous chapter, a reduction in the world's use of oil was what crushed OPEC's market power for eighteen years.

Our choice is not between a wrecked economy and economic growth. It is between controlling our own energy policy and letting OPEC's high prices force upon us an energy policy of its own design. Theirs is a poor policy indeed, as OPEC profits from our addiction and dislikes policies that stop global warming. But its policy is forcing us to conserve oil. By 2007, our rising oil use leveled off,

and in the first half of 2008 U.S. oil use was down over 2 percent from a year earlier and oil imports were down 2.5 percent. Compare this with an annual growth rate in oil use of 1.5 percent in the decade before 2005. President George W. Bush claims credit for reducing energy intensity—energy use compared with gross domestic product (GDP). But the reality is that OPEC's high prices are making us conserve—just as they did in the 1980s—while the economy continues to grow. While conservation is a benefit, when administered by OPEC, it comes at far too high a price.

Instead of idly waiting to see what OPEC had in store for us, we could have chosen our own destiny. Our own market-based policies could have guided the use of better technology to reduce our dependence on coal and oil. According to the Department of Energy (DOE), this would have reduced the world price of oil—just as it did in the 1980s. The DOE discovered this in 1998 when Congress asked it how signing on to the Kyoto treaty would affect our economy. The DOE also discovered that implementing the Kyoto Protocol, flawed as it was, would not wreck our economy.

It is too late to avoid paying the present round of tribute to those powers both foreign and domestic that control the world's oil. But we can, in a few years, regain control of our energy destiny by heeding the advice of a president who presided over some of the most perilous times in U.S. history. Even before confronting the perils of World War II, Franklin D. Roosevelt faced the dangers of the Great Depression. He did not flinch, saying, "Only a foolish optimist can deny the dark realities of the moment." But he also warned of the greater danger of being ruled—and paralyzed—by fear, famously declaring "We have nothing to fear but fear itself."

Just as it was seventy-odd years ago, fear itself is again our greatest enemy. That's why I begin this book by dispensing with the exaggerated predictions of economic ruin, catastrophic shortages, and unstoppable climate change. And although the book is motivated by the real dangers of global warming and the dependence on foreign oil, I do not dwell on these. Instead, I present a plan to improve our chances against both threats, without wasting money and at a surprisingly low cost. Although no panacea exists, what we need as a nation is courage, cool heads, and a clever, low-risk plan of action.

Overcoming Fear

Only after we lay to rest the fear of taking action will it make sense to plan a more secure and environmentally sound energy future. But after so much misleading rhetoric, a simple claim that the U.S. economy is strong will not suffice. The belief in economic damage is so ingrained that it afflicts even some of those most willing to take action.

Undoing those misconceptions requires looking at energy policy from all angles—from the expert, rather than the political, perspective; from the perspective of economic growth; from the perspective of physical possibility; and, finally, from the present perspective of inaction.

To begin, consider what the government found out when it studied the cost of complying with the Kyoto Protocol. In 1998, Congress asked the DOE to examine this cost. Congress required the DOE to assume that we would begin complying as late as possible and then comply suddenly. Congress also prohibited analysis of fuel-economy or energy-efficiency standards. It allowed the DOE to model only a carbon tax.

In spite of those cost-increasing assumptions, the DOE found no reduction in long-term economic growth. It found that the shock of sudden compliance would cause a temporary slowing of growth. But the report predicted that, by 2020, our gross domestic product (GDP) would be less than 1 percent behind the no-Kyoto scenario.

But what about more-recent proposals that seek to accomplish even more than the Kyoto Protocol does? For over twenty years, economists have been estimating the costs of energy policies. Researchers have performed dozens of such studies and have generally found costs in the range of 1 to 3 percent of GDP for strong policies. I will use a cost of 2 percent as a benchmark, though most proposals predict that costs will increase slowly, not reaching 2 percent for decades. I will return to the question of why the cost is so low after I dispense with a more urgent question.

Could a 2 Percent Cost Stop Economic Growth?

Confusingly, politicians and pundits always seem to tie energy program costs to reduced economic growth. This happens so consistently that when I first checked on costs, I was afraid that an effective policy would reduce the economy's growth rate by 2 percent—from a normal 3 percent per year to 1 percent per year. That would indeed wreck the economy.

When President Bush announced his Global Climate Change Initiative on Valentine's Day 2002, he said: "Our nation must have economic growth—growth to create opportunity; growth to create a higher quality of life for our citizens. Growth is also what pays for investments in clean technologies, increased conservation, and energy efficiency."

It sounds as if growth itself is in question. Perhaps if Bush had picked the wrong climate-change initiative, the United States would have stoppped growing. This didn't sound right to me. But if it were true and the country grew even 1 percent slower for 100 years, the economy would make almost two-thirds less progress. Such a dire outcome worried me, even though the no-growth rhetoric appeared to be based on pop economic theory or on a

misunderstanding of real economics. The administration cited no studies or papers to support its dire predictions.

For help with this question, I turned to the work of Dale W. Jorgenson. Jorgenson has a chair at Harvard, has been president of the American Economic Association, and has won many honors in economics. Perhaps more important, he is the man who wrote the book, figuratively and literally, in this area of economics. So I bought Jorgenson's *Growth: Energy, the Environment, and Economic Growth*, volume 2.

The first study in the book analyzes the OPEC crisis of 1973 to 1986, the original great energy policy "experiment." Of all the studies estimating the costs of an economy-wide policy, this one appears to be the most reliable, because it examines a policy experiment—OPEC's—that was actually carried out. Most studies examine proposed future policies. The strength of the OPEC policy provided Jorgenson with an ideal data set for his analysis.

Two of his most interesting scenarios he calls OIL72 and OIL81. The first represents what would have happened if OPEC had never raised the price of oil higher than $12.50 per barrel (in 2007 dollars), the price in 1972. The OIL81 scenario represents what would have happened if the oil price had stayed at its 1981 value of about $90 per barrel. In the first scenario, the country would have been a bit richer, and in the second scenario a bit poorer. The difference is equivalent to a policy that raises the oil price from $12.50 to $90 and keeps it there permanently. Jorgenson found that such a policy would have reduced GDP by 2.5 percent.

That's 2.5 percent total in the long run—not 2.5 percent per year!

Jorgenson's analysis shows that ten, twenty, or a hundred years after oil reached $90 per barrel, the United States would be 2.5 percent poorer than if oil had stayed at $12.50 per barrel. This tells us that growth has not slowed down permanently. After a one-time reduction in GDP, full-speed growth would resume. If growth had slowed permanently, GDP would have fallen further and further behind each year

Although this is probably the most convincing analysis, because it is based on a wealth of real-world data and examines a harsh policy, Jorgenson's analysis is completely in line with every analysis of long-term economic growth that I have examined. An energy policy that makes a large, fixed, and permanent increase in the cost of fossil energy causes a small initial reduction in growth, but then growth resumes at full speed forever after.

This does not surprise economists. Technological progress is the main determinant of long-term growth, and energy policy does not slow technological progress. In 1997, over 2,600 economists—including nine recipients of the Nobel Memorial Prize in Economic Sciences—signed the Economists' Statement on Climate Change, which concludes:

> For the United States in particular, sound economic analysis shows that there are policy options that would slow climate change *without harming American living standards*, and these measures may in fact improve U.S. productivity in the longer run [emphasis added].*

In other words, economists do not believe the wreck-the-economy myth. They believe that many potential policies could reduce greenhouse gas emissions and not harm—let alone wreck—the American standard of living. In fact, economists believe those policies might actually improve productivity.

Looking at the historical performance of the U.S. economy tends to confirm this finding. In 1982, the economy slumped, but in the next three years it grew 4.5 percent, 7.2 percent, and 4.1 percent—quite a record, considering average growth is only about 3 percent annually. And all the while, OPEC was imposing its superaggressive climate policy—to put it charitably.

So that answers this section's question. A policy that costs 2 percent of GDP does not wreck economic growth. Imposing a 2 percent cost on the economy slows its growth only until the GDP has fallen 2 percent behind. After that, growth resumes at its full normal rate. Think of it like this: If I have to give up my two SUVs for hybrids, I might be 1 percent poorer now, and I would still be 1 percent poorer in ten years. But I won't be 10 percent poorer after ten years. Once I make the switch, my income resumes its normal growth.

Is 2 Percent a Large Sacrifice?

President Richard Nixon announced Project Independence just three weeks after the start of the oil embargo in 1973, when Arab nations stopped shipping oil to countries that supported Israel in the Yom Kippur War. "We must ask everyone to lower the thermostat in your home by at least six degrees," said Nixon, "so that we can achieve a national daytime average of 68 degrees." President Jimmy Carter endorsed the same temperature and suggested wearing a sweater.

But over the past thirty years, the talk of sacrifice has shifted dramatically. Even among environmentalists, only a few emphasize sacrifice, and most don't think much sacrifice is necessary. New Mexico governor Bill Richardson, in an interview posted on the online environmental publication Grist, expresses the current view most clearly:

> I believe it's going to take … sacrifice for the common good. … What I'm asking for is not sacrifice, like Americans wearing sweaters and turning the heat down. What I'm asking for is being more energy-efficient with appliances, with vehicles, with mass transit. Maybe, instead of driving to work, once a month go mass transit.

Richardson is not wrong, but he's missing a crucial part of the picture. Usually, sacrifice means getting by with less. A strong energy policy does not require that. It costs us something, but even with that "sacrifice" we will get by with more, not less. But we won't have quite as much more as we could have had.

Here's an example of "sacrifice" with growth. The Apollo program sent a man to the moon but made us poorer than we would have been—that is, we paid extra taxes to cover the program's cost. But it didn't hurt our economic growth rate. The United States grew richer at the same time as Apollo's costs were increasing. The costs increased more slowly than the economy grew, so the "sacrifice" for Apollo didn't actually make the country poorer. On the day we landed a man on the moon, the country was richer than on the day President John F. Kennedy announced that goal—just not quite as much richer as it might have been.

Perhaps it's worth restating the obvious at this point. The purpose of an Apollo program or an energy program is to buy a moon landing, a better climate, or increased security. That's why there is a cost. If the policy is wise, the benefit will outweigh the cost. The gain will be worth more than the sacrifice. In any case, the cost does not slow economic growth; it just takes a bite out of our income.

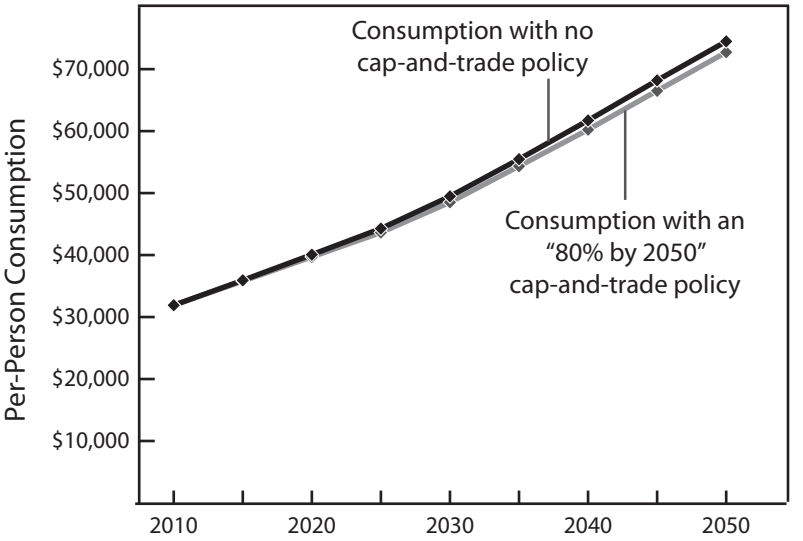
In April 2007, researchers at the Massachusetts Institute of Technology (MIT) looked forty years into the future at the impacts of seven cap-and-trade bills before Congress. Each would place a decreasing cap on greenhouse gas emissions. Figure 1 shows the increase in consumption per person (not per family) from 2010 until 2050, under the strictest scenario modeled by the MIT group.

Consumption of goods and services more than doubles, from $31,900 per person in 2010 to $74,500 per person in 2050. But with a strict greenhouse gas policy, consumption is 2.4 percent less in 2050 than without the policy. The "sacrifice" means getting 128 percent richer instead of 133 percent richer.

The "sacrifice" is relatively small in the first few years under the strict policy. After ten years, consumption is only half a percent lower than it would have been. The policy requires deeper cuts in CO_2 over time—about 50 percent after fifteen years, relative to a case in which no policy is in place, and about 75 percent after forty years.

The economy fall further behind over time not because economic growth is damaged, but because the policy becomes stricter. If energy problems abate and the policy does not require further lowering of the cap, the rate of economic growth is unaffected. A policy with an unchanging cap has no impact on growth.

Figure 1. Effect on Personal Consumption of a Strong Cap-and-Trade Policy



As the cap of a cap-and-trade program tightens, it takes an increasing bite out of income. This graph assumes a program that targets an 80 percent reduction in greenhouse gas emissions by 2050 and is similar to programs proposed by Congress. After forty years, average per-person (not per-family) consumption would have reached only $72,700 instead of $74,500. The graph is based on data published in April 2007 by a team of researchers at MIT.*

Another way to think of the "sacrifice" required is as a delayed increase in income. Under the strict policy that the MIT team studied, the country must wait until 2051 to achieve the income it could have attained in 2050.

How Can It Be So Cheap?

You may now be wondering if the economists who come up with these numbers are in touch with reality. How could it be so inexpensive to cut back on fossil fuel, the very lifeblood of a modern economy? Why are we so addicted if it's so cheap to switch?

The basic answer is this: The United States is rich, and fossil fuel is not as costly as you might think. In fact, it has been too cheap to pass up. Much of the cost of electricity and gasoline is not the cost of fossil fuel, but of wires, generators, and refineries.

The DOE's 1998 model predicted that the largest carbon savings would come from replacing coal-fired generators with natural-gas-fired generators. Coal is higher in carbon per unit of energy produced than other fossil fuels and produces 35 percent of U.S. CO_2 emissions. Natural gas is the cleanest

fossil fuel and generates electricity more efficiently. So using gas instead of coal would reduce U.S. CO_2 emissions by about 20 percent, a good start. How much would that cost us?

Coal is cheap. All the coal we use costs only 0.2 percent of GDP. That's two one-thousandths of domestic production. However, coal plants are more expensive to build than gas-fired plants and are less efficient. So although gas cost several times more than coal per unit of energy, electricity produced with gas is not that much more expensive. Switching from coal- to gas-fired power plants would increase electricity costs only about 2 cents per kilowatt hour. (The retail price is about 10 cents per kilowatt hour.) This would cost about $40 billion dollars a year or 0.3 percent of GDP. If enough other fixes could be found that were equally cheap, fossil CO_2 emissions could be eliminated completely for a cost of 1.5 percent of GDP.

No Guarantee

Economic estimates of low cost are not a guarantee. You can buy a cheap used car, but buy a lemon and repairs can triple the cost you expected.

Most economic estimates assume, as the DOE did, the use of an energy policy similar to the one I recommend. But adopt a huge ethanol program or mandate an end to fossil-fired electricity in ten years, and all bets are off.

Non-market-based programs could easily cost ten times more than expected or not work at all.

Wind power is a little more expensive than electricity from natural gas, but it has the potential to eliminate 100 percent of CO_2 emissions. So it's almost as cheap a way to reduce emissions as switching to natural gas. A third option is nuclear power. It costs about the same as wind power and also eliminates CO_2 emissions. As an aside, building power plants of any kind emits some CO_2, but the amount is very small compared with the amount emitted by producing power with coal.

What about oil? When oil costs over $100 a barrel, I cannot escape a startling conclusion. OPEC and the world oil market have already forced an oil conservation policy on us, in the form of high oil prices. This "policy" is as costly as the oil component of the strictest actual climate-change policy. We do not need to spend more than we are already spending. Instead, we need to take those revenues back from OPEC and Exxon and use them to implement a real policy that is just as effective as OPEC's unofficial one.

High oil prices have, for three years running, stopped the growth in oil use, and even initiated a decline. As long as oil costs over $100 a barrel, we can reduce emissions as much as we need to at no extra cost for a couple decades.

Even Cheaper?

The cost of alternative energy is easier to pin down than the cost of conservation, so I use alternative energy as a reliable way to show that the costs of reducing greenhouse gas emissions could be low. But when OPEC raises prices, the world

responds mostly by conserving, because more cheap conservation is available than cheap alternative fuel.

A 2007 report from McKinsey and Company, the world's leading management-consulting firm, examined dozens of approaches to abating greenhouse gases, including conservation measures, forestation, and alternative fuels. The company found that the world can accomplish a large fraction of the required emission reduction at a cost savings (a negative cost) of half a percent of world GDP. For example, better insulation can save more by reducing oil and gas costs than it costs to insulate. To be cautious, the authors of the report count the negative cost as a cost of zero, then double their total estimated cost. The report concludes that an aggressive policy could cost 1.4 percent of world GDP.[1]

The DOE's Conclusion: Kyoto Would Cut the Price of Oil

In its 1998 report on the effects of the Kyoto Protocol, here's what the DOE predicted: "Because of lower petroleum demand in the United States and in other developed countries that are committed to reducing emissions under the Kyoto Protocol, world oil prices are lower by between 4 and 16 percent in 2010, relative to the reference case price of $20.77 per barrel."

The 16 percent value is based on full compliance, and the 4 to 16 percent range in oil price reduction indicates that U.S. compliance would have the dominant effect on world oil prices under the Kyoto Protocol. (Lack of U.S. compliance nearly eliminates the oil price reduction.)

Taking Charge of Oil Policy

How did OPEC regain its power? Before the 1973 oil embargo, the United States spent under 2 percent of its GDP on oil. Then, for a few years, it spent 5 to 6 percent. In 1979, the cost spiked to 9.9 percent, and the world began to take oil prices seriously. By the end of 1985, worldwide conservation had crushed OPEC, and for eighteen years—until 2004—the United States again spent, on average, under 2 percent of GDP on oil.

During the eighteen-year grace period, and especially in 1986, people had two points of view. Some said to keep the price high so we would keep conserving and keep OPEC at bay. Others said they liked the low prices. "Liking low prices" won out.

Keeping prices low had the predicted effect. Conservation partly petered out, and the much-smaller increase in oil supply petered out completely. Meanwhile, OPEC wisely stopped the growth of their production capacity and waited for world oil use to grow. It has grown, and prices went back up. With oil at $100 a barrel and with GDP at the 2008 level, the United States spends 5.5 percent of GDP on oil, up from 1.7 percent in 2002. OPEC's recent "energy policy" is a lot like a Kyoto policy focused on oil, but with a startling difference.

1. This is their cost estimate for a policy that would "cap the long-term concentration of greenhouse gases in the atmosphere at 450 parts per million (ppm)." We are now just over 380 ppm.

In 1998, the DOE concluded that the United States, to comply with the Kyoto Protocol, would need to push the price of gasoline up to $2.31 per gallon (in 2007 dollars). Similarly, the MIT researchers found that a price of $101 per barrel of oil was sufficient up through 2030. In other words, in mid-2008, oil and gas cost more than enough, and much more than was expected from compliance with the Kyoto Protocol.

But that's not the difference I'm talking about. To see the real difference, follow the money. The DOE assumed that the government would refund revenues from the tax on oil "to consumers through a personal income tax lump sum rebate." In other words, all the higher gas costs of a Kyoto policy could have been returned to you and me in the form of annual checks from the government. (I will explain how this works in Chapter 7.) That's the way Alaska returns revenues from its oil pipeline to its citizens. Needless to say, when OPEC and Exxon raise the price of gasoline, they forget to put the check in the mail. That's the enormous difference between implementing our own policy to comply with Kyoto and letting OPEC impose a policy on us.

There is no doubt that paying OPEC is worse than paying ourselves, but with a Kyoto-style policy, wouldn't we have had to pay both at once? The answer is no, for two reasons. First, gasoline prices need to be only so high to encourage conservation—say, $3.50 per gallon. To the extent OPEC raises the price, we don't need to. Second, if we raise the price of oil before OPEC does, that curbs oil use and makes it harder for OPEC to raise its price.

Had we implemented a Kyoto policy in 1998, we would have preempted OPEC by six years. The DOE estimated that a Kyoto policy could have cut OPEC's prices by 16 percent. However, the policy the DOE examined focused on coal and included no fuel-economy measures. With a policy focused more strongly on oil, we could have reduced OPEC's price even more. Also, the DOE report did not anticipate an oil market as tight as it is now. When the market is tight, an oil conservation policy has more impact on price.

The DOE is not alone in predicting that climate and energy independence policies will reduce OPEC's price. For example, the MIT climate-policy model predicts a 47 percent reduction in the world oil price by 2050, and others have made similar predictions. The idea that reducing demand reduces price dates back to Adam Smith. That's just how markets work—even when a cartel controls part of the market.

An Oil Policy That Works

As I explain in more detail in Chapter 7, a good oil policy includes an untax on oil and a fuel-economy incentive for carmakers. Untax is the term I use for the DOE study's method of refunding all revenues. It's not a tax, because the government keeps none of the revenue. The point to understand here is that

the government refunds all revenues on a per-person basis, the way Alaska handles its Permanent Fund.

The untax keeps encouraging us to use less oil, even if OPEC lowers its price. Here's an example: Suppose the price of oil is $100 per barrel when we implement an untax. The starting untax rate is zero, because the oil price is already high enough to encourage consumers to save oil. If the price goes down to $80, the untax goes up to $20 a barrel. For consumers, it's the equivalent of having the price of oil stay at $100. They keep conserving and buying alternative fuel. But consumers still benefit from OPEC's price reduction. The government refunds all the money collected—$20 per barrel on 20 million barrels per day—by sending checks out in June on an equal-per-person basis, just like Alaska.

Keeping the domestic price of oil effectively at, say, $100 per barrel while pocketing the difference between that price and the actual world oil price holds down demand, which holds down the world price of oil. When the price of oil is $100 a barrel or more, we're already paying the most expensive part of a climate policy. As the world oil price comes back down, and we pocket the difference between that price and $100, climate policy will only get cheaper.

In every decade since 1920, U.S. income has increased faster than energy use has. Adjusting for inflation, we now have three times as many dollars to spend per unit of energy that we consume. With a sound energy policy that ends up costing 2 percent of GDP in 2050, the fraction of our income that we spend on energy will continue to decline.

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The Kyoto Protocol puts no restriction on how countries curb their emissions of greenhouse gases. So when President Bush claimed the treaty would wreck the economy, he was claiming that any serious climate proposal would wreck the economy. In 1998, however, the DOE found that by 2020, more than a decade after its start, the protocol would have reduced GDP by less than 1 percent—not from its 1998 level, but from its predicted level in 2020.

Experts generally estimate that strong greenhouse gas programs cost roughly 2 percent of GDP. Those who claim such programs will wreck the economy generally speak of a reduction in economic growth. And, indeed, a 2 percent reduction in the rate of growth would be devastating.

But climate programs of constant strength cause no reduction in economic growth. They only cause a continuing cost. The difference is enormous. A 2 percent reduction in growth would cut our income in half after forty years, while a 2 percent continuing cost only cuts it by 2 percent.

Every economic analysis of climate proposals points to a continuing cost, not a reduction in the rate of economic growth. This means we might have to wait until 2051 to be as rich as we would otherwise be in 2050—which will be more than twice as rich as we are now. This is the case even with climate programs stronger than the Kyoto Protocol. So do not fear. Market economies are strong and not so easily wrecked.