our energy decline, but I want to close with two last things: How do we harness a new alternative energy source and make it replace what we have been using for more than 2 centuries? How do we do that? We do it with initiative, ingenuity, intellect, vision, and leadership. Remember when I said quadrillion was one with 15 zeroes and talked about how much energy we use, and right now it is 100 quadrillion BTUs, we are not too far away from understanding how to separate hydrogen and oxygen; that is heavy hydrogen from oxygen in seawater.

If we can slow light down 186,000 miles a second to zero, we can stop light, we can put information in a molecule, we understand the human genome, we will be able to use our ingenuity to tap 10 trillion quadrillion quads of BTUs in seawater. Our energy demand is increasing; oil production is decreasing. With intellect and leadership, we can transition to a new fuel source.

OIL DEMANDS

The SPEAKER pro tempore (Mr. DANIEL E. LUNGREN of California). Under the Speaker's announced policy of January 4, 2005, the gentleman from Maryland (Mr. BARTLETT) is recognized for 60 minutes as the designee of the majority leader.

Mr. BARTLETT of Maryland. Mr. Speaker, in this first chart we have some headlines from The Washington Post just a month or so ago. These are headlines from just one day in The Washington Post. The Dow drops 174 points driven, the article says, by economic damage from rising oil prices, the plunging dollar, and growing worries about consumer spending. It goes on to say that a recent oil price rise of 20 percent is continuing to crunch the profits of struggling airlines and is believed to be a factor in disappointing retail sales.

Another headline: ''Dollar Slides Against the Euro and the Yen.'' And another headline: ''Consumer Confidence Slips in February.''

Now, should we have had any indication that these were going to be the kinds of headlines that we have been reading in our paper recently? We need to go back a few years, as indicated on this next chart. Let us go back to the 1940s and the 1950s when a scientist by the name of M. King Hubbert, a geologist, was working for the Shell Oil Company. He was watching the discovery and the exploitation and final exhaustion of individual oil fields. He noticed that every oil field followed a very typical pattern. It was a little slow getting the oil out at first, and then it came very quickly and reached a maximum, and then it tailed off as it became more difficult to get the oil out of the ground.

This followed a bell curve. Here is one of those bell curves. Now, bell curves are very familiar in science, and in life, for that matter. If we look at people and how tall they are, we will have a few people down around 4½ or 5 feet and some up to 7½ feet; but the big mass fall in the middle, clustered around 5½ to 6 feet.

Looking at a yield of corn, a few farmers may get 50 bushels per acre, some may get 300, but the big mass today it is somewhere around 200 bushels per acre for corn.

Hubbert noticed when the bell curve reached its peak, about half of the oil had been exhausted from the field. Being a scientist, he theorized if you added up a lot of little bell curves, you would get one big bell curve, and if he could know the amount of reserves of oil in the United States, and he was doing this in the 1940s and early 1950s, and could project how much more might be found, he could then predict when the United States would peak in its oil production.

Doing this analysis, he concluded that we would peak in our oil production in 1970. This curve is what is known as Hubbert's Curve. The peak of the curve is what is known as Hubbert's Peak. Sometimes this is called the ''great rollover'' because when you get to the top, you roll over and start down the other side. It is frequently called ''peak oil.'' So peak oil for the United States occurred in 1970, and it is true that every year since then we have pumped less oil and found less oil. The big blue squares here are the actual and Members see they deviated a little from the theoretical as M. King Hubbert predicted, but not all that much.

At the bottom, see the difference the big field in Alaska made, and see what that made in the down slope, that never increased production in our country. It just meant that we were not going down quite as fast. You can see that here on the curve. Notice that the Alaska oil production was not the typical bell curve. It should have been, but a couple of things meant it could not be. One was it could not flow at all until we had a 4-foot pipeline. So the fields were developed and they were waiting; then we got the pipeline on board, and it was filled with oil and oil started to flow, and Members see the rapid increase here. It could not flow any faster than through that 4-foot pipe, and so it levels off at the top. We have pumped probably three-fourths of the oil in Prudhoe Bay.

Many people would like to open up ANWR. ANWR has considerably less oil than Prudhoe Bay, so the contribution will be significantly less. I want to note on this chart we also have the red curve, which is the theoretical curve for the former Soviet Union. It is a nice bell curve, peaking a little higher, they have more reserves than we do, and later because we entered the industrial age with vigor before the Soviet Union was quite there. Notice what happened when they came apart; notice how precipitously it fell here. After they got things organized, the fall stopped and now they are producing more oil. As a matter of fact, we might see a little upsurge in this; but the general trend is still going to be down.

On the next chart, and we have here the same Hubbert Curve, but the abscissa is a little too long and the ordinate a little too compressed, so it is not the sharp peak that we saw before. That is the curve we saw before. It shows the Texas component, and it shows the rest of the United States; and it also shows some natural gas liquids. We learned how to extract those a little later. So if you were plotting that as a bell curve, it would peak about here. It is little and then it is much, and then it tails off.

This is the contribution of Alaska, and you can see this not going to be our salvation to pump ANWR because ANWR contains probably not even half as much as Prudhoe Bay. And notice the small contribution that Alaska made. And that is not a bell curve for the reason I mentioned before because we had to develop the fields and they waited for the pipeline, and then it would surge through the pipeline when it was developed. So you do not see the tail getting greater and tailing off.

This is gulf oil. Remember the hullabaloo about the big finds of gulf oil that were going to solve our problem? That is what it did. There never was a moment in time between the big Alaska oil find and all of the pumping discovery and pumping in the gulf, there never was a moment in time when it decreased the fall in our country. The peak occurred, as you see here, about 1970.

Now, the next chart shows what is happening worldwide.

□ 2000

The red curve here shows the actual discovery of oil. Notice that that peaked. There was a big find here that distorted the curve a little but if you rounded that off, you would have the typical bell curve. It started somewhere back here off the chart, then it peaks, and then it is downhill and it tails off. These are the discoveries. The last find there is simply an extrapolation. We have no idea where it is going.

We are, by the way, very good at finding oil now. We use 3D seismic detection techniques. The world has drilled, I think, about 5 million oil wells and I think we have drilled about 3 million of them in this country, so we have a pretty good idea of where oil is.

A couple of Congresses ago, I was privileged to chair the Energy Subcommittee on Science. One of the first things I wanted to do was to determine the dimensions of the problem. We held a couple of hearings and had the world experts in. Surprisingly from the most pessimistic to the most optimistic, there was not much deviation in what the estimate is as to what the known reserves are out there. It is about 1,000 gigabarrels. That sounds like an awful lot of oil. But when you divide into that the amount of oil which we use, about 20 million barrels a day, and the amount of oil the rest of the world uses, about 60 million barrels a day, as a matter of fact, the total now is a bit over the 80 million that those two add up to. About 83½, I think. If you divide that into the 1,000 gigabarrels, you come out at about 40 years of oil remaining in the world. That is pretty good. Because up until the Carter years, during the Carter years, in every decade we used as much oil as had been used in all of previous history. Let me repeat that, because that is startling. In every decade, we used as much oil as had been used in all of previous history. The reason for that, of course, was that we were on the upward side of this bell curve. The bell curve for usage, only part of it is shown on this chart. That is the green one down here, the bell curve for usage. Notice that we are out here now about 2005. Where is it going? The Energy Information Agency says that we are going to keep on using more oil. This green line just going up and up and up is a projection of the Energy Information Agency. But that cannot be true. That cannot be true for a couple of reasons. We peaked in our discovery of oil way back here in the late sixties, about 1970. In our country it peaked much earlier than that, by the way. But the world is following several years behind us. And the area under this red curve must be the same as the area under the green curve. You cannot pump any more oil than you have found, quite obviously. If you have not found it, you cannot pump it. If you were to extend this on out where they have extended their green line, even if it turned down right there at the end of that green line, the area under the green curve is going to be very much larger than the area under the red curve. That just cannot be. We will see in some subsequent charts that we probably have reached peak oil.

Let me mention that M. King Hubbert looked at the world situation. He was joined by another scientist, Colin Campbell, who is still alive, an American citizen who lives in Scotland. Using M. King Hubbert's predictive techniques, oil was predicted to reach a maximum in about 1995, without perturbations. But there were some perturbations. One of the perturbations was 1973, the Arab oil embargo. Other perturbations were the oil price shocks and a worldwide recession that reduced the demand for oil. And so the peak that might have occurred in 1995 will occur later. How much later? That is what we are looking at this evening. There is a lot of evidence that suggests that if not now, then very quickly we should see world production of oil peak.

What are the consequences? What are the consequences of this depletion? The remaining oil is harder to get. It requires greater energy investment, resulting in a lower return on energy invested. That is the energy-profit ratio, which is decreasing. When we started out, you put in one unit of energy and you could get 30 out. Then that fell off, and then we found a few more fields and we got really good at extracting oil with better techniques. It looked for a little while like it was going up, but look what happened. It falls off to where it would have come anyhow if this curve had simply gone down. This is an inevitable consequence of pumping a field.

Lower profits are not the only concern. When more energy is required to extract it than is contained in the recovered oil, that is, when this ratio is less than 1, notice, we are over there at about 1984, we have got to get now another 20 years, I am not quite sure where we are now when you plot that day. We are getting very close to the unit it takes as much energy to get the oil out as you get out of the oil. It may still seem profitable from a monetary perspective, but when you are using more energy to get oil out of the ground than you are getting out of the oil, then clearly you need to leave it there when we reach that point. I mentioned the bump there was caused by a few more discoveries and particularly by increased efficiency in pumping the oil.

What is the current U.S. status? We have only 2 percent, between 2 and 3 percent, not really known for certain, but approximately 2 percent of the known reserves of oil. We use 25 percent of the world's oil. By the way, we have about 8 percent of the world production. What that means is if we have only 2 percent of the reserves and 8 percent of the production, that means we are real good at pumping oil, does it not? That means we are pumping our reserves at roughly four times faster than the rest of the world. That means that this 2 percent will not stay 2 percent by and by because we are so good at pumping oil, we are going to be down to 1 percent of the known reserves in the world and we will still be using about 25 percent of the world's oil. We are now importing about two-thirds of that. At the Arab oil embargo we imported about one-third of that. So we are now importing, relatively, two times more oil, actual quantity much more than that, but relatively about two times more oil.

Chart 6 shows us that more drilling just will not solve the problem. This is a very interesting chart. This shows the difference between the amount of oil that you are finding and the amount of oil that you are pumping. Notice from 1960 on until about 1980, declining for sure, but every year except for one we found more oil than we pumped. The yellow line up here is drilling. You remember the Reagan administration and all the emphasis on drilling because we knew that we were approaching this flipover point where we were going to be pumping more oil than we found and so there was a rationale that if you just give them a profit motive and you have the right incentives, tax and regulatory incentives and so forth, they will go out and they will dig more wells and they will find more oil. Sure as heck they went out and dug more wells. But did they find any more oil? As a matter of fact, in 1982, more oil was used in looking for oil than the oil they found in 1982. Pretty consistently for every year after 1982, we have used more oil than we found. Today worldwide we are pumping at least six barrels of oil for every barrel that we find.

Chart 7 shows that worldwide discoveries are repeating the U.S. pattern. This is a rough bell curve. You find a big find of oil and it is going to make a spike. This is average for 5 years. If you look at it on a year for year, it is really up and down as you find big reservoirs of oil. But generally it starts low and it goes up and it comes down. It follows roughly a bell curve. I would not pay too much attention to the figures on the ordinate here, because the area under this curve must equal just a little bit over 2,000 gigabarrels of oil. If I visually sum the area under this curve, it is going to equal something more, not frightfully more but something more than 2,000 gigabarrels of oil which from other sources we know ought to be the total amount of oil under the sun. Notice that we are tailing off to something very low. It is unlikely that we are going to find big additional finds in the future. Again, we are very good at that. We have dug about 5 million wells worldwide. We have done a whole lot more than that explorations with detonations and seismic and 3D and computers and we are very good at looking at the kind of geology where you might find oil. There is just no real expectation that there are going to be big additional fields of oil found out there. This dropoff in discovery is really in spite of very improved technology for finding oil.

Chart 8. This is a very interesting chart. It has nothing to do with time, because on the abscissa here, we have the number of wells that are drilled, the cumulative oil caps, and on the ordinate, we have the amount of oil that was found. For any relatively big field, here we are talking about 50 gigabarrels. Remember, there are about 2,000 gigabarrels worldwide, so this is a meaningful part of the world reserves of oil. We see that that goes up and up and then it tails off. You cannot find what is not there. No matter how many more wells you drill, you are not going to find oil that is not there. The same pattern should be apparent on a world scale.

Chart 9. This is a very interesting chart. It is a little too busy, but let me try to explain what is there. The oil companies for reasons of pricing and regulations and so forth have had the habit through the years of underreporting initially how much oil they found. Then later when it was appropriate to their license to produce more oil, they would report additional oil. They never found any additional oil, they simply reported oil they had found previously. By the way, you may have noted that three times in the last roughly 3 weeks, oil companies have admitted that their estimates of the reserves were exaggerated and have downscaled the reserves that they said were there. If you took the original reporting of the reserves, you might be able to construct a curve, a straight line curve which said we are just getting more and more. But if you backdated that to the actual discoveries, then you get this curve. This curve is asymtoting at a bit over 2,000 gigabarrels, which is about what the world's experts say had been there. We have now pumped about half of that. We have about 1,000 gigabarrels remaining.

What now? Where do we go now? One observer, Matt Savinar, who has thoroughly researched the options, and this is not the most optimistic assessment, by the way, but may be somewhat realistic, he starts out by saying, Dear Readers, civilization as we know it is coming to an end soon. I hope not. This is not the wacky proclamation of a doomsday cult, apocalypse Bible sect or conspiracy theory society. Rather, it is a scientific conclusion of the best-paid, most widely respected geologists, physicists and investment bankers in the world. These are rational, professional, conservative individuals who are absolutely terrified by the phenomenon known as global peak oil.

Why should they be terrified? Why should they be terrified just because we have reached the peak of oil production? Last year, China used about 30 percent more oil. India now is demanding more oil. As a matter of fact, China now is the second largest importer of oil in the world. They have passed Japan. When you look at how important oil is to our economy, you can understand the big concern if, in fact, we cannot produce oil any faster than we are producing it now and there are increasing demands, as there will be, for oil. In our country, for instance, we have a debt that we must service. It will be essentially impossible to service that debt if our economy does not continue to grow. So there are enormous potential consequences, which is why he says that these people are absolutely terrified by the phenomenon known as peak oil.

What can we do to avert the kind of a catastrophe that he hints at with those words? We must not squander an opportunity. One is always reminded of Malthus. I am sure you have heard of him. He was looking at the increase in world population and he looked at our ability to produce food and he says, gosh, those two curves are going to cross because the world population was increasing faster than our ability to produce food and we are going to have mass starvation. That did not happen. The reason that did not happen was because Malthus could not have anticipated the green revolution, which, by the way, was made possible almost entirely, well, the plant science had a lot to do with it but better plants and better genes without the fertilizer to make them grow is not going to do you much good, so the green revolution was very largely the result of our intensive use of oil. Most people do not know it, but all of our nitrogen fertilizer is made from natural gas. You may have observed that when you have a thunderstorm in the summertime, your lawn is greener than when you have watered it.

□ 2015

That is because of what is known as poor man's fertilizer. The lightning combines some of the nitrogen so they can be carried down by the water and one's lawn is, in fact, greener after a thunderstorm than it is when they water it. We have kind of learned how to mimic lightning, and we now know how to make nitrogen fertilizer from gas. By the way, before we knew how to do that, the only sources of nitrogen fertilizer were barnyard manurers. If one is on the Eastern Shore with a lot of chickens, one could go a long way with that now in agriculture, could one not? But barnyard manurers would fertilize only a tiny percentage of the nitrogen needs of our plants.

And other than that it was guano. My colleagues know what guano is. Guano is the droppings of bats or of birds on a tropical island, their droppings accumulating for thousands of years, and there was a major industry in sending ships around the world to tropical islands and getting the guano.

We must not squander the opportunity that we have. Jevons Paradox becomes applicable here. Just a word about what Jevons Paradox is because I am going to mention it a time or two again. But Jevons Paradox says that frequently when one works to solve a problem, they really make the situation worse.

Let me give one little example. Suppose there is a small businessman who owns a store. He is really concerned about peak oil, and he is concerned about energy, and he wants to do something. His little store is using $1,000 worth of electricity a month, and he decides that he can really cut that use. So he does several things. He gets a storm door. He puts on storm windows. He insulates more. He turns down the thermostat, and he asks his workers to wear sweaters. And he is successful because he reduces his electric bill from $1,000 to $500. Almost no matter what he does with that $500, he has just made the situation worse by doing that.

Let me explain. One of the things that he may do, and it is a natural thing for a small businessperson to do, he may decide, I could hire more people and have a bigger business if I expanded. And so now he will expand, and he will still be using as much energy. Or if he decides to invest his money, if he invests his money in the bank, the bank will lend his money out five or six times, and at least some of those loans will be to small business people. And what the small business people will do is to create jobs and use energy. So the store owner is concerned about energy and the environment and being a responsible citizen, cutting his use of electricity, because everybody did not do it, because only he did it and nobody took advantage of the opportunity that was presented because he used less energy, he really contributed to the problem.

Because after he expanded his business, he would be using still more energy. Or if the money was lent out by the bank and small businesses created more jobs and they used more energy, the situation would have just gotten worse.

All that the ''green revolution'' did was temporarily extend the caring capacity of the world. If we think about that, ultimately if we cannot do something about it to stabilize it, the green revolution just made matters worse. In the meantime we have all eaten very well in spite of the fact that about a fifth of the world will go to bed hungry tonight; but on the average, we are eating very well, and because of the average American, we are eating maybe too well.

But what we have done with the green revolution is to permit the population of the world to double and double again. So if we cannot now make sure that we stabilize population and bring it to the point where it can be supported by a technology where there is not what was ordinarily perceived as an inexhaustible supply of oil, there will simply be more people out there to be hungry and starved if we cannot meet their needs. So we have got to make sure that whatever we do to solve this problem that Jevons Paradox does not contribute.

Chart 10, this shows that this growth cannot be sustained forever. The greatest power in the universe, Albert Einstein was asked this question: Dr. Einstein, you have now discovered the ability to release energy from the atom. We get just incredible amounts of energy from the atom. A relatively small amount of fuel in one of our big submarines will fuel it for 33 years now. Enormous energy density. And they asked him, Dr. Einstein, what is the most energy-intensive thing in the world? He said, ''It is compound interest.''

That is what we have here in this exponential curve. And by the way, we, and when I say ''we,'' I mean the world, have been using oil as if our economy could just continue to grow on this unlimited exponential curve. Whether it is 2 percent a year or 5 percent a year or near 10 percent, which is what China has been growing in the last few years, we are still on an exponential curve. Not quite so steep if we are on a lower growth rate. It goes up and up forever and ever.

Obviously, there is not an inexhaustible amount of oil in the world; so we have the exhaustible resource, which is this lower curve. It reaches a peak, which, if not now, shortly. Oil, as the Members may have noticed, is $54 or $55 a barrel. I saw the other day one future had sold for $100 a barrel, and the experts are saying we are probably going to see $60 before we see $50. We will wait and see.

The third curve here is the renewable resource curve. Do not be confused by the size of these curves. They are simply placed here so that lines would not cross other lines. But in actual practice, the renewable resource curve is likely to be nowhere near the peak of the exhaustible resource curve, energy.

Let me give a little example of what the problem is and why this is almost certainly true. One barrel of oil, 42 gallons of oil, equals the productivity of 25,000 manhours. That is the equivalent of having 60 dedicated servants that do nothing but work for someone. We can get a little better real-life example of this. A gallon of gas will drive a 3-ton SUV, and some of those are better than others, and let us say it takes it 20 minutes, which some will but most will not. Most are around 10. But let us say one gallon of gas will take a 3-ton SUV 20 miles at 60 miles an hour down the road. That is just one little gallon of gas, which, by the way, is still cheaper than water. We pay more for water in the grocery store than we pay for gas at $2 a gallon at the pump, added up.

How long would it take one to push their 3-ton SUV the equivalent of 60 miles an hour, 20 miles down the road? To get some idea of the energy density in these fossil fuels, there is just nothing out there in the alternatives that have anything like this energy density. There are some potentials, nuclear, and we will talk about those in a little bit. But of the general renewables, there is nothing out there with that kind of density. So this curve is likely to be much lower than this curve; and notice that if it is, in fact, going to be renewable, it cannot go to an unrealistic height. There is only so much wood to cut. Easter Island had that experience. When they cut the last tree, they totally changed the ecology.

The Bible talks about the large clusters of grapes and the honey and so forth that they found when the spies went out. That now is a desert. The Cedars of Lebanon, the grand Cedars of Lebanon that built the temple, that is now largely a desert. Why is it a desert? Because they cut the trees, they changed the environment, they changed the climate. So obviously this line has to be a reasonable sustainable level. It just cannot go on forever.

The challenge, then, is to reduce consumption ultimately to a level that cannot be sustained indefinitely without succumbing to Jevons Paradox.

How do we buy time, the time that we will need to make the transition to sustainability? Obviously, there are only two things that we can do to buy time. One is to conserve, and the other is to be more efficient. And the gentleman from Maryland (Mr. GILCHREST) mentioned our increasing efficiency. We have done a great job. Our refrigerators today are probably twice as efficient as they were 20 or 30 years ago. But instead of a little refrigerator, we have a big one. Instead of one, we may have two. So I will bet we are using as much electricity in our refrigeration as we ever used.

Conservation, we can do that. Remember several years ago when there were brownouts, blackouts in California and we were predicting, boy, the next year is really going to be rough? Do the Members know why it was not and we did not see any headlines about blackouts in California? Because knowing that there was a problem, the Californians, without anybody telling them they had to, voluntarily reduced their electricity consumption by 11 percent. That is pretty significant. And that avoided the rolling blackouts or brownouts.

And, finally, we must commit to major investments in alternatives, especially as efficiencies improve. This must ultimately lead to the ability to do everything within the capability of renewable resources. If we have got a solar breeder, and this shows a picture of a solar breeder. That, by the way, is about 5 miles from my home. It was built by Solarex, and it is a sign of the times. Mr. Speaker, this is now owned by BP. They know that oil is not forever. They are now the world's second largest producer of solar panels.

A few years ago, the largest buyer of solar panels in the world, and I do not know if that is true today, but a few years ago it was Saudi Arabia. Why would Saudi Arabia, with the most oil in the world, be the biggest purchaser of solar panels in the world? The reasons are very simple. These are not dumb people, and they figured out that solar panels were better for them in producing electricity than oil because they had widely distributed communities that were very small. Electrons in a wire are very different than oil in a pipeline. Put a gallon of oil in a pipeline up at Prudhoe Bay, and a gallon will come out where it goes on the ship. If we put electrons in a line which is long enough, nothing will come out in the other end. It is called line loss.

And they knew that in their small communities, widely distributed, with the enormous line losses they had from big plants, that they would be better off with distributed production.

By the way, just a hint to our people who are concerned with homeland security, the more distributed production we have, the less vulnerable we are going to be to terrorist attacks on our power infrastructure.

Transition to sustainability will not happen if left applying market forces alone. Everyone must be part of the effort or Jevons Paradox will prevail. If only our country tries to do it and nobody else helps, we will just put off the day when we must make the transition, and it will be even more difficult. The market will, indeed, signal the arrival of peak oil. To wait until it does, however, is like waiting until we see a tsunami: by then it may be too late to do anything.

We now are doing a lot of talking here in the Congress and fortunately across the country about Social Security, and it is a big problem. But I tell the Members if the problem of Social Security is equivalent to the tidal wave produced by the hurricane, then this peak oil problem is equivalent to the tsunami. The impact and the consequences are going to be enormously greater than the impact and the consequences of Social Security or Medicare or those two put together.

□ 2030

It will take a sustained, conscious, coordinated national and even international, effort. If everybody is not working together and buying time by conserving and being efficient and using wisely that time we bought, then all we do is put off the inevitable.

The hydroelectric and nuclear power industries did not arise spontaneously from market forces alone. They were the product of a purposeful partnership of public and private entities focused on the public good. This is what we have to do relative to alternatives.

As I mentioned, California solved their energy crisis by voluntarily reducing their demand for electricity. Time, capital and energy resources are all finite. We have only so much time until it would be too late to avoid a real problem. Capital is limited and energy resources are certainly limited.

This time it will not be like the seventies. The big difference between now and the seventies is that in the seventies, we were just going up this curve, we were nowhere near the top of the curve, so there was always the ability to expand, to surge. If, in fact, we are now at peak oil, there is no such ability remaining.

Is there any reason to remain optimistic or hopeful? Let me go back to Matt Savinar, that not-too-optimistic journalist. ''If what you mean is there any way technology or the market or brilliant scientists or comprehensive government programs are going to hold things together or solve this for me or allow for business to continue as usual, the answer is no. On the other hand, if what you really mean is is there any way that I still can have a happy, fulfilling life, in spite of some clearly grim facts, the answer is yes. But it is going to require a lot of work, a lot of adjustments, and probably a bit of good fortune on your part.''

What now? Well, what we need to do now clearly is to buy time, and we buy that, as I mentioned, with efficiency and conservation. This will keep energy prices affordable. If demand continues to increase and output cannot increase, energy prices are going through the ceiling.

So we have got to reduce demand so that prices do not get so high that it is impossible to invest the capital necessary to develop the alternatives, using existing conventional technologies to make the transition as new technologies are developed.

We must use it wisely. If we do not use it wisely, and I have talked about Jevons Paradox several times, we have got to make investments in efficient, sustainable technologies, further reduce requirements for energy in any form, making smaller systems feasible which reduce both initial and operating costs.

The benefits are enormous. Additional benefits include business opportunities, lots of business opportunities we do not even dream of. Look at the business opportunities created by putting a man on the moon. I have 200-some companies in Maryland alone which are there only because of technology breakthroughs in putting a man on the moon.

That same thing could happen if we had a Manhattan type project focusing on renewables, potential worldwide markets, if we are the leader, and we have every reason to be the leader because we have the biggest problem. We can develop worldwide markets, domestic job creation and environmentally benign technologies with potential to reduce and or eliminate pollution. We could be a real role model.

We are, as I mentioned, less than 5 percent of the world's population, and we use 25 percent of the world's energy. I was in Europe a month or so ago, and their comment was somewhere between anger and disdain. ‘‘You are still only paying $2 a gallon for gasoline in your country.’’ It is $5.50 or $6.00 a gallon there. And they are not unmindful that this one person in 22 in the world is using 25 percent of the world's energy. We have a real opportunity to be a role model.

Let me put up the last chart. This is potential alternative solutions. For what time we have remaining, let me ask my colleague, the gentleman from Maryland (Mr. GILCHREST) to join us as we talk about this.

I have only have some of the potential solutions here. I just want to go down this list and look at these. There may be some others. The gentleman mentioned hydrogen from the ocean. That is certainly one.

There are some finite resources here, ones we have not maximally exploited here, and some renewable resources here, and we want to spend another whole hour talking about this, because there are a lot of things to talk about in these resources. But almost none of these have the density of energy that we find in fossil fuels.

There are tar sands in Canada, there is oil shale in this country, but it takes an awful lot of energy to get energy out of those. You may not have much more than a one-and-a-half to one. I have heard it takes six barrels of oil to get one net barrel of oil out of these tar sands and oil shale. There is an awful lot there, but there are considerable environmental costs and enormous economic costs to develop it.

Mr. GILCHREST. If the gentleman will yield, another analogy I heard recently about the efforts to bring out ever-increasing and diminishing oil reserves and how that simply is not going to work for sustaining our energy needs, this particular physicist gave an analogy that compared the oil to a lion in Africa taking the energy of catching two gazelles to catch one gazelle. How long would that lion last? It takes the energy of catching two gazelles to only catch one, but he needs it to sustain himself, and that simply is not going to work.

I want to compliment the gentleman from Maryland, and I would like to be a part of the extra hour that we will do maybe this week to show what the alternatives are, simply because our energy requirements are increasing, they are not decreasing, and they will continue to increase.

Political parties are not going to let the grid go cold, but what do we do when we rely on oil and natural gas as the predominant energy source for this country? We have to simply find alternatives.

If I could just say briefly, there are two problems with our dependence on oil, and the gentleman has laid those out exceptionally well tonight. Part of the first problem is trade deficits and national security because of our oil dependence. When the price goes up, because we do not have most of the reserves, when oil peaks, we have no control over that. There will never be a decrease in demand. There will always be an increase in demand, no matter what happens, and our energy hunger is gargantuan.

The other problem with our oil dependence is that we are burning fossil fuel. We are returning to the atmosphere carbon that has not been there in this amount for millions of years, and what we are burning in decades it took the natural processes millions of years to lock away.

One other comment about letting the market forces deal with this fairly eminent problem. The global marketplace deals with the CEOs that are rightly so in the business to make a quick profit. The international marketplace is when nations get together, discuss an issue and they find mutual benefit to these vast problems. Vast solutions are available through what the gentleman has described so well tonight.

Mr. BARTLETT of Maryland. Mr. Speaker, reclaiming my time, of course the real challenge is to have everybody agree on what the facts are. I suspect a big percentage of the people that might read or listen to what we say this evening had not even heard of peak oil.

We really had about 30 years warning that this was going to happen. When M. King Hubbert predicted oil would peak in this country in 1970 and it did, and 5 years later, certainly by 10 years later we knew absolutely he was right, because we were well down on the curve 10 years later, we should have had some hint that he probably was right, he and Colin Campbell were probably right about world production? We paid no attention to that.

As a matter of fact, the people that were talking about this until very recently have been quickly relegated to the lunatic fringe. If I had been up here 3 or 4 years ago talking about this, someone may want to relegate the two of us this evening to the lunatic fringe.

But I think the evidence is out there. I think the evidence is out there, and the marketplace is saying that it is out there, because oil is now at $54 or $55 a barrel, they are saying we are going to see $60 before we see $50. I saw one future that was $100 a barrel.

By the way, at $100 or $200 a barrel, tar sands and oil shale become somewhat competitive, but with enormous costs. They will be positive, we will get a little more out than we put in, but not the kind of energy we are now using.

Coal, we have a lot of coal. China has a lot of coal. We now use coal primarily in this country for producing electricity. It is very dirty. Our environmental requirements now, there has not been a new coal plant in a long while, it is all natural gas. It is a real pity. Oil and natural gas are, in a very real sense, too good to burn. They are the feedstock for an enormous petrochemical industry. I mentioned only the fertilizer that grows our crops and the pesticides we make from oil. We live in a plastic world, and all of that plastic is made from oil.

Now, it is true that you can also use biomass and so forth to do some of that, but let us remember that we are just on the verge of not being able to feed the world. Tonight about one-fifth of the world will go to bed hungry. We we are not going to bed hungry in this country, not by a long shot, and we are living very high on the food chain. The time will come when you will not be able to eat the pig that ate the corn, because there is at least 10 times as much energy in the corn that the pig ate as you are going to get out of the pig by eating him. So we can certainly do a lot of by living lower on the food chain.

Mr. GILCHREST. If the gentleman would yield for a second, first of all, I want to compliment the gentleman on this fascinating factual presentation which leads me to what I want to say.

The gentleman said something earlier about finding solutions to the problem is going to be similar to the Manhattan Project or similar to placing a man on the moon within a decade when President Kennedy made that statement, and it is that kind of leadership from this Congress, from the administration, to incentivize, to create the kind of inspiration from the general public, to put these forces together to make it all work.

Mr. BARTLETT of Maryland. Mr. Speaker, reclaiming my time, but now we must do it on a global basis, because of Jevons Paradox, if all the world does not cooperate, we will not get there. Had we paid attention to M. King Hubbert and not relegated him to the lunatic fringe, and he was right as evidence indicates on his prediction from 1970, had we paid attention to him we would have had at least 20 years headstart, and then we could have done it alone in this country because we are so big and use so much of the world's energy.

Before we leave coal, we are going to come back to this and spend another hour with a lot of detail on this, but someone said there are 500 years of coal, that is not true there is maybe 250, at present use rates. But as oil becomes harder and harder to find, we are going to turn more and more to coal, and that 70 years with enormous environmental penalty will shortly become a relatively few years. That is not forever. But we will be leaning on coal more than in the past nuclear.

Three ways we can get nuclear energy. For one of them we are home free, and that is fusion. We send a little less than $300 million a year on that. I would like to spend more if there was the infrastructure out there to support it, because if we get there, we are home free.

But I kind of think that hoping to solve our energy problems with fusion is a bit like you or me hoping to solve our personal financial problems by winning the lottery. That would be real nice. I think the odds are somewhere near the same. I am about as likely to win the lottery as we are to come to economically feasible fusion.

I hope I am wrong. Frequently my hopes and my anticipations are different. My anticipation is we are not going to get there because of the enormous engineering challenges. My hope is I am wrong and we are going to get there.

Two other ways to get energy from nuclear. One is the light water reactor, which is all we have in this country. By the way, tonight when you go home, every fifth home and every fifth business would be dark if we did not have nuclear. It produces 20 percent of all of our electricity. But there is not all that much fissionable uranium in the world, so we are not going to get there with light water reactors.

France produces about 80 percent of its electricity from nuclear. They have a lot of breeder reactors. They do what the name implies, they make more fuel than they use, with big problems, in enrichment, shipping it around, squirreling away the products for a quarter of a million years. That presents enormous challenges to us.

So there is the potential here in nuclear, but a lot of problems involved with it. It is not just that simple. By the way, it takes a lot of oil to build a nuclear power plant.

□ 2045

At some point, you pass the point of no return where there is not enough readily available high-quality fossil fuels to support our present economy while we make the investment we have got to make to transition to these renewables. And then we come to true renewables: solar, wind, geothermal, ocean energy. All of these suffer.

By the way, I am a big supporter of these. I had the first hybrid electric car in Maryland. I had the first one in the Congress. I have a vacation home that is off the grid and totally powered by solar. And I am going to put in a wind machine. I am a big supporter of this.

But the energy density here is very low. And it is intermittent. It takes a lot of solar panels to produce the electricity that you use in your home. It takes 12 of them to power your ordinary refrigerator just as an example. So those are real potential, and they are growing. Wind machines now produce electricity at 3½ cents a kilowatt hour. That is getting competitive. A whole lot of them in California. They are in West Virginia. We are putting some up on Backbone Mountain in western Maryland.

Boy, if we could get down there to geothermal we would have it, would we not?

There is not a single chimney in Iceland because they do not need them. They have got geothermal. They have a little bit of it in the West. But for most of the world that molten core is far too deep for us to tap.

Mr. GILCHREST. If the gentleman would yield just for a second, I am sure he knows, but the general public, I do not think realizes it is not necessary to be sitting right on top of a volcanic area, an earthquake zone to get geothermal energy. We on the Eastern Shore of Maryland have a number of schools that are actually providing heat for those schools from geothermal energy. Some of these things are sort of a hidden secret. But it is the classical conventional wisdom that keeps us from exploring some of these things a little bit further. And I think the gentleman is bringing those out tonight.

Mr. BARTLETT of Maryland. Is this tying the school to the molten core, or is it simply using a heat pump and exchanging, not with the air? What you are trying to do in the winter-time is cool the air and what you are trying to do in the summer time is heat the air.

Mr. GILCHREST. It is actually bringing water up from the surface, from the subsurface. The water is much warmer further down.

Mr. BARTLETT of Maryland. It is indeed. But you still have to have energy to use that. You are much more efficient using a heat pump that is tied to the ground, to groundwater than it is to the cold air in the winter and the hot air in the summer. If you are thinking about what you are trying to do is to cool the cold air in the winter time and to heat the hot air in the summertime. And obviously ground water is very much better in both seasons than either the air in the winter or the cold, the hot air in the summer or the cold air in the winter.

Ocean energy. You know, it takes an enormous amount of energy to lift the ocean 2 feet. That is roughly what the Moon does in the tides, is it not? But the problem with that is energy density.

There is an old adage that says what is everybody's business is nobody's business. And the corollary to that in energy is if it is too widely distributed, you probably cannot make much of it. And we have really tried to harness the tides. In some fjords in Norway where they have 60-foot tides you put a bar there, when it runs in you trap it and then you run it out through a turbine. When it is running out, you can get some energy from it. And there is potential there, a lot of potential energy. But you know it is very dispersed. We have a hard time capturing that energy.

I suspect that our hour is about up, and this is maybe a good place to end. We are going to come back and spend another hour looking at agriculture, enormous opportunities from agriculture. But let me remind the gentleman that we are just barely able to feed the world now. And if we start taking all of this biomass off the field, what is going to happen to the tilth of our soil, to the organic matter in our soil, which is essential to the availability of nutrients in the soil by the plant. So there are lots of challenges here. There are lots of opportunities here. And we will spend another hour talking about them. Thank you very much. And I yield back, Mr. Speaker.

FURTHER MESSAGE FROM THE SENATE

A further message from the Senate by Mr. Monahan, one of its clerks, announced that the Senate has passed a bill of the following title in which the concurrence of the House is requested.

S. 256. An act to amend title 11 of the United States Code, and for other purposes.

REPORT ON RESOLUTION PROVIDING FOR CONSIDERATION OF H.R. 1268, EMERGENCY SUPPLEMENTAL APPROPRIATIONS ACT FOR DEFENSE, THE GLOBAL WAR ON TERROR, AND TSUNAMI RELIEF, 2005

Mr. COLE of Oklahoma (during the Special Order of Mr. BARTLETT of Maryland), from the Committee on Rules, submitted a privileged report (Rept. No. 109–18) on the resolution (H. Res. 151) providing for consideration of the bill (H.R. 1268) making emergency supplemental appropriations for the fiscal year ending September 30, 2005, and for other purposes, which was referred to the House Calendar and ordered to be printed.

LEAVE OF ABSENCE

By unanimous consent, leave of absence was granted to:

Mr. BECERRA (at the request of Ms. PELOSI) for today.