Mr. DELAHUNT. Mr. Speaker, just think of the message that this sends to the rest of the world. When crowds were demonstrating in the Ukraine, we were cheering. We approved. We welcomed the so-called Orange Revolution. And we speak about bringing the fire of freedom to dark corners of the world, and yet here is one dark corner of the world where there is no light, there is no hope, and we do not bring the fire of freedom. And we wonder why polling data indicates that country after country, our traditional allies, look at us as having a mainly negative influence in the world, all because of the war in Iraq. That was the genesis.

Mr. Speaker, it will have implications for us.

ANNOUNCEMENT BY THE SPEAKER PRO TEMPORE

The SPEAKER pro tempore (Mr. POE). The Chair would remind Members to address their remarks to the Chair and not to the television audience.

PEAK OIL

The SPEAKER pro tempore. Under the Speaker's announced policy of January 4, 2005, the gentleman from Maryland (Mr. BARTLETT) is recognized for 60 minutes.

Mr. BARTLETT of Maryland. Mr. Speaker, if you go to your computer this evening and do a Google search for peak oil, you will find there a large assortment of articles and comments. Like every issue, you will find a few people who are on the extreme, but there will be a lot of mainstream observations there.

One of the articles that you will find there was written by Matt Savinar. Matt Savinar is not a technical person. He is a lawyer, a good one, and he does what lawyers do. He goes to the sources and builds his case.

I remember in another life I was involved in morphing some of my knowledge of human physiology into the practical world, and I was awarded 20 patents. For every one of those I had a lawyer. I knew that he knew absolutely nothing about the subject that he was helping me on before he came to work with me. By the way, Mr. Speaker, the 20 patents I had, 19 were military patents so these were military lawyers. I was really impressed with how quickly they caught on and knew what was going on and were able to contribute.

I think that Matt Savinar has done that, and I wanted to begin this discussion this evening with a quote from Matt Savinar because it kind of grabs your attention and makes you either want to put down his article with the statement that gee, this guy cannot be for real, or you want to finish it to see the basis for his statement because he begins his article by saying, ''Dear Reader, Civilization as we know it is coming to an end soon.''

When my wife read that she had the first reaction that I mentioned, Gee, this guy is a nut. I am not going to read any further.

I said, Please read on and reserve judgment until you have finished reading his thesis.

She read on and at the end was genuinely frightened by what she read. I do not believe Matt Savinar has to be correct, but he could be correct. I am going to spend a few minutes this evening talking about the subject that caused Matt Savinar to make his prediction: ''Dear Reader, Civilization as we know it is coming to an end soon.''

I have on the first chart here a trend that I think everybody in America is familiar with. This shows the inflation rate, and we have done a pretty good job since 1995 in the last 10 years of taming inflation. It has gone up only slightly. But the zigzag magenta here is the price of fuel, of gasoline. This is a month or so old because you see it stops at $55 a barrel, and fuel oil from which we get gasoline is now up to around $60 a barrel. It has fallen off just a little now. It was over $60.

This is a trend that we are all familiar with and you see in the last 4 years from 2001 to 2005, if you draw a best fit line through those points, it would be a pretty steep slope. This gave rise to a letter that was written by about 30 prominent people in our country, McFarland, James Woolsey, Frank Gaffney, and a number of retired admirals and generals.

The next chart shows the subject of their letter to the President. They noted that we have only 2 percent of the world's oil reserves, and that is a generally agreed upon figure. You will not find much contention with that statement. Some will say closer to 3 percent. They point out that we use 25 percent of the world's oil, and we are importing about two-thirds of what we use. That is up from about one-third that we imported as of the Arab oil embargo.

□ 2100

The other points here are significant ones, I think. This 25 percent of the oil used in the world is less than 5 percent of the world's population. If we divide the 280 million people in our country into the world's population, just short of 7 billion, we get about 22. So we are one person out of 22 in the world, and we use a fourth of all the world's energy.

These first two bullets here are really interesting ones. We have really only 2 percent of the world's oil reserves, but from that we are producing 8 percent of the world's oil. We are pretty good at pumping oil. What this says is that we are pumping our oil four times faster than the average well in the world. We do a good job of pumping oil.

Their letter to the President pointed out that this was an unacceptable national security risk. And the President himself, Mr. Speaker, has noted that much of this two thirds of imported oil that we get comes from countries, in his words, that do not even like us very much. They are unstable, unpredictable. And these 30 prominent Americans wrote to the President, saying: Mr. President, we think this is an unacceptable national security risk and our country needs to mount an aggressive program to free us from our dependence on foreign oil.

The next chart shows us how we got here. And we have to go back several decades, like 6 decades, to see where this story started, and it started with a Shell Oil Company geologist, a scientist, who was studying the exploitation and exhaustion of oil fields. And he noticed that for each typical oil field that production increased until it reached a peak, and, then after holding that peak for a little while, it started down the other side, and it is perfectly reasonable that the last oil that they get out of the well is probably going to be harder to get than the first oil that they get out of the well; so it should come more slowly. His name was M. King Hubbert, and he theorized that if he knew the totality of the oil fields in the United States and that they all behaved the way that several fields that he had studied behaved that he ought to then be able to predict when the United States would peak in oil production. And so he did that. He added up all of the fields that he knew of in the country. He made a reasonable estimate of how many more fields the country was likely to discover because this discovery trend followed a similar curve. That was a lot earlier on, and we generally are discovering the oil something like 30 or 40 years before we are using oil. And he then created a curve, a bell-shaped curve, which we call bell shaped because it rises to this peak and then falls off. That is a very typical curve that is familiar to scientists and statisticians. And he theorized that if he added up all the little bell curves in the country, he would get a big bell curve for the country. And he predicted in 1956, from his studies in the 1940s and 1950s, that the United States would peak in oil production about 1970. As it turned out, it was precisely 1970 that we peaked in oil production.

When he came up with that prediction, his employers told him, Please do not publish that; people will think you are silly. He published it anyhow, and when he finally was proven to be a prophet who had predicted correctly, he became something of an institution in his own time.

The smooth green curve here is the curve that he predicted, and he made this prediction in 1956. We were up that curve, and he predicted it would peak about 1970 and then fall off. And the more ragged, heavier green symbols, those are the actual production. And we now are well down on that curve. This is called Hubbert's Peak. And, Mr. Speaker, if one is doing this Google search, they can do one for Hubbert's Peak too, and they will find a lot of articles there, pretty much many of the same articles that one will find when they do a search for ''peak oil.''

The red curve here is the curve for the Soviet Union, now Russia. They had more oil; so their peak was higher than ours. And we see that the reality of their production fell off very dramatically after the collapse of the Soviet Union. So they are going to have a little secondary peak here to compensate for the fact that they were very inefficient in pumping oil during the collapse of the Soviet Union.

The little blue here that we cannot see very well represents what happened with the oil discovery in Alaska, in Prudhoe Bay.

The next chart is a graphic one that shows us where we have gotten our oil from and where we are getting our oil from. The red on top is natural gas liquids, and we see that as oil runs down, we are depending more and more on this source. Notice the enormous contribution that Texas made here, that one State, but they are really winding down now, as we can see. It peaked in 1970, and notice that the big Alaska oil find produced just a little bump in the down slope of Hubbert's Peak. Except for a very short period of time, there was never any increase in oil production as a result of that. It plateaued briefly and then went on down.

The yellow is an interesting one. I am sure the Members can remember, Mr. Speaker, the fabled Gulf of Mexico oil discoveries that were going to save the world, there was so much oil there. That is the only contribution from the Gulf of Mexico deep water oil discoveries. It helped a little, but it certainly did not stop the downward slope of our production.

We are now talking about drilling in ANWR. And for a couple of reasons, Mr. Speaker, I am opposed to drilling in ANWR. One of them is that if we were to drill in ANWR, there would be the perception that we have solved the oil problem. Nobody believes, almost nobody believes, that there is as much oil in ANWR as there was in Prudhoe Bay. And notice, Mr. Speaker, the relatively small contribution that the oil in Prudhoe Bay made. ANWR would make much less. So I am opposed to drilling because I think it would give us a false sense of security and we would not then have the incentives to do what I think we must do if we are going to avoid the consequences that Matt Savinar talked about: ''Dear Reader, civilization, as we know it, is coming to an end soon.''

The other reason that I am opposed to drilling in ANWR goes back to our second chart, which showed that we have only 2 percent of the known reserves of oil. If we have only 2 percent of the known reserves and are using 25 percent of the world's oil, help me understand, Mr. Speaker, why it is in our national security interests to pump that little bit of oil as quickly as we can. Would it not be nice to husband that? This may be a rainy day, but I suspect that there will be a rainier day when we need it more than we need the oil today.

The next chart is a chart that Albert Einstein would really have appreciated. He was asked after the discovery of nuclear energy and the nuclear weapons went off, an enormous release of energy from a very small amount of mass, and he was asked what would be the next great energy source in the world? And his answer was that the greatest force in the universe was the force of compound interest. And that is, in effect, what we have in these exponential growth curves here. When it is compounded, that is referred to by mathematicians as ''exponential growth.'' That is, if we grew 5 percent last year and we leave the 5 percent in this year, then we do not start out with 100 units; we start out with 105 units. So 5 percent of 105 is obviously bigger than 5 percent of the 100 from the previous year. So each year, now, we are going to have a greater incremental increase. And the straight line on the bottom here shows what we get if we extrapolate from a 2 percent growth the first year and just assume it is going to follow that straight line. But that is not exponential growth. If we now are taking out the interest, if we are taking out the interest and the principal is going to grow, that is the curve, I guess, we would get. But if we have exponential growth, that is the next curve here, and it shows what happens. This doubles in 35 years, just 2 percent exponential growth. I am using the 2 percent figure because that has been about the rate of growth of the consumption of oil over the past several years. If we double that and go to a 4 percent growth rate, that doubles now in 17½ years and it quadruples in 35 years.

The curve over here on the extreme left is one I want to spend just a moment talking about because it is a really interesting one. That is a 10 percent growth rate. That is about the rate at which China's economy is growing. With a 10 percent growth rate, it doubles in 7.2 years. That is rounded off to 7. That means it is four times bigger in 14 years. That means it is eight times bigger in 21 years. If China's economy is going to be eight times bigger in 21 years than it is now, that is really going to challenge our GDP, is it not?

The next chart shows the consequence of this enormous exponential growth rate in China. China's use of fossil fuels, they used to be an exporter. The last several years they have become an importer of oil. As a matter of fact, they now are the second largest importer in the world, just behind the United States. They just displaced last year, I think, Japan as the second largest importer of oil. And this map shows some symbols that indicate where China has gone to secure the rights to future oil and gas production. And they are all over the world. They are in Canada. They have locked up most of the future increased production from the oil sands in Canada. They are all over South America. They are in Colombia and in Venezuela and in Brazil and in Argentina. And notice, Mr. Speaker, that not all of these countries in South America, as a matter of fact, the one with the largest reserves there, Venezuela, is not particularly friendly to the United States. They have locked up oil in the Caribbean and in Africa and all over the Middle East. We see the symbols here for the oil production rights that they bought up in the Middle East.

The Members may have noticed, Mr. Speaker, that in the last few days there have been some reports of the decision of the Russians, announced by Mr. Putin himself, that they are going to favor China with their Sakhalin oil production rather than Japan. And Japan, which needs to import essentially all of its energy, is really concerned about the decision that Russia has made from the Sakhalin Island region here. That is called the Far Eastern Russian oil, and it is very difficult to get that to the countries in the West, and they are now moving it by train, and they are building a large pipeline, and China is going to be the primary beneficiary of this.

There have been several reports recently about the fact that China is making an aggressive bid to buy Unocal, which I think is the ninth largest oil company in the world. They are not particularly interested in the oil that they own in this country, but Unocal has rights to oil in a number of other places in the world, much of it closer to China than we are. They have offered about $2 billion more than Chevron has offered, and there have been some really interesting articles.

□ 2115

I have here a Washington Post article from the 13th. The government's current push, that is the government of China, to secure oil fields is driven by worries that there may one day be too little oil to meet worldwide demand and that foreign powers and particularly the United States will choke China.

Now, it is interesting, Mr. Speaker, to note that when M. King Hubbert was making his predictions about the United States, after he made that prediction, he looked at the world and he made a prediction about the world and that was that if you added up all of the fields in the world and made some reasonable estimates about how much more oil the world would find, that the world should peak out in oil production, which is why we are calling this peak oil, should peak in oil production about the turn of the millennium.

That did not quite happen, because he could not have known about the Arab oil embargo or the oil price spike hikes or the worldwide recession that resulted from that. That reduced the demand for oil and the use of oil, and so we are now reaching, in the view of many experts in the area, we are probably reaching peak oil now.

By the way, Mr. Speaker, there may be some disagreement as to when we

will reach peak oil, but there is no disagreement that oil is a finite resource. I know of no one who believes that the elves or God or whoever is filling the oil wells as we are pumping them out. If he is doing that, we are failing somehow in the United States, because our oil wells are being pumped down. Here we are now just pumping barely more than half of what we did at our peak.

It is very interesting that, although we have 5,000 years of recorded history, we have been in the age of oil just a little over 100 years, and we are now probably about halfway through pumping all of the reserves of oil in the world.

A couple of Congresses ago, I was Chair of the Subcommittee on Energy on the Committee on Science, and I wanted to determine the dimensions of the problem. So we had a hearing with the world's experts in as to how much oil was out there, how much had been pumped and how much was out there.

A gross estimate of how much oil is still out there, which happens to be the same number as the oil that has been pumped, because there is general agreement that we probably have pumped about half of all the oil out there, there is about 1,000 gigabarrels of oil remaining in the world.

Nobody in the industry, by the way, expects that we are going to find any more giant deposits of oil. We are now very good at prospecting for oil. We use 3–D seismic with a lot of computer analysis. As you may note, Mr. Speaker, with the plethora of cash that the oil companies now have, they are doing very little prospecting.

I just read the other day that for the last several years, they have spent more money prospecting than they will ever get from the oil they found, even at $60 a barrel. So the oil companies know that this is not a good financial investment, to spend a lot of money looking for what are, in most people's views, very small oil fields remaining out there yet to be discovered.

Well, this is what the Chinese government is concerned about. There may one day be too little oil to meet worldwide demand and that foreign powers, in particular the United States, will choke China. They are very concerned about the Straits of Malacca through which a lot of their oil passes.

Mr. Speaker, we ought to really be concerned about where our oil comes from, because there are some choke points, that if one of those choke points was cut off, our economy would suffer grievous damages from that. The Straits of Hormuz are one of these. Just mining those straits by terrorists or sinking a single supertanker in there would probably shutdown oil through the Straits of Hormuz for a number of months, and 40 percent of all the world's oil moves through the Straits of Hormuz. Of course, it would not be the United States that was affected by that, it would be all of the great industrial powers.

I have here a copy of Fortune Magazine, July 25, that is the most recent one. There is a big article here ''Why China Scares Big Oil.'' The Chinese company that is looking to buy UNOCAL is called CNOOC. This is their offshore oil company. We have a new word coined for them, I saw it the other day, called CNOOCered, that China is now buying or looking to buy this billing oil field and lock up reserves of oil that both we and they need.

The next chart that I want to show, Mr. Speaker, is a schematic one, but I think it shows very well the challenge that we face. I mentioned that the production of oil had been increasing at about 2 percent a year. This curb that we show here is a 2 percent exponential growth rate, and then it falls off after it reaches a peak down the other side.

Now, of course, by choosing different scales for the abscissa and the ordinate, you can make this a very spread out curve, as we have shown here, or you can make it a very sharp curve, if you make the scale bigger and the scale on the bottom smaller. But it is still a 2 percent growth rate, and notice it keeps going up and up.

The curve on top here is the rate at which we have been using oil. Of course, up until this point in history, we have used all the oil that has been produced, and there has been enough to fuel everybody's economy, so the oil we used matched the oil we produced.

By if in fact we are reaching peak oil, as many of the experts in the field suspect, then there will be a leveling out of the supply of oil, but the demand for oil, unless everybody is interested in conservation and efficiency, the demand for oil should keep going up.

Now, there is a suggestion by many experts that we are probably at this point. Maybe we haven't peaked yet, although one of the major experts in this area, a professor at Cornell University, says that the peak is going to occur on Thanksgiving day of this year.

It is going to occur a little before or after that. Even if it is 10 years after that, Mr. Speaker, it is not going to make a lot of difference. Because let us look at the scale here.

We mentioned before that if you have a growth rate, exponential growth rate of 2 percent, that doubles in 35 years. This point on the graph is half as high as this point on the graph. So that period of time, time is on the abscissa here, that period of time is 35 years, and you see that about 17½ years before you reach peak, the curve starts to level out and you are having a discrepancy between the amount of oil that you would like to use, that is demand, and the amount of oil that is available to use.

Well, if in fact we are at that point, then this explains the $60 a barrel oil. There is some evidence that the high price at the gas pump is reducing demand a little. I do not see any less SUVs and pickup trucks on the road with one person on it, but there is a waiting line for buying any of the hybrids.

Mr. Speaker, I have been driving a hybrid now since 2000. We have 90,000 miles on it. It has performed very well. We get an honest 45 miles per gallon. We bought the first one in Maryland and the first one in Congress. Now to buy a hybrid, whether it is an SUV or just a sedan hybrid, there are, for many of them, pretty long waiting periods.

If in fact this is where we are worldwide now, in order to avoid the kind of a consequence that Matt Savinar referenced when he started his article by saying ''Dear reader, civilization as we know it is coming to an end soon,'' if we are going to avoid that kind of a consequence, we have got to do two things right now, Mr. Speaker.

The first thing that we have to do is to use even less oil than is under this blue curve, because we cannot use all the oil in our present economy or there will be none left to make the big investments that we are going to have to make in the alternatives as we transition from the age of oil to the alternatives. We are going to have to reduce our demand even below this point so that we have something to invest.

I might point out, Mr. Speaker, that we, the world and the United States, have blown 25 years. We knew very well in 1980 we were already 10 years down Hubbert's peak. The United States was producing meaningfully less oil than we were 10 years before. We had peaked 10 years ago. Ronald Reagan knew that when he came to office. He knew the problem, but he certainly did not have the right to suggestion to the problem. His presumption was that there was essentially for at least present purposes an infinite amount of oil out there and all we needed to do was give the American producer the incentive to explore more, give them a better profit motive, and he would go out and drill more. And we did that.

I have a chart, I did not bring this evening, but it shows the frequency of drilling. We drilled a whole lot more wells, but it did not help because we did not find much more oil because we pretty much found all the oil there was to find in the United States by that time.

But we are going to have to, worldwide, reduce the amount of energy that we are using so that we have some to invest. We should have started these investments at least 25 years ago when we knew that M. King Hubbert was right about the United States. If he was right about the United States, Mr. Speaker, why should he not be right about the world? There should have been a very good reason that we just ignored what he said and relegated him to the lunatic fringe and kept on using oil as if there was no end to oil.

So we now have blown 25 years. I have used an analogy in talking about this, it is a plane that is flying across the Atlantic. They notice when they are well out there that they do not have enough fuel to get to the other side. As a matter of fact, they do not

have enough fuel to turn around and come home. They have passed the point of no return.

For perhaps 30 years now I have been telling audiences that we will pass the point of no return. We will come to that point where there is not enough readily available, high quality oil in the world to both sustain our present economies and make the investments we are going to have to make in the alternatives if we are going to transition.

What would you do if you were in a plane crossing the Atlantic and you have passed the point of no return? Well, you would jettison all the luggage, and then you would make some assessments, am I going to make it to the other side. I cannot make it to the other side.

What would you then do? Ask half the passengers to jump overboard so you can make it to the other side?

We are now in a situation, Mr. Speaker, where if we, and I mean the world, but since we in the United States use 25 percent of the world's energy, whether we like it or not, we have a leadership position and we have got to take a leadership role in this. What should we do?

Well, the first thing to do is an enormous effort at conservation so we reduce our demand, so that we have something to invest. We need to make big investments of money, let us not worry about money, because we just borrow that from our kids and grandkids without their permission. But there are two things we have to make investments of. One of those is time, and the other is energy.

Mr. Speaker, we are running very short on both time and energy to make the investments that we need to make.

The next chart shows the alternatives that we face. There are some finite resources out there. There are the tar sands up in Canada, the oil shales in our Midwest, coal, and we will come to that in a few minutes. Some people say do not worry about energy, we have a world supply of coal out there to last 500 years. That is not true. At current use rates it will last 250 years. We will come to that in a few minutes.

Nuclear fission. We get 20 percent of our electricity from nuclear. As you drive home tonight, Mr. Speaker, every fifth house and every fifth business would be dark if we did not have nuclear power. We have never had a death, we have never had a serious accidents. I live very near Three Mile Island. There was nothing serious that happened then. It was blown up in the press. We got through that with proper design. It was all contained. There was really no big problem.

I want to spend a little time, a few moments talking about each of these.

I am going to Canada, I have been invited up by the Canadians to see what they call their oil sands, others call them tar, because it is really very tarry. The way this oil and gas is produced we believe was that a very long time ago when the Earth was much warmer because it was subtropical and tropical climate up in Prudhoe Bay and ANWR, there were lakes, fresh water lakes, everywhere, with lots of life growing in it, and at the end of the season the life would die and fall to the bottom. Then there would be rains which would carry sediment in from the shores and it would cover this organic material, it was decaying on the bottom there, and this happened year after year. And then upheavals of the big plates that the crust of the Earth floats on, and these could be buried under large rock domes. And when you have a rock dome, like a lid over it, that will trap the volatiles that come off the oil, that is where we get gas.

But when you have the oil very close to the surface, and in our Western United States and in Canada, there was never these big upheavals that submerged it way down so it was covered by rock and so forth.

□ 2130

So the volatiles have all gone out of this, and instead of being oil and some gas trapped with it or above it, all the volatiles are gone now, so it is real sticky, tarry stuff. Out in California, these tar pits out there have some ancient animals that were trapped in those and we can find a lot of fossils there. But it takes a lot of energy to get this oil out of the ground. It will not flow. They need to do one of 2 things. Drill 2 wells side-by-side, eventually make them horizontal, pump steam into the upper well that softens the oil, and it now flows down and is picked up by the lower well and you can pump it out. Or, you can simply mine it and put it in a vessel and heat it up, and that is maybe more economical as far as heat is concerned but, of course, you have to spend all the energy mining it.

Mr. Speaker, I do not know whether this is a net energy winner or loser. I know they are producing oil up there at $30 a barrel. That sounds great when it is selling for $60 a barrel. But I also hear that more energy from gas is going in to produce the oil than they are getting out of the oil. Now, there could be better ways of doing it.

But the point I want to make, Mr. Speaker, is that there are many people who tell us, do not worry about energy, because when the conventional oil is gone, we have this nonconventional oil, and there is more oil in the tar sands and in the oil shales than there is in all of the Middle East. That may or may not be true. But even if it is true, Mr. Speaker, and it takes more energy to get the oil out than you get out of the oil, then in terms of energy balance, unless the oil is a higher quality than the energy you are putting in, why would you want to do it, if you are putting more energy in than you get out of it. Now, hopefully, we will have processes that will be energy positive. But at least a number, several experts now believe that the processes we are using are energy deficient. It is a negative energy balance.

By the way, we seldom talk about energy balance when we are talking about exploiting these energy resources. We are always talking about profit and profitability. Now, if the gas is there and the gas is cheap, what does it matter if you are using more gas energy than you get out of the oil you get, because the gas is there and it is hard to transport. When you get the oil, it is easier to transport; put it in a pipe and it is a liquid and move it to gas, you have to liquefy it under very cold temperatures and high pressure, or move it as a gas and you cannot move much mass through a pipe when you are moving it as a gas. So I just caution that there may or may not be a lot of finite resources there that are usable. With coal, we have a chart in a few minutes that will show us something about coal. We really do need to look at fission and fusion. Fusion, of course, if we get that, we are home free. But hoping to solve our national, international energy problems by counting on fusion is a little bit, Mr. Speaker, like you or me hoping to solve our personal financial problems by winning the lottery. It would be real nice if it happened, and I think the odds are probably roughly the same. I support all the money that this technology can use, because if we get there, we are home free, but boy, I surely would not bet the ranch that we are going to get there, at least in time to avoid the crunch that may be coming.

Well, we really do need to look at nuclear fission. There are 2 kinds of fission. We use only one in this country, that is the light water reactor. There is not an infinite supply of fission or uranium in the world. If everybody cranked up their nuclear fission, we would fairly shortly run out of uranium. At current use rates, it will last a very long time. But as we run down on these conventional fossil fuels, we are going to be turning to some of these other sources. We saw from the previous chart, exponential growth rates are just incredible.

If you run out of fission uranium, you still can have efficient electricity from nuclear, but now it is breeder reactors. As the name implies, they produce more fuel than they use, but they also produce a lot of potential problems with enrichment and transporting and bomb grade material that might be more readily available to terrorists and so forth. So these are all issues we need to look at.

But once we have gone through these, and these are all finites, except for the fusion and breeder reactors, and they come with uncertainties and big problems; then we come to the real renewables: solar and wind and geothermal and ocean energy. My goodness, the moon lifts the whole ocean about 2 feet. Mr. Speaker, take a bucket of water and lift it 2 feet, enormous amount of energy in lifting the ocean 2 feet. But we have great difficulty in harnessing that energy because it is so dispersed. There is an old axiom that

says energy power to be effective must be concentrated. And unless you are a fiord in Scandinavia where the tides are 60 feet high because they are funneled in, we have great difficulty in capturing ocean energy.

But there is other kinds of ocean energy. There is the thermal gradients between the deep cold water and the more shallow warm water. There are some entrepreneurs out there that are working, and it will not help us, by the way, to get meaningful energy from that, unless you live in Key West, because this is only going to be effective probably down in that part of the world, that much above and that much below the equator.

Then there are the agricultural resources, soy diesel, biodiesel, methanol, ethanol, biomass. I was very enthusiastic about these, and today I saw, I guess it was a couple of days ago, an article which distressed me a little. A group of scientists out in California at Stanford and at Berkeley published an article saying that it takes more energy to produce a gallon of ethanol than you will get out of the gallon of ethanol. Now, others say that they use antiquated data and that really is not true, that you might get a little net energy out of producing ethanol anyway; after you produce the ethanol, there is still something left in the corn. All the fat is there and all the protein is there, and you can eat that or feed the chickens and pigs and then eat the chickens and pigs.

But the point I want to make, Mr. Speaker, is that if we are going to solve this problem, we at least have to focus on what the facts are. We cannot start to have a rational discussion about how to solve the problem until we agree on the facts. There is no agreement that, as a matter of fact, you can actually get energy out of the tar sands and the oil shales. Some people believe that will always be negative. Some people believe that the ethanol is negative. It may be positive. I am going to show a chart in a few minutes from our Department of Energy that shows that it is slightly positive. I am told that is wildly optimistic, and this article that just appears says that it is, in fact, negative.

Another caution on energy from these agricultural products. We are barely able to maintain the quality of our soils by leaving all of the agricultural waste on the soil. If you take that organic material off to make energy from it, you are removing humus from the soil, we call that tilth, and if you remove enough of that humus, you have removed much of the ability of the soil to produce crops.

Until we learn to do no-till farming, we are losing the battle of maintaining our topsoil. It was increasingly ending up in the center of our country in the Mississippi Delta and, in the east here, into our lakes and streams and so forth. So although there are some opportunities from agriculture for energy, I would caution, Mr. Speaker, that in terms of the enormous amounts of energy that we need to get, this is going to contribute, it is going to contribute only marginally.

Let me give my colleagues a couple of little illustrations of the energy density in fossil fuels. The energy density in one barrel of oil, the refined product, 42 gallons, of which you can buy at the pump today for about, what, $100, 42 gallons of gas at the present rate, about $100; that energy is the energy that would be produced by 12 people, Mr. Speaker, working full-time for you for one year. That is the energy density in these fossil fuels. They have been such cheap slaves. We have become addicted to this energy. Just like the cocaine addict, we are addicted to this cheap energy.

Let me give another example, Mr. Speaker. If you go out this weekend and you work really hard in your yard all day, I will get more physical work out of an electric motor with less than 25 cents worth of electricity. So in terms of fossil fuels, Mr. Speaker, you are worth less than 25 cents a day in energy output. Now, that is the challenge that we have. What are we going to come up with that has anything like the quantity and the energy density of these fossil fuels?

Just one word about waste of energy. We really need to be doing that. There is a great facility up in Dickerson, Maryland, I am proud to have it next to my church, and they burn trash and you would never know it, it looks like an office building. You ought to go up and see it. They are burning trash. We do not need to fill the gullies, or more than gullies, because the landfills become more than a fill, it becomes a mountain. We really need to be getting what energy we can from that.

Just a word about hydrogen. Hydrogen, Mr. Speaker, is not an energy source. There is no place you can go to get hydrogen. The only way to get hydrogen is to make it, using more energy to make it than you will ever get out of the hydrogen. Well, we say gee, why all this fuss about the hydrogen economy? The reason, Mr. Speaker, is that hydrogen is a really nice fuel once you have it. It burns very cleanly. Water is the by-product. And you can use it in a fuel cell which has at least twice the efficiency of a reciprocating engine.

Please think of hydrogen as a really neat battery. It takes energy from one place, like a nuclear power plant that produces electricity, I cannot put that electricity in my truck, I can put it in batteries, but the batteries do not have much energy density. You fill up your car with batteries and they will take you 50 miles. That is all you can get from it. But I can put the hydrogen in there and it has a lot of energy. So please think of it as a battery, as a convenient way of hauling energy from one place to another.

It is no solution for our energy crisis. It is a nice way to take energy from something nasty and dirty like coal and put it in a form that is really convenient and clean to use in another place.

The next chart shows us how we got here, Mr. Speaker, and this is a really interesting chart. This goes back to the history of the world, and this relates just to the United States, that it mirrors what happened in the rest of the world. The brown one on the bottom here is energy from wood and, by the way, we still get a fair amount of energy from wood. But primarily, in those industries that use a lot of wood like the timber industry and the paper industry, and they have by-products which they burn and they get energy from that; but notice that leveled out, and then we discovered coal. The industrial revolution stuttered a little, you can see it here, with coal, and then we found oil and gas. Look what happened. Over on the ordinate here is the quadrillions of BTUs. Look at the energy density, the quantity of energy that we got from gas and oil.

Now, if we are going to look at something to replace these conventional sources of energy, the next chart shows us the qualities that these replacements have to have. We are looking for two things. One, we are looking for something which is really neat and easy to use. That is on the bottom here. Economic effectiveness in transport, something really neat and easy to use. And on the ordinate here, we are looking at something that you do not pay too much for, and this is called the energy profit ratio. The giant oil fields are about 60 to 1. We do not have any of those. They are in Saudi Arabia. The giant oil fields are about 60 to 1. You put in $1, as an example, and you get out $60. Well, we do not have any of those.

Here is our 1970 oil fields in the United States, still really neat in terms of its effectiveness and quality, but energy profit ratio, much lower. Here we are in 1985. I do not know where we are; we are down now near zero in 2005. And we look at some of the other photovoltaics. Here they are in 2005, here they are in 1995, getting better. They will never move this way, because they are just stuck on the roof of your house or out in the field or something, but they can move up here as they get more and more efficient, and they are getting more efficient. We do not show wind generators here. They are pretty good. We can now produce electricity at about 3.5 cents a kilowatt hour. Here is coal. It is no good at all in terms of effectiveness for transport; big and dirty and bulky, but the profit, energy profit ratio is up about here. That will come down, by the way. It is coming down, because coal is getting harder and harder to get.

The next chart shows us a number of things that we might get energy from, and it shows, this is energy density is really what it shows.

□ 2145

And natural gas you see is very high here. Become aviation fuel and naptha

and petrol. This is automotive gasoline and diesel and crude oil and ethanol. Notice ethanol is way down, compared to the gas and oil and things like that. Then it is downhill from there.

Coke and black coal and wood and dung. Many people heat their homes with dung in other parts of the world. Baled straw, brown coal, a very poor quality coal and domestic refuse. There is something in domestic refuse. You may as well use it.

The next chart shows us something really interesting. I could have shown one for the world, which would have shown the average person in Europe using half the energy that the average American uses. And you would be hard pressed to argue that they do not live as well as we live.

This is a really interesting one. It shows energy used for the United States as a whole and for California. And notice that the people in California, and we have a lot of Members from California, and they are not going to tell you they are living less well than we do. But they are getting by on about two-thirds of the energy of the average in the rest of the country. This is because of many of the regulations that they have in California.

I put this up, Mr. Speaker, to show that life can be good with less energy. You do not have to live poorly because you are using less energy. The Europeans, I see as many smiles on their faces as I see on faces in this country. And the average Californian seems to me to be as well off and as happy as the average American.

The next chart is a really interesting one and it gets to one of the things that I was talking about previously, that is the top part of the chart here. And this shows the energy you get when you start with crude oil. And it takes 1.23 BTUs to get 1 million PTUs of gasoline. Obviously you have got to use some energy to pump it and haul it and refine it and take it to the service station and so forth. And it is about what, 1/5 of the total you take to do that.

This is what the Department of Energy says is the energy balance for ethanol. I have been using this because they gave it to me. And I had an expert the other day tell me that is wildly optimistic and it is maybe not even half that good. But even with this, what I am told is a very optimistic projection, you have .74 million BTUs to get 1 million. Now of course you have got a lot of energy from the sun. That is why you get more than you are putting in.

But others, I mentioned the article previously where they say that it is really a net energy loss. And again, Mr. Speaker, we cannot really have an effective discussion on this until we can agree on the facts at a very minimum. And I think we in the Congress, we in the Federal Government, have a responsibility. At a very minimum we need to agree on the facts before we can start talking about solutions.

The bottom here is a really interesting one. It shocked me, and I am a farmer. This is the energy input in producing a bushel of corn. And notice the big, almost 50 percent of it here says nitrogen. Almost half the energy in producing a bushel of corn comes from nitrogen. And that is because we are producing nitrogen from natural gas. Before that the only source was barnyard manures and guano. That is gone. We mined the guano. If we wait 10,000 years we will have some more.

All these others are energy largely from fossil fuels. Mine the potash. Mine the lime. This is diesel fuel, gasoline, liquid gas, electricity, natural gas, cost of work was a lot of oil.

A lot of the chemicals we use in agriculture come from oil. You are almost literally eating oil, Mr. Speaker, when you eat that food on your plates because of the energy that went into producing it.

The next chart shows coal and, you know, do not worry, we have got this big supply of coal. At current use rates it will last about 250 years. That is true. But if you have to start ramping up the use because you are running short of other fuels, at a 2 percent growth rate you are down to about what, 85 years?

But I cannot put a trunkful of coal in my car and go down the road and have to convert it to gas or oil. And once I do that and the energy to do that, now I am down to about 50 years. So we do not have a surfeit of coal out there. We must be very careful how we husband these finite resources to make the transition.

The last chart I want to show is a really interesting one. And I want to use a little analogy here that I think helps us understand where we are and the challenge we have. This shows our total energy and where it comes from, 23 percent from coal, 8 percent from nuclear power, electrical, 30 percent from petroleum, 24 percent from natural gas. If you add up these three big ones, natural gas, petroleum and coal, you get 85 percent of all the energy we use comes from fossil fuels.

We are a little bit like the couple that has just gotten married and they have gotten a big inheritance from their grandparents, and they have established a lifestyle where 85 percent of what they spend comes from their grandparents inheritance, and only 15 percent of it comes from their income.

Now the grandparents inheritance will not last forever. And so they are going to have to transition from the present lifestyle they have, where 85 percent comes from their grandparents inheritance and only 15 percent is interest income.

Our income is nuclear power, 8 percent, and then renewable energy, 7 percent. And we have blown up the renewable energy here to show where that comes from. Solar. And that is going to have to be a big source of future energy when we have run out of these fossil fuels.

I want to make the point that we are not running out of oil. Half of what was ever there is still there, Mr. Speaker. There will be a lot of oil for a long time, but not at the quantities that we are used to using it, with ever diminishing quantities, with an ever greater demand in the world for oil.

This 1 percent solar, that is 1 percent of seven. That is .07 percent of our current energy comes from solar. Mr. Speaker, it is a long way from .07 percent to the quantities of energy we are going to have to get from somewhere else when we are running down Hubbert's peak and running out of these fossil fuels.

Here is wood. We probably cannot increase that much unless we stop building houses because we are barely able to maintain our forests now. We are using a lot of wood energy, but that, as I mentioned earlier, is in the timber industry, the wood industry and in the paper industry they are burning waste product. 8 percent of 7 percent comes from waste, 1 percent from wind. Wind has got to be a big sorts of energy. .07 percent of our current supply comes from wind. Conventional hydroelectric. That is a big part. What is it, more than half of all the renewables.

Mr. Speaker, we are tapped out on that. There are no more rivers we can dam. As a matter of fact, they are now breaching some of the dams so that the fish can move up to spawn. So we are not going to grow anything here. We probably cannot grow much in wood. We ought to use more waste. We can really do something more there. But we are going to have to count on solar and on wind.

Alcohol. That may or may not be a positive. We mentioned that previously. That is still a very small amount, .07 percent.

Geothermal. There are some opportunities in the West to get energy from the deep molten core of our earth. We need to be exploiting those.

If you go to Iceland Mr. Speaker, there is not a single chimney in the whole country because they do not need to burn anything because they have geothermal energy.

Mr. Speaker, the challenge that we have now is to reduce the amount of energy we are using so that there is a surplus of the available energy to make investments in the alternatives that we are going to have to turn to as we run down Hubbert's peak.

I think that our country, Mr. Speaker, needs something like a melding of the Manhattan Project, the urgency of the Manhattan Project and the commitment that we had in putting a man on the moon. Short of that, Matt Savinar could be correct when he said, ''Dear Reader, civilization as we know it is coming to an end soon.''

I would encourage you, Mr. Speaker, to pull up his article and read it. It is really very sobering.

One of the great attributes of being in America is that we are entrepreneurs. We do very poorly at avoiding crises. We do very well at responding to a crisis. We now are approaching

a crisis. I think the Federal Government and the Congress needs to take the lead in challenging our people, our entrepreneurs, our creative spirit, to address this problem. There may be solutions that I have not dreamed of here. But I think if you look through all the potential sources of energy in the world, there are not many that we have missed here.

This is a big challenge. There is nothing like a challenge like this to sharpen the intellect and give you a feeling of really doing something worthwhile.

Mr. Speaker, I would like to see this not as a problem but as a challenge. And if every American addresses that appropriately, I think we will weather the storm.

FURTHER MESSAGE FROM THE SENATE

A further message from the Senate by Mr. Monahan, one of its clerks, announced that the Senate has passed without amendment a bill of the House of the following title:

H.R. 3332. An act to provide an extension of highway, highway safety, motor carrier safety, transit, and other programs funded out of the Highway Trust Fund pending enactment of a law reauthorizing the Transportation Equity Act for the 21st Century.

LEAVE OF ABSENCE

By unanimous consent, leave of absence was granted to:

Mr. BECERRA (at the request of Ms. PELOSI) for today before 2:00 p.m. on account of official business.

Mr. BROWN of South Carolina (at the request of Mr. DELAY) for today on account of illness.

SPECIAL ORDERS GRANTED

By unanimous consent, permission to address the House, following the legislative program and any special orders heretofore entered, was granted to:

(The following Members (at the request of Mr. DEFAZIO) to revise and extend their remarks and include extraneous material:)

Mr. DEFAZIO, for 5 minutes, today.

Mr. BROWN of Ohio, for 5 minutes, today.

Ms. WOOLSEY, for 5 minutes, today.

Mr. EMANUEL, for 5 minutes, today.

Ms. MILLENDER-MCDONALD, for 5 minutes, today.

Ms. JACKSON-LEE of Texas, for 5 minutes, today.

(The following Members (at the request of Ms. ROS-LEHTINEN) to revise and extend their remarks and include extraneous material:)

Mr. HENSARLING, for 5 minutes, today.

Mr. KING of Iowa, for 5 minutes, today.

Mr. HUNTER, for 5 minutes, July 20.

Mrs. JOHNSON of Connecticut, for 5 minutes, today.

Mr. CUNNINGHAM, for 5 minutes, July 20.

Mr. NORWOOD, for 5 minutes, July 21.

Ms. ROS-LEHTINEN, for 5 minutes, July 20.

(The following Member (at her own request) to revise and extend her remarks and include extraneous material:)

Ms. KAPTUR, for 5 minutes, today.

SENATE BILLS AND A CONCURRENT RESOLUTION REFERRED

Bills and a concurrent resolution of the Senate of the following titles were taken from the Speaker's table and, under the rule, referred as follows:

S. 335. An act to reauthorize the Congressional Award Act; to the Committee on Education and the Workforce.

S. 1413. An act to redesignate the Crowne Plaza in Kingston, Jamaica as the Colin L. Powell Residential Plaza; to the Committee on Transportation and Infrastructure.

S. Con. Res. 26. Concurrent resolution honoring and memorializing the passengers and crew of United Airlines Flight 93; to the Committee on Transportation and Infrastructure.

ENROLLED BILL SIGNED

Mr. Trandahl, Clerk of the House, reported and found truly enrolled a bill of the House of the following title, which was thereupon signed by the Speaker:

H.R. 3332. An act to provide an extension of highway, highway safety, motor carrier safety, transit, and other programs funded out of the Highway Trust Fund pending enactment of a law reauthorizing the Transportation Equity Act for the 21st Century.

ADJOURNMENT

Mr. BARTLETT. Mr. Speaker, I move that the House do now adjourn.

The motion was agreed to; accordingly (at 9 o'clock and 55 minutes p.m.), the House adjourned until tomorrow, Wednesday, July 20, 2005, at 10 a.m.

EXECUTIVE COMMUNICATIONS, ETC.

Under clause 8 of rule XII, executive communications were taken from the Speaker's table and referred as follows:

2815. A letter from the Secretary, Department of Agriculture, transmitting the annual assessment of the cattle and hog industries, pursuant to 7 U.S.C. 181 et seq.; to the Committee on Agriculture.

2816. A letter from the Acting Comptroller, Department of Defense, transmitting a report of a violation of the Antideficiency Act by the Department of the Army, Case Number 02-03, pursuant to 31 U.S.C. 1351; to the Committee on Appropriations.

2817. A letter from the Assistant Secretary for Health Affairs, Department of Defense, transmitting a report entitled, '' Expanding Access to Mental Health Counselors: Evaluation of the TRICARE Demonstration Report to Congress,'' pursuant to 10 U.S.C. 1073 note; to the Committee on Armed Services.

2818. A letter from the Under Secretary for Acquisition, Technology and Logistics, Department of Defense, transmitting certified materials supplied to the Defense Base Closure and Realignment Commission, pursuant to Public Law 101–510, section 2903(c)(6) and 2914(b)(1; to the Committee on Armed Services.

2819. A letter from the Under Secretary for Acquisition, Technology and Logistics, Department of Defense, transmitting certified materials supplied to the Defense Base Closure and Realignment Commission, pursuant to Public Law 101–510, section 2903(c)(6) and 2914(b)(1); to the Committee on Armed Services.

2820. A letter from the Under Secretary for Acquisition, Technology and Logistics, Department of Defense, transmitting certified materials supplied to the Defense Base Closure and Realignment Commission, pursuant to Public Law 101–510, section 2903(c)(6) and 2914(b)(1); to the Committee on Armed Services.

2821. A letter from the Under Secretary for Acquisition, Technology and Logistics, Department of Defense, transmitting certified materials supplied to the Defense Base Closure and Realignment Commission, pursuant to Public Law 101–510, section 2903(c)(6) and 2914(b)(1); to the Committee on Armed Services.

2822. A letter from the Under Secretary for Acquisition, Technology and Logistics, Department of Defense, transmitting certified materials supplied to the Defense Base Closure and Realignment Commission, pursuant to Public Law 101–510, section 2903(c)(6) and 2914(b)(1); to the Committee on Armed Services.

2823. A letter from the Under Secretary for Acquisition, Technology and Logistics, Department of Defense, transmitting certified materials supplied to the Defense Base Closure and Realignment Commission, pursuant to Public Law 101–510, section 2903(c)(6) and 2914(b)(1); to the Committee on Armed Services.

2824. A letter from the Director of Defense Research and Engineering, Department of Defense, transmitting the Annual Report of the Strategic Environmental Research and Development Program for Fiscal Year 2004, pursuant to 10 U.S.C. 2902(d)(3) and (g)(2); to the Committee on Armed Services.

2825. A letter from the Under Secretary for Acquisition, Technology and Logistics, Department of Defense, transmitting certified materials supplied to the Defense Base Closure and Realignment Commission, pursuant to Public Law 101–510, section 2903(c)(6) and 2914(b)(1); to the Committee on Armed Services.

2826. A letter from the Under Secretary for Acquisition, Technology and Logistics, Department of Defense, transmitting certified materials supplied to the Defense Base Closure and Realignment Commission, pursuant to Public Law 101–510, section 2903(c)(6) and 2914(b)(1); to the Committee on Armed Services.

2827. A letter from the Under Secretary for Acquisition, Technology and Logistics, Department of Defense, transmitting certified materials supplied to the Defense Base Closure and Realignment Commission, pursuant to Public Law 101–510, section 2903(c)(6) and 2914(b)(1); to the Committee on Armed Services.

2828. A letter from the President and Chairman, Export-Import Bank of the United States, transmitting a report involving U.S. exports to Kenya, pursuant to 12 U.S.C. 635(b)(3)(i); to the Committee on Financial Services.

2829. A letter from the Chairman, Federal Deposit Insurance Corporation, transmitting a report entitled, ''Merger Decisions 2004,'' in accordance with Section 18(c)(9) of the Federal Deposit Insurance Act; to the Committee on Financial Services.

2830. A letter from the Secretary, Department of Health and Human Services, transmitting a report on the Community Food and Nutrition Program for Fiscal Year 2001; to the Committee on Education and the Workforce.