The House Hears About 'Peak Oil'

Testimony from the Congressional Record

**by Roscoe T. Bartlett (R-MD)
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THE SPEAKER PRO TEMPORE (MR. DENT): Under the Speaker's announced policy of January 4, 2005, the gentleman from Maryland (Mr. Bartlett) is recognized until midnight.

MR. BARTLETT OF MARYLAND: Mr. Speaker, several weeks ago I read a treatise written by Matt Savinar, and I was galvanized by his introduction. Let me read it. "Dear reader,'" he begins, "civilization as we know it is coming to an end soon. This is not the whacky proclamation of a doomsday cult, apocalypse Bible prophesy sect, or conspiracy theory society. Rather, it is the 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 a phenomenon known as global peak oil."

Mr. Speaker, in the weeks since I read this, I have checked with a large number of experts in this area across the country and indeed around the world. He could be right. He will be right unless we appropriately address this big challenge which faces the world and particularly faces the United States, and that is what we will be talking about in our Special Order this evening. I have been joined by the gentleman from the eastern shore of Maryland (Mr. Gilchrest), one of my colleagues who shares a concern in this area of energy, and I yield to the gentleman.

MR. GILCHREST: Mr. Speaker, I am only going to speak for just a couple of minutes because the gentleman from Maryland (Mr. Bartlett) has a fascinating story to tell, one that richly deserves everybody's attention. But, just briefly, I want to thank the gentleman for yielding to me. The gentleman from Maryland (Mr. Bartlett) will talk about energy, peak oil. As the demand increases enormously, the supply of the fossil fuel that we are using continues to decrease. We know that energy is power, and energy is what drives the Nation's economy. And we have assumed for a long time, for decades anyway, that energy supplies have a bottomless well. And that is correct. The energy source at the bottom of the well is bottomless. It is endless. But what is at the bottom of that well is not oil. It is not even natural gas. It is not coal. What lies at the bottom of the bottomless well is our intellect, our logic, our knowledge, our know-how.

We used to light our homes with whale oil. They did not stop lighting homes because we ran out of whales, thank goodness; but we transitioned to a number of other things. We used to use just wood all over the world, and thank goodness we transitioned from wood to coal because we were tearing our forests down, and there are a lot better uses for wood than to burn that wood. We transitioned for our transportation needs and many other needs from coal to oil, and oil is a lot cleaner and it is a lot more efficient. Then we went from oil and we found that natural gas is cleaner yet and more efficient than oil. We also began to realize that coal has more hydrogen than wood. Oil has more hydrogen in its content than coal. Natural gas has more hydrogen than oil. The transition through our energy sources has not come about because we ran out of those energy sources. It has come about because we got a little smarter. Our intellect, our quest for knowledge, our curiosity about something that is better overtook the status quo. And when the gentleman from Maryland (Mr. Bartlett) talks about peak oil, not only do we need to move away from the status quo when we hear his words about fossil fuel; it is essential.

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There is a sense of urgency to move away. In all our measurements of oil or natural gas, whenever one looks at a heater in their home, whether it is their oil furnace, a Carison heater or whatever it is, it is measured in Btus. I want to show a number. This is a 1 with 15 zeros. That is 1 quadrillion. In 1910 we used 7 quadrillion Btus in the United States. In 1954 we used 35 quadrillion Btus, energy demand increase. Right now we use 100 quadrillion Btus, and that is not slowing down. What we need in this country is logic and intellect to move us away from an energy source that has now lost its usefulness for a number of reasons. It is putting carbon dioxide into our atmosphere faster than we have seen that infusion of carbon dioxide in the last 400,000 years, and our supply is diminishing quickly as our demand is increasing even faster.

There are a number of energy sources. The gentleman from Maryland (Mr. Bartlett) will talk about some of them. We will have these on a number of occasions. We are looking at nuclear. We are looking at solar. We are looking at wind. We are looking at hydrogen. We are looking at a number of alternatives. But before we have the technology to move into those alternatives for energy security, which means energy independence, the transition has got to be vastly improved efficiency for oil, for natural gas, to move into biofuels, and I am not talking about ethanol, which is corn which will feed the world. I am not talking about biodiesel, which is soy beans, which is used to feed the world. What I am talking about are other sources like certain grass or poplar trees, which farmers can grow, which they can use to produce.

So peak oil, the transition to a new energy source, has got to come now. We cannot wait a decade. It is vastly important.

I want to thank the gentleman from Maryland (Mr. Bartlett) for yielding to me and I urge the Speaker to listen to the words of the gentleman from Maryland.

Mr. BARTLETT of Maryland: Mr. Speaker, the gentleman from Maryland (Mr. Gilchrest) was talking about growth in the use of energy; and I have here some curves, some exponential curves. Ordinarily, when people think about growth, they may think about a straight line. And on the bottom here it shows the extrapolation of 2 percent growth starting at this point. If it is a straight line, it would look like that. But that is not 2 percent growth because every year we are growing something less than 2 percent. To be 2 percent growth, one has got to grow 2 percent more than they were the last year, and that is called exponential growth, and this is a 2 percent growth curve for exponential growth, just 2 percent.

The next curve here is a 4 percent exponential growth curve and then 5 percent. And I put on here the growth curve that China has been following, and that is a 10 percent growth curve. In just 7 years, if they are growing at 10 percent, they double. They double again in the next 7 years; so in just 14 years, they are four times bigger. They double again in the next 7 years so that at 21 years it is eight times bigger. That is why this curve is so sharp.

China is now following this growth curve. It is very difficult for one's economy to grow at 10 percent without their energy use growing at somewhere near 10 percent. So we need to keep that in mind as we go through the charts that are going to follow this, that China is growing at this rate. The world, by the way, grew last year at 5 percent. We grew probably a bit over 2 percent in this country. Of course, we were way ahead to start with; so with our 2 percent growth, we are still way out in front of everybody else in terms of the amount of energy we use.

As a matter of fact, the next chart shows some figures which alarmed 30 of the leading figures in our country: Jim Woolsey and McFarland and Frank Gaffney and 27 others who wrote a letter to the President just a few weeks ago, and they noted to the President that we have only two percent of the world's oil reserves. By the way, from that two percent, we are generating eight percent of the world's oil. And what that means, of course, is that we are getting four times as much oil relatively out of each of our wells as the world gets out of their average wells, so we are really good at pumping oil. In fact, we are so good at pumping oil that just recently, the Saudis came here to find out how we do it, how we get out those last dribs and drabs from our oil reservoirs, because we have been doing this for a very long time.

We represent a bit less than 5 percent of the world's population, one person in 22 in the world, but we consume 25 percent of the world's energy, and we are importing about two-thirds of that. And, as the

President himself said, a lot of that oil comes from countries that do not even like us.

These 30 people, about half of them were retired generals and admirals. There were several retired secretaries of previous administrations. These were really the leaders in America that wrote to the President: Mr. President, this is an unacceptable national security risk that we have only two percent of the world's oil reserves and we use 25 percent of the world's oil, and we import two-thirds of that. By the way, that is up from about one-third that we imported during the Arab oil embargo. We peaked in 1970. As a matter of fact, the next chart shows when we peaked and we can get a better idea of this.

To explain how this curve got here, I have to go back about six decades. It was in the 1940s and 1950s, a scientist at the Shell Oil Company named M. King Hubbert was watching the exploitation and exhaustion of oil fields, and he noted that each of those fields followed a bell curve. The oil came out very rapidly at first and then, when it reached a peak, at which time he noted about half of the field had been pumped, and then it stands to reason the last oil out of the field is going to be harder to get, so there was now a downslope. So in 1956 he kind of guessed at the additional fields that we were going to find in this country, and he mathematically calculated when we should peak, and he thought that would be in the early 1970s, and he made this prediction in 1956. As a matter of fact, we did peak in 1970.Now, his curve is the smooth curve here, his projected curve, and he did that back in 1956, and the data points here, the rougher curve, the actual data points which fall remarkably near his curve, Prudhoe Bay, the Alaska oil, that occurred after we were already on the down slope of what is called Hubbert's Peak here, and we see what Prudhoe Bay did. And then we are going to go to a chart just after this that shows the different places we get oil from in our country.

The red curve here shows Russia, and when the Soviet Union was falling apart, they had more oil than we, so they peaked higher. When the Soviet Union was falling apart, they did very poorly and, as a matter of fact, there is now a little secondary peak, here is a recovered one, but it is on down; the first peak was considerably higher than the second peak.

The second chart shows where we get our oil from. A great deal of it came from Texas. I saw some early photographs of some of the oil fields in Texas, and I will tell my colleagues, the oil derricks were about as close together as trees in a forest, just an incredible bonanza of derricks down there getting this oil out of the ground. The rest of the United States is the big area here, natural gas liquids, we have learned how to liquefy natural gas, and now that is supplementing the petroleum.

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There are two parts of this curve that I want to pay special attention to. One of them is Alaska here, that is Prudhoe Bay. And notice that it was just a little blip in the downslope here from Prudhoe Bay, we are still going down. It delayed it just a little; it never got back to the peak production in 1970. By the way, we are now sliding down this curve and we produce about half as much oil now as we did in 1970.

Mr. Speaker, I am sure that my colleagues can remember all of the hullabaloo about the enormous finds of oil in the Gulf of Mexico. That was going to solve our energy problems for the foreseeable future. What that turned out to be is this little yellow here. That is all there was to it. And again, it did not bring us back to where we were in 1970; we are still sliding down Hubbert's Peak.

I would like to come back to the Alaska oil for just a moment. We are now talking about going into ANWR. It really does not matter whether one is for going into ANWR or one thinks that is a pristine wilderness that we should not drill in, because the amount of oil in ANWR is probably not more than half of this. Even if it were that much, it is not going to come on line; the chairman of the Committee on

Transportation, the gentleman from Alaska (Mr. Young) says it may be 10 years before it comes on line, and it is really not going to make enough difference to matter. My concern is that if we drill in ANWR, Americans will think, gee, we have solved our energy problem, we are drilling in ANWR. It will be little more than a nit in terms of the enormous amounts of oil that we use. That kind of helps us put ANWR in perspective, because this is Prudhoe Bay, which may be twice as large as ANWR. So it kind of gives us a picture of what we can expect from ANWR.

The next chart is a generic chart which kind of shows us where we are, very probably where we are, and we have here only a two percent growth. Remember those curves I showed earlier? This is only the two percent growth curve. But notice what happens: it gets steeper and steeper as we go out. That is the interesting thing about exponential growth. The blue curve here is the available oil. Now, obviously, the use of oil and the production of oil paralleled each other going up the slope because nobody was storing it in large reservoirs anywhere. The yellow area between the amount of oil that can be produced and the oil that we would like to use represents the deficit. We do not even have to get to peak oil to have a problem, as the curve shows here, because we start deviating from this curve before we get to the peak of the curve. So we might expect, if we are at this point where the arrow points here, we might expect it for the next couple of years or so that it will be marginally greater increases in the production of oil, but they will not begin to keep up with the increased demand for oil. Last year, for instance, China increased their oil imports about 25 percent. They now are the number two importer in the world. They have replaced Japan as the number two importer in the world. Of course, we are number one. We import more oil than anyone else in the world. India is following closely behind China. The Third World is now industrializing and probably, one of the things that we could most productively do would be to help India and help China and help the Third World countries who are industrializing to do it more efficiently. They are not only industrializing 30, 40 years after we did; they are kind of following the same path that we followed and using very inefficient techniques. So we could help alleviate the world's energy problem by helping these countries, which are now following us by 30 years or more in industrialization, to use techniques that are more efficient, which would make more oil available for everyone.

The next chart shows the discovery of oil, and the discovery of oil, if my colleagues see, that peaked for the world back here before 1970, and it peaked for the United States considerably before that. So discoveries peak a long time before consumption, and they are down, down, down now. I just had a paper sent to me that says that there is a whole lot more oil out there that we have not found.

I hope that is true. But whether it is true or not for the moment is not going to make much difference, because it is not going to come on line, as Chairman Young says, for maybe 10 years. And in 10 years we are going to be sliding down Hubbert's Peak. So if there is a lot more oil out there, the most it will do is kind of slow our descent down Hubbert's Peak. We cannot escape the reality that the world production of oil will peak, many believe that it has peaked, and the demand for oil is certainly not going to peak. That is going to keep on going up.

The next chart shows something very interesting, that is, that drilling more will not help. And this is an interesting chart, because what it shows, the green shows the discoveries above use by the United States, and the red shows when we started to run a deficit. What you see is in the 1980ish time zone, the yellow here shows the wells that we drilled. And notice this big spike in the number of wells e drilled. This was early in the Reagan administration. Now, President Reagan recognized that we had a problem. We were already sliding down Hubbert's Peak. And he thought that the reason that we did not have more oil was simply because they did not have enough incentive to drill for more oil. And so he gave them incentives to drill for oil, and these incentives did work, they did drill for oil; but notice the increased drilling for oil simply followed an ever-decreasing discovery of oil with increased use, so now we have been operating in the red for a long time.

Notice that in spite of enormously increased profits, the industry is not drilling very many more wells. Why are they not drilling many more wells? It quite obviously is because they have done a lot of exploration, we are really pretty good at that today, and we use seismic and 3-D and computers. And if they thought there was a whole lot more oil out there to be found, they would be drilling more wells, because they certainly have the capital to do that now.

There is another dimension in this story that our next chart shows for us. And this is what is happening around the world. And I want to pay particular attention to China. China is now, remember, the number two importer in the world, 1.3 billion people, with an economy growing, remember that 10 percent curve, very sharp growth in their economy. And they are now scouring the world for oil.

They have contracts in Canada for oil, in Colombia, Venezuela, Brazil, Argentina, a number of them in the Middle East and Africa. They are now negotiating with Russia for oil there. They are talking with Russia about building a pipeline from the Sakhalin Island, in the Russian far east. Russia spans 11 time zones.

This ought to be colored green here, because Russia comes clear around here, nearly up to Alaska. They cover 11 time zones. And their far eastern oil is so far away from their major population centers, that they just cannot get it there over this large expanse.

And so now they are talking about a pipeline that would carry it down to China and perhaps down to the Korean Peninsula. By the way, they negotiated for an oil company in our country, and were just barely outbid. They may be back bidding for oil companies in our country. They now control a number of assets around the world to make sure that they have access to this oil.

For instance, for a number of years now they have had ports at both ends of the Panama Canal. A poll, kind of an informal poll, was conducted in India and China over a several-month period by sending people that would just talk to people across the spectrum of their society there to ask them about energy and the future, and there is pretty broad knowledge in both of those countries that energy is going to be an increasing problem.

And in China they found a big recognition that China was dependent on the sea lanes for their oil, and they do not control the sea lanes. The United States controls the sea lanes. And so China is now aggressively developing a blue water navy. By a blue water navy, I mean a navy that operates in the oceans of the world. Many countries have a navy, but most of them are designed to protect the country close in.

Only we now, since the Soviets and the Russians have pulled back, only we now have a blue water navy that controls the world's oceans. And China recognizes that we could, if we wished, cut off their oil supply. And so they now are aggressively developing, among other armaments, a blue water navy.

By the way, last year our trade deficit with China was $162 billion. So it is not that they are without resources to develop this blue water navy. The next chart is a very interesting one, and Congressman Gilchrest talked about this. And this shows the transition from one fuel to another. And notice the lower brown curve here is wood.

And we really started using wood when we learned how to make steel. As a matter of fact, the hills, the mountains of New England were largely denuded of trees. There are now more forests in New Hampshire than there were when the Industrial Revolution began here, because it began in England a bit sooner, and they were cutting trees from New England to take to England.

As a matter of fact, the Industrial Revolution almost foundered because, as Congressman Gilchrest mentioned, we were exhausting the forest and cutting the trees for energy, and then we discovered coal. And notice how much greater the economy became, because over here is quadrillion BTUs. Remember you talked about BTUs, these are quadrillion BTUs over here. I think you were up, what, over a hundred quadrillion BTUs? Here it is 70. We are now up over a hundred quadrillion BTUs.

And then we discovered oil. And here it goes. Up to a hundred quadrillion BTUs total energy production. By the way, the lower curve here is a breakout of these, and it shows what maybe I hope is the future, what better be the future, or the future is pretty grim, that is, some alternatives to fossil fuels. Those are things like nuclear and solar and wind. They are so far down here in the noise level you do not see them so we have blown it up.

By the way, you do not see this big red peak here, because this combines petroleum and natural gas which come together, and here they are separated so you add this to this, you will get this big peak up here.

This explains some of the characteristics that alternatives must have, and that is energy density. Why were the Btus so much higher with coal and enormously higher with oil? And Congressman Gilchrest mentioned this, it is the energy density there.

Give you a little example of energy density. At maybe 25 percent efficiency only, because in your internal combustion engine you are lucky if you get 25 percent efficiency, which is the reason that you have that big radiator and all those pipes and fins to get rid of the heat. A barrel of oil contains the energy of 25,000 man-hours of labor.

That is the equivalent of having 12 people work for you full time for a whole year. And it costs you about $100, $50 for the oil, that is about what it was today, maybe another $50 to refine it. So you have got 42 gallons at $2-something a gallon. That is about $100, is it not? And that $100 will buy you the work equivalent, the energy equivalent of 25,000 an-hours of labor.

So when we are looking for something to replace these fossil fuels, we have got to find something with a lot of energy density, or we are going to have to change the way we live and change the way we use energy. You may have trouble calibrating that 25,000 man-hours and 12 man-years, but let me give you a little example that it may be easier to identify with, and that is what your car does with a gallon of gas, a gallon of gas, not very big.

By the way, still cheaper than water in the grocery store, at $2-and-something a gallon, unless you are buying it in Wal-Mart or KMart a gallon at a time. But in the little bottles you buy it in, it is much more expensive than gas. Recently, I went with my brother-in-law and sister-in-law in our little Prius. We have been driving one for a number of years now, since 2000 as a matter of fact; but the first one in Maryland, the first one in Congress. 85,000 miles on it. We were down in West Virginia going up mountains down there. It has an instantaneous record of your efficiency, miles per gallon. The worst mileage we got was 20 miles per gallon.

Well, that is going up a West Virginia mountain with four people in the car and luggage, and that one gallon took me 20 miles up the mountain. How long would it take me to pull my car 20 miles up the mountain? Of course, I cannot do that without some mechanical advantage. I could use a winch. We call it a come along and chains and the guardrail or trees or something, and by and by I could get my car up the mountain.

"We cannot use coal in the traditional way because it is enormously polluting."

If I got it there in 90 days, that would be 90 hard days work, if you want to calculate that out how many feet you have to pull it a day. That gives you some idea of the energy density in these fossil fuels. So that is the challenge we have.

The next chart shows us the kind of things we can look to for getting energy to replace these fossil fuels. Now there are some finite resources we really have to pay attention to. They will not last forever, but in this transition we will have to use them as we can.

The tar sands, and I am going to Canada this summer, when I gave a talk on a couple of weeks ago, they called and would like me to see their tar sands exploitation so we will look at that. There is a lot of oil in tar sand, but most of it is pretty poor quality and it takes a lot of energy to get it out. It may take almost as much energy to get it out as you get oil out of the tar sands.

Then we have the oil shale in this country. The same thing is true there. Ultimately when Goldman Sachs has oil going to $105 a barrel, when it gets there it might be feasible to get oil shales. But again, a big environmental penalty and a lot of energy to get it out.

Coal. We will leave this chart up and put another chart in front of this because we want to come back to this one. The chart we put in front shows coal, and you have heard that we have 250 years of use, that is true, with no growth at current use rates. Remember that flat curve we showed before? No growth at current use rates.

This is perfectly flat. It will last us 250 years with no growth, but if it just grows 1.1 percent a year it will only last that long. Less than 150 years. At 2 percent growth it will last less than 100 years. But what are you going to do with coal? You cannot put it in the trunk of your car and go down the road. You have to convert coal to a liquid or a gas so that you can use it.

And when you have a 2 percent growth rate and after conversion you are now down about 50 years of supply. And you have got to use a lot of energy to make sure that you clean up the coal.

We appropriate money from the Congress for clean coal technology, I support that, because we cannot use coal in the traditional way because it is enormously polluting.

We will go back now to our chart we were looking at the options that we have. The only thing on this table here that comes close to the energy density of fossil fuels is nuclear. Now, a lot of people have some big concerns about nuclear. But we have had 104 nuclear power plants in our country. We have never had a fatal accident. We have never had any real serious accidents there. Three Mile Island, by the way, was not a catastrophe. It was very unfortunate. As far as I know nobody was hurt from that and we learned a lot from that.

There are three different ways we can get nuclear energy. The way that will get us home free is fusion, that is what happens in the sun. And by the way, the sun is the origin of the most of energy that we have. All of the fossil fuels came from the sun ultimately. The ferns grew that produced the coal. The little organisms that grew in the water that settled to the bottom and were later covered over by silt, and then with the movement of tectonic plates they were buried with heat and pressure. In time they became oil.

The odds of getting fusion in time are pretty small. I would like to use the analogy that me trying to solve my personal economic problems by winning the lottery is pretty much the same kind of odds that we face if we want to solve our energy problems in our country with fusion. That does not keep me from voting for the something less than $300 million that we appropriate each year to fusion, because if we get there we are really home free. That is incredible. But that is probably not going to happen. We certainly would not bank on it. If it happens that is nice. Like winning the lottery, if it happens that is nice.

Two other kinds of energy are from nuclear. These are fission. One of those is whitewater reactor, which is the kind we have in this country. This uses uranium which is in even shorter supply in the world than oil. So that will not last forever.

Ultimately if we are going to get large amounts of energy from nuclear figures, we are going to have to go to breeder reactors. France gets about 80 percent of their electricity from nuclear and they have a lot of breeder reactors. With breeder reactors, you buy a problem of waste products that you have to store away we believe for maybe a quarter of a million years. That is a time span we can even think of and how do you safely store something away for a quarter of a million years?

Anything that has that much energy in it ought to be good for something. If it is so hot, if it has so much energy in it that you have got to store it away, you cannot even come close to it for a quarter of a million years, I would think you have not unleashed the ingenuity of the American people to see what we can do with that energy. I just think there is some potential there that we have not tapped.

Our time for this evening is nearly up. So what I want to do now is just mention, and we will be coming back again for a full hour and we will be talking about in detail about these renewable resources down here, what can we realistically expect from them and what do we need to do to get them started? Solar and wind and geothermal, tapping that hot molten iron core of the earth. Ocean energy, the tides and the waves. Lots of potential from agriculture, soy diesel, bio diesel, ethanol, methanol, bio mass.

Waste of energy. Great idea. Rather than filling landfills with it, burn it and get energy from it. By the way, the heat you got from it ought to be used for heating people's home. It ought not be wasted in evaporating water in a big tower outside town.

Last, we will close with hydrogen from renewable. Hydrogen is not an energy source. You cannot mine hydrogen. You cannot suck it out of the air. The only way you get hydrogen is to produce it. Right now we are getting hydrogen from natural gas. It would be better to get it from renewables. We can do that. We can get it from nuclear. One of the things you might do with a nuclear plant is to split water to get hydrogen. You put that hydrogen in a fuel cell in your car. It has at least twice the efficiency of the reciprocating engine. It produces only water when you burn it. You do not have a flame but you are, in effect, chemically burning it in the fuel cell.

There are lots of things to look at here. But the real urgency here is that we have got to buy time by conservation and by efficiency so that we can use the limited resources of oil that we have, not only to continue the economies we now have in the world, but to make the investments we must make in these renewables so that we are going to continue to be able to live the kinds of quality lives that we have been living.

I am sure that Americans are up to this. What we need is leadership articulating the problem and articulating the things that Americans need to do. Americans just need leadership. We are the envy of the world and we need to be a world leader in this because we use most of the oil in the world. ■