

# The Charlie Rose Show Transcript

## Environmentalism Amory Lovins from Rocky Mountain Institute on Energy Alternatives

November 28, 2006

Byline: Charlie Rose

**CHARLIE ROSE**, HOST: Welcome to the broadcast. Tonight, environmentalist Amory Lovins from the Rocky Mountain Institute on energy alternatives. (BEGIN VIDEO CLIP)

**AMORY LOVINS**, FOUNDER & CEO, THE ROCKY MOUNTAIN INSTITUTE: We could be completely off oil in this country at about a fifth the cost of buying it.

**CHARLIE ROSE**: Yeah.

**AMORY LOVINS**: We could get, by the way, a million new jobs and save a million old jobs that way and get rid of a quarter of our carbon dioxide emissions that cause global warming. And we'd make a very handsome return, which is why that transition beyond oil can be led by business for profit. We're helping that happen now. We could also have largely or wholly faced out the emissions that are changing the climate and we'd make money on the deal because it's cheaper to save fuel than to buy fuel. (END VIDEO CLIP)

**CHARLIE ROSE**: A program note: President Jimmy Carter was scheduled for tonight's program. He will be seen on Thursday night with the former prime minister of Israel, Shimon Peres. Tonight, Amory Lovins and Ian Schrager when we continue. (COMMERCIAL BREAK)

**CHARLIE ROSE**: Amory Lovins is here. He's the founder and the CEO of the Rocky Mountain Institute, which is dedicated to energy research. For the last 30 years, he's been at the forefront of research and to new and sustainable forms of energy. Once dismissed as 'crazy' or 'irrelevant', his ideas are now being embraced by major corporations and governments. He is now an advisor to both Wal-Mart and the Pentagon.

In 2004 he co-authored a book called *Winning the Oil Endgame* ([www.oilendgame.com](http://www.oilendgame.com)), which was sponsored by the Pentagon. He is the recipient of numerous awards and honors for his work including a MacArthur "genius" grant. I am pleased to have him here at this table for the first time. Welcome.

**AMORY LOVINS**: Thank you.

**CHARLIE ROSE**: Nice to have you here. Now, let me — let's just go back to your career a moment and just see how you got this religion. You went to Oxford.

**AMORY LOVINS**: I dropped out of both Harvard and Oxford.

**CHARLIE ROSE**: Yeah.

**AMORY LOVINS:** Harvard wanted me to specialize too much. And I got to Oxford.

**CHARLIE ROSE:** But you went like when you were what, eight — I mean you were very young — at 16, you went to Oxford.

**AMORY LOVINS:** And then transferred to Oxford as a grad student and became a don, but I wanted to do a doctorate in energy two years before the Arab oil embargo. And they said, "Energy?"

**CHARLIE ROSE:** Yeah.

**AMORY LOVINS:** "What is that? We haven't a chair, pick a real subject." So I quit and did the work anyway. Now they have a chair in it.

**CHARLIE ROSE:** Now what was it — I mean, that — how come you were so prescient?

**AMORY LOVINS:** It was clear that if you looked at the whole tangle of energy, resources, security, environment and development — energy was kind of a master key for unlocking all those tangled issues both directly, because it affects everything, and because it would teach us how to deal with a lot of other problems. And that has turned out quite well.

**CHARLIE ROSE:** Where do you think we are now? I mean, the idea that you have believed in, the sense of sustainability, has reached the critical mass?

**AMORY LOVINS:** I think so. We're — we're just around that tipping point or a little past it already. There is still a lot of work to do, but I think it's coming along very nicely. You know, some of it seems too good to be true when you really look at the numbers but I think Marshall McLuhan said that only puny secrets need protection. Great discoveries are protected by public incredulity.

**CHARLIE ROSE:** The medium is the message, Marshall McLuhan. You did write a piece I guess when was it — '76 called "**Energy Strategy: The Road Not Taken?**" that's become famous (#E77-01, [www.rmi.org/sitepages/pid171.php#E77-01](http://www.rmi.org/sitepages/pid171.php#E77-01)).

**AMORY LOVINS:** That was in...

**CHARLIE ROSE:** What did you say, in '76?

**AMORY LOVINS:** That was in *Foreign Affairs*. And I'd happened to be in the right place at the right time to redefine the energy problem. Until that time, people thought that the energy problem was just where do you get more energy...

**CHARLIE ROSE:** Yes.

**AMORY LOVINS:** ...more of any kind from any source at any price? And instead, I turned the problem around and said what do we want energy for? You don't want lumps of coal and raw kilowatt-hours and barrels of sticky black goo. You want hot showers, cold beer, comfort, mobility...

**CHARLIE ROSE:** Right. Right.

**AMORY LOVINS:** ...all the things we use energy to do.

**CHARLIE ROSE:** Right.

**AMORY LOVINS:** So, for each of those, let's look for how much energy at what scale, at what quality from what source is going to do the job in the cheapest way. That turned out to be a very useful way to look at the competition between supplying and saving energy. And the way that's played out, my once a radical soft-energy past graph was actually right within a couple of percent by 2000.

**CHARLIE ROSE:** You know, has the — as you went from, as I said early on, sort of the sense of incredulity or irrelevancy to this moment now where you and the Rocky Mountain Institute are sort of considered part of the — part of the future. I mean people who see the path.

**AMORY LOVINS:** Painfully respectable.

**CHARLIE ROSE:** Yeah, painfully respectable. Yeah, I mean — what did — when did it break through for you? What do you think happened so that you went from outside to inside?

**AMORY LOVINS:** Well, if you're right for a while, they start paying attention.

**CHARLIE ROSE:** Yeah.

**AMORY LOVINS:** And, actually, we find a lot of our intellectual capital goes in cycles, like the *Foreign Affairs* paper we had later in 1980, "**Nuclear Power, Nuclear Bombs**" (#S80-02) — if that had been followed at the time, we would not now be worrying about bombs in Iran and North Korea. But that sank without trace, because it couldn't cope with being a little early for its time, the nuclear theology, but now it's coming up again. Or around the early '80s we did a book for the Pentagon called ***Brittle Power*** (#S82-03, [www.rmi.org/sitepages/pid1011.php](http://www.rmi.org/sitepages/pid1011.php)).

**CHARLIE ROSE:** Right.

**AMORY LOVINS:** ...on how a handful of people could turn off three quarters of the oil and gas to the eastern states in an evening without leaving Louisiana. I mean, sorry if Katrina read that.

**CHARLIE ROSE:** Yeah.

**AMORY LOVINS:** The electric grid is worse than that. But nothing happened then for turning.

**CHARLIE ROSE:** Turn it off for most of the eastern states?

**AMORY LOVINS:** Yeah, three quarters of it for over a year without leaving Louisiana.

**CHARLIE ROSE:** Right.

**AMORY LOVINS:** And the electric grid is more vulnerable than that. And they still are. But that was in a pre-9/11 age, so not much was done. Now, it's big issue for — for military and other authorities.

**CHARLIE ROSE:** Vulnerable to the fact that what...

**AMORY LOVINS:** To accident or malice. And — you know, it could be a hurricane. It could be somebody doing bad things to these very vulnerable over-centralized energy systems. But that has — that has turned around now, and, in fact, what we showed 25 years ago is now all the more true, that if you let the market work properly, it tends to buy the cheapest things first. That makes the energy system more efficient, diverse, dispersed, renewable. So major failures instead of being as now inevitable by design become impossible by design. It just can't be turned off. And that revolution is really gathering strength now because the technology is so much better.

**CHARLIE ROSE:** And so by the year 2050, you think we could — which is 44 years from now — you believe that we will what? Be...

**AMORY LOVINS:** We could be completely off oil in this country at about a fifth the cost of buying it.

**CHARLIE ROSE:** Yeah.

**AMORY LOVINS:** We could get, by the way, a million new jobs and save a million old jobs that way, get rid of a quarter of our carbon dioxide emission that cause "global weirding." And we'd make a very handsome return, which is why that transition beyond oil can be led by business for profit. We're helping that happen now.

We could also have largely or wholly phased out the emissions that are changing the climate and we'd make money on the deal, because it's cheaper to save fuel than to buy fuel. We could also have put an end to the spread of nuclear bombs, which the president rightly says are our biggest threat to national security. And we could have greatly dispersed the energy system.

I mean, so called micro-power made last year a sixth of the world's total electricity and a third of its new electricity. Very few people understand that. But...

**CHARLIE ROSE:** What is micro-power?

**AMORY LOVINS:** Well, it's either making heat and power together in buildings or factories. That's a lot more efficient. Or decentralized renewables: sun, wind, and the rest. And those actually added last year four times as much new electricity and about 11 times as much generating capacity as nuclear added. And yet the nuclear folks will tell you these are small, slow, futuristic, decades from being competitive. Well, actually it's their central power plants, coal, nuclear, gas...

**CHARLIE ROSE:** Right.

**AMORY LOVINS:** ... that probably by now have less than half the world market in providing those electrical services for the world, because both "negawatts"— saving electricity and micro-power — have taken at least the other half of the market. Nobody noticed.

**CHARLIE ROSE:** You've also said that we can get — have energy independence in 10 years if we're willing to go spend \$180 billion?

**AMORY LOVINS:** I didn't say in 10 years, but if we spent \$180 billion getting off oil, half of it to retool the car, truck and plane industries for tripled efficiency, and half to build a modern bio-fuels industry, then that \$180 billion investment by 2025 would return net \$70

billion a year of profit. That's a really good return. And that's assuming that the oil we save only cost \$26 a barrel.

**CHARLIE ROSE:** When in fact it costs ...

**AMORY LOVINS:** Well, it's ...

**CHARLIE ROSE:** What is it now? 55?

**AMORY LOVINS:** High — high 50s now. And the average cost, therefore, of getting off oil is only \$15 a barrel. Compared to 75 recently. So how do you do that? Well, you save half the oil by redoubling the efficiency of using it. That costs an average of \$12 a barrel. The other half, you replace with saved natural gas and advanced bio-fuels like making alcohol out of woody stuff like switch grass.

**CHARLIE ROSE:** Right.

**AMORY LOVINS:** That costs an average of 18 bucks a barrel. The average of the whole thing is 15, you know, a fifth the recent cost, a quarter of today's cost.

**CHARLIE ROSE:** A couple of questions about that. One is, when you go to talk to the — your friends at the Pentagon or at the White House or Commerce or Energy or wherever they are, they — does it resonate with them? Do they say to you, God, it's great to here — to have you here and let's get started?

**AMORY LOVINS:** Well, in the Pentagon, we do hear that. And I think they're emerging as the leader in the federal government in leading the nation off oil so we don't need to fight...

**CHARLIE ROSE:** More so than the Energy Department?

**AMORY LOVINS:** Yeah, so far.

**CHARLIE ROSE:** Yeah.

**AMORY LOVINS:** ...which is more captive of — of its energy industry constituencies historically. But the Pentagon is a bunch of war fighters. And they would — they would love the idea of having "nega-missions" in the Persian Gulf: Mission Unnecessary.

**CHARLIE ROSE:** Yeah.

**AMORY LOVINS:** But we don't need to fight over the oil because we don't need the oil.

**CHARLIE ROSE:** Right.

**AMORY LOVINS:** And, of course, it's a very teachable moment right now, because they spend about half their money and a third of their people moving stuff around. That's called logistics.

**CHARLIE ROSE:** Right. Right.

**AMORY LOVINS:** 70 percent of the tonnage they move is fuel.

**CHARLIE ROSE:** Right.

**AMORY LOVINS:** And those are those convoys that get blown up every day. So we have, you know, a two-star general in Iraq begging for renewable energy to un-tether him from that very costly, vulnerable fuel logistics tail.

**CHARLIE ROSE:** But can you give him...

**AMORY LOVINS:** Yeah.

**CHARLIE ROSE:** But what would we give him?

**AMORY LOVINS:** Well, he's being shipped right now some little power plants in a box, solar and wind. Of course, there's a whole lot of solar in that part of the world.

**CHARLIE ROSE:** Yes there is.

**AMORY LOVINS:** And we're working with another branch of the Army on helping them make where people sleep a whole lot more energy efficient so you don't need all the electricity to run the air conditioners because you've got better ways of keeping cool.

**CHARLIE ROSE:** Yes.

**AMORY LOVINS:** Then you don't need the oil to run the gen sets.

**CHARLIE ROSE:** You used that nice expression about taking away their need to go fight wars for oil in the Persian Gulf. And is it your political belief that we went there for — in the interest of protecting oil sources or trying to guarantee an oil source?

**AMORY LOVINS:** I don't think you can untangle it that neatly, but I think it's fair to say even going back to the '91 operations when Iraq invaded Kuwait that we wouldn't have put half a million troops there if Kuwait just grew broccoli.

**CHARLIE ROSE:** But we were also worried about Saudi Arabia at that time too.

**AMORY LOVINS:** Well, we — still are and for a good reason. I mean, look...

**CHARLIE ROSE:** Yeah, but we didn't go to — I'm just trying to — I'm just trying to get a sense of — because of where you come from in terms of your understanding of energy and therefore your conversations, whether this whole idea about the fact that we're there in Iraq in significant part because of their — they have the second largest reserves of oil I guess in the Middle East. Don't they? After Saudi Arabia?

**AMORY LOVINS:** Yes, they're big.

**CHARLIE ROSE:** Who is third? Iran?

**AMORY LOVINS:** Nobody knows exactly who has got what. You can't take their word for it.

**CHARLIE ROSE:** Fair enough.

**AMORY LOVINS:** This is also I think relevant to the peak oil argument.

**CHARLIE ROSE:** Yeah.

**AMORY LOVINS:** When does production start to go down and price zoom up? Well, nobody knows. 94 percent of the oil you see is owned by governments, which either don't know or won't honestly say what they've got.

**CHARLIE ROSE:** Yeah.

**AMORY LOVINS:** But it doesn't matter that you can't tell who is right, because we ought to do all the same things anyway just to save money.

**CHARLIE ROSE:** Is there any major oil producer nation that has not since owned its oil or taken it over? Most of them have. Saudi Arabia, Iran.

**AMORY LOVINS:** I think in the U.S., it's still largely a private function.

**CHARLIE ROSE:** But how much do we produce in contrast to everybody else?

**AMORY LOVINS:** Let's see. We own two or three percent of the world's oil. We produce nine percent — and we use — or extract nine percent, and we use about 26 percent.

**CHARLIE ROSE:** Yeah.

**AMORY LOVINS:** So, obviously we can't drill our way out of this one.

**CHARLIE ROSE:** Exactly. Do — what would happen to the economy of those countries — Iran, Iraq, Libya— if in fact oil pricing went down to 25?

**AMORY LOVINS:** Well, the despots...

**CHARLIE ROSE:** Russia?

**AMORY LOVINS:** The despots, the tyrants would have their style considerably cramped. Remember that because...

**CHARLIE ROSE:** Their leverage.

**AMORY LOVINS:** Yeah. Remember this run-up in oil price came at a time when Iran was broke, the Saudis were nearly running out of money too. And we very thoughtfully bailed them out by putting up the oil price tens of dollars through what we did in the region, and through our wasteful use of oil. So the result is that we've now got Putin and Chávez and Ahmadinejad.

**CHARLIE ROSE:** Right.

**AMORY LOVINS:** These — these are monsters of our own creation. They didn't just come out of nowhere. Tom Friedman got it right when he said that as oil prices go up, the pace of democracy goes down, and vice versa.

**CHARLIE ROSE:** They have more leverage and everything else, and they can do more...

**AMORY LOVINS:** Yeah, right.

**CHARLIE ROSE:** ...to maintain their own power.

**AMORY LOVINS:** Let me remind you.

**CHARLIE ROSE:** You don't have to...

**AMORY LOVINS:** Exactly.

**CHARLIE ROSE:** ...make choices.

**AMORY LOVINS:** Yeah. They can — they can keep on their social lid and not have to reform their polity or their economy. But let me remind you of a happier time. The last time America paid attention to oil, from 1977 to '85, in those eight years, the economy grew 27 percent. Oil use went down 17 percent. Oil — oil imports fell by half. Imports from the Persian Gulf fell 87 percent. And they would have been gone if we had kept — kept that up for one more year.

**CHARLIE ROSE:** It was at the end of the Carter administration was...

**AMORY LOVINS:** Yeah, and it was partly his policies like the car efficiency standards...

**CHARLIE ROSE:** Right.

**AMORY LOVINS:** ...working their way through, and partly that we had a second worse oil shock in '79. So the high price got people's attention.

**CHARLIE ROSE:** Yeah.

**AMORY LOVINS:** Now, as it happens.

**CHARLIE ROSE:** (inaudible) OPEC.

**AMORY LOVINS:** Yeah, but you see, because we saved so much oil and so did others in the world, it cut OPEC's exports in half. And it cut that supply cartel's market power so much it really broke them for a decade. And it turned out that we especially in this country, the Saudi Arabia of "nega-barrels" — saved barrels — we have more market power than OPEC, but ours is on the demand side. We can save oil faster than they can conveniently sell us oil. And at that time, we were cutting our oil per dollar of GDP by over five percent a year.

**CHARLIE ROSE:** Do we have the political will to do that?

**AMORY LOVINS:** Well, I think we do, but ...

**CHARLIE ROSE:** And the public support to do it?

**AMORY LOVINS:** Yeah, because the way we propose to do it does not inconvenience anybody. No changes in lifestyle are required. Our analysis assumes all the same rapid growth in the economy and driving and flying and all that stuff...

**CHARLIE ROSE:** Right. Right. Right.

**AMORY LOVINS:** ...that's in the government forecast. But we do do things like triple the efficiency of cars, trucks and planes. And those pay for themselves in less than two years,

and one year and four or five years respectively. It's a good deal.

Now, the whole thing is driven by business logic. We built the case around competitive strategy for cars, trucks, planes, oil and military. They all like that idea. They're going to make more money this way at less risk.

Now, we did hope for innovative public policies that would support and not distort the business logic, but the policies we propose do not require new energy taxes, subsidies, mandates, federal laws or anything else that either major party doesn't like or could mess up. You could do it all administratively or at a state level. And because it's driven by profit opportunity, we've been able to get a good start on implementing it through a kind of institutional acupuncture. We just figure out where the business logic is congested and not flowing properly and stick a needle in and it starts flowing, presto.

**CHARLIE ROSE:** That's right. You think of — when you think about all these policies, among them is alternative fuel sources, bio-fuels. How much of our energy demand could be met by either ethanol or some other variant?

**AMORY LOVINS:** Well, as much as we need to — to run our vehicles.

**CHARLIE ROSE:** And if we take that out of the equation of our demand, what does the demand look like?

**AMORY LOVINS:** Vehicles, all kinds of transport in this country use 70 percent of our oil.

**CHARLIE ROSE:** So, 70 percent of the demand — you say that 70 percent of the demand comes from vehicles?

**AMORY LOVINS:** Yes.

**CHARLIE ROSE:** Planes, trains, trucks, cars...

**AMORY LOVINS:** And the rest is industrial raw materials, industrial heat and buildings.

**CHARLIE ROSE:** And more and more people are doing sort of efficiency things in terms of buildings, are they not?

**AMORY LOVINS:** Yeah, yeah.

**CHARLIE ROSE:** Green buildings.

**AMORY LOVINS:** Heck, I live up in the Rockies at 7,100 feet where it can go to minus 47 on occasion.

**CHARLIE ROSE:** Yes. I don't want to be there.

**AMORY LOVINS:** You can get frost any day of the year. You can get 39 days of continuous cloud in mid-winter. And in the middle of my house, I've harvested so far 28 banana crops with no heating system. I don't need one. It's cheaper upfront not to put one in.

**CHARLIE ROSE:** Yeah.

**AMORY LOVINS:** Because the heating system would have cost more to install than I paid

for the super-windows and super-insulation and stuff that got rid of it.

**CHARLIE ROSE:** So, solar gives you your entire energy needs?

**AMORY LOVINS:** 99 percent of the space and water heating is passive or active solar.

**CHARLIE ROSE:** Yeah.

**AMORY LOVINS:** Ninety percent of my electricity got saved and I get the rest from solar five or six times over and sell the rest back to the grid. And by the way, all the efficiencies paid for themselves in 10 months with 1983 technologies. We can do a lot better now.

**CHARLIE ROSE:** In a minute — I want you to go ahead, I want you — I want you to tell me what technologies are on the cusp, you know, what is the cutting edge of where the technology — I mean, I've had oil executives talking about their ability to find oil. It's certainly — it's better today because of technology.

**AMORY LOVINS:** Stunningly right.

**CHARLIE ROSE:** Stunningly better, they say.

**AMORY LOVINS:** They're right.

**CHARLIE ROSE:** Now, before you tell me — go ahead.

**AMORY LOVINS:** But the technologies for wringing more work out of each barrel are advancing even faster...

**CHARLIE ROSE:** Right.

**AMORY LOVINS:** ...and faster than we're using them up. So efficiency, whether of oil or electricity or gas, is getting ever bigger and cheaper. The opposite of oil.

**CHARLIE ROSE:** Right.

**AMORY LOVINS:** You know, it's like the low-hanging fruit is mooshing up around our ankles...

**CHARLIE ROSE:** Yeah.

**AMORY LOVINS:** ...and the tree keeps pelting our heads with more fruit. What part of this don't we get?

**CHARLIE ROSE:** Exactly. Do you — what do you think of the oil companies? And for all of the political rhetoric, someone who knows where they're — where they're honest and where they're not honest and knows where they are accurate or not accurate. I mean it's a broad brush I'm asking you to paint with.

**AMORY LOVINS:** Well, I worked — for and with and sometimes within the oil majors for 33 years now.

**CHARLIE ROSE:** And therefore the answer is?

**AMORY LOVINS:** Well, they're different. They're not all in the same tribe. And in fact, there's a big split down the middle of the industry now between those making smart investments and the rest. And.

**CHARLIE ROSE:** If you look at advertising, you would assume that BP is one of them, and ...

**AMORY LOVINS:** BP, Shell...

**CHARLIE ROSE:** Shell. Shell is another because they have been... Now, would you assume that Exxon Mobil is not?

**AMORY LOVINS:** Well.

**CHARLIE ROSE:** Because they are.

**AMORY LOVINS:** They...

**CHARLIE ROSE:** ...sort of demonized as the worst?

**AMORY LOVINS:** I'd say they're the best in the industry in execution and probably the worst in strategy.

**CHARLIE ROSE:** What does that mean?

**AMORY LOVINS:** Well, they do inadvisable things very efficiently.

**CHARLIE ROSE:** That's not good for us, is it?

**AMORY LOVINS:** Well, I don't think it's actually good for their shareholders either. But it turns out that many of their analysts have come to conclusions strikingly similar to those in our book (*Winning the Oil Endgame*, [www.oilendgame.com](http://www.oilendgame.com)). Those tend to be the technology analysts. It's the economic forecasters that don't get it.

**CHARLIE ROSE:** OK, so when their analysts present that to the CEO of these respective companies, what happens?

**AMORY LOVINS:** It depends. In fact, the head of Exxon Mobil has just changed, and there are already some changes perhaps emerging in policy. It's a very capable company. And I think they could do...

**CHARLIE ROSE:** It's the most...

**AMORY LOVINS:** ...the oil endgame stuff better than anybody if they put their minds to it.

**CHARLIE ROSE:** Say that again.

**AMORY LOVINS:** Well, I think they could do the oil endgame stuff better than anybody if they put their minds to it.

**CHARLIE ROSE:** This is your book. [Holds up copy of RMI's *Winning the Oil Endgame* ([www.oilendgame.com](http://www.oilendgame.com)).]

**AMORY LOVINS:** Yeah. And in fact, you may have noticed that the just-retired chairman of Shell, Sir Mark Moody-Stuart, wrote one of the two forewords to that book. And in general, the industry likes this book.

**CHARLIE ROSE:** And the other part is written by George Shultz.

**AMORY LOVINS:** Yeah.

**CHARLIE ROSE:** Yeah.

**AMORY LOVINS:** A very fine economist.

**CHARLIE ROSE:** Former Secretary of the Treasury.

**AMORY LOVINS:** And State.

**CHARLIE ROSE:** And State, and you know. And OMB [Office of Management and Budget] as well.

**AMORY LOVINS:** Yes.

**CHARLIE ROSE:** So what is the problem here? I mean, what do we need to do to have them go where they ought to go in terms of whatever their responsibility is to the shareholders as well as their responsibility as good citizens, thinking about, you know, the energy policy of their country?

**AMORY LOVINS:** It's a little like the question I was asked by a senior auto making official recently. What should we do about California's attempt to regulate the CO2 that comes out of the cars and helps cause global warming? I said, well, you should throw your engineers at it and let your competitors throw their lawyers at it. Your engineers will beat their lawyers.

**CHARLIE ROSE:** Well, you see, I believe that too. So why don't they do that? That's the smart answer. And you're right.

**AMORY LOVINS:** Well, let's just look at what just happened at Ford. They hired the head of Boeing commercial airplanes to be their new CEO. And the business press said, well, that's unorthodox but interesting, because he healed a sick airplane business and introduced lean manufacturing and did tough union negotiations.

That's not the important part of his resume. The important part is Boeing is beating the pants off Airbus with a technology leapfrog in the Dreamliner, 20 percent more fuel efficiency — same cost. That leapfrog is based on ultra light, strong materials like carbon fiber composites, which, if brought to the auto industry, will double cars' efficiency and make them safer at no extra cost.

**CHARLIE ROSE:** Are we getting to go your bowl?

**AMORY LOVINS:** And — so he knows how to do that. He knows about the ultra-light leapfrog and how to organize people to do that and how to make the weight-saving snowball and integrate the design. Those are all the DNA transplants that auto making needed. And in our book, we actually recommended that Detroit should do what Boeing was doing. That's a winning strategy.

So watch this space. It's a sign of how — what the economist Joseph Schumpeter called "creative destruction." In the auto business, this gale is sweeping through. And it is either going to change the managers' minds or change the managers, whichever happens first. There's very encouraging signs, a tectonic plates are creaking loudly.

**CHARLIE ROSE:** People will get it or they won't be working.

**AMORY LOVINS:** Yeah. I brought along a little prop, actually.

**CHARLIE ROSE:** OK, show me the prop. I once saw this. Tom Friedman did this piece with you. And I saw you do this, and I was so excited I get to see it.

**AMORY LOVINS:** Actually he (Tom Friedman) tried to smash this thing with a sledgehammer.

**CHARLIE ROSE:** Oh, that's right.

**AMORY LOVINS:** This is a really light bowl.

**CHARLIE ROSE:** Oh, my goodness, you could just — yes, it's like you could do that with it and.

**AMORY LOVINS:** You notice the sound. It tells you how stiff it is.

**CHARLIE ROSE:** You mean it's hard?

**AMORY LOVINS:** Very strong, very stiff. This stuff can absorb 12 times as much crash energy per pound as steel. It's two-thirds carbon fiber and one third thermoplastic. This is a piece of carbon and nylon plywood automatically made. And then we just stick it on a hot dye and mold it to the shape you want it in less than a minute. So it can be, say, an auto body.

**CHARLIE ROSE:** Right. So why isn't everybody rushing in to do this?

**AMORY LOVINS:** Well, this was just validated over the last couple of years, but the little company I chair that does this stuff ([www.fiberforge.com](http://www.fiberforge.com)) — and to declare an interest, I'm a tiny shareholder in it — actually has auto makers among its customers, it's licensed to aerospace, selling equipment to aerospace.

Now, if you make a car out of this stuff, you lose half the weight, half the fuel use.  
(CROSSTALK)

**AMORY LOVINS:** It costs the same to make and it's safer, 12 times the crash energy absorption of steel per pound. Why does it cost the same to make? Aren't these real expensive materials? Well, yeah. But the way you — you don't need much material when it's so much stiffer and stronger than steel. And actually, the costlier materials are offset by making the propulsion system about three times smaller and by much simpler auto making. A hundred times less tooling costs, at least two-fifths less capital costs. No body shop, no paint shop, radically simplified. Because these parts — there's 14 parts in the body of an SUV made of this stuff. Parts snap together like a kids' toy precisely for gluing. We don't need no stinking, you know, jigs, robots and welders, all that fancy stuff used to make cars.

They're really good at making cars. They make one every couple of seconds in this country.

And the car, you know, uses 100 times its weight every day in ancient plants, but most of that is wasted.

**CHARLIE ROSE:** Why has it taken us so long to get religion on this? I mean, even the president, you know, talking about we're addicted to oil. Was it what, and why not earlier?

**AMORY LOVINS:** Several things. We somehow became convinced that saving fuel is costly when it's actually profitable. That means by the way protecting the climate is profitable, because it costs a lot less to save fuel than to buy fuel.

**CHARLIE ROSE:** Before you continue, let me just interrupt you and say one thing. Were other people arguing this was not true? I mean, was there a constituency for saying what you just said is not true?

**AMORY LOVINS:** Not exactly. What they would say is that efficiency is nice, let's get all of it we can, but that won't amount to much.

**CHARLIE ROSE:** That's exactly what they say.

**AMORY LOVINS:** Yes.

**CHARLIE ROSE:** We believe that efficiency is good, but it's like 1 percent.

**AMORY LOVINS:** Then you've got some enormous institutions, including oil and car companies, that are very good at what they do, fortunately. And yet it's like turning a super tanker to change that culture.

You had a federal government that tended to think anything environmentalists proposed must be bad, whether it was White House or Congress under various administrations. And you just had this funny dynamic where when oil prices were high in the '70s and into the early '80s, we all paid attention. We did magnificently in saving oil, so much so it crashed the price. So we'd spent 15 years getting really good at saving energy, and then we spent the next 15 years forgetting more than we learned, because once the oil prices went down, who cared?

**CHARLIE ROSE:** Exactly. We went back, yes.

**AMORY LOVINS:** It's only now that we're figuring out, however low the price goes, it doesn't matter. Efficiency is still a great deal, and at 15 bucks a barrel, I'm not worried that oil is going to stick down there.

**CHARLIE ROSE:** There is also this. According to some of the polls I read, people are suggesting that energy independence is now a priority for the American public. Is that — does that...

**AMORY LOVINS:** Because they're starting to make the connection, whether it's due to uncompetitiveness and job loss or national security or climate change or lack of proper care for creation, you know, whatever your motivation is, this is in a way at the root of many of our nation's and the world's biggest problems. And yet the solutions are staring us in the face. I think the basic problem...

**CHARLIE ROSE:** Staring us in the face means that they're do-able.

**AMORY LOVINS:** Oh. Absolutely. They're not only do-able, they're fun and they're profitable. It's exactly the thing that a democracy and a market economy are really good at once they pay attention.

But you know, I used to work for the inventor Edwin Land and he said people who seem to have had a new idea have often just stopped having an old idea. I think also, we're a little steeped in the — yes, he said, "Invention is the sudden cessation of stupidity."

We're steeped also in gloom. We have all these problems coming at us all at once, many of them with common causes like oil. And it's like Raymond Williams wrote, to be truly radical is to make hope possible, not despair convincing. There must be 50 books out there on the oil problem. There's one book as far as I know on an oil solution (***Winning the Oil Endgame***, [www.oilendgame.com](http://www.oilendgame.com)).

**CHARLIE ROSE:** Exactly. Yes, yes. Others would argue a little about that, but let me go, because I'm out of time, nuclear. You're opposed.

**AMORY LOVINS:** Well, I take markets seriously. And I notice that there isn't a single nuclear project in the world with a penny of private capital at risk. There's \$38 billion...

**CHARLIE ROSE:** They are all government owned.

**AMORY LOVINS:** Well, they're all bought by central planners. And they're paid for one way or another from the public purse. In fact, in this country, last year, the president got through Congress a new bill that subsidized the next six nuclear plants, if any, by roughly their entire capital cost. Standard and Poor's put out two reports saying it didn't matter much. It wouldn't much improve the credit ratings of builders. So my conclusion is, this is kind of like defibrillating a corpse, you know. It will jump, but it won't revive. And the reason that micro-power and efficiency have taken at least half the world market in electric services is they cost a lot less than nuclear or coal or gas big power plants. They have less financial risk. So that's the kind of thing that private capital loves to finance.

**CHARLIE ROSE:** OK, these are all economic arguments. Is there a risk argument to be made?

**AMORY LOVINS:** Well, you know, since nuclear power is unnecessary and uneconomic, we don't need to argue about whether it's safe. But if it were economic, there's still a showstopper, and that's the spread of nuclear bombs. Because the reactors and all the stuff that goes with them spreads the materials, the knowledge skills, equipment for do-it-yourself bomb kits.

**CHARLIE ROSE:** Yes, the Iranians or whatever.

**AMORY LOVINS:** And it wraps them in this innocent-looking civilian disguise.

Now, imagine we did the cheapest things first. So we just gave nuclear a decent burial, because it died of an incurable attack of market forces. And what would then happen is all the ingredients you could assemble to make your bombs would be harder to get, they'd be much more conspicuous to try to get, and they'd be politically much costlier to be caught trying to get. Because for the first time, your reason for wanting them would be unambiguously military. No doubt you're up to making bombs. You couldn't claim like Iran that you're just making peaceful electricity.

That wouldn't make the spread of bombs impossible, but it would make it a lot harder. And it would mean that we could concentrate our scarce intelligence resources on needles, not haystacks, and have much better chance of spotting stuff early enough to fix it.

So since the president is quite right in saying that the proliferation of nuclear weapons is the gravest threat to our security, I think this is a very promising approach. In fact, if we take economics seriously, the oil problem, the climate problem, the proliferation problem, much of the development problem fade away. They're an artifact of not using energy in a way that saves money.

**CHARLIE ROSE:** Since the president has made his State of the Union — was it his State of the Union when he talked about oil addiction, yes?

**AMORY LOVINS:** Yes.

**CHARLIE ROSE:** Have you seen a change, a demonstrable change in American energy policy?

**AMORY LOVINS:** The policy is changing slower than the rhetoric. It's still playing catch-up. And I think when the evangelical Christian leaders weighed in on the cause of climate protection.

**CHARLIE ROSE:** They all weighed in on the side of environment, did they not?

**AMORY LOVINS:** Yes. For creation care, which I think is very good theology. That was the political tipping point. Well, it's like what happened when the churches joined the civil rights struggle. It was all over after that, politically. And I'm seeing very encouraging signs from some very smart people in the administration that they'd really like to solve this problem in ways that rely on our prowess and technology and markets, and about that they're right. Those are what we're good at. That's what it needs. So I think there are wonderful solutions at hand, and the real leadership on them so far is not federal. It's state and local and private sector.

**CHARLIE ROSE:** Finally talking about the automobile industry. Take a look at this. This is Rick Wagoner who came here to talk about General Motors, and here it is. (BEGIN VIDEO CLIP)

RICK WAGONER, GM CEO: I would say when you lay out the range of technologies and the performance we have today, we don't really take a back seat to anybody. Whether it's internal combustion engines, gas engines that get high fuel economy, we offer a lot of those, as I mentioned. We're a leader in ethanol, E-85. If someone is really interested in reducing imported oil, that is the button to push today to really move the needle. There's work to do there.

**CHARLIE ROSE:** To buy E-85 cars.

RICK WAGONER: Right. We are also rolling out a very aggressive plan with hybrids. We're going to have low-cost hybrids, the most sophisticated hybrids. We have already got a lot of hybrids out in city buses. We have diesel offerings for the right categories of those.

My point simply is it's inaccurate to say that GM is not a leader in technologies. I'm not saying we're leading in every one, but we're investing in every one. We're playing seriously in all, and we will be very seriously in hybrids imminently. And so it's perhaps convenient to

victimize or villainize one of the companies, but it's inaccurate to do so. (END VIDEO CLIP)

**AMORY LOVINS:** Well, I need to go back and talk to Rick. I haven't talked to the president's council there for some years, but he's right that they're a very capable company technologically. In fact, I just poached two of their better engineers.

**CHARLIE ROSE:** Poached them for your Institute?

**AMORY LOVINS:** Yeah. But what he didn't mention there is the ultra-lighting. You know, the average car today only uses .3 percent of its fuel energy to move the driver; 95 percent of the weight you're moving around is the car, not the driver. And we need to fix that.

But I've been in a long conversation with GM about this since '91. And they graciously took my car education in hand. They are very good at cars. I think they can do some other things a lot better in going beyond, say, fuel cells, which they're terrific at, and make the hydrogen economy, for example, happen a lot sooner. But let me just tell you...

**CHARLIE ROSE:** And that's a real option.

**AMORY LOVINS:** It is a real option if you have tripled efficiency cars, which we should anyway. And then there's a robust business case for running them on hydrogen. But you don't need to do that to get off oil. Here's how it works, leaving out hydrogen. Take a car today and put a good hybrid drive in it. And if you then drive it the way a hybrid should be driven, you double this efficiency. Make it out of this stuff or out of ultra-light steel, which has to compete with carbon, and you roughly double its efficiency again. Run it on as a plug-in hybrid...

**CHARLIE ROSE:** OK, how much is it going to sell for?

**AMORY LOVINS:** Very reasonable price. We actually designed in detail a mid-size uncompromised SUV six years ago made of this sort of stuff: 67 miles a gallon, and the extra sticker price is \$2,500 — not because it's ultra light, because it's hybrid. That pays for itself in about 22 months at \$3 a gallon.

**CHARLIE ROSE:** Great to have you here.

**AMORY LOVINS:** Thank you.

**CHARLIE ROSE:** Amory Lovins is the founder and CEO of the Rocky Mountain Institute, where he lives like he preaches.

###