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THE ECONOMICS OF GLOBAL WARMING: SHAPING HOW U.S. COMPANIES ARE DOING BUSINESS

FIELD HEARING

BEFORE THE

SELECT COMMITTEE ON
ENERGY INDEPENDENCE
AND GLOBAL WARMING
HOUSE OF REPRESENTATIVES

ONE HUNDRED TENTH CONGRESS

SECOND SESSION

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THE ECONOMICS OF GLOBAL WARMING: SHAPING HOW U.S. COMPANIES ARE DOING BUSINESS

MONDAY, JULY 28, 2008

HOUSE OF REPRESENTATIVES,
SELECT COMMITTEE ON ENERGY INDEPENDENCE
AND GLOBAL WARMING,
Washington, DC.

The committee met, pursuant to call, at 11 a.m., in the Mark Twain Museum, Hartford, Connecticut, Hon. Edward Markey [chairman of the Committee] presiding.

Present: Representatives Markey and Larson.

Also Present: Representatives Shays, Murphy, and Courtney.

Staff Present: Stephanie Herring.

Chairman MARKEY. This hearing is called to order.

This is the Select Committee on Energy Independence and Global Warming, and I am pleased to hold this hearing in the historic Mark Twain House and Museum, and we thank the museum for hosting this event.

I want to thank Congressman John Larson from Connecticut, who is a member of the Select Committee, named by Speaker Pelosi at the creation of the Select Commission, so that we would have one of the leading advocates for all of these issues to deal with oil and gasoline prices aggressively, to deal with the issue of global warming aggressively, and Mr. Larson and I traveled around the world with the Speaker, and no matter where we go he talks about the companies that are going to be testifying today as the solutions to the problem. If you come to Connecticut, he said, we have the solution. So, this is a conversation of the Speaker and I, and he had all around the world.

His District is home to some of America's truly great companies, companies that will lead the way on solving the global warming problem. So, we are glad to be here to see first hand how Connecticut can lead us to a new energy future.

As Congressman Larson knows, I am fond of quoting Mark Twain, and not just when I am in this museum. One quote that I am particularly familiar with and use quite often is that, as Mark Twain says, "History doesn't repeat itself, but it does tend to rhyme," meaning that the story of our energy policy in our country over the past 35 years, unfortunately, is a story that has all too familiar rhyme to it.

I have been in Congress for 32 years, and during that time I have heard Doomsday prophets wax lyrical as they repeatedly ex-

aggerate the cost of new technologies. While I have heard the predictions, I have also seen technologies continually exceed our expectations, and seeing is believing.

When the Mark Twain House was built 130 years ago, it was considered modern because of revolutionary features like gas lighting. Mark Twain could never have imagined that today we would be kept cool by the latest in geothermal technology. His home, now the first museum in the Nation to achieve LEED certification, stands as a reminder that technology will continue to unlock doors our imaginations have yet to dream.

America has a proud history of dreaming big and aiming high. A President from my home state, John Kennedy, set a bold goal for America, send a man to the moon and back in just nine years. He was setting the goal high, not because it is easy, he said, but because it is hard. He recognized that ambitious goals require the invention of technologies and metals not yet imagined.

The challenge facing our Nation on climate change is equal to the challenge our Nation faced to explore the moon, and I am confident that American ingenuity and technology will answer with the same speed and spirit as it did a generation ago.

In the process of developing and deploying these technologies, a new green job market is being created that stands ready to hire in increasingly large numbers. The technologies we deploy to save our planet will have to be produced, installed and maintained. This will require a transformation in our workforce, from coal mines to wind farms, from oil rigs to solar plants. Future low emission cars will not only drive us to work, they will drive our economy. Renewable energy from wind and solar will not only power our homes, they will power job growth.

Today we will hear and learn from two great American companies that have been leaders, not only in developing the technologies that will help transform us into a low carbon world, but have changed their own day-to-day operations in order to decrease their carbon footprints. They have done all this while continuing to see profits grow.

These companies serve as examples of the economic prosperity that can be unleashed by pursuing the principle of environmental stewardship. While protecting the environment is a valued moral principle on its own, it is rapidly revealing market opportunities far greater than business as usual.

For too long, naysayers have insisted that protecting our planet will be the death nail for our economy, but the climate is changing, and as we face the greatest moral obligation of our time, to protect our planet, we are also discovering business opportunities embedded in being good stewards of the environment.

As Mark Twain also said, "Prosperity is the best protector of principle."

I now recognize the Gentleman from the State of Connecticut, and our host here in Hartford, Congressman John Larson.

[The prepared statement of Mr. Markey follows:]

Opening Statement of Chairman Edward Markey
Select Committee on Energy Independence and Global Warming
Connecticut Field Hearing

This hearing is called to order. Thank you all for coming today.

I am pleased to hold this hearing in the historic Mark Twain House and Museum, and we thank the Museum for hosting this event. I would also like to thank Congressman Larson and his staff for their help in organizing this important hearing. Congressman Larson is a very important Member of the Select Committee and also has been one of the leading advocates for Congress to deal with oil and gasoline prices aggressively. His district is home to some of America's truly great companies, companies that will lead the way on solving the global warming problem, and so we are glad to be here to see first hand how Connecticut can lead us to a new energy future.

As Congressman Larson knows, I am fond of quoting Mark Twain, and not just when I am at his museum. One quote I particularly like is when he said, "History doesn't repeat itself, but it does rhyme."

The story of energy policy in our country over the past 35 years, unfortunately, is a story that has an all too familiar rhyme. I have been in Congress for 32 years, and during that time I have heard doomsday prophets wax lyrical as they repeatedly exaggerate the cost of new technologies. While I have heard the predictions, I have also seen technologies continually exceed our expectations. And seeing is believing. When the Mark Twain House was built 130 years ago, it was considered modern because of revolutionary features like gas lighting. Mark Twain could never have imagined that today we would be kept cool by the latest in geothermal technology. His home, now the first museum in the nation to achieve LEED certification, stands as a reminder that technology will continue to unlock doors our imagination has yet to dream.

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is easy, but because it is hard." He recognized that ambitious goal required the invention of technologies and metals not yet imagined. The challenge facing our nation on climate change is equal to the challenge our nation faced to explore the moon. And I am confident that American ingenuity and technology will answer with the same speed and spirit as it did a generation ago.

In the process of developing and deploying these technologies, a new green job market is being created that stands ready to hire at increasingly large numbers. The technologies we deploy to save our planet will have to be produced, installed, and maintained. This will require a transformation in our work force, from coal mines to wind farms, from oil rigs to solar plants. Future low emission cars will not only drive us to work, they will drive our economy. Renewable energy from wind and solar will not only power our homes, they will power job growth.

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While protecting the environment is a valued moral principle on its own, it is rapidly revealing market opportunities far greater than business as usual. For too long naysayers have insisted that protecting our planet will be the death knell for our economy. But the climate is changing. And as we face the greatest moral obligation of our time to protect our planet, we are also discovering business opportunities embedded in being good stewards of the environment. As Mark Twain also said, "Prosperity is the best protector of principle."

I now recognize the gentleman from Connecticut, Congressman John Larson.

Mr. LARSON. I thank you, Mr. Chairman, and what an honor it is for me to have the distinguished Chair from Massachusetts, the Dean of the New England Delegation, as you heard him say he's been in Congress 32 years, and served with distinction and, certainly, Speaker Pelosi knew when she selected him to Chair this very able Select Committee the role and the responsibility and acumen that he possesses. I'm honored that you are here today in Hartford to conduct this very important hearing.

I also apologize, Ed, I did tell you that I was going to have Jim Calhoun and, perhaps, Ray Allen show up. Mr. Markey, as you may or may not know, is an avid Boston Red Sox fan, nice win last night, put them in a better frame of mind, and also a Patriot man, but a Celtic fan as well. And, this was not a basketball injury, contrary to the popular belief, and we are glad to see that the Chairman is on the mend. I'm completely honored to be here at the Mark Twain House as well, and want to again applaud Jeffrey Nichols, the Director here, what a great setting to hold a public hearing.

I can't help but think what Mark Twain would think about all of this, but as the Chairman pointed out, of course, this is the first museum in the Nation, and the first building in Connecticut, to become a certified leadership in energy and environmental design, or a LEED building. This means that it meets the highest standard for sustainability, energy efficiency, water savings, and indoor environmental quality. I think they deserve a round of applause, don't you?

And, the Chairman indicated, and it is true, he does like to quote Mark Twain often in our Committee hearings and meetings, and he does. It is with a little bit of trepidation, however, that I recall some of Twain's comments about Congress. He actually said that, "Fleas can be taught nearly anything that a Congressman can." He further said, "It is the will of God that we must have a Congressman, and we must bear the burden, therefore."

So, with that I'm happy also to be joined by my distinguished colleagues in the State of Connecticut, the Dean of our Delegation in Connecticut, Chris Shays, is from the 4th Congressional District, Joe Courtney from the 2nd Congressional District, and Chris Murphy from the 5th Congressional District, that will participate today in this very important hearing.

Criticism of climate change legislation often centers on the fact that any legislation would be devastating to business. It is often believed that doing the right thing for the environment, and for one's shareholders, must be mutually exclusive.

This hearing today, I believe, will leave no doubt that the ideas and innovation that are good for the environment can also be good for business' bottom line.

I am proud to represent the State of Connecticut and the kind of business leaders that we have in this great State, and especially today with the opportunity to have United Technologies Corporation, under the leadership of its Chairman, George David, and G.E., under the leadership of Mr. John Rice, who leads the company's Infrastructure Division, G.E.'s largest.

George David, flat out, for me is an inspiration, and I wish all of you could have had the opportunity I did last year to see the Speaker of the House engaged in a one-on-one discussion about en-

ergy and energy policy, and back and forth between the two of them talking about the laws of physics and science. Most of the conversation, I will confess, was over my head, but, nonetheless, it was very pointed and sincere.

As many of you know, it was George David who got the nod from Mayor Bloomberg to come to New York City and address the Conference of Mayors in those cities about the importance of the greening of America, the kind of technology that we need to be moving forward with.

He has been the epitome of what corporate leadership should be all about. Not only in making sure that the corporation which he leads became more efficient and more productive, but also providing educational opportunity for his employees, a fact that is not very well advertised, but I know that you can see employees are grateful for as well.

He has created more employee shareholders and invested more than $700 million in providing college degrees to UTC employees. He has simultaneously invested in developing more environmental friendly and efficient UTC products by the use of science and physics. Pretty incredible, don't you agree?

Mr. Rice will tell us about G.E.'s ground breaking project, now how do I say this correctly, John, ecomagination.

Mr. RICE. Perfect.

Mr. LARSON. He would have said perfect even if I had pronounced it wrong, which is a good sign, but under his leadership, and since the launch of this program in 2005, G.E. has consistently had to set new goals for itself because it keeps meeting and exceeding those that it sets.

His testimony today builds on G.E.'s strong belief in public education on these important environmental issues.

I had the opportunity to have dinner with him in Washington and talk about this almost a year ago, and am so pleased with the progress. And, of course, we heard from—our Caucus heard earlier this week from T. Boone Pickens, and he was very upbeat about his relationship with G.E. and all that you are doing with wind technology as well.

And, Dan Esty, as the Chairman pointed out, is down at Yale, but once—and he's there because of the Chairman himself, who says he wrote your recommendation, Dan, and we are so pleased that because of that recommendation you were able to succeed and come, he's written a book, "Green to Gold," which is a book that deals with the positive interaction and potential for greater interplay between business and the environment.

Connecticut has been, as the Chairman says, a leader in moving technology forward, and largely because of the corporations that reside here, but also because of Yankee ingenuity and the genius of Connecticut. We have great opportunity here in this State, including something we refer to as the Connecticut Center for Advanced Technology, and I'm glad Elliott Ginsberg is here today representing them, but to embrace the technology, especially, that that will, ultimately, capture hydrogen, the most abundant element, having eight companies, four major companies, and, certainly, UT power that leads the world in terms of focusing on fuel cell, fuel cell technology, to have powered the space stations and have been

certified for more than 100,000 hours of success in these areas, certainly, is a tribute to Yankee ingenuity, and, certainly, a tribute to United Technologies Corporation.

So, I'm encouraged and inspired by the leadership, and excited, as I am sure all of the Members are here, to listen to the testimony, and also thank the people who have attended today. I think you are in for a special treat, and I am especially grateful for Chairman Markey for bringing Washington, D.C. to Hartford, Connecticut.

And, with that, Mr. Chairman, I'll yield back.

[The prepared statement of Mr. Larson follows:]

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Select Committee on Energy Independence and Global Warming

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And, with that, Mr. Chairman, I'll yield back.

Chairman MARKEY. Thank you. Thank you, John.

Now, let me just, at this juncture, we have a lot of seats down here in the first row, really great seats. These are, you know, box seats. We have other seats that are throughout the audience, and we really do recommend that rather than, you know, standing for an hour and a half or so that you move down and get comfortable, so that you can enjoy this hearing. So, please, feel comfortable.

Mr. LARSON. Let the record show, however, that there was standing room only at this event.

Chairman MARKEY. So, let me turn now and recognize my good friend, the Gentleman from Connecticut, Chris Shays.

Mr. SHAYS. Thank you, Mr. Chairman, for bringing the Select Committee on Energy Independence and Global Warming here, and I want to say that Ed can tell you that the longer you are in Congress the more you appreciate seniority.

And, I want to say to my colleague, John Larson, that I will always suck up to you, because I am pretty convinced you will be some day the Speaker of the House. You have to understand that we have many ways to walk into the Chamber, but one day I saw him get there early and greet every member who walked in one way, and when they left he was there shaking hands with every member, Republican and Democrat, who went out the other way. And, he is just, as is Ed, just a great Member, as are my two new colleagues, Joe and Chris.

It's a little confusing to have three Chrises in the delegation, but, in fact, one time I was at a meeting where I was a new member, and a senior member was talking about all the great things that I had done, he said, Chris has done this, and Chris has done that, I said this is absurd, I haven't done that. He looked at me and he said, "Chris, would you like to say anything?" I was about to stand up, and Chris Dodd was right behind me. So, I have learned to make sure my last name is called.

I want to be very candid about this meeting, because I think we need to go where the truth takes us, and one of the big failures, I think, in Congress has been that we have not been having meaningful debate for any number of years, and we all lose.

We got into this mess, this mess, in a bipartisan way, and we need to get out of it in a bipartisan way. One reason why we have this Select Committee is getting good legislation out of the Commerce Committee is difficult. You had the Senior Member of the entire Delegation, excuse me, in Congress, John Dingell, who literally didn't believe that minivans, SUVs, cars and trucks should get better mileage, and you understood he was from Detroit, and you have this nexus between labor and management in the car industry, no layoffs, if we have layoffs we are going to cover you, but don't allow there to be intervention on the part of the Government. So, we have really been punting this issue for years to the credit, obviously, of Democrats, more Democrats have wanted to deal with this issue than Republicans, but the fact is this, that we have not been dealing with it because we have not wanted to face up to some tough choices.

There are lots of inconvenient truths that confront our country. Global warming is one of them. Energy independence is another. We will have to compromise, ultimately, to have energy independ-

ence, and I think Ed knows this, and he is trying to steer us in a direction where that compromise will happen.

We have, in this country, energy independence when it comes to electricity, and we sometimes forget that. Admittedly, it is coal, it is nuclear, and it is hydro, but industry throughout the United States—you would not know it in New England because our energy costs are so high here—but energy cost for our manufacturers around the country is below the world average in cost or right at the world average, and there is a view that we will, ultimately, be able to compete with the rest of the world, not because of labor costs, but energy costs will prompt labor costs, and that you will start to see more manufacturing come back to this country.

But, it is going to be a mixture of getting conservation to make sure that we have better mileage in our SUVs, cars, minivans and trucks, and not the pathetic 35 miles a gallon by the year 2020, we have Europe going to 48 miles by the year 2012. So, it is a good step forward, it didn't have that movement under Republicans. Candidly, we have it now under a new Democratic Congress, but I think we are going to have to be moving in a much quicker way.

It is going to involve alternative fuels in a big way, but alternative fuels will not replace conventional fuels in the short run. It is going to involve nuclear power, which some environmentalists do not want to see happen, but some environmentalists say it better happen if we are going to deal with global warming. It is going to involve our producing more oil and gas in this country.

One of the great ironies is to look at Canada. They are mining their coast for gas, they are getting that gas from their coast. They are transferring it by pipeline in Canada, then coming down to heat in Massachusetts 400,000 homes with natural gas. That is what is happening. And, the absurdity that you would want to continue to pay people overseas to bring in oil and gas, when we can produce it here, is something that has to be part of this debate.

We have a huge balance of payments problem, we have a national security problem, oil and gas from Russia, from the Middle East, from Nigeria, from Venezuela, no, we want it from countries like Canada and the United States.

So, I would just say in conclusion that we have a great country. We need to be more plain speaking about what is going on. We need to have Republicans and Democrats work together. We need to see a vote in Congress to understand what people feel about drilling, not in ANWR, that is protected, but off our coast, and I will conclude by this comment about drilling, if Great Britain had not mined their northern slope they would not be the power they are today. Norway is the richest country in the world, because they have managed their resources and they have mined the North Sea. We go all the way from Canada and then there is nothing happening in our coast line.

I may disagree with some of my colleagues about this, but I am absolutely convinced that it has to be part of this mix.

And, I will just end by saying that John Larson can boast about UTC, but given that G.E. is right in the center of my District I can boast about G.E. So, let us just collectively, as Connecticut legislators, just recognize we have a great state, with lots of innovation,

and we are very proud of all our companies, and we love our Yalie as well.

Chairman MARKEY. The Gentleman's time has expired.

Now we have—Jim Calhoun never had as good a recruiting class as the United States Congress had with these two freshmen who are now in the United States Congress. They are outstanding. They both made an incredible mark in just their first term, and let me begin by introducing, for an opening statement, Chris Murphy.

Mr. MURPHY. Thank you very much. That is the first time that I have ever been compared to Ben Gordon in my life.

Mr. Chairman, we really appreciate you coming down and giving us the opportunity to have access to your Committee, which has done such great work, and to allow us to be involved.

And, I'd like to say to Chris that, even though I'm just a freshman, I also appreciate seniority, but only because I have no choice in the matter.

I think, though, there may be some irony in some of Twain's comments regarding Congress, I think there is a decent degree of synthesis, in terms of being here today.

Mark Twain came to Connecticut because at that moment in time Connecticut and Hartford were the epicenter of the Nation's cultural and arts movement, and our desire here today, and I think it will be witnessed by the testimony we will hear, is that we think in a world defined by a quest to develop renewable or alternative energy, Connecticut can be the epicenter of that world as well.

And, that's what we will hear today, and that's the message that Chris, and John, and Rosa, and Joe, and I bring to Washington every day that we are down there, because we have such great stories to tell, those on the panel, those other companies like Fuel Cell Energy in the 5th District of Connecticut, and others around our great state.

I want to hear from the panel, so I don't have very much to say except for this, this is really—what we are talking about, the Holy Grail of Federal policy, because our ability to harness domestically produced renewable energy sources solves so many different problems. Often, you know, Government compartmentalizes everything—too often. Here we have an ability with one solution to solve so many different problems. We can no longer emit 25 percent of the world's pollution with only 5 percent of the world's population. We will do great justice to the world's environment and ecosystems if we are able to solve this problem.

By commercializing these products, and making investments, and creating markets for the development of renewable energy, we will do something about energy prices, because we know that we are on the verge of having these renewable sources be truly price competitive with older sources of energy.

But lastly, we talk about the jobs and the economy pieces, this is about national security as well, and Chris touched on this, our ability to grow, domestically produce renewable sources of energy, is also our ability to make sure that our conversations around the globe are done with our national security interest first in mind, rather than our national energy interest, and that, maybe, is one of the most important, most fundamental things that we can do to protect the next generation of Americans.

So, it is an absolute honor to be part of this Delegation. Chris is right, this is a bipartisan problem, and our ability to hold forums like this I think extends our ability in Washington to make this a bipartisan solution as well.

Chairman MARKEY. Great. The Gentleman's time is expired.

My mother is Christine Courtney, and she said the Courtneys are a very intelligent people, and I think the last year and a half has borne witness to that reality in Washington, and so I introduce Joe Courtney for an opening statement.

Mr. COURTNEY. Thank you, Mr. Chairman.

I was just about to begin by saying what an intelligent, good looking, and articulate Chairman we have today. It is a coincidence that——

Chairman MARKEY. You will go far in our system, yes.

Mr. COURTNEY. I represent the eastern half of Connecticut. In the last three weeks, I was at a factory in Westbrook, the Lee Company, 800 employees, they make aircraft parts, very energy-intensive factory. They turned on an acre of solar panels, again, just a couple of weeks ago, with a cheering crowd there to witness it.

A couple weeks ago I was at Windham Hospital, where we cut the ribbon for a UTC fuel cell power plant, which will take up 40 percent of the energy costs to run the hospital. Lee Company will be 20 percent for the solar panels.

STR Technology up in Enfield, which makes the protective coating for solar panels, they are now working three shifts, 24/7, they can hardly keep up with the demand that's coming in from all over the world, as well as the U.S., in terms of the product that they were out there pretty lonely selling 10 or 15 years ago.

Every single one of these stories is united by one aspect, which is that the renewable energy production tax credits make these enterprises feasible, and we have two people here today, three people, really, Chairman Markey, John Larson, Chris Shays, who have been strong advocates, they were prophets, in terms of the value of this type of public policy, but in every instance when I went to visit over the last few weeks it was—the message was loud and clear that without those production tax credits these efforts would not have been possible, and they show that there really is an intersection between public policy and the challenges that the other members have talked about here this morning.

We have obviously got to extend the tax credits, which are due to expire in December, but we have a much bigger step to take after that battle is finished, and I look forward to the witnesses helping guide us as policymakers to make sure that we take this challenge as an opportunity and work out great solutions, not only for our country, but for the State of Connecticut.

Thank you, Mr. Chairman.

Chairman MARKEY. Great, the Gentleman's time has expired.

And, one last invitation to everyone whose legs are starting to get wobbly up there, who might want to reconsider whether or not they would like to move down and to sit in the front, please, we welcome you to——

Mr. COURTNEY. You are allowed to leave any time you want, so it is not a two hour commitment.

Chairman MARKEY. So, come on down. You are welcome. Great.

Our first witness, Mr. George David, is the Chairman of the Board at United Technologies Corporation. He joined UTC in 1975. He served as President and CEO, and presided over UTC's transformation to a $63.5 billion conglomerate with a focus on research and development. He's chaired the boards of the graduate business school at the University of Virginia. He's Vice Chairman of the Peterson Institute for International Economics.

It's a great honor to have you with us today, Mr. David, whenever you are ready, please begin.

STATEMENT OF GEORGE DAVID, CHAIRMAN OF BOARD, UNITED TECHNOLOGIES CORPORATION

Mr. DAVID. Mr. Chairman and Congressmen, thank you very much for being here. Thank you for those introductory comments. John Larson, I especially thank you for yours, you are your usual enthusiastic self about UTC.

Since we are here in our own home state and city of Hartford, Connecticut, I should make just the quickest comments about UTC. We are New England's largest private employer. We have had $60 billion in revenues this year. The products include, as this group here knows so well, Pratt & Whitney aircraft engines, Sikorsky helicopter, Otis elevators, Carrier air conditioning systems. We also make fuel cells, as has been referred to by our congressional visitors today, and also on-site co-gen products which we have particular interest in our conversations.

Now, I have a single message, it is one of great, great optimism. I think it is also based on a very solid foundation of science and physics. We are a big research spender, some $3.5 billion a year, as has been noted earlier, and I think we speak with both knowledge and also with great optimism. And, the reason why is because the common denominator of every single thing that UTC does is, we convert energy to useful work, whether it is overcoming gravity with elevators or aerospace, or climate with carrier heating and air conditioning systems, all these things are bound together by the consumption of energy to make useful work for our planet.

And, out of that background, I have a single point to emphasize today, which is we can do more with less. We can do far, far more with far, far less in energy consumption. And, to do so with nothing, relying on nothing more than the laws of physics, which I believe are about as solid and reliable a foundation as we will find for anything on the face of this earth.

We are also starting in conservation from a remarkably low base. On physics, if we take the energy coming out of the ground expressed in some measure like BTUs or other physical equivalent, 91 percent of that energy is wasted before it becomes final or useful work. And, final or useful work would be the hot air in your hair dryer, or it could be the rotation of the wheels of your car, 91 percent in physical terms just disappears and goes away. And, that is because we have the legacy of well more than a century of cheap energy, nearly free energy, and because it is free we have learned to waste it. And, in physics you don't have to have anything remotely approaching 91 percent waste. I think this is the biggest single opportunity for us to solve the energy problem, and I put

that ahead of renewables, ahead of alternatives, ahead of convention fossil fuels. Do more with less.

And, by the way, that does not mean—well, the conventional viewpoint about conservation is sleep in the cold, work in the dark. I don't mean that whatsoever. This is simply having the same standard of living we have today, but simply having more efficiency in the underlying conversion processes.

I have four examples to touch briefly in the few minutes allotted to me this morning. One is, half the energy in central station power plants goes up the stack as waste heat. Now, why is that, because you cannot move heat economically. An alternative is to move the power generation from the central station to on site locally in buildings, and then recapture and reuse the waste heat.

On measurement, a central station power plant operates with a physical energy conversion of efficiency in the low 30 percent. If you do the power generation on site, recapture and reuse the waste heat for other building uses like air conditioning, yes, heat can make cold in air conditioning. You can run the physical conversion efficiency from the low 30s to the high 70s percent capture, and that goes a long way toward removing or toward working away at that 91 percent of energy which is otherwise wasted.

I think another one that is to me startling and transparent in its simplicity and its power. We waste energy by not recapturing it from vehicles and other accelerated objects when they are braked. You have to think about that for a second. Isaac Newton taught us that in the 17th century. The energy of deceleration is equal to an opposite to the energy of acceleration. Yet, for more than a century of vehicles we have never captured the energy of acceleration via the process of braking or deceleration.

But, there are some examples that work today. Otis elevators with regenerative drives, this is a very simple example, recapture the energy on descent that went into the elevator on ascent. And, the result of that is that we can run elevators today that use 75 percent less electric power than were used in comparable elevators measured in speed and load only a decade ago, four times improvement in efficiency, and it is that basic principle of recapturing the energy of acceleration via the process of deceleration, and that is the laws of physics just as naked as we can possibly get them, and it can be done.

Of course, elevators are relatively small energy users in the entire world, vehicles are much bigger ones, and let us note the fact that we have never, until hybrids very recently, recaptured the energy of acceleration in cars, and the principal benefit of hybrids is not so much the gas electric combination, it is the recapture of energy in the braking cycle.

A third example is heat transfer instead of heat dissipation. Heat is everywhere in the world, and it goes everywhere in the world. We are doing a multi-year study with the World Business Council for Sustainable Development. A couple of statistics are revealing. First of all, buildings that count for 40 percent of the world's total energy load, they are actually a larger component of energy load than are vehicles in the entire world.

Within buildings, and here is one example, hot water heating uses a surprising 15 percent of the 40 percent energy consumption

for buildings, and yet, again, this goes back to physics, we still do it the old way. Think about hot water heating in your house. We do it just the same way we did it thousands of years ago with a pot over a camp fire. That is, we heat hot water conductibly with the direct insertion of energy into the water.

I want to borrow from air conditioning for a second. That means the physical conversion of that process is definitionally less than one, that is, BTUs can become calories, and there is a physical conversion process and definitionally it is less than one when you have the pot over the camp fire, because you will have some energy that dissipates and goes somewhere else.

Now, you can also transfer heat. Heat is everywhere in our world. You can also transfer heat and you can concentrate it, the same way you do with a heat pump, which some people have in residences, and are growing applications, but you can do the same thing with hot water heating. Just take heat that is in the atmosphere, concentrate it, move it, and put it into the hot water, with an energy conversion efficiency of three to four times higher than you have with the direct insertion, as we would have with the pot over the camp fire.

And, that means that you can drop the energy consumption for hot water heaters by 70 percent, that again, is 15 percent of buildings, and buildings are 40 percent of the world. These are big numbers. In fact, hot water heating savings are, potentially, several percentage points of the total world energy demand.

The fourth opportunity is electric power generation from geothermal. We build some products today that do that right now with geothermal energy as low as 165 degrees Fahrenheit, the U.S. Geological Survey says there is 10 percent of energy load in America can be met by geothermal applications with water at this temperature or higher.

The point of all these examples is that energy conservation, in significant amounts, reflects the laws of physics. It is feasible today, good financial returns, products exist, products are coming, and there is great impact to drop this 91 percent of energy that is wasted.

I think to close this may be with an internal comment, conservation in a company like ours can be achieved both in our products, that is, I have spoken here about air conditioning, things like that, geothermal, elevators, but also inside our operations internally. And, for the latter, that is operations, since 1997 this company has reduced its gross energy load by 20 percent in absolute terms, while the company has grown to more than twice the size. That is an energy efficiency improvement of more than 50 percent, that is, normalizing energy for volume, 20 percent absolute, companies twice as big.

At the same time, our water consumption has gone down by 40 percent expressed in gallons, again, in absolute reduction. Looking ahead, we have taken 3 percent per annum goals for energy, reduction absolute, that is 12 percent over the four-year period from 2007 to 2010, and by the way, we beat that 3 percent in the first year of this four-year goal period last year. So, it can be done, both in terms of products we build, relying on things like physics which

are so reliable, you can see examples in internal operations of a great company like UTC.

And, I guess just to summarize this and restate, there is too much talk about alternative energy sources, I believe, and we have heard comments today, and I do not mean that to be in any sense a negative or a critical comment, I just think we always focus about the idea about renewables, and we can have some wonderful new things, and new sources, and, therefore, not oil. I think the biggest single source we have available to us is conservation, more with less.

And again, I do not mean the variety of conservation of sleep in the dark, or sleep in the cold, work in the dark, rather it is the simple notion, get rid of the waste and do more with less. It is a flat fact that most energy conversion processes are far, far from optimized. We can double, triple these easily, look at our own operations, energy is down 20 percent in a company twice the size, where general development is hot water heating by heat transfer, recapture of otherwise waste heat. The potential is clear and compelling.

And again, what has held us back is this century of cheap energy, and the prospect is changing and changing, I believe, forever. So, let us go back and use some physics and the basic principle of more with less, and we will lick this problem. This is a problem that can be solved.

Sometimes we have problems that cannot, this one can.

[The statement of Mr. David follows:]

George David
Testimony for the Select Committee on Energy Independence and Global Warming
July 28, 2008
Hartford, Conn.

First, the briefest words about United Technologies Corporation. We'll be about $60 billion in revenues this year and build aircraft engines (Pratt & Whitney), helicopters (Sikorsky), elevators (Otis), heating and air conditioning systems (Carrier), fire protection and security systems, aircraft and space systems, and even our country's iconic space suits. Finally, we build hydrogen powered fuel cells and a line of on-site co-gen products of particular interest today.

The common denominator of every single thing we do is to convert energy to useful work, whether elevators or air conditioning or aerospace. So we're highly alert to the energy and conservation agenda.

I have a single point to emphasize in these remarks: we can do more with less, and indeed much more with much less. Let's start with the fact that 91 percent of the energy coming out of the ground is lost or wasted before it becomes useful work. It does not have to be that way, not remotely. A glaring example is that half of the input energy in a central station power plant goes up the stack as waste heat because we can't move heat effectively any distance at all. But how about putting the generation on-site and capturing and using the waste heat there. We do this routinely, and the answer is that energy conversion efficiencies (which means kilowatts or work out relative to Btus in) go from percentages in the low 30s for central station plants to more than 75 percent for generation and heat capture locally.

A second glaring example is not recapturing input energy into vehicles and other accelerated objects when they're braked. Isaac Newton taught us that the net energy in this acceleration/deceleration cycle is zero, adjusted only for system inefficiencies and losses. A good way to think about this is elevators. New ones recapture the energy on descent that was expended on ascent. The result is that we build Otis elevators today that use 75 percent less electric energy than comparable equipment in speed and load a decade ago. Said another way, a re-generative high rise elevator lifts a million pounds a day for an energy cost of a dollar an hour.

The third glaring example is heat transfer instead of heat dissipation. Realize first that air conditioning systems do not cool air in a direct sense like food in a refrigerator. Instead they move heat from one place (inside) to another place (outside). We measure the efficiency of air conditioning systems by Coefficient of Performance (COP). It's the amount of energy required to move another amount of energy (in this case the caloric content of the heat moved). Air conditioning systems worldwide work this way, and the COP is between three

and four times. In other words, one unit of input energy is needed to move three or four units of energy or heat.

So how about heating hot water by heat transfer. We're learning an amazing statistic in a multiyear study of buildings worldwide with the World Business Council on Sustainable Development. First, buildings themselves account for about 40% of the world's total energy load. Inside buildings, hot water heating accounts for a remarkable 15% of their total energy demand. And we still do it the old way with direct or conductive insertion of heat into the water, just as we did thousands of years ago over the campfire. In other words with a COP of less than one, by definition. But it's also entirely feasible to heat hot water via heat transfer with COPs like air conditioning of three or four times. So energy can go down by 70 percent which means 10 percent or so less energy for buildings. Which is four percent for the planet! And paybacks are good too, between three and four years.

Yet another heat transfer opportunity is electric power generation from geothermal sources. UTC builds a unit generating a little over 200 kW, and we're about to launch one in the megawatt range. We can work with lower grade geothermal heat at about 165 degrees Fahrenheit, and according to the U.S. Geological Survey this source is enough to provide about 10% of the nation's energy load. And unlike wind or solar sources, the source doesn't shut off from time to time.

The point of all these examples is that energy conservation in significant amounts is feasible today and reflects the laws of physics. And not only feasible but with good financial returns.

Let's apply this to Connecticut for a moment. The State has a population of about 3.5 million using about a million buildings and three million cars. I'll skip the terawatt hours because nobody can keep track of the zeros and instead talk about energy loads in large power plant equivalents. On this basis, Connecticut needs about 31.

A little less than half of this energy load supports buildings, about 40 percent vehicles, and the balance industrial. Inside the 47 percent for buildings, about half or 24 percentage points is used for heating. Another eight percentage points each for lighting and hot water, four percentage points for equipment and appliances, and a surprisingly low three percentage points for air conditioning (recalling the comment about the efficiency of heat transfer above!).

So where do we start? First is setbacks on heating/cooling/lighting for residential and office space when not occupied in off hours during the day for residences and at night for commercial space. Both would save about 10 percent of their current total energy load, or about a power plant in total.

Another is the hot water heating example earlier. Another power plant. Another is re-generative elevators although their total energy load isn't enough to make the power plant savings meaningful. But we could extend the same reasoning to cars which would save at least three power plants. Bear in mind that hybrids do this already by capturing braking energy while re-charging the battery.

Fourth is to move more central station electricity generation to units on-site in buildings, enabling capture and use of the heat there for heating, air conditioning, and hot water. Another two power plants.

Together these are about seven plants out of Connecticut's 31 equivalent total, or 23 percent. The saving won't come cheaply with retrofits versus new construction but it's what a greenfield state would look like, and lots of the gains can be had with attractive returns even on a retrofit basis.

Conservation in a company like ours can be achieved internally as well as designed into our products. Over the last decade, UTC has reduced its energy consumption (in kilowatts and Btus) by an amazing 20% even while the company has more than doubled in size. Our water consumption is down comparably 47%.

In summary, there's too much talk about alternative energy sources and way not enough about conservation. And when there is talk about conservation it's typically of the variety of "sleep in the cold, work in the dark." I'm not talking about this at all, rather the simplest notions of getting rid of the waste and doing more with less. It's a flat fact that most energy conversion processes are far from optimized, and that we can readily double or even triple these efficiencies of conversion. Look at our own operations with absolute energy down 20% on a company twice the size. Look at products like regenerative elevators, hot water heating via heat transfer, and recapture of otherwise waste heat literally all over the world, and the potential is clear and compelling. What's held us back for a century is cheap energy, and now that prospect is changing and maybe forever. It's time to use physics and the basic principle of more with less to change our world.

Chairman MARKEY. Thank you, Mr. David, very much.

The next witness, John Rice, is currently the Vice Chairman of General Electric, as well as President and CEO of G.E. Infrastructure, a business segment which includes energy, aviation, rail, oil, gas, water, energy, financial services, and aviation financial services.

Mr. Rice joined G.E. in 1978, was also President and CEO of G.E. Energy, a leading supplier of power generation technology energy services and energy management systems.

We welcome you, sir, and whenever you are ready, please begin.

STATEMENT OF JOHN RICE, VICE CHAIRMAN, GENERAL ELECTRIC, PRESIDENT AND CEO, G.E. INFRASTRUCTURE

Mr. RICE. Thank you, Mr. Chairman and Members of the Committee. We really appreciate this opportunity to testify this morning.

At our heart, I think most of you know this, G.E. is a technology company that has withstood the test of time for 125 years because of a commitment to invest in the technologies that solve big problems, meet market needs and improve standards of living.

As you all know, a focus of this hearing is around sustainability, and in that context we are proud of our commitment to ecomagination, which is the program under which most of our sustainability efforts lie. When we launched ecomagination in 2005, it included four major commitments, that we would first double our investment in environmentally responsible technologies, second, that we would significantly reduce our own greenhouse gas emissions, third, and importantly, that we would sell more products and services and demonstrate that these new technologies would be valuable to our customers and deliver a return to our shareholders, and fourth, that we would be very public about our commitments and our progress toward them. Earlier this year, we added a fifth commitment, to reduce our own water consumption by 20 percent by 2012.

Three years into the mission, we are meeting or exceeding each of our goals, and in light of the focus of this hearing, and what we are learning as a company as we take this journey, I would like to reinforce three points.

First, we believe that it is critical for companies like ours, and governments like the United States, to invest in advanced technology that reduces fuel consumption and emissions. But, these efforts also, as my colleague just pointed out, must apply to the enormous installed base, as well as the next generation jet engines, locomotives and gas turbines.

The products that we bring to market will help secure our energy future by allowing consumers the benefit of cleaner energy from a broader range of sources. Some ask if we can afford to invest, when the real question is whether we can afford not to.

The second point is that we are dealing with big problems that have taken decades, even centuries, to create. Solving them demands big investments and a coordinated approach, which attracts large companies like G.E., UTC and many others. Sustainability, therefore, requires a cycle of investment and reinvestment that introduces new technologies and improves them over time, just as it

has for combined cycle gas turbines, or wind turbines, or just about any other energy conversion technology you can think of.

Capital must be allocated and investments sustained over long periods of time, and this can only happen if reasonable returns and risk reward trade offs are available. Progressive environmental groups understand this and are allies now, where they used to be adversaries.

Anything else, anything other than this, will not deliver truly sustainable improvements in technology, and progress on climate change. All of us know that addressing climate change will require a basic shift in the way we produce and use energy, which is the underlying architecture of our economy and a fundamental building block in everyone's standard of living in every country in the world.

Solutions must be both technically viable and commercially acceptable. That is, available at a price that the market accepts. Too often today, we see the debate focus on one or the other, but not both. We believe that a cap and trade program can provide a reliable market pricing mechanism for carbon that will stimulate and accelerate research, development and deployment of sustainable technologies over the long term.

It can also ensure that appropriate incentives or returns flow quickly and predictably to investors and risk takers, who are bringing new technology to markets. However, we also think that the program is likely to be constructed to phase this pricing in over time.

During this transition period, sensible government policies are going to be necessary to stimulate the deployment of low carbon technologies, such as renewables and cleaner coal with carbon capture and sequestration. In effect, government must play a more substantial and stabilizing role as a bridge between technical and commercial viability.

The need for clarity and consistency in this area is especially critical at this time. Capacity additions are being made in the U.S. and around the world with long-term implications. In some cases, decisions to invest in carbon free or low-carbon technologies are being deferred largely because economic or risk reward models assign no value to carbon reductions.

The third point that I would like to make is that there is no one special technology that is going to solve the climate change problem. Since our portfolio includes an extremely broad range of energy solutions from wind turbines to nuclear reactors, and just about everything in between, we can have a pretty objective view about the trade offs among the various choices. Simply stated, if the goal is energy security, we will need as many choices as possible.

We believe that our country's energy and climate policies must promote a balance of reliable, clean and low-cost energy from a diverse fuel mix. These policies must recognize the continuing importance of all current and potential fuel sources. Because coal will remain an important fuel for the U.S. and many other countries, it is imperative that climate change policies promote development and deployment of carbon capture and sequestration technology as rapidly as possible, and ideas like replacing nuclear with wind might make for nice headlines, but will never work unless we are

prepared to find space for another 150,000 wind turbines, which would require about 7 million acres, to replace the hundred reactors we have today that will be decommissioned at some point.

As you know well, there is important work to be done, and the U.S. Government must play a proactive role with regulations and incentives that encourage the biggest and best deployment of private capital.

Again, thank you very much for the opportunity to testify.

[The statement of Mr. Rice follows:]

STATEMENT OF JOHN G. RICE
VICE CHAIRMAN, GE
BEFORE THE HOUSE SELECT COMMITTEE ON
ENERGY INDEPENDENCE AND GLOBAL WARMING
JULY 28, 2008

Mr. Chairman, Members of the Committee. Good morning and thank you for the opportunity to appear before you today. I am John Rice, Vice Chairman of the General Electric Company, and President and CEO of GE Infrastructure. GE's Infrastructure organization is GE's largest business, and includes our aviation and energy businesses, our financial service units for aviation and energy, as well as our oil and gas, rail and water businesses.

I am pleased to join you to explain how we have taken the term "sustainable" and applied it to these broad and diverse operations and across the whole of GE.

1. SUSTAINABLE BUSINESS IS GOOD BUSINESS

After 130 years, we have a unique perspective on how sustainable business can be good for the bottom line. We took some risks – but we have been rewarded. I'm pleased to share our experience with you today.

GE launched its sustainable business strategy – what we call "ecomagination" – in 2005. It is our commitment to invest in technologies that help our customers and our selves address growing climate and resource scarcity challenges. Our commitment has been grounded in the belief that what is good for the environment is good for business, and what's good for business can be good for the environment. We like to say green is green: that the power of technology is going to enable environmental investing, environmental development and energy savings to drive profits for our shareholders.

We made four concrete, measurable commitments three years ago:

1) to grow cleaner revenues to $20 billion by 2010
2) to double cleaner R&D to $1.5 billion by 2010
3) to reduce our own GHG footprint and energy use, and
4) to keep the public informed.

We have recently added a fifth commitment:

5) to reduce our water use by 20% by 2012.

The results are encouraging for our company, our employees and our shareowners. Our ecomagination revenues will be $18 billion this year and we will reach our $20 billion goal a year ahead of plan, and therefore are raising our goal to $25 billion by 2010. Our order backlog is more than $70 billion. Ecomagination revenue has been growing at 20 percent a year, faster than the rest of the company as customers opt for products that provide them better environmental performance and better economics.

With record-high prices for oil, natural gas, coal, and almost every raw material, green is truly green.

It is also driving innovation. We will spend $1.4 billion on "cleantech" this year, nearing our goal of $1.5 billion in annual clean R&D investment by 2010. We continue to invest in products and new technologies to make more efficient and less emitting gas turbines, aircraft engines, locomotives and compression equipment. These investments cannot be made instantaneously. We continue to grow our R&D spending year over year, contributing an additional $2 billion in the five years stated to reach out 2010 goal. We are funding improvements in wind turbines and solar that will make these renewable technologies more efficient and cost effective. We have already seen the huge impact on the cost of wind power – now at 8 cents/kwh, competitive with mainstream generation.

We are working on new technologies such as Integrated Coal Gasification Combined Cycle, which will allow this country to use its indigenous, secure coal resources. Other technology programs include more efficient grid transmission and the ability for utilities to utilize existing resources more efficiently through Smart Meters and demand side management – the latter which would allow ratepayers to "talk" to their utility over power lines and use energy more judiciously.

We have invested in numerous technologies that allow industrial and municipal customers to use water more efficiently. In many industrial applications, our technologies enable 90% recovery of wastewater.

And finally we are exploring the potential of next generation biofuels: both the ability to utilize these fuels in all of our combustion products – like aircraft engines, gas engines, gas turbines and locomotives – as well as in supply equipment to make these processes more efficient and sustainable.

We also committed to lowering our own greenhouse gases by 2012 by an absolute 1%, compared to our 2004 baseline. We have more than 5,000 projects across the company, helping reduce our CO_2 footprint by 8% thus far, or 700,000 tons. We committed to lowering our energy intensity by 30% by 2012; we currently are down 34%.

What is equally important is that these actions have resulted in savings to the bottom line in reduced energy and fuel consumption of $100 million last year and an estimated $120 million this year. Most of these projects have less than a two-year payback and many are under 6 months. Investment in energy efficiency is just smart business – and a hedge to future high-energy prices and the very real likelihood of a price on CO_2. This is good news for GE investors as it reduces risk. It is also an energizer within our company, offering employees opportunities to highlight savings within their own businesses.

We remain transparent in our actions and are publicly accountable. We issue an annual ecomagination report, are founding members of the US Climate Action Partnership, engage with customers, thought leaders, governments and NGOs all around the world and, of course, are here today as part of that commitment.

Finally, regarding our fifth, and newest, goal: a 20% water reduction. This commitment is expected to free up enough fresh water to fill over 3,000 Olympic-sized swimming pools every year. Mr. Chairman, while CO_2 is a major challenge in today's environment, we believe water scarcity is the next such challenge – and is already upon us. And we think that GE technology can help.

In short, we see financial benefits by having more differentiated, competitive products that are winning in the market place, lower operating costs due to better efficiency, and significant public recognition for our efforts. This is of exceeding value in our relationships with customers – my second point today.

2. HELPING CUSTOMERS COMPETE AND WIN IN THE NEW GREEN ECONOMY

Sustainability often casts a myopic view toward improving the environment and combating climate change. We find that unless these solutions are coupled with a realizable economic benefit, rapid implementation cannot be realized. With respect to the competitive advantage that sustainability offers, some numbers make the case most clearly.

We are the number one wind turbine manufacturer in the U.S. and number two worldwide, with over 8,700 wind turbines installed. Wind will be a $6 billion this year, up from $300 million when we bought it just 6 years ago. The business has grown because we invested in technology – wind capture, reliability, and maintenance – that improved both performance and economics.

Our evolution locomotive, 5% more efficient than the competition, was and continues to be the most successful uptake of a technology in the rail industry, where we enjoy a strong number one position.

Our GeNX, GE90 and CFM aircraft engines continue to hold number one positions on all the aircraft they power and we were just recently awarded over $4 billion in orders at the Farnborough International Airshow. Our biomass engines, called Jenbachers, continue to grow their installed base around the world with over 8000 engines installed and a third in renewable applications such as landfill, biomass or coal mine methane applications.

These numbers are clearly good for GE. But they are only so because they help our customers compete both technically and commercially to win in an increasingly carbon-constrained world. Whether an airline, a utility or a railway, these customers need these technologies to succeed in today's changing regulatory and policy landscape.

We plan to continue making money doing this, and helping our customers to make money. We are capitalists at GE.

And if industry cannot make money for shareowners, then that is not a "sustainable business" – or a logical way to produce real policy progress. Big solutions require big bets on big technology. Anything else will not work.

3. FUTURE U.S. CLIMATE AND ENERGY POLICY

Now: to our views on climate and energy policy.

We need a national climate change and energy policy to provide certainty so the necessary investments can be made in the most cost effective way possible.

Our goal must be availability, affordability, sustainability, and security. It requires convergence of policy and technology.

Our recommendations on climate and energy policy are grounded in the following principles:

- It is critical for our energy and national security that the U.S. avoid overdependence on any single source or region for energy. Energy security can best be achieved through government policies that promote diversification—of geographic sources, fuel types, and technologies—so that the potential impact from disruption of any one source is minimized.

- Government should expand funding for advanced research and promote broader private sector investment in order to realize breakthrough technologies. Pubic-private investment can also reduce costs for existing technologies like solar, geothermal, wind, and coal gasification. Adequate protection of intellectual property rights is essential for promoting continued private investment in cleaner energy research and development.

- Energy-saving technologies and conservation can bolster energy security, reduce emissions quickly and at low cost. Incentives are necessary to encourage their adoption and must be directed both to technologies to reduce consumption and to encourage upgrades to the installed base.

- Governments must establish polices that establish a price on greenhouse gas emissions in the very near future. This price must be predictable, long-term and at a level that achieves required emission cuts. The backbone of this program must be a mandatory cap and trade program that covers as a broad a spectrum of emission sources as is politically achievable and administratively practicable.

- Governments must create incentives for accelerated deployment of low-carbon power generation and renewable technologies. For example, we need a long-term production tax credit for wind.

- Nuclear energy is a near-zero, low cost energy source. Early, widespread deployment of nuclear should be promoted through financial, regulatory fuel storage and liability protection initiatives.

- Coal is the most available energy source in the U.S. supplies much of our energy and should remain part of our framework. Coal gasification and carbon capture and sequestration require legal structures, emission standards comparable to natural gas, and incentives for technology demonstration and deployment.

- Natural gas is a low-cost, plentiful and cleaner-burning fuel for power generation and heating. Natural gas is the cleanest, non-renewable fuel choice in the short-term and will be a primary fuel of choice due to current structural and regulatory constraints on coal and nuclear. Government policies must encourage increased efficiency and reliable and consistent siting of natural gas plants and facilities.

Finally, in considering the important pieces of a viable near-term energy policy, I would respectfully call your attention to the renewable energy tax credits that expire at the end of this year, and ask your urgent help in renewing them soon.

Long-term, stable, predictable incentives encourage innovation and give technology manufacturers and suppliers the confidence to invest in expanding capacity. In also drives improvements in efficiency and cost. For example, innovations in wind turbine design since 1985 have lowered the cost of wind-generated energy by over 80%. Size and efficiencies have also improved. In 1985 the average wind turbine was 100 kilowatts with a 17-meter rotor blade. Today our standard turbine is 1,500 kilowatts with an 82-meter rotor and each provides energy for roughly 500 homes.

Unpredictable policies, conversely, stunt investment and send an unwanted signal that the US government is an unreliable partner in the difficult and expensive quest of deploying cleaner technologies.

A clear illustration of the importance of stable, long-term, predictable policy is the historical "boom-bust" pattern of the US wind segment resulting from the "on-again, off-again" nature of the production tax credit. When the production tax credit expired at the end of 1999, 2001, and 2003, wind power installations declined by 73% to 93%. By contrast, the repeated extensions in 2005 and 2006 have stabilized the policy environment, establishing the United States as the world leader in the annual wind power installations and stimulating investments and jobs.

With only months remaining for the current credits, GE Energy Financial Services estimates that over 6 gigawatts, or more than $12 billion of project investment, are at risk. They have also assessed the overall economic impact of the 5.2 gigawatts of wind installed in 2007, and found that the PTC more than paid for itself through project and other tax revenues.

4. CLEAN R&D

There needs to be a convergence of policy and technology that will allow us to reach a goal of greater energy availability and affordability, growth in sustainability and strengthening of energy security.

In this world we can never be certain which technology, which public policy is going to pass. But GE is big enough to spread a number of different, big bets at the same time.

Our R&D pipeline is full with new product and white space ideas and we have grown our eco product portfolio three times since we started. We now have more than 60 ecomagination products demonstrating both environmental and commercial benefits for our customers.

In addition to the technologies discussed above, GE has invested in technologies that help end users – such as small and medium enterprises and individual consumers – lower their carbon footprints, energy bills and water consumption.

These technologies include the world's most efficient lighting products, such as linear fluorescents and compact fluorescent bulbs, Energy Star appliances, and energy management and controls.

Two interesting new offerings include the Homebuilder Program inspired by ecomagination which guarantees 20% less energy and water use for the certified home. Even in this distressed homebuilders' market, this program is doing well, with close to 30,000 homes under contract.

A similar product for hospitals has been introduced which not only improves the workflow efficiency in the hospital but its energy and water footprint. It is an exciting new product that will be built at the intersection of energy and healthcare – clearly, two of the major concerns facing this country.

5. ENSURING FREE AND FAIR TRADE FOR TECHNOLOGY

From a global perspective, we must remain aware of the impact of trade barriers, including unreasonable tariffs on clean technology, and other "debates" that impede the flow of technology, and ultimately our ability to achieve energy security.

International trade is an integral part of the U.S. economy, accounting for more than one-quarter of the U.S. gross domestic product and supporting more than 12 million U.S. jobs.

At GE we are forthright free traders – because we see thousands of jobs in Lynn, Massachusetts, Greenville, South Carolina, Erie, Pennsylvania and Cincinnati, Ohio that exist due to our ability to compete globally. We don't see how we can have smart energy policy without smart trade policy.

CONCLUSION

Mr. Chairman, in closing, let me make an appeal for this country to pursue a full portfolio of choices from which to choose – and it must include renewables, nuclear, natural gas and coal. And we need forcing functions to advance technologies to produce energy from all these fuels.

The U.S. needs to draw equally from business, government, and non-governmental bodies to create climate and energy policy that is integrated, coherent and clear. That commits to market mechanisms. That promotes a diverse energy mix of proven technologies and encourages future technologies through tax credits and other economic incentives.

At GE, we invest in innovation because we find that applying technology against big problems is good business. But in the end, we need to work together to make true, lasting progress for business, the country and the world.

Thank you.

Chairman MARKEY. Thank you, Mr. Rice, very much.

Our next witness, Dan Esty, is currently Hillhouse Professor of Environmental Law and Policy at both Yale Law School and the Yale School of Forestry and Environmental Studies. He is also the Director of the Yale Center for Environmental Law and Policy and the Center for Business and Environment.

Mr. Esty's research focuses on next generation regulation, environment, trade and governance. He also was an intern in my office in 1979, and I wrote the recommendation for him to win a Rhodes Scholarship, so along with Jim Calhoun he is one of Boston's great contributions to Connecticut. Okay?

So, we welcome you, Dan, whenever you are ready, please begin.

STATEMENT OF DAN ESTY, HILLHOUSE PROFESSOR OF ENVIRONMENTAL LAW AND POLICY, YALE LAW SCHOOL AND YALE SCHOOL OF FORESTRY AND ENVIRONMENTAL STUDIES; DIRECTOR OF YALE CENTER FOR ENVIRONMENTAL LAW AND POLICY, AND CENTER FOR BUSINESS AND ENVIRONMENT

Mr. ESTY. Thank you, Mr. Chairman.

It is really a great pleasure, and I am still grateful for that opportunity to different leaflets in those early Markey campaigns. And then, you did get me to Washington where it took me nearly a decade to escape, and I have now been at Yale 14 years.

But, in my time in Washington, I did have the fortune to work for an EPA that actually tried to do something, had the privilege to be the Chief Negotiator of the Framework Convention on Climate Change for the EPA, and I think the issues that you have put forward for us to think about today are ones that have sadly not made progress for a very long time.

So, I want to reflect on where we are and where we need to go.

I think America stands at a watershed moment. I think we face a triple policy challenge that is almost unprecedented in its complexity and its urgency.

As you have already made clear, all of you, in fact, have spoken, the climate pressure on us is mounting, the greenhouse gases are building up, we cannot lay back. We have, in fact, spent too much time not addressing this issue for a good period, and we have to step up.

And, at the same moment we face an energy crisis, real pressures on real people, with $4 a gallon gasoline and the threat of heating oil at prices that are going to be hard to bear this winter. And, I think that is a challenge that we have to take seriously.

So, we are going to need clever policy that responds, both to the need to bring greenhouse gases down, and to respond to the climate issues in the energy relationship, and, frankly, there is a third piece to this, and that is our independence, our energy independence, and the economic consequences of shipping something above $650 billion a year overseas to pay our energy bill, not to mention the geostrategic challenge of being reliant on the Middle East. I think all of us become frustrated with the situation in Iraq. I think even more generally that Middle East is an area that we understand is complicated, and we do not do well there. And, if we stay on a fossil fuel track, even if we were to get out of the Middle East

it means reliance on other places, like Russia, and Kazikstan, and Venezuela, and Nigeria, it is almost a laundry list of places we do not want the life blood of our economy dependent.

So, I think we are at a moment where the commitment to a clean energy future is critical. And, this will present challenges, it will require sacrifice, but I also want to focus on the opportunities. This, as Congressman Larson made mention, is what I have spent a good bit of time researching for more than 15 years, have been arguing that the critical point of leverage for policy progress on the environment is the business world. So, I think engaging the private sector in the search for solutions, and we have heard two great examples already today, is the critical challenge in front of us.

And, let me just identify three quick points in that regard. I think we have a revolution going on in business attitudes towards the environment, and I want to talk about that. I think we have an opportunity for a policy rethink and a revolution in policy progress. And finally, I think the link to our economic future is really important to stress.

In terms of the sea change in business attitudes, you could not have had a more beautiful demonstration of that than what we have heard already today. When I first got to Washington, almost every corporate leader talked about the environment as a burden, as a cost, as regulations to follow. What you have heard today is a whole new attitude and, frankly, while these are leading examples there are hundreds, thousands of businesses and business leaders across the country that understand today there is an up side opportunity in responding to society's needs, and engaging in the search for technology solutions. So, I think we really do have a big opportunity in that regard.

You know, for all of you who have seen this, you know, this is UTC, and it is all of what George David talked about and more, just dozens of different interventions across the efficiency conservation platform, but also in terms of new technology in fuels, and the same thing is going on at G.E., where John Rice and Jeff Immelt are investing in high-efficiency locomotives, jet engines, wind power, solar power, clean water, it is a full-bore spectrum of technology opportunities that they are pushing.

I think the challenge then is to produce a police revolution that supports the sea change in business attitudes, and that really requires us, I believe, to put innovation front and center in how we envision our policy structure, and we really focus on creating incentives that engage the private sector.

So, what does that mean? Number one, make polluters pay for the harms they cause. Fundamental principle, we talk about it, we do not do it. We often just simply set a standard and say, if you bring emissions down to there you are okay. I say no good, make people pay for every bit of their emissions, and I think the first step is the climate change package that has a cap and trade program. But, I say, let us get serious about it, auction all the permits, and let us move over time to a broader commitment to making polluters pay and having a price on every bit of harm that is caused.

Second, if we really are serious about innovation, we have got to promote broad-scale innovation. We want to have a lot of money devoted to this sector, and we want to have a lot of players betting

in diverse directions about what the future is going to require. And that, I think, requires more than just a cap and trade program in a climate change context. I believe we need a policy portfolio of incentives.

And some of this again is already under debate. We need green building standards, we need commitments to energy efficiency. We, frankly, need funding mechanisms to ensure that every-day people can bring some of these important conservation activities into their own homes. There is big challenges of both cost and inertia in getting us to retrofit all of America's houses to be the energy efficient places we need them to be.

So, I do think we have to have a portfolio approach with lots of different incentives. And, I promise you, and these guys I think have already hinted at it, that at $125 a barrel for oil every single company in America can do a lot to improve its efficiency, and every single one of us is under invested in efficiency in our own homes. This is a huge challenge. We need to address it together.

And finally, competitiveness. If we, as a nation, do not step up and push forward this clean energy future, others will do it. We saw just last week a huge effort being launched in Abudabi to create a cluster around clean energy. G.E. is, in fact, involved. That cluster should be in Connecticut. We need to have the same level of commitment here to really pushing out technology innovation and our own commitment to a clean energy future.

And, I think it is absolutely the case that what Saudi Arabia is to oil we in this country are to innovation and technology development, and it is a policy structure to support that that I think we need to push for.

And so, let me close by saying that this is not just an environmental challenge, but, of course, it is. It is not just an energy challenge, and, of course, it is. I think it is a fundamental challenge to the future of our country and to our prosperity.

And, speaking as a former negotiator, it is not just important that the U.S. get on the game plan, which we have not been for eight years, but we have to lead the program. There are no examples of a successful response to a global environmental challenge, and, frankly, we have never had one as big as climate change, but even smaller challenges, we have never succeeded where the U.S. is anything less but driving the bus. So, we need to get ourselves in that front seat, and really push out on this innovation model.

Thank you very much, Mr. Chairman.

[The statement of Mr. Esty follows:]

Testimony by
Daniel C. Esty
Hillhouse Professor at Yale University
Director, Yale Center for Environmental Law and Policy
Co-Director, Yale Center for Business and Environment

United States House of Representatives
Select Committee on Energy Independence and Global Warming

Hearing on
The Economics of Global Warming:
Shaping How US Companies are Doing Business

July 28, 2008

My name is Dan Esty, and I am a professor at Yale University where I hold appointments in both the Law School and the School of Forestry and Environmental Studies. I am also Director of the Yale Center for Environmental Law and Policy (www.yale.edu/envirocenter) and Co-Director of the Center for Business and the Environment at Yale (www.yale.edu/cbey). I would like to thank Congressman Larson, Chairman Markey, and the other members of the Select Committee for the opportunity to testify today. It is an honor to be here and to share my thoughts on the economics of global warming – and on how American companies can turn our present energy and environmental challenges into opportunities. Our nation's success in responding to the issues you address today – finding a way to combat climate change and putting the United States on a course toward a Clean Energy future – will, in very fundamental ways, determine the health of our planet and our economy for generations to come.

I have been at Yale for 14 years, where my teaching and research center on "next generation" environmental policy, global environmental governance, corporate

environmental strategy, and "trade and environment" issues. Prior to my time at Yale, I spent nearly a decade in Washington in a variety of positions, including a four-year stint at the US Environmental Protection Agency, where I served as Special Assistant to EPA Administrator William Reilly, Deputy Chief of Staff, and Deputy Assistant Administrator for Policy. During that time, I helped to negotiate the 1992 UN Framework Convention on Climate Change, the environmental provisions of NAFTA, and various elements of the 1992 Rio Earth Summit.

Much of my work focuses on the business-environment interface. I have studied both how policy structures create (or fail to create) incentives to engage the private sector in addressing environmental harms and why environmental protection and related energy issues have become core elements of business strategy. My recent book, ***Green to Gold: How Smart Companies Use Environmental Strategy to Innovate, Create Value, and Build Competitive Advantage***, shows why corporate leaders have come to recognize that environmental thinking in general and a focus on climate change in particular can be sources of competitive advantage in the marketplace. The research for this volume involved interviews with hundreds of corporate executives and dozens of companies across the United States and around the world – and provides the underpinning for my testimony today.

Overview

I want to stress three major points in my testimony:

1. There has been a sea change in business attitudes towards the environment and climate change over the last several years. Smart executives have come to understand that environmental issues (including the challenge of

reducing greenhouse gas emissions) are not simply about regulations to follow, costs to bear, and risks to manage. They also offer important "upside" opportunities. Specifically, companies that are able to position themselves as "solutions providers" are going to profit handsomely from society's increased investment in responses to climate change and other environmental challenges.

2. The key to progress on environmental issues generally and climate change specifically lies with adopting an innovation-oriented approach to regulation. This means using policy tools to create incentives that engage business leaders in technology development and the search for improved energy efficiency, alternative sources of energy, increased resource productivity, and the possibility of carbon capture and storage. Policies that promote a large-scale private sector commitment of resources and effort to a diverse set of technology solutions in the climate change arena are essential. Harnessing the abundant creativity of our country's scientists, innovative thinkers, entrepreneurs, and venture capitalists is the key to societal progress in reducing greenhouse gas emissions. Innovation and technology development lie at the heart of not only a successful response to global warming but also to the renewed vitality of the US economy and our continued competitive position in the world.

3. The need to engage the private sector to maximize technology development and innovation in response to climate change does not mean that the government has no role to play. Quite to the contrary, our

lawmaking and regulations must be even more carefully designed to ensure that our policy framework has an appropriate portfolio of incentives in place to drive the innovation process and maintain US competitiveness.

I will elaborate on each of these three core points in the testimony that follows.

Business's New Attitude Toward the Environment

Business attitudes toward the environment have shifted dramatically in recent years away from thinking about climate change as merely a burden. A growing number of companies recognize that investments in eco-efficiency reduce operating costs and pay quick dividends. With oil prices at record high levels, the payback period for investments in "green buildings" (with more efficient lighting, windows, insulation, heating, and air-conditioning) has never been shorter. Companies can also save money and improve their competitive position by lowering their energy consumption through more sophisticated approaches to distribution, warehousing, and logistics – and particularly by bringing information technologies to bear on environmental problems.

Business leaders are stepping up to these opportunities. UPS has used onboard navigation systems to dramatically reduce the number of left turns its drivers make – cutting 28 million miles from their routes, saving the company over 3 million gallons of gas, and reducing their greenhouse gas emissions by over 25,000 metric tons.[1] Likewise, DuPont has cut its contribution to global warming over the past decade by an astounding

[1] Daniel C. Esty and Andrew S. Winston, *Green to Gold: How Smart Companies Use Environmental Strategy to Innovate, Create Value, and Build Competitive Advantage* (New Haven: Yale University Press, 2006), 106; Emissions factor from Environmental Protection Agency, "Greenhouse Gas Equivalencies Calculator," Environmental Protection Agency, http://www.epa.gov/cleanenergy/energy-resources/calculator.html

72 percent, and CEO Chad Holliday's emphasis on greenhouse gas emissions reduction has saved the company an estimated $2 billion over this period.[2] IBM offers another example of corporate leadership on climate change that has delivered both environmental and economic dividends. The company redesigned its heating and cooling systems to be more energy efficient and ended up saving $155 million per year, as well as dramatically cutting its greenhouse gas emissions.[3] Staples similarly saved $6 million in two years with centralized controls for lighting, heating, and cooling at its 1,500 stores.[4]

The range of internal strategies that companies have used to identify opportunities for increased energy efficiency is truly impressive. BP discovered over $2 billion in savings by putting a shadow price on greenhouse gas emissions and internally trading emissions among its business units. Besides saving money, the company's experience helped it to refine its policy knowledge, positioning BP to shape the United Kingdom and EU emissions trading systems. As Lord John Browne, then BP's CEO, observed, getting ahead of the curve meant the company got "a seat at the table and a chance to influence future rules."[5] While many companies have come to appreciate the value of eco-efficiency in the context of high energy prices, the truly leading companies recognize that the real opportunity for competitive gain in the marketplace comes from helping to solve the energy crisis facing their customers. Two of the leading companies in this regard are headquartered in Connecticut and are represented here today: General Electric and United Technologies.

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[2] Esty and Winston, 105.
[3] *Ibid.*, 106
[4] *Ibid.*, 109
[5] *Ibid.*, 120

Jeff Immelt, CEO of GE, is fond of saying, "green is green." As I am sure my co-panelist John Rice of GE will explain, the company has invested in an extraordinary array of "ecomagination" goods and services – ranging from high efficiency locomotives and jet engines to wind and solar power – positioning the company as a leader in the climate change solutions marketplace.

Likewise, George David of UTC added billions of dollars of value to his company's market capitalization by developing and selling goods and services that provide eco-efficiency to the company's customers. From energy-efficient air conditioners and elevators to cutting-edge fuel cells, UTC has worked to break new ground in a variety of areas that will be critical to our country's response to climate change.

The shift to a carbon-constrained world will undoubtedly mean a degree of upheaval in the marketplace. As with any dynamic situation, there will be losers as well as winners. Companies that are focused on the changing requirements of their customers, particularly the need for every business and every household in the country to become more energy efficient, can expect success and profitability in the months and years ahead.

Companies that do not see the strategic imperative that arises with society's efforts to respond to climate change face potentially significant challenges. The US auto industry offers a case-in-point. While Detroit only recently began to factor environmental concerns into core business strategy, Toyota developed a sophisticated hybrid engine and reengineered its entire fleet to take advantage of fuel efficiency improvements, including "lightweighting" its cars through the use of carbon fiber and other advanced materials as well as developing "smart systems" that deploy computer power to reduce the energy

draw of everything from the stereo to the ignition.[6] The lesson here is clear: companies must be strategic in their efforts to bring an environmental lens to their business operations. Those who do this in a systematic, comprehensive, and analytically rigorous fashion have every reason to expect a strengthened position in the marketplace. Those who are more haphazard or, worse yet, fail to see the green wave sweeping across society, are at real risk.

This green wave represents, of course, not only an opportunity for businesses, but also a chance for society in general to shift toward a Clean Energy future. From the earliest days of the Industrial Revolution, innovation drove America's prosperity. Our economy flourished as a result of technological innovations such as New Haven-based Eli Whitney's cotton gin, which increased labor productivity by a factor of ten. Our economy will have to undergo a similar transition by increasing our *carbon productivity* ($GDP per ton of carbon emissions) by a factor of ten in the next 40 years to meet the necessary emissions targets agreed upon by climate scientists to avoid dangerous climate change.[7] While this may seem like a daunting challenge, the technological innovation required to respond to climate change can put us on a course toward independence from foreign oil (and the related wealth transfer of $600 billion per year[8]), reduced dependence on energy supplied from unstable regions of the worlds such as the Middle East, and new sources of energy that ultimately promise lower costs and greater prosperity.

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[6] Esty and Winston, 133.
[7] McKinsey & Company. McKinsey Global Institute. *Carbon Productivity Challenge: Curbing Climate Change and Sustaining Economic Growth*, (June 2008).
[8] Number based on U.S. Department of Energy's Energy Information Administration report on U.S. oil consumption per year in 2007 (7.55 billion barrels per year), 60% of which is imported, and a price of $125/barrel. EIA, "Products Supplied" *Petroleum Navigator*, http://tonto.eia.doe.gov/dnav/pet/pet_cons_psup_dc_nus_mbbl_a.htm. EIA, "How Dependent Are We on Foreign Oil?" *Energy in Brief*, http://tonto.eia.doe.gov/energy_in_brief/foreign_oil_dependence.cfm.

Toward an Innovation-Centered Environmental Policy

America's economic strength has long been a function of our creativity, willingness to experiment, and technological development. Twenty years in the environmental arena have convinced me that we owe our success in responding to pollution control and natural resource management challenges to our capacity for innovation. For many years, America led the world in environmental technology development. In more recent years, we have lost ground in this regard to companies in both Europe and Asia, where the spur of demanding regulatory standards has helped sharpen the private sector's environmental focus.[9]

Historically, America has not only been a leader in technology development but also in policy innovation. The European Union's greenhouse gas emissions trading system builds on the sulfur dioxide allowance trading that the United States advanced to respond to the problem of acid rain in the early 1990s. We also led the way in using "harm charges" that create incentives for companies to avoid environmentally damaging behavior – such as the fees put on ozone-layer-damaging chlorofluorocarbons (CFCs). This pricing structure helped move American companies out of CFC production ahead of the schedule set by international treaties and at much lower cost than anticipated.

The key to innovation is to draw the private sector into the search for solutions. While government has an important role to play where the risks are too high or the payoffs too distant to engage companies, the bulk of the effort to produce the innovations needed to respond to climate change must come from the business world. When faced with the right incentives, American companies have a nearly unbounded capacity for creativity. From our largest companies to garage-based solo innovators, the history of our

[9] Michael E. Porter, "America's Green Strategy." *Scientific American,* 264 no. 4 (1991), 168.

country is replete with stories of successful entrepreneurs contributing important breakthroughs that have helped remake our society and the broader world.

To maximize innovation, we need to encourage the largest possible scale of investment in the "clean tech" marketplace. Simultaneously, we want to promote the greatest diversity of thinking about where breakthroughs might be found. As I noted earlier, the government has a critical role to play in establishing the policy framework that encourages both the appropriate scale and diversity of investments.

The good news is that venture capitalists and other investors have plowed billions of dollars into companies working on breakthroughs in improved energy efficiency, reduced greenhouse gas emissions, better resource productivity, and alternative sources of energy. Additionally, the private sector has placed a number of "side bets" on the prospect of being able to capture carbon dioxide and store it for many centuries, preventing it from causing climate change.

Estimates suggest that worldwide investment in the clean tech marketplace last year topped $100 billion.[10] But the continued commitment of resources to this technology development arena depends on the promise of a payoff for successful innovators. Government must ensure that the incentives are in place to promote the continued flow of resources into building a Clean Energy economy – rather than into programming new video games or other less socially productive investments.

[10] New Energy Finance, "Welcome to New Energy Finance," New Energy Finance, http://www.newenergyfinance.com

Keeping the United States Competitive

Historic foundations for competitiveness relied upon access to low-cost natural resources or labor. In today's world, competitive advantage comes from innovation and the capacity to make each hour of work return high-productivity results. The United States should be at the very forefront of this process. Indeed, what Saudi Arabia is to oil, the United States of America is to innovation.

We are poised to transform our role from being a major contributor to climate change to emerging as the world's leading solutions provider. But to do so we will have to restructure our environment and energy policy frameworks. Fundamentally, we have an unmatched research and development capacity. In 2007, the World Economic Forum ranked the United States as the most competitive and innovative economy in the world. Innovation is our comparative advantage, but government policies must be designed to promote clean tech breakthroughs. Putting a price on carbon is a start – a necessary but not a sufficient step.

The precise form that the price signal related to climate change takes is less important than getting a framework of incentives in place that provides a steadily increasing logic for investments in greenhouse gas emissions control. While a "cap and trade" system of allowances seems likely to have the most traction in our political process, I believe a broader portfolio of incentives should be adopted. We need clear and broad signals to every company – and for that matter every citizen – that any activity that leads to the release of greenhouse gas emissions will bear a price for the harm it causes. In some cases, our best approach will likely be old-style government mandates. For

example, we should move quickly to adopt green building standards that push energy efficiency forward in our homes, offices, and factories.

Government agencies at all levels should reexamine their regulatory frameworks, approval processes for environmentally friendly technologies, and purchasing practices. Already, the FDA's endorsement of post-consumer recycled material in Starbucks coffee cups and the FAA's allowance of continuous-descent arrivals (to lower aircraft fuel consumption during landing) in four major cities have helped companies reduce greenhouse gas emissions.[11] Public procurement can help jumpstart the market for innovations.[12] And the public utility commissions in each state need to align the incentives of utilities with our national climate change goals, by paying electric generators for the services they provide (including energy efficiency) and not just the sheer quantity of kilowatts they produce.

Information is also a powerful policy tool. Databases such as the EPA's Toxic Release Inventory and voluntary programs such as the Energy Star Program have produced positive results in reducing toxic compound release and conserving energy without any federal mandate.[13] We must also take advantage of the Internet and other information dissemination tools to spread the word about best practices in energy efficiency at the state, community, company, and household levels.

Let me offer, if I may, a few words on what the government should *not* do. Most critically, the government must refrain from choosing "winning" technologies. Anyone with an innovative idea should be allowed to pursue it. The government should simply

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[11] Environmental Defense Fund. *Innovations Review,* (2008) www.edf.org/InnovationsReview.
[12] European Commission. Institute for Environmental Studies. *Innovation Dynamics Induced by Environmental Policy: Final Report,* (November 2006).
[13]Environmental Protection Agency. National Advisory Council for Environmental Policy and Technology. *EPA and the Venture Capital Community: Building Bridges to Commercialize Technology,* (April 2008).

"level the playing field" – putting all energy options on equal footing by ending the past practice of subsidizing fossil fuels and nuclear power.

The US needs to move *quickly* toward this innovation-centered policy focus, not just for environmental reasons but for economic ones as well. Our economic strength and future competitiveness depend on the United States leading the way to a Clean Energy future. Should we fail to step up, others will. Just last week Abu Dhabi launched a massive new development aimed at creating a world-class clean tech R&D center.

Perhaps most importantly, we need leadership that galvanizes the American public – Republicans and Democrats, young and old, and citizens in every state. Likewise, we must mobilize the entire American business community – old-line manufacturing companies as well as high-tech industries and service providers, small businesses as well as big. Changing our nation's energy trajectory demands policies that are bold yet carefully crafted and sensitive to our competitive position.

Conclusion

We stand at a watershed moment with regard to climate change and environmental policy more generally. The international community will not succeed in responding to the threat of global warming and the related risks of sea level rise, changed rainfall patterns, and more intense hurricanes and other windstorms unless the United States steps up to global leadership. Historically, the international community has been able to respond to global-scale environmental challenges, such as the risk to the ozone layer from CFCs, only when the United States led the worldwide policy process toward an effective, economically sensible, and equitable outcome.

We cannot shy away from the present challenge. The American public stands ready for change. Poll after poll reveals a citizenry that wants a serious response to the threat of climate change, freedom from foreign oil, reduced exposure to fossil-fuel-caused local air pollution, and real competition in energy markets where renewable sources of fuel and power drive down prices.

The business community is ready to play its role. Indeed, the US Climate Action Partnership has dozens of leading companies behind it – signaling their commitment to being part of the solution to climate change and willingness to accept mandatory greenhouse gas emissions controls. Smart companies now see the opportunity to be providers of environmental goods and services and to help move us toward a Clean Energy future.

Similarly, policymakers should recognize that the climate change challenge is also an opportunity. It offers the chance to shift our environmental protection efforts toward an approach that spurs innovation by ensuring that those who cause harms pay for the damage they produce. In putting a price on pollution, we can reward those all across this country (and the world) who dig into the opportunities that can be found in a hundred different directions to improve energy efficiency, reduce emissions, and find new fuels as well as carbon-free ways to generate electricity.

Moving to engage seriously in the process of addressing climate change is not just an environmental imperative; it is an economic one as well. America can be the leading nation in the world when it comes to the new Clean Energy economy. But we will not get there if we rest on our laurels. We need a policy structure that engages every segment of society in remaking our energy infrastructure and revitalizing our economy. Our

competitiveness and the prosperity that we seek for our children and grandchildren depend upon it.

Thank you very much.

Chairman MARKEY. Thank you, Mr. Esty, very much, and that completes time for opening statements.

Now we will turn and recognize the Members for questions for our panel.

Mr. David, you are saying we have to learn how to use more, how to get along with less, and get more out of it. My mother actually used to say to me beginning at age ten, "Eddie, you have got to learn how to work smarter, not harder." And, she would always say that immediately after she had said that she was going to donate my brain to Harvard Medical School as a completely unused human organ. And, this is from age ten on.

And, what you are talking about, actually, goes right to the heart of these issues. So, unbelievably, Newt Gingrich, actually, beginning in 1995, as soon as he took over, actually, put a rider on the Department of Transportation bill forbidding the Department of Transportation from improving the fuel economy standards, forbidding, every single year, unbelievable. Cannot make it smarter, cannot make it less hard.

Beginning 2001, President Bush missed all 35 deadlines for improving the appliances, that is, air conditioning, toasters, stoves, refrigerators, lighting, everything that leads to the consumption of electricity, missed all 35 deadlines for every single appliance, which is working smarter, getting less electricity to power the same appliances.

So, now we are in a new era, thank goodness, and in December of 2007 we were able to include my increase in fuel economy standards from 25 to 35 miles per gallon, which backs out, by the way, the equivalence of all the oil that we import from the Persian Gulf, improvements in all the appliances that we have, starting to reduce, in other words, our energy consumption, but still only at the beginning of this journey.

So, talk to us a little bit, Mr. David, if you could, and then you, Mr. Rice, about the jobs that are there. You know, this opportunity that we have, to actually increase employment. Tell us what is going on at each of your companies, in terms of new job opportunities for you and export opportunities, as you develop these new technologies.

Mr. DAVID. Well, I think you heard from Mr. Esty a moment or so ago the compelling statement that maybe Saudi has got the oil, but we have the technology. And, I suppose we could, with a little effort, make a variation on your mother's statement to you, that we do have the technology.

America has also built its presence in the world, after all, companies like ourselves, and I think G.E. as well, we are well more than half of our revenues arise outside the United States. Almost all of our research and development is done here domestically. Something like 95 percent of our R&D spend is in North America, even though 60 percent of the revenues of the company come from outside the United States.

This is a very typical pattern, where we take presence in world markets to generate revenues and profitability, which we use to sustain investment in our own domestic market. That is a basic equation for this company and for many, many people like us. I believe we need extraordinary commitment to technology. If you will

permit, oh, I do not know, maybe the greatest abstraction of all, in the last 50–60 years in the postwar period, America has invented almost everything in the world. That is a simple fact, and whether it is the Internet, or material sciences, or jet engines, or space, control theory, digital control, digital communications, it goes on, and on, and on. And, very large amounts of that has been done with pioneering investment by the U.S. Government.

We have seen some reductions in U.S. Government R&D spending in the last 10 or 15 years; it is a long-term trend down. I think that is unfortunate and could well be reversed. We have to simply reaffirm every single day that.

Let me take another one of the grand statements, 80 percent or so of the GDP of America is new since the second World War, as we have five times more physical product, whether it is software in that kind of a sense, or something physical like a computer or a car, we have five times more than we had in our country 50 or 60 years ago. Almost all of that has been facilitated by technological advances, large amounts of which have been funded with government leadership, also funded by the private sector. We need an extraordinary commitment in our country to the role of technology.

Technology and science give us the things that we have today. You see leading examples for the two companies represented before you here today, you see many examples with things like NIH and our Government, health research, science is incredibly important to America, and it is important to jobs at home, because it creates—that is our resource in all of this, is we know how to do things better as a nation, and that is how we maintain competitiveness worldwide, how we maintain jobs at home, how we continue the transition of our society away from building a lower value addition, older style components, and to building higher, and higher, and higher technology for exports that are in need all across the world.

There couldn't be a stronger way of saying that, we need to reaffirm the technology agenda for this nation, and I think these environmental changes, these opportunities to chip away at this 90 percent of energy that is wasted out of simply bad process, bad equipment, that is a huge business opportunity for us, and science and technology will——

Chairman MARKEY. More jobs for Connecticut.

Mr. DAVID. Yes, that is true.

Chairman MARKEY. Mr. Rice.

Mr. RICE. Well, as you pointed out, Mr. Chairman, Saudi Arabia has the oil, but they get their gas turbines from us, produced in Greenville, South Carolina, where 75 percent of the production from that facility now gets exported to Saudi Arabia.

So, we need them, at least for now, and they need us. The fact of the matter is that there are jobs associated with this everywhere you look, whether it is the jobs that develop the next generation technologies, and we know those are important, but also the jobs to improve the efficiency of the installed base.

You know, we have 75,000 pieces of equipment installed around the world. That is a jet engine, it is a locomotive, it is a gas turbine, that consume fuel. And, if we can make these 5, or 10, or 20

percent more efficient, while we are working on the next generation technology, there are enormous savings that go with that.

So, one suggestion is to take many states, we were talking about this earlier, in 2000 there were seven states with renewable portfolio standards. Today there are 29 or so, but they don't all address efficiencies in the installed base. And, if you would give credit for improvements to the installed base along with the addition of wind power technology, or solar or anything else, I think you would see even more money flow to the development of capabilities which will help that installed base run more efficiently and more effectively. And, I think that's a relatively straightforward thing that can be done.

Chairman MARKEY. Well, you know what, you put your finger right on it. We actually, that is, in December we had a bill that almost, it passed the House overwhelmingly, and then in the Senate it was going to be 15 percent of all electricity had to come from renewables by 2020.

Mr. RICE. Right.

Chairman MARKEY. With 4 percent that could actually be efficiency, that is, if you built more efficiency into the electrical generating system you could get credit for that.

But, the Southern Company blocked us, along with Senator Domenici, from putting it on the books. Okay? And, I think that would have unleashed a revolution across all 50 states that would have empowered United Technologies, General Electric, and other companies as well.

And, I will just make this other kind of thought right here, that I drive a Camry, a Toyota Camry hybrid, and it gets 14 miles per gallon more than the regular Camry, which is the most popular sedan in the United States. And, at $4.20 a gallon I am going to get the pay back for the differential, but they are only making 60,000 this year. They made 60,000 last year at Toyota, because they built a new Tundra SUV plant in Texas last year, so they were moving, they wanted to sell more Tundras, and they were actually naming the vehicle after the thing which would get destroyed.

So, unfortunately, you do have to put these laws on the books, okay, because even Toyota was against 35 miles per gallon by 2020, unbelievable, okay? So, we have to set some standards.

But, I think industry would then respond as each of you have said.

Let me turn now and recognize again——

Mr. ESTY. Can I just add one thing, Mr. Chairman?

Chairman MARKEY. Yes.

Mr. ESTY. That there is another segment of the job opportunity, you just brought up the high tech opportunities, but there is also the green collar jobs, and I think there is a huge potential for installation of new insulation in houses, of new windows, of solar cells, and I think we should not overlook that this is not just the high tech opportunity, although it is important, but that there are opportunities across the spectrum, and I think, you know, we get nervous as a society that it will somehow be just a few companies, or just a certain part of the population, but it really can be something we all benefit from.

Chairman MARKEY. I agree with you, and another way of saying green collar are really just blue collar people now, instead of doing the old stuff they did, just doing this new stuff, putting in the new solar panels, doing this new work, it's really blue collar powered. It opens up a new job opportunity for that whole sector that feels it is getting left behind. But, if we do this revolution correctly it will not.

Let me turn and recognize the Gentleman from Connecticut, Mr. Larson.

Mr. LARSON. Thank you, Mr. Chairman, and let me thank the panelists again. You know, your testimony was outstanding.

I would just like to follow through on a couple of points. We were fortunate, as I said in my remarks, opening remarks, to be visited by T. Boone Pickens, who is getting great notoriety of late with his commercials on TV, previously had notoriety that wasn't so great, funding swift voting of John Kerry, but, nonetheless, he came with an entrepreneurial spirit and somewhat of a message to the Democratic Caucus that one couldn't help but take heed, and it centered around a lot of what the discussion was here today.

Willingness on the part of business to invest money, Government acts best, I feel, when it operates as a collective enterprise, when it embraces, not only the business sector, but the academic and labor sectors, in the manner in which that we can provide those incentives.

Now, Mr. David, you started with the notion of being able to do more with less, and the whole ethic of conservation. How would we, from a policy standpoint, get at that issue, and it is a question I would like to see all of the panelists asked, but because I think that from a standards standpoint to try to shoot towards uniformity, it is great that companies like United Technologies and G.E. have this kind of ethic and see it, but what is it that Government could do in this collective manner, this collective enterprise, so to speak, to augment what your business has done, your businesses have done?

Mr. DAVID. Okay, John, thank you for that question. I think we have the answers in front of us, and we had them for a long time. There are a couple of mechanisms in our Government. One is very long-term research funding, with places like ARPA, the Advanced Research Projects Agency, all the national laboratories, National Institutes of Health, National Science Foundation, things like this, and we have this long history, as was mentioned earlier, of Government leadership in research and development.

There is a certain amount of grant funding that is allocated to private industry, that buys down the cost of these very, very long-range kinds of research programs, and so I would certainly applaud it and call for continuation of that kind of government leadership in R&D. It has made our Nation, it has made the world in the last 50 years. That is a sweeping statement, but it is true. Government leadership in research and development, science, innovation and technology has remade the world. That's a fact.

The second thing is, I think very much on the minds of the Committee and its Chairman, you have mentioned it a couple times today, which are these investment tax credits for renewables and for conservation. And, I'll state the reason why.

I think, actually, in many of these energy conservation devices, I think the need for the investment tax credits is greater than the need for R&D funding, because many of these products are at the stage of maturity today, where they are technically proven, they work, prototypes are done, prototype fleets have been built, and now the problem is to create market demand, and here is the simple problem, and I will round it off for ease in communication.

A lot of these new technologies cost around $3,000 a kilowatt to install the equipment. We have had renewables and conservation investment tax credits in place for the last several years, and in the Reingold bill continuing now, it has passed the House and is in front of the Senate, we've had these tax credits in the range of $1,000 per kilowatt. It buys down the initial capital cost by about a third.

And, the reason why we need that is because we have to build the fleet and build the volume. Realize, it takes something like fuel cells, which people talk about as an ultimate answer to replacing gasoline for power in vehicle propulsion, the fact of the matter is that vehicle fuel cells today cost even more than $3,000 a kilowatt and they need to get down to the range of $100 a kilowatt to be, ultimately, effective. That is a very, very long way to go. We will get there, because the fact of the matter is, you set the target price of $100 a kilowatt relative to an internal combustion engine, which has been in development for 150 years, and where we build 50 million or 60 million internal combustion engines a year.

Fuel cells are in their infancy, and we have got to seed the fleet to get the volume, to get the cost down, at which point the investment tax credits go away, and industry competes entirely on its own.

So, my appeal would be more for these renewables and conservation tax credits. That is the most important thing, is we need to build the volumes to get the cost down, to let this go away.

Mr. LARSON. Aside from the tax credits, which we hope Congress will pass, I would like you to comment, all three of you, on the length of the tax credit, because this is important to research and development, and given the maturity of, or the stages of particular development, and then also the idea, and this is what Mr. Pickens said at our caucus, the idea that if you are, you know, mandating use, for example, he used the example of wind and solar, which is for some parts of the country very important, but maybe in other parts of the country not as applicable. But, whether it is mail trucks, or school buses, or whether it is the buildings themselves, and whether it is geothermal, or fuel cell, or whatever the particular technology might be, is it important for government, much like it did in the TVA, much like it did in the Highway System, much like it did as was noted in DARPA, to lead the way and say, listen, here is what we need in order to be energy independent in ten years.

We know, and I think the term you used, Mr. David, was seed, this is what we are going to have to do to seed this, to go along with the investment tax credits and to accompany the research and development that is currently going on. It is that kind of triumvirate something that we should—direction we should be moving in.

Mr. Rice.

Mr. RICE. Well, I think that is exactly where we should be headed, and this whole discussion, I think, elaborates the comment I made about the bridge between technical viability and commercial viability. People want to talk, a lot of times we get questioned, well, is this possible? Can it be done?

Carbon sequestration, carbon capture and sequestration can be done today. It is technically viable. Is it commercially viable? Not yet. There are complicated things that have to be sorted out, but it is viable, and so we have to be thinking in terms of both technical viability and commercial viability, and the production tax credit will bridge the gap. Take technical—I mean, wind turbines have been technically viable for decades, but it was .30 cents a kilowatt ten years ago, and now it is .08 cents a kilowatt. Okay, how did we get down that cost curve? Well, incentives in Europe helped, the Europeans spent a lot of money to do this, as has now the U.S. Government.

But, having a two to three year, on again, off again, production tax credit is probably the most expensive, inefficient way to run a supply chain. I mean, you have wind suppliers now, component manufacturers, that will not invest, will not take a long-term view on capacity because they only get a two or three year window. So, we cannot, and I understand everybody supports it, and we are thinking about a one year extension, and that would be better than nothing, but we really need to pass the ball a little bit further down the field, because starting and stopping does not help us bring the cost down.

Mr. LARSON. On the Ways and Means Committee, we passed an eight-year extension.

Mr. RICE. And, that is exactly, exactly what we ought to be thinking about, and if you sunset it after that, or you say, look, industry, you get it right over this eight-year period, and then you are on your own, I think companies like ours can live with that.

Chairman MARKEY. The gentleman's time has expired. Again, that lost by one vote in the Senate, we needed 60 votes, and Senator Domenici was opposing it, so we lost it. But, we are going to still try before we adjourn, five more weeks.

Let me turn now and recognize the gentleman from Connecticut, Mr. Murphy.

Mr. MURPHY. Thank you, Mr. Chairman.

I want to actually move backwards for a second from the question that Mr. Larson posed, regarding what the right government incentives are, and just ask you, and maybe I will direct it first to Mr. Esty, why doesn't the market work here? I mean, certainly, you would understand from a business perspective how important it is for G.E. and UTC to make those investments in conservation, but why doesn't the market create the right incentives for the level of conservation investment and renewable energy investment that we want. And, are there pieces of market mechanics that actually work against conservation?

For instance, I remember being stunned, I should have known this, but stunned at a conversation with an electricity distribution company when they told me that they still give volume discounts

in distribution of electricity, which would seem to actually be a market force that works against investments in conservation.

You talk a little bit, and I am happy to ask this question to Mr. Rice, Mr. David as well, where are the market failings here?

Mr. ESTY. So, in simple terms, we have an element of harm that is not being priced. So, when we burn fossil fuels, and it is not only the greenhouse gases we send up the stack, it is the localized pollutants as well, if you do not pay for that you end up doing more of it than you otherwise would.

So, I think getting the price signals right is very fundamental, and that does mean putting a price on greenhouse gas emissions, through a cap in trade mechanism. There are other ways to do that.

And, I think it is also getting at the sort of risk that the investor faces in going in to becoming a solutions provider. These are big companies, and they have done very well jumping into this space, but I think we have to have an even broader set of players out there. We need to engage, not only big companies, but small. We need every entrepreneur, and one of the great successes in America is kind of the solo garage-based inventor, and we need to have a signal to every one of those guys that there is a big pay day coming if you can contribute to improved energy efficiency in one way or another, an alternative fuel, any part of this solution.

And again, I think we are facing a world where the solutions are going to be coming from a lot of directions. We need scale and diversity of effort. And, I do think that means, as the other panelists have mentioned, some government investment, particularly, when the risks are big, or the pay off is far away, or there is a gap to commercialization. So, I think targeted government money is critical.

But, I think, you know, fundamentally, we should go back to Ed Markey's mother, who may be the hero of this hearing, but I think we have got to, not only have business work smarter, I think we have to make policy work smarter, and that goes to, Congressman Murphy, your point, every public utility commission in this country should be rewarding those that generate electricity, not just for the amount they generate, but for delivering services, providing heat, providing light, providing air conditioning, and if they can invest in the conservation they should be rewarded for that, and not simply for how many electrons they pump out the door.

Mr. MURPHY. A second question maybe for Mr. David and Mr. Rice. Can you talk a little bit about the global market for these technologies, both from a renewable standpoint and from devices that are going to provide more levels of conservation? Are there the right policy incentives in other parts of the world, global warming agreements, a predicate to making some of these technologies marketable in countries like China or India? What is the landscape globally for the export of the technologies that we are producing, or could potentially produce?

Mr. DAVID. I wonder if I could just combine an earlier question and the last question, Congressman.

I think I need to reaffirm the principle of predictability, and the comment has been made about an eight-year life on the renewables credits, certainly, I think private sector would applaud that and

say you need that kind of a duration to give some confidence to cause people to invest privately.

I think another one we need to pay attention to and this runs to the market behavior, is that some predictability in the cost of energy. The fact of the matter is, we have what we have today because we have had 100 and some odd years of, literally, free energy. And, we have seen energy costs, oil costs, double in the last year alone, and so people are not quite sure that is going to last. And, maybe it will go back to the way it was before. We had oil price spikes, you will recall, after the first Arab war in the early 1970s, big oil price spike up to, I guess, over $100 a barrel, expressed in 2007 currency, and then it went back down to $10 a barrel ten years ago.

So, there is a question of predictability, and I think we need to say to our world that we are going to have a cost of carbon, whether it is cap and trade or carbon tax or something, there has got to be a conviction that high costs of energy are with us for a very, very long time.

To turn to your more recent question, Congressman Murphy, I will take our experience in China to respond to you specifically, is that I rate the Chinese, and this is based on very large UTC presence there, something like 15,000 employees and several billion dollars of revenue, and a long time presence, and 40 operating companies, I rate the Chinese, actually, quite high on their commitment to conservation. They have—they are in the middle now of their so-called 11th five-year plan that started in 2006, that ends in 2011, and there is, one of the two primary goals as stated is an energy intensity goal, which is to reduce the energy intensity of the Chinese economy by 20 percentage points between 2006 and 2011. And, they are tracking it precisely, they publish the results, they have fallen short in the first couple of years by a percentage point or so, because, realize, 20 percent over five years is 4 percent per annum and they are coming in more like 3 or 3.5 percent.

There is a great deal of pressure and tension in Chinese industry to do things to comply and to drive down the cost, or drive down the consumption of energy to get this national energy intensity goal right, so I would rate their appetite very high, in fact, for export equipment, and technology, and U.S. ideas, there are lots of things.

China, in some respects, is—well, we have heard our President say that they are the biggest part of the problem, and the way you get to that is by virtue of you look in at the increases coming in emissions in the next five, or six, or ten years, and it clearly, more comes from China than everywhere else. So, we say, you know, the future problem is theirs, while we conveniently forget the past problem is ours.

We still produce far more hydrocarbon emissions in the United States than China does today. We still do. So, the fact that they are building new, and they are growing and expanding, means their cost to save, their cost to conserve, is lower than ours is. We are faced with a retrofit problem, they are faced with a new build problem, and, therefore, their appetite is high. They do see good returns. The nation is driving this hard, and I think it is a tremendous opportunity for America to go and, to me, if you said big opportunities in the world for exporters, I'd say conservation equip-

ment to the nation of China. It's sort of right up there at the very, very top.

Chairman MARKEY. The Gentleman's time has expired.

The Chair recognizes the Gentleman from Connecticut, Mr. Shays.

Mr. SHAYS. Again, Mr. Chairman, thank you for holding this hearing, and thank you for inviting me to participate.

My daughter just graduated from Vermont Law School on Environmental Policy, and Yale School of Forestry and Environmental Policy, and she thinks I am a work in process, as good as I think I am doing here.

But, maybe it is because I am the only Republican in New England, I feel like when I—John McCain says I'm the last of the Mohicans, but I am an endangered species, and I know that Democrats want to protect endangered species.

So, I just want to state for the record——

Chairman MARKEY. It is good that we are in a museum.

Mr. SHAYS. You know——

Chairman MARKEY. New England Republican.

Mr. SHAYS [continuing]. I can never outclass this guy, but I do it at my peril, and Barney Frank as well.

I do want to say that there was a vote in the Senate when we voted on Kyoto, when it was negotiated, and Bill Clinton was in the bus. He was driving the bus. And, the Senate voted 95 to 0 to say do not give us Kyoto without China and India as part of the mix.

So, I just, I kind of get a little uneasy when I hear, well, Domenici did this, and so on, because we will get not to first base if that is the way our mentality is. The bottom line is, Bill Clinton never submitted Kyoto to this Senate, because it did not include that.

I said to President Bush, I wish he had just submitted Kyoto to the Senate without prejudice, it would have had about ten votes. Now you think every Senator would have voted for it.

The question I would like to ask you, Mr. Esty, is I support cap and trade, I want polluters to pay, but it was pointed out to me by those who tend to have investment in coal, that really what we then do is we bring up significantly the price of coal, which is what has generated most electricity in the United States, and has enabled those companies that still can compete with the rest of the world in manufacturing to have modest energy costs. Again, not in New England. We don't want to produce, and we do not want transmission lines here.

But, so my question is, will cap and trade have to be phased in, so that industry can deal with the increased costs, or will cap and trade not impact the cost of energy and electricity?

Mr. ESTY. Let me say that I think you have identified something very important, and I hope this Committee will do more with it over time, and that is the progress on the domestic front in responding to these issues, has to be done with an eye on the international negotiations.

And, frankly again, as competitiveness has become an important issue, we cannot simply sit back and ask, well, will China and India step up. I believe we absolutely must have a beyond Kyoto protocol that engages every country in the world, and again, as someone who studies these issues, I will tell you we have never had

success in galvanizing the world in response to a challenge on anything but the principle of common, but differentiated, responsibility, common meaning every country steps up, every country has to do something.

Mr. SHAYS. Yes, but let me just say, differentiating meaning we scale the level of obligation, but my question is, what will be the impact to our industry and to our jobs when we put a cap and trade in? How do we phase it in?

Mr. ESTY. So, two things. First, as long as everybody is stepping up the price of coal around the world, the competitive disadvantage is much reduced. So, having that global commitment is very important.

And second, I think there will have to be some transition work done. We will have to have mechanisms that try to minimize the impact on industries that are in sensitive positions.

Mr. SHAYS. I happen to know a lot of members on both sides of the aisle who want dearly to move forward, but they are trying to deal with the reality that we have to compete with the rest of the world, and we do not want to put people out of work in that process.

I want to make sure from G.E. and UTC's issue, when T. Boone Pickens came in, it was reported at first that he wanted to—it was this billion dollar investment, and non-profit almost attitude on wind power, he came back to the Senate and said, you are not hearing me if you think this replaces the need to increase our production of fossil fuels. He said you need to do all of the above. In fact, I disagreed with him because he said we also had to do ANWAR.

But, is it the position of your two companies that in the process of your working the way you are working that we do not need to increase the production, and, hopefully, in our own country, of fossil fuels?

Mr. RICE. We think that—we were one of the founding members of U.S. cap, so we have come out in support of cap and trade. We understand——

Mr. SHAYS. No, that is not my question.

Mr. RICE. No, I know.

Mr. SHAYS. I just want to make sure you answer my question before you tell me what you want me to know.

Mr. RICE. Well, no, but we do believe that you need—T. Boone Pickens is a great customer, he buys a lot of wind turbines. We believe you need everything, including fossil fuels to solve this point. And, that was the thread of my comments, that you need a portfolio, it is not really about energy——

Mr. SHAYS. We need all of the above.

Mr. RICE [continuing]. Independence. Right, because you need, you need everything. We have 150 years, 200 years worth of coal in this country, we have to find a way to use it. We cannot just cut that off, we have to find a way to use it efficiently, and effectively, and keep people working, while we——

Mr. SHAYS. Mr. David.

Mr. DAVID. If I understand the question correctly, Chris, we are not afraid of increases in the cost of energy at all.

Mr. SHAYS. That is not what I asked. The question I asked is, is your position that we do not need to increase the production of domestic fossil fuels, because we can rely on renewables and so on. That is the question. And, it is not a difficult question.

Mr. DAVID. I think we should increase the cost of carbon, and let the market decide.

Mr. SHAYS. Does your company believe that we should continue to buy fossil fuels overseas, transferring $600 billion overseas, or do you think it would be wise for us to end up buying from ourselves with American jobs and American production, or is that not something you think about?

Mr. DAVID. Pardon me for repeating myself, I think again, we should increase the cost of carbon and let the market decide.

Mr. SHAYS. Do you support drilling off our coast?

Mr. DAVID. Pardon me for repeating myself again, I think we should increase the cost of carbon and let the market decide.

Mr. SHAYS. But, see, what I think is, we need straight talk, and I feel like you want to—and I want to be candid, I feel like you do not want to say what is the obvious. Do you think it makes sense for us to tell Canada to drill for oil off the coast and sell to us, because we do not have enough natural gas, so we buy from them, or do you think it would be a wise public policy decision. I have to vote on this issue. I want to know should I be supporting drilling off the coast or not. You are a major manufacturer, you are into technology, are you saying technology solves the problem and we do not need to deal with conventional fuels? It is not a difficult question.

Mr. RICE. Fossil fuels today represent 70–75 percent of the power generation of the United States, and to my way of thinking finding responsible ways to access as much of our fossil fuel sources as we can is the only way to go forward. You have got to do it responsibly. You have to do it cost effectively, and you have to develop the rest of the 25 and 30 percent wind, and solar, and all of the alternate forms of power generation.

Mr. SHAYS. Let me just ask you this then, Mr. David. I thank you for your answer.

Mr. David, do you disagree with that answer, or agree with it?

Mr. DAVID. Again, I want to look at the big picture. I think we need to drive down consumption and drive up renewables, and the way you will cause that to happen is by increasing the cost of carbon.

Mr. SHAYS. Do you agree with his answer or not? It is not a difficult question. Your own employees, if you would ask them a question you would want a straight answer. Do you agree or disagree with his answer?

Mr. DAVID. The market will cause increased production of fossil fuels. It will cause them less if we have higher cost of carbon.

Mr. SHAYS. I do not disagree with what you said, but I want to know the answer to this question. I do not know why you are reluctant to give it to me, and I guess I am not going to get an answer.

And, I do not want to have a dispute with someone so important, but I just feel like we do not have straight talk, give me straight talk.

Chairman MARKEY. The Gentleman's time——

Mr. DAVID. State the question precisely.

Mr. SHAYS. No, I will not do it again.

Chairman MARKEY. Let me turn——

Mr. DAVID. I misunderstand why there is tension. Can you help me with that?

Mr. SHAYS. Yes, because I feel like because you are involved in technology you do not want to offend Democrats, you do not want, you want to be careful, you want to be like Alan Greenspan and have everyone think you agree with them. It is such a simple gosh darn question. Do you think that we need to increase production of fossil fuels in this country? Do you think it makes sense? If you do not, just tell me, it does not make sense to drill off our coast, we should get it from Canada, we should get it from Saudi Arabia. We should not do it. It is a straightforward question. It could be yes or no.

Mr. DAVID. The fact is that energy consumption in the world is not going up very rapidly. Oil production and consumption last year went down by about a 1/2 percent globally. We are talking about things at the margin, and we do not need to go out and to have vast new efforts to tap vast new sources of fossil fuel. We need to look for renewables. We need to look for conservation. We can solve this problem without having these enormous increases in fossil fuels. Some are required, not that much.

The way to deal with that is to increase the cost of carbon. I am sorry to be so repetitive about that.

Chairman MARKEY. Let me turn now and recognize the Gentleman from Connecticut, Mr. Courtney.

Mr. COURTNEY. Thank you, Mr. Chairman.

One, actually, I think Mr. David's comments started to sort of go in a direction I was wanting to ask about, which is the fact that, you know, there is sort of this all of the above sort of discussion. Dan, you sort of mentioned about having the portfolio as diverse as possible.

But, at some point, I mean, particularly, in the transportation sector, I mean, you really do not have an infinite ability to just choose all technologies. I mean, T. Boone Pickens talked about, you know, running cars and transportation on natural gas. I mean, that was sort of his message the other day when he was at the caucus.

The government of Israel right now is talking about going, you know, straight electric, in terms of, you know, no liquid fuel.

But, you know, in both cases, and I know, you know, fuel cells were being talked about by Arnold out in California, but, you know, when you set up a transportation system, I mean, you have got to set up a distribution system for keeps, or for an awful long time, in terms of, you know, whether you are switching batteries, or filling up the liquid natural gas.

And, I mean, it does seem at some point, if we are really going to transform on the transportation side, you know, we really don't have the ability to just sort of, you know, say, you know, anything goes, and everybody can jump in. I mean, you know, we sort of have to have some consistent thread about how you, you know, what energy you are going to choose as a country to—and, I mean, so is sort of the Israeli vision feasible here in the U.S., or is it the

T. Boone Pickens, and do we, you know, as a country, have to make a choice? And, is that choice in Washington?

Mr. ESTY. So, I think we have to be careful not to have government make that choice, so I am going to echo George David's comments, I think we want to let the marketplace test out these ideas. I think we want to at least for the next number of years see lots of thinking going in different directions, because we cannot tell what is going to emerge as low cost.

And, the real answer to Representative Shays' concern is, a day when the price of the alternative energy is coming under the price of burning fossil fuels, because then we get out from under the burden we feel, which I think we all feel, which is we do not want to have a cost of energy so high that it harms our competitiveness, threatens our prosperity.

So, I actually think the long-term goal is low energy prices, but to get there we have to make sure that these market signals are right. We are going to have to make people pay for the harms they cause.

And, I do think that if you made me guess as one person who studies this, but I could be wrong, I think we are going to head for an all electric future. I think we are going to come in some day with a way to generate electricity cheap enough that we can have an electric car.

I used to think hydrogen was more likely, I now think why not go directly to electricity, and as someone who also drives a hybrid I have been actually pretty pleased with the electric push that my car gets as we get going.

But, I think it is really tough to decide that, and I think the history here is that when the government picks winners we do not do well. I mean, not to criticize our Congress, but, you know, corn-based ethanol will not be the solution to our energy future. I just promise you that.

And, all the effort that has gone into corn-based ethanol is really distraction from getting on to all of the things we really do need to go for.

So, let us be careful about that, and I guess the one other thing I would say, in terms of transportation, in the short run we have got to make it easy for people who are helping to do their part by switching to public transit, to the bus, to the subway, and, you know, I have a kid who is taking an internship in New Haven, and is riding the Waterbury New Haven bus, it is totally overcrowded by the time it hits Chester. You know, we need to provide extra buses, extra support, for people who are changing their lives to be part of a more carbon efficient future, and I think we have under invested in that element of society that supports, particularly, those at the lowest income levels.

Chairman MARKEY. Great. We——

No, please, go ahead.

Mr. COURTNEY. No, I didn't know if the other two had a comment about sort of liquid fuel for cars and transportation's future.

Mr. RICE. Well, I think you hit on a very good point. I mean, whether it is jet engines or locomotives, you know, we are working on hybrid technology, we are working on power saving technologies,

at both UTC and G.E. But, there are short-term answers, which do not carry some cost that goes with that.

And so, I think that—I totally agree with Dan's comments.

Mr. DAVID. Of course, we have—we have built fuel cells in UTC for longer than anybody else in the world, and, obviously, we are invested in that. I think we are going to migrate, ultimately, to fuel cell power compulsion, maybe in buses first, cars second.

Cars are a good long way in the future, because of the cost per kilowatt. It is very high. Also, there are power density issues, because fuel cells are relatively faulty, and to put them into a smaller vehicle like a car makes it harder. I do not want to say it is not going to happen, but it is going to be a decade or two in the future, where other applications like buses are right here and now. In fact, there is a fuel cell powered bus outside today, and we will probably provide some rides, or folks can take a look at it. It is in service today here in Hartford.

Mr. COURTNEY. Thank you.

Chairman MARKEY. Okay. So, we will do a quick round here of two minutes apiece for any members that have any other questions, and the Chair is going to recognize himself.

The wind revolution is taking off, Boone Pickens came in, he talked about it, he is going to invest $4 billion of his own money, 7,000 megawatts of electricity are going to be constructed this year.

Just to give everybody an idea, when you think of the Seabrook Nuclear Power Plant, or you think of the Albulcany, that's a 1,000 megawatts. Okay, so there is not going to be a new nuclear power plant that actually gets commissioned in the United States for ten more years. This year, 7,000 megawatts of wind. So, by the time the first nuclear power plant gets commissioned, finally turns its switch, there will be 125,000 megawatts of wind before the first 1,000 of nuclear actually gets commissioned. That's because the market is moving toward wind. The price has come down, there is no price on carbon, and states and countries want to move in that direction.

So, the market is beginning to reflect that, and we actually had a hearing on the Select Committee two weeks ago, where we had in Shai Agassi, who is the guy running the project in Israel, we had the guy who is running the program in Denmark, they have 2 million cars in Denmark, they say with 2,500 megawatts of wind they can power the entire fleet of vehicles on electricity in Denmark. So, they are moving in that direction as well, the all electric future using all wind electrical generating capacity.

So, there is something that is happening out in this marketplace, and what Pickens said to us is, he said, I want you to remember three numbers. He said the numbers are, we consume 25 percent of the oil in the world on a daily basis. We are 4 percent of the population, and we have 2 percent of the world's oil reserves. So, it is 25, 4 and 2.

And, he said to us that since we consume 21 million barrels a day, and we only produce 5.9 million barrels, we cannot drill our way out of it. We are going to have to innovate our way out of it. We are going to have to find the new technologies, move to electric vehicles, move to natural gas, because we have a lot of domestic natural gas. Believe it or not, we produce twice as much natural

gas each day as we do oil, and there is a potential to produce upwards of 20 million barrels of oil if we go to natural gas on a daily basis, which is what he was talking to us about, and that would all be on the lower 48 where we already are, and everyone wants that drilling to take place.

And, that is half the emittance of coal, that is, natural gas has half the carbon content of coal, so that gives us a route. He was giving us a path looking at wind and looking at natural gas, away from coal, away from the greater pollutants, even away from oil, which he felt in the long run was non-sustainable.

So, I think that was a good vision for us, for our country, and it is something that has to be combined with a cap and trade system, a mandatory cap and trade system, so that every industry does understand that there is a price, there is a price on carbon.

And, once you do that, wind, and solar, and all these other technologies, become much more attractive. Energy efficiency becomes much more attractive. Geothermal becomes much more attractive. They all look like they are where you should be, and where we should have been the whole way, because they are abundant, they are plentiful, they are cheaper than fossil fuel once you say that it is a pollutant as well, and it has to pay an extra price because of that.

So, that is just a comment that I would add at this point, and once we do that I think we are tapping into domestic resources, that is, what is already here, this indigenous source of energy that we have in our country already.

So, I'm going to stop there and ask if any other Members here, at this point, have anything they want to add.

Mr. LARSON. Well, thank you, Mr. Markey, and again, thank the panelists.

I would just add that the Ways and Means Committee is going to be having a hearing as well on the whole subject matter area of proposed tax on carbon, and while I expect that little will happen in the Congress, it goes back to the discussion that Mr. Markey raised in our Committee over the issue of cap and trade versus a carbon tax. And, when he inquired of our esteemed colleague, Mr. Sensebrenner, he said that he was opposed to a cap and trade system, because he thought that the credits would be fairly difficult, et cetera, and Mr. Markey responded by saying, well, would you be in favor of a carbon tax then, like Mr. Larson is proposing? He says, no, we are going to be opposed to both, because they raise taxes, period.

And, I think therein lies some of the political dilemma that Congress faces, but it is an inconvenient truth to address the fact that, as Mr. Pickens did, that we are dealing with consuming 25 percent, have 4 percent of the world's population, and 2 percent of those reserves. And, to look at pollution and ignore it is to stare into the face of harm's way into the future, and we have to face that future.

I believe that we have to come up with a system that is ultimately revenue neutral. I believe that some form of trust fund that passes the savings along by way of a payroll deduction to the end user, so that the ultimate consumer, the person who is ultimately impacted by all of the policies that we generate, both from the negative aspects of pollution, but everyone knows that any company

ultimately will pass on those costs to the consumer. So, to make any proposal, cap and trade, or a carbon trust fund, or carbon tax, that focuses in this area, has to be revenue neutral, has to provide the individuals, the end users, with relief by deducting money from their payroll taxes, thereby, giving them a tax cut themselves to deal with the impending costs, direct and specific aid into the technologies like carbon sequestration, like direct relief for the potential replacement of mine workers and individuals who will be impacted by this, and transitioning them into a greener technology and greener opportunities, as well as providing an opportunity for investment into new technologies.

Chairman MARKEY. The Gentleman's time has expired.

The Gentleman from Connecticut, Mr. Shays.

Mr. SHAYS. Thank you.

Given my questions, you could have a sense that I am arguing for a particular position, but what I am trying to argue for is that we look at the whole mix and figure out what we do as a country.

I tell people that being a member of Congress is like going to a large university and being told you have to take every course and get a passing grade. We tend to know a little about everything, and then we specialize in a few areas.

Since I am not on the Energy Committee, I kept waiting for someone to introduce a bill to have increased efficiency in CAFE standards, and it did not happen. So, I went to the League of Conservation Voters and to the Sierra Club and we created a bill, and then—a Democrat, co-sponsors it. I always find a Democrat to co-sponsor any bill.

And, what it said was, you should get 40 miles to a gallon by the year 2016. We introduced this five years ago. It said that we would have renewable energy, and we would put dollars into it. We would take money out of the fossil fuel industry to fund it, that we would have appliances that were efficient, and that we would help provide incentives to homeowners to have fuel efficient heating and insulation.

That was our bill. We got out of Congress, to the credit of this Congress, in the House, 35 miles by the year 2020, and Europe is at 2012/48. It is not a problem in the House, it is a problem in the Senate. I tell people that the Iraqi Parliament is more constructive and gets more things done than the U.S. Senate, and I believe it.

The bottom line to this, though, is that we have to look at all issues and all parts of it.

And, I just want to ask you, Mr. Esty, if you would tell me, if you had to rank geothermal, sun power, wind power, and bio-fuel, which do you think has the greatest opportunity for us, the earliest pay back, and which will have it more difficult. Does wind trump sun, are they equal, is geothermal out there? If you could give me a sense.

Mr. ESTY. I think in the short to middle term it will depend where you are. So, if you are in a sunny spot sun looks pretty good, if you are in a windy spot wind looks pretty good. If you have got thin crust of the earth, geothermal looks pretty good.

I think one of the challenges we have not talked about is the need for innovation goes beyond these technologies to transmission. We are really going to have to figure out how to move the power

from where it is most effectively generated to where we consume it. There is, you know, huge potential for wind across the Great Plains, Texas, to North Dakota, and that is not where the consumption is. We have to figure out how to get the power to Chicago, and L.A., and elsewhere.

So, I think we are going to have to do more to ensure in the short run all of those.

If you made me bet 50 years out, I think solar power will dominate, but that is just a thought, and I have been wrong before, and would hesitate to have anyone take that too seriously.

Mr. SHAYS. Does it have to be 50 years, could it be 20 years?

Mr. ESTY. I think we are going to have a slower paced transition than a lot of people are hoping for, but I think we could drive it with the right policy structure that puts us in a place where these companies, and so many others, are really incentivized to put their shoulder to the wheel, and give us that clean energy future sooner rather than later.

Mr. SHAYS. Thank you.

Chairman MARKEY. The Gentleman's time has expired.

Mr. Murphy.

Mr. MURPHY. Mr. Murphy, just to say thank you again for joining us here in Connecticut. I think you can see by the robust attendance here how seriously we take this. We are proud of what we have done in the state legislature as well as here in Connecticut, led by State Senator Gary Labot who is joining us and others. We have here a renewable portfolio standard, we just passed a climate change bill, and as you can see we have a great deal of interest in helping you with your efforts. So, thank you again for convening here in Hartford.

Chairman MARKEY. Great, and Mr. Courtney.

Mr. COURTNEY. Thank you, Mr. Chairman, and thank you for bringing your Committee here.

Every committee in Congress, though, right now is having this issue before them. On the Armed Services Committee, on which I sit, you know, we are looking at the fact that 90 percent of the Government's use of energy is in the Pentagon. Obviously, more efficient engines is a way to address it.

The company I mentioned earlier up in Enfield that is making the protective coating for solar panels just got a contract to build pop-up tents for the Army with the solar panels actually right in the fabric to power radio equipment, back packs as well. So, we are seeing the greening of the Pentagon as well.

And, on the Education and Labor Committee, I am a founding member of the Green School Caucus, because as we know in Connecticut, Eastern Connecticut State University did an inventory of the school buildings in our state and found that they are, perhaps, some of the most inefficient structures of all. And, we have to come up with ways, because, particularly, local communities are strapped enough in terms of trying to find those investment class to make buildings more efficient and to incorporate possibly even, you know, energy sources like alternative fuels.

So, it is everywhere in the Congress. I know Chris' committees are probably experiencing the same thing, but we have here the

leadership of the solution with Mr. Markey and his Select Committee, and I want to thank you for joining us here in Connecticut.

Chairman MARKEY. Thank you, I appreciate it. Thank you. Thank you very much, Joe.

What I would ask is each one of our witnesses give us the two minutes they want us to remember from their testimony here today. What is that you think that everyone should know about the future, and what has to happen?

We will begin with you, Mr. Esty. We will go in reverse order of how we started. Please give us your two-minute summation of what you think we have to know.

Mr. ESTY. Well, I think we are facing a real challenge as a country, and so I appreciate Congressman Shays' passion here. I think we are going to have to step up in a very different way than we have in the past, and I believe the answer lies with innovation, and harnessing the engine of the private sector, from the largest companies to the smallest.

But, having said that, it is critically important that we do not think this somehow gives the Government a pass. To the contrary, the Government has to get much smarter about the policy framework that it creates, and the incentives to engage the private sector, and I do want to ensure that those who come up with breakthroughs are rewarded for that effort, and I think we have to set up a process for doing that.

And, I think we also want to set out a process that rewards our success and ensures that as a country we are achieving economic progress alongside energy and environmental progress. And, I believe in that regard we probably have an additional item that we did not get to today that is worth discussing, and that is a floor on oil prices in the short run, to ensure that we do not have prices dramatically drop causing a huge withdrawal of all this capital that is being invested in new technology.

And, I think we could call it a tax on our energy security and future, because what we really want to do is to ensure that we are not at risk of an OPEC-induced price change that destroys all this innovation that is underway.

So, I think innovation is the key, and, really, understanding the linkages of energy, environment and our economic prosperity is essential.

Chairman MARKEY. Thank you.

Mr. Rice.

Mr. RICE. We believe that it is less about energy independence, because the practical aspects of that are very complicated and very far out, more about energy interdependence and security. How do you build availability, both in what you do domestically and what you have access to from outside the U.S., that is going to give you the sources of supply that you need.

And, over time, one of the—since we do not have enough fossil-based fuels in the United States, one of the ways to solve that is going to be through the development of alternative technologies, renewables, wind and solar, and I say on the solar thing that, you know, today it is where wind was ten or 15 years ago. Can it become more mainstream in that period of time? I don't know, it is

going to take a lot more investment, but it certainly is going to be big in the future.

In the meantime, we have got to be developing every source that we have. I do not think we can constrain ourselves, because the answers, you know, you cannot bet on one technology or two technologies, you have to bet on a portfolio and then make them as clean and environmentally responsible as you possibly can.

And so, that is why this is such a tough problem, with so many moving parts, and you want to do it without crashing your economy, and putting people out of business, and losing jobs. Right? That is what we are all about. We believe you can. We also think it is a huge global issue.

I visit 30 countries a year, and every country, I was in Southeast Asia two weeks ago, and Vietnam, and Malaysia, and Thailand, and Singapore, they are talking about renewables, they are talking about nuclear. These people would never have been thinking about it five or ten years ago. So, it is a real issue in front of real people, and we are all struggling to get to the same goal, I think.

Chairman MARKEY. Thank you, Mr. Rice.

Mr. David.

Mr. DAVID. Mr. Chairman, thank you for that comment to summarize. I think I have one suggestion or appeal, and that is that we amend the list of renewables, whether they be solar, geothermal, wind or anything else, to include conservation. That is a very effective, I believe the most cost effective, and most readily available, least risk source of renewable or alternative energy, is actually conservation.

Maybe I could go back again to physics for just a moment here, and just remind us all that heat is actually never—beg your pardon, energy is actually never consumed. Just going back to basic physical principles, energy is instead converted. We cannot destroy energy, it cannot be destroyed. It is simply converted, put into some alternate form.

And, 91 percent of it is converted to an ineffective use, that is, something that is not used for work. We waste 91 percent of what we have every single day, and it is not destroyed, it is just wasted.

And so, my appeal again, and I think the science, and the physics, and the technologies are there. You can conserve enormous amounts of this energy, and there is way more available from conservation than there is any other source in the short term. It is cost effective. It is low risk.

Chairman MARKEY. Thank you, Mr. David, very much.

We have a challenge in the United States. The world is going to meet in Copenhagen in December of 2009. They want the United States to be the leader, and not the laggard. There has to be a follow-on protocol to Kyoto. We need the entire world to look at us as the leader. So, the Congress will pass legislation in 2009, a mandatory cap and trade system, and both President Obama and President McCain have both said that they will sign a mandatory cap-and-trade bill, which will put us into a new era, because it will put a price on carbon. That is the new era.

And, once that happens, innovation will follow. The lowest cost product, service, idea, will win, because otherwise that company,

that family, that individual, will be paying a higher price than they want to.

So, the pressure nationally will be great to work smarter and not harder. And, that is what happened, I was fortunate in being the Chairman of the Telecommunications Subcommittee, that was the goal when we were writing the 1996 Telecommunications Act. Everyone was analog, not digital. Everyone was narrow band, not broad band. Not one home in America in 1996 had broad band, not one home.

Think about it today. You go out ten years, it is a world of Google, and Amazon, and eBay, and YouTube, words that didn't even exist, but it was all bottled up because we were thinking old, we were thinking in a way that existed for 100 years.

But, once we got the policy right, we unleashed a world where it was not just the big companies, but thousands and thousands of small ideas were able to thrive, and that is what we have to do in energy and environment now, we have to reset the policy so that we give the incentive to the entrepreneurs, to the individuals, to go out and to innovate. And, if we do that, and we come back in ten years, as Bill Gates always says, there is an over statement of what technologies can accomplish in the short run, but there is an under statement in the long run, an under estimation. And, I think ten years from now we will come back and we will see that that is the case.

And, one of my favorite Mark Twain——

Mr. LARSON. I hope you come back to Connecticut in ten years, though, Mr. Chairman.

Chairman MARKEY [continuing]. Well, again, and I am glad that we are here, because when he wrote a "Connecticut Yankee in King Arthur's Court," it was kind of bringing this Yankee Connecticut ingenuity back in time, and letting people see now who are thinking in old ways how that technology, you know, could affect their society. And, that is what we have to do again. We have to unleash this Connecticut Yankee ingenuity in a way that Mark Twain showed us it could work.

And, if we do that, then I think that revolution will not only not decrease our quality of life, but increase it, make us all much more efficient and in better touch with this planet that God gave us and that we have a responsibility to preserve, and enhance, and pass on to next generations better off than it was when we received it.

It was a great honor for the Select Committee on Energy Independence and Global Warming to be here. Thank you all so much for being here.

Mr. LARSON. And, if I could say, if I could just thank you. I think you can see from how gifted a Chairman that Ed Markey is, and how appropriate a selection by our Speaker, Nancy Pelosi, he was to chair this Committee, but I would also point out that there are many Connecticut Red Sox in here, too, as well, so it is not just Connecticut Yankees.

Chairman MARKEY. You know, the same way that David Ortiz had to go to Pawtucket for a couple of weeks, I think coming out of Washington and coming to Hartford is going to serve our Select Committee well. Thank you.

This Committee is adjourned. Thank you.

[Whereupon, at 1:14 p.m., the Committee was adjourned.]