

# Building a Bridge to a Low-Carbon World.

by Jim Rogers, Chairman, President and CEO  
Platts Lecture Series, New York, N.Y.  
Nov. 29, 2007



I am going to start by sharing with you three numbers.

Three.

Twelve.

Forty-one.

These numbers drive my passion for addressing the climate issue. These numbers are why I am here today.

Three – We are the third-largest emitter of CO<sub>2</sub> of all the companies in the United States.

Twelve – Of all the companies in the world, we rank No. 12 in our emissions of CO<sub>2</sub>.

Forty-one – Of the 192 countries in the United Nations, we would rank 41<sup>st</sup> in our emissions of CO<sub>2</sub>.

These are not numbers to be proud of or numbers to brag about, but it should tell you, as CEO of Duke Energy, why I am committed to addressing this issue – because I think it is critical for us to do that. We have a special duty, a special responsibility to step up and address this issue in a meaningful way.

I leave the science to the scientists. I defer to their judgments with respect to this, and they have spoken. My focus, as a CEO and as a leader in the energy and environmental areas, is to focus on the solutions. What I want to do today is talk about the solutions. Let me quickly list them.

One is developing new technologies and developing the funding for new technologies – I believe this is the most important key to building a bridge to a low-carbon world. Building a consensus on regulatory and legislative solutions to address the problem is an important point. Thirdly, making sure that the solutions do not unfairly penalize any one group of customers, any one industry, any one country, any one region of any country. Next, investing in our energy infrastructure and redesigning our business model, and finding new ways to create value for our customers in a low-carbon world.

I am delighted to be here today to share with you my vision. I am just one CEO of one company in one industry, but I am committed to designing and building a bridge to a low-carbon world. As I look across our country today and around the world, I see three trends that will drive legislative and regulatory as well as business action.

One is the need to decarbonize our energy supply. The second is the need to become the most energy-efficient economy in the world, and I will talk much more about that in a moment. And thirdly, the need to have reliable, affordable electricity to fuel the growth of the economy and raise the per-capita GDP of our people.

All of these trends – some are aspirations, some are goals, but all three of these are done in the context of a projection that the growth and demand for electricity in our country will be 40 percent by 2030. As a CEO, and it's actually now – the clock turned in October – it has been 19 years as CEO. One of the things that I have learned is I am judged every day when somebody throws a switch. If that electricity comes on, that is a good thing. That means I am providing reliable service. I am judged every month when people pay their bills. Is it affordable? I am judged every quarter and every year. Am I producing good returns and [am I] accountable to those who have invested in our business?

But I am judged in the future by my grandchildren – and I call it “the grandchildren’s test” – by how I address environmental issues or the important issues of the day. Because my hope is – and my belief is – that the grandchildren’s test is simply a test that when my grandchildren are my age, they look back and say, “The decisions my granddaddy made at that time are still good decisions today, and they have truly made a difference.”

So I am judged those four ways.

Our industry is judged by how reliable and affordable [electricity is]. Let me do a quick look-back to set the stage going forward. In the past 25 years, we have had significant increases in energy use in our country, along with significant growth and per-capita GDP in the U.S. At the same time, we have seen productivity gains in the use of that energy. We have actually – and not many people talk about this – reduced our carbon intensity and improved our energy efficiency, based on per-capita GDP in the United States. Today we are using 40 percent less energy and 49 percent less oil to produce each dollar of GDP than we did in 1975. Surprisingly – and when I saw the statistics I was totally surprised by this – the carbon intensity of GDP has improved faster than general energy efficiency, and that is due to the increase in nuclear and natural gas use since 1990. Prior to 1990, nuclear units were running at about a 70 percent load factor. Now they are running at about a 95 percent load factor. And then if you look at the decade of the ‘90s, 90 percent of the generation we built was natural gas; the carbon footprint there is about 40 percent of a comparable amount of generation from coal.

In fact, if you look over this period of time, you see about a 3 percent increase in energy productivity each year. Now, that number is a little misleading, because it is driven in large part by restructuring of our economy. So while we have improved energy efficiency and our carbon intensity, at the same time our economy is restructured, and we have less energy-intensive industry in the country today, as a percent of the whole, than we did then. So a lot of the gain has to do with this restructuring of industry.

The other important point is the price of electricity. The real price has actually fallen in the last 15 years. This is good news for consumers, but at the same time it has contributed to chronic underinvestment in energy efficiency in the United States over the past several decades. This is what we have done. My question is – imagine what we could have achieved and what we can achieve if we make energy efficiency and building a bridge to a low-carbon economy a national priority, which I believe we need to do.

Let me quickly tell you what our company has done – the actions that we have taken. Then, I want to step off and talk in a broader way about the type of technologies we need to build this bridge to a low-carbon world.

We felt like the first thing we had to do was lead on policy; let me share briefly with you the journey that we have been on. We started the journey with three specific policy objectives. One is to make sure we can get funding for R&D of new technology. If you take a look at the government's spend on R&D for energy, and you go back to the 1970s, you will see since 1980 it has fallen off dramatically. So in a sense we have – and by the way, that reflects our whole approach to energy and environmental issues in the country. It swings from panic to complacency, panic to complacency. Our spend on R&D said we were truly panicked in the late '70s and the early '80s – but clearly we have been in a period of great complacency since then, with respect to funding R&D.

So one objective is to fund R&D. The second objective is to make sure that we adopt a national cap-and-trade system in the United States, because I believe that is the low-cost way to do it. It is the government setting the cap. It is turning business loose to find the low-cost ways to deliver on the reductions in emissions.

The third thing is to make sure – because 70 percent of our electricity comes from the burning of coal – to make sure our customers do not have to pay twice to cross the bridge to the low-carbon world.

Those are the three objectives that we have focused on, as we try to develop policy going forward. We joined in January of last year with companies like G.E. and DuPont and Alcoa and four NGOs – a group called USCAP – to basically call for a 60 to 80 percent reduction in CO<sub>2</sub> by 2050. It is a unique combination, if you think about it, of private companies and NGOs coming together and calling for the government to act. Very rarely do you ever see private enterprise working with NGOs ahead of the government, pushing the government to deal with an important issue like the environment. So that to me was a tipping point in the conversations and the debate in Washington.

We have also worked very closely with a group called CCC, which is an international group of 46 companies committed to climate action, because we recognize this is not just a national problem – this is an international problem that needs to be addressed around the world.

We joined with seven other companies here in New York at the Clinton Global Initiative and made a \$1.5 billion annual commitment to energy efficiency, looking out over the next decade. As well, we joined together to fund the establishment of an Institute for [Electric] Efficiency in D.C. – so we could take best practices in the U.S. and subsequently best practices from around the world, and create the capability to really lead on the issue of energy efficiency in our country and around the world.

Personally, I have had a very interesting set of insights that have come from co-chairing the National Action Plan on Energy Efficiency and the Alliance to Save Energy, which is a group in Washington, D.C. As a consequence of that, I had a chance to review every regulatory plan and most of what states are doing with respect to energy efficiency, and I came out of that experience saying, “There has got to be a better way.” We have got to find a way to change the regulatory model of this country. We have to find a way for utilities to change their business model. We have to find a way to create what we call “save-a-watts” because we think that is the fifth fuel, and it is critical to our ability to reduce our carbon footprint and to create a more efficient economy. We have obviously been very active in the states, so leading public policy and shaping public policy has been a critical thing.

Let me take a minute and just tell you about how we have tried to change our business model and “save-a-watt.” We have filed to change the model in three states, and we are going to do it in all five. Tom Friedman wrote an article about it. I do not know if you all have had a chance to see it, but Tom grasped this idea. He has always been one of my favorite columnists, and he is now my very favorite. He basically called it “the mother of all energy paradigm shifts.” Now, we have a lot of work to do to live up to that, and I think he set the bar high. What we believe is that the fifth fuel is energy efficiency, and that we should be compensated for producing save-a-watts in the same way we are compensated for producing megawatts. The big difference is they will be cheaper than producing it from coal or gas or nuclear, and dramatically cheaper than renewables. So if you think renewables are good with a zero-emissions footprint, you will love “save-a-watt” because it’s cheaper, and has a lower-emissions or the same emissions footprint, and in some cases lower than renewable investments – because I have always believed the most environmentally responsible plant you build is the one that you don’t build. If we put this “save-a-watt” in place, we will be incented in a way to produce save-a-watts, and I believe companies in our industry are in the best position to do that going forward.

The concept is really this. Think about Jimmy Carter telling people – sitting by the fire with a sweater on – and I look across the room, and I know some of you all remember. I see a few of you who probably do not remember, but you have read about it. You think about what he said, you know, you've got to conserve. It is kind of like cold floors in the morning and warm beer – you've got to sacrifice! That is what energy efficiency is all about.

I am here to tell you that, with the technologies that are developing and with this save-a-watt concept, this is really about maintaining comfort and convenience, and using technology in a way to save energy and use it in a more efficient way. I believe that we can do that, but it will require the regulatory and business model to be changed, require us to make substantial investments beyond the meter. That is moving into a different place than we have been before, going forward.

The other thing that we have done is that – you know that Job One for me is making sure there is reliable, affordable electricity for our customers. I get interesting calls from governors when our prices go up. But if our power is out for four or five days because of an ice storm or a tornado, I get really interesting calls! The tone of voice is a lot higher. The emotion is a lot stronger, so I understand what the assignment is, in terms of reliability and affordability.

The other thing is, I know clearly, that we are moving into a low-carbon world. So the question is – how do I do that, particularly given the fact that we do not have technologies today that allow us to make that transition. So what we have done is – and let me quickly tell you – we have done a series of things.

We have made supply decisions – knowing we are going to be in a low-carbon world, these are the decisions we have made. Last week we got approval to build the first commercial coal gasification plant in the United States. We are going to be building it in Indiana. It is a 600-megawatt plant, and the geology in Indiana is such that it will become, when that plant is completed, the first available site to do major carbon capture and sequestration – we are talking to DOE, and we are talking with EPRI. We want that to be the site, because 50 percent of the electricity in this country comes from coal, and we have got to find a way to do carbon capture and sequestration. That will be a great site to build a test-set technology and develop the technology. So we are on the way to spending \$2 billion on that plant.

We are modernizing our fleet in North Carolina. We basically have gotten approval this year to build an 800-megawatt plant, a supercritical pulverized-coal plant. We are not building coal-gas there because the geology is not the right geology for new sequestration, but at the end of the day, what we are going to do when that plant is built, we are going to shut down 1,000 megawatts of old high-emitting coal plants – plants that we have not retrofitted for SO<sub>2</sub>, or we

have not retrofitted for NOx. Our SOx, NOx and mercury footprint will be much smaller. We view that plant as our bridge to 2050 because we do not have plans to build any more coal plants in North Carolina for at least 20 years, and by then there should be carbon capture and sequestration technology available at that point, if everything stays as people are projecting. This plant is 30 percent more efficient. It is going to cost us about \$2 billion, but again, it is a bridge to the low-carbon world that we envision.

We will be filing next month to build 2,200 megawatts of nuclear in Cherokee County, South Carolina – a \$6 billion plant. We believe that nuclear is key. It is the only source that has zero greenhouse-gas emissions. We have a great track record. I will talk more about that in a moment.

We have purchased gas plants and we are going to build. We purchased about 1,300 megawatts of gas, and we are building almost 1,600 more to meet the demand for our customers. Gas has a much smaller carbon footprint, even though the technology is not yet available there to remove CO<sub>2</sub>.

We acquired a wind developer. We are developing over 1,000 megawatts of wind. We have a very large position in hydropower in South America – over 3,000 megawatts – and we are expanding our hydro development in South America. And at the same time, we are purchasing domestically renewables – wind and solar – to be able to meet our load. What you are hearing is someone who knows we are going to a low-carbon world, and you are probably sitting there saying, “Well, why the world is he building a coal plants with no technology?” But recognizing it is a tradeoff between reliability, affordability and being clean – we are making the tradeoffs, in a way, and making sure we have a portfolio of generation that allows us to bridge the gap.

The fourth and last thing I will report to you about is that we are transforming our grid. Our grid is an analog grid. That grid needs to move from analog to digital, and that is going to fundamentally – in a sense we are creating the Internet on our grid. We are actually thinking about open architecture – having the type of protocols [to provide] two-way communications with our customers. It will be the backbone of the system of the future. It will allow us to do more sophisticated energy efficiency and energy-efficiency technologies, and allow us to better operate solar, wind and distributed generation on our system. At the end of the day, it will make a more efficient system. So that is a quick summary of four actions that we are taking today.

Now, let me talk a little bit about the future, and step back in a broader, more macro way to talk about this. We need in this country, and in this world, new technologies to achieve our carbon-reduction goals. Anybody that tells you they think we can move to a 60 to 80 percent reduction in our carbon footprint in this country, without new technologies, does not really

understand. We need that to happen, so that means we have to fund R&D. That is the only way, in my judgment, the bridge gets built to the low-carbon world with reductions of that level. We are committed to the 60 to 80 percent reduction.

There are only five ways to generate electricity – coal, gas, nuclear, renewables, or what I call the fifth fuel, energy efficiency. None of them are perfect choices. There are no silver bullets. They must all be kept in the mix. Some people are saying we need to take one out of the mix or take this one out of the mix, but we need all of them in the mix. They each have pluses and minuses, and each and every one of them needs new technological development to make them contributors in the future. That is what I want to take a few moments to talk about.

Take renewables. Renewables provide intermittent power. When the sun does not shine, solar does not deliver. When the wind does not blow, wind does not deliver. We need new storage technologies to make those work. Today, if you have an increase in demand of one megawatt, to be able to meet that one megawatt, you have to combine both wind and gas equal to 1.8 megawatts to meet a one-megawatt increase in demand. When you do the math, that is a pretty expensive cost to meet an incremental. It really goes to the fact of the intermittent nature, and how do you solve that?

People have gotten pretty comfortable in this country with having power delivered 99.9 percent of the time, and anything less than that is unacceptable. As we move into the digital age, it is going to have to be better than that in the future. The other thing that is going on with wind, as well as with other sources of power, is that the dollar is weak, and most of the wind turbines come from overseas. So that has exacerbated the cost of wind in the United States – just the weakness in the dollar – coupled with worldwide demand. So there are a couple of factors coming together that say that we need to solve the technology piece in order to make [renewables] a better contributor in the future.

Nuclear, as I mentioned a moment ago – if you are serious about solving climate, you have to be serious about re-engaging on nuclear. In this country, it has been 30 years since we started a new plant, and our plant will be the first new plant on a greenfield site. Around the world there are 30 reactors being built today, and around the world there are 70 reactors on the drawing board under development. We do not have a single reactor under construction in this country today.

We still have an issue to deal with, and that is spent fuel. We have more work to do. We sort of punted it to the government to handle it with Yucca Mountain. The government, in my judgment, is not prepared to step up and deal with it. I think it is going to require us to step up as an industry and try to address it. Recycling is one alternative. Interim storage regionally might be

another alternative. The bottom line is – it's unacceptable. The government is not going to act, and I think that it is important for the industry now to step up and address this issue in a straightforward way. So nuclear has to come back in, and we need the conversation. The safety record is there; the reliability record is there. There is a supporting story.

Coal – you cannot take coal out of the equation. Fifty percent of our electricity, as I mentioned a moment ago, comes from coal. We have ample supplies of coal. Our economy is dependent on coal, and it is not just the U.S. economy – it's internationally as well. The demand for coal in China and India is expected to increase 73 percent by 2030. Think about that – 73 percent. A great statistic is – just look at China alone, put India over here to the side – China alone in the next eight years is going to build 800,000 megawatts of new coal-fired plants. There is not going to be carbon capture and sequestration ready for that, so the bottom line is that coal is going to play a role, not just domestically but internationally. That is why it is so critical to develop technologies on carbon capture and storage. If we do not do that, we are not going to be able to achieve our 60 to 80 percent reductions going forward.

Let me turn to natural gas and quickly walk you through [it]. It has lower emissions of CO<sub>2</sub> than coal; that is a good thing, but we still do not have a technology to take it out of the stream. The problem with natural gas is that within the U.S. we have restrictions on drilling for natural gas. Actually, over the last year the import of natural gas, or LNG, has increased dramatically, although we are behind a little bit in the building of terminals that we need. The most remarkable thing to think about – and we like to talk about energy independence; at least politicians do – about energy security is that we are in the same place on the import of natural gas today as we were on the import of oil in the '60s. If we are going to use, as we did in the '90s, natural gas as the primary fuel for electricity in this country, we need to think hard about what the implications will be over time of continuing to build natural gas plants in this country. I talk to my friends at DuPont and Dow, and they are building all their new facilities not in the United States – not creating jobs in the U.S. – but they are creating jobs in other parts of the world, because natural gas is cheaper there than here, and it is much easier to transport their products here than to build plants and rely on natural gas here in the United States. The question you have to ask yourself: Is that a good answer for our economy long term? It is clearly inconsistent with energy security, and it is inconsistent with political leaders' concept of independence.

Energy efficiency – even there we need new technologies to really advance the ball. So if you walk out of here with only one thing you remember from what I have talked about, remember the importance of funding R&D in technologies and the development of technologies. Walk out of here knowing that it is not just for coal that we need new technologies; we need new technologies for nuclear, for gas, for renewables – wind and solar – as well as for energy efficiency. So one of our keys is to figure that out.

Let me turn and talk to an issue that is going to be an uncomfortable issue to talk about. I want to talk about the political viability of climate change legislation in this country, because we have seen enough bills evolve on the Hill to start to get a picture of how the battle is framing up. The political viability and our ability to really stick to a program of reducing our emissions in this country is really going to go to how we address these equity issues going forward – both from an international perspective as well as from a U.S. domestic perspective. They are the toughest, thorniest and most emotional issues to address.

Let me start on the global perspective first. You look around the world, and you have different countries that have different needs, different governments, different capabilities, different motivations. Even within the developing countries, there are differences even there. It is convenient but no longer accurate to just talk about “developing world” and “developed world.” It is far more nuanced than that, and I think what the U.N. calls “differentiated responsibilities” is really a key thing to think about as we think about post-Kyoto 2012. In my judgment, it is more important to get a commitment from every country in the world to address this issue, than have every country have the same commitment – that is a starting point for me. As a country – and I am going to say this in a very careful way, as an American – we must first step up and stand side by side with the other nations of the world who are addressing this issue. Only at that point can we start to talk about leadership.

I love hearing people talk about how we are going to just lead on this. I would like to see us stand side by side first. If we lead after that, that will be a great thing, but the important point is – we need to address the issue and stand side by side with our neighbors addressing this issue. The international equation is going to be a very tough equation, and bringing 192 countries together on this is going to be a great challenge.

Secondly is what I call intergenerational equities. We like to talk about addressing the issue today in the present because we do not want to borrow from the future, and I think that is a very important intergenerational point to keep in mind. But at the same time, we should not look back to decisions that were made by prior generations and penalize those people for the decisions that were made then. So to be symmetrical about both past generations and future generations, we need to make sure we understand the intergenerational equities as we address the issue in the present.

The other point I would like to make is that one of the things we are learning – and the scientists tell us this – is that climate change affects different regions of the world differently, so this uneven effect is going to change people’s motivations with respect to addressing this issue in the future. Let me say that I have had an opportunity to work, to help with the U.N. Foundation and the Club of Madrid to draft a set of post-Kyoto principles to go by. And one of the things I

recognize – and I think experts are recognizing – is that this is not just about mitigation going forward; this is also about adaptation, and I will talk more about that in a moment.

Lastly, I would say, climate change is an important, critical and maybe the most challenging environmental issue that we have, but it is not the only environmental issue we have. We need to save some of our resources and our focus and our commitment to address these other issues – like land use and water accessibility, etc., because all of these issues are very important.

To me, the key is political action. We need to engage everyone in the debate, build a consensus and – I spend a lot of time in Washington on the Hill – and you can see the learning curve as it continues to grow. But let me talk about the importance of getting the rules right from the get-go. This really goes to political viability. I am going to state and start a conversation about something that I see going on that I think is wrong, and that I think that at the end of the day is going to undermine our ability to act in a timely way and undermine our ability to stay focused on the climate issue long term.

In my judgment, we must decouple the cap-and-trade mechanism from efforts to raise revenue to fund R&D for new technologies and other desires. Let me tell you what I mean. The cap-and-trade mechanism is really patterned after what we did in 1990 with the Clean Air Act Amendments with respect to cap and trade on SO<sub>2</sub>. As I said a moment ago, it is about creating a mandatory cap on CO<sub>2</sub> and then it declining over time. One of the key things of cap and trade is to set a clear, credible and long-term price signal for carbon. That will drive future investment. When I look at building a plant, I say, well, if the carbon price is going to be \$20 or \$30 or \$40 or \$100, I factor that in my economics in terms of how I make my investment. That is an important thing that comes from cap and trade.

The other important thing that people have lost sight of on the Hill is that the granting of allowances is an important part of a transition mechanism to protect consumers until technology is available. Said another way, the word allowances really comes from allowing existing plants to operate until they can come into compliance, because we set a baseline period. You have to find allowances for growth, but existing plants effectively operate until the technology is available. My belief is that trying to fund R&D through the cap-and-trade mechanism is a mistake. I would make the policy argument this way because, as I mentioned a few moments ago, every technology to generate electricity, every option needs new technology – it needs R&D. Because this is a national initiative, some have suggested – and I am coming to believe – that an R&D charge on the wires for every kilowatt-hour delivered to every customer in America might be the best way to fund R&D, because we need technology investment for all these technologies. It is a national effort, and maybe what we ought to do is have a technology charge and spread it out

over every consumer in America, and let that fund technology. That approach decouples cap and trade from the function of raising money.

Let me talk specifically about Lieberman-Warner. The shortcoming of Lieberman-Warner in my judgment – and I applaud what they are doing and the targets, etc. – but the shortcoming of Lieberman-Warner is they have not decoupled. They are using an auction of allowances to raise money to fund R&D. Actually, some of our presidential candidates want 100 percent auctions – and not just for R&D, but for a variety of other desires that they might have. The truth of the matter is, an auction is nothing more than a carbon tax. For those that are heavily dependent on coal, it is a tax – and they ought to call it a tax. If they want to tax it, they ought to call it a tax, rather than saying “auctioning off allowances,” because it will have exactly that effect.

I am going to say this from a partisan standpoint: There are 25 states in our country where more than 50 percent of electricity comes from coal, and this will be a tax on the consumers in those states. Even if those states were committed to crossing the bridge to a low-carbon world – and I think the people are – they are going to have to pay twice to cross that bridge. They will have to pay for the auction allowances, or the carbon tax, and then they are going to have to pay for the technology to do the retrofit. It is just not fair in my judgment to penalize them.

The decisions that were made to generate electricity were made 40 years ago, when you built a coal plant or a nuclear plant. It was based on geography. It was based on geology. It was based on good faith using the best available technology and, quite frankly, when we made those decisions 30 or 40 years ago, we had no clue about carbon emissions. It was made based on – how do you provide electricity?

In my judgment, the goal of legislation should not be to punish customers of utilities that built coal plants in the past. It should be to create the incentives to put new, clean technologies in place for the future, including the funding of carbon capture and sequestration.

In concluding, what I would like to do is to say a couple of things to put this in context. I personally believe we need to act now. That is why I am such an advocate for energy efficiency. While they debate in Washington for the next two to three years how to do this, we can be spending money on energy efficiency and reducing our carbon footprint in this country. And then there is going to be a debate that is going to take three to five [years] – I do not know how long it is going to take worldwide to get agreement on this. But the bottom line is – we can be investing in energy efficiency and be getting something done in reducing our carbon footprint, so our No. 1 priority ought to be energy efficiency. I would actually like to see an energy efficiency arms race in this world, where countries are competing against each other to see who could have the most energy-efficient economy. To me, that is the kind of competition that would make a difference.

We are behind. The Japanese are leading. We are going to have to catch up. That would force us to do things and make decisions that I think, at the end of the day, would be in our national interest.

While I believe we need to act now, I also believe we need to be thoughtful, deliberate and fair. Let me tell you what that means to me. It is not a time to look back and place blame or wring our hands over past actions. It is not a time to panic, nor a time to be complacent. As I started out, I said our whole policy in this country on energy has been swinging from panic to complacency. We need to take the world – and this is something I have learned through the years – you take the world as you find it, and you move forward with optimism. We are where we are. Now the question is, how do we get to a low-carbon world? How do we build the bridge? How do we take our people across that bridge? How do we do it in a way that is thoughtful and fair to them?

What we need to do – and you have heard people talk about this; it is almost hackneyed now to say this – but we need to put our best minds to work. We need an Apollo Project, a Manhattan Project. By the way, I had Neil Armstrong on my board for 10 years, and every time I needed his vote, I would start my presentation with “one small step.” It often got his vote, but the point is that we need people to step up and make commitments – ordinary people – the leadership in our government and businesses, to really step up.

But let me make a point. I look at what is going on in China and India and our country and around the world. I do not want you to walk out of here and think of this as a pessimistic view, but I think this is reality, as I see it today. It is to the projected growth in CO<sub>2</sub> emissions – in one sense it is too late. Many are recognizing around the world that mitigation alone will not solve this problem – not even dramatic action. Even if we shut down all coal-fired generation in this country – which is 50 percent of our electricity – [if] we shut down 50 percent of our country, it would not make a difference. Remember the stat I told you – 800,000 new megawatts of coal generation in the next eight years in China. It would not make a difference.

My judgment is, given the projected growth in CO<sub>2</sub>, we are facing the need to adopt adaptation strategies for certain parts of the world, and we need to face up to that. We are going to be called on as a country. Sri Lanka, Bangladesh – I can go through the list of the countries that will be most affected, and you can already see things happening there. But the climate change issue is going to affect generations to come. It will require a concerted long-term effort. I said this recently, and somebody asked me a question afterwards. They said, “Rogers, you do not get it. This is not a country that has the ability to stay focused. We do not have the ability to be patient. We are an instant gratification culture.” Think about it – fast food, express lanes, ATMs, instant messaging, auto bill-pay, Blackberries, high-speed Internet. What in that is patient, really? My judgment is that we are going to need patience. We are going to need stick-to-itiveness.

I want to close on a personal note. I had a great opportunity on my 60<sup>th</sup> birthday, which was in September, to take my 10-year-old granddaughter to Paris. She had never been to Paris before, and it turned out her birthday is September 19<sup>th</sup>. She was born three hours before my 50<sup>th</sup> birthday, which was September 20<sup>th</sup>, a decade ago; and I made an idle commitment to my daughter – because I was trying to get my daughter to have that baby delivered on my 50<sup>th</sup> birthday. My coaching did not help, by the way!

The bottom line is that I made the commitment to my granddaughter and to my daughter that – because my daughter said, “Well, Dad, I did the best.” (She is the oldest daughter.) “On London time she was born on your birthday.” Turns out my granddaughter had already been to London and I took her to London, but I also took her to Paris because I wanted this to be a first-time type of opportunity. At the end of the day we went to Notre Dame, and it reminded me of something that I think our country needs. Notre Dame took 104 years to build. It took three generations. The architect who designed it never saw it completed. The people that worked on the foundation never saw the stained-glass windows. Those that worked on the walls and the stained-glass windows never saw it completed, yet they committed their lives to creating it. To me, that is cathedral thinking. That is the kind of thinking that we need in this country. That is the kind of thinking we need around the world, to be able to address climate change.

My hope for us is that our commitment is not just for the term of one politician – that it is a multigenerational commitment, and that we build it in our children, that we build it in the future, and that we in this country embrace cathedral thinking. That is the only way we will solve this.

Thank you.