Energy Myths and Realities

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Utah Valley University
April 2, 2009

Thank you for that introduction. Good morning, everyone. I'm honored to join you today.

I see a lot of faculty in the audience, but I'm going to address my remarks today primarily to you students of this fine school. Thirty-three years ago I was sitting where you are today, trying to decide what to do with my career after graduating with my degree in Electrical Engineering. I made a decision to go to work for an oil company – Chevron - on what turns out to have been a false premise: I was convinced that by the time I reached the age I am today that America and the world would no longer be running on fossil fuels. Chevron was pouring lots of money into alternatives – and they had lots of money and the incentive to find alternatives - and I wanted to be part of the transition.

Fast forward 33 years. Today, you students are being told that by the time you're *my age* the world will no longer be running on fossil fuels.

I'm going to try to do something that seems impossible these days – and that's have an honest conversation about energy policy, global warming and what it means for America's energy future – and for you, the generation that will have to live with the consequences of the policy choices we make. My goal is to inform you with easily verifiable facts – not hyperbole and propaganda – and to appeal to your common sense. But first a few words about Questar.

Questar Corporation is the largest public shareholder-owned company headquartered in Utah, based on stock-market value, NYSE ticker STR. We're one of two Utah-based companies in the S&P 500. Most of you know us as the parent company of Questar Gas, the utility that sends you your natural gas bill every month. But outside of Utah and to investors we're known as one of America's fastest-growing natural gas producers. We also own a pipeline company. I'm also proud to say that we're the only Utah-based company ever to make the *Business Week* magazine annual ranking of the 50 top-performing companies in the S&P 500 – we were #5 in both 2007 and 2008, and we're #18 in the top 50 in *Business Week's* 2009 ranking, just out this week.

At Questar our mission is simple: we find, produce and deliver clean energy that makes modern life possible. We focus on natural gas, and that puts us in the "sweet spot" of America's energy future and the global warming debate. Natural gas currently provides about one-fourth of America's energy needs. When you do the math, the inescapable conclusion is that greater use of natural gas will be a consequence of any policy aimed at lowering America's carbon footprint. You cut carbon dioxide emissions by up to 50% when you use

natural gas instead of coal to generate electricity. You cut carbon emissions by at least 30% and NOx emissions by 90% when you use natural gas instead of gasoline in your car or truck - and here in Utah you save a lot of money - you can fill up your natural gas car at a cost of about 80 cents per gallon equivalent. You also cut carbon emissions by 30-50% when you use natural gas instead of fuel oil or electricity to heat your home.

But you didn't come here for a commercial about Questar and I didn't come here to give you one. Let's talk about energy.

There may be no greater challenge facing mankind today – and your generation in particular - than figuring out how we're going to meet the energy needs of a planet that may have 10 billion people living on it by the middle of this century. The magnitude of that challenge becomes even more daunting when you consider that of the 6.2 billion people on the planet today, nearly two billion people don't even have electricity -- never flipped a light switch.

Now, when I started my career with Chevron in the mid-1970s the "consensus" at the time was that America and the world were running out of oil. Ironically, the media back then was also declaring a scientific consensus that the planet was cooling, fossil fuels were to blame, and we were all going to freeze to death unless we kicked our fossil fuel habit. We were told we needed to find alternatives to oil – fast. That task, we were told, was too important to leave to markets, so government needed to intervene with massive taxpayer subsidies for otherwise uneconomic forms of energy. That thinking led to the now infamous 1977 National Energy Plan, an experiment with central planning that failed miserably. Fast-forward to today, and: déjà vu. This time the fear is not so much that we're running out of oil, but that we're running out of time – the earth is getting hotter, humans are to blame, and we're all doomed unless we find alternatives to oil, gas and coal -- fast. Once again we're being told that the job is too important to be left to markets.

Well, the doomsters of the 1970s turned out to be remarkably wrong. My bet is that today's doomsters will be proven wrong. Over the past 33 years mankind has consumed more than three times the world's known oil reserves in 1976 – and today proven oil reserves are nearly double what they were before we started. The story with natural gas is even better – here and around the world enormous amounts of natural gas have been found. More will be found. And of course, the 30-year cooling trend that prompted the *global cooling* scare in the mid-70s abruptly ended in the late 70s, replaced by with a 20-year warming trend that *peaked in 1998*.

The lesson that we should've learned from the 1970s is that when it comes to deciding how much energy gets used, what types of energy get used, and where, how and by whom energy gets used -- that job is too important *not* to be left to markets.

Now, I'd love to stand up here and debate the science of global warming. The mainstream media, of course long ago declared that debate over -- global warming is a planetary emergency, we've got to change the way we live *now*. I've followed this debate closely for over 15 years. I read everything I can get my hands on. I'm an engineer, so I try to bypass the media's penchant for alarmism – "World coming to an end – details at 11" - and go

straight to the actual science. My research convinces me that claims of a scientific consensus mislead the public and policy makers - and often reflect another agenda.

Yes, planet earth does appear to be warming – but by a not so unusual and not so alarming *one degree* over the past 100 years. Indeed, global average temperatures have increased by about one degree per century since the end of the so-called Little Ice Age 250 years ago. And, yes carbon dioxide concentration in the upper atmosphere has increased over the past 250 years from about 280 *parts per million* in 1750 to about 380 parts per million today – that's .00038. What that number tells you is that carbon dioxide – the gas that everyone in this room exhales every three seconds or so, the gas that plants need to grow - is a trace gas, comprising just four out of every 10,000 molecules in the atmosphere. But it's a very important trace gas – without CO2 in the atmosphere, the earth would be a lifeless ball covered with ice. And yes, most scientists believe that humans are responsible for much of that increase.

But that's where the alleged consensus ends. Contrary to the righteous certitude we get from some, no one knows how much warming will occur in the future, nor how much of any warming that does occur will be due to man, and how much to nature. No one knows what the impact of warming will be, nor how easily people, plants and species will adapt to warming. When you hear someone claim they know, I suggest Mark Twain's advice: respect those who seek the truth, be wary of those who claim to have found it.

My views on this issue changed dramatically about a decade ago when I looked at the inputs to one of the global circulation models (GCM) that had been built to predict warming over the next century. If the only input were carbon dioxide, the output would be simple – doubling of the concentration of CO2 in the atmosphere would result in only about a 1 degree increase in global average temperatures over the next 100 years. But the earth's climate is what geek engineers refer to as a "non-linear, dynamic system". There are dozens of inputs, and as I studied the model further I concluded that many of the inputs into these models are little more than the opinion of the scientist – in some cases, just a guess. For example, water vapor is the most important greenhouse gas – far more potent than CO2. [As an aside, if CO2 is a "pollutant" as some assert, then water vapor is also a "pollutant" – an absurd conclusion. But I digress]. I discovered that scientists do not agree on how to model water vapor, clouds, precipitation and evaporation. Some argue that clouds amplify CO2 forcing, others believe precipitation acts as the earth's thermostat. The point is there's no consensus this fundamental issue.

But the reality for American consumers is that whether you agree that the science is settled or not, the political science is settled. The new Congress has promised to "do something". Carbon dioxide regulation is coming. Indeed, President Obama's hope of shrinking the massive federal budget deficit depends on vast new carbon revenues from a tax on carbon energy – so called "cap and trade". Senate Majority Leader Harry Reid has promised a bill by May.

Under cap-and-trade, the government would try to create a market for carbon dioxide by selling credits to companies that emit carbon dioxide. They would set a cap for the maximum

amount of CO2 emissions. Over time, the cap would be lowered. In theory, this will induce companies to invest in lower-carbon technologies, thus reducing emissions to avoid the cost of buying credits from other companies that have already met their emissions goals. The costs of the credits would be passed on to consumers. Because virtually everything we do and consume in modern life has a carbon footprint, the cost of just about everything will go up. This in theory will cause each of us to choose products that have a lower-carbon footprint. Any way you slice it, cap and trade a tax on the way we live our lives – one that by design will produce a windfall for government.

Here's the crucial point. The long term goal is '80 by 50'– an 80% reduction in carbon dioxide emissions by 2050.

Please indulge me as we do the math on what '80 by 50' means, using Utah as an example. Utah's carbon footprint today is about 66 MM tons per year. Our population is 2.6 MM. You divide those two numbers, and the average Utahan today has a carbon footprint of about 25 tons per year. An 80% reduction in Utah's carbon footprint by 2050 implies a reduction from 66 MM tons today to about 13 MM tons per year by 2050. If Utah's population continues to grow at 2% per year, by 2050 there will be about 6 MM people living in our state. So 13 MM tons divided by 6 MM people = 2.2 tons per person per year. Under 80 by 50 by the time you folks are about my age you will be required to have a carbon footprint of just 2.2 tons per year.

Q: when was the last time Utah's carbon footprint was as low as 2.2 tons per person?
A: not since Brigham Young and the Mormon pioneers first entered the Wasatch Valley and declared "this is the place".

You reach a similar conclusion when you do the math on '80 by 50' for the entire country. '80 by 50' would require a reduction in America's carbon footprint from about 20 tons per person per year today, to less than 2 tons per person per year in 2050 – again, a 90% reduction in per capita carbon footprint.

Q: when was America's carbon footprint as low as 2 tons per person per year?
A: not since the Pilgrims arrived at Plymouth Rock in 1620.

In short, '80 by 50' means that by the time you folks are my age, you won't be allowed to use anything made with - or made possible by - fossil fuels.

So I want to focus you young people today on this critical question: "How on God's green earth – pun intended - are *you* going to do what my generation said we would do but didn't – and that's wean yourselves from fossil fuels in just four decades?" That's a conversation that each of you, and indeed, all Americans need to engage in now -- because when it comes to "how" there clearly is *no consensus*. Simply put, with today's energy technologies, we can't get there from here.

The hallmark of this dilemma is our inability to reconcile our prosperity and our way of life with our environmental ideals. We Americans love our cars. We like the freedom to "move

about the country" – to drive to work, fly to conferences, visit distant friends and family. We aspire to own the biggest house we can afford. We like to keep our homes and offices warm in the winter and cool in the summer. We like devices that use electricity – computers, flat screen TVs, cell phones, the Internet, and many other conveniences of modern life that come with a power cord. We want food that's low cost, high quality, and free of bugs – which means farmers must use fertilizers and pesticides made from fossil fuels. We like things made of plastic and clothes made with synthetic fibers – and all of these things depend on abundant, affordable, growing supplies of energy.

And guess what? We share this planet with 5.9 billion other people *who all want the same damn things*.

America's energy use has been growing at about 1.5 % per year, driven by population growth and prosperity. But while our way of life depends on ever-increasing amounts of energy, we're downright schizophrenic when it comes to the things that energy companies must do to deliver the energy that makes modern life possible.

We want energy security – we don't like being dependent on foreign oil. But we also don't like drilling in the U.S. Millions of acres of prospective onshore public lands here in the Rockies plus the entire east and west coast of the U.S. are off-limits to drilling for a variety of reasons, some legitimate, some not. We hate paying $2 per gallon for gasoline -- but not as much as we hate the refineries that turn unusable crude oil into gasoline. We haven't allowed anyone to build a new refinery in the U.S. in over 30 years. We expect the lights to come on when we flip the switch, but we don't like coal, the source of 40% of our electricity – it's dirty and mining scars the earth. We also don't like nuclear power, the source of nearly 20% of our electricity -- it's clean, but we're afraid of it. Hydropower, the source of about 6% of our electricity is clean and renewable. But it has also been blacklisted – dams hurt fish.

We don't want pollution of any kind, in any amount, but we also don't want to be asked: "how much are we willing to pay for environmental perfection?" When it comes to global warming, *Time* magazine tells us to "be worried, be very worried" – and we say we are -- but we don't act that way.

Let me suggest that our conversation about how to reduce carbon dioxide emissions must begin with a few "inconvenient" realities.

Reality 1: America's and the world's demand for energy will grow by 30-50% over the next two decades – in fact it will more than double and could triple by the time you're my age. Simply put, America and the rest of the world will need all the energy that markets can deliver. We're going to need it all – oil, natural gas, coal, nuclear, wind, solar, geothermal, biofuels.

Reality 2: There are no near-term alternatives to oil, natural gas, and coal. Like it or not, the world runs on fossil fuels, and it will for decades to come. The U.S. government's own forecast shows that fossil fuels will supply about 85% of total world energy demand in 2030 – roughly the same as today. Yes, someday we'll find alternatives. But that day is still a long

way off. It's not about will. It's not about who's in the White House. It's about thermodynamics and economics.

Now, I was told back in the 1970s the same that you're being told today: that wind and solar power are 'alternatives' to fossil fuels. A more honest description would be 'supplements'. Taken together, wind and solar power today account for just one-sixth of 1% of America's annual energy consumption today. Let me repeat that statistic – one-sixth of one percent -- .0016.

I'm holding a pie chart showing total U.S. primary energy demand today. PowerPoint won't even create a thin slice for wind and solar – it's just a line.
Back when I was starting my career Jimmy Carter declared that America would be out of oil and gas by 1990, and declared alternative energy the "moral equivalent of war." Thirty years and $30 billion in government subsidies and all we get for all the wind farms and all the solar electricity plants in operation in this country today is a thin line on a pie chart.

Undaunted by all of this, President Obama has proposed to *double* wind and solar power generation in this country by the end of his first term. I would first point out that the line on this pie chart will become a slightly thicker line by the end of his first term. I would also point out that wind and solar power doubled in just the last three years of the George W. Bush administration. I'll grant you that W. started from a smaller baseline, so doubling again over the next four years will be a taller order. But if President Obama's goal is achieved, wind and solar together will grow from one-sixth of one percent to a combined one-third of one percent of total primary energy use – and that assumes energy consumption remains stagnant, which of course it will not.

The problems with wind and solar power become apparent when you look at their footprint. To generate electricity comparable to a 1,000 MW gas-fired power plant you'd have to build a wind farm with at least 500 very tall windmills occupying 40,000 acres of land. What about solar power? Well, here's a photo of "America's most productive utility-scale solar electricity plant". It has a *capacity* 8.2 MW, and it's located on 82 acres of land in southwest Colorado. When you take into account the fact that the sun doesn't always shine, you would need roughly 250 of these plants, occupying roughly 20,000 acres to replace a single 1,000 MW gas-fired power plant.

By comparison, a 1,000 MW gas-fired power plant can be built on about 10 -15 acres. [Another example, you'll find a photo of Sempra energy's El Dorado Solar near Las Vegas on their website. 10 MW – largest of its kind in North America – built next to a 500 MW gas-fired power plant. They plan to run the gas plant and "supplement" gas-power with solar when its available. This is the current state of the art].

The *Salt Lake Tribune* recently celebrated the planned startup of a 14 MW geothermal plant near Beaver, Utah. That's wonderful! But the Tribune failed to put 14 MW into perspective. Utah has over 7,000 MW of installed generating capacity, primarily coal. America has one million MW of installed capacity. Because U.S. demand for electricity has been growing at about 2% per year – we need to build 10-20,000 MW of new capacity every year to keep

pace with growth. There's a worldwide building boom in new coal-fired power plants – over 200,000 MW under construction, over 30,000 MW in China. In fact, there are 30 coal plants under construction in the U.S. today that when complete will burn about 70 million tons of coal per year.

Why did my generation fail to develop wind and solar? Because our energy choices are ruthlessly ruled, not by political judgments, but by the immutable laws of thermodynamics. In engineer-speak, turning diffused sources of energy such as photons in sunlight or the kinetic energy in wind requires *massive* investment to concentrate that energy into a form that's usable on any meaningful scale.

What's more, the wind doesn't always blow and the sun doesn't always shine. Unless or until there's significant breakthrough in high-density electricity storage – a problem that has confounded scientists for more than a century – wind and solar can never be relied upon to provide base load power.

But it's not just thermodynamics. It's economics. Over the past 150 years America has invested trillions of dollars in our existing energy systems – offshore platforms, power plants, the grid, steam and gas turbines, railroads, pipelines, distribution infrastructure, refineries, service stations, boilers, airplanes, cars, trucks, appliances, etc. Changing that infrastructure to a system based on renewable energy will take decades and massive new investment.

To be clear, we need all the wind and solar power *the markets can deliver at prices we can afford*. But please, let's get real -- wind and solar are not "alternatives" to fossil fuels. [If time, explain why Bush's hydrogen vision has gone nowhere].

Reality 3: Carbon cap and trade regulation will drive the cost of energy painfully higher. Obama's budget puts the cost at $650 MM over the next decade. Some believe that this estimate could be off by a factor of three – suggesting the true cost will approach $2 trillion over the next decade. As I mentioned, the businesses that are forced to buy credits will pass this cost on in the price of their goods – we'll all pay for it.
Aside from the enormous cost, I hope you would ask: will cap and trade work? In my opinion the answer is no. It won't work until we have viable alternatives to fossil fuels that can be delivered to markets at scale and at a cost that is politically and economically acceptable.

The European Union implemented a cap and trade scheme in an effort to meet their Kyoto commitments to reduce carbon emissions to below 1990 levels by 2012. [Explain Kyoto if time]. There's a reason why they're failing: no country is willing to sacrifice their economy and their standard of living to do so. Europe's cap and trade scheme was designed to fail – and it's working as designed.

Let me do the math to explain why Kyoto would have failed in the U.S. and why I think Obama's cap and trade scheme will also fail.

Americans were responsible for about 5 billion metric tons of CO_2 emissions in 1990. By 2005 that amount had risen to about 5.8 billion tons. Let's suppose that the U.S. had signed

the Kyoto treaty back in 1997 – incidentally, Bill Clinton was President and Al Gore was Vice President when the Senate voted 95-0 to reject Kyoto - the U.S. would've committed to cut manmade CO2 emissions to 7% below that 1990 level – to about 4.6 billion tons, a 1.2 billion ton per year cut.

Q: what would it take to cut CO2 emissions by 1.2 billion tons per year by 2012?
A: a lot more sacrifice than just riding your Schwinn to work or school, and changing light bulbs.

We could've outlawed gasoline. In 2005 gasoline use in America generated about 1.1 B tons of CO2. That would almost get us there. Or, we could shut down over half of the coal-fired power plants in this country – coal plants generated about 2 B tons of CO2 in 2005. Of course, before we did that we'd have to get about 60 MM Americans and a significant number of American businesses to volunteer to go without electricity.

This simple math is not friendly to those who demand that government to mandate sharp cuts in manmade carbon dioxide emissions -- now.

Reality 4: Even if America does cut CO2 emissions, the same computer models that predict manmade warming over the next century also predict that Kyoto-type CO2 cuts will have *no discernible effect* on global average temperatures for decades, if at all. The models show that Kyoto reductions would prevent only a small fraction of one degree of warming over the next 50 years. When was the last time you read that in the paper? We've been told that Kyoto was "just a first step." Your generation may want to ask: "what's the second step?"

That begs another question: "how much are Americans willing to pay for 'a first step' that has no discernible effect on global climate?"

The answer here in Utah is: not much, according to a public opinion poll conducted by Dan Jones and Associates published in the *Deseret News.* 63% of those surveyed said they're worried about global warming. But when asked how much they'd be willing to see their electricity bills go up to help cut carbon dioxide emissions, only half were willing to pay more for electricity. Only 18% were willing to see their power bill go up by 10% or more. Only three percent were willing to see their power bill go up by 20%.

Here's the rub: many Europeans today pay at least 20% more for electricity as a consequence of their (failed) efforts to severe the link between modern life and CO2 emissions.

If Americans aren't willing to pay a lot more for their energy, how do we reduce CO2 emissions? Well, here are four things we can all agree on.

First, we need to improve energy efficiency.

Second, we need to stop wasting energy.

Third, we need to conserve energy.

Fourth, we need to rethink our irrational fear of nuclear power. I see Steve Creamer, the Chairman and CEO of Energy Solutions is here today. I'll let Steve make the case for nuclear power.

Fifth, we need to embrace one of the key recommendations of the Intergovernmental Panel on Climate Change - substitute low-carbon natural gas for higher-carbon coal and oil. The good news: we can now do so without driving the price of natural gas to unacceptable high levels.

Indeed, 2008 will be remembered in the energy industry as the year U.S. natural gas producers changed the game for U.S. energy policy. Smart people in my industry have 'cracked the code' – we've figured out how to produce stunning amounts of natural gas from shale formations right here in the U.S. [Explain difference between shale gas and shale oil]. As a result, we can now say with confidence that America and the world are "swimming" in natural gas. U.S. onshore natural gas production has grown more than 20% over the past three years, a feat that most energy experts thought impossible a few years ago. America's known natural gas resource base now exceeds 100 years of supply at current U.S. consumption – and that number is sure to get bigger. Abundant supplies mean that natural gas prices over the next decade and beyond will likely be much lower than over the past five years. While prices may spike from time to time in response to sudden, unexpected changes in supply or demand – for example, hurricanes in the Gulf of Mexico or extreme cold or hot weather – these spikes will be temporary.

Greater use of natural gas produced in America - by American companies who pay American taxes - will help reduce oil imports. Unlike oil, 98% of America's natural gas supply comes from North America.

What's more, we don't need massive new investment in gas-fired power plants to substitute gas for coal. I mentioned earlier that America has about one million MW of installed electric generation capacity. Forty percent of that capacity is built to run on natural gas – about 400,000 MW. That compares to just 312,000 MW of coal capacity. But unlike those coal plants, which run at an average load factor of about 75%, America's existing, installed natural gas-fired power plants operate with an average load factor of less than 25%. Turns out that we've got a quick and easy way to cut carbon emissions without driving the price of electricity through the roof – use clean burning, low-carbon, American-made natural gas in our existing, underutilized gas-fired power plants.

Sixth, your generation needs to focus on new technology and not just assume it, as many in my generation did back in the 70s – and as many in Congress continue to do today. Just one example: there's no such thing as "clean" coal. But given America and the world's dependence on coal for electric generation, we need to fund R&D aimed at capturing and storing carbon dioxide from fossil fuel plants. [Mention USTAR funding].

To be sure, carbon capture and sequestration will be hugely expensive and it'll take decades to implement *on any meaningful scale*. The high costs will be passed through in electricity rates to consumers. It's not just the capture part - we'll have to construct a massive pipeline grid comparable to our existing natural gas pipeline grid, and drill thousands of wells to transport and pump massive amounts of CO2 into the ground. The facilities required to do this will use huge amounts of energy – which most likely will come from fossil fuels, negating some of the carbon reduction benefits. We're not sure where we're going to put all this CO2. Questar is one of the largest owner-operators of underground natural gas storage. Gas storage is in high demand - we're always looking for places to build cost-effective storage. But I can tell you that there aren't many places left that are economic to develop. That will be the case with CO2 sequestration as well.

But the point is, R&D aimed at allowing us to continue to use fossil fuels while waiting for breakthroughs in other technologies seems a rational thing to do.

Seventh, it's time to have an honest discussion about alternative responses to global warming than what will likely be a futile attempt to eliminate CO2 emissions related to fossil fuel use. In truth, while many scientists believe man's use of fossil fuels is at least partly responsible for global warming, many also believe the amount of warming will be modest and the planet will easily adapt. Just about everyone agrees that a modest amount of warming won't harm the planet. In fact, highly-respected scientists such as Harvard astrophysicist Willie Soon believe that added CO2 in the atmosphere may actually benefit mankind because more CO2 helps plants grow and increases biodiversity. When was the last time you read that in the paper?

You've no doubt heard the argument that even if global warming turns out not to be as bad as some are saying, we should still cut carbon emissions – as an insurance policy – the so-called precautionary principle. While appealing in its simplicity, there are three major problems with the precautionary principle.

First, none of us live our lives according to the precautionary principle. Let me give you just one example. Around the world about 1.2 million people die each year in car accidents – about 3,200 deaths a day. At that pace, 120 million people will die this century in a car wreck somewhere in the world. We could save the lives of 120 million people by banning cars and trucks, or by imposing a 5 mile per hour speed limit worldwide. How many of you can live with a 5 MPH speed limit to save 120 million lives? Of course we don't – we accept trade-offs. We implicitly do a cost-benefit analysis and conclude that we're not going to do without our cars, even if doing so would save 120 million lives. Don't you think we should insist on an honest cost-benefit analysis for cap and trade regulation?

Second, the media dwells on the potential harm from global warming, but ignores the fact that the costs borne to address it will also harm us. We have a finite amount of wealth in the world. We have a long list of problems – hunger, poverty, malaria, nuclear proliferation just to name a few. Your generation should ask: how can we do the most good with our limited resources? The opportunity cost of diverting a large part of current wealth to solve a potential problem 50-100 years from now means we do "less good" dealing with these other problems.

Third, economists will tell you that the consequence of what is in effect a huge tax on the way we live our lives will be slower economic growth. Slower economic growth, compounded over several decades, means that we leave future generations with less wealth to deal with the consequences of global warming, whatever they may be. [Compare U.S. wealth in 1900 vs. today].

In truth, mankind has proven to be remarkably adaptive. Humans live north of the Arctic Circle where temperatures are below zero most of the year. Roughly one-third of mankind today lives in tropical climates where temperatures often exceed 100 degrees. In fact, you can take every one of the potential problems caused by global warming and identify lower-cost ways to deal with that problem than rationing energy use. For example, if in fact melting arctic ice causes the sea level to rise, a wealthier world will adapt over time by moving away from the beach or building retaining walls to protect beachfront property. What about the polar bear? Polar bears have survived sometimes dramatic climate changes over thousands of years, most recently the so called “medieval warm period” of 1000-1300 A.D. in which large parts of the arctic glaciers disappeared and Greenland was truly “green”. It’s an established fact that more polar bears die each year from gunshot wounds than from drowning. The first thing we need to do to protect polar bears is to stop shooting them.

Let me close by returning to the lessons my generation learned from the 1970s energy crisis. We learned that energy choices favored by politicians but not confirmed by markets are destined to fail. If history has taught us anything it’s that we should let markets determine how much energy gets used, what types of energy get used, and where, how and by whom energy gets used. What’s more, no form of energy is perfect, thus only markets can weigh the advantages and disadvantages of different energy forms. Instead, government’s role is to set reasonable standards for environmental performance, and make sure markets work.

I’ve tried to cover a lot of ground this afternoon. I hope my comments provoke at least some of you to become engaged in the discussion about America’s energy future. Most of all I wish you freedom, prosperity – and abundant supplies of energy at prices you can afford. Thank you for your attention, and now I’ll be glad to take rebuttal!