

Wyoming Forum Report

November 20-21, 2008

**A Wyoming Business Alliance /
Wyoming Heritage Foundation Event**

The 26th annual Wyoming Business Alliance / Wyoming Heritage Foundation Forum was held in Casper November 20-21, 2008 and tackled one of the more controversial worldwide political issues of our times. **"Climate Change . . . Politics and Economic Realities"** featured an array of distinguished speakers and panels that touched on many facets of global warming and climate change.

Wyoming Business Alliance / Wyoming Heritage Foundation Chairman Mike Ceballos opened the forum's kickoff luncheon meeting by noting that "once again we're tackling an important issue for Wyoming and the Nation. Our speakers are outstanding and offer diverse, thoughtful and sometimes controversial comments and opinions.

"Our goal is to explore the history of climate change, scientific reports, disputed facts and opinions, economic implications, pending Congressional actions and what it means for each and every one of us in this room.

"We expect and encourage robust debate...serious questions and informed opinions. This is also a multi-generational and multi-sector issue. In this context, we are pleased to have with us a group of high school and college students who will have an opportunity to talk to and question three of our main speakers.

The Keynote Speaker. Chairman Mike Ceballos in the introduction said: "We are fortunate to have with us Dr. Jay Shogren of the University of Wyoming." Dr. Shogren has a long-term background of assignments with the U.S. Council on Economic Advisors, a Kyoto Protocol advisor and a member of the Swedish Academy of Sciences, the organization tasked with selecting Nobel Prize recipients.

Jay Shogren, Keynote Speaker

Dr. Shogren pointed out that he is an academic economist. He worked on the White House staff devising discussions and serving as an environmental counselor on the economy and worked on the Kyoto Protocol through participation on the Intergovernmental Panel on Climate Change (IPCC). He also spent 10 years as a member of Wyoming's Environmental Quality Council where he dealt with industrial citing applications...

"I'm more of an agnostic on this issue. I have taken what scientists tell me and I use it to help people make decisions, such as my work on the Council of Economic Advisors," Dr. Shogren said. "I pushed for years as an advocate for efficiency. **We have to figure out how to do things cost-efficiently. In this case, I call it Planet Insurance.**"

"My goal is to walk between both sides and try to whittle out what makes sense and what doesn't. I can offer some background that would help you think about the problem and some of the ways to frame the question. **For Wyoming it doesn't get any bigger than this in terms of understanding our future and understanding what it means for the next 50 years.**

"My students told me before I came today to talk about investing the Permanent Mineral Trust Fund in them. They're human capital. They also said to thank the Wyoming Business Alliance for the Hathaway Scholarships program and they said to invest the PMTF in renewable energy sources.

"Scientists I've worked with over the last decade have convinced me 'something is going on' and I'm convinced we have 'something to do with it.' Think about framing the question in the Planet Insurance context. The Casper Star-Tribune published the Mason-Dixon Survey earlier this year in which more than half of the respondents did not believe climate change is a significant threat. Those living in Arizona, Colorado, Nevada, Utah and Wyoming were polled. Overall, 57% said climate change is not a threat and 31% said it was and 12% were undecided.

"I attended a session in early November with senior executives from the energy sector. Greenhouse gas emissions were declared unavoidable. We need to craft a federal policy without compromising the U.S. economy. How will U.S. national policy coordinate with international policies? Will there be federal legislation independent from the rest of the world? We're talking about the global public good. Will individuals adapt to meet the consequences of new legislation?

"Can we ensure energy security in a carbon-constrained world? We would create a new global currency in a world where carbon targets are sharply reduced. And, where do we get the biggest bang for our buck with greenhouse gas legislation.

1.) Scientific Consensus

"The earth is getting warmer. There's been a rise of one degree F over the past 100 years. Most of the warming is human-caused. Warming will likely continue for centuries to come. Who believes these statements? Organizations such as the American Academy for the Advancement of Science; the Geological Society of

America; the American Physical Society; and the American Meteorological Society.

2.) Planet Insurance Question

"The planet insurance question means we have a choice at risk We need to look hard at probability and severity; our portfolio of risk management tools; how to protect the planet in a cost-effective manner; look at mitigation as self-protection; determine what it will cost to mitigate and what it will cost if we don't.

"Adaptation as self-insurance is possible. We must find mechanisms that allow us to do mitigation in the most cost-effective manner.

3.) Pre-Kyoto Protocol

"In 1992 the United Nations formed the Convention on Climate Change and called for voluntary reductions in emissions by 2000. In the 1990s voluntary pledges were not being met. In 1992, State Department Undersecretary Tim Wirth announced the U.S. wanted a binding target for emissions.

"In 1997, the Kyoto Protocol set targets and timetables for emission reductions of 5% below 1990 levels by 2008-2012. In Europe, only Sweden and the United Kingdom are below targets; the rest are a bit above. Kyoto was not ratified in the U.S. because President Clinton wanted to negotiate with China and India to achieve cooperation.

"The discussions centered on the idea that broad but thin targets could be signed onto versus narrow but deep targets. Could we ask the developing world to sign on and ask for deep cuts?

4.) Mechanisms to Help Reduce the Costs

Dr. Shogren outlined some options that would help countries reduce the costs of meeting carbon reductions.

"First, there could be a Global/Regional cap and trade program. We could fix the amount of emissions then allow people to trade their targets.

"Second, we have talked a lot about carbon sequestration in Wyoming. We have talked about the potential of re-injecting carbon back into the ground at a certain price which could be profitable.

"Third, **establish a Clean Development Fund.** We can spend money to help startup businesses in China and India that are less carbon intensive. That gives

credits in the U.S. to help meet our goals. **The costs:** opportunities to society to pursue climate protection. **The benefits:** there are gains from mitigation and adaptation. The planet insurance could cost 1-2% of world GDP; it could prevent catastrophe; it could accrue to future generations in developing nations whose agrarian economies depend on a favorable climate.

"Some of the costs could be zero to economic disarmament. It could cost a .45 to 1.96% reduction in GDP without trading carbon units. Or a .3 to .54% reduction in GDP with trading. We need to consider Kyoto's position based on: flexible incentive systems; participation by developing countries; and, voluntary adoption of low-carbon energy technologies.

"We need to find a way to assure that China and India participate in global solutions and participate in binding targets. New technologies will result in reduced costs without a price increase in energy costs.

"Meetings start next month in Poland to begin thinking about post-Kyoto targets after 2012.

"There's the Stern report to be considered. Are we willing to pay 1% of our GDP now in order to save 5% to 20% later?"

"The financial crisis is resulting in some people pressing for a green fiscal policy by the new Administration. Obama may appoint a new Climate Czar to work with all agencies in the U.S. and international organizations," Dr. Shogren concluded.

Panel: Environmental Perspectives and Forecasts

Panel moderator, Rep. Debbie Hammons, was introduced by Wyoming Business Alliance/Wyoming Heritage Foundation Chairman Mike Ceballos. The question for the panel was posed as **"Is Wyoming's environment impacted by climate change?"**

Steve Laird, Foundation Coal, Gillette

The first panelist was Steve Laird of Foundation Coal, owners of the Belle Ayr and Eagle Butte surface coal mines in Campbell County, as well as coal properties in other regions of the U.S. "I'm here as a coal miner," Laird started off his presentation. "I want to set the stage for coal mining. Belle Ayr mine holds the distinction of being Wyoming's first non-captive coal mine. Overburden stripping started in 1972 and the first coal was shipped in 1973."

"In Wyoming, most mines are in the Powder River Basin. If Wyoming was a country it would rank 7th in coal reserves. The total resource is 1.4 trillion tons, more than all of Saudi Arabia's oil reserves. The total recoverable reserves are 69 billion tons. Wyoming's recoverable coal is six times the U.S. reserves of natural gas; 25% of U.S. fossil fuel reserves; and eight times U.S. domestic oil reserves. Wyoming provides 35% of the nation's coal.

"Coal pays 6,371 employees in Wyoming some \$480 million in annual wages plus benefits. The average annual income per worker is \$75,000. There are also 2,631 contractors employed by the mines. And, in 2007, we coal mining paid about \$900 million in taxes and other payments.

"Coal mining in 2006 was safer than the financial industry and manufacturing, retail, agriculture and construction.

"Powder River Basin coal is inexpensive. A comparison shows 17.6 million BTUs per ton. **On a million BTU basis, coal from the Basin costs about 57 cents. Crude oil is \$10.34 and natural gas is \$10.00 when sold at \$20/MCF.**

"Coal mining in the basin in 1969 was zero but by 2007 it reached 450 million tons. About 49% of U.S. electricity is generated by coal-fired plants. Then, there's the CO2 factor. **Man caused** about 5% of total worldwide CO2. **Solid fuels** such as coal contributed 35% of the total; **liquid fuels** at 36%; **cement production** at 3%; **gaseous fuels** at 20%; **flaring gas** less than 1%; and shipping and **air transportation** about 4%.

"The major sectors of our economy are all CO2 emitters. These are industrial plants, transportation, residential, commercial and agriculture contributors. How do we reduce CO2 emissions? The Lieberman-Warner bill (S-2191) would force reducing greenhouse gas emissions (GHG) 30% below 2005 levels by the year 2030 through a carbon cap-and-trade system. **Cap-and-trade means setting up a carbon pie and then distributing to regulated industries rights to emit up to the level of their cap.** Industries would be able to transfer their allowances among themselves or buy offset credits allowing them to emit more.

"Over time, the cap is reduced, forcing down emissions. The economic impacts of Lieberman-Warner are as follows:

	<u>U.S.</u>	<u>WYOMING</u>
Job Losses	3 - 4 million	6,300 - 8,100
Disposable Income Loss	\$4,022 - \$6,752	\$3,678- \$6,707
Increase in Gasoline Costs	60% - 144%	74% - 140%

Rise in Electricity Costs	77% - 129%	96% - 133%
Decline in Federal/State GDP	35%	35% - 43%
Rise in Energy Costs for Schools Hospitals, Colleges		64% - 84%

"Foundation Coal has joined with the National Mining Association to recommend sufficient funding of initiatives to develop advanced carbon management technologies such as FutureGen. There should also be a legal framework for carbon capture and sequestration. There must be cost containment and economic and energy security for any allowances issued. Duplicative and conflicting regulatory schemes should be eliminated. There should be one set of regulations with everybody playing by the same rules.

"And, whatever the end game is, we need to maintain global competitiveness for U.S. industry. And, all energy sources (coal-oil-gas-wind-biofuels-hydropower-and others such as geothermal, solar and new technologies) must be in the mix.

"In conclusion, Wyoming coal is safe; it funds state and local governments; it's reliable and will be a major part of Wyoming's economy for years to come; and, the industry is working to find new ways to burn coal cleaner."

Rep. Hammons then recognized Todd Parfitt, Deputy Director of Wyoming Department of Environmental Quality.

Todd Parfitt, WY D.E.Q., Cheyenne

"We have to look at the political side of climate change, the economic side and the environmental side. These have to be looked at collectively as a whole to really understand what the implications are.

"For the arid West, a dramatic increase in temperatures would result in a smaller snowpack and earlier runoff. There would be diminished groundwater recharge, reduced stream flows and unfilled reservoirs.

"There would be a lot of **stress on ecological systems**, particularly the aquatics because of lower-flowing streams. The warmer water will impact aquatic systems. More importantly, it will have an impact on wastewater treatment facilities. The old adage that the solution to pollution is dilution won't work. Without dilution there is no solution.

"I want to talk less about direct impacts and look at policy issues. There is a growing demand for energy across the U.S. with that demand there is an increase in CO2 and green house gasses associated with burning fossil fuels. The leading contributors are electricity generation and transportation.

"There is a **lack of federal policy direction** that has caused great uncertainty. There are also unanswered questions about green house gas's relationship to the Clean Air Act. Also, there is a lack of clear technology on removal of CO2 from the emissions.

"Some side **effects of indecision and inaction are states taking the initiative.** There are two prime examples. The first is the Climate Registry adopted by some US states and tribes, some Canadian provinces and some states in Mexico. The idea is to create a level playing field to define how carbon credits are obtained within individual industrial sectors and how those credits can be verified. There are also regional initiatives in the U.S. for cap-and-trade proposals.

"As we explore alternative energy sources we also have to understand there may be unintended consequences. We're just beginning to learn about the impacts from ethanol and whether it makes a lot of sense to take ethanol crops out of the food chain. And, how reliable are wind and solar in providing base load power supply?

"There are also some questions about the Western Climate Initiative. Will wind and natural gas production end up being credits for states like California when those offsets are taken or will they end up being used in the states where they're produced?

"Looking at some individual sectors there's no progress on how to use coal resources and achieve the reductions we're looking for in a meaningful way. We are looking at carbon sequestration technology and the rules for injecting it into underground reservoirs. Wyoming's draft regulations should be out by the spring of 2009, about a year ahead of EPA. Coal, which produces about 50% of electricity in the U.S., is not going to be quickly replaced.

"Second, looking at uranium we see that Wyoming has the largest reserves in the US. With increased production from mining activities we are dealing with dust control and groundwater monitoring and reclamation.

"With regard to wind, about 800 wind powered turbines currently operate in Wyoming. We expect 6 new projects in 2009 with up to 1700 towers. Most of the wind energy development occurs along the I-80 corridor and then up I-25 to Converse County.

"And, there are impacts from natural gas development, especially in Southwest Wyoming, on wildlife and winter-time ozone levels.

"In conclusion...there's no free lunch."

Nikki Roy - PEW Charitable Trust Center for Climate Change, Arlington, Virginia

Nikki Roy of Arlington, Virginia is Vice President of Federal Government Outreach for the PEW Charitable Trust Center on Climate Change. He noted that the PEW Center was founded in 1998 as an independent, non-profit and non-partisan organization. They work in five major program areas: scientific studies and analyses; domestic and international strategies; outreach; solutions; and, communications.

PEW also has a Business Council composed of 42 large corporations, Roy noted. To be a member of the Council you have to believe that "we know enough about climate change that we need mandatory reductions in greenhouse gas emissions. These folks have bought into the science and support those mandatory reductions," he said.

Roy gave the Trust's outlook for federal action on greenhouse gas issues in 2009. **"There will likely be proposals from the Obama Administration dealing with a set of what he will term pro-growth energy and climate measures, including a greenhouse gas cap and trade program in the first half of 2009," Roy said.**

"Congress is expected to begin debate on these measures immediately. It is possible that a **cap-and-trade bill will be enacted by 2010 or even December 2009.** The U.S., under Obama, is likely to be more constructive in negotiating a global climate treaty than under Bush or Clinton. But, the U.S. is not likely to agree to specific targets during the UN climate negotiations in December 2009.

"By way of background, in 1992 President George H.W. Bush supported the UN Framework Convention on Climate Change. The U.S. Senate quickly ratified the action. The objective of the framework convention was to 'stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous human interference with the climate system. The reductions were voluntary programs that were expanded under Bush forty-one, Clinton and Bush forty-three but U.S. greenhouse gas emissions continued to rise.'"

Roy pointed out that between 1993 and 2000 the U.S. Senate unanimously opposed the Kyoto framework; President Clinton supported Kyoto but proposed no legislation nor did he submit the protocol to the Senate for ratification.

"In 2001, President Bush opposed Kyoto. He also changed his mind on campaign discussions to limit greenhouse gas emissions from power plants. Democrats and some moderate Republicans began to offer climate proposals. A minority of

Senators voted for the McCain-Lieberman greenhouse cap and trade bill in 2003. In 2005, a majority voted for a non-binding resolution supporting mandatory climate actions.

"There's been a lot of action by the states...in reality most U.S. Federal environmental laws are based on state and local models. The 24 states developing greenhouse gas cap and trade programs include Utah and Montana. In California, Gov. Schwarzenegger issued an executive order setting greenhouse targets to reach 1990 levels by 2020 and 80% below 1990 levels by 2050.

"I'm also part of an organization of industry and non-government groups called the **U.S. Climate Action Partnership** (USCAP) found at www.us-cap.org. We have called for reductions of U.S. greenhouse gas emissions with a long-term target of 20-40% of current levels by 2050. USCAP called for rapid enactment of laws including greenhouse gas cap and trade; support for technology research and deployment—especially for carbon capture and sequestration; better auto efficiency and reduced travel; and buildings that are more efficient and cleaner.

"This **group's approach to coal recognizes it is cheap and plentiful and we're going to have to use** it. If, by some fantasy, you could shut off the use of U.S. coal, India and China have large coal reserves and they are going to use them. What we are about is **accelerating technology development that will allow us to live sustainably and grow our economies in a carbon-constrained environment around the world**. One of the things we need to know how to do is learn how to do carbon capture and sequestration from coal burning facilities.

Roy referenced the testimony before a Congressional committee by the Business Roundtable, agreeing that there is "increasing evidence that earth's climate has been warming over the last century and that greenhouse gas concentrations have increased. We believe that steps to address global warming are prudent now even while the science continues to evolve."

"President Bush said in 2007: 'The US must lead the world to produce fewer greenhouse gasses and we must do it in a way that does not undermine the economic growth or prevent nations from delivering greater prosperity for their people,'" Roy said.

He also summarized actions in the 110th Congress, which is just wrapping up. **"There were 213 hearings on climate issues and 235 climate change bills introduced.** The energy bill passed in 2007 will affect greenhouse gas emissions through new vehicle efficient standards, renewable fuel standards and appliance efficiency standards. In Washington today a climate bill equals cap and trade legislation.

Roy also explained his view of cap-and-trade. He noted that "the EPA has this large stack of paper for 2012, a smaller stack for 2013, a smaller stack for 2014 and so on...going all the way out to 2050. This would affect about 10,000 companies nationwide.

"So, the EPA has given me this stack of papers. At the end of every year I submit one piece of paper for each ton of greenhouse gas I put up this year. I then go to my engineers and ask them what to do. They tell me we're going to emit 110 tons. We have some choices then. One is to go out on the market and buy ten new pieces of paper. Another possibility is to improve the plant and increase our efficiency so we can bring our emissions down to 100 tons. That will cost about \$5 a ton. Still another possibility is to install this great new gizmo that will bring our emissions down to 90 tons at a cost of \$20 a ton.

"So I go out onto the market and look for somebody who will sell me their papers at \$3 a ton. I tell my engineers to hold off; that we're buying paper. On the other hand, I find somebody willing to pay me \$25 a ton so I tell my engineers to fire up the projects...we have a customer!

"That's essentially cap and trade. It incentivizes the search for solutions throughout the economy. There was a June 6 discussion of the Boxer-Lieberman-Warner bill. There wasn't a vote on final passage. There were 48 Senators who voted to consider amendments; 6 who said they would have voted 'aye' if present; six others are on record supporting cap-and-trade and another six are on record supporting mandatory greenhouse gas reductions. The main bill has very little support; a majority of the Senate supports mandatory climate action, probably in the form of greenhouse gas cap and trade; the design of cap-and-trade is very controversial and without strong Presidential leadership the debate will last for years.

"Would the current horrific financial crises and the skyrocketing gasoline prices delay cap-and-trade? Our sense is no. In the last two months we've seen seven western governors release design recommendations for cap-and-trade; we've seen ten northeastern states auction CO2 allowances; congressmen Dingell and Boucher have released a greenhouse cap and trade draft bill.

"Why the urgency for climate legislation? First, the **U.S. Supreme Court** has told the EPA to start regulating greenhouse gases; there's a potential **patchwork of state actions**; there's **greenhouse gas regulation in place in Europe** and companies are living with them; and, there's a **need for business certainty**," he concluded.

Leighton Steward - Author & Former Oil and Gas Executive, Boerne, Texas

Former President and CEO of Louisiana Land and Exploration and author Leighton Steward wrapped-up the panel on **Environmental Perspectives and Forecasts** with an overview of material found in his latest book "**Fire, Ice and Paradise.**" Steward is also a former Chairman of the U.S. Oil and Gas Association and Chairman of the Institute of Earth and Man at Southern Methodist University. He is also a geologist.

He opened his remarks by noting "This will be widely different....now for the rest of the story. I'm going to tell you that draconian cuts in CO₂, bankruptcy of the coal industry and cap-and-trade schemes — none of that should happen if we just listen to the science. And, I'm not talking about political science.

"My goal today is to educate you a little bit about climate change. I was back at my alma mater and found out that CO₂ levels were once 18 times higher than they are today. Being a geologist I thought I'd look back and see what tremendous climate impact this must have had on earth. I looked back about 540 million years. That drove me to write "**Fire, Ice and Paradise.**"

"How do we know what happened 540 million years ago? Or 10,000 years ago? There are a lot of indicators that range from thermometers to ice cores. The ice cores tell us what happened more than 800,000 years ago and they can tell us some pretty accurate information. We can look at ocean cores back 170 million years. Stable isotopes are real keys to the climate." He also discussed dates related to temperatures of the earth, CO₂ levels, oxygen levels and other data over the 540 million years.

Steward also pointed out what he learned about climate drivers. "**The sun is obviously our major source of heat. It not only is our biggest climate driver, but also because of the magnetism changes in the sun...these do affect earth's climate.**

"**Earth's orbit around the sun is also important because it shifts from a round orbit to an elliptical orbit every 365 days.** When it is in an elliptical orbit it makes a difference because we get three million miles closer to the sun. That's on a 100,000 year time scale. And, the earth's position tilts. **The more it tilts the more sun shines on the poles and that makes a difference when a lot of ice** is melted on the poles on a 41,000 year cycle.

"**There's also the wobble...**like you seen when a spinning top starts to slow. That happens on a 19,000 to 23,000 year cycle. It changes seasons when that happens. There are greenhouse gasses in the atmosphere. Water vapor makes up 95 percent of all greenhouse gases. CO₂ contributes about .038%...methane contributes not much.

"Ocean currents contribute since the earth is 70% covered with water. The oceans soak up a lot of earth's heat...they absorb about 90% of the sun's heat."

Steward also discussed several studies of Antarctic ice cores. He noted that one analysis **showed that CO2 levels started up about 700 years after temperatures started climbing.** "CO2 did not cause the temperatures to rise," he said. "The ice core study results were confirmed by scientists in numerous countries."

He referenced a study by the **United Kingdom's Hadley Climate Centre showing that temperatures are going down in spite of a 1.7 part per million rise in CO2 annually.** "CO2 is not affecting our climate. **The climate change we're seeing today is by no means unprecedented.** All of the climate drivers move at different rates. We should never expect the climate to be at equilibrium.

"Is the science settled? In December of 2007 at a **UN conference in Bali one hundred prominent scientists sent a letter to the Secretary General** asking that no drastic action be taken on CO2. They wrote that they 'don't believe all these catastrophic forecasts that would damage mankind if we do these cuts real quickly.

"These reputable scientists are seeing the same science and they're coming out of the woodwork finally. It just took a few to poke their heads above water. The next week 400 more reputable scientists jumped on this bandwagon. And, in June of this year, the **Institute of Science and Medicine in Oregon said that more than 30,000 scientists reported they did not believe that CO2 was having this catastrophic effect on the climate.** There were 9,021 PhDs in that group.

"The science is not settled. I don't care what all this hearsay is...four years ago I'd have been on the other side of the table saying that we gotta do something about this. We're about to spend trillions of dollars reducing something that is good for us. A bunch of scientists are saying CO2 is a good thing. It makes plants grow. If CO2 levels rise that will benefit mankind.

"Is CO2 a greenhouse gas. Yes, it is. But, CO2 and temperatures aren't that well tied together. Why did we have ice ages when the CO2 levels were some 3,000 parts per million or higher?" Steward asked as he concluded his remarks.

Consumer Realities—Economic and Social Challenges

The Thursday afternoon panel was moderated by Rep. Mike Madden (R-Buffalo). He's a member of the House Revenue Committee and is a former

college professor and administrator. Dr. Madden introduced Tom Hewson of Arlington, VA, representing Energy Ventures.

Tom Hewson, Principal, Energy Ventures Analysis, Arlington, Virginia

Tom Hewson said he was given the challenge of discussing economic challenges of climate change. He reviewed climate change proposals before the 110th Congress. "They're mostly cap and trade programs," Hewson said. "They're all slowly phased-in over a period of time up to 2050. The reason for phasing-in is that we're trying to develop new technologies."

Hewson said the **transportation sector emits 34.1% of U.S. CO2; electric generation another 39.8% and heating/cooling 26.1%**. He focused his presentation on the power sector.

"In Wyoming, for every megawatt of power you consume, there's roughly a ton of CO2 emitted. And, we're **buying bigger homes, leaving the lights on longer and creating a bigger footprint**. We're looking at electrical generation needs to increase. We forecast **1.2% growth of electric consumption a year assuming** a great deal of energy efficiency."

But, he noted, we are also believers in economic growth. "Because of the increased need for electricity we will **need to build more power plants**. The Energy Information Administration projects building 91,000 megawatts of coal-fired capacity by 2030. We're also looking at renewable sources, natural gas combined cycle plants and nuclear facilities."

"When we talk about reducing true emissions, there are various things we can do. We can use less energy; purchase greenhouse gas offset credits; increase 'no carbon' technologies; switch to co-fired plants with lower CO2 fuels; and, do more carbon capture and sequestration." He also noted that there are limits to the effectiveness of energy efficiency measures. Those include an increasing population; increasing share of larger houses with higher energy consumption needs; more electricity-consuming appliances and electric cars; lighting quality as opposed to efficiency and climate and power rates account for much of the regional differences. It will be difficult to go in reverse.

Purchasing green house gas offsets would include re-forestration. One acre of trees will capture 12 tons of CO2 a year. Capturing methane from landfills and burning it would reduce emissions of methane which as 24 times the potential of CO2 to contribute green house gasses in the atmosphere.

"We can capture over 250 million tons a year for less than \$10 a ton. In Wyoming \$10 a ton would equal about 1 cent per kilowatt hour on your electric bill. All the environmental groups have tended to be against nuclear power. But,

when DOE does its analysis of all the green house gas controls they assume that our nuclear power plants are going to more than triple. Only biomass and geothermal provide base load supplies, which is what we need. Renewables are unable to compete against conventional alternatives."

Hewson said that penalties will have to go really high before we start replacing coal-fired generation. **"If we displace much coal we're running into severe supply problems with natural gas because of our ability to expand our gas production in a rapid manner to displace much coal.** It's our belief we might be able to shift 1.5 to 2.0 billion cubic feet of gas before we run into supply shortages. **We're having those shortages because over the next 20 years 54% of our conventional gas will be depleted.** We have to **replace that supply with Arctic gas and important LNG.** The three largest suppliers of LNG are Russia, Venezuela, and Iran. Think about that in terms of **energy security.**

Coal, Hewson said, has to be the answer in terms of long range supply so we have to figure out a way to reduce the carbon footprint. We have nine plants in the U.S. which remove CO2. Most of them cost around \$100 a ton for CO2. If we can get carbon capture costs to \$20 a ton, coal will be the cheapest generation alternative.

"Climate change regulation will affect all fossil fuel prices and significantly increase costs for fossil fuel options," Hewson concluded.

Eric Arnould, University of Wyoming, Laramie

Dr. Eric Arnould, Distinguished Professor of Marketing and Sustainable Business Practices at the University of Wyoming talked about consumer anxiety...the demand side of the discussion. Dr. Arnould discussed several elements of a climate of generalized risks, including the global warming/climate change discussions, terrorism, pandemics, loss of liberties and food panics such as when melamine was discovered in foods imported from China.

He said there are various coping responses that people adopt. First, people conform by doing what they're supposed to do. Then, there's innovation - replacing the old ways. And, there's ritualism where people give up on their dreams. There are then people who give up on their dreams...they retreat. This leads to more criminality, gangsterism, a breakdown of norms, more methamphetamine addiction and wife beating. Then, there are people who engage in various forms of rebellion.

Now, he said, when we're expected to do something about energy there's a big problem. Our energy markets are not coherent. They're different from one place

to another. Since the Roosevelt administration people have become accustomed to cheap energy on demand. We also have a situation in this country where nobody trusts the energy companies.

And, he continued, there are system-wide constraints on customer choices such as paying flat rates for energy [such as renters] and not being encouraged to conserve. "I've been studying consumer behavior for 25 years. We know very little about how ordinary people think about electricity or their use of it. We need to know more about what people think about the various power platforms. Do people still think that nuclear power is still super-scary?"

"We need to know people's beliefs about purchasing the various kinds of energy products. Perhaps Wyoming coal could be branded. We would say it's better than coal from other places and perhaps even start charging a premium for it," he said.

In closing, Dr. Arnould said "Prices alone are not enough to transform demand...nor is information."

Matt Keating, Natrona County Commissioner, Casper

Natrona County Commissioner Matt Keating said "there are ominous signs about climate change and these may portend a drastic decline in food production. "Climatologists are pessimistic that political leaders will take positive action to compensate for climate change or even allay its effects. The longer planners delay, the more difficult it will be to cope with climate change once the results become grim reality.

"Over 25,000 physicists, geophysicists, climatologists, meteorologists, oceanographers, environmentalists and representatives of other specialties made the following declaration:

"We urge the U.S. government to reject the global warming agreement written in Kyoto, Japan, in December 1997 and other similar proposals. The UN proposed limits on green house gas emissions would harm the environment; hinder the advancement of science and technology; and, damage the health and welfare of mankind. There is no convincing scientific evidence that human release of CO₂, or methane or other green house gasses is causing or will in the foreseeable future cause catastrophic heating of the earth's climate. Moreover, there is substantial scientific evidence that increases in atmospheric CO₂ produce many beneficial effects on the natural plant and animal environments of the earth. The Oregon Institute of Science and Medicine stated that green house gasses cause plants and animals that depend on CO₂ to thrive..."

Canada did sign the Kyoto protocol, Keating said. But, they fell short of compliance by 35%. "The Canadian environmental minister, Rhonda Ambrose, announced in 2006 that to comply with Kyoto 'we **would have to take every train, plane and auto off the streets of Canada. She said that would be unrealistic,**" Keating said.

"I'm always open to an honest debate about global warming and if it is manmade or not. **But, let us decide our future based on facts, not theory, consensus or unsettled science,**" he closed.

Neil Harrison, Ph.D., Director and Founder, Sustainable Development Institute, Laramie

Founder of the Sustainable Development Institute in Laramie, Neil Harrison, author of Editor of Science and Politics in the International World, began by saying. "To paraphrase Mark Twain 'everybody talks about sustainable development, but nobody really knows what it is.' To make a connection with what you've heard all say, climate change is part of sustainable development. The official definition of sustainable development is 'development that continues forever in such a way that it meets the needs of present and/or future generations.'"

One element is conservation of natural goods and services. We obviously can't conserve because then we would not be able to use any coal or oil or gas. Development is also about making a more human society. And, economic growth equals greater technology. "Sustainable development is not a goal...there is no place where we will suddenly say 'now we have sustainable development.'"

It's a matter of continuously making choices about which paths to take. He discussed three different pathways. First, Efficiency, where we rely on markets where scarce resources will be allocated most efficiently, and technical innovation which will save the planet. Then there's equity between generations and there are issues about politics and power. Finally, there's ethics. If we thought about the environment differently we would treat it differently, he said.

Sustainability is complex. The components include ecosystems, markets, social systems and interactions among systems. **The complexity of climate change is why we get responses from the UN Climate Change panel. They've been at this for seventeen years and they think that human causes are most likely a major cause of climate change. They really don't know. Future warming could be between 1.1 degrees C and 6.4 degrees C.**

With **regard to sustainable business, there needs to be adaptation,** he said. Business needs to watch what's going on and change to survive. There

needs to be less central control and better self-organization. There must also be connection with the community so business understands who they are dealing with. They need to have a diversity of ideas.

And, there's efficiency...the low cost producers always have a benefit here. And, flexibility...build it into the organization so it can change rapidly. Finally, there's personal sustainability. Live well...what do you want out of life? Then, in the U.S. we talk about the pursuit of happiness instead of growth; wealth instead of political power.

The only coin individuals have is time...it's the most important thing. That and how we spend it, Dr. Harrison concluded.

The Energy Equation

The Friday morning panel was moderated by Dave Bostrom, Vice Chair of the Wyoming Business Alliance/Wyoming Heritage Foundation. He gave brief remarks and introduced Representative Lorraine Quarberg of Thermopolis, and a member of the House Minerals Committee.

"Our purpose this morning is to look at how worldwide energy consumption by 2030 will increase by 55%." She asked if anyone in the room believed that fossil fuels will not be the major supplier to raise their hands. Representative Quarberg noted that the over-riding question is: What is Wyoming's stake in that equation?"

The first speaker was geologist Mark Doelger who is Chairman of the Wyoming Pipeline Authority and President of Barlow and Haun in Casper.

"According to the U.S. Department of Energy's Energy Information Administration, U.S. demand will increase 19 percent by 2030. Their report gives oil 44 quadrillion BTUs; gas 23 billion BTUs; coal 30 quadrillion BTUs, for a total of 97 quadrillion. It is noted that this represents 82% of total U.S. energy consumption with the balance made up by uranium, hydropower, biomass and renewables.

"Ten years ago revenue from gas was \$250 million for the state. Today it is \$1.5 to \$2.0 billion a year, depending on the price. Pipeline capacity has doubled in the region to 7.7 billion cubic feet a day. It cost industry \$9 billion to pay for the added capacity. Of the 7.7 billion cubic feet (bcf) per day, Wyoming provides 6.5 bcf. This is 80-85% of the mix from Wyoming, Utah and Colorado. **On a warm day, Wyoming consumes 1 bcf a day. When the temperature is 20 degrees, Wyoming consumers use 2.5 bcf per day.**

"The Midwest and California are our major markets. The Rockies Express pipeline from northwest Colorado to Wamsutter and east to the Ohio-Pennsylvania border should be completed in about ten months. There should be a significant change in pricing when it is completed.

"There are nine projects being proposed. It looks like three could be completed by 2011. These pipelines would include the Bison project to carry 400 million cubic feet a day of Powder River Basin gas; there would be an expansion of Kern River by 145 million cubic feet a day; and the Ruby project that heads west to the Oregon-California border to carry 1.3 bcf from our region. These projects will certainly help the revenue side...Wyoming could see \$2.5 billion in revenue from the added capacity to export our gas.

"Canadian exports to the U.S. are declining because of flat production and increasing use of gas to create steam floods in the tar sands areas. Ruby and Bison pipelines will help replace Canadian imports, especially to the Chicago market.

With regard to the Alaska pipeline, it's been talked about for 30 years...it's always about ten years out. The Alaska pipeline would cost \$40 billion to construct and would only add 4.5 bcf to supplies in the lower 48 states. The numbers don't make sense.

"Impediments to future development of natural gas include many, many layers of risks and uncertainty on the regulatory side, plus commercial, engineering and geology challenges. It's remarkable that anything gets done at all!"

A word on CO2 and oil. CO2 is a topic the pipeline authority is looking at with the Enhanced Oil Recovery institute at the University of Wyoming. We are looking at designing a pipeline delivery system that **links CO2 suppliers with enhanced oil recovery projects.** We're hopeful this system could then be built with the cooperation of industry and the State of Wyoming to help foster an emerging industry in CO2 pipeline distribution. This would compare with the conventional natural gas pipelines that are part of a mature industry. We would help stabilize oil production. We don't expect dramatic growth in oil production as a result.

During the brief question and answer session, Doelger responded to a question about permitting and regulatory roadblocks. "The permitting of pipelines is not holding up things. The Federal Energy Regulatory Commission (FERC) works well with us. Considerations of credit-worthiness and commitments producers have to make to the pipelines are important. And, well permitting to make certain the wells will be developed is something we're working on. An example is Ultra Petroleum, which contracted with the Rockies pipeline to supply 200 mcf a day.

Ultra has to pay a \$1.20 fee per mcf, a \$726 million expense that must be paid regardless of whether or not they drill the wells.

Mike Easley - Wyoming Infrastructure Authority, Sundance

The next panelist was Mike Easley, President of Powder River Energy (PRECorp) and chairman of the Wyoming Infrastructure Authority. The authority deals largely with electric transmission lines.

Easley asked: "What is going to happen at the end of the line to your constituencies as a result of climate change?" He stated his company, PRECorp, is a distribution cooperative formed in 1945. It serves five counties in northeast Wyoming through 28,000 electric meters, 10,600 miles of power lines; 450 megawatts of demand; and 3.3 billion kilowatt hours of sales each year. "Nearly half of our demand comes from coal mines in the Powder River Basin," Easley said.

He noted that **70-80 coal trains leave the PRB daily. They range from 120-150 cars per train with each car carrying between 100-115 tons of coal.** PRB coal is used in 36 states, he noted.

"Coal bed methane has been a big driver in the company's growth and is the fastest growing customer class," Easley said.

He has been talking throughout the state and in Washington, D.C. about the transmission infrastructure. "Our policy makers have finally found out that you won't get your wind power electricity to market without transmission lines," he said. "If we're serious about renewable energy, then we have to be serious about transmission systems."

The Wyoming Infrastructure Authority is working on the Wyoming-Colorado intertie project. It has been through the FERC processes and has subscribed capacity. The Trans-West Express line will send Wyoming power to California. But, he noted, a study shows that Wyoming wind power could be delivered to California cheaper than California utilities could generate their own electricity from wind.

The Anschutz Corporation has moved into this project. But, he asked: "What about the guy at the end of the process?" PRECorp sells 3.3 billion kWhs. There's one ton of CO₂ per 1,000 kWhs, or 3.3 million tons of CO₂. The average residential customer pays \$75 a month for our electricity. If the carbon management cost is \$10, the bill goes up \$10 a month. If carbon costs are \$30 a ton then the bill goes up that same amount.

"The average coal mine served by PRECorp uses 7.3 million kWhs with average bills of \$230,000 a month. If carbon costs go up \$10 a ton, the bill goes up \$73,000 a month. If carbon costs are \$30 a ton, then that coal mine's bill increases by \$219,000 a month. The economic realities speak for themselves.

"The **science of climate change may be uncertain, but the policies are not.** There's a range of options from do nothing and lay blame or engage, get smarter, and create opportunities."

Rob Hurless - Advisor to the Governor, Cheyenne

The next panelist was Rob Hurless, former chairman of the Wyoming Public Service Commission and currently the Energy and Telecommunications Policy Advisor to Gov. Dave Freudenthal.

"The question is: Will fossil fuels be called upon to meet the 55% growth in demand?" Hurless asked. The real question is: Will we be able to meet that demand using every resource we have?

We see the demographic inertia of global population growth plus economic growth...both leading to increases in energy demand. Will fossil fuels be in the mix? And, will we be able to meet the total increase in demand?

Coal is the fastest growing source of energy on the planet. He noted he recently read a study showing the amount of investment to meet energy demands by 2050 at \$30 trillion. That works out to \$200 million investment a day to keep up with that growth in demand, Hurless said.

"When we look at how to get things done, we run into some really interesting equations. He met with a company that wants to build a new coal-fired power plant that would capture carbon and sequester it. It would take nine years to build because of permitting requirements.

"In the nuclear world, when PacifiCorp looked at building a plant in Idaho the stories in the news reported that the project wouldn't be pursued after their studies. But, buried deep in one article it was noted that **the specialized pressure vessels needed are only built in two places in the world and the queue is ten years long.**

"I've been told that the U.S. couldn't build two nuclear plants simultaneously because we don't have engineering talent, specialized building talent and other skills needed to build a plant. The people who built the last plants decades ago have gone on to other work or are retired.

"Then we have this 'policy by sound bite stuff,' that just drives me crazy. It's where people say let's figure out a clever sound bite like '20 by 20' or '25 by 10' or whatever and that's what establishes the policy. I'm arguing against the cynicism embedded in goofy policies.

"I'll pick on California for a minute. Their current policy is to have 20% renewable energy by 2010. A recent report said they're not going to make it. They have about 12% now from renewables. It's noted that fossil fuels account for about 63% of their economy. Short of turning out the lights, there's no way to achieve their targets.

"The real question is: Can we get there from here? There's also the geo-political layer. If you look at where the natural gas is you will likely see a 3-4% increase in supply this year. But, the biggest reserves are in Russia where those guys play hardball. In Europe, about 25% of energy consumed is from gas imported from Russia....and, that's on its way to 33%. There are definite geo-political implications to that situation.

"With regard to cap and trade as a model, it is attractive because that model has worked in reducing sulfur dioxide emissions. In the electric generation industry in the U.S. we produce about ten million tons of sulfur dioxide a year. If you look at the figures over the last ten years, there's a nice increase in generation and a nice decrease in sulfur. That accounts for the natural attraction to that model. **But, people forget we're dealing with ten million tons of sulfur dioxide and 150 billion tons of CO2. The question is: does that equation still translate when we're looking at that large amount of material?**

"Wyoming is incredibly fortunate to have the energy portfolio we have. Whichever way the economy goes and policies set...we're going to be players," Hurless said in closing.

Donna Wichers, Uranium One, Senior Vice President, ISR Operations, Casper

Donna Wichers is Senior Vice President of In Situ Operations for Uranium One, a mining company operating in Wyoming.

She noted that "as energy consumption continues to rise, the challenge is to supply a sufficient amount of energy while minimizing the impacts. In 2004

instability in the Mideast and hurricanes in the Gulf of Mexico made us realize how vulnerable our energy supplies are. Society is demanding cleaner and greener energy. Renewables are promising, but subject to favorable weather conditions.

"By 2025 the US will need 5,787 billion kWhs of electricity. Where will it come from? We need all the sources of energy—coal, gas, nuclear, geothermal, hydro, solar and wind. Some people are surprised to learn that nuclear power is alive and well in the U.S. Worldwide, 16% of global electricity is produced by nuclear reactors. In the U.S. it's nearly 20%; France 77%; Japan it's 27%; Russia 16%; and the Ukraine 48%.

The annual growth rate in power from nuclear plants is about 9.5%. There are 104 nuclear reactors operating in the U.S. and we are the world's largest producer of nuclear power. Currently, 430 reactors operate worldwide. Currently 348 reactors are under construction, planned or proposed with 75% located in seven countries. By 2030, more than 600 reactors will be in service.

"The U.S. nuclear fleet requires 48 million pounds of uranium annually to operate. This will increase by about 20% by 2025 or 55 million pounds of uranium needed per year. **There's a huge gap between the amount of uranium we use and what we need.** In the U.S. we produce about four and a half million pounds. Half of that comes from Wyoming. The rest comes from Australia, Russia and Kazakhstan. **Our future supplies will have to come from areas with the largest uranium resources. That will be the U.S., Canada, Australia and Kazakhstan.**

"In Wyoming, more than 200 million pounds have been extracted since 1954. We still have some 300 million pounds of historical resources. We operate in a well-established regulatory framework and Wyoming is the top producer in the U.S. Texas is gaining on us; there's some production in Utah and Colorado; and, New Mexico no longer produces uranium.

"The technique used today for mining is because of economics....it's in situ recovery. There should be more operators next year in the state.

"The biggest challenge in Wyoming is the public's perception and acceptance of environmental, health and safety and other aspects of uranium mining. Also, permitting at the state and federal levels, the Wyoming labor shortages, and market fluctuations all are challenges."

She stressed, in closing, that even with the growth in nuclear power generation, all sources of energy are needed.

Conference Address, Dennis Avery, Hudson Institute, Churchville, Virginia

Following the panel on **The Energy Equation**, the four hundred attendees gathered in the main ballroom to hear a conference address by Dennis Avery. He is a Hudson Institute Scholar and Director of the Center for Global Food Issues. Avery is also the co-author of a NY Times bestseller "**Global Warming: Unstoppable Every 1500 Years**"; and author of "**Save The Planet**" and 354 other articles and publications. He was introduced by Allan Tessler, Chairman of the Hudson Institute and a resident of Jackson, Wyoming.

Tessler said, in his introduction of Avery, that: "We absolutely need a book on the physical evidence of earth's past warming events. His co-author with **Global Warming** was Fred Singer, the leading skeptic about global warming causes in the world."

"The reason I'm here and the reason the global warming debate is late is that the other side is beloved of process," Avery started out. "They have a lot of public empathy and they have moved ahead with the process without even telling us about the science. They've moved closer and closer and closer to a definite moment but they haven't been able to close the deal!"

"Last week New Zealand postponed it's cap and trade law for a year. They have a new government—the cap and trade law in that country may be finished.

"There are ten countries in Europe that are saying 'wait a minute...we really don't think we can meet the requirements the European Union (EU) machinery has set up...we're not ready!

"In Britain they will lose 40% of their electricity generating capacity in the next eight years. All but one of their nuclear plants is due to be decommissioned and, the EU, without any definitive science, has decreed that nine of Britain's big coal-fired plants must be shut down.

"In **California** two things have changed since the rolling blackouts of a few years back. One, **they're reopened one of the dirtiest coal-fired plants in California history at Huntington Beach**; and, second, they're getting more snowpack and more power from the hydro dams. That's all that's changed.

"So, better late than never, **we'll come back to the alternative explanation for global warming, which is solar. We're talking about a 1500 year cycle but it is a solar cycle.** We have to start here because this is the new format for the global warming discussion.

"Looking at the temperature recordings on land and satellite measurements we see, there has **since 1998 been no warming trend. In fact, over the last two years we've had a sharp decline of five-tenths of a degree. This is one of the sharpest declines in history** and it took us well below the temperatures of 1940. This is particularly important for two additional reasons and one not-on the screen, which **showed the increase in CO2 in the atmosphere with no correlation with the temperatures.**

"In addition, data on hurricanes show there's been a **remarkable downturn in hurricanes.** We have seen the least northern hemisphere hurricane action in 30 years. The North Atlantic hurricanes have been above normal but the rest of the world is lower.

Avery quoted Steve Goldenberg of the National Oceanographic and Atmospheric Administration (NOAA) who said on November 12, 2008, "The simplistic notion that warmer oceans automatically mean more hurricanes has not been verified."

Avery then posed the question: **Why are the earth's temperatures falling? He noted that the earth hasn't warmed since 1998 despite a 5% rise in CO2 emissions.** And, he said European ski resorts opened a month early this year because of unexpected snowfall. And, Alaska set a new record cold temperature of 4F degrees lower than the previous record in October. He also stated that the staff of the United Nation's **Intergovernmental Panel on Climate Change (IPCC) still claims that earth will warm 2-5 degrees Celsius by 2100.**

"Where is the warming? The rule of science is clear. If the observations from the real world disagree with your theory then you must change your theory. **The correlation between our temperatures and the sunspot index is 79%.** The sunspots predicted this downturn not by a computer model. **The sunspots can predict in ten year increments. Our downturn came in 2007.** That was a La Nina year. The trend has changed and this has been confirmed by the Jason satellite, a NASA satellite. They tell us that the Jason satellite has confirmed that the Pacific Ocean has moved into its cooling phase. We discovered this cooling phase in 1996 because people said the salmon were going extinct in the Columbia River. It turns out **that salmon thrive in the Columbia for 25-30 years and then go into decline but thrive in the Gulf of Alaska because nature has moved the fish food.**

"When we look at tree rings cored around the Pacific Rim over the last 40 years we discover that the phase of the Pacific Ocean has governed whether or not the earth has warmed or cooled and this pattern goes back 400 years to 1623. We have temperature records since 1945. According to CO2 levels, the temperatures

should have spurted. Instead, the temperature went down. We have a record since 1870 that cannot at all be explained by CO2 levels in the atmosphere.

"Man-made CO2 doesn't add up to much. Human CO2 emissions are about 3.4% of carbon released to the atmosphere. The Greenhouse Theory is probably valid...it's just insignificant. Humans cause .11% of CO2 cycling in the atmosphere."

"Could the warming be caused by volcanoes? They emit a lot of CO2 but not in a cycle. The sun is the source of earth's heat. In the 1st Century the Romans grew wine grapes in Britain. This continued until the 11th Century. From 1300 to 1950 Britain was too cold for wine grapes. Since 1950 hobbyists have planted grapes and have two good years out of ten.

"The **earth has warmed every 1470 years for the past million years.** Earth warmings over that period had no correlation with atmospheric CO2 levels. The warming periods were moderate but sudden. These were the best times for humans. This argues for an external force...like the sun. We always get one cycle or the other. You won't like cooling very much.

"Studies of stalagmites on every continent plus New Zealand show that every 1500 years oxygen isotopes show up precisely and reflect temperatures at the time. Solar variations drive the changes in ocean surface temperatures, lagging about ten years. And, research has shown that Earth's temperatures correlate with sunspot activity. CO2 concentrations do not have an effect.

"The more intense sun activity, the more the earth is shielded from cosmic rays. When there are fewer cosmic rays hitting earth, water molecules are shattered and there are fewer low, wet clouds deflecting heat...and cooling the planet. These particles become cloud seeds and they then become low, wet clouds that typically cover 30% of the earth. These clouds are earth's thermostat.

"A slightly more active sun means a significantly warmer earth.

Avery challenged Al Gore, who's movie left the impression that more CO2 meant higher temperatures. "No," Avery emphasized. "We have done three additional studies of the Antarctic ice core with more refined time scales. The temperatures changed about every 600-1000 years before the CO2 levels changed. The oceans have 70 times more CO2 than the air. Cold water and the laws of physics show that the water will hold more gas. If the sun warms the ocean more CO2 will be released.

"Will melting in the Antarctic raise sea levels 20 feet? No. Antarctic ice is too cold to melt. It flows to sea slowly in blocks based on weight and the slope of the ice.

The ice has flowed at the same rate since the last ice age. Over the last forty years, the Antarctic has defied greenhouse gas models by not warming! **In the Arctic you can talk about regional warming but not global warming, or cooling.**

With regard to animal life..."we'll lose a million species" is what we're being told. We're told it will warm so rapidly that creatures can't adapt. He pointed out that it was thought the Edith's Checkerspot Butterfly has become regionally extinct in northern Mexico on Baja. In fact, Avery said, the butterfly has shifted north. It's now found even in Canada.

"There have been 600 of these warming cycles in the last million years. Most species have been through the cycles hundreds of times. Vegetation is cold-limited but not heat-limited.

"What about polar bears...those cute, cuddly 1,300 pound critters? Arctic ice is back to normal this year. The wind shifted the ice in 2007, creating more open water. The jawbone of a very old polar bear was recently discovered. It has been dated at 100,000 to 130,000 years old. The bears have survived the big warmings of 9,000 and 4,000 years ago.

"There's all this anguish about species going extinct. How many species have we lost to global warming since 1850? The answer is ZERO.

"Why not trust the United Nations? We don't trust them because they have lied to us! In 1996 **the Intergovernmental Panel on Climate Change claimed it found the human fingerprint on our warming. Yet, lead science author Santer later admitted he removed five statements approved by science advisors that no such fingerprint had been found.** He inserted false statements that a human imprint had been found. He's still working on the panel.

"There's **little evidence to support drastic energy cuts.** The computer models give us radical warming projections but no evidence. The projections are not verified. If the models were correct, the earth would have warmed six degrees Celsius from 1900 to 2006, ten times the observed warming. The Greenhouse theory is ardently supported by people who hate cars and air conditioners!

"The **correlation between temperature and CO2 does not prove causation. But, the lack of correlation rules out CO2 as our warming cause.**

"The oceans stopped warming 4-5 years ago. The data were collected from 3,000 new Argo diving ocean buoys that collect sea temperatures more broadly

and accurately than ever before. The NASA scientist working on the issue said 'It's no big deal' when he discussed ocean cooling on National Public Radio.

"The **earth can't warm if the oceans don't**. The oceans stopped warming 4-5 years ago. The NASA scientist didn't bother to talk about this until his radio interview.

"Is this the kind of due diligence we should expect from people who are monitoring global warming that's about to cost each of us lots of money and cost our economies something bigger than \$30 trillion.

"What **should we expect? We're in a moderate 25-30 year global cooling phase like that of 1940-1975**. This is predicted by sunspots and Pacific decadal oscillations that last for 25-30 years.

"Such a long cooling period is likely to overwhelm the greenhouse alarmists. Over the rest of this century we should expect a little more warming...less than half a degree. How long will governments—including ours—deny the evidence, especially information gather by satellites?

"They're [the global warming anti-CO2 people] saying it's too late for this debate. It can never be too late for reality. It can never be too late for truth. **Right now the temperatures are talking and we must make certain the failure of the temperatures to accord with the greenhouse theory doesn't go unnoticed**.

"You can't listen to a skeptic, that will be bad for the planet. Our journalists have taken the oath...they've drunk the Kool Aid" and have bought into the notion that man's release of CO2 is causing global warming.

Avery maintains a website that provides more information. Go to www.cgfi.org.

Revenue Impacts & Investment Decisions

The Friday morning panel was hosted by Senator Jim Anderson (R-Glenrock). He chairs the Senate Revenue Committee and is Senate Vice President. **"After we've heard all the diverse opinions and all the discussions we have to ask: "What now?"**, he said.

Tom Lubnau, Speaker Pro Tempore, Gillette

Senator Anderson introduced Representative Tom Lubnau (R-Gillette) who noted "We are facing some daunting issues and we're looking at financing and risks as they affect the State of Wyoming." He said that world energy consumption will

increase by 60% in ten years. "We have to be prepared for a world market for energy," Lubnau said. **"Every key economic driver in the U.S. that produces something is in some way or another a generator of carbon dioxide.** Generally, our economy thrives on carbon dioxide. When you peel the economy down to its base, one of the more important factors of being successful is cheap and available energy. If you don't have cheap and available energy your economy grinds to a halt.

He remarked that whatever you believe about global warming the political tide has changed. We had two candidates running for president on platforms of capping carbon emissions. The most liberal candidate was elected. What does that tell you about the political landscape over the next four years? What say does Wyoming have in affecting policies?

There are several responses to CO2 caps. There's conservation and that doesn't mean shutting off the bathroom light when you're through. It means shutting down the auto plant in the new rust belt because they're on coal-dependent electricity. Then, we've heard there are huge barriers to going to low or zero emission sources. Wind could go up to 2%; nuclear has huge barriers; carbon capture and sequestration are the only ways known for carbon-based fuels to be long-term players in the energy market. **But, the national trends could be driving coal out of business. There are two options: burn coal until it is regulated out of business or be proactive and design a model system for carbon capture and sequestration. The costs will be billions of dollars. I'd rather Wyoming be on the receiving end of those dollars and not the paying end.**

We need to create a legal infrastructure that allows the free market to work for carbon capture and sequestration. The State does not have on its radar mandating caps for CO2 production. That's not anywhere on the Legislature's agenda. There's an economic opportunity for Wyoming if the projected 55 million people in California by 2015 want to pay us 150% for their electricity over what they're paying now...that's fine with me.

We've been storing CO2 underground for 40 years through enhanced oil recovery. We are injecting liquid CO2 one to two miles underground and mixing it in unusable saline aquifers. What are the risks? We don't know. But, if CO2 comes up two mile hole it freezes and makes a nice ice block. The ideal solution underground is to take that CO2 and create a solid with it because then it will be inert and we won't have the costs of further injecting it underground. But, we don't have the technology to do that right now. We do have the technology to inject it as a liquid. What are the costs? Each \$25 tax per ton adds 24 cents a gallon to the cost of gasoline; \$1.39 per trillion cubic feet of natural gas and 27 cents per gallon of heating oil.

The cost to Wyoming's economy if we don't maintain our coal production is \$20 million in revenue for a 1% decrease in production and a loss of \$357 million in GDP if there's a 20% decrease in coal production. With that there would be nearly 3,200 jobs lost. The numbers increase from there.

Whatever you believe about global warming, the consequences to Wyoming are very serious. Many of the carbon sequestration ideas are out of our control. We have to anticipate all the possibilities and be prepared to address those possibilities so we can protect our economy and land on our feet.

Mary Throne, State Representative, Cheyenne

Sen. Anderson then introduced Rep. Mary Throne (D-Cheyenne). She serves as a member of the House Judiciary Committee and has been an attorney for two decades.

"We all have some skepticism about global warming since there's conflicting evidence out there," Rep. Throne said. "In reality we can't afford to take the risk"

She noted she has spent 20 years as an environmental attorney and "we deal with risk assessment and the risk of what global warming could do is too great — we can't take that risk. By the time we have absolute certainty it might be too late to do anything about the problem, she opined. "I also don't want to take the risk to Wyoming's economy if we don't get more active on this subject. We have to be at the table; we have to be engaged on this issue. It's is not constructive for us to bury our heads in the sand and worry about whether the science is right or wrong. That horse is out of the barn. We have to deal with the political realities we face. As an attorney I have to deal with the weight of the evidence and global warming is something we have to deal with."

As policy makers, she said, the first thing is we don't go to extremes on either side. She expressed concern about those in her own party who go to extremes. She mentioned House Speaker Nancy Pelosi who didn't know that natural gas was a fossil fuel and Al Gore encouraging students to protest at coal-fired power plants.

The economic reality is that coal has to play a role in our economy. We can't get by without coal. It's not reality for the extremes in my party who want to get coal out of our lives. We're living in fearful times right now. And, we don't want to go to extremes on either side. **What we need is rational policymaking. That's the role Wyoming can play. We can't pretend that the CO2 issue isn't here to stay.**

The biggest problem right now is that on a national level we have no regulatory certainty. We don't know what the economics of carbon management will be...it's very hard for the business world to plan. The national environmental groups are challenging any use of coal. We need a regulatory system in place that creates financial certainty for the market so these projects can go ahead. "There are things we can continue to do in Wyoming...we can continue to tweak our carbon sequestration framework...we've provided incentives for wind and clean coal and we've invested heavily at the university for clean coal technologies. We need to continue those things so we don't live in fear and we'll see our economy continue to grow," Representative Throne said.

Steve Johnson, Basin Electric Power Cooperative, Bismarck, ND

Senator Anderson then introduced Steve Johnson, Manager of Treasury Services for Basin Electric Power Corporation in Bismarck, ND. Mr. Johnson noted that Basin is one of the largest power suppliers in the U.S. with 2.6 million customers in 9 states. He said the company expects growth of 4.5% annually for the next ten years. "That will take our demand requirements from 1,834 to 3,781 megawatts. It will take \$5.1 billion to build resources to meet that projected demand," he said.

In the **public domain are the carbon principles, a group of principles adopted by a number of financial institutions saying there needs to be a balanced portfolio approach in the power industry**

to **meet future** needs. That balanced approach is **conservation, renewables** and still using **conventional generation resources including coal and nuclear**. "The issues are; coal must remain part of America's future; new technology is required but there isn't anything commercially available today with regard for coal-based generation to capture carbon. Time is important on both sides....this issue can't drag on forever but we can't be forced to do something immediately given the fact that technology is still developing."

He continued: there **also needs to be a sharing of risk among industry and the federal and state governments**. He also described Basin's carbon capture and storage pilot plant in North Dakota that has removed 14 million tons of CO2 from power generation operations and shipped it more than 200 miles into Canada's oilfields where it will be injected. Basin Electric has also hired a company that will develop a pilot plant to capture CO2 and then work on full-scale plants.

**Tim Considine, Ph.D., University of Wyoming, School of Energy,
Laramie**

Senator Anderson then welcomed to the lectern Dr. Tim Considine, an economist at the School of Energy Resources at the University of Wyoming.

Dr. Considine noted that "the proper investment climate is probably the antithesis of what we're experiencing today. If you look worldwide at the energy sector there's been a dramatic reversal from prior to July. There are a lot of big energy projects underway; the entire energy complex was characterized by rapidly growing demand in Asia and in particular the Middle East for natural gas, oil and even coal."

There were dramatic changes because demand outstripped supply in July. Oil hit \$140 a barrel; natural gas sold for more than \$12 mcf; but, oil and gas have now dropped by half or more.

Oil is an important commodity to watch because it indirectly affects prices for natural gas and coal. What are the characteristics of supply and demand that could give us insight into the future? **We have seen an alarming collapse in demand for oil, starting in the U.S. and spreading worldwide. The economic recession ahead of us could be quite severe.** Most of the macro forecasters are now projecting some really big declines in the 4th quarter and in the first quarter of next year on the order of 5-6%. These are big declines that we haven't seen since the 1981-82 recession. On the supply side, we don't have the gargantuan oil fields coming on line like we had in the late 1980s...we have a lot of good oilfields but they are relatively small and are higher cost to operate.

How is our energy portfolio changing? I look at energy in two simple camps: There's the transportation market where oil basically has a lock. The other big camp is stationary uses of fuels. I focus on the electric power industry because that segment will bear the brunt of any adjustment to a low carbon economy. **Looking at energy shares in the U.S., natural gas now produces more electricity than nuclear plants. That gain has also come at the expense of coal and hydroelectric sources.**

Carbon emissions between 2001-2006 grew only 0.1% a year. In the previous five years, carbon growth was 3.2% a year. The difference is coming primarily because of the switch from coal to natural gas.

With regard to the costs of carbon controls, during the Kyoto debate there were extensive discussions about the cost of carbon controls to the U.S. economy. A model currently in use by the government and Congress is the National Energy Modeling System (NEMS). Under NEMS reducing carbon emissions causes a shift to more nuclear power, more biomass power generation and more wind and some solar.

The question in industry and among economics and finance is what happens if these sources don't really pan out? What happens if our plans to build 25 new nuclear plants don't pan out and we don't build them. What happens if we have problems integrating wind and solar into our power grid systems? A lot of people believe in that case there will be a dash to gas. If so, natural gas prices could escalate rapidly and the cost of compliance to our economy could be much higher. While coal use would drop, a lot of the energy demand would be picked up by natural gas and nuclear and renewables and conservation in the form of demand reductions.

If society is serious about cutting carbon emissions, domestic coal shipments would decline sharply. Can America afford to devalue its largest energy asset? If that happens, Dr. Considine said, more coal would be available for export. In the near term of ten years, natural gas could be a real winner and nuclear could be if we can build new plants. And, if wind power increases, it becomes evident that additional grid capacity has to be built. The question is who will pay that cost? There could be a capacity surcharge on wind power that would totally change wind's economics.

Bjorn Lomborg, author of *The Skeptical Environmentalist*, Copenhagen, Denmark

Friday's luncheon speaker at the Forum was the highly-anticipated economist from Copenhagen, Bjorn Lomborg. He is an internationally-acclaimed author and frequently writes commentaries and articles for the NY Times, Wall Street Journal, Globe and Manchester Guardian, The Australian, The Economist, the China Post and others. He was named by Business Week as one of the 50 stars of Europe. And, Time magazine listed him in their compilation of the world's 100 most influential people. He is organizer and director of the Copenhagen Consensus Center which annually brings together 50 of the world's top economists to prioritize the best solutions to the world's biggest challenges.

Bjorn Lomborg was introduced by Paula Barnett of BP, Denver.

"What I'd like to talk to you about is what do we think about global warming; how we should behave when we think about global warming. If we're really going to talk about global warming we have to ask 'what is it we really want?' Presumably, global warming is not about cutting carbon emissions per se or even about creating a lower temperature — presumably this is about making a better world.

"We have to ask ourselves: 'Is what we're doing...**we're thinking of cutting carbon emissions...is that really the best way to help make a better world?**' What I'd like to focus on is stuff that's rational and not just stuff that is

fashionable. We **shouldn't do things that make us feel good but things that actually DO GOOD.**

"This is also crucial in order to remove our myths...if we have a panic that's not well supported it's unlikely that we're going to make good policy choices. Take the whole ethanol business where we decided to put a lot of our food into cars. The problem is that it costs a lot of money in subsidies...about \$15 billion a year now and causes a lot more people to go hungry because food prices have gone up. It's a classic lose-lose-lose situation. I simply want us to get back and say panic is unlikely to be a good judge about how people actually think about smart policy choices.

"We can't spend our money twice...so, let's make certain we spend it right in the first place. If we over-worry about some problems we end up under-worrying about other problems. Let's make sure we end up making a lot better world and not just a tiny bit better world.

"Before I get into global warming I want to discuss another issue: the origin of the whole environmental movement. In many ways it comes from Rachel Carson and her worry about The Silent Spring back in 1962...that pesticides (especially DDT) would kill all of the songbirds and, more importantly, kill all our children, or a lot of them, through cancer.

"When we're talking about environmentalism there was an inordinate amount of concern about cancer. **It 's estimated from EPA and others that well-regulated pesticides cause 20 cancer deaths a year in the U.S. Putting that in context, about 200 people die every year by drowning in their own bathtubs.**

"We can't just say 'here's a solution to a problem' without asking how much it's going to cost. If **we went ecological we could avoid the 20 deaths but it would cost \$100 billion a year in the U.S.**" Lomborg noted that "going ecological meant devoting more land to farming and plowing up more nature to be able to feed the people in the same quality of life. We also have to remember the most effective way of avoiding cancer is eating more fruits and vegetables. We could cut cancer rates almost in half. **By going ecological, he noted, we would push fruit and vegetable prices up 10-20% which would reduce consumption by 5-10% a year....and, cancer deaths could increase by 26,000 a year.**

Turning to global warming, Lomborg noted that people ask what should we do about it? How should we think about it? And, how should we move forward on this issue?

"The UN climate panel (UNCC), which I take as my starting point, publishes every 5-6 years three reports that are summaries of peer-reviewed studies available around the world. There are points we need to talk about. **One**, global warming is real and it is man-made. And, the best information comes from the UN climate panel. This does not mean it is perfect by any means but it's the best we have. The likely temperature rise by 2100 is 2.9 to 6.8 degrees F. That doesn't sound so bad; if it's the entire planet. This is not a trivial impact. If you look at the economic models the total cost of global warming is \$15 trillion. That's a large amount of money. But, in perspective, the cost is 0.05% of the 21st century's \$3,000 trillion [GDP]. We need to keep our cool! **Global warming is not by any standards the end of the world or the end of our civilization.**

"Global warming is one of many problems we need to try and fix. We need a smart strategy and we need to be much smarter about how we deal with global warming.

"The **second** point is that the **consequences of global warming are often vastly exaggerated and one-sided, leading to bad judgment.** Al Gore and others are telling us that global warming is terrifying...it's a planetary emergency. Gore's website states 'We have just ten years to avert a major catastrophe that could send our entire planet into a tail spin of epic destruction involving extreme weather, floods drought, epidemics and killer heat waves beyond anything we have ever experienced.'"

"Surprisingly," Lomborg continued, "this is technically true but dramatically misleading. Looking at four central issues: heat deaths, sea level rise, hurricanes and malaria" we can establish some perspective.

Starting with heat deaths, Lomborg said that by 2050 we'll see in Britain about 2,000 people dying every year because of global warming. We should be honest about that and say this is definitely a problem with global warming. The heat wave Al Gore most often mentions is the one in Europe in 2003 where 35,000 people died across the continent...especially about 2,500 people just in Paris, France, mostly old women stuck in their apartments. And, about 2,000 people died in Britain that same year.

"But, isn't it curious that if we see more heat waves we're also going to see fewer cold waves. The same studies that predict heat-related deaths also show what we'll see 20,000 fewer cold deaths. This is not a good way to form the debate. **Looking globally by mid-century we can expect 400,000 people dying from heat but 1.8 million fewer people dying from cold. My point is we need to hear both sides of the story.** If this was the only problem with

global warming maybe we should have some more. Overall, there are problems and benefits from global warming.

"Is cutting carbon emissions the best way to help those poor, elderly women in Paris? Look at the U.S.. Virtually nobody dies from heat...because you have air conditioning.

"We know that many cities around the world are much warmer than their surrounding countryside mainly because there's lots of black stuff on tarmac. Tokyo is about 20 degrees warmer than the surrounding countryside [because of so much heat absorption from the sun].

"Clearly there's an **opportunity here because by the end of the century about 80 percent of the people will be living in cities.** If we added more **greenery and water**...such as in London...we **could reduce daytime temperatures** by about 14 degrees....much more than what global warming will add and we could make London a prettier city. And, if we painted one-fourth of the black surfaces in London white, that would be rooftops for instance, we could certainly reduce daytime temperatures by about 18 degrees.

"We've been told that we'll see more killer heat waves and the solution is cutting carbon emissions. But, there will be many fewer killer cold waves. We'll see more people surviving because of global warming. If we want to help people survive those heat waves why is it we want to do it through the least efficient policy...cutting carbon emissions?

"Next, will sea levels rise? Yes, but it's not a catastrophe. **The UNCC estimates a 1 foot rise over the next 100 years. That is not Al Gore's 20 feet!** How big a problem is a one foot rise? We actually know because **over the last 150 years sea levels actually rose 1 foot. Did anybody notice?**

"Let's look at what a one foot rise would do to the Maldives. It would flood 77% of the Maldives at a cost of 121% of their GDP. This would be a catastrophe for the Maldives, but, will it happen? No, because the Maldives will do what they've done the last 150 years...they'll protect themselves. For 0.04% of their GDP they can safeguard virtually all of their dry land. How do we save the Maldives, Vietnam or Bangladesh? Everybody seems to say the way to help is by cutting carbon emissions. Should we cut CO2 or should we make these countries richer? The UNCC actually has two scenarios...the A and B. These are the economic and the environmental.

If we see in the economic scenario a sea level rise of one foot, we also see the average person in the world earning about \$77,000 per year. That's a huge increase! If we envision the Al Gore world where we've initiated

lots of carbon cuts, we'll be about one-third less rich but we will also have about one third less sea level rise. Which of these scenarios would be best for the Maldives or Bangladesh or Vietnam?

"It would be wrong to choose being slightly less rich and have slightly less sea level rise. It actually turns out that if they are rich they will lose less dry land. Under the Al Gore scenario they will lose three times more dry land.

"Looking at hurricanes...where the U.S. has the best data. **It is true we'll see more and more costly hurricanes but, these have very little to do with global warming but everything to do with population. Many more people live closer to where hurricanes hit and they have more expensive houses.** The U.S. population over the last century quadrupled. At the same time the Florida coastal population increased 50 fold. Living where hurricanes hit is an increasingly nice place to live when they don't hit!

Looking further at hurricanes, Lomborg said we might expect 10% more damage by mid-century caused by global warming. But, he asserted that more people may move closer to hurricane-prone areas and acquire more "stuff" with the result being a 480% increase in damage and losses. "My guess is why we focus so much on cutting a little bit and so little on cutting the higher losses. If everybody lived under the Kyoto protocol, we could probably cut one half of one percent of the projected damages.

"We could cut the 480% loss by 250-400% very cheaply and simply. Most people don't know how. We would not subsidize insurance in Florida. Basically, we're encouraging people to build irresponsibly. We should have better building codes and better enforcement of them. There should be more wetlands in front of Louisiana and better levees in front of New Orleans. The point is that if we invested in these things it would be vastly cheaper than investing in climate change. We'd end up with less damage by mid-century than if we focused on climate change policy.

"It's technically true we're going to get more ferocious weather but that's by far not the most important issue. The policy of cutting carbon emissions is probably the least helpful way of dealing with damages from climate change.

"The last point is about seeing more malaria from heat. **Malaria is weakly correlated to temperature**, so by the end of the century we can expect to see about 3% more malaria because of global warming. But, remember that malaria is strongly correlated to wealth. If you're rich you don't get malaria. If you get it, you don't die from it. If you're poor you get malaria and you die from malaria. Should we focus on temperature or on treatment?

"If everybody in the world did the Kyoto Protocol through the end of the century, **we would have saved about 1,400 people from dying of malaria.** It strikes one as odd that if we really cared about malaria victims, why don't we look at malaria and its specific causes which would then **probably save about 850,000 people from dying of the disease.** The cost would be one-sixtieth of Kyoto. For every time the Kyoto Protocol could save one person from dying of malaria, the same amount of money spent actually helping people with malaria would save 36,000 people from dying.

"My point throughout is that yes, global warming is real but it is often vastly exaggerated and one-sided which leads to bad policy judgment. The whole point here is that if what we care about is a better world then we can do that through better policies. The current policies are simply stupid. We need to move on to smarter policies. Kyoto solutions are high cost-no gain!

"By all estimates, Kyoto would cost about \$180 billion a year. It would only produce a reduction in global temperatures of 0.007 degrees. We're essentially saying let's spend an enormous amount of money to do virtually no good.

"There's the **European** Union...which always seems to say 'if nobody else will save the world we will.' They've **decided to cut carbon emissions 20% by 2020. In the United Kingdom** it is estimated the **total cost of that policy will be about 100 billion** pounds. I've asked many times how much temperature reduction will we get and they tell me that's not a relevant question. Well, they've run some models and they show this expenditure **would produce 1/600th of a degree lower temperatures.**

"If everybody in the world did what the United Kingdom did it would cost about 5,000 billion pounds and the net effect would be to lower the temperature about **1/30th of a degree.** I'm questioning the logic of saying let's do something that costs a lot now that has **virtually no impact 100 years from now when there's so many other things we could do on this planet.**

"Take polar bears...a very good way to summarize how we think about global warming. Everybody talks about polar bears at the icon of global warming. The polar bear population has probably quadrupled with about 5,000 in 1960 and now about 22,000. This doesn't mean there won't be a problem in the future so we then have to ask ourselves, what are we going to do?

"Some people would say let's do the Kyoto Protocol. Nobody tells you how much that will do for polar bears and I think I know why. If everybody, including the U.S., did Kyoto it would save about one polar bear each year. But, nobody talks about the fact that we shoot between 300 and 500 polar bears each year. I don't know about you, but maybe we should stop shooting polar bears.

"We're so blind-sided that we think whatever the problem is we have to cut carbon emissions. **The smarter way forward is a new Kyoto...investing 0.05% of GDP in research and development of non-carbon emitting technologies. That would be about ten times cheaper than the current Kyoto.** We should make new technology cheaper than fossil fuels.

"We should let each country focus on its own future, such as the use of renewables, fusion, fission, carbon storage, 2nd generation biofuels and conservation. We can do \$11 worth of good for every \$1 spent. We can do more good than just doing stuff that makes us feel good.

"There are many other things we can do that are good for the world. Al Gore talks about our generational mission and how we want to be remembered to our kids and grandkids. That's exactly the right question. I find it very amusing that Al Gore and so many people around the western world **want to be remembered for spending \$180 billion a year doing virtually no good a hundred years from now.**

"By all estimates that for \$75 billion a year we can solve all major basic problems such as: clean drinking water, sanitation, basic healthcare and education."

Lomborg referenced the Copenhagen Consensus 2008 where the world's top economists agreed the world should focus on micro nutrients, free trade, immunizations, and agricultural research and development. In 14th place on the priority list was energy research and development. Coming in last was cutting carbon emissions because of the reduced possibility of doing good.

"The real point is how we need to think about dealing with all the world's problems smartly. This is not just reducing carbon emissions or cutting the temperatures. This is about making a better future for our kids, the environment and this planet," Lomborg concluded.

Leadership Change

Incoming chairman Dave Bostrom presented a plaque to outgoing Foundation/Alliance Chairman Mike Ceballos and thanked him on behalf of the Steering Committee and the Foundation.

Senator John Barrasso (R-WY) made a brief appearance with excellent remarks about the forum, activities in Washington during the lame duck session, and the importance of the global warming issue to Wyoming and the nation.