Committee On Finance
Max Baucus, Ranking Member

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Floor Statement of U.S. Senator Max Baucus on Energy Competitiveness

(WASHINGTON, D.C.) As energy costs continue to soar, U.S. Senator Max Baucus delivered the following floor statement addressing the impact of energy on America's ability to stay competitive in a global economy. Baucus highlights alternative sources of energy that could potentially drive down the cost of various forms of energy. This is Baucus' sixth speech on America's competitive edge in today's world economy.

This past summer, Baucus began delivering speeches on America's role in the global economy, the importance of education in keeping a competitive edge, the importance opening new trade markets, and warning of the damaging effects rising health care costs have on American companies. The floor statement follows:

Energy Competitiveness
Floor Statement of U.S. Senator Max Baucus

In the 12th century, in the Bay of Biscay, Basque sailors began to hunt right whales. The Basques melted the whales' blubber into oil to fuel their lamps. When the whales died out in Spanish waters, the Basques sailed north to Iceland pursuing the source of their lamp oil. By the 16th century, whalers hunted extensively in Icelandic waters to find the fuel for light.

As our former Colleague Phil Gramm wrote in 1973, from American colonial times through the middle of the 19th Century, whale oil provided the major source of artificial lighting in America and Europe. But in the middle of the 19th Century, America faced an energy crisis. The price of whale oil was rising. From a low of 23 cents a gallon in 1832, it rose to $1.45 a gallon in 1865.

But then in 1859, people discovered petroleum oil in western Pennsylvania. The rising price of whale oil encouraged an engineer to invent a process to convert that western Pennsylvania black oil into a new fuel, kerosene.

The whale oil era was ending. And the petroleum era began.

150 years later, at the turn of the 21st Century, gasoline prices are rising. As late as December 2002, Montana gasoline prices averaged a little more than $1.30 a gallon. On September 5 of this year, the average price hit about $2.90 a gallon.

In the wake of Hurricane Katrina's disruption of oil refineries, many Montanans feel gouged by sky-high gasoline and diesel prices. High gas prices hit low-income Montanans

particularly hard. Peggy Grimes, director of the Montana Food Bank Network, says: "[P]eople are going without food more often and coming to visit local food pantries more often."

Rising natural gas and fuel oil prices have many Montanans concerned about how they will heat their homes this winter. And rising fertilizer costs will hit many Montana farmers hard.

In the short term, petroleum price increases are forcing painful adjustments. In the medium term, we need to invest in conservation, weatherization, and upgrading the efficiency of cars, appliances, and machines that use energy. And in the long term, we need to adjust intelligently to higher petroleum costs, systematically and purposefully diversifying our energy sources.

In the middle of the 19th Century, America led the way to the next energy era, leaving the whale oil era behind. Now, at the beginning of the 21st Century, America must once again lead the way to another energy era, an era that severs the world's dependence on Middle Eastern oil. Domestic oil and gas production will remain a critical part of our energy security for some time. But to lead the world to a new era, we will have to make major investments in new innovative forms and uses of energy.

Once again, we have cause to look again across the waters to Iceland.

Iceland is leaving the petroleum era behind. Iceland is entering the hydrogen era. The government has announced its intention to become a hydrogen-based economy by 2030.

In Iceland, icy water cascades down from massive glaciers. And in Iceland, boiling water bubbles up from just beneath the surface. Iceland already harnesses these renewable resources to generate virtually all of its electricity and heating from hydroelectric and geothermal sources.

But with no fossil fuel resources, Iceland relies heavily on imported oil to power cars, buses, and the fishing trawlers that provide 70 percent of Iceland's income.

To break that dependency, and to reduce greenhouse gases, Iceland is turning to fuel cells. Fuel cells use hydrogen and oxygen to generate electricity to power engines. And the vehicles powered by those engines emit only water as exhaust.

Iceland plans to use its cheap electricity to split water — H2O — into its component parts — hydrogen and oxygen. Iceland uses the process of electrolysis. Electrolysis runs an electric current through bonded elements to separate the elements.

Iceland's capital Reykjavik intends to replace its entire fleet of 80 buses with fuel cell buses. Next, Iceland hopes to convert private cars. And after that, Iceland hopes to switch the huge Icelandic fishing trawlers to hydrogen power.

Iceland thus hopes to convert its renewable hydroelectric and geothermal energy into a form that can power its transportation system. And in the process, Iceland hopes to slash emissions and end its dependence on fossil fuels.

Maria Maack, the project director of Iceland New Energy, explained: "We are so reliant on our fisheries, and the fisheries are totally dependent on oil. So we have a chance to be quite independent of this. . . . [I]t's about being independent and relying on ourselves to continue the way we live."

Bragi Arnason, a chemistry professor at the University of Iceland, and a leader in hydrogen technology, beamed: "I think we could be a pilot country, giving a vision of the world to come."

Mr. President, this is my sixth address to the Senate on competitiveness. Starting this summer, I spoke on competitiveness generally. I spoke on the role of education in competitiveness. I spoke on the role of trade. I spoke on the role of controlling health-care

costs. I spoke about the role of capital and savings. And today, I wish to speak about the role of energy in competitiveness.

Iceland's Professor Arnason is not alone in his vision of a hydrogen future. At the University of Montana — Missoula College of Technology, Dean Paul Williamson has a similar vision. He is working to use hydrogen as the focal point to build a state-of-the-art college of technology and futures park. He wants to create something that folks in Geneva will get on a plane to come out to see — a laboratory of excellence — to serve as a gateway to alternative technology in the larger community.

Dean Williamson's vision is to marry Montana's resource base with the best-trained workforce. And he is working to make the Missoula College of Technology a focal point to transform the vision into reality. Missoula College of Technology is creating the educational venue. And with it, they will match a business gateway. They hope to bring business and industry to the area, creating networks of micro-enterprises.

All around Montana and the Nation, people are working on renewable and alternative energy research and industry. Rising energy prices, combined with smart government incentives, have spurred innovation. We are already beginning to reap the benefits.

I've already talked about one example: hydrogen. Another example is coal conversion.

Coal gasification can be used to help produce hydrogen. And coal gasification can also be used to produce fertilizers, other chemicals, and diesel fuel.

Montana's Governor Brian Schweitzer and I have targeted a process to turn Montana's coal into clean-burning diesel and jet fuel. The process is called Fischer-Tropsch, or F-T, for the German scientists who developed it in the 1920s.

Energy technology firms in America and elsewhere are fine-tuning F-T to make it even cleaner. F-T fuels are relatively clean. The process can recover sulfur, mercury, and arsenic as marketable byproducts.

Jack Holmes, president of Syntroleum, extols the cleanliness of F-T diesel. He says it can be burned straight or blended with regular diesel fuel. He says: "It's like a single-malt scotch."

Governor Schweitzer calculates: "It would cost less that a $1 per gallon to make that diesel." The break-even point for F-T comes when crude oil sells for more than $35 a barrel. These days, that looks like a pretty safe bet.

To help processes like these, in the just-passed energy bill, I worked to include an investment tax credit for the coal gasification technology used by the F-T process. In the highway bill, I worked to include a 50-cent-a-gallon tax credit to companies who generate fuel using an updated version of the F-T process. And I also included a federal loan guarantee so that companies can finance these capital investments.

We have a real opportunity here. The coal-to-fuel technology can be a win for everybody, if we do it right and make sure that any facility uses the cleanest and most advanced technology available. It will help lessen our dependence on foreign sources of energy, while creating thousands of jobs here in America. I'm proud to join Governor Schweitzer in trying to bring new investment in this technology to Montana and to the Nation.

A third example of renewable and alternative energy is wind energy.

They may call Chicago "the windy city." But many say that Great Falls, Montana, is the windiest city in America. "Wind is like water flowing out of the mountains," says Bob Quinn, a farmer from Big Sandy, Montana.

Closer to the mountains, the wind is turbulent. But across the prairie, it flows uniformly, like a huge river. And that makes it attractive for a wind farm site.

Five years ago, Bob traveled to Germany to research his ancestry. He visited a distant cousin who had developed a wind project, and was contemplating others in Chile or South Africa.

Bob asked him, "Why are you thinking about going clear to Chile to build a wind farm when you can build one in Montana?" The cousin reconsidered and chose Montana. Along with another partner, the two cousins formed WindPark Solutions America, and began looking for sites.

They settled on Judith Gap, a town of about 150 people in central Montana. Eventually, WindPark sold the project to Invenergy Wind, a Chicago-based company that will own and operate the project. And Invenergy is now building a $150 million facility, the Judith Gap Wind Farm.

Billings resident Ludlow Howe manages the construction. His work crews are erecting 130 turbines in two phases. The Wind Farm will cover an area about 8 miles long and 5 miles wide, straddling Highway 191 between Judith Gap and Harlowton.

So far, workers have assembled at least 27 towers, colored white-gray to blend with the sky. Each tower is 260-feet tall. On top of each tower sits a generator box the size of a motor home. 7-ton rotors with 122-foot blades sweep up to 387 feet into the air. Each turbine weighs more than 400,000 pounds. A system of 140 bolts secures each tower to its base.

The rotors come from Houston. The turbines come from North Carolina. And the tower sections come from China, Korea, and Fargo, North Dakota.

Ludlow says of the wind turbines: "They will actually seek out the wind at 9 mph. They will pitch their blades, just like a sailboat."

The plant should be in full operation soon. NorthWestern Energy will buy power from the 150-megawatt wind farm for customers in central and Western Montana.

Wheatland County Commissioner Tom Bennett says admiringly: "It's environmentally friendly. It's renewable. It's something we'll have forever. You tell me any negative on this. We couldn't find any."

A fourth example of renewable and alternative energy is biomass and ethanol.

Energy competitiveness can also come from a clear commitment to the development of biomass and ethanol-based fuels. Currently, most alternative fuels are not profitable without a federal subsidy. But if we continue to support the industry until it reaches profitability, much as with wind power, it will become a self-sustaining model in its own right.

A Pentagon-sponsored study, "Winning the Oil Endgame," projects that biomass and ethanol-based fuels could create 750,000 new jobs. This effort could revitalize rural and agricultural areas of America. It could add tens of billions of dollars to farmers' revenue every year.

Rural America is the center of the next age in domestic energy production. Rather than sending $50 billion a year overseas to buy oil from foreign countries, we could be buying into rural America. We must continue to support these new industries.

The man who headed the research team that created the hybrid Toyota Prius tells his young researchers: "Forget about concentrating on such things as trivial increments in performance or cost cutting. If you restrict yourself to refining the prevailing paradigm, you will never come up with an earth-shattering idea or technology."

America needs to follow that sage advice. We need to move beyond trivial increments in refining the prevailing petroleum paradigm. We need to move on to the next earth-shattering ideas and technologies.

During World War II, America created the Manhattan Project, an effort to develop the first nuclear weapons and win the war against fascism. That important effort involved sites at Hanford, Los Alamos, Oak Ridge — and more than 30 locations in all. By 1945, the Project employed more than 130,000 people. It cost nearly $2 billion, or $20 billion in 2004 dollars.

Today, America needs a new Manhattan Project. As Tom Friedman puts it in his book *The World Is Flat*, we need "a crash program to . . . develop clean alternative energies."

On May 25, 1961, President John F. Kennedy told the Congress: "I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to the Earth."

Today, America needs a new challenge. As Friedman puts it, we need "a similar legacy project . . . a crash program for alternative energy and conservation to make America energy-independent in 10 years."

Developing new energy sources in America will contribute to energy independence. Energy independence will contribute to national security. And energy independence will contribute to the stability of energy sources, allowing business to go forward without the jolts of supply disruptions.

As well, developing new energy sources in America has the potential to turn renewable and alternative energy development into a comparative advantage for America. If we can figure out how to make clean, cheap energy before other countries, then those other countries will pay American companies to build energy production there.

Because of our early investments in the 1970s, America had an opportunity to become the world leader of the fossil-alternative energy industry. With lower energy prices and decreased federal support, however, our advantage dwindled.

Countries like Denmark and Germany built on our initial research. Denmark and Germany have become the world leaders in wind generation. Danish companies are now the number 1 provider of wind services in America, outnumbering even American companies.

The Danish became world leaders in wind power production by first growing the industry at home. According to the Danish Wind Industry Association, the Danish wind industry has created 20,000 new jobs. It exports 90 percent of the wind turbines it creates. And it supplies 20 percent of Denmark's electricity.

This is all because Denmark was the second country to reach the critical production level of 100 megawatts a year in 1987. That was 4 years after America. But we decided to end wind power subsidies for a time.

There is a silver lining, however. America still has the resources to create technologies that could be turned into comparative advantages. Because of our wind power penetration, we are still fairly advanced compared to other nations. With a concerted effort for research, development, and production of wind generation — or solar power, or other energy programs that we have been working on — we could easily become the world leader in those industries.

America has underinvested in research and development. This happens because firms invest in R&D based on the private return to their firms alone. The social rate of return to investment, however, exceeds the private return. As economists put it, positive externalities exist. These external benefits come from knowledge spillovers, the creation of public goods, and

economics of scale. The existence of these externalities counsels that the government needs to subsidize R&D until the private rate of return matches the social rate of return.

Traditionally, governments have used a few different policy tools to subsidize R&D. The first is government research grants to industry and education institutions. Second, we can provide tax incentives for R&D.

A third tool is the increasingly popular and effective technique of offering prizes to spur innovation.

For example, in 1714, the British government offered the longitude prize — a prize of 20,000 pounds — for the precise determination of a ship's longitude. John Harrison solved the problem and eventually won the prize, using precision clocks.

And a year ago, SpaceShipOne won the Ansari X Prize competition. The X Prize Foundation offered $10 million to the first private venture to send a privately funded craft into space, twice in a week.

And the Clay Mathematics Institute of Cambridge, Massachusetts, offers $1 million each for the solutions to seven Prize Problems. The problems are classic mathematical questions that have resisted solution over the years.

Prizes like these involve little risk for the government. And these prizes provide a very efficient, market-based approach to subsidy.

For every success there will be numerous failures. It is extremely difficult to predict who the winner will be. America needs to invest in a basket of potential technologies.

In 1874, it was a dream of science fiction: Jules Verne envisaged a world in which water would replace coal as the fuel of the future.

Now the Icelanders believe that they can turn that dream into science fact. And they are taking steps to create the world's first hydrogen society.

In old Icelandic sagas, whales were either good or evil. The evil whales swallowed boats and men. Just talking about such whales while on a boat would bring bad luck.

The blue whale, in contrast, protected both boats and men. Blue whales would scare away all the evil whales. According to old Icelandic sagas, blue whales would warn fishermen by circling a boat three times in a row.

Sometimes, energy sources also can appear to be good or bad. With hydrogen, Iceland hopes that it has found the energy equivalent of the good, blue whale.

Certainly, with the 1970s oil shocks and now the Katrina-related price spike, we have been warned at least three times in a row to seek out safer seas.

In the 19th Century, America plotted the course to a more-productive energy future. In this new century, let us see that American once again leads the way. Let us once again chart a course to more secure energy waters. And let us once again explore the uncharted oceans of possibilities, and bring the energy that we need safely home.

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