

**ALASKA STATE LEGISLATURE
JOINT MEETING
SENATE SPECIAL COMMITTEE ON ENERGY
HOUSE SPECIAL COMMITTEE ON ENERGY**

February 26, 2009

3:08 p.m.

MEMBERS PRESENT

SENATE SPECIAL COMMITTEE ON ENERGY

Senator Lesil McGuire, Chair
Senator Bert Stedman
Senator Bill Wielechowski

HOUSE SPECIAL COMMITTEE ON ENERGY

Representative Bryce Edgmon, Co-Chair
Representative Charisse Millett, Co-Chair
Representative Kyle Johansen
Representative Jay Ramras
Representative Pete Petersen

Also present were Representatives Fairclough and Guttenberg.

MEMBERS ABSENT

SENATE SPECIAL COMMITTEE ON ENERGY

Senator Lyman Hoffman
Senator Albert Kookesh

HOUSE SPECIAL COMMITTEE ON ENERGY

Representative Nancy Dahlstrom
Representative Chris Tuck

COMMITTEE CALENDAR

Work Session: Comprehensive Energy Plan

Presenters:

Gwen Holdmann, Alaska Center for Energy and Power
Ginny Fay, Institute of Social and Economic Research
David Hobbs, Cambridge Energy Research Associates
Darrell Smith, Black Lion Energae

PREVIOUS COMMITTEE ACTION

No action to report

WITNESS REGISTER

GWEN HOLDMANN, Director
Alaska Center for Energy and Power (ACEP)
Fairbanks AK
POSITION STATEMENT: Spoke of Alaska's energy policies.

GINNY FAY, Economist
Institute of Social and Economic Research (ISER)
Anchorage AK
POSITION STATEMENT: Spoke of Alaska's energy policies.

DAVID HOBBS, Managing Director
Cambridge Energy Research Associates (CERA)
Cambridge MA
POSITION STATEMENT: Promoted CERA for providing the state with energy consulting.

DARRELL SMITH
Black Lion Energae and ING
Mason City, IA
POSITION STATEMENT: Promoted using algae for energy.

ACTION NARRATIVE

Work Session: Comprehensive Energy Plan

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CHAIR LESIL MCGUIRE called the joint meeting of the Senate and House Special Committee on Energy to order at 3:08 p.m. Senators Stedman, Wielechowski, and McGuire and Representatives Petersen, Ramras, Edgmon, and Millett were present at the call to order.

Alaska Center for Energy and Power

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GWEN HOLDMANN, Director, Alaska Center for Energy and Power (ACEP), Fairbanks, said ACEP is the applied-energy research arm of the University of Alaska. There are many programs in the University researching energy issues in Alaska, and ACEP draws on all of those resources and addresses the most pressing near-term, applied energy concerns for Alaska communities and industries. It has projects all over the state and is active in

small and large-scale renewable and non-renewable technologies. The three areas of focus are community energy solutions; powering the economy; and the energy field of the future. ACEP is partnering with communities to address renewable and alternative energy. ACEP is assessing geothermal, large scale solutions like Susitna and Chakachamna, and power for remote mines. The energy field of the future is how Alaska can best manage and develop oil resources for the long term, including heavy oil and methane hydrates. ACEP is looking at what can be done with the infrastructure once the oil fields are depleted.

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MS. HOLDMANN said Alaska needs to address its energy goals. Does Alaska want to lower the cost of energy, stabilize the cost, develop community and state self-sufficiency, boost local economies, create jobs, develop wealth, or reduce greenhouse gas emissions? "If your energy is free but you don't have a job, is that really a benefit to our residents?" What are Alaska's priorities, and do some goals conflict with one another? Making smart investments is important. Alaska has begun investing in the renewable energy fund, and they should be prudent, smart investments that will result in projects that are around for the long term. Alaska should take calculated risks and be invested in cutting-edge technology, but it should start with the low-hanging fruit. A balanced approach includes planning, projects, and research. Planning must be done at all levels from community to statewide. There have been efforts at creating an Alaska energy policy, "and I think that we're getting a lot closer to really coming up with some good objectives."

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MS. HOLDMANN said without projects, policy means very little. The Chena hot springs geothermal plant put Alaska on the map for geothermal power. She showed a photo of the first in-river turbine ever installed in North America, and it is in Ruby, Alaska. ACEP has spent resources on the Healy clean coal project. Research is the third leg of having a balanced plan. It can peer over the horizon to see what is needed for long-term success. Efficiency is the best "bang for our buck." "However, where we are today is we're investing in projects, which have a fairly substantial, often, capital cost investment ... but we also see long-term benefits associated with those." There is interest in innovative, but costly, new technology in Alaska. The goal of ACEP is to drive down the cost and risk of innovations so they make economic sense for Alaska.

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MS. HOLDMANN said one role of ACEP is to test equipment to keep things out of the field that may not work, saving the state a lot of money. ACEP is partnering with the Institute for Social and Economic Research (ISER) for assessing technical and economic feasibility. ACEP also tests emissions. A unique challenge for Alaska is the integration of projects with existing power systems. Alaska has small isolated grids, which also occurs in the world but not so much in the United States. Alaska needs to take the lead in deploying renewables in small grids. Procurement experiments are a favorite of the ACEP. Many vendors come by and the ACEP looks to see if they actually have a product behind the sales pitch and if it meets their claims. Her group also works with viable manufacturers to improve products for use in Alaska. ACEP can be an impartial agent on behalf of Alaska communities to make sure investments are wise. ACEP can also leverage resources. Every dollar can be leveraged into five dollars of federal funding, because the Department of Energy typically requires 20 percent cost share per project.

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MS. HOLDMANN said these projects save money in the long run. Fuel cells have been tested by ACEP, but that technology isn't ready for Alaska. It may change. The big problem is that the federal government is the customer for the research programs at the university. "If they are the customer, we are doing research that our customer is having us do." So ACEP focuses on what the federal government wants instead of state interests. ACEP has no base funding; it was vetoed in last year's budget. So the state is not spending any money on research and development of energy; Alaska ranks 46th in the country. North Dakota has the Energy and Environmental Research Center -- a high-tech nonprofit branch of the University of North Dakota. It operates as a business within the university system, so it does things similar to ACEP within a private business model with a goal of moving the best technologies into the marketplace. The private sector makes up 84 percent of its contracts. It has generated 14 spin-off companies. It has 290 scientists and engineers, and most are graduates from the University of North Dakota. They are people that the state is able to retain because of the good high-paying jobs. Additional job creation was \$94 million. That program receives no base funding from the state. It serves as a funding source and generates money to fund the university. But there was significant state and federal money put into developing the program when it started about 20 years ago.

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SENATOR WIELECHOWSKI asked if there was any money put in the budget for ACEP.

MS. HOLDMANN said there was \$500,000 passed by the legislature.

SENATOR WIELECHOWSKI asked why the governor vetoed it.

MS. HOLDMANN said she heard that the governor wanted to wait for a completed energy plan. Ms. Holdmann provided the requests for the capital budget for energy projects for fiscal year 2010. It is a tight budget year, but funding for research and development is a very important component. By putting it in the capital budget, the legislature has the opportunity to not fund programs that aren't successful and to continue to fund programs that give a return on the money. Another option is to create an emerging energy technology development fund. She is not saying that all the energy research should be done through the university, but there is this existing program and it makes sense to fund it. It also makes sense to fund pilot projects in technologies where Alaska can take a leading role and that result in long-term jobs and economic opportunities. The company that put the in-river turbine in Ruby is considering opening a facility in Alaska for building the turbines.

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MS. HOLDMANN said a good state research and development program can attract investment and reduce failures. That saves money. It can provide focus to energy initiatives. Rather than take a scatter-shot approach, Alaska can do a good job at implementing the projects that give a good bang for the buck. The program can assist with developing prudent policy and planning, and it can create jobs. Iceland is one model of a research and development program that created 100,000 jobs tied to the energy sector.

SENATOR MCGUIRE thanked her for doing all her work without a budget and for being creative and finding other funding sources.

REPRESENTATIVE RAMRAS said he was a shareholder of General Electric when it was \$28 per share. It is now about \$9. One corporate rule for General Electric is not to buy a business unless it can be number one or two in the sector. The company wants to dominate. He said he has seen some of the work done at the university, including research on important medical issues. He has wondered why the university doesn't seek out those things where it can dominate. Ms. Holdmann is one of the gems of the University programs. He asked about tidal and biomass fuels, and suggested Alaska can be a first mover and best in a category.

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MS. HOLDMANN said Alaska has immense resources, renewable and nonrenewable. Biomass is an opportunity for much of the state, but the technology for small-scale gasification has not been economic. Manufacturers are working with Alaska communities, and if Alaska can find something that works and develop the expertise, it can export it to a large part of the developing world. Alaska has 90 percent of the tidal and wave resources. "We can't be waiting for someone else to take the leading role. If somebody is going to be developing these kinds of devices, tidal and wave energy and in-river hydro, it's got to be done here." Alaskans may not be inventing the turbines, but they will be working with the manufacturers, shepherding the technology ahead and having the expertise. Energy storage is important for rural Alaska. It is a big deal to try and increase the capacity of wind power on the grids. The turbines need to be performing better and displacing more diesel fuel than they are today. This is of interest in the developing world and in the United States. The grid systems were not designed for inconsistent power generation sources like wind. Energy storage can offset those fluctuations and is a big part of research. She was at a national lab last week and the lab was very interested in solving Alaska's rural issues. If the models work on a small scale, then they can work on a big scale in the Lower 48. New transmission lines and smart grids are other opportunities here.

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SENATOR WIELECHOWSKI said the programs need funding. The legislature provided it, but the governor vetoed it.

REPRESENTATIVE RAMRAS said Chris Rose was looking for incubator funds. There was a vigorous debate about 77 projects for \$100 million into the communities. What is the distinction between the incubator funds and the \$1 million for ACEP, and how would that differ from the \$100 million for the 77 projects? Redundant funding would be a reason for another veto.

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MS. HOLDMANN said the Alaska Energy Authority has a specific mandate to work in commercial technology. Its mission is to find deployable energy solutions for today, but it doesn't look at pre-commercial technology. A good example would be the Chena geothermal power plant. It was the first installation like that in the world. It was not proven technology. The state needs to be prudently investing in those kinds of projects.

CHAIR MCGUIRE asked about alternative grants in the federal stimulus package.

MS. HOLDMANN said she thinks there are a lot of opportunities and has been working with the Department of Energy. Money from the state could be leveraged for those funds. Alaska already lost some opportunities in hydro-kinetic-tidal energy and geothermal in the past for not having the matching dollars. But there is a lot of funding out there. Some of the geothermal budget is coming to Alaska, and she hopes other money too.

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MS. HOLDMANN said she works directly with communities. The Tanana Chiefs Conference represents 42 villages in rural Alaska, and ACEP created a position jointly with them that will expand the work with rural communities to pick the technologies that make the most sense and find funding opportunities.

Institute of Social and Economic Research

GINNY FAY, Economist, Institute of Social and Economic Research (ISER), Anchorage, said she has worked on energy policy in Alaska for over 25 years. The average Alaska household spends 40 percent of their household budgets on space heating, 35 percent on electricity, and 25 percent on transportation. In some parts of Alaska people spend 70 percent on space heating. Alaska has focused its energy policy on electric power generation and oil and gas development. It would be good to broaden that out to what really affects Alaskans every day. A bystander would think that Alaska's energy policy is to reduce the total cost of energy, to distribute the resources fairly, and to lower the cost of energy in rural Alaska. She suggested developing a long-term approach to energy rather than a reaction to oil prices at the time. When oil prices go up, Alaska has more money, but all households and businesses suffer because of the cost of energy. "So we scramble to try to lower their cost of energy and then we go down the next cycle, oil prices go down; we abandon our quest for energy efficiency and renewable energy because we can't afford it anymore."

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MS. FAY suggested looking at 50 years from now. She provided the committee with a paper on what could be considered in an energy policy. It's not complete, but it has general recommendations knowing that oil prices are going to be volatile. She suggested establishing a long-term oil price forecast to use for budgeting and as an assumption for renewable energy planning. There will

probably be "cap and trade" and carbon pricing in the future. Alaska should be proactive in where it wants to be, "and not look at it that we're using renewable energy to replace fossil fuels, think of it more as we're investing in ways that we can be able to export more of our energy resources that we develop because we have our long term. We're more self-sufficient, we aren't as dependent on consuming so much of our oil, and we're not so much victims of volatile prices, because we don't really have any control over them."

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REPRESENTATIVE RAMRAS said a problem with export in Alaska is the cost of moving things. "Cap and trade is a little bit like synthetic gas for the air force. Their objective is 20 percent." The Air Force in Alaska could be at 100 percent, contributing to the whole United States Air Force without having to export one drop of synthetic gas. Is the same thing true of any trade material created in Alaska? "Could we create it and sell it to the Lower 48, which is the whole nature of the cap and trade exchange, without having to physically transport it?" That could level the playing field.

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MS. FAY said she is not an expert on cap and trade, but it is her understanding that there will be a mechanism for accounting. It is similar to what is done with Bradley Lake. "Not all those neurons make it to Fairbanks; it might be consumed in Homer, but then you have agreements on how you share those agreements. So I think they envision those kinds of things for cap and trade."

REPRESENTATIVE RAMRAS said there is a tremendous export opportunity to invest in tidal and others and then create an exported commodity that doesn't have to be put on a truck, boat, or plane to actually export it. "I was hoping that you could be more explicit."

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MS. HOLDMANN said this is a different way to export energy. Alaska doesn't have a grid that ties Alaska to the Lower 48, but Alaska has an opportunity to create value-added products so "we are essentially exporting our energy to other places in the world." This is especially true with developing stranded resources; "that would certainly give us some fairly unique opportunities to do that, especially when you take a look at shipping routes and where our resources are." The state should be looking at it very carefully in term of where it wants to position itself. She sees it as a national security issue as

well. "As we're exporting many of our high energy-intensive industries off shore, that really creates some potential concerns in terms of national security. And if we can be doing some of that here in Alaska, that certainly is one way to export our stranded resources."

MS. FAY said one of Alaska's opportunities is its isolated grids. While Alaska is solving problems for one community at a time by developing integrated systems, Alaskans should be developing the expertise the same way they have with module oil and gas development and oil spill technology. There are about two billion people who live off the grid in the world, and Alaskans should be the exporters. The state's objective in renewable energy is not always clear. Is the goal to redistribute wealth or reduce the total amount of energy? It would be helpful for everyone to know the state's objectives, goals, and policies. Sometimes the most efficient policy is not the fairest.

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REPRESENTATIVE RAMRAS said, "We might try and find somebody at Citibank or Bank of America to talk about micro lending." It is a new phenomenon around the world where \$100 may be insignificant for us but people start businesses in small countries with it. It is now a commercial division of the largest banks. Ms. Fay told the committee that there are two billion people living in a world just like rural Alaska, and it is an untapped potential for the state. He referred to the Ketchikan dry dock, which has the licensing rights to the intellectual property of Lockheed Martin and the ability to replicate that effort. Alaska could use its villages with these varying types of renewable energy and create all these incubators, "and while we're solving problems of dollar kilowatts and reducing them to 20 or 30 cents, if we learned about micro lending and how that works, we really could recognize this as an export commodity for the state of Alaska that could be replicated where two billion people live."

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MS. FAY said, "As you develop energy policy...at the end of the day we are all better off in Alaska, but instead of having outsiders come and sell us things that might not work, we take it on to ourselves to make sure it works by testing it, educating our students and people within our state to become experts." Alaska will solve its problems one village at a time. Every time there is an oil spill in the world, someone from

Alaska goes and helps. The silver lining of high energy costs is building an industry.

CHAIR MCGUIRE said there is a school in Seward training students to work with wind/diesel turbines.

MS. FAY said Alaska should look at energy policy from the stand point of electricity and space heating. Transportation is a significant portion of household budgets. A policy should look at "how we provide for transit and build communities and help save families' money, and also just looking at how we build jobs and our industrial sector to make them more cost effective by also being more efficient."

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Cambridge Energy Research Associates

DAVID HOBBS, Managing Director, Cambridge Energy Research (CERA), Cambridge, Massachusetts, said noted that the strategic debate about energy in Alaska has changed from maximizing value from production into developing a long-term strategy to insure sustainable energy for residents. No strategy ever survives its first contact with reality. Alaskans need to fly to be able to get anywhere. The reason there is confidence in the pilot is that he or she has worked in a simulator and in a variety of aircraft. Alaska's energy strategy needs to come from envisioning different results and practicing responses to those situations so that when the unexpected happens, like a change in oil prices, Alaska knows how to respond without losing stride.

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MR. HOBBS said Alaska has the smarts to develop a strategy, but outsiders can help Alaska learn from other people's mistakes. Alaska needs to be seen as islands that are separated by land instead of water. Alaska should look at how the Seychelles or Hawaii has dealt with energy challenges, as well as places with cold environments. He can discuss what the components of an energy strategy are and what can be learned from others. The most important goal is inspiring all Alaskans to share a vision of where it wants to go. There are many routes to arriving at that destination. "If we can inspire a shared vision of that destination then there's a chance of achieving something that ... probably no legislature anywhere else in North America has successfully achieved."

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REPRESENTATIVE PETERSEN said setting a goal is the first thing to do. Part of that would be committing funding for projects to reach the goal. Alaska has made a commitment to renewable energy, so it has a start. The state needs to feel confident that it is heading in the right direction.

MR. HOBBS said it is easy to be daunted by the financial challenge. Napoleon said his soldiers would be better off in the shade, so he wanted to plant trees along routes. He was told the trees would take forty years to grow. His response was, "We better start planting now." Alaska needs that kind of long-term commitment. With low oil prices it may look like a deep valley to cross, but there is another side to the valley. Alaska needs to know what it will take to bridge that divide. The new team in Washington D.C. has a greater sense of strategic vision and a determination not to fall pray to the prisoner's dilemma.

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REPRESENTATIVE RAMRAS said committee members are enthusiasts of alternative energy. T. Boone Pickens believes the Midwest can be the Saudi Arabia of wind, but it can't happen without federal subsidies. Alaska is taking a buckshot approach to energy because its needs are so vast, as shown in the \$100 million for 77 projects that must be regionally balanced. It was difficult to sort out a compromise on that. The three people from CERA each represent strategy, philosophy, or business. He asked what a comprehensive energy plan will cost that is not bogged down by politics. What can CERA do for us? How does one string together all these vast opportunities in Alaska and make it work? There is a limitless energy potential. "How do we make a business out of it so that we can get it approved by Senator Stedman?"

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MR. HOBBS said there are a variety of parts to the answer. He has been asked by legislators if Alaska is unique. It is "as unique as every other unique place, and in all the same ways." CERA is in the business of ruthless research of energy. He has no illusions that when oil prices hit \$150 per barrel, it may be very good to invest in a particular type of renewable energy, but at a low price the investment looks terrible. Energy is about heat, light, and motion. The firm was founded on telling stories that allowed people to interpret the past and the future. Energy doesn't produce jobs, but the energy is used to create jobs. Everyone has their own vision, and sometimes they forget that they are working in the same direction, instead of focusing on what divides them. Any energy policy has to include

sustainable, reliable, and affordable energy. His firm helps develop the consensus.

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CHAIR MCGUIRE asked for an example of past work.

MR. HOBBS said Libya had many of the challenges of Alaska. It was an economy that was over dependent on oil and gas production, and the absence of revenues that could support the social programs generated by oil and gas made the economy a hollow vessel. Libya has a dearth of leadership. Nobody dared to put their head above the parapet and propose a course of action unless they were sure the country's leader would agree with it. His firm started by developing leadership among a professional class that had been too frightened to display it. CERA equipped them with "how other people had dealt with those challenges." His firm helped Libya begin to develop a broader industrial sector to generate economic prosperity. "We needed to get them to take a very level-headed view of what the future of oil and gas revenues would be." The firm didn't preach the future to them, but it developed three stories of the future. One story was continuing globalization, especially with demands from developing nations, and what that would mean to keep up with energy demands and what that would mean in the terms of the cost and prices of energy. The second story had globalization derailed. "We talked about a rapid rebalancing of the financial imbalances triggered by the U.S. housing crisis coupled with an increase in terrorist activity that undermined trust in global trade, and that that would lead to an economic crisis in which growth for the long term would be much slower, and we would see a collapse in oil prices ... down below \$20 per barrel." If Libya's strategy relied on the first story, and the second story came to pass, "then you'd feel awfully silly and also probably be in a desperately difficult place."

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MR. HOBBS said the third story for the future of Libya was a supply shortage pushing oil to \$150 per barrel, and how policy makers would destroy the demand for oil and gas products by investing in renewable energy and efficiency. As demand for fossil fuel decreased, "you would find the price collapse back to a level at which everyone would say we don't need renewables, we don't need efficiency, we don't need small cars, et cetera." Once his firm got Libya to buy into those stories and understand that they were all quite feasible, Libya was able to ask themselves, "How would this piece of the economy that we understand much better than you, CERA, ever can understand

because you're not Libyan?" He knows CERA will never understand Alaska as well as Alaskans, but it can provide the framework that forces Alaska to confront the hard truths of potential futures and make sure a policy will be resilient to all potential futures, rather than making a huge bet on one rather than the other.

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REPRESENTATIVE RAMRAS asked the cost for an initial scoping and model from CERA for a comprehensive program that would revolutionize the energy backbone of Alaska. The state is talking about a \$4 billion private gas pipeline and \$100 million for 77 different projects that will need \$1 billion in conduit funding in order to do them all. He doesn't know how many megawatts will be created and how much diesel will be displaced.

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MR. HOBBS said he cannot tell CERA's price now, but he can come back with the details. CERA's engagements run from "a couple of hundred thousand dollars to a couple million dollars." CERA sometimes facilitates workshops to give an entity a clear idea of the direction it wants to go, and that may be all. That would cost a "couple hundred thousand dollars."

CHAIR MCGUIRE said CERA was invited to discuss what would go into crafting an energy policy, and it wasn't asked to be prepared for terms of engagement. She asked what talent CERA has to offer to help Alaska develop an energy policy.

MR. HOBBS said he will be happy to come back with more specific terms. A tool CERA can bring is an understanding of different types of fuel and technology and the geographies where they have been applied. It will work with Alaska's talent pool. Alaska has ISER, universities, and research already being done. CERA can help provide context to keep the discussion on the right track. CERA is at its best when bringing the research it has been doing on the energy world for 25 years, and that helps facilitate the policy debate. CERA can recommend a destination, but if it is not Alaska's solution, it won't be as resilient.

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MR. HOBBS said the works starts with the realization that the course people are on will not lead them where they want to go. There are diverse views that may be worked out with a common understanding of what actually is the market landscape. CERA is doing a lot of work on coal sands in Canada, and it has brought together different entities. Just getting them to use a single

vocabulary to describe their problems has made an impact. The next step is a structured dialogue on what can be achieved. As an aside, people value electricity at a higher price than they pay for it. People won't give up electricity even at extremely high prices. People may not agree with decisions that are taken but they understand them.

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MR. HOBBS said Oman's major industrial activity was oil and gas development. It had begun to develop energy-intensive, value-added industry only to find that the commitments to export gas exceeded its own domestic demand. Oman had to decide between shutting down industry or renegeing on export contracts. CERA worked in California and found that after years of not building new plants because of environmental objectives, the inevitable consequences was that there wouldn't be enough power. India found that by not paying international rates to build power stations, the contractors decided not to build them. India thus ended up with an energy deficit. A key part of the process is identifying the stakeholders whose opinions matter in forming policy. The representatives of the oil companies were afraid to tell leadership what was going to happen because their jobs depended on the version of the future they were told. CERA's role was "to tell truth to power and make sure they understood the consequences of the decisions they had taken." CERA looked at the entire energy spectrum, including nuclear power and burning coal in an oil-producing state. CERA looked at export earnings and industrial earnings. The stakeholders were engaged throughout. The end result was that they looked at a variety of options and let them make the political decisions.

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REPRESENTATIVE RAMRAS said, "We're so hungry to do something and we need somebody to help us put together a comprehensive energy plan, so desperately. We're going in so many different directions and we're doing so with great enthusiasm, but quite clumsily." He asked for a letter addressing his questions.

MR. HOBBS said economists will say a tax is the best answer, and politicians prefer a cap and trade. The outcome will likely be a cap and trade that looks like a tax. It will have "get-outs" at the top end so it doesn't get too expensive, or credits can be added to make the availability greater. The advantage is making "energy far more location agnostic." If Alaska provides 100 percent synthetic fuel to the U.S. Air Force in Alaska it counts against its aggregate obligation, "so you effectively export production without ever actually physically moving it anywhere"

and without building a pipeline. Alaska can build the expertise and export know-how - "a way in which the logistical challenges that you face here in Alaska can be overcome to a point at which you can achieve your economic development objectives without as much hardware as otherwise you'd require."

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The committee took a brief at-ease.

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Black Lion Energae

DARRELL SMITH, Black Lion Energae and ING, Mason City, Iowa, said he has worked for ING for 23 years. Tim Tompkins invented the system that will be discussed today. Mr. Smith has seven different degrees. Today the Obama Administration has \$634 billion in tax carbon credits in its budget. It will raise the cost of fuel about 20 percent. Biofuel was specifically mentioned. He asked what biofuels meant and the Department of Energy sent him a letter that said: "We know for certain that biofuels is defined as energy derived from algae."

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MR. SMITH said Black Lion Energae is the capital arm formed to help fund Renewed World Energies (RWE), a South Carolina company that produced the first known commercially-economic algae-to-energy production facility. It developed a proprietary, fully-automated algae growing and harvesting system that produces two main energy feedstock sources: algae oil, which can be burned for fuel or converted into biodiesel, and algae cake, which is processed into synthetic gas or converted to animal feed. It is grown in an algae bioreactor, which is an incubation unit developed by Richard Armstrong and Tim Tompkins. The two have built \$7 billion worth of pulp paper and energy for B.F. Goodrich, Duke Power, G.E. and others. Why algae and why now? Biodiesel and coal are in big trouble. In rural Alaska, energy costs are the highest in the country. About 80 percent of all biodiesel production in the U.S. is idle due to soy oil feed stock costs. Coal can't expand due to greenhouse gas emissions.

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MR. SMITH said he visited with [Alaska Village Electric Cooperative] this week. The cost of a kilowatt is \$00.127 in Anchorage and \$00.51 in the villages. RWE is growing algae, which produces oil and cake. The oil is extracted from the cake. The algae are fed with CO2 and NOx [nitrogen oxide]. Oil is produced at \$00.85 per gallon. Cake is converted into synthetic

gas to provide cheap energy at \$00.025 per kilowatt hour or sold as animal feed. The reason the biodiesel industry is going under in the Midwest is due to high soy oil feedstock costs. Algae can consume all the CO2 and NOx produced by coal. Power companies spend \$22.00 per ton of coal just to get rid of NOx. Algae are a plant that offers massive growth and an energy solution. The mass of algae is 35 to 80 percent oil. There are over 100,000 different strains of algae. It helps clean up diesel and can seasonally reduce CO2 and NOx emissions by sequestering the gases from diesel generators. Algae will supplement diesel reducing the average cost per kilowatt hour. It can provide community jobs and reduce energy subsidies. Dried algae biomass can be stored and burned as needed. Installation costs are affordable. The bioreactor provides low-cost energy, and installation is affordable. "Operation costs doesn't require a PhD." Nothing is harmed if it is spilled.

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MR. SMITH said algae consume wastes while growing. "Both human and animal waste can be made to operate in all weather types." He showed a picture of the bioreactor. It is fully integrated with diesel for minimal costs. It is self sustaining. "You can put this system down anywhere at any particular location and the low quality oil produced by the system is used to operate the system and provide electricity." It is a closed system with full automation. It uses super-strains, which are modified algae, and 98 percent of the oil is extracted. Universities are partnering with RWE. South Carolina Power and South Carolina Gas and Electric is the largest power production company in the state and is offering its free CO2. The state of South Carolina has partnered with RWE and is offering \$13 million in tax credits and to pay for all worker training. The state is providing 250,000 acres at \$25 per acre to grow the algae. The system was validated by Applied Research Associates, one of the nation's foremost grant-writing firms that work with the Department of Defense for system weapons and energy production. "They looked at all algae systems nationwide; they came away saying that this particular system would solve our energy problems."

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MR. SMITH said there is a proposed tax on CO2 emissions and algae will eat CO2. Coal plants are being voted down because of the gas exchange problem, but algae will consume the CO2 and NOx. A typical million-ton coal plant will spend \$30 million a year sequestering NOx. Sequestering CO2 will cost from \$2 to \$70 per ton for coal. Algae convert the CO2 into harmless organic carbons. "Gas sequestration provides an environmentally safe

expansion of coal mining and the petroleum industries in Alaska," including the Pebble gold mine. Algae consume the nasty elements associated with mining.

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MR. SMITH said there are two models for CO2 in the world, the European Union model where each country gets an allotted amount of CO2 emissions, and if those are exceeded carbon credits must be purchased or there will be heavy fines. The U.S. model is voluntary. All emissions are reported. If the new budget comes through there will be "CO2 issues." There are not enough carbon credits relative to demand in Europe. In the U.S. the carbon-trading market is \$2 a ton for CO2, and in Europe it is \$19 per ton. Algae produce 38,500 gallons of oil per acre at \$00.85 per gallon. It also produces 285 tons of cake. It consumes 10,000 tons of CO2. At \$2 per ton, one acre of CO2-consuming algae is worth \$20,000. If it is trading at \$19 per ton, one acre is worth \$190,000. With one acre of soy, "you're lucky to get a net profit of \$1,000." Algae consume 50 tons of NOx per acre. Gasification of both oil and cake will provide for the storage of energy in Alaska. It can be used as needed. "We are making a proposal with the Department of Energy for the state of Alaska."

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MR. SMITH said the company has a relationship with Applied Research Associates, and both are filing a grant with the department. The Applied Research Associates are bringing in the partners. The largest power company in the Midwest met with his company over the last several months. The power company was skeptical, but at the end of the meeting it wanted to know when it could get started. One ton of coal will produce 3 million tons of carbon. There is no other solution.

CHAIR MCGUIRE asked if the grant is under the new stimulus package - the competitive grants.

MR. SMITH said yes.

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REPRESENTATIVE PETERSEN asked how this can benefit small Alaska communities.

MR. SMITH said his objective is simple. "We plan to plunk these units down into individual communities." The units don't need an outside source of energy to operate, because the energy is created by the unit. The oil and cake are gasified. Ms. Holdmann said the gasification industry isn't "there yet," but he is

working with gasification firms from Scotland to Texas that have solved many gasification problems. The units will produce kilowatt hours at substantially lower costs than the villages are paying. He is not asking Alaska for money. He has met with Alaska's largest shipping and handling management company. A development corporation will help. He met with John Harpole, who is the state's foremost authority on diesel integration. He has put together a good team, "and we're going to approach the DOE on your behalf."

CHAIR MCGUIRE invited him to continue to share his progress on getting the competitive grant money.

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The meeting was adjourned at 4:57 p.m.