

Summary of Proceedings from the panel discussion at the
**Northern Energy Science
& Technology Fair**

A Week of the Arctic Presentation



Hosted by the Institute of the North's Arctic Energy Network, the Northern Energy Science & Technology Fair brought together leading northern energy experts to share the science and technology behind developing renewable and extractive energy resources, meeting community energy needs with local input, and responding to the unique challenges energy projects in the Arctic often present. Attendees learned about advances in energy development, emerging technologies, research, and unique collaborations in northern environments and were then treated to an energy science fair featuring interactive new and innovative energy technology projects.

Summaries of key points presented during the luncheon panel are summarized on the reverse side; presentation slides and video available at www.institutenorth.org/woa. Special thanks goes to speakers, to moderator Dr. Mark Myers (UAF), to science fair exhibitors and to Shell Alaska for sponsoring the day. Other sponsors included Alaska Center for Energy and Power, Alaska Housing Finance Corporation, Coffman Engineers, Fugro and Statoil.

The luncheon panel was moderated by Dr. Mark Myers, Vice Chancellor for Research, University of Alaska Fairbanks. A unique blend of energy experts addressed a suite of challenges and solutions:

- Meera Kohler, CEO, Alaska Village Electric Cooperative
- Mike Malvick, Senior Flow Assurance Advisor, Alyeska Pipeline Service Company
- Gwen Holdmann, Director, Alaska Center for Energy and Power
- Joe Balash, Deputy Commissioner, Alaska Department of Natural Resources

Meera Kohler stated the challenge clearly by indicating that nearly 80% of rural communities are dependent on diesel fuel for their primary energy needs. The poorest Alaska households spend up to 47% of their income on energy, more than five times what is paid by their urban neighbors. In addition, the costs of transportation and infrastructure in rural Alaska are extreme, and warming trends are affecting the expanse and depth of permafrost.

One high profile solution under consideration is high voltage direct current (HVDC) powered by stranded natural gas deposits on the North Slope. Electric heat as a viable energy source is an idea that was mothballed when electric costs were high, but the ever-rising cost of diesel fuel has sparked new interest.

At Alyeska Pipeline Service Company, technology is being used to address the effects of decreasing amounts of oil transported through the Trans-Alaska Pipeline System (TAPS). Although the quantity comprises 11% of the nation's domestic oil production, the annual average throughput has declined to only 500,000 bbl per day. Longer transit times create lower temperatures and flow rates leading to lower volume and the opportunity for ice build-up in the pipeline, which can cause corrosion. Increased wax deposition and precipitation require additional pipe inspection and more frequent use of a scraper pig.

In the face of these complications, Alyeska is running studies to verify the effects of mitigation efforts addressing lower flow rates; tests on technologies such as crude oil heating, enhanced insulation, regular pigging, and wax crystal modifiers.

The Alaska Center for Energy and Power (ACEP) has defined the Alaska energy 'niche' to include high energy costs, a fragmented distribution grid, harsh climate, stranded resources, a location at the end of supply lines, and a dispersed population. Based at the University of Alaska Fairbanks, ACEP blends talent from within the University of Alaska system to produce energy information for decision-makers, to produce students with experience in energy related disciplines, to perform energy testing and analysis, and to develop intellectual property with Alaska applications.

Current work demonstrates some of the challenges ACEP is addressing: a hybrid applications laboratory for real-world simulation; development of a device to divert surface debris from an in-river hydro installation; and technology analysis for Alaska and beyond, including modular reactors, heat pumps, small HVDC, and stranded renewables.

Deputy Commissioner Joe Balash (SOA DNR) illustrated how Alaskans are applying science and technology to the challenges inherent in the exploration and development of oil and gas in the remote areas and sensitive habitat of Alaska.

Where wires have limited seismic information and 3D applications, the recent advent of wireless sounding nodes has reduced the number of dry holes and cut costs significantly. With climate change and a minimal impact philosophy reducing access and the use of ice roads, the state is exploring other transportation modes to move freight in winter months. Extended reach drilling was pioneered in Alaska and, paired with hydraulic fracturing, will be used to help access nontraditional resources while dramatically improving the number of wells that can fit on ever-smaller drill pads. Production facilities have improved emissions by achieving efficiencies and the remediation and restoration of existing sites are creating opportunities for innovative approaches; e.g., Cook Inlet platforms may be used for tidal power if structural integrity has been maintained.

Coming from the private, public and academic sectors to address issues of rural energy, oil and gas development, and research possibilities, the speakers illustrated how Alaskans continue to innovate in the face of challenges inherent to this remote and often harsh environment.

