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# INTRODUCTION

## Welcome to the Arctic Energy Summit's Technology Conference:

*The Arctic as an emerging energy province!*

For the next four days, experts from nations around the Far North, along with those from the United Kingdom, Japan, South Korea and other nations, will discuss, debate and collaborate on energy challenges and opportunities in the extractive and renewable fields, as well as tackling how to provide affordable energy to the Arctic remote communities.

As one of the 228 approved International Polar Year projects, the Arctic Energy Summit Technology Conference is sanctioned by the eight-nation Arctic Council, sponsored by the U.S. State Department and organized by the Anchorage-based Institute of the North. Founded by former U.S. Secretary of the Interior and twice governor of Alaska, Walter J. Hickel, the institute has worked on Arctic Council issues for the past seven years, including efforts to increase the infrastructure within the Arctic region to promote sustainable development. Related to that work, the institute will be awarding the Robert O. Anderson Sustainable Arctic Award during Wednesday night's summit banquet at the Hotel Captain Cook.

The Arctic is home to more than 25% of the planet's potentially undiscovered reserves of oil and natural gas. Yet much of the Arctic region is remote, sparsely populated with extreme temperatures along with fragile terrestrial and aquatic ecosystems. Any discussion of the Arctic and the polar regions would be remiss if there was no consideration of the extensive oil and gas development occurring in Alaska, the Russia Far East and Siberia, Canada and the Barents Sea, as well as the need for affordable energy in the remote rural areas within these regions. In addition, there appear to be many unique renewable energy resources within the Arctic, many of which are untapped.

We hope there will be many positive outcomes of this gathering, but one of the most promising is the creation of an Arctic Energy Summit Action Team. During the remainder of the IPY, a group of energy experts convened at this conference will tackle developing a roadmap for the enhancement of extractive energy recovery in the Arctic, the expanded use of renewable and hybrid energy sources, and the deployment of economical and environmentally sensitive energy sources to rural Arctic communities.

It is envisaged that the group will be comprised of technolo-



The Arctic Energy Summit's Technology Conference is being held in Anchorage, Alaska.

gists, producers, investors, economists, consumers, landowners and government officials. In addition, it is expected that experts in the fields of transportation, supply, security and climate change will join the team. The group's work, including recommendations, potential demonstration projects and more, will be submitted to the Arctic Council for consideration at the Norwegian Ministerial meeting in early 2009.

The institute hopes to further develop the bilingual (English/Russian) Arctic energy website, [www.arcticenergysummit.org](http://www.arcticenergysummit.org). Provided additional funding is secured, future educational outreach components may include university research grants, creating a curriculum for university level Arctic energy courses, and the development of a web-based, interactive Arctic energy atlas profiling extractive and renewable energy potential and resource development.

The summit supports the IPY aim of utilizing the intellectual resources and scientific assets of Arctic nations to make major advances in polar knowledge and understanding, creating a legacy of new or enhanced observational systems, facilities and infrastructure. The most important legacies will be a new generation of polar scientists and engineers, as well as an exceptional level of interest and participation from polar residents, students, the general public and decision-makers worldwide.

Once again, welcome. We wish your stay in Anchorage to be inspiring, productive, educational and most enjoyable.

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2008







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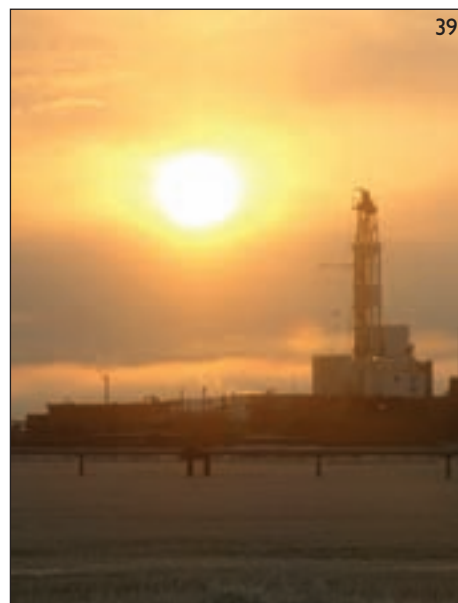
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The Arctic Energy Summit  
Technology Conference

*Released October 2007  
Brought to you by the Institute of the  
North in conjunction with  
Petroleum News*

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*Cover photo by Chris Arend.*

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*Printed by Camai Printing,*

*Anchorage, Alaska*



## DISPELLING THE ALASKA FEAR FACTOR

This is an annual comprehensive guide to Alaska's oil and gas basins and business environment. The purpose of the guide is to give potential oil and gas investors the information they need to make investment decisions — or point to where they can find the information.

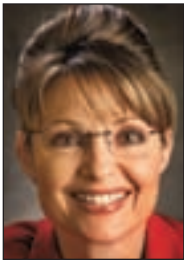
The 17 chapters include everything from securing leases to permitting to Alaska service company profiles. A chapter analyzing efforts made to reduce the 'fear factors' that underlie the belief you can find lots of oil in Alaska but you can't make money in the state spawned the guide's title, *Dispelling the Alaska Fear Factor*.

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# SPEAKERS



Alaska Governor  
Sarah Palin

Sarah Palin was elected Governor of Alaska in 2006. Under the governor's leadership this spring, the State Legislature passed the Alaska Gasline Inducement Act. In explaining AGIA, the governor has said: "Our plan focuses on what's best for Alaskans: beginning with an open and transparent process, followed through with absolute must-haves for Alaskans and a strong commitment to low tariffs, while maintaining focus on becoming a viable and significant player in the nation's energy plan."

She has served as chairman of Alaska's Oil and Gas Conservation Commission, as well as on the Interstate Oil and Gas Compact Commission.



U.S. Senator Lisa  
Murkowski

U.S. Senator Lisa Murkowski is the first Alaskan born Senator to serve the State. A member of the Senate Energy and Natural Resources Committee, Senator Murkowski is the ranking member on the Energy Subcommittee. She also serves on the Senate Foreign Relations committee where she is ranking member for the subcommittee on East Asian and Pacific Affairs. Additionally, she is a member of the Indian Affairs Committee and the Senate Health, Education, Labor and Pensions Committee. She has stated that "our energy policy in the United States must continue to be aggressive in promoting new energy development, conservation and efficiency."



Assistant Secretary  
of State Dan Sullivan

Dan Sullivan is the Assistant Secretary of State for the Bureau of Economic, Energy and Business Affairs. He previously was a member of the National Security Council/National Economic Council staff at the White House where he served as a Director and Acting Senior Director in the International Economics Directorate.

In his conformation statement before the U.S. Senate Foreign Relations Committee, Sullivan pledged to continue the focus on seven key initiatives including "promoting U.S. and global energy security by working with partner countries and seeking to diversify energy resources."



Andrew Revkin  
New York Times

In an illustrated presentation and live web video "visit," Andrew Revkin, of The New York Times, will attempt to demystify global and Arctic warming, cutting through the overheated rhetoric of catastrophe and hoax that has permeated recent environmental debates. In three Arctic trips since 2003 -- to the North Slope, Greenland and the North Pole -- he has deeply probed the science pointing to big environmental changes and evidence of a human contribution. Revkin also will discuss findings from a prize-winning series and documentary he spearheaded showing how companies and countries were already looking for opportunities amid the ice retreat.



U.S. Senator Ted  
Stevens

U.S. Senator Ted Stevens is the senior member of Alaska's congressional delegation, the senior Republican in the U.S. Senate, and the longest-serving Senator in the history of the Republican Party. He serves as the Senate's President Pro Tempore Emeritus; Vice Chairman of the Committee on Commerce, Science, and Transportation; Co-Chairman of the Defense Appropriations Subcommittee; and Ranking Member of the Disaster Recovery Homeland Security and Governmental Affairs subcommittee.

"It is obvious our (energy) production is declining every year, in terms of domestic production," Stevens said. "I feel that we need to replace that, but we cannot do that until we demonstrate that we are willing to go into the concept of using alternative fuels and technologies."



Julian Evans, British  
Consul General, San  
Francisco



Betsy Spomer, Senior  
VP, BG North America



Margaret McCuaig-  
Johnston, Asst. Dep.  
Minister, Natural  
Resources Canada



Bud Fackrell Senior  
VP BP Alaska



George Cannelos  
Federal Co-Chair  
Denali Commission



Patricia Cochran,  
Chair, Inupiat  
Circumpolar Council



Alexander Karsner,  
Asst. Secretary, US  
Dept. of Energy

# AGENDA MONDAY

08:00 – 09:00	Registration	14:30-15:00	Patricia Cochran Chair, Inuit Circumpolar Council Chair, Indigenous Peoples Secretariat
09:00 – 09:30	Opening Ceremony and Introductory Comments Honorable Walter J. Hickel	15:00-15:30	Honourable Julian Evans British Consul General
09:30 – 09:55	Welcome – Alaska Governor Sarah Palin	15:30-16:00	BREAK
09:55 – 10:20	Welcome – U.S. Senator Lisa Murkowski	16:00-16:30	Margaret McCuaig-Johnston Assistant Deputy Minister for Energy Technology and Programs Sector Natural Resources Canada
10:20 – 10:30	Daniel Sullivan Assistant Secretary, Bureau of Economic, Energy and Business Affairs U.S. Department of State	16:30-17:00	Bud Fackrell Senior Vice President BP Exploration, Alaska
10:30 - 11:00	BREAK	17:00-17:30	James Hemsath Senior Fellow – Energy Institute of the North
11:00-11:30	Dr. Evgeny Velikhov President Kurchatov Institute	19:00-21:00	Opening Banquet Anchorage Marriot Hotel
11:30-12:00	Alexander Karsner Assistant Secretary for Energy Efficiency and Renewable Energy U.S. Department of Energy		
12:00-14:00	Lunch Keynote Speaker Andrew Revkin New York (interactive video presentation)		
14:00-14:30	Honourable Ólafur Ragnar Grímsson President of Iceland		



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# TECHNICAL PRESENTATIONS

Technical presentations will be held on Tuesday, Oct. 16 and Wednesday, Oct. 17.  
Information on presentation times and room locations will be made available during the conference.

## Extractive Energy in the Arctic (EXT)

### Identification, Development and Deployment

Oil, Coal, Gas, Methane gas hydrates  
Natural gas from coal seams  
GTL and syngas from coal and gas  
Transportation  
Climate change, oil spill technologies

## Sustainability of Energy in the Arctic (SUS)

### Responsible Development in Northern Regions

Social impacts Economics  
Regulatory obstacles and opportunities  
Management systems  
Energy security in the Arctic  
Environment

## Renewable Energy in the Arctic (REN)

### Alternative Solutions for Arctic Energy

Wind, wind/diesel, wind/hydrogen  
Transmission and transportation systems  
Hydro, in-river, tidal  
Geothermal, solar  
Fuel cells, biomass

## Rural Energy in the Arctic (RUR)

### Alternative Solutions for Rural Power

Propane, GTL, rural coal bed methane  
Arctic energy audits, energy efficiency  
Availability/need  
Implementation  
Distribution systems  
Case studies

Paper #	Title	First Name	Last Name	Affiliation	Country	Categories	Sub Category
EXT-01	Arctic Oil and Gas Activities: Effects and Potential Effects	Dennis	Thurston	MMS	United States of America	Extractive	Oil and Gas
EXT-02	Global and Alaskan Oil Demand and Supply Program of centralized power supply in the Khanty-Mansiysk	William	Sackinger	EnergieforschungStiftung	United States of America	Extractive	Oil and Gas
EXT-03	Autonomous Okrug-Ugra Exploration Results in the Arctic Islands	Alexander	Semenov	Khanty-Masiysk	Russia	Rural	Power
EXT-04	Hydrocarbon Systems, Basin Analyses, and 2006 Field and Subsurface Data: Bristol Bay, Alaska Peninsula, Frontier Basin	Robert	Meneley		Canada	Extractive	Oil and Gas
EXT-05		Rocky	Reifenstuhl	Division of Geological & Geophysical Surveys	United States of America	Extractive	Oil and Gas

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From left, Tim Wood, Steve Stuart, & Owen Boyle

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# TECHNICAL PRESENTATIONS

Paper #	Title	First Name	Last Name	Affiliation	Country	Categories	Sub Category
EXT-06	U.S. Geological Survey Circum-Arctic Resource Appraisal	Brenda	Pierce	United States Geological Survey	United States of America	Extractive	Oil and Gas
EXT-07	Low-sulfur Coals of Arctic Alaska: A Vast Undeveloped Energy Resource	James	Clough	Alaska Div. of Geological & Geophysical Surveys	United States of America	Extractive	Coal
EXT-08	Creation of Technology for Utilization and Recovery of Coal Seam Methane	Lev	Puckov	Moscow State Mining University	Russia	Extractive	Methane Hydrates
EXT-09	Characterization and Quantification of the Methane Hydrate Resource Potential Associated with the Barrow Gas Fields	Tom	Walsh	PRA	United States of America	Extractive	Methane Hydrates
EXT-10	Experimental investigation of the possibility of relict gas hydrates formation in frozen sediments	Evgeny	Chuvilin	Faculty of Geology, Moscow State University	Russia	Extractive	Methane Hydrates
EXT-11	Development of Methods for Hydrate Fields Exploitation	K.S.	Basniev		Russia	Extractive	Methane Hydrates
EXT-12	What if High North Energy Exploitation Fails? An Analysis of What Can Go Wrong	Jan	Soernes	Bodø University	Norway	Extractive	Oil and Gas
EXT-13	Arctic Gas Hydrate Energy Assessment Studies	Timothy	Collett	US Geological Survey	United States of America	Extractive	Methane Hydrates
EXT-14	Canada's Unconventional Gas Program	Leah	Dell	Natural Resources Canada	Canada	Extractive	Methane Hydrates
EXT-15	Preliminary results from the 2007 Wainwright, Alaska CBNG drilling and testing program	Art	Clark	United States Government	United States of America	Extractive	Methane Hydrates
EXT-16	Future Marine Transportaion of Arctic Energy Resources	Lawson	Brigham	US Arctic Research Commission	United States of America	Extractive	Shipping

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Paper #	Title	First Name	Last Name	Affiliation	Country	Categories	Sub Category
EXT-17	Oil Spill management in ice conditions in the Baltic Sea.	Bjorn	Forsman	SSPA, AB	Sweden	Extractive	Environment
EXT-18	Oil Shipments in the Barents Region	Bjorn	Frantzen	Akvaplan-niva	Norway	Extractive	Shipping
EXT-19	Impact of High Volatile Content Alaska Coal Grind Size on Combustion in Pulverised Coal Power Plants	Rajive	Ganglia	UAF	United States of America	Extractive	Coal
EXT-20	Alaska Gas Hydrate Research and Stratigraphic Test Preliminary Results	Robert	Hunter	ASRC Energy Services	United States of America	Extractive	Methane Hydrates
EXT-21	Training for Sustainability Life Cycles in Safety Instrumented Systems: Building towards Common Commitments in Arctic Alaska Oil and Gas	John	Metzler	Eagre Associates LLC	United States of America	Extractive	Oil and Gas
EXT-22	Experience of Mastering the Oil and Gas Potential in the Khanty-Mansiysk Autonomous Okrug; The Regions Practice in Social and Economic Development of Northern Indigenous People	Veniamin	Panov	Khanty-Masiysk	United States of America	Extractive	Sustainability
EXT-23	Exploration Potential for Natural Gas in Cook Inlet and the Brooks Range Foothills of Alaska	Robert	Swenson	Alaska Div. of Geological & Geophysical Surveys	United States of America	Extractive	Oil and Gas
EXT-24	Arctic escape, evacuation, and rescue	Frank	Bercha	Bercha Group	Canada	Extractive	Shipping
REN-01	Geothermal Potential in the Arctic	Ragnar	Baldursson		Iceland	Renewable	Geothermal
REN-02	Overview of Geothermal Prospects in Alaska	David	Lockard	Alaska Energy Authority	United States of America	Renewable	Geothermal
REN-03	An Integrated Geoscience Investigation and Geothermal	Gwen	Holdmann	Chena Hot Springs Resort	United States of America	Renewable	Geothermal



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Paper #	Title	First Name	Last Name	Affiliation	Country	Categories	Sub Category
REN-04	Exploration of Chena Hot Springs as a model for Other Alaska Geothermal Sites Renewable Energy Development in the Aleutian Pribilof Islands	Connie	Fredenberg	Aleutian Pribilof Islands Association	United States of America	Renewable	Wind
REN-05	Economic impacts of climate variability in the Arctic: the case of hydropower	Jessica	Cherry	University of Alaska Fairbanks	United States of America	Renewable	Hydro
REN-06	Fire Island and Renewable Energy for Alaska	Steve	Gilbert	enXco Development Corp	United States of America	Renewable	Wind
REN-07	Fish Oil as an Alternative Fuel for Conventional Combustors	Jinsheng	Wang	Natural Resources Canada	Canada	Renewable	Biomass
REN-08	Cold Climate Problems of a Micro-Hydroelectric Development on Crow Creek, Alaska	Brian	Yanity	University of Alaska Anchorage	United States of America	Renewable	Hydro
REN-09	Relevance of Hydrogen Technology for the development of stablr energy grids in small communities in the Arctic	Ragnar	Baldursson		Iceland	Renewable	Hydrogen
REN-10	Feasibility Analysis of Deploying Photovoltaic Array in a Remote Arctic Community	Ashish	Agrawal	Aiken Global Group, LLC	United States of America	Renewable	Solar
REN-11	Renewable Energy and Waste Heat Utilization for Greenhouse Production in Rural Communities, Using Chena Hot Springs As a Local Model	Gwen	Holdmann	Chena Hot Springs Resort	United States of America	Renewable	Waste Heat
REN-12	Status of Wind/Diesel Applications in Artic Climates	Edward	Baring-Gould	National Renewable Energy Laboratory	United States of America	Renewable	Wind
REN-13	Foundation Design of Wind Towers in Southwestern Alaska	Lorie	Dilley	Hattenburg Dilley & Linnell	United States of America	Renewable	Wind



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Paper #	Title	First Name	Last Name	Affiliation	Country	Categories	Sub Category
REN-14	<b>Renewable Energy and Energy Planning in NW Alaska</b>	Brad	Reeve	Kotzebue Electric Association	United States of America	Renewable	Power
REN-15	Impacts of RETScreen in Canadian Northern and Remote Communities	Ron	Alward	Natural Resources Canada	Canada	Renewable	Planning
REN-16	<b>Tidal Energy Projects in Alaska</b>	Christopher	Sauer	Ocean Renewable Power Company	United States of America	Renewable	Hydro
REN-17	Snow Cooling - Renewable Energy for Large Parts of the World Climate and Renewable Energy in Nordic Countries	Kjell	Skogsberg	Snowpower AB	Sweden	Renewable	Sustainability
REN-18	The VRB Flow Battery for Load Leveling for Wind Systems	Arni	Snorrason	National Energy Authority	Iceland	Renewable	Climate
REN-19	Power Engineering of Russia's North-East	Dennis	Witmer	University of Alaska Fairbanks	United States of America	Renewable	Wind
RUR-01	An Integrated village energy analysis model allowing for comparison of different supply options with respect to the total energy demands of a small community	Alexander	Antonenko	Sakha Republic	Russia	Rural	Power
RUR-02	Renewable Power in Rural Alaska: Improved Opportunities for Economic Deployment	Steve	Colt	ISER	United States of America	Rural	Power
RUR-03	A Systems Dynamic Approach to Model a Multimodal Energy System in Rural Arctic Communities	Peter	Crimp	Alaska Energy Authority	United States of America	Rural	Power
RUR-04		James	Hemsath	IntegrityOne, LLC	United States of America	Rural	Power
RUR-05	Interhemispheric Tunnel & Rail Group Proposal	George	Koumal	Interhemispheric Bering Strait Tunnel & Rail Group, Inc.	United States of America	Rural	Power
	Experimental Study of Heat Recovery from Diesel Exhaust for						



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Paper #	Title	First Name	Last Name	Affiliation	Country	Categories	Sub Category
RUR-06	Alaskan Village Diesel Generators Load and Temperature Profiling for Improvements in Efficiency and Operational Lifetime of Diesel Electric Generators in Alaska	Chuen-Sen	Lin	University of Alaska fairbanks	United States of America	Rural	Waste Heat
RUR-07	Rural Villages Wind-Diesel Systems for Isolated Arctic Communities	Richard	Wies	University of Alaska Fairbanks	United States of America	Rural	Power
RUR-08	Hybrid Micro Energy Project (HMEP) – A comprehensive year-round approach to powering the Arctic	Jesse	Stowell	Northern Power	United States of America	Rural	Wind
RUR-09	Pre-payment Utility Meters - Encouraging Greater Conservation and Efficiency in Rural Alaska Villages	John	Davies	Cold Climate Housing Research Center (CCHRC)	United States of America	Rural	Power
RUR-10	PolarPower.Org – Sharing knowledge about power systems for polar regions	Michael	Brubaker	Aleutian Pribilof Islands Association, Inc.	United States of America	Rural	Power
RUR-10	Advanced Residential Energy Technologies for Harsh Northern Climate	Roy	Stehle	SRI International	United States of America	Rural	Power
RUR-11		Evgueniy	Entchev	CANMET	Canada	Rural	Alternative




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# TECHNICAL PRESENTATIONS

Paper #	Title	First Name	Last Name	Affiliation	Country	Categories	Sub Category
RUR-12	Life Cycle Cost, Efficiency and Environmental Impact Analysis for Integrating Renewable Energy Sources into Standalone Village Power Systems in Remote Arctic Climates	Richard	Wies	University of Alaska Fairbanks	United States of America	Rural	Power
RUR-13	The Aurora Ice Museum Absorption Refrigeration System: An Example of Using Absorption Chilling To Reduce Refrigeration Expenses In High Energy Cost Communities	Gwen	Holdmann	Chena Hot Springs Resort	United States of America	Rural	Geothermal
RUR-14	Economic Wind Power Development in Rural Alaska	Martina	Dabo	State of Alaska	United States of America	Rural	Wind
RUR-15	NorthWind100: The 100 kW Arctic Wind Turbine The Optimization of local Generation Unit's Fuel Balance in Sakha Republic of Russia	Brett	Pingree	Distributed Energy Systems	United States of America	Rural	Wind
RUR-16	Ivotuk: An Autonomous Power and Communications System on Alaska's North Slope	Konstantin	Ilkovsky	JSC Yakutskenergo	Russia	Rural	Power
RUR-18	Alaska Military's Arctic Energy Challenges at Remote Sites	Tracy	Dahl	VECO Polar Resources	United States of America	Rural	Power
RUR-19		David	Fosbrook	US Army Corps of Engineers	United States of America	Rural	Power

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# TECHNICAL PRESENTATIONS

Paper #	Title	First Name	Last Name	Affiliation	Country	Categories	Sub Category
RUR-20	An Amalgamated Approach to Rural Generation: A Case Study in Sustainability	Jay	Hermanson	NanaPacific	United States of America	Rural	Sustainability
RUR-21	Energy in Community Planning	Brent	Petrie	Alaska Village Electric Cooperative	United States of America	Rural	Power
RUR-22	Alaska/British Columbia Intertie	Jim	Strandberg	Alaska Energy Authority	United States of America	Rural	Power
RUR-23	Approach for Wood Energy in Alaska Rural Villages	William	Wall	Alaska Village Initiatives	United States of America	Rural	Sustainability
RUR-24	Energy Alternatives in the Yukon River Watershed	Jon	Waterhous	Yukon River Inter-Tribal Watershed Council	United States of America	Rural	Sustainability
RUR-25	Fuel Cells and Hydrogen for Rural Alaska: A Reality Check	Dennis	Witmer	University of Alaska Fairbanks	United States of America	Rural	Power
SUS-01	"Above-Ground" Issues Affecting Energy Development in the Arctic	Rachel	Halpern	US Department of Commerce	United States of America	Sustainability	Policy
SUS-02	Defining "Energy Security" in the Arctic Context in a Sustainable Development World	Peter	Sharp	Government of Caanda	Canada	Sustainability	Security
SUS-03	Norways Experience with Developing a Holistic Management Plan for its Arctic Waters and Implementing Integrated Oceans Management and Ecosystem Approach	Robert	Kvile		Norway	Sustainability	Environment
SUS-04	Energy Education for Secondary Schools	Kevin	Holthaus	Atheneum School	United States of America	Sustainability	Education
SUS-05	Education and Outreach Activities through the Black Sea and the Caspian Sea International Environmental Information Center	Marion (Kay)	Thompson	U.S. Department of Energy	United States of America	Sustainability	Competency
SUS-06	Sustainable development principles in training of oil and gas specialist for Arctic region. Russian view and experience	Valeri	Salygin	International Institute of Energy Policy and Diplomacy of MGIMO-University of Ministry of Foreign Af	Russia	Sustainability	Competency
SUS-07	Aerospace Information Management	Anatoli	Bourmistrov	Bodoe University College	Norway	Sustainability	Management
SUS-08	Arctic Energy and Cumulative Effects: Growing Demands	Anne	Southam	URS Corporation	United States of America	Sustainability	Environment



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Paper #	Title	First Name	Last Name	Affiliation	Country	Categories	Sub Category
SUS-09	Environmental Issues in the Arctic Oil spill response in cold and ice conditions, experiences and developments in Baltic Sea States	William	Stillings	Owner - World Environmental Service Tech LLC [WEST]	United States of America	Sustainability	Environment
SUS-10	Extending Oil Spill Occurrence Rates from the Gulf of Mexico to the Beaufort and Chukchi Seas	Kari	Lampela	Finnish Environment Institute	Finland	Sustainability	Environment
SUS-11	Promoting Sustainable Oil and Gas Development in Alaska's Arctic Seas through the Local-Scale Integration of Geophysical and Traditional Knowledge Ecosystem Habitat Mapping Studies: Preparing for Renewed Hydrocarbon Development in the Canadian Beaufort Sea	Ted	Eschenbach	TGE Consulting	United States of America	Sustainability	Environment
SUS-12	Energy and Water Saving Techniques Identified at Fort Wainwright, Alaska	Matthew	Druckenmiller	Geophysical Institute / University of Alaska Fairbanks	United States of America	Sustainability	People
SUS-13	Climate Change Mitigation Possibilities in the Energy Sector: an Arctic Perspective	Donald	Cobb	Fisheries and Oceans Canada	Canada	Sustainability	Environment
SUS-14	Climate monitoring in the Arctic: benefits for science and industry	Ashish	Agrawal	Aiken Global Group, LLC	United States of America	Sustainability	Conservation
SUS-15	Analysis of Disturbance to Vegetation and Changes in Active Layer Depths Resulting from Different Ice Road Construction Methods	Maria	Pettersson	Luleå University of Technology	Sweden	Sustainability	Climate
SUS-16	Estimating the Value of Alaska Public Infrastructure at Risk to Climate Change	Jessica	Cherry	University of Alaska Fairbanks	United States of America	Sustainability	Climate
SUS-17	Energy Development in the Arctic: A Fine Balance?	Laurence	Byrne		United States of America	Sustainability	Environment
SUS-18		Peter	Larsen	University of Alaska Anchorage	United States of America	Sustainability	Climate
SUS-19		Gabrielle	Slowey	York University	Canada	Sustainability	People



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# TECHNICAL PRESENTATIONS

Paper #	Title	First Name	Last Name	Affiliation	Country	Categories	Sub Category
SUS-20	Social Impacts of Energy Sustainability in Kivalina	Jon	Issaacs	URS Corporation	United States of America	Sustainability	People
SUS-21	Community Energy Planning in NWT	Aleta	Fowler	Indian & Northern Affairs Canada	Canada	Sustainability	Planning
SUS-22	The Nordic network for sustainable energy systems in isolated locations	David	Pointing	Risoe National Laboratory	Denmark	Sustainability	Planning
SUS-23	A Toolkit for Community Energy Planning in Northern Canadian Communities	Andrew	Robinson	Arctic Energy Alliance	Canada	Sustainability	Planning
SUS-24	A Review of the Sustainable Design Approach for the South Pole Station Modernization Project	Steven	Theno	PDC Engineers	United States of America	Sustainability	Power
SUS-25	Inupiat Traditional Knowledge and Energy Development Decisions	Taylor	Brelsford	URS Corporation	United States of America	Sustainability	People
SUS-26	Impact and Benefits Agreement : A Russian-Canadian Comparison	Doris	Dreyer	Arctic Athabaskan Council	Canada	Sustainability	People
SUS-27	Arctic Soils Monitoring, Oil Spill Bioremediation, Remote Sensing Technologies: Fruits of International Collaborations	Heather	Fernuik	US Civilian Research & Development Foundation	United States of America	Sustainability	Environment
SUS-28	A Review of the Diesel-Engine Generator Exhaust Design Approach for the South Pole Station Power Plant	Steven	Theno	PDC Engineers	United States of America	Sustainability	Power

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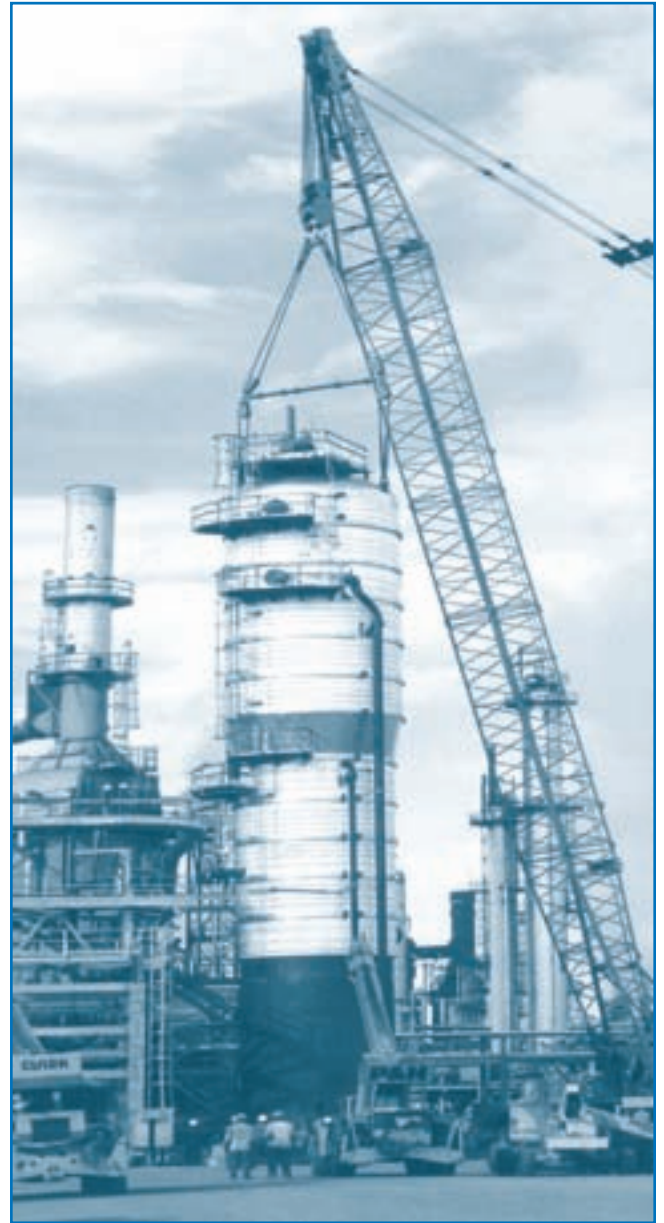
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# AGENDA THURSDAY

- 08:00-08:30** Mead Treadwell  
Chair  
U.S. Arctic Research Commission
- 8:30-09:00** George Cannnelos  
Co-chair  
Denali Commission
- 9:00-10:00** Keynote Address  
U.S. Senator Ted Stevens
- 10:00-10:30** Betsy Spomer  
Senior Vice President – Business Development  
B-G North America, Caribbean and Global LNG
- 10:30-11:00** BREAK
- 11:00-11:30** Shell Exploration and Production Company
- 11:30-12:30** Arctic Energy Action Team  
James Hemsath  
Senior Fellow – Energy  
Institute of the North
- 12:30-13:00** Close of Technology Conference  
Ben Ellis  
Managing Director,  
Institute of the North



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# TRADE SHOW

## ARCTIC ENERGY SUMMIT TECHNOLOGY CONFERENCE TRADE SHOW EXHIBITION

*Located on the main level of the convention center.*

### Trade Show Exhibit Dates and Hours

**Tuesday, October 16** 10:00 am - 7:00 pm  
**Wednesday, October 17** 8:00 am - 5:00 pm

Morning and afternoon coffee and snack breaks will be held in the adjoining area.

## EXHIBITORS

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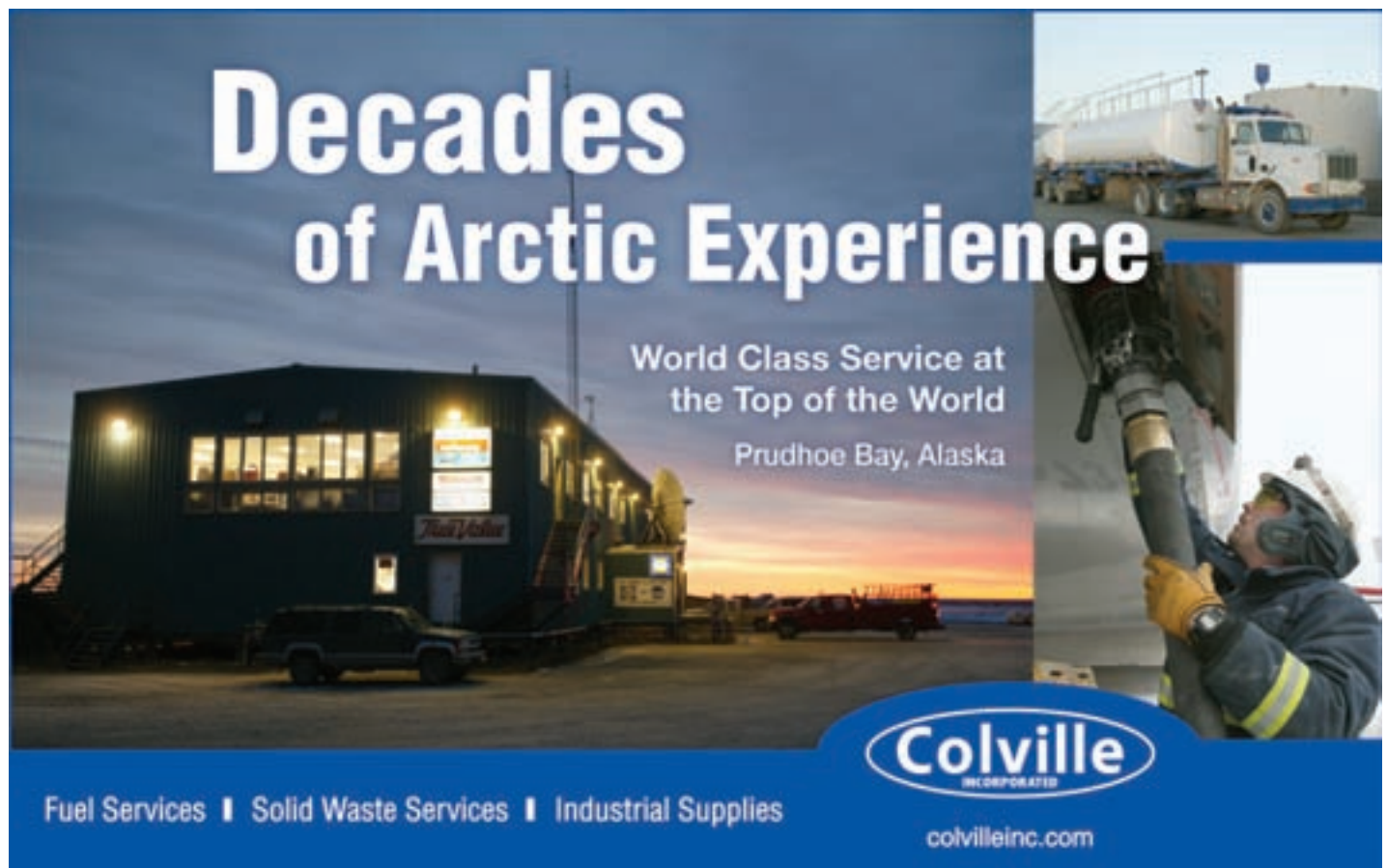
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# PANEL SESSIONS

## Panel Session One: Policy Experiences in Developing Energy Assets in the Arctic

Policy decisions even more than technical capabilities have the largest influence on the selection of technology, projects, economics and funding as it relates to the development of energy projects. The development of the Arctic as an energy province versus an exploitable resource will be determined by a comprehensive, integrated energy policy. This panel is convened to open a dialogue to share policy experiences both good and bad amongst the Arctic communities. Discussion areas will include industry development, environmental concerns, and shared arctic policies.

## Panel Session Two: Developing the Human Resources for Arctic Energy Development

The development of energy assets and their operation in the Arctic will require a similar development of human resources in the Arctic. This will include those skill sets necessary to bring the next generation of energy projects to fruition. Specific attention must be given to the energy systems required for rural and remote communities. To achieve this new level of competency will require an entire new curriculum that addresses the breadth of Arctic energy including engineering, design, operations, maintenance, management, economics and all aspects of care of the environment. This

panel is convened to open a dialogue to identify key the required skill sets, the kinds of curriculum necessary to meet those needs and to examine new training paradigms, including distance learning, to deliver those skills to the appropriate areas.

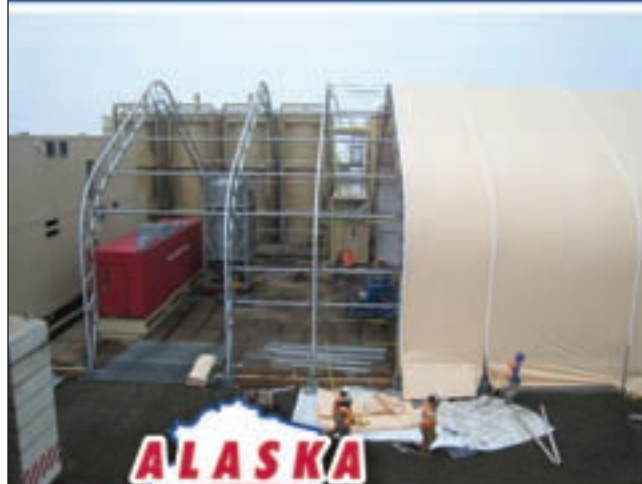
## Panel Session Three: Development of Rural Energy in the Arctic

The Arctic is a region of tremendous energy wealth; however, rural arctic communities are living in tremendous energy poverty. These communities off the electrical grid; off the road system; populated by predominately aboriginal peoples living a subsistence lifestyle; suffer crippling energy costs that threaten their very existence. New approaches to moderating these energy costs are needed to prevent the extinction of these communities. This panel is convened to open a dialogue on the rural energy situation, discuss new technologies and technological approaches, energy sources, as well as approaches to energy efficiency that will be necessary to create a new rural energy paradigm.

## Panel Session Four: Shipping and Transportation Options for the Arctic

The ability for the Arctic to emerge as a global energy

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## PANEL SESSIONS

province will be both driven and constrained by transportation. Climate change, while potentially opening up new sea routes, is also changing the structure of river shipping, weakening existing roads and runways and shortening tundra travel. More open sea travel will necessitate increased air support. The basic logistics paradigm for the arctic is changing and shipping and transportation options will have to change as well. This panel is convened to open a dialogue on the opportunities and threats that climate change and new shipping routes via marine, ground and air, that energy development will present.

### Panel Session Five: Environmental Concerns in Developing Arctic Energy Assets

Rural energy costs are far in excess of urban costs. Communities that are off the electrical and transportation grids are seeing fuel costs rise to crippling levels. Choices made now will either result in energy wealth or energy poverty. The development of a new paradigm for energy production in rural arctic regions is an urgent need. This panel is convened to open a dialogue on the opportunities and threats that exist in the rural energy field. The discussion will include the development of an arctic energy technology, how it can be applied and what is necessary to address this important problem.

### Panel Session Six: Infrastructure and the Impact of Climate Change

As the Arctic continues its long cycle of warming the infrastructure developed and built in a colder environment will be impacted. This will include roads, harbors, bridges, foundations, transmission lines, pipelines, airstrips, as well as ice roads, and rivers. The damage will be concentrated in places where permafrost thaws; flooding increases; and coastal erosion gets worse. Development of the arctic as an energy province is essential to global and energy security and energy costs are rising in rural Arctic communities. This panel is convened to open a dialogue on the various impacts, both opportunities and threats that climate change will have on Arctic infrastructure, especially as it relates to the development and deployment of energy resources.

### Panel Session Seven: Impacts of Energy Development on the Peoples of the North

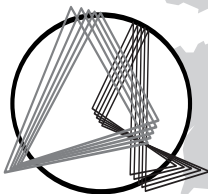
The development of energy projects in the far north have had and will have significant impact on the peoples of the north, specifically those native or indigenous peoples in remote communities living a subsistence lifestyle. Energy development will have both positive and negative impacts on a community. Extractive development could bring wealth and jobs but impact a subsistence lifestyle. High energy costs drain community resources but the development of new lower cost energy facilities could require a differently trained workforce to operate and maintain said facility. This panel is convened to open a dialogue on the various impacts, both opportunities and threats that energy development will bring to the peoples of the north.

### Panel Session Eight: Energy Security – the Arctic's Role in Global Security

The development of the Arctic as an energy province has and will have an impact on how the world defines energy security. Different and changing shipping and transportation routes, new geopolitical boundaries (as evidenced by this summer's North Pole activities), transnational indigenous organizations, new technology, new wealth and sensitive environments will all have an impact on defining global and energy security. This panel is convened to open a dialogue on the changing face of energy security and the influence of the emergence of the arctic as an energy province will have on that security. Discussion areas could include energy development (both extractive and renewable), arctic infrastructure, new political participants and climate change.

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## ADDITIONAL INFORMATION

### Arctic Energy Action Team

An Arctic energy action team will be convened at the technology conference with the purpose of developing a cooperative international vision and programmatic way forward on common problems related to the development and deployment of energy in the Arctic. Potential members of the team may include energy experts from the eight Arctic nations, producers, investors, economists, educators, consumers, and government officials; as well as experts in the fields of transportation, supply security and climate change. The action team will explore a challenge from the extractive energy sector (e.g. the development of Arctic coal), one from the renewable energy sector (e.g. tidal power in ice filled waters), and one from the rural power sector (e.g. development of an alternative transportation fuel), and develop a series of scenarios and strategic technology roadmaps that will address a potential solution for each of these challenges. For further details contact James Hemsath, [jhemsath@institutenorth.org](mailto:jhemsath@institutenorth.org).

### Technology Conference Bookstore

The Arctic Energy Summit Technology Conference Bookstore will be provided by University of Alaska Anchorage. The UAA Campus Bookstore will highlight guest speakers' publications and books authored by UAA faculty. Crisis in the Commons will be featured for a special signing opportunity by author Gov. Walter J. Hickel, twice-governor of Alaska and former Secretary of the Interior. Also available: books by Andrew Revkin, Monday's keynote luncheon speaker and science reporter for the New York Times; gift selections and books from Alaska and the Arctic, as well as UAA memorabilia and clothing. Visit the UAA Campus Bookstore on the web at <http://www.uaa.alaska.edu/bookstore>.

### Arctic Synergy Electronic Newsletter

Produced by the Institute of the North as part of its educational outreach for the Arctic Energy Summit, the Arctic Synergy provides readers with weekly up-to-date information about rural, renewable and extractive energy, and the sustainability of energy in the Arctic. Check it out under the NEWS tab at [www.arcticenergysummit.org](http://www.arcticenergysummit.org), where you'll find links to current and past issues.

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### The International Polar Year

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# ADDITIONAL INFORMATION

(IPY) projects, the Arctic Energy Summit Technology Conference is sanctioned by the eight-nation Arctic Council. The Arctic Energy Summit convenes during IPY to bring focus to areas of developing resources while addressing the need for affordable energy in rural areas throughout the Arctic. The Summit supports the IPY aim of utilizing the intellectual resources and scientific assets of Arctic nations to make major advances in polar knowledge and understanding, while

leaving a legacy of a new generation of Arctic scientists, engineers and polar residents. <http://www.ipy.org>

## The Arctic Council

The Arctic Council is an intergovernmental forum for addressing many of the common concerns and challenges faced by the Arctic states; Canada, Denmark (including Greenland and the Faroe

Islands), Finland, Iceland, Norway, the Russian Federation, Sweden and the United States.

The Council is a unique forum for co-operation between national governments and indigenous peoples. Six international organizations representing many Arctic indigenous communities have the status of Permanent Participants of the Arctic Council and are involved in the work of the Council in full consultation with governments. The indigenous populations in the Arctic are represented by the following organizations: Aleut International Association, Arctic Athabaskan Council, Gwich'in Council International, Inuit Circumpolar Council, Russian Association of Indigenous Peoples of the North, and the Saami Council. The Indigenous Peoples Secretariat of the Arctic Council helps Arctic indigenous organizations to work together through the Arctic Council. Observers to the Arctic Council include European non-arctic countries, international organizations and NGOs. <http://www.arctic-council.org>

## The Sustainable Development Working Group

The Sustainable Development Working Group is a working group of the Arctic Council. The Arctic Council Sustainable Development Program was established at the Ministerial meeting in Iqaluit, Nunavut, Canada, in September 1998. The Terms of Reference for the SD Program were also agreed to in Iqaluit. The Sustainable Development Framework Document was adopted by the Ministerial meeting in Barrow in 2000, outlining the elements of the SD Program and identifying six subject areas under the heading of sustainable development of special importance:

- Health issues and the well-being of people living in the Arctic
- Sustainable economic activities and increasing community prosperity
- Education and cultural heritage
- Children and youth
- Management of natural, including living, resources
- Infrastructure development

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# ADDITIONAL INFORMATION

## The United States Arctic Research Commission

The United States Arctic Research Commission (USARC) was established by the Arctic Research and Policy Act of 1984. Its principal duties are to develop and recommend an integrated national Arctic research policy and to assist in establishing a national Arctic research program plan to implement the policy. USARC's commissioners facilitate cooperation between the Federal government, state and local governments, and other nations with respect to Arctic research, both basic and applied, including natural resources and materials, physical, biological and health sciences, and social and behavioral sciences. The Commission works with the National Science Foundation as the lead agency responsible for implementing the Arctic research policy. It offers guidance to the Interagency Arctic Research Policy Committee (IARPC) to develop national Arctic research projects and interacts with Arctic residents, international Arctic research programs and organizations and local institutions in order to obtain the broadest possible view of Arctic research needs. USARC's seven Commissioners are from academic or research institutions, private industry undertaking

commercial activities in the Arctic or from among the indigenous residents of the US Arctic. The Director of the National Science Foundation serves as an ex officio member. [www.arctic.gov](http://www.arctic.gov)

## Arctic Portal

The Arctic Portal is a gateway to Arctic related information as it relates to the Arctic Council, its Working Groups, Permanent Participants and Observers. The Arctic Portal provides a venue for webcasting from conferences, seminars, presentations and other activities of interest with emphasis on Northern and IPY activities. Go to [www.arcticportal.org](http://www.arcticportal.org) where the Arctic Energy Summit Technology Conference will be webcast live on Monday, Oct. 15th and on Thursday, Oct. 18th. AES will be highlighted on the frontpage and direct access to subpages with archived videos, text, photos, etc., all hosted at the main computer of the University of Akureyri which is connected via broadband. An AES video repository will be created so that speaker presentations will be available to review following the conclusion of the Technology Conference.

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# TECHNICAL SUMMARIES

## Arctic Energy Summit Technology Conference Presentation Summaries (As of September 27, 2007)

*The following information has been arranged alphabetically by presenter's last name. Full versions of technical summaries can be found online at [www.arcticenergy-summit.org](http://www.arcticenergy-summit.org). The locations of individual presentations will be made available during the conference.*

Ashish N. Agrawal  
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Renewable-10

### **Feasibility Analysis of Deploying Photovoltaic Array in a Remote Arctic Community**

Ashish N. Agrawal  
Aiken Global Group, LLC  
USA  
ftana@uaf.edu  
Sustainable-14

### **Energy and Water Saving Techniques Identified at Fort Wainwright, Alaska**

Ron Alward  
Natural Resources Canada  
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### **Harnessing Hot Spots in the Arctic**

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### **The Implications of Hydrogen Economy for the Arctic**

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### **Status of Wind/Diesel Applications in Arctic Climates**


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### **Development of Methods for Hydrated Fields Exploitation**

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**Future Marine Transportation of Arctic Energy Resources**



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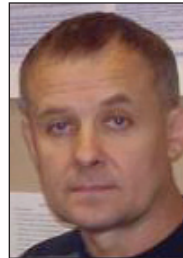
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**Analysis of Disturbance to Vegetation and Changes in Active Layer Depths Resulting from Different Ice Road Construction Methods**

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**Climate Monitoring in the Arctic: Benefits for Science and Industry**

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Renewable-05  
**Economic Impacts of Climate Variability in the Arctic: the**

## Case of Hydropower



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## Arctic Gas Hydrate Energy Assessment Studies

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## Integrated Villages Energy Analysis Model



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## Renewable Power in Rural Alaska: Improved Opportunities for Economic Deployment

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## Economic Wind Power Development in Rural Alaska

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## Ivotuk: An Autonomous Power and Communications System on Alaska's North Slope

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## Foundation Design of Wind Towers in Southwestern Alaska

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## Advanced Residential Energy Technologies for Harsh Northern Climate

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**Extending Oil Spill Occurrence Rates from the Gulf of Mexico to the Beaufort and Chukchi Seas**

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**Arctic Soils Monitoring, Oil Spill Bioremediation, Remote Sensing Technologies**

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## **Fire Island and Renewable Energy for Alaska**

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## **"Above-Ground" Issues Affecting Energy Development in the Arctic**

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## **Systems Dynamic Approach to Model a Multimodal Energy System in Rural Arctic Communities**

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## **An Amalgamated Approach at Rural Power Generation: A Case Study in Sustainability**

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## **Biomass Power Generation for Rural Alaskan Applications Using Binary Power Plant Equipment Coupled With a Thermal Oil Heater**

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## The Aurora Ice Museum Absorption Refrigeration System

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## Renewable Energy and Waste Heat Utilization for Greenhouse Production in Rural Communities, Using Chena Hot Springs as a Local Model

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## Energy Education for Secondary Schools

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## The Optimization of Local Generation Unit's Fuel Balance in the Sakha Republic (Yakutia), Russia

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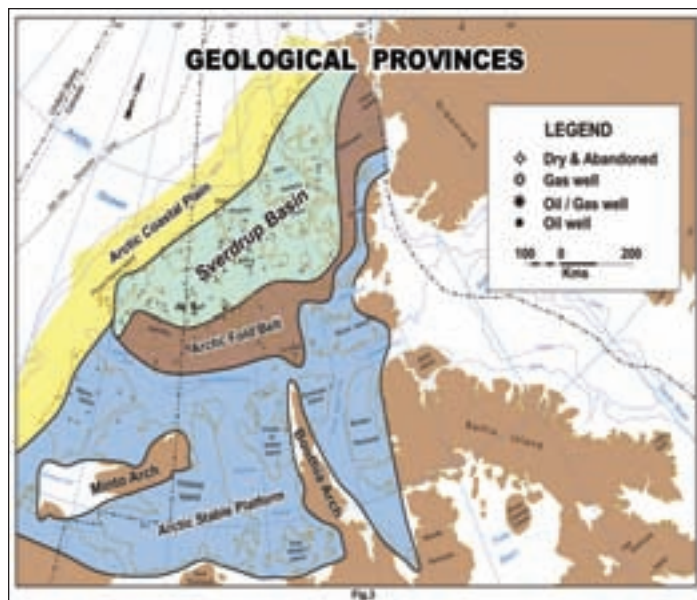
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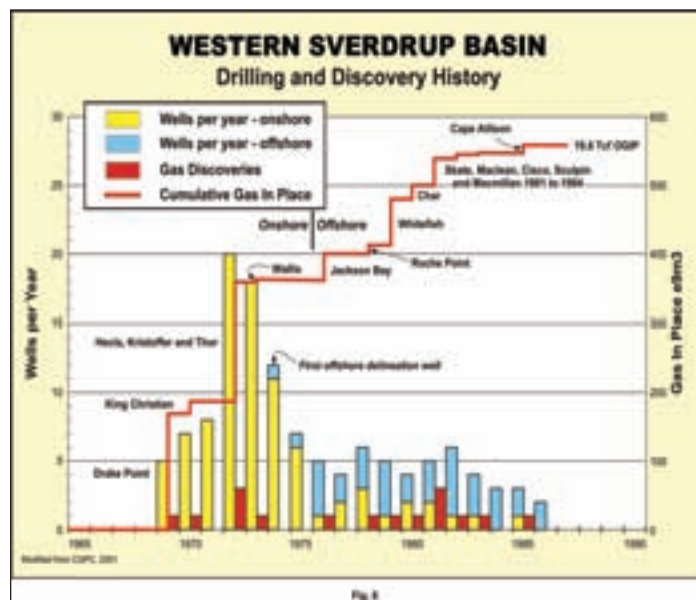
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**Interhemispheric Tunnel & Rail Group Proposal**

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**Experimental Study of Heat Recovery from Diesel Exhaust for Alaskan Village Diesel Generators**



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**Exploration Results in the Canadian Arctic Islands**



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**Training for Sustainable Life Cycles in Safety Instrumented Systems**

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## Climate Change Mitigation Possibilities in the Energy Sector: an Arctic Perspective

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## U.S. Geological Survey Circum-Arctic Resource Appraisal

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## NorthWind100: The 100 kW Arctic Wind Turbine

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## The Nordic Network for Sustainable Energy Systems in Isolated Locations

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Creation of Technology for Utilization and Recovery of Coal Seam Methane

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**A Toolkit for Community Energy Planning in Northern Canadian Communities**

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**Global and Alaskan Oil Demand and Supply**

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**Sustainable Development Principles in Training of Oil and Gas Specialist for Arctic Region**

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**Tidal Energy Projects in Alaska**

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**Program of Centralized Power Supply in the Khanty-Mansiysk Autonomous Okrug – Ugra**

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**Snow Cooling – Renewable Energy for Large Parts of the World**

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**A Renewed North? Resources, Corporations and First Nations in Canada**

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**What if High North Energy Exploitation Fails? An Analysis of What Could Go Wrong.**

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**Arctic Energy and Cumulative Effects: Growing Demands**

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**PolarPower.Org – Sharing Knowledge about Power Systems for Polar Regions**

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**Environmental Issues in the Arctic**

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**Wind-Diesel Systems for Isolated Arctic Communities**

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**Exploration Potential for Natural Gas in Cook Inlet and the Brooks Range Foothills, Alaska**

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**A Review of the Sustainable Design Approach for the South Pole Station Modernization Project**

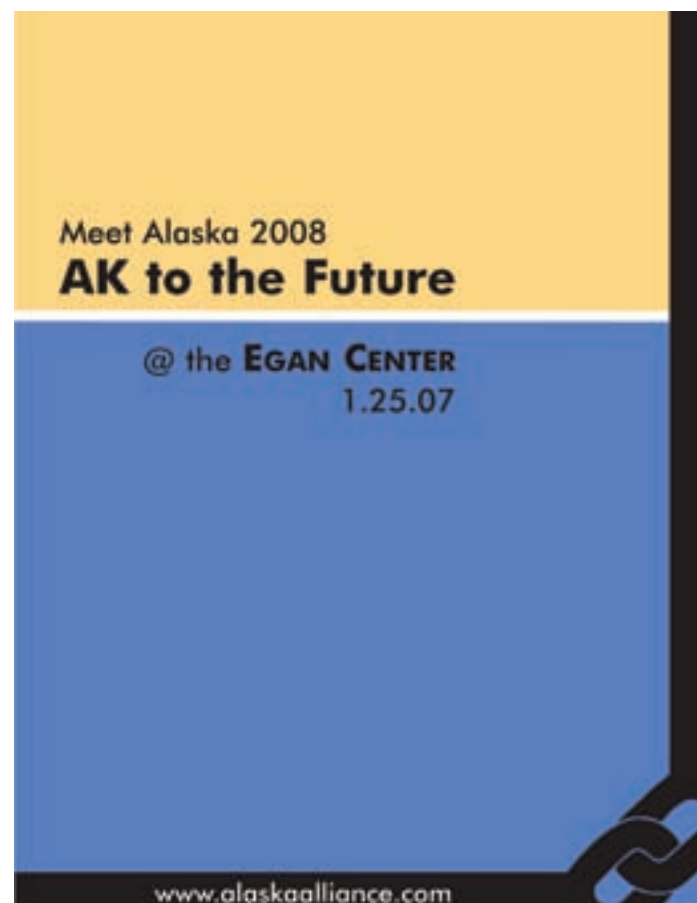
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**A Review of the Diesel-Engine Generator Exhaust Design Approach for the South Pole Station Power Plant**

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**Education and Outreach Activities through the Black Sea and the Caspian Sea International Environmental Information Center**

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## Integrated Systems Approach for Wood Energy in Alaska Rural Villages

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## Characterization and Quantification of the Methane Hydrate Resource Potential Associated with the Barrow Gas Fields

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## Fish Oil as an Alternative Fuel for Conventional Combustors

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Energy Alternatives in the Yukon River Watershed

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## Load and Temperature Profiling for Improvements in Efficiency and Operational Lifetime of Diesel Electric Generators in Alaska Rural Villages

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## Cold Climate Problems of a Micro-Hydroelectric Development on Crow Creek, Alaska

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# High Arctic: industry's last oil and gas frontier

RAY TYSON

**T**here's one thing industry hopefully can look to when the Earth's offshore oil and gas resources south of the giant Arctic ice-cap are exhausted. Many geologists now believe this vast and frigid region, as it melts away purportedly due to global warming, could expose drilling access to as much as a quarter of the planet's remaining hydrocarbons.

For years offshore exploration and development have been limited to the 200-mile "economic" zones of the five nations — United States, Canada, Russia, Norway and Denmark — that border on the Arctic icecap. However, these endeavors have met with limited success.

Nonetheless, Alaska holds the honor of producing the first oil from Arctic outer continental shelf waters with BP's Northstar oil field, which is in about six miles offshore Prudhoe Bay in state and federal waters. BP also is said to be close to sanctioning development of its OCS Liberty discovery.

The first offshore Arctic discovery to be developed in state waters was BP's Endicott field east of Prudhoe Bay, which came online in 1987 and was the world's first producing offshore Arctic oil field. Endicott is linked to shore with a 1.5-mile gravel causeway.

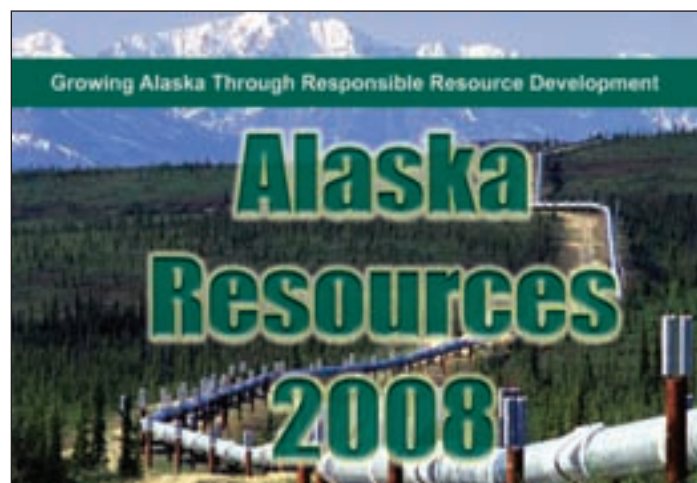
Other Arctic development projects in state waters offshore Alaska's North Slope include Pioneer Natural Resources' Oooguruk field, expected to be in production by early 2008, and Eni's near-



Statoil-operated Snøhvit field in the Barents Sea

by Nikaitchuq field, under serious consideration for development starting in 2008.

Also encouraging is the U.S. Minerals Management Service's proposed oil and gas lease sale for Alaska's Chukchi Sea next February. It would be the first such federal lease sale in the remote Arctic region in some 17 years. MMS estimates that the sale area could hold a mean of 15 billion barrels of oil and 76 trillion cubic feet of natural gas. Proposed Chukchi Sea Lease Sale 193, stretching from north of Point Barrow to northwest of Cape Lisburne, contains about 29 million acres and extends from roughly 25 to 200 miles seaward. Water depths range from 95 feet to about 262 feet. Thus far, more than 90 exploration wells have been drilled in federal waters offshore Alaska, mostly in the Beaufort Sea.



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Icebreaker Shell intends to use for its offshore Alaska work.

*continued from page 39*

## ARCTIC

### Not smooth sailing

It has not all been smooth sailing for the offshore industry in the Alaska Arctic. Shell's summer exploration program in the Beaufort Sea ground to a halt in mid-August when the U.S. Court of Appeals for the

9th Circuit placed a temporary hold on the company's drilling plans until the court ruled on appeals by the North Slope Borough, the Alaska Eskimo Whaling Commission and several environmental organizations against MMS approval of the Shell program. The borough and whaling commission have long believed that offshore

exploration activities threaten subsistence hunting activities, especially the hunting of bowhead whales. Shell had planned to start drilling its Sivulliq prospect on the western side of Camden Bay off the coast of the coastal plain of the Arctic National Wildlife Refuge. Because of the drilling delay, Shell reportedly began releasing workers who ironically included Alaska Natives.

Just west of Alaska's northeastern border is Canada's Beaufort-Mackenzie basin, a hydrocarbon-rich domain with numerous discoveries awaiting approval for a major pipeline to transport the gas portion to southern markets.

More than 180 exploration wells and around 60-plus development wells have been drilled in the Beaufort-Mackenzie basin, resulting in the discovery of more than 50 oil and gas fields, a high frontier success ratio of near 30 percent. The largest onshore discoveries include the Taglu field, with estimated

recoverable natural gas reserves of 2 tcf and the Parsons Lake field, with gas reserves of 1.2 tcf. The largest offshore field is believed to be Amauligak, with an estimated 235 million barrels of oil reserves and 1.3 tcf of gas reserves.

Total discovered resources in the Beaufort-Mackenzie basin are estimated at around 9 tcf of recoverable gas and 1 billion barrels of recoverable oil. The petroleum resources of the area represent about 25 percent of the total oil and 20 percent of the total gas resource potential in Canadian frontier basins. However, with the exception of local gas production from the onshore Ikhil field near Inuvik, no oil or gas fields have been developed in the region to date.

### Mostly gas in Barents

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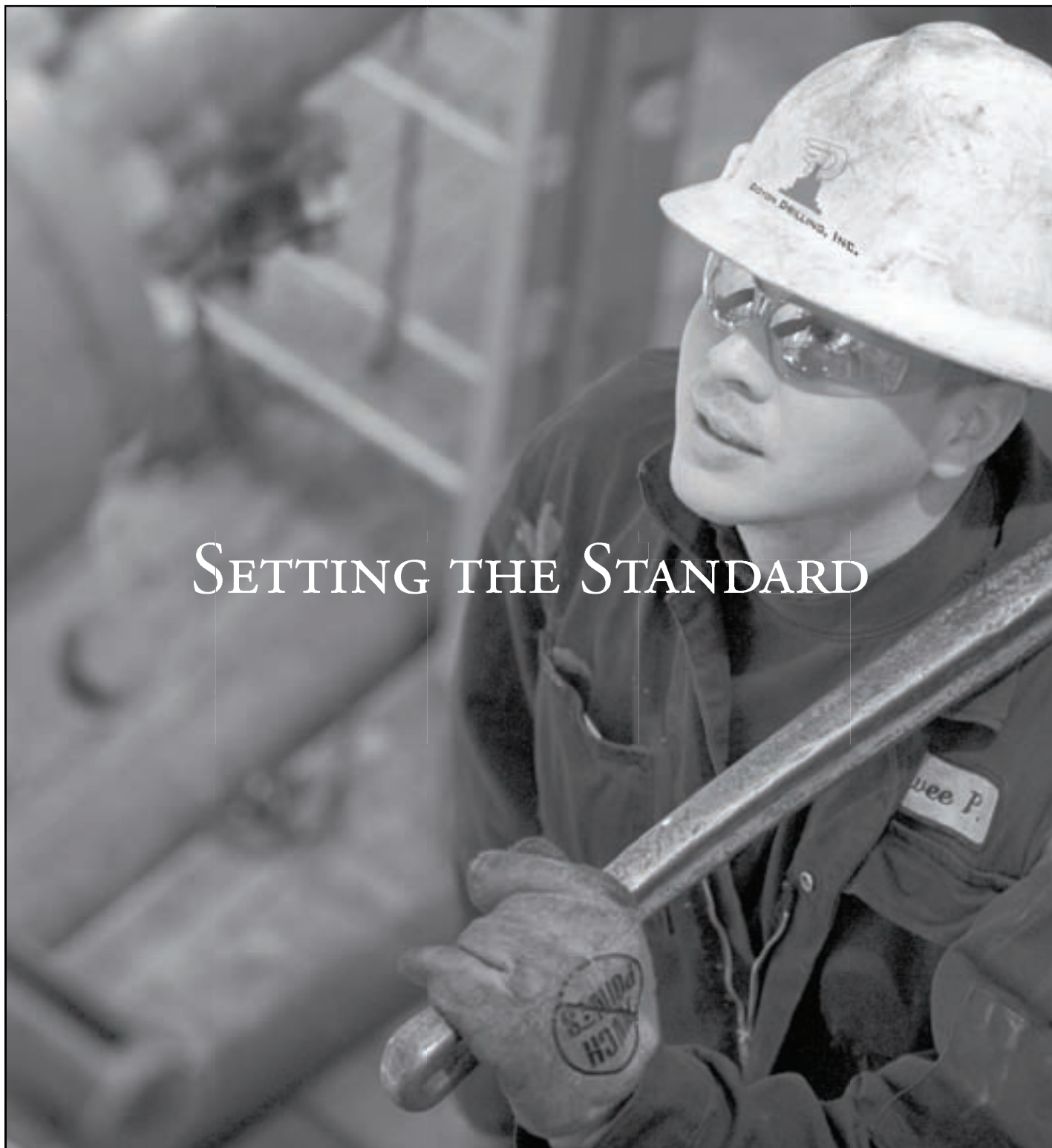
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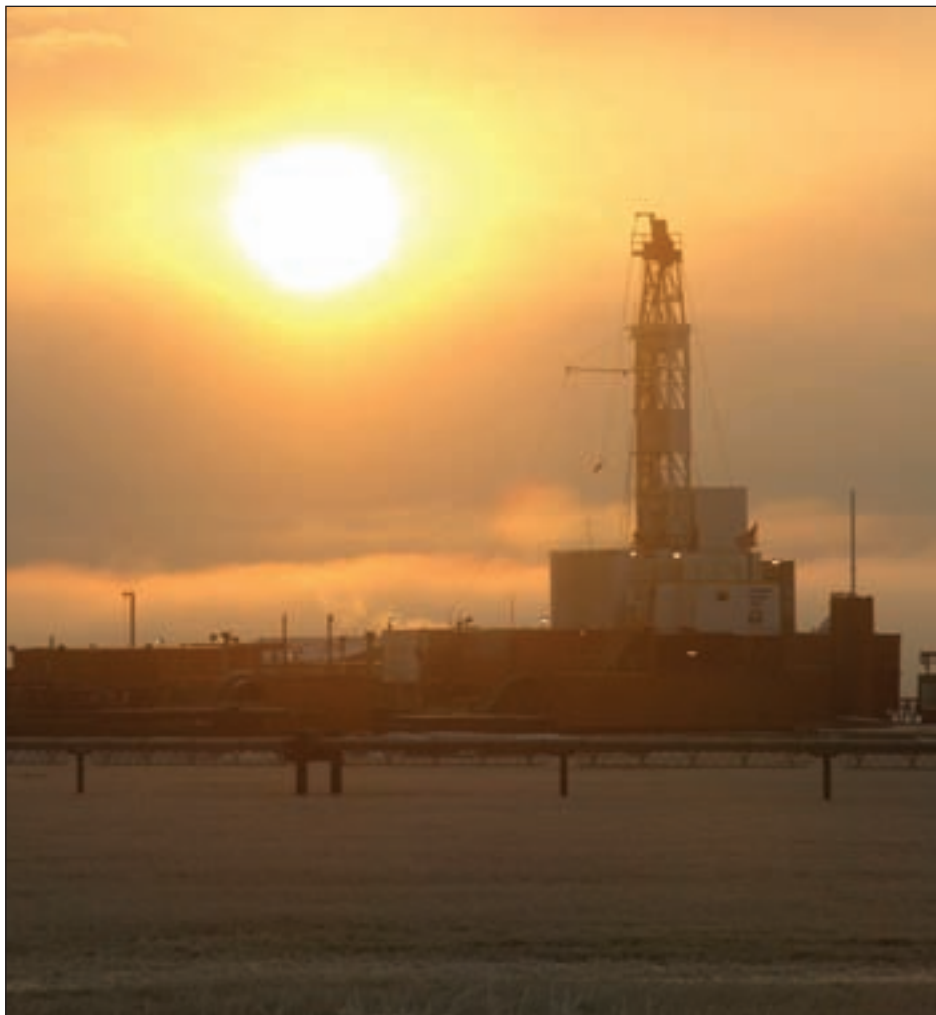
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Doyon-Akita Arctic Fox rig was first new lighter-weight, purpose-built exploration rig for northern Alaska

*continued from page 40*

## ARCTIC

have mostly uncovered gas reserves, and analysts believe the area shows significant promise.

"We have experienced frustration and disappointments with dry wells along the way," said Henrik Carlsen, senior vice president for Statoil's Barents Sea opera-

tions. "However, we have gained valuable knowledge. The geology in the Barents Sea seems to be different from other parts of the Norwegian continental shelf. We must think in new ways and use new models to trace those hydrocarbons. We realize that we do not understand this geology well enough yet."

Norway beat Russia with first production from its portion of the Arctic Barents Sea, when natural gas from the

JUDY PATRICK  
Statoil-operated Snohvit field development arrived via pipeline at a liquefied natural gas processing facility at Hammerfest in northern Norway on Aug. 21, after just over five years of construction. The Hammerfest plant is Europe's first export facility of its kind.

From the beginning, Snohvit was pitched as the most environmentally friendly offshore development project in the world. For example, the entire offshore portion is subsea, with no production facilities protruding at the ocean surface.

"Viewed overall, the development of Snohvit involves the application of new technology which will be crucial for Statoil's future, both in the far north and internationally," Carlsen said. As for Russia, it is having considerable problems choosing partners to help develop its giant Shtokman natural gas discovery located in its portion of the Arctic Barents Sea.


At first, state-controlled Gazprom solicited proposals from potential partners but then decided to go it alone. More recently, Gazprom picked French oil major Total to help with Shtokman and launched another campaign to find additional partners. In early September, Reuter's news service reported that Gazprom had received applications from five companies, which wanted to join Total in developing the field. The names were not disclosed. But other hopefuls are believed to be Norway's Statoil and Norsk Hydro and U.S. oil major ConocoPhillips, Reuters said. Total would receive a 25 percent stake in the managing company for Shtokman.

## High Arctic political issues

In regard to the high Arctic, breaking out of each country's 200-mile economic zone to claim territory beneath the ice-cap is far off and could be confrontational, depending on the attitude and politics of the five countries bordering on the high Arctic. In the meantime, the U.S. Geological Survey continues with a study that likely will be the most comprehensive oil and gas assessment of the entire upper Arctic region.

"Knowing the potential resources of the Arctic — an area of tremendous resource potential, environmental sensitivity, technological risk and geological uncertainty — is critical to our understanding of future energy supplies to the United States and the world," said Mark

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Myers, former head of the Alaska Division of Oil and Gas and current director of USGS.

Little was known about this region's true potential as an oil and gas producer until the release earlier this year of a USGS study of the so-called East Greenland Rift basins province. It was the first step leading to a USGS assessment of the entire high Arctic region, referred to as the Circum-Arctic Resource Appraisal. USGS said assessments "of all the Arctic provinces" would be released to the public over the next year.

The area of study takes in nearly 200,000 square miles, most of which underlies less than 1,640 feet of water offshore of eastern Greenland. USGS said most of the undiscovered oil, natural gas, and natural gas liquids are expected to be found in the offshore parts of the province.

Careful to note that no proven reserves have been discovered in north-eastern Greenland, "significant undiscovered

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### The Denali Commission Energy Program

In 1998 Senator Ted Stevens focused national attention on the immense infrastructure and economic challenges faced by rural Alaskan communities by passing the Denali Commission Act. The Act became law on October 21, 1998.

The Denali Commission is an innovative federal-state partnership designed to provide critical utilities, infrastructure and support for economic development in Alaska by delivering federal services in the most cost-effective manner possible. By creating the Commission, Congress mandated that all parties involved partner together to find new and innovative solutions to the unique infrastructure and economic development challenges of America's most remote communities. This approach gives the Denali Commission its unique scope and breadth of services.

Recognizing the critical role energy plays in the quality of life and economic development of Alaska's communities, the Denali Commission has made energy its primary infrastructure theme since 1999. In partnership with the State of Alaska and other energy organizations, great strides are being made to develop safe and reliable energy infrastructure in Alaska while minimizing expenses.

The energy program primarily funds design and construction of replacement bulk fuel storage facilities, upgrades to community power generation and distribution systems, and some energy cost reduction projects. The Commission works with the Alaska Energy Authority, Alaska Village Electric Cooperative (AVEC), and other partners to meet rural communities' fuel storage and power generation needs. Since its inception, the Commission has provided over \$300 million in support of energy projects.

"Despite being an oil producing state, Alaska has some of the highest per capita electric power costs in the U.S., particularly in our rural, isolated villages scattered throughout the state," stated George Cannelos, Federal Co-Chair at the Commission. The Commission will also focus on alternative-renewable projects to find new solutions to this growing need in rural Alaska.

The Denali Commission Energy Program Includes funding for:

- Bulk-Fuel Storage
- Community Power Generation
- Distribution Systems Upgrades
- Energy Cost Reduction Projects
- Renewable and Alternative Energy Projects
- Power Line Interties



Details on the Denali Commission can be found on our website at [www.denali.gov](http://www.denali.gov).





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The first Snohvit well was completed by Transocean's Polar Pioneer semi-submersible rig, which Statoil said would perform the same operations on the remaining eight production wells and a carbon dioxide injection well drilled through Snohvit's four seabed templates.

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## ARCTIC

ered resource potential exists," USGS concluded in its study, which estimates a mean resource in this province alone could be 31.4 billion barrels of oil equivalent. If

this resource was proved and realized, northeastern Greenland would rank 19th compared to the world's 500 other oil and gas provinces, USGS said.

In fact, new data made available for the current assessment significantly changed the geological under-

standing of northeastern Greenland, USGS said. In comparison to the 2000 USGS assessment of northeastern Greenland, the recent assessment "estimated significantly less total resource, more natural gas and natural gas liquids, and an increased ratio of gas to oil."

These new geological data indicate that the burial and uplift history of the northeastern Greenland province and the source rock character are "suggestive of significantly more gas generation than we previously interpreted." The 2000 assessment estimated 47 billion barrels of oil equivalent, or 81 tcf of natural gas and 4 billion barrels of natural gas liquids.

No doubt the significance of the Arctic has been magnified by the growing focus from professional energy forecasters and politicians about a near-term peaking in global oil supplies. This view has been confirmed by independent surveys that show industry's biggest concern is its ability to replace spent oil reserves, despite record capital investment.

However, despite the current interest in the melting Arctic, not only as a hydrocarbon play but also as a possible ocean shipping route over the top of the globe, oil and gas explorers will have to wait until world politics decide who owns what and where. That's because what resources are below the Arctic icecap are considered to be public domain.

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Alaska holds the honor of producing the first oil from Arctic waters: BP's Endicott oil field in the Beaufort Sea. Northeast of Prudhoe Bay, Endicott is connected to the mainland by a 1.5-mile gravel causeway.

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### Land grab has begun

Public domain or not, a land grab already has begun, spurred on by none other than Russia and its apparent desire to return to the glory years of the former Soviet Union, staking claim to property it does not own — in this case, a vast 460,800 square mile chunk of the ice-covered Arctic seabed. Moreover, this claim doesn't seem to be about territory, but rather about the potential of huge hydrocarbon reserves that may be hidden beneath the seabed under the Arctic ice cap. A Russian scientific expedition, headed by a renowned Russian Arctic explorer leading a team of scientists, actually dove to the ocean floor and planted the country's flag.

The Russians, who were earlier turned down in their request to claim more of the Arctic Ocean shelf for their country, are now preparing the data gained from the expedition to support a new claim to be presented to the United Nations committee

empowered to resolve land claims offshore under the Law of the Sea Treaty. It seems Russia has set the world stage for what could develop into a serious confrontation with its Arctic neighbors.

A 40-member scientific team, including 10 Danes, followed the Russian expedition, which left in August on a research ship following a chartered Russian icebreaker. The research ship planned to use sophisticated equipment including sonar to map the continental shelf extending from Greenland to the highly prospective Lomonosov Ridge. This 1,240-mile submerged mountain range happens to be the same landmass Russia is claiming.

"The preliminary investigations done so far are very promising," announced Helge Sander, the Danish minister of science, technology and innovation. "There are things suggesting that Denmark could be given the North Pole."

The announcement of the start of the Danish expedition was followed by a U.S. announcement that it would be sending the Coast Guard Cutter Healy on a mission to

map the seafloor on the northern Chukchi Cap, an underwater plateau that extends 500 miles northward from Alaska's North Slope.

Clearly, the United States is

at a disadvantage in this global land grab because it is not a signatory to the UN Law of the Sea Treaty, something President George W. Bush is trying to convince the Congress to remedy.

With all this activity from neighboring Arctic Ocean countries, Canada has accelerated its response. Rather than sending scientists, although there are reportedly some Canadians on the Danish expedition, the country elected to send its prime minister, Stephen Harper, on a three-day trip to the far north region of the country to announce plans to expand Canada's presence in the region. He announced plans to build an army training center for 100 troops in Resolute Bay along with a deepwater port on Baffin Island. While on his trip, he added plans for a second deepwater port. ●

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