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# the Arctic game

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# The Arctic game



The new frontier of energy procurement runs along the Arctic Circle. While not downplaying the difficulties, the experts seem certain about this. Besides, one need only consider the enormous reserves of oil and gas (and other resources) that are hidden under the Arctic ice and are still almost completely untapped, to understand how – to a large extent – the future of energy and of the world economy might depend on that rugged and fascinating region.

This explains the expectations and uncertainties that such a prospect raises, now that the gradual melting of the polar ice cap seems to make possible the opportunities for exploitation of previously inaccessible natural resources. Revolutionary hypotheses from the viewpoint of energy and economic policy loom large, as do complex geopolitical developments, new international perspectives and new power balances between States, especially among oil producers. One could foresee the U.S. able to achieve full energy self-sufficiency, and Russia shooting to the heights of oil and gas production from the Arctic Siberian reserves...and a world with new, abundant reserves of raw materials for its energy needs.

But this raises a number of issues. First of all, the need for a stringent policy of respect for the ecosystem in one of the most delicate areas in terms of the natural equilibrium of the earth – such as the polar region is. And then, the major difficulties in the prospecting and exploitation of deposits in extreme conditions, despite the rise in temperature; along with the need for huge investments and extremely expensive technology developments – each



GIANNI  
DI GIOVANNI

with unknown consistency and sustainability. And that's without considering the legal complications and the complications concerning the relations between countries bordering on the Pole, which have thus far never been an issue, given the lack of interest sparked by the icy expanses of the Arctic.

But with the sudden centrality of the region, these would surely trigger a particular kind of repeat of the Cold War between the U.S. and Russia (never was a definition more apt than in this case) – a Cold War in an energy perspective. What's the solution in the face of so many complex and often conflicting elements? In this issue of our magazine, entirely dedicated to the "polar question," we have tried to find out. In our usual *Oil* style: without preconceived ideas or prejudices, trying to address the issue from multiple points of view. We turn, therefore, to qualified experts and call on them each to provide an answer, each in his own field, to the key questions. The result is a particularly rich and diverse dossier in which the prospects and difficulties of exploitation of the Arctic are analyzed with a view to energy; as well as the attitudes of the countries most closely involved; the economic, legal and technological aspects; and the impact on the market and the energy production world. Without of course claiming to have exhausted the subject, we consider this documentation to be useful food for thought for what is certainly destined – in the years to come – to be one of the major issues of international energy policy.

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# The rediscovery of the Arctic: the beginning of a new cycle?



**GEMINELLO ALVI**  
An economist and writer, he was columnist for the *Corriere della Sera* and *La Repubblica*; now he writes for *Il Giornale*.

**S**een on a world map, the Arctic is an icy gulf lying just beyond the northern fringes of America, Europe and Asia, revealing undreamed-of borders that now preoccupy governments and multinational energy companies. If we picture ourselves in that distant northern zone, where

the sky rotates around the pole star, our normal perception is altered: distances are squeezed, like the squashed sphere of planet Earth itself, and the Arctic becomes a place of paradox once again – all the more so if we consider the melting of the ice and the fact that this most inhospitable of areas might one day be green again, and even inhabited. The traditional calculations of geopolitics and energy are overturned, and the extreme Arctic north is once again viewed as a region of promise and surprise, just as it was in the most ancient stories of the birth of the West and the myths of the Hyperboreans' descent to milder climes.

In all the ancient Greek tales, the Hyperboreans were the inhabitants of the land that lay beyond Boreas (the North Wind), but they did not freeze, because Apollo the sun god visited them soon after his birth, on a chariot drawn by swans. Only fragments remain of Hecataeus of Abdera's book on the Hyperboreans, but we know that he recorded them as living on an island with a near view of the three sons of Boreas, the priests of Apollo. Herodotus, too, described this Arctic society, placing it close to the high waterfalls of the Eridan, but away from the cold. The Hyperboreans, he said, lived in a land of eternal spring, where feathers danced in the air. According to the pre-Socratic philosophers, the mildness of the climate was accompanied by a primordial wisdom that made these Arctic people purifiers of the sun's rays.

The paradoxical idea of a sunny, enlightened north was to recur again and again in Western culture. Even Friedrich Nietzsche was later struck by it, writing: "We are Hyperboreans; we know very well how far off we live. 'Neither by land nor by sea will you find the way to the Hyperboreans' – Pindar already knew this about us. Beyond the north, ice, and death – our life, our happiness."

Later, the extreme north would be restored from a spiritual realm (Thule) to a geographical one (Iceland or Greenland), and even the most hard-line view would have to take account of Ptolemy's "Geography." Others would explain the discrepancies in the ancient climate of these places by positing a number of interglacial periods between 40,000 and 28,000 B.C., when the temperature at 70-80 degrees latitude would have been around 10 degrees Celsius.

One of the subscribers to this theory was Tilak, who wrote about it in his book "The Arctic Home in the Vedas" (1903). An astronomer, philosopher and Indian patriot, Tilak argued that the extreme Hyperbore-

**With the melting of the ice, this most inhospitable of areas might one day be green again, and even inhabited, as in the myths about the Hyperboreans**

an north was the origin of the Aryan people. It was from there, he claimed, that the Indo-European races and languages migrated, following their primordial wisdom, when the Arctic skies fell ever lower, the earth shook and the sun, moon and stars changed their course, and the trapped waters burst forth and flooded those lands. This, he said, was the start of the migration of the Hyperboreans – still triggered by the sun, but less serenely than described by the Ancient Greeks.

In any event, there is no doubt that the Arctic comes back to center stage at extreme moments, when apocalypse – geographical or otherwise – looms. Reading back over these ideas, which have resurfaced in very different eras, leaves one with strange thoughts that have nothing to do with geopolitics or economics. Rather, we find ourselves wondering – like the Ancient Greeks or the enthusiastic Mr. Tilak – whether the rediscovery of the Arctic is merely the start of a new cycle, or the beginning of an end.

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● Welcome to *Oil*, a publication of news and ideas for the energy community and beyond. It provides authoritative analysis of current trends in the world of energy, with particular attention to economic and geopolitical developments.

● *Oil* is published by Eni with the aim of fostering open dialogue about the challenges of making energy a reliable and sustainable contributor to social and economic development.

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**Exclusive/**Joe Oliver, Canada's Minister of Natural Resources



# The right choice

Canada is a strong democracy with respect for the environment, including in the Arctic. It is the ideal partner for the U.S. in Keystone XL, the \$7 billion oil pipeline

**JOE OLIVER**

Joe Oliver is Canada's Minister of Natural Resources. He was elected to the House of Commons for the first time in May 2011. Prior to his election to Parliament, Mr. Oliver had a career in the investment banking industry. He began his investment banking career at Merrill Lynch, and served in senior positions at other investment dealers and as Executive Director of the Ontario Securities Commission.

**A**lthough it has an abundance of energy resources right now, the U.S. will continue to need imported oil. The oil produced by Canada's oil sands represents the "right" choice – the most responsible choice in terms of environmental sustainability. So says Joe Oliver, Canada's Minister of Natural Resources; in this interview done during IHS CERAWEEK, he argued strongly in support of the Keystone XL project, the \$7 billion pipeline intended to carry semi-finished crude from the sands of Alberta to the Gulf of Mexico – which is opposed by environmentalists and currently under scrutiny by the U.S. government.

by RITA  
KIRBY

**Is Canada afraid that the White House might veto the Keystone XL project?**

I am not anticipating a rejection of the plan. I remain cautiously optimistic. The United States is still going to need to import oil beyond 2035. It is estimated that they are going to need to import 3.4 million barrels a day. This does not argue against Keystone, because if Keystone is not built, the U.S. is going to continue importing oil from Mexico and Venezuela and elsewhere.

**Why do you think Canada is the "right" choice for the U.S.?**

Unlike some oil-producing regions, Canada is a strong and stable democracy, with a free market that is respected, where →

# Canadian oil and gas milestones

**1st OIL WELL  
IN ONTARIO**



**1858**

**GAS DEVELOPMENT  
IN TURNER VALLEY**



**1890s**

**1950s**

**1st SAGD WELL**



**1967**

**1978**



**ALBERTA  
OIL SANDS  
IDENTIFICATION**



**GREAT CANADIAN  
OIL SANDS  
PROJECT**

the rule of law prevails and where there is a long-demonstrated commitment to environmental protection. The oil sands may be the most rigorously regulated and monitored industrial sector in the world. Regulation and monitoring are driving innovation – innovation that has achieved a drop of 26 percent in greenhouse gas emissions per barrel between 1990 and 2010. Approval of the pipeline would create tens of thousands of high-quality jobs and enhance energy security. I have appreciated the opportunity to visit LyondellBasell's east Houston refinery, which processes 60,000 barrels of Canadian oil-sand crude each day. We see a tremendous opportunity to continue supplying oil to the Texan refineries, which have a greater need now – and in the future – for heavy oil. There is capacity here, and there is a growing demand.

**You have pointed out that Venezuela's reliability is questionable. Do you think the death of Hugo Chavez will have an impact on global supplies of crude?**

No, I do not think so at this point.

**Would blockage of the Keystone project by the White House have an impact on relations between Canada and the United States? Is it true to say that this would be viewed as a betrayal?**

I wouldn't view it as a betrayal. The basic relationship between Canada and the United States remains very strong. Normally I do not answer hypothetical questions, but in this case I will say that we have the most important bilateral commercial relationship in the world. It is also one of the closest diplomatic relationships. We are not going to let anything happen to jeopardize that relationship, irrespective of the decision the U.S. government takes in this regard.

**Canada has estimated reserves of 174 billion barrels in oil sands, mostly situated in the province of Alberta, which means that production could potentially go on for the next 100 years. If this oil**

**NEWFOUNDLAND,  
HIBERNIA  
DISCOVERY**

**TIGHT OIL  
AND SHALE GAS**

**1980s**
**1997**
**2004**
**2000s**
**2012**

**MACKENZIE DELTA  
AND CANADIAN  
BEAUFORT  
EXPLORATION**

**UNITED STATES' EIA  
PUT CANADIAN OIL  
RESERVES  
SECOND ONLY  
TO SAUDI ARABIA**

**LNG PROJECTS  
UNDEREVALUATION**
**is not imported to the U.S., where will it go?**

Any such rejection, which I do not anticipate, would give even more impetus for us to move west, to move east... but we're not anticipating that result.

**Opponents of Keystone XL argue that the project would expand the Canadian oil sands market, with a consequent increase in polluting emissions, higher than those produced from conventional supplies. How do you answer these criticisms?**

Facts and science speak for themselves. We need to put the oil sands in perspective. Total greenhouse gas [GHG] emissions from the oil sands represent one-thousandth of global emissions, about the same as emissions from coal plants in [the U.S. state of] Iowa, and half of the emissions from electricity generated by coal in the state of Illinois. Crude transported to the proposed Keystone pipeline would represent one two-thousandth of global emissions. This means that the total emissions from oil sands crude transported by

Keystone XL would be less than those of the largest coal-fired plant in the U.S., and conservatively less than one-eightieth of the emissions produced by coal generation in the United States. Canada is the largest supplier of heavy oil in the U.S., and will soon be one of the few with stringent oil and greenhouse gas regulations.

We're moving to become more and more environmentally responsible, and this isn't a new thing. We've invested some \$10 billion in alternative energy, and we're reducing the footprint of conventional and unconventional sources. Between 2005 and 2010, Canada's economy grew while its GHG emissions declined. Canada is halfway to cutting its GHG emissions by 17 percent by 2020, along with the U.S. Our next step will be to apply GHG regulations in the oil and gas sector. In contrast, other foreign suppliers have done little or nothing to manage their GHG emissions. Canada is a greener choice for the U.S. to meet its oil needs for years to come. Contrary to the hyperbole of some groups, the oil sands are not going to destroy the planet! ■

**RYAN M. LANCE**

As Chairman and CEO of ConocoPhillips, Lance is a petroleum engineer with 28 years of experience in the oil and natural gas industry. He also serves on the board of directors of Spindletop International and Montana Tech Foundation, and on the University of Houston's energy advisory board. Lance is a member of the Society of Petroleum Engineers.

**Interview/**Ryan M. Lance, Chairman and CEO of ConocoPhillips

# An incredible opportunity



Exporting liquefied natural gas (LNG) would improve energy security and the trade balance, and generate profit and jobs in the United States and importer countries

**T**he United States has entered a new era of abundance in terms of energy resources. ConocoPhillips CEO Ryan Lance says it is crucial that the U.S. not waste the incredible opportunity offered by unconventional energy and liquefied natural gas. Conoco was the first company to export LNG, in 1968, from its Kenai plant in Alaska. Now, says Lance, "The ability of the U.S. to export LNG would improve energy security and our trade balance, and also support

by RITA  
KIRBY



# nity for development



While it is important to think about renewables, it is even more important not to forget about the oil and gas that got us to where we are today and that is going to lead the economic recovery over the next ten years. The focus of worldwide investment is back in North America... Of course, we need a balanced regulatory environment

the economic recovery while protecting the environment.”

**What do you expect from the Obama administration for the energy industry?**

The President is on the right track with the all-of-the-above strategy. What I think is that this strategy must recognize an appropriate place for oil and gas. Oil and gas will have a much bigger role in the future, going forward, to drive the economic growth and the well paying jobs in the United States. So just as it is important to think about the renewables, it is even more important not to forget about the oil and gas that got us to where we are today, and that is what

is going to lead the economic recovery over the next ten years. The focus of most of the worldwide investment these days is back in North America. This is a tremendous opportunity to strengthen our energy security and to reduce our dependence on foreign oil. Of course we need a balanced regulatory environment here at home.

**ConocoPhillips is pursuing a strategy aimed at growing production and growing returns to shareholders, shedding less-profitable assets. Will new acquisitions be part of this growth plan?**



# First in Alaska

## AVERAGE DAILY NET PRODUCTION, 2011

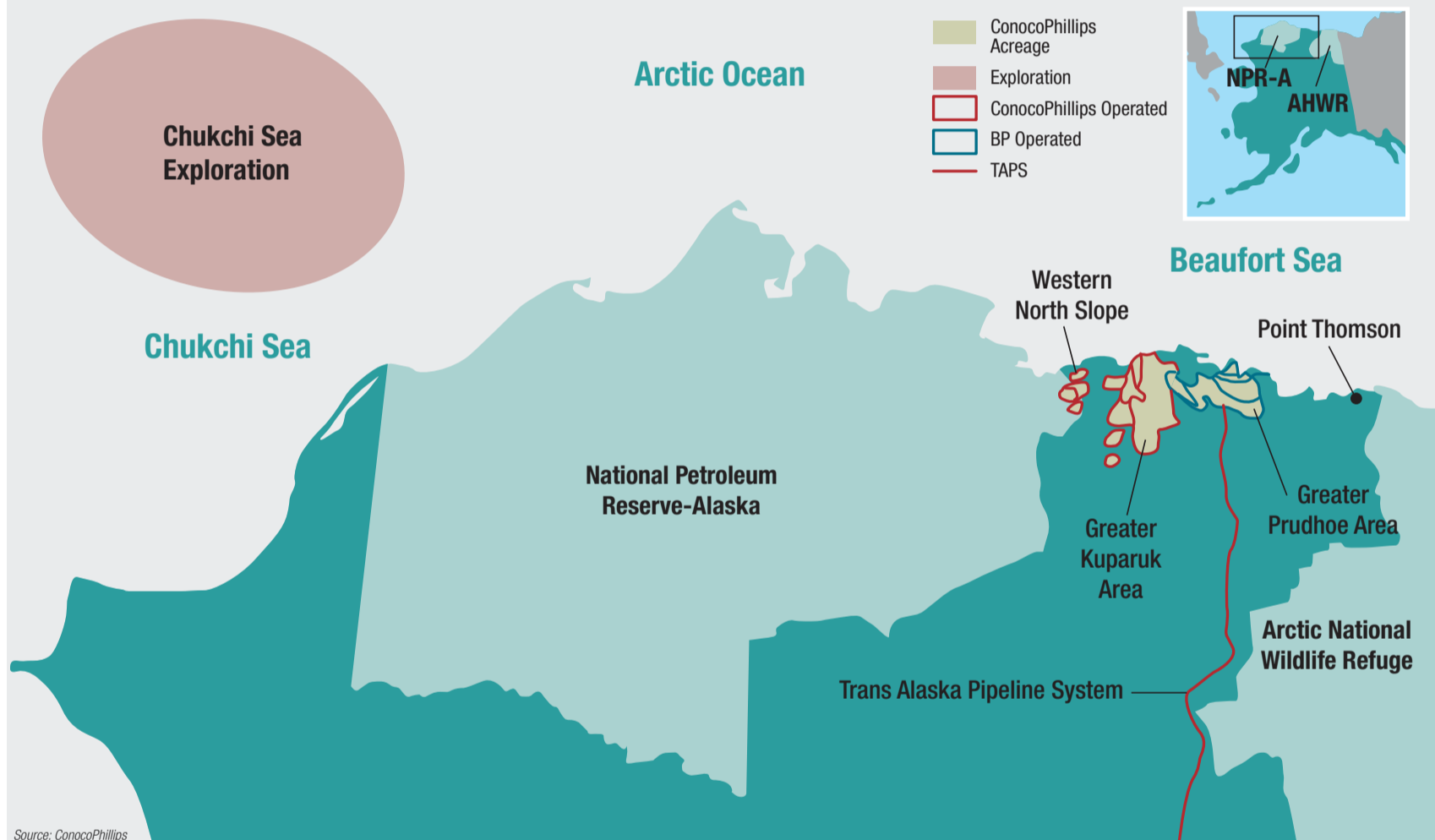
AREA	INTEREST	OPERATOR	LIQUIDS*	NATURAL GAS **	TOTAL***
Greater Prudhoe Area	36.1%	BP	106	6	107
Greater Kuparuk Area	52.2%-55.4%	ConocoPhillips	58	–	58
Western North Slope	78%	ConocoPhillips	51	1	51
Cook Inlet Area	33.3%-100%	ConocoPhillips	–	54	9
<b>Total Alaska</b>			<b>215</b>	<b>61</b>	<b>225</b>

\* MBD, \*\* MMCFD, \*\*\* MBOED

Source: ConocoPhillips

**ConocoPhillips is Alaska's largest oil producer and one of the largest owners of state and federal exploration leases, with approximately 1.2 million net undeveloped acres at year-end 2011. Approximately 0.6 million of those acres are in the National**

**Petroleum Reserve- Alaska (NPR-A). ConocoPhillips has major ownership interests in two of North America's largest oil fields, both located on Alaska's North Slope – Kuparuk, which the company operates, and Prudhoe Bay.**



Source: ConocoPhillips

No, although obviously we always look at good opportunities. In order to become an independent company – as we have been since last May – we had to sell some assets and redefine our portfolio.

We're still working on it. Our focus now is on organic growth. We are investing in unconventional sources, in blocks with high production potential like Eagle Ford, in south Texas, where we currently put out 100,000 barrels a day – just to give you an idea of their impact. So, unconventional will be a very important part of our growth plan for the next 10 years. On top of that there is our position in Canadian oil sand, our work in Alaska, in the North Sea, in Malaysia and in Australia.

**In Australia your APLNG (Australia Pacific Liquefied Natural Gas) project is drawing a lot of investment right now. Are you planning to build a third LNG train?**

We are permitted to build four trains on our site. We have announced that we are building two trains but we have a large resource potential. We will look at it down the road.

**In the Australian region, ConocoPhillips has working interests in the Greater Sunrise area. Is the project still on the table?**

It is still a development. We have to work out the concept with the two governments before we can move forward.

**Alaska continues to be the most productive oil region for ConocoPhillips, according to your financial results, but it seems to be losing momentum in your strategy, compared to the lower 48 states...**

We still invest quite a bit of money in Alaska. We are investing \$800 million in the Alaskan operations today. It is still

capturing a lot of our investment. It has been a legacy asset in the company for 40 years. Prudhoe Bay was discovered by Arco in 1968. So it is a huge part of our business. We are willing to invest even more in Alaska – that is our message – but they have put in place a fiscal regime now that really is imbalanced in terms of the risk and reward and the sharing of the opportunity between the state of Alaska and the companies that are there. The encouragement to the governor has been to consider ways to make it a fair, proportional share, because if he would do that he would find that there is more investment that would be attracted to Alaska, and ConocoPhillips would be among those looking to invest more.

**Together with Exxon Mobil, BP and TransCanada, ConocoPhillips has proposed to develop a natural-gas pipeline from Alaska's North Slope to a port where the gas would be prepared for export. At what stage is the project?**

The companies are studying it. It is a very big project. We are trying to understand the cost of a project that size and more importantly what kind of regulatory and fiscal stability we would need to support such a project, worth billions and billions of dollars.

**How important is it for the U.S. to become a major LNG exporter?**

It is very important. Conoco was the first company to export LNG from our Kenai plant in Alaska. It began operations in 1968. The ability of the U.S. to export LNG would improve energy security and our trade balance, and also support the economic recovery while protecting the environment.

Ultimately energy security in the U.S. would have an impact on the geopolitical side: it can be a formidable asset in re-establishing U.S. influence around the world.

**Could the environmental concerns over the hydraulic fracturing process used to extract shale gas slow down development of these reserves?**

It is a significant issue, but there are some extreme positions on this issue. We have the most advanced technologies. We need to demonstrate to the public that this is a safe business and that it is environmentally sustainable. The technology in this business is really outstanding.

**Where will the U.S. LNG be directed to?**

We need to leave it to the market to determine. It will also depend on the infrastructure in place. Certainly big economies like China or India will need more and more energy in the future to supply their growing energy demand.

**Will the "shale gas revolution" spread to other parts of the globe, or will it remain essentially a North America phenomenon?**

Certainly shale gas formations have been discovered in other parts of the world and not only in North America. There are potential shale reserves in China, Poland, Colombia – but you need the infrastructure to develop those reserves; you need services companies; and obviously the right regulations. It is not only a geological issue.

**How important is China for your business?**

China has been an important country for us, and remains an important country for us. We started in China in the late Seventies, in the South China Sea, and we have our development set up in Bohai Bay. We just signed a deal to work on some of the unconventional opportunities in China's Sichuan Basin. So China is a key country for the energy business, and for our company.

**What are your plans for the Gulf of Mexico, and**



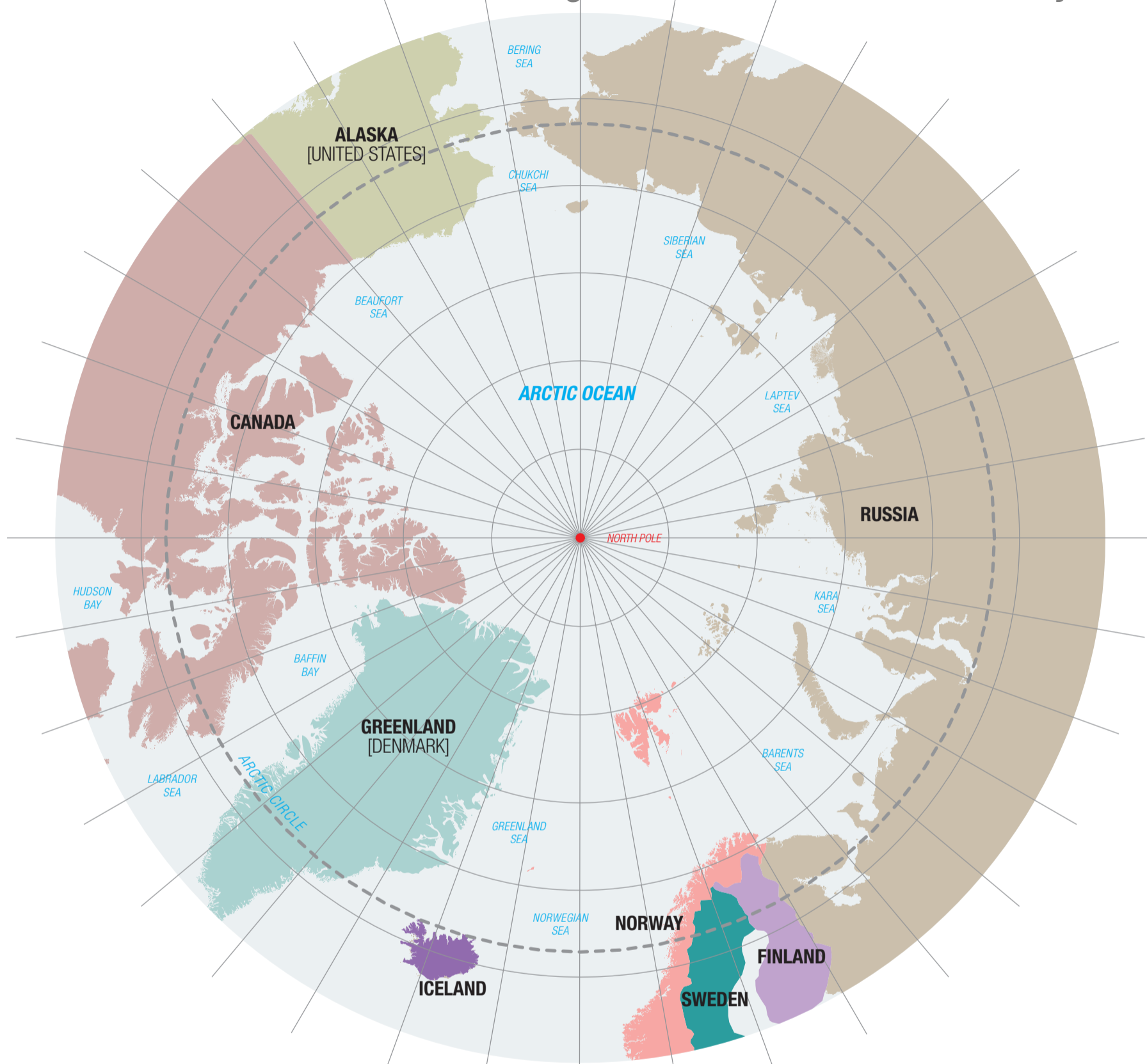
**what is the role of deep water in the new ConocoPhillips?**

In the course of the last two or three years we have rebuilt our position in the Gulf of Mexico. We are the sixth-largest leaseholder in the Gulf of Mexico. The deep water of the Gulf of Mexico and other deep waters in the world are going to be a big part of our plans. With the well control incident in the Gulf in 2010, the regulatory environment has become stronger and now it takes more time and more money to do the same things we were doing before. But it is also important to make sure that the regulations are balanced with the needs of the economy. Deep water technologies today are very competitive, but only one accident can change that. We are ready to work within the framework of stronger rules imposed after the accident at the Macondo well.

**DEEP WATERS**

**The deep water of the Gulf of Mexico and other deep waters in the world are going to be a big part of the company's plans.**

**Future scenarios/**Between multilateral governance and institutional anarchy



# The new Arctic: how to inter

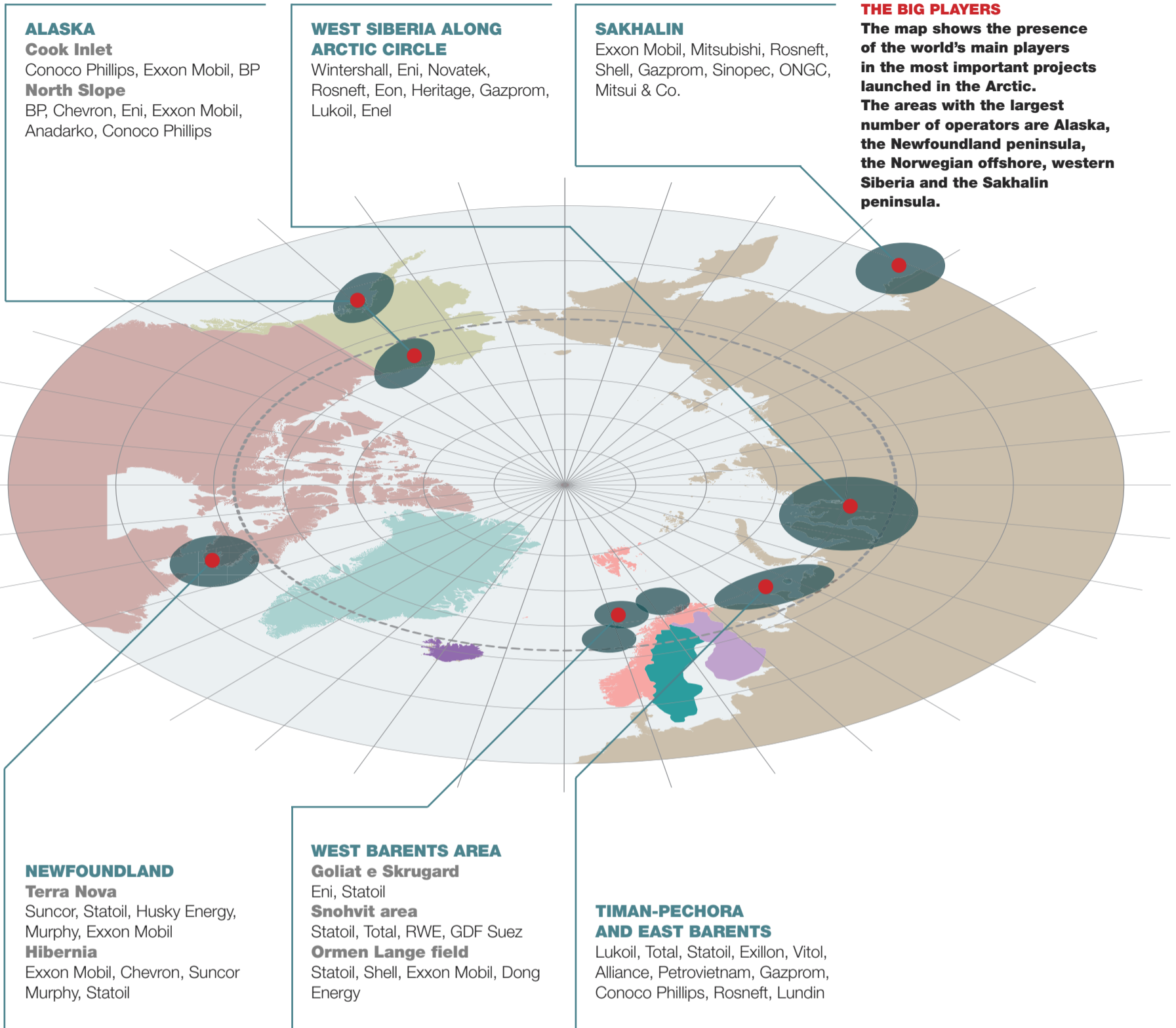
Although the area holds immense riches, it is extremely difficult to translate this potential into reality. Critical environmental, technological, political and institutional questions remain unanswered

**M**

by MOISÉS NAÍM

elting sea ice in the Arctic is changing not only the geographical landscape of the circumpolar region; it is transforming the political environment, as well as global dialogue and policy-making. The abundance of oil, gas, and mineral

wealth, along with wind, tidal, and geothermal energies, have converted the Arctic into a fiercely debated topic – and a highly contested region. There are four main forces which have changed how we need to think about the Arctic: climate change; a fresh global yearning for resources; the emergence of new and influential actors; and new technologies.



# pret it. And how to rethink it

**CLIMATE CHANGE**

For several decades, changes in the climate have led to huge disruptions in the Arctic environment, as rising temperatures, retreating sea ice, melting glaciers, and thawing permafrost have drastically transformed the terrain. The implications of climate change have led governments and businesses to pay more attention to the potential benefits from Arctic transport, tourism, fishing, and to

the exploitation of its vast reservoirs of natural resources. Scientists, multilateral organizations, and activists are also increasingly present in the Arctic.

Even though the region will not be completely ice-free and navigable year-round, the months in which it becomes passable will clearly have an impact on the shipping industry. Opening waters may lead to the development of major new shipping

routes, shortening the distance, travel time, and costs of intercontinental transportation. Moreover, the melting ice will also open new opportunities for “polar tourism,” as exploration and sightseeing will flourish.

The trend, then, is for climate change to make the region more accessible, bolstering the attraction to the Arctic’s wealth of oil, gas, and mineral supplies. Inevitably, all of

this poses enormous risks as well. The most immediate is the danger these new activities pose to those who currently inhabit this region, particularly indigenous groups such as the Inuit. With the emergence of an Arctic economy, a corresponding prevalence of new diseases and epidemics has surfaced. For instance, according to a 2011 report published by the University of the Arctic’s Institute for Applied Circumpolar →

Policy, the rise in tick-borne diseases, tularemia, and contaminants like mercury, as well as exposure of animal burial grounds (and potentially anthrax) may create a dangerous public health situation.

But an Arctic region altered by climate change and human activity poses risks for others beyond the indigenous inhabitants. Changes there will not stay there: they will affect the rest of the planet. The effects of receding coastlines and melting ice are already having a global impact. It is safe to assume that other unintended consequences of changes in the polar habitat will also be felt in the future.

The Arctic has never been a static environment, but in the past two decades its changes have become more complex, varied, and rapid. And in the decades ahead, the Arctic will change more than it has in previous centuries. The consequences of these changes will be both promising and dire.

### A NEW FRONTIER FOR OIL, GAS AND MINERALS

The Arctic is endowed with a lavish supply of valuable natural resources including petroleum, minerals, fish, and even forests. In 2008, the U.S. Geological Survey released a report estimating that the undiscovered oil north of the Arctic Circle could amount to as much as one-third of the entire world's reserves. Gas reserves in that same area could reach 12 percent of the world's total. Most Arctic petroleum production is taking place in Alaska and Northern Russia. The mineral wealth concentrated in this region includes the world's most abundant fossil fuel, coal, as well as iron ore, nickel, cobalt, titanium, bauxite, zinc, lead, copper, gold, silver, platinum, and diamonds. Fish stocks in the Arctic include shrimp, snow crab, cod, herring, and sardines; salmon and trout are also farmed there.

Although most of the Arctic resembles a polar desert, low shrub vegetation is evident. The boreal forest, though uncultivated, is the largest natural forest on earth. While wood removal and harvesting does occur, stringent environmental regulations have, so far, limited their exploitation.

All of these valuable commodities are attractive not only to countries with claims to the region, but also to potential investors from non-Arctic nations. For instance, Russia may allow western companies to own oil licenses in its Arctic waters, which might make Russia the world's second largest crude producer.

In 2012, ArcelorMittal, the world's largest steel company, was author-

ized to begin a multi-billion dollar project to develop the first iron-ore mine on Baffin Island—a Canadian territory in the Arctic. Due to the extremely harsh conditions, this is the first and largest mining development in the frigid Arctic.

While the Arctic is the repository of immense reserves of natural, mineral, and hydrocarbon resources, the complexities of converting this potential into a reality are enormous. Difficult environmental, technological, political, and institutional questions about how to operate in the Arctic remain unanswered.

### NEW ACTORS

Governing the arctic is a complicated matter. Start with the fact that the main body charged with coordinating the many different nations, peoples and organizations with claims in the Arctic is overwhelmed by an exploding demand for action and a more limited capacity to deliver what its diverse constituents want.

The Arctic Council is formed by the eight countries with territorial sovereignty over parts of the region, plus organizations of indigenous peoples, as well as intergovernmental and non-governmental organizations. The member countries of the Council – Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, and the United States – are not, however, the only nations actively involved in the Arctic. Geopolitical ambitions are emerging from non-member states, including the European Union, Japan, South Korea, and China.

A potential resource boom in the Arctic would be especially attractive to the emerging economies of China and India, whose hunger for energy is well known. In August 2012, for example, China proclaimed itself a

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The Arctic Council is trying to find the best strategy for fulfilling the responsibilities that it must take on and the challenges that lie in store for it

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“near-Arctic state.” The Asian giant's attempts to secure access to resources in the Arctic are driving its expanded diplomatic relations with the member nations of the Arctic Council, focusing on this matter. It has also inked lucrative agreements involving geothermal energy with Iceland and Greenland. The Arctic



Council has itself changed substantially since its official inception in 1996, increasingly assuming new roles such as negotiating agreements for oil spill remediation and conducting studies on shipping and climate change.

It is important to note that countries are not the only actors proliferating within the circle of Arctic policy. Multinational companies – the United States' Exxon, Italy's ENI, Norway's Statoil, and Russia's Rosneft and Gazprom – are actively engaged in the region, exploring for hydrocarbons.

The maritime industry (shipping companies, offshore drilling companies, cruise lines, the fishing industry, and oil spill response organizations) is gaining more influence, as are marine insurers. New groups of scientists from all over the world, as well as non-governmental organizations, are also multiplying.

How to govern and organize all this booming activity in such a fragile and fast-changing environment? Currently, the main locus of the policy debate remains in the Arctic Council and its members.

With several initiatives that deal with issues ranging from conserving Arctic flora and fauna and protecting the marine environment, to assessing Arctic biodiversity, climate change, and human development, the eight Arctic nations are working with other nations (including permanent and ad-hoc observer states), NGOs, multinationals, intergovernmental bodies, and indigenous peoples to protect the region from harmful exploitation and mismanagement. As technologies advance and resource extraction becomes more viable, the political and economic ambitions of all these actors will influence the direction of diplomacy and negotiations.

How these dynamics will shape global politics is still uncertain, as the Arctic Council is still finding its way on how to best respond to the growing number of responsibilities



**NORDKAPP.** The “Globe,” an iron sculpture representing the planet, at the North Cape, on the northern island of Magerøya, Norway.

and challenges it faces. The demands on the Arctic Council are growing faster than its capacity to adequately respond to them.

### NEW TECHNOLOGIES

The expanded possibilities to operate in the Arctic and seek its treasures have also been driven by an explosion of technological innovation. New technologies are opening new opportunities, but also creating new problems for the Arctic. Remotely-operated vehicles equipped with high-definition cameras have allowed scientists to collect samples and identify several creatures never seen before. More sophisticated ice-coring techniques, in which cylinders of ice are drilled out of glaciers and ice sheets, also provide scientists with fresh opportunities to learn about sea ice algae as well as pollutants and dust, allowing them to gain a deeper understanding of the Arctic food chain and biological systems. New technologies, including drill ships for year-round operation, are being tested.

All of these advances, however, also have shortcomings. In December 2012, for instance, a drill ship used by Shell Oil was under investigation by the U.S. Coast Guard for problems related to pollution control equipment and crew safety. The drill ship, Noble Discoverer, is just one example of how even the most advanced equipment can have potentially devastating imperfections. Even mechanical problems, which may not necessarily harm the environment, may make search and rescue efforts problematic, by placing rescue squads in harm’s way. Because of the Arctic’s pristine nature, countries with an interest in exploration are especially selective in their choice of the corporations allowed to operate in the region; only the most environmentally sensible, technologically advanced, and financially robust companies are suited to pursue endeavors in the Arctic. Corporations engaging in natural resource exploration there use a variety of state-of-the-art technologies and techniques, such as drilling rigs, marine streamers, and

inspection devices. “The Arctic Marine Shipping Assessment” published in 2009 by the Arctic Council outlined several of the challenges faced by navigators, as well as potential solutions. Navigation devices with accurate and timely information, icebreakers, deep-water ports, search and rescue squads and equipment, and resources to respond to emergencies are still in their infancy. The Automated Identification System (AIS) transmitter, which electronically identifies, locates, and prevents the collision of vessels, has advanced the evolution of Arctic expedition, although it is not yet mandatory for all vessels. Nonetheless, the continued development of high-tech devices, equipment, ports, and vessels will expand the realm of Arctic exploration.

### TWO EXTREME SCENARIOS

The economic and strategic implications of ice-free Arctic seas are growing in importance as climate change reconstructs the region and the opportunities it presents. One feature is irrefutable: the Arctic, always fragile, has now become even more vulnerable.

Formerly inaccessible to and isolated from the rest of the world, the wildlife, indigenous people, and landscape are now more at risk. The Arctic is exposed to governments, businesses, and institutions previously indifferent to the region – all of whom must be mindful of the implications of their activities there. The new frontier of the Arctic is only beginning to shift; limiting the costs and damages associated with industrial development, climate change, pollution, natural resource extraction, and disturbance to the precious ecosystem must be prioritized and monitored with great attention.

The Arctic can evolve in two vastly different scenarios. In one – let’s call it the predatory future of the Arctic – the region and the environment are polluted, decayed, and over-exploited, and each actor is able to pursue its own interests more or less autonomously and without coordination with others. Individual

governments assume total sovereignty in their endeavors to explore and exploit the Arctic, and thus weak or no overall governance of the region is the norm. The outcome is an Arctic where anarchy reigns. In the other extreme scenario – global governance at its best – we find that governments find a way to agree on an effective and shared governance of the region. They are capable of coordinating their actions, agreeing on rules applicable to all the different actors, and mustering the will and the ability to enforce these rules. This leads to an Arctic governing arrangement that is both sustainable and harmonious. In this scenario, multilateral governance has successfully led to the orderly development and effective collective decision-making in the Arctic. Clearly, the utopian nature of the latter scenario would benefit humanity the greatest. These two extreme scenarios are unlikely to unfold, but depicting these two options brings to mind the limitations, benefits, and drawbacks of effective collaboration as well as the consequences of institutional anarchy. In reality, the most likely scenario is that the Arctic will be wedged somewhere in between these two extremes. In order to achieve a more sustainable Arctic, responsible and shared governance must create incentives, regulatory measures, and institutions that will be capable of maintaining peaceful relations at the international level without pushing the region into the path of over exploitation and even destruction.

The Arctic wilderness is the perfect evolving, modern day example of the tragedy of the commons – the concept that highlights how a resource available to all is prone to be abused and eventually destroyed. It encompasses all textbook examples including pollution, depletion of fish stock, loss of habitat – the list goes on. Countries must act rationally, but most importantly, they must act responsibly in their political and economic endeavors in the Arctic to ensure its environment and resources are not needlessly sacrificed.

What happens in the Arctic in the next decade will have consequences for us all.

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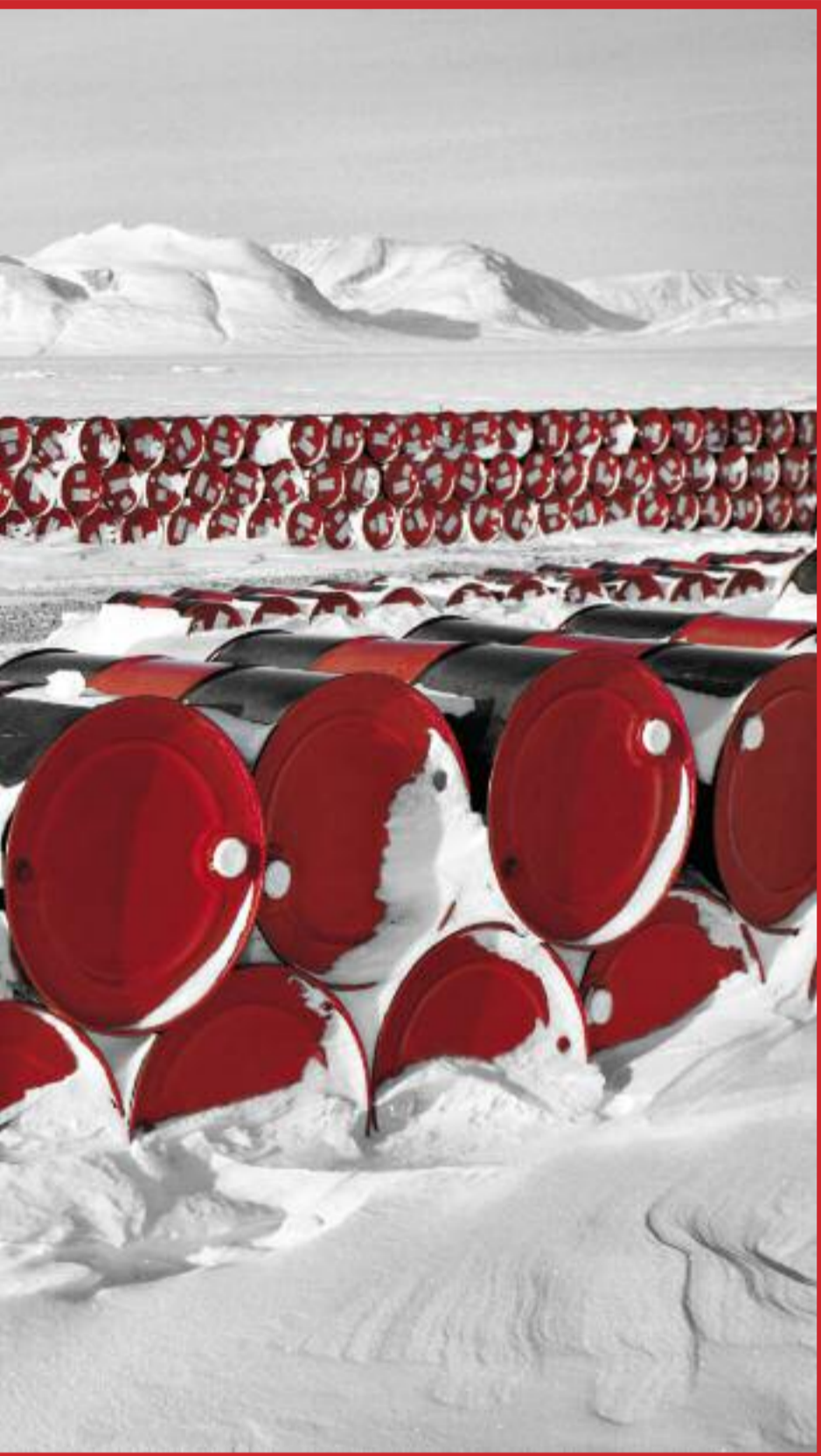


**Outlook/**Over 20 percent of the world's unexplored gas and oil potential lies in the Arctic

# Big promises and big question marks

Most of the resources lie in the continental shelves of coastal countries, i.e., in areas not involved in international disputes. The costs and risks associated with hydrocarbon development are very high





## LAND, SEA AND ICE

The Arctic as a geographical region is often defined as the area of land, sea and ice north of the Arctic Circle (66 degrees North). It encompasses about 6 percent of the earth's total surface and is dominated by continental landmasses, continental shelves and deeper Arctic Ocean waters (beyond 500 meters). The Arctic contains elements of eight countries; Canada, Denmark/Greenland, Finland, Iceland, Norway, Russia, Sweden and the United States. Around four million people inhabit the Arctic, with the vast majority to be found in the Russian Arctic. Northern communities are involved in energy development projects but their participation remains controversial, with some residents complaining that their interests are often secondary to those of corporations and national/federal governments. Oil and gas exploration in the region is not new, and has occurred in one form or another for decades. Onshore and offshore exploration and exploitation intensified in the 1960s, especially in Alaska (Prudhoe Bay 1967) and Russia (Tazovskoye 1962). It is important to bear in mind that the discovery of large oil and gas fields was critical given the development costs. Prudhoe Bay, with an estimated 13 billion barrels of recoverable oil justified the investment in a trans-Alaska pipeline project. The North Slope might never have been developed without that kind of infrastructural investment, and even then the gas potential in the region still remains under-developed compared to oil. There are in the order of 60 large oil and gas Arctic fields; 43 are located in Russia, 11 in Canada, 6 in Alaska, 1 in Norway. Greenland does not as of yet possess any large oil and gas fields in production.

## MOUNTING INTEREST

There is an unprecedented interest in the northern latitudes among Arctic states and non-Arctic states, corporations and organizations alike. The role and contribution of climate change, resource potential, strategic significance, political interest, environmental anxiety and the like have all been credited with this polar enchantment. No longer a remote region of the world, more and more emphasis is now placed on commercial accessibility, geopolitical dynamism and resource potential. In the terms of resource potential, the 2008 U.S. Geological Survey Circum-Arctic Resource Appraisal was galvanizing. It was the first of its kind. The report's authors put together an international panel of experts and drew on data held by a range of interested parties including the Norwegian Petroleum Institute and Ge-



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by **KLAUS DODDS**

If you wanted a powerful reminder as to the operational challenges facing companies and national governments eager to explore the oil and gas potential of the Arctic, then you might look no further than the story surrounding Shell's drilling rig, the Kulluk. On route from Alaska to Seattle it eventually ended up grounded on the shores of Sitkalidak Island. The resulting image of the stranded drilling rig became widely circu-

lated and provoked a backlash against Shell. While environmental campaigners stepped up their efforts to "save the Arctic" from further hydrocarbon exploitation, financial investors were alarmed at the apparent risks facing those who sought to drill in the Arctic region. Were the technological, environmental, and financial risks too high? The U.S. Interior Secretary Ken Salazar has ordered a review of offshore drilling in Alaska and asked that review to consider whether "lessons" need to be learnt. The review, once published, might lead to new delays for any drilling campaign planned by Shell in 2013.

ological Survey of Canada. Its conclusion, based on an appraisal of 33 geological provinces (25 of the most promising were considered in detail), highlighted the following undiscovered potential: 82 billion barrels of oil (12 percent of estimated world total), 1663 trillion cubic feet of natural gas (TCF, 30 percent of estimated world total) and 44 billion barrels of natural gas liquids (NGL, 20 percent of estimated world total). In sum, the report asserted that the undiscovered potential of the Arctic totaled some 403 billion barrels of oil equivalent (BOE, 20 percent of the estimated world total). Those figures were revised in a 2010 USGS re-assessment →

of the Alaskan National Petroleum Reserve but give a good indication of the scale of the undiscovered potential. As the report's authors made clear, the assessment of undiscovered potential meant that some of that potential may never be discovered or exploited depending on geographical location, physical accessibility and long-term market conditions. So we need to exercise caution before describing the Arctic region as a bonanza space. It might be, but only in some places.

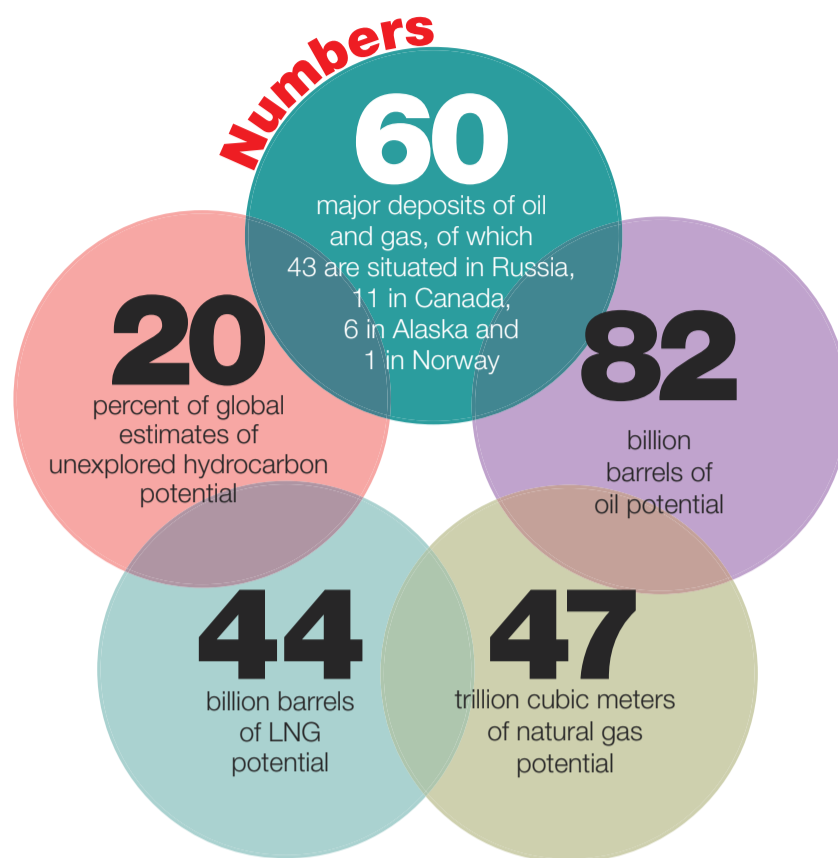
### GREATEST POTENTIAL IN TEN PROVINCES

The report also – and this was of considerable geopolitical significance – affirmed that the majority of the undiscovered potential is located on the continental shelves of the five Arctic Ocean coastal states, namely Canada, Denmark/Greenland, Norway, Russia and the United States. Undiscovered natural gas is three times more plentiful than oil in the Arctic region and the vast majority of that potential lies in the undisputed exclusive economic zone of Russia. Despite the emotive importance of the North Pole and central Arctic Ocean, the report did not consider that region to be commercially significant. Thus, oil and gas undiscovered potential was, in the main, to be found in areas that are not subject to international dispute.

The undiscovered oil and gas potential of the Arctic is also geographically uneven, with some resource provinces being particularly significant (e.g., the West Siberian Basin and East Barents Basin). Much of the undiscovered potential is actually concentrated in ten of the largest resource provinces. Euro-Asian provinces hold about 60-65 percent of the total Arctic resource base, and the North American sector is more promising in undiscovered oil potential as opposed to gas. The North American Arctic is estimated to have 65 percent of undiscovered oil potential, for example. This distribution of potential matters for several reasons – the exploitation of gas is more expensive due to pipeline construction and lower energy density, Russia is considered to be a challenging commercial environment, and long-distance shipping is costly in polar environments. While liquefaction and pressurization can offset transport costs for natural gas, there are other commercial factors such as the large capital costs required to establish liquefaction facilities and the liquefied natural gas (LNG) tankers.

### MOVING FORWARD: OPPORTUNITIES, COSTS AND RISKS

Considerable uncertainty remains regarding the undiscovered oil and gas



potential of the Arctic region. As more oil and gas drilling and exploration is undertaken, so we will gradually develop a better understanding of what might be achievable. Market conditions, political decision-making, environmental issues, alternative energy supplies (e.g., the shale gas revolution in the U.S.) and long-term low

The region holds promise from a commercial point of view, but operators need to be aware that it is very difficult to make predictions about the future development of resources

carbon transition policies and strategies will add further complexity to this overall assessment. It is worth remembering that around 15 large oil and gas fields still await development, and in some cases have been known about for four decades. So there are commercial opportunities both in the here and now as well as in the future.

Making Arctic oil and gas fields commercially attractive is thus not straightforward, and operating costs are expensive. The factors contributing to costs include harsh weather and challenging terrestrial and marine conditions (e.g., sea ice distribution, icebergs, permafrost), establishing and maintaining robust infrastructure and transport networks, long-distance lo-

gistical chains, labor costs, social licensing and local community investment, commercial-legal requirements, and insurance-related expenditure. Oil and gas development can be affected by severe weather, resulting in supply-chain and exploratory-drilling delays. The latter can also be very expensive; Shell has paid over \$2 billion for exploratory leases in the Alaskan Arctic, and legal action taken by indigenous communities can also add to cost and reputational risk. The Alaskan Eskimo Whaling Commission challenged Shell in the U.S. courts over the environmental consequences of offshore drilling to subsistence lifestyles.

Oil and gas operators confront, as a consequence, a whole series of risks, some of which have been magnified by recent disasters such as the Deepwater Horizon spill in the Gulf of Mexico. Russia's Yamal Peninsula and Barents Sea region have often been noted to be physically challenging. Ice conditions are testing, including year-round pack ice, multi-year ice, massive icebergs, and limited open water seasons. Operators have had to undertake further investment in oil-spill response planning, and this has made it all the more difficult to estimate lead times in terms of project operationalization. BP's experience in Russia has also proven challenging with costly legal arguments over commercial partner-

ships and environmental standards. Delays and over-runs in combination with commercial, legal and political uncertainties mean that oil and gas development in the Arctic is never straightforward. Technological development in the areas of oil-spill response, icebreaking tankers, iceberg resistant platforms, and ice-resistant pipelines will clearly help ameliorate some of these risks.

### CONCLUSION

There is no Arctic "scramble" at the present time for resource development. Relations amongst the Arctic states are generally cordial and the Arctic Council, the main inter-governmental forum, has recently overseen the introduction of search and rescue co-operation and is developing more robust oil-spill response management. There are very few areas of territorial dispute; notably Norway and Russia have agreed on a common boundary for the Barents Sea. There is no reason to think that the five Arctic Ocean coastal states will not agree upon the delimitation of Arctic extended continental shelves. As noted earlier, the undiscovered oil and gas potential of the region lies within the undisputed exclusive economic zones of the Arctic 5.

The Arctic region holds over 20 percent of the world's undiscovered oil and gas potential, and about ten energy provinces are key to future exploitation. The vast potential in gas is concentrated off the Russian continental shelf but it will remain costly to develop. Offshore oil potential is not, as the Shell Alaskan example proves, free from cost and delay. And any future oil and gas development will have to contend with environmental campaigning and indigenous/Northern community scrutiny. This does not mean, as the Greenlandic example demonstrates, that Arctic communities are against oil and gas development. But they will be increasingly active in demanding consultation and participation (with benefits to follow).

There are considerable costs and risks attached to oil and gas development in the Arctic region. Lead times will not be short. Delays are highly likely. There is commercial promise but operators/investors need to be aware that this makes the Arctic's future resource development very difficult to predict.

**Problems/Risks** and costs associated with resource development are fueling skepticism

# The Pole may be warming, but enthusiasm is cooling

After a period of “irrational exuberance,” the pace in the Arctic is slowing. In the last year, Royal Dutch Shell, BP and Statoil have stopped drilling, and Gazprom has suspended the Shtokman project

**A** year or so ago, there was still what can only be described as “irrational exuberance” over the prospects of a great oil and gas rush in the unforgiving environment of the Arctic. Rapidly melting Arctic ice was expected to open up

access to this remote and frosty region, which is estimated to hold about a fifth of the world’s undiscovered oil and gas deposits. Politicians from all the Arctic nations – not least U.S. President Barack Obama and his Russian counterpart Vladimir Putin, as well as those from the other Arctic nations including Canada, Greenland, Iceland, Norway, Denmark and Finland – launched ambitious new policies to tap this new resource-rich frontier. International and national oil companies have already spent billions of dollars on drilling leases and equipment made to withstand the extreme conditions of the Arctic. Newspapers talked of “the great scramble for the Arctic” and “the race for the Arctic.”

## THE DOUBTS OF POLITICIANS AND COMPANIES

In retrospect, everybody appears to have gone ahead of themselves. In recent months and weeks policy makers and industry experts, let alone environmentalists who have always opposed Arctic drilling, have become increasingly skeptical about the ability of oil companies – at least for now – to drill, extract and ship the oil and gas safely in the extreme weather and sea conditions of this remote region. The recent and embarrassing difficulties encountered by Royal Dutch Shell in its ambitious U.S. Arctic campaign, which has already cost the company nearly \$5bn, have concen-



trated the minds of political and industry leaders, raising serious doubts over whether the oil industry was indeed ready to take on the daunting technical and environmental challenges of Arctic offshore drilling.

At the end of February, Royal Dutch Shell announced it was postponing a second summer of drilling in the U.S. Arctic Ocean after suffering a string of mechanical failures, regulatory challenges, damage to its spill-containment equipment, and other problems. These culminated on January 1 when its Kulluk drilling ship ran aground on an uninhabited island about 300 miles southwest of Anchorage, after ships towing it lost control of the rig during a storm. The U.S. administration is now reviewing its Arctic oil and gas policy. Two of President Obama’s closest advisers – the former head of the environmental protection agency, Carol Browner, and John Podesta, who headed the President’s 2009 transition team – have said they do not see any way to drill safely for oil in the Arctic. Ken Salazar (Interior Secretary until March 2013) shares this view. Soon after ordering a government review of Shell’s Arctic operations, he acknowledged that he had doubts about whether drilling could be safely conducted in the Arctic at all.

Shell’s decision to postpone its planned drilling campaign in Alaska’s Beaufort and Chukchi Seas this year has now cast further doubt about the future of drilling in the Arctic. Even before the recent disasters, other oil companies had decided to hold back on their Arctic plans. Already last July, British Petroleum, still struggling with the repercussions of its 2010 Deepwater Horizon massive spill in the Gulf of Mexico, withdrew its own bid to drill in the Alaskan Arctic due to incalculable “costs” of any accidents. Norway’s Statoil also suspended its own plans for drilling in →

# Oil and gas: the next steps for the sub-Arctic countries



## RUSSIA

Exploitation of the new petroleum fields is a strategic priority for the country, to offset the inevitable fall in output from the currently active fields. However, Russia is fully aware that exploiting the oil and gas of the Arctic – particularly in deep waters – depends to some extent on the involvement and collaboration of western oil companies, which have the necessary technology.



## NORWAY

Following the settlement in 2010 of the dispute with Russia over the south-eastern part of the Barents Sea, Norway is now actively engaged in opening up a new oil exploitation area in collaboration with Statoil. It plans to build a terminal in the Arctic to receive output from the Skrugard and Havis fields in the Barents Sea, which are estimated to contain from 400 to 600 million barrels of oil.

the Alaskan Arctic in August, saying at the time; “We have decided to take what we believe is a prudent step of observing the outcome of Shell’s efforts before finalizing our own exploration.” In September, French oil company Total called Arctic drilling operations a “disaster.”

### RISKS, COSTS AND OIL PRICES

“For oil companies there is a need to balance the huge potential of the region with its risks and enormous costs. These risks are not only technical and financial but also reputational,” argues Charles Emmerson, a senior researcher at London’s Chatham House think tank and author of a comprehensive book on these and other critical issues called “The Future History of the Arctic.”

Mr. Emmerson also contributed to a detailed study on the risks involved in Arctic development for the British insurer, Lloyd’s of London, that argues “cleaning up any spill in the Arctic, particularly in ice-covered areas, would present multiple obstacles which together constitute a unique and hard-to-manage risk.” Indeed, there is general agreement among academics that no one has yet fully determined how to clean up an oil spill in pack ice or broken ice.

In another study, the accounting and consultancy firm Ernst & Young stresses that Arctic oil and gas “is not for the faint of heart, nor for those with less than deep pockets.” It lists the high risks and costs of Arctic drilling. These include the harsh climate, limited infrastructure, long projected lead times, spill contain-

ment and recovery in a particularly remote and unfriendly environment. Development will ultimately depend not only on innovative technical resources and necessary infrastructures, but also on a sufficiently high price of oil to make these huge long-term investments viable. There is no

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Only a sufficiently high oil price will ensure the long-term profitability of investments. But there is no guarantee where oil and gas prices are heading

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guarantee where oil and gas prices are heading. A first phase of Arctic exploration and exploitation in the 1970s and 1980s petered out in the 1990s when oil prices collapsed to \$10 a barrel. Now, the large quantities of gas in the Arctic Ocean – according to the 2008 United States Geological Survey, the Arctic Circle is estimated to contain 90bn barrels of undiscovered oil and considerably more gas – face competition from other gasses including the U.S. shale revolution as well as coal-seam gas and liquefied natural gas. Moreover, recent big gas discoveries off the coast of East Africa will also put pressure on Arctic ventures, given that these resources will cost about half as much to develop. Dr Donald L Gautier, principal investigator for the 2008 U.S. Geological Survey, re-

cently noted that the new competing forces in the gas sector “means very, very expensive gas sitting offshore in the Arctic is now even more difficult to bring to market that it was before.” Industry experts also point out that whereas it costs around \$5 to produce a barrel of oil in the Middle East, it

could cost anything between \$35 and \$100 in the far north, depending on the zones and the depth of the water.

This is one of the main reasons why Russia’s Gazprom decided last year to suspend its flagship Shtokman project in the Barents Sea. Professor Marcel Gubaidullin, the director of the Institute

of Oil and Gas at the Northern (Arctic) Federal University in the Russian city of Arkhangelsk, confirmed that “the project became too expensive.” Graphically describing the scale of the challenge to the Deutsche Welle broadcasting group, he explained: “The Shtokman reserves lie 600 km off the coast of Murmansk. A helicopter with a full tank wouldn’t make it there. So a temporary platform would have to be built on the open sea or an intermediate stop on the island of Nowaja Semlja. Besides, the water there is 340 meters deep. If you placed the Eiffel Tower on the bottom of the sea, it wouldn’t even stick out of the water. In addition, it’s very stormy there, with waves up to 27 meters high, with temperatures fluctuating over the year between minus 55 and plus 35 degrees Celsius.”

The Russians also remember only too vividly the tragedy that occurred in December 2011 when the Kolskaya jack-up rig which was being towed capsized and sank during a fierce storm in the sea of Okhotsk. It had just completed an exploration well for Gazprom off the Kamchatka peninsula. As many as 53 people died or were declared missing – the largest number of casualties in an accident in the Russian oil sector.

### BOUNDARY DISPUTES

If all this was not enough, geopolitics are adding an extra element of uncertainty to Arctic oil and gas development. Overlapping and competing sovereignty claims have led to boundary disputes that make long-term investment decisions all the more difficult. The Ernst & Young report emphasizes that a stable geopolitical environment will be required if companies are to commit to Arctic exploration. The risk is that rather than cooperating diplomatically to avoid conflict, countries around the Arctic Circle will promote their individual and differing interests by seeking control through country-specific regulations, environmental laws and jurisdictions. Some eyebrows have already been raised at Russian moves to rebuild its Arctic military capabilities.

As Charles Emmerson points out: “There is a key geopolitical dimension to Arctic oil and gas developments, involving states’ power, stability and influence. This is particularly true of Russia, where hydrocarbons represent 40 per cent of export earnings and the

**CANADA AND GREENLAND**

So far, Arctic prospecting by Canada and Greenland has produced disappointing results, but interest has been re-ignited by a number of wells in the Canadian Arctic that were abandoned as unprofitable at the end of the 1980s. Much will depend on the price of oil, which will need to stay sufficiently high to justify the resumption of drilling in these wells, and on prospecting operations in certain areas that were leased in 2007 and 2010 but have thus far remained inactive.

**U.S.A.**

Production in Alaska's North Slope hit its all-time high at the end of the 1980s. Today, the challenge is to identify new fields to offset the fall in output and maintain the economic viability of the Trans-Alaska Pipeline, which is currently running at half capacity. However, prospecting in the Alaskan Arctic will probably be mothballed following Shell's decision to suspend the drilling operations planned for this year.

**UNITED KINGDOM**

A report issued by the Environmental Audit Committee of the British House of Commons has called for the suspension of exploratory drilling for oil and gas in the Arctic until more rigorous protection measures have been adopted.



state budget depends on taxes and royalties from hydrocarbon production.” Thus Russia's gas exports are a significant feature of the country's geopolitical role in Europe, while expanding oil and gas exports to China has become an important policy objective for the Russian government. President Putin has made it clear that developing new oil and gas resources in the far north is a strategic priority to eventually replace the declining production from the country's existing fields. Russia, however, is also fully aware that it cannot do this by itself and that the development of the oil and gas sector in the Arctic, particularly offshore, depends to some extent on the participation and cooperation of Western oil companies with the technology (although recent events suggest there is still much technical and scientific work to be done even by the best-in-class companies to ensure safe and responsible drilling) and management skills to develop these tantalizing new resources. A recent example of this type of collaboration is the decision of ExxonMobil and Rosneft to expand their 2011 strategic cooperation agreement to include far more Russian Arctic exploratory acreage and a possible Russian Arctic LNG project.

If Russia is committed to long term Arctic exploration and development, the country which is moving somewhat faster than other areas in the far north is Norway. Given the country's arguably more stable regulatory and operating environment, investment in Norway's Arctic fields is more predictable. Following resolution with Russia in 2010 of the southeastern

Barents Sea dispute, Norway is now seriously moving to open up a new oil province with Statoil planning to build an oil terminal in the Arctic to service the Skrugard and Havis fields that are thought to contain 400m-600m barrels of oil in the Barents Sea. Canada and Greenland have so far been disappointments in terms of Arctic exploration. However, there has been renewed interest in Canadian Arctic wells previously abandoned as unprofitable at the end of the 1980s. Much will depend on the price of oil remaining at sufficiently high levels to justify renewed drilling in these wells and exploration of leases awarded in 2007 and 2010 that have since been on hold. In Greenland, the U.K. independent Cairn Energy is the only

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The exploitation of the Arctic's resources also has geopolitical significance in terms of the power, stability and influence of the various countries. This is especially true for Russia

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company undertaking exploration. It has so far spent more than \$1bn in fruitless offshore drilling. Finally, this leaves the U.S. as the other big oil and gas prospect in the Arctic Circle. Already back in 1923, a petroleum reserve for the U.S. Navy was established in northern Alaska, and commercial development began in the 1970s after the discovery of the Prud-

hoe Bay field in the North Slope of Alaska. After a decade-long boom in this region, North Slope production peaked in the late 1980s. Today the challenge is to find new fields to replace dwindling North Slope production and maintain the viability of the Trans Alaskan Pipeline currently operating at half – and even less – capacity. The Alaskan Arctic, which is believed to hold most of the oil hidden in the far north, therefore has great potential.

**THE SHELL REPORT**

The potential is significant for the Alaskan Arctic is estimated to hold the lion's share of undiscovered oil in the far north, while the main new gas re-

sources are believed to be in the Russian Arctic. A report commissioned by Shell in 2011 estimated commercial production of Arctic Alaska offshore oil and gas would generate government revenues estimated at \$97bn in the Beaufort Sea and \$96bn in the Chukchi Sea over a 50-year period. Not surprisingly,

the Obama administration early on was increasingly supportive to Arctic development, but that was before the shale oil and gas revolution, the repercussions of the Deepwater Horizon spill on government thinking, and the controversial accident-prone history of Shell's Arctic drilling program. There is now likely to be a moratorium on Alaskan Arctic exploration in

the wake of Shell's decision to suspend its planned drilling program this year, and a call for more scientific and technical research to close the knowledge gaps and ensure safe and reliable exploration in the region's harsh and hazardous conditions.

It is not just the U.S. that is worried. A report by the environmental audit committee of the U.K. House of Commons has called for a halt on oil and gas drilling in the Arctic until stronger safeguards are put in place. All this political and environmental agitation has once again underlined the profound uncertainties of Arctic oil and gas drilling as well as its opportunities. In the next 50 years or so, the ice cap may well have melted, making it easier to explore, produce and ship out oil and gas from this remote, complex, and environmentally fragile region – all the more so if the industry develops the necessary technologies and equipment to operate in unforgiving Arctic conditions and the oil prices remain high. But it will never be a picnic party. Even if the ice has melted, it will still be very dark for a large part of the year, the seas will still be fierce and stormy, and above all it will always be very, very cold.

Paul Betts has worked for the *Financial Times* for the last 36 years, including 28 years as the paper's foreign correspondent in Rome, Paris, New York and Milan. He is currently based in London.

**Future scenarios/Corporations**  
are crucial for future success

# A promising outlook

It will take several decades and massive investment to bring significant volumes of Arctic resources to market. There are many challenges to be faced, but the payoff is worth it

**A**  
by IAN BREMMER

As the opportunities to access lower-cost-of-production oil and gas plays have become fewer and farther between, the energy industry has forged ahead to identify the next big plays. While shale oil and gas are driving current successes in the industry, the Arctic – given its vast resource potential coupled with melting sea ice – looks to be the ultimate target for supplying future energy needs. This is no surprise considering the U.S. Geological Survey estimates the Arctic could hold around 90 billion bbls of oil and 1,670 trillion cubic feet of gas (or 30 percent of the world's undiscovered gas and 13 percent of oil), and a joint report by Chatham House and Lloyd's of London estimates \$100 billion could be invested in the Arctic over the next decade.

## TIMEFRAMES, INFRASTRUCTURE AND TECHNOLOGY

There are several important realities to keep in mind as interest in Arctic energy resources escalates. First, there is a common misconception that oil and gas companies are entering these territories for the first time, when in fact they have been operating, and even producing, in parts of the Arctic since as early as the 1960s. Second, it is important to realize that it will still be several decades before significant volumes

of Arctic resources are brought to market. This will require substantial investments including: in support infrastructure (such as pipelines and ports), which is noticeably lacking across the Arctic; in ice-resistant technologies including rigs, support vessels, and tankers; and, perhaps most importantly, in additional safety measures and spill-response capabilities, an issue of particular concern in the post-Macondo era. Also of note, there are a number of regulatory, social, and environmental issues that oil and gas companies will have to account for as they consider Arctic opportunities and commence Arctic resource development programs.

On the regulatory side, lease agreements are one issue of considerable concern, particularly in North America and Greenland, where heavy ice conditions permit for only a three- to four-month drilling window in the summer when ice has sufficiently receded. In many cases, this means a drilling program could take several years to complete. Considering existing Arctic lease terms are typically 10 to 16 years, there is concern among oil and gas companies that this barely allows for enough time to achieve cost recovery. Additionally, governments are under pressure to introduce tax regimes that will incentivize production in these more difficult and remote Arctic plays.

There is also the question of resource ownership in offshore waters that border more than one country. The United Nations Convention on the Law of the Sea



(UNCLOS) has helped to some extent by establishing a framework that grants states sovereign jurisdiction over resources contained within 200 nautical miles out on their continental shelf. However, the United States is not a signatory to the convention. In some cases, countries have turned to bilateral negotiations to resolve border questions, as was the case with Norway and Russia in the Barents Sea.

## INDIGENOUS COMMUNITIES HAVE ENVIRONMENTAL CONCERNS

In terms of social considerations, indigenous and local communities have been some of the most vocal in

expressing their concerns with Arctic resource development and the possible ways an oil spill or pollution could disrupt their livelihoods. However, the potential for job creation and tax revenue benefits can help these communities develop, so both oil and gas companies and indigenous communities will gain from engaging in constructive dialogue.

To this end, the Arctic Council will be an important venue for addressing these respective interests. The Council has been established as the main, consensus-based intergovernmental forum through which the eight Arctic nations, six international indigenous peoples organizations, and non-Arctic observers can coor-



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political risk index, and has authored several books, including the bestseller, *The End of the Free Market: Who Wins the War Between States and Corporations?*

dinate on policies and best practices for developing the Arctic. Moving forward, the Council could become one of the most effective mechanisms for ensuring the interests of a range of social, environmental, industry and government entities are represented.

#### CURRENT STATUS OF OIL AND GAS ACTIVITIES

Turning to the status of hydrocarbon activity, although North America has made significantly greater strides exploring its Arctic resources to date than the eastern hemisphere countries, the combination of the U.S. Lower 48 states' shale plays and Canada's Alberta oil

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There is a misconception that oil and gas companies are entering the Arctic for the first time. In fact they have been operating there since the 1960s

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sands has diverted attention away from these ice-covered, remote Arctic resources, at least for the time being. The case is slightly different in Greenland, as the island turns to its oil and gas sector to gain economic self-sufficiency from Denmark. In the eastern hemisphere,

a combination of the lack of severe ice conditions, Norway's extensive offshore experience, and considerable production decline at Norway and Russia's legacy fields has led to a more immediate interest in commencing exploration and production

activity, starting with portions of the Russian and Norwegian sections of the Barents Sea and Russia's Kara Sea.

For the United States, the experience of Royal Dutch Shell in the Alaskan Beaufort and Chukchi Seas during the summer of 2012 was to

serve as a test case for gauging the feasibility of a more extensive U.S. Arctic program. Of particular concern is the need to bring additional resources online that can keep the Trans-Alaska Pipeline System (TAPS) in operation (the pipeline is currently running far below capacity and faces the threat of closure).

However, the complications encountered by Shell, forced the government to renew its assessment of U.S. Arctic exploration and production opportunities, and this decision is likely to impact prospects for other companies hoping to operate in the area, including ConocoPhillips and Statoil.

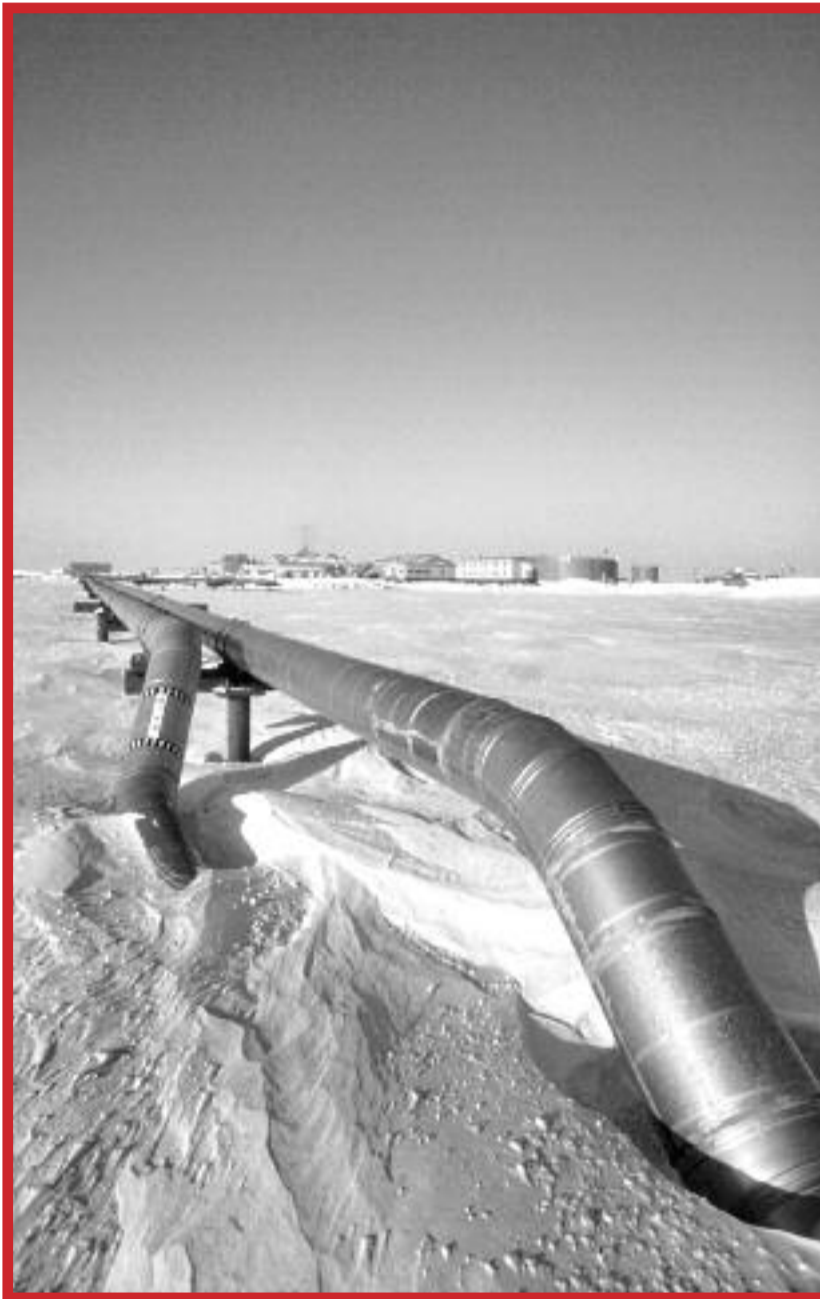
Canada has been slower in pursuing Arctic resource development projects, with progress hampered by the higher costs associated with the Arctic as well as competition from the vast availability of more easily accessible onshore resources. Still, the Conservative government called for bids to develop a five-year strategic plan to conduct oil-spill research in the Canadian Arctic, and last summer Aboriginal Affairs and Northern Development Canada held an auction for acreage in the Beaufort Sea and Mackenzie Delta following a review of offshore Arctic drilling by the National Energy Board.

#### GREENLAND'S EAGER OPERATORS

In the case of Greenland, despite a disappointing 2010 drilling program by Cairn Energy, companies remain eager to acquire new exploration acreage. Greenland's eastern →

**OPERATING DIFFICULTIES**

**Across most of North America and Greenland's Arctic territories, there is an obvious lack of oil and gas infrastructure to support development activity and transportation of resources to market.**



offshore territory is of particular interest to investors, and license awards in this area should be finalized sometime in summer 2013. Operating conditions are particularly difficult in Greenland, considering most of the island lies north of the Arctic Circle and is covered in ice sheets. Still, Greenland remains anxious to develop its resources to reduce its ongoing financial dependence on Denmark. Across most of North America and Greenland's Arctic territories, there is an obvious lack of oil and gas infrastructure, particularly in the offshore areas, to support development activity and transportation of resources to market. The most cost-effective and efficient way to transport supplies and resources looks to be by tanker, and with additional investment into ice-resistant vessels and icebreakers, this could conceivably become a year-round option.

As previously mentioned, the future of Arctic resource development in Norway and Russia looks to be a more promising nearer-term story

as both countries look to offset production decline at their aging fields in the North and Norwegian Seas and in West Siberia.

**RUSSIAN TAX REFORM**

For Russia, Arctic shelf development is the key, long-term strategic prior-

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Lease agreements are one issue of considerable concern, because ice conditions allow a drilling window of only three to four months in the summer

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ity to sustain the country's oil and gas production growth beyond 2020. For now, Rosneft and Gazprom will dominate shelf development activities, aided by technological support and expertise from international joint venture partners, including Eni,

ExxonMobil, and Statoil. Russia is currently in the process of establishing a tax regime system for the shelf, and given the political influence of state oil company Rosneft and its CEO Igor Sechin, the terms will almost certainly favor Rosneft and its joint-venture partners as Rosneft looks to spend nearly \$40 billion in shelf exploration over the next 10 years.

Tax reform should be finalized sometime in 2013 and ExxonMobil will commence its Arctic drilling program in 2014.

In Norway, a good portion of the future hydrocarbon prospects lie north of the Arctic Circle, and the country has the good fortune of extremely limited ice conditions. Forty percent of Norway's continental shelf remains off limits to oil and gas companies, but there is significant potential for extensive hydrocarbon development if additional portions of this territory are opened

up. This is a highly politicized issue and source of much debate, particularly over environmental and ecological concerns, and accordingly is likely to remain shelved at least until after the September 2013 parliamentary elections. While Norway has a well-established tax regime to govern offshore hydrocarbon development, it too, like its Arctic counterparts, is under pressure to extend greater incentives to oil and gas companies interested in developing remote, far north fields.

As is the case in the Western Hemisphere, Russia and Norway possess little existing oil and gas infrastructure. For Russia, this will in part be aided by support and investments from foreign partners, and Norway and Russia will also benefit from agreements targeting cooperation in developing their respective portions of the Barents Sea.

Resource development across the Norwegian and Russian Arctic will inevitably prompt a surge in Arctic shipping, and Russia has already successfully transported goods through its Northern Sea Route, which looks to be a promising future commercial route to transport goods from Europe to Asian markets. This route has added support to Russia's Shtokman and Yamal LNG projects, and Russian gas producer Novatek has signed a 15-year icebreaker transport agreement with Russia's state nuclear company Rosatom. Russia will benefit from ongoing investments in its shipyards and ports, and could build a promising shipping industry on the coattails of its Arctic hydrocarbon program.

**HUGE INVESTMENTS**

Across the Arctic, the onus of successful resource development lies largely with oil and gas companies, which must be prepared to invest heavily in new technologies and to take all precautions to ensure they are observing the most responsible safety and environmental practices. Undoubtedly, there will be a steep learning curve, and during this time access to various services, including rigs and drill equipment, will continue to be constrained as operators prefer to pursue year-round opportunities in less extreme climates. However, the opportunities are vast and the rewards look to be immense. With careful progress, investments into research and technology, and ongoing engagement and agreements with environmental and social interest groups, oil and gas companies look to have a promising and exciting future in the Arctic.





**Russia/Moscow's Arctic Strategy: between cooperation and militarization**

# Icy tensions

Climate change will make Arctic resources increasingly accessible, and the idea of a regular North Sea Route is becoming more realistic by the day. But rapid melting is exacerbating tensions

**T**he 21st century is characterized by the growing international competition for access to energy resources—an essential condition of the economy of a modern state. Despite intensive research for alternative sources, the de-

by YURY MOROZOV

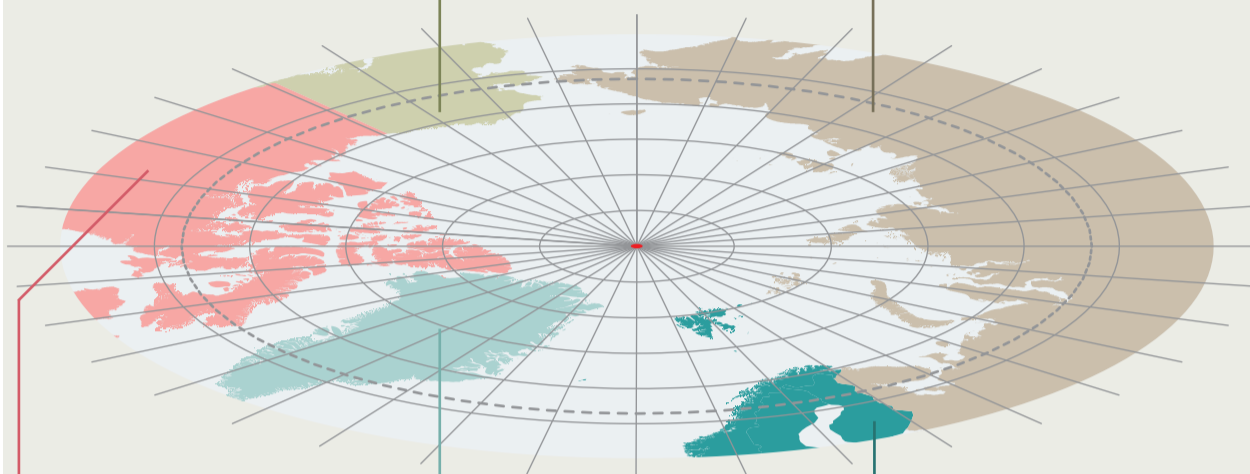
pendence on hydrocarbons is likely to continue in the near future. In these circumstances, the Arctic region has begun to attract the attention of developed countries and international organizations, not only because of the presence of substantial oil and gas reserves, but also because of the possibility of tracing new sea routes and intercontinental flights. Geographically, the Arctic region is the part of the planet north of the

Arctic Circle. It covers an area of 21 million square kilometers, including the Arctic Ocean and adjacent seas, as well as the islands and the neighboring areas of the European, Asian and North American continents. The subarctic nations are Russia, Canada, the United States of America, Norway and Denmark; Finland, Sweden and Iceland have asked to be counted in this group. →



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## The big moves



### THE UNITED STATES

regularly organizes large-scale military maneuvers in the Arctic. The same applies to Canada, which is concerned by U.S. and Russian activities in the region.

### RUSSIA

is looking at creating a division of the armed forces to ensure the security of its Arctic territory in various military and political situations.

### CANADA

is against the Northwest Passage between the Pacific and the Atlantic being assigned international zone status.

### DENMARK

is unwilling to come to an agreement with Canada over maritime boundaries in the waters between their territories.

### THE SCANDINAVIAN COUNTRIES

have announced plans to create a military bloc to "maintain the security of the Arctic region."

### THE AREA'S VALUE FOR THE INTERNATIONAL COMMUNITY

Today, mining in many parts of the Arctic is becoming increasingly profitable, so a series of international agents are seeking to actively control this region. In addition to the five Arctic coastal states, more than 20 other countries claim access to this wealth of resources. China, for example, has sent several expeditions in the Arctic in recent years; it is a candidate for entry into the "Arctic Club"; has built a research base in Spitsbergen, Norway (with the consent of Norway); and converted a former Ukrainian ship into an icebreaker. It is also building a second icebreaker, is weighing the idea of designing an aircraft that can land at the North Pole, and is considering drilling a well in the icy depths of a Russian island. The reason for this is the discovery in the Arctic region of a wide range of minerals, some of them in sufficient quantities for industrial development. The Arctic's natural resources give rise to conflicts of interest among the coastal states and other stakeholders; this aggravates border disputes over national economic zones, while there

is a growing desire among previously-excluded countries to participate in the exploitation of the subsoil Arctic. According to estimates by the U.S. Geological Survey, the Arctic Ocean zone contains 20 percent of the world's hydrocarbon reserves; the potential oil reserves amount to 90 billion barrels, the potential gas amounts to 47.3 billion cubic meters, and the potential gas condensate

### Russian energy policy calls for increased resources from the country's Arctic territory in order to meet demand for hydrocarbons and other raw materials

amounts to more than 44 billion barrels. Therefore, in the long run, the Arctic shelf could become one of the most important sources—if not the most important source—of hydrocarbons in the world.

In the near future, the melting of polar ice could facilitate transport and other commercial activities in the Arctic. The Arctic is also the site that concentrates the broadest biological research conducted on over 150 fish species, some of which (cod, plaice, herring, etc.) represent the lion's share of the world catch.

The Arctic plays a key role in military and strategic terms, as it has sites that are suitable for the installation of ballistic missiles of all kinds, as well as for anti-missile defense systems and rocket-attack prevention, and other means of deterrence that are of strategic importance for national security. At the same time, the region is crucial for planetary meteorological and hydrological events that affect the Earth's climate. It affects the movement of air masses in the atmosphere and the circulation of water in the world's oceans, thus influencing climatic conditions in the entire northern hemisphere.

The region is criss-crossed by the shortest sea and air routes between North America and Europe and between the eastern and western parts of the Eurasian continent. Some international experts believe the Arctic Ocean could become ice-free as early as 2019. Russian scientists from the Arctic and Antarctic Research Institute disagree with those forecasts. They believe the Russian sector of the Arctic will be completely open to navigation during the summer season (April to September) by the early 2030s, but the Canadian and U.S. sectors will not be ice-free until the early 2070s. Despite these contradictory forecasts, most scientists agree that it will become easier in the near future to engage in economic activities in the northern latitudes. That will make shipping via the Northern Sea Route more attractive—and will be an ace in the hole for Russia, as merchant and passenger ships will be able to traverse the most difficult section of the Northern Sea Route only in convoy with Russian nuclear icebreakers.

### RUSSIA'S INTERESTS IN THE REGION

At the end of 2008, Moscow took note of the growing importance of the Arctic region for Russia in the 21st century and launched a Development Strategy Journal. The strategy sets out key principles for Russian policy in the Arctic up to 2020 and aims to optimize the system for monitoring the situation in the area, with Russia cooperating with other subarctic nations. According to this document, Russian national interests in the Arctic region are:

- Use of the Russian Federation's Arctic zone as a strategic base for the development of national resources that help solve the country's social and economic problems;
- Preservation of the Arctic region as a cooperation zone;
- Safeguarding the unique ecological system of the region;
- Use of the Northern Sea Route for ordinary communications and national transport.

These interests define the overall objectives and also the primary goals and strategic priorities of Russian state policy in the Arctic region, which are articulated in several directions. The Russian energy policy provides, for example, for the expansion of the resource base in the Arctic area of the country to substantially meet the domestic demand for oil and other strategic raw materials in the future. The strategy also calls for the development of the resource base in the Arctic through the use of new exploration technologies and the new

fleet of icebreakers being built in the shipyards of Saint Petersburg, the Far East and other foreign countries. Despite the economic crisis, Russian shipyards are actively constructing oil rigs capable of operating in the extreme weather conditions of the Arctic. When they come into service they will greatly increase the stocks of minerals from deposits in the Arctic Ocean, and will permit the extraction of oil and gas in the Arctic zone of the Russian Federation.

Preparations for heavy traffic in the Arctic are already underway. Russia plans to use its proximity to the Northern Sea Route and the Arctic's undersea riches to make the area a strategic resource base. Because commercial and military competition involving other Arctic nations might hamper those plans, Russia is stressing international cooperation in its Arctic approach and is supporting joint action against environmental challenges, national boundaries that are set according to the Law of the Sea, and management of air and sea traffic in the area according to international law and by agreement of the Arctic states.

For now, the future of the Arctic remains uncertain, and the problems and challenges in the area are the same for all countries.

#### PROBLEMS AND CHALLENGES

The exploitation of the vast natural resources of the Arctic regions is limited by poor weather conditions and even extreme temperatures; seasonal or perennial ice on water and land; permafrost; and polar nights. Economic activity and day-today life are conditioned by high energy needs and dependence on external supplies of fuel and industrial equipment, as well as of food and essential goods. To compound the difficulty, there are challenging conditions for shipping and flights over long distances and poor transport infrastructure as a consequence of the extreme climate of the region. There is also disagreement over the problem of global warming. For example, a few years ago the area was affected by a wave of unseasonable cold, which hindered Russia from sending raw materials, food supplies and goods needed in locations in the polar region.

Therefore, in the near future navigation in Arctic waters will only be possible during the hottest months of summer and in some locations quite distant from one other. Navigation in the Arctic will necessitate additional equipment on transport ships (strengthening of the hull at the waterline, installation of heating systems in offices, lodgings, and cargo bays)—all of which considerably reduces the ships' speed. The additional



Construction of the trans-Siberian pipeline.

Up to 40 percent of infrastructure built on the permafrost layer is in critical condition due to thawing ground. Buildings are sinking into quagmires

equipment would decrease speeds to less than two times that of the floating ice (10-15 percent), reducing to zero the advantage of this shorter route, compared with an alternative path to the south. It is important to

consider the possibility that the ships might ice up, and thus reduce the maximum size of the loads accepted; and to consider the increase in fuel costs, the heightened insurance risk, higher fees for ice-breaking, material incentives for crew members, and so on. Furthermore, the natural environment in the Arctic is extremely sensitive to human activity and is very slow to recover after rough handling. Human economic activity has a particularly negative impact on what was considered virgin

territory until recently. Harmful substances in atmospheric flows, sea currents and river waters of the northern hemisphere converge here. In winter and spring, polluted air from the remotest areas of the Eurasian continent often blows into this region. A report by the Arctic Council shows that the region is constantly threatened by the risk of decomposition due to harmful substances found not only in the soil, but also in animals.

For example, in Arctic Russia, 27 areas have been labeled as "imparked" (literally, fenced-off areas), because the process of pollution has caused an obvious transformation of the natural geochemical environment, as well as serious damage to the atmosphere, degradation of the vegetation layer and the soil and an increase in the rate of spread of diseases among the local population.

It must also be said that the positions of each of the sub-arctic nations regarding the activities in these areas are in contradiction with those of other countries in the region. Canada, for example, does not want the Northwest Passage linking the Pacific Ocean to the Atlantic to obtain the status of an international zone. Denmark, for its part, is unwilling to reach an agreement with Canada on the boundaries of jurisdiction of waters between their territories. There are also disputes on many issues related to the use of the Arctic by Norway and Russia, which add more fuel to the fire of the controversy concerning the possible direction of future development in the Arctic.

As a result, the nations here intend to take steps to protect their national interests in the region, even by using military force. The Scandinavian countries have announced plans to create their own military bloc, declaring that their association aims to "maintain security in the Arctic." To do this, these countries intend to organize a series of regular patrols of the Arctic and the airspace up to Iceland, through the creation of rapid reaction forces and satellite systems. In a similar trend, even the leader of NATO—the U.S.—regularly organizes large-scale military maneuvers in the Arctic. The same is true for Canada; disturbed by the American and Russian activities in the region, it is taking steps—including military activity—to protect the sovereignty of the northern part of the country.

It must be said that the main aim of any military bloc is preparing to use military means. If you look at the map of the planetary North, the only country ready to choose this solution seems to be Russia. Under these conditions, Russia also plans to create a group of armed forces in the Arctic, the purpose of which is to pro- →

**MOSCOW, MARCH 30, 2012**  
**An agreement signed between Russia's Gazprom, Norway's Statoil-Hydro and France's Total on the establishment of a joint venture to develop the Shtokman gas field – one of the most promising in Russia. The Shtokman field is expected to produce 71 billion cubic meters of gas per year by 2020.**



vide security to the Arctic zone of the Russian Federation in various military and political situations.

Arctic warming caused by climatic factors and by the impact of humans on atmospheric processes from the late 1970s until early 2012 has reduced the area covered by permanent ice in the Arctic by almost half—from over 3 million to 1.6 million square miles—and the average annual temperature in the Arctic has increased by 2 degrees Celsius. As it continues over the next few decades, this warming may create a fundamentally new situation in the Arctic and in Russia's far north. And what happens in the Arctic will have global implications. On the negative side of the ledger, the melting of Arctic ice will cause the salinity of the Arctic Ocean to drop, possibly disrupting the "conveyor belt" of ocean currents that move water from equatorial regions to the Arctic and back. If the currents slow, northern Europe will grow colder, and the monsoon rains that are the main water source for much of South Asia may fail. Rising sea levels, melting permafrost, extended droughts, and more intense storm activity can all be expected, unless global carbon emissions are quickly controlled.

Currently, up to 40 percent of the infrastructure of Russian cities and towns built on permafrost is in critical condition because the frozen ground is melting. Apartment buildings and factories are gradually sinking into quagmires. Buildings are collapsing and pipelines are rupturing. As permafrost melts, underground organic carbon can be released into the

atmosphere. According to the latest scientific data, there is more than 1.6 trillion tons of carbon held underground by permafrost—twice what there is in the atmosphere. Permafrost melting could therefore result in 100 billion tons of methane—a greenhouse gas—being released into the air in this century.

Emissions of methane currently held underground by permafrost will accelerate global warming; that process has already begun. The concentration of methane in the atmosphere has grown over the past decade as the Arctic (and areas that extend inland in Russia's Siberian region, Alaska, Canada, Greenland, and Scandinavia) warms at a record pace. Some Siberian lakes have quintupled in size since 2006, and increasing numbers of thermokarst lakes—that is, lakes formed by the melt-water from thawed permafrost—are appearing. These changes suggest that deep permafrost layers may disappear far sooner than initially thought—within 100 rather than 500 years.

#### **MOSCOW'S STANCE ON THE FUTURE OF THE ARCTIC**

As the largest country in the Arctic, Russia has major development plans that are linked to global warming and are aimed at transforming the Arctic into a strategic resource base by 2020. Those plans give rise to a question—which of Russia's strategic interests in the region is linked to climate change?

Warming temperatures in the Arctic facilitate Russia's access to the rich-

es of the north and support the use of the Northern Sea Route, which passes close by Russia's land borders and is the shortest route from Europe to Asia. Via the Northern Sea Route, the distance from St. Petersburg, Russia, to Yokohama, Japan, is 7,456 miles; the distance through the Suez Canal is 12,738 miles. That difference could save ships 13 days of travel time and up to \$300,000 per voyage. Therefore, the volume of freight traffic in 2012 could exceed five million tons and eventually increase from there more than tenfold. Thus,

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**If Moscow acquires the rights to the Lomonosov Ridge, it will control 60 percent of hydrocarbons discovered in the region, overtaking Canada and the United States**

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development of the Northern Sea Route could have an impact comparable to that of the Panama and Suez canals.

Climate change will bring the mineral resources of the Arctic within reach and make regular oceangoing traffic between Europe and Asia via the Northern Sea Route more realistic. Moscow also is aware that above the Arctic Circle lies 30 percent of the Earth's undeveloped natural gas reserves and 13 percent of its oil, and that the melting Arctic ice is opening new vistas for national and in-

ternational oil and gas companies. Among other things, as the ice melts, those companies will no longer have to factor into their operations the costs of building an icebreaker fleet and expensive tankers capable of working in icy conditions.

But international relations associated with climate warming in the Arctic threaten to hamper implementation of Moscow's plans.

The issue of sovereignty over the Arctic territories was academic so long as the region's harsh climate prevented the use of modern technology to exploit potential

riches. Recently, however, Arctic glaciers and ice cover have been melting twice as rapidly as in other regions, and diplomatic temperatures related to the future of this 21st-century Klondike keep on climbing.

As mentioned above, Russia, the United States, Canada, and

the other Arctic nations are trying to secure for themselves rights to the Arctic seabed, which is estimated to contain billions of tons of oil and natural gas. Also still unresolved are ways to deal with the environmental challenges in and the militarization of the region. Arctic states, therefore, have adopted measures to protect their interests. Recently Deputy Prime Minister Sergei Ivanov promised that Russia will petition the United Nations to expand the boundaries of its sovereignty on the Arctic shelf. In the near future,

a second expedition will be dispatched to the region to acquire scientific justification for Russia's claims to territories in the vicinity of the Lomonosov and Mendeleev ridges, which extend into the Arctic beyond the country's 200-mile exclusive economic zone. If Russia acquires the rights to the Lomonosov Ridge, it would have control of 60 percent of the hydrocarbons detected in the region, thereby overtaking Canada and the United States in the race for the "treasures of the Arctic."

Russia's president Vladimir Putin, in his pre-election campaign, accused the West of having designs on Russian energy resources. "Many conflicts, foreign policy actions, and diplomatic moves reek of oil and gas," he said in 2011. The Commander-in-Chief of the Navy fueled passions when he said Russian economic interests are threatened by the navies of NATO, China, Japan, Korea, and such "well-known Arctic nations" as Malaysia and Thailand.

Consequently Russia's defense minister has promised to add two additional brigades to the military forces stationed in the Arctic. Russia's Finance Ministry joined in by announcing that, in the near future, Russia will expand its icebreaker fleet, which is already the largest in the world. Funds were already allocated in 2012 to build three nuclear- and three diesel-powered icebreakers. Russia's newest national security strategy also makes it clear that the Kremlin views the Arctic as an area where military conflicts could occur. That document said, in part: "In a competition for resources, it cannot be ruled out that military force could be used to resolve emerging problems that would destroy the balance of forces near the borders of Russia and her allies."

At the same time, Russia is aware that it will need foreign investment and expertise to develop deposits lying under the seabed. The environmental conditions themselves are harsh; the Russian government sees no need to make the energy exploration situation even more difficult by transforming the Arctic into a zone of confrontation. In the interest of international cooperation, Moscow will maintain mutually advantageous bilateral and multilateral relations with the other Arctic states, based on international agreements to which the Russian Federation is a party.

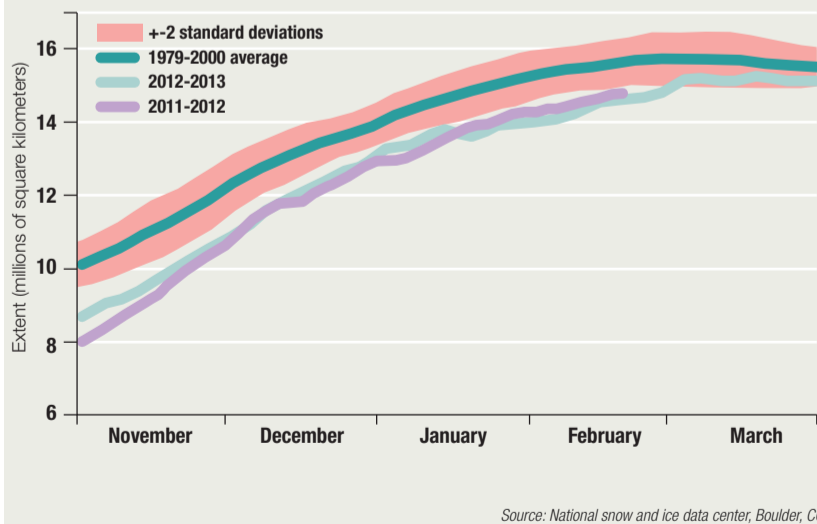
For example, the gas-oil complex will be based on the Arctic Russian fields that are already open. The development of these resources will require the participation of foreign companies to build 117 extraction platforms and 65 tankers.

One of the most promising gas fields in Russia is the Shtokmanovsky field.

## MELTING POLAR ICE



**The white area shows polar ice coverage on February 20, 2013. The red line represents the average area covered by ice in the years 1979-2000.**



**The graphic shows that the area of the Arctic Ocean covered with ice between November 2012 and March 2013 was significantly lower than the average for the years 1979-2000.**

The Russian giant, Gazprom; Norway's Statoil-Hydro; and France's Total signed an agreement to set up a joint venture for the development of these reserves. By 2020, gas production in the Shtokmanovsky field will amount to 71 billion cubic meters per year.

In general the relations of the countries in the polar region should be based on their common interests, and those relations should include an increased ability to counter threats by responding jointly when they arise. The environmental problems in the Arctic can not be considered specific to a country or a region, but are indicators of global trends.

In addition to the destruction of the ecological balance, the consequences sooner or later flow beyond national boundaries. Realizing the potential of ecological territories, mitigating anthropogenic risk to keep it within acceptable limits, and developing specific guidelines for the management of wildlife in the Arctic regions is possible only with the involvement and commitment of all subarctic member states.

According to Russia, there are three major tasks to be carried out within the framework of international cooperation in the Arctic:

- The boundaries of possessions in the region should be formalized in accordance with the 1982 U.N. Convention on the Law of the Sea.
- To maintain peace and stability in the region, environmental and other challenges should be dealt with jointly by the Arctic countries.
- Air traffic across the Arctic and shipping via the Russian Northern Sea Route should be managed under the auspices of international law and by agreement among the Arctic states.

Russia is keenly interested in developing the Arctic economically, in reviving the Northern Sea Route and rebuilding Arctic ports, in investing in the development of Arctic resources, and in continuing research to support sustainable development and preservation of the environment in the north. It is aware of and is preparing for the possibility that commercial competition could lead to military conflict in the Arctic, but Russia is doing all it can to ensure that the Arctic's future is peaceful, prosperous, and managed cooperatively by the countries with legitimate claims to the region. The evolution of international relations in the Arctic offers an incentive for a fresh view of the situation in the region and beyond, and a rethinking of the priorities of national foreign policies of the united subarctic zone, which takes into account the existing realities and takes responsibility for future events.



**China/**The country's new strategy is worrying Russia

## Beijing's "Arctic dream"

For decades, the Asian giant focused its attention almost exclusively on research and archaeology, but the melting of the ice has awakened the nation's interest in resources and new commercial sea routes

**B**ecause of global warming and melting glaciers, the increasing economic and strategic importance of the Arctic has attracted many countries to compete on this "hot" continent. The international community has paid more and more attention to the Arctic's resources and sea routes, bringing substantial changes to relations among the major countries. The original balance has been destroyed. Countries far away from the Arctic expect to share resources with countries closer in to the area. In addition, the melting of the glaciers, which may significantly influence many countries' weather and economy, is causing great concern around the world.

by LIFAN  
LI

**FIRST STEPS**

**In the early 1990s, China starts preparing for scientific observation activities at the Pole. In 1996 it signs on to the International Arctic Science Committee. Two years later, the first Chinese delegation, consisting of experts and officials, boards a Russian ice-breaker bound for the Arctic.**

For decades, China focused its attention on research and archaeology in the Arctic, while participating little in sea routes, resources and military security cooperation. In August 2007, a Russian expedition team placed a titanium flag on the Arctic Ocean floor, pushing the issue of potential competition among nations. From then on, China began to address issues such as sea routes, resources and geopolitics in the area. As a country that is neither at the Arctic nor a permanent observer of the Arctic Council, China is at a disadvantage in all aspects.

**CHINA HAS BEEN INVOLVED WITH THE ARCTIC DATING BACK TO 1925**

On February 9th, 1920, the U.K.,

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As a signatory to the U.N. Convention on the Law of the Sea, China has a right of access to the waters of the Arctic and can begin operations

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U.S., Denmark, Norway and 14 other countries signed the Svalbard Treaty. China joined the treaty in 1925. This agreement is the first and only international non-military treaty among governments in the Arctic. According to the treaty, citizens of China or of any other member country can enter and stay

in the Arctic and launch production, business and scientific research, as long as they don't contradict Norwegian law. However, the treaty was long neglected by China. Only at the end of the 1990s did China begin to realize that it could be used

as the legal basis for activities in the Arctic. In the beginning of the 1990s, China started to prepare for scientific observation in the Arctic. In 1996, China joined the International Arctic Science Committee (IASC). Two years later, a delegation consisting of experts and officials boarded a Russian ice-

breaker heading to the Arctic, initiating the adventure of participation in Arctic issues.

As a non-Arctic country, China has been attempting to become a permanent member of the Arctic Council, which was established in 1996 with the aim of protecting the local environment and promoting sustainable economic, social and welfare developments. Member countries include Finland, Sweden, Norway, Denmark, Iceland, Canada, the U.S. and Russia. In April 2012, China applied to be a permanent member; the Council will discuss the application in May 2013.

As a contracting party for the United Nations Convention on the Law of the Sea, China enjoys the right to access the high seas in the Arctic areas and to launch activities including scientific research. Arctic resources are a global treasure, and should be shared by people around the world.

**ECONOMIC STIMULUS**

Chinese companies have a strong interest in the development of the Arctic, because the economy is a priority for China, which is facing serious resource shortages. As an emerging large country, China can →

# The History

On **AUGUST 1, 2007**, the Russian flag (inside a titanium capsule) waved from the seabed beneath the geographical **NORTH POLE**. In an unprecedented feat, the mini-submersible **MIR-1**, piloted by the explorer and Deputy Chairman of the Russian parliament **ARTUR CHILINGAROV**, successfully dove to the Arctic seabed at a **DEPTH OF 4,261 meters** and planted the flag. This symbolic act served to reassert Russia's territorial claims in the Arctic region: "Our mission," said project leader Chilingarov, "is to remind the whole world that Russia is a major power in the Arctic and in the field of research."



reach certain goals through diplomatic and economic moves and other leverage, in the complex relations in the Arctic area.

China can participate in several aspects of the Arctic development such as following climate change, launching scientific research and exploring new opportunities in trade and development. The pursuit of resources is the key focus for China in the Arctic.

According to the scientific statistics, the glaciers in the Arctic contain 83 billion barrels of oil, equivalent to 13 percent of the unproven exploitable oil reserve, as well as 1.55 trillion cubic meters of natural gas, and iron, uranium and diamonds. Most of the resources are buried underground, more than 500 meters deep. Currently, China is the country that consumes the most energy. Based on its speedy economic and population growth, the need for resources will increase. The Medium and Long-Term Development Plan for Renewable Energy in China declares that there are four directions for energy development: energy efficiency, efficient development of local fields, energy-import security and active participation in international resources cooperation. To reach energy security, the diversification of energy supply should be ensured. China should import oil from all

around the world, including the Arctic. The plan also points out that as a participant in global and local organizations, China should

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## The titanium flag planted in 2007 by a Russian expedition to the floor of the Arctic Ocean raised the bar for the potential competition between various countries

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join in more aggressively on oil and gas co-development. Therefore, China should increase investment in exploration and development, and launch its "go-out" policy, using technology and capital to operate in foreign development. The plan embraces not only the neighboring countries but also includes the Arctic in its long-term prospects.

### STRATEGIC ANALYSIS OF THE ARCTIC ROUTE

In the coming 50 years, the Arctic Route might pose a challenge to the Panama Canal / Suez Canal Route. If the Arctic Route can be fully opened, the transportation distance

can be reduced from 13,000 to 7,900 miles. The savings can be very substantial.

With the melting of glaciers in the Arctic, the area can be opened to navigation in summer. This melting can facilitate resource development and the opening of new route: a North-west route connecting the Pacific and the Atlantic, and a North route passing by Siberia and connecting Europe with the Far East. The latter

route shortens the distance between China and the European countries, and reduces the current transportation time by 40 percent.

China, however, has never enjoyed equal rights with the Arctic countries, whose rights were confirmed by geography, by historic agreements and by law. China is not an Arctic country and has no right to enter the Arctic continental shelf. China is not a member of the Arctic Council, but it enjoys the same right to do research and participate in resource trade. These rights have been ensured by UNCLS. The Arctic Ocean was regarded as "high sea." However, with its increasing economic and strategic value, the competition has become fierce.

Some islands prove to be vital communication lines, and some, such as Hans Island, are becoming more important. From the geographical viewpoint, Russia is the largest country bordering the Arctic. In order to obtain as many resources as possible, Russia is pushing to possess the Arctic Ocean. Many other countries – such as Canada, the U.S. and Norway – also want to gain their own share.

The Arctic Route is important to China. China should seize the opportunity to participate in building an international coordination system and to have its say in scientific exploration and development.

### ACTIVE PARTICIPATION IN THE MANAGEMENT OF RESOURCES

China signed up for a regular system of dialogues with Norway and Canada concerning Arctic issues. In April 2012, China signed the Arctic Cooperation Frame Agreement with Iceland but it altered its level of participation. In Arctic politics, China should ensure that no single country's sovereign right to the Arctic continental shelf is confirmed by international laws. Otherwise, the rights of international community on the Arctic high seas will be drastically reduced. China adheres to the principle of sovereignty integrity, and sticks to a hard-line



strategy in protecting its sovereignty in the South China Sea and the East China Sea. Therefore, when dealing with countries bordering the Arctic, China will persist in this principle and will not initiate many activities in the area. Fearing that an aggressive position may attract opposition, China should avoid sensitive topics such as energy exploration and focus on weather change and participate constructively in the relative issues. Its increasing impact requires China to participate more in international issues. In solving problems like global warming, China can show its comprehensive strength and reflect its own interests. The “Arctic Dream” of China is an epitome of participation in global management and pursuit of international interest, which can be seen as a means to measure the diplomatic ability of the new government.

#### DIFFICULTIES AND FUTURE CHOICES FOR CHINA'S PARTICIPATION

First, it is hard to decide to open a new military corridor and participate in military competition. Currently, many countries stake a claim for presence and rights in the Arctic. The expedition teams are sent first and military drills will be added. For example, Canada held the largest drill ever in the Arctic, from August 5 to 26, 2011. Russia planted its flag and sent bombers. The U.S. and Norway held their own drills, in preparation for future competition in energy development and sovereignty claims. With increasing numbers of Chinese living abroad, the protection of their interests and search for new routes has become an important strategy for China. In the new century, the navy has enjoyed booming development and the authorities decided to define the navy as a strategic military force. China is a country that loves peace and will not join any military competition. Therefore, the authorities should decide whether to strengthen its military deployment.

Second, it is hard to deal with Russia. Bashneft had invested 5 billion to develop two large fields – Trebs and Titov – in the Arctic, which were presumed to contain 200 million tons of oil. China's participation in developing Arctic resources may arouse dissatisfaction from Russia. In 2011, SIPRI submitted a report saying that China is preparing to develop the free Arctic glacier, pointing out that China and Russia did not reach agreement on Arctic development. There were also skirmishes between the two countries.



**COLLABORATION AGREEMENT**  
Outgoing Chinese premier Wen Jiabao and Icelandic premier Johanna Sigurdardottir listening to the Chinese national anthem at Keflavik airport on April 20, 2012. During Jiabao's visit, China and Iceland signed a framework collaboration agreement.

For example, China's expedition ship “Coastal-517” was detained by Russians who believed the ship was equipped with a sonic location system and electric instruments for continental-shelf exploration.

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Russia aims to strengthen its strategic position. Moscow will be a relentless competitor of Beijing's and will oppose its efforts to join the Arctic Council

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#### RUSSIA'S WORRIES

Russia defines the Arctic as a priority for its resource base and is trying to strengthen its strategic status. Russia plans to build a guided missile and nuclear submarine base. Sixty-seven percent of its 576 sea-based nuclear warheads are located on a nuclear submarine in the Cola Peninsula, while the rest are located in the Kamchatka Peninsula. Obviously Russia considers the Arctic its own military camp. China's interest in the Arctic has aroused concerns among the

Russian authorities. Russian Navy Commander Vladimir Vysotsky commented that Russia should treat its position reasonably and give up no interest. Currently there are no enemies or coalitions in the Arctic. The

biggest challenge is to deal with unconventional members of the Arctic Council.

Therefore, Russia will launch a fierce competition with China in the Arctic and will block China from joining the Arctic Council.

China will continue to strengthen exploration and research and pre-

pare for “going out.” Besides overcoming obstacles, the government should monitor weather reports on the route, in order to facilitate companies' plans and ensure security.

#### LAUNCH COMPANY DEVELOPMENT STRATEGIES AND BROADEN THE TRANSPORTATION MARKET

Russia and northern European countries plan to increase their investment in the Arctic and initiate

substantial development. China should take the opportunity to increase business cooperation. Ship-building companies in China are exploring plans to equip oil tankers and LNG ships with ice-breaking instruments. In June 1997, the Murmansk Ocean Shipping Company signed a contract with Master Shipyard in Qingdao to build four dry-cargo ships. China can increase its building capability through such contracts.

The building of the Arctic Route provides opportunities for Chinese companies, which can increase their storage and processing activities, making the shift to modern transportation and domestic service.

China cannot lose its say in the Arctic competition. To launch initiatives in international mechanisms on the Arctic route, its strategy and interests should be clarified. ■

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**USA** The government estimates that the Arctic waters hold 25 billion barrels of oil



# Obama's dilemma

In his first term in office, the U.S. President supported the idea of opening up more of Alaska. But the White House has still not resolved the question of whether to allow offshore drilling in the Chukchi and Beaufort seas

**A**  
by MOLLY MOORE

Alaska's frozen seas and tundra are some of the most divisive political battlegrounds facing President Obama and his new energy and environmental team in his second term in office. The debate over Arctic drilling in Alaska – like most

major political decisions in Washington – is mired in partisan politics. Democrats and Republicans are sharply divided. Environmentalists and oil companies are waging fierce lobbying efforts. Native Alaskans, who could benefit from the jobs and money the oil industry would bring – as well as suffer from any environmental mishaps – also are at odds. In his first term, Obama indicated support for opening more of Alaska,

Obama seemed to appease both the petroleum industry and environmentalists with his administration's announcement of a new management plan for the National Petroleum Reserve in Alaska, the largest tract of public land in the United States, covering 23 million acres, or 9.3 million hectares.

The plan opens 72 percent of the vast lands on Alaska's North Slope for leasing and development of oil resources, including construction of pipelines and infrastructure that could be used to support offshore oil and gas development. Environmentalists who had pushed for keeping even more of the area off limits to the petroleum industry, said the decision, in the end, protected some of the most sensitive wildlife areas which are breeding grounds for birds from seven continents.

But, the most controversial decision for U.S. politicians – whether to allow offshore drilling in the Chukchi and Beaufort seas – remains far from resolved. The U.S. government estimates that 25 billion barrels of oil and 120 trillion cubic feet of natural gas lie under the waters off the northern coast of Alaska.

The decision-making has been complicated even further by a series of accidents and mishaps by Royal Dutch Shell, the first company granted exploratory drilling rights in the Chukchi Sea in two decades. Marvin E. Odum, president of Shell Oil, announced in February that the company was suspending drilling efforts for all of 2013 to “give us time to ensure the readiness of all our equipment and people.”

#### SPILL CONTAINMENT

Shell, which has invested an estimated more than \$4.5 billion and more than six years in offshore Alaskan oil exploration, was plagued by problems at every step of the process. Its drill rig, Noble Discoverer, slipped anchor in Dutch Harbor last summer while awaiting the start of the exploratory drilling and later suffered a fire and explosion while in harbor. The company's oil spill containment dome was damaged during a calm-water test. Its vessels have failed to meet Clean Air Act standards and Coast Guard requirements for oil spill response.

And just hours after it finally started drilling operations on the sea bottom, Shell was forced to abandon the site when a massive ice sheet characterized as 10 times the size of Manhattan began bearing down on the drilling equipment.

On New Year's Eve, Shell's drilling ship Kulluk tore loose from its towboat during an Arctic storm and was stranded on the shores of an isolated island. The incident is under inves-

tigation by both the U.S. Department of Interior and the U.S. Coast Guard. The continuing chain of failures frustrated Shell and other oil companies preparing to seek offshore Alaskan drilling permits, and gave environmentalists an unexpected trove of ammunition to lobby the Obama administration against expanding offshore drilling in Alaska.

“Shell Oil's attempts at Arctic exploration in recent months add up to a flashing red light,” said David Yarnold, president of the National Audubon Society, which monitors the hundreds of thousands of birds that nest in Alaska's wilderness. “Scientists concede that so little is known about how to clean up an oil spill or other disaster in these frigid waters that the Deepwater Horizon spill in the Gulf would look like a picnic in comparison to a similar event in the Arctic seas.”

The Government Accountability Office, an independent investigative unit of the U.S. Congress, issued a report saying that Shell's “capabilities do not completely mitigate some of the environmental and logistical risks associated with the remoteness and environment of the region.”

#### THE ADMINISTRATION'S CONCERNS

During his first term, Obama's Secretary of Interior – the position with perhaps the greatest power over the Alaskan drilling decision – frequently voiced support of Arctic oil exploration.

But, as much-publicized mishap after mishap followed Dutch Shell's inaugural efforts to begin exploratory drilling in the Chukchi Sea, Interior Secretary Ken Salazar began toning down the administration's support. In the final days before he left the Cabinet in early March, Salazar said he was not “comfortable” with Shell's preparations for drilling in Alaska.

Sen. Lisa Murkowski, a Republican senator from Alaska and one of the U.S. Senate's most powerful Republican voices on energy development, argues that the administration should not allow Shell's initial experiences to halt future oil exploration and development in the Arctic waters off Alaska.

“Alaska's offshore resources are crucial to improving America's energy security and reducing our dependency on OPEC,” she said.

Murkowski and other Alaskan officials also highlight the economic impact of Arctic drilling. A study conducted by the University of Alaska for Shell said that petroleum development on the outer continental shelf would create an average of 54,700 new jobs a year for the next four decades, resulting in payrolls of \$145 billion.

## In their own words



**MARVIN E. ODUM**  
PRESIDENT  
OF SHELL OIL

“We've made progress in Alaska, but this is a long-term program that we are pursuing in a safe and measured way. Our decision to pause in 2013 will give us time to ensure the readiness of all our equipment and people.”



**KEN SALAZAR**  
INTERIOR  
SECRETARY UNTIL  
MARCH 2013

“It's troubling that there was such a series of mishaps. There is a troubling sense I have that so many things went wrong. The Arctic is an area where our policy has been that we should move forward with the utmost of caution.”



**DAVID YARNOLD**  
PRESIDENT  
OF THE NATIONAL  
AUDUBON  
SOCIETY

“Shell Oil's attempts at Arctic exploration in recent months add up to a flashing red light. Scientists concede that so little is known about how to clean up an oil spill or other disaster in these frigid waters that the Deepwater Horizon spill in the Gulf would look like a picnic in comparison to a similar event in the Arctic seas.”



**LISA MURKOWSKI**  
REPUBLICAN  
SENATOR FROM  
ALASKA

“Alaska's offshore resources are crucial to improving America's energy security and reducing our dependency on OPEC.”



**JOHN PODESTA**  
A CLOSE OBAMA  
ADVISOR

“There is no safe and responsible way to drill for oil and gas in the Arctic ocean. The Administration should suspend all action in this remote and unpredictable region.”

with its shrinking ice cover and large mineral reserves. He viewed Alaska as a key component of his policy of diversifying the country's energy sources while becoming more self-sufficient and less dependent on oil imports.

#### THE NEW MANAGEMENT PLAN FOR THE NATIONAL PETROLEUM RESERVE

In the first week of his second term,



**NEW LICENCES IN THE NORTH SLOPE.** Obama announced a new management plan for the National Petroleum Reserve in Alaska, that covers 23 million acres.

“The Obama administration shouldn’t issue any new permits to Shell this year and should suspend all action on other companies’ applications to drill in this remote and unpredictable region,” they concluded.

Some political speculators in Washington saw their statements as a foreshadowing of shifting positions in the Obama administration on the Arctic drilling issue.

Industry leaders have become increasingly frustrated by what they consider the administration’s long, slow response time on decisions.

#### PROJECTS “ADRIFT”

But Shell’s experiences also have been troubling to other companies. In addition to investigations by several U.S. government agencies, the U.S. Environmental Protection Agency has accused Shell of violations of the Clean Air Act in its drilling operations and could impose penalties of up to \$37,500 a day on the company.

There already have been some casualties.

BP said this summer that it is backing off from a \$1.5 billion project that was 14 years in the making to drill in the same area as Shell. In announcing its decision, BP – which is facing billions of dollars in losses because of its 2010 Gulf of Mexico rig explosion – said the Alaska project “does not meet our test” for safety standards, and it would cost too much to make it safe enough.

France’s Total has said it will not drill in the Arctic because of environmental dangers, and Norwegian Statoil announced last fall that it is delaying indefinitely its plans to start drilling off the coast of Alaska in 2014. While melting ice may be making Arctic waters more accessible to petroleum development, the U.S. politics of energy and the environment remain as entrenched as ever. ■

Almost every administration cabinet position charged with advising Obama on the future of mineral extraction in America’s largest state is changing hands, which could prolong key decisions.

#### A KEY ROLE

Perhaps the biggest player in this political minefield will be Sally Jewell, who was nominated in February to take over as Secretary of the Interior. Her background is anchored in both sides of the issue: she is the for-

mer CEO of REI, one of America’s largest outdoor gear chains, climbs mountains in her spare time, helped found a conservation group, and worked for Mobil oil company as an engineer in the oil fields of Oklahoma until she was hired by a bank to provide advice on financing oil-industry clients.

She knows and understands the issues from both the business and environmental perspectives. That may not make it easier for her, however. The Interior Department currently is considering proposals to increase

the number of companies permitted to drill in the Chukchi and Beaufort seas. It also has the option to ban all drilling in the two areas.

Carol Browner, Obama’s climate advisor early in his first administration, and John Podesta, a close Obama advisor, said in a recent commentary published by Bloomberg News: “Following a series of mishaps and errors, as well as overwhelming weather conditions, it has become clear that there is no safe and responsible way to drill for oil and gas in the Arctic ocean.

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**Routes/**The number of ships crossing the Arctic increased tenfold in one year

# A world of ice and water

The ability to ship along the Northern Sea Route throughout the year will quickly have very significant economic and political consequences

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by  
ALESSANDRO  
LANZA  
& ANTONIO  
NAVARRA

or at least 30 years now, the Arctic ice cap has been shrinking under the effects of climate change. Indeed, in September 2012 sea-ice coverage in this vast frozen landscape fell to an all-time low of 3.41 million square kilometers (roughly 10 times the area of Italy), which was 3.43 million square kilometers less than the September average for the years 1979-2000. In other words: today's polar ice cap is half the size it used to be.

Another related and absolutely crucial issue is the rate of decline. Suffice it to say that if the melt rate had remained the same since 1979, then the overall reduction in area would have been 2.3 percent per year, or 13 percent per decade. Moreover, simulations by the Euro-Mediterranean Center on Climate Change (CMCC) and other global research institutes involved in the latest tests point to extreme changes in the near future, because one of the most important and reliable outcomes of greenhouse effect projections is increasing temperatures in polar areas, and especially in the Arctic.

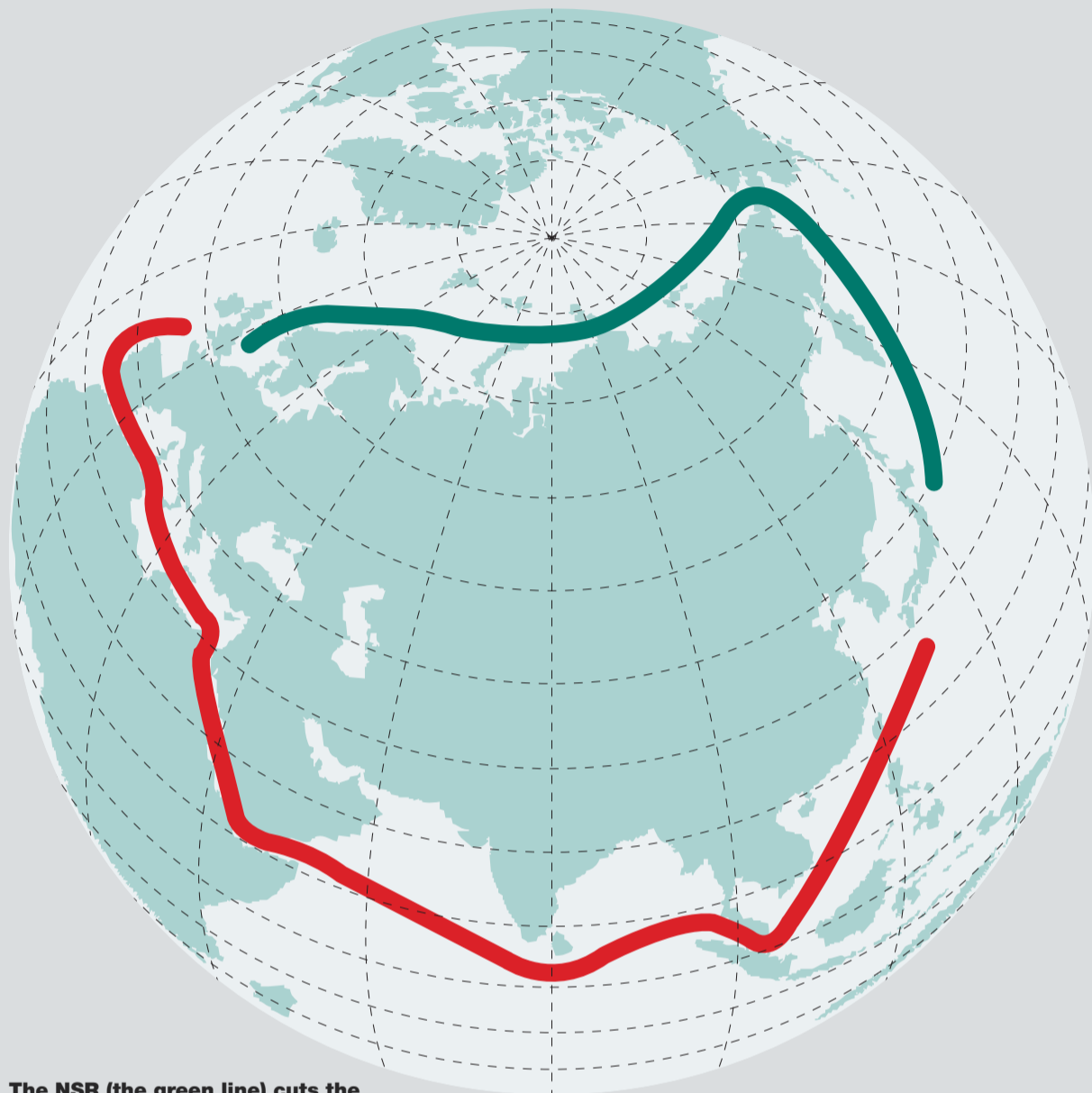
#### FROM PERENNIAL TO SEASONAL SEA ICE

If the current trend continues over the next 20 years, we could see a change from perennial to seasonal sea ice, which would form only in the winter and would melt away almost completely during the summer.

Along the Siberian coast, this change will provide larger windows for shipping along the Northern Sea Route (NSR) throughout the year. And while the climatic changes of this marked seasonal pattern have yet to become clear, its economic and political consequences will quickly become highly significant. The international natural gas market – and especially natural gas shipping – is the chief sector that stands to be affected by the change. Liquefied natural gas (LNG) is currently the most dynamic segment in the overall natural gas market, and during 2011 demand for LNG grew by 8 percent – due in part to the Fukushima disaster and the temporary closure of 54 nuclear plants in Japan – continuing a growth trend that began some 30 years ago.

Notably, only three countries were active in the LNG market in 1980, but now there are more than 30. While figures for 2012 are not yet available, initial indicators point to slowing growth tied closely to the

## Ever closer



**The NSR (the green line) cuts the journey between northern Europe, north-eastern Asia and the north-western coast of North America by 40 percent compared to southern shipping routes via Suez (the red line) or Panama.**

global economic situation. The increase in shipping activity in the Arctic is striking, with statistics indicating a tenfold increase in the ships using the NSR between 2010 and

2011; in the 2012 season, 46 ships used the NSR, compared to 32 in 2011 and just 4 in 2010. Moreover, it is worth noting that traffic was bal-

anced in both directions, from east to west and vice-versa. The gas industry's interest in the NSR is plain to see. Asia has historically been seen as a very promising

gas market: Japan and Korea are currently the main gas importers, while China and India are already among the leaders and have huge potential for growth. For this reason, a recurring question in studies on the gas market is how exports from Russia (or other countries) might benefit if con-

ditions were to change in the Arctic Ocean. Even now, LNG exports via the Arctic are a reality, with an LNG tanker sailing the NSR in late 2012

for the first time ever (travelling from Norway to Japan in nine days). The Hammerfest LNG plant is one of the most northerly in the world; it lies at the mouth of the NSR. As such, it is keen to identify new business opportunities, since the Arctic passage takes about half the time of the alternative route via the Suez Canal. Even though ships have to be preceded by Russian nuclear ice-breakers in some central sections of the NSR, the window for sailing is widening rapidly, exceeding four months in 2012.

#### RUSSIA CHANGES STRATEGY

Russia's prospects and strategy have changed dramatically since 2008 and the inception of the global economic crisis. Collapsing domestic and international demand, together with

Huge uncertainties still abound, but one thing seems certain: one way or another, the Arctic is set to become a key issue on the global political and economic agenda

2011; in the 2012 season, 46 ships used the NSR, compared to 32 in 2011 and just 4 in 2010. Moreover, it is worth noting that traffic was bal-

the rapid development of shale gas in the United States, is forcing Russia into major reconsiderations.

Not only is it no longer worth pressing ahead with plans to increase shipping to the west and the United States' Atlantic Coast, it is also hard to foresee any significant growth in European demand in the near future. Accordingly, Russia has responded to these difficulties by trying to break into new markets and, in particular, is planning a gas pipeline to China; new routes for Arctic LNG are also being explored. Its success in recent years with Qatari LNG and a certain level of frustration over its inability to tap into Europe's alternative markets are leading the Russian government to pin its hopes on the growth of new liquefaction plants, including through significant tax breaks. A number of different plans have been announced, which will be at least partially in competition with each other.

In the far east of Russia, there are two Gazprom proposals: the expansion of the existing Sakhalin 2 plant and a new plant in Vladivostok. Gazprom already has two further projects in the western Arctic (Shtokman and Novatek Yamal), while another, smaller, company is working on a plant in the Timan Pechora region. Russia – lest we forget – is the world's leading natural gas producer and needs no further incentive to max out potential export growth to the east through the NSR and LNG.

The Shtokman project (where the partners are Gazprom, with 51 percent; Total, 25 percent; and Statoil, 24 percent), for example, has been singled out a number of times – including by Gazprom CEO Alexei Miller – as a leading candidate to satisfy Japan's appetite for gas, and potentially that of China and India. Japan, the largest market in the world for LNG, currently imports mainly from Malaysia, Australia and Qatar, but if the NSR becomes a more feasible option then the outcome could be truly surprising.

#### HIGH COSTS CAUSE MANY PROBLEMS

Quite aside from the development of the NSR, the Arctic and Russia both present enormous technical difficulties in terms of extraction and logistics, and therefore above all in terms of cost.

Arctic operations play out under extreme conditions both for people and for materials, which are currently at the limit of their economic and operational capacity, as shown by the difficulties that the Shtokman project has encountered. The



changes taking place in the Arctic, even with all the current uncertainties, are likely to make its resources more significant.

The reduction of Arctic sea ice goes hand in hand with rising temperatures, which also pose permafrost problems. Warmer temperatures push down the level at which the ground is permanently frozen, destabilizing existing infrastructure and altering the conditions for new works.

The question is obvious, then: how much will Russia really benefit from a more accessible Arctic? Above all, will it manage to do so in time for it to remain competitive?

#### JAPAN'S PLANS

I will conclude with a more general observation. Japan is rethinking its energy policy and if it decides to downscale its entire nuclear sector by 2040 – which is possible – then this will provide a boost for natural gas and especially for LNG. There are therefore huge opportunities for Qatar and Australia, but also for Russia and the United States: if and when the Panama Canal is opened for gas exports, the U.S. will have a much more comfortable (i.e., cheaper) route for exports to Asia, bearing in mind that the majority of U.S. LNG terminals are on the east coast.

In this scenario Russia would lose further appeal on the Asian market as it waits for an unlikely Russia-Japan gas pipeline or another pipeline to South Korea, which would of course have to pass through North Korea.

The Arctic is therefore a land of major problems and substantial opportunities, and huge uncertainties still abound. But one thing seems certain: one way or another, the Arctic is set to become a key issue on the global political and economic agenda.

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## Numbers

# 3.41

**MILLION SQUARE KILOMETERS**

– the all-time low Arctic ice coverage, reached in September 2012.

# 3.43

**MILLION SQUARE KILOMETERS**

– the amount of ice that has disappeared from the total average cover between 1979 and 2000.

# 46

**SHIPS**

used the NSR during the 2012 season, compared to 32 in 2011 and 4 in 2010.

# 4

**MONTHS**

– the amount of time the Arctic was navigable during 2012.

# 9

**DAYS**

– the time at sea for the first LNG tanker that crossed the Arctic from Norway to Japan via the NSR.

**1982 LAW OF THE SEA CONVENTION**

The continental shelf extends for 200 nautical miles or, until the natural prolongation ends, up to a maximum of 350 nautical miles. Beyond that the seabed is outside a country's Exclusive Economic Zone (EEZ) and is subject to the International Seabed Authority and the Common Heritage of Mankind Principle. Under the Convention, the external boundaries of the continental shelf beyond 200 miles must be set in agreement with the Commission on the Limits of the Continental Shelf.

**1996 ESTABLISHMENT OF THE ARCTIC COUNCIL**

The Council serves as a forum for consultation and is made up of the eight countries with Arctic coasts or long-standing interests in the area (Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, and the United States). It also has six permanent observers (France, Germany, the Netherlands, Poland, Spain, and the United Kingdom), while the European Union and China, among others, aspire to permanent observer status.



**Rules/Seabeds** are currently governed by the 1982 Law of the Sea Convention

# A new legal framework is inevitable

Fears of widespread conflict in the Arctic have faded, despite simmering tensions over maritime borders and freedom of navigation. But there is still no satisfactory legal framework

**A**ccording to a 2009 number of the journal *Science*, fuel reserves in the Arctic could total 83 billion barrels of oil and 44 trillion cubic meters of gas. However, even these estimates fall short, according to research on hydrocarbon reserves published in 2011 by the Geological Society. Such figures reveal why the “race to the Arctic” has already started and is likely to intensify over the coming years: the weather conditions may be prohibitive, but the resources are at an accessible depth. Other minerals are also available in

by NATALINO RONZITTI

the Arctic seabed, but oil and gas resources are currently the most sought-after, with biological resources relatively less important, particularly due to the warming of Arctic waters (though this point is disputed). Higher temperatures in the area also open up new options for shipping and hence for the transport of crude oil. Since the end of the Cold War, fears of widespread conflict in the Arctic have been definitively quelled, despite the inevitable friction caused by the establishment of maritime borders and counter-claims that restrict the freedom of navigation. The situation therefore looks ideal for peaceful resource extraction, but the problem is that the area still lacks a satisfactory regulatory framework.

In this respect the Arctic differs significantly from the Antarctic, which contains areas of land rising above sea level. That continent is governed by the Antarctic Treaty, signed in Washington in 1959, which freezes the sovereign claims of a number of states, prohibits military activity and guarantees freedom for scientific research. The Treaty of Wellington (1988) on mineral resources in the area never came into force – due mostly to objections from environmentalists – and in its place a Protocol was signed in 1991, designating the Antarctic “a natural reserve, devoted to peace and science.” All mining activity is therefore banned in Antarctica for at least 50 years from the date of the Protocol's entry into legal force in 1998.

**THE 1982 LAW OF THE SEA CONVENTION**

The Arctic polar ice cap does not rest on the earth's crust and is thus simply water or, rather, international waters. This is true despite the claims made by certain countries (Canada and the Russian Federation) based on the “sector theory,” whereby the area of sea in a triangular area having its base along a country's coastline and its apex at the North Pole would be subject to the sovereignty of the coastal state in question. Clearly, there are areas of land bordering the Arctic Circle that are under sovereign control, such as Greenland and the Svalbard islands. However, claims to these lands have not yet given rise to any significant dispute.



## 2008 ILULISSAT DECLARATION

The five Arctic circumpolar nations signed a declaration in Ilulissat (Greenland), which – though not legally binding – sets out a number of principles that are designed to guide cooperation between the countries. However, the Declaration affirms that the Law of the Sea lays the legal groundwork on the limits of the continental shelf, protection of the marine environment, freedom of navigation, scientific research and all other uses of the sea, while stating that a new and comprehensive international legal structure to govern the Arctic Ocean is not necessary.

## 2011 SEARCH AND RESCUE AGREEMENT

In 2011 the Arctic Council reached a binding agreement in Nuuk (Greenland) on the management of search and rescue operations by air and by sea in the Arctic. Although it deals with a marginal issue, the agreement is a highly significant step in political terms.



Hans Island is the only disputed “land” in the area; it is the subject of a (currently dormant) quarrel between Canada and Denmark.

The five countries with Arctic coastlines (Canada, Denmark – through Greenland, the United States, Norway and the Russian Federation) do, however, have sovereign rights to extract natural resources in their sections of the continental shelf. Coastal states have the exclusive rights to mineral extraction, but can sell licenses to companies from other countries.

It is worth noting here that “sovereign rights” does not mean “sovereignty” (i.e., the power that the state has over its own territory and adjacent waters). In 2007, Russia planted a titanium flag in the Arctic seabed, which was erroneously seen as an extension of Russian sovereignty over neighboring seas, whereas in reality it was merely a claim of rights to the continental shelf. The shelf is governed by the 1982 Law of the Sea Convention to which all the aforementioned states are signatories, except for the United States (the U.S. in any case complies with its main provisions since this is the customary governing law).

In legal terms the continental shelf extends for 200 nautical miles or, until the natural prolongation ends, up to a maximum of 350 nautical miles. Beyond that the seabed is outside a country’s Exclusive Economic Zone (EEZ) and is subject to the International Seabed Authority and the Common Heritage of Mankind Principle – although this system has basically never been tested in the Arctic.

Under the Law of the Sea Convention, the external boundaries of the continental shelf beyond 200 miles must be set in agreement with the Commission on the Limits of the Continental Shelf (CLCS), which is charged with providing appropriate guidelines on the subject.

In the Arctic, the continental shelf extends beyond 200 nautical miles, but the EEZ covers a very small surface area. So far, only Norway has established the outer limit of its continental shelf in accordance with the CLCS. Russia is finalizing its position, while Canada and Denmark intend to submit coordinates to the Commission

### The five countries with Arctic coastlines have sovereign rights to extract natural resources in their sections of the continental shelf

this year and next year, respectively. The United States is not required to do so, as it is not a signatory to the Law of the Sea Convention. The shelf beyond the 200-mile mark (such as the Lomonosov Ridge) is subject to conflicting claims from Arctic coastal states that are yet to be resolved. By contrast, agreements on maritime borders between neighboring states within the 200 miles are fairly advanced. The latest agreement

on the subject – signed by Norway and Russia in 2010 – also governs the shelf beyond the 200-mile mark and provides for possible joint extraction of resources spanning the boundary.

### THE PRINCIPLES OF THE ILULISSAT DECLARATION

The five Arctic circumpolar nations signed a declaration in Ilulissat (Greenland), which – though not legally binding – sets out a number of principles designed to guide cooperation between the countries. The Declaration affirms however that the Law of the Sea lays the legal

groundwork on the limits of the continental shelf, protection of the marine environment, freedom of navigation, scientific research and all other uses of the sea, while stating that a new and comprehensive international legal structure to govern the Arctic Ocean is not necessary.

It also points out that a number of issues (such as navigation) could be resolved in coordination with the International Maritime Organization. In any case, it will be impossible to avoid a tailor-made body of regulations, as shown by the Arctic Council’s Search and Rescue Agreement, signed in 2011.

The Arctic Council was established in 1996 to serve as a forum for consultation and is made up of the eight

countries with Arctic coasts or long-standing interests in the area (Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, and the United States). It also has six permanent observers (France, Germany, the Netherlands, Poland, Spain, and the United Kingdom). Italy – which until now has participated in some Council meetings on an ad hoc basis – is an aspiring permanent observer along with the European Union and various other countries, including China. The situation is fluid and will likely change more quickly if Greenland’s hopes for independence are realized, thus requiring a reevaluation of Denmark’s status in the Arctic. The real question, though, is whether the Council in its current set-up (in terms both of its members and its powers) is capable of assuring governance in the Arctic. ■



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at numerous foreign universities, an advisor to the Ministries of Foreign Affairs and of Defence, and legal advisor to the Italian Mission at the Conference on Disarmament in Geneva.

**Interview/Germán Curá, President of Tenaris North America**

# Being extremely reliable



Difficult climatic and environmental conditions, like those in the Arctic, require technological expertise and sophisticated project-management skills. One wrong move could have catastrophic consequences

**N**

by RITA KIRBY

orth America is the new frontier of the energy industry, where exploration and production are growing at breakneck pace, even in the most extreme areas such as the Arctic. The future prospects of the region are rather promising,

says the President of Tenaris North America, Germán Curá, who has just announced an investment of \$1.5 billion in a huge new plant in Texas.

**How important are the Arctic regions for securing the world's future energy supply?**

The Arctic regions hold an estimated 22 percent of the world's undiscovered, technically-recoverable hy-



drocarbon resources. According to the U.S. Geological Survey, there are more than 400 billion barrels of oil equivalent waiting to be discovered and technically recoverable in the region's onshore and offshore areas. While the potential for this region is significant, the Arctic – especially its offshore operations, where approximately 85 percent of these reserves are located – is an extremely sensitive and complex operating environment.

**Exploration and production continues to grow in these new Arctic frontiers. What are the main challenges – from your business perspective – in locations such as Canada and Alaska?**

There are many operational challenges associated with Arctic exploration and production projects, including extremely cold temperatures

and a very sensitive environment. These conditions require technological expertise and sophisticated project management skills.

An additional challenge is the short drilling season in some areas, when the Arctic ice melts enough to permit offshore drilling operations.

This demands excellent logistics to ensure that the products arrive on-site in accordance with the tight drilling schedule.

Today, Tenaris is supporting operators in Alaska, northern Canada, the Barents Sea and Russia.

**How is Tenaris responding to the significant environmental concerns related to Arctic operations? How is the technology that Tenaris offers reducing the environmental impact on the tundra?**

Our products are designed and tested to provide consistent reliability and efficiency even when they are used in sensitive and difficult environments, such as the Arctic. We have designed proprietary Low Temperature steel grades, and our Blue® and Wedge Series 500™ premium connections, along with our Dopeless® technology – the dry, dope-free coating that makes pipe dope, or pipe-thread sealant, superfluous – have extensive track records in some of the most renowned projects in this region, including Russia's Sakalhin project and Norway's Snøhvit field.

In fact, the groundbreaking Snøhvit project was the first in the world to adopt Dopeless connections for all casing, production tubing and liners run into its wells. Dopeless technology satisfied the strict regulations imposed by the Norwegian government on Statoil's E&P activities to help protect the fishing industry and reduce the risk of harming the environment and livelihoods of the people who share the sea. With temperatures falling as low as 40°C, the Arctic Circle has a slow and relatively self-contained ecosystem. In this environment, any failure would have catastrophic consequences. Workover operations in this subsea well are also very complex and expensive. Dopeless connections continue to perform flawlessly, even after seven years in the ground.

**Can you mention some of the most advanced products required for ultra-low temperature conditions?**

Special oilfield products are required in sub-zero temperature conditions, because metals without sufficient impact toughness tend to fail due to brittleness when exposed to extreme

low temperature environments. With this in mind, Tenaris has developed Low Temperature proprietary grades with improved fracture toughness and better ductility.

One operational challenge of Arctic environments is the application of dope during pipe makeup and running, since dope freezes in sub-zero temperatures. Dopeless technology renders thread compounds superfluous, making operations simpler and →



**GERMÁN CURÁ**

Germán Curá currently serves as the North American area manager for Tenaris. He assumed his current position in October 2006. He is a marine engineer and was first employed with Siderca in 1988. He was also a member of the board of directors of the American Petroleum Institute (API).

**MCKINLEY BAY, CANADA**

**A diver plunges into a hole in the ice pack to monitor an oil leak beneath the Arctic ice.**



cleaner. This makes operations safer and more efficient. For example, for a project in Eastern Siberia, Dopeless technology achieved 25 percent running gains when compared with pipes using dope.

Dopeless technology is available on our durable Wedge Series 500™ connections, which are rugged and easy to use in the field, making connection make-up efficient and reliable.

**In blessing Shell's move into the Arctic, President Obama seems to be writing a new chapter in the nation's unfolding energy transformation, opening up the Arctic Ocean for drilling, to the general benefit of fossil fuel producers. Is this the case? What is your take as Tenaris' president for North America?**

President Obama has lent his support to Arctic drilling as part of the domestic energy policy. However the recent incidents in Shell's program have brought on heightened environmental concerns.

Tenaris is prepared to partner with customers in order to take on these challenges, providing pipes and premium connections that will consistently perform with the utmost reliability, even in this hazardous environment.

**If the Arctic is considered the new frontier, can we also talk about a drilling renaissance in the Gulf of Mexico?**

Yes, definitely. Deepwater permitting activity in the U.S. Gulf of Mexico exceeds pre-Macondo levels. The at-

traction and reward of deepwater drilling outweigh the increased regulatory scrutiny. Deepwater drilling is also quickly expanding in international markets such as Brazil and West Africa.

**The promising oil and gas trend in North America is positively impacting the entire supply chain. Pipe manufacturers like Tenaris are also expanding. You have just announced the plan to build a \$1.3-1.5 billion manufacturing facility on the Gulf Coast. How would you describe this new steel facility in Matagorda County? When will it be completed? How many new jobs will it bring, and what are the production targets?**

The new seamless pipe mill in Bay City, Matagorda County, Texas is a major step for Tenaris – our first greenfield project in 60 years. A \$1.5 billion investment, TenarisBayCity

will complement our integrated global manufacturing network, as well as our existing North American facilities, and further strengthen our domestic

**THE COMPANY**

Tenaris is a leading global manufacturer and supplier of steel tubes and related services for the world's energy industry, as well as other industrial applications. Listed on the New York, Italian, Buenos Aires and Mexican stock exchanges, it has an integrated worldwide network of steel pipe manufacturing, research, finishing and service facilities, with industrial operations in North and South America, Europe, Asia and Africa, and a direct presence in most major oil and gas markets. Tenaris has annual revenues of \$10.8 billion and 26,500 employees worldwide.

production of premium connections and seamless requirements for our customers.

When operations begin in 2016, we will produce 600,000 tons of high-quality seamless pipe, and we will have created 600 direct manufacturing jobs.

The facility is being designed under stringent environmental and safety standards, with the implementation of control technologies such as Selective Catalytic Reducers that will reduce its emissions footprint and exceed state and federal regulations.

**Why did you choose this location in Texas?**

We chose Bay City due to its proximity to Houston, which is also our North American headquarters. The location offers a combination of favorable geography and operational logistics, and availability of a skilled workforce.

**The State is providing \$6 million to this new facility through the Texas Enterprise Fund (TEF). Is Governor Perry's campaign to attract outside firms and business to the State being effective? How would you describe the business climate in the Lone Star State?**

Tenaris has been in Texas for 20 years, and we have always felt very comfortable operating here.

**The boom in oil and gas production and piping may end up being the best argument against building the Keystone XL, according to some industry experts. What is your point of view?**

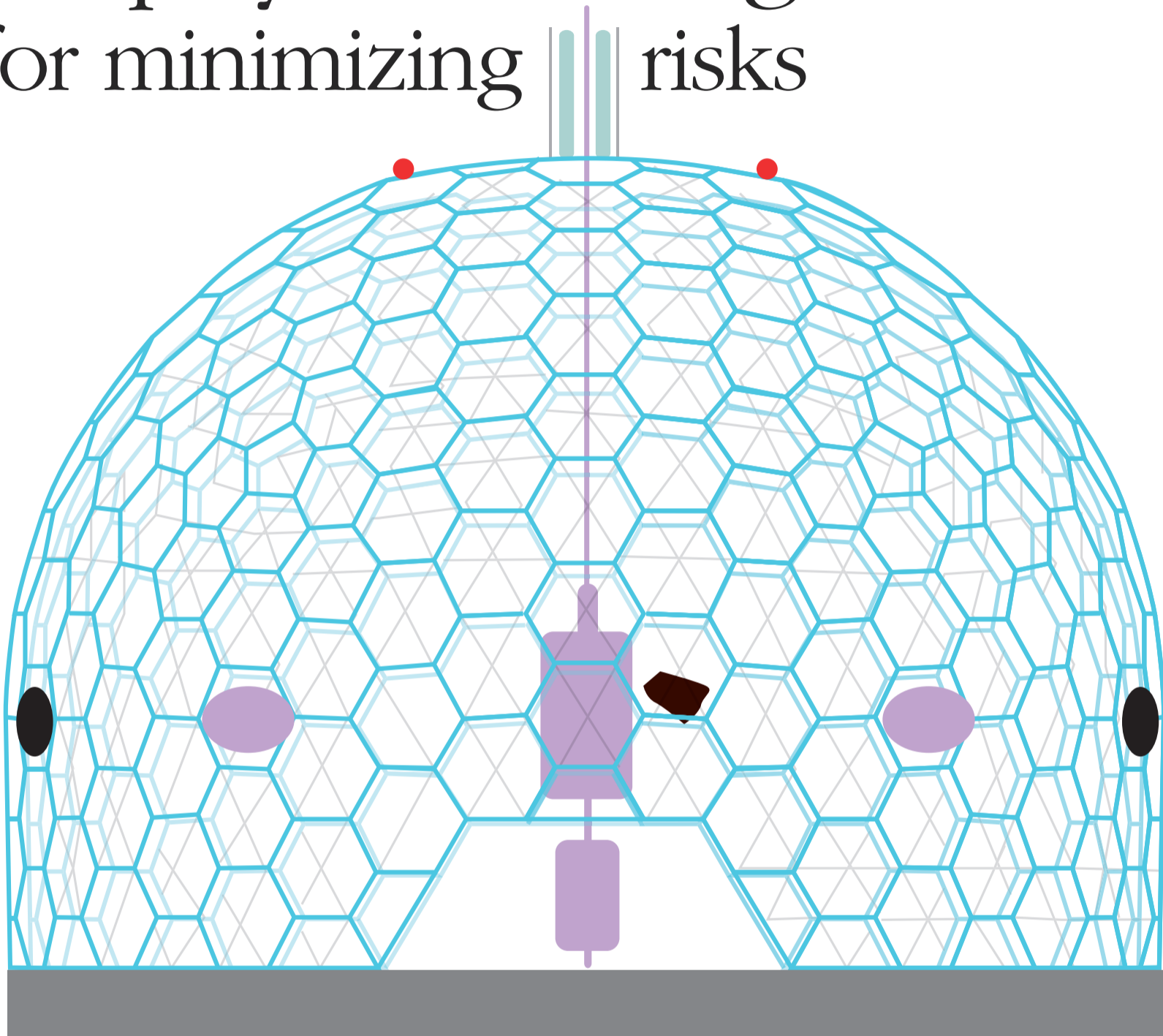
We think the Keystone XL project will prosper because it is part of the energy infrastructure needed to transport oil to the markets where it is consumed.

**North America is Tenaris' largest market, accounting for about 50 percent of sales. What are your projections for 2013?**

Our positioning in North America has strengthened substantially. U.S. sales in 2012 rose by 23 percent compared with 2011, and represented 49 percent of our total sales for the year. Our leading position in deepwater Gulf of Mexico, shale plays in the U.S., thermal in Canada and throughout Mexico have been the key drivers of this achievement. The new mill in Bay City reflects our confidence in the future development of North America as the new frontier for the energy industry.

**Technology/**A sphere limits the effects of any oil spill in deep seas

# Prophylactic design for minimizing risks



A project for placing an oil-containment dome on the seabed before drilling begins: a deep-water geodesic dome that contains and recovers oil, minimizing damage in case of a spill

**G**

by THOMAS  
T. K. ZUNG

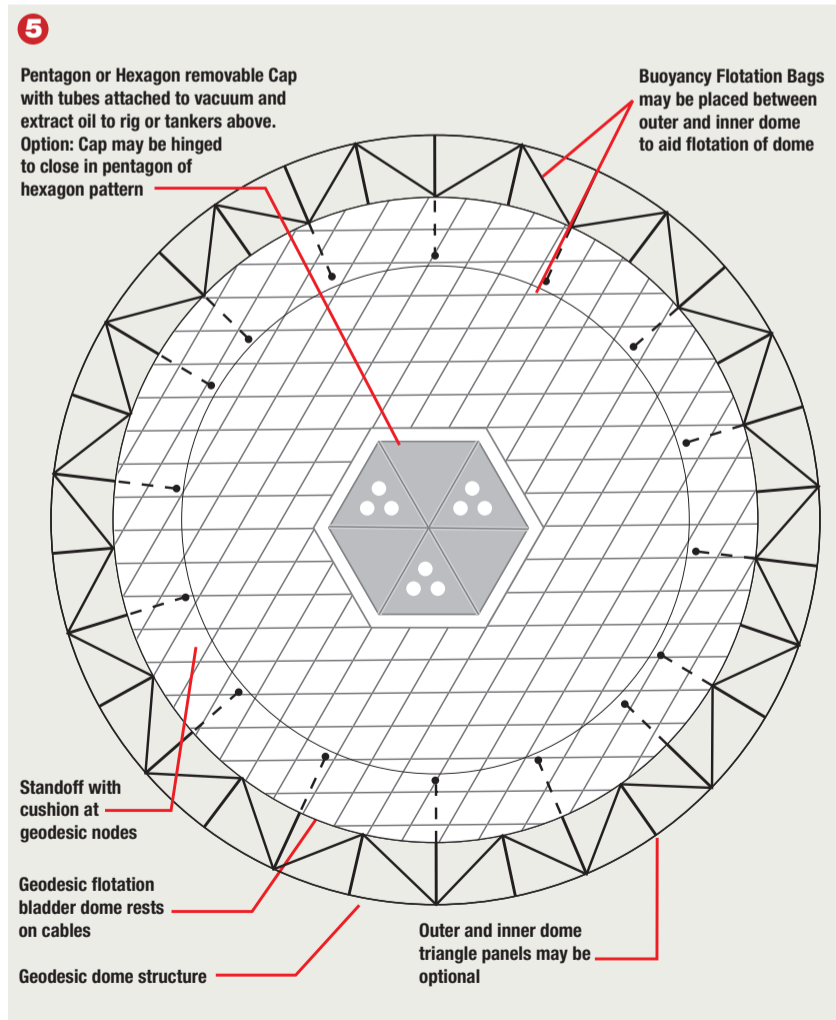
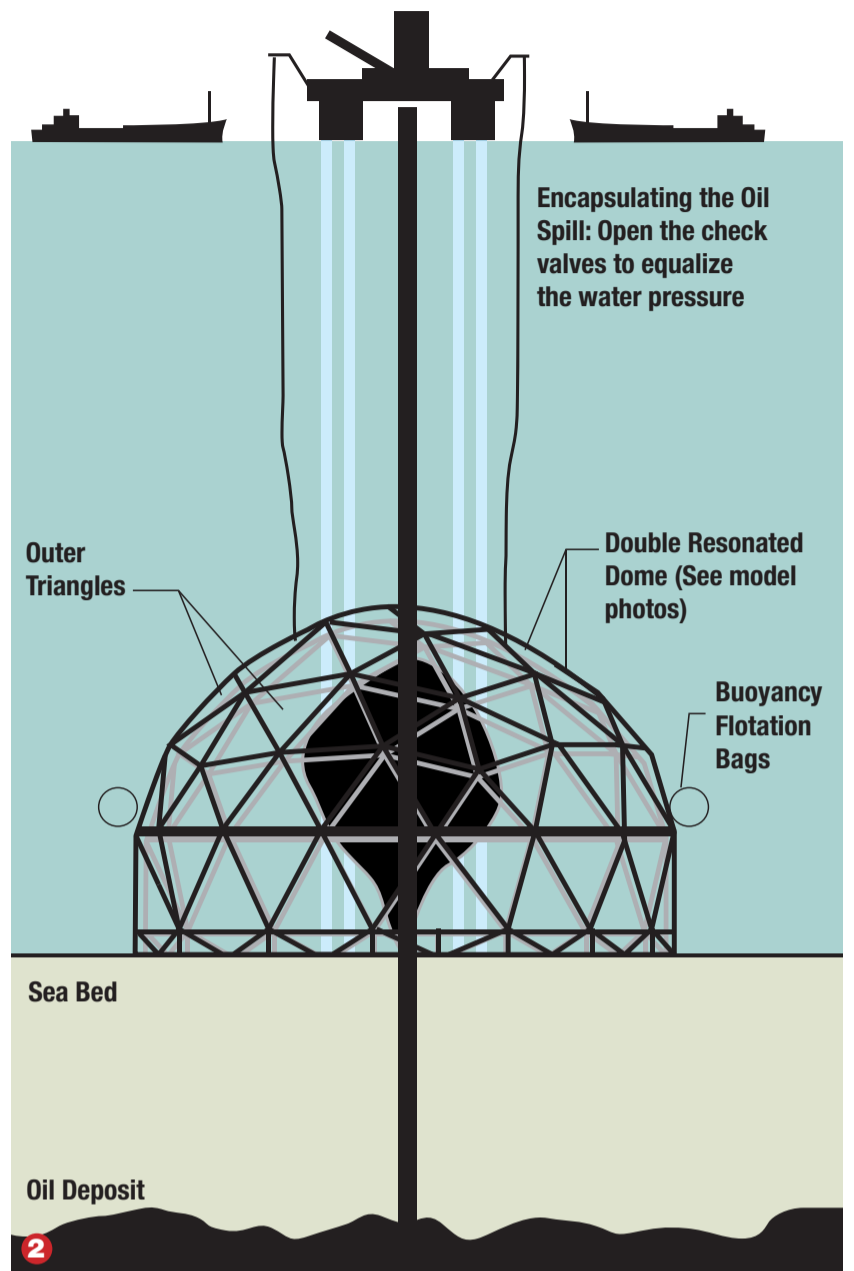
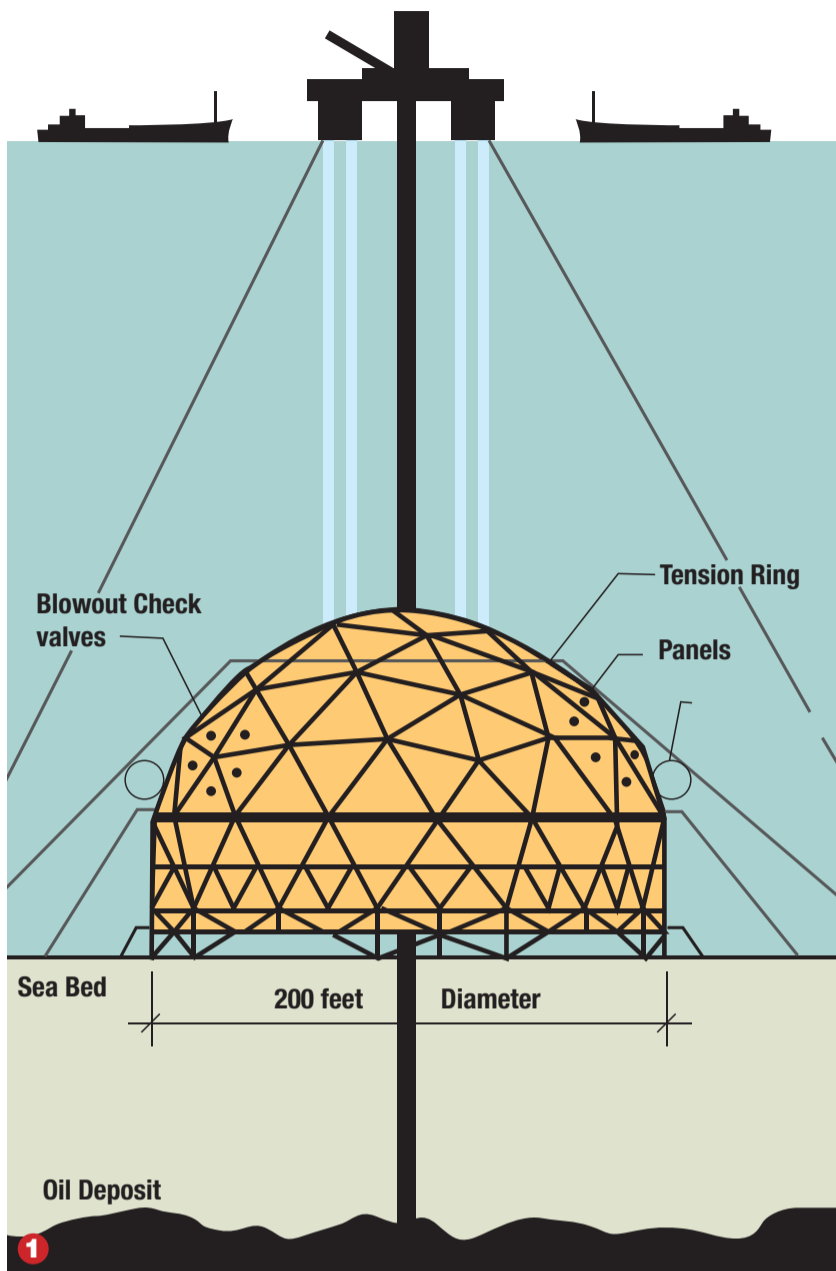
lobal energy demands continue to increase with the expansion of developing economies. As land-based petroleum reserves decrease, deep-sea oil drilling is necessary to meet current and future energy-demand levels. These

more hazardous drilling environments possess inherent dangers. Oil spills are now a recurring nightmare for the petroleum industry, the environment, and the local economies impacted by the damage. While the 2010 Deepwater Horizon accident remains news, there have been oil spills off shore with China, Brazil, and in the North Sea. Last October, The Guardian reported that since 2000 there were 4,123 oil spills in

the North Sea alone. To avoid huge costs in fines, and associated clean-up expenses, our firm offers a unique application of the geodesic dome before drilling: the Oil Recovery and Containment Geodesic Dome (ORCoD) for this dilemma. The ORCoD, deep-water containment prevention sphere, is based on the geodesic dome invented by the late American, Buckminster Fuller. We propose placing an oil containment →



**THE AUTHOR.** Thomas T.K. Zung, President of Buckminster Fuller, Sadao and Zung Architects was a student of Buckminster Fuller. Prior to joining Fuller, he served for many years as principal designer and project architect for the internationally renowned architect, Edward Durrell Stone.



dome on the seabed before the drilling begins (1) so the structure contains and recovers oil, minimizing damage to the environment and local economies. This will be particularly important in harsh environments like the Arctic, where any marine environment harm from a disaster could persist for decades.

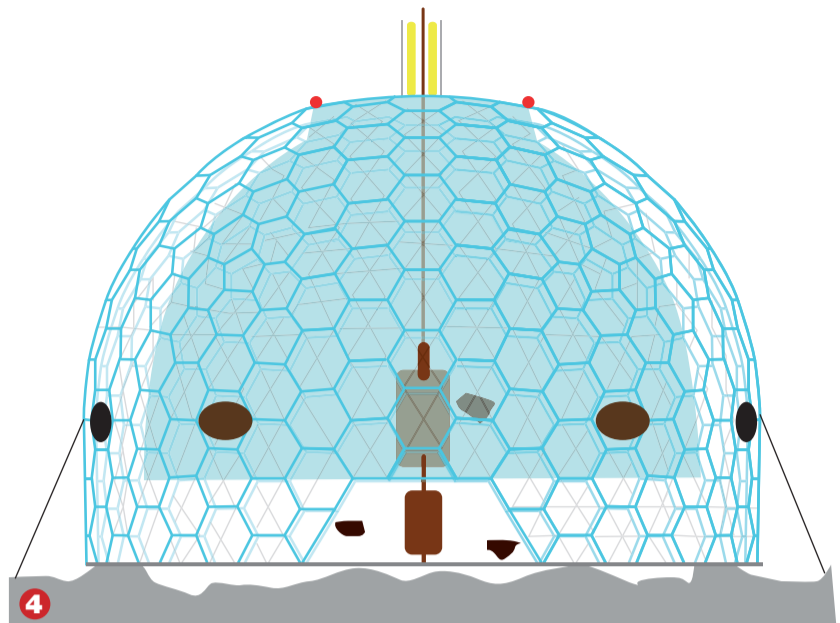
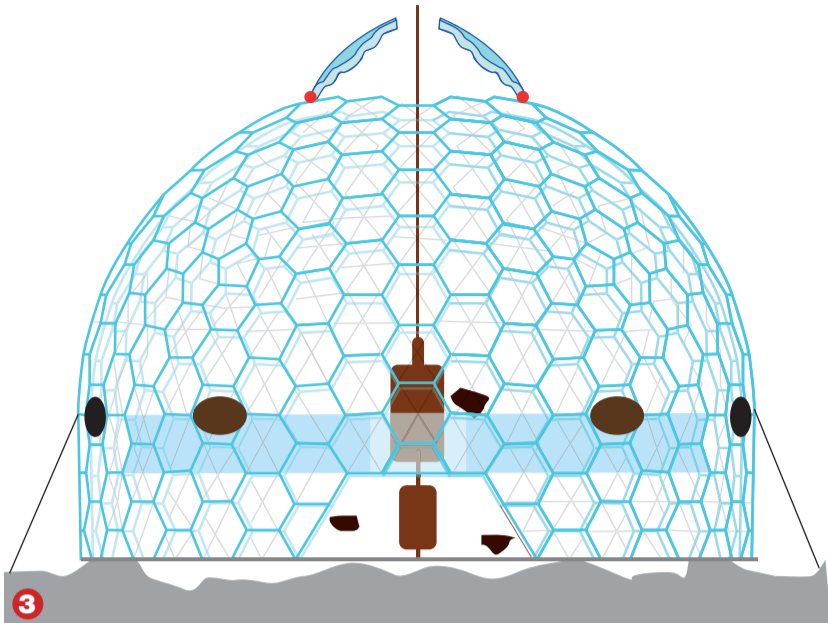
**HOW THE ORCOD WORKS**

The ORCoD geodesic dome is a prophylactic device designed to mitigate the effects of any spill before and during the drilling for oil in deep seas in any condition. ORCoD was what Fuller called “anticipatory design science,” an active process whereby we anticipate an incident and design for it. In this case, therefore, we “anticipate” that a spill may occur and design a dome capable of capturing the escaping oil. A 200-foot geodesic dome, for example, would hold approximately 30 million gallons of oil (725,000 barrels), which would then be siphoned off to waiting tankers above. This “design” philosophy entails the co-implementation of science, architecture and engineering, and uses the strongest manufactured

structure to date: a double-resonated geodesic dome made of stainless steel, resistant to salt water. Since oil is lighter than water, the oil will rise in the dome (2) to be pumped out by surface vessels. A sage investment in a reusable dome will both protect the environment in the event of accident and ensure significant financial savings.

The geodesic dome is manufactured in parts, and shipped to a site adjacent to a seaport. An example is the 415-foot wide, 130-foot high geodesic dome that protected Howard Hughes’s “Spruce Goose,” which was laid out in sections. Crews then placed their units together, and each section was lifted up to complete the dome. This dome was manufactured at the Temcor Company by Don Richter, a Fuller student and colleague. Among Fuller’s other celebrated domes were the Disneyworld Epcot Center and the U.S. Pavilion for Expo ’67.

In the case of the ORCoD, after final dockside assembly, a crane will lift the completed dome onto a ship for transport to the designated drilling location. U.S. Navy Seabee crews had to brave freezing temperatures and



high winds to assemble the South Pole Dome from modular components shipped by plane. The structure withstood winds of up to 130 mph and freezing temperatures for over 40 years, with huge snows pushing against the dome sides. Recently, this dome was dismantled and placed in the U.S. Navy Seabee museum; it, too, was fabricated by the Temcor Company.

In 2008, a geodesic dome was erected near the North Pole for the North Greenland Eemian Ice Drilling project (NEEM), a scientific site dedicated to ice-core drilling and analyzing carbon isotopes from the last three ice ages. This international effort to comprehend the dramatic effects of climate change is supported by the U.S. Office of Polar programs of the National Science Foundation.

The dome was designed by Blair Wolfram, a Fuller student, and manufactured by Dome Inc.

In addition to these two examples of domes used in the most extreme conditions, Fuller made a significant contribution to the protection of the United States during the Cold War, when large numbers of his Distant Early Warning Radar Domes were used to protect Department of Defense dish antennas in numerous locations around the globe.

### TRANSPORTING THE DOME

After ORCoD is erected, the 200-foot geodesic dome is transported to the designated drilling site aboard a vessel like the Blue Marlin or a catamaran equipped with telescoping crane towers. In either case, the vessel is water-ballasted to allow lowering the dome to float off the ship and be safely controlled to the sea floor.

The dome is secured on the sea bottom with tie-down anchors similar

to those used to secure floating oil rigs. Buoyant bags integral to the dome can also be used to control the distribution weight. Once in place, the geometry of the structure allows sensors at the nodes to detect current movements, drilling incidents, and seismic movements using cameras and other devices controlled from above, to monitor the drilling exploration process.

Part of the ORCoD design is a 50- to 60-foot wide cap named the “Bucky Cap” that can be opened and closed from above by simple cables. This opening allows the super Blowout Preventer Helix or a well-containment vessel to be lowered into the dome for repairs. The dome can also be outfitted with interior lighting to make it easier for

remotely-operated vehicles (ROV) to perform their assigned tasks, and secure the “Christmas tree” device. The 200-foot double-resonated dome is equipped for two options. The first has a polymer surface material attached to the interior dome to contain the oil and gas. The exterior is covered by mesh to ward off unwanted sea inquisitors. At the bottom of the dome, there are five large openings to allow an ROV to enter for any purpose.

The second option is a folded four-ply buoyant bag material (3) that remains collapsed on the dome floor until activated from above by the pull of a cable (4). This solution is used when it is determined that the ocean currents are so severe and unpredictable that, under normal

circumstances, an open cage structure would subject the dome to less turbulence. In this case, the bladder is only activated after a spill incident has occurred.

### DOMESTRUCTURE

Due to its structural integrity, the geodesic dome is the strongest man-made structure ever invented. The stainless steel double-resonated ORCoD dome (5-6) will outperform any comparable structure and, being constructed of stainless steel, will withstand the saline waters of the marine environment.

We emphasize that the ORCoD dome has no moving parts. The double-resonated geodesic dome has a 20 percent permanent opening at the bottom of the dome to keep the sea pressure stabilized.

### ORCoD vetting plan

Upon completed testing, the dome benefits might include smooth issuance of government leasing permits, lawsuit avoidance, and corporate environmental assurance to the public. The dome team is currently investigating oil-industry partners to vet the ORCoD geodesic dome. Together, we can help resolve one of the problems of the dilemma of deep-sea exploration: the need for safe oil energy. ■



by DANIEL  
ATZORI

# The Arctic Sea could become the “Mediterranean of the 21st century”

It is still common, for many of us, to imagine our world through the old maps, inspired by the sixteenth-century cartographer Gerardus Mercator, where the Arctic was just a marginal region on the top. That area was simply too cold, and too far away from civilization and trade routes, to be even considered. But globalization and the IT revolution, as well as climate change, are rapidly changing our perception of the world.

**Today, the Arctic region is more and more interconnected with the global economy, and it is becoming one of the main battlegrounds for world hegemony**

On the one hand, the more global warming goes on, the more the unique and precious Arctic environment is threatened. On the other hand, melting ice opens up new opportunities for the world economy. To begin with, the retreat of summer sea ice is increasing the relevance of lanes such as the Northern Sea Route, which links the Atlantic with the Pacific Ocean. This will not only stimulate marine transport, but also make it easier to reach the area's resources, like fish and hydrocarbons. Places such as the Kara Sea, north of Siberia, and the Chukchi Sea, between Alaska and Siberia, have the potential to hide huge amounts of hydrocarbons. For sure, every opportunity for development is also a potential threat to the environment, and sustainable models need to be implemented in this virgin area. The paradox, well explained by *The Economist*, is that “climate change caused by burning fossil fuels will allow



more Arctic hydrocarbons to be extracted and burned.”<sup>1</sup> All of us should start paying more attention to this region of the world, which is by no means “marginal” anymore. There's plenty of oil and gas in the Arctic, that's for sure: according to the United States Geological Survey estimates, they amount to about one quarter of the world's undiscovered resources of oil and gas. But not everyone agrees that the region will have the lion's share of global energy supply. Let's have a look at some numbers: estimates say that 15 percent of global undiscovered oil reserves are in the Arctic, and of these, 41 percent are thought to be in Arctic Russia, 28 percent in Alaska, 18 percent in Greenland, 9 percent in Arctic Canada and 4 percent in

Arctic Norway. As for Arctic gas, which amounts to 30 percent of global undiscovered reserves, 70 percent appears to be in Arctic Russia, 14 percent in Alaska, 8 percent in Greenland, 4 percent in Arctic Norway and 4 percent in Arctic Canada<sup>2</sup>. However, it should be noted that ownership of the Arctic lands and seas, and of their underlying resources, is disputed among various countries, and that these quarrels may escalate in the future. Despite its huge reserves, a study says that, in the future, the Arctic will supply just 8-10 percent of global production. The fact is, as the researchers say, that “cheap and abundant reserves” coming from countries such as Qatar and Iran will prevent Arctic

hydrocarbons to flood the markets.<sup>3</sup>

**The region is rich in energy resources, but they may still be too expensive to extract**

In this respect, the two main variables are the price of oil and the pace of global warming; to put it simply, if prices remain high and the ice keeps on melting, it will be more and more convenient to explore and drill the Arctic. The Arctic could become the Mediterranean of the 21st century: an open sea, strategic for world powers, as James Holmes wrote in *Foreign Policy*. His argument is that an ice-free Arctic will be the battleground for hegemony between the United States and Russia. On the one hand, global warming, opening up new

sea-lanes north of Russia, will offer Moscow the chance to put an end to being landlocked. On the other hand, an open Arctic could make Russia more vulnerable to the U.S. navy. Who would prevail, then? What is sure is that competition in the Arctic has already started.<sup>4</sup> However, Arctic countries may rely on dialogue and cooperation to both develop and preserve the region. For example, in 2010 Norway and Russia put an end to a border dispute, and this allowed Oslo to map out its resources. The Scandinavian country estimates that its discoverable offshore oil is 18.7 billion barrels of oil equivalent (boe), of which 1.9 billion boe are in an area of the Barents Sea. The risk of having fields near the border between two countries is that whoever starts drilling it first can empty it. Nothing new under the sun: as Daniel Yergin explains in *The Prize*, this is also what happened at the very beginning of the industry, in the first fields discovered in Pennsylvania's Oil Region. However, agreements such as the one between Norway and Russia should pave the way for a peaceful solution. In this case, for example, Norway's Statoil could offer the Russians its technology and know-how, for the benefits of both. Overall, cooperation appears to be the best way both to preserve the Arctic environment and to avoid conflict over the resources of the “polar Mediterranean.” ■

- 1 “The Melting North,” *The Economist*, July 16, 2012
- 2 Lindholt L. and S. Glomsrød, “The Arctic: No big bonanza for the global petroleum industry,” *Energy Economics*, Vol. 34, Iss. 5, September 2012, pp. 1465–1474
- 3 L. Lindholt and S. Glomsrød, “The Arctic: No big bonanza for the global petroleum industry,” *Energy Economics*, Vol. 34, Iss. 5, September 2012, pp. 1465–1474
- 4 *The Arctic states – cooperation or competition?*, Russian International Affairs Council, December 4, 2012

He has been a Senior Researcher at the Fondazione Eni Enrico Mattei (Feem) and he is currently Editorial Team Coordinator of the magazine *Papers of Dialogue*. He is the author of *Fede e mercato: verso una via islamica al capitalismo?* (Il Mulino, 2010).





by ANTONIO GALDO

# Environmental catastrophe or opportunity for sustainable development?

The Arctic ice cap shrank faster than ever before in 2012, melting at a rate that even outstripped scientists' predictions. The surface area of the ice cap has now fallen to 3.4 million square kilometers – an all-time low. In 2007 the Arctic ice sheet covered 4.2 million square kilometers, and it spanned more than 14 million square kilometers back in the 1940s, when modern climate research began.

**Essentially, it is as if an area of ice the size of Europe has melted into the Arctic Ocean since 2007**

Predictions of ice-free summers in the Arctic abound: several years ago the Canadian Ice Service, which leads the world in the study of arctic glaciers, estimated that we would not see the first ice-free summer in the Arctic Ocean until 2050. Now, however, the Service is updating its forecasts on a monthly basis and expects an ice-free Arctic summer some time between 2015 and 2025 – far earlier than had been predicted as recently as 2008. In the United States, meanwhile, a group of researchers from the University of Colorado has said that it expects the ice to melt far more quickly than the Canadian Ice Service has envisaged. The researchers say that the characteristics of the Arctic sea ice are changing and becoming more translucent, speeding up the warming of the oceans and thus the melting of the ice. According to the team in Colorado, we can expect an ice-free summer as early as 2015, especially if the changes recorded during 2012 are confirmed as accurate.



Since 2007 the polar ice cap has shrunk, losing an area of ice the size of Europe.

But what are the consequences of the vertiginous decline of the Arctic ice cap for the ecosystem and for human beings? It does not take a glass-half-empty environmental doomsayer to appreciate the dangers that come with global warming: aside from the extinction of several animal species – such as the famous polar bear – scientists are most concerned by the systemic consequences of melting ice in the distant seas of the Arctic. Global warming is, indeed, the primary concern. Scientists meeting last year in Montreal (Canada) for the International Polar Year Conference confirmed that global temperatures have risen by an average of 0.7 degrees since 1951, and that the change is more acute in the Arctic Circle. In Greenland, for example, average temperatures are up by two degrees – almost triple the worldwide average. This has led to rising sea levels and sinking land, as well as a

number of changes to biodiversity and major disruption to the lives of indigenous peoples. For example, polar bears habitually live on a diet of seal, but the lack of ice has made the animals very difficult to hunt; the bears have adapted by eating birds' eggs, but these are central to the diet of local communities, which are thus facing the threat of food shortages that would force them, at barely sustainable costs, to resort to imports.

**Climatic instability linked to warming temperatures in the Arctic also increases carbon dioxide levels**

Until the industrial revolution – and the resulting use of fossil fuels and massive deforestation – the volume of carbon dioxide in the atmosphere was approximately 280 parts per million; it now stands at 392 parts per million, and the exponential rise in temperatures will ensure that CO2 percentages will continue to grow. We will live

in a more polluted world, just as technology offers us increasingly effective ways to reduce the damage we do to the environment. Moreover, meteorologists say that global warming exposes the whole planet to more extreme weather events, such as heat waves, freezing temperatures and drought. On the other hand, melting ice caps are a real boon for the mining industry, since 25 percent of global energy resources are located in the Arctic. Indeed, this bounty is already a major contributor to the income of countries on the Arctic Ocean. For example, Norway – known for good reason as the “the Emirate of the North” – pulls in 40 billion euros per year from oil and gas, and invests the proceeds into a welfare state that leads the world in terms of the quantity and quality of services it offers its citizens. Historic, civilized Norway could, then, be seen as the symbol of what might happen in the Arctic Ocean as a result of these geographical changes. If the resources are

used well, if the environment is respected, and if the right balance can be found between extracting energy resources and protecting the ecosystem, then the melting of the ice caps will not be a disaster, but could in fact turn out to be a new driver of sustainable economic growth. The melting of the Arctic Ocean ice also opens the way to a second economic opportunity: new international trade routes. Ships travelling between Asia and Europe via the Arctic, instead of through the Suez Canal, have a 40 percent shorter journey time. Moreover, crossing the Arctic would also mean that commercial ships could avoid the pirate threat in the Gulf of Aden, significantly cutting the cost of insurance against criminal attacks along trading routes.

**“Ice melts and history shifts; the Arctic will be the new Mediterranean,” say those convinced of the new economic opportunities that will arise from the sudden melting of the glaciers**

Some even predict a doubling in commercial shipping activity at these latitudes over the next decade. Kirkenes, one of the most northerly towns in the Arctic polar circle, which stands at the border between Norway and Siberia, could be reborn as a result of the change in shipping patterns. During World War Two, Kirkenes was one of the most-bombed towns in Europe, since it was seen as the Nazis' stronghold on the border of the Soviet Union; then, during the Cold War, it was an epicenter of potential conflict between the U.S. and the U.S.S.R., with NATO and Russian submarines lying in its waters like fingers hovering over triggers. Now this town of just 7,000 people is set to become a hub for sea freight – an Arctic version of Rotterdam – with storage facilities, re-gasification plants and pipeline terminals. If the Arctic is on the cusp of a new future, then it will arrive by way of Kirkenes. ■

He runs the website [www.nonsprecare.it](http://www.nonsprecare.it) and is the author of the books *Non Sprecare* and *Basta Poco*, published by Einaudi. He recently published *L'egoismo è finito* (Einaudi).

## MARKET TRENDS

# Difficult start to 2013

The markets reflect good U.S. and Chinese economic performance figures, but the outlook remains uncertain

## Oil prices

In 2012, the average price of Brent reached an all-time nominal high of \$111.6/barrel, although it remained close to the 2011 average of \$111.3/barrel. Over the last two years, the market has been caught between the opposing forces of geopolitical tensions, which have tended to drive prices up, and weak macroeconomic data, which has tended to pull them down, with the result being relative "stability" of crude prices. Although prices in absolute terms remained on a par with those of last year, 2012 was nevertheless a record-breaking year. On the supply side, the Iranian embargo brought a drop in the country's output and exports, offset by the highest levels of Saudi Arabian production in 30 years. Outside OPEC, there was a boom in U.S. output, causing a steep decline in the country's crude imports. The combined increase in OPEC and (especially) non-OPEC output resulted in the highest surplus of supply in the last 14 years. All of these factors limited fluctuations in absolute prices, but generated significant volatility in spreads between crude oils and refined products.

The futures market also underwent a historic change in 2012: starting in April, for the first time ever, Brent listed on the London ICE traded at higher volumes than WTI on New York's CME. The shift in "paper" volumes from New York to London also reflects divergent trends in the physical market: the American benchmark is suffering from the congestion

of its domestic market, and in recent years has lost its position as global marker. Meanwhile, although Brent's sphere of influence as a marker in international trade has grown, in volume terms it has come under pressure against a highly problematic regional background: North Sea production has halved in recent years, declining from 6.0 mb/d in 2000 to 2.6 mb/d in 2012. Moreover, both the U.K. and Norway saw their plays running into a series of technical difficulties last year, and these will continue to affect volumes this year.

The new year began with prices climbing strongly: good economic results for the U.S. and China, as well as new geopolitical events such as the terrorist attacks in Algeria, combined with pre-existing tensions to push January Brent to \$113/barrel, with a further drive in February to \$116/barrel.

Although crude prices have been climbing in the early part of the year, their likely direction for the rest of the year remains uncertain, due to ongoing economic fragility and growing supply. However, any excessive price drops or prolonged rises will be kept in check by Saudi Arabia, which has promised to continue its historic role of swing producer on the international markets. The impact of unforeseeable events, including geopolitical shocks, remains high, and this could alter the expected trend in fundamentals.

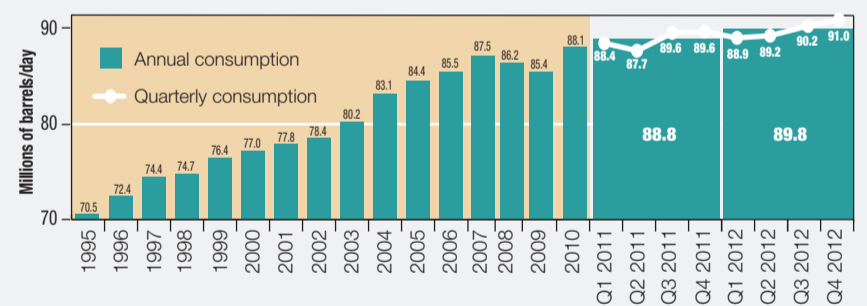
## Oil demand

Global oil demand in 2012 hit 89.8 mb/d, with growth just slightly higher than in the previous year (+1 mb/d in 2012, compared with 0.8 mb/d in 2011), in view of the European recession, the more general deterioration of the international economic scenario, and ongoing high prices.

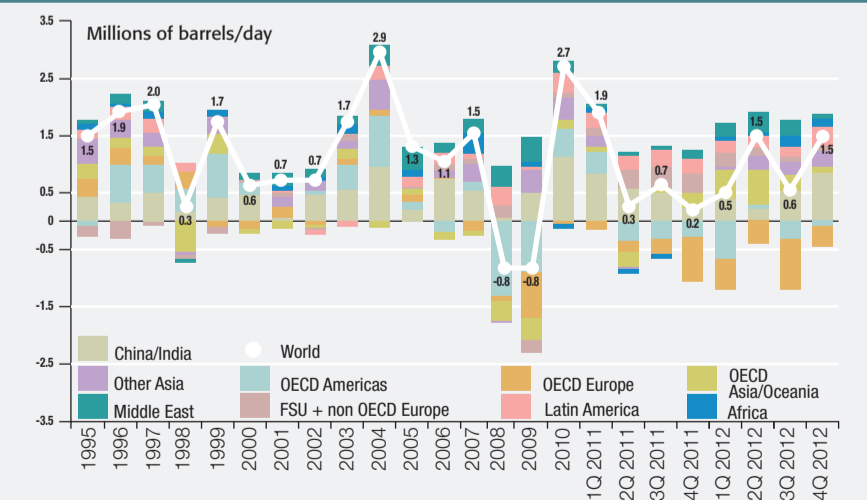
As in 2011, growth in global demand was kept in positive territory only by consumption in non-OECD countries (+1.4 mb/d), which more than offset the decline among OECD states (-0.4 mb/d). The moment when non-OECD consumption irreversibly overtakes that of the OECD countries is coming closer, with the OECD accounting for 51 percent of oil consumption in 2012.

The OECD area was marked by contrasting trends: while consumption rose in OECD Asia / Oceania (+0.3 mb/d compared with 2011) due to the Japan effect, there was a sharp decline in Europe (-0.5 mb/d) and a less marked fall in OECD Americas (-0.2 mb/d). Consumption in Italy plunged by 10 percent, exceeding even the massive drop seen in 2009 (-7.4 percent), in view of declining industrial output, high unemployment and lower consumer confidence due to rising taxes. The structural decline in U.S. production continued (-0.3 mb/d, down by 2 percent on 2011). Oil demand in non-OECD countries continued to grow, albeit more slowly than in the recent past (+3.3 percent in 2012, against an annual average of +4 percent from 2006 to 2011). Consumption growth slowed in China, falling from an average of 6 percent per year in 2006-2011 to 3.8 percent in 2012, despite 7 percent growth in the fourth quarter thanks to the recovery of the industrial output index and increased refinery activity as new capacity became available. A significant contribution (17 percent) to the 2012 growth came from the Middle East, where oil consumption is stimulated by controlled retail prices and highly energy-intensive investment in economic growth.

### GLOBAL CONSUMPTION



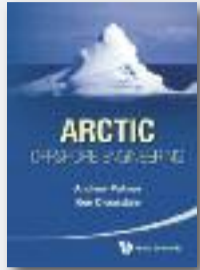
### VARIATION IN GLOBAL CONSUMPTION AND BY AREA



Source: prepared by Eni with data from the International Energy Agency; changes over the same period of the previous year



## The complexity of the Arctic

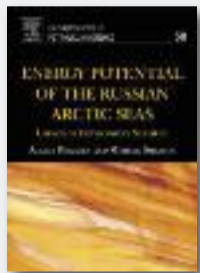


**Title:** Arctic Offshore Engineering  
**Authors:** Andrew Palmer and Ken Croasdale  
**Publisher:** World Scientific Pub Co Inc  
**Info:** 2012, 357 pages  
**Price:** 108 dollars

A thorough survey and brilliant analysis of the many and often subtle forces at play in the Arctic Ocean. The book is a collection of contemporary case studies

addressed in light of the increasingly obvious need for new engineering projects in this most difficult of landscapes.

## Russian energy at the Pole



**Title:** Energy Potential of the Russian Arctic Seas  
**Authors:** Alexey Piskarev and Mikhail Shkatov  
**Publisher:** Elsevier  
**Info:** 2012, 440 pages  
**Price:** 170 dollars

The structure of sedimentary basins in the Russian Arctic Sea is examined and illustrated here by a selection of maps,

cross-sections and geophysical models. The calculated density models of the Earth's crust illustrate the deep structure of the main blocks of crust, which hold five major gas-condensate and gas fields: three in the Barents (Shtokman, Ludlov, Ledovoe) and two in the Kara Sea (Leningrad and Rusanov).

## A journey through the ice



**Title:** Breaking Ice for Arctic Oil: The Epic Voyage of the SS Manhattan through the Northwest Passage  
**Author:** Ross Coen  
**Publisher:** University of Alaska Press  
**Info:** 2012, 215 pages  
**Price:** 28.95 dollars

In 1969, Humble Oil commissioned an ice-breaking tanker, the SS Manhattan, to transit the Northwest Passage in order to test the logistical and economic feasibility of an all-marine transportation system for Alaskan North Slope crude oil, seen as an alternative to the Trans-Alaska Pipeline. The Manhattan made two voyages to the North American Arctic and collected huge volumes of scientific data on ice conditions and the behavior of ships in polar waters.

## Two worlds collide



**Title:** The Eskimo and the Oil Man: The Battle at the Top of the World for America's Future  
**Author:** Bob Reiss  
**Publisher:** Business Plus  
**Info:** 2012, 320 pages  
**Price:** 27.99 dollars

The book tells its story through the eyes of two men: one an Inupiat Eskimo leader on Alaska's North Slope, the other the head of Shell Oil's Alaskan venture. Their saga is set against the background of an under-sea land rush in the Arctic, between threats from Russian bombers and the danger posed to millions of sea mammals.

## CNPC takes 20 percent of Eni's Area 4 in Mozambique



**March 14** - Eni and PetroChina Company Limited (a subsidiary of the China National Petroleum Corporation) have put pen to paper on an agreement which provides for the sale by the Italian company to CNPC of 28.57 percent of the share capital of Eni East Africa, which in turn owns

70 percent of the Area 4 offshore block in Mozambique. The deal hands China an indirect 20 percent stake in the African play for a total price of \$4.21 billion. CNPC's participation in Area 4 is especially significant in light of its influence in the global upstream and downstream sectors.

## Jordan licenses shale oil distillation



**Khalid A. Al-Falih**  
**CEO of Saudi Aramco.**

**March 4** - Jordan's government has approved a licensing deal with the Saudi Arabian Oil Shale Company for the distillation of unconventional oil. The project, which covers the Atarat Umm Ghadran area and will cost an estimated \$1.93 billion, requires the use of Russian technology and targets an output of 30,000 barrels within the next four to eight years. The company has already completed the necessary feasibility study to determine the project's environmental impact. The Jordanian government has also given the green light to a co-production agreement with Korea Global Energy Corporation for oil exploration in the Dead Sea and the Wadi Araba block. The four-year project will allow the Korean company to carry out geological studies and to drill three wells. Jordan's cabinet has also decided to set up a committee for the promotion of oil

exploration in this southern area, as part of a strategy to develop the country's oil potential.

## Russia-China relations growing ever closer

**February 27** - Russia has sealed a deal to supply China with 38 billion cubic meters of gas per year, to be transported via the eastern gas pipeline. The agreement had been foreshadowed in recent months in several statements by Russian president Vladimir Putin. Speaking outside the Valdai International Discussion Club - an annual forum bringing together Russian market experts and analysts - Putin had announced the intention of reaching an agreement with Beijing on supplies of gas as well as of oil. The goal is to reach \$100 billion in trade between the two countries, compared to the current \$80 billion. In order to achieve this target, Putin has said that the country is keen to open its market to Chinese goods, and to work together on peaceful nuclear projects, on aviation and on missile technology.

## KPI to build Indonesian refinery

**February 27** - Kuwait is to start work on a \$7 billion refinery in Indonesia that will have a daily output capacity of 300,000 barrels of oil. The news was announced by Kuwait's ambassador to Indonesia, Nasser Bareh Al

Enezi, who added that the project is being seen as a key part of the strategic relationship between the two countries. The refinery is of huge importance for the Indonesian government, which in 2012 spent \$42.6 billion importing oil and gas products, since its own refineries meet just 60 percent of the country's current 1.5 million b/d demand for oil. It is not yet clear whether the Indonesian government will grant Kuwait Petroleum International the necessary tax breaks and financing to expand the project to encompass the construction of a petrochemical center.

## China and ExxonMobil close to Iraqi oil partnership

**March 6** - China is looking to join up with ExxonMobil to develop the huge Iraqi West Qurna-1 oilfield. The news was reported by a senior executive at the American company, who said that Beijing could assume a major role in the project and help Exxon to repair its relationship with the Iraqi government. Last year Exxon announced the sale of its 60 percent stake in the field following a number of spats with the Iraqi government. According to industry sources, Iraqi prime minister Nuri al-Maliki wants to continue the country's partnership with ExxonMobil and is offering improved contractual terms for the development of the field. The U.S. company, meanwhile, is weighing its options, which include selling a part of its West Qurna-1 stake to PetroChina, an associate of the China National Petroleum Corporation (CNPC). PetroChina chairman Jiang Jiemin has confirmed his readiness to link up with Exxon to develop the field, which currently yields more than 400,000 barrels of oil per day.

## CNOOC completes Nexen acquisition

**February 26** - China National Offshore Oil Corporation (CNOOC) has finalized the acquisition of Canadian company Nexen

for \$15.1 billion (\$27.50 per share) – seven months after the agreement had been announced by the Chinese oil giant. This is the largest-ever acquisition by a Chinese group of a foreign company, and will therefore have strategic repercussions for the entire country.

## Jordan and Iraq could sign pipeline deal



**February 26** - Jordan and Iraq are expected to sign an agreement for the construction of a double pipeline supplying Amman with oil and gas. The news was revealed by the chairman of the Iraqi Business Council (IBC), Majid Saadi, who said that an invitation to tender should soon be launched for the construction of the \$18 billion pipeline. The project is seen as hugely important in the Arab world; it is expected to provide a link between the producer region of Basra and the province of Anbar, and then onwards to the Jordanian port of Aqaba for export. The pipeline, which should be 1,680 km in length and carry 2.25 million barrels per day through Jordan, could generate estimated annual revenues in the region of \$2-3 billion.

## AOC seals oil cooperation agreement with Ethiopia

**February 25** - Africa Oil Corporation (AOC), a Canadian company, has signed an oil exploration and production agreement with Ethiopia. The project will enable AOC to work alongside two English companies – Tullow Oil and New Age Ethiopian Ltd – to extract and develop oil in an area covering between 42,000 and 50,000 square kilometers in the Ogaden and South Omo blocks. The Ogaden National Liberation Front (ONLF) has accused the company of conspiring with the Ethiopian government to exploit the region's oil resources and has threatened consequences. The Ethiopian government sees the threat as mere propaganda being spread by a few members of the group, although in 2007 the ONLF killed 65 Ethiopian and 9 Chinese workers in an attack on an oil company working in the country.

## Maersk chooses GDI for development of Qatar play

**February 25** - Denmark's Maersk Oil and Qatar's Gulf Drilling International (GDI) have signed a four-year agreement worth \$211 million for the Al Shaheen play – the largest offshore oilfield in Qatari territory. Under the contract GDI will supply the Al Jassra drilling rig that Maersk Oil will use in its current plans to develop the field, where it

aims to drill 51 new wells. The CEO of GDI, Ibrahim J. Al-Othman, has praised the decision of Maersk Oil to use the services of a Qatari company, thereby supporting the country's aim of developing domestic skills and capabilities.

## PetroChina and Conoco in talks over Australian gas



**February 22** - Chinese oil group PetroChina is in talks with U.S. company ConocoPhillips to determine Conoco's share in two gas development projects in Australia. The companies are also set to begin a partnership for shale gas exploration in China. The agreements provide for PetroChina to buy 20 percent of the Poseidon offshore block in the Browse Basin, off the coast of northwestern Australia, and 29 percent of the Canning Basin, in the northwest of the country. The two groups are also shortly expected to enter into an agreement to explore unconventional gas in the Neijiang-Dazu block in China's Sichuan Basin. However, the agreements are still subject to government and partner approval.

## Chesapeake to sell Mississippi Lime assets to Sinopec



**Aubrey McClendon**  
CEO of Chesapeake.

of half the field, which covers 850,000 acres in its entirety. During the final quarter of 2012, output across the play increased by 208 percent, reaching 32,500 barrels of oil equivalent per day (45 percent crude

**February 26** - Sinopec is poised to buy half the assets in the Mississippi Lime gas and oil play (Oklahoma, U.S.) for \$1.02 billion. The vendor, Chesapeake Energy Corp., announced the deal in a press release disclosing the sale to Sinopec

oil, 46 percent gas, and the remainder in liquefied gas). Chesapeake, the second-largest U.S. gas producer, will use the proceeds of the deal to pay down some of its debt, which on December 31, 2012, stood at \$12 billion. The acquisition of the Oklahoma play allows Sinopec to increase its share of the U.S. shale gas industry. China holds the largest reserves of gas extracted from clay-rich shale sediment, but lacks the expertise to develop it fully. Following two auctions for drilling rights held in recent years – and despite massive Chinese investment in the sector – the exploration and development of this unconventional energy source is proceeding slowly in China due to high costs and a shortage of adequate technology.

## Arctic Circle ABCs



**Title:** Who Owns the Arctic?  
**Author:** Michael Byers  
**Publisher:** Douglas & McIntyre  
**Info:** 2010, 192 pages  
**Price:** 17.95 dollars

Michael Byers, a leading Arctic expert and renowned international lawyer, clearly and concisely explains the sometimes contradictory rules governing the division and protection of the Arctic, and the disputes over the region that still need to be resolved. What emerges is a vision for the Arctic in which cooperation, not conflict, prevails.

## Somewhere between past and future



**Title:** The Future History of Arctic  
**Author:** Charles Emmerson  
**Publisher:** PublicAffairs  
**Info:** 2010, 448 pages  
**Price:** 28.95 dollars

Charles Emmerson weaves together the history of the region with a combination of reportage and reflection, revealing an area of the globe that is as complex as it is vast, replete with opportunity and yet fraught with challenges at this turning point in Arctic history. This engrossing book tells the story of what is happening there now and what might happen in the future, through the stories of those who live there, those who study it, and those who will determine its destiny.

## An explorer's life story



**Title:** Life on Ice:  
25 Years of Arctic Exploration  
**Author:** Lonnie Dupre  
**Publisher:** Editions Keen  
**Info:** 2012, 320 pages  
**Price:** 22 dollars

The renowned Arctic explorer Lonnie Dupre tells of his 25 years as an explorer, including the world's first circumnavigation of Greenland and the One World Expedition, a summer expedition to the North Pole that was followed online by 68 million people worldwide. Dupre has also worked with and gathered data for diverse organizations including the National Geographic Society, Greenpeace, the Explorers Club, the National Snow and Ice Data Center and the U.S. Department of Atmospheric Sciences.

## Arctic wonderland



**Title:** On Arctic Ground  
**Author:** Debbie S Miller  
**Publisher:** Mountaineers Books  
**Info:** 2012, 144 pages  
**Price:** 29.95 dollars

The National Petroleum Reserve-Alaska is more than a natural resource, it is a place of rare, unprotected beauty, with fossilized dinosaur bones, caribou tracks both ancient and new, and wide-open spaces. This book serves as a platform to bring greater public awareness to the opportunities for permanently preserving the significant biological areas and wildlife that thrive within the Reserve.

**LONDON****World National Oil Companies Congress****When:** June 19-20**Where:** Grange St. Paul's Hotel**Info:** tel. +44 (0)207 827 4171

e-mail: enquiry.uk@terrapinn.com

website: www.terrapinn.com

■ The seventh annual World National Oil Companies Congress is where leaders of the world's NOCs meet each other and their partners to debate and decide the future of the oil and gas business. The Congress provides a critical platform to create and develop the partnerships necessary to secure success in an uncertain and volatile world. It tackles the big issues, from the impacts of global gas game-changers and the global economic outlook, to the changing nature of partnerships in both upstream and downstream projects and the challenges of investing and expanding abroad.

**ABERDEEN****North Sea Oil&Gas Summit****When:** April 15-16**Where:** Hurray Exhibition**Info:** tel. +44 (0)207 127 4501

e-mail: info@oliverkinross.com

website: www.

northseaoilandgassummit.com

■ The North Sea Oil & Gas Summit 2013 combines three conferences, an exhibition and a networking

evening. This comprehensive event includes: a North Sea exploration and production conference examining the recent Geitungen Prospect discovery and the exploratory outlook for the region; a North Sea Technology World conference examining how the latest technological advances can benefit the North Sea Oil & Gas industry; and a North Sea Decommissioning conference covering the best practice for the planning and execution of decommissioning projects.

**BERGEN** [NORWAY]**Underwater Technology Conference (UTC)****When:** June 19-20**Where:** Grieghallen**Info:** tel. +47 55 11 59 14

e-mail: Lene.vikre@possibility.no

website: www.utc.no

■ Focusing on the road ahead for subsea technology, UTC is a widely recognized conference which attracts participants from all parts of the international petroleum community.

**BARCELONA**  
**Annual Global Refining Summit****When:** May 21-23**Where:** Hesperia Tower**Info:** tel. +44 (0)20 7202 7622

e-mail:

michael.ratcliffe@wtgevents.com

website:

www.refiningsummit.com

■ The Global Refining Summit explores winning strategies and technologies in tackling the challenge of depreciating profit margins, debilitating regulations and increased competition within the European market.

**HOUSTON****International Conference & Exhibition on Liquefied Natural Gas (LNG)****When:** April 16-19**Where:** George R. Brown Convention Center**Info:** tel. +44 20 7978 0030

e-mail:

cfinch@thecwcgroup.com

website:

www.lng17.org

■ The LNG series of events are considered the premier global LNG events. LNG 17 will be the biggest global gas event to take place this year, and is the next International Gas Union event, attracting decision-makers and gas industry experts from all over the world.

**LIMA****World Economic Forum on Latin America 2013****When:** April 23-25**Info:** tel. +41(0)22 869 1405

e-mail:

annualmeeting@weforum.org

website: www.weforum.org

■ The World Economic Forum regional gathering in Lima will provide an ideal platform to discuss

the critical factors behind the region's resilience and dynamic development models. Under the theme "Delivering Growth, Strengthening Societies", regional and global leaders will discuss the opportunities and challenges the region will face in terms of achieving its full potential.

**SÃO PAULO****Santos Offshore Oil & Gas Expo****When:** April 23-26**Where:** Mendes Convention Center, Santos, Brasile**Info:** tel. +55 11 3060-5000

website:

www.santosoffshore.com.br

e-mail: santosoffshore@

reedalcantara.com.br

■ This event is now established as the main business meeting place for companies operating in the Santos Basin. As the largest service provider and product

supplier in the Oil and Gas market, the State of São Paulo has recently gained a special incentive to develop the sector in light of the findings in the Santos Basin, particularly in the Pre-Salt layer. Santos Offshore provides opportunities to generate business between E&P suppliers and investors in the region, and is the ideal place to meet and present the latest innovations to the industry.



## NAPLES

### Energy Med

**When:** April 11-13

**Where:** Mostra d'Oltremare

**Info:** tel. +39 081 419528

e-mail: info@energymed.it

website: www.energymed.it

■ EnergyMed is an established hub for businesses, local bodies, research agencies, associations and technical professionals in the sector to exchange knowledge and information on renewable sources, energy efficiency, sustainable mobility, building and recycling.



## SAINT PETERSBURG

### SPIEF

**When:** June 20-22

**Where:** Lenexpo Exhibition Comp.

**Info:** tel. +7 (812) 680 0000

e-mail: info@forumspb.com

website: www.forumspb.com/en

■ The St. Petersburg International Economic Forum is the main annual international economic and business forum held in Russia. The Forum has transformed into a leading global business event over the past few years, attracting over 4,000 Russian and international participants, representing government and business leaders from around the world.

## MOSCOW

### Moscow International Oil & Gas Exhibition (MIOGE)

**When:** June 25-28

**Where:** Expocentre

**Info:** tel. +44 (0) 207 596 5037

e-mail: graeme.coombes@ite-events.com

website: www.mioge.com

■ MIOGE is the largest and most famous oil and gas trade event in Russia and Central Asia. For the past 20 years, the event has become the traditional meeting place for the world's leading oil and gas companies to come together and build new business partnerships with local trade operators and suppliers.



## TURKMENBASHI

[TURKMENISTAN]

### Turkmenistan Gas Congress

**When:** May 21-22

**Where:** Arzuv Hotel

**Info:** tel. +44 (0) 20 7328 8899

website: www.turkmenistangascongress.com

■ TGC aims to stimulate, establish and enhance international cooperation among countries, ministries, departments, international organizations and companies in the sectors of oil and gas.



## HONG KONG

### Asia Oil & Gas Assembly

**When:** April 24-25

**Where:** JW Marriott (Hong Kong Island)

**Info:** tel. +44 20 7384 8056

e-mail: omar.aljanabi@oilcouncil.com

website: www.oilcouncil.com/event/asia

■ The Assembly focuses on corporate development and provides opportunities for attendees to meet and discuss: new business development opportunities both in Asia and internationally; deal flow and capital coming to and from the continent; and how to successfully access Asia's capital markets and investors.

## LAHORE

[PAKISTAN]

### POGEE 2013

**When:** May 16-1

**Where:** Expo Centre Lahore

**Info:** tel. (9221) 111 PEGCON

(111734266)

e-mail: info@pogee.com

website: www.pogeeepakistan.com

■ Oil & Gas Pakistan offers an excellent platform for decision-makers and companies to meet a highly targeted audience in a business-to-business environment. Pakistan has one of the fastest growing energy industries in Asia and POGEE therefore provides the ideal venue to capture business opportunities in this emerging market.



## JAKARTA

### Indonesian Petroleum Association

**When:** May 14-16

**Where:** Jakarta Convention Center

**Info:** tel. +62 (021) 515-5959

e-mail: tpc@ipa.or.id

website: www.ipa.or.id

■ The 37 Indonesian Petroleum Association (IPA)

Annual Conventions have highlighted the achievements of and challenges faced by Indonesia's oil and gas industry. The IPA Convention & Exhibition provides an important forum for exchanging knowledge and ideas through interaction among scientists, engineers, government officials, academics, and other professionals. Its success has been driven by the contributions of PSC contractors, service companies, suppliers, universities, and research institutes.

## PERTH

### World Renewable Energy Congress - Australia 2013

**When:** July 14-18

**Where:** Murdoch University

**Info:** tel. +61 (08) 9360 2896

e-mail:

K.Mathew@murdoch.edu.au

website:

www.promaco.com.au/events/WREC\_2013/index.html

■ WREC is a major and well-known forum for industry networking. It addresses issues through regular meetings and exhibitions that bring together representatives of all those involved in the supply, distribution, consumption and development.

## KUALA LUMPUR

### OGA 2013

**When:** June 5-7

**Where:** Kuala Lumpur Convention Centre

**Info:** tel. +603 4041 0311

e-mail: enquiry@mesallworld.com

website: www.oilandgas-asia.com

■ Running for over two decades, Oil and Gas Asia has established itself as the premier event for buyers and vendors in the Asia-Pacific region. Taking place once every two years, this event provides the region's oil industry professionals with an opportunity to network, share knowledge and, most importantly, to close deals.



March 2013

News and ideas for the energy community and beyond.  
On paper and online.  
For more information, visit [www.abo.net](http://www.abo.net)

