



The Future of the Arctic: A Key to Global Sustainability

Francesco Stipo, Fellow, World Academy of Art and Science;
Chair, Legal & Political Committee, US Association, Club of Rome

Anitra Thorhaug, Chair, Energy & Resources Committee,
US Association, Club of Rome

Ryan Jackson, Chair, Health, Population & Religion Committee,
US Association, Club of Rome

**Keith Butler, Roberta Gibbs, James Gray, Philip Marshall, Andrew Oerke,
Marian Simion, Lockey White, Bernard Zak.***

Abstract

The USACOR Report forecasts that by 2050 the Arctic will become the major supplier of energy to the world, in particular oil and natural gas, and natural resources such as mineral water. In the coming decades, the population in the Arctic region is projected to increase significantly due to the expansion of exploration for resources. The Report recommends that a Zero emission policy be implemented throughout the Arctic area for water emissions into the seas, rivers, or estuaries and oceans. The Report recommends that the Arctic Council guarantees safe navigation and environmental protection, establishing a Fund to cover expenses to purchase icebreakers and towards the cost of the personnel in order to assist commercial navigation in the Arctic region. The Arctic Council shall also issue environmental rules to regulate the mineral exploitation in the region and ensure that the wildlife is protected and that the exploitation of resources is conducted in a sustainable manner.

1. Legal and Political Issues

1.1 Political status of the Arctic

Throughout its entire history, the Arctic has been a relatively peaceful region. Prior to World War II and the Cold War, the Arctic's political and economic development was primarily influenced by indigenous peoples as well as European explorers and colonizers.

The Arctic Council (founded in 1996) has sought to increase cooperative efforts among its member states — Canada, Denmark (representing both Greenland and the Faroe Islands), Iceland, Norway, the Russian Federation, Sweden, and the United States.† The Nordic

*This article is an excerpt taken from the 2012 report of the US Association of the Club of Rome. The full report is available on the website www.usacor.org.

† See <http://www.arctic-council.org/index.php/en/about-us/members>

Council has also addressed and worked on similar issues as the Arctic Council.*

Both the Arctic Council and the Nordic Council have worked to improve cooperation among their members in the areas of environmental protection and sustainable development. In 2011, the Arctic Council member states signed the Arctic Search and Rescue Agreement, the first binding treaty concluded under the Council's auspices. This year, the Arctic Council member states are negotiating a second binding agreement on oil spills in the Arctic.

While other organizations exist to provide regional cooperation and stability, the Arctic Council has the greatest potential to act as a forum for future economic development and trade, security cooperation, and diplomatic resolution of territorial sovereignty issues.

Furthermore, non-Arctic countries have expressed interest in participating in the activities of the Arctic Council, in particular, China that presented a formal petition to become an Observer in the Arctic Council.

1.2 Disputes in the Arctic

Boundary disputes between sovereign nations of the Arctic which are currently pending include these disputes:

1. Between Canada and the United States over a pie-shaped area extending from the eastern side of Prudhoe Bay into the Canadian Basin;
2. Between Canada and Greenland/Denmark over the boundary from the northern end of Baffin Bay northward from the Canadian Ellesmere Island and the north shore of Greenland towards the southern edge of the Lomonosov seabed ridge; as well as over Hans Island in the Nares Straits, a sea passage between Canada's Ellesmere Island and Greenland.
3. Between Denmark/Greenland and Norway over the boundary between the Greenland and Iceland seabed, east of Greenland/Denmark through the Greenland Sea and west of the Norwegian Svalbard archipelago.

A number of boundary disputes have been resolved. The dispute between Denmark and Norway over the continental shelf boundary between the Faroe Islands, Denmark, and mainland Norway was settled in a bilateral agreement in 1979. The controversy over the seabed boundary between Iceland and Jan Mayen, Norway, was settled through an international conciliation panel in 1981. The dispute between Iceland and Norway over the continental shelf between Jan Mayen, Norway, and Greenland/Denmark was resolved by the International Court of Justice in 1993. On September 17, 2010, Norway and the Russian Federation resolved the decades-old conflict over the disputed area in the Barents Sea, between Svalbard archipelago and the Novaya Zemlya archipelago. The agreement divided the disputed territory equally with plans to jointly develop boundary resources, which include an estimated 38 to 40 billion barrels of oil.

The Lomonosov Ridge controversy illustrates how a number of jurisdictional factors can interplay in a single dispute. In 2001, the Russian Federation submitted its claim to the extended continental shelf, including the Lomonosov Ridge, an under-sea protuberance that runs

* See <http://www.norden.org/en/about-nordic-co-operation/countries-and-territories>

from the northern edge of the New Siberian Islands across the North Pole to the north-eastern edge of the Canadian Ellesmere Island and the north-western border of Greenland/Denmark, just north of the Amundsen Basin. The Commission on the Limits of the Continental Shelf has not decided the issue, but has referred the Russian Federation back to collecting scientific data that will be used to support or to deny their claim. The Russian Federation is in the process of submitting an amended claim by 2013.

The Northwest Passage Dispute is, in some sense, a boundary dispute, but more profoundly is a dispute over sovereign rights versus international rights in the various classes of maritime regions described by U.N. Convention on the Law of the Sea (UNCLOS), and indeed, a referendum on the legitimacy of UNCLOS itself. Specifically, the Northwest Passage dispute concerns the extent to which the waters of the northern Canadian Archipelago are international and the extent to which Canada is entitled to exercise its sovereignty over the waters of the Northwest Passage. Interestingly, in this dispute, the antagonists are the United States and Canada, two close allies. Historically, the United States as a marine power has plied the waters of the Northwest Passage as international waters. With the advent of UNCLOS and the extension of sovereign boundaries into what were once high seas, Canada has claimed sovereignty over the water between the islands of its northern archipelago. Nevertheless, under the terms of Parts II, III, IV and V of UNCLOS, the vessels of all nations have rights of innocent passage, not only through Straits, sovereign Exclusive Economic Zones and Contiguous Areas of coastal nations, but also through the twelve-nautical-mile Territorial Seas. However, if the northern boundary of Canada is taken to be the farthest extent of its most remote archipelago islands, then the enclosed waters become Internal Waters and so subject to the absolute sovereignty of Canada.

1.3 The Future of Greenland

A substantial development in the field of mineral exploitation can be found in Greenland. Over one thousand years after the Viking explorer Erik the Red gave it its current pleasant name to attract settlers, Greenland is becoming an important strategic land for both North America and Europe.

In 2000, the U.S. Geological Survey (USGS) estimated that there may be as much as 47 billion barrels of oil offshore Greenland, starting a new wave of oil exploration in the world's largest island. In 2008, the USGS reported that the Arctic could contain about 22% of the world's undiscovered oil and natural gas resources.

Oil and natural gas are not the only strategic commodities found in Greenland. According to Greenland Mining Services, a private mining company based in Nuuk, rocks from Greenlandic mines sent to laboratories for analysis have in most cases been shown to contain traces of uranium. Tests have revealed that radioactive substance is present all over the country.

Another important resource present in Greenland is drinkable water. A recent USGS report states that the largest source of freshwater on Earth, 7 million mi^3 , is stored in glaciers and icecaps, mainly located in the Polar Regions and in Greenland, in contrast with two million mi^3 stored in aquifers below ground, and just 60,000 mi^3 stored in lakes, inland seas and rivers. The Ilulissat Glacier in Western Greenland is one of the fastest and most active glaciers in the world and produces 10% of all Greenland's ice fields, corresponding to around 35 billion tons of ice a year.

Greenland is renegotiating its relationship with Denmark, which has ruled the island since 1775. A non-binding referendum on Greenland's autonomy was held on November 25th 2008 and was passed with 75% approval. There are two main obstacles to the island's independence: Greenland's need for Danish economic subsidies and the percentage of Danish royalties on Greenland's resources. Greenland has full control over the issuance of mining licenses but Denmark currently receives half of the revenue from oil and mineral resources, a percentage that Greenland is trying to reduce.

Denmark remains responsible for Greenland's foreign affairs and defense. But Greenland's claim over Hans Island against Canada is an issue of foreign policy dealt directly by Greenland rather than Denmark.¹

There is a high likelihood that Greenland will become a new independent country within 5 or 10 years.

The island's independence and its potential ability to supply North America with essential resources such as oil, water and uranium are good arguments in favor of its access to the North American Free Trade Agreement. Free trade with NAFTA countries would produce dramatic benefits to the Greenlandic population in terms of access to low cost medicine and technology manufactured in the USA and Canada, as well as inexpensive textile products from Mexico. Greenland has been so far reluctant to enter free trade agreements to protect its fishing industry. For this reason, it withdrew from the European Economic Community in 1985. But the new mineral discoveries have the ability to transform the ice-capped island into Saudi Arabia of the Arctic, an economic phenomenon that would inevitably increase its population and economic dimension. In this case, the current protectionism would be replaced with free and fair-trade policies that are more appropriate to foster Greenland's economic development. If this happens, Greenland can either join NAFTA and enter a bilateral free trade agreement with the European Union (as Mexico did), or establish bilateral free trade agreements with both the NAFTA countries and the European Union.

Another important issue is security. As an independent country, it would be in Greenland's interest to join NATO and the Arctic Council. Denmark's position in the Arctic Council would not automatically transfer to Greenland. Therefore, Greenland would have to join both organizations as a new member.

Because of Greenland's geostrategic importance, the United States would have all the interest in inviting Greenland to be a member of NATO for negotiating the installment of a missile-defense system on the island.

1.4 The application of the U.N. Convention on the Law of the Sea to mineral exploitation in the Arctic

A common definition of the Arctic policy is fundamental to establish the rights to mineral exploitation in the region.

In 1970, United Nations General Assembly Resolution 2749, the *Declaration of Principles Governing the Seabed and Ocean Floor*, was adopted by 108 states, including the United States, declaring the deep seabed as the "Common Heritage of Mankind". In 1982, the UNCLOS codified the customary law concept of Common Heritage of Mankind, applying

it to “the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction” under Article 136. The International Seabed Authority was created by UNCLOS to administer access and exploitation of this common heritage. While the concept of the deep seabed as a common heritage is an established custom, the establishment of an agency to administer that heritage is not. The ISA, which is mostly focused on mineral exploitation, is the agency charged with regulating seabed resources in the deep sea, including oil and gas. However, because oil and gas reserves generally are found on the continental shelf, and the Exclusive Economic Zone (EEZ) is generally defined as up to and including 350 miles of actual continental shelf, the International Seabed Authority’s regulatory infrastructure is almost completely geared towards the exploitation of minerals.*

All Arctic littoral states define their jurisdictional rights to the Arctic Ocean area using the general framework of UNCLOS, according to the Ilulissat Declaration on 28th May 2008. Currently, U.S. companies cannot submit applications to the International Seabed Authority for drilling and exploration in the deep sea until the U.S. ratifies the convention, and the new binding tribunal elements of UNCLOS won’t apply to the U.S. without its accession to UNCLOS.

The five surrounding Arctic states — Russia, the United States, Canada, Norway and Denmark (via Greenland) — currently have an Exclusive Economic Zone (EEZ) of 200 nautical miles (370 kms; 230 miles) adjacent to their coasts, which is provided for by both UNCLOS and modern custom. Those with broader continental shelves with more than 200 miles, who are signatories of UNCLOS, can apply to the Commission on the Limits of the Continental Shelf for an extension of the EEZ up to 350 nautical miles if they can make a good case for it, and Russia already has applied.

The U.S. Government has argued, time and again, that deep seabed mining is a freedom of the high seas under customary international law. This position is based on Article 2 of the High Seas Convention of 1958.

Under this view, the U.S. contends that its companies enjoy a right of access to seabed minerals and that this right can only be altered by its acceptance of a different legal regime through the processes of conventional or customary international law.

The 1980 Seabed Act of the United States affirms that “it is the legal opinion of the U.S. that exploration for and commercial recovery of hard mineral resources of the deep seabed are freedoms of the high seas pursuant to Article 2 of the 1958 High Seas Convention”.†

The UNCLOS Implementing Agreement reached in 1994 weakened the provisions to which the United States

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*When proper claims are approved by the Commission on the Limits of the Continental Shelf.

†USACOR author Lockey White’s opinion is that the ISA’s authorization or other substitute authorization by the international community is required for all nations to exploit the deep seabed, including countries that did not ratify the UNCLOS because, under emerging peremptory norms, unilateral exploitation would not be appropriate under international law.

most objected (guaranteeing it a seat on the Council and eliminating the provisions compelling the transfer of technology), but retained the framework in which mining in international waters would be conducted under the authority of the International Sea-Bed Authority.*

The Arctic can play a key role in global sustainability if the exploitation of resources such as oil, natural gas and water will be conducted in a manner that does not damage its ecosystem. The mineral resources in the Arctic can supply a large portion of the increasing world demand for energy and water. It is the duty of all Arctic nations to establish clear criteria for the exploitation of the resources in the region for the benefit of mankind.

2. Energy and Resources

2.1 What is the Arctic?

What do we mean when we speak of the Arctic? The precise limits and definition of the Arctic region may be defined differently for different purposes.² For example, lawmakers and policy analysts may use a political definition of the Arctic (i.e. the member states of the Arctic Council), whereas cartographers may define the Arctic in terms of latitude (i.e. the area north of 66°30'N latitude, the Arctic Circle). For the consideration of resource and environmental issues, however, it is useful to refer to an ecological definition of the Arctic, conventionally understood as that part of the extreme polar region of the Northern Hemisphere where the mean July temperature is less than 10° Celsius. Restated in more intuitive terms, it is the region “where the soil is permanently frozen and where trees cannot grow”.³ This definition of course only collaterally refers to the fact that inside this terrestrial tundra perimeter, the largest spatial portion of the Arctic region is oceanic. However, this latter definition conveys the real limitations that the extreme conditions of the Arctic impose on both environmental and human economic activity and is used herein.

2.2 Defining the Problem of Sustainability in the Arctic

The Arctic is a fragile, irreplaceable environmental area easily degraded. It is chiefly an oceanic area with fluctuating extremes of natural conditions (climate, light availability) which reflect processes that are both planetary and anthropogenic. Since the end of the last Ice Age in the Arctic, the inhospitable conditions have limited Homo sapiens to a very few human groups living in very small numbers over millennia by hunting and gathering, with settlements chiefly along and/or near coastlines. Presently, growing demands for resources and access to other ocean basins through geographical features contained in the Arctic region will bring about human expansion; rapidly changing climate in the Arctic leads us to predict that technology will accelerate the process of resource extraction over the next 50 years. There are specific problems to overcome. Interactions of natural forces with mankind's efforts must be considered.

2.3 The Biological Arctic Resources

The areas of inflow from other oceans contain massive plankton communities, acknowledged to be the basis of the Arctic food chain, with associated prolific fish populations. The largest areas of the open water on or near the continental shelf and shorelines are predomi-

*See National Intelligence Council <http://www.dni.gov/index.php/about/organization/national-intelligence-council-who-we-are>

nantly within the Law of the Sea limits of Russia, Greenland, Iceland, Norway, Canada, Finland, and the USA. Much of the central area of the ocean has been covered for millennia by ice.

There are four basic Arctic fisheries: three in the Atlantic (the Norwegian and Barents Sea, Iceland-east Greenland, and Newfoundland-Labrador), and one in the Pacific (the Bering Sea). As Erik J. Molenaar and Robert Corell put it:

“Warmer Arctic surface and water temperatures, reductions in sea ice coverage and thickness, reduced salinity, increasing acidification and other oceanographic and meteorological changes are all factors that are certain to affect arctic marine ecosystems, accurate predictions cannot be made.”

The anthropogenic effects will also bring large changes.⁴

2.4 The Arctic Mineral and Energy Resources

Gas and oil production in the Arctic is presently about 16% of the total global production. The Arctic Council has estimated that up to one-fifth of the world’s undiscovered petroleum resources can be found in the Arctic. Further, they state that the Arctic’s share of the world’s presently-known petroleum resources is 12%. It is well-known that Russia is the most important gas and oil producer in the Arctic, and the bulk of proven Arctic oil and gas reserves is located in Northern Russia. (Note that together the production from Arctic Russia and Alaska result in 97% of the total Arctic oil and gas. Russia is predicted to contain the bulk of the undiscovered petroleum reserves while significant regions of petroleum are predicted to be in Alaska, Canadian offshore and the Norwegian Sea. Predictions include future, new oil-producing states occurring within Greenland and Iceland territorial waters).*

2.5 Conclusions: Sustainability of Arctic Ecosystems and Economies

The extreme conditions and the fragile and sensitive ecology of the Arctic mean that sustainable management and development of the region in the next 50 years will require a thoughtful approach to planning and regulation that consider not only the needs of future human generations, but the stability of the ecosystems that make the human economies of the Arctic possible. The exploitation of Arctic fisheries, forests, plus petroleum and mineral resources and increased shipping and tourism must not be allowed to compromise the integrity and function of natural systems and landscapes, which may well prove to be irreplaceable and of critical importance to the health of the planet.

3. Religion, Population and Health

3.1 Religion in the Arctic

In the case of the Arctic’s indigenous religions, the geo-climatic conditions that the Arctic population endured through millennia had prevented the development of more elaborate religious structures that would entice power and membership enlargement. As a result, doctrinal sophistication, elaborated forms of worship, and the building of elaborated sanctuaries are considerably absent, except for the presence of various “sacred grounds,” some protected by

*Information summarized from the Arctic Council webpage - <http://www.arctic-council.org>

law today.⁵ The Arctic forms of religiosity were simply limited to one's survival in relationship with the harsh nature, and thus focused exclusively on survival and healing, as seen in various forms of *animism* and *shamanism*⁶ still in practice today.

Although during the 18th and 19th centuries, Christian missionaries largely converted the Arctic indigenous population to *Russian Orthodoxy* (e.g., Siberia, Alaska and parts of Finland), to *Protestantism* (e.g., northern Fennoscandia, Iceland, the Faroe Islands, Greenland, Alaska and parts of northern Canada), and even to *Roman Catholicism* [Alaska, Greenland (missions to the Norse), and parts of Canada], the indigenous religion survived Christianity in the form of myths, superstitions and legends that rule one's daily life, as well as one's harmony with the universe itself.⁷ This is because the adoption of the Christian faith was not necessarily a replacement of religion, but a synergic combination and a merger of faiths that preserved key elements from the animist and shamanist outlook on life. Arctic shamanism was practiced as a restorative instinct toward healing, and toward the (re)establishment of man's harmony with the universe through preventive and curative measures. As the ritual leader, the shaman was the only one credited with the power to interpret the mystery of illness, cure the sick, control nature and predict the future. After years of training, the shaman's ritual itself implied going into a trance to communicate with the souls of the deceased.⁸

3.2 Religious demographics of the Arctic peoples

Given the rising trend of internal identity awakening, the recreation of tradition and symbols, as well as in light of various efforts for cultural preservation made by the Arctic Council and other entities, it is highly unlikely that Arctic religious spiritualities would disappear.⁹ * Yet, emerging challenges will be triggered by global competition over resources,¹⁰ which, for the Arctic population and its spirituality, will be nothing more than a "resources curse." Given the resource-driven immigration into the Arctic, missionary activities will most likely parallel resource exploration in line with the common trend of the colonial era.¹¹ Such activities will most likely reinforce the existing religious organization, attempt to convert the existing agnostics, atheists, and ethno-religionists to Christianity and perhaps other religions, and even trigger proselytic activities between Protestantism and Orthodoxy.

3.3 Population growth estimates

About 4 million people live in the Arctic, half of whom are in the Russian Federation and about 1.3 million in the Nordic Countries, 130,000 in Canada and 650,000 in the US. The eight Arctic countries are Canada, Denmark with the Faroe Islands and Greenland, Iceland, Norway, Finland, Sweden, the Russian Federation and the United States. Arctic communities and indigenous people, in particular, rely on marine ecosystems which play an important role in their livelihood and well-being. In the Arctic Council, six indigenous organizations are recognized as parties to the Arctic Council. (Arctic Council Report).

The International Futures Model states that the population of Greenland and Iceland will increase by 50% in the next 50 years. The present trend of temporary workers being moved into projects in the Arctic will accelerate as jobs, commerce and industry get intensified. It is our first estimate that there will be a 2 to 3 times increase in the number of people moving

*Cf. <http://www.arctic-council.org>

from Russia, USA, and the European nations to other Arctic regions. The increase is estimated to be between 1.3 million and two million from the USA, between four and six million from Russia and between 2.6 and 3.9 million from Europe, making the population of the region double at least to eight million or more, up to twelve million. Severe problems in maintaining food and other built spaces may occur. Problems will be encountered in constructing shelter and industrial built space, ridding the area of waste and materials to withstand the winter conditions.

Table 1: Population of Iceland over the next 20 years in millions
(from *International Futures*, Hughes, 2006).

2010	2015	2020	2025	2030
0.321	0.3413	0.358	0.3711	0.3815

3.4 Health Issues

In past times, the Aboriginal health profile depended on naturally occurring parasitic-host relationships. As a result of European colonization and exploration, a plethora of diseases have evolved eg: *Trichinella spiralis* from consumption of uncooked polar bear and walrus, rabies from fox and dog, and brucellosis from infected deer.

In the coming decades, population in the Arctic region is projected to increase significantly due to the expected expansion of exploration for oil, natural gas and other resources. The increasing immigrant population in this region will have to adapt to the environment including weather and limited daylight in the winter. The infrastructure will have to be expanded to accommodate the growing population with access to drinking water, sewage, transportation and healthcare.

Emerging infectious diseases of the 21st century are raising multi-eyed medusal heads in the form of drug resistant *Streptococcus pneumoniae*, Helicobacter infection, hepatitis, *Haemophilus bacteremia* and meningitis. Coupled with immune-compromised individuals, pregnancy and neonatal demands comes an exponentially increased incidence of disease in healthcare workers, clinical laboratory staff and Public Health Officers, who provide the frontline for recognition, treatment and prevention of illness. These, of course, include methicillin-resistant *Staphylococcus aureus* (MRSA), respiratory syncytial viruses, syphilis, chlamydia, gonorrhea, drug-resistant tuberculosis, and Psychiatric disorders.

Future requirements will include increasing management of acute illness and injury from medical, surgical (even robotic and remote) sources, DNA diagnostics, and Stem cell research. The Arctic Council and Multinational Governmental Cooperation and Collaboration remain the Gold Standard for health in the Arctic region.

The authors thank Dr. Nancy Maynard, Senior Research Scientist in Cryospheric Sciences, NASA, and member, US Association of the Club of Rome, for sharing her insights on the biological resources and the Future of the Arctic. We also thank Professor Graeme P. Berlyn, Harriman Professor of Forestry at Yale University and Editor of the Journal of Sustainable Forestry, for sharing his wisdom about potential future events in the terrestrial arctic and its

interaction with the marine arctic. We have also had substantive interactions with Professor Sirka Heinonen, Professor at the Finnish Future Research Center, School of Economics, Turku University and member of the Finnish Association of the Club of Rome and interactions with a series of members of the Canadian Association of the Club of Rome. We thank Dr. Mary Jo Ryan Duncan of Canada and Ireland for reviewing this substantively, as well as Andrew Oerke, CEO of the Greater Caribbean Energy and Environment Foundation.

Author Contact Information

Email : fstipo@hotmail.com

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