



The Arctic in 2035

NBICs & Biodiversity

Mikå Mered

French Polar Cluster



LE POLAR
CLUSTER

INFORM. PROTECT. INNOVATE.



Géopolitique & Gouvernance
Coordinateur: Oleg Kobtzeff



Économie, Innovation & Énergies
Coordinateur: Mikló Mered



LE POLAR
CLUSTER

INFORM. PROTECT. INNOVATE.



Mer, Océan & Cryo-risques
Coordinateur: Pascaline Bourgain



Eau, Infrastructures & Matériaux
Coordinateur: Franck Galland



Dronautique, aéro & espace
Coordinateur: Olivier Dobbels



Polaire & Outre-mers
Coordinateur: Nathalie Farfant



Culture & Tourisme
Coordinateur: Marie Hervieu



Sûreté & Sécurité
Coordinateur: Yann Mission



Biodiversité & Environnement
Coordinateur: TBA



RH & Sociétés
Coordinateur: TBA



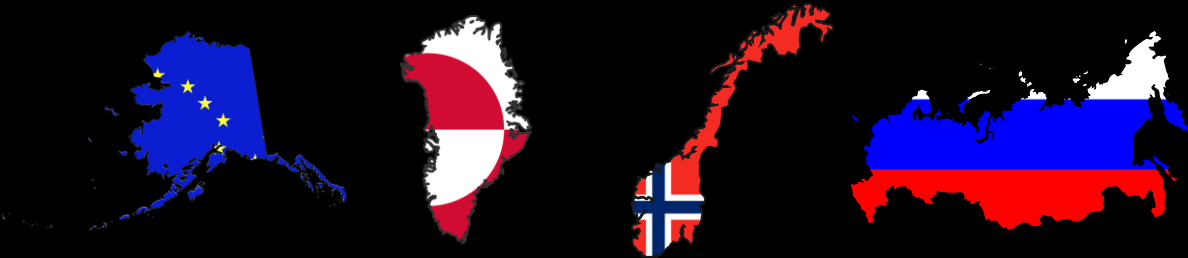
If you love something,
you have to protect it.

If you want to protect it,
give it a value.

Protection by innovation

1er incubateur d'innovation
en milieu polaire

OBJECTIF 20 18

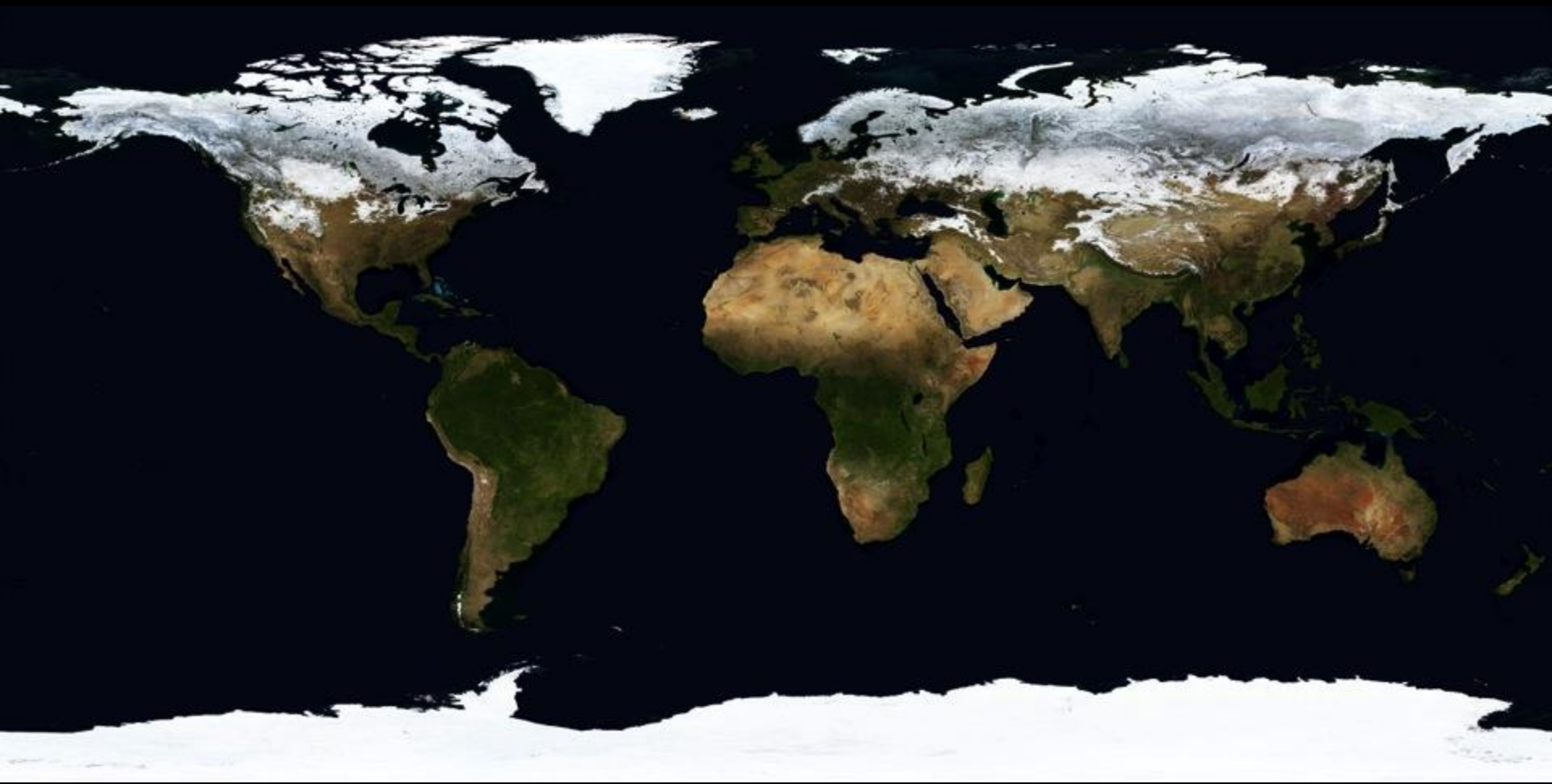


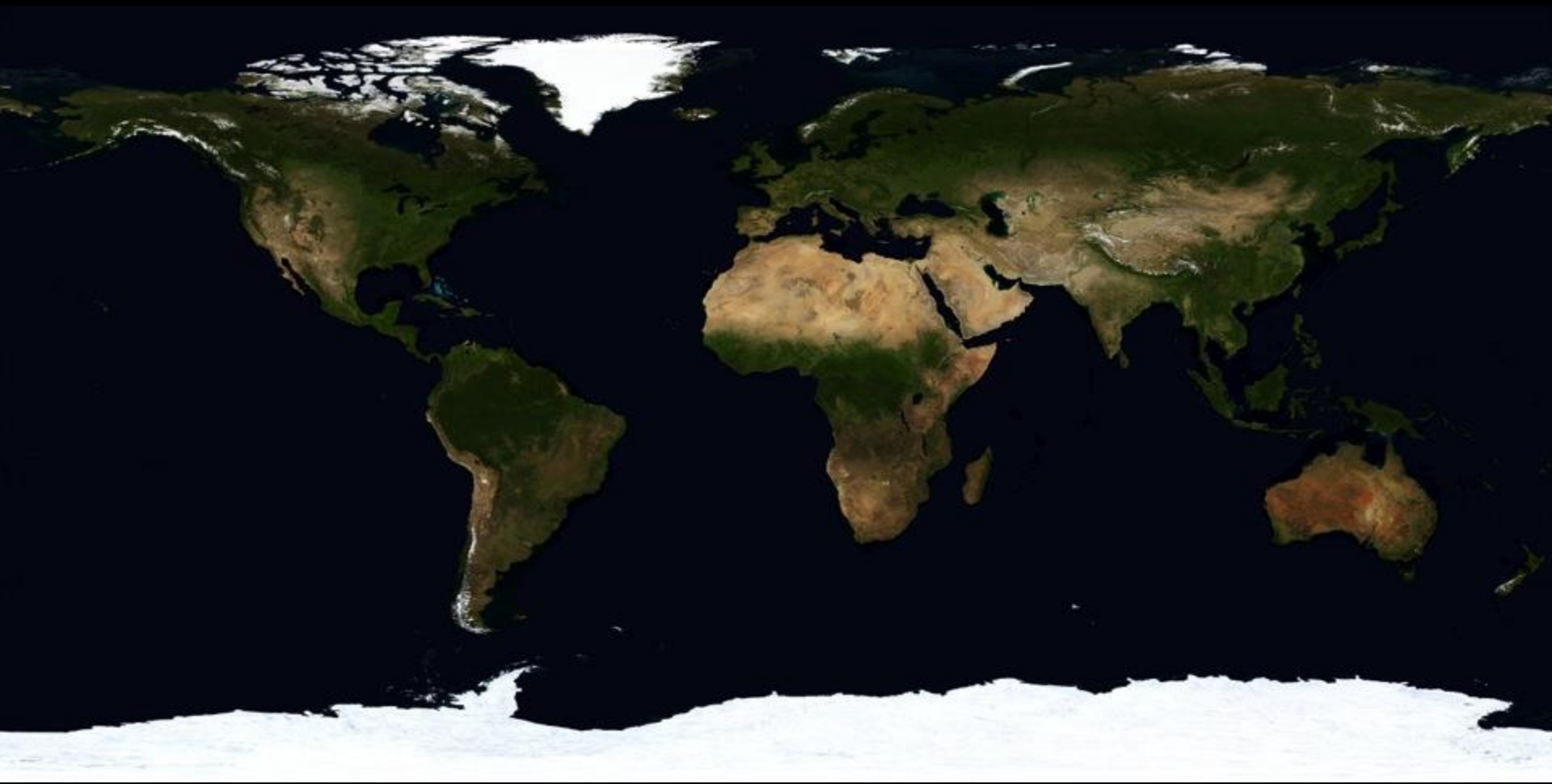




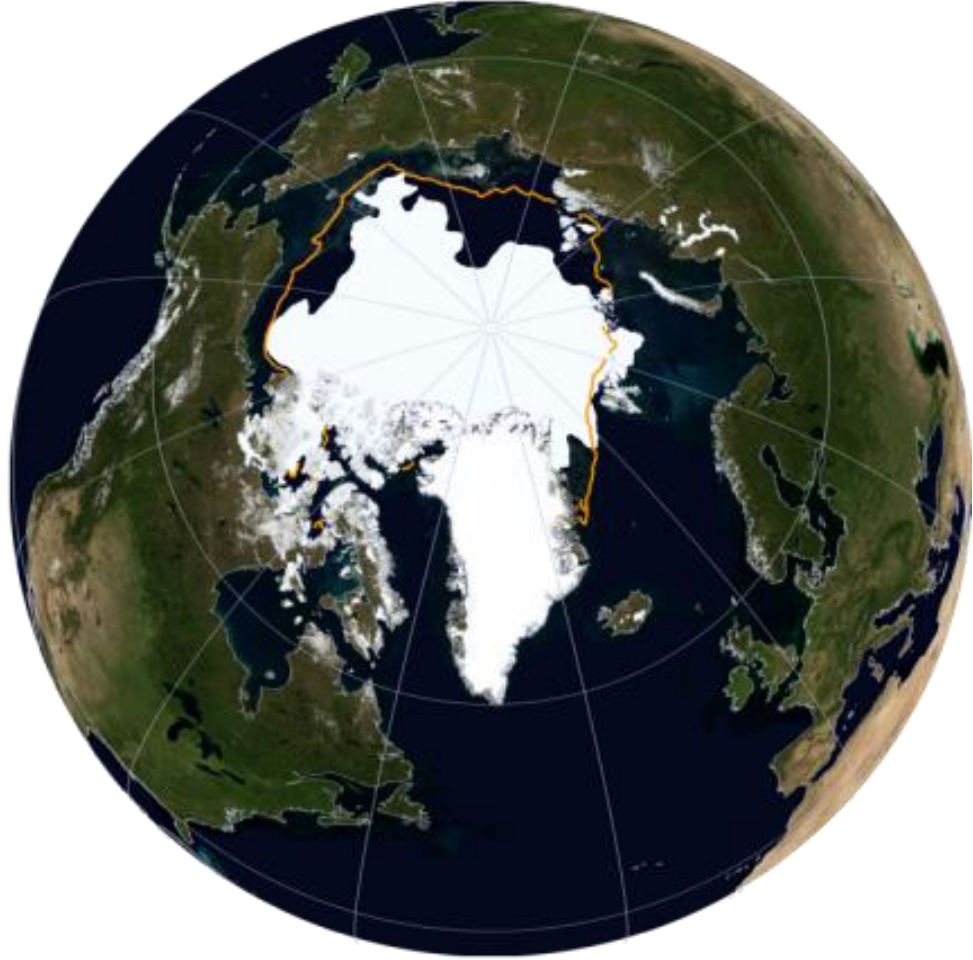


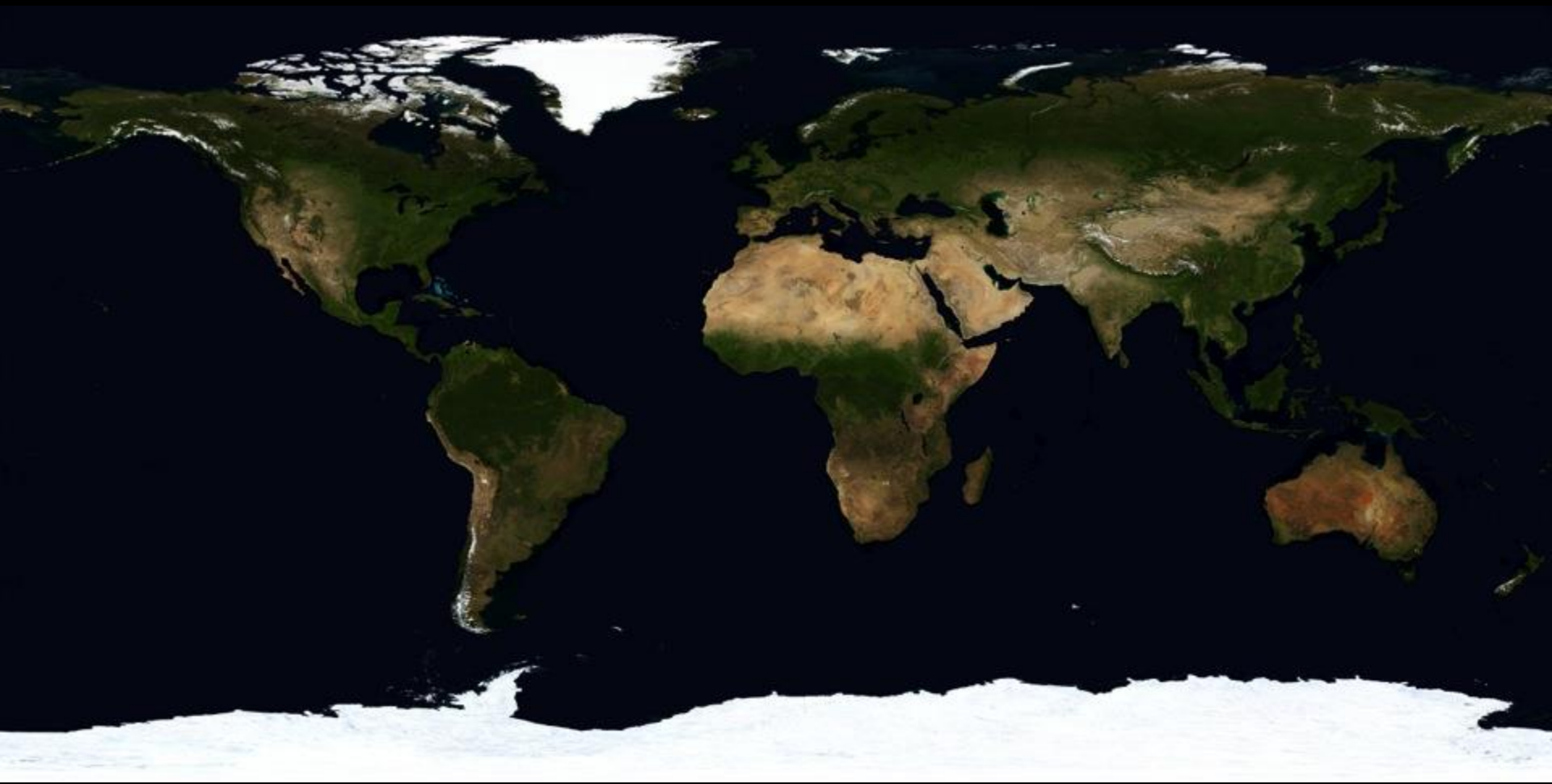






National Snow and Ice Data Center / NASA Earth Observatory







The World in 2035

World population
8-9 Bn

source: UN

Global GDP in 2015

\$81 Tn

source: IMF

Global GDP in 2035

\$210 Tn

source: BP

Global primary energy demand

+42%

source: BP

Global primary energy demand

32,000 kwh/yr/cap

source: BP

Oil price in 2035

Business as usual: \$135

New policies: \$113

450 scenario: \$90

source: IEA



The Arctic in 2035

The Arctic in 2035

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2015-2025

ARCTIC CONSTRUCTION ERA

2025 & beyond

ARCTIC BOOM ERA

Arctic market GDP in 2015

\$620 Bn

Arctic market GDP in 2035

Up to \$2.1 Tn

The *Arctic market* in 2035

USA (Alaska)

Kalaallit Nunaat

Iceland

Finland

Faroe Islands

Denmark (Nordjylland)

France (St-Pierre-et-Miquelon)

Norway (north of Nord-Trøndelag)

Sweden (north of Dalarna/Gövleborg)

Canada (north of 55°N + Labrador & Newfoundland)

Russia (Murmansk, Karelia,

Arkhangelsk, Nenetsia, Komi,

Yamalia, Khantia-Mansia,

Krasnoyarsk, Sakha, Chukotka,

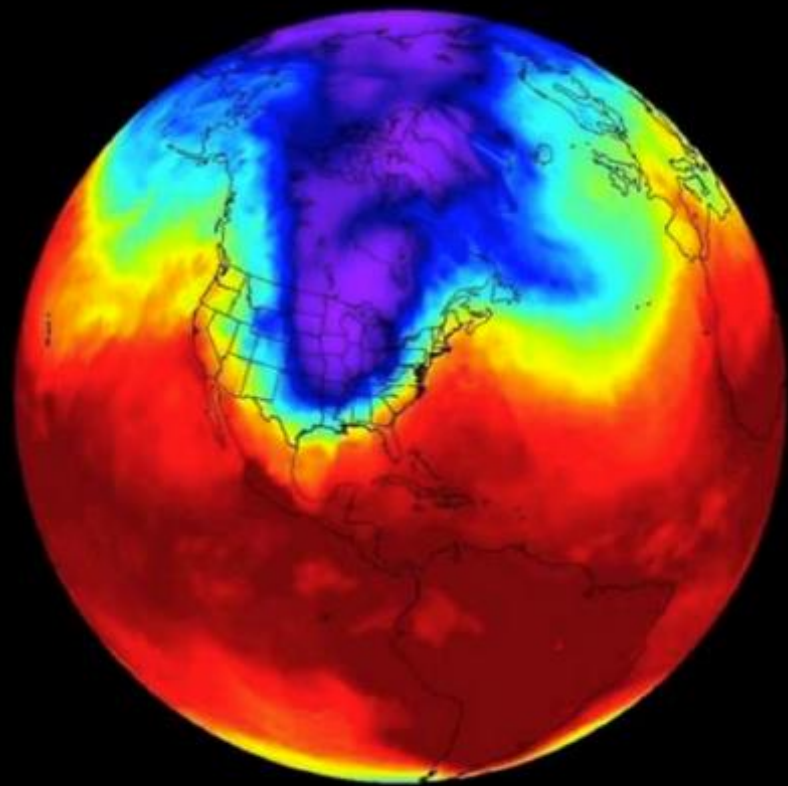
Kamchatka, Magadan,

Khabarovsk, Birobidzhan, Amur,

Sakhalin, Primorsky, Kuril Islands

China (Heilongjiang)

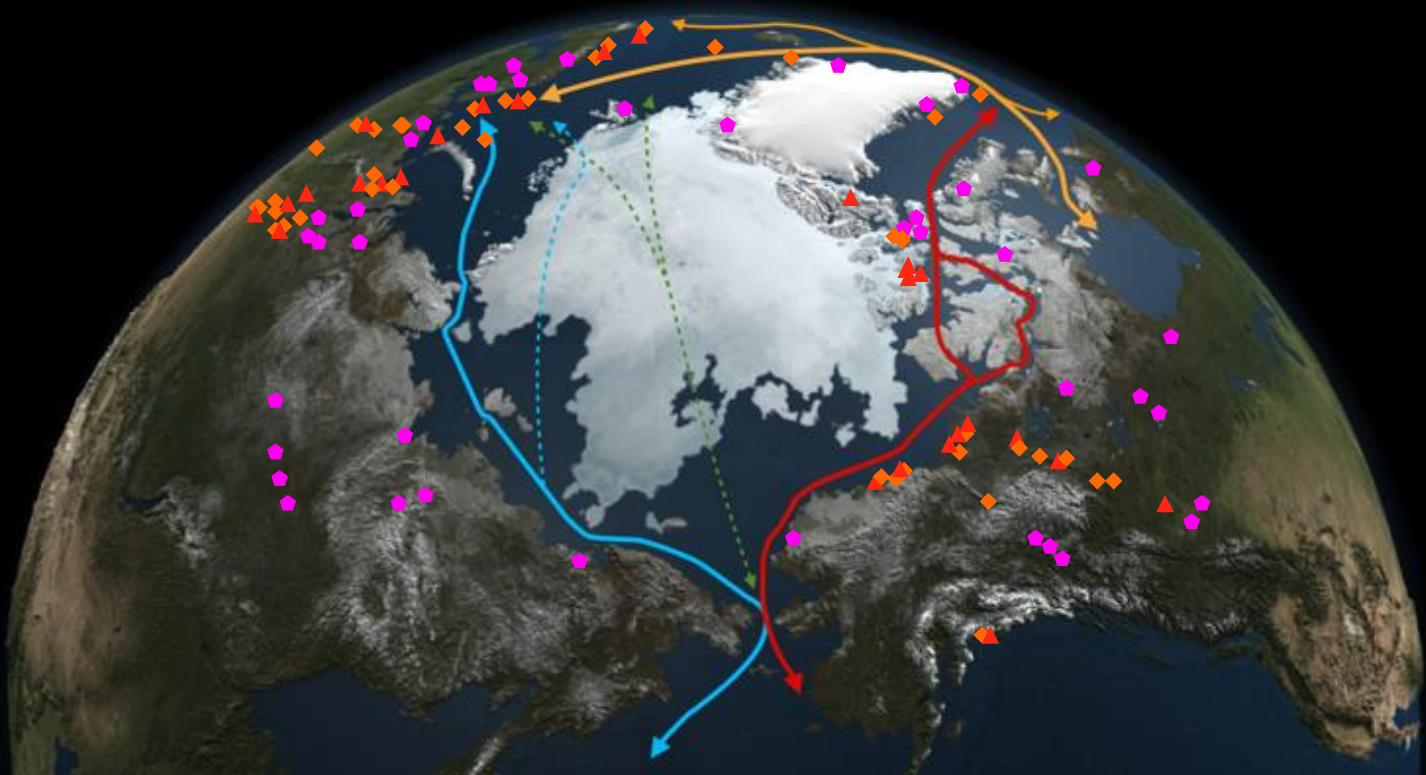




Arctic =



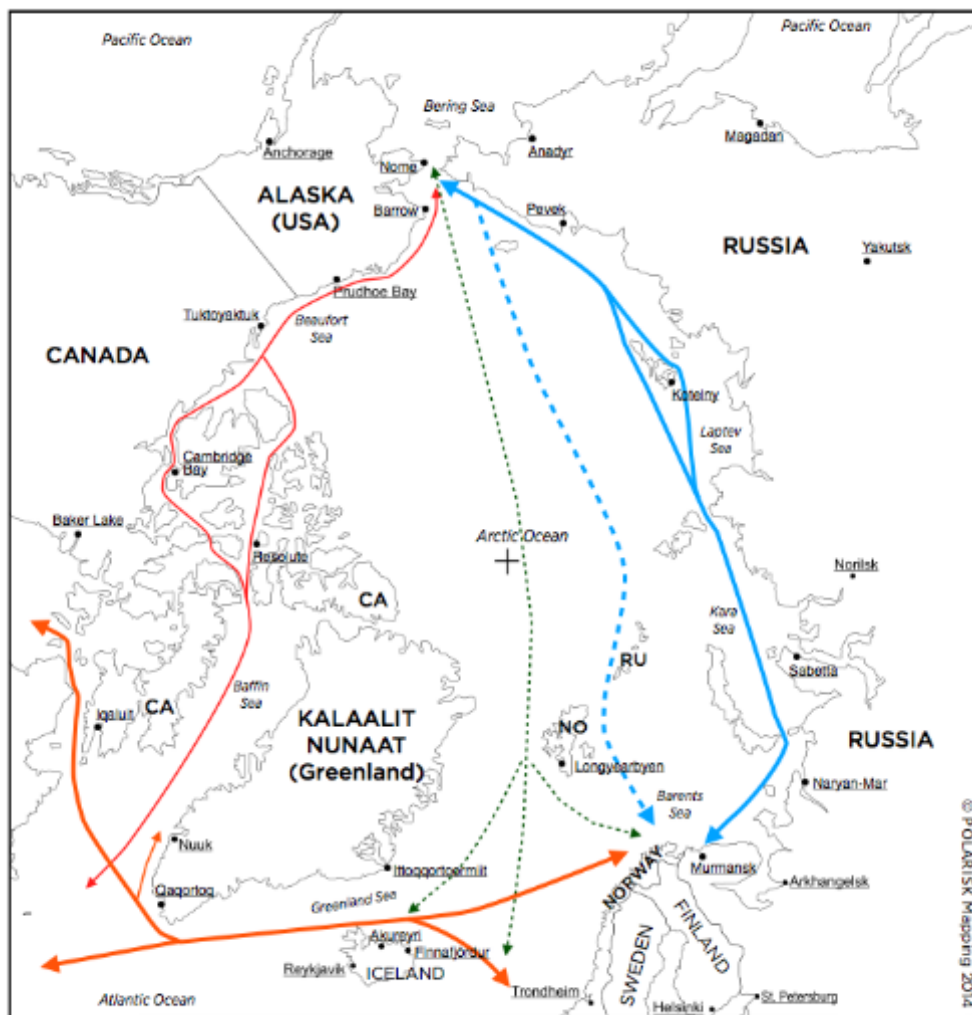
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Case #1: SHIPPING

Murmansk – Tianjin
Weekly service, starting April
2035





-  Passage du Nord-Est (NSR+Barents) — 2014
-  PNE — 2030
Projection by DNVGL
-  Arctic Bridge
-  Route Transpolaire (2050+)
-  Passage du Nord-Ouest

- RUSSIA** Etat du groupe "A5"
- SWEDEN** Etat-membre du Conseil de l'Arctique ("A8")
- +** Pôle Nord géographique

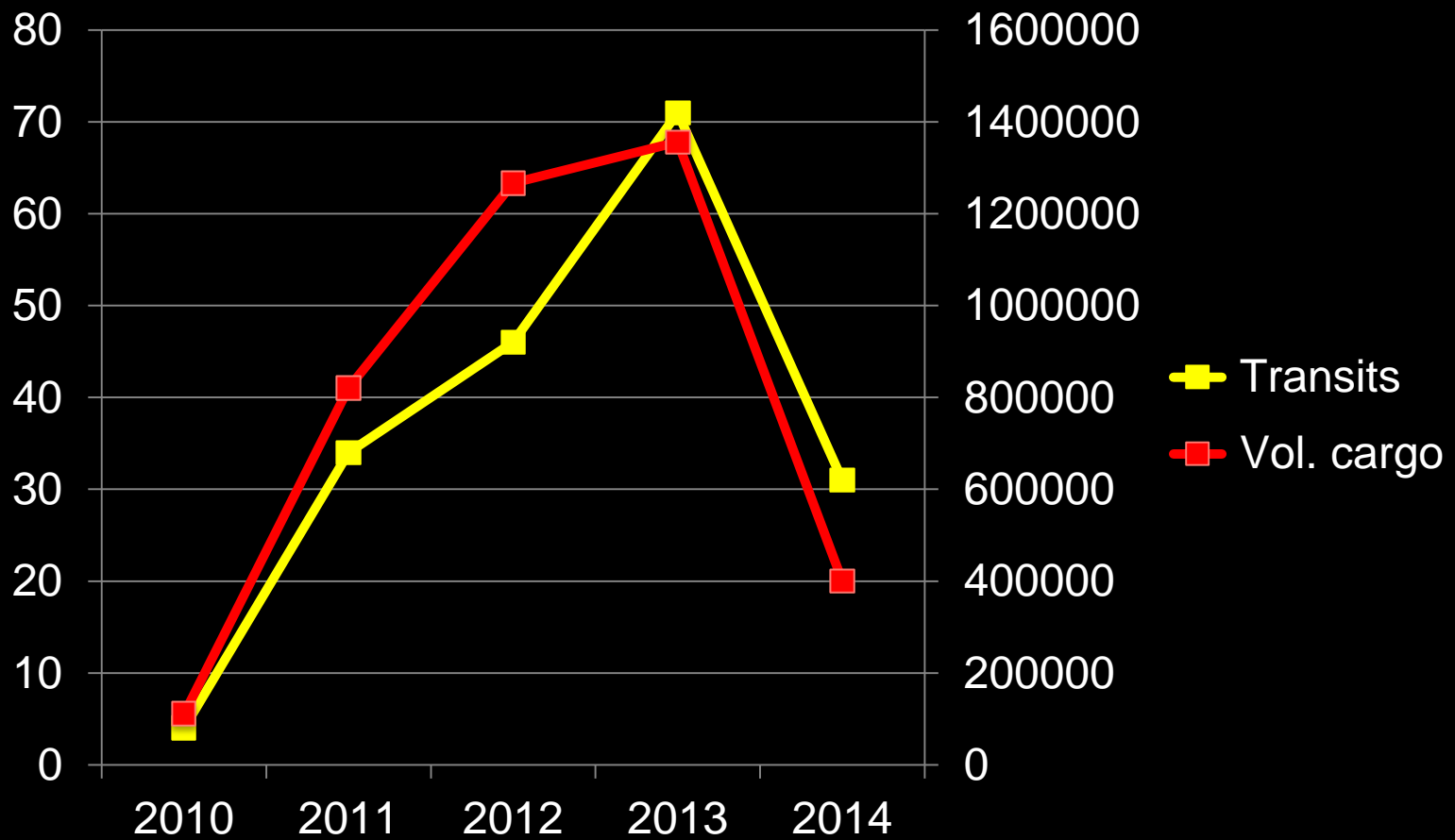
NSR 2014 season

28 transits (as of Oct. 14)

32 transits est.

source: NSR Information Office

estimates: POLARISK Analytics



Emergence of +30 Arctic-related hubs

NSR/Bering:

Kandalaksha, Vitino, Onega, Arkhangelsk, Mezen, Sabetta, Naryan-Mar, Varandey, Amderma, Dikson, Dudinka, Igarka, Khatanga, Tiksi, Pevek, Provideniya, Nome, Prudhoe Bay, Anadyr, Magadan...

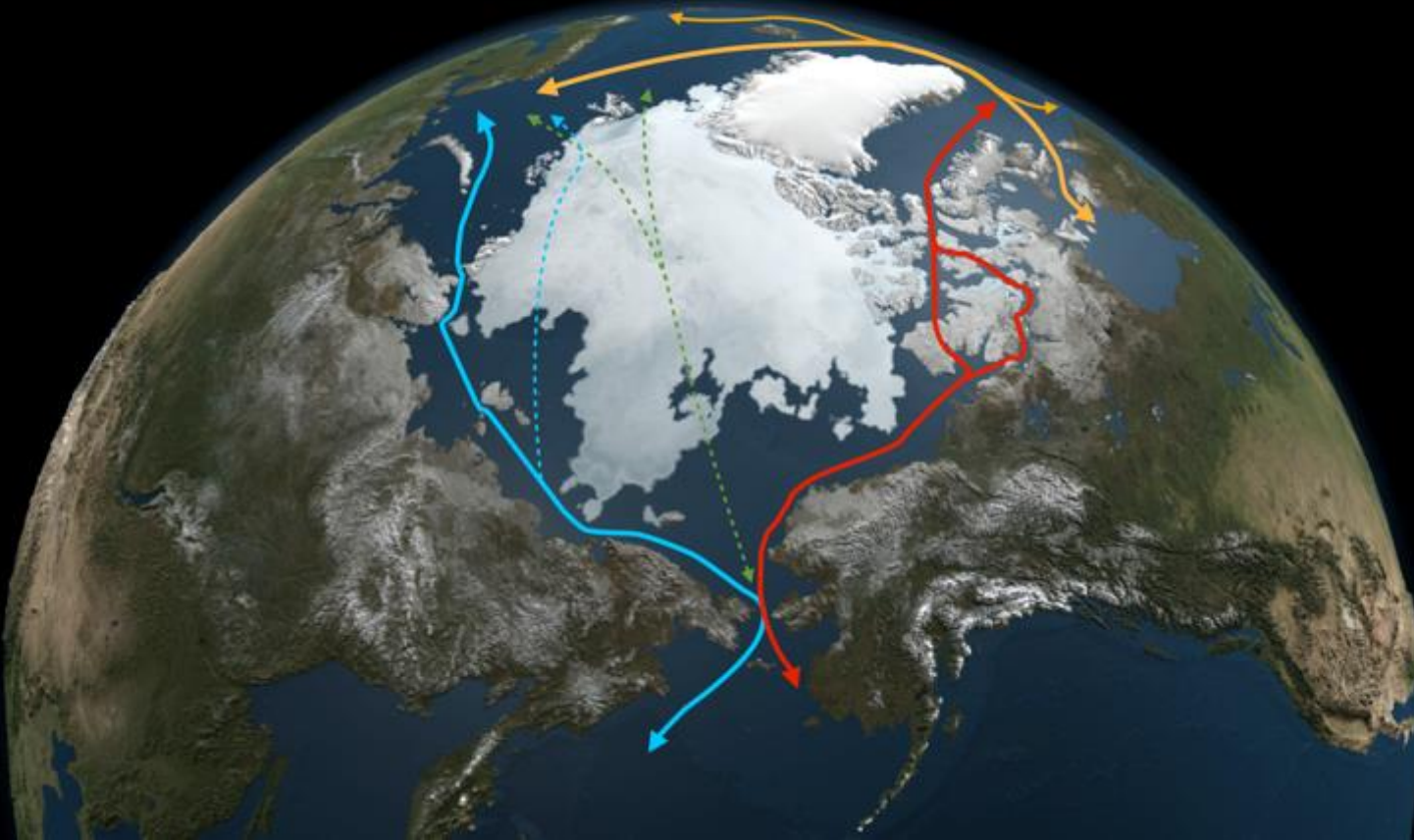
NWP/Arctic Bridge:

Murmansk, Kikenes/Jakobsnes, Hammerfest, Tromsø, Narvik, Oulu, Reykjavík, Akureyri, Finna fjörður, Nuuk, Qaqortoq, Iqaluit, Baker Lake, Churchill...

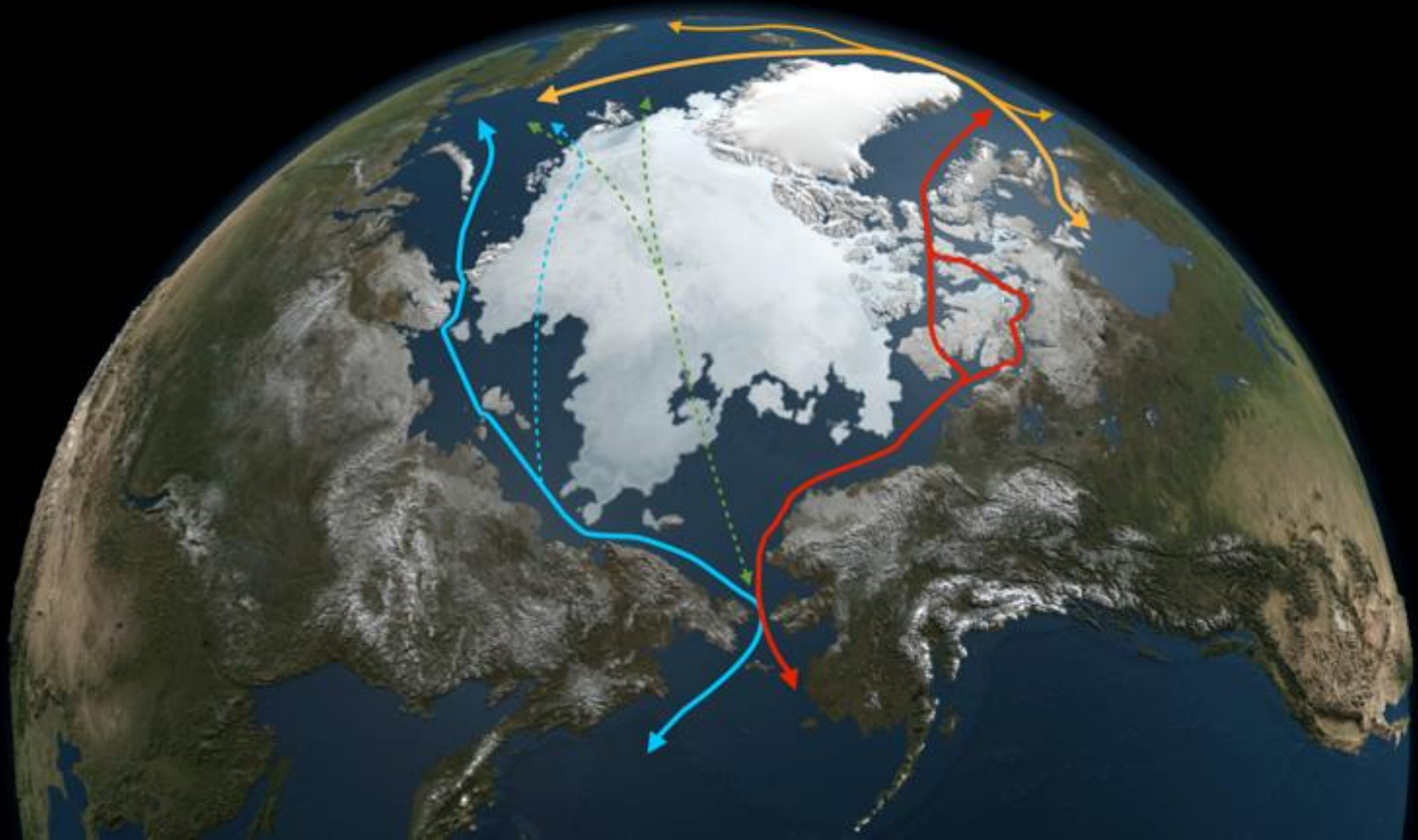
Non-Arctic:

Tianjin, Busan, Yokohama, Dunkerque, Le Havre, Ålborg, Grimsby & Immingham, Hamburg, St-Pierre-et-Miquelon, Portland

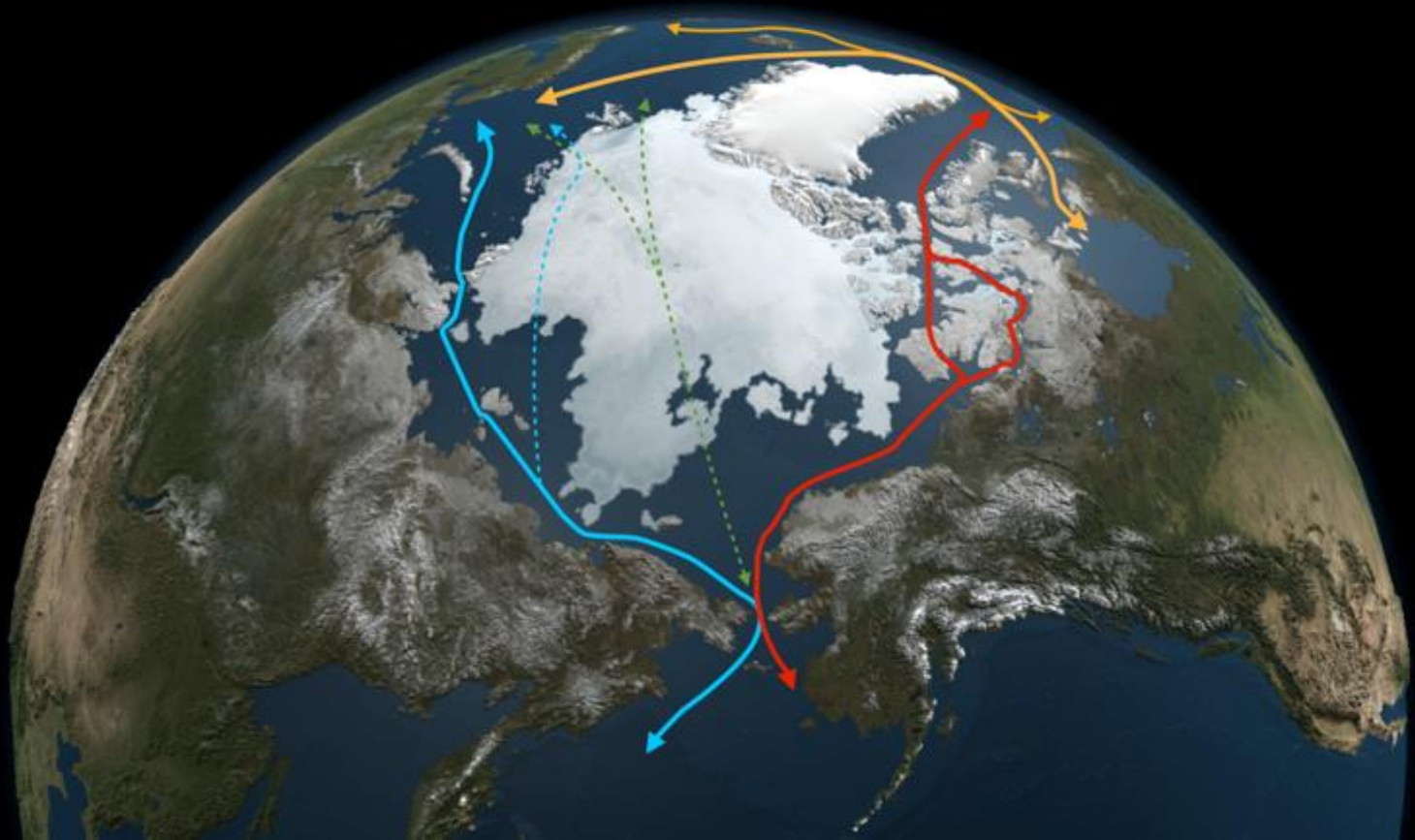
Up to 19% of China's exports by 2035



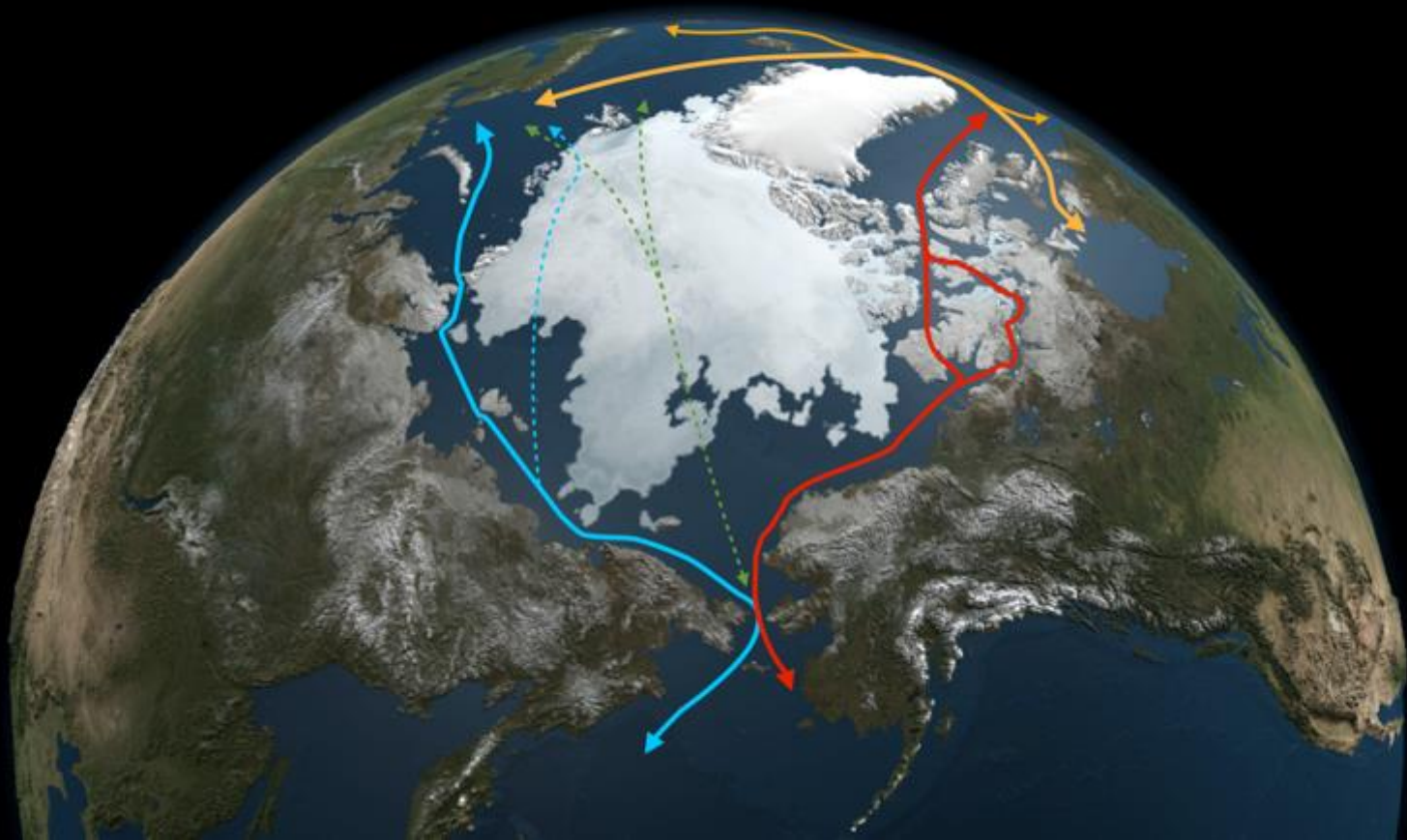
Up to 50% marketshare on N-N shipments



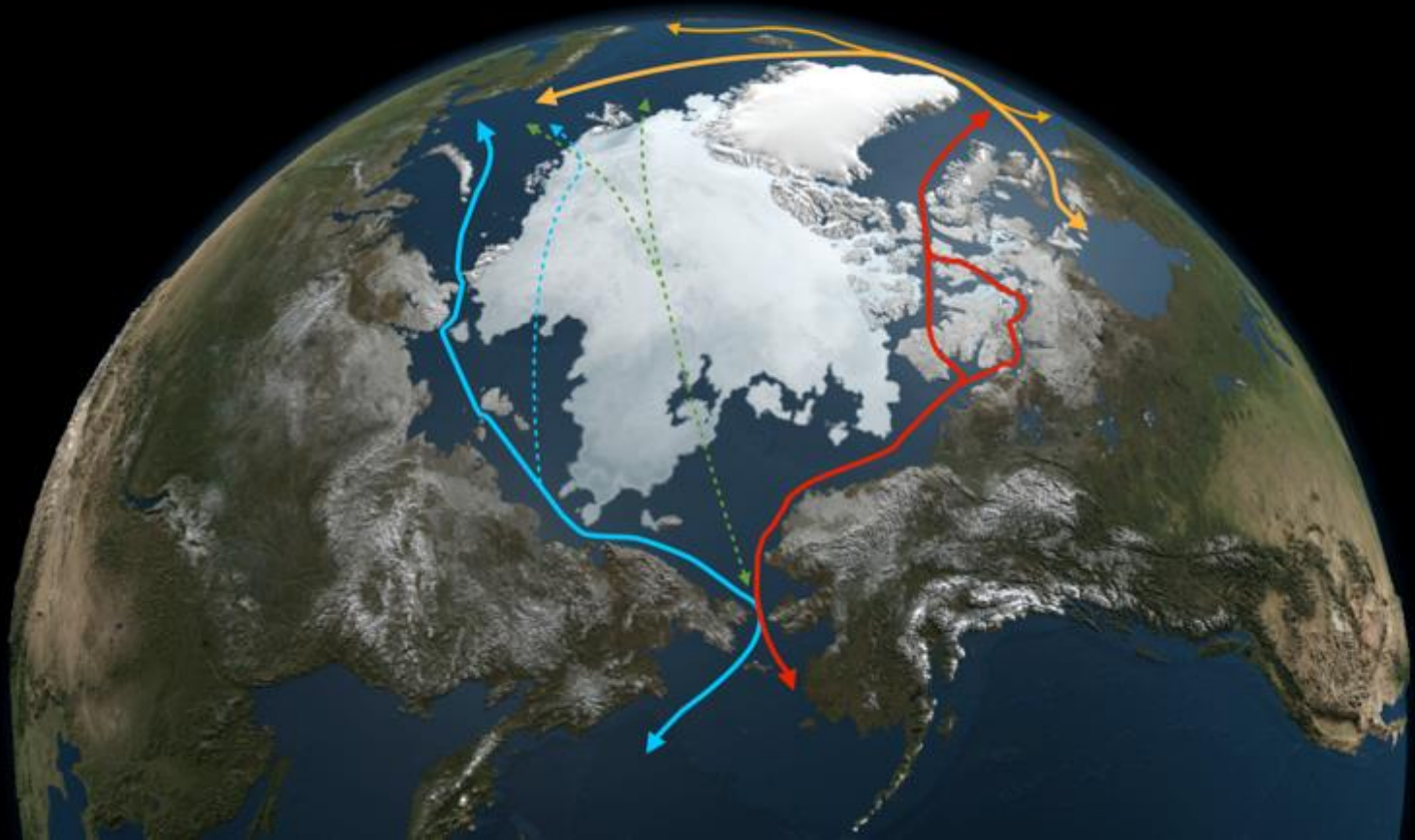
Impact on Panama/Suez traffic: very little



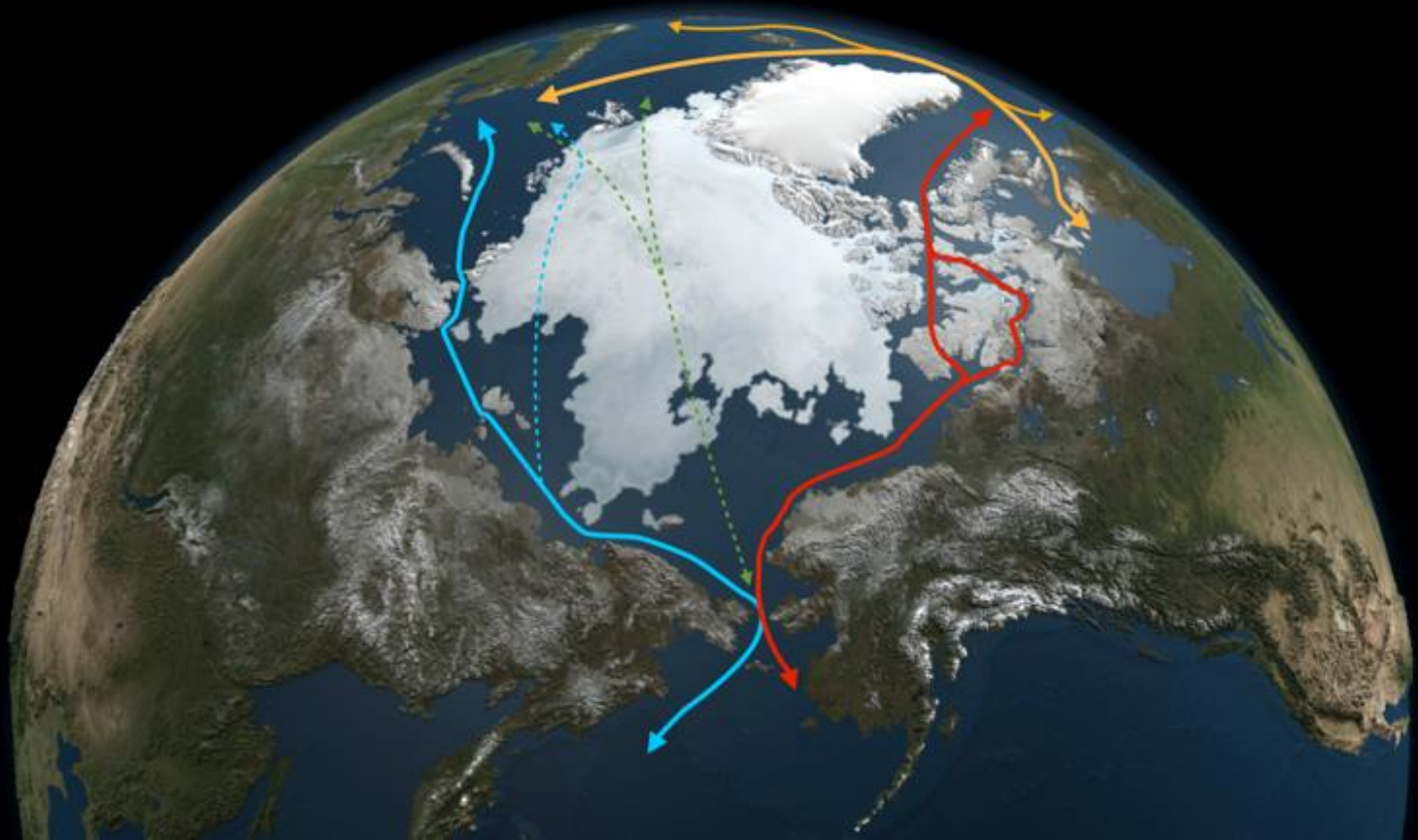
NSR transits in 2035: up to +2000



Main hubs: Murmansk/Kirkenes – Iceland



Icelandic hubs: Reykjavík – Dysnes - Helgavík



Icelandic hubs: Reykjavík – Dysnes - Helgavík

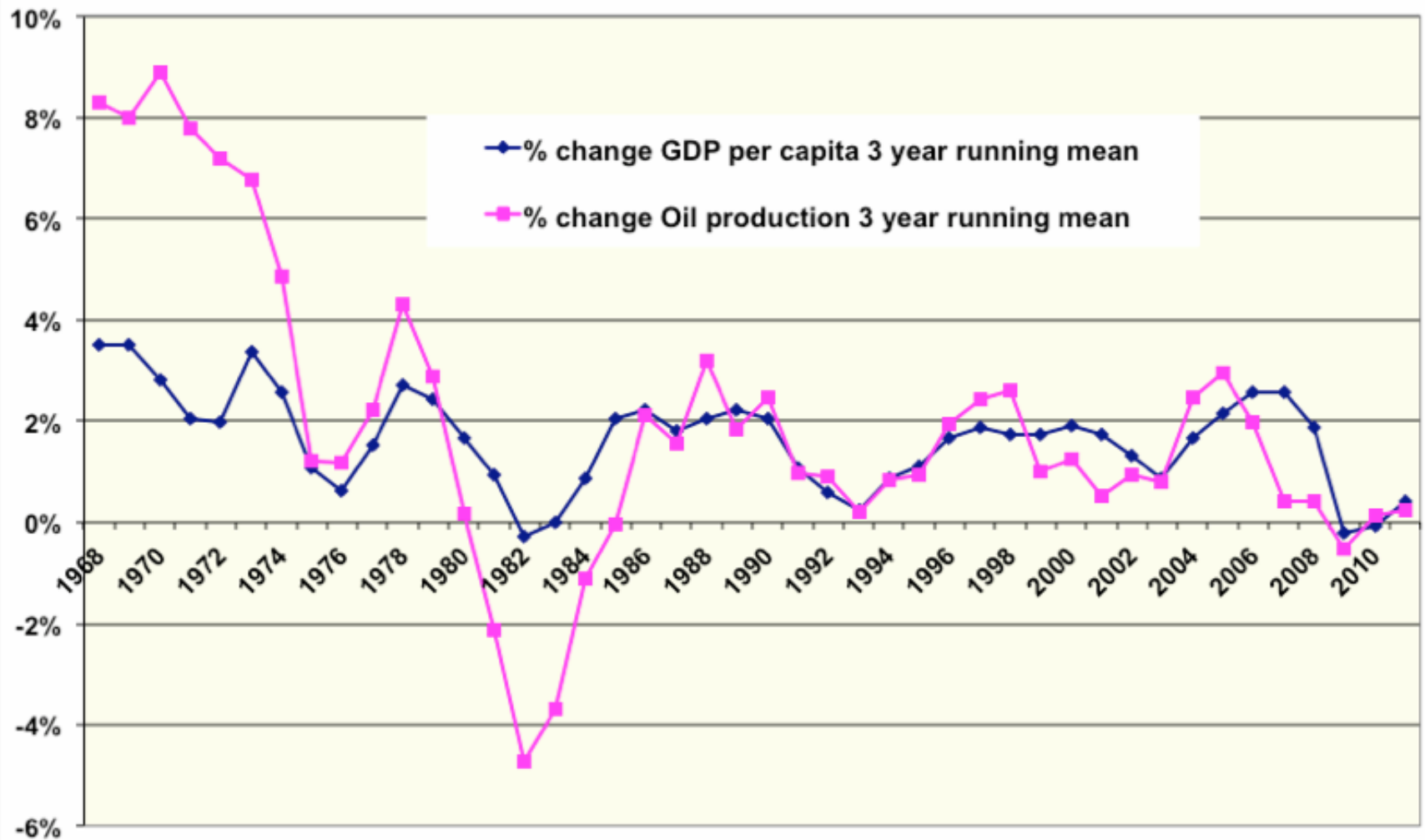
Finna fjörður < competition from Norway

Longyearbyen

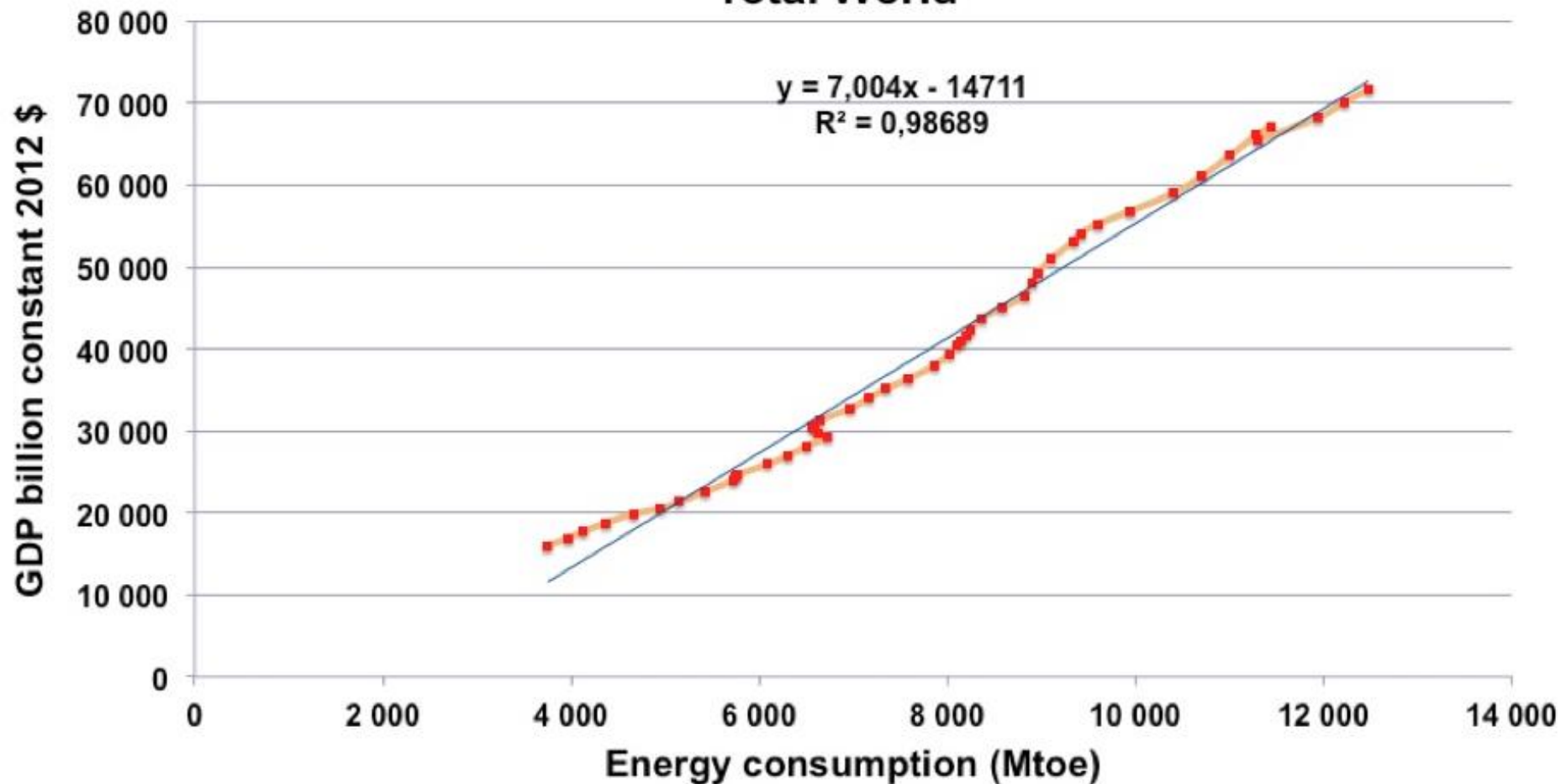
Tromsø

Narvik

Case #2: ENERGY



Total World



$$\text{Since } \text{GDP} = \frac{\text{GDP}}{\text{NRG}} \times \text{NRG}$$

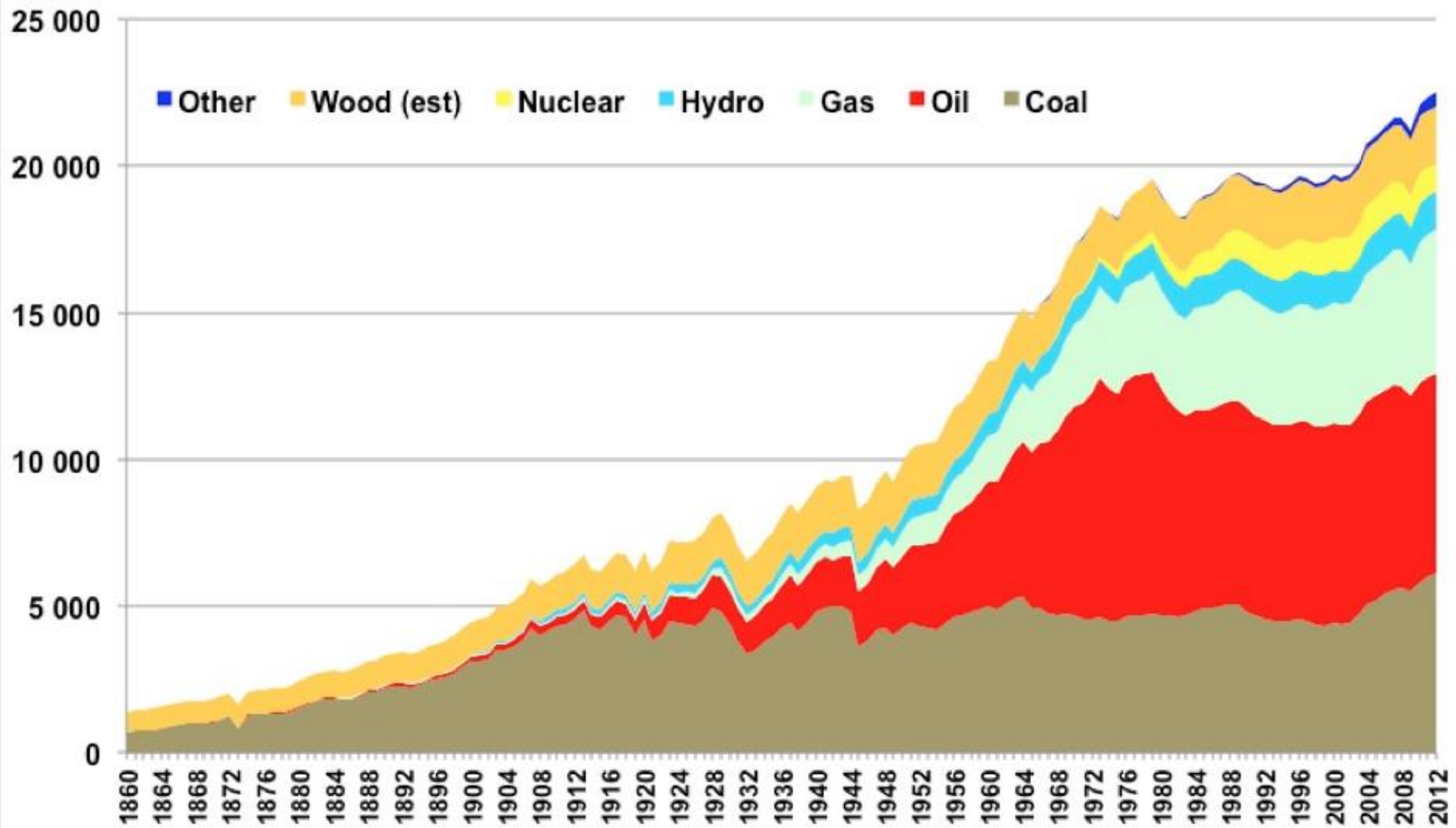
then, when there is *not enough*
energy produced, there is *not*
enough GDP

Growth & crises:

Function of energy volumes
available,
Not function of energy prices *per*
se.

#ARCO to be exploited

unless hydrogen, fusion or
affordable solar

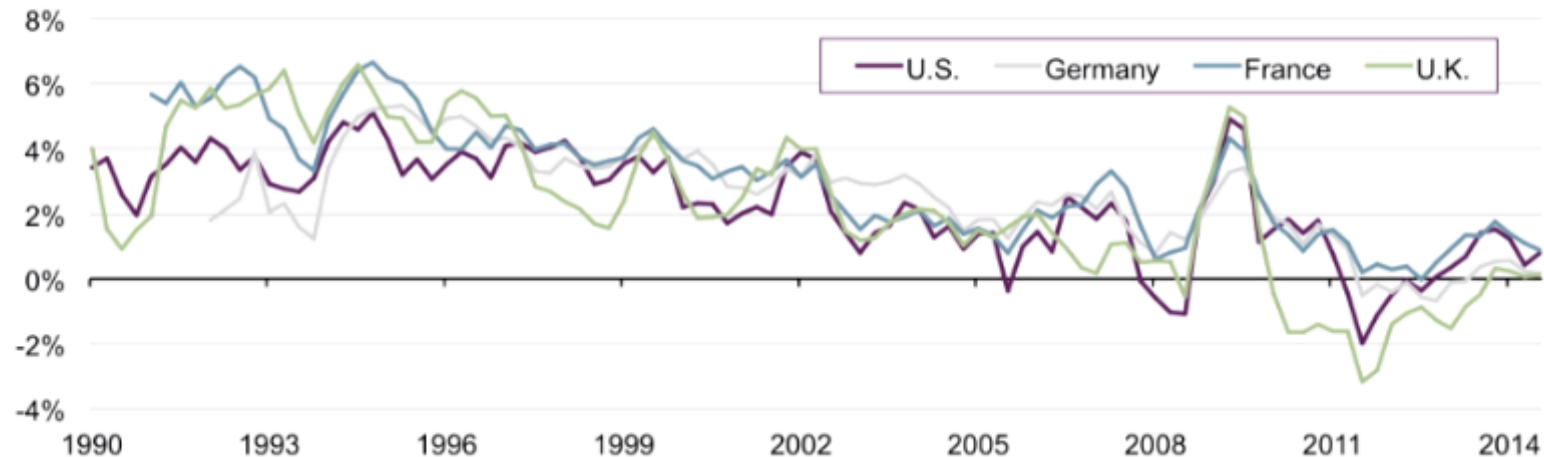


	COAL	O&G	Hydro	Nuclear	Onshore wind	Offshore wind	Solar
€ / kW installed	1 500	800	3 000	4 000	1 000	3 000	3 000
Yearly hrs of running	8 000	6 000	4 000	8 000	1 800	3 000	1 000
€ / kW / working hours	1 643	1 168	6 570	4 380	4 867	8 760	26 280
Lifetime (in years)	40	30	100	60	20	20	25
kWh produced per kW installed over lifetime	320 000	180 000	400 000	480 000	36 000	60 000	25 000
€cents of capital required per kWh produced over lifetime	0,5	0,4	0,8	0,8	2,8	5,0	12

Case #3: INFRASTRUCTURE

INVESTORS SEEKING RETURNS IN A LOW YIELD WORLD

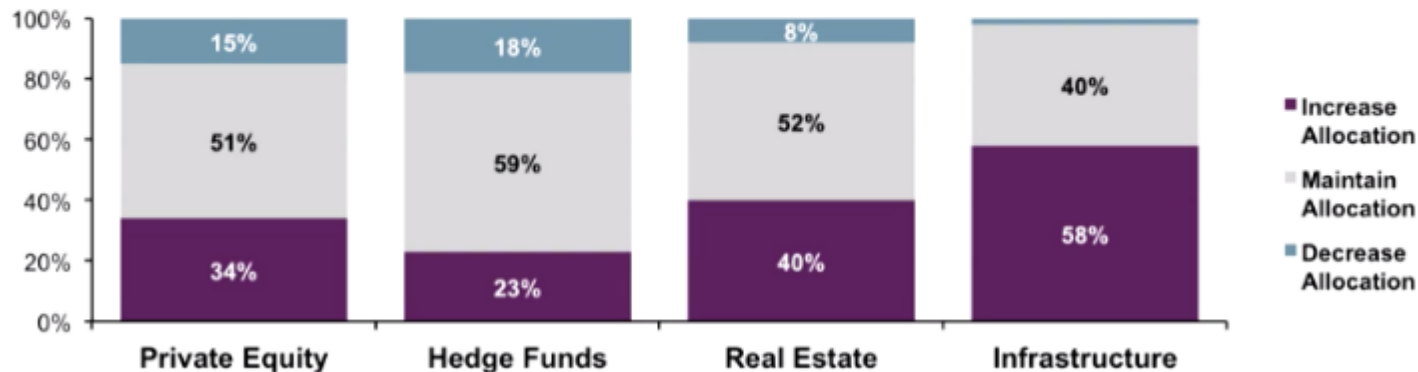
Real 10-Year Government Bond Yields



Source: Bloomberg, Guggenheim Investments. Data as of 9/30/2014. *Note: Real 10-year government bond yields are nominal yields subtracted by CPI YoY rate.

58% OF INSTITUTIONAL INVESTORS PLAN TO INCREASE INFRASTRUCTURE ALLOCATION

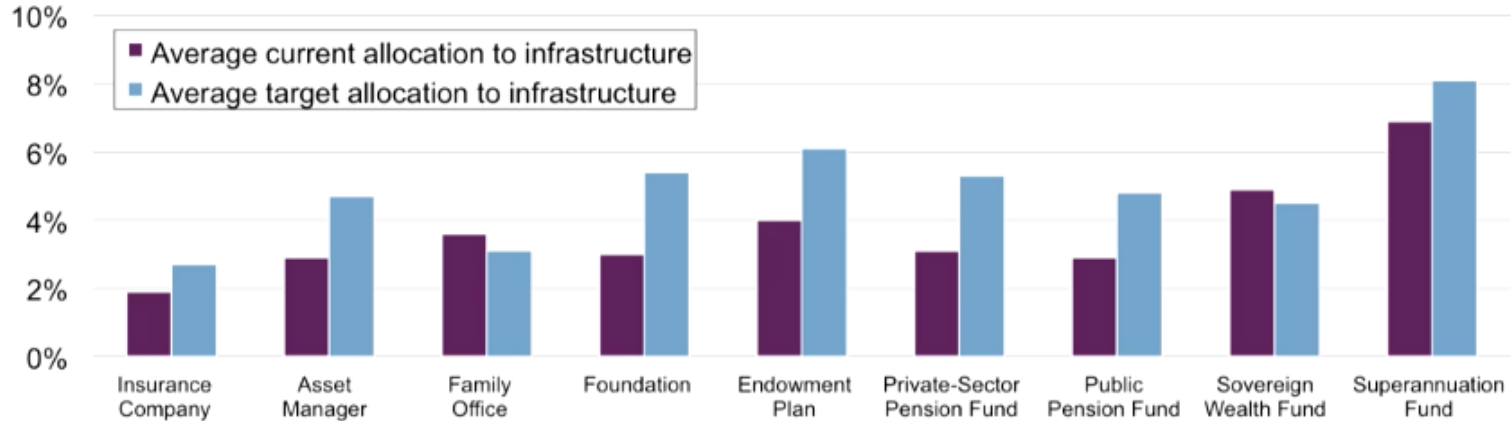
Survey of Institutional Investor Intentions for Allocation



Source: *Global Infrastructure Trends in 2013*, Preqin, September 2013.

MEETING ALLOCATION TARGETS COULD PROVIDE AN EXTRA \$200 BILLION PER YEAR

Average vs. Target Allocation to Infrastructure by Investor Type



Source: S&P, Preqin, January 2014.

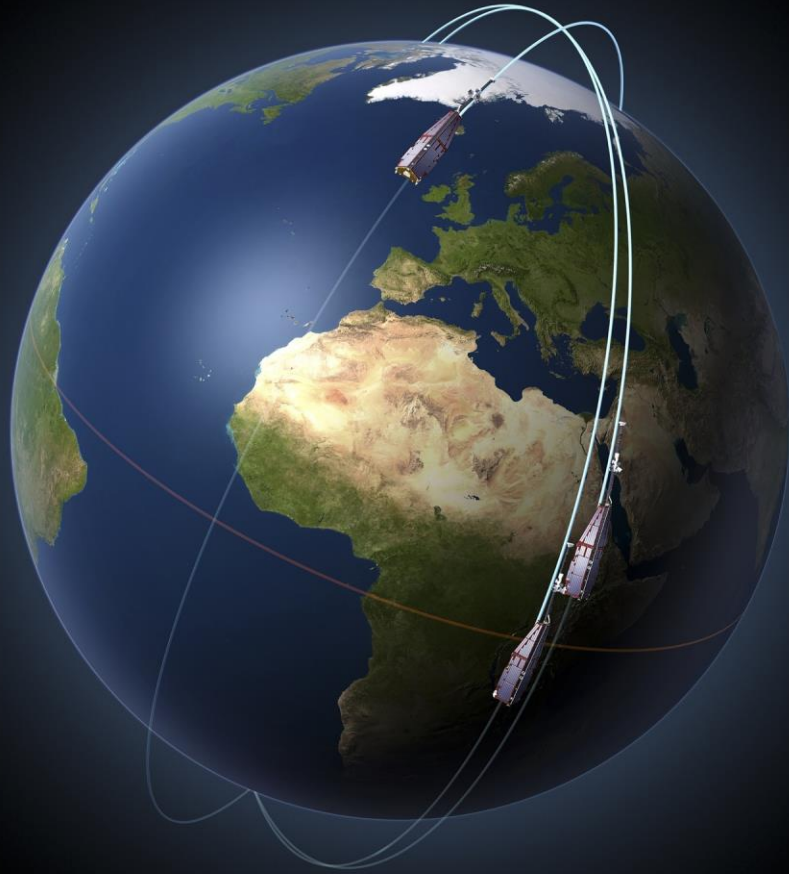
INNOVATION

Greenland – Iceland - Yakutia: the world's greenhouses

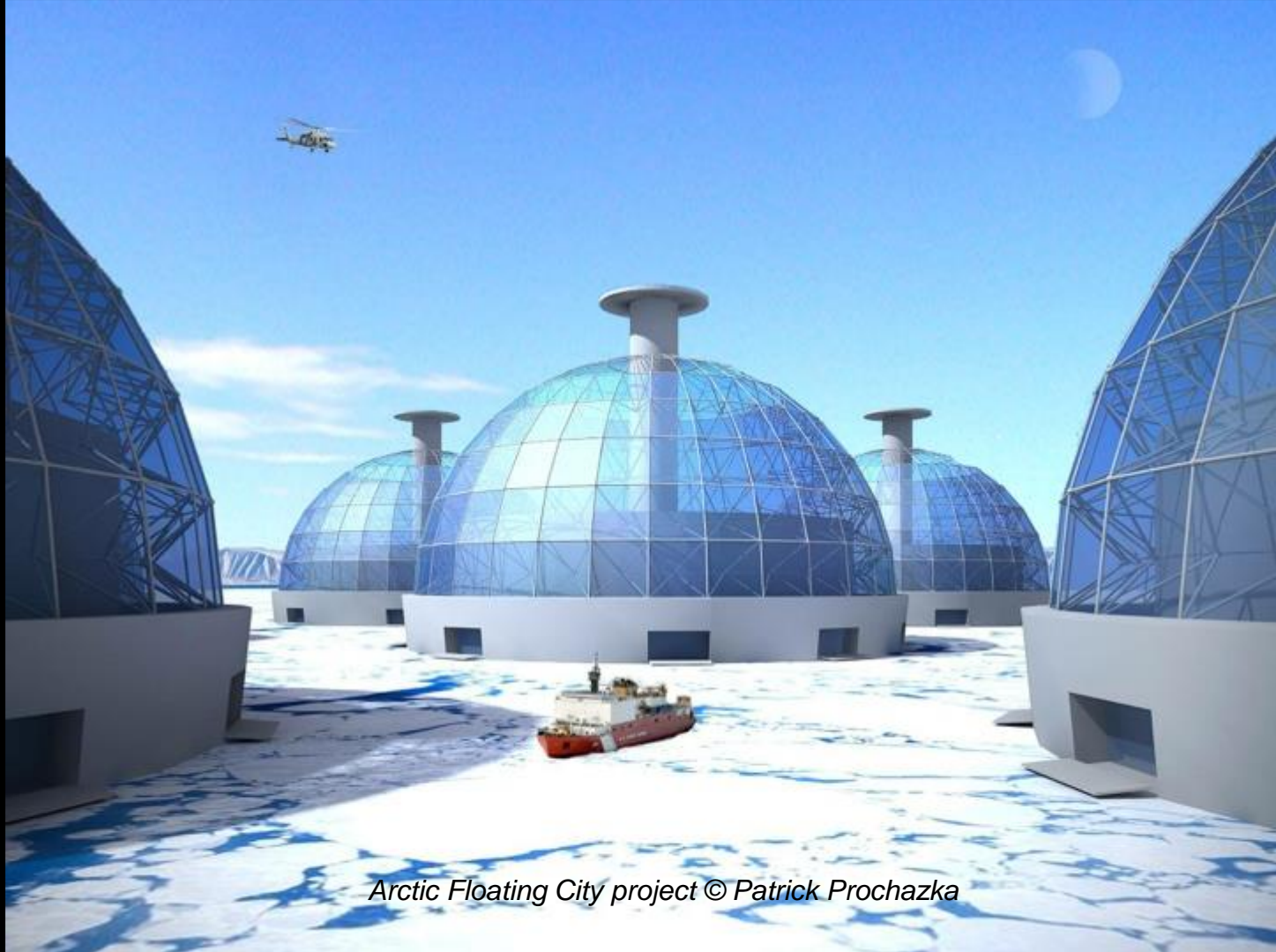


In 2035, this Arctic road takes
you to a world-class data
center

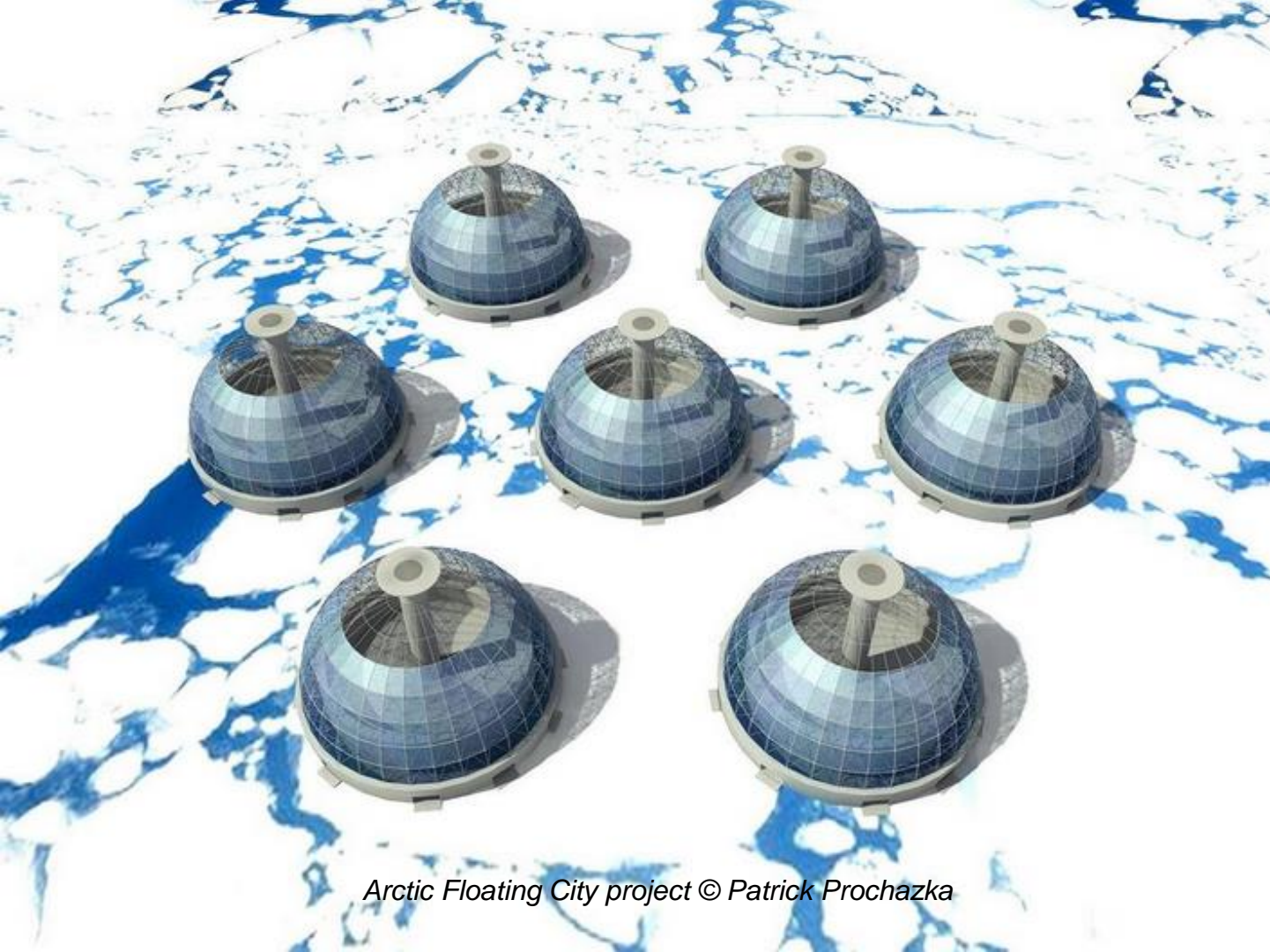




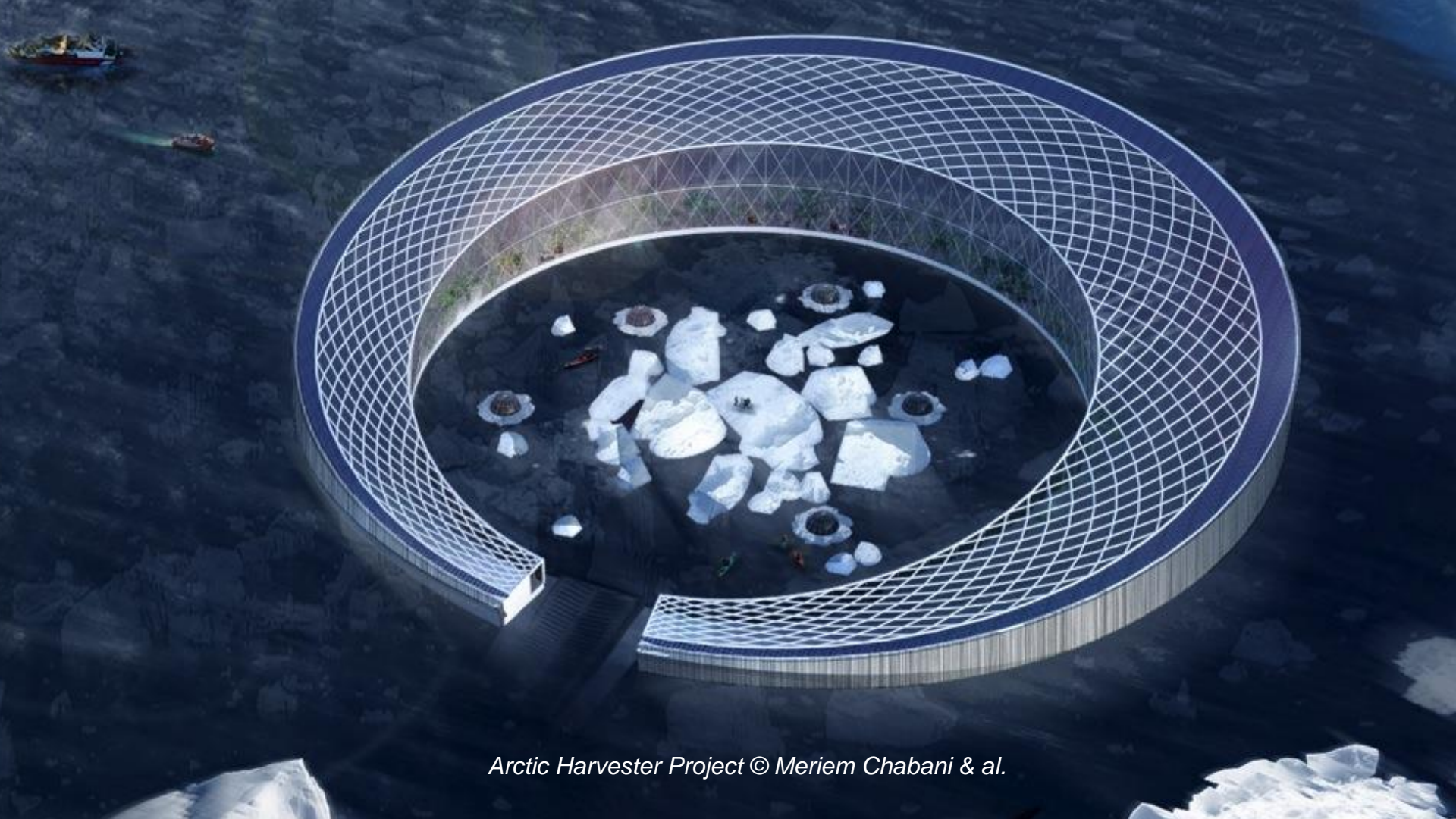
In 2035, the Arctic
is the world's
gateway to
space...



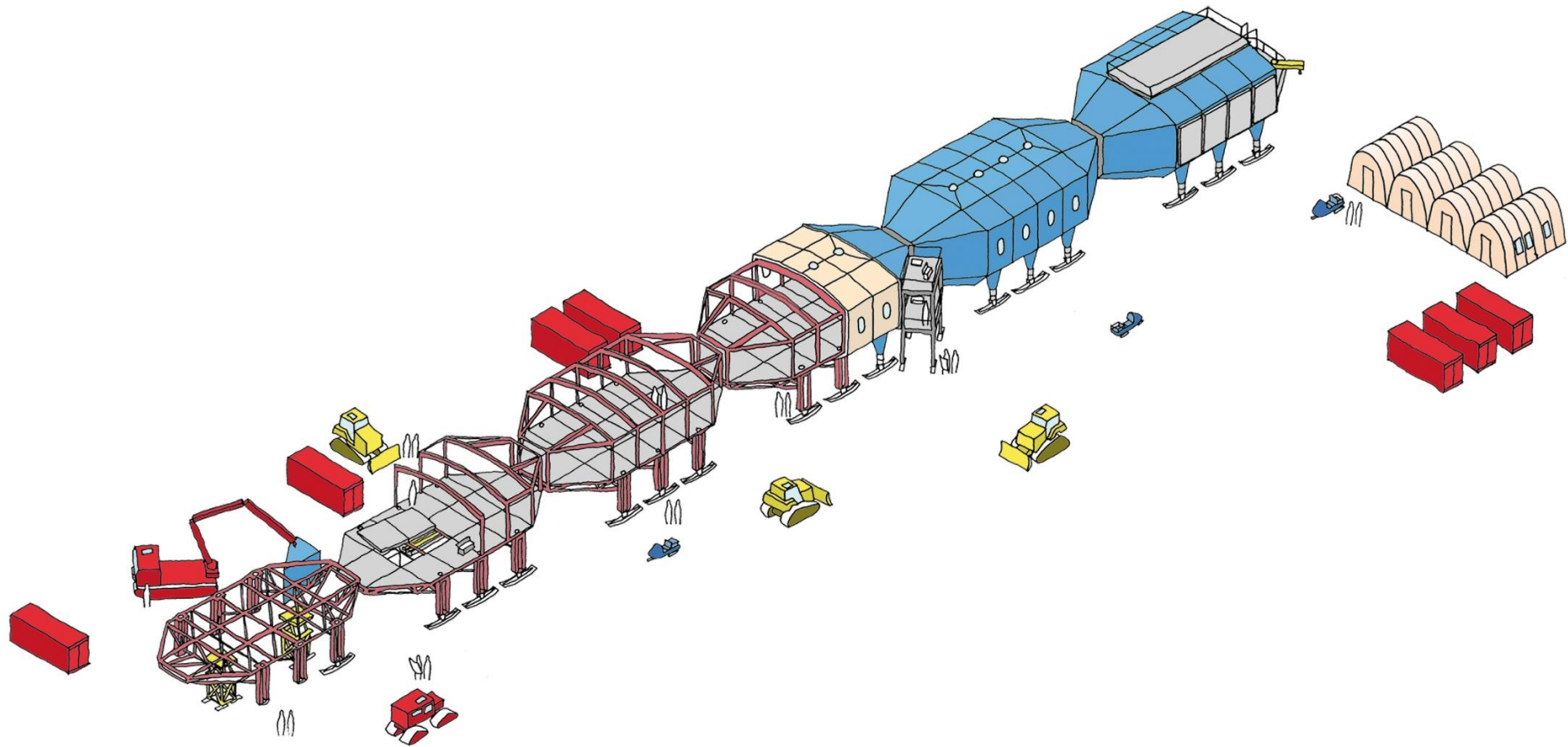
Arctic Floating City project © Patrick Prochazka



Arctic Floating City project © Patrick Prochazka



Arctic Harvester Project © Meriem Chabani & al.



- Dronautics/remote-sensing (air, surface, ground, undersea)
- Construction / smart city planning
- Machine learning applications for environmental protection
- Telemedicine
- Bioprospecting, synthetic biology, microfluidics/nanomedicine
- Cleantechs (hydrogen, geothermal, thermal efficiency, new materials)
- Microfluidics/Nanomedicine
- Satcom / Earth-bound space applications
- Waste management & recycling
- Fiber-optic routes / Data-centers
- Environmental insurance
- Arctic-ready certification
- Autonomous marine cities (i.e. AFC / Arctic Harvester projects)



In 2035, Kalaallit Nunaat
is
an independent state.

The Arctic is what
we all make of it

Internationalism vs. Interregionalism

Greater exposure to
macro-political risks

Greater financing
leverage

Higher level of
representativeness

Greater strategic
thinking

Greater local knowledge

Greater ability to
mobilize business
partners

Faster decision-making

Better mitigate micro-
political risks

Primakov Doctrine



Chinese military expenditure

50% of US in 2016

100% of US in 2035

At current trends

Defense/security-related investments

Scenario 8 (re-icing): \$160Bn

Scenario 6 (most robust): \$350Bn

Scenario 5 (militarization): \$600Bn

ARCTIC COUNCIL - PSI

Largest provider: RUSSIA

New applicants

Mexico
UAE
Switzerland
Australia
Qatar
Belgium
Indonesia
Estonia
Egypt
Mongolia



Timeline

2015: USA
2017: Finland
2019: Iceland
2021: Russia
2023: Norway
2025: Denmark
2027: Sweden
2029: Canada
2031: USA
2033: Finland
2035: Iceland

MUTATIONS



Solutions for the Arctic

- Arctic Development Bank
 - Pan-Arctic FTA
 - Bering visa-free zone
 - Arctic NBIC network
- Interregional diplomacy (Maine/SPM)

Solutions for the Arctic

- Arctic bioprospecting patenting system
 - Pan-Arctic bioprospecting flat tax agreement
 - Arctic bioprospecting bureau

If it has value, it will be protected.



