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Clingendael International Energy Programme

# The Challenges of Arctic Oil and Gas

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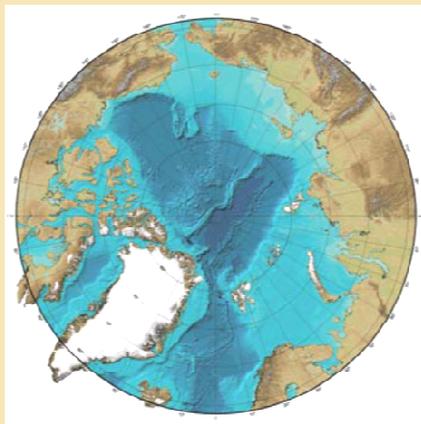
## This Presentation

- Introduction
- Energy Security
- Arctic Oil and Gas
- Concluding Remarks

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## The Arctic: key characteristics

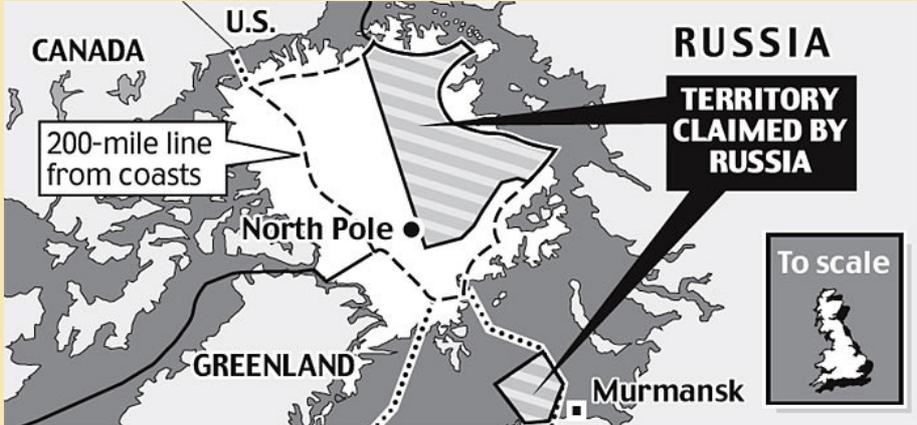
- Physical environment
  - Cold
  - Ice/sea
  - Permafrost
- Biological environment
  - Intact habitats
  - Sensitive ecosystem
- Human environment
  - Few people
  - Remote, largely roadless



## The Arctic: a bit of history

- End 16th century:
  - Explorers
  - Northern passage
- Cold war:
  - SSBN shelter
- Climate Change
  - NE/NW Passage
  - Geopolitics





Under current international law, the countries ringing the Arctic - *Russia, Canada, the U.S., Norway, and Denmark (which owns Greenland)* - are limited to a 200-mile economic zone around their coasts.

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## Russia: Claiming the North Pole

(and all its oil and gas?)

Photo: Reuters

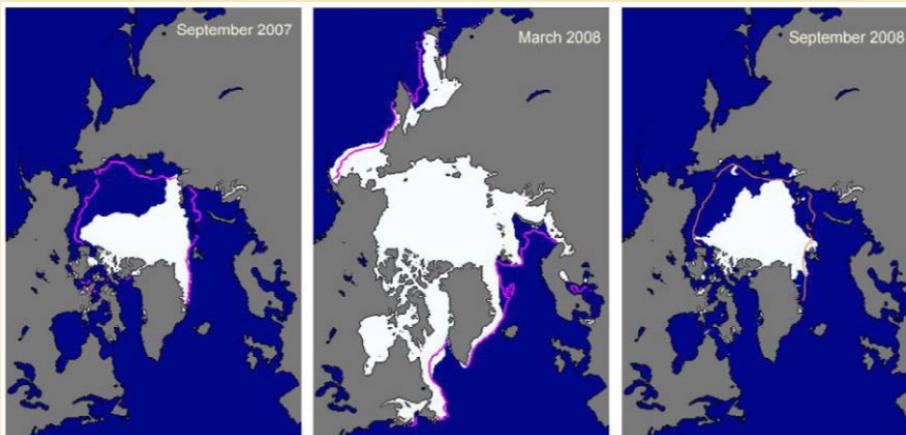


Arctic explorer Artur Chilingarov holds a photograph showing the Russian national flag that was planted 4000-meters deep on the seabed at the North Pole in July 2007.



Russia argues that an underwater mountain below the North Pole is an extension of Russian landmass

## Data on Sea Ice - 2008

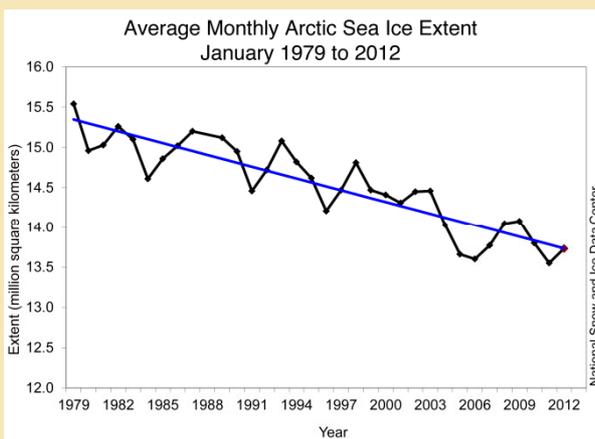


Source: NASA

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## Data on Sea Ice - 2012

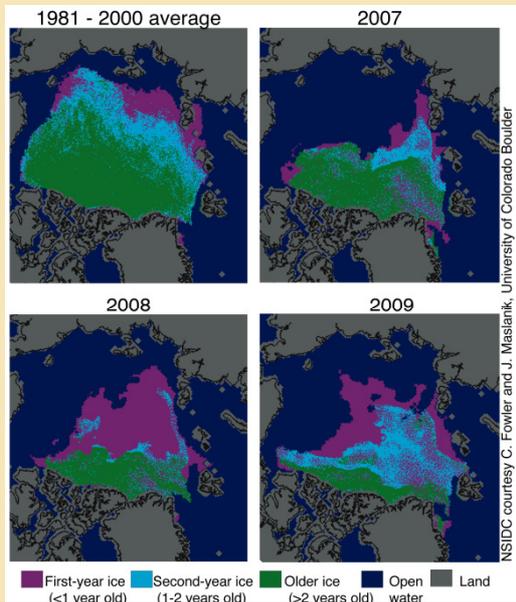


Source: NASA

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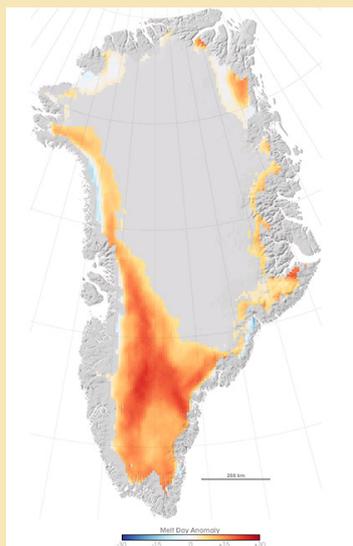
### Arctic sea ice age at the end of the melt season



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### Melting days in Greenland



The world's largest island is covered by a massive ice sheet with an average thickness of **2.3 kilometers** (1.6 miles). If this ice sheet was to melt, global sea levels would rise.

From 2003 to 2005, Greenland lost about 101 billion tons of ice annually.  
(Graphic: NASA)

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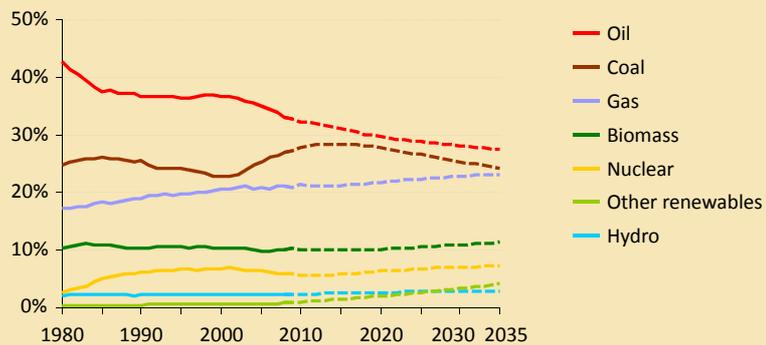
## Northwest passage



Canada claims the route to be national waters, while the United States and the European Union demand free passage (Graphic: NASA)

## The age of fossil fuels is far from over, but their dominance declines

Shares of energy sources in world primary energy demand in the New Policies Scenario



*Oil remains the leading fuel though natural gas demand rises the most in absolute terms*

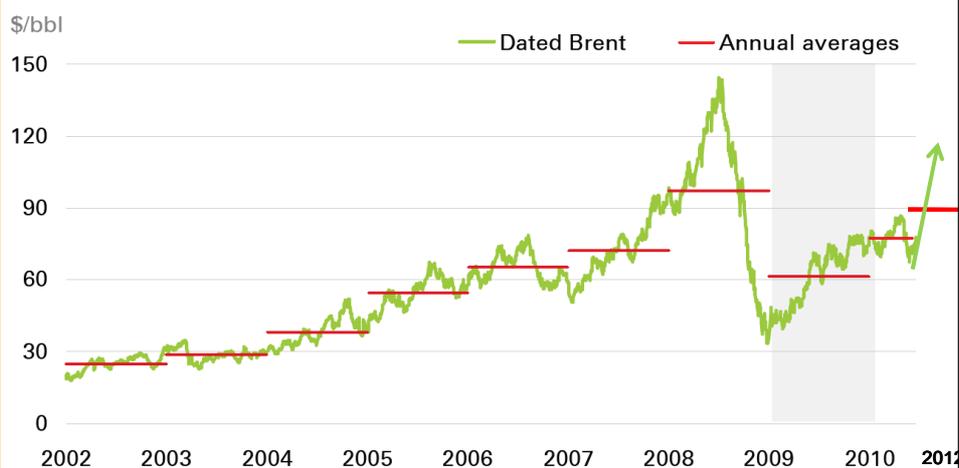
Source: IEA WEO 2011

## Power Politics and Energy

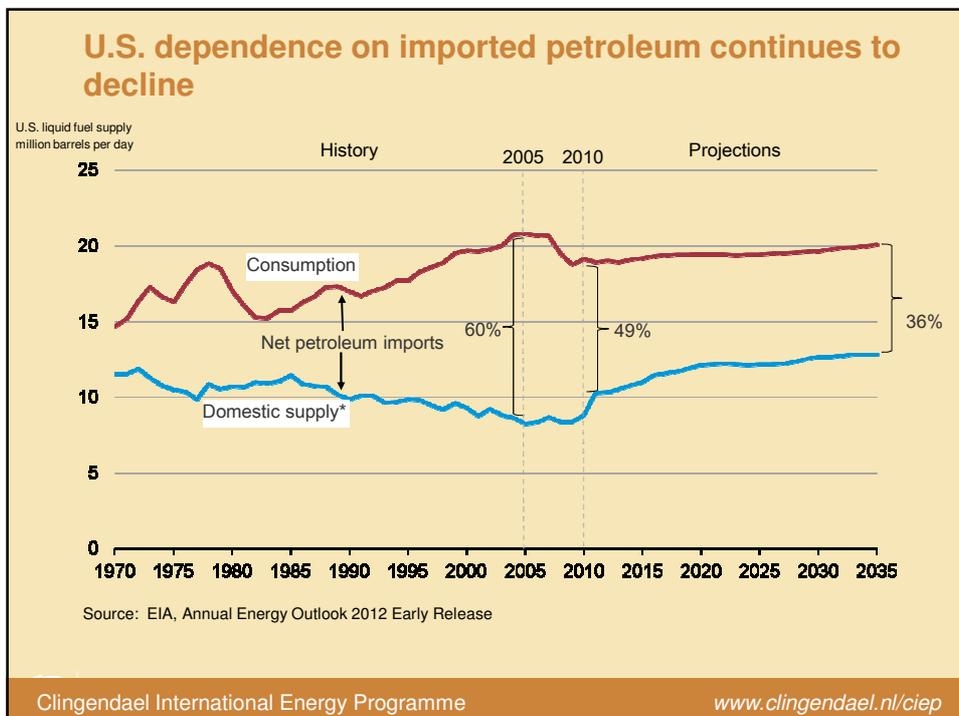
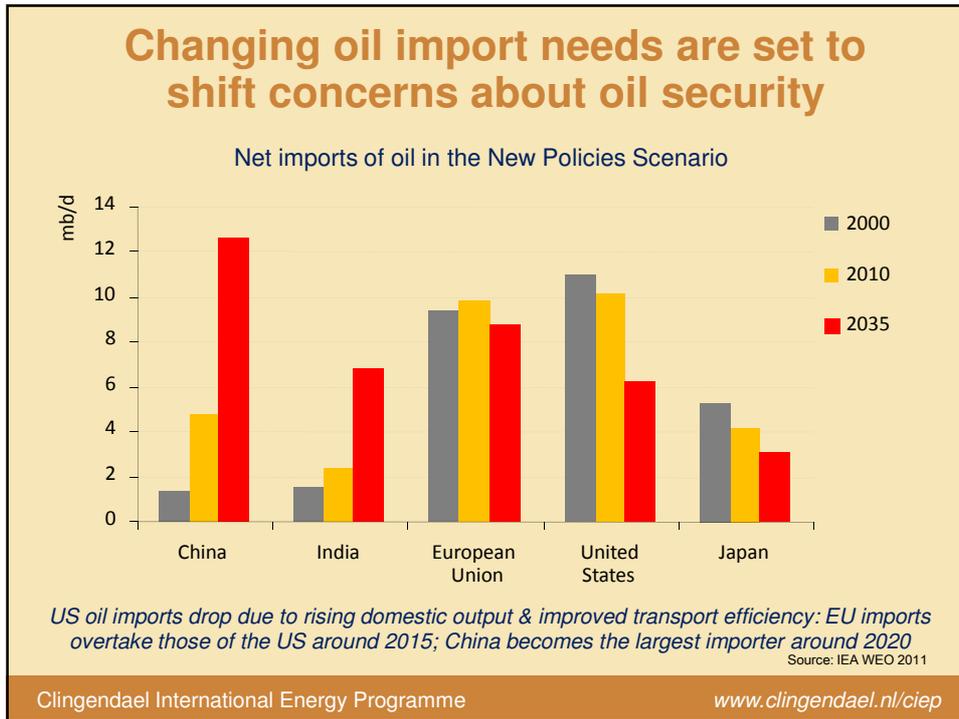
### The system of international politics and economics is challenged

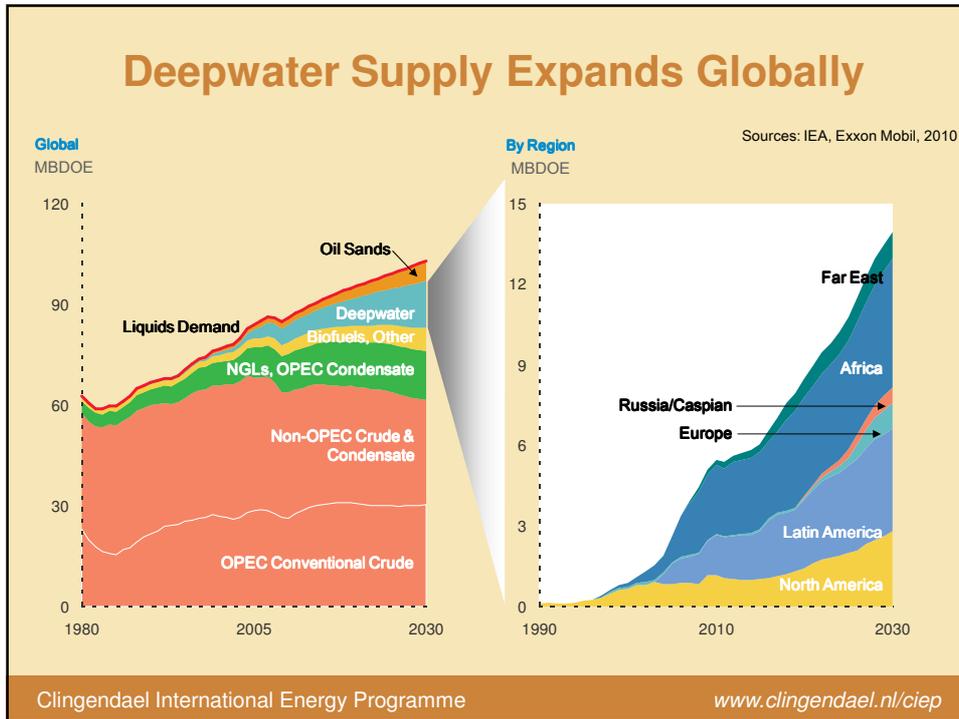
- Increasing resource nationalism
- Increasing worries about (import) dependency in a period of changing power relations
- Management of risks in the energy value chain
  - Security of demand and Security of supply
  - Diversification of the energymix
  - Domestic production viz. imports

## Oil Price 2002-2011



Source: Platts, BP 2011





### Risk management of new technologies

NASA, 2010

**\* Is H&S management & regulation up to speed with space age oil and gas technology?**

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## Was the Macondo disaster a game changer ?

- Current deepsea production: 5-6 mb/d
- 2030: >30% of global oil production from offshore drilling
- US: 'more regulation, more liability, more costs, more time'
- Ownership-shift to bigger companies
- Drilling options in the Arctic more difficult (environment)

Fear that the success of oil E&P in US deep water will be hampered by regulation

*U.S. has 100 deepwater fields, 1.3 mb/d in 2009*

## Arctic Oil and Gas Resources

### *Recent publications:*

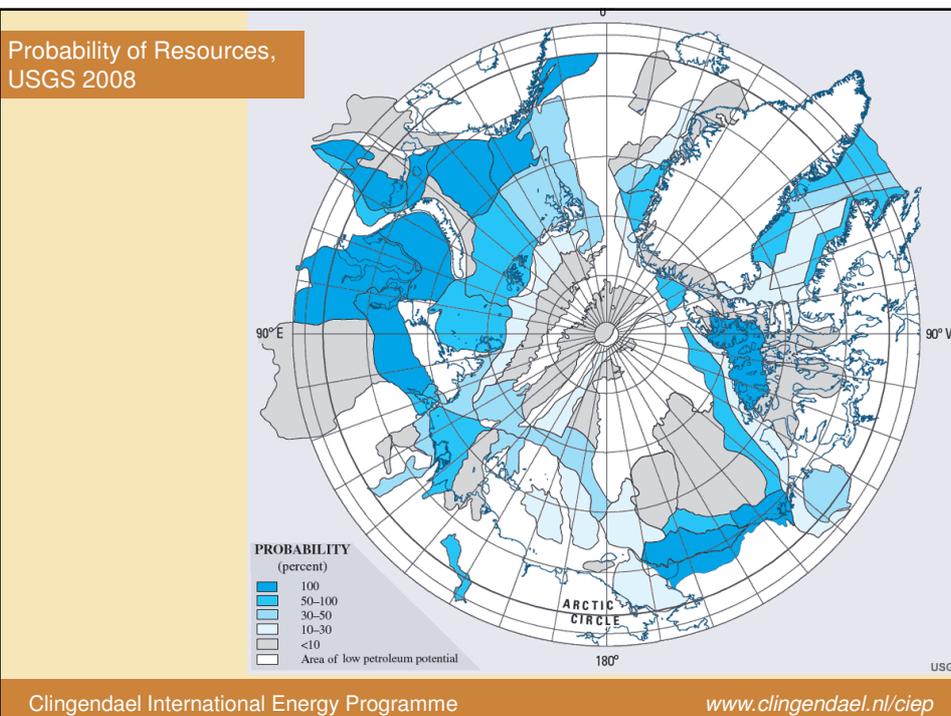
- Arctic Monitoring and Assessment Programme (AMAP): Arctic Oil and Gas 2007
- Circum-Arctic Resource Appraisal (CARA)/US Geological Survey study 2009

## The Arctic: The last great, almost unexplored, frontier area on the planet

- CARA/USGS 2009 appraisal: 530 Billion bbl of oil equivalent undiscovered resources (**North of the Arctic Circle; no hydrates, no bitumen, no oil shales**)

- > 5% world oil reserves; > 20% known gas reserves in the Arctic; 25% undiscovered oil & gas

- Plans for new pipelines and development are underway:
  - Russia: growing activity Timan-Pechora, W. Siberia provinces and the Kara and Barents seas
  - Canada: Mackenzie Valley pipeline construction development Mackenzie Delta and Beaufort Sea
  - Alaska: gas pipeline from North Slope; expansion offshore oil activity
  - Greenland, Iceland, Faroe Islands, Arctic Russia exploration etc



## Arctic Oil and Gas production

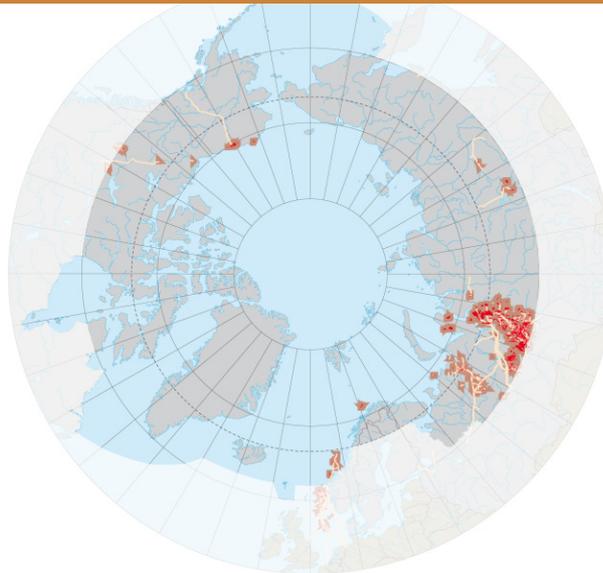
Current Arctic production (*AMAP area*)

~10% world's oil

~25% of world's gas

Most from the Russian Arctic!

Oil/Gas production Areas in the Arctic, AMAP 2007, Pipelines + Production areas



AMAP, 2007

## Russia set for greater diversity of gas export markets



Net gas exports rise substantially from 190 bcm in 2010 to close to 330 bcm in 2035, bolstered by an expansion of gas trade links with China

Source: IEA, 2011

## Food for Thought

- In the next decades, fossil fuels will continue to dominate world's energy demand
- Advances in technology will be key to expanding fuel supplies; North America and Russia are at the forefront of unconventional exploitation
- Demand growth will be met by newer sources with the biggest gains coming from deepwater production

"Oil is a strategic commodity and no country can afford to run out of oil,"  
 "Here, the Arctic could play an important role. If the U.S. Geological Survey is right, 25 percent of the world's undiscovered petroleum reserves could be found in the Arctic."

The Arctic region could be part of the "solution to the growing energy needs of the world," Exploitation of these resources would lead to considerable economic development in the Northern areas, but such a development would also cause considerable environmental concern.

## Major geopolitical issues are unresolved across the Arctic Basin

**Access:** issues of access and right of passage

**Seaward Claims:** claims of seaward ownership etc

**Boundary Disputes:** many boundary disputes still exist

**Venue:** is the Law of the Sea the venue to resolve geopolitical issues; are other international frameworks required



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