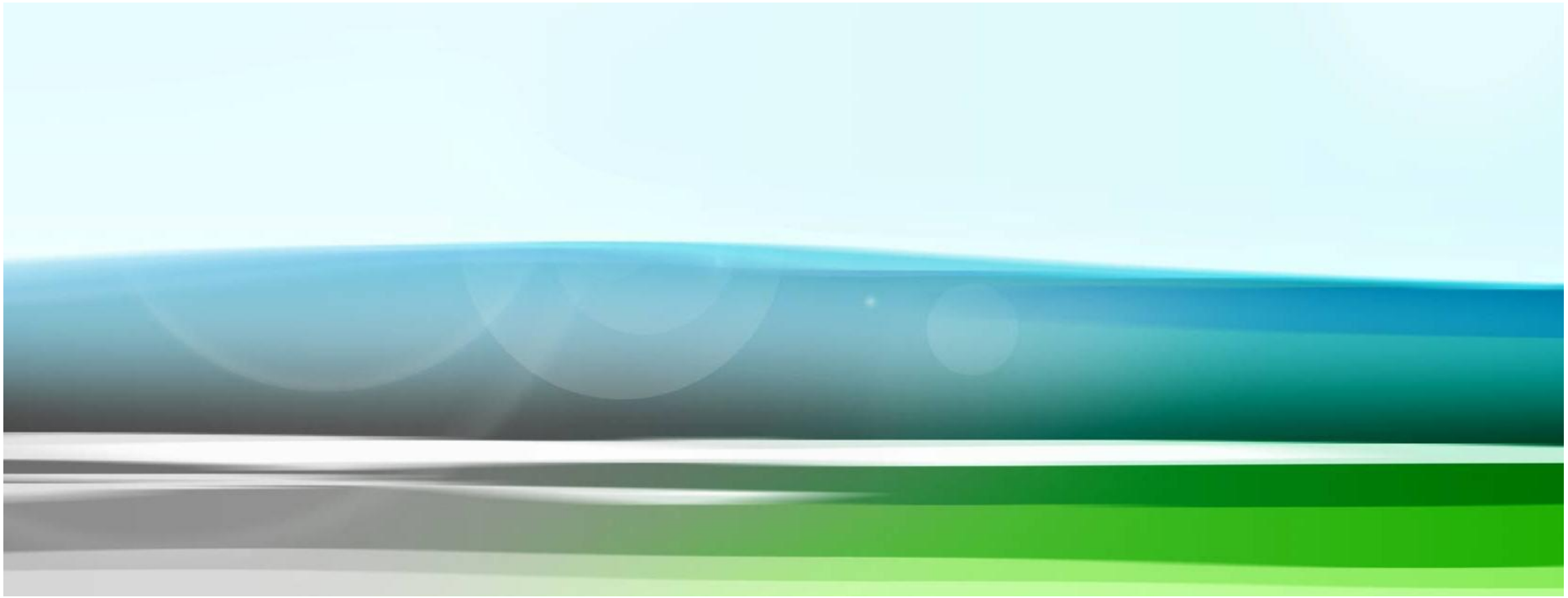


NSR transit shipping - A risk based approach

Northern Sea Route: New Opportunities

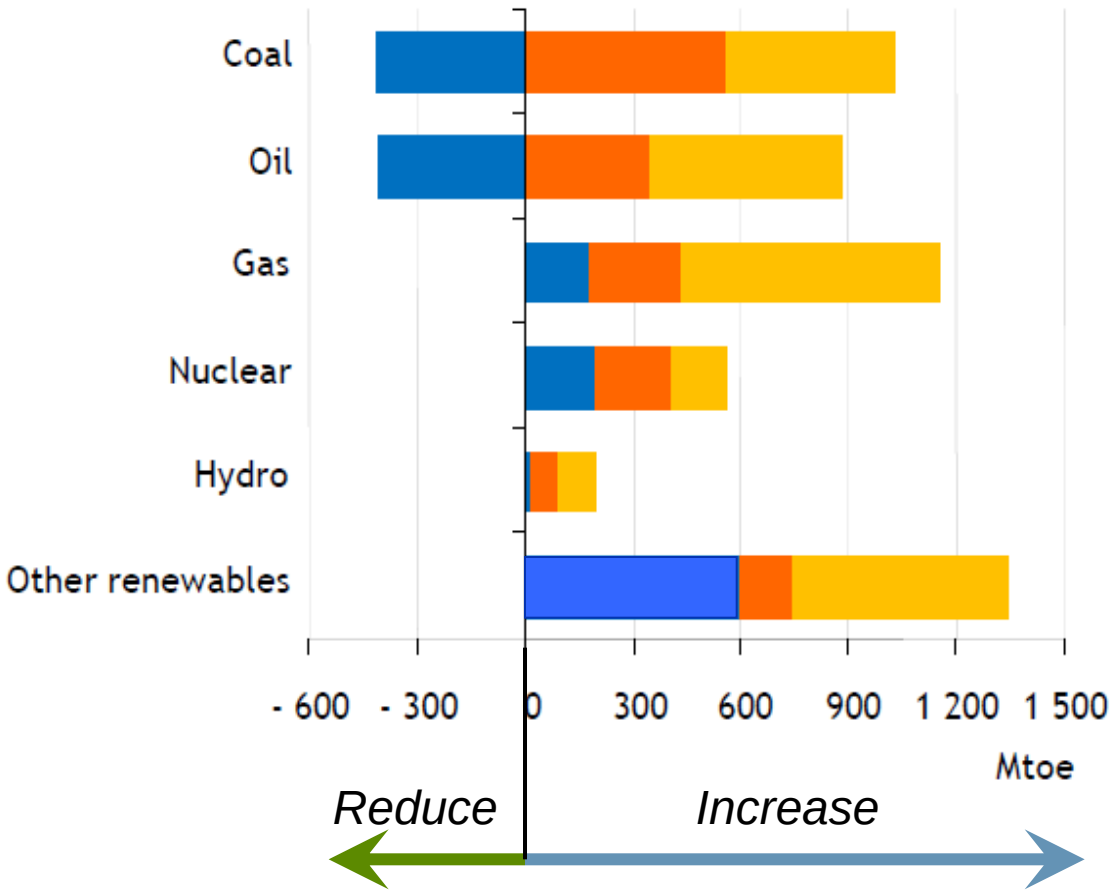
Jan Kvålsvold, Det Norske Veritas, Director
Moscow, June 2012

MANAGING RISK

The drivers

30 year horizon: + 2 billion people

Demand for energy (2008 – 2035) – New Policy Scenario (IEA)



OECD
China
Rest of world

Global energy use

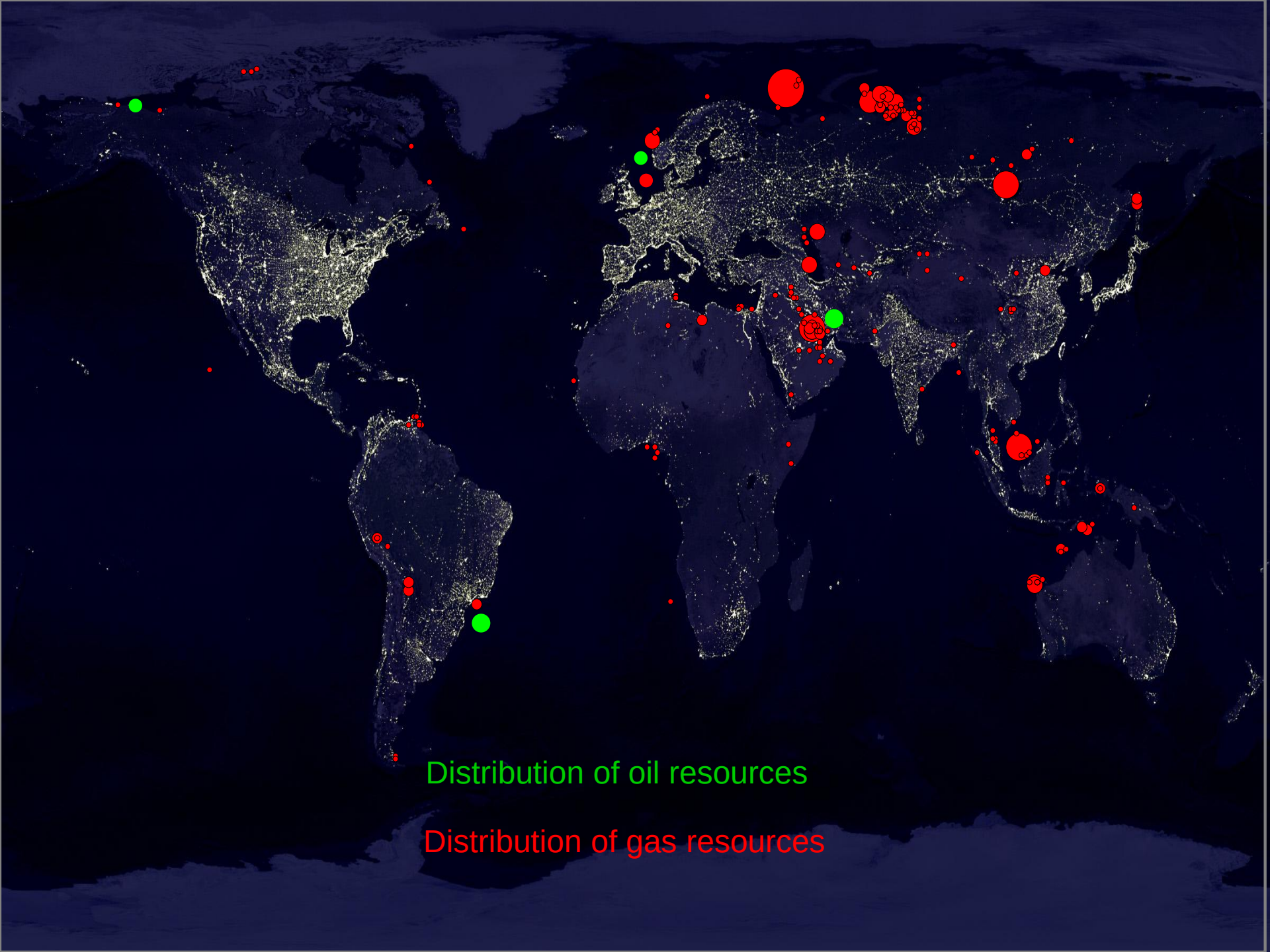
increase by 36%

towards 2035

60% of gas & oil production in 2035:

fields not yet found or developed

Source: IEA, World Energy Outlook - November 2010

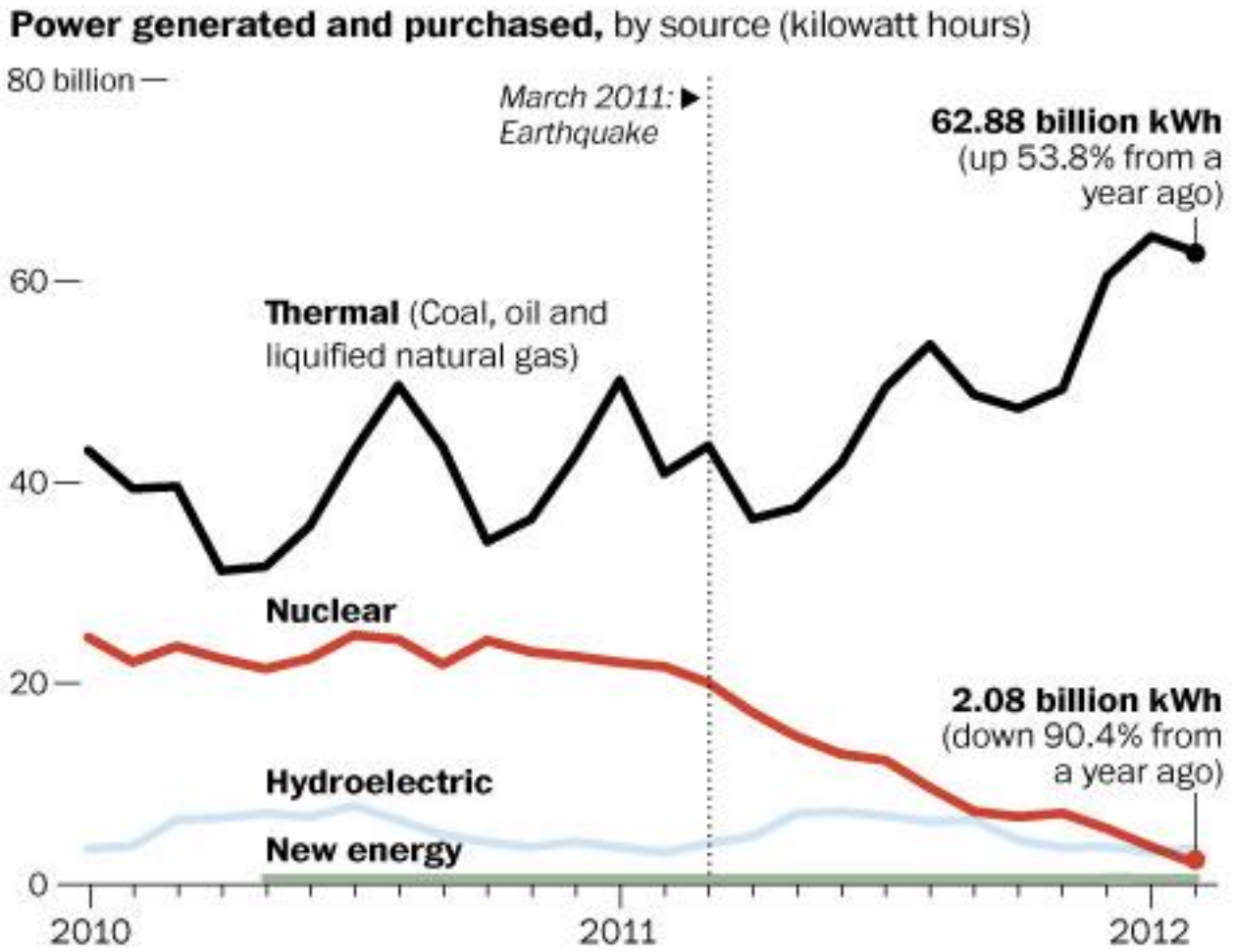

Distribution of oil resources
Distribution of gas resources

The need for energy in Japan is critical

- Nuclear power used to represent 30% of Japan's power consumption
- 27% of world LNG imported to Japan (pre-Fukushima)
- Year-on-Year (January 2011-2012) import hike of 39%
- Last, of 54, nuclear power plant closed in May 2012

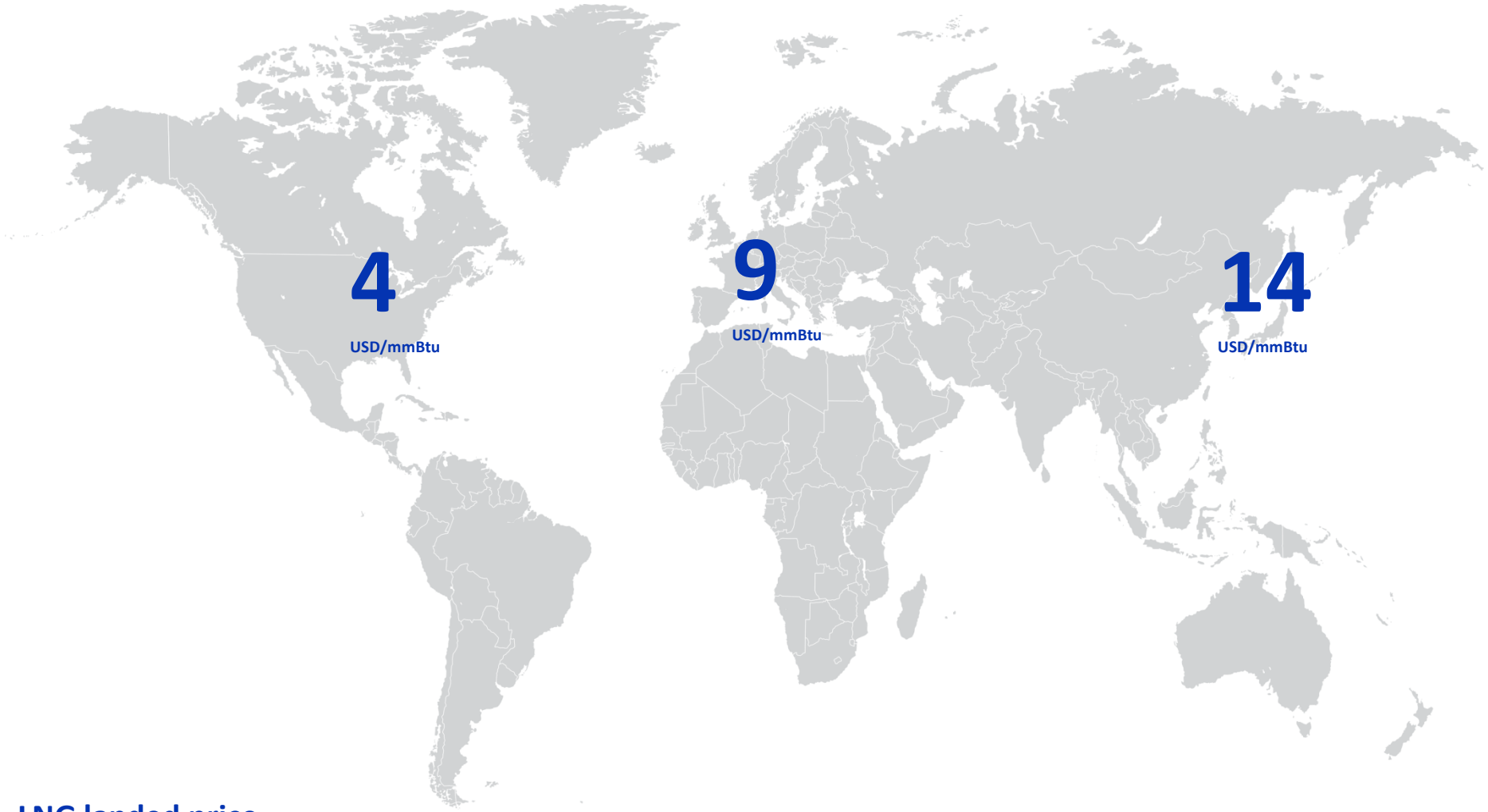
Fukushima March 2011

Japan shift in energy mix is dramatic



Source: Federation of Electric Power Companies in Japan.
The Washington Post. Published on April 7, 2012

LNG – a regionally disintegrated market



LNG landed price

Minerals in the north

- Commodity prices have increased
- Old sites become profitable
- Growth plans
- What about sea bottom minerals?

LKAB

SYDVARANGER AS

Store Norske
– VERDENS NORDLIGSTE GRUVESELSKAP

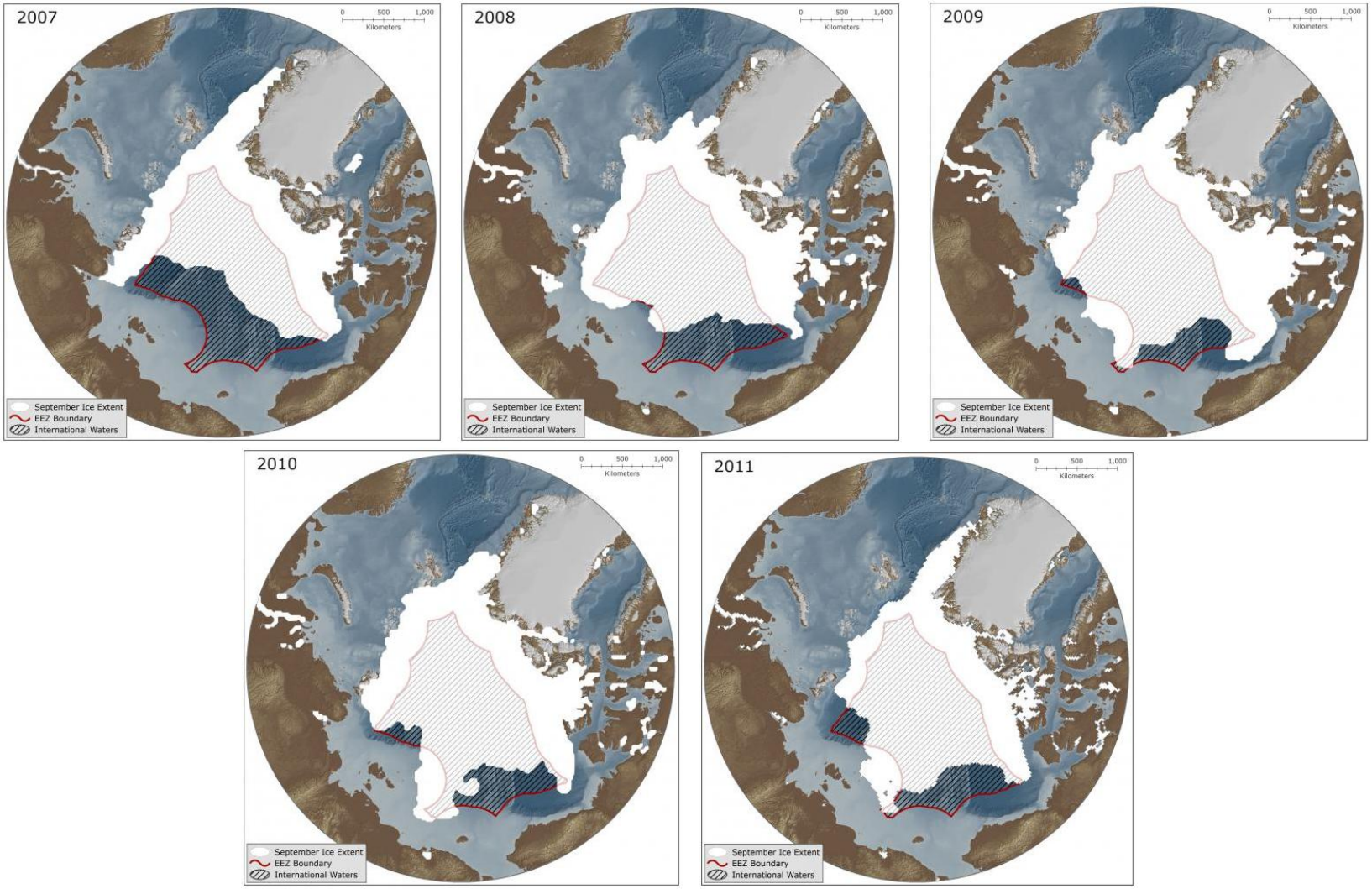
Source: http://www.nautilusminerals.com/s/Home.asp

The incentives

Why? –because it's shorter

Yokohama – Rotterdam is 40% shorter than Suez

Ice cap is melting – September ice extent



Source: http://www.oceansnorth.org/new-maps-melting-ice#

Current regulations in the Polar Region

Current regulations in Polar Water

Mandatory international conventions apply world wide:

SOLAS – Safety of Life at Sea

MARPOL – Prevention of Pollution From Ships

AFS – Anti-Fouling system

BWM – Ballast Water Management (Not yet in force)

Convention on Load Lines

STCW – Standards of Training, Certification and Watch keeping

COLREG – Preventing Collisions at Sea

Voluntary guidelines especially for polar waters:

Guidelines for ships operating in Polar waters – adopted 2009, recommended to be used from 1. January 2011 IMO doc. A 26/Res.1024

National and Regional Regulations and Agreements

- Flag states (Administration)
- Coastal state requirements (UNCLOS – 6mnds of ice)
- Classification societies
- The Antarctic Treaty Consultative meeting (ATCM)
- Arctic Council
- International and national standards and guidance

  IMO doc. DE 56/INF.2 – Listing such standards

IMO Polar Waters Actions

- Developed new regulations **prohibiting use of HFO** in Antarctic waters – entered into force in 1st August 2011.
- Working on measures to **reduce air emission**
- Extended the application of the '**Guidelines for operation in Polar water**' to cover **Antarctic** as well
- Developed **training guidance for officers** on ships operating in the polar areas
- Started the development of a mandatory safety and environment protection code for ships operating in the polar areas – **The Polar Code**
  - The goal is to have the same level of safety for persons, environment and ships as in other waters

INTERNATIONAL MARITIME ORGANIZATION

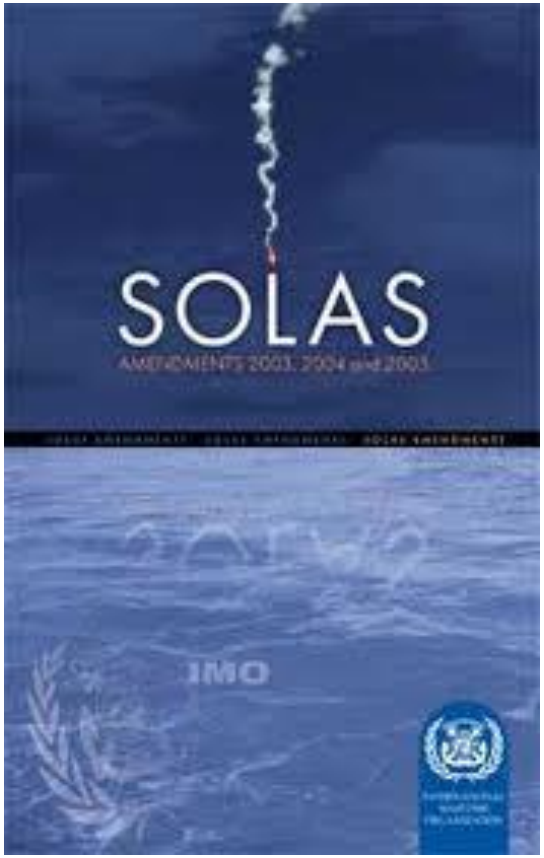
NSR requirements

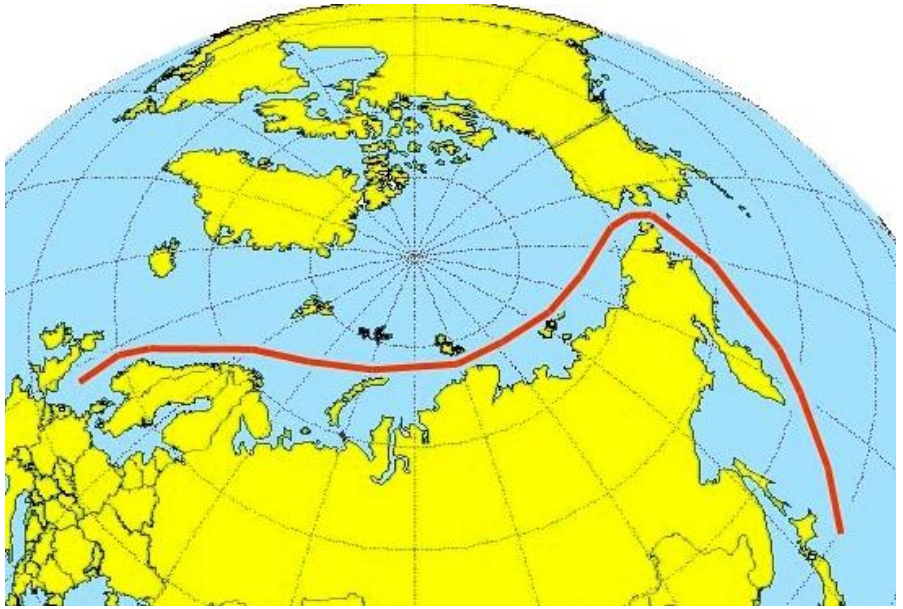
Examples of requirements

- Ice strengthening ACR4 – approximately ICE-1A
- Tank and DB arrangement
- No bulbous bow
- Towing arrangement
- Engine and propeller requirements
- Waste handling
- Ballast tank heating
- Stability
- Icing and winterization
- Navigation
- Crew

The role of Classification

International and Regional Regulations





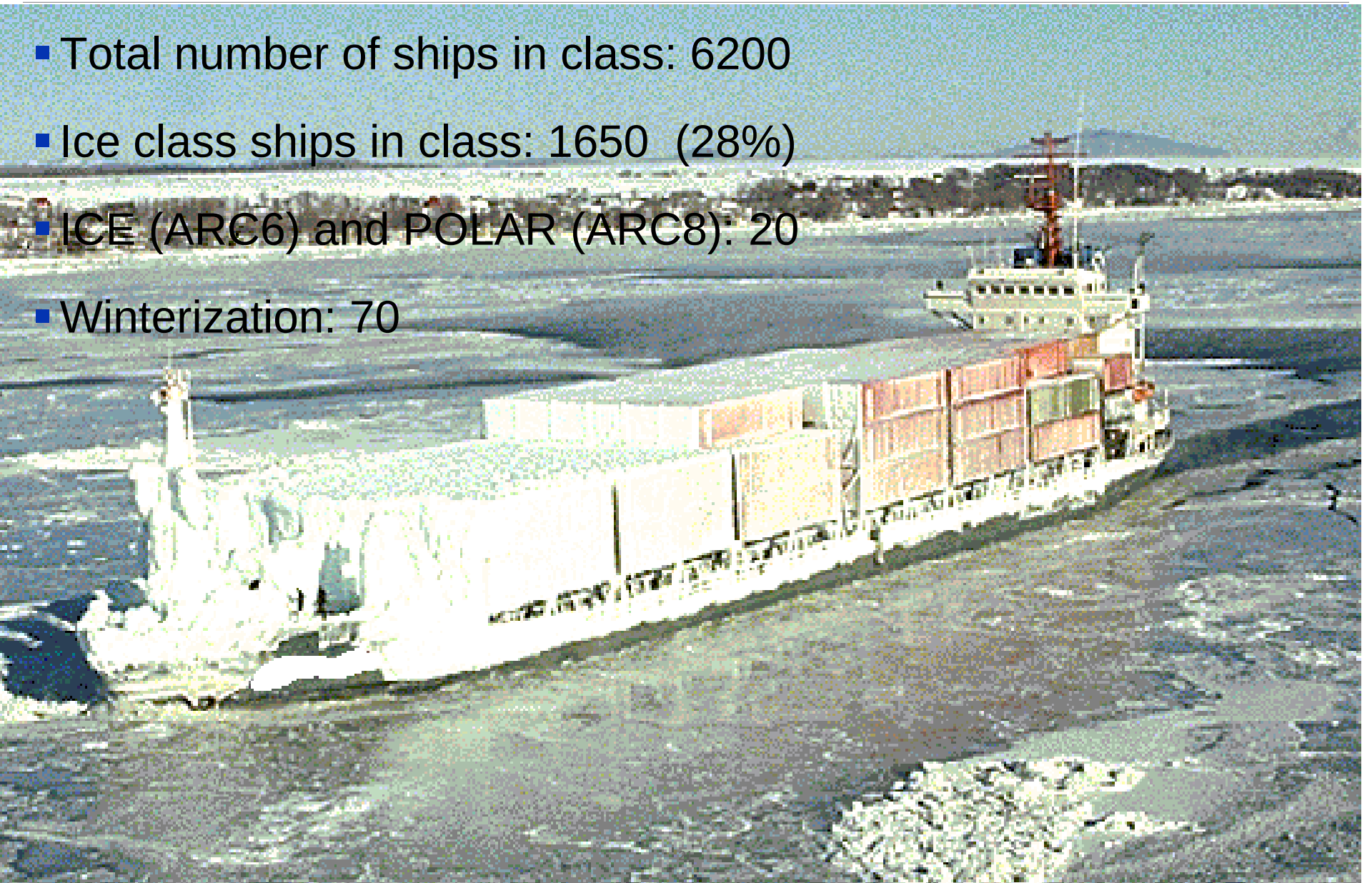
Ownership is with the Administration and Local authority – NOT the class

DNV's core competence

identify
assess
manage

risk

DNV position for cold climate

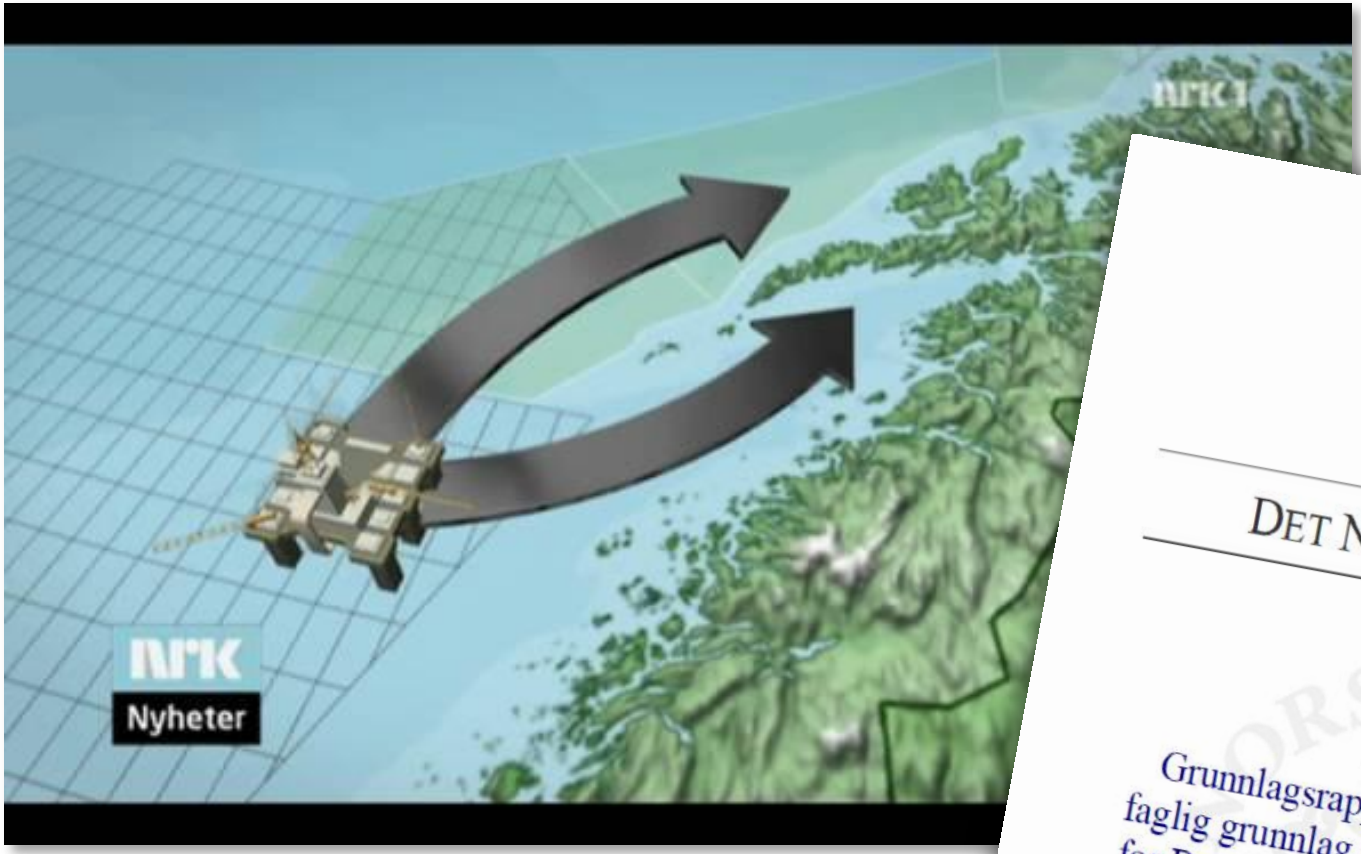


- Total number of ships in class: 6200
- Ice class ships in class: 1650 (28%)
- ICE (ARC6) and POLAR (ARC8): 20
- Winterization: 70

What is RISK?

Are we prepared for the new risk reality ?

Understanding of risk may not be straight forward



DET NORSKE VERITAS

Rapport

Grunnlagsrapport. Oppdatering av faglig grunnlag for forvaltningsplanen for Barentshavet og områdene utenfor Lofoten (HFB). Oljedriftsmodellering, OS3D.

RISK is not always easy to communicate ?

Says Veritas in a report:

«In total, the environmental risk originating from an oil spill will be reduced in the area Lofoten-Barentshavet as a consequence of oil exploration activities there.»

Does this make sense?

What is RISK?

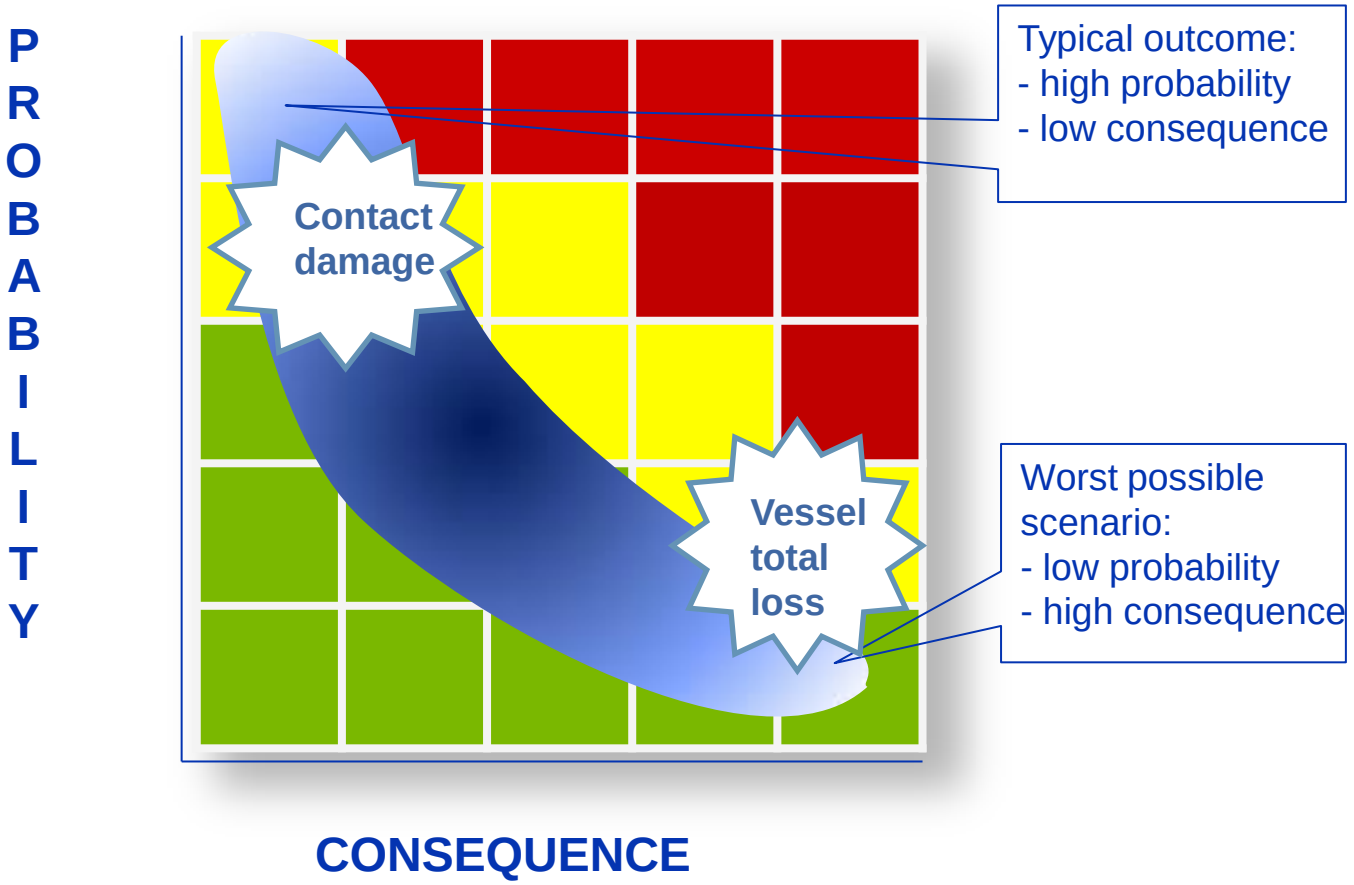
Generally: RISK is a function of probability and consequence of a possible unwanted outcome

$$R = f(P, C)$$

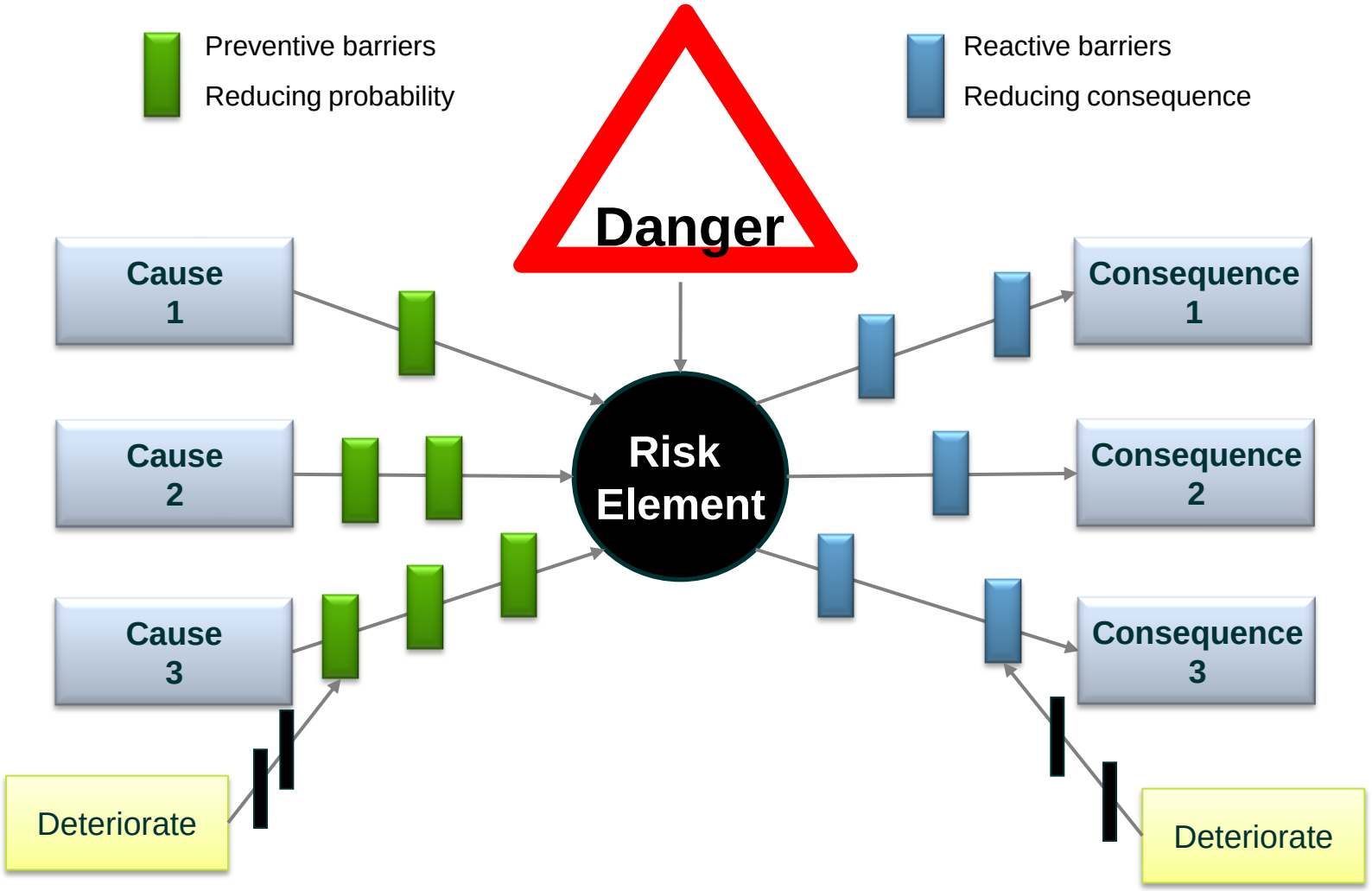
Simplified: $R \approx P \cdot C$ (Important aspects can disappear)

What does the combination of probability and consequence mean?

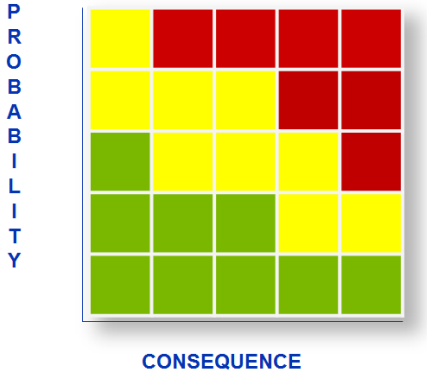
RISK = PROBABILITY X CONSEQUENCE



How to reduce the RISK? - The “bow-tie” model

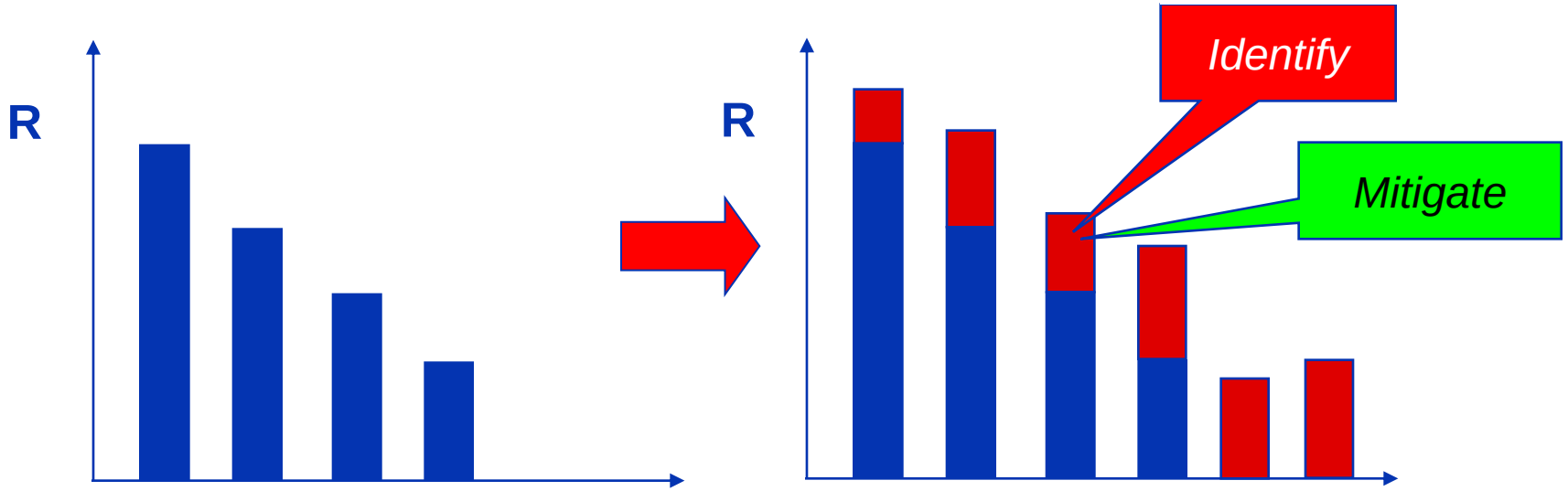


Risk = Probability x Consequence



North Sea/World wide

Arctic



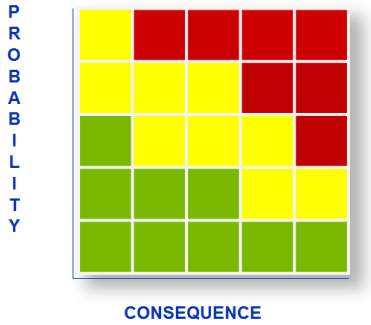
Ex. Maritime Risk Elements:

- Collision with other vessel
- Contact
- Fire/explosion
- Structural failure
- Grounding
- Collision with installation
- Collision during Ship To Ship (STS) approach
- Accidental oil spill during loading/unloading

Additional risk

What are the additional Arctic risk elements?

Arctic Risk Picture



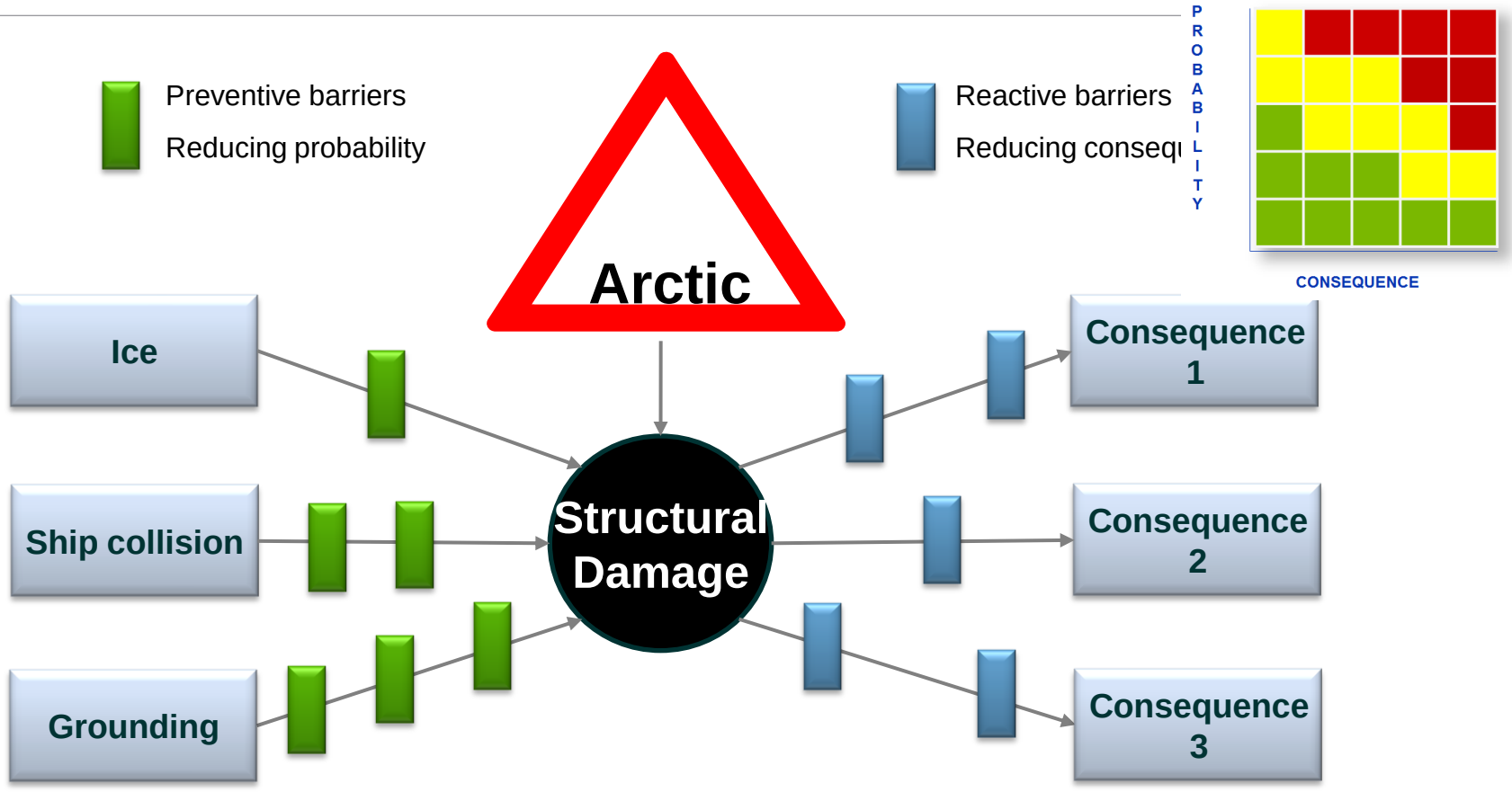
Risk = Probability x Consequence

Due to the Arctic Challenges:

- *Low Temperatures*
- *Ice*
- *Darkness*
- *Operation*
- *Remoteness*
- *Environment*

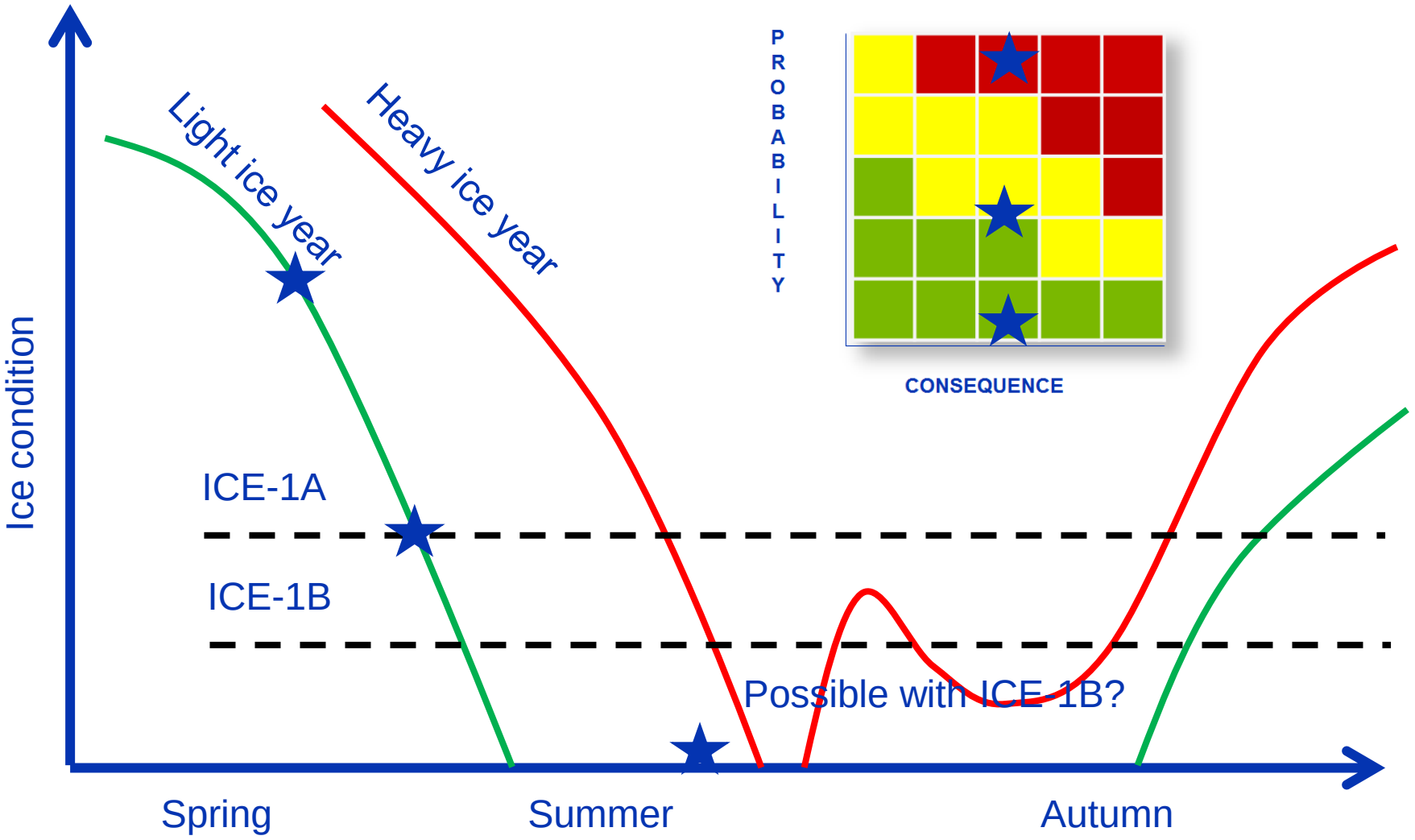
Are influencing the Risk picture (probability or consequence)

Example: Ice class ICE-1A (or ARC4)



ICE-1A is used as a preventive barrier to reduce probability for damage

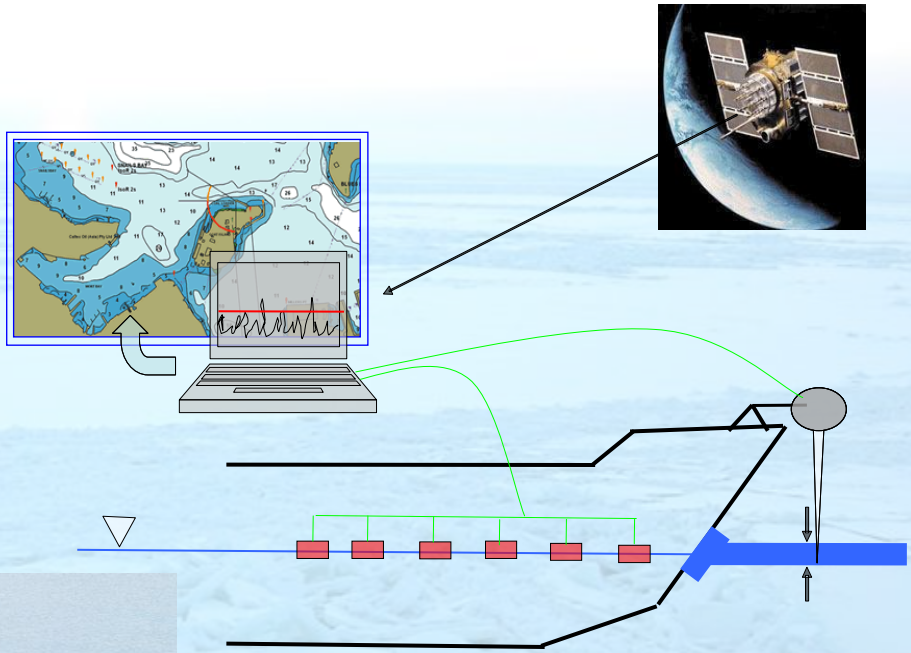
Illustration of seasonal ice condition



ICE LOAD MONITORING (ILM)

A Norwegian Research Council funded project during the period 2006-2008

Goal: *To provide the navigator with information about the actual ice load acting on the hull to avoid permanent damage.*



Partners:

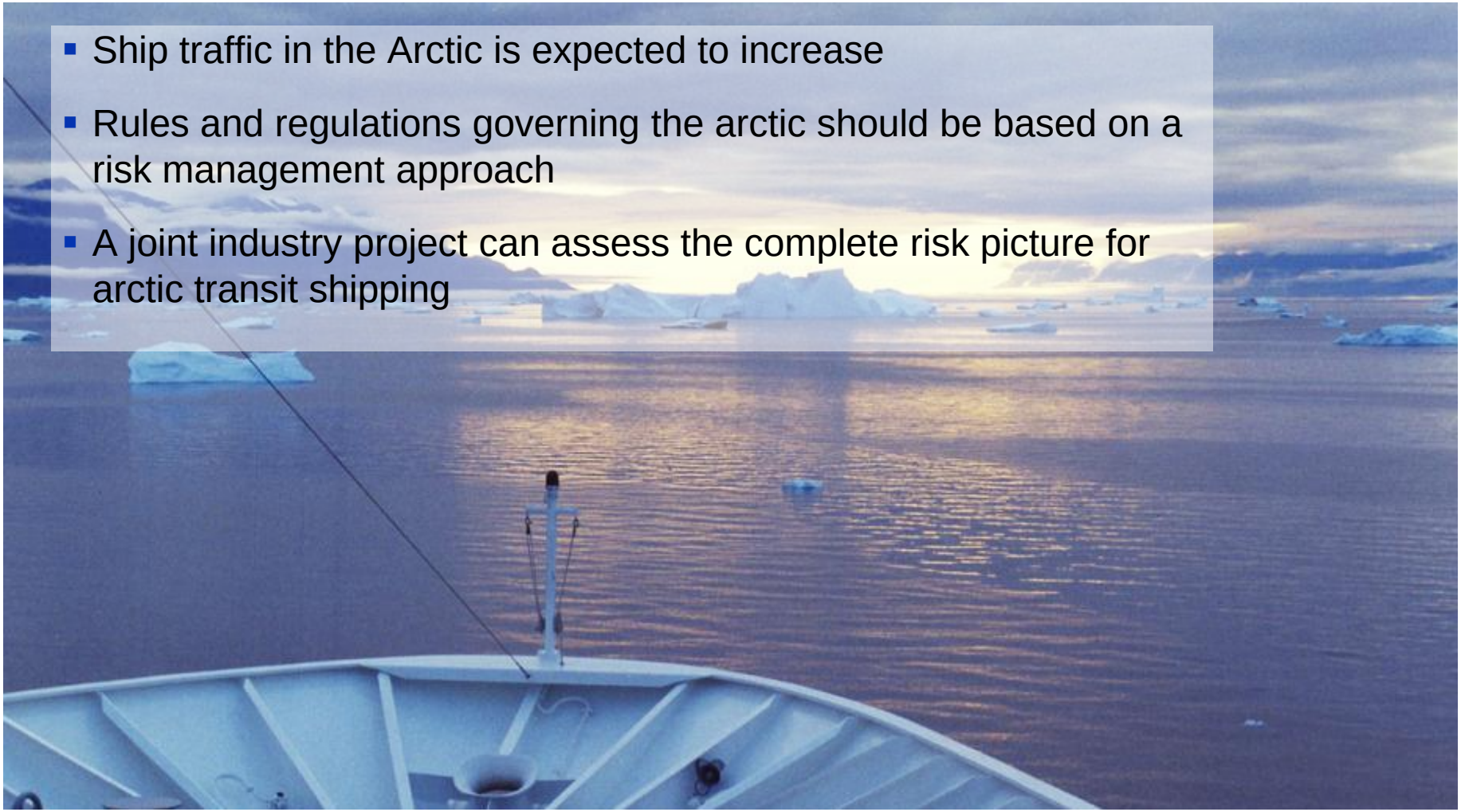
- C-map Marine Forcast
- Light Structures
- Meteorological Institute in Tromsø
- Norwegian Coastguard
- Statoil
- Teekay

What about Enterprise Risk?

And what about the Enterprise Risk?

- One company's accident can influence a whole industry
- Carnival stocks dived 18% first trading day, RCCL stocks dived 8%

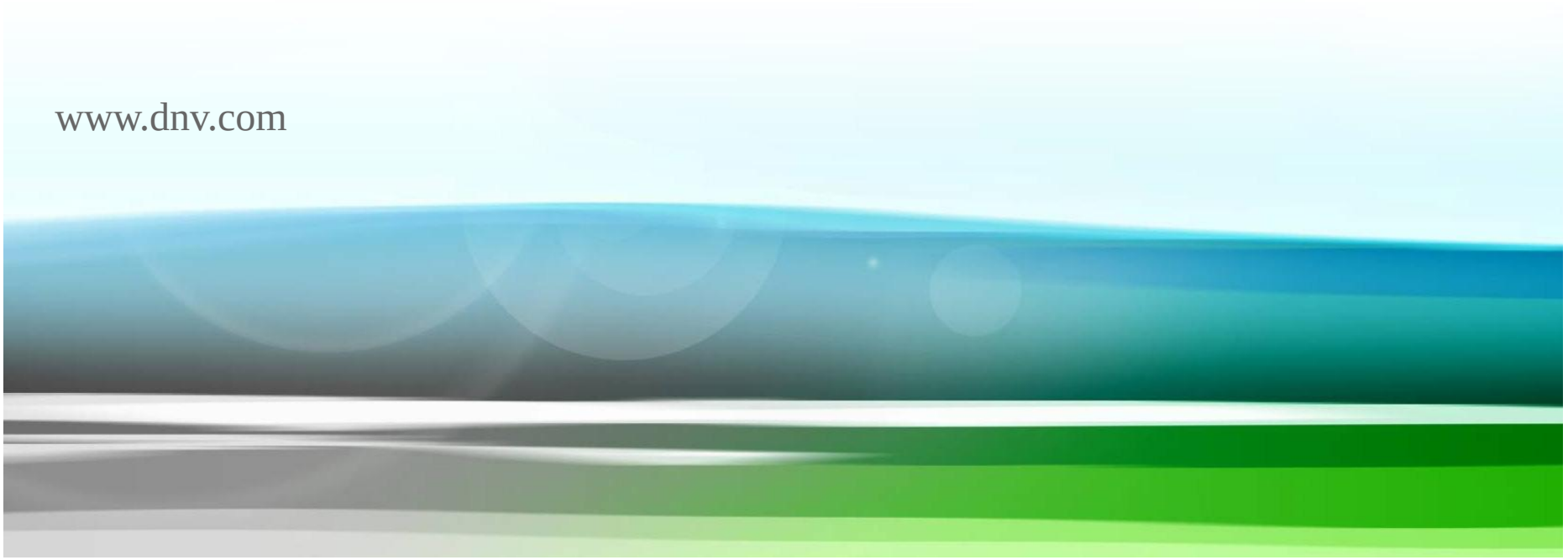
Key take away



- Ship traffic in the Arctic is expected to increase
- Rules and regulations governing the arctic should be based on a risk management approach
- A joint industry project can assess the complete risk picture for arctic transit shipping

Safeguarding life, property and the environment

www.dnv.com



MANAGING RISK