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Oil and Gas Supply in Siberia and the Russian Far East

Irkutsk, Marriott Courtyard

June 29th, 2017

outline

1. Geography & History
2. Synergy of hydrocarbon's Export and Domestic Supply
3. Measuring security: Terminology & Metrics

Implications

1. Geography & History

Framework for the North and Arctic regions:

- low density and low intensity of energy consumers (few exemptions are Norilsk, Yakutsk, Petropavlovsk-Kamchatsky, and Magadan)
- extremely high social cost of energy supply disruptions
- unaccessibility – $\frac{1}{5}$ to $\frac{1}{3}$ of the year
- lack of transport routes

Siberia & (Russian) Far East - Fed. Distr.

Major indicators:

- Permafrost – 9.3 mln sq. km (55%)
- Population 3.9 mln (2.7%)
- Energy supply – 2.9 toe/cap (54%)
- Energy self-sufficiency 48%

Petroleum – < 1%

Gas – 100%

Coal – 80%



... and Winter



Transport network

Waterways (rivers)
1.9 km per 1000 km²

Roads (permanent)
0.7 km per 1000 km²

Gas pipelines
0,6 km per 1000 km²

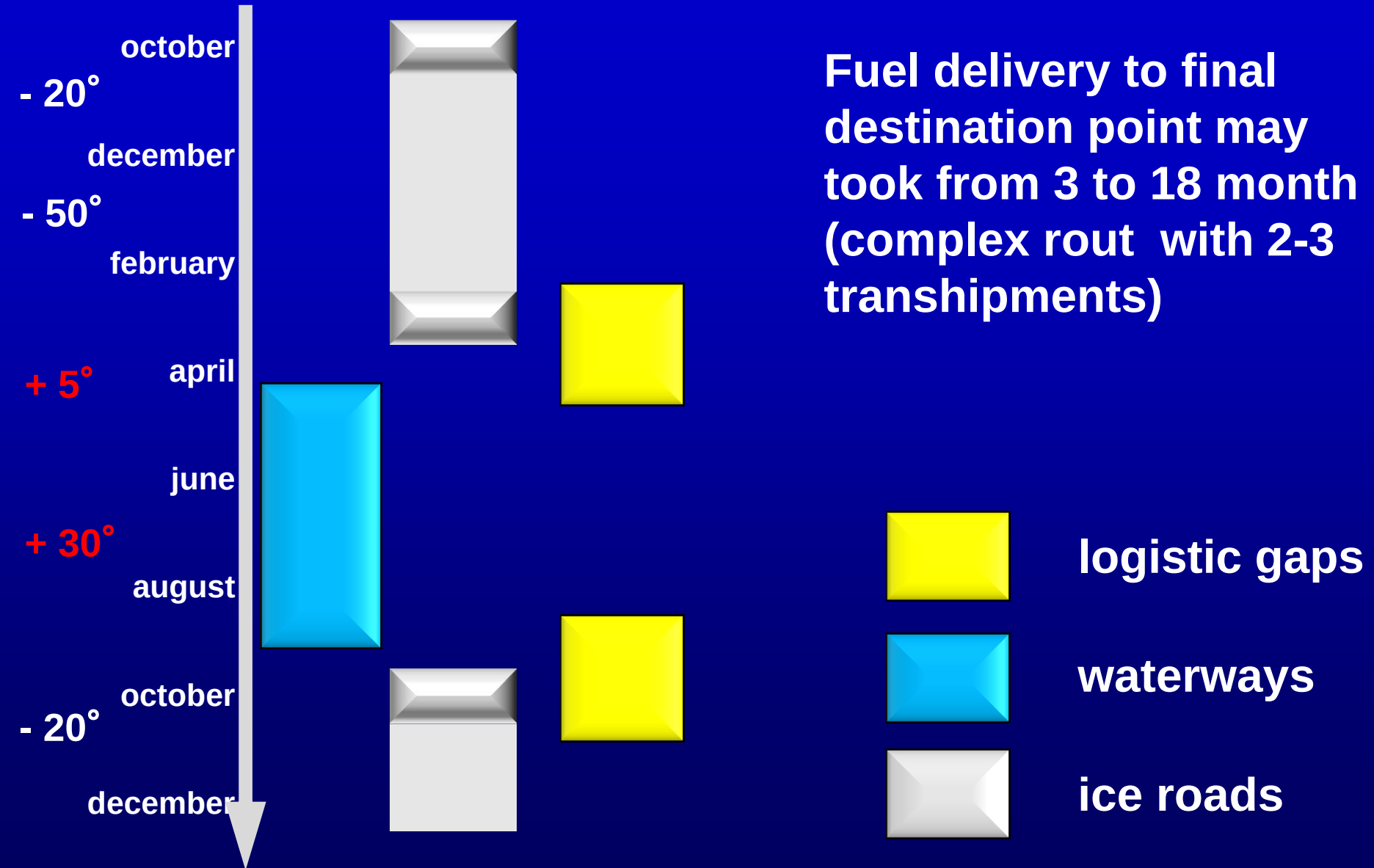
Northern Sea Route
3000 nm,
June – November +

Infrastructure and
Institutions

- ✓ Petroleum stock in logistic nodes
- ✓ Special financial mechanisms to support “Northern Delivery”
- ✓ Reserves at consumption site

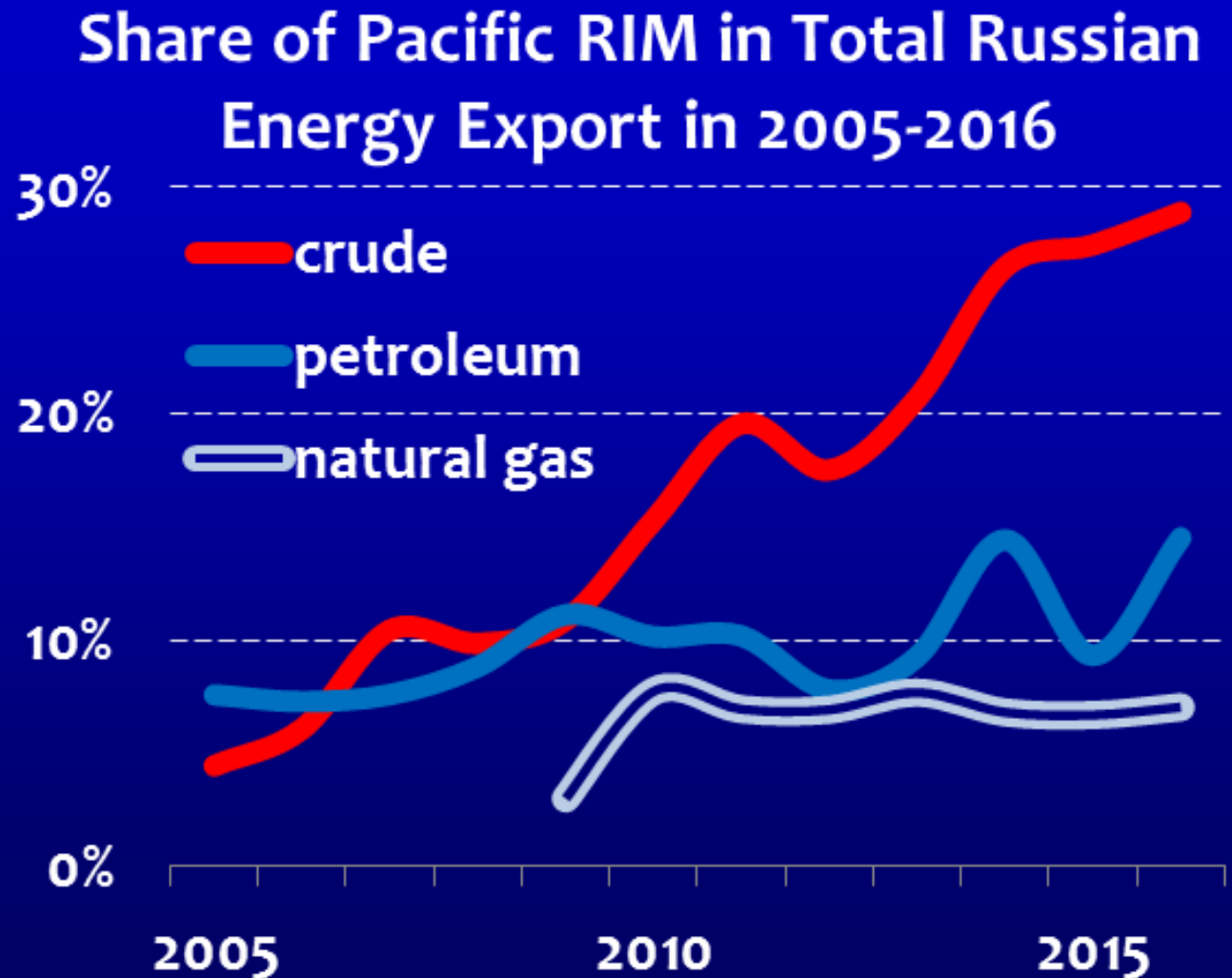


Natural Cycles and Logistic gaps



2. Synergy of Export and Domestic Supply

Rapid growth of Oil and Gas export from Russia to the Pacific markets in recent years



Oil & Gas export – Past, Present, and Future

1897-1904
(Yergin & Alekperov)

The Prize

by Daniel Yergin

“[in 1904 Standard Oil] regain the markets for American kerosene in the Far East that had formerly been lost to Russian oil”

Oil of Russia: Past, Present & Future

by Vaghit Alekperov

Russian kerosene export
Mt

	1887	1904
Europe	0,3	0,8
Asia	0,5	1,0
share of Asia	65%	54%



Soviet-era Oil & Gas Supply Infrastructure

1920-1990

1937-1960

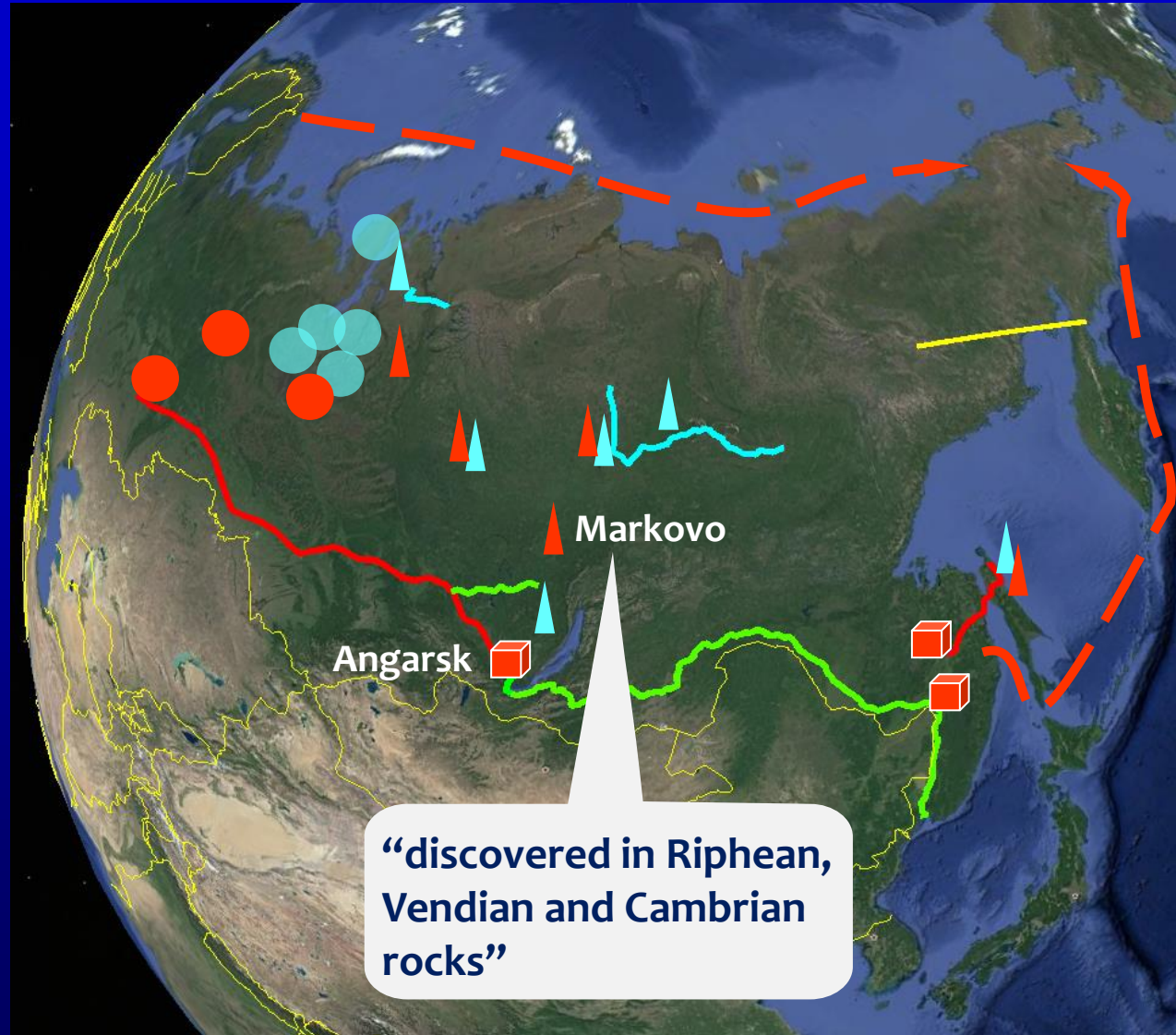
2 refinery

60th –

Oil and Gas
discoveries

+1 refinery
supplied by
pipeline from Ural
+ local gas systems

complex logistics
for petroleum
products, incl.
North Sea Route.



Reopening Asia-Pacific markets

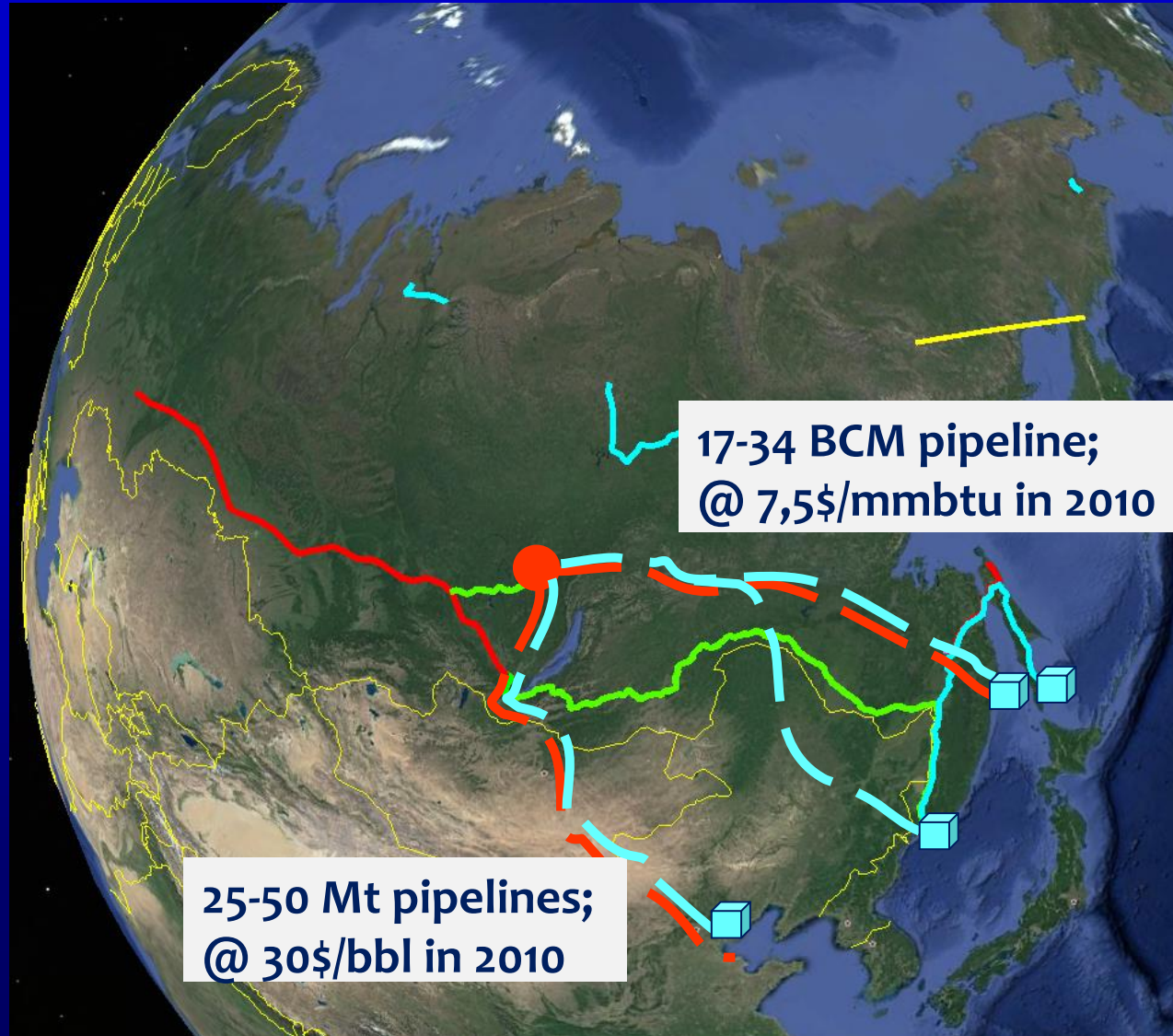
MASTER PLAN

1991-2000

**on the
development of
fuel-energy
complex of the
East Siberia and
the Russian Far
East**

RAS + IEEJ (1993-1995)

Improving energy supply within Russia while monetising Oil, Gas, Coal, and Renewables by large-scale export to Asia-Pacific



Present (after Y2000)

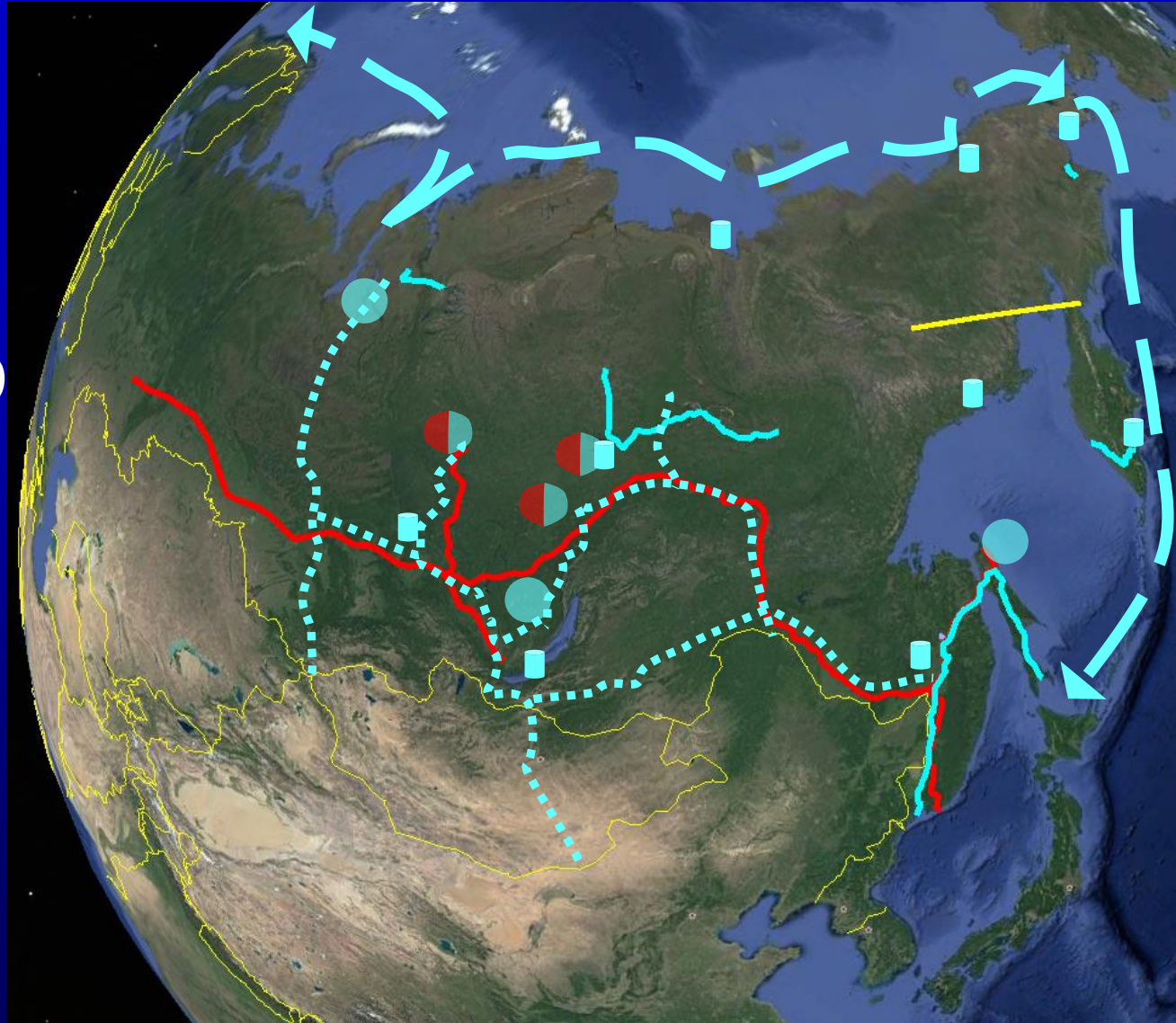
ESPO – 2004-2012
4740 km; 1,6 mb/d

LNG: 11 Mt (+45 ?)
&
Gas Pipelines (38-70 BCM)

LNG for sea and road
transport

ECA (ecological control
area for sea traffic)
are expected for Arctic.

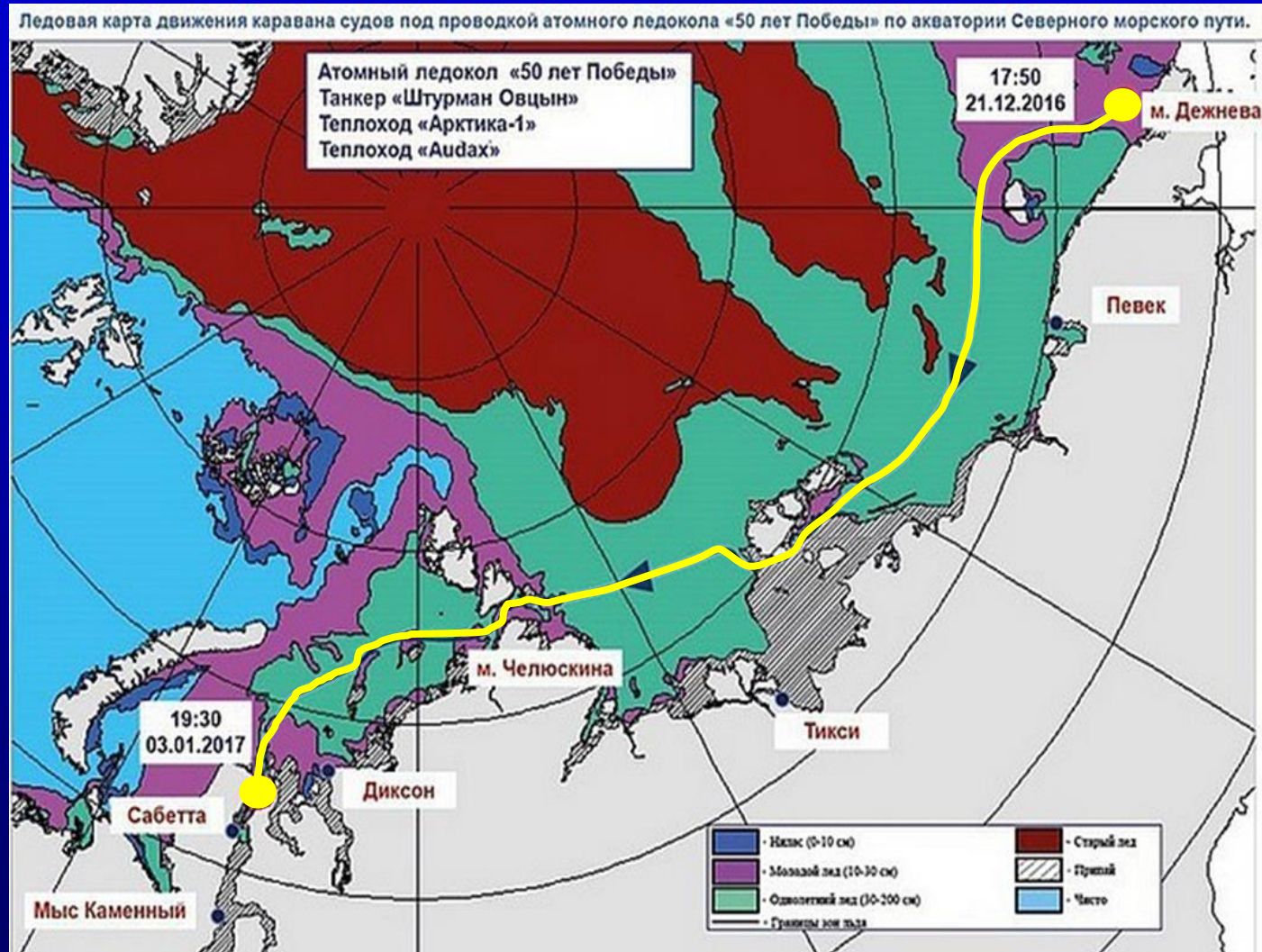
ECA for Baikal will be
appreciated.



Northern Sea Route

LNG production at Yamal peninsula **PLUS** the North Sea Route:

- tenth Mt of LNG with strong position to arbitrage Atlantic and Pacific Markets;
- Environmentally-friendly bunker fuel **PLUS** clean energy supply for Arctic regions



3. Energy Security: Terminology & Metrics

Are important within International Organisation

[Energy] Security

status

- **Reliability** *feature*
- **Survivability** *feature*
- **Safety** *feature*

+ characteristics like

*durability, resilience, endurance, recoverability,
controllability, sustainability...*

Federal level of Indicators

Energy Security of the Russian Federation: threat clusters

Domestic:

Economic and Social

The ratio of annual reserves to production growth

The share of gas in primary energy demand

Energy price Index (by energy)

Defaults at wholesale and retail markets

Investment Index (by industry)

Energy intensity Index

Self-sufficiency (by energy)

Terrorist attacks (events and damage Index)

Supply stability (by energy)

Natural and Technological

Emergency events at energy facilities

Faults within energy facilities

External

Share of Energy in total Export

Share of petroleum in total Energy export

Regional (provincial) level of Indicators

Regional Energy Security: threat clusters

Availability

of Heat & Power Generation infrastructure
and domestic supply (by energy)

Reliability of energy supply

- Natural and Technological threats

Investments and Energy Infrastructure's
renovation

Indicative analysis of Energy Security

Qualitative assessment

$$f(S_i) = \begin{cases} H, & S_i < S_i^{ПК} \\ ПК, & S_i^{ПК} \leq S_i < S_i^K \\ K, & S_i \geq S_i^K \end{cases} \quad i = 1, n$$



Indicator's weighing



Integral indicative assessment of the Energy Security status



$$Q_u = \begin{cases} H, & \sum_{i=1}^n V_i^H \geq \delta_H \\ ПК, & \sum_{i=1}^n V_i^K < \delta_K \text{ и } \sum_{i=1}^n V_i^H < \delta_H, \quad i = 1, n \\ K, & \sum_{i=1}^n V_i^K \geq \delta_K \end{cases}$$

Implications

- **Case story of the Oil and Gas infrastructure supply chain in Russian Northern and Arctic regions**
- **Catching synergy of large scale export development and domestic supply**

Infrastructure developments

- **Absence of Oil and Gas production in Eastern Russian regions (ex. Northern Sakhalin) up to 60th**
- **New logistics was established based on few refineries and local gas pipeline systems 1957 to 2009**
- **Export of Russian oil and LNG emerge after Sakhalin I and II, ESPO crude pipeline development – since 2009**
- **LNG production growth at Yamal peninsula and traffic developments along the North Sea Route will create new market opportunities both for East Asia, Pacific, and for Russia, especially for it's Northern and Arctic regions**

Oil & Gas Security

- Logistic issues and extremely high security concerns for energy supply within Northern and Arctic regions require establishing of petroleum storage and reserves in critical nodes of the transport infrastructure
- New geopolitical framework after USSR dissolution in 90th lead to emerge of the Russian energy export to the Pacific RIM
- Export infrastructure development is a pivot factor for domestic Oil and Gas security improvements in Asian regions of the Russian Federation



Thanks for your attention!