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Impacts of an ice-free Northeast Passage on LNG markets and geopolitics

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ABSTRACT

In this paper we examine the economic and geopolitical relevance of an ice-free Northeast Passage as a shipping route, with a particular view on the major LNG-supplying and LNG-consuming countries, and expected changes in LNG trade flows. Several key aspects are considered in depth, such as the developments in natural gas production in the Russian Arctic, important trends and strategies of major Asian LNG-consuming countries, and the geographical and climatic particularities of the Arctic. The analysis reveals the competitiveness of Russian LNG exports along the Northeast Passage due to Yamal LNG, which could be a game-changer for global LNG supplies. We further find that an ice-free NEP is primarily relevant for maritime bulk, and particularly LNG, shipping, and thus of great geopolitical importance and strategic interest, especially for Russia and the US on the supply side, and China, Japan, and South Korea on the demand side. The political relevance of the Arctic is becoming more lucid, because the retreating ice creates possibilities for the development of hydrocarbons but also fosters strategic and military considerations of the littoral countries.

1. Introduction

The International Energy Agency (IEA) predicts a 45% increase in global natural gas consumption by 2040, driven by industrialization and urbanization in emerging economies (IEA, 2017: 2). Traditionally, natural gas has been traded and transported via pipeline, on the basis of bilateral, over-the-counter, long-term contracts (LTCs). Development of new conventional and unconventional supplies, technological advances, supply diversification, and domestic policy factors facilitated the spread of liquefied natural gas (LNG). In 2017, the global LNG trade reached an all-time high of 293 million t, accounting for roughly 10% of the globally consumed natural gas. The growth rate of LNG supplies averaged to 6% from 2000 to 2016; indigenous production and pipeline supplies have also shown substantial growth since 2010 (IGU, 2018: 5, 7). British Petroleum (BP) forecast that LNG will substitute pipeline gas as the most frequent form of inter-regionally traded natural gas in the early 2020s (BP, 2018: 82). The major LNG market is located in Asia: Japan, China, and South Korea were responsible for 55.5% of the global LNG imports in 2017 (IGU, 2018: 11). The rapidly increasing energy demand, particularly LNG demand, of Asian countries fosters the ambitions of suppliers like Qatar, Australia, USA, and Russia for extensive, new natural gas exports, especially via LNG supplies.

The Northeast Passage (NEP) has been a subject of researchers' curiosity for centuries. In 1878/79, the Swedish explorer and mineralogist Adolf Erik Nordenskiöld successfully traversed the passage for the first time in history (Avango et al., 2014: 22). The NEP is the shortest maritime connection between Europe and Asia. Over a century after Nordenskiöld's expedition, the progressive decline of the Arctic ice is uncovering the potential of the NEP as a seasonal supplement to or even a substitute for the Suez Canal Route (SCR) (Fig. 1).

Moreover, the retreating ice is exacerbating the disputes of such countries as the United States of America, the Russian Federation,

Abbreviations: AMSA, Arctic Marine Shipping Assessment; BP, British Petroleum; CNPC, China National Petroleum Corporation; EIA, U.S. Energy Information Administration; E&P, Exploration and Production; FID, Final Investment Decision; FSU, Former Soviet Union; GECF, Gas Exporting Countries Forum; IEA, International Energy Agency; IGU, International Gas Union; IMO, International Maritime Organization; JCC, Japan Crude Cocktail; JV, Joint Venture; LNG, Liquefied Natural Gas; LTC, Long-Term Contract; METI, Ministry of Economy, Trade and Industry; MOU, Memorandum of Understanding; NEP, Northeast Passage; NSR, Northern Sea Route; NWP, Northwest Passage; OIES, Oxford Institute for Energy Studies; OPEC, Organization of the Petroleum Exporting Countries; OTC, Over-the-counter; PAME, Protection of the Arctic Marine Environment; SAR, Search and Rescue; SCR, Suez Canal Route; SIPRI, Stockholm International Peace Research Institute; SOLAS, International Convention on Safety of Life at Sea; TOCOM, Tokyo Commodity Exchange; UNCLOS, United Nations Convention on the Law of the Sea; USGS, United States Geological Survey; VAT, Value-added Tax

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Nomenclature

bcm	billion cubic meters
bn	billion
CO_2	carbon dioxide
m	meter
m^3	cubic meter
MMBtu	million British thermal units
Mtoe	million tons of oil equivalent
MTPA	million tons per annum
t	ton
°C	degree Celsius
$	U.S. dollar

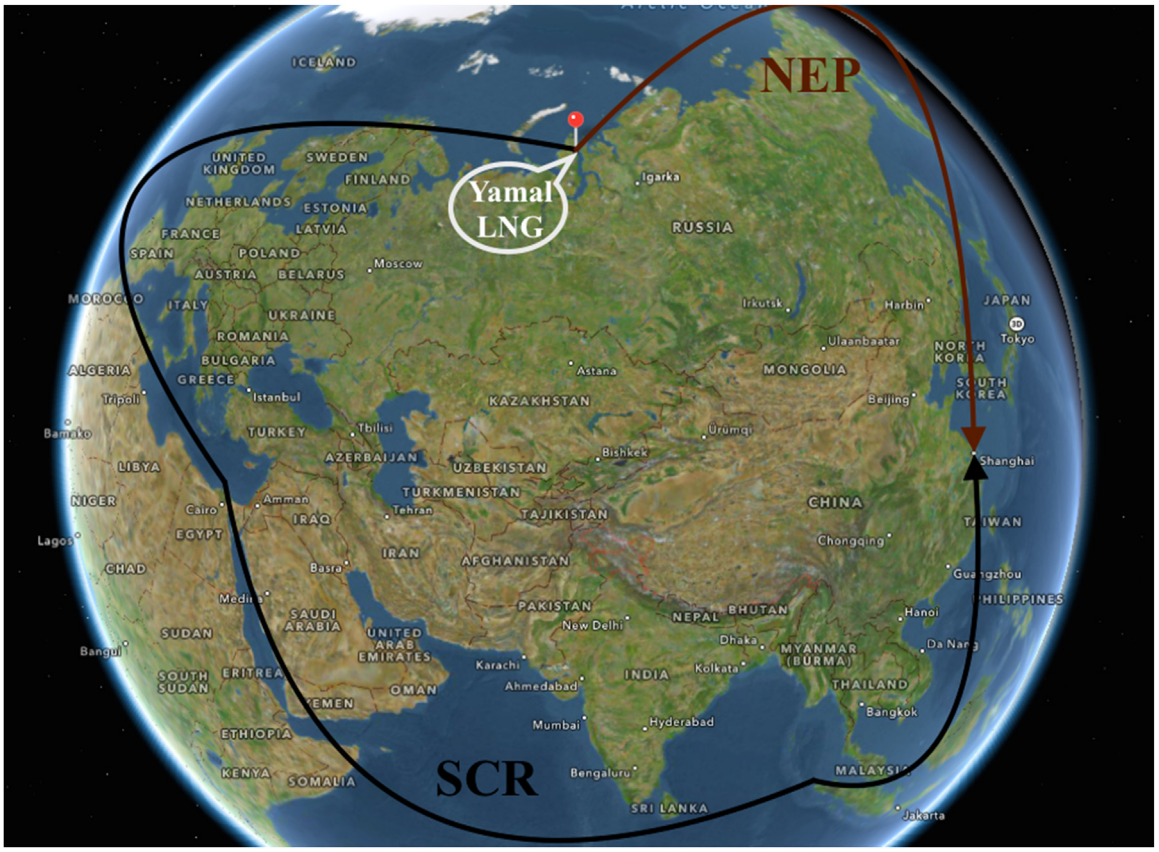

Fig. 1. Yamal LNG, the Northeast Passage (NEP), and the Suez Canal Route (SCR) Source: Own illustration, based on Google Earth (2018).

Norway, and others, concerning their claims to Arctic territories. Asian countries with massive maritime trade flows are monitoring these geographical and political developments closely. The transportation of Asian exports to Europe, as well as of commodity imports from the Russian Arctic to Asia is of great interest to countries such as Japan, China, and South Korea. In early 2018, China's State Council Information Office formulated the countries' national vision of the Arctic with regard to Arctic development of natural resources and shipping along the Northeast Passage in order to build a "Polar Silk Road" (SIPRI, 2018). Certainly, the Arctic sea route has the potential to convey the enormous Russian natural gas assets from the North of Western Siberia to European and Asian markets. Considering the challenging conditions of the present LNG market, the NEP might even become a crucial competitive advantage for Russian LNG exporters, such as Yamal LNG (Fig. 1), due to the considerable cost and time savings involved.

The emergence of a new shipping route that could greatly impact the long-distance maritime trade flows is of global economic and political relevance. Especially for Russia, it could constitute a potential game-changer, enabling extensive LNG exports not just from the Sakhalin Peninsula, but increasingly also from the huge resource base in the Yamal region. Hence, aside from low production costs, Arctic shipping along the NEP could constitute a unique competitive advantage for LNG suppliers in Russia – not just to Asia but also to Europe, where it may become the least-cost shipping route: Schach and Madlener (2018) find, in a quantitative analysis using a world gas model, that when surplus volumes are diverted to Europe after Asian demand is satisfied, it will be predominantly LNG from Yamal, rather than for example from the US, going to Europe because of the relatively short distance. In their analysis, however, they abstract from destination clauses and strategic governmental purchases and assume abundant global LNG supplies.

The aim of the present study is to examine the relevance and eligibility of the NEP for LNG shipping, based on a detailed literature review. While there is an extensive body of geographical literature, and another one on LNG markets without much geographical coverage, our paper's original contribution is to combine the two, providing an economic and geopolitical analysis of the NEP on international LNG trade and markets. Three distinct *research questions* are raised: (1) How will the LNG market be impacted by the developments on the supply and demand side? (2) To what extent is the NEP economically and politically relevant for LNG-producing and LNG-consuming states? (3) What are the impacts of an ice-free NEP on LNG markets and geopolitics?

The remainder of the paper is organized as follows. Section 2 analyzes the developments and trends in LNG production outside of Russia, inside of Russia, and in particular in the Russian Arctic. Section 3