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NEAEF 14th International Conference
Shenyang, September 20, 2005

THE NEW NATURAL GAS-BASED TECHNOLOGIES IN THE CONTEXT OF NORTHEAST ASIA

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All economies, including those in Europe and East Asia, are now facing the linked challenges of energy security, rising energy prices and climate change. These challenges all point in the same direction: the need for an increased emphasis on energy efficiency and on the de-carbonization of energy sources. Achieving these goals, in a way that enhances growth and competitiveness, will require (1) the development and use of the most cost effective policy mechanisms, and (2) a coordinated international policy framework.

Improving energy efficiency in Russia should be seen as an opportunity to improve the productivity of the economy and of individual businesses. Innovation can create new markets and increase competitiveness through greater resource efficiency and new investment opportunities. Governments' role is to provide the effective policy framework and remove barriers to encourage the development and commercialization of new eco-efficient technologies and products.

In this context, the policy and investment decision taken in Russia with regard not only the future of its oil and gas industries, but also export-oriented natural gas projects, electric power generation and the massive application of technologies that improve energy efficiency could have significant regional and even global implications. This is the approach shared by the United States and European Union in their policy and energy dialogues with Russia. On both these fronts, Russia is engaged in intensive professional exchanges, as both the U.S. and EU cultivate Russia as their strategic source of energy supply, natural gas in particular, for decades to come.

For example, in the framework of energy dialogue with EU, more than 100 experts from Russian and European companies and governments participate on a regular basis in the working-level discussions on investment, infrastructure development, trade and energy efficiency, preparing practical recommendations for Moscow and Brussels. Moreover, on October 3, 2005, the first meeting of the Standing Partnership Council on Energy took place in London. On the part of the U.S., a number of high-level professional meetings were organized to discuss prospects for natural gas and LNG technology in view of the anticipated demand in North America.

Despite Russia's drive towards diversifying its exports for oil and gas in favor of Asia-Pacific markets, the political influence and practical value of these bonds is difficult to overestimate. What could be highly desirable for Japan and Russia, as well as other economies of Northeast Asia is to look at these models and find ways to make the

subregion they share a part of the global energy agenda and innovation in the energy sector.

Natural gas and its future in the context of energy supply in the subregion could represent one such area for innovation. The LNG (liquefied natural gas) industry is about 40 years old. It is still relatively new and regionalized in terms of LNG consumption. At the same time, this is very dynamic sector, which is expanding faster than any other sector of the international oil and gas industry. The economies of Northeast Asia, including Japan, the Republic of Korea and Taiwan were behind the development of this industry from its inception, serving as principles importers of LNG. In 2002, according to Energy Information Administration, 12 nations shipped 113 million metric tons of LNG. Japan received two-thirds of global LNG imports in 1990 and 48% in 2002.

LNG projects are massive and expensive and traditionally financed based on long-term purchase contracts. LNG is costly to produce, but advances in technology are reducing the costs associated with the liquefaction and re-gasification. Over the last two decades, liquefaction costs have declined by between 35% to 50%, while the cost of building an LNG tanker has fallen by about 45%. Re-gasification costs have also dropped. According to projections, the world liquefaction capacity could reach 200 Mt by 2007 and 300 Mt by 2012, with the growing number of suppliers and importers.

In addition to traditional LNG exporters such as Indonesia and Algeria, Russia, Norway and Egypt are constructing liquefaction plants. The number of importers is also increasing. The United Kingdom, India and China are currently building their first re-gasification facilities, and the Dominican Republic and Portugal opened terminals. About 40 new LNG projects have been proposed in North America. LNG currently supplies about 2% of U.S. gas consumption, but could take a 25% to 30% share of the gas market by 2020.

LNG is becoming global energy industry. In June 2003, Federal Reserve Chairman Alan Greenspan told the U.S. Congress that "… if North American natural gas markets are to function with the flexibility exhibited by oil, unlimited access to the vast world reserves of gas is required. ... Access to world natural gas supplies will require a major expansion of LNG terminal import capacity."

The most recent METI publication “FY 2006 Economic and Industrial Policy: Key Points” refers to the set of issues called “Securing stable energy supply by strengthening fuel strategy.”[1] In this document, important measures were identified, including the following:

- independent development of oil and natural gas in such strategic areas as Russia
- diversification of supply sources
- protection of Japanese mining rights in the East China Sea and other areas
- strengthening Japan’s relationship with oil and gas supplier nations

[1] Available at: http://www.meti.go.jp/english/policy/FY2006keypoints.pdf

- promotion of natural gas-related research and development.[2]

To fulfill these goals, promoting natural gas imports from Eastern Russia (Sakhalin) a realistic transportation option must be found. Considering that a natural gas pipeline project would be difficult to realize any time soon, as well as high and increasing cost of LNG, potential importers of gas in Japan can explore a compressed natural gas (CNG) transportation option.

The CHG carriers serve as transport and storage vehicles, discharging their cargo directly into the land based gas grid via both offshore and onshore terminals thus avoiding costly liquefaction, re-gasification and storage. Only a few years ago, experts would comment on the prospects of CNG in somewhat skeptical way: too much metal and too little gas to move. Technologies, however, were improving rapidly.

The new type of ships (VOTRANS[3] and PNG[4] types) are much lighter in weight, making possible a large storage volume up to 34 million cubic meters of gas. For distances of 2,500 nautical miles or less, this technology should be very competitive both vis-à-vis pipeline gas and LNG. This reduces investment in infrastructure and offers greater flexibility. The storage could be located both onshore (underground) and offshore. Moreover, stranded gas could be used for the project.

An appropriate and coordination attention to these opportunities promises significant benefits and could help launch a new industry in a similar way the LNG business started 35-40 years ago, being focused for a significant period of time on the markets of Northeast Asia. To prosper nationally, compete globally and feel more confident in terms of supply security the economies of Northeast Asia should work together, pioneering new industries and new technologies in the energy sector.

[2] For development of the GTL and DME technologies, as well as other fuel sources: JPY 14 billion were allocated. On the other hand, the support measures for increased demand for natural gas accounted for another JPY 14 billion. These amounts are relatively modest, if compared with funding allocated for the effective management of oil reserves and the national petroleum stockpile (JPY 225 billion). In addition, METI intends promote the environment-friendly and efficient use of natural gas.

[3] Volume Optimized Transport (VOTRANS) technology includes cooling natural gas in the range of conventional temperatures (minus 30 degrees Celsius) and the compression.

[4] Pressurized Natural Gas (PNG) technology does not require cooling, only compression.