

International Energy Cooperation in Northeast Asia: Problems of Development

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Abstract — The aim of this paper is to confirm the viability and present a methodological approach to the research into the multilateral international energy cooperation in Northeast Asia (NEA). It seems to be important for the methodology to be validated after ten years since the first version of this approach has been applied. The scope of the study includes the gradual formation of interstate energy markets in the region, active adoption of innovative energy technologies, as well as the further expansion of renewable and nuclear energy in the NEA countries. The aim of this study is to update the methodology by means of analysis of the multilateral international energy cooperation activity in Northeast Asia. The main objective of the study is to analyze the mechanisms of multilateral international energy cooperation, given the institutional changes that have occurred in the energy sectors of the NEA countries since the early 2010s.

Index Terms — North-East Asian countries, development of international energy cooperation, energy infrastructure, energy policy.

I. INTRODUCTION

The region of Northeast Asia (NEA), both for now and for the long time ahead, is of particular importance to Russia as the world's largest energy exporter. International energy initiatives (IEI) play an important role in the development of energy cooperation in the Northeast Asian region. This is a tool that allows states and representatives

of the energy business to deepen multilateral inter-state relations, coordinate the modernization and construction of energy infrastructure. The study of experience of IEI implementation is also relevant for the assessment of priority trends in the development of energy sector in the NEA countries. The traditional bilateral format of energy cooperation is still the main one, and will remain so in the near future. However, multilateral energy cooperation has already proved its effectiveness and has good long-term prospects. Based on the findings of the international project "Understanding International Energy Initiatives" implemented by the international team headed by Sergey Popov at the APEC Energy Research Centre (APERC) in 2006-2008, two analytical reports were published. The purpose of these reports was to develop and introduce a methodology for integrated assessment of the IEI implementation in the Asia-Pacific region [1, 2].

The first report includes the definition, classification and summary of the main IEI involving three or more APEC economies. The result of this work was the classification of goals and methods, as well as an analysis of the relationship of international energy cooperation actors throughout the IEI lifecycle. A brief overview of this report is presented in [3]. The purpose of the second report was to assess the effectiveness of the IEI institute and to identify the promising areas for the multilateral cooperation in the energy sectors on the basis of the recommendations made in the first report [2].

The insights obtained by APERC in 2008 were applied to Northeast Asian countries, which is a subject of the research at issue. The list of initiatives under consideration has been changed compared to the APERC second report (Table 1). The initiative of the International Forum "Generation IV" was removed from the initial list due to the lack of reliable information about its activities over the past 10 years. There is a need to update the previous evaluation of the selected IEI, due to a number of changes that have occurred since the beginning of the so-called "shale revolution" in the United States (2007) and the financial crisis of 2008. The main ones are: a) strengthening of integration trends

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in the power and gas industry; b) significant changes in the structure of national and international energy markets in the NEA region in accordance to the energy transition paradigm.

II. DEVELOPMENT OF A METHODOLOGY FOR THE ANALYSIS OF INTERNATIONAL ENERGY INITIATIVES

Within the framework of the updated analysis, changes in the composition of the IEI participants were considered; goals, methods and mechanisms of cooperation were confirmed or updated, and the results of the IEI activities achieved (or not achieved) as of 2018 were presented. Thus, the analysis was aimed at learning lessons from the real experience of international energy initiatives in three key areas [3, 4]:

- The role of the IEI participants (including the preservation or change of their weights) in achieving the goals of international energy initiatives;
- The importance of determining the uniqueness and relevance of the IEI mission;
- Requirements that contribute to the effective practical implementation of IEI.

The selected IEI are considered in terms of the extent to which the external factors influence the initiatives themselves, and in terms of the reverse impact of the international energy initiatives on their framework. The two-way relationship includes, for example, government institutions, technical and financial regulatory mechanisms, economic incentives, environmental issues, etc. It should be clarified that the international energy initiative evolves from its very inception, so the mutability is its inherited feature.

In order to confirm the applicability of the methodology developed in the abovementioned APEC publications, the activity of the selected IEI since 2009 has been analyzed, and their stakeholders' commitment to the original goals of cooperation has been analyzed.

The refinement of the research methodology suggests the use of quantitative indicators to assess the viability of the international energy initiatives. The indicators of a

quantitative assessment are determined by the objectives of a specific initiative, and refer to the type of criteria that help to characterize the intensity of initiative's development.

1. Length of a constructed pipeline (for TAGP aimed at building the regional gas supply system);
2. Frequency of working conferences and periodicity of research reports (for NAGPF, designed to prepare governments and businesses of NEA countries for the establishment of a regional gas system; for INPRO, conducting similar work on a global scale with regard to nuclear technologies);
3. The number and status of participants (involved in the development of legal institutions within the framework of the Energy Charter Treaty).

However, the quantitative assessment cannot be considered as an indicator of the initiative's effectiveness or ineffectiveness. It is a good auxiliary tool that works together with all the rest evaluation mechanisms. It is worth noting that a comprehensive quantitative assessment of the IEI is beyond the scope of this study. The circumstances and objectives of the initiatives lifecycle are so varied that the assessment in terms of success/failure does not make it possible to grasp the full value of the lessons learned from the IEI experience analysis.

It is more important to understand the interaction of IEI mechanisms and external factors, which are formed not only from economic, technological, social and environmental prerequisites, but also stem from the general geopolitical situation in the given region. Below is a brief analysis of the four initiatives that was conducted in accordance with the updated methodological approach.

III. TRANS-ASEAN GAS PIPELINE (TAGP)

The mission of this initiative is to enhance energy security by natural gas supplies through international pipeline network in the ASEAN region. It is supposed that the integration of the existing national gas supply systems and bilateral international gas pipelines into a single united regional gas transportation network will create the environment for international gas trading [2].

Table I List of IEI selected for analysis of their effectiveness.

Abbreviation	Name	Method of realizing	Northeast Asian countries	Dates
TAGP	The project of gas pipelines system construction in ASEAN countries	Building of energy infrastructure	None, China in prospect	1988 – present
NAGPF	North-East Asian Gas and Pipeline Forum	Joint scientific research on the efficiency of energy infrastructure (mainly the gas transportation) development	Russia, China, Japan, Republic of Korea, Mongolia	1995 – present
INPRO	International Project on Innovative Nuclear Reactors and Fuel Cycles	Development and promotion of the methodology for assessing the effectiveness of innovative nuclear energy technologies	Russia, China, Japan, Republic of Korea	2000 – present
ECT	Energy Charter Treaty Organization	Creation of the international legal system for unification of business rules in the energy sector	Mongolia, Japan	1990 – present

Sources [1, 2]

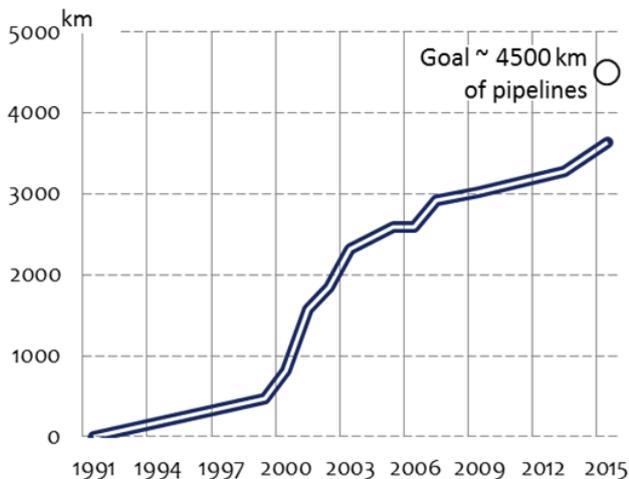


Fig. 1. Total length of the pipelines built under the TAGP project.

Provided the mission is accomplished, the importing countries will get an opportunity to lower the dependence on crude oil imports from Persian Gulf as well as to minimize CO₂ emissions by switching to gas. The exporters, in their turn, can open new markets and become more competitive with the suppliers from outside the ASEAN region.

The TAGP project was born in ASCOPE (The ASEAN Council of Petroleum) under the aegis of all the 10 ASEAN countries at the end of the 1980s. The national oil companies or the authorities in charge of petroleum issues represent ASEAN member countries in ASCOPE. The IEI's annual budget is about \$7 billion; the main investors are national oil and gas companies, which are usually monopolies in the domestic markets. The role of private energy business is limited to the participation in forums and workshops [5].

Natural gas can be transported through pipelines or by railway, road and sea in the form of LNG (liquefied natural gas). When the TAGP project started, LNG was less competitive than pipeline gas. However, technology-driven reductions in LNG production and transportation costs led to the significant changes in the project. Today 4 LNG regasification facilities are in operation, 25 regasification facilities are planned to be built in the region.

Great progress has been achieved for the three decades of the IEI's life. The first 5 km Singapore – Malaysia pipeline was built in 1991. By the April of 2015, 13 pipelines with the total length of 3.6 thousand km from the planned 4.5



Fig. 2. Indicators of NAGPF activity in 1995-2017.

thousand km have already been established. The further integration of the bilateral pipeline connections into a single gas transportation network requires a coordinated policy from the participants to develop uniform technological standards, legal regimes and pricing mechanisms [5]. The dominance of the national monopolies in the domestic markets and limited third-party access to the infrastructure discourages private investments and makes the project financing dependable on the interests of several large players.

The IEI can be considered as successful. The main reason for this is the existence of the sufficient interest from ASEAN countries in establishing a regional gas market. Although the length of the pipelines does not provide a comprehensive judgment on the level of IEI's success, it demonstrates that the IEI still exists, and it is evolving. The analysis of the TAGP initiative shows that such factors as institutional frameworks, the level of domestic markets development and geopolitical environment should be taken into account. Further development of TAGP largely depends on the rates and the results of the gas market reforms aimed at increasing competition and liberalizing the markets in many ASEAN economies.

IV. NORTHEAST ASIAN NATURAL GAS & PIPELINE FORUM (NAGPF)

After the USSR dissolution, the geopolitical environment was changed, and the interest of Japan, Korea and China in the import of Russian and the other former USSR countries' gas started to rise again. The establishment of a gas pipeline network in Northeastern Asia, which will connect large production centers with consumers, will support economic and social development and enhance energy security. NAGPF was created as a platform to discuss the plans and promote the establishment of gas transportation system in the Northeast Asian region.

NAGPF mechanisms include organizing the annual International Conferences, conducting collaborative R&D in order to facilitate discussions on barriers and problems facing the international natural gas pipeline development in the Northeast Asian region. This approach provides policy recommendations on natural gas development agreed by the member countries to international organizations and governments [2].

Since 1995, NAGPF has conducted regular conferences devoted to the gas supply and gas infrastructure development in the NEA region. The organizers are NAGPF "ordinary" and "sustaining" members. Ordinary members include the Asia Gas & Pipeline Cooperation Research Centre of China (AGPRCC), Mineral Resources and Petroleum Authority of Mongolia (MRPAM), Korea Pan-Asian Natural Gas & Pipeline Association (KPGA), Asian Pipeline Research Society of Japan (APRSJ), and the Asian Pipeline Research Society of the Russian Federation (ROSASIAGAS). Sustaining membership is freely open to any private organization [6]. NAGPF is

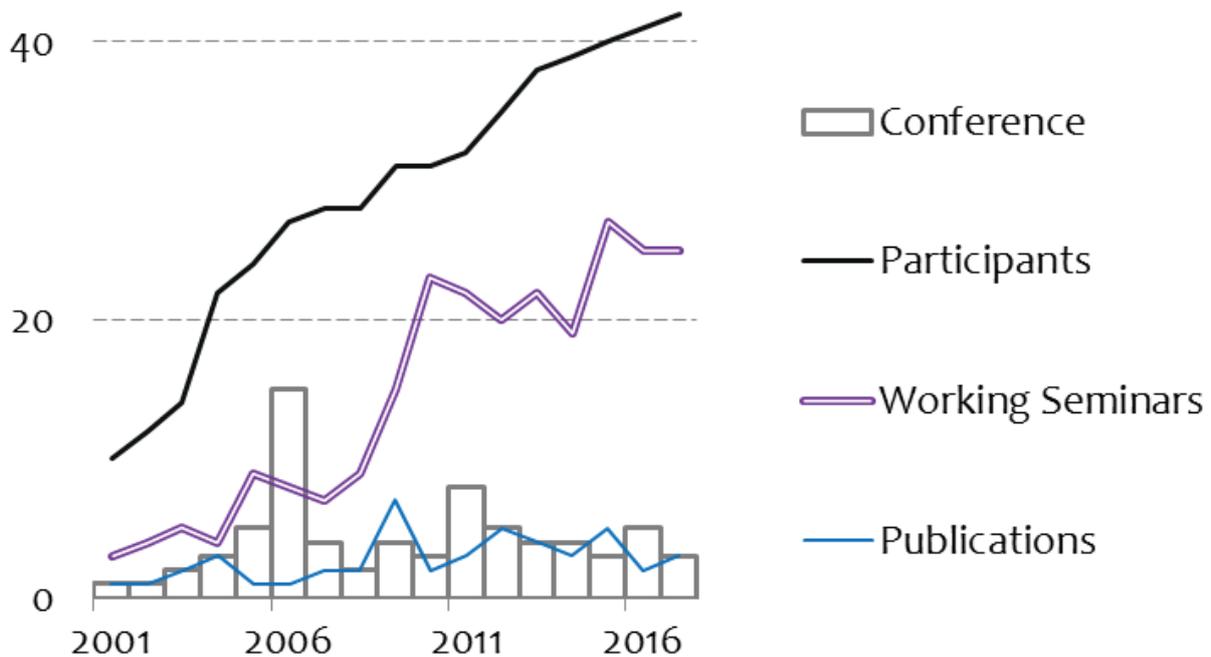


Fig. 3. INPRO activity indicators in 2001-2017

financed by membership fees; sponsors are attracted to organize conferences.

R&D projects conducted by NAGPF allow business to evaluate the opportunities of the NEA gas market development. Nevertheless, the dominance of state-owned companies in the domestic markets (Japan is an exception) and the lack of the institutes of international trade when applied to the continuous and coherent energy transportation systems (which are pipelines and power transmission lines) restrict private investments. During the period of 1995-2018, sixteen International Conferences were organized, five R&D projects were conducted. The latest R&D project was finished in 2009 [7].

Now NAGPF initiative is going through a difficult period characterized by unfavorable political and economic environment. The economic factors include high risks of capital-intensive projects in the absence of developed mechanisms for multilateral investment cooperation. The political factors include the lack of trust among the countries due to historical contradictions and different vision of integration processes in the NEA region. Because of insufficient organizational and financial support from the NEA countries, NAGF initiative could not go beyond the borders of research and expert community. Nevertheless, it is still an important tool for discussing the directions of gas market development in the Northeast Asian region.

Comprehensive studies on the priority directions of gas infrastructure development in the NEA region have been carried out under NAGPF initiative since the beginning of its foundation. The implementation of the proposed projects of gas infrastructure development is beyond the NAGPF format, as no real technical, financial, social and political

implementation mechanisms were established within NAGPF mandate. The construction of gas infrastructure is under the competence of governments and businesses.

V. INTERNATIONAL PROJECT ON INNOVATIVE NUCLEAR REACTORS AND FUEL CYCLES (INPRO)

The project was launched in 2000 by the decision of the General Conference of the International Atomic Energy Agency (IAEA) after Russia's proposal at the UN General Assembly session to develop international cooperation for the large-scale use of nuclear energy. The basis for the creation of INPRO was the interest of many countries in the nuclear energy development, and the main tool of this initiative is the creation of a single platform for the comprehensive assessment of the widespread use of innovative technologies in the field of nuclear reactors and nuclear fuel cycles [2].

INPRO develops regional and global scenarios of the nuclear energy development, evaluates the prospects for innovative technologies and regulatory institutions in the nuclear industry, and assists the interested states in a comprehensive assessment of the development of nuclear energy using INPRO methodology.

Today 41 countries, including Russia, China, Japan and the Republic of Korea from the NEA region, participate in the INPRO initiative. In 2001-2006, a methodology for evaluating innovative nuclear power systems was developed. Since 2006, this methodology has been implemented at three levels: national, regional, and global [8]. This initiative is well organized and structured, which eliminates duplication of functions between different departments of the parent organization and significantly

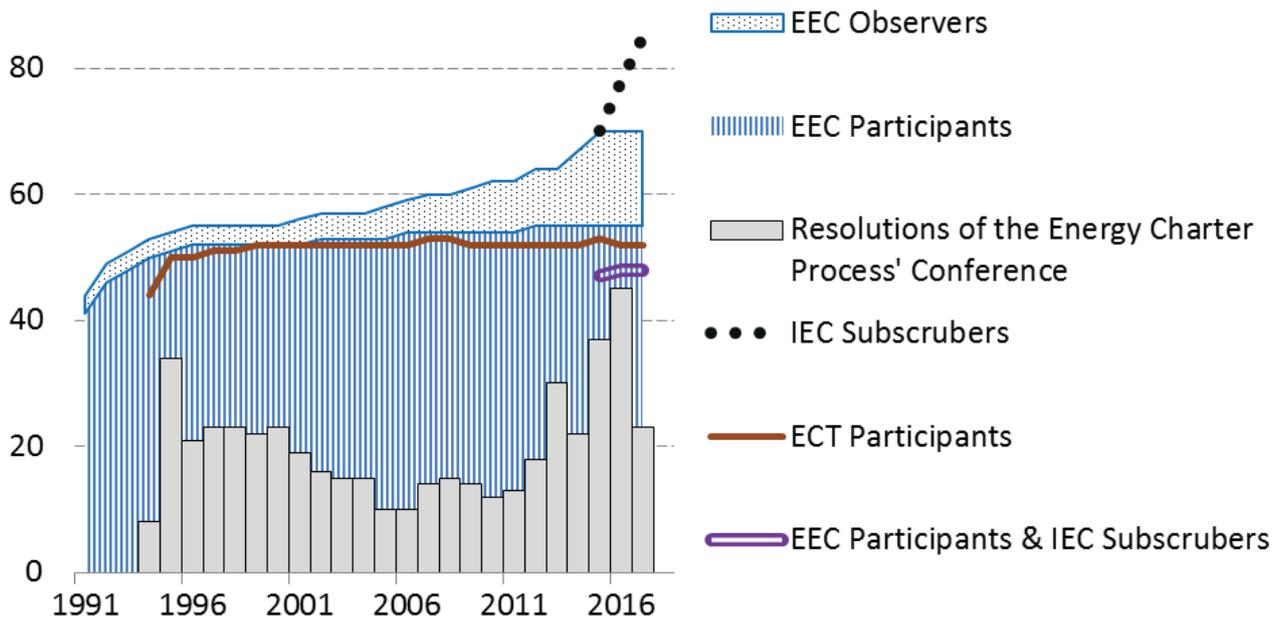


Fig. 4. Change in the number of participants in the Energy Charter Process

reduces the uncertainty of decision-making. The activities of INPRO are regulated by the Supervisory Board, which includes representatives of the participating countries. The INPRO is financed by the member countries and in part by IAEA [9].

The work of the initiative under the auspices of the IAEA is an important organizational factor. Despite a number of the existing political contradictions, there is a clear understanding among the participants of the initiative that it will be difficult to keep the leading positions in the field of peaceful nuclear energy without joint efforts for the sake of technology development.

The international project is an example of a successful IEI in nuclear energy. The results of the research on innovative nuclear reactors and fuel cycles are publicly available. The most productive period of INPRO's work was in 2002-2012 (Fig. 3). This period is characterized by a fast increase in the number of this IEI's participants, and by the large number of organized seminars and conferences. At the moment, the potential for further development of INPRO is not exhausted, but the presence of some economic and political contradictions between its main participants can significantly reduce the level of involvement of new member countries in the future.

VI. THE ENERGY CHARTER TREATY PROCESS (ECT PROCESS)

The Energy Charter Treaty (ECT) was signed in December 1994 on the basis of the idea "that multilateral rules can provide a more balanced and efficient framework for international cooperation than bilateral agreements alone or non-legislative instruments". It was a remarkable multilateral effort to improve energy security by means of

binding regulatory framework for resolving disputes around two basic international energy issues: investments and international (including transit) overland energy deliveries by using a specialized technological infrastructure. These particular issues are beyond the scope of the World Trade Organization.

There are few mechanisms for the implementation of the Energy Charter Treaty objectives: a) monitoring of the ECT implementation and readiness to consider proposals for new tools development under the ECT parties' control (the so-called Energy Charter Process); b) the keeping and enhancing of the ECT's legislative platform; c) providing institutions for settling disputes at all communication strata of the Energy Charter Process' participants [10].

There are several strata to participate in the ECT: a signatory party, an observer, a full ECT member (Contracting Party). Among the Northeast Asian countries, only Mongolia and Japan are full ECT members, while China and the Republic of Korea are observers to the Energy Charter process [11]. The Russian Federation, being the ECT Signatory, unilaterally changed its institutional status in August 2009 and became an observer. In April 2018 Russia formally withdrew its signature under the Energy Charter Treaty, losing the right to vote for further development of this unique multilateral instrument to protect and stimulate energy investments [12].

In 2015, participants in the Energy Charter Process adopted a new Declaration – the International Energy Charter (IEC). The IEC lists important global energy regulation issues for multilateral cooperation [13]:

- The growing weight of developing countries for global energy security;
- Interrelations between energy security, economic

development and environmental protection;

- The role of energy trade for sustainable human development;
- The need to diversify energy sources and routes of energy delivery to its consumers;
- The process of energy markets' regional integration.

Full membership in the ECT allows one to take advantage of binding guarantees of access to international energy infrastructure, to investment and innovative technologies. Despite the widespread interest in the ECT, major actors at the energy stage prefer not to commit themselves. It is worth noting that eight of the top ten world's energy producers, as well as eight of the top ten energy consumers, are not among the participants of the ECT process. These are China, USA, Russia, Republic of Korea, Brazil, Saudi Arabia, India, Canada, and Iran [11; 13]. Most of these energy powers have a developed maritime transport infrastructure, and are not interested in the overland energy transit issues.

The obstacles are quite opposite in the Northeast Asian region, where both Mongolia and Japan are extremely interested in the ECT as a binding mechanism to reduce investment risks in energy sector and to level playground for the energy transit from landlocked Mongolia. Meanwhile, China relies on its economic, financial and geographical position to deal with investment and transit issues on a bilateral basis, without being bound by multilateral obligations. At the same time, the largest regional "island" importers of energy resources (Japan, the Republic of Korea, and Taiwan) need established legal regulation for energy transit infrastructure in order to get direct access to the Eurasia's energy resources [14].

VII. RESULTS OF THE STUDY

International energy initiatives provide a wide field for discussion in terms of their influence on national economies. As the economic ties between Northeast Asian countries improve, a strong interest in energy cooperation will gradually shift from endless conversations to particular practical implementation.

Thus, it is worthwhile to place an emphasis on several implications derived from the study:

1. All countries within the NEA region are interested in both the results and the very process of international cooperation, bearing in mind their own energy security;
2. The political factor is of high importance to each IEI considered. Despite significant slowdown, TAGP continues to build interstate gas pipelines with the ASEAN Member States support. The NAGPF example demonstrates both the importance and ambivalence of the international policy factor for bilateral and multilateral relations. The steady growth in the number of the IEI participants, such as INPRO and ECT, illustrates the importance of government support to the multilateral energy cooperation's progress.
3. The high practical value of proper management

and adequate resources for IEI implementation is confirmed by the TAGP, INPRO, and the Energy Charter Treaty initiatives. The first has benefits from the ASEAN's umbrella exploitation, the second is under the auspices of the IAEA, and the last one is an important international organisation. For each of the initiatives a particular mechanism for regular revision of its mission, goals, and implementation procedures is incorporated within its organisational structure.

International energy initiatives discussed in the paper cannot be unambiguously evaluated as successful or unsuccessful, even after complete cessation of the initiative's activities and the elimination of its organisational structure. Initiatives can go through cyclical developments, alternating stages of activity and stagnation depending on the socio-political and financial-economic framework.

The paper recommends evaluating the development of IEI in NEA countries through overarching interaction within national governments, private energy businesses and R&D organizations. Today IEI create an international language in the Northeast Asian region, which will facilitate launching large-scale interstate energy infrastructure projects, introducing experience gained in negotiations, and increasing mutual trust.

VIII. CONCLUSION

Revision and refinement of the methodology for the assessment of the International Energy Initiatives was the main objective of this paper. The original methodology, briefly presented in the first part of the paper, identifies several factors that affect the international energy initiatives' progress. It was reaffirmed that the International Energy Initiatives are developed and implemented only if there is a strong common motivation among the participating countries. Furthermore, it is proposed to widen this methodology by using some quantitative indicators. Amid political and economic contradictions plaguing Northeast Asian countries, the analysis reasserts the existence of effective multilateral international energy cooperation in the region.

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