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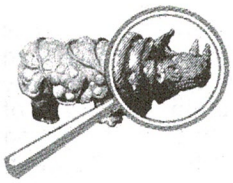

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RUSSIA AND SOUTHEAST ASIA: TOWARDS NUCLEAR PARTNERSHIP*

Amid the ongoing confrontation with the West, Russia's foreign-policy course is pivoting towards the East, a region where new configurations of international alliances are being shaped, where integration institutes are evolving, and where the mechanisms of influence and cooperation are becoming more complicated.

For Southeast Asia, Russia still remains a guest whose strategic goals are unclear, but who is, nevertheless, aspiring to build closer bilateral relations in such areas as politics, economics, energy, science, and technology. Russia pursues a two-pronged approach to cooperation with Southeast Asian nations. On the one hand, it is trying to strengthen its positions in the Asia Pacific by stepping up its involvement in regional integration institutes and processes (such as APEC, ASEAN, and EAS) and various strategic dialogue platforms (ARF, the Asia-Europe Forum, ADMM-Plus, Asia Cooperation Dialogue forum, etc). On the other hand, Russia is also seeking closer cooperation and contacts on a bilateral level.[1]

One of the key documents in the framework of Russia–ASEAN cooperation is the *Intergovernmental Agreement on Cooperation in Economics and Development*, which was signed in December 2005.[2]

On December 13, 2005 the two sides adopted a Comprehensive Action Program for 2005–2013. It is aimed at deepening and diversifying mutually beneficial cooperation between Russia and ASEAN nations.[3] The program includes nine distinct areas of cooperation. Russia is particularly interested in military and technical cooperation, since the ASEAN markets account for up to 15 percent of global arms sales in dollar terms. The ASEAN nations also pursue long-term programs of modernizing their armed forces. Russia can also help ASEAN to diversify its energy sources, even though several of its members (Vietnam, Indonesia, Malaysia, and Brunei) are major producers of hydrocarbons. Finally, Southeast Asian countries are showing great interest in the latest Russian technologies in such areas as telecommunications, biotech, and space.[4]

Over the past decade Russia has also been trying to secure ASEAN nations' interest in pursuing nuclear energy cooperation.[5] Even though Russia is not the most significant actor in Southeast Asia, it has a significant strategic potential, advanced nuclear technologies, and world-class nuclear know-how. This attracts potential partners who are interested in peaceful nuclear energy.

NUCLEAR ENERGY DEVELOPMENT IN SOUTHEAST ASIA

There is a growing realization of the need to develop renewable technologies in Southeast Asia. Experts are worried by the prospect of growing carbon emissions as natural gas is being replaced by coal in electricity generation. This will significantly increase the environmental burden. As a result, researchers are predicting a deterioration in the environmental situation in Southeast Asia that will pose grave public health risks, slow the development of vital industries such as tourism, and destroy the region's unique natural heritage.[6]

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Energy demand in the rapidly growing Southeast Asian economies is rising fast. It is predicted to increase by 67 percent over the next 20 years, and to account for more than half of global energy demand by 2035.[7] The share of coal in the ASEAN countries' energy balance is projected to rise from 31 percent in 2011 to 49 percent in 2035. The share of natural gas, meanwhile, will shrink from 44 percent to 28 percent.[8] Countries in the region are already facing severe energy shortages. One of the ways of closing the gap between supply and demand is to pursue nuclear energy development.

Of all the ASEAN nations, Vietnam and Indonesia probably have the most advanced nuclear programs at this point. Both countries launched these programs in the late 1990s. In Vietnam, however, the nuclear program is gaining momentum, whereas Indonesia's program is making very slow progress. Vietnam currently has 20GW of generation capacity, a third of which is hydroelectric power plants. Under earlier plans, the share of nuclear power in the country's energy balance was to reach 15 percent by 2015.[9] Vietnam actively pursues cooperation with such nuclear energy leaders as Russia, the United States, France, Britain, and China. It has a special relationship with Russia. In October 2010 Russia and Vietnam signed a bilateral agreement on building the Ninh Thuan nuclear power plant, which will consist of two 1.2GW VVER-type nuclear power reactors. The first reactor is scheduled for launch in 2020.[10]

In the 1990s Indonesia set up the National Nuclear Energy Agency (BATAN). The country also received energetic support for its nuclear energy development plans from the IAEA, but the opposition and the Indonesian public in general were unhappy with the government's plans. For that reason, and also because of the discovery of large natural gas reserves at the Natuna field, in 1997 plans to build nuclear power plants were shelved. The program was resurrected in 2005 as part of Indonesia's efforts to diversify its energy sources. In the mid-2000s Rosatom undertook a marketing effort in the country, hoping to secure Indonesia's interest in its floating nuclear power plants. In 2010 the Indonesian government approved the decision to build a nuclear power plant (NPP) in northern Java, on the slopes of the Muria volcano.[11]

Thailand is in a good position to become a major electricity exporter to Southeast Asian countries. Natural gas currently makes up 70 percent of its energy balance. By 2020 the country's demand for electricity is expected to reach 45GW, half of it generated by gas-fired power plants. In view of the growing prices for natural gas, the Thai nuclear energy commission launched a feasibility study for nuclear energy plans.[12] Under a new energy plan to 2030, which was approved in 2010, the share of renewable energy in Thailand's energy balance is to reach 18 percent.[13] The government wants to build two nuclear power plants with a total capacity of 4GW by 2021.[14] Proposals have also been unveiled to build an additional four NPPs.[15]

Five potential NPP sites have been examined in recent years. Three southern sites near Surat Thani and one in Nakhon Si Thammarat have been ruled out because of protests among local residents. (Other reasons included proximity of the southern provinces of Narathiwat, Songkhla, and Yala, where separatism and terrorist attacks remain a problem). The Thai opposition also opposes plans to build nuclear power plants in Ubon-Ratchathani (near the border with Laos) and in Nakhon Sawan, 200km from Bangkok.[16]

In 2009 Malaysian officials said there were no plans to build the country's first nuclear reactor before 2025.[17] A year later, however, they spoke of launching the first NPP in 2021.[18] The proposed sites included the coast of the Strait of Malacca, and the states of Johor (Batu Pahat), Selangor (Pulau Angsa), and Perak (Sitiawan) in the west of the country, as well as Pahang state.

Different opinions have been expressed regarding the size of the future Malaysian NPPs. Abdul Aziz Raja Adnan, director-general of the Malaysian atomic energy licensing board, argued that the first nuclear power plant should consist of two 500MW reactors. Other experts are in favor of two 1GW reactors, which would be a more traditional choice.[19]

The Malaysian nuclear energy project is still at the discussion stage, so it is too early to speak of any serious breakthroughs or specific timelines.

In Myanmar, proposals were made in the early 2000s to build nuclear power plants. Now, however, these plans are viewed as a matter of the distant future. At the time, it was Russia

who approached Myanmar with a proposal to build a research reactor and a nuclear research center in the country.[20] Russia had an opportunity to become Myanmar's main nuclear energy partner, but the project was later frozen for political and economic reasons.[21]

Singapore has shown interest in medium-size and small reactors, and said it was ready to cooperate with Malaysia in that area. In November 2010 Prime Minister Lee Hsien Loong officially declared that Singapore "cannot afford not to use nuclear energy". Nevertheless, the small size of the city-state and its high population density mean that any man-made disaster would have very grave consequences.[22] It seems unlikely that Singapore will build its first NPP any time soon.

The only country in Southeast Asia that has already built (but not launched) an NPP is the Philippines. The country's first nuclear energy initiatives were launched under the Marcos regime and were largely spurred by the global energy crisis of 1973. The project to build the 621MW nuclear power plant in Bataan was launched in 1976, and completed in 1984, costing the country's treasury 460 million dollars.[23]

After the overthrow of the Marcos regime in 1986 the nuclear power plant was mothballed. Almost 30 years on it has yet to be launched, largely because of unresolved financial and safety problems.[24] The Chernobyl accident, which happened the same year as the Bataan NPP was mothballed, was a major blow for the project.

The arguments against the launch of the nuclear power plant include high seismic activity in the Philippines archipelago, even though the Australian consulting company MEETS says these fears are overblown (its researchers conducted various studies and found no substantial risks). Potentially a more serious obstacle is the lack of qualified specialists who could operate the NPP.[25]

To summarize, among all the Southeast Asian countries, only Vietnam, Indonesia, and Thailand have detailed plans for nuclear energy development or have declared their intention to build nuclear power plants.[26] Experts believe that nuclear energy development in the region will begin in earnest in the early 2020s, and that firm foundations will have been laid by 2030.[27] At the moment, however, that process is still in the very early stages. As Svetlana Klyuchanskaya put it, "in most of these countries, nuclear infrastructure is being built from scratch.... As a result, the country that wins the contract to build a nuclear power plant is also likely to win contracts for training specialists for the future NPP, for maintaining the safety infrastructure, etc."[28]

On the whole, Southeast Asia has found itself between the rock of energy shortages and the hard place of risks (both avoidable and unavoidable) that are associated with nuclear technologies.

CHALLENGES AND RISKS

The public in those Southeast Asian countries that are planning to build nuclear power plants is concerned about the prospect of man-made disasters. In view of the region's natural conditions and climate, such disasters could inflict irreparable damage to its wildlife as well as agriculture. (Nuclear power plants are usually built well away from big cities, even though people living in rural areas do not like that at all.) The rural population is usually opposed to any proposals to build a nuclear power plant in their area, regardless of the advantages of such projects trumpeted by the media and scientists. The public opinion in small towns and villages is often extremely intolerant of anything that has to do with nuclear energy, even though many of these negative expectations are unfounded, and there is no reason whatsoever for panic or alarmism. In fact, nuclear technologies can bring numerous benefits to agrarian regions. For example, the use of radiation can improve plant emergence and storability. Plant cells are less vulnerable to radiation; furthermore, radiation can make them more resilient without any harmful effects for the people who eat those plants.[29]

Southeast Asian countries need to roll out social and education programs that help members of the public understand the real risks and benefits of nuclear energy, and to pursue awareness campaigns that emphasize the low environmental risks posed by modern nuclear technologies.

Of course, such programs are not always able to overcome entrenched negative perceptions of nuclear energy among the rural population. For example, an Indonesian program in Bangka-Belitung province that cost 16 millon dollars was a complete failure: the locals refused to believe that the province is not prone to earthquakes.[30]

The Fukushima syndrome has also had an impact on nuclear programs in Southeast Asian countries.[31] Even though reactions to the Fukushima accident were fairly moderate in these states, the disaster in Japan has clearly dampened enthusiasm for peaceful nuclear energy. Fears of another nuclear accident create major political obstacles to nuclear energy development, slowing or even halting progress in that area.

The project to build a nuclear power plant in Thailand has been frozen; the head of the National Council for Peace and Order, Prayuth Chan-ocha, recently ruled out nuclear power and proposed a coal-fired power plant project instead.[32] Malaysia has also postponed its nuclear project indefinitely.[33]

Indonesia and Vietnam are the two nuclear energy leaders in Southeast Asia—but compared with Vietnam, Indonesia clearly has much greater economic capability to build a nuclear power plant. It also appears to be skeptical of renewable energy technologies, and believes that these technologies carry more risks than benefits.

To make a political decision on the development of nuclear energy in Southeast Asia, several key factors must be taken into account. They include the availability of alternative sources of energy; adequate safety and security measures; securing the general public's support for nuclear technologies; the availability of trained specialists and experts; and reliable financing.[34]

Safety is one of the most important factors for successful long-term nuclear energy development in Southeast Asia, especially in view of infrastructure development needs and the fact that the region is prone to natural disasters.

Extremely negative factors that hamper the development of a nuclear energy industry in Southeast Asia include political instability and the terror threat. The situation in the region is compounded by functional problems in the operation of nuclear power plants.

Based on interviews with experts and field research, the authors of a research project headlined "Nuclear Safety and Security Prospects. Partnership in Southeast Asia" have highlighted potential nuclear safety and security challenges in Indonesia, Vietnam, and Myanmar (Table 1).

Resolving Southeast Asia's security problems is a cornerstone of stable and sustainable development of the region's nations and economies, which are an extremely important hub

Table 1. **Potential nuclear safety and security challenges in Indonesia, Vietnam, and Myanmar**[53]

Country	Nuclear safety and security challenges
Indonesia	Lack of resources to improve safety and security arrangements and culture
	Need to strengthen human resources in the nuclear industry
	Lack of coordination
	Uncontrolled exports of radioactive isotopes
Vietnam	Insufficient level of systemic training of personnel
	Lack of equipment for border controls and other nuclear security and safety measures
	Risk of Vietnam being used as a sea hub for WMD smuggling
	Poor understanding of the concept of dual-use products
	Absence of a truly independent nuclear regulatory agency
Myanmar	Lack of legislative and compulsory measures in the nuclear sphere
	Lack of mechanisms for nuclear regulation on the national level
	Lack of resources and equipment for border controls, including insufficient use of IT systems by the customs service
	Insufficient level of individual training in the area of nuclear safety and security

of regional and global economic processes. Southeast Asia's huge strategic significance is based on its geopolitical situation and the growing threats related to social (man-made) and natural factors (tsunami, earthquakes).

Contradictions between Southeast Asian states that have different strategic potentials and military-political resources, but still try to prevent the strengthening of intra-regional actors, are not conducive to improving a climate of trust. Such a climate is an important prerequisite for developing nuclear technologies. In particular, the Philippines and Singapore regard prospects for building NPPs as one of the most high-profile political issues.[35]

Southeast Asian countries are especially worried by the high likelihood of China's rapidly growing might eventually leading to an imbalance of power in the region. Such concerns have come to the fore once again in the conflict over the Spratly and Paracel islands in the South China Sea.

There is a good chance that peaceful nuclear energy programs in Southeast Asia will help to defuse tensions over the disputed islands and their oil- and gas-rich offshore areas. China is not opposed to nuclear energy development in Southeast Asia, provided that such development is pursued under IAEA supervision—especially since the region is part of the Zone Free of Nuclear Weapons agreed in the 1995 Treaty of Bangkok.

Building nuclear power plants will, however, require colossal financial resources, which Southeast Asian countries do not seem in a position to spend. Of course, there is a relatively cheap nuclear energy option in the form of floating nuclear power plants. Indonesia and Malaysia, as well as China, have already shown interest in this technology, For example, the Chinese want to position four such power plants in coastal areas of the South China Sea.[36]

Such a step, however, would be fraught with potential political complications. Some experts have also expressed skepticism about floating NPPs. They believe that "the floating NPPs will be based on the KLT-40S reactors, which use highly enriched uranium." Greenpeace specialists argue that a floating NPP reactor contains enough fissile material to build dozens of atomic bombs. In addition, experts are worried by the difficulties of providing adequate security measures for floating nuclear power plants.[37]

At the same time, Southeast Asia has effective mechanisms of bilateral, multilateral, and regional cooperation that have become the basis of regionalization. The ASEAN Way format, meanwhile, has become an important platform for discussing the key problems facing the region. Another such platform is the ASEAN Regional Forum (ARF), which hosts discussions on security problems, threats, and challenges facing the region. At a meeting in Hanoi in 2010 foreign ministers adopted the Hanoi Action Plan, which focuses on active cooperation in fighting terrorism and transnational crime, maritime security, nuclear nonproliferation, and disarmament.

Four regional instruments have been created in the ASEAN framework that can be used to introduce and strengthen a program of physical protection of nuclear materials. They include the Treaty of Bangkok on a Zone Free of Nuclear Weapons; a regional agreement on cooperation in Asia and the Pacific; a regional IAEA project entitled Technical Cooperation Program; and the Forum for Nuclear Cooperation in Asia.[38]

Brunei, Cambodia, the Philippines, Singapore, and Thailand participate in the Proliferation Security Initiative.

In 2005 Singapore began to hold regular Deep Sabre naval exercises to intercept ships carrying WMD and related technologies.[39] Also, a nuclear forensic network is being set up in the region.

In September 2013 representatives of 41 countries took part in the first meeting of ASEANTOM (the ASEAN network of nuclear regulation agencies). Apart from the 10 ASEAN states, the organization also includes IAEA members. The new body aims to foster cooperation in nuclear safety and security, nuclear forensics, prevention of nuclear and radioactive smuggling, and facilitating the return of spent nuclear materials to their country of origin.[40]

Five ASEAN states are members of ANENT (the Asian Network for Education in Nuclear Technology). The body strives to promote, manage, and preserve nuclear knowledge to ensure the continued availability of qualified human resources in Asia for the sustainability of nuclear technology.[41]

WHAT CAN RUSSIA CONTRIBUTE?

Russia must work out a formula for its involvement and participation in Southeast Asia. It has colossal experience and expertise in building nuclear power plants and radioactive waste management. It is an undisputed leader in this area, and can offer projects for implementing national nuclear energy programs on better terms than its competitors, taking into account the unique challenges related to Southeast Asian countries' geographic situation.[42] The Fukushima accident has undermined confidence in Japanese reactor technology and Japanese companies' potential as nuclear engineering contractors. Cynical as it sounds, this creates opportunities for Russia because nuclear power plants built using Russian technology (such as the Tianwan NPP in China) are some of the safest in the world. Nevertheless, as already mentioned, most of the Southeast Asian countries are not yet ready to build NPPs.

Russia's lead-bismuth fast reactor (SVBR-100) technology can potentially be of great interest for its Southeast Asian partners. This is an extremely reliable, resilient, and compact reactor. The technology is one of the projects spearheaded by the Presidential Commission for the Modernization and Technological Development of the Russian Economy. It is listed under the section "New Technological Platform: Closed Nuclear Fuel Cycle and Fast Neutron Reactors," and has been included in the federal program Next Generation Nuclear Energy Technologies in 2010–2015 and in the 2020 timeframe.[43]

SVBR-100 can be used to build 100–400MW regional power plants, which can be a good option for small resort towns, with their energy-hungry desalination plants, hotels, shopping streets, bars, etc. Initially the reactor was designed as a propulsion unit for nuclear submarines. Instead of pressurized water it uses liquid metal (a lead-bismuth alloy with a boiling temperature of over 3,000°C) as coolant. Such a reactor can work without fuel reloads for 7–15 years. Also, unlike VVER-type reactors, which require up to 1,500 personnel to operate them, SVBR-100 reactors can be operated by a team of 10 people. In other words, the reactor is very economical.

In places such as Singapore or the Philippines, where land is at a premium, the SVBR-100 reactors can be built underground, which will also protect them from earthquakes and tsunami. Even if something untoward happens to such a reactor, it simply goes into hibernation mode (unlike the VVER-1200 reactors, which take 7–15 days to restart). Finally, the price tag of an SVBR-100 reactor is only one-tenth of the price of a VVER unit, so it does not take the financial resources of a national government to build one.[44]

An important role in the promotion of Russian nuclear reactor technology is played by the Far-Eastern Nuclear Technology and Radiation and Environmental Safety Research and Education Center. The Center was set up in 2012 at the Far-Eastern Federal University (DVFU). The initiative was proposed by Rosatom and backed by the Russian Academy of Sciences' Institute of Safe and Secure Nuclear Energy Development.

According to Dzhomart Aliyev, Director-General of Rusatom Overseas, "DVFU serves as a showroom, a demonstration platform for reference technologies that could be exported to other countries, especially to Asia." Another task facing DVFU is to train highly qualified specialists who could be used to operate and maintain nuclear power plants. The university is already working to attract foreign students.[45]

The main training modules offered by the DVFU's Nuclear Center are supplied by Rosatom. They cover the following areas: (1) supplying nuclear power reactors and training NPP operators, nuclear physicists, and nuclear chemistry specialists; (2) education and training technologies; (3) nuclear medicine; (4) dismantling and disposing of nuclear energy facilities (NPPs, burial sites); using sorbents, and removal of radionuclides; (5) project to set up an oceanic ecology laboratory under the IAEA auspices. The latter project operates a system of online monitoring of the spread of pollutants in the world's oceans and in the atmosphere. In particular, the system monitors the situation in such areas of concern as waters off the coast of Japan's Fukushima Province. (The Japanese periodically dump batches of 100 metric tons of contaminated water into the ocean; they deny it, but indirect evidence is clear.[46])

Unfortunately, only a few Southeast Asian countries are pursuing specific cooperation projects with Russia. One of these countries is Vietnam, where Russia is fostering a program of constructive cooperation. The Vietnamese are very welcoming of Russian initiatives and

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Unfortunately, only a few Southeast Asian countries are pursuing specific cooperation projects with Russia. One of these countries is Vietnam, where Russia is fostering a program of constructive cooperation. The Vietnamese are very welcoming of Russian initiatives and

projects, and Russia is currently planning to build 13 nuclear power reactors in the country, with a total capacity of 15GW.[47]

Speaking of the plans to build the Ninh Thuan 1 NPP, Russian Prime Minister Dmitry Medvedev has described them as "the flagship project," and estimated its value at 10 billion dollars or even more.[48] Vietnam remains one of Russia's most promising nuclear energy partners in Southeast Asia.

Another relatively new project is Russia's agreement with Bangladesh[49] to build the Ruppur NPP, where two Russian-designed 1GW reactors are to be launched in 2020.[50]

In recent years Rosatom has also pursued contacts with the Institute of Nuclear Technologies in Thailand. Last year the two governments were drafting an agreement on cooperation in peaceful space exploration and a program of science and technology cooperation until 2020.

Rusatom Overseas is energetically promoting Russian nuclear technologies and products abroad, including in Southeast Asia. The company can draw on the expertise and capability of more than 250 Russian nuclear industry facilities. It offers unique and comprehensive energy solutions, from uranium mining to building energy grid infrastructure.[51]

On the whole, Russia has the capability to meet the most demanding requirements of its foreign partners as far as nuclear cooperation is concerned.

Apart from nuclear energy, Southeast Asian countries are also greatly interested in non-energy nuclear technologies (Table 2), such as using radioactive isotopes in medicine, agriculture, and other areas. Russia is in a very good position to meet these requirements, too.

Table 2. **Use of radiation sources for non-energy industrial applications in Southeast Asia**[54]

Use of radiation sources for non-energy purposes	Vietnam	Cambodia	Laos	Myanmar	Thailand
Irradiators	+	n/a	n/a	+	+
Nuclear medicine	+	n/a	n/a	+	+
Radio-isotopic diagnostics	+	+	+	+	+
Radiotherapy	+	n/a	+	+	+
Cyclotrons	+	n/a	n/a	n/a	+
Industrial radiography	+	+	n/a	n/a	+
Industrial instruments	+	+	+	+	+
Reactor research	+	–	–	–	+
Neutron generator	+	n/a	n/a	+	+
Radioactive waste disposal	+	+	+	+	+
Use of radiation sources for non-energy purposes	Indonesia	Philippines	Brunei	Malaysia	Singapore
Irradiators	+	+	n/a	+	+
Nuclear medicine	+	+	n/a	+	+
Radio-isotopic diagnostics	+	+	+	+	+
Radiotherapy	+	+	+	+	+
Cyclotrons	+	+	n/a	+	+
Industrial radiography	+	+	+	+	+
Industrial instruments	+	+	+	+	+
Reactor research	+	+	–	+	–
Neutron generator	+	+	n/a	+	+
Radioactive waste disposal	+	+	+	+	+

Note: n/a = information not available.

CONCLUSION

Nuclear cooperation programs between Russia and Southeast Asian countries must take into account the region's specific environmental and geological conditions.

Russia must manage peaceful nuclear energy development and promote intellectual and educational initiatives and technologies, while also showing flexibility to see off competition from the French and Americans. The United States has obvious geopolitical interests in Southeast Asia; the country has stepped up peaceful nuclear cooperation with Vietnam, Thailand, and Myanmar.

Russia can and must compete in high-tech areas, as well as in ensuring industrial and radiation safety and eliminating the consequences of any possible accidents. The implementation of nuclear technology projects and programs, the provision of expertise in building nuclear power plants, and support in protecting the environment will bolster Russian soft power in the region.[52]

As far as the balance of risks and benefits is concerned, Russia will have to develop a comprehensive strategy of active cooperation in Southeast Asia. Nuclear cooperation is one of the most promising areas. It can yield major economic benefits while at the same time helping to address strategic problems and security challenges.

Apart from its contribution to resolving the region's energy problems, Russia's nuclear cooperation with Southeast Asian countries can also facilitate constructive cooperation in other areas.

Russia must win a reputation as a reliable supplier and partner not only in supplying equipment, technology, and intellectual resources, but also as a guarantor of peaceful use of nuclear energy under IAEA controls. In a region where the Asean-Way principles of non-violent diplomacy have come to the fore, closer cooperation will require the parties to overcome old stereotypes and ambiguities that strengthen the potential for conflict and could even threaten stability in Southeast Asia.

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[49] Note: Geographically, Bangladesh is not part of Southeast Asia, although it is very close to that region both territorially and economically. The author cites Bangladesh as an example of cooperation with an underdeveloped country with a rapidly growing economy that requires reliable electricity supplies to sustain its growth (there are similar countries in Southeast Asia, such as Cambodia, Laos, and Myanmar).

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