



REGIONAL WORKSHOP ON ENERGY AND NON-TRADITIONAL SECURITY

27-29 AUGUST 2008
SINGAPORE



REGIONAL WORKSHOP ON ENERGY AND NON-TRADITIONAL SECURITY

CONFERENCE REPORT

ORGANIZED BY THE CENTRE FOR NTS STUDIES, RSIS

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S. RAJARATNAM SCHOOL OF INTERNATIONAL STUDIES,
NANYANG TECHNOLOGICAL UNIVERSITY

Abstract: The workshop on Energy and Non-Traditional Security (NTS) examined the attendant issues and challenges in addressing the problem of energy security. It focused mainly on the East Asian region and adopted a multi-disciplinary approach in examining the complex issues surrounding energy security.

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This report summarizes the proceedings of the conference as interpreted by the assigned rapporteurs and editor appointed by the S. Rajaratnam School of International Studies, Nanyang Technological University. Participants neither reviewed nor approved this report.

The conference adheres to a variation of the Chatham House Rule. Accordingly, beyond the paper presenters cited, no other attributions have been included in this conference report.

EXECUTIVE SUMMARY

The issue of energy security – namely the security of supply, demand and sustainable development of energy – has taken on added significance given the devastating effects of spiralling world oil prices. This has only exacerbated pressures on national economies and thwarted socio-economic developments of many developing countries. The significance of oil on the global economy has therefore transcended beyond the traditional political concerns and into the sphere of non-traditional issues such as human, health and food security, which have ultimately served to undermine the security of the state.

The stream of protests in various parts of Asia, as a result of governments' action of raising domestic fuel prices and their inability to mitigate soaring prices of basic food commodities, clearly underscores this trend. The demonstrations in Myanmar, Indonesia and Thailand in 2007 are a reminder of this trend and an indication of the risks posed to governments if they fail to provide the basic needs of their people, especially the poor and marginalised who would be most affected. Thus, it is critical to adopt a holistic and inter-disciplinary approach to addressing rising energy as well as human security needs.

Amidst spiralling world oil and food prices, the Centre for Non-Traditional Security (NTS) Studies at the S. Rajaratnam School of International Studies (RSIS), Nanyang Technological University, organised a Regional Workshop on Energy and Non-Traditional Security on the 28th and 29th August, 2008, in Singapore. The workshop was supported by the Consortium of Non-Traditional Security Studies in Asia (NTS-Asia), which is led by the RSIS Centre for (NTS) Studies.

The workshop examined the attendant issues and challenges in addressing the problem of energy security.

It focused mainly on the East Asian region and adopted a multi-disciplinary approach in examining the complex issues surrounding energy security and its impact on East Asia, state and human security.

The premise of the ensuing discussions was based on the consensus that traditional political thinking on the issue of energy security focused on ensuring supply without much emphasis on the socio-economic and environmental impact as well as the role of non-state actors.

Therefore, the workshop analysed, among other things, the shifting approach to energy security beyond the conventional, state-centric, geo-political approach toward a human security-centric approach.

A total of 26 scholars of varying expertise were convened and grouped under four themes which were split into seven sessions over the two days.

The first day covered two themes - contemporary views on energy security and country studies, which included major players from the northeast and southeast regions, the United States, India and Australia. The second day discussed the non-traditional dimensions of energy security, environmental and socio-economic impact, and the role of the market, technology and civil society.

The workshop concluded that states have indeed begun to factor in the non-traditional security issues into their national energy security policy frameworks albeit at varying degrees and pace. However, the challenge for most states remains securing their national energy needs while simultaneously mitigating its impact on the environment with an eye towards sustainable development in the long-run.

WELCOME ADDRESS

Ambassador Barry Desker
Dean
S. Rajaratnam School of International Studies
Nanyang Technological University



Ambassador Barry Desker, Dean of the S. Rajaratnam School of International Studies, extended a warm welcome to the participants and thanked Professor Chou Siaw Kiang, Head of the Energy Studies Institute, National University of Singapore, for his presence at the workshop.

In his address, Ambassador Desker raised three pertinent issues which are crucial with regard to the global development of energy security. They are the

increasing emphasis on the security of supply on the part of the oil-producing countries, the security of distributing chains of energy supplies and the increasing reliance on technology-based solutions towards ensuring the security of energy supplies.

However, apart from the conventional focus on the security of demand and supply, Ambassador Desker pointed out that the issue of energy security has a far wider implication on the state. For instance, spiralling energy prices has, especially in more recent times, led to protests from civil society groups and demonstrations from the masses due to rising food prices which is due to the rising costs of factors of production. Also, decades of reliance on the inefficient use of energy has had an adverse effect on global climate change. Therefore, security in a globalised world has taken on a new dimension from the perspective of traditional military responses, warns Ambassador Desker. Hence, issues such as food security, climate change and pandemics have now been firmly placed on the security agenda and this means that the multidimensional effect of energy security requires that states adopt a multi-disciplinary approach towards addressing their security issues.

OPENING ADDRESS

Prof S.K. Chou
Executive Director
Energy Studies Institute
National University of Singapore



In his opening remarks, Professor Chou referred to the notion of energy security which he explained as being evolved from the traditional ideas of self-sufficiency to the present which is more multi-faceted in nature and intricately linked to other global issues such as climate change, market dynamics and food security. More importantly, the conventional model of the relationship between oil producers and consumers is no longer a zero sum game. Energy security as understood today emphasises equitable relationships and mutually beneficial scenarios. These new dynamics in energy security are further highlighted when the issue of climate change is drawn in and its transnational challenges and implications surface.

SESSION 1

Shifting Views on Energy Security

Panellist:
Prof James Tang
(University of Hong Kong)

Assoc Prof Mely Caballero-Anthony
(Centre for NTS Studies, RSIS, NTU)

Asst Prof Youngho Chang
(Centre for NTS Studies, RSIS, NTU)



(L-R: Prof Tang, Asst Prof Chang and Assoc Prof Caballero-Anthony)

The current model of energy security, as Daniel Yergin had aptly pointed out in *Foreign Affairs* (2006), focuses primarily on how to handle any disruption of oil supplies from the producing countries. Indeed, his argument would have resonated with the traditional notion of energy security, which has been based on the affordability, accessibility and adequacy of energy supplies as national and global challenges. Since oil price volatility has a direct fiscal impact on the socioeconomic well-being of nations and societies, energy security in the pure economics perspective, deals largely with the securing of energy supplies. The traditional approach to energy security – privatisation, liberalisation and competition – has all worked well in the past.

However, new challenges such as the post-9/11 security environment as well as climate change issues straddle beyond economics and they are poised to change the traditional landscape of energy security to include the physical security of energy-related infrastructure, as well as mitigating the effects of global warming. As such, this metamorphosis in the notion of energy security would require the collective effort of the global

community to not only ensure the continued availability of reasonably-priced energy resources, but also to combat the environmental effects of energy use, for instance. However, little progress has been underway for the transition from competition to cooperation among states in the energy field. Energy security in this sense is more than a price and supply issue but also has geopolitical ramifications since energy, national and international security are tightly interwoven.

Oil had traditionally shaped and has been interlinked tightly with foreign policies, especially those of major powers if we delve into examples of China's deft use of 'energy diplomacy' – sometimes to the chagrin of Western counterparts in particular in dealing with energy-rich pariah states shunned by the latter – or the Russian 'energy geopolitics' in Europe, skilfully using its energy exports as a means to advance its foreign policy agenda. Even for Japan, which has been relying on the free market for energy supplies, had come to conceive pragmatism in the face of intense competition, such as by China, to secure oil through increased use of diplomacy in the Middle East. Lastly, the alleged motive of securing energy supplies by the US through armed intervention, such as the Iraq War in 2003, has been hotly discussed.

However, the participants of the conference did have slightly differing views on the future paradigm for energy security. One proffered the term 'cooperative competition' to describe the path taken by most nations for the present and future of energy security, although energy security has been viewed differently among developed and developing, oil producing and consuming nations. Nevertheless, in view of the emerging challenges, the paradigm shift of energy security would revolve around energy, environment and security as its main pillars. In exploring this paradigm shift in energy security, the following questions could be worthy of further analysis: 1) to what extent should energy security be re-conceptualised in view of non-traditional issues such as climate change; 2) are old energy security issues being revisited or are there new issues being uncovered; and 3) can a framework for rethinking energy security be plausible?

SESSION 2

Regional Players (I) – North East Asia

Chairperson

Mr Kwa Chong Guan
Head of External Programmes,
S. Rajaratnam School of International Studies,
NTU

Discussant

Prof James Tang
Chairman, Contemporary China Studies
Seminar Programme
Centre of Asian Studies
University of Hong Kong



(L-R: Mr Kwa, Prof Zha, Dr Gwak and Prof Tang)

China's Energy Security

Prof Zha Dao Jiong
School of International Studies
Peking University, China

China's energy securities with regard to its security of supply and climate change issues are treated, by the national leaders, as first and foremost a national interest followed by the international community's. Although its energy security policies have been subjected to much external criticism, China does not feel that its current energy security is under any threat especially since the 1970s and this is due to four reasons according to Professor Zha.

First, after 30 years of re-entering the world economy, the pattern of economic interdependence between China and the rest of the world is unlikely to change. This means that the likelihood of any form of economic

sanction on China similar to that which took effect after the Korean War is unlikely to happen again. And this is primarily due to the significance of China's position in the international system. Secondly, China does not pose a political threat in the arena of global energy security despite the prevalence of such perceptions. This is largely because China does not use its energy security concerns as part of its foreign policy instrument. China's change of status from a net importer to that of a net exporter has still not led to any change in its foreign policy. For instance, when China was a net oil exporter, it neither joined nor supported the Organisation of Petroleum Exporting Countries (OPEC). Thirdly, there is a knowledge gap with regard to China's role in the 1980s when the global oil prices collapsed. That was mainly due to a lack of research done either in the English or Chinese language. In fact, it was only in 2002 when energy security as an important research subject gained prominence in China. This knowledge gap has led to a lack of understanding of the role of market dynamics on world oil prices in the 1980s which would have allayed the perceptions of threats emanating from China. Fourth, a deeper understanding of the role and effect of international institutions and commodity investment banks on global energy security issues would have shown that these institutions rather than states such as China, have had a larger impact on world oil prices.

These factors as well as the states' reluctance to pursue domestic reforms to their energy security policies meant that more often than not, there is a tendency to blame China for the rising oil prices.

Professor Zha instead argued that, firstly, states should reform their energy security policies especially on the issue of pricing and consumption habits. Secondly, China and the other Southeast Asian states should consider limiting their dependence on the Straits of Malacca and Singapore in terms of the preferred route for tankers that transport crude oil. The shallow waters and the heavy traffic are not suitable for large tankers. Instead, there is a need to look into developing Lombok and Sunda as an alternative and thus it is necessary

to engage Indonesia in such a dialogue. Thirdly, with regard to the oil-producing states in Africa, there is a need for China and Southeast Asian states to reduce their dependency on African countries in the long-run. In the future, as fewer African countries retain the ability to export oil, these very same states may end up politicising access to the upstream market. Finally, China is currently too dependent on coal for its energy sources and is facing pressure from the international community on the back of its carbon and sulphuric emission. The challenge for China and the international community thus is to find a viable solution instead of rather than just mounting pressure. After all, what energy alternative can China resort to in place of coal?

In the final analysis however, China has to make a decision with regard to its position in an interdependent world. Should it really continue to be a 'club of one' or should it be more active as an international player? The puzzle and challenge thus is how does one frame such a dialogue?

Korea's Energy Security

Dr Gwak Dae-Jong
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Korea's national strategy is to ensure that it achieves energy security at both the supply chain and end-user levels. Although it already has achieved a high level of energy efficiency, it is still lower than other nations in terms of its value-added industries. Therefore, its current national energy security framework, National Energy Vision 2030, aims towards further decreasing the national energy intensity especially in those industries. Simultaneously, it intends to exploit the untapped renewable energies. To that end, Korea has

to adopt a proactive stand towards renewable energy production. Therefore, its national energy framework emphasises foreign energy resource development, energy efficiency enhancement and research and development in renewable energy.

Korea's energy policy objectives are premised on the assumption that it has very limited natural resources and thus relies heavily on the imports of oil, natural gas and coal. The recent oil price hike raised renewed concerns over its energy security issues. Its previous energy policy has led to a number of measures throughout its energy supply chains and end-user sectors with the intent to reduce reliance on energy imports while enhancing its energy supply security. For instance, the industry sector was required to meet stringent regulations for a high level of energy efficiency. Building up on this, Korea's pursuit of increased energy market efficiency has led to the deregularisation and establishment of an environmentally friendly energy supply chain. Therefore, the pursuit of increased efficiency and environmentally friendly supply chains inevitably means that its national energy policy framework hinges upon a balance of three Es – Energy Security, Energy Efficiency and Environment Protection.

Korea's present energy policy framework seems timely considering that its major energy indicators, between 1981 and 2006, shows that despite its attained high level of efficiency, the country's total energy consumption increased at an average rate of 6.7 percent per annum. Its per capita energy consumption within the same period increased at 5.8 percent per annum. The national energy intensity, between 1998 and 2006, increased somewhat modestly at 1.3 percent per annum.

Thus, the new energy policy framework, amongst other things, targets five sectors in particular – demand, supply, building, transportation fuel and transportation. The respective strategies and objectives are to integrally manage energy policy conservation, improve energy efficiency, expand the use of renewable energy and clean energy, improve energy efficiency in buildings and the efficient management of national transportation system and traffic demand as well as the establishment of logistics information network.

Meanwhile, with regard to the strategy on energy and the environment, Korea's vision is one of energy

independency, energy intensity enhancement, a post-petroleum society, an energy welfare program and, energy industry and technology which all focus on

enhancing the use of alternative sources of energy and reducing dependency on imported fossil fuels.

SESSION 3

Regional Players (II) – South East Asia

Chairperson
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NTU

Discussant
Prof Han Feng
Deputy Director
Institute of Asia-Pacific Studies
Chinese Academy of Social Sciences



(L-R: Dr Chew, Mr Tumiwa, Asst Prof Chang, Mr Nur Azha Putra and Prof Han Feng)

Indonesia's Energy Security

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Indonesia's energy security policy has remained unchanged since 1981 and revolves around the three principles of intensification, diversification and conservation despite the state's recent change in status from that of a net oil exporter to a net importer. Indonesia has opted out of OPEC in 2008. Despite its

wide variety and huge fossil fuel resources primarily in coal, gas and oil, the share of oil in the national energy mix stands approximately at 53 percent as of 2005. It is projected that oil will continue to comprise at least 20 percent of the national energy mix up to 2025. This means that Indonesia will continue to rely on oil in the foreseeable future as a source of energy and revenue amidst decreasing domestic production, increasing domestic consumption and global price hikes. Since gaining independence in 1949, oil and gas revenue has formed the backbone of the country's economic development throughout the 1960s and 1970s where it has accounted for more than 70 per cent of the state's annual budget. This figure dropped to about 50 per cent in the 1980s and 40 per cent in the 1990s and dipped to 25 per cent in 2005.

Indonesia is highly dependent on oil for its energy supplies in sectors such as the industries, transportation and power generation. As of 2006, its oil fuel consumption stands at more than 60 percent of total energy consumption. As the global oil prices started to increase in 2005, the government was keen on the development of renewable energy and also in energy conservation due to the pressure caused by the fuel subsidy, which led to a proposed bio-fuel development program in 2006. However, the program could not be sustained.

The major concern in the Indonesian energy scenario is the declining oil reserves and production. This could affect the country's energy security in the short term. However, in the long term, Indonesia could always look to its abundant reserves of natural gas and coal. Indonesia is one of the largest Liquefied Natural Gas (LNG) exporters and possesses the tenth largest proven reserves of natural gas in the world.

Revenue from coal was estimated to reach about \$1 billion in 2008 while revenue from natural gas reached \$8 billion in 2006 which is almost double the \$4.2 billion in 2004. The resource/production ratio (R/P) of coal stands at 86 years or 18.7 billion tonnes of proven reserves, while its natural gas reserves stands at 165 trillion standard cubic feet with an R/P ratio of 59 years. Indonesia's crude oil reserves remain the lowest of the three at 8.4 million barrels with an R/P ratio of 24 years.

In its 2006 national energy policy framework, there was a noticeable shift towards a more demand-side policy and emphasis on energy diversification through the development of alternative energy, bio-fuel and fuel substitution programmes especially for poor households. This paradigm shift in thinking led to the new Energy Law which was enacted in 2007. Among other things, the new law stipulates that the government must provide an energy buffer stock to ensure the security of supply in the short-run.

Singapore's Energy Security

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&

Mr Nur Azha Putra b Abdul Azim
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Singapore is an island city with limited energy resources. Currently, its energy market is entirely reliant on oil and natural gas imports. In 2007, Singapore's electricity was generated by natural gas (76 percent), fuel oil (22 percent), refuse (two percent) and diesel (0.3 percent).

As of 2006, 75 per cent of Singapore's crude oil sources come from the Middle East where Saudi Arabia supplies almost 33 per cent of it. While from Southeast Asia, Vietnam is the largest supplier at about 7 per cent. About 80 per cent of Singapore's electricity is generated by gas imported from Indonesia and Malaysia. Hence, Singapore's energy mix is one of the least diversified in Southeast Asia.

Singapore's energy policy, the National Energy Policy Report (NEPR), targets development at three levels, which are the domestic/national, regional and international.

National Energy Policy Report (NEPR)

The NEPR, titled Energy for Growth, was released by the Energy Policy Group (EPG), in 2007. The report represents the state's holistic approach towards energy security. It aims to carry out three main policy objectives, which are economic competitiveness, energy security and environmental sustainability.

These three policy objectives thus translates itself into six strategies which are to Promote Competitive Markets, Diversify Energy Supplies, Improve Energy Efficiency, Build Energy Industry and Invest in Energy R&D, Step-up International Cooperation and Develop Whole-of-Government Approach.

These objectives are to be achieved by developing and strengthening the collaboration between the government, academic and research institutions for the purpose of studying energy-related issues and the regulation of industry and market. To that end, the government has institutionalised its plans by introducing several agencies within the bureaucracy that has specific functions with regard to the state's strategic objectives. These agencies in return regulate the industry and market according to the policies set by the state. These policies and regulations in turn ensure that the energy market remains competitive and efficient. The research institutions on the other hand were institutionalised to study energy related issues.

The impact of these six strategies is perhaps better understood when studied against the backdrop of its implications to Singapore at the national, regional and international level.

At the domestic/national level, the state pursues open market principles in a bid to ensure that the price of consumption remains reasonably low. An open market will ensure that price is determined by market forces instead of central planning and resource allocation would be decided instead by market prices, investments and production decisions. Also, with a view of the long-run, the state will be investing in photovoltaic (PV) technology research and a liquefied natural gas (LNG) terminal so that it could diversify the energy mix which is currently too dependent on piped natural gas (PNG) and oil. In addition to this, the government has also introduced a number of state

agencies such as the Energy Division at MTI and the Energy Market Authority (EMA) to manage its energy security policies and electricity market. A number of think-tanks which study and analyse energy-related issues have also emerged with the support of the state.

At the regional and international level, Singapore will continue its policy of regional cooperation and integration with other member states via the ASEAN and East Asia Summit platform. At the international level, Singapore will continue to lend its support by participating in the UNFCCC Kyoto Protocol.

SESSION 4

External Players – The United States, India and Australia

Chairperson

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Discussant

Dr Bo Kong
Director
Global Energy and Environment Initiative
John Hopkins University



(L-R: Assoc Prof Basrur, Asst Prof Chang, Mr Forbes and Dr Kong)

United States' Energy Security

Presentation of Dr Toufiq Siddiqi's paper
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Until the 1860s, wood was the primary source of energy in the United States (U.S) while coal supplied most of the energy sources for the industrial revolution in the U.S and Europe after that. In fact, coal still supplies more than 20 per cent of the U.S energy consumption today. However, petroleum has been the largest source

of energy for the past 50 years. Natural gas stands at about 23 per cent while nuclear and renewable energy contributes about eight and seven per cent respectively. The two largest sectors in the consumption of energy are in the production of electricity and consumption in transportation, and both sectors account for about 70 per cent of the total national consumption.

Specifically, energy security requires meeting not only the overall energy demand, but also specific sectors such as transportation, which depends on petroleum for almost 96 per cent of its energy requirements. It is unlikely that the structure of energy consumption in this sector will change in the near future.

Thus one of the main challenges in U.S energy security lies on its dependence on oil imports. With regard to domestic consumption, as of 2007, the U.S imported over 500 million tonnes of crude oil, and over 100 million tonnes of oil products. Such high reliance on imports leaves the country highly vulnerable to supply disruptions. This is because the oil supply chain is highly integrated and supply disruptions in one region would quickly lead to supply shortages and price hikes elsewhere. Although the greater use of nuclear generated electricity is one of the principal options available, the political and social obstacles to increasing nuclear power are considerable. In fact, of the 132 nuclear power plants that received full-power approval

between 1957 and 2007, 28 have been shut down permanently. Also, the number of operating units has declined by 8 percent since 1990.

On the global front, although the U.S has been a leading contributor to the understanding of climate change, it is also the largest contributor of emissions of greenhouse gases. The U.S accumulated emissions of carbon dioxide from energy use since 1850 is more than three times than that of any other country. It is estimated that the U.S is responsible for 27 per cent of the global carbon dioxide emission.

One of the issues facing the U.S is the challenge of improving its energy efficiency. The energy consumption per capita in the United States is about twice that of the industrialised European countries such as Germany and the United Kingdom, and of Japan, although the GDP per capita of these countries are comparable. However, U.S emissions of carbon dioxide per capita are double than that of Europe and Japan, about four times more than China and 20 times than that of India. Thus, the U.S. needs to improve its energy efficiency considerably in order to reduce such disparities. Therefore, the emphasis within the U.S. on energy security needs to shift from expanding its oil and gas supplies towards using energy more efficiently and increasing the share of renewable energy. Both will also enhance environmental security.

However, the U.S has stated that it will not reduce emissions unless developing countries such as China and India follows suit because a unilateral reduction will hurt the American economy. On the other hand, the developing countries argued that the emphasis should be on per capita emissions instead rather than total emissions. These countries also argued that the reduction of their emissions will prevent them from further developing their economies.

Notwithstanding the lack of consensus, global climate change presents an unusual example of a challenge in which the security of every country's environment is closely linked to that of all the other countries. By addressing this concern vigorously, the U.S would be helping itself as well as helping the rest of the world.

On the home front, the U.S needs a greater emphasis on using energy more efficiently, and on accelerating the development of non-fossil energy sources.

India's Energy Security

Ms Rekha Krishnan
Visiting Fellow
Centre for Research on Energy Security
The Energy and Resources Institute, India

India has witnessed a soaring demand for energy in recent decades due to an expanding economy and rapidly growing population. As of 2008, India accounts for one-sixth of the world's population but consumes just five per cent of global energy.

India's commercial energy mix is dominated by coal, oil and gas. Of the electricity generated, nearly 70 per cent is coal-based while hydro power accounts for about 14 percent and other renewable energy sources (mostly wind and solar), as well as nuclear power, together account for almost five percent of the national electricity supply. About 40 per cent of India's commercial energy use is imported. Import dependency on oil is of particular significance given the volatility in the international oil market. With the production of domestic crude oil remaining stagnant over the past 15 years, import dependency on oil has been increasing and currently stands at about 75 per cent, of which nearly 74 per cent is sourced from the Middle East, Saudi Arabia being the single largest source. Given India's large population and rate of economic growth, and that a large percentage of the population still need access energy, India's energy demand will stay on a high growth trajectory for several decades. Projections up to the year 2020 suggest that oil consumption will grow at a rate of six percent per annum while the annual electricity consumption is expected to be around seven per cent. In the electricity sector, India already has a shortage of nearly 10 per cent in energy and nearly 14 per cent in peaking power. It is evident, therefore, that India will have to continue to contend with energy security issues as well as the associated environmental concerns unless there are some major structural and policy changes.

Looking around, the importance of energy in fostering development has long been identified by many countries and several initiatives have been taken to address the various aspects of energy security. Thus, it is useful to learn from the experiences of the South Asian region, notwithstanding those of other countries as well. The initiatives from these countries can be broadly understood under the following three categories:

First, there is a need to develop substitutes for traditional biomass-based cooking fuels and thus options apart from provision of LPG need to be explored. Secondly, the development of renewable energy sources which can be applied in sectors such as electricity generation, industries, community services and transport. Thirdly, there must be improvements in energy efficiency which can contribute to environmental damage reduction and reduced pressure on energy systems.

In addition to the above, from a traditional energy security point of view, particularly towards reducing supply risks for imported energy, India is also looking into supply diversification and strategic reserves. This in turn highlights the role of energy trade and investment linkages.

Australia's Energy Security

Mr Andrew Forbes
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Australian National Centre for Ocean Resources
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University of Wollongong



Australia has abundant reserves of coal, natural gas, uranium, and oil, and is generally regarded as being self-sufficient in the majority of energy resources required. Given this fortuitous circumstance, Australia has come 'late' to the energy security debate. While Australia has been involved in examining energy security issues at an international level for most of this decade, the Australian government did not issue its energy security policy, "Securing Australia's Energy Future", until 2004 and only began examining emissions trading schemes in 2007.

Australia's energy security is based on the assumption that access to energy resources is secured, through its abundant local resources and ability to import necessary items - it is therefore a market driven approach. The government views the use of international diplomacy and membership of international organisations, such as the International Energy Agency (IEA), as the best way to manage its energy security. Hence, Australia's energy security policy focus on measures to improve the efficiency and effectiveness of its power generation industry, while encouraging further exploration in its exclusive economic zone for additional liquid energy resources.

At its most basic level, the domestic objectives of Australia's energy security policy are to deliver prosperity, security and sustainability to the Australian people through:

- Attracting investments in the efficient discovery and development of energy resources.
- Delivering a prosperous economy while protecting the environment and playing an active role in global efforts to reduce greenhouse emissions.
- Encouraging the development of cleaner and more efficient energy technologies.
- Developing effective and efficient energy markets that deliver competitively priced energy when and where it is needed.
- Minimising disruptions to energy supplies and to respond quickly and effectively when disruptions occur.
- To establish an efficient energy tax base, restricting fuel excise to end users and applying resource rent taxes to offshore projects.
- Ensure that Australia uses its energy wisely.

Coal is Australia's major energy source accounting for 42 per cent of its primary energy consumption and 81 per cent of the fuel for electricity generation.

Australia produces enough oil to meet about 85 per cent of its domestic fuel needs. However its oil is light sweet crude which attracts a premium on global oil markets.

Also, these oil fields are located in the north and north-west regions which are readily accessible to the export hubs and are therefore more suitable for export than domestic use.

Given Australia's declining oil reserves and projected increase in consumption, the government anticipated that Australia's propensity for self-sufficiency will decrease to 70 per cent by 2030.

As of 2007, Australia's seven refineries produce automotive gasoline, diesel fuel and aviation turbine fuel. Australia is less self-sufficient in the heavier products such as kerosene, diesel, fuel oil and lubricants although its refining industry has the capacity to supply almost all of its transport fuel requirements. This is because refinery capacity in Australia has been on the decline, which has led to a reliance on the large-scale refining capacity in Asia, particularly Singapore.

Natural gas accounts for 20 per cent of primary energy consumption, and supplies 3.75 million households and 75,000 businesses, using 25,000 km of high pressure gas pipelines to move the gas to distribution centres and 80,000 km of low pressure pipelines for retail distribution.

In addition to oil and gas, Australia also has nearly 40 per cent of the world's low cost reserves of uranium. With regard to nuclear power, there is no domestic nuclear industry. As yet, there are no indications that Australia will pursue a nuclear power option although such a move would lessen greenhouse gas emissions considerably.

In the final analysis, Australia is in a unique situation where it is generally self-sufficient in energy resources, and where there are shortfalls, it can import what is required. However, Australia's energy security policy does not weigh the potential impact on the Australian economy if there were disruptions in its energy imports. Also, the policy does not consider the repercussions of supply disruptions to its major trading partners. Thus its energy security policy could be considered as optimistic amidst global concerns over the security of supply and production capacity.

SESSION 5

Non-Traditional Dimensions of Energy Security (I)

Chairperson
Prof Han Feng
Deputy Director
Institute of Asia-Pacific Studies
Chinese Academy of Social Sciences

Discussant
Assoc Prof Rajesh M Basur
Centre for Non-Traditional Security Studies
S. Rajaratnam School of International Studies,
NTU



(L-R: Mr Wibisono, Prof Yuxin and Prof Han Feng)

Environmental Impact in Northeast Asia

Prof Zheng Yuxin
Research Fellow
Institute of Quantitative & Technical Economics
Chinese Academy of Social Sciences
Beijing, China

Professor Zheng warned that climate change is a global issue which is of a concern to the international community. The use of fossil fuel is the main source of carbon dioxide (CO₂) and thus global warming. The impact of global warming on the ecosystem would be far more disastrous in the future if no positive actions are taken soon.

He pointed out a recent study by the Netherlands Environmental Assessment Agency (MNP) which showed that a less than two-degree Celsius reduction in the current global temperature would be a reasonable baseline to mitigate future climate change related issues. However, to achieve this objective, global CO₂ emissions have to be reduced by at least 50 per cent of the 1990

levels by 2050. This means that developed countries should reduce their CO₂ emissions to at least 30-35 per cent of the 1990 levels by 2020. On the other hand, developing economies are allowed to continue with their current rate of emission until 2020 followed by a substantial reduction. However, this means that China's levels of emission can no longer increase, which would then affect further economic development.

However, China is a developing country in the early stage of its industrialisation and it does not have a significant cumulative emissions over the years compared to the developed nations. From 1950 to 2002, China's carbon dioxide emissions from fossil-fuel accounted for only 9.3 per cent of the world emissions over the same period, and its per capita carbon dioxide emissions ranks 92 in the world but recent results show that China's carbon dioxide emissions this year will surpass the United States and rank first in the world. China obviously cannot ignore such realities.

The environmental problems caused by deterioration of oil security

China is currently the world's second largest energy producer and consumer. Between 1980 and 2006, China's 9.8 per cent average annual economic growth is built on the back of an average 5.6 per cent growth in energy consumption. It was projected that in the first two decades of the 21st century, China's population would continue to increase, the total economic output would quadruple and the demand for energy resources would continue to increase, leaving its national environmental protection programme neglected.

Some strategic thinking to cope with the change in energy systems

One possible strategy is to transform China's production and consumption structure, as well as to lower its power consumption according to its environmental goals. China has thus proposed building a resource-saving and environmental-friendly society.

Faced with the challenges of uncertainty

China's Five-Year (2005-2010) Plan committed that the emissions of major pollutants, energy intensity and water consumption for industrial use will decrease by 10, 20 and 30 per cent respectively. The Chinese government also promised that it will further lower energy consumption by another 20 per cent by 2020. Also, in 2006, China promulgated the "Renewable Energy Law", which includes a series of policies to promote the development of renewable energy power. In September 2007, the National Development and Reform Commission announced its plans to increase the proportion of renewable energy to total energy consumption from 10 to 15 per cent in 2020. These show clearly China's proactive attitude facing the challenge of energy and climate change.

Bewaring of falling deeper into the technical lock

China suffers from market technology lock when some industries ignore the more energy efficient equipment and machinery for those which are technologically backward and inexpensive.

Difficulty in following the developed countries

China's national energy efficiency is about 20 per cent lower than developed countries and it needs at least 20 years to reduce this gap. China's per capita energy consumption is only an eighth of the United States's and a quarter of Japan's. However, there is a growing consumer trend which mirrors the consumption pattern of developed countries, which in turn affects the national supply and demand for energy. It would be difficult for China to reduce its efficiency gap if its consumption behaviour is not compatible with its efficiency level.

Difficulty in going beyond the development stage

In recent years, China's booming energy consumption is brought about by large-scale urbanisation. The largest energy consumer within the industries are construction and real estate which has reached 500 million square meters which is approximately half of the world's newly built houses. Construction materials, machinery and transportation consume huge amounts of energy. It is clear that the stage of extensive growth cannot go beyond current levels.

Strengthening international cooperation in the Northeast Asia

Due to rapid economic growth, energy demand in Northeast Asia is significantly higher than other parts of the world. However, mechanisms for regional energy cooperation in Northeast Asia are lagging behind other regions. The countries in Northeast Asia have to cooperate to promote their common interests in the field of energy security and environmental protection.

Environmental Impact in Southeast Asia

Mr Iwan Wibisono
Coordinator for Forest Carbon Policy
World Wide Fund for Nature



Energy demand, in particular for the generation of electricity and fuel for transportation, will increase in line with regional economic development and population growth. Consequently, the state is expected to provide energy supplies to avoid energy insecurity issues. However, the soaring price of oil has dealt a terrible blow to countries that rely on oil imports to fuel their economies and the situation is similar for Indonesia which has recently become a net oil-importing country, according to Mr Wibisono. Indonesia and other developing countries are adversely affected by the soaring price of oil due to the problems with energy provision and poverty alleviation. Consequently, efforts are made to search and refer to alternative sources of energy – mostly coal and bio-fuels.

The use of coals and bio-fuels, however, may create additional problems if certain parameters are overlooked. For instance, in 2004, only 53 per cent of Indonesia's population have access to electricity, yet

the emission generated from electricity has reach more than 21 per cent of total national emissions. Heavier emissions can be expected if the scheme to build 10,000 megawatts coal-power plants go ahead.

The increase in emissions will exacerbate climate change and this will only worsen the situation in Indonesia where the impact of climate change is being felt. This includes damage to assets from extreme weather, loss of agricultural outputs due to droughts, flooding, trans-boundary haze and unseasonal weather and disruption to business from infrastructure damage or disruption.

The development of bio-fuels, in particular palm oil, if done irresponsibly, is leading towards the rapid clearing of the most bio-diverse tropical forests in the world, putting pressure on forest-dependent people as well as the wildlife. The prevalence of forest fires to clear land for plantations is a regular source of haze in Southeast Asia and this poses serious health problems. In addition, the disregard for the rights and interests of local communities by some players within the industry has created tensions and conflicts with local communities.

There are options available to meet the soaring demand for energy while negating the negative environmental impacts. Indonesia is rich with natural resources, such as the potential for river-run hydro power, geo-thermal, solar and biomass power. In addition, bio-fuel development can also contribute positively towards climate change and economic development. These options need to be explored and impediments (i.e. energy pricing, investment, etc.) need to be addressed so that renewable, clean and sustainable energy can be adopted as concrete solutions for Indonesia.

Energy Development In The New Multifaceted Security Equation: The Caspian Sea Region

Dr Alexandre Babak Hedjazi
Institute of Environmental Studies
University of Geneva



Dr Hedjazi explained that energy security needs to be viewed in the context of networks of emerging threats and insecurities because a network-based security reading provides an interdisciplinary approach to emerging threats and vulnerabilities, while connecting one debate such as energy security with analytical elements of other disciplines such as environmental and societal security.

Whether dealing with malevolent threats such as terrorism or energy insecurities, the common characteristic lies in their dispersed nature and the fact that they can be encouraged and amplified based on distinct and sometimes colliding rationales and motivations across the network. For instance in the case of climate change, factors such as social, economic and environmental determinants dictate a consumer's choice of energy use which in return impacts the demand for energy.

These individual behaviours are interrelated and translational and constitute an informal web capable of inducing global scale phenomena such as climate change or demand-based scarcity of natural resources with uneven impacts across the world. Induced by various dispersed factors, the threat to energy security cannot be addressed and its impacts mitigated simply based on a unique policy model which could modify the behaviour of only one node of the network. Therefore, the scale of global trade of energy grows substantially as world markets become more integrated, and thus interdependence is an intrinsic element of energy security.

Furthermore, regions that depend on imports to meet a significant part of their oil needs will become even more dependent on imports over the projection period.

For instance, in the future, it is projected that oil dependence in Europe will rise from 53 per cent to 79 per cent. In the Organisation for Economic Co-operation and Development (OECD) countries, it is expected to rise from a high of 89 percent to over 92 per cent. China, which became a net importer of oil products only in 1993, is projected to import more than three-quarters of it needs, over eight millions of barrels per day (mb/d) by 2020. All other regions remain net importers.

Meanwhile, the Middle East, which is the biggest exporting region, will see exports rise from 17 mb/d in 1997 to over 41 mb/d by 2020.

The interaction between the geopolitics of energy with the fundamentals of the market

Supply-induced scarcity, or its anticipation, provoke power projection by militarily capable and import-dependent nations (US, E.U., Russia, China) aiming to get control over stocks by either internally engineered regime changes or by conquests of territory. A major power that manages to get control over conditions of access by third parties to the stocks has the option to

induce scarcity for selected outsiders. Collusion of some states against one producer or a group of producer creates new barriers for third parties to project their power.

The Caspian Sea

It was noted that the Caspian littoral states have often been heralded as holding together one of the world's largest oil and gas reserves. According to the Statistical Review of World Energy (British Petroleum 2002), the total proven oil reserves is 15.5 billion barrels (bbl) and the total proven gas reserves are 196 trillion cubic feet (tcf). While, the combined Caspian output will never rival that of Saudi Arabia or Russia which produce 8.8 million and 7.1 mbd respectively, the resulting competition for resources has led to the axial regionalism of the Caspian Sea Oil, where the various pipelines are sponsored and endorsed by a mixture of regional and external states.

Consequently, energy security has failed in providing state, societal and environmental security. This is largely because the post – Soviet Caspian region was not divided into stable and agreed-upon zones of influence, and thus extra regional states and non-state actors have projected their power and influence into the region.

SESSION 6

Non-Traditional Dimensions of Energy Security (II)

Chairperson
Assoc Prof Euston Quah
Division of Economics
Head, Economics & Associate Chair (Research)
Nanyang Technological University

Discussant
Asst Prof Ho Kong Weng
Division of Economics
School of Humanities and Social Sciences, NTU



(L-R: Assoc Prof Quah and Prof Iida)

Socio-Economic Impact in Northeast Asia

Prof Tetsunari Iida
Executive Director
Institute for Sustainable Energy Policies
Tokyo, Japan

Current energy security issues are broad-ranging, with considerable impact on food production and prices, economic well-being such as inflation and employment, migration and refugee problems, the living conditions of humankind as well as the socio-political stability of nations. These pose a risk of an 'energy tsunami', as quoted by one of the speakers, in particular for Northeast Asia, wherein this potential

problem could be aggravated with the region's persistent dependence on imported energy resources, its diverse mix of countries with varying levels of socioeconomic development, its lagging behind of renewable energy research and development (R&D) as well as the lack of a regional energy network and policy harmonisation measures.

However, Professor Iida argued that there is still room for growth in the R&D of renewable energy in Northeast Asia, with Japan spearheading alongside Western countries, bottom-up energy transformation, as indicated in the Japanese climate change strategy 2008 which aims to further reduce greenhouse gas (GHG) emissions, although this endeavour would not be easy. In the case of Japan, part of its energy market is liberalised but is still economically and politically monopolised and hence difficult to change. The support for renewable energy use was further beset by accidents, such as the earthquake which had caused minor radioactive leakage at one of the world's largest nuclear power plants in Japan in 2007.

Nevertheless, there is still substantial social innovation at the local, national, regional and global levels, with other conceivable renewable energy sources being explored for exploitation, one of which being wind power. Denmark, which has had a comprehensive wind power R&D base, had been instrumental in associated technology and the knowledge transfer to Japan, such that the Tokyo Metropolitan Government had conceived the ambitious Tokyo Renewable Energy Strategy 2006 to achieve a 20 per cent share for renewable energy in the total energy mix by 2020, through applying the 'principle of subsidiarity' for its renewable energy policy, as well as strategic collaboration between national, international and non-state organisations. With the success in this project, Tokyo would be able to disseminate wind power expertise to the entire nation.

With the close interconnection between energy security, socio-economic development and environmental protection, the welfare of end-users is linked to developments in the energy sector and the socio-economic effects of changes in energy prices could affect all nations, even though the brunt of the impact would be on the households and the individual end-user. Southeast Asia, characterised by diverse levels of income and development, is not immune to

such impacts. Its endowment of abundant natural gas and coal supplies notwithstanding, the region has been heavily reliant upon oil imports since such energy sources are crucial for power generation and transportation.

Socio-Economic Impact in Southeast Asia

Asst Prof Maria Nimfa F. Mendoza
School of Economics
University of Philippines



(L-R: Asst Prof Mendoza and Asst Prof Ho)

Most Southeast Asian countries issue fuel subsidies which are generally skewed towards socially-sensitive fuels such as diesel, liquefied petroleum gas and kerosene. However, in the face of energy price hikes, regional governments had become hard-pressed to raise fuel prices in order to overcome fiscal difficulties in sustaining subsidies. Unfortunately, broad fuel subsidies such as tax relief, sometimes implemented for political expediency, are not only inefficient but prone to the abuse that entails increased costs. Subsidies would encourage uncurbed consumption and such funds could be better spent on short-term targeted income transfer or on long-term investments in socioeconomic development projects in education, health and infrastructure.

Increased oil prices raised the attractiveness of renewable energy sources but these would also be dependent on subsidies for implementation due to the costs involved in R&D. Also, renewable energies such as bio-fuels could encourage increased agricultural production and rural development, barring the potential social impact stemming from land-use conflicts with respect to bio-fuel investments. While intra-regional energy cooperation in Southeast Asia does exist, there remain prospects, with regard to energy conservation

and diversification, for the role of subsidies for the promotion of renewable energy utilisation and energy interdependence among nations in Southeast Asia.

Several interesting areas of research warrant further analyses. The first concerns the primacy of developed states in spearheading the use of renewable energy as well as the problem of effective and efficient transfer of bottom-up energy transformation methods to less developed states which are less endowed. As such,

an international as opposed to a regional energy network would be desirable to facilitate knowledge and technology transfers. The second aspect would revolve around socio-economic impacts, such as policy option alternatives to subsidies and how regional governments could respond to emergent social and environmental challenges. A third area of interest would be the assimilation of renewable energy within developing countries and also the role of technology.

SESSION 7

Towards a New Framework

Chairperson
Assoc Prof Mely Caballero-Anthony
Head, Centre for Non-Traditional Security
Studies
S. Rajaratnam School of International Studies,
NTU

Discussant
Asst Prof T S Gopi Rethinaraj
Lee Kuan Yew School of Public Policy
National University of Singapore

&

Dr Guy Hentsch
Former Advisor
European Centre for Nuclear Research (CERN)

Role of Markets in Governance and Energy Security

Asst Prof Youngho Chang
Centre for Non-Traditional Security Studies
S. Rajaratnam School of International Studies,
NTU

&

Mr Collin Koh
Research Analyst
Centre for Non-Traditional Security Studies
S. Rajaratnam School of International Studies,
NTU

The world is faced with contemporary energy security challenges, including volatile energy supply and pricing, the continued dominance of hydrocarbons in the global energy mix, slow transition to alternative energy sources as well as environmental issues relating to the consumption of traditional energy. These challenges necessitate increased interdependence and therefore more collective effort in addressing the problems at hand, said Mr Koh.

However, the role of the market, as traditionally relied upon in lieu of stronger government intervention, especially in the post-Cold War era of globalisation, has been put into question when it relates to the continued socio-economic implications of future energy use. The alleged profiteering by energy corporations in an environment absent of adequate government regulations, as indicated in the case of the Chad-Cameroon oil pipeline in 2000, point to the



(L-R: Mr Koh, Dr Indriyanto and Assoc Prof Caballero-Anthony)

potential pitfalls of relying solely on markets for ensuring energy security.

Governmental role could in fact complement the free market in order to ensure access by the average citizen to energy supplies, provide service quality mechanisms as well as allocate responsibilities among different market players. However, the case of Venezuela, where oil has been re-nationalised and used for geopolitical leverage in foreign policies, highlighted the drawbacks of relying solely on governance, which is prone to abuse or misuse by self-centred individuals or regimes for political expediency. Therefore, proper and adequate governance, encompassing such virtues as transparency, independent market supervision, accountability, consistency and respect for competition principles, could be the way for the future.

The starkly different outcomes during the First and Second Oil Crises in 1973 and 1979 respectively in the case of Japan could be testimony to the benefits of good market governance. Unlike the widespread consumer panic experienced by the Japanese public in 1973 due to over-reliance on the free market for energy supplies and lack of adequate governmental intervention, Tokyo managed to adapt better in the second oil shock. In 1979, government policies, such as an energy stabilisation policy and multiple government and independent sources of information projecting energy-related forecasts implemented post-1973, had managed to tide Japan through the crisis, allowing it to economically recover within a short span of less than a year, thanks to increased consumer and investor confidence.

States, Regional and Global Governance

Dr Asclepias Rachmi S. Indriyanto
Executive Director
Indonesian Institute for Energy Economics
Jakarta, Indonesia

Governance as a concept has evolved from addressing public administration by the executive branch of national authorities to become a broader term that encompasses non-state actors as well.

With regard to Asia, however, reviews on the practice of governance in some countries pointed to a somewhat skewed distribution of benefits ranging from economic growth and prolonged hardship to widespread public dissatisfaction of reform policies. The persistent socio-economic disparities would not only constitute a threat to the national but also regional and international contexts of security. In this respect, energy security which is linked to socio-economic development warrants greater attention when it comes to the issue of governance.

While there had been diverse definitions of the term 'governance', good governance essentially refers to the ideal features including accountability of public authorities and the bureaucracy, transparency of information, clear and fair rule of law as well as open participation in key decision-making process which affects lives. The term 'effective' governance has also been used synonymously with 'good' governance, and could be categorized into national, regional and global governance.

Governance implementation had been customarily linked to economic performance of countries, with a direct relationship between good governance and economic performance. Some critics, however, charged that increasing governance could potentially stifle sustained economic growth.

With respect to four countries in the Association of Southeast Asian Nations (ASEAN) – Indonesia, Malaysia, the Philippines and Thailand – a 2004 study had shown that the adoption of international governance practices was dependent on the political dynamics of these countries, with disparate outcomes.

At the regional and global levels, ASEAN integration could serve as a case study. Challenges such as uneven socio-economic development and the conservatism of regional governments would need to be overcome in order to achieve a reasonable degree of regional and global governance.

Role of Civil Society in Energy Security

Ms Lina Alexandra
Researcher
Centre for Strategic and International Studies
Jakarta, Indonesia

Among the non-state actors involved in governance, civil society has gained increased prominence. For instance, there had been increased space for civil society involvement in Indonesia, in particular occasional invitations to ad-hoc government and public consultations. In the area of energy security, civil society has served as advocates for environmental protection, 'watchdogs' over government policies as well as raising public awareness in supporting or rejecting government initiatives. Such efforts have been aided by the advent of information and communication technology (ICT), which has become increasingly proliferated throughout the societies.

Many civil society groups have been able to conduct their own research and release reliable information that could serve as an alternative to official government publications. Backed by sufficient data, they have become increasingly successful in pushing through their agenda with respect to energy security issues. A notable instance could be seen in the success of campaigns conducted by civil society organisations in Indonesia against the installation of nuclear power plants, bringing the project to a halt.

In the case of East Asia, where civil societal involvement has been nascent, there is room for improvement, such as 1) creating a comprehensive agenda among civil society groups in order to gain greater bargaining power with the government; 2) continuing to work through formal processes and demand for more access and transparency from governments and 3) strengthening civil society networks at both domestic and regional levels which could help in expanding the knowledge base and advocacy power.

Role of Technology

Dr Alvin Chew
Research Fellow
Centre for Non-Traditional Security Studies
S. Rajaratnam School of International Studies,
NTU



In today's era of globalisation, technology has become increasingly relied upon to solve almost any problem encountered by humankind, in improving the way of life and to further national goals, such as socioeconomic development. It is in this respect that technology and energy security are so closely related to each other. With global warming becoming a perennial existential threat to humankind nowadays, and in the face of increased energy demand but uncertainty of supply, technology would seem to be the solution. However, tremendous amounts of investments would be required for R&D in the following areas:

1) Traditional fuel sources: The common perception that fossil fuel supplies would be exhausted in the foreseeable future had been challenged within scientific circles. Therefore, the issue on hand is not the problem with availability of supplies, but rather, the problem of accessibility. However, access to untapped fuel sources in naturally inhospitable regions require better exploration and extraction techniques.

2) Alternative fuel sources: Continued dependence on traditional energy sources could only constitute a short term measure due to their price and supply volatility as well as environmental side-effects. Therefore, cleaner, alternative energy would constitute the long-term solution.

3) Supply chains: The energy supply chain is not concerned only with exploration and extraction, but

also the refinement and distribution processes. Geographical limitations and security risks on the supply chain would require technological solutions. For instance, technological innovations could facilitate easier energy transportation, such as liquefying natural gas to reduce reliance on overland pipelines subject to geopolitical disruptions.

4) Energy efficiency and conservation: More attention should be devoted to curbing energy demand through technological solutions for households and industries to conserve energy, thereby sustaining energy resources.

That being said, however, technology could not be the sole solution to all energy security problems. Insofar as alternative energy sources are concerned, costs count as one of the factors which preclude widespread adoption, at least at the present moment, not to forget the adverse consequences of harnessing technology, as evident in the historical antecedents of nuclear accidents and their impact on the environment and humankind at large.

While a broad range of issues had been discussed during the sessions, a new framework remains far from

becoming a conceptual reality. Indeed, the holistic, albeit bewildering, range of issues to be incorporated into the energy security discourse would risk making a framework too wide-ranging and unwieldy to manage.

Reconciliation of many longstanding and emergent issues so diverse as to include matters relating to governance, technology, markets, geopolitics and socioeconomic development would be no easy feat. To cope with a specific energy security situation, specific actions rather than a generic framework might be necessary, given the unique sets of objectives, constraints and different national and regional contexts which characterise the particular problem. Taking the case of ASEAN as an example, no doubt the long-term energy security formula would rest upon the development and safe use of nuclear energy, which would necessitate a regional framework which, if successful in its formulation and implementation, could well serve as an example of a framework designed to address context-specific energy security issues. One thing, however, is clear: energy security as a paradigm needs to continue to look beyond the state-centric framework in order to devise suitable measures which take into consideration human security issues, in order to ensure energy security in the long term.

CONCLUSION

Energy security is no longer an issue of the security of supply only. The survival of the state is no longer simply tied to the availability of securing energy resources at a price which may ensure future economic growth. There are now other ramifications, tied to energy security, such as climate change, human security and sustainable development. Thus, the study of energy security has transcended traditional political and security thinking into the sphere of non-traditional security issues. Consequently, the current approach to energy security requires multifaceted and cross-cutting policy agendas involving disciplines such as international relations, economics, environmental science, law, public governance and the role of non-state actors such as civil society.

At the workshop, issues ranging from the diversification of supply sources, multiple fuel use capabilities, changes in regulatory or institutional mechanisms, price reforms or price controls, development of new technologies and sustainable development were raised and discussed. The presentations on the country and regional case studies and the ensuing debate further articulated the case for a multi-pronged approach study on energy security. It was therefore concluded at the end of the workshop that these issues, while remaining unresolved and requires more academic attention, merit to be published as a single volume in the hope that these issues would create sufficient awareness and interests amongst the stakeholders.

CONFERENCE PROGRAMME

27 August (Wednesday)	Arrival of foreign participants	Chairperson: Mr Kwa Chong Guan
1900	Welcome Dinner (only for Invited Participants) Venue: Café Brio's Dress Code: Smart Casual	China's Energy Security Prof Zha Dao Jiong School of International Studies Peking University China
28 August (Thursday)		Korea's Energy Security Dr Gwak Dae-Jong Research Fellow Korea Institute for Industrial Economics and Trade
0830	Registration Workshop Venue: Riverfront 1 & 2 Dress Code: Office Attire (Tie not required)	
0900-0915	Welcome Address Ambassador Barry Desker Dean S. Rajaratnam School of International Studies, NTU	Discussant Prof James Tang Chairman, Contemporary China Studies Seminar Programme Centre of Asian Studies University of Hong Kong
	Opening Address Prof S.K. Chou Executive Director Energy Studies Institute National University of Singapore	1200-1330 Lunch Venue: Riverfront 3
0915-1000	Session 1: Shifting Views on Energy Security? An Overview Prof James Tang (University of Hong Kong) Assoc Prof Mely Caballero-Anthony (Centre for NTS Studies, RSIS, NTU) Asst Prof Youngho Chang (Centre for NTS Studies, RSIS, NTU)	1330-1500 Session 3: Regional Players (II) – South East Asia Chairperson Dr Alvin Chew Research Fellow Centre for NTS Studies, RSIS Indonesia's Energy Security Mr Fabby Tumiwa Director Institute for Essential Services Reform (IESR) Jakarta, Indonesia
1000-1030	Tea break	Singapore's Energy Security Asst Prof Youngho Chang Centre for Non-Traditional Security Studies
1030-1200	Session 2: Regional Players (I) – North East Asia	S. Rajaratnam School of International Studies, NTU &

	Mr Nur Azha Putra B Abdul Azim Associate Research Fellow Centre for Non-Traditional Security Studies S. Rajaratnam School of International Studies, NTU	1900	Dinner (only for Invited Participants) Venue: Jumbo Seafood Pte Ltd (Blk 1206 East Coast Seafood Centre, #01-07/08 Singapore 449883. Transport will be provided)
	Discussant Prof Han Feng Deputy Director Institute of Asia-Pacific Studies Chinese Academy of Social Sciences		
		29 August (Friday)	
		0900-1030	Session 5: Non-Traditional Dimensions of Energy Security (I)
1500-1530	Tea Break		Chairperson Prof Han Feng Deputy Director Institute of Asia-Pacific Studies Chinese Academy of Social Sciences
1530-1730	Session 4 : External Players		
	Chairperson Assoc Prof Rajesh Basrur Centre for Non-Traditional Security Studies S. Rajaratnam School of International Studies, NTU		Environmental Impact in Northeast Asia Prof Zheng Yuxin Research Fellow Institute of Quantitative & Technical Economics Chinese Academy of Social Sciences Beijing, China
	United States' Energy Security Presentation of Dr Toufiq Siddiqi's paper Adjunct Senior Fellow East-West Centre, Hawaii		Environmental Impact in Southeast Asia Mr Iwan Wibisono Coordinator for Forest Carbon Policy World Wide Fund for Nature
	India's Energy Security Ms Rekha Krishnan Visiting Fellow Centre for Research on Energy Security The Energy and Resources Institute, India		Shifting geopolitics in the Caspian Basin: The New Multifaceted Security Equation Dr Alexandre Babak Hedjazi Institute of Environmental Studies University of Geneva
	Australia's Energy Security Mr Andrew Forbes Visiting Senior Fellow Australian National Centre for Ocean Resources and Security University of Wollongong		Discussant Assoc Prof Rajesh M Basrur Centre for Non-Traditional Security Studies S. Rajaratnam School of International Studies, NTU
	Discussant Dr Bo Kong Director Global Energy and Environment Initiative John Hopkins University		
		1030-1100	Tea break

1100–1230	<p>Session 6: Non-Traditional Dimensions of Energy Security (II)</p> <p>Chairperson Assoc Prof Euston Quah Division of Economics Head, Economics & Associate Chair (Research) Nanyang Technological University</p> <p>Socio-Economic Impact in Northeast Asia Prof Tetsunari Iida Executive Director Institute for Sustainable Energy Policies Tokyo, Japan</p> <p>Socio-Economic Impact in Southeast Asia Asst Prof Maria Nimfa F. Mendoza School of Economics University of Philippines</p> <p>Discussant Asst Prof Ho Kong Weng Division of Economics School of Humanities and Social Sciences, NTU</p>	<p>&</p> <p>Mr Collin Koh Research Analyst Centre for Non-Traditional Security Studies S. Rajaratnam School of International Studies, NTU</p> <p>States, Regional and Global Governance Dr Asclepias Rachmi S Indriyanto Executive Director Indonesian Institute for Energy Economics Jakarta, Indonesia</p> <p>Role of Civil Society in Energy Security Ms Lina Alexandra Researcher Centre for Strategic and International Studies Jakarta, Indonesia</p> <p>Role of Technology Dr Alvin Chew Research Fellow Centre for Non-Traditional Security Studies S. Rajaratnam School of International Studies, NTU</p>
1230-1400	<p>Lunch Venue: Riverfront 3</p>	<p>Discussants Asst Prof T S Gopi Rethinaraj Lee Kuan Yew School of Public Policy National University of Singapore</p>
1400-1600	<p>Session 7: Towards a New Framework – Roundtable Session</p> <p>Chairperson Assoc Prof Mely Caballero-Anthony Head, Centre for Non-Traditional Security Studies S. Rajaratnam School of International Studies, NTU</p>	<p>&</p> <p>Dr Guy Hentsch Former Advisor European Centre for Nuclear Research (CERN)</p>
	<p>Role of Markets in Governance and Energy Security Asst Prof Youngho Chang Centre for Non-Traditional Security Studies S. Rajaratnam School of International Studies, NTU</p>	<p>1600 Concluding Remarks</p> <p>1700 Free & Easy</p> <p>30 August Departure of Foreign Participants</p>

LIST OF CHAIRPERSONS AND PAPER PRESENTERS

1. Prof Zha Dao Jiong
School of International Studies
Peking University
China
2. Dr Gwak Dae-Jong
Research Fellow
Korea Institute for Industrial Economics and Trade
3. Prof James Tang
Chairman, Contemporary China Studies Seminar
Programme
Centre of Asian Studies
University of Hong Kong
4. Dr Alvin Chew
Research Fellow
Centre for Non-Traditional Security Studies
S. Rajaratnam School of International Studies,
NTU
5. Mr Fabby Tumiwa
Director
Institute for Essential Services Reform (IESR)
Jakarta, Indonesia
6. Asst Prof Youngho Chang
Centre for Non-Traditional Security Studies
S. Rajaratnam School of International Studies,
NTU
7. Mr Nur Azha Putra b Abdul Azim
Associate Research Fellow
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8. Prof Han Feng
Deputy Director
Institute of Asia-Pacific Studies
Chinese Academy of Social Sciences
9. Assoc Prof Rajesh Basrur
Centre for Non-Traditional Security Studies
S. Rajaratnam School of International Studies,
NTU
10. Mr Andrew Forbes
Visiting Senior Fellow
Australian National Centre for Ocean
Resources and Security
University of Wollongong
11. Dr Bo Kong
Director
Global Energy and Environment Initiative
John Hopkins University
12. Prof Han Feng
Deputy Director
Institute of Asia-Pacific Studies
Chinese Academy of Social Sciences
13. Prof Zheng Yuxin
Research Fellow
Institute of Quantitative & Technical Economics
Chinese Academy of Social Sciences
Beijing, China
14. Mr Iwan Wibisono
Coordinator for Forest Carbon Policy
World Wide Fund for Nature
15. Dr Alexandre Babak Hedjazi
Institute of Environmental Studies
University of Geneva
16. Assoc Prof Euston Quah
Division of Economics
Head, Economics & Associate Chair (Research)
Nanyang Technological University

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| <p>17. Prof Tetsunari Iida
Executive Director
Institute for Sustainable Energy Policies
Tokyo, Japan</p> <p>18. Asst Prof Maria Nimfa F. Mendoza
School of Economics
University of Philippines</p> <p>19. Asst Prof Ho Kong Weng
Division of Economics
School of Humanities and Social Sciences, NTU</p> <p>20. Assoc Prof Mely Caballero- Anthony
Head, Centre for Non-Traditional Security Studies
S. Rajaratnam School of International Studies,
NTU</p> <p>21. Mr Collin Koh
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ABOUT THE CENTRE FOR NTS STUDIES AND THE CONSORTIUM OF NON-TRADITIONAL SECURITY STUDIES IN ASIA (NTS-ASIA)

The Centre for the Study of Non-Traditional Security (NTS) Issues is a graduate school of the S. Rajaratnam School of International Studies (RSIS), Nanyang Technological University, Singapore. The Centre is also the secretariat for the Consortium of Non-Traditional Security Studies in Asia (NTS-Asia). The consortium which is led by RSIS is a newly established network of research institutes and think tanks in Asia.

Its primary objectives are to develop further the process of networking among scholars and analysts working on NTS issues in the region, to build long-term and sustainable regional capacity for research on NTS issues, as well as to mainstream and advance the field of non-traditional security studies in Asia.

The Consortium conducts a number of activities for its members and associates. These include:

Annual Conventions, Sub-Regional Workshops and Dissemination Seminars

- Raise Awareness of emerging NTS issues and challenges in the Asian region and beyond.
- Undertake periodic studies to assess the impact of NTS on states and societies in the region.
- Facilitate the exchange of information and experiences in responding to NTS threats through comparative policy studies, both at the national and regional level.
- Build regional capacity and regional expertise on the broad field of non-traditional security.

Research Fellowship Programme

- Build capacity for research and policy studies on NTS issues.
- Provide opportunities for exchange of scholars from various institutions attached, but not limited to, the members of the Consortium.
- Give equal opportunities to males and females in the fellowship selection.

Books, Newsletters, Reports, NTS Website and Curriculum Development

- Contribute to mainstreaming of NTS in security studies and practice in Asia.
- Facilitate the flow of information by providing a database on NTS for policymakers, scholars, and opinion-makers working on NTS in Asia.
- Explore possible solutions to transnational dangers in Asia through seminars, conferences, policy studies and training programmes.
- Provide gender-sensitive perspectives on NTS and human security issue

ABOUT THE S. RAJARATNAM SCHOOL OF INTERNATIONAL STUDIES (RSIS)

The S. Rajaratnam School of International Studies (RSIS) was inaugurated on 1 January 2007 as an autonomous School within the Nanyang Technological University (NTU), upgraded from its previous incarnation as the Institute of Defence and Strategic Studies (IDSS), which was established in 1996.

The School exists to develop a community of scholars and policy analysts at the forefront of Asia-Pacific security studies and international affairs. Its three core functions are research, graduate teaching

and networking activities in the Asia-Pacific region. It produces cutting-edge security related research in Asia-Pacific Security, Conflict and Non-Traditional Security, International Political Economy, and Country and Area Studies.

The School's activities are aimed at assisting policymakers to develop comprehensive approaches to strategic thinking on issues related to security and stability in the Asia-Pacific and their implications for Singapore.



S. RAJARATNAM SCHOOL OF INTERNATIONAL STUDIES

A Graduate School of Nanyang Technological University