東北亞維持能源穩定現狀的利益

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關鍵字：能源穩定、東北亞、中國、美國、日本、南韓

中文摘要

能源穩定與地緣政治的穩定息息相關，而地緣政治的穩定又與維持有效的和平與秩序的體系有關。東北亞地緣政治的安排是在二次世界大戰後的秩序上建立的，是美國友邦（扇骨）與美國（扇軸）間所構建的一系列相互關連的互利的雙邊安排。此一安排是政經互利優先爲基礎，歷經半世紀在信任與正直的基礎上逐漸建立起來的。因其成員國有能力吸收衝擊以避免不利所有成員的尖銳不和諧的出現，所以此一體系能確保穩定、持續與平順地轉移。此一扇軸-扇骨體系（hub and spoke system）也適用於能源供給與需求。

就能源的使用而言，東北亞的特徵之一是除俄羅斯與蒙古之外此一區域的大多數經濟體都倚賴進口能源。這些經濟體也有共同的弱點，即幅員廣大能源基礎建設不易銜接，又缺乏聯合陣線來進行燃料談判，歷史觀點歧異、領土紛爭以及其他因素等阻礙他們彼此合作。本文認爲與其競爭能源供給的優勢與主導以及進行水下資源的海事紛爭，不如務實地選擇在此方面與美國合作，讓美國擔任此一地區能源交易的樞紐。

Status Quo Energy Stability: the Benefits of Maintaining Hub and Spoke system to Japan, China and Northeast Asia

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Key Words: energy stability, Northeast Asia, China, U.S., Japan, South Korea

The geopolitical arrangements in Northeast Asia is founded upon a post-World War II order sometimes known as a hub and spokes system which is a series of interconnected mutually-beneficial bilateral arrangements between US-friendly nations (the spokes) and the US (the hub).[1] This arrangement is based on mutually-beneficial economic and political priorities that are gradually built up over half a century based on trust and integrity between partners. The system ensures stability, continuity and smooth transitions for its members with the ability to absorb shocks to avoid sharp dissonance in the system that do not benefit anyone. This hub and spoke system also applies to energy supply and demand as well. Energy stability is related to geopolitical stability which is related to

1 Ikenberry, G. John, "American hegemony and East Asian Order" dated September 2004 in Australian Journal of International Affairs Vol. 58 No. 3, (Carfax Publishing), p. 353.

maintenance of an effective system of peace and order.

The maintenance of peace and order and the ability to absorb new entrants and changes in the system is dependent on the strength of a normative order, one that is principled with enough integrity to have core values of peace and equitable, balanced treatment to all players, including the hyper-powerful, large, medium and small sized states. The US has demonstrated itself sufficiently in this aspect as a benign power with willingness to help out other states in need. It therefore earns the respect and support from other nations, including smaller ones. It may be possible to label small states adherence to the system as 'band-wagoning' but in reality, band-wagoning also requires a conscious decision, based on national priorities and needs and reliance on prevailing order must be based on a form of trust to a certain extent that the leadership of the order or hub and spoke system is a highly trustable entity. In this sense, the US is credited with this reputation.

Martha Finnemore and Kathryn Sikkink and other scholars cannot explain the precise nature of the connection between norms and rationality and developed differing opinions about this aspect.[2] Normative behavior helps to foster a sense of common and collective interest and identity and within this rubric of common identity, each state may advance its interest in a pragmatic way in accordance with commonly-agreed rules. One way to

[2] Finnemore, Martha and Kathryn Sikkink, "International Norm Dynamics and Political Change" dated 1998 in International Organization, Vol. 52, No. 4, International Organization at Fifty: Exploration and Contestation in the Study of World Politics, Autumn, (Massachusetts: MIT Press), p. 888.

contextualize this is in the direction of pragmatism. States thinking and decision-making tend to be pragmatic and interest-driven. In the case of energy supply, this is probably not an exception. Energy is connected with contemporary civilization. An example of one interpretation: Richard Duncan's paper discusses the 'Olduvai Theory' which argues that energy output and production is correlated with life expectancy and industrial attainments.[3] While the precise connection between civilization and energy elicits different scholarly views, the pragmatic and practical element is clear to many states, including those in Northeast Asia.

Pragmatism strengthens the integrity and principled elements of the stable prevailing order and lubricates the interest-driven collectivity of the system. It may be possible in general that the smaller the states, the more pragmatic they have to be in order to survive and adapt in a system whereby large entities exert great and disproportionate influence. Northeast Asia has the presence of a collection of a few large states and many other smaller states. The system therefore preserves the survival of smaller states, an essential feature for peace, order and stability in the region. While the discussion of smaller states is important and indeed essential for an understanding of the Northeast Asian energy interactions, the focus of the paper is on the larger states which are the main energy users in Northeast Asia and indeed the world. Discussion on smaller and medium sized energy users in the region will be reserved

[3] Duncan, Richard C., "The Olduvai Theory Energy, Population and Industrial Civilization" dated Winter 2005-2006 in The Social Contract, available at http://www.hubbertpeak.com/duncan/olduvaitheorysocialcontract.pdf, p. 1.

for a future study.

In terms of energy usage, there are several characteristics of the energy situation in Northeast Asia that stand out. First, most of the economies in that region are dependent on imported energy with the exception of Russia and perhaps Mongolia. At least three of the economies are economically-vibrant – South Korea, China and Japan (Taiwan and Hong Kong SAR are included in this collection of economies). It also shares the common disadvantages of large terrains for energy infrastructure connectivity, lack of common front in negotiating for fuel, differences in historical viewpoints, territorial disputes and other factors that impede cooperation and collaboration between them. The essay argues that, instead of vying for supremacy and dominance in energy supply and engaging in maritime disputes over underwater resources, it may be a more pragmatic option to cooperation with the US as the hub of managing the energy transactions in that region.

What are the advantages in doing this? First, the US is the originator and foundation on which the WWII world order is constructed upon. It would not be practical to carry out and implement any initiatives without the direct or indirect support of the Americans, given their importance to the world. If cooperation is envisioned in Northeast Asia, it may be practical and pragmatic to have a loose form of regionalism whereby the US is able to participate meaningfully through its consultation with allies Japan and South Korea and its engagement (whether carrot or stick) with non-allies but important partners of China, Mongolia, the ambiguous presence of North Korea

and the economic entities of Taiwan and Hong Kong SAR. An inclusive process may be helpful rather than an exclusive one. For the same reason, the former chatter of a G2 condominium (shared strategic power between the US and China) formation in the world may not work as well in comparison, given the following reasons:

-a bipolar mechanism is reminiscent of Cold War stark choices for medium sized and smaller states which are not keen to be forced into a position of having to choose between choice A or B.

-the world geopolitical situation is much more complicated and interdependent than a G2 scenario.

-the format does not do justice to the importance of other great powers such as the EU, Japan and Russia (within the immediate Northeast Asian neighborhood), India, Indonesia, Brazil, South Africa and many others which are important world entities and civilizations in their own right.

On the other hand, Japan-South Korean closeness in friendship and partnership may help to stabilize the region, given their common interests in strategic matters in Northeast Asia. Both economies are at a similar stage of development, share common democratic values and systems and are interdependent with their important, valuable and essential alliance partner the US but also have close economic links with China and perhaps in the future energy relations with Russia. This partnership could give them the scale and size needed to manage affairs with larger neighbors, not in a hostile manner but to

coincide their interests more deeply so that they can be an anchor of stability in the region, along with other centers of power such as Pacific US, Russia, China and the not too-far distant India. Russia, China and India all have their own individual heft, weight and power to anchor the region in stability in concert along with other nations. Japan and, perhaps South Korea, alone also has this heft, weight and power but together, their combined weight provides the fourth leg to a US, China, Russia concert of nations in Northeast Asia.

The Energy hub and spokes model. Based on this scenario, one may spot the unique position of the US in this concert of nations, making it an ideal candidate as the hub of energy transactions in that region. Here are its qualifications why the US is an important hub for energy transactions in Northeast Asia. It is either the largest or second largest consumer of energy on the planet, depending on how the figures are calculated but at least according to the International Energy Agency (IEA), it is the second largest[4]. According to the Energy Watch Group, in some aspects, the US is also a ranking energy producer, for e.g. the US is a major energy producer owning 30% of global coal reserves and has the second largest produced output in the world.[5] The US economy is effectively interdependent with that of Japan, China and

[4] International Energy Agency (IEA), "China overtakes the United States to become world's largest energy consumer" dated 20 July 2010 in the IEA website, available at http://www.iea.org/index_info.asp?id=1479

[5] Energy Watch Group, "Peak Coal" in Sparking a Worldwide Energy Revolution Social Struggles in the Transition to a Post-Petrol World, edited by Kolya Abramsky, (Canada: AK Press), 2010, p. 432

South Korea, including the export orientation of these economies to the American consumer market. Energy discussions with regards to the Northeast Asian production system is likely to be meaningless without addressing this economic interchange between the production systems in Northeast Asia manufacturing for American markets. The US is a valuable and trusted ally of South Korea and Japan. The recent 3.11 Fukushima incident serves only to underline this fact. The US overall was the largest and most important facilitator of help to its ally. Pragmatically and strategically, the US alliances with Japan and South Korea will only grow stronger in the coming years to underpin peace and stability in the region.

Given that US is closely partnered with Japan and South Korea and deeply engaged economically with China (the Nixon visits effectively integrated the Chinese economy into the world economy) and a history of dealing with Russia (both in the Cold War period as well as the post-Cold War period of democratization), the US is the ideal candidate as the hub for the Northeast Asian region. It does not have ongoing historical issues in that region. It is sufficiently far away across the Pacific not to have overlapping maritime claims. It buys the products manufactured in Northeast Asia that utilizes energy that is imported from the Middle East and other sources. The US possesses the world's more advanced technologies and new ongoing technological research. It is a democratic society that encompasses a diversity of opinions and debating points and open equitably to lobbying efforts by stakeholders within an interdependent energy system.

The main question that remains then is the receptivity of energy users and consumers in the Northeast Asian region to a US hub and spoke energy model in Northeast Asia. What would China, Japan, Russia, South Korea, India and others think about this? The US has the credentials but are others willing to accept this reality and form of pragmatism? More questions rather than answers are possibly raised in thinking about this issue. It may be possible that their reactions might be ambiguous and complicated but not an outright rejection. There is not enough space to discuss such complex reactions in this short article but there is some space to understand briefly the sort of benefits Northeast Asian energy consumer states can derive from this arrangement. The arrangement is likely to be more receptive by Japan and South Korea, given their energy dependency and the crucial priority of keeping sea-lanes open in the region so that energy transportation remains uninterrupted.

The US (first ranking energy consumer), China (second ranking energy consumer), Japan (third ranking), Russia (fifth ranking), Korea (seventh ranking) and not-too-distant India (fourth ranking) are amongst the world's top consumers of energy (rankings dated 2008)[6], it makes sense for them to cooperate rather than compete for energy with each other aggressively. This point appears to

[6] Wu, Kang, Batsaikhan, Usukh and Bulganmurun Tsevegjav, "Energy Cooperation in Northeast Asia: The Role of Mongolia" (original version dated 8 November 2005, current version undated) in the Ritsumeikan Research Repository R-Cube website, available at http://r-cube.ritsumei.ac.jp/bitstream/10367/950/1/9-RJAPS26_Energy%20Cooperation%20in%20Northeast%20Asia.pdf, p. 89.

have the agreement of American, Chinese and Japanese academicians, according to Steven Lewis.[7] Jason Snow's argument probably represents the furthest extent of taking US+Northeast Asian cooperation to the furthest extent. Snow believes that one of the main factors for solidifying such alliances is energy and he goes furthest in suggesting that US and China can combine efforts to send delegations of consortiums of energy teams that include Japan and South Korea to mitigate both countries' energy consumption pressures.[8] It is unclear if regional initiatives will take this format of a US-Sino led group but it may be possible to imagine a US-consulted and participating Northeast Asian consortium if all parties are agreeable.

The importance of China and India. Steven Lewis' important study *The Future of Energy Security and Energy Policy in Northeast Asia: Cooperation among China, Japan and the United States Conference Report* examines the question of how China might cooperate with the US and Japan on energy security issues. He indicated that perception-wise, Chinese people consider the US to be the "most influential" entity in the world and that it is the biggest energy user or the sole superpower left in the post-

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7 Lewis, Steven W., "The Future of Energy Security and Energy Policy in Northeast Asia: Cooperation among China, Japan and the United States Conference Report" dated September 2004 in The James A. Baker III Institute for Public Policy of Rice University website, available at http://bakerinstitute.org/publications/UFJ_conferencereport-SECURED.pdf, p. 40.

8 Snow, Jason, "Solidifying US Alliances in Northeast Asia", available at http://se1.isn.ch, p. 1-21

Cold War years.[9] What is left now may be the political will and determination to recognize this public perception as a policy reality. But policy-making may be increasingly sophisticated and complex in an economically fast-developing, technocratically sophisticated and politically pluralistic environment in China. Sun Shao-Cheng's informative study indicated that the China State Council Information Office came up with the inaugural white paper on energy on 26 December 2007 which also placed accent on international cooperation with some African and Asian energy producers amongst other features[10], it is unclear if future white papers will address energy relation augmentation with immediate neighboring states that are not energy producers but are energy efficiency and environmentally-friendly technological giants. It may require the leadership of the US in concert with its important partners, Japan and South Korea, to provide the incentives for energy cooperation, this may be the challenge for the coming decades, given the importance of energy supply to both India and China.

One helpful incentive may be the impending oil consumption pressure for Northeast Asia. According to

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9 Lewis, Steven W., "The Future of Energy Security and Energy Policy in Northeast Asia: Cooperation among China, Japan and the United States Conference Report" dated September 2004 in The James A. Baker III Institute for Public Policy of Rice University website, available at http://bakerinstitute.org/publications/UFJ_conferencereport-SECURED.pdf, p. 13.

10 Sun, Shao-Cheng, "The Sino-Japanese Quest for Energy Resources" in the Asia Pacific Economic Association (APEA) website, available at http://www.apeaweb.org/confer/bus11/papers/Sun.pdf, p. 4

Stuart Harris, Northeast Asia (the economies and energy users of China, HKSAR, Mongolia, Japan, North Korea, South Korea and Taiwan) comprise approximately 22% of world consumption with China making up 2/3 of the share.[11] As the leading user in the pack, China may be under the most pressure to ensure stable supplies but it may also have the most potential to demonstrate leadership in working with others in the region to manage regional consumption. Jae-Young Lee and Alexey Novitskiy projects that the overall crude oil import of Northeast Asia will be 14 million barrels daily in 2020, up from 10 million barrels daily in 2008.[12] Jiang Wenran has a slightly more optimistic picture of consumption and argues that China uses 6.3 million barrels of oil daily, second after the US which uses 20 million barrels daily (mmb/d) but, in his study, China is expected to attain the level of 10 mmb/d in approximately 20 years from 2010.[13] Regardless of either projection, the message is that China needs energy and it does not have enough of its own and needs to work with the rest to continue to feed its energy

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11 Harris, Stuart, "Institutionalising Northeast Asia: The energy market" dated December 2008 in Working Paper (Australian National University, Dept. of International Relations, Research School of Pacific and Asian Studies website, (Canberra: Department of International Relations Australian National University), available at http://ips.cap.anu.edu.au/ir/pubs/work_papers/08-6.pdf, p. 3.

12 Lee, Jae-Young and Alexey Novitskiy, "Russia's Energy Policy and Its Impacts on Northeast Asian Energy Security" dated Spring 2010 in International Area Review Vol. 13 No. 1 Spring 2010, available at http://www.iar.ac.kr/file/13-1/13-1-3.pdf, p.52

13 Jiang, Wenran, "China and India Come to Latin America for Energy" in the Inter-American Development Bank Website, available at http://www.iadb.org/intal/intalcdi/PE/2010/05618.pdf, p. 8

needs. According to Preben Maegaard, energy requirements for the functions of power generation, temperature adjustments and transportation system will experience more rapid increase in India and China, comparative to the average rate for the rest of the world in the second decade of the 21st century.[14]

China in many ways is already an important world power. But it may be a different form of large influential state from the US. While the world recognizes its economic achievements and the scale of its poverty alleviation development, China is keen on crafting internal stability in accordance with its national interests, thinking and political system and its priority economically is also on uplifting the standards of living and livelihoods of its people, ensuring they have more sustainable and equitable lifestyles. This process is likely to divert considerable attention and resources on managing internal and neighboring regional relations while energy ventures further away from its immediate neighborhood are likely to be managed at arm's lengths and in a business-like manner. If energy cooperation with the US and its neighbors emerges, China's sustainable development along with peaceful normative relations with its neighborhood itself can be a source of soft power in recognition of its "rise", "emergence" and energy role in the world. The world is already convinced by China's

[14] Maegaard, Preben, "Accelerated Global Expansion of the Renewable Energy Sector as a Response to the World economic crisis: the Example of Wind" in Sparking a Worldwide Energy Revolution Social Struggles in the Transition to a Post-Petrol World, edited by Kolya Abramsky, (Canada: AK Press), 2010, p. 546.

achievement in poverty alleviation in quantitative terms, it wants to be impressed by China's qualitative achievements which may keep planners, technocrats, the private sector and non-governmental organizations occupied and busy for decades to come.

In comparison, the US is an established and well-positioned world power and has deeply entrenched and well-established interests, alliances and communications with other democracies. It has effectively global interests and its participation in world affairs is often desired by allies, partners and sometimes non-allies, whether invited directly or indirectly. It is a secure working democracy with adequate outlets and avenues for voicing alternative opinions, a dynamic and adaptable economy that leads the world in consumption and is welcomed, tolerated or specifically invited to keep the world's sea-lanes open for energy supply and transportation. A pragmatic view of the US as a global hub for managing energy transactions may cite the fact that there is no able and/or willing alternative state ready to shoulder this burden of keeping international trade and energy flow going.

While a greater percentage (70%) of India's oil comes from foreign sources compared with China's (40%)[15], India is in a more comfortable position in the

[15] Tonnesson, Stein and Ashild Kolas, "Energy Security in Asia: China, India, Oil and Peace Report to the Norwegian Ministry of Foreign Affairs" dated April 2006 in the International Peace Research institute Oslo (PRIO) website, available at http://www.prio.no/files/file47777_060420_energy_security_in_asia__final_.pdf, p. 8.

global energy map because it enjoys relative good working relationship with the Middle East, US and Japan as the world's largest democracy. India is important to Northeast Asia because its policy decisions will increasingly determine the volume of energy transmission through the South Asian continent or the Indian Ocean. If India did not have a fast-developing economy still in need of energy for development and its position next to Northeast Asia, it may have been a deciding balancer in the energy equations but its developmental needs is likely to remain as a national priority (as it should) rather than expend resources as a hub for managing energy transactions in another sub-region of the world. India's preoccupations are likely to lie with its south Asian neighborhood and crafting its internal development as it emerges as a world power (which it already is to a certain extent).

Japan's energy efficiency leadership. While the US may be the hub through which Northeast Asian energy supply and demand needs are articulated, Japan may be the longer-term future hub through which energy efficiency transactions may be managed and articulated. As a leader in energy-efficiency technologies, Japan exerts effective soft power as the model for emerging economies keen to emulate Japan's state-led fast growth economic model which had been transplanted to various extents and in various forms in East Asia and to a lesser extent in South Asia. Japan is a model not just for rapid economic development but also a model of economic development that is in tandem with social orderliness and cultural sensitivity. Japan's track record speaks for itself. It retooled its economy in the 1970s to become more

energy-efficient after the oil crises in that decade. There is no doubt Japan is able to reproduce the same kind of social mobilization, industrial discipline and technological determination to emerge even more energy-efficient after the 3.11 Fukushima incident.

China can benefit from Japan's energy efficiency hub, given that it needs to develop clean coal technologies to mitigate its dependence on coal as an energy resource. The two priorities in this area for China, according to the Nautilus report *Energy, Environment and Security in Northeast Asia: Defining a US-Japan Partnership for Regional Comprehensive Security Energy, Security, Environment in Northeast Asia (ESENA) Project Final Report*, are improving the efficiency (defined as the magnitude of energy obtainable from every ton of coal used) and upgrade the environmental integrity of the use of coal (lessening by-products of the process).[16] Japan and South Korea can work with China in such projects. It is unclear if such cooperation can lead to functionalist, constructivist, neo-functionalist or deep integration as the optimists predict, but they are unlikely to be no-detriments policies which have yieldable benefits and little apparent negative effects.

[16] Nautilus, "Energy, Environment and Security in Northeast Asia: Defining a US-Japan Partnership for Regional Comprehensive Security Energy, Security, Environment in Northeast Asia (ESENA) Project Final Report" undated in the Nautilus website, available at http://oldsite.nautilus.org/archives/papers/energy/ESENAfinalreport.PDF, p. 33.

Conclusion

All Northeast Asian energy users practice diversification in one form or another to avoid dependence particularly on Middle Eastern sources of energy. But diversification away from one source may translate to reliance on another source. The world is effectively one single energy system and it may be difficult to split it up into sub-regional systems as all aspects in terms of supply, demand, transmission, infrastructure construction are interconnected and transnational in nature. Therefore, the pragmatic solution for the region may still be working with the US and other Northeast Asian partners in an open and inclusive energy regionalism, cooperation and integration network to ensure the success of initiatives and also work with external stakeholders and parties for a more effective solution. Kent Calder's important highlights glaringly that Northeast Asia remains the only region in the developed world without a regional gas grid despite natural gas' environmentally-friendly qualities[17] and the promises that it holds out. The costs involved in setting up such a grid necessitates greater cooperation between major Northeast Asian entities in conjunction with the obstructive and tacit agreement of other smaller and medium sized states as well as the cooperation of the US and India since gas comes from regions where these two entities are highly engaged in.

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[17] Calder, Kent, "The Geopolitics of Energy in Northeast Asia" dated 16 March 2004 in the Nautilus website, available at http://www.nautilus.org/publications/essays/napsnet/forum/security/copy_of_0432A_Calder.pdfp. 17

The question that remains for stakeholders in the Northeast Asian region is would they want to continue with less productive energy competition or resolve more immediate energy needs by engaging all partners including the important players of the US and India which in many ways will determine the shape of the future global energy system's rules of engagement. Ultimately, the US plays an important decision hinderer or facilitator role. Falah al-Jibury, Amy Myers Jaffe, George Marcus, Joe Barnes, Banning Garrett, Katherine HS Moon, Thomas Berger, John Ikenberry, Richard J. Stoll, Victor Cha, Steven W. Lewis and Fred R. vonder Mehden argue that Northeast Asian energy users may turn to examples of regional energy grids such as those in Latin America as inspiration and precedent for Northeast Asia's own regional grid plans such as the one that links Russian oil and gas to Japan, China and the Korean Peninsula.[18]

Stuart Harris also lists out some of the issues that the major Northeast Asian economies and states are concerned with. For example, South Korea and Japan worry about keeping prices of energy at manageable

[18] al-Jibury, Falah, Amy Myers Jaffe, George Marcus, Joe Barnes, Banning Garrett, Katherine HS Moon, Thomas Berger, John Ikenberry, Richard J. Stoll, Victor Cha, Steven W. Lewis and Fred R. vonder Mehden, "Japanese Energy Security and Changing Global Energy Markets: An Analysis of Northeast Asian Energy Cooperation and Japan's Evolving Leadership Role in the Region Cultural Security Perceptions in Northeast Asia and their Impact on Energy Cooperation" dated May 2000 in the James A. Baker III Institute for Public Policy of Rice University website (Texas: James A. Baker III Institute for Public Policy), 2000, available at http://www.bakerinstitute.org/publications/cultural-security-perspectives-in-northeast-asia-and-their-impact-on-energy-cooperation, p. 30.

levels to compete more effectively with India and China price-wise; China and Japan prioritize maritime supply access and are keen to upgrade their refining/pipeline/energy transmission facilities; these are just some of the many examples of issues common to many if not all Northeast Asian economies and states.[19] Doh Hyun-jae highlighted the possibility of cooperation amongst the Northeast Asian nations to offset the "Asian Premium" and attempt to reduce the higher costs of oil sent to Northeast Asia (relative to Europe/North American-headed oil).[20] Whether it is a common front for working with Middle Eastern suppliers for more competitive pricing, transnational pipelines, stockpiling, the success of initiatives depend on the ability to satisfy small and medium states that their interests are not compromised and also the US hub of the world energy system that it is not bypassed or given the incentive to express opposition against any regional initiatives.

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19 Harris, Stuart, "Institutionalising Northeast Asia: The energy market" dated December 2008 in Working Paper (Australian National University, Dept. of International Relations, Research School of Pacific and Asian Studies website, (Canberra: Department of International Relations Australian National University), available at http://ips.cap.anu.edu.au/ir/pubs/work_papers/08-6.pdf, p. 8.

20 Doh, Hyun-jae, "Energy Cooperation in Northeast Asia:Prospects and Challenges" dated Autumn 2003 in East Asian Review Vol. 15 No. 3, p. 102.

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