

### ASEAN's "Addiction" to Fossil Fuels

The volatility of oil prices have been the bane of energy security worldwide. Geopolitical instabilities and loud calls for mitigating global warming have encouraged countries to explore the use of clean energy and reduce their reliance on fossil fuels. Having witnessed phenomenal socioeconomic growth since the 1997-1998 Asian Financial Crisis, Southeast Asia has been no exception to developments which impact the world energy landscape. However, the present global economic downturn has presented new energy security challenges some which are hindering the development of alternative fuels. Fortuitously, energy security has not been dropped from the minds of ASEAN leaders, who have continued to stress the need for regional energy development to spur socioeconomic growth and sustain the region's competitiveness.

It would be more realistic to conclude that, while alternative energy such as nuclear power does hold huge promises for long-term energy security, the continued appeal of fossil fuels should not be overlooked. This is especially the case for Southeast Asia, where diffusion of alternative fuel technology has been slow and uneven. Therefore, for the near future, the region will continue to depend on fossil fuels to drive socioeconomic growth. Consequently, Association of Southeast Asian Nations (ASEAN) countries will continue to be import dependent on foreign oil.

There are already numerous regional initiatives to reduce the reliance on foreign oil; one such notable regional attempt has been the Trans-ASEAN Energy Network, which was first conceived of in the late 1980s; later on it was subsumed under the ASEAN Plan of Action for Energy Cooperation (APAEC) 2004-2009.

Southeast Asia has traditionally enjoyed abundant fuel resources such as coal and natural gas even though rapid regional economic development has necessitated foreign fuel imports. Given its less polluting characteristics as compared to coal, natural gas would seem highly suitable to reduce import dependency. Thus, natural gas constitutes the cornerstone of the Trans-ASEAN Energy Network and represents a regional effort to ensure some modicum of energy self sufficiency.

Comprising the Trans-ASEAN Gas Pipeline (TAGP) and ASEAN Power Grid (APG), this common regional energy network appears promising from the start and enjoys strong intramural support within the ASEAN community of states. Despite slow progress, parts of the TAGP have been completed while portions of the APG, such as the 115-kilovolt Thai-Laotian grid, have already become operational. Realization of the entire network means increased energy interdependency among ASEAN countries; any disruption to the network along the combined supply-power chain could have serious transnational impact. Therefore, it is necessary to address potential infrastructure security risks to the Trans-ASEAN Energy Network.

### **Lurking Security Risks to the Trans-ASEAN Energy Network**

Critical energy infrastructure comprises the production, storage, refining, processing and distribution of fossil fuels. Broadly speaking, the entire concept may even underpin all related infrastructure including essential services from health and human services to the integrity of financial networks and systems. Southeast Asia on the whole requires more than 140\$ billion in capital investments in its critical energy infrastructure over the period 2006-2010; this includes 88\$ billion for the power utilities sector alone. However, the geography and active presence of militant groups in the region may potentially heighten security risks to the Trans-ASEAN Energy Network.

#### Deliberate Physical Attacks

Numerous instances of attacks on overland oil and gas pipelines by militants in Colombia, Iraq, and Nigeria amplify the vulnerability of overland energy networks to deliberate physical attacks, since such systems traverse remote, mostly uninhabited areas and cover great distances which make monitoring difficult. Compared to the Middle East, intentional attacks on Southeast Asian energy infrastructure have received much less attention in the Western media even though there have been disturbing indications of regional training and capacity-building cooperation among terrorist groups. Once complete cross-border interconnectedness is achieved, the Trans-ASEAN Energy Network could be threatened by these militants. One global study has demonstrated that deliberate attacks on electricity grids constituted 59% of all terrorist incidents worldwide from 1994 to 2004. The resilience of energy systems is crucial despite the short-lived consequences of a deliberate attack, since risk perceptions among corporate entities could deter future foreign investment.

#### Cyberspace Threats

Digitalization is necessary for the smooth and efficient functioning of modern energy infrastructures. However, this heightens cyberspace threats to electricity systems, especially since modern grids have become more interoperable, remotely accessible and less costly through the use of open software standards and protocols to achieve cost efficiency. Few power operators possess the resources available to track cyber security threats and some rely only on automated services provided by their distributed control systems or commercial software vendors. As one example, the United States' energy sector alone experienced an average of 1280 significant cyber attacks in each of the first six months of 2002. The eventual realization of a Trans-ASEAN Energy Network, which will span vast geographical areas thus increasing network complexity and difficulty in monitoring, could potentially increase its vulnerability to malicious cyber disruptions. When combined with deliberate physical attacks, cyber attacks on the regional energy network could have far-ranging adverse effects on a transnational scale.

#### **Environmental Threats**

The considerable damage wrought on the Gulf Coast energy facilities by Hurricane Katrina in

2005 illustrates the threat posed to energy infrastructures by natural disasters. Earthquakes and volcanic activities, which are regularly encountered by ASEAN countries such as Indonesia, could potentially affect the Trans-ASEAN Energy Network. The disruption to energy infrastructure as a result of natural disasters has negative effects on essential areas vital to human well-being. For example, the 7.9 Richter-Scale Sumatran earthquake in 2000 knocked out local electricity supplies and hampered rescue efforts. Within the common energy network, the power grid components would be especially vulnerable since most of the critical equipment is exposed in surface level facilities which could not be feasibly shielded against severe natural occurrences.

### **ASEAN Plan of Action for Energy Cooperation (APAEC) 2004-2009: Adequate in Addressing CEIP?**

Critical energy infrastructures worldwide are typically optimized for reliable operations in benign operating environments thus susceptible to cascading failures. Generally, global energy sectors are better prepared against unintentional incidents, such as technical accidents, rather than deliberate threats. Whether the casual incident is man-made or natural, the effect of a debilitating effect on energy infrastructures would be identical. In the face of multiple security risks, CEIP should comprise diversified energy systems, incorporate redundancies as well as active intelligence and monitoring systems so that disruption to any one portion of an infrastructure chain might not necessarily paralyze the entire system. Being a transnational and complex energy system, the Trans-ASEAN Energy Network is highly vulnerable to disruptions by a concerted terrorist attack or massive earthquake. Therefore, a comprehensive regional CEIP strategy is essential.

In fact, ASEAN has made notable strides in regional CEIP. One of the most notable instances has been maritime security cooperation in the Straits of Malacca among the ASEAN littoral states. Indeed, the region's dependence on Middle East oil imports certainly necessitates such efforts. However, the inherent vulnerability of the supply chain to geopolitical upheavals in the Middle East, as well as maritime security threats in the regional waterways, has illuminated the importance of the Trans-ASEAN Energy Network. Such regional energy development initiatives – designed to attain stability of energy supplies – could also produce a host of new vulnerabilities. As such, evaluations and adjustments of existing CEIP agreements would be necessary in order to effectively deal with new threats to the evolving energy landscape in Southeast Asia.

A closer look at ASEAN regional energy initiatives shows that more emphases has been placed on ensuring supply security and attaining energy efficiency than on regional frameworks addressing energy infrastructure security. Most prominent has been APAEC 2004-2009, which comprises (1) APG (2) TAGP (3) energy efficiency and conservation (4) new and renewable energy sources including the sustainable harnessing of coal, and (5) regional energy policy

and planning. Specifications outlined for cooperation under the rubric of the Trans-ASEAN Energy Network emphasize mainly, inter-alia, supply distribution, transit rights, jurisdiction and taxation while no provisions exist for collective arrangements on CEIP considering the geographical, technical and financial scales of these major projects. Under APAEC 2004-2009, the project on regional energy policy and planning specified eight strategies which include supply security sharing network and database development, energy-related dialogue with non-ASEAN partners as well as pursuit of studies on evolving regional energy policy issues. However, this project does not contain any clause that specifies regional cooperation in energy infrastructure security.

Individual ASEAN countries could have taken national-level CEIP measures. For instance, since the 29 June 2004 power failure that affected more than 300, 000 households for more than two hours, the Singapore Government decided to enhance its critical energy infrastructure by implementing measures revolving around system redundancy and diversification of fuel sources. Later in 2005, the Singapore Government unveiled a three-year program, costing 24\$ million, to combat cyber security threats to critical infrastructures, which include the energy sectors. However, preparations at the national-level have been insufficient to cope with threats to a more complex, region-wide energy network. Transnational risks to energy infrastructure, such as cyber security threats, require not just national-level coordination and intelligence-sharing among government agencies, industrial players and local communities, but also harmonization of procedures, in the form of a regional framework, among various countries.

Regional cooperation against cyber threats, which would be instrumental for the protection of the Trans-ASEAN Energy Network, could provide a notable example of the lack of progress in collective CEIP efforts. In August 2002, ASEAN telecommunications ministers agreed to establish an ASEAN Network Security Coordination Council and to set up an early warning system to monitor cyber terrorism in the region. However, nothing more has been heard regarding the establishment of the regional network security coordinating council even though national-level computer emergency response teams (CERTs) do exist, though not in all ASEAN countries. At present, only seven out of the ten ASEAN countries possess CERTs which cooperate at the wider regional level, through the Asia-Pacific Computer Emergency Response Team (APCERT) framework. This notwithstanding, three other ASEAN countries – Cambodia, Laos and Myanmar – are practically absent in APCERT. Even at ASEAN sub-regional level, the picture of CERT cooperation appears hazy.

Similarly, the Brunei Action Plan adopted by ASEAN ministers for telecommunications and information technology on 19 September 2006 made no mention of establishing a coordinating council, although it did specify “intensifying capacity building and training programs for national CERTs” and in “strengthening the region’s cyber-security network by expanding ASEAN CERT

incident drills to include ASEAN's Dialogue Partners in 2007". Beyond these, however, the Brunei Action Plan essentially focuses more on promoting region-wide societal access to information and communications technology (ICT). Institutional mechanisms in the form of an ASEAN coordinating council could be a wise choice in harmonizing cyber security policies, not merely restricted to national-level initiatives, which could benefit critical energy infrastructure. This is especially so since the ICT complexity of the common energy network would necessitate greater degree of interstate, multi-sectoral coordination.

### **Plugging the Gaps: Towards a Comprehensive CEIP Scheme for ASEAN**

During the ASEAN Summit held in Thailand in late February 2009, ASEAN leaders noted the sound economic fundamentals of the region, and "acknowledged that the scope for regional cooperation must be expanded to mobilize savings for investments in productive areas, particularly infrastructure development to spur regional growth." This implies that regional energy initiatives, most importantly those specified under the APAEC 2004-2009, would most likely proceed. With energy price hikes likely during the pending post-crisis recovery, such a move is certainly prudent to ensure energy security through reducing dependence on foreign oil. However, realization of such goals could unfortunately open the Pandora's Box of new vulnerabilities for the Trans-ASEAN Energy Network in particular.

In fact, the overland network may be more vulnerable than seaborne energy infrastructures such as offshore platforms and sea lanes of communications for tanker shipping. Hence, in view of a future ASEAN energy landscape which stresses greater energy self-sufficiency and interdependency through such initiatives as the Trans-ASEAN Energy Network, there is a need to look beyond regional maritime security framework as the primary CEIP mechanism. Overland, practically static, critical energy infrastructures require a different set of protective solutions beyond maritime security cooperation.

ASEAN has been very much focused on energy supply security and appears to pay less attention on CEIP, judging from the regional agreements reached to date. Active measures such as intelligence gathering against terrorist disruptions would not guarantee comprehensive CEIP since loopholes (which could be exploited by saboteurs) and uncontrolled causes (natural disasters) would always be present. Passive, reactive CEIP measures – hardening of physical and information systems – against man-made and natural threats remain highly essential. National-level CEIP measures are noteworthy, though not adequate for a future, increasingly energy-interdependent ASEAN tapping into a common energy network. A more comprehensive regional CEIP framework could potentially fill the gaps.

Before the Trans-ASEAN Energy Network is being fully realized, the following policy

recommendations could be proposed for post-APAEC 2004-2009 in particular:

- Post-APAEC 2004-2009 re-evaluation of threats to energy infrastructure
- Formulation of a regional framework of standardized CEIP guidelines, regulations and procedures, including a common risk mitigation strategy. It could facilitate regional policy coordination, even though the framework provisions would have variations according to differing national contexts
- Establishment of a regional funding program which could help individual ASEAN member states finance national-level CEIP projects
- Allocation of resources to emergency response measures, such as the utilization of distributed energy assets (includes on-site, standalone and easily-deployable systems such as fuel cells) as back-up supply system in the event of failure in the main energy grid system. These could be of use in times of major national and regional emergencies, such as a natural disaster, so that rescue and relief efforts as well as other essential services would not be hampered
- Continual focus on active, intelligence-led mitigation against man-made threats, such as through regional maritime security initiatives, given that the region will remain dependent on foreign oil over the near to medium term
- A multi-sectoral, public-private partnership and governance approach for energy infrastructure security

Working towards such goals may be financially and politically difficult but not impossible. In fact, the diverse backgrounds of the ASEAN region substantiates the need to forge cooperation among the various states, leveraging on the varying competencies of individual nations to overcome conventional challenges faced by a single country. ASEAN has traditionally emphasized regional cooperation, which culminated in the formation of the ASEAN Charter in 2008.

Energy policies are typically formulated for normal, as opposed to emergency, conditions with little attention being paid to the potential vulnerabilities from man-made or natural disruptions. The benefits of inserting redundancies and diversification into CEIP strategies have often been overlooked or foregone due to either competing priorities or the costs involved. These are legitimate concerns, bearing in mind that only a few nations, such as those in Southeast Asia, can generate funding due to their own limited financial capacities. Furthermore, the security of adequate energy supplies has always been a perennial concern for ASEAN countries. However, viewed from another perspective, the costs of potential disruptions to the critical energy infrastructure could carry greater transnational ramifications for both policymakers and the average electricity consumer. Therefore, at this current juncture, notwithstanding the global economic slowdown, more attention should be paid to forge a comprehensive regional CEIP framework that could serve to ensure the long term energy security of ASEAN states.

# **Critical Energy Infrastructure Protection: The Case of the Trans-ASEAN Energy Network**

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