Chapter 1

Introduction

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1. INTRODUCTION

Responding to the Cebu Declaration on East Asia Energy Security on 15 January 2007 by the leaders of the 16 countries of the East Asia Summit (EAS), Japan proposed to undertake a study of the energy savings and CO_2 emission reduction potential in the EAS region. The study would quantify the total potential savings under the individual energy efficiency goals and action plans of each country above and beyond business-as-usual[1]. The study would provide insight to national energy ministers for establishing goals and action plans to improve energy efficiency in their respective countries.

The Cebu Declaration outlined the difficult energy situation the region could be facing in the future, including the limited global reserves of fossil energy, the unstable world prices of fuel oil, the worsening problems of environment and health, and the urgent need to address climate change[2].

For these reasons, the EAS leaders resolved to enhance regional cooperation in various areas, including improving energy efficiency and environmental performance of fossil fuel use, reducing dependence on conventional fuels through intensified energy efficiency and conservation programs, hydropower, and expansion of renewable energy, bio-fuels, and civilian nuclear power. See Box 1 for the complete list of EAS leaders' resolutions under the Cebu Declaration.

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[1] Ministry of Economy, Trade and Industry (METI) (2007) "EAS Cooperation on Energy Efficiency and Conservation" Submitted to the 3rd ECTF Meeting in Tokyo in June 2007.

[2] ASEAN Secretariat (2007) *Cebu Declaration on East Asian Energy Security 2007*. Jakarta: http://www.aseansec.org/19319.htm (accessed February 27, 2008)

Box 1: EAS Leaders' Resolution under the Cebu Declaration

1. Improve the efficiency and environmental performance of fossil fuel use;
2. Reduce dependence on conventional fuels through intensified energy efficiency and conservation programmes, hydropower, expansion of renewable energy systems and biofuel production/utilisation, and for interested parties, civilian nuclear power;
3. Encourage the open and competitive regional and international markets geared towards providing affordable energy at all economic levels;
4. Mitigate greenhouse gas emissions through effective policies and measures, thus contributing to global climate change abatement; and
5. Pursue and encourage investment on energy resource and infrastructure development through greater private sector involvement.

Source: ASEAN Secretariat (2007) *Cebu Declaration on East Asian Energy Security 2007*. Jakarta: http://www.aseansec.org/19319.htm (accessed February 27, 2008)

1.1. The East Asia Summit

The East Asia Summit (EAS) is a collection of diverse countries. There are wide variations between them in terms of per capita income, standard of living, population density, energy resource endowment, climate, and energy consumption per capita. It is composed of the 10 member countries of the Association of Southeast Asian Nations (ASEAN), namely: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam, and 6 other countries, namely:

Australia, China, India, Japan, Republic of Korea and New Zealand.[3] Table 1 shows the geographic, demographic and economic profile of the 16 EAS countries. Table 2 shows their economic structure and energy consumption profile.

Table 1: Geographic, Demographic, and Economic Profiles, 2005

	Land Area (thousand sq.km.)	Population (thousands)	Population Density (persons/ sq.km.)	GDP (Billion 2000US$)	GDP per Capita (US$/person)
Australia	7,682	20,329	2.65	468.4	23,041
Brunei Darussalam	5	374	74.80	4.8	12,834
Cambodia	177	14,071	79.50	5.7	405
China	9,326	1,304,500	139.88	1889.9	1,449
India	2,973	1,094,583	368.17	644.1	588
Indonesia	1,812	220,558	121.72	207.7	942
Japan	365	127,774	350.07	4992.8	39,075
Korea, Rep.	99	48,294	487.82	637.9	13,209
Lao PDR	231	5,924	25.65	2.3	388
Malaysia	329	25,347	77.04	112.5	4,438
Myanmar	658	50,519	76.78		-
New Zealand	268	4,099	15.29	62.7	15,296
Philippines	298	83,054	278.70	93.7	1,128
Singapore	1	4,342	4,342.00	112.2	25,841
Thailand	511	64,233	125.70	156.8	2,441
Vietnam	325	83,119	255.75	44.7	538

Source: World Bank 2007. *World Development Indicator CD-ROM 2007.* Washington DC.

While some EAS countries have what might be called mature economies, the majority have developing economies. Several counties have a per capita GDP of less than 1000 US$ (constant 2000 US$[4]). Countries with mature economies have higher energy consumption per capita, while developing countries generally have lower energy

[3] The Ministry of Foreign Affairs of Japan (2005) *Kuala Lumpur Declaration on the East Asia Summit, 2005*. Tokyo: http://www.mofa.go.jp/region/asia-paci/eas/joint0512.html (accessed February 27, 2008).

[4] All US$ (US Dollar) in this document are stated at constant year 2000 values unless specified.

consumption per capita. A large percentage of the people in the latter countries still meet their energy needs mainly with traditional biomass fuels.

Table 2: Economic Structure and Energy Consumption, 2005

	GDP (Billion 2000US$)	Share of Industry In GDP, %	Share of Services in GDP, %	Share of Agriculture in GDP, %	Energy Consumption (Mtoe)	Energyper Capita (toe/person)
Australia	468.4	27.0	69.6	3.3	122	6.0
Brunei Darussalam	4.8	47.8	49.5	2.7	2.6	7.0
Cambodia	5.7	26.7	39.1	34.2	1.2	0.09
China	1889.9	47.5	39.9	12.6	1493.6	1.1
India	644.1	27.3	54.4	18.3	379.3	0.3
Indonesia	207.7	45.8	40.8	13.4	128.4	0.6
Japan	4992.8	30.2	68.1	1.7	530.5	4.2
Korea, Rep.	637.9	40.3	56.3	3.3	213.8	4.4
Lao PDR	2.3	29.5	25.7	44.8	0.48	0.08
Malaysia	112.5	51.8	39.6	8.7	58.5	2.3
Myanmar		9.7	33.1	57.2	3.8	0.07
New Zealand	62.7	24.9	65.7	9.4	16.9	4.1
Philippines	93.7	32.2	53.4	14.3	33.8	0.4
Singapore	112.2	33.8	66.1	0.1	30.1	6.9
Thailand	156.8	44.1	46.0	9.9	83.5	1.3
Vietnam	44.7	41.0	38.1	20.9	27.3	0.3

Sources: 1. World Bank (2007) *World Development Indicators CD-ROM 2007*. Washington DC.
2. International Energy Agency (IEA) (2007) *Energy Balances of OECD Countries 2007 and Energy Balances of Non-OECD Countries 2007*, Paris.

These differences explain why the individual development goals of each country differ in the priority they assign to energy efficiency and conservation (EEC). While countries with developed economies may be very keen on reducing energy consumption, developing countries tend to put more emphasis on economic growth and improving standards of living. It should be noted that developing countries generally have less energy consumption per capita compared to developed countries. However, as the economies of these countries grow, it should be expected that energy consumption per capita will grow as well.

Despite the differences among the 16 countries, the EAS leaders agree that the EAS "could play a significant role in community building", which could be an important cornerstone for the development of regional cooperation in the years to come[5].

1.2. Background

Upon the approval of the Economic Research Institute for ASEAN and East Asia (ERIA) of the proposal of the Japanese government to conduct a study on energy saving and CO_2 emission reduction potential in East Asia Region, the Working Group (WG) for the Analysis of Energy Savings Potential was created. All the 16 EAS countries are represented in the WG with Mr. Shigeru Kimura of The Institute of Energy Economics, Japan (IEEJ) as the leader of the group.

The WG conducted three meetings in Bangkok, Kuala Lumpur and Singapore from July to November 2007. During the first meeting, the WG leader, Mr. Kimura and his colleagues from IEEJ began with a presentation on the objective, methodology, and data requirements to carry out the analysis. The succeeding meetings were devoted to reaching agreement on outlook assumptions and to review the results of the IEEJ's model by the WG members.

[5] The Ministry of Foreign Affairs of Japan (2005) *Prime Minister Junichiro Koizumi Attends the EAS, ASEAN+3, and Japan-ASEAN Summit Meetings, (Overview and Preliminary Evaluation*), 2005. Tokyo: http://www.mofa.go.jp/region/asia-paci/eas/summary0512.html (accessed February 28,2008)

1.3. Rationale

The rationale of this study is based on the Cebu Declaration[6], which highlighted a number of goals including the following:

- improve the efficiency and environmental performance of fossil fuel use;
- reduce the dependence on conventional fuels through intensified energy efficiency and conservation programmes, hydropower, expansion of renewable energy systems and biofuel production/utilisation, and for interested parties, civilian nuclear power; and
- mitigate greenhouse gas emissions through effective policies and measures, thus contributing to global climate change abatement.

To be able to design an action plan to reduce energy consumption, there is a need for projections of energy consumption. Hence, Japan suggested the preparation of an energy outlook for the EAS region, including an estimate of the energy savings and CO_2 emission reduction potential if the current and proposed national energy efficiency and conservation goals and action plans could be implemented as planned by the EAS countries.

1.4. Objective

The objective of the study is to analyse the impact of proposed additional energy savings goals and action plans in the East Asia Summit Region. IEEJ proposed that the

[6] ASEAN Secretariat (2007) *Cebu Declaration on East Asian Energy Security (2007)*. Jakarta: http://www.aseansec.org/19319.htm (accessed February 27, 2008).

model used by IEEJ in the preparation of their *Asia/World Energy Outlook*[7] *(*the IEEJ World Energy Outlook Model) would be an appropriate tool for this study as well. The WG members agreed to IEEJ's proposal and agreed to provide IEEJ with the necessary data and information for their respective countries.

During the presentation of the research proposal to the Energy Cooperation Task Force (ECTF) that was created as an offshoot of the Cebu Declaration, there was a debate as to what to do if a country has no quantified energy saving goals and action plans. Some argued that if a country has no quantified goals and action plans, it does not necessarily mean that there is no potential. Therefore, the study should develop its own estimates of energy saving potential in these countries. However, this was not done, as the objective of the study is to prepare an energy outlook to 2030 and determine the energy savings that could result from national energy efficiency goals and action plans.

1.5. Organization of the WG

Experts from research institutions and government offices in the EAS region were invited to join a working group created for this project. The invited experts were energy analysts and government officials who have experience in the preparation of energy outlooks in their respective countries.

The WG members were asked to provide inputs from their respective countries, including key assumptions such as population and GDP growth, electric generation fuel mixes, as well as the Energy Efficiency and Conservation (EEC) goals and action plans of their country. The EEC goals and action plans were summarised and the resulting

[7] Ito, K., Morita, Y., Koyama, K., Shen, Z., Yanagisawa, A., and Suehiro, S. 2007 *"Asia/World energy outlook 2007"*, October 2007, Tokyo.

energy saving potentials were estimated.

The 1st WG meeting was held on 10-11 July 2007 in Bangkok. At the meeting, IEEJ delivered the energy outlook projections developed by IEEJ, as well as a summary of the macro-economic and energy saving assumptions used in the projections. Two cases were examined: a Business-as-Usual (BAU) case and an Alternative Policy Scenario (APS) case, as discussed in Chapter 2. Members were requested to examine the assumptions and provide suggested changes, if necessary. A progress report was submitted to the Energy Cooperation Task Force meeting on 25 July 2007 in Jakarta.

The 2nd WG meeting was held on 11-12 September 2007 in Kuala Lumpur. Members delivered their revised assumptions, which were discussed and finalised during the meeting. Model results, including the impact of EEC goals and action plans on energy demand were reviewed and discussed.

The 3rd WG meeting was held on 12-13 November 2007 in Singapore. IEEJ delivered revised energy outlook projections for both the BAU and APS cases using the revised assumptions for finalisation with the WG members. These were again reviewed and discussed. During the meeting, opportunities for energy efficiency and conservation were identified, and policy implications were also extracted.