

Chapter 1

Introduction

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Energy Outlook and Analysis of Energy Saving Potential in EAS

1. Introduction

Responding to the Cebu Declaration on East Asia Energy Security announced by the leaders of the 16 countries of the East Asia Summit (EAS) on 15 January 2007, the EAS Energy Cooperation Task Force (ECTF) was established and one of the agreed areas for cooperation was energy efficiency and conservation. Taking the initiative, Japan proposed to undertake a study on the energy savings and CO₂ emission reduction potential in the EAS region. The study would quantify the total potential savings under the individual energy efficiency goals, action plans and policies of each country above and beyond Business As Usual¹. The study would provide insights to national energy ministers for establishing goals, action plans and policies to improve energy efficiency in their respective countries.

1.1. The East Asia Summit

The East Asia Summit (EAS) is a collection of diverse countries. There are wide variations among them in terms of per capita income, standard of living, population density, energy resource endowments, 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 People's Democratic Republic (Lao PDR), Malaysia, Myanmar, the Philippines, Singapore, Thailand and Viet Nam, and six other countries, namely: Australia, China, India, Japan, Republic of Korea and New Zealand.²

While some EAS countries have what might be called mature economies, the majority have developing economies. Several countries have a per capita GDP of less than 1000 US\$ (in 2005 prices³). Countries with mature economies have higher energy consumption per capita, while developing countries generally have lower energy consumption per capita. A large percentage of the

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 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).

³ All US\$ (US Dollar) in this document are stated at constant year 2005 values unless specified.

people in the latter countries still meet their energy needs mainly with traditional biomass fuels.

These differences partly explain why energy efficiency and conservation goals, action plans and policies are assigned different priorities across countries. 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. 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 come⁴.

Table 1 shows the geographic, demographic and economic profiles of the 16 EAS countries. Table 2 shows their economic structure and energy consumption profiles.

Table 1: Geographic, Demographic, and Economic Profiles, 2011

	Land Area (thousand sq.km.) ¹	Population (million)	Population Density (persons/ sq.km.)	GDP (Billion 2005US\$)	GDP per Capita (2005US\$/ person)
Australia	7,682	22.3	2.9	818.3	36,628
Brunei Darussalam	5.3	0.4	77.1	10.1	24,765
Cambodia	181	14.6	82.7	9.3	637
China	9,327	1,344.1	144.1	4,194.9	3,121
India	2,973	1,221.2	410.7	1,326.2	1,086
Indonesia	1,911	243.8	134.6	402.4	1,651
Japan	378	127.8	350.7	4,622.0	36,161
Korea, Rep.	97	49.8	512.7	1,056.6	21,226
Lao PDR	231	6.5	28.3	4.3	666
Malaysia	329	28.8	87.5	187.8	6,531
Myanmar	653	48.3	74.0	21.5	444
New Zealand	263	4.4	16.7	122.2	27,749
Philippines	298	95.1	318.8	135.9	1,430
Singapore	0.7	5.2	7,405.3	178.2	34,379
Thailand	511	66.6	130.3	210.3	3,158
Vietnam	310	87.8	283.3	83.2	947

Note: ¹ Information on the land area of Cambodia, Indonesia and Japan were provided by the WG members from these countries.

Source: World Bank (2014) World Databank: <http://databank.worldbank.org/ddp/home.do>. Washington DC (accessed: 16 April 2014); United Nations Statistics Division (2013) UNSD Statistical Databases: <https://unstats.un.org/unsd/databases.htm>. New York (accessed: November 2013) and Government of Cambodia.

⁴ 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)

Table 2: Economic Structure and Energy Consumption, 2011

	GDP (Billion 2005US\$)	Share of Industry In GDP, % ¹	Share of Services in GDP, % ¹	Share of Agriculture in GDP, % ¹	Primary Energy Consumption (Mtoe)	Energy Consumption per Capita (toe/person)
Australia	818.3	28.5	69.0	2.5	135.8	6.1
Brunei Darussalam	10.1	71.7	27.7	0.6	3.4	8.3
Cambodia	9.3	23.5	39.8	36.7	5.3	0.4
China	4,194.9	46.6	43.4	10.0	2,727.7	2.0
India	1,326.2	27.2	54.9	17.9	749.5	0.6
Indonesia	402.4	47.1	38.2	14.7	227.5	0.9
Japan	4,622.0	26.2	72.7	1.2	461.5	3.6
Korea, Rep.	1,056.6	39.3	58.0	2.7	260.4	5.2
Lao PDR	4.3	34.8	35.7	29.5	2.4	0.4
Malaysia	187.8	40.4	47.8	11.8	64.3	2.2
Myanmar	21.5	40.1	37.5	39.8	14.1	0.3
New Zealand	122.2	24.1	69.3	6.6	18.2	4.1
Philippines	135.9	31.3	55.9	12.7	40.5	0.4
Singapore	178.2	26.7	73.3	0.0	29.8	5.7
Thailand	210.3	43.0	43.7	13.3	115.9	1.7
Vietnam	83.2	37.9	42.0	20.1	53.5	0.6

Note: ¹ Sectoral shares to GDP New Zealand are 2009 values.

Source: World Bank (2014) World Databank: <http://databank.worldbank.org/ddp/home.do>. Washington DC (accessed: 16 April 2014); International Energy Agency (IEA) (2013) Energy Balances of OECD Countries 2011 and Energy Balances of Non-OECD Countries 2011, Paris; and United Nations Statistics Division (2013) UNSD Statistical Databases: <https://unstats.un.org/unsd/databases.htm> (accessed: November 2013).

1.2. Rationale

The rationale of this study is derived from the Cebu Declaration⁵, which highlighted a number of goals including the following:

- improving the efficiency and environmental performance of fossil fuel use;
- reducing 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
- mitigating greenhouse gas emissions through effective policies and measures, thus contributing to global climate change abatement.

To be able to design an action plan or policy measures to reduce energy consumption, projections of energy consumption by sector are required. Hence, Japan suggested the preparation of an energy outlook for the EAS region, including an estimate of the energy savings and CO₂ emission reduction

⁵ ASEAN Secretariat (2007) *Cebu Declaration on East Asian Energy Security (2007)*. Jakarta: <http://www.aseansec.org/19319.htm> (accessed February 27, 2008).

potential if current and proposed national energy efficiency and conservation goals, action plans and policies could be implemented as planned by the EAS countries.

The Economic Research Institute for ASEAN and East Asia (ERIA) approved the proposal of the Japanese government to conduct a study on energy saving and CO₂ emission reduction potentials in the East Asia Region. As a result, a Working Group (WG) for the Analysis of Energy Savings Potential was convened. Members from all of 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.

1.3. Objective

The objective of the study is to analyse the potential impacts of proposed additional energy saving goals, action plans and policies in the East Asia Summit region on energy consumption by fuel and sector and greenhouse gas emissions.

Specifically, a business-as-usual BAU scenario was developed for each country outlining future sectoral and economy-wide energy consumption assuming no significant changes to government policies. An alternative policy scenario (APS) was also designed to examine the potential impacts if additional energy efficiency goals, action plans or policies that are currently, or likely to be, under consideration were developed. Increased uptake of renewable energy sources - including liquid biofuels - and nuclear energy as well as utilisation of more efficient thermal power plant technologies were also considered in the APS. The difference between the BAU and APS in both the final and primary energy consumption represents potential energy savings. The difference in CO₂ emissions in the two scenarios represents the greenhouse gas emission reduction potential.

In addition, collaboration between EAS countries on energy modelling and policy development was a key objective of the WG.