ANALYSIS ON ENERGY SAVING POTENTIAL IN EAST ASIA REGION

ERIA Working Group on Energy Saving Potential

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BACKGROUND

- The Leaders of the 16 countries of the East Asia Summit (EAS) signed the Cebu Declaration on East Asia Energy Security at the 2nd EAS Meeting held in Singapore on 15 January 2007.
- As a respond, the East Asia Summit (EAS) Energy Cooperation Task Force (ECTF) was established on 1 March 2007 focusing initially on three areas for cooperation, (i) Energy Efficiency & Conservation; (ii) Energy Market Integration; and (iii) Bio-fuels for transport and for other purposes
- As one of the co-chairs for the Energy Efficiency and Conservation (EE&C) Work Stream Japan proposed to undertake a study of the energy savings and CO2 emission reduction potential in the EAS region.
- In view of this, a Working Group Working Group for Analysis on Energy Saving Potential in East Asia Region was created in 2007 as part of the studies of the Economic Research Institute for ASEAN and East Asia (ERIA).

ECONOMIC RESEARCH INSTITUTE FOR ASEAN AND EAST ASIA (ERIA)

To facilitate ASEAN Economic Community buildings To support ASEAN's role as the driver of the wide economic integration

Objectives of ERIA

To contribute to narrowing the development gaps

To nurture a greater sense of community in East Asia

RESEARCH PROGRAMS FOR THE HARMONIOUS INTEGRATION IN ASEAN AND EAST ASIA



WORKING GROUP FOR ANALYSIS ON ENERGY SAVING POTENTIAL IN EAST ASIA REGION Objectives

- To estimate the energy savings potential in East Asia region based on:
 - Projected energy demand in future
 - Individual energy efficiency and conservation targets and action plans of East Asian countries
- To assess the energy saving potential of such targets and effectiveness of action plans by using a computer model.
- To identify areas where energy saving programs are more effective.

APPROACH

- Summarize the energy saving targets and action plans of East Asian countries and estimate energy saving potential induced by the targets and plans
- Apply scenario analysis
 - + Reference Scenario (RS): BAU case
 - + Alternative Policy Scenario (APS): Energy Efficiency and Conservation Promotion case
 - + Estimate energy conservation potential as defined below:
 - × Potential = RS APS in terms of PES or FEC
 - * PES: Primary Energy Supply
 - * FEC: Final Energy Consumption
- IEEJ energy outlook model or national models can be applied for the above analysis.

CURRENT SCENARIO APPROACH USING TWO ENERGY OUTLOOKS, BAU AND APS



MODEL STRUCTURE



MEMBERS AND TASKS OF THE WORKING GROUP

Members

 Consists of 16 members from each country, having appropriate experience in the preparation of energy outlooks in their respective countries

Tasks

- The members are requested to do followings works:
 - Choice of outlook model, IEEJ or national
 - Model assumptions
 - Macro economic assumptions
 - Energy saving goals and action plans
 - Make energy outlooks, BAU and APS, using a national model
 - Make a summary table
 - Discuss the action plans and useful efficiency indicators
 - Extract policy recommendation to ECTF

WG OUTCOMES

http://www.eria.org/research/no6-1.html

• ERIA RESEARCH PROJECT 2007 No. 6-1: Analysis on Energy Saving Potential in East Asia Region

http://www.eria.org/research/y2008-no8-1.html

 ERIA Research Project Report 2008 No. 8-1: Analysis on Energy Saving Potential in East Asia Region

http://www.eria.org/research/y2009-no11.html

 ERIA RESEARCH PROJECT 2009 No. 11: Analysis on Energy Saving Potential

http://www.eria.org/research/y2010-no21.html

• ERIA RESEARCH PROJECT 2010 No. 21: Analysis on Energy Saving Potential in East Asia

ANALYSIS ON ENERGY SAVING POTENTIAL IN EAST ASIA REGION 2010

Macro Assumptions: Population and GDP (2000 constant price)



Population

Economic Growth

CRUDE OIL PRICE



VEHICLE OWNERSHIP

× Number of Road Vehicles							
(millions)							
Country	2005	2030					
Australia	13.5	21.6					
China	31.6	206.2					
India	15.4	112.7					
Japan	74.2	78.3					
Korea	10.8	19.2					
New Zealand	3.0	4.2					





TFEC by Sector

TFEC





TFEC by Sector (ASEAN)

TFEC by Sector (East Asia)



TFEC by Energy (East Asia



TFEC by Energy (ASEAN)







TPES

TPES by Fuel

Energy Intensity by Country

		2030		Variance		
2005	BAU	APS	APS/BAU	2005/2030 BAU	2005/2030 APS	
(//////////////////////////////////////	(toe/million US\$)	(toe/million US\$)	(toe/million US\$)	%	%	%
Australia	260	205	205	0.0	-21.2	-21.2
Brunei Darussalam	397	321	255	-20.7	-19.2	-35.9
Cambodia	228	245	215	-12.2	7.5	-5.6
China	795	418	341	-18.4	-47.4	-57.1
India	589	298	227	-23.8	-49.4	-61.4
Indonesia	650	581	433	-25.5	-10.6	-33.4
Japan	104	72	64	-11.3	-30.7	-38.5
Korea	342	223	179	-19.6	-34.6	-47.5
Lao PDR	193	412	388	-5.9	113.8	101.2
Malaysia	558	346	301	-13.0	-38.0	-46.0
Myanmar	439	171	159	-7.0	-61.0	-63.8
New Zealand	247	183	164	-10.5	-25.8	-33.6
Philippines	358	304	278	-8.6	-15.0	-22.3
Singapore	241	152	148	-2.6	-37.0	-38.7
Thailand	630	590	463	-21.5	-6.3	-26.5
Viet Nam	609	560	523	-6.5	-8.1	-14.1
Total	334	301	245	-18.6	-9.9	-26.7





CO2 Emission

CO2 Emission / TPES

SUMMARY

× Key Findings

- + Sustained population and economic growth will lead to significant increases in energy demand and greenhouse gas emissions.
- + Due to significant increase of electricity demand and road transport fuel, advanced energy efficient and low emission technologies need to be widely deployed throughout the region.
- The current energy efficiency goals and action plans reported by the EAS countries could lead to significant energy saving and reduction of CO₂ emissions.
- + The diversification of the regional energy mix, which shifts from coal & oil to biomass & nuclear, will contribute to the improvement in the regional energy security as well as carbon intensity.
- The industry and transport (especially road) sectors are challenging sectors in terms of improving energy efficiency and reducing CO₂ emissions.

SUMMARY

Policy Implications

- Energy efficiency & conservation and renewable energy policies
 - × Policymakers should set and continuously improve the energy saving goals and action plans for each sub-sector.
 - Policy mechanisms, which include incentives, should contribute to promote the use of renewable energy and implementation of energy efficiency and conservation.
 - Policies to remove subsidies to fossil fuels also need to be formulated.
 - × Shift from 1st generation sources of biofuels to 2nd and 3rd generation sources need to be considered in order to avoid competition for land between food and energy production.

SUMMARY

× Policy Implications

+ Carbon emission mitigation

- CCT along with CCS technology are key options for maintaining energy security and climate change mitigation through wiser use of coal.
- Improved vehicle fuel economy and increased alternative fuel vehicles will slow oil demand growth and improve oil supply security of this region.
- Carbon pricing and provision of subsidies for application of low emission technologies such as solar PV and low emission vehicles are measures to reduce CO₂ emissions.
- + Enhancing reliable energy statistics
 - × More reliable energy statistics, especially end-use data, is needed for a robust analysis of energy saving potential applying appropriate benchmarks.

2 SUB-WORKING GROUPS AND 5 SATELLITE PROJECTS

- × 2 sub-working groups
 - + Energy efficiency design SWG
 - + Nuclear power study SWG
- × Satellite projects
 - + Energy conservation in Eastern-Asian steel industry by JFE-TRC
 - Data collection on road transport activities in India and Thailand by JARI and MRI
 - Engineering network for advancement of energy productivity in East Asia by NRI
 - Research projects for improving "CO2 mitigation roadmap" in Indonesia by MRI
 - + Clean coal technology by IEEJ
- Purpose: The sub-groups and projects will feedback their research outcomes to this WG and this WG will apply the outcomes to improve energy saving potential through increasing accuracy of the energy outlooks both BAU and APS.

OTHER OUTCOMES

 Pilot Study on Energy Consumption Survey in Residential Sector
+ China and ASEAN 10 Countries

Snapshot Study on Energy Saving Potential in Specific Sectors applying the Technology Approach

- + Cement sector
- + Road transport sector
- + Household sector
- + Building sector

SNAPSHOT STUDY IN SPECIFIC SECTOR

× Objective:

+ Analyze energy saving potential in a specific sector applying a bottom-up approach or technology approach

× Selected sectors:

- + Cement sub-sector in Vietnam
- + Road transport sector in Singapore
- + Appliances in residential sector in Lao PDR
- + Building sub-sector in Thailand

× Outcome:

+ The Bottom-up approach is useful to assess appropriateness of current energy saving targets and action plans from EAS countries

SNAPSHOT STUDY IN SPECIFIC SECTOR



ROAD TRANSPORT SECTOR IN SINGAPORE -ESP BY POLICY: OMTOE IN 2030 -ESP BY BOTTOM-UP: 2KTOE IN 2030 -DIVERSIFICATION FROM ORDINARY CARS TO MORE EFFICIENT CARS TAKES TIME

Building sector in Thailand

ESP in Res&Com by Policy: 9 Mtoe

More efficiency in air conditioning, lighting and others

ESP in Buildin<mark>g by Bottom-</mark>up: 2 Mtoe

20%

Introduction

✓CO2 emissions from transport sector in the reference scenario are predicted to increase steadily.

CO2 Emissions by Sector



CO2 Emissions from Transport Sector in the Reference Scenario



Power generation Industry residential Other sectors Source : IEA, CO2 Emissions From Fuel Combustion (2010 Edition), World Energy Outlook 2009

COLLABORATION WITH APERC

- × APERC presented its CEEDS project.
- × APERC conducts CEEDS in addition to PREE.
- CEEDS focus on sector wise energy efficiency and conservation issues.
- APERC will hold two workshops for CEEDS. APERC and this WG will explore the possibility to hold APERC and ERIA joint workshops.
- It is confirmed that APERC and this WG continues to cooperate in terms of information sharing.

THANK YOU