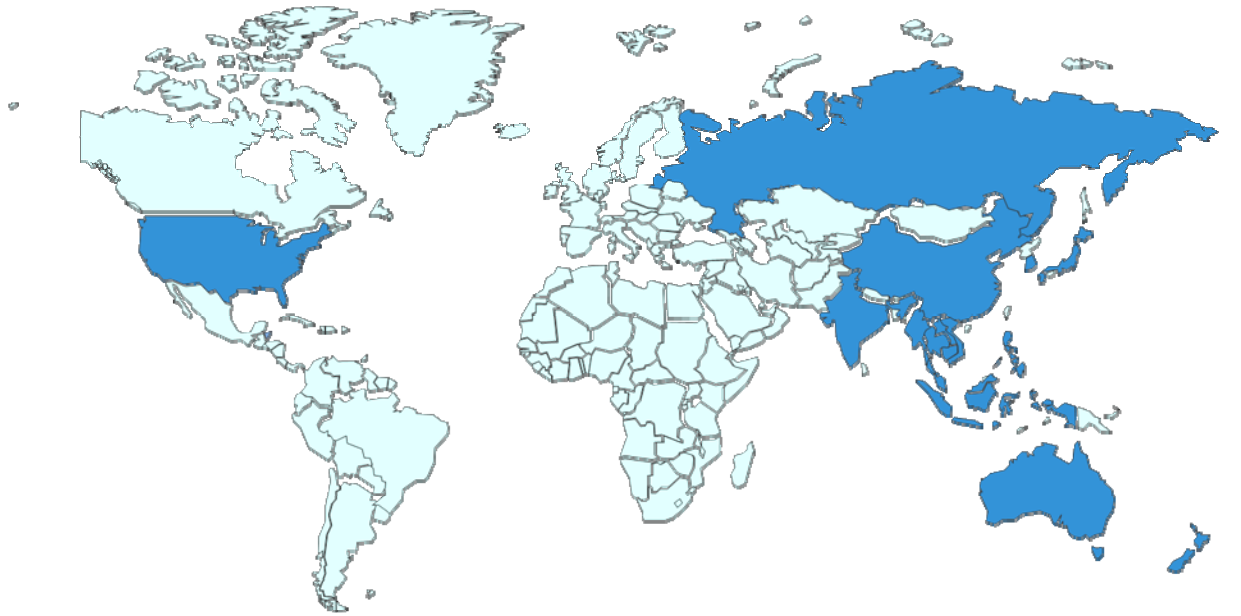


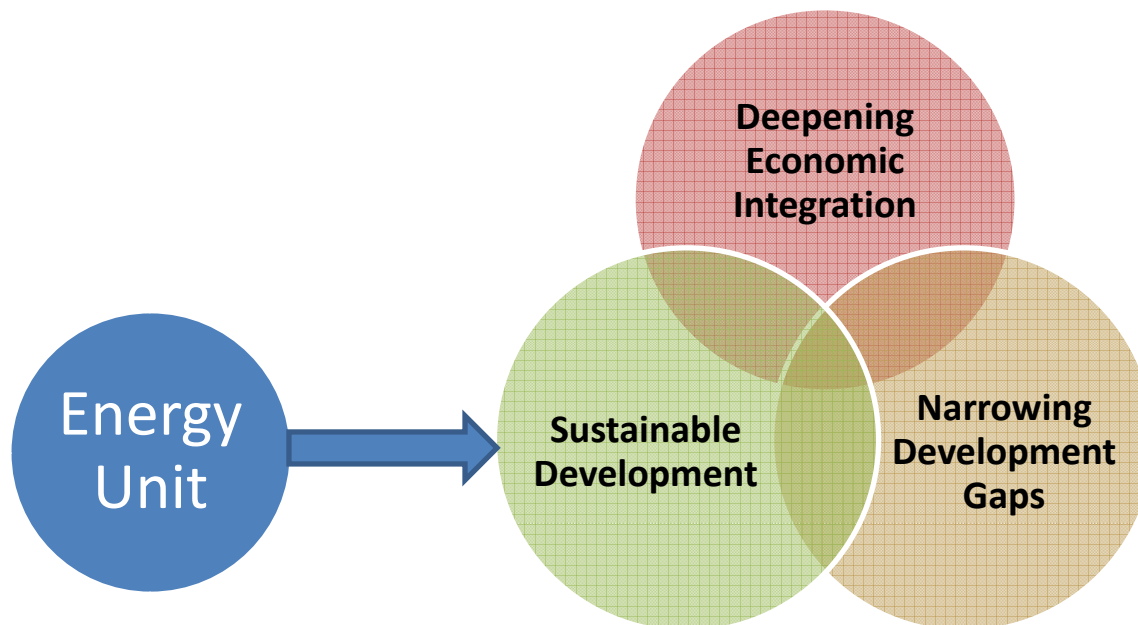


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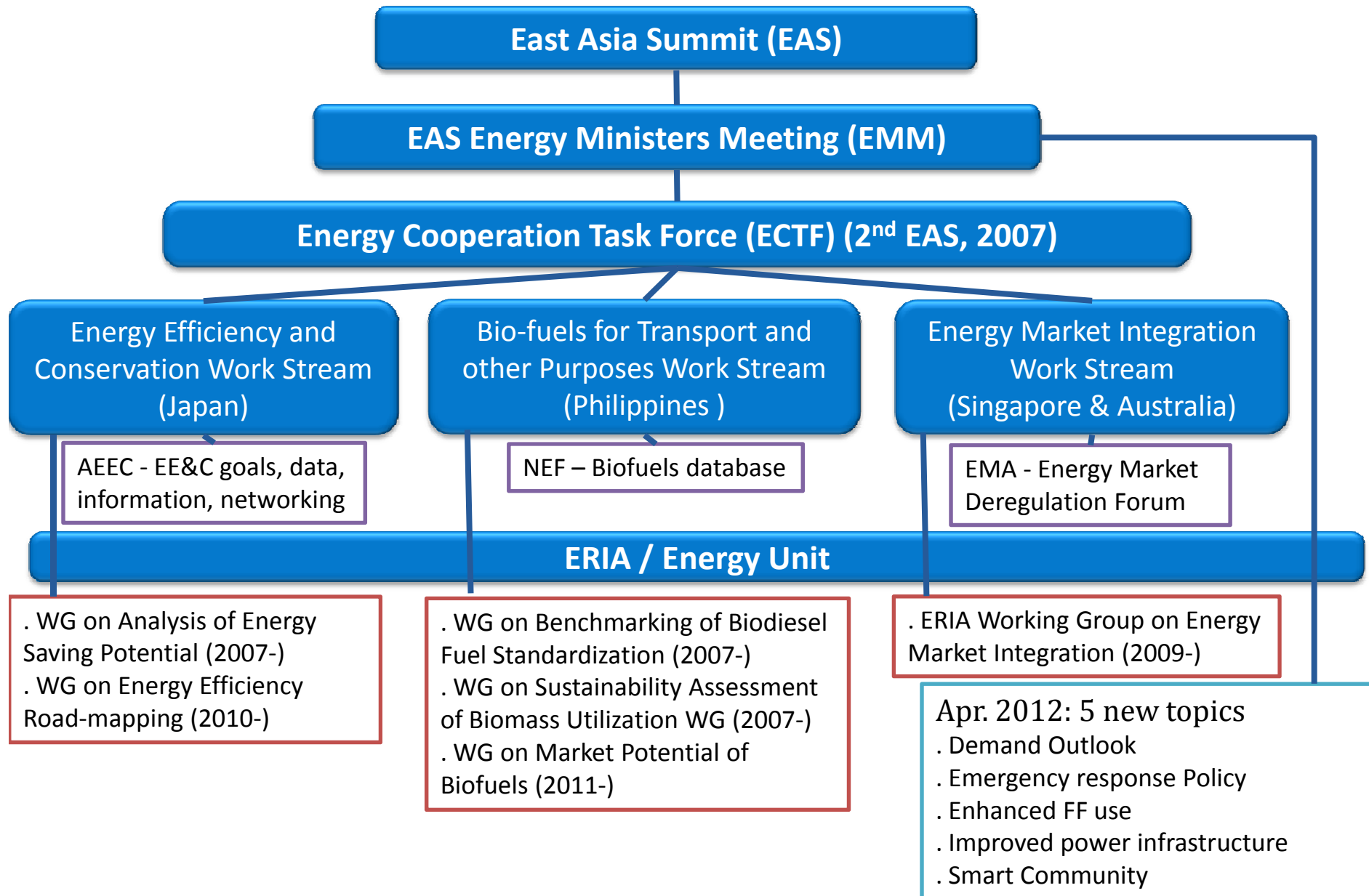


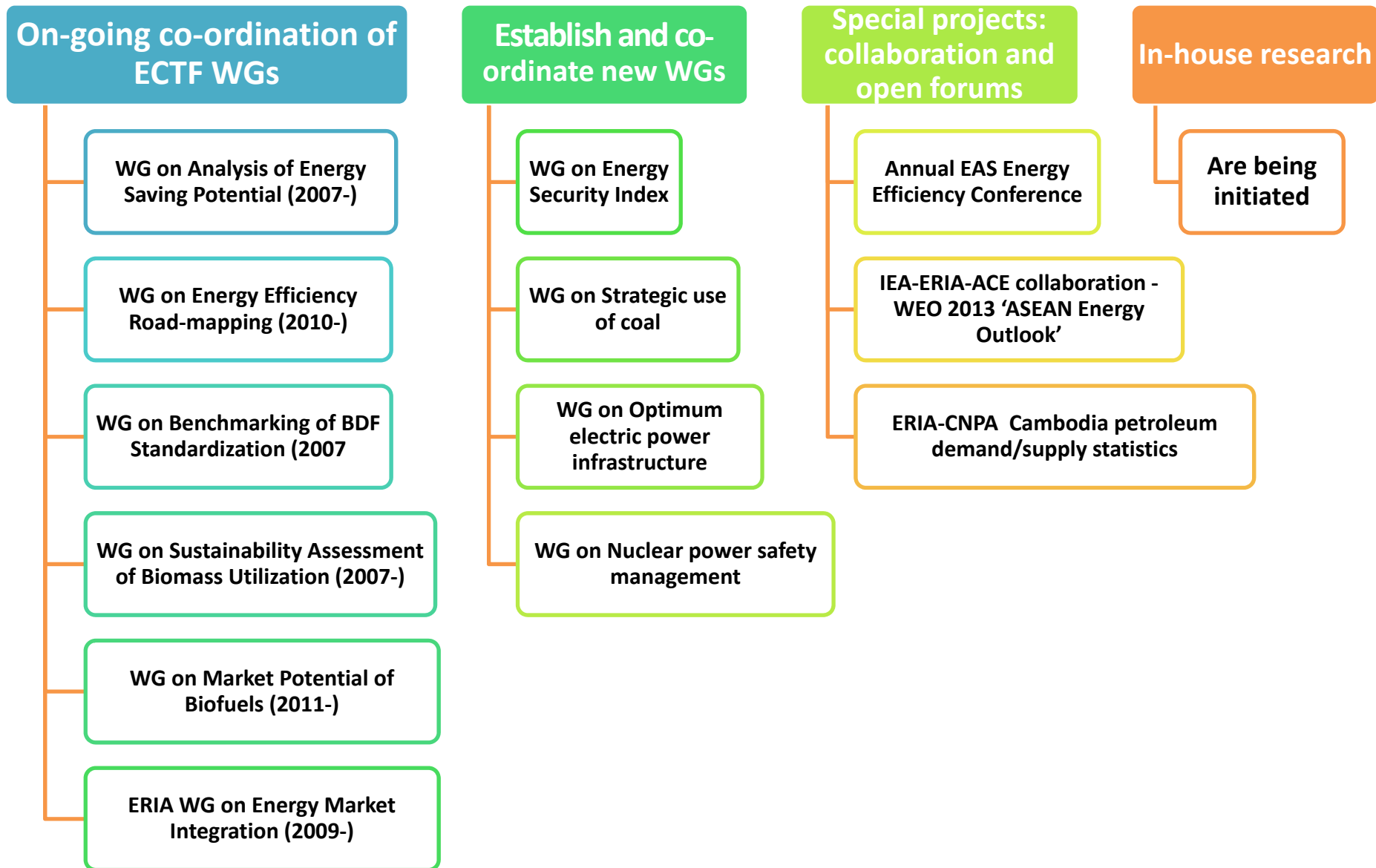
## **Research in ERIA Energy Unit**

**Phoumin, HAN  
Energy Economist**



# EAS energy co-operation Framework and Activity





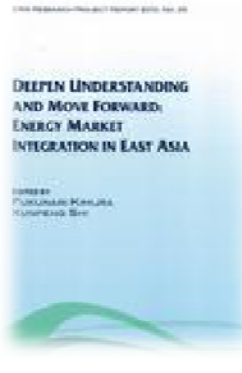
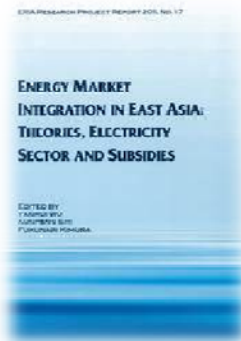
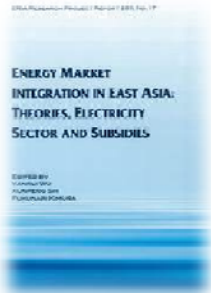


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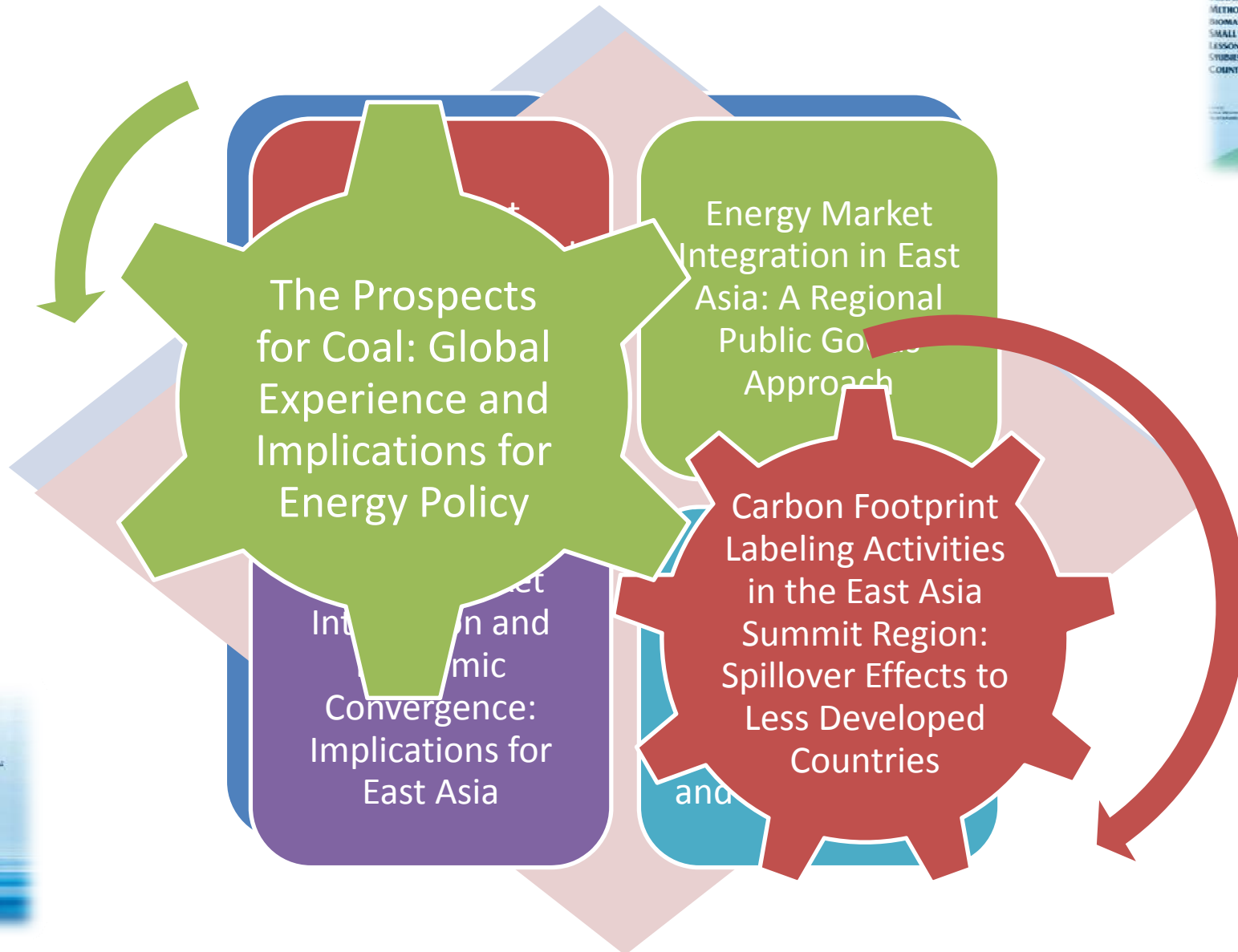
ERIA discussion  
papers

ERIA policy  
briefs

ERIA project  
reports



# Publication- discussion papers



# Publication- project reports

ERIA-RPR-2007-6-2 Standardization of Biodiesel Fuel for Vehicles in East Asia;

ERIA-RPR-2008-8-2 Guidelines to Assess Sustainability of Biomass Utilization in East Asia;

ERIA-RPR-2010-21 Analysis on Energy Saving Potential in East Asia;

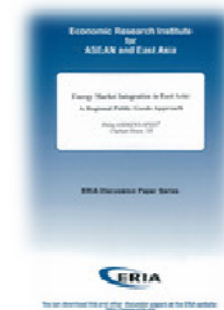
ERIA-RPR- 2011-17 Energy Market Integration in East Asia Theories, Electricity Sector and Subsidies;

ERIA-RPR-2007-6-3 Sustainable Biomass Utilization Vision in East Asia;

ERIA-RPR-2008-8-3 Benchmarking of Biodiesel Fuel Standardization in East Asia;

ERIA-RPR-2010-22 Sustainable Assessment Methodology for Biomass Energy Utilization for Small and Large Scale Initiatives;

ERIA-RPR-2008-6-2 Mainstreaming Sustainable Development Policies in East Asia;



# Publication- project reports

ERIA-RPR-2010-25 Deepen Understanding and Move Forward Energy Market Integration in East Asia;

ERIA-RPR-2008-7 Sustainable Automobile Society in East Asia;

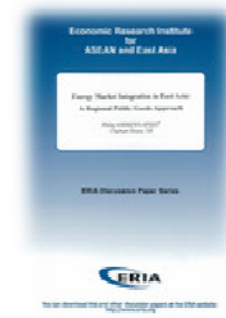
ERIA-RPR-2009-12 Sustainability Assessment of Biomass Energy Utilization in Selected East Asian Countries;

ERIA-RPR-2011-13 Study on the Development of an Energy Security Index and an Assessment of Energy Security in East Asia Countries;

ERIA-RPR-2008-8-1 Analysis on Energy Saving Potential in East Asia Countries;

ERIA-RPR-2009-13 Energy Market Integration In The East Asia Summit Region-Review of Initiatives And Estimation Of Benefit;

ERIA-RPR-2011-18 Analysis on Energy Saving Potential in East Asia Region





# Publication- policy briefs

## Policy Brief

### The Economic Consequences of Shifting Away From Nuclear Energy

- **GTAP Model, Database, and Extension**
- **Simulation Results**
- **Policy Implications**

By Ken Itakura

*In the aftermath of the devastating nuclear fallout in Japan, there has been a harsh debate surrounding the role of nuclear energy in electricity generation. A changing role will have economic consequences on production, consumption, and international trade. To quantify these effects, we implemented simulations with a global CGE model and database. The simulation results show that reductions in the use of nuclear for electric power generation may have profound negative impacts on the Japanese economy.*

A nuclear accident at the Fukushima power plant changed the future direction of Japanese energy policy as well as Asian energy policy. These policies are integrated via technological, financial, and nuclear energy knowledge sharing activities within the region. The main objective of this policy brief is to shed some light on the following question: what would be the economic consequences of altering the source of power generation from nuclear to fossil fuels? This Japanese case study offers policy implications for both Japan and the region as a whole.

A global Computable General Equilibrium (CGE) model and its database are used to quantitatively estimate the effect of reducing the use of nuclear power in Japan through economic linkages and channels affecting industries and households across countries. Two sets of simulations were implemented: Simulation [A]: Reduce the electric power generated by nuclear in Japan; and Simulation [B]: Reduce the electric power generated by nuclear in Japan, while maintaining the overall generation level by substituting nuclear for fossil fuels.

Suppressing the use of nuclear power in simulation [A] will lead to a fall in supply of electricity, and I will examine how far economic activities in Japan would be curtailed. In simulation [B], electric power generation based on fossil fuels will fill the gap caused by the cut in nuclear. The extent to which substitution would mitigate the negative impacts on economic activities is considered.

• **GTAP Model, Database, and Extension**

A multi-sector multi-region CGE model is employed to evaluate the quantitative effect of shifting the electric power generation from nuclear to fossil fuels. The widely used

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## Other works of



Capacity Building Seminar

Conference

Workshop

Symposium

Public Private Partnership (PPP)

ERIA/JENESYS Next Leaders Program

APEN Projects



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### 3rd ASEAN Connectivity Symposium

The two-day symposium organized by Economic Research Institute for ASEAN and East Asia (ERIA), Ministry of Foreign Affairs of Cambodia and ASEAN Secretariat on 7 and 8 September in Phnom Penh,

3rd ASEAN Connectivity Symposium

Asia Cosmopolitan Award

Comprehensive CADP Asia Development Plan

RIN Statement

Statement 1st ERIA Governing Board Meeting

#### Latest News

- September 24, 2012 [News] ASEAN Economic Community Symposium
- September 21, 2012 [News] First Global Conference at which both Government and Private LNG Producers and Consumers Gathered
- September 19, 2012 [News] Outcomes of the 30th ASEAN Ministers on Energy Meeting and its Associated Meetings
- September 17, 2012 [Press Releases] ERIA Launched the ERIA's Research Project in Fiscal Year 2012-13
- September 15, 2012 [Press Releases] The Selection Committee Member Discussed the Candidates of the 1st Asia Cosmopolitan Awards

...More

#### Upcoming Events

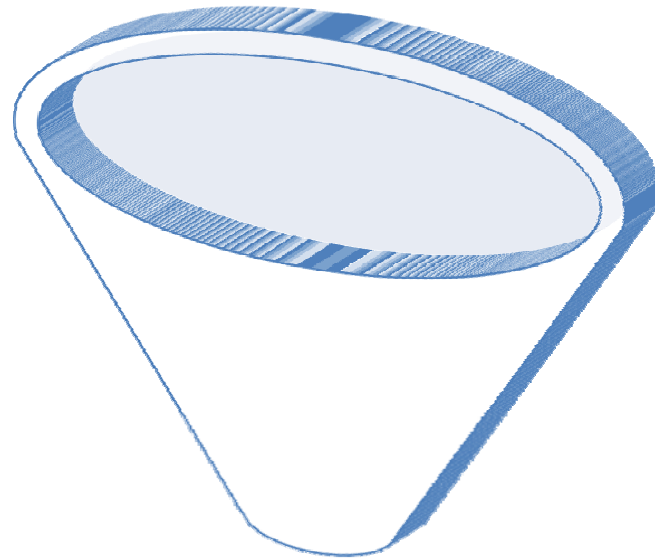
- November 16, 2012 Editor's Roundtable on ASEAN Connectivity
- December 18, 2012 The 1st Asia Cosmopolitan Awards Ceremony and Forum

...More

#### Latest Publications

- September 27, 2012 [Discussion Papers] Market Entry Barriers for FDI and Private Investors: Lessons from China's Electricity Market
- September 27, 2012 [Discussion Papers] Electricity Market Integration: Global Trends and Implications for the EAS Region
- September 27, 2012 [Discussion Papers] Power Generation and Cross-border Grid Planning for the Integrated ASEAN Electricity Market: A Dynamic Linear Programming Model
- September 06, 2012 [Research Project Reports] Energy Market Integration in East Asia: Theories, Electricity Sector and Subsidies
- August 24, 2012 [Discussion Papers]

http://www.eria.org/events/2012/06/asean-connectivity-symposium.html ch Projects



**Recap on ERIA Working Group on  
“Benchmarking of Biodiesel Fuel  
Standardization in East Asia”**



Palm



Soybean



Rapeseed



Jatropha



Coconut

## Key drivers to bio-fuels

Soaring oil prices and increased energy consumption;

Countermeasure for global warming;

Potential feedstock (2<sup>nd</sup> generation of bio-fuels feedstock)

Necessity of a standard of biodiesel fuel specification

Considering all feedstock harvested in Asia region;

To prevent vehicle's troubles;

To control fuel quality in the actual market

Stabilized biodiesel fuel production, establishing fuel quality standard and the safety use are key to improve the use of biodiesel

## Bio diesel fuel and expected feedstock in EAS members

Country	Mixing rate	Main Feedstocks	Strategy / Goal	Standard
Australia	Up to 5% in automotive diesel.  NSW B2 mandate (January 2010)	Tallow Waste cooking oil Soy (imported)	No Federal mandate. Up to 5% allowed in automotive diesel.  NSW mandate - B2 in January 2010 and B5 in 2012 – as supply is available.	Fuel Standard (Biodiesel) Determination 2003. Fuel Standard (Automotive Diesel) Determination 2001.  Biofuels Act 2007 (NSW Government).
China	5% 20%	Waste cooking oil Jatropha	National Goal : 2 M tons at 2010; 12M tons at 2020; Biodiesel Standard: BD100- GB/T20828-2007;BD5-Protocol finished at 2008, waiting for conforming	GB/T20828-2007 BD5 Standard -protocol finished
Indonesia	up to 10%	Palm	National Energy Program / BDF usage 10.22 million kL in 2025	SNI-04-7182-2006
Japan	Up to 5% in diesel fuel  (no mandate)	Waste cooking oil	No national mandate. Up to 5% allowed in automotive diesel.  The reduction of crude oil dependence in the country's transportation sector to ca. 80% in 2030	Compulsory Diesel Fuel Standard (FAME Blended Diesel Fuel)  JIS K2390:2008 (Blend-stock for B5)
Malaysia	5%	Palm	National Biofuel Policy 2006 / B5	MS 2008:2008
New Zealand	Up to 5% for retail sales	Tallow, Rapeseed, Waste cooking oil	Up to 5% biodiesel permitted in diesel for retail sale.	Engine Fuel Specifications Regulations 2008 (B100 and biodiesel blend quality requirements)

## Bio diesel fuel and expected feedstock in EAS members

Country	Mixing rate	Main Feedstocks	Strategy / Goal	Standard
Philippines	- B1 (2004) for government - owned and controlled vehicles	Coconut	Memorandum Circular #55	- PNS/DOE QS 002:2003 (B100) (Biodiesel: Cocomethyl ester)
	- B1 (2007) for all diesels	Coconut	Biofuel Law 2006 ➢ National Biofuels Board	- PNS/DOE QS 002:2007 (B100) - PNS/DOE QS 004:2007 (B1)
	- B2 (2009) for all diesels	Coconut  (Research on-going for Jatropa and other feedstocks)	Renewable Energy Law 2009	- PNS/DOE QS 004:2009 (B2)
Singapore	-	-	-	Nil
Republic of Korea	B0.5(2007) B1.0(2008) B1.5(2009) B3(2012)	Soybean, Palm (imported) Waste cooking oil	PPAFB Act, MOCIE BD100 from Apr. 2006 BD 20 from Jul. 2006 BD5 from Jan. 2006	have
Thailand	B2 (2008) B5 (optional) One-grade diesel of up to 5% (2011)	Palm	Biodiesel Development and Promotion Strategy nationwide / Mandate B2 in Feb. 2008, Optional B5 One-grade diesel (≤5%) in May 2011  (5.97 ML/D in 2021 target)	DOEB-2009 (B100 Community level) DOEB-2007 (B100 Industrial level) DOEB-2011 onwards (One-grade diesel)
Vietnam	B5 (by 2010)	Basa fish	50,000 t/year of B5 (by 2010)	TCVN 7717: 2007

## Impurities and the oxidation of biodiesel fuel



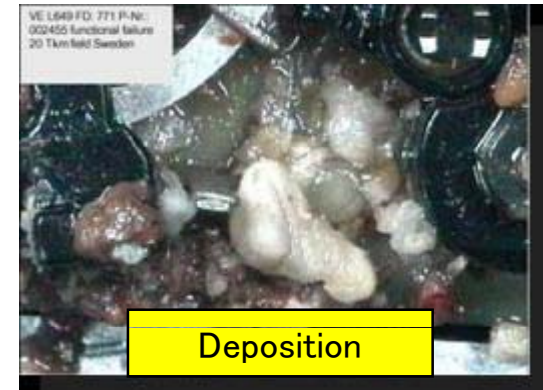
Examples of mechanical defects caused by using “inferior biodiesel fuel”



Injector  
(source : JAMA)



Fuel tank  
(source: Fuel Policy Subcommittee)



Engine  
(source: JAMA)

It is necessary to use “High-quality biodiesel fuel” to prevent these troubles



Harmonization of standards within the East Asia region will facilitate the use and trading of high-quality biodiesel fuel.



# Goal of the ERIA BDFWG

Safety "Automobile Industry"  
and "Our Beautiful Earth"

Quality Control/Management  
method: 2011-2012 (Plan)



Standard  
(EESB: 2008)

Items	Units	U.S. ASTM D6751-07b	EU EN14214:2003	Japan JIS K2390:2008	EAS-ERIA BDF Standard (EESB):2008
Ester content	mass%	-	96.5 min.	96.5 min.	96.5 min.
Density	kg/m <sup>3</sup>	-	860-900	860-900	860-900
Viscosity	mm <sup>2</sup> /s	1.9-6.0	3.50-5.00	3.50-5.00	2.00-5.00
Flashpoint	deg. C	93 min.	120 min.	120 min.	100 min.
Sulfur content	mass%	0.0015 max.	0.0010 max.	0.0010 max.	0.0010 max.
Distillation, T90	deg. C	360 max.	-	-	-
Carbon residue (100%) or Carbon residue (10%)	mass%	0.05 max.	0.30 max.	0.3 max.	0.05 max. 0.3 max.
Cetane number	-	47 min.	51.0 min.	51.0 min.	51.0 min.
Sulfated ash	mass%	0.02 max.	0.02 max.	0.02 max.	0.02 max.
Water content	mg/kg	0.05(vol%) max.	500 max.	500 max.	500 max.
Total contamination	mg/kg	-	24 max.	24 max.	24 max.
Copper corrosion	-	No.3	Class-1	Class-1	Class-1
Acid value	mgKOH/g	0.50 max.	0.50 min.	0.50 max.	0.50 max.
Oxidation stability	hrs.	3 min.	6.0 min.	(**)	10.0 min. (***)
Iodine value	-	-	120 max.	120 max.	Reported (***)
Methyl Linolenate	mass%	-	12.0 max.	12.0 max.	12.0 max.
Polyunsaturated FAME (more than 4 double bonds)	mass%	-	1 max.	N.D.	N.D. (***)
Methanol content	mass%	0.2 max. (*)	0.20 max.	0.20 max.	0.20 max.
Monoglyceride content	mass%	-	0.80 max.	0.80 max.	0.80 max.
Diglyceride content	mass%	-	0.20 max.	0.20 max.	0.20 max.
Triglyceride content	mass%	-	0.20 max.	0.20 max.	0.20 max.
Free glycerol content	mass%	0.020 max.	0.02 max.	0.02 max.	0.02 max.
Total glycerol content	mass%	0.240 max.	0.25 max.	0.25 max.	0.25 max.
Na+K	mg/kg	5 max.	5.0 max.	5.0 max.	5.0 max.
Ca+Mg	mg/kg	5 max.	5.0 max.	5.0 max.	5.0 max.
Phosphorous content	mg/kg	10 max.	10.0 max.	10.0 max.	10.0 max.

EAS's Initiative

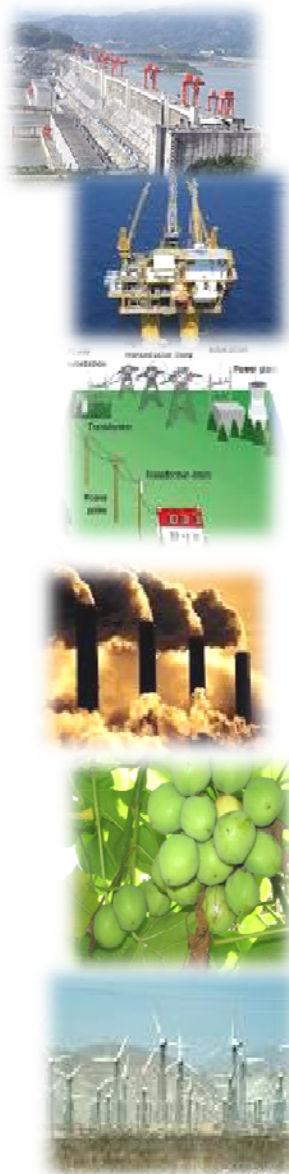


Handbook: 2010

Produce, Trade and Use  
"High-quality Biodiesel Fuel"...

Findings from Working Group on  
“Benchmarking of Biodiesel Fuel  
Standardization in East Asia”  
presented by  
Dr. Nuwong Chollacp, MTEC





# Thanks for your attentions

