ASEAN ENERGY MARKET INTEGRATION (AEMI):

PROCEEDINGS
AEMI BRAINSTORMING SESSION
GRAND MERCURE FORTUNE BANGKOK,
BANGKOK, MAY 14-15, 2014

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AEMI BRAINSTORMING SESSION, BANGKOK, MAY 14-15, 2014

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จุฬาลงกรณ์มหาวิทยาลัย
ASEAN STUDIES CENTER
CHULALONGKORN UNIVERSITY

AGENDA

ASEAN ENERGY MARKET INTEGRATION (AEMI)

BRAINSTORMING SESSION
Grand Mercure Fortune Bangkok
May 13-14-15, 2014

May 13, 2014

6:00-6:30 pm – Welcome Remarks and Cocktail
6:30-9:00 pm – Welcome Dinner

May 14, 2014

9:00-9:30: **Opening Remarks – The AEMI Initiative: Across Borders**
Dr. M.R. Kalaya Tingsabadh, Vice President, Chulalongkorn University;
Dr. Chayodom Sabhasri, Dean, Faculty of Economics, Chulalongkorn University

Photo Group Session

9:30-10:00: **The AEMI Initiative – Accomplishments, Next Steps, Timeline**
Dr. Nawal Kamel, Chulalongkorn University
Dr. Philip Andrews-Speed, National University of Singapore

10:00-10:30: **AEMI Group introductions**
All participants

10:30-11:00: **Objectives and Modalities of the Brainstorming**
Dr. Nawal Kamel, Chulalongkorn University
Dr. Philip Andrews-Speed, National University of Singapore

11:00-11:15 – Coffee Break

11:15-11:45: **Components of AEMI Blueprint – Overview (what it *should* contain)**
Dr. Nawal Kamel, Chulalongkorn University
Dr. Philip Andrews-Speed, National University of Singapore

11:45-12:30: **Components of AEMI Blueprint – Revisions**
Roundtable Discussion, all participants

12:30-2:00 pm – Lunch

2:00-2:30 pm: **Components of AEMI Blueprint – Conclusions**
Roundtable discussion, all participants

2:30-3:15 pm: **AEMI Papers for Blueprint and Roadmap – Overview**
Dr. Nawal Kamel, Chulalongkorn University
Dr. Philip Andrews-Speed, National University of Singapore

3:15-3:30 pm – Coffee Break

3:30-5:00 pm: **AEMI Papers for Blueprint and Roadmap – Revisions**
Roundtable discussion, all participants

5:00-5:30 pm: **First Day Conclusions**
Dr. Nawal Kamel, Chulalongkorn University
Dr. Philip Andrews-Speed, National University of Singapore

5:30-6:00 pm – Break
6:00-9:30 pm – Farewell Dinner

May 15, 2014

9:00-10:30: **AEMI Papers for Blueprint and Roadmap – Conclusions (what we *will* do)**
Roundtable discussion, all participants

10:30-11:00: **AEMI Papers for Blueprint and Roadmap – Work Plan and Next Steps**
Dr. Nawal Kamel, Chulalongkorn University
Dr. Philip Andrews-Speed, National University of Singapore

11:00-11:15 – Coffee Break

11:15-12:15 pm: **AEMI Papers for Blueprint and Roadmap – AEMI Group Commitments**
Roundtable discussion, all participants

12:15-12:30 pm: **Concluding Remarks**
Dr. Nawal Kamel, Chulalongkorn University
Dr. Philip Andrews-Speed, National University of Singapore

12:30-2:00 pm – Lunch

AEMI BRAINSTORMING SESSION,

BANGKOK, MAY 14-15, 2014

2. LIST OF ATTENDEES

ASEAN ENERGY MARKET INTEGRATION (AEMI)

BRAINSTORMING SESSION
Grand Mercure Fortune Bangkok
May 13-14-15, 2014

LIST OF ATTENDEES

I. AEMI Group members

BRUNEI	Dr. Lim Chee Ming *cheeming.lim@ubd.edu.bn* Dr. Romeo Pacudan *romeo.pacudan@bneri.org.bn,* *romeo.pacudan@gmail.com* Dr. Xunpeng Shi *xunpeng.shi@bneri.org.bn,* *xunpeng.shi@gmail.com,* *shixunpeng@hotmail.com*	Associate Professor, Institution of Engineering and Technology, Universiti Brunei Darussalam (UBD). Chief Researcher and Director, Renewable and Alternative Energy, Brunei National Energy Research Institute (BNERI). Chief Researcher and Director, Energy Efficiency and Conservation, Brunei National Energy Research Institute (BNERI).
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II. AEMI Advisory Committee

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Dr. Nawal Kamel *nawal.thailand@gmail.com*	Visiting Professor, Faculty of Economics, Chulalongkorn University, Thailand.
Dr. Philip Andrews-Speed *esicpa@nus.edu.sg*	Principal Fellow, Energy Studies Institute (ESI), National University of Singapore, Singapore (NUS).

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Ms. Siti Azrah Mohd Ibrahim *azrah@kettha.gov.my*	Principal Assistant Secretary, Electricity Policy, Energy Sector, Ministry of Energy, Green Technology and Water (KeTTHA), Member of the APAEC Drafting Committee, Malaysia.
Mr. Yim Sophy *yimsophymime@ymail.com*	Officer, General Department of Energy, Ministry of Mines and Energy (MME), Cambodia.

IV. **Research/Academic Institutions**

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Dr. Isabel Pereira Rodrigues *isabel.per@mahidol.ac.th,* *isamedalho@gmail.com*	Lecturer, Mahidol University International College (MUIC), Thailand.
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Dr. Ruengsak Thitiratsakul *ruengsak@ptit.org*	Deputy Executive Director, Petroleum Institute of Thailand (PTIT), Thailand.
Dr. Sirintornthep Towprayoon *sirin@jgsee.kmutt.ac.th*	Associate Professor, Joint Graduate School of Energy and Environment (JGSEE), King Mongkut's University of Technology Thonburi (KMUTT).
Ms. Suthida Chokthanyawat *suthida@ptit.org*	Analyst, Petroleum Institute of Thailand (PTIT), Thailand.

Also present was Dr. Chaiwat Muncharoen.

3. AEMI INITIATIVE: MOVING FORWARD

AEMI BRAINSTORMING SESSION

Grand Mercure Fortune Bangkok, May 14-15, 2014

AEMI INITITAVE: MOVING FORWARD

A. ACHIEVEMENTS

1. The ASEAN Energy Market Integration (AEMI) initiative makes the case for energy market integration across ASEAN in the framework of the ASEAN Economic Community (AEC). A network of ASEAN academics have constituted the AEMI Group to develop the rationale for such an approach, assess the benefits it would deliver, design its architectural structure, and draw a strategy for its deployment through 2030 within the AEC. The 31st Senior Officials Meeting on Energy (SOME) endorsed the AEMI initiative last June in Bali. The AEMI Group has also benefited from the continuous support and guidance by the ASEAN Secretariat, and has relied on the publications from the ASEAN Center for Energy (ACE).

2. The AEC is to provide for arrangements to transform ASEAN into a single market with a free flow of goods, services, investment and skilled labor, so that resources go into their most productive uses within ASEAN for the benefit of all. The objective of AEMI is to extend the scope of such provisions to the energy sector – that is, to allow the free flow of energy products, services, investment and skilled labor in the framework of AEC, in order to achieve access to secure, affordable and sustainable energy sources for all ASEAN Member States (AMS).

3. AEMI would build on the current ASEAN Plan of Action for Energy Cooperation (APAEC, 2010-2015), taking it a step further, from regional energy cooperation into energy integration. It would deepen APAEC accomplishments by lifting the challenges it faces, and would broaden them by capturing the new opportunities provided within the AEC. The approach would move from Memoranda of Understanding to policy agreements at the ASEAN level; from coordination and harmonization on a bilateral basis, to framework agreements on a broader basis within the AEC; from piecemeal disparate actions as agreed upon during forums, to regional ASEAN energy policy formulation designed within an agreed framework; and from disparate decision-making entities into a cohesive institutional framework within the AEC.

4. AEMI would be a logical progression of the APAEC and a credible successor to it in the broader context created by the AEC. AEMI would elevate key energy challenges to the AEC level, taking them beyond piecemeal trading arrangements to fully integrated policies and frameworks across ASEAN. It would focus on energy policies and institutional frameworks that would gain from being elevated to the ASEAN level for greater cohesion, efficiency and leverage within the AEC.

5. The development of AEMI is an imperative requirement for the success of the AEC, given the vital role that energy plays in sustaining economic growth and in securing the well-being of people. AEMI holds the promise of enabling AMS to share the least cost energy resources, with the best attainable environmental impact. If designed properly and implemented efficiently, AEMI has the potential to insulate net energy importers within the AEC from uncertainties of international oil markets, while offering net energy exporters a readily available and efficient market for their energy products and services, with leveraged investments to develop them. AEMI would also have the potential to preserve long-term secure and reliable supply of energy in the region, and to provide opportunities for private sector involvement in terms of investment, including financing of technological innovation, development and transfer.

B. BUILDING ON AEMI FORUM 2013

6. The AEMI Forum was convened on August 27-28, 2013 on behalf of the ASEAN Secretariat, ACE, the AEMI Group and Chulalongkorn University (ASEAN Studies Center, Faculty of Economics and Energy Research Institute). The objective of the Forum was to engage a dialogue between ASEAN policymakers (Track I) and academics (Track II) on the AEMI concept and the way to develop it further. Its participants included representatives from academic institutions, research centers, and regional decision making entities from across ASEAN. The proceedings from the Forum, as well as the seven AEMI papers were published in a book by the AEMI Group "AEMI: From coordination to integration", and is available upon request.

7. Participants unanimously expressed their support for the vision of AEMI within the framework of the AEC and for its deployment through 2030, and further identified the agenda in moving forward. They agreed that AEMI would deliver benefits throughout AMS by promoting better energy efficiency; improving energy access; enhancing economic prospects; improving reliability and energy security; and achieving overall higher economic growth for AMS and improved wellbeing for their people. However, in order to reap these benefits, the AEMI Forum recognized that AMS will have to address challenges, notably building energy market infrastructure; harmonizing energy prices and subsidies; identifying infrastructure needs; enhancing ability to diversify sources of energy; and heightening public awareness about AEMI.

8. The AEMI Forum also recommended that in developing AEMI, the focus should not only be on management of energy resources, but also on addressing the legal and regulatory frameworks, as well as the technical, environmental and business perspectives for the production, distribution and consumption of energy. The Forum also recognized that the path to AEMI should emerge from the combined perspectives of policymakers, the private sector and civil society in each country. Participants agreed with the suggestion that "national teams" could be set up to combine such perspectives and participate in the establishment of AEMI. Furthermore, they recommended that AEMI be equipped with a clear mechanism for its implementation and a timeline for its deployment, with specific goals and next steps for the short, medium and long term.

9. In terms of the interaction with policy makers (Track I), the AEMI Forum recommended that its conclusions be presented to the Senior Officials Meeting on Energy (SOME), and subsequently to ASEAN Ministers of Energy Meeting (AMEM). It also called for tasking the SOE and all Specialized Energy Bodies (namely, HAPUA, ASCOPE, AFOC, RE-SSN, EE&C-SSN, NEC-SSN, REPP-SSN) to develop *a blueprint and a roadmap* for AEMI, with appropriate goals and steps for the short term (2015), medium term (2020) and long term (2030). It specified that this work be coordinated by the REPP-SSN, and supported by the ASEAN Secretariat and ACE, with technical support from the AEMI Group in delivering commissioned studies, both at the national and ASEAN levels. Finally, the Forum also recommended that the REPP-SSN presents a progress report on AEMI to the SOME in June 2014.

C. AEMI GROUP OPERATING PRINCIPLES

10. *The AEMI Group is a network of ASEAN economists and engineers*, creating a neutral platform to develop the case for AEMI as a way to support the provision of affordable, secure and sustainable energy for all people within the AEC. Members of the AEMI Group work together to provide the academic support to develop the AEMI vision and deliver it, and stand ready to support the work for drafting the next APAEC. The value proposition is based on the national expertise within the Group, the commitment of its members, and their first hand understanding of the issues at stake.

11. *Independent academic work*. The work of the AEMI Group will remain a Track II input into the policy dialogue. It would continue to get its strength from the academic work of its members across the ASEAN community of academic institutions and research centers. Through its members, it would conduct its investigative analyses and provide support to policy makers as needed. It would be available to respond to requests for advice or analytical work from the ASEAN Secretariat, ACE, the REPP-SSN, as well as Specialized Energy Bodies, when such requests are consistent with its work agenda. It would remain independent from affiliation with any institutional framework, national or international, and would continue to seek funding with "no strings" attached.

12. *AEMI Group status*. The AEMI Group is currently viewed as an informal ASEAN network of academics from well-established institutions across ASEAN, committed to developing the vision and structure of AEMI within the framework of the AEC. Although common in other fields across ASEAN, such initiative (akin to Track II) is rather new to energy. The AEMI Group would therefore seek to get some recognition as a pool of "neutral" ASEAN academics contributing their expertise to the emergence of a strong and sustainable ASEAN community. The AEMI Group will approach the ASEAN Secretariat to seek ways to get such recognition from within ASEAN structure, which would give it valuable credentials in delivering support to ASEAN bodies as required. ***Annex 1*** provides an overview of ASEAN organizational structure.

13. *AEMI Group funding – moving beyond a single sponsor*. The current funding for the AEMI work has generously been provided by the *ASEAN Studies Center*, Chulalongkorn University, a testimony to the vision and its foresight in embracing the ASEAN perspective for the benefit of all. This has provided a strong basis to develop the initial stages of the AEMI work, and an effective approach to deliver it. At subsequent stages, more academic institutions across ASEAN will need to join in sponsoring this work, in order to give it a broader ASEAN character. Such sponsorship and support could take various forms, including in-kind contributions, or financial participation. Moreover, the AEMI Group should also seek funding from broader "neutral" sources, including international organizations, development institutions, foundations, as well as bilateral donors.

14. The project will continue to be conducted under the auspices of the *ASEAN Studies Center*, Chulalongkorn University and managed by the *Faculty of Economics*. The work will continue to be overseen by the *AEMI Advisory Committee*, which would review progress, provide advice and supervise the budget. The *AEMI Review Committee* will review the AEMI Papers, provide comments to authors and oversee the academic quality of the work to support the drafting APAEC (2016-2019).

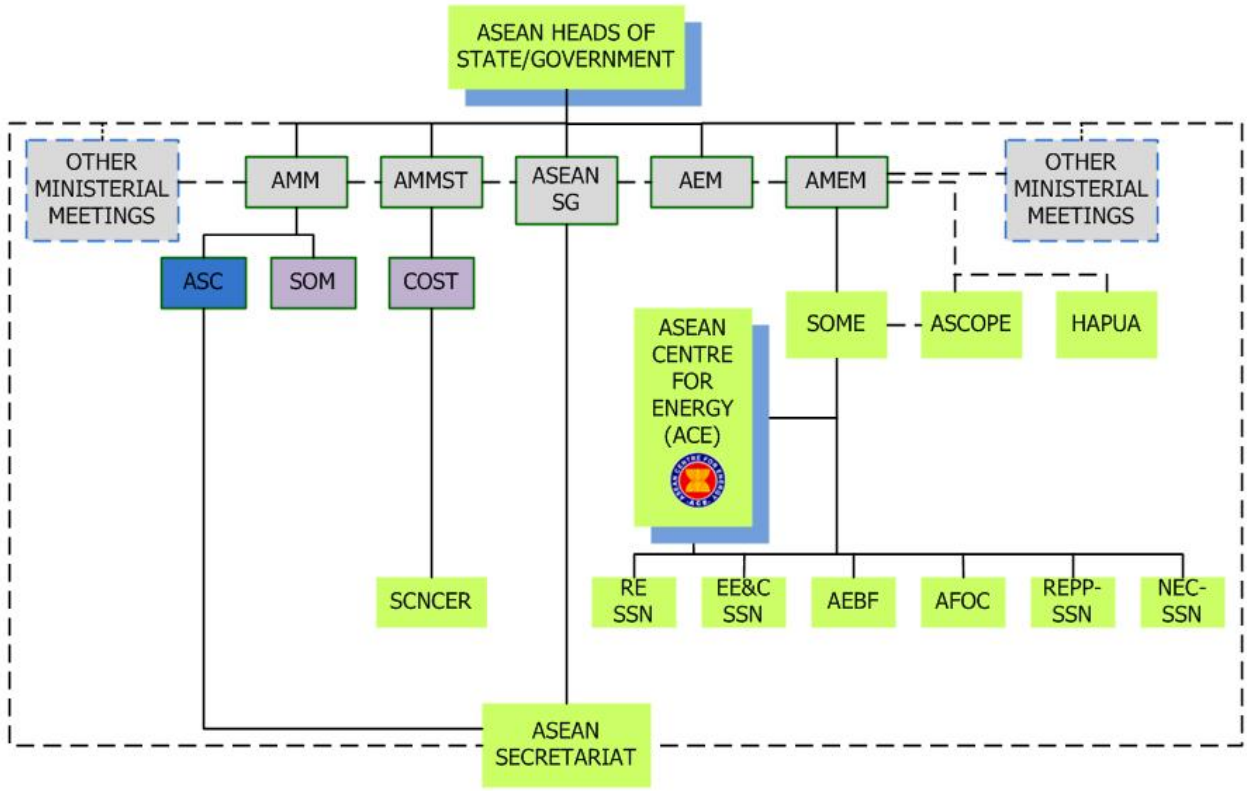
Nawal Kamel, May 2014
Chulalongkorn University, Bangkok

ANNEX 1

ASEAN ORGANIZATIONAL STRUCTURE[1]

ASEAN is organized in three Communities, each of which is defined by a "Blue Print" (e.g. ASEAN Economic Community Blueprint) which indicates the principles the Community adheres to and the objectives it pursues. Each Community has a governance structure, starting with the highest inter-governmental level (where it exists), followed by the Ministerial levels, and finally the various sector Ministerial bodies. Following is the list of these entities (and their acronyms).

ASEAN ORGANIZATIONAL STRUCTURE



[1] This list and diagram has been compiled through the ASEAN Community website.

A. ASEAN Political-Security Community

- ASEAN Intergovernmental Commission on Human Rights (AICHR)

- ASEAN Ministerial Meeting (AMM)
- ASEAN Regional Forum (ARF)
- ASEAN Defense Ministers Meeting (ADMM)
- ASEAN Law Ministers Meeting (ALAWMM)
- ASEAN Ministerial Meeting on Transnational Crime (AMMTC)

B. ASEAN Economic Community

- ASEAN Economic Ministers (AEM)

- ASEAN Free Trade Area (AFTA Council)
- ASEAN Ministers on Energy Meeting (AMEM)
- ASEAN Ministerial Meeting on Agriculture and Forestry (AMAF)
- ASEAN Finance Ministers Meeting (AFMM)
- ASEAN Investment Area (AIA) Council
- ASEAN Ministerial Meeting on Minerals (AMMin)
- ASEAN Ministerial Meeting on Science and Technology (AMMST)
- ASEAN Mekong Basin Development Cooperation (AMBDC)
- ASEAN Transport Ministers Meeting (ATM)
- ASEAN Telecommunications and IT Ministers Meeting (TELMIN)
- ASEAN Tourism Ministers Meeting (M-ATM)
- Initiative for ASEAN Integration (IAI) and Narrowing the Development Gap (NDG)
- Sector Bodies under the Purview of AEM

C. ASEAN Socio-Cultural Economic Community

- ASEAN Ministers Responsible for Culture & Arts (AMCA)

- ASEAN Ministerial Meeting on Disaster Management (AMMDM)
- ASEAN Education Ministers Meeting (ASED)
- ASEAN Ministerial Meeting on Environment (AMME)
- COP to AATHP (Conference of the Parties to the ASEAN Agreement on Transboundary Haze Pollution)
- ASEAN Health Ministers Meeting (AHMM)
- ASEAN Ministers Responsible for Information (AMRI)
- ASEAN Labour Ministers Meeting (ALMM)
- ASEAN Ministers Meeting on Rural Development and Poverty Eradication (AMRDPE)
- ASEAN Ministerial Meeting on Science and Technology (AMMST)
- ASEAN Ministerial Meeting on Social Welfare and Development (AMMSWD)
- ASEAN Ministerial Meeting on Women (AMMW)
- ASEAN Ministerial Meeting on Youth (AMMY)

D. ENERGY STRUCTURES ACRONYMS

AEBF	ASEAN Energy Business Forum
AEM	ASEAN Economy Ministers
AFOC	ASEAN Forum on Coal
AMEM	ASEAN Ministers of Energy Meeting
AMM	ASEAN Ministerial Meeting
AMMST	ASEAN Ministerial Meeting on Science & Technology
ASC	ASEAN Standing Committee
ASCOPE	ASEAN Council on Petroleum
COST	Committee on Science & Technology
EE&C SSN	Energy Efficiency and Conservation Subsector Network
HAPUA	Heads of ASEAN Power Utilities/ Authorities
NRSE SSN	New & Renewable Energy Source of Energy Subsector Network
SG	Secretary General
SOM	Senior officials Meeting
SOME	Senior Officials Meeting on Energy
REPP-SSN	Regional Energy Policy and Planning Subsector Network

4. AEMI: TOWARDS A BLUEPRINT AND ROADMAP

A DISCUSSION PAPER

AEMI BRAINSTORMING SESSION

Grand Mercure Fortune Bangkok, May 14-15, 2014

AEMI: TOWARDS A BLUEPRINT AND ROADMAP

FOREWORD

1. The AEMI work ahead will focus on producing a new series of AEMI Papers to support the development of the AEMI *Blueprint and Roadmap*. The core objective is to make a contribution to the development of the drafting of the new APAEC (2016-2019), which central theme is now set to be "Connectivity and Market Integration".

2. The objectives of the AEMI *Brainstorming Session* May 14-15 are to:

   (a) Determine the *broad components* of the *AEMI Blueprint and Roadmap*,
   (b) Identify the *analytical issues* that would need to be addressed in order to determine all the specific elements of the AEMI *Blueprint and Roadmap*;
   (c) Agree on a new set of *AEMI Papers* that would support the drafting of the AEMI *Blueprint and Roadmap*.

3. This *Discussion Paper* will serve as a guide and companion to the Agenda of the session. It is organized in four sections as follows:

   (a) Section A: *Components of the AEMI Blueprint*

   The *Blueprint* comprises the main strategic elements that need to be in place, or that need to be addressed, in order to move towards AEMI. Section A provides a preliminary list of seven main strategic elements the *AEMI Blueprint*. The list is based on the AEMI work so far, and is submitted to participants for consideration and discussion.

   (b) Section B: *AEMI Papers for the Blueprint*

   This section proposes a set of new AEMI papers, selected to address the analytical issues needed to develop each of the seven strategic elements of the *AEMI Blueprint*. This preliminary choice of AEMI papers is mainly based on the recommendation of the *AEMI Forum* (August 2013), and also reflects various subsequent discussions with ASEAN officials.

   (c) Section C: *AEMI Papers for the Roadmap*

   The *AEMI Roadmap* would build on the *AEMI Blueprint* to indicate explicitly what needs to be done, in what order it would be done, and by when. It also identifies the mechanisms and timelines for the implementation of specific steps, as well as the dependencies and relationships between these steps. It would be best to consider the elements of the *AEMI Roadmap* once there is greater clarity on its *Blueprint*. However, Section C still proposes a set of *AEMI Papers* for the *Roadmap*, based on clear recommendations from the *AEMI Forum* (2013).

   (d) Section D: *Next Steps*

   This section will be completed during the Brainstorming session, when the *AEMI Group* determines the list of *AEMI Papers* it commits to undertake. Nevertheless, the section includes the AEMI timetable and deliverables for information. Finally, Annexes 1 and 2 provide some background information on the current APAEC, and a summary of a gap analysis of its limitations.

A. COMPONENTS OF AEMI BLUEPRINT

I. Build AEMI market infrastructure

ASEAN energy demand will double by 2030, outpaces that of global energy demand. Demand for all hydrocarbons is set to expand: oil 50%; natural gas 80%, and demand for coal will triple, as it increasingly replaces gas and oil, notably for electricity generation. The creation of the AEC in 2015 opens up new opportunities, and provides a framework to create an integrated ASEAN energy market (AEMI), as a way to tackle its energy challenge. AEMI would require adopting energy policies and devising frameworks at the ASEAN level, to allow the integrated energy market to function efficiently.

AEMI actions include:

(a) Lift *tariffs and non-tariff barriers* to trading energy goods, services and investment.
(b) Harmonize *energy pricing* including subsidies and taxes.
(c) Establish enforceable *targets and standards* for EE, RE and energy conservation.
(d) Design the appropriate *legal, and regulatory* frameworks.
(e) Establish appropriate *institutional and governance* structures.

II. Expand market connectivity

ASEAN power grid APG and pipeline projects TAGP are facing several challenges, including institutional bottle necks, legal and regulatory problems as well as technological limitations. Moreover, energy policy and pricing, cross-border trade barriers, and the absence of a framework to encourage long-term investment are all obstacles to forming an integrated power and gas market across ASEAN.

AEMI cannot be implemented unless there are sufficient infrastructure and cross-border interconnectors over land and maritime areas within the AEC (oil, gas, electricity). However, physical infrastructure connectivity (hardware) must also be supplemented by proper policies and frameworks (software) to allow the integrated market to function. Finally, connectivity would also require proper technology for energy to be connected across different systems and for renewable energy to b integrated, as was apparent in the case of the APG (compatibility of grid, electricity generated from RE sources).

To support the completion of a fully-integrated power grid APG and gas pipelines TAGP, and secure adequate electricity generation and gas supply within the AEC, the current approach, focused on infrastructure connectivity, needs to be broadened to *market connectivity* and include components needed for the market to function efficiently throughout ASEAN: policy (e.g., pricing, taxation, tariffs), frameworks (e.g., legal, regulatory, governance), and technology (e.g., technical codes, new technology).

AEMI actions include:

(a) Address policy issues, including *tariffs, pricing and taxation* for gas and electricity*;*

(b) Establish *legal and regulatory frameworks* for power generation and cross-border trade, transportation and distribution of gas and power through the APG and TAGP networks.

(c) Agree *technical standards and guidelines* on product quality and technical infrastructure standards; as well as technical codes; (The newly-established ASEAN Energy Regulatory Network (AERN) is to assess the regulatory frameworks for trade, investment and cross-border transmission of the APG).

(d) Devise *safety measures and environmental requirements* to govern the construction, operation, surveillance and maintenance of pipelines or power grid, and agree on and safety, health and environmental quality standards. This is necessary to ensure reliability of operation, performance and safety standards and procedures in generation and transmission of electricity.

(e) Establish a framework to tackle issues related to *cross-border trade of gas and electricity*, including contractual arrangements for cross border trade, legally binding commercial agreements, settlement of cross-border disputes and contractual dispute resolution, and issues related to third party access, use/transit rights, as well as health, safety and environment (HSE), particularly relevant in order to support the completion of the TAGP.

(f) Devise an agreement to address the issue of *transit passage rights* in order to avoid future conflicts that could threaten the flow of gas and/or electricity. This would also facilitate the issuance of permits, licenses, consent or other forms of authorization for the passage of gas and and/or electricity across the AEC;

(g) Establish a framework for *governance and planning* development and operation of the ASEAN power grid and gas pipelines.

III. Develop incentives for financing and investment

An integrated ASEAN energy market would help attract investment by: (i) addressing perceptions of different long-term commitments in each AMS; (ii) establishing the existence of unified reliable and predictable policy and regulatory measures; and (iii) allowing for sound project viability within a broader market. This could secure long-term investment for large infrastructure projects, including APG, TAGP.

AEMI action would include:

(a) Establish an *institutional framework* for greater collaboration between the private and public sectors in delivering large energy infrastructure projects;

(b) Devise a set *policy incentives* for encouraging private sector participation in financing development of commercially viable new energy technology and in commercializing it across the single AEC market.

(c) For APG, create an environment that would *attract investors* by agreeing on investments in infrastructure, appropriate technologies, and planning expansion of electricity generation, transmission, distribution and trade, so as to secure long-term sustainability of the electricity sector, and provide project predictability and commitment.

IV. Support Renewable Energy (RE)

Renewables currently represent 3% of the primary energy mix (ASEAN-5) and this ratio is set to fall through 2030, as gains from the use of alternative energy will only displace current use of primary biomass.

AEMI action would include:

(a) Establish binding *targets for RE* within the ASEAN energy mix, with corresponding binding targets at the national level. AMS have already agreed on regional targets of 15% share of RE in power generation.

(b) Establish a reliable and predictable *RE policy*, backed up by clear regulatory and enforcement measures to secure its implementation and to enhance the potential for investment and commercialization of RE technological innovation. For the transportation sector, promote fuel switching to cleaner and renewable energy sources.

(c) Create *financial mechanisms* to support funding of RE, building on the potential created by the broader integrated energy market, and the ability to design larger projects eligible for assistance from the international community as part of its efforts to address global environmental concerns.

(d) Devise an ASEAN framework for *monitoring implementation* and enforcement of RE policy; as well as agreed methodologies for measuring and monitoring progress in developing RE and their deployment, including their increased role in electricity generation. Such a system would enhance the economic value of new technology to support RE, and would encourage their deployment.

V. Enhance Energy Efficiency and Conservation (EE&C)

ASEAN energy intensity improved by 12% in the last decade, as compared to 26% worldwide. In fact, its industrial energy intensity has been worsening by 0.2% every year since 1980. As it stands, ASEAN currently consumes more than twice the amount of energy per unit of GDP than the average industrial countries in the OECD.

ASEAN needs to tap into available technology for EE for end-users products (industrial and household) at the local, national and AEC levels. End-users appliances, incandescent light, bulbs in buildings, air conditioners as well as industrial motors across ASEAN are typically highly inefficient compared to the best available technologies worldwide. So far, ASEAN policies have generally focused on voluntary measures, with a lesser role for mandatory measures, and absence of policies and incentives for widespread deployment of new technologies, and for attracting investors.

AEMI actions would include:

(a) Establish *binding targets for EE* at the ASEAN level, with consistent binding targets at the national level to enhance competitiveness and deliver energy savings. AMS have already agreed on regional targets of 8% reduction in energy intensity.

(b) Establish a reliable and predictable *EE and energy conservation policy*, backed up by clear regulatory and enforcement measures to secure its implementation, and to encourage investment and commercialization of technological innovation.

(c) Devise energy *product labeling and standards* in key sectors (for household and industrial end-uses) consistent with the EE and energy conservation targets, and create an ASEAN framework for its monitoring, implementation and enforcement. These would also applicable to the import and production of electrical appliances and vehicles. Devise an ASEAN framework for *monitoring implementation* and enforcement of EE&C policy; as well as agreed devising indicators and methodologies for measuring and monitoring progress savings from EE and effectiveness in reaching energy conservation targets. Such a system would enhance the economic value of new technology to support them, and encourage their deployment.

(d) Create *financial mechanisms to support funding of EE*, building on the potential created by the broader integrated energy market, and the ability to design larger consolidated projects eligible for assistance from the international community.

VI. Reduce greenhouse gas emissions

ASEAN energy-related greenhouse gas emissions will double by 2030, due in part to the expected 8% annual increase in coal consumption, as coal increasingly replaces gas for electricity generation.

(a) Establish binding *targets and standards for reduction of greenhouse gas* emissions.

(b) Devise an ASEAN framework for *monitoring* progress in reducing greenhouse gas emissions; as well as agreed methodologies for measuring and monitoring emission reductions from RE, EE, and from development and deployment of clean carbon technology.

VII. Support ASEAN energy technology

AEMI would allow pooling efforts for technology design and adaptation across ASEAN, and offer a broader market for their commercialization and deployment, opening up business opportunities and quality jobs for skilled labor. It would also make it possible to develop a strategy to support ASEAN energy technology.

AEMI actions would include:

(a) Establish a framework to *share technological innovations and acquisition*, adapt successful technology to ASEAN conditions, and scale up small-scale successful projects (e.g., for energy generation from renewable sources) from local to cross-border larger-scale ASEAN level. This is relevant for EE, RE, CCT and to the APG where new technology is needed to increase cross-border trade of electricity generated from renewable energy sources and for the introduction of standardized smart electricity grids.

(b) Develop approaches to *build and strengthen human capacity*, skills, and institutional capacity; to encourage research and development as well as AEC cooperation in the compilation and sharing of energy information and data, and to increase public education and outreach.

VIII. Enhance energy security and accessibility

AEMI would enhance energy security by allowing efficient flow of energy resources within the AEC, secure energy supplies through diversification of energy sources, and decrease dependence on foreign markets.

AEMI action to realize such benefits include:

(a) Create ASEAN actionable *emergency energy stockpiles* (oil and gas reserves), together with effective agreement for their utilization. This would enhance PSA within AEC, as there are currently uneven oil stockpiles across ASEAN, and uneven capacities for reserve storage.

(b) Develop strategies to ensure *sustainability of energy sources during crises or natural disaster*. In particular, develop a strategy for APG and TAGP to contribute to energy security through reliability of electricity and gas supplies for AMS during a crisis.

(c) Develop strategies to address *energy poverty* characterized by the lack of access to electricity, combined with the lack of access to modern clean energy sources across ASEAN, especially among the poorest population, and to establish strategies to extend access to affordable energy (electricity, clean cooking fuels) and eradicate energy poverty within ASEAN by 2030.

A. AEMI PAPERS FOR THE BLUEPRINT

I. BUILD AEMI MARKET STRUCTURE

(1) *Energy pricing and subsidies*

AEMI implementation would require a higher degree of consistency of energy pricing and taxation policies across ASEAN for the integrated market to function efficiently. This AEMI paper would investigate feasible options for energy pricing and taxation, with the view to identifying a cohesive approach across ASEAN for the energy market to function efficiently, while respecting national welfare objectives of protecting the poor and of addressing energy poverty. It would formulate innovative options in the short and medium terms, including the use of different instruments to "decouple" energy pricing from welfare objectives to assist the poor in most vulnerable communities. Such options include a combination of tax breaks, social security mechanisms, rebates on energy bills. The paper would also explore ASEAN-wide equalization mechanisms, inspired from those in action in some federal systems. The AEMI paper would also quantify the impact of such options on the price of energy, focusing on electricity and gas.

(2) *Removal of tariffs and non-tariffs barriers*

This AEMI paper would review tariffs and non-tariffs barriers across ASEAN and would quantify the impact of their removal on energy prices, as well as on energy trade flows within ASEAN.

(3) *Quantify AEMI economic benefits*

This AEMI work would quantify the benefits of AEMI at the ASEAN and national ASEAN levels, including the impact on energy prices, economic growth, and on closing the ASEAN development gap.

II. EXPAND MARKET CONNECTIVITY

(4) *Evaluate ASEAN infrastructure connectivity needs*

Establishing a proper infrastructure for the free flow of energy across ASEAN will require investments to upgrade existing energy infrastructure, and to expand it with more extensive distribution systems and cross-border connectivity within the AEC, particularly in less developed region of ASEAN. This AEMI paper would assess the investments needs which would require action at the AEC level. While investment decisions lie mainly with market players (energy companies, system operators and consumers), public policy is decisive in creating a stable and framework for investment decisions.

(5) Evaluate investments needed to integrate green electricity

Electricity generated from renewable sources (e.g., large-scale wind parks and solar facilities) need corresponding power lines capable of transmitting this green power to the areas of high consumption. Proper investments are needed for the grid to be able to absorb the full potential from such green power, including investment in smart meters and power grids, as well as in the design of a grid infrastructure which will enable renewables to compete on an equal footing with traditional sources. The AEMI paper will estimate the investments needed to upgrade the grid so that it can absorb the full potential of green power. It will further outline the policy and common standards on smart metering and smart grids needed to ensure interoperability across the network.

III. DEVELOP INCENTIVES FOR FINANCING AND INVESTMENT

(6) *Formulate policy incentives for investment*

The AEMI paper will investigate the *policy incentives* and frameworks needed to create an enabling environment for the private sector to invest in energy infrastructure projects (e.g., construction of gas pipelines, expanding infrastructure for electricity transmission, introduction of standardized smart electricity grids), and to engage in the creation and deployment of new technology across ASEAN.

IV. SUPPORT RENEWABLE ENERGY (RE)

(7) *Impact of RE targets and standards*

The AEMI paper would identify relevant targets and standards for use of RE in different sectors, both at the national and ASEAN levels. It would quantify the impact of such targets on appropriate RE indictors, and on key environmental indicators.

(8) *Policy incentives for RE*

The AEMI paper would explore policy incentives to encourage the use of RE in the context of the AEC; review international best practice in adopting policy instruments towards this purpose. This would include incentives to fund RE technologies and practices, innovative taxation and pricing approaches, and ways to encourage investments for development of RE technologies.

(9) *Quantify benefits from the use of RE*

The AEMI paper will estimate benefits from using RE from economic, social and environmental perspectives, both at the ASEAN and national levels. This would include in particular energy savings, reduction in greenhouse gas emissions, and improvements in energy services, from exploiting the full potential of RE, particularly for producing green power.

V. ENHANCE ENERGY EFFICIENCY AND CONSERVATION (EE&C)

(10) *Quantify ASEAN opportunities for energy conservation*

The AEMI paper would analyze potential opportunities for energy savings by sectors within ASEAN, with particular attention to the sectors where the greatest energy savings might be generated. It would estimate potential energy savings at the national as well as the ASEAN level, and propose different instruments (standards, targets) that would best realize such savings. Finally it would recommend an appropriate ASEAN policy framework, in view of these investigations and available technologies.

(11) *Quantify impact of standards and targets on EE&C*

The AEMI paper would quantify energy savings realized through the implementation of various standards and targets for EE, by sector. It would also identify a series of *energy efficiency indicators* that could be applicable across the AEC, notably by the public sector in ASEAN (e.g., public transportation, buildings and public procurement contracts). The paper would finally examine how the introduction of such indicators could provide a useful instrument for public authorities to use in order to monitor their use of energy, develop innovative approaches (e.g., smart cities), and introduce additional environmentally friendly energy saving measures.

(12) *Policy incentives for EE*

The AEMI paper would explore market-based instruments to stimulate higher energy savings in the context of the AEC; and review international best practice in adopting policy instruments towards this purpose. This would include incentives to fund energy-efficient technologies and practices, innovative taxation and pricing approaches, and ways to encourage investments for development of green energy technologies.

(13) *Quantify benefits from improving EE within ASEAN*

The AEMI paper would identify and quantify benefits from energy efficiency, from economic, social and environmental perspectives, both at the national and ASEAN levels. These would include estimates of the impact of greater energy efficiency on energy savings (national and ASEAN levels); on energy security; and on economic competitiveness. The paper would also establish cost effectiveness of EE as a demand-curbing measure, and estimate energy savings to consumers (households and businesses) through savings on their energy bills. Finally, it would assess the impact of greater energy efficiency savings on the environment, notably through the reduction of emissions.

VI. BUILD A CLEAN-AIR, LOW CARBON ECONOMY

(14) *Quantify AEMI environmental benefits*

The AEMI paper will identify the key drivers of AEMI environmental benefits and provide a quantitative estimate of the impact of AEMI on greenhouse gas reductions, both at national and ASEAN levels. The analysis will take into account the presence of the larger integrated energy market, the enactment of RE and EE targets at the ASEAN level, and the increased role of new technologies.

VII. SUPPORT ASEAN ENERGY TECHNOLOGY

(15) *Formulate an ASEAN energy technology strategy*

The AEMI paper would first take stock of the use of energy technology (RE, EE and CCT) throughout ASEN, and identify the challenges in deploying them further. It would then investigate policies at the ASEAN level, to support the emergence of ASEAN energy technology. It would define an ASEAN strategy for the development and acquisition of green technology, and spell out the incentives and mechanisms for its implementation. This could include the creation of an *ASEAN Energy Technology Trust* to enhance ASEAN ability to: (i) generate promising new technologies for renewable and clean sources of energy; (ii) support the early-stage experimental deployment of such technology; (iii) adapt the ASEAN context relevant technology with a proven track of success around the world; and (iv) facilitate technology deployment and funding from international sources. The paper would develop a proposal for such a Trust, including its structure, operational rules and funding requirements.

VIII. ENHANCE ENERGY SECURITY AND ACCESSIBILITY

(16) *Develop modalities for an ASEAN energy reserves*

The AEMI paper would consider the rationale for ASEAN to constitute its own energy reserve. At the international level, countries members of the *International Energy Agency* (IEA) are required to maintain total oil stock levels equivalent to at least 90 days of the previous year's net imports. None of the ASEAN is a member of the IEA and thus do not hold access to such a reserve dedicated to IEA member states. The AEMI Paper would investigate the case for constituting an ASEAN energy reserve, spell out its design, develop the conditions which would trigger the use of such reserves, and outline the modalities and conditions for the release of such reserves to AMS.

(17) *AEMI potential to address energy poverty*

The AEMI paper will design a set of policies and frameworks to combat energy poverty across ASEAN. The purpose would be to improve access to energy throughout the AEC, to eradicate energy poverty in ASEAN by 2030 as per the international millennium development goals, and to help close the development gap within ASEAN. The paper would estimate the required investments to achieve this objective, notably to build more efficient extensions of energy networks across ASEAN for access to

electricity and clean energy fuel. Finally, the AEMI paper would also quantify the impact of such strategy on ASEAN growth both at national and ASEAN levels, as well as the implications on narrowing the development gap.

B. AEMI PAPERS FOR ROADMAP

(18) *Understanding national perspectives in joining AEMI*

The AEMI paper will review national perspectives in joining AEMI, highlight national benefits and challenges, and clarify for governments what needs to be done and the minimum requirements for joining AEMI both at the policy and institutional levels. Based on this analysis, the AEMI paper would provide an assessment of AMS energy markets, which are at different stages of their development and have different structures and policies – covering the entire spectrum from the most liberalized markets to monopolistic structures. It would then formulate options for the deployment of AEMI, taking into account AMS diversity and degree of preparedness. Such options would include sequencing, to allow each AMS to join AEMI at its own pace in a "progressive and incremental" approach; or else allowing AEMI components to be gradually deployed as all AMS are ready, within the period to 2030.

(19) *Define AEMI roadmap with clear timeframe and milestones*

Design a coherent AEMI roadmap with clear mechanisms for implementation, a timeline for its deployment with specific goals and required steps for the immediate, short-term, as well as medium-and-long-term for the delivery of AEMI through 2030 in the framework of the AEC. The roadmap will also take into account the need to establish institutional arrangements and governance structures for the implementation of AEMI, and to build strong national commitments and legally binding agreements. It will also recognize that political cohesion and commitment at the highest level will be essential to its success, as it would lift uncertainties and encourage investors to support projects within the AEC.

(20) *Develop a geo-political strategy for ASEAN energy security*

The AEMI Paper would identify global energy flows and growing energy demand, particularly from emerging economic powers (notably India, Japan, Korea and China). It would analyze the dynamics implications of such situation on ASEAN energy security and the heightened importance for more cohesion within the AEC. It would then formulate the elements of an external ASEAN energy policy to promote a unified and cohesive external position on energy policy.

C. NEXT STEPS

The following **Table 1** provides an overview of AEMI Papers for *Blueprint* and *Roadmap* to be discussed at the Brainstorming session, and **Table 2** the AEMI timetable and deliverables May –December 2014.

Nawal Kamel, May 2014
Chulalongkorn University, Bangkok

ANNEX 1

ASEAN Plan of Action for Energy Cooperation APAEC (2010-2015)

The APAEC contains 26 strategies and 91 actions. The program strategies and the division of tasks among the ASEAN specialized energy bodies under the plan of action are clearly specified as follows:[2]

Program Area	Strategies	Ownership
1. ASEAN Power Grid	(a) Accelerate the development of the ASEAN Power Grid Interconnection projects; (b) Optimize the generation sector vis-à-vis the available indigenous energy resources in the region; (c) Encourage and optimize the utilization of ASEAN resources, such as, funding, expertise and products to develop the generation, transmission, and distribution sectors.	HAPUA
2. Trans-ASEAN Gas Pipeline	(a) Collectively implement the ASEAN MOU on TAGP by ASCOPE Members ; (b) PERTAMINA and PSC Partners to undertake detailed feasibility study for East Natuna Gas Field Development; (c) Implement the approved Roadmap for TAGP by respective ASCOPE Members; (d) Implement the approved 5-year ASCOPE Gas Centre (AGC) Work Program.	ASCOPE
3. Coal and Clean Coal Technology	(a) Strengthen Institutional and Policy Framework and build an ASEAN Coal Image; (b) Promote Coal and Clean Coal Technologies; (c) Promote Intra-ASEAN Coal Trade & Investment; (d) Enhance environmental planning and assessment of coal projects.	AFOC (ACE as Secretariat)
4. Energy Efficiency and Conservation	(a) Develop Energy Efficiency Policy and Build Capacity; (b) Enhance awareness raising and dissemination of information; (c) Promote good energy management practices, especially for industrial and commercial sectors; (d) Facilitate Energy Efficiency Financing.	EE&C-SSN (ACE as Secretariat)

[2] *ASEAN Plan of Action for Energy Cooperation 2010-2015*, ASEAN Center for Energy (ACE).

5. Renewable Energy	(a) Increase the development and utilization of RE sources to achieve the 15% target share of RE in ASEAN power generation mix (b) Enhance awareness and information sharing and strengthen networks (c) Promote intra-ASEAN cooperation on ASEAN-made products and services (d) Promote renewable energy financing scheme (e) Promote the commercial development and utilization of biofuels (f) Develop ASEAN as a hub for renewable energy	RE-SSN (ACE as Secretariat)
6. Regional Energy Policy and Planning	(a) Enhance energy policy and supply security information sharing network (b) Conduct capacity building in energy and environmental policy planning and energy supply security assessment (c) Prepare regional energy outlooks and conducting ASEAN energy policy reviews and analysis series (d) Strengthen collaboration and dialogues with ASEAN partners and with national, regional and global institutions (e) Monitor and evaluate the progress of APAEC programs	REPP-SSN (ACE as Secretariat)
7. Civilian Nuclear Energy	(a) Conduct capacity building among ASEAN Member States (b) Strengthen public information and public education on nuclear power generation (c) Strengthen institutional, legal and regulatory capacities on nuclear energy for power generation.	(ACE as Secretariat)

ANNEX 2

APAEC Barriers: A Gap Analysis [3]

I. Lack of Institutional and regulatory frameworks

(a) There is no specific ASEAN policy and institutional framework related to gas, power, RE or EE at the regional level. Instead, the approach is based on the signing of MoUs between the relevant ASEAN Member States (AMS) concerned, on a case-by-case basis, and relying on a long history of regional cooperation by resolving issues through ASEAN forums.

(b) APG and TAGP have MoUs, but the APG MoU has yet to develop a common ASEAN policy on power interconnection and trade. No MoUs have been signed on cooperating on RE and EE.

(c) The AMS have different technical standards, guidelines, regulations and procedures, which makes cross-border trade difficult to implement.

II. Multiplicity of Tariffs, taxation and pricing

(a) There are no harmonized common tariffs on energy trade. APG is planning to establish them, but it is not known whether this would relate to power purchase, energy exchange or other trade arrangements. Under the GMS program, bilateral and case-by-case agreements are used.

(b) There is no harmonized taxation, which could distort competitiveness of resources and production and hamper cross-border trade. APG has not as yet addressed taxation issues. For TAGP, tax and duties on natural gas and pipelines are essential to commercial arrangements. Tax is set prior to the construction and operation of a pipeline, while tariff rates are a matter of commercial and contractual negotiation between parties.

(c) Pricing of energy is treated differently across the AMS, which impedes the ability to structure cross-border projects, ensure their commercial viability, and attract proper funding.

III. Absence of Safety, health and the environment

(a) There are no Safety, Health, Environment (SHE) regulations at the ASEAN level across AMS.

(b) There is no specific cooperation agreement or institutional arrangement to manage impacts on SHE for energy projects.

IV. Weak Financial availability

(a) More investment needs to be attracted to fund APG and TAGP, which are infrastructure projects that require large financial investments in their construction, operation and maintenance.

(b) Securing funds for development and implementation of RE and EE technologies and their deployment is also difficult as they are perceived as high-risk projects.

[3] *Source:* Analysis and compilation based on *APAEC 2010-2015* and *Development of ASEAN Energy Sector, 2013*, an APAEC review conducted jointly by the ASEAN Centre for Energy (ACE) and Korea Energy Economics Institute (KEEI).

V. Deficient Technology acquisition and deployment

(a) The capacity to design, manufacture and deploy renewable and energy-efficiency technologies is weak in some AMS, with limited collaborative efforts for R&D across ASEAN.

(b) Limited infrastructure also contributes to low levels of local manufacturing; consequently, most RE and EE equipment is imported from other countries.

(c) The AMS do not all have national standards for renewable energy or for efficient use of energy. Testing and certification labs in most AMS are inadequate, which leads to difficulties in enforcing technical standards, and prevents local product development.

VI. Lack of political cohesion and commitment

(a) Governments' firm commitments are strongly required to deliver APG and TAGP infrastructure projects according to Master Plans. Absence of firm commitments results in delays in project execution and difficulties in attracting investment. The regional power grid has been on the agenda of ASEAN for more than a decade now, and has not been progressing timely as planned.

(b) Lack of firm commitment from governments could also be the indirect cause of possible diverted budgetary resources and deterred foreign investment.

(c) The AMS have yet to agree on an approach to share investments needed for APG and TAGP projects, as these have not been specified in detail. There is a perception that trans-boundary gas pipeline could create dependency situations like those between Russia and Ukraine.

AEMI BRAINSTORMING SESSION

5. CONCLUSIONS: AEMI PAPERS AND TIMELINE

AEMI Papers for Blueprint and Roadmap

OVERVIEW

BLUEPRINT	AEMI PAPERS FOR BLUEPRINT
I. Make AEMI market work	(1) Next generation energy prospects (2) Energy pricing and subsidies (3) Removal of tariffs and non-tariffs barriers (4) Quantify AEMI economic and environmental benefits
II. Expand market connectivity	(5) Evaluate ASEAN infrastructure connectivity needs
III. Support Renewable Energy (RE)	(6) Impact of RE targets and standards
IV. Enhance EE&C	(7) Quantify ASEAN opportunities for energy conservation, as well as the impact of standards and targets on EE&C
V. Build a clean-air, low-carbon economy	(8) Identify policy incentives for a clean-air, low-carbon ASEAN Economic Community – including renewable energy, energy efficiency, CO2 mitigation and clean air provisions
VI. Support ASEAN energy technology	(9) Formulate an ASEAN energy technology strategy
VII. Enhance energy security and accessibility	(10) Develop an ASEAN energy security strategy (11) Address energy poverty through AEMI
ROADMAP	**AEMI PAPERS FOR ROADMAP**
VIII. Formulate AEMI Roadmap Design a Roadmap identifying the steps, the sequence and the timing for the delivery of AEMI as part of the AEC through 2030.	(12) Understand national perspectives in joining AEMI (13) Develop a geo-political strategy of ASEAN energy security *The AEMI Group has postponed to a later stage the work on defining AEMI roadmap with clear timeframe and milestones.*

AEMI BRAINSTORMING SESSION: CONCLUSIONS

AEMI PAPERS AND TIMELINE

(May 2014)

AEMI Paper	Team Members
I. MAKE AEMI MARKET WORK	
(1) Next generation energy prospects (a) Present a macro perspective for global energy flows. (b) Highlight advances in energy technology that shape next generation energy carriers, including hydrogen technology. (c) Draw implications for ASEAN energy supply, and draw policy recommendations.	**Team Leader:** *Dato' Ir. Dr. Abu Bakar Jaafar* Professor, Perdana School of Science, Technology and Innovation Policy, Universiti Teknologi Malaysia (UTM), Malaysia. *Dr. Aishah Mohd Isa* Senior Lecturer, College of Engineering, Universiti Tenaga Nasional (UNITEN), Malaysia *Ms. Cecilya L. Malik* Independent Scholar, previously Senior Researcher, Energy Planning Division, Agency for the Assessment and Application of Technology (BPPT), Indonesia. *Dr. Han Phoumin (Non-Member Guest)* Researcher, Economic Research Institute for ASEAN and East Asia (ERIA). *Dr. Maxensius Tri Sambodo* Researcher, Indonesian Institute of Sciences (LIPI)-Economic Research Center, Indonesia; Fellow, Institute of Southeast Asian Studies (ISEAS), National University of Singapore (NUS).
(2) Energy pricing and subsidies (a) Investigate feasible options for energy pricing and taxation, with the view to identifying a cohesive approach across ASEAN for the energy market to function efficiently, while respecting national welfare objectives of protecting the poor and of addressing energy poverty. (b) Formulate innovative options in the short and medium terms, including the use of different instruments to "decouple" energy pricing from welfare objectives to assist the poor in most vulnerable communities.	**Team Leader:** *Dr. Youngho Chang* Assistant Professor, Division of Economics, Nanyang Technological University (NTU), Singapore. *Dr. Adoracion M. Navarro* Senior Research Fellow, The Philippine Institute for Development Studies (PIDS), the Philippines. *Dr. Ma. Joy V. Abrenica* Associate Professor, School of Economics, University of the Philippines (UP)-Diliman, the Philippines. *Dr. Khalid Abdul Hamid* Associate Research Fellow, Malaysian Institute of Economic Research (MIER), Malaysia.

(c) Such alternative options include a combination of tax breaks, social security mechanisms, rebates on energy bills. (d) Explore ASEAN-wide equalization mechanisms, inspired from those in action in some federal systems.	*Dr. Romeo Pacudan* Chief Researcher and Director, Energy Efficiency and Conservation, Brunei National Energy Research Institute (BNERI), Brunei Darussalam. *Dr. Tri Widodo* Professor and Head of Economics, Faculty of Economics and Business, Universitas Gadjah Mada (UGM), Indonesia. *Dr. Zakariah Abdul Rashid* Executive Director, Malaysian Institute of Economic Research (MIER), Malaysia.
(3) Removal of tariffs and non-tariffs barriers (a) Review tariffs and non-tariffs barriers across ASEAN, including regulatory and legal barriers as well as governance bottlenecks. (b) Design an approach and framework to address the legal and regulatory frameworks for cross border free flow of energy products, services and investment across national borders in the framework of AEMI.	**Team Leader:** *Dr. Ma. Joy V. Abrenica* Associate Professor, School of Economics, University of the Philippines-Diliman, the Philippines. *Dr. Adoracion M. Navarro* Senior Research Fellow, The Philippine Institute for Development Studies (PIDS), the Philippines. *Dr. Tri Widodo* Professor and Head of Economics, Faculty of Economics and Business, Universitas Gadjah Mada, Indonesia. *Dr. Youngho Chang* Assistant Professor, Division of Economics, Nanyang Technological University (NTU), Singapore.
(4) Quantify AEMI economic and environmental benefits (a) Quantify AEMI benefits at the ASEAN level, from economic and environmental perspectives, including the impact on energy prices, economic growth, and on closing the ASEAN development gap. (b) Estimate benefits from using RE at the ASEAN level, from economic, social and environmental perspectives, including energy savings, reduction in greenhouse gas emissions (c) Quantify benefits from enhanced EE at the ASEAN level, from economic, social and environmental perspectives, including estimates of the impact of greater energy efficiency on energy savings; on energy security; and on economic competitiveness.	**Team Leader:** *Dr. Xunpeng Shi* Chief Researcher and Director, Renewable and Alternative Energy, Brunei National Energy Research Institute (BNERI), Brunei Darussalam. *Ms. Cecilya L. Malik* Independent Scholar, previously Senior Researcher, Energy Planning Division, Agency for the Assessment and Application of Technology (BPPT), Indonesia. *Dr. Khalid Abdul Hamid* Associate Research Fellow, Malaysian Institute of Economic Research (MIER), Malaysia. *Dr. Tri Widodo* Professor and Head of Economics, Faculty of Economics and Business, Universitas Gadjah Mada (UGM), Indonesia.

(d) Establish cost effectiveness of EE as a demand-curbing measure, and estimate energy savings to consumers (households, businesses) through savings on energy bills. (e) Assess the impact of greater energy efficiency savings on the environment, notably through the reduction of emissions. (f) Provide a quantitative estimate of the impact of AEMI on CO_2 level due to the integrated energy market, the enactment of RE and EE targets, and the wider use of new technologies.	*Mr. Nguyen Duc Song* Researcher, Demand Forecast and DSM Department, Institute of Energy, Viet Nam. *Dr. Youngho Chang* Assistant Professor, Division of Economics, Nanyang Technological University (NTU), Singapore. *Dr. Zakariah Abdul Rashid* Executive Director, Malaysian Institute of Economic Research (MIER), Malaysia.

II. EXPAND MARKET CONNECTIVITY

(5) Evaluate ASEAN infrastructure connectivity needs (a) Assess the investment needs for physical connectivity through the APG and TAGP. (b) Assess the appropriate investments needed for the grid to be able to absorb the full potential from RE sources, including investment in smart meters and power grids, as well as in the design of a grid infrastructure which will enable renewables to compete on an equal footing with traditional sources. (c) Outline the policy and common standards on smart metering and smart grids needed to ensure interoperability across the network. (d) Identify public policy and governance structures for creating a stable framework for investment decisions. (e) Investigate the *policy incentives* and frameworks needed to create an enabling environment for the private sector to invest in energy infrastructure and smart grids.	**Team Leader**: *Dr. Youngho Chang* Assistant Professor, Division of Economics, Nanyang Technological University (NTU), Singapore. *Dato' Ir. Dr. Abu Bakar Jaafar* Professor, Perdana School of Science, Technology and Innovation Policy, Universiti Teknologi Malaysia (UTM), Malaysia. *Ms. Cecilya L. Malik* Independent Scholar, previously Senior Researcher, Energy Planning Division, Agency for the Assessment and Application of Technology (BPPT), Indonesia. *Dr. Romeo Pacudan* Chief Researcher and Director, Energy Efficiency and Conservation, Brunei National Energy Research Institute (BNERI), Brunei Darussalam. *Ir. Dr. Tuan Ab. Rashid Bin Tuan Abdullah* Director, Institute of Energy, Policy and Research (IEPRe), Universiti Tenaga Nasional (UNITEN), Malaysia.

III. SUPPORT RENEWABLE ENERGY (RE)

(6) Impact of RE targets and standards (a) Identify relevant targets and standards for use of RE in different sectors at the ASEAN level, taking into account the need to offset the impact on fiscal revenue from moving away from fossil fuels. (b) Provide options for establishing national targets consistent with such ASEAN-level target. (c) Quantify the impact of such targets on key environmental and economic indicators, as well as on fiscal revenues.	**Team Leader:** *Dr. Watcharapong Ratisukpimol* Lecturer, Faculty of Economics, Chulalongkorn University, Thailand. *Dr. Aishah Mohd Isa* Senior Lecturer, College of Engineering, Universiti Tenaga Nasional (UNITEN), Malaysia *Dr. Kanittha Tambunlertchai* Lecturer, Faculty of Economics, Chulalongkorn University, Thailand. *Ir. G. Lalchand* Associate, Akademi Sains Malaysia, Malaysia. *Dr. Maxensius Tri Sambodo* Researcher, Indonesian Institute of Sciences (LIPI)-Economic Research Center, Indonesia; Fellow, Institute of Southeast Asian Studies (ISEAS), National University of Singapore (NUS). *Dr. Romeo Pacudan* Chief Researcher and Director, Energy Efficiency and Conservation, Brunei National Energy Research Institute (BNERI), Brunei Darussalam.

IV. ENHANCE ENERGY EFFICIENCY AND CONSERVATION (EE&C)

(7) Quantify ASEAN opportunities for energy conservation, as well as the impact of standards and targets on EE& C. (a) Identify opportunities for energy savings by sectors within ASEAN, with particular attention to the sectors where the greatest energy savings might be generated. (b) Estimate potential energy savings at the ASEAN level and propose different instruments (standards, targets) that would best realize such savings, in view of available technologies. (c) Quantify energy savings realized through the implementation of various standards and targets for EE, at the ASEAN sector level.	**Team Leader:** *Ms. Cecilya L. Malik* Independent Scholar, previously Senior Researcher, Energy Planning Division, Agency for the Assessment and Application of Technology (BPPT), Indonesia. *Ir. G. Lalchand* Associate, Akademi Sains Malaysia, Malaysia. *Mr. Nguyen Duc Song* Researcher, Demand Forecast and DSM Department, Institute of Energy, Viet Nam. *Dr. Romeo Pacudan* Chief Researcher and Director, Energy Efficiency and Conservation, Brunei National Energy Research Institute (BNERI), Brunei Darussalam.

(d) Identify ASEAN energy efficiency indicators and standards that could be applicable by the public sector (e.g., public transportation, buildings, procurement). (e) Examine how such indicators and standards could provide an effective instrument for public authorities to monitor their own use of energy, to develop innovative approaches (e.g., smart cities), and to introduce additional environmentally friendly energy saving measures. (f) Investigate the policy incentives and frameworks needed to create an enabling environment for the private sector to invest in the creation and deployment of EE & C technology across ASEAN.	*Dr. Zakariah Abdul Rashid* Executive Director, Malaysian Institute of Economic Research (MIER), Malaysia.

V. BUILD A CLEAN-AIR, LOW-CARBON ECONOMY

(8) Identify policy incentives for a clean-air, low-carbon ASEAN Economic Community – including renewable energy, energy efficiency, CO_2 mitigation and clean air provisions. (a) Explore policy incentives to encourage the use of RE in the context of AEMI. (b) Spell out incentives to fund RE technologies and practices, including innovative taxation and pricing approaches, and ways to encourage private sector investments for development and deployment of RE technologies. (c) Review international best practice in adopting RE policy instruments. (d) Explore market-based instruments and policies to stimulate EE and C, and quantify related potential ASEAN energy savings. (e) Review international EE and C best practice in adopting policy instruments, including incentives to fund energy-efficient technologies and practices, innovative taxation and pricing approaches, and ways to encourage investments for development and deployment of EE energy technologies.	**Team Leader:** *Dr. Anthony D. Owen* Principal Fellow, Energy Studies Institute (ESI), National University of Singapore (NUS), Singapore. *Dr. Charit Tingsabadh* Assistant Professor and Director, Centre for European Studies, Executive Committee, Chula Global Network (CGN), Chulalongkorn University, Thailand. *Dr. Nguyen Thi Mai Anh* Lecturer, Department of Industrial Economics, School of Economics and Management, Hanoi University of Science and Technology (HUST), Viet Nam. *Dr. Phouphet Kyophilavong* Associate Professor and Director, Research Division, Department of Economics and Business Management, National University of Laos (NUOL), Lao PDR. *Dr. Romeo Pacudan* Chief Researcher and Director, Energy Efficiency and Conservation, Brunei National Energy Research Institute (BNERI), Brunei Darussalam. *Dr. San Sampattavanija* Lecturer, Faculty of Economics, Chulalongkorn University, Thailand.

(f) Define policy incentives to reduce air pollution, reduce CO_2 emissions, including minimum efficiency standards for the use of coal to generate electricity, CCT and CCS. (g) Assess cost effectiveness of clean air measures, taking into account public health considerations. (h) Investigate new market mechanisms for promoting RE, EE, CT, CCS, including incentives to attract private sector investments, and investigate options for use of carbon credit earning mechanisms to bring down the cost of CCs and CCT.	*Dr. Xunpeng Shi* Chief Researcher and Director, Renewable and Alternative Energy, Brunei National Energy Research Institute (BNERI), Brunei Darussalam.

VI. SUPPORT ASEAN ENERGY TECHNOLOGY

(9) Formulate an ASEAN energy technology strategy (a) Take stock of the use of energy technology (RE, EE, CCS and CCT) throughout ASEAN, and identify the challenges in acquiring and deploying them further. (b) Investigate policy incentives at the ASEAN level to support the emergence of such technologies and a strategy for their development and deployment across AEC, including institutional, regulatory and legal frameworks. (c) Investigate the policy incentives and frameworks needed to create an enabling environment for the private sector to invest in the creation and deployment of such technology across ASEAN. (d) Develop a proposal (structure, operational rules and funding requirements) for the creation of an *ASEAN Energy Technology Trust*, with a dual *Brain Trust* and *Funding Trust* to enhance ASEAN ability to: o generate promising new technologies for RE, EE, CCT, CCS, and clean air technologies; o adapt technologies with a proven track of success around the world and facilitate their deployment; o support the early-stage experimental deployment of such technology; o attract funding from public and private sectors and from international sources.	**Team Leader:** *Dr. Bundit Fungtammasan* Associate Professor and Vice President for Research, Joint Graduate School of Energy and Environment (JGSEE), King Mongkut's University of Technology Thonburi, Thailand. *Dato' Ir. Dr. Abu Bakar Jaafar* Professor, Perdana School of Science, Technology and Innovation Policy, Universiti Teknologi Malaysia (UTM), Malaysia. *Dr. Boonrod Sajjakulnukit* Lecturer, Energy Division, Energy Policy Researcher, Joint Graduate School of Energy and Environment (JGSEE), King Mongkut's University of Technology Thonburi, Thailand. *Dr. Lim Chee Ming* Associate Professor, Institution of Engineering and Technology, Universiti Brunei Darussalam (UBD), Brunei Darussalam. *Dr. Romeo Pacudan* Chief Researcher and Director, Energy Efficiency and Conservation, Brunei National Energy Research Institute (BNERI), Brunei Darussalam.

VII. ENHANCE ENERGY SECURITY AND ACCESSIBILITY

(10) Develop an ASEAN energy security strategy (a) Develop the rationale for ASEAN energy security strategy, and the modalities and mechanisms for its implementation. (b) The strategy would assess the recently adopted APSA and recommend ways to build on its accomplishments and address its current gaps (including physical availability, and deployment conditions and modalities of such reserves). (c) Such strategy would include reserve margins for power generation, to maintain electricity provision through national and local grids. (d) Such strategy would identify and develop key components including: o energy reserves; o technology requirements for physical reserve creation, maintenance and deployment; o reliability of such physical reserves; o funding and energy reserve pricing.	**Team Leader:** *Dr. Youngho Chang* Assistant Professor, Division of Economics, Nanyang Technological University (NTU), Singapore. *Dato' Ir. Dr. Abu Bakar Jaafar* Professor, Perdana School of Science, Technology and Innovation Policy, Universiti Teknologi Malaysia (UTM), Malaysia. *Dr. Maxensius Tri Sambodo* Researcher, Indonesian Institute of Sciences (LIPI)-Economic Research Center, Indonesia; Fellow, Institute of Southeast Asian Studies (ISEAS), National University of Singapore (NUS). *Mr. Nguyen Duc Song* Researcher, Demand Forecast and DSM Department, Institute of Energy, Viet Nam. *Dr. Philip Andrews-Speed* Principal Fellow, Energy Studies Institute (ESI), National University of Singapore (NUS), Singapore.
(11) Address energy poverty through AEMI (a) Design a set of policies and frameworks to improve access to energy and eradicate energy poverty across ASEAN by 2030, as per the millennium development goals. (b) Identify and estimate investments to achieve this objective, notably to build more efficient extensions of energy networks for access to electricity and clean energy fuel. (c) Investigate policy incentives and frameworks needed to create an enabling environment for the private sector to invest in such energy infrastructure projects. (d) Quantify the implications of eradicating energy poverty on narrowing the development gap across ASEAN (an objective of the AEC), and on improving GDP prospects across ASEAN.	**Team Leader:** *Dr. Maxensius Tri Sambodo* Researcher, Indonesian Institute of Sciences (LIPI)-Economic Research Center, Indonesia; Fellow, Institute of Southeast Asian Studies (ISEAS), National University of Singapore (NUS). *Dr. Khalid Abdul Hamid* Associate Research Fellow, Malaysian Institute of Economic Research (MIER), Malaysia. *Ir. G. Lalchand* Associate, Akademi Sains Malaysia, Malaysia. *Dr. Nguyen Thi Mai Anh* Lecturer, Department of Industrial Economics, School of Economics and Management, Hanoi University of Science and Technology, Viet Nam. *Dr. Zakariah Abdul Rashid* Executive Director, Malaysian Institute of Economic Research (MIER), Malaysia.

VIII. FORMULATE AEMI ROADMAP

(12) Understand national perspectives in joining AEMI[***] (a) Review national perspectives in joining AEMI, highlight national benefits and challenges, and clarify for governments what needs to be done and the minimum requirements for joining AEMI both at the policy and institutional levels. (b) Provide an assessment of energy markets across ASEAN, which are at different stages of their development and have different structures and policies, covering the spectrum from the most liberalized markets to monopolistic structures. (c) Formulate options for the deployment of AEMI, taking into account ASEAN Member States (AMS) diversity and degree of preparedness. Such options include: o sequencing, to allow each AMS to join AEMI at its own pace in a "progressive and incremental" approach; or o gradual deployment, to allow AEMI components to be gradually deployed as all AMS are ready, through to 2030.	**Team Leader**: *Ir. Dr. Tuan Ab. Rashid Bin Tuan Abdullah* Director, Institute of Energy, Policy and Research (IEPRe), Universiti Tenaga Nasional (UNITEN), Malaysia. *Dr. Romeo Pacudan* Chief Researcher and Director, Energy Efficiency and Conservation, Brunei National Energy Research Institute (BNERI), Brunei Darussalam. *Dr. Tran Van Binh* Lecturer, Department of Industrial Economics, School of Economics and Management, Hanoi University of Science and Technology (HUST), Viet Nam. [***]*The AEMI Group recognized that this study would require proper investigations at the national level, based on a common analytical framework. The AEMI team participating in this work will be completed once financial resources are secured for a full-fledged study.*
(13) Develop a geo-political strategy for ASEAN energy security (a) Identify global energy flows and growing energy demand, particularly from neighboring emerging economic powers (notably India, Japan, Korea and China). (b) Analyze the dynamics implications of such situation on ASEAN energy security and the heightened importance for more cohesion within the AEC. (c) Formulate the elements of an external ASEAN energy policy to promote a unified and cohesive external position on ASEAN energy policy in the framework of AEMI.	**Team Leader:** *Dr. Philip Andrews-Speed* Principal Fellow, Energy Studies Institute (ESI), National University of Singapore (NUS), Singapore. *Dr. Boonrod Sajjakulnukit* Lecturer, Joint Graduate School of Energy and Environment (JGSEE), King Mongkut's University of Technology Thonburi, Thailand. *Dr. Charit Tingsabadh* Assistant Professor and Director, Centre for European Studies, Executive Committee, Chula Global Network (CGN), Thailand. *Dr. Christopher Len (Non-Member Guest)* Research Fellow, Energy Studies Institute (ESI), National University of Singapore (NUS), Singapore. *Acting Sub Lt. Seksan Anantasirikiat (Non-Member)* Academic Officer, ASEAN Studies Center, Chulalongkorn University, Thailand.

AEMI Papers Timetable

TIMELINE	AEMI GROUP MEMBERS	AEMI SECRETARIAT
May 13-15, 2014 May 30, 2014	**AEMI Brainstorm Session: "AEMI: Moving Forward"**	o *Overview Paper for Brainstorming* o *Agreement on AEMI Papers* **Proceedings AEMI Brainstorming**
Friday June 6 2014	• OUTLINE AEMI Paper due to AEMI Review Committee (highlighting Content and Methodology)	o *Review of OUTLINE AEMI Papers* o *Comments sent to authors within one week*
Friday September 12, 2014	• DRAFT 1 AEMI Paper due to AEMI Review Committee	o *Comments sent to authors within two weeks*
Friday October 3, 2014 **October 14-16, 2014** Friday October 24, 2014 **Friday October 31, 2014**	• Revised Draft 1 AEMI Paper due to AEMI Review Committee **AEMI Brainstorming session** • DRAFT 2 AEMI Paper due to AEMI Review Committee	o *Prepare Brainstorming; Distribute Draft AEMI Paper* **Proceedings AEMI Brainstorming** o *Comments sent to authors within two weeks*
Friday November 21, 2014	• Final AEMI Papers due to AEMI Advisory Committee	o *Prepare Forum; Distribute Final AEMI Papers*
December 1-3, 2014	**AEMI Forum*:* "AEMI: Moving from Vision to Action"**	
December 8, 2015 February	• AEMI Papers due to Editor • STAND BY to respond to Editor questions	o *Editing AEMI papers* o *Production of AEMI book* **AEMI GROUP BOOK: "AEMI: Moving from Vision to Action"**

6. AEMI GROUP MEMBERS

May 2014

AEMI Group Members
(May 2014)

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	Ir. G. Lalchand	Associate, Akademi Sains Malaysia.
	Dr. Khalid Abdul Hamid	Associate Research Fellow, Malaysian Institute of Economic Research (MIER).
	Ir. Dr. Tuan Ab. Rashid Bin Tuan Abdullah	Director, Institute of Energy, Policy and Research (IEPRe), Universiti Tenaga Nasional (UNITEN).
	Dr. Zakariah Abdul Rashid	Executive Director, Malaysian Institute of Economic Research (MIER).

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	Dr. Ma. Joy V. Abrenica	Associate Professor, School of Economics, University of the Philippines (UP)-Diliman.
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	Dr. Nguyen Thi Mai Anh	Lecturer, Department of Industrial Economics, School of Economics and Management, Hanoi University of Science and Technology (HUST).
	Dr. Tran Van Binh	Lecturer, Department of Industrial Economics, School of Economics and Management, Hanoi University of Science and Technology (HUST)