

ASEAN ENERGY MARKET INTEGRATION (AEMI)

BRAINSTORMING SESSION Grand Mercure Fortune Bangkok May 13-14-15, 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 providesome 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 be 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-users) consistent with the EE and energy conservation targets, and create an ASEAN framework for its monitoring, implementation and enforcement. These would also be 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 mission 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 indicators, 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 ASEAN, 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:¹

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)

¹ASEAN Plan of Action for Energy Cooperation 2010-2015, ASEAN Center for Energy (ACE).

5. Renewable Energy	<ul style="list-style-type: none"> (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	<ul style="list-style-type: none"> (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	<ul style="list-style-type: none"> (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*²

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.

²Source: 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.