



Consultant Opportunity

Grid Codes and Regulations Consultant

USAID Clean Power Asia program, implemented by Abt Associates

I. Introduction/Overview

The primary objective of USAID Clean Power Asia is to work with Lower Mekong Countries and other Association of Southeast Asian Nations (ASEAN) developing member states to encourage power sector investments in environmentally friendly, clean energy sources, specifically focusing on scaling up investment in grid-connected renewable power. USAID Clean Power Asia is a program funded by USAID and implemented by Abt Associates. When any reference is made to approvals or authorizations, it will be stipulated whether those decisions are contractually made by USAID or Abt Associates as implementer. As the client, any decisions made by USAID and communicated to Abt Associates are final.

II. Background

Abt Associates is supporting the Head of ASEAN Power Utilities/Authorities (HAPUA) through the ASEAN Centre for Energy (ACE) on the first step in moving towards a multilateral power market, through the third ASEAN Interconnection Master Plan Study (AIMS). To complement this study, the International Energy Agency (IEA) conducted a feasibility study for developing a voluntary multilateral power market in Southeast Asia, and the Economic Research Institute for ASEAN and SE Asia (ERIA) conducted a study on institutional arrangements required for developing this market.

The purpose of AIMS III is to determine the combined generation and transmission needs for Southeast Asia, the opportunities for increasing bilateral and multilateral power trade, and the potential for increasing the amount of variable renewable energy (VRE) on the ASEAN power grid. This process includes three phases. Phase 1 includes an RE resource assessment, capacity expansion planning, production cost modeling, and a socio-economic-environmental assessment. A second phase to analyze the impact on the system's reliability is currently in process. The outcome will include identifying the transmission interconnections to be included in an updated ASEAN Power Grid (APG) plan.

The HAPUA Secretariat and ACE presented the results of the AIMS III study to the HAPUA council at the 36th meeting of the HAPUA Council, followed by presenting the results of the study to ASEAN preliminary decision-makers at the 38th Senior Official Meeting on Energy (SOME) held in August, and the ASEAN Ministers of Energy Meeting (AMEM) in November 2020.

After Phases 1 and 2, Phase 3 is planned which includes developing harmonized regulatory frameworks, grid codes, and technical standards among the ASEAN member states. As a first step in this process, Abt Associates intends to understand the gaps that need to be addressed for



harmonizing grid codes in Southeast Asia, followed by addressing the gaps, including a comparison to the grid code for the Greater Mekong Subregion through the support of the Asian Development Bank¹. Though a GMS regional grid code report has recently been completed with an updated gap analysis, it has not yet been published. Experts familiar with ASEAN and the recommended GMS grid code have noted it is overly complicated for a minimum grid code.

To reach the aforementioned objectives, Abt Associates is seeking a consultant on grid codes and regulations who can achieve the tasks as outlined below.

III. Objective

Recommend a minimum grid code for SE Asian countries, to be adopted by ASEAN member states to 1) improve stability and reliability of domestic grids and interconnections between SE Asian countries; 2) to facilitate bilateral and multilateral power trade in the region, 2) increase the ability of the power grids in SE Asian countries to accommodate higher levels of VRE; compare the recommended grid code to the grid code adopted by the GMS; and analyze the gap between SE Asian countries' existing grid codes and the recommended grid code.

IV. Scope of Work

The consultant will conduct a desk study of various international reports, studies, and publications related to grid codes in Southeast Asia, focused on facilitating interconnected power systems and power trade as well as integrating more variable renewable energy into the grids of SE Asian countries. Documents to review include, but are not limited to:

- Analyses of grid codes in the Lower Mekong, and a recommended common grid code, prepared under the Asian Development Bank- ADB's GMS program²
- JICA reports on medium-term power plans and grid codes³

¹ The Greater Mekong sub-region (GMS) is a name coined by ADB with the launch of their economic cooperation program with this region includes Cambodia, Lao PDR, Myanmar, Thailand, and Vietnam and Southern China, specifically [Yunnan Province](#) and the [Guangxi Zhuang Autonomous Region](#). The GMS has been coordinating on energy sector cooperation since the early 1990s, with the first meeting of the Regional Power Trade Coordination Committee (RPTCC) held in 2004. The RPTCC has been conducting joint planning and analysis of differences in regulations and grid codes, focused mainly on transmission interconnections. See <https://www.adb.org/sites/default/files/publication/29387/gms-ecp-overview-2015.pdf>

² In 2012 a Performance Standards and grid code working group was established for the GMS. At the 20th RPTCC meeting in 2016, a consultant compared GMS countries' grid codes to the recommended standards of the European Network of Transmission System Operators for Electricity (ENTSO-E). Synchronization of grid codes was again discussed at RPTCC #24 in June 2018. Finally, at the RPTCC meeting #25 in March 2019, the summary notes mention that a report "Regional Grid Code – Gap Assessment Analysis" was completed, which presents the requirements of each Sub-code and the identified pre-conditions with an updated gap analysis. However, Abt Associates has not yet obtained a copy of the report. Though a GMS regional grid code report has recently been completed with an updated gap analysis, it has not yet been published. Note that experts familiar with ASEAN and the recommended GMS grid code have noted it is overly complicated for a minimum ASEAN grid code with the objective of facilitating power trade and integrating VRE.

³ The JICA study on the power network system masterplan for the Laos People's Democratic Republic is available at <https://libopac.jica.go.jp/images/report/P1000042609.html>. Reports on their work in Cambodia and Myanmar are not currently available. The LM countries, led by Thailand, also developed a MasterPlan for Infrastructure development under the



- Reports by the International Energy Agency (IEA)⁴
- A Report by the German Corporation for International Cooperation GmbH (GIZ) on existing grid codes and gap analyses⁵
- Other documents as determined by Abt Associates in consultation with the consultant

The consultant will synthesize the information; prepare a gap analysis of Southeast Asian grid codes in terms of facilitating bilateral and multilateral power trade as well as increasing the share of variable renewable energy in power production in each country; provide recommendations to Abt Associates on critical issues to be addressed; and make technical recommendations on grid code changes and institutional changes required to implement the recommendations. While the focus is on all Southeast Asian countries, particular attention should be paid to remaining gaps for the Lower Mekong countries.

S/he is also expected to provide a framework for improving grid codes to facilitate expanded bilateral power trade among Southeast Asian countries, i.e., developing a strategy for providing technical assistance to Southeast Asian countries and to ASEAN to improve grid codes and strengthen relevant institutions. The consultant will work with a transmission planner consultant to coordinate with JICA and prepare presentations on the analysis. Lastly, s/he will write a scope for a firm to analyze all relevant technical and regulatory barriers to bilateral and multilateral trade.

V. Tasks, Services Sought & Deliverables

1. Task 1: Review and summarize donors supporting grid codes and regulations

The consultant will review donor programs supporting Southeast Asian countries to upgrade grid codes and other regulations to support power trade and integration of variable renewable energy and summarize contact information and the focus of their assistance.

Deliverable: Donor analysis review and summary

2. Task 2: Desk Study on technical and institutional gaps of country-specific grid codes and regulations, and a recommendation for a common ASEAN-wide grid code

The consultant will conduct a desk study and literature review and prepare a report highlighting the technical and institutional gaps for improving and implementing revised

Ayeyarwady-Chao Phraya-Mekong Economic Cooperation strategy (ACMECS), a cooperation framework among Cambodia, Lao PDR, Myanmar, Thailand, and Vietnam to promote balanced development in the sub-region. Its MasterPlan issued in 2018, includes priorities for infrastructure development, including high priorities transmission lines to facilitate power trade. The official ACMECS MasterPlan unveiled in 2018 can no longer be found on the official ACMECS website - <https://www.dft.go.th/acmeecs-wgtif/ABOUT>. However, an article by the Asia Foundation provides some insight into the plan at <https://asiafoundation.org/2019/10/23/making-sense-of-the-many-mekongs/>. A hard copy of the masterplan will be provided by Abt Associates to the selected consultant. JICA's priorities for support of the ACMECS (Lower Mekong) MasterPlan may be found at <https://www.mofa.go.jp/files/000406737.pdf>.

⁴ IEA's Thailand Renewable Energy Grid Assessment may be found at <https://www.iea.org/reports/partner-country-series-thailand-renewable-grid-integration-assessment> and their ASEAN Renewable Energy Grid Analysis may be found at <https://www.iea.org/reports/asean-renewable-energy-integration-analysis>. A study evaluating the opportunities for Thailand to trade power with 6 neighboring countries was recently completed but is not yet publicly available.

⁵ Report on ASEAN Grid Code Comparison and Review may be found at <https://aseanenergy.org/report-on-asean-grid-code-comparison-review/>



grid codes to achieve the objectives of improved power reliability and stability, promoting regional power trade, and integrating increased levels of VRE per adopted ASEAN or country targets. Services sought include:

- Reviewing grid codes in Southeast Asian countries from the perspective of improving or maintaining grid stability and reliability; promoting power trade by synchronizing grids across borders; and integrating increased variable renewable energy per the current or new adopted ASEAN VRE target and individual country VRE targets. For countries that have already been studied, the consultant is expected to summarize the findings. For any of these issues that have not yet been studied, or for countries where no analysis is available, the consultant will complete a full analysis and comparison of the codes and how they address reliability and stability, power trade, and VRE integration.
- Reviewing the proposed grid code for the GMS region as documented on the RPTCC web site, or obtained directly from ADB, and comparing the recommendation above to the GMS standard
- Comparing the recommendation above to European or U.S. standards (if not already completed in previous studies), and discussing the pros and cons of adopting the consultant's recommendation rather than the European or U.S. standards
- Analyzing institutions responsible for developing and enforcing grid codes in SE Asian countries, and identifying gaps, compared to advanced or developed countries in Europe, the U.S or other countries with international standards. S/he will provide recommendation to Abt Associates on critical issues to be addressed, recommendations on what needs to be improved in terms of institutional issues, what changes are required to improve grid stability and reliability, facilitate bilateral trade and increase VRE, and who/what institution will lead the change in each country and the region (LM and SE Asia).

Deliverable: A report on existing grid codes in LM and Southeast Asian countries, in comparison to the GMS adopted standard and international standards, and recommendations for improving grid codes to improve grid stability and reliability, and facilitate power trade and integration of VRE, including appropriate institution(s) to lead the change.

3. ***Task 3: Develop a framework and strategy for future assistance on grid codes***

The consultant shall develop a strategy to implement the grid code improvements in SE Asia to improve grid stability and reliability, facilitate power trade and increase VRE integration. The objective is to prioritize opportunities to support harmonizing codes to facilitate bilateral trade between Southeast Asian countries. The strategy should include criteria for screening/grouping the countries where the USG could provide support, as well as evaluating the readiness of pairs of countries for increasing or enabling power trade, in particular grid to grid vs gen-ties, and make recommendations on which pairs of countries are highest priority for assistance based on the criteria. It is envisioned that



AIMS III could provide priorities for after the completion of Phase 2. The criteria to be used, still in discussion with ACE as this scope is drafted, include net economic benefits of the planned power trade, amount of power trade facilitated, and the amount of VRE generation built in the relevant countries. ACE and HAPUA will also be proposing an approach to conducting power trade pilots as part of Phase 3. The consultant services sought include:

- Develop criteria to analyze the readiness of Southeast Asian countries to improve their grid codes to address the goals of improving reliability and stability, increasing power trade and increasing VRE to meet their individual country VRE targets, if they exist, and/or the VRE allocated to each country as part of the AIMS III study
- Review the priorities provided by ACE, if completed and provide and evaluate the pros and cons of the method used and the results
- Recommend prioritized pairs of countries for developing pilots to harmonize grid codes and support bilateral trade among LM and/or SE Asian countries

Deliverable: A report on the strategy and framework for future assistance to Lower Mekong and SE Asian countries on improving grid codes to improve grid stability and reliability, promote power trade and increase VRE on their systems, based on the priorities provided by ACE and/or revised priorities proposed by the consultant.

4. ***Task 4: Prepare presentations***

The consultant will prepare presentations on results of tasks 1-3 above, including donor assistance, the desk study and strategy/framework for future assistance at various venues.

Deliverable: Presentations for various venues which could include meetings of ASEAN or LM countries and other venues as to be determined later.

5. ***Task 5: Cooperation with other donor programs through coordination with power system planning consultant***

The consultant will coordinate with a power system planning consultant, in cooperating with JICA and ADB GMS on grid code harmonization in Lower Mekong countries.

Deliverable: Monthly memo summarizing meetings and calls with the power system planner, JICA, and ADB.

6. ***Draft scope of work for firm to analyze barriers to improving grid stability and reliability, increasing power trade and increasing VRE, and prepare an implementation plan***

The consultant will draft a scope of work for a firm to conduct a study and analyze all political and regulatory, institutional and technical barriers to 1) improving grid stability and reliability (especially as regards synchronizing grids between and among SE Asian countries), 2) increasing levels of VRE in SE Asian countries; and 3) developing bilateral and multilateral trade in Southeast Asia, with a particular focus on the Lower Mekong countries, and propose a program to address these barriers.



Deliverable: A scope of work for a firm to analyze all relevant barriers and prepare implementation plan to improve grid codes and regulations to improve grid stability and reliability, promote power trade and increase VRE integration in LM and SE Asian countries.

VI. Schedule

1. The consultant should be able to start working once a consulting agreement is signed.
2. All work and deliverables are to be completed by **March 31, 2021** with an estimated level of effort (LOE) of **80 days**.
3. The consultant will discuss with Abt Associates on setting a schedule to ensure that each deliverable can meet the scheduled due dates to be established prior to signing an agreement. The consultant will work at least 15 days a month with a preference to meet the Abt Associates' team once a week. The meeting can be held virtually depending on the location of the consultant and the situation in country with regarding to Abt Associates' policy on working from home.

VII. Qualifications / Requirements

Minimum qualifications required for this position:

1. **Education:** Master's degree in power engineering or related field.
2. **Experience:** Minimum of 10-12 years of relevant professional experience in working on power grid codes and regulations. Strong experience in conducting transmission engineering studies
3. **Citizenship:** Thai national is preferred. A citizen of Southeast Asian country with a Thai work permit is also eligible to apply.
4. **Other qualifications:** Ability to work effectively and harmoniously with colleagues from varied cultures and professional backgrounds; excellent in English writing, coordination, communication and negotiation

Preferred qualifications:

1. Professional experience working for donor-funded projects in Southeast Asia and experience working with utilities, regulators or dispatching centers in using grid codes.
2. Experience working for international organizations, nongovernmental or governmental institutions /organizations in a multi-cultural setting.
3. Experience providing consulting services and/or development solutions related to renewable energy, electricity transmission and distribution, and grid code compliance.
4. Ability to demonstrate understanding of the technical requirements and operations for cross-border power transmission and power trading; experience with RE trading is a plus.
5. Excellent knowledge of English and at least one language of a Southeast Asian country an



advantage (Thai is preferable).

VIII. How to apply

Interested candidates may express their interest by emailing a CV and expression of interest to recruitment@usaidcleanpowerasia.com no later than **December 16, 2020**. To be complete, your application **MUST INCLUDE** the following information:

1. A written **Expression of Interest** of at least one page should past experiences with similar assignments and discuss any previous publications, writing samples, and/or technical analyses related to this position. The expression of interest must address the minimum qualifications and preferred skills/prerequisites specified above.
2. **Resume or CV** clearly indicating work/consulting history and either daily consulting rate or annual compensation for each consultancy/position, stated in currency of payment.
3. **US Federal Form 1420 (EBD)** <https://www.usaid.gov/forms/aid-1420-17>

Please be prepared to provide upon request **proof of education and/or degree attained** (transcript or diploma) and **proof of annual salary or daily consulting rate** as stated in the EBD (acceptable forms include employment agreement, pay stubs, employer verification letter).

Abt Associates is an Affirmative Action/Equal Opportunity employer committed to fostering a diverse workforce and provides market-competitive salaries and comprehensive employee benefits.

Disclaimer: Abt Associates will never ask candidates for money in exchange for an offer of employment.