

**Capacity Development for
Renewable Energy Integration into the Power System
Electricity Regulation Authority of Viet Nam**

Development Engagement Document

**Annex E to
Energy Partnership Programme between Viet Nam and Denmark
Development Engagement 2**

May 16th 2017

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1 INTRODUCTION

The present development engagement (DE) document details the objectives and management arrangements for the development cooperation concerning the Capacity Development of Electricity Regulation Authority of Viet Nam (ERAV) for the period from July 2017 to June 2020 as agreed between the parties specified below. The development engagement document is an annex to the Bilateral Agreement with the Implementing Partner and constitutes an integrated part hereof together with the documentation specified below. This DE with ERAV is part of the support provided through the Energy Partnership Program between Viet Nam and Denmark. The Partnership Programme with Viet Nam is embedded in the Danish Energy Agency (DEA) Energy Partnership Programme (DEPP) supported by the Danish Climate Envelope focusing on four countries including also China, Mexico and South Africa.

2 PARTIES

The Danish Energy Agency
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Denmark

and

Electricity Regulation Authority of Viet Nam
[insert address/PO Box]

3 DOCUMENTATION

The partner documents that support this intervention are:

1. Decision No. 63/2013/QĐ-TTg, November 8th 2013: Road Map, Conditions and Power Sector Organization Structure for Viet Nam Power Market Stages Formation and Development.
2. Decision No. 14576/QĐ-BCT, 30th December 2015: Approving the training curriculum on competitive wholesale power market

4 BACKGROUND

In recent years, political and economic reforms have transformed Viet Nam from one of the poorest nations in the world to a middle-income country. Access to basic infrastructure has also improved substantially: Electricity is available to almost all households; up from less than half in 1993, however, there remain financial and managerial difficulties in the sub-sector. The low electricity tariff rates constitute indirect subsidies and prevent the investment in low-carbon and renewables based power sources. Recognizing the need to meet the rapidly growing demand for electricity, the development of power infrastructure in an economically and environmentally sustainable manner is a key priority of the Viet Nam government.

In 2006, the Prime Minister issued a ‘20-year Roadmap’ for developing a competitive electricity market, this was updated in 2013 by Decision No. 63/2013/QĐ-TTg. A competitive power market will contribute to making renewable energy such as solar photovoltaic and wind power become much more cost competitive over time; thus, having a positive impact on pollution reduction and future GHG-emissions levels in Viet Nam. Assisting this transition and the resulting reduction in CO₂ emissions is in accordance with the overall objective of the Danish Climate Envelope.

The Ministry of Industry and Trade (MOIT) is responsible for managing the energy sector. In 2005 the Electricity Regulatory Authority of Viet Nam (ERAV) was established as an entity under the MOIT to assist MOIT “with the functions of regulating the electricity activities and power market”. Several Development Partners are currently assisting it with developing regulations on the operation of a competitive power market and directions for the regulations’ implementation including, most notably GIZ, the World Bank and the Asian Development Bank.

ERAV is working to implement the “road map for power market reform” a prime ministerial decision issued in November 2013. This sets out the conditions and power sector organization structure to form and develop power market in three stages in Viet Nam until, from 2019¹ onwards, a competitive retail market can be operated in full. So far good progress has been made in establishing necessary regulatory framework for a competitive power market. However, the power market players cannot yet forecast supply and demand reliable. ERAV intends build capacity with the three National Load Dispatch Centres (NLDC) and Power Cooperations on forecasting and has requested Danish support.

ERAV have had previous external capacity development support, including cooperation with IES (Australia) on market rules, and has opportunities for cooperation with other donors but has found piecemeal training ineffective, even distracting, in tackling the institution’s strategic priorities. High level MOIT and ERAV interaction with Danish experts during previous and ongoing programmes led to the realisation that the DEA general approach and the specific expertise of the Danish System Operator, were an ideal fit for ERAV’s immediate needs.

ERAV understands, correctly, that Danish power market is a successful paradigm for the integration of renewable energy with one of the highest levels of security of supply globally, and optimization of the power system at lowest price. DEA and Danish operator assistance is requested to focus on integration of RE into the power system, in particular improved forecasting of load and of RE generation. The point of entry for the Danish support will be the Power Market Development Research and Training Centre of ERAV. The centre is headed by a Deputy Director under one of ERAV’s three Deputy Directors General and provides training internally for ERAV staff and to external stakeholders including the three NLDCs and the Power Corporations (PCs) engaged with power transmission and distribution. The centre also has responsibility for coordinating international co-operation.

5 DEVELOPMENT ENGAGEMENT OBJECTIVE

The wider objective of the development cooperation among the parties is that most cost-effective opportunities for low carbon transition in energy system are more widely adopted throughout Viet Nam. This objective is in alignment with Viet Nam’s Plan for Implementation of the Paris Agreement and the Viet Nam National Green Growth Strategy. The particular objective of this DE is efficient integration of renewable energy into the Viet Nam power system, with consequent reduction of CO₂ emissions.

The intention is through ERAV’s training function to help support NLDCs and Power Corporations (PCs) in being sufficiently prepared for a new grid operation paradigm that efficiently integrate a larger share of intermittent RE into the electricity grid as targeted for in

¹ The roadmap actually cites 2023 as the target date for full implementation. Progress has been such that the target has been brought forward.

the Viet Nam RE Master Plan. This would also support ERAV in its key objectives of furthering energy security, maintaining a reasonable price for electricity and protecting the environment. It is also consistent with Danish Climate Envelope overall GHG-emissions reduction aim.

The actual support will be based on progress attained in the implementation of the engagement as described in the documentation. Progress will be measured through the ERAV's monitoring framework, the Climate Change Envelope (CCE) indicators, and specific indicators developed for this development engagement.

6 THEORY OF CHANGE

The intended outcome is that the impacts of intermittent RE-generation on the operation of the power system as well as the electricity market are well managed by the system operator. At present, electricity from intermittent RE sources accounts for less than 1% of power generation but the RE Master Plan aims to increase this to 7% by 2020 and 10% by 2030. This would challenge the existing operational paradigm including with regard to the ability to maintain demand and supply in constant equilibrium and hence avoiding blackouts, one potential consequence being that RE-generation would be at high risk of being curtailed. This DE accordingly seeks to give comfort to key-stakeholders in the power system that stable operation of the grid as more intermittent generation capacity comes on line, is indeed technical possible, and in a cost-effective manner.

Two basic requirements for securing constant equilibrium in supply and demand, are accurate forecast of the amount of power likely to be available in the short and medium terms, and accurate forecast of the demand for power. NLDCs and PCs currently provide forecasts to ERAV, but these are unreliable. The first output targeted by this cooperation is accordingly that power system participants have strengthened capacity in load forecasting as well as in forecasting on RE-generation including through adequate tools/models/systems at hand and access to relevant data to do accurate forecasting.

As the capacity to forecast improves, the need for auxiliary services will be kept at a minimum but since even state of the art forecasting will never be 100% accurate, the NLDCs will still have to activate auxiliary services to keep the power system stable and avoid outages. The more effective methods followed to activate auxiliary service, the better ability to secure the equilibrium and hence maintain or even improve security of supply. Further, if effective methods to ensure auxiliary services are followed then traditional power generators can gain financially by providing the operational plant flexibility needed by the power system at a price. Thereby, the losses encountered by traditional power generation units as new RE capacity comes on line, can be lessened by the new revenue stream, and the wider power system can operate more cost effectively.

For this to materialize, ERAV is assisted by the program to build capacity with power system participants for them to develop and implement supportive measures including basic calculation principles of auxiliary service prices and standard auxiliary service supply contracts so that they are well prepared to operate the power system in a cost effective way under the new conditions following full implementation of the competitive power market. Hence, the second output targeted by end-of- programme is that NLDCs and other relevant stakeholders calculate the power systems needs for ancillary services more accurately; and that methods to

secure adequate availability of ancillary services are developed as a result of the support, and applied.

ERAV recognizes that the Danish Transmission System Operator has expertise to maintain grid stability under conditions of high penetration of RE, that thermal power plants in the Danish system are able to operate in a highly flexible manner and that auxiliary services market is an integral part of the power market. An international system operator with comparable remit to EVN, such as the Danish Transmission system operator, would be engaged to undertake the capacity development of NLDCs and PCs through expert review of documentation, workshops and seminars, and involving also exchange expert work tours as relevant to Denmark of key people involved in the national grid operation

Successful achievement of the immediate outputs rests on the assumption that resource allocation to ERAV is in place to carry out training activities of stakeholders as required by Decision No. 14576/QD-BCT on curriculum training for a competitive power market and that NLDCs and PCs are closely engaged in the activities through the ERAV Training division, the development engagement anchor at ERAV, and on the participation of NLDCs and PCs in relevant training on RE-integration at distribution level. It is also an assumption that DEA is able to provide relevant experts and technical assistance in a timely manner as per agreed work plans.

Successful achievement of the outcome rests on the assumption that Government of Viet Nam retains its commitment to expansion of RE-generation capacity in the power mix and that this is reflected in regulation of electricity prices that allows NLDC, PCs and other stakeholders to make investments in systems needed for accurate forecast and auxiliary services. Attached to this, is the assumption that RE will come online in a scale that requires increased attention to the technical and operational grid integration issues that this cooperation addresses. The commitment of the Government is strong, however, arising from compelling strategic concerns in the power sector.

7 RESULTS FRAMEWORK

For Danida's reporting purposes the following key outcome and output indicators have been selected to document progress. Detailed indicators for each output will be revisited and potentially refined as part of the inception, where the baselines and targets, will be adjusted with reference to prevailing knowledge and the Danish Climate Envelope guidelines for monitoring:

Outcome		Enhanced power system ability to integrate the renewable energy generated in a cost effective way.	
Outcome indicator		Capacity to effectively integrate RE into the grid.	
Baseline	Year	2017	1) Limited capacity available to integrate the targeted increase of power generated from RE. 2) No significant curtailment with current level of RE integration
Target	Year	2020	1) NLDC and PCs has the capacity to integrate all generated RE in accordance with the ability of power grid while at the same time minimizing the costs of the auxiliary services needed to balance the variable nature of the resource

			2) No significant curtailment with the increased level of RE integration
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Output 1		Enhancement of capacity in forecasting of load and of generation from intermittent RE Power system participants manage more accurate short term and medium term forecasting including through use of real time weather data as available.	
Output indicator		Progress in execution of capacity development programme established for the Danish support	
Baseline	Year	2017	NLDC, PCs and relevant stakeholders have basic capacity in short-term load forecasting and forecasting production from intermittent RE
MTR Target	Year 1½	2019	Detailed capacity development program developed, and activities initiated including expert-review of adequacy of existing forecasting tools/methodologies/systems.
Target	Year 3	2020	Capacity development program successfully completed and evaluation shows that participants are enabled to do more accurate forecasting.
Output 2		Improved capacity for calculating need for and secure availability of ancillary services to ensure stability of the power system as well as power market NLDCs and other relevant stakeholders calculate the power systems needs for ancillary services more accurately. Methods to secure adequate availability of ancillary services are developed as a result of the support, and applied.	
Output indicator		Ability of NLDCs and relevant stakeholders to calculate needs for ancillary services and availability of methods to secure availability of ancillary services are developed.	
Baseline	Year	2017	NLDC and relevant stakeholders have basic capacity in calculating needs for ancillary services.
MTR Target	Year 1½	2019	NLDC and relevant stakeholders have enhanced capacity for understanding methods to identify needs of each kind of ancillary services for ensuring stable operation of the power system and power market.
Target	Year 3	2020	NLDC and relevant stakeholders assess more exactly the needs for ancillary services and methods to secure availability of ancillary services.

8 RISK MANAGEMENT

The major risks of the development engagement are:

Proper implementation of the competitive power market is delayed. Action from ERAV to implement the competitive power market is required on a number of fronts and the engagement only deals with one aspect, the integration of renewable energy. Delay in power market implementation related to other aspects is only a minor risk as the capacity needs will be the same in a vertically-integrated power sector as in a power sector where ownership is

unbundled and power companies compete on a power market. Hence the ownership structure in the power market and the degree of competition does the effect the overall need for accurate forecast and auxiliary services. Moreover, other development partners have supported and have indicated willingness to further support other capacity development areas necessary to power market development. The risk is therefore minor.

The ambitious targets for increasing the share of power provided by renewable energy are not met. The support is valuable because it helps overcome the difficulties in integrating intermittent power production that can occur when Viet Nam realises the plans to construct new wind and solar capacity. If the share of renewable energy remains at or around the current level (1%) the outputs of the engagement will be less relevant. Furthermore successful integration also depends on the capacity of power grid to transmit power across Viet Nam and investment in upgrading the power grid will be an important element in the integration of intermittent power production. The risk is medium on the very short term since there are still barriers for boosting power from renewable, including incorrect pricing, too low feed in tariffs etc. However, compelling strategic concerns of the power sector includes economic growth and long term security in supply suggesting that intermittent RE resources eventually will play a larger role in the power supply mix, and hence the merits from the intervention would eventually apply. The risk will be mitigated through inter alia policy dialogues including with point of departure of energy analysis resulting from DE1 and including also other development partner engaged. The risk is therefore minor.

There are no other major risks identified that have not been mitigated as part of the design, but risks will be monitored closely throughout implementation and measures will be carried out accordingly.

9 INPUTS/BUDGETS

Outputs	Contribution with Danish funds	Partner Contribution in-kind
1. Enhancement of capacity in forecasting of load and of generation from intermittent RE	3,404	4500 hours (ERAV + NLDC)
TA travel costs etc. in DKK '000	298	
Delegations to Denmark in DKK '000	350	
Other costs in DKK '000	100	Meeting venue
TA from DEA	416	
TA from other international experts	1420	
TA from local consultants	280	
Long Term Advisor	540	
2. Improved capacity for calculating needs and secure availability of ancillary services to ensure stability of the power system as well as power market	2,521	3000 hours (ERAV + NLDC)
TA travel costs etc. in DKK '000	451	
Delegations to Denmark, in DKK '000	350	
Other costs, in DKK '000	100	Meeting venue
TA from DEA	299	
TA from other international experts	540	

TA from local consultants	241	
Long Term Advisor	540	
GRAND TOTAL, in DKK '000	5,926	

10 MANAGEMENT ARRANGEMENT

The parties have agreed to the following management arrangement with the aim to ensure adequate dialogue and timely decisions regarding this development engagement.

The development engagement is anchored in the Power Market Development Research and Training Centre of ERAV that has the overall responsibility for implementation of the engagement. The daily implementation is the responsibility of the Leader of this department.

A Development Engagement Implementation Group, hereafter called the Implementation Group, managing daily implementation of the development engagement will be headed by a person from the partner institution and consist of the international Long Term Adviser posted with MOIT, the EDK programme officer, the DEA country coordinator/DEA expert and partner specialists as required. The Implementation Group will guide daily implementation and meet on a needs basis, and will: i) develop annual and detailed half-yearly work plans for the DE, matching priorities in the partners work plans, ii) associated with the detailed half-yearly work plan determine need for Technical Assistance (TA) inputs from DEA experts and from national and international TA through development of a TA provision plan; iii) endorse inputs based on TOR prepared at output level; iv) monitor day-to-day progress of DE implementation. The head of the Implementation Group reports on DE outputs to the Management Group.

A Management Group is established with representatives from the partner institutions at senior operational level, LTA, DEA-representative(s) and EDK representative. The Management Group will be led by DEA country coordinator, EDK programme manager and MOIT Programme Director. The Management Group follows progress, approve work plans with associated TA procurement plans to be reported to the Steering Committee (annual), advises the Steering Committee and is a forum for technical level policy dialogue. This group will meet at least twice per year and have the responsibility to: i) consolidate and check annual and detailed half-year work-plans with associated TA procurement plans against development engagement partners work-plans and budgets; ii) monitor and report performance progress at output level, using the “traffic light” system; iii) ensure cross fertilization between engagements. Decisions are made by consensus.

The Steering Committee is established and expected to meet once or twice per year. The Steering Committee should be co-chaired by Vice Minister of MOIT and the Danish Ambassador to Viet Nam and include a representative from Danish Energy Agency and heads/deputy heads of departments for the development engagement partner institutions. Its main task will be to approve annual work plans, budgets and reports, and review annual progress. The Steering Committee should provide strategic guidance to the Partnership Programme, discuss and resolve issues related to program progress and decide on any reallocation between the Development Engagements. Decisions are made by consensus. Also, the Steering Committee is a forum for high level policy dialogue on matters of relevance to the programme.

Implementation arrangements

At implementation level the DE partners are responsible for implementation of the DE with DEA being responsible for providing the necessary and timely resources to deliver the outputs, according to the output-based budget and along the request for TA from the DEs. Each DE partner has, at output level, dedicated partner specialists, assisted by DEA that provide inputs to the annual and half-yearly work-plans, and proposed needs for provision of TA. This includes formulating detailed Terms of Reference and specific TA profiles and time-input required to deliver the outputs. Provision of TA should be based on the principles of a) national TA where relevant; b) DEA experts where peer advice is required and; c) international specialists where dedicated specialist tasks will be needed.

DEA is also responsible for coordination of inputs from Denmark and for advising on implementation, and approving deliverables from external service providers.

In addition to national and international short term TA the programme will finance a Long Term Adviser to be placed in MOIT. MOIT will arrange and finance project office facilities. The LTA will have primary focus on delivering technical advice at output level to DE1 with MOIT, but will also support the other development engagement including assist with coordination on the Vietnamese side of TA-missions from Denmark, and facilitation of data sharing across programme and beyond. The LTA would also use any opportunity to encourage partners (as duty bearers) to ensure consultation of relevant DE outputs with right holders – civil society organizations, private sector investors and other relevant stakeholders. The LTA will also support integrated policy dialogues. The LTA will be able to draw on local TA from the programme, when required.

At the Embassy of Denmark (EDK) a programme officer will coordinate programme implementation and facilitate inputs from Denmark. The programme officer will also participate in meetings of the Implementation Group as needed.

11 PROCUREMENT AND FINANCIAL MANAGEMENT

This development engagement will have no cash transferred or disbursed directly to the development engagement partner. Hence, there are no requirements for accounting of funds and financial reporting at development engagement level. However, based on the agreed annual workplan the international and national adviser inputs will be budgeted and agreed in terms of days delivered in country. The bi-annual progress reports will include the actual time spent for each TA input to monitor the use against agreed TA budget.

Procurement of agreed international TA (in any form) will be carried out by DEA and follow Danish procurement rules/drawn from a pool of experts. Final selection will be done in close cooperation based on no objection from the Implementation Group.

Procurement of agreed national specialist TA, not covered by the above, will be carried out by the EDK in consultation with DEA, and follow Danish procurement rules for local procurement of TA. Final selection will be done by in close cooperation with the Implementation Group.

Recruitment of the Long Term Adviser (LTA) follows procedures of the Danish Ministry of Foreign Affairs. Representatives from MOIT will be part of the recruitment panel together with representatives from DEA, EDK and MFA.

Study tours will be paid for by the partnership programme with Viet Nam. This includes airfares, accommodation and daily allowances. DEA, through the EDK, will arrange all bookings of airfares, hotels, transport and other practical arrangements. Daily allowances for the entire trip will be paid out by the EDK in cash upon departure following EDK procedures for appropriate documentation. Workshops and seminars in Viet Nam will be paid for by the partnership programme through EDK, based on appropriate quotations approved by EDK and documented expenses. Sitting allowance for any workshop or meetings will be paid for out of partners own budgets.

12 MONITORING AND EVALUATION

Daily progress will be followed by the Implementation Groups who will report progress towards outputs and outcome of this engagement through bi-annual progress reporting to the Management Group that consolidate reports across the programme and report this to the Steering Committee at annual or bi-annual Steering Committee meetings. The Management Group will also provide an Annual Progress Report to be approved by the Steering Committee. All reporting should, to the extent possible and when relevant, be disaggregated by gender, area, sector, etc. forwarded to the DEPP Advisory Group in Copenhagen, which follow the overall DEA Energy Partnership Programme in all countries..

Detailed indicators for each specific development engagement output will be revisited and potentially refined as part of the inception, where annual targets, in line with already defined targets will be adjusted with reference to the Climate Change Envelope guidelines for monitoring. Monitoring towards these targets will be reported through the bi-annual progress reporting using a “traffic-light” system, where:

- “green” is on-track – implementation continues as scheduled;
- “yellow” is partly on-track which needs an explanation by the Implementation Group to the Management Group, including actions taken to get back on-track and closer monitoring of progress by the Management Group;
- “red” is off-track, which needs a detailed explanation by Management Group to the Steering Committee with recommendations of changes to the implementation to get the engagement back on-track. If “red” in two consecutive reporting periods, the Steering Committee may consider reallocation between outputs within or between the development engagements as deemed relevant.

Monitoring of actual time spent by international and national advisers will be reported in the biannual progress reports with updated work plan and projection of TA input for the following quarter will be stipulated. Similar reporting will be done for workshops and study-tours.

The Danish MFA shall have the right to carry out any technical mission that is considered necessary to monitor the implementation of the programme, which may include a mid-term review. After the termination of the programme support the Danish MFA reserves the right to carry out evaluation in accordance with this article.

Anti corruption

No offer, payment, consideration or benefit of any kind, which could be regarded as an illegal or corrupt practice, shall be made, promised, sought or accepted - neither directly nor indirectly - as an inducement or reward in relation to activities funded under this agreement,

incl. tendering, award, or execution of contracts. Any such practice will be grounds for the immediate cancellation of this agreement or parts of it, and for such additional action, civil and/or criminal, as may be appropriate. At the discretion of the Danish Government, a further consequence of any such practice can be the definite exclusion from any projects funded by the Government of Denmark.

Prerequisites

This Development Engagement is in accord with a Memorandum of Understanding between the Ministry of Trade and Industry of Viet Nam and the Ministry of Climate, Energy and Building of Denmark, signed on 6th June 2015. There are no additional prerequisites.

Signatures

Partner/DEA