****Terms of Reference****

**Energy Partnership Programme between Vietnam and Denmark**

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| **Project Title:  Adaptation to the wholesale market and demand response actors** |

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| **Partnership programme context** | |
| **Country** | *Vietnam* |
| **Development engagement** | *DE2: Capacity Development for Renewable Energy Integration into the Power System with ERAV* |
| **Engagement timeframe** | *01-04-2022 – 31-12-2022* |
| **Partner(s)** | *Electricity Regulatory Authority of Vietnam (ERAV)* |
| **DEA responsible** | *Alessandro Michael Setti* |
| **DEA alias for accounting** | *Output2: 417428* |
| **Framework position** | * *Local consultant* * *Energinet* |
| **Engagement outcome relevant for this project**   |  |  |  | | --- | --- | --- | | Outcome | | Regulatory framework and flexible tools in the power system supports the efficient and secure transition towards clean energy with a rising share of electricity from variable renewable energy (VRE) sources | | Outcome indicator | | Transparent regulatory framework in line with international standards in place for efficient, secure and market-based integration of variable renewable energy (VRE) generation in the power system | | Baseline | Year  2020 | Incomplete framework for integration of renewable energy in place. | | Target | Year  2025 | * Ancillary services deployment and with reliant of electricity market stakeholders for VRE integration is governed by enhanced regulatory framework. * Increased VRE integration, system flexibility with reliant VRE forecasting, and enhanced system stability | |  |  |  | | |

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| **Engagement output relevant for this project**   |  |  |  | | --- | --- | --- | | Output 2 | | Solutions focusing on the demand side and dispatchable power generation to ensure increased integration of VRE | | Output indicator | | Mechanisms to ensure optimal integration of VRE through flexibility of dispatchable power plants and demand flexibility | | Baseline | 2020 | Limited incentives for demand flexibility and not applied | | Target | 2023 | Solutions for flexibility in power generation and demand-response to allow for optimal integration of VRE | | Target | 2025 | Optimization of VRE integration regulated through enforcement of updated mechanisms. | |  |  |  | |

**1. Background / Context**

Denmark cooperates with ERAV under Ministry of Industry and Trade (MOIT) on integration of variable renewable energy in the power system. ERAV is the authority of regulation of the electricity sector of Vietnam which includes among others flexibility mechanism and market development. The Danish Energy Agency and the Danish Transmission System Operator (TSO), Energinet, has supported ERAV by developing recommendations for flexibility mechanisms.

Wholesale markets are being deployed in Vietnam, which provide an incentive for power plant owners to operate their assets flexible to optimize earnings. However, experience from the Nordic power markets, shows that power plant owners do not necessarily respond to incentives, or at the very least will need to adjust their organisation towards the optimising earnings in the wholesale market.

Vietnam is currently experiencing an immediate challenge with large amounts of solar power being connected to the grid. While photovoltaics are inexpensive and a source for low-carbon electricity, they are not dispatchable, and as such dispatchable power plants will need to operate flexibly in order to accommodate increasing production from renewable sources.

Similarly, flexible consumption can contribute to the flexibility of the entire system, hence understanding of roles and responsibility of key market players within demand response is a stepping stone towards independence from fossil fuels.

**2. Objectives of the assignment**

The overall objective of the assignment is to continue to support ERAV, NLDC and other Vietnamese stakeholders in integrating large shares of variables renewables in the power system as smooth and cost-efficient as possible.

By developing the regulatory framework like international standards, it is easier for e.g., power plant owners to understand the requirements and optimize their operation accordingly. Thus, creating the awareness of the opportunities for earnings in the Vietnamese wholesale market is the first step towards power plants providing flexibility. Hence, this activity aims at assessing the awareness of the opportunities for earnings in the Vietnamese wholesale market among power plant owners, especially by operating flexibly.

Another relevant tool when implementing flexibility mechanisms is demand response. Hence, this activity also aims at performing expert meetings and workshops on market actors such as aggregators and balance responsible parties, to better identify their roles and responsibility in managing and facilitating demand response initiatives.

It is in this context that the flexibility of the Vietnamese power system is addressed in work programme 2022.

**3. Tasks and activities / Scope of work**

This Term of Reference (ToR) is addressing output 2: flexibility and markets.

**Output 2** will build on top of the previous WP21 where Energinet provided recommendations on the incentives for flexibility, while the DEA have performed a study on the status for demand response in Vietnam and provided recommendations on the next steps.

* **Activity 2.2** will provide insight into the perception of power plant owners on the opportunities in operating their assets flexible in order to optimize earnings.
* **Activity 2.3** will provideinsight into relevant actors in the Nordic electricity market, specifically aggregators and balance responsible parties, with the aim of facilitating the success of demand response initiatives in the future.

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| Output 2 Activities | | Time  line | Deliverables | Roles |
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| **2.2** | **Insight into Vietnamese power plant operation**  Assessment on how Vietnamese power market designs are incentivising power plant operations | Jun – Nov |  |  |
| **2.2.1** | **Inquiries with power plant owners**  By making inquiries to power plant owners - both power companies and independent power producers – data will be gathered over the level of awareness of power plant owners with respect to incentive mechanisms. | Jun – Sep |  | ERAV will facilitate the process while LC will perform the inquiries and the DEA will provide expert advise |
| **2.2.2** | **Assessment of the perception of power plant owners**  The assessment will provide insight into the perception of power plant owners on the opportunities in operating their assets flexibly in order to optimize earnings | Sep – Nov | D2.2 | LC will perform the assessment and write the report with the support of the DEA. |
| **2.3** | **Roles and responsibilities of market actors with focus on demand response**  The purpose of this activity is to share experiences within the structure of power markets and on how the definition of new specific roles facilitates the development of demand response activities | Aug – Dec |  |  |
| **2.3.1** | **Kick-off expert meeting on aggregators and balance responsible parties**  By presenting market approaches to demand response and the actors involved, knowledge will be shared between Danish and Vietnamese participants, fostering a conversation aimed at identify focal points of interest, that will help scoping Activity 2.3.3 | Aug | D2.3.1 | DEA will facilitate. Energinet will provide insight into market actors, ERAV and LC will present current situation in Vietnam. |
| **2.3.2** | **Follow-up meeting(s) on aggregators and balance responsible parties**  By presenting market approaches to demand response and the actors involved, knowledge will be shared between Danish and Vietnamese participants about specific roles and responsibilities of market actors such as aggregators and BRPs. | Sep-Oct | D2.3.2 | Based on input from Activity 2.3.1, DEA will facilitate the meetings with the participation of ERAV, LC, Energinet and actors such as aggregators and balance responsible parties |
| **2.3.3** | **Adaptation of aggregators and balance responsible parties to Vietnam**  This activity will analyse Danish setup and experiences, providing recommendations on how new roles and responsibilities could be developed and integrated in the Vietnamese energy system with the aim to foster demand response activities | Nov | D2.3.3 | LC will write the report with support from Energinet and the DEA |
| **2.3.4** | **Optional workshop on aggregators and balance responsible parties**  This activity involves the presentation of lessons learnt and recommendations for Vietnam on the base of expert meetings on the topic of aggregators and BRPs, as market players facilitating the activation of demand response activities. | Dec | (D2.3.4) | Based on the results of Activities 2.3.1, 2.3.2 and 2.3.3, DEA and ERAV will facilitate a workshop with the participation of relevant stakeholders. |

**4. Deliverables / Output**

General requirements for reports: Reports will present in detail Danish/international experiences and recommendation/suggestion for Vietnam (if have), including underlying principles, methodologies, framework conditions, positive as well as negative learnings and a profound insight into benefits and limitations of relevant policies applied, including context and involved stakeholders. It is envisioned, but not a requirement that reports are in the range of 50 – 60 pages or more. Additionally, there is a requirement for at least one round of commenting from both the DEA and ERAV before application for final approval can be submitted.

D2.2: Report: Insight into Vietnamese power plant operation

Assessment on how Vietnamese power market designs are incentivising power plant owners to generate power in order to optimize earnings in the power markets. LC and the DEA will collaborate on an analysis on power production plans from power producers in order to optimize earnings in the power market. The product will be a report on the topic written by LC with the support of the DEA.

D2.3.1: Kick-off expert meeting on aggregators and balance responsible parties

With focus on demand response facilitation, Energinet, ERAV and LC will share experiences on market setup, market actors and their roles and responsibilities in relation to demand response. The scope and focus of Activity 2.3.3 will be discussed.

D2.3.2: Follow-up expert meeting(s) on aggregators and balance responsible parties

Based on input from Activity 2.3.1, DEA will facilitate one or more meeting with the foreseeable participation of ERAV, LC, Energinet and actors such as aggregators and balance responsible parties from Denmark. Drafts for Activity 2.3.3 can be presented, to which ERAV will provide feedback.

D2.3.3: Report: Adaptation of aggregators and balance responsible parties to Vietnam

Roles and responsibilities of market actors in Denmark will be described, as well as concrete experiences within demand response facilitation. The Vietnamese market will be analysed and the integration of actors such as aggregators and balance responsible parties will be assessed. The product will be a report on the topic written by LC with the support of Energinet and the DEA.

(D2.3.4): Optional workshop on aggregators and balance responsible parties

Resulting from the conversations during the expert meetings conducted during the work programme, a final workshop with lessons learnt and recommendations to Vietnam could provide value to the cooperation. LC is envisioned to provide an assessment of the opportunities and challenges emerging from Activity 2.3.1 and 2.3.2.

This activity is considered optional, and reliant on the quality of the information exchanged during the expert meetings. Requirements will regard a sufficient understanding of the Vietnamese energy market and how new roles could be established. The working group will evaluate the added value of a final workshop for the parties involved as the work programme progresses, and reserves the right to cancel Activity 2.3.4 if conditions will not be met.

**5. Staffing and organisation / required skills**

A deep theoretical and practical experience with power system operation is required for the project participants.

Specific competences and experience to be covered by consultancy members of the project team are agreed on prior to the start-up of relevant activities.

General requirement for NC experts (does not have to be fulfilled in entirety):

1. Expected to have a MSc in mechanical engineering, electrical engineering or energy planning.
2. A profound knowledge and understanding of:
   1. Power plant operation and dispatch strategies
   2. The Vietnamese power system
   3. Electricity market, ancillary services and regulatory framework
   4. The stakeholders of the Vietnamese power system
   5. Flexible operation of power systems and power plants
3. Network within the Vietnamese power sector especially within operators and owners of coal-fired power plants
4. Work experience within:
   1. Power plant operational and maintenance strategies
   2. Conducting interviews/surveys/audits
   3. Presentation of results at meetings and report writing in English
5. Good written and spoken communication skills in English and Vietnamese
6. Besides the above skills experience in the following experience will be prioritized:
   1. Design expertise and configuration of power plant
   2. Study and assessment of the domestic and international markets for energy resources and fuels for electricity generation
   3. Modeling and making assessments of the stability of power systems
   4. Designing questionnaires

**6. Missions**

The 2022 work programme includes 2 planned missions, which will focus of the first mission will be scoping and engaging relevant stakeholders, while the second mission will be aiming towards having both technical and high level elements.

The first mission is expected to be conducted in June, and will serve as a scoping mission with representation from the DEA. The objective is to establish contact with relevant stakeholders, who could be interested in collaborating on increasing the flexibility of both thermal power plants and demand response in Vietnam. Additionally, this mission is intended to support capacity building at both ERAV and the DEA.

The second mission will take place in Q4 and is intended to serve as a finalization of activity 2.2 & 2.3. During the mission, products can be presented to a broader audience, allowing for a discussion with relevant Vietnamese stakeholders.

**7. Milestones**

Below are suggested milestones of the project. The consultant is required to propose updated timeline for the indicated milestones in order to complete the project before the end of December 2022. Elaboration of how to implement the activities if any should be put in the Comments column.

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| **Date** | **Activity** | **Comments** |
| 15.05.2022 | Project start |  |
| 15.09.2022 | Expert meeting D2.3.1 on aggregators and BRPs |  |
| 15.10.2022 | Draft deliverable D2.2 on power plant operation |  |
| 01.11.2022 | Follow-up expert meeting D2.3-2 on aggregators and BRPs |  |
| 15.11.2022 | Final deliverable D2.2 on power plant operation |  |
| 15.12.2022 | Workshop D2.3.3 on aggregators and BRPs | Optional |
| 21.12.2022 | Project completion |  |

**8. Man-day Inputs and budget**

The consultant should propose the number of man-day inputs and rate for completing the above mentioned tasks. However, the total fee budget should not exceed 100,000 DKK. Expenses relating to travels and organisation of workshop/meeting are not required as it will be paid for by the programme and should not be included in the consultancy price proposed by the consultant.