

TERMS OF REFERENCE

For

VIETNAM WIND GRID INTEGRATION STUDIES

Deadline for application: 31 October 2013

Location: Vietnam

Estimated period of assignment: November 2013 – August 2014

1. Background and rationale

EVN and ICASEA signed the MOU on 2 May 2012 in Hanoi on the cooperation namely “*Study on wind power in Vietnam power system and Electricity Market*” which includes three components as follows:

- Component 1: Impact of wind power on Vietnam’s power system;
- Component 2: Interconnection of wind power to EVN’s transmission system;
- Component 3: Integration of wind power to a competitive electricity market structure

Under Component 2, the *Technical Manual for Interconnecting Wind Power to Vietnam Power System* has been prepared and introduced by EVN and ICASEA. However, this Technical Manual was based on a low penetration limit for wind power and did not rely on full scale study of grid integration with simulation models. Nevertheless, it serves as a technical reference of guide pending having in place official regulation by the government on interconnecting wind power to Vietnam power system. For this latter purpose, full scale grid impact studies are needed. In the decision No 1272/QĐ-BCĐ dated 4 March 2013, EVN is assigned by MOIT to develop technical standards for Smart Grid, including standard for Renewable Energy integration. EVN is cooperating with ICASEA to conduct the wind integration studies in 2013 and 2014. ICASEA will recruit international consultant as the team leader while EVN will recruit local consultant to carry out these studies. Local consultant is responsible to provide all inputs and support international consultant implementing the assignment.

The cooperation will have the activities as follows:

Conduct the wind integration studies for Binh Thuan, Ninh Thuan area. The simulation model of the power system and wind farms is expected. The study will not only aim to know the actual impacts to the power system for mitigation measures but also for inputs towards the development of Vietnam wind grid regulation in the future. The study must include the simulation model with actual parameters. Based on the study results and the technical manual published in March 2013, a draft Vietnam wind grid regulation will be prepared by local consultant with the format of the government regulation. International consultant will provide comments/review. EVN will be responsible to work with ERAV/MOIT on promulgation of the Vietnam wind grid code. Collecting comments for the technical

manual will be conducted in the consultation workshops. They will be helpful to prepare the draft wind grid code.

2. Scope of work

The wind integration studies will include but not be limited to:

- Data collection for the wind integration studies: current status and development trend of wind power in Vietnam and in the world, wind power development planning in Vietnam and the studied area, existing and planned Vietnam power system, operational information of power system, relevant standard, regulation & references on wind power and power system, etc. Data includes such as generator, transformer, transmission and distribution line parameters, load & demand as well as other relevant data. General issues with integration of wind power to power system including distribution system and transmission system in Vietnam and the world.
- Establishment of the base cases: The study will perform the load flow analysis without any power integrated into the grid for three based cases: 2013, 2020 and 2030. From the load flow results, there are to identify any issues of existing and future condition of the grid as well as recommendation & possible solutions.
- Wind integration studies¹. The studies must have steady-state and dynamic simulation model with high accuracy parameters for three years 2013, 2020, 2030. The boundary of studied areas for the simulation model will be specified by consultant in the proposal, but need to cover at least 2 provinces Ninh Thuan, Binh Thuan. The simulation model must provide sufficient inputs for developing the draft wind grid code. The load flow analysis will be studied with wind integration. The study is to observe the behaviour of the grid and the impact on the grid that could lead to severe physical damage to the electrical equipments if it remains unchecked. The study will help to identify any issues of existing and future condition of the grid as well as recommendation & possible solutions.

The studies will calculate with scenarios but not be limited to: high load/high wind, high load/no wind, load load/high wind, low load/no wind, N-1 analysis for critical cases, short circuit, loss of wind generation (largest wind farms) at maximum load, loss of wind generation (largest wind farms) at minimum load, etc.

The impact study will include but not be limited to: power flow studies, frequency stability, voltage stability (PV and QV curves), transient analysis, fault level and protection system studies, reliability studies, power quality studies (flicker, voltage fluctuation, harmonic), impact of wind technology mix (type A, B, C, D), etc.

The study also need to fulfil unvalued parameters/technical criteria in the technical manual (due to limit of the previous study) such as active power – frequency capability requirement in section 4.3.2, active power output control for frequency support in section 4.4.2, LVRT requirement in section 4.4.4, etc.

The studies will cover only grid-connected capacities, and not off-grid and offshore.

- Transmission capacity upgrade, reinforcement or additions. Wind resources in Vietnam are concentrated in some specific areas, notably Ninh Thuan and Binh Thuan provinces and the South Central Coast of Vietnam. To harness the wind energy in these areas it is necessary to reinforce or upgrade and increase the

¹ EVN and national load dispatching centre are using PEE/S software for the power system modeling.

transmission capabilities and matching with the total wind potential. The study will give recommendations on necessary new transmission capacity upgrade or reinforcement and additions.

- Wind grid code: Based on results of the integration studies, the technical manual and other relevant regulations, and considerations of international standards on wind power interconnection, the draft wind grid code will be prepared. The draft wind grid code must be in the government regulation format.

The expected key respective contributions of the international and local consultants are as shown:

Items	International consultant	Local consultant
Develop methodology, timeline for each component	√	
Prepare inception report	√	
Provide reference materials, inputs for the study	√	√
Simulation model for the study	√	√
Do the analysis, calculations, etc.	√	√
Prepare the integration report	√	
Translate the reports from English to Vietnamese, and Vietnamese to English		√
Prepare draft wind grid code	√	√
Do presentation at the kick-off meeting, consultation workshops	√	√
Do presentation at the final workshop and technical meeting on the technical manual		√

In the wind integration studies, international consultant will be the team leader. Local consultant will provide inputs, comments and will be involved in the development of the simulation model, including collection of inputs and converting data into an appropriate format of the simulation model, calculation, analysis, preparation of some parts of the report. That is also aimed at building the capacity of the local consultant. The draft Vietnam wind grid code will be prepared by international consultant with the format of the government regulation. Local consultant will review and revise to develop the draft final code. International consultant will provide comments for local consultant developing the final code.

The international consultant will have three visits in Hanoi for the kick-off meeting with EVN, ICASEA and local consultant after signing the contract and the consultation workshops for collecting comments for the draft integration report.

3. Project milestones and deliverables

Kick off meeting with EVN and ICASEA, local consultant, international consultant	19 November 2013
Inception report	2 December 2013
Draft report on wind integration studies	14 March 2014
Draft final report on wind integration studies	16 June 2014
Draft wind grid code	16 June 2014
First consultation workshop	2 April 2014
Second consultation workshop	25 June 2014

Final report on wind integration studies and final draft wind grid code	21 July 2014
The dissemination workshop	27 August 2014

4. Deliverables

There are two final outputs: Wind integration studies report and draft wind grid code. Beside two reports, the consultant must submit all **editable** soft files used for the studies such as files for the simulation model, calculation (Microsoft Word, Excel, PSS/E AutoCAD, etc.). All reports will be both in English and Vietnamese and submitted in hard copies.

5. Consultant key qualifications

- i) Experience on conducting grid impact studies, planning in wind power sector. Preference will be given to experts and organizations who have been involved entirely or partly in the establishment of wind inter-connection standards
- ii) Excellent oral and written communication skills in English

6. Application

Each applicant will be required to submit the following material in English:

- i) A technical proposal including methodology, approach, proposed timeline, list of experts and proposed position, CVs of all experts, company profile, table of 10 similar assignments, etc.
- ii) A financial proposal with breakdown for each activity: expertise fee for each item (data collection, base cases, wind integration studies, wind grid code), travel and accommodation, tax, etc. The payment schedule is required.

The templates of required documents are enclosed for reference.

7. Address for application

Mr. Jessie Todoc – ICASEA. Email: jessie.todoc@copperalliance.asia

Mr. Huynh Hong Tan – ICASEA. Email: huynh.tan@copperalliance.asia

Mr. Vu Quang Dang – ICASEA. Email: dang.vu@copperalliance.asia

The application must be submitted to all above emails.

Only short-listed candidates will be contacted. Interviews will be conducted in person or over telephone/email.

TEMPLATE OF FINANCIAL PROPOSAL BREAKDOWN

No	Speciality/Function	Name of expert	Person months	Company/ Affiliation	Rate (USD/month)	Cost (USD)
I. Expertise fee						F
1.1	Activity 1 (Data collection)					A
1.2	Activity 2 (Base cases analysis)					B
1.3	Activity 3 (Wind integration studies)					C
1.4	Activity 4 (Wind grid code)					D
.....	Others if had					E
II. Visit costs						G
II.1. Kick-off meeting						L
3.1	Travel cost					J
3.2	Perdiem					K
II.2. Consultation workshop						P
4.1	Travel cost					M
4.2	Perdiem					N
TOTAL COST						Q

TEMPLATE OF COMPANY PROJECT REFERENCES

Project title 1		Country	
Name of Client		Dates (start/end)	
Project value	USD	Share carried out by legal entity %	100%
Consortium members			
Description of project			
Types of services			
Project title 2		Country	
Name of Client		Dates (start/end)	
Project value	USD	Share carried out by legal entity %	100%
Consortium members			
Description of project			
Types of services			
Project title 3		Country	
Name of Client		Dates (start/end)	
Project value	USD	Share carried out by legal entity %	100%
Consortium members			
Description of project			
Types of services			
Project title 4		Country	
Name of Client		Dates (start/end)	
Project value	USD	Share carried out by legal entity %	100%
Consortium members			
Description of project			
Types of services			
Project title 5		Country	
Name of Client		Dates (start/end)	
Project value	USD	Share carried out by legal entity %	100%
Consortium members			

Description of project			
Types of services			
Project title 6		Country	
Name of Client		Dates (start/end)	
Project value	USD	Share carried out by legal entity %	100%
Consortium members			
Description of project			
Types of services			
Project title 7		Country	
Name of Client		Dates (start/end)	
Project value	USD	Share carried out by legal entity %	100%
Consortium members			
Description of project			
Types of services			
Project title 8		Country	
Name of Client		Dates (start/end)	
Project value	USD	Share carried out by legal entity %	100%
Consortium members			
Description of project			
Types of services			
Project title 9		Country	
Name of Client		Dates (start/end)	
Project value	USD	Share carried out by legal entity %	100%
Consortium members			
Description of project			
Types of services			
Project title 10		Country	
Name of Client		Dates (start/end)	
Project value	USD	Share carried out by legal entity %	100%

Consortium members	
Description of project	
Types of services	

TEMPLATE OF PROPOSED LIST OF EXPERTS

Key Professional Experts	Company	Proposed position
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Reference:

- *CVs of proposed experts (Attachment)*

TEMPLATE OF CURRICULUM VITAE (CV)

1. Proposed Position:

2. Name of Firm:

3. Name of Expert:

4. Current Residential Address:

Telephone No.:

Fax No.:

E-Mail Address:

5. Date of Birth:

Citizenship:

6. Education:

7. Membership in Professional Associations:

8. Other Trainings:

9. Countries of Work Experience:

10. Languages [*For each language indicate proficiency: excellent, good, fair, or poor in speaking, reading, and writing*]:

Language	Reading	Speaking	Writing

11. Employment Record:

From To

Employer:

Positions held:

12. Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned:

Name of assignment or project:

Year:

Location:

Client:

Main project features:

Positions held:

Activities performed:

Name of assignment or project:

Year:

Location:

Client:

Main project features:

Positions held:

Activities performed:

Name of assignment or project:

Year:

Location:

Client:

Main project features:

Positions held:

Activities performed:

I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged.

_____ Signature and name of expert _____ Date: _____