MOIT/GIZ "Support to the Up-Scaling of Wind Power" Project

A number of regulatory and market barriers as well as the lack of capacity have been identified as the obstacles that hinder the expansion of the wind power sector. The project "Support to the Up-Scaling of Wind Power in Vietnam" aims to tackle these issues through technical assistance. It is implemented in the period 2014-2018 by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) jointly with the Ministry of Industry and Trade (MOIT) and its General Directorate for Energy (GDE) of the Socialist Republic of Vietnam. With a total budget of EUR 6.900.000, the project is commissioned by the Federal Ministry of Economic Development and Cooperation (BMZ) under the German Climate Technology Initiative (DKTI).

Among the three Action Areas of the project, the Technology Cooperation Component aims to facilitate partnerships between Vietnam and Germany in addition to work on Legal and Regulatory Frameworks and Capacity Development measures. The collaboration between the two countries is geared towards benefiting the development of the Vietnamese wind power sector, building on the experiences and the knowledge accumulated in the sector in Germany.

Imprint

Published by the
Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

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Bonn and Eschborn, Germany

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As at
February, 2017

Printed by
Incamedia
Alley 1, lane 1/5, house 38, Au Co str., Tay Ho dist.,
Hanoi, Vietnam

Design and layout
Incamedia
Alley 1, lane 1/5, house 38, Au Co str., Tay Ho dist.,
Hanoi, Vietnam

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GIZ is responsible for the content of this publication.

On behalf of the
German Federal Ministry for Economic Cooperation
and Development (BMZ)

Ministry of Industry and Trade

Hợp tác Đức
DEUTSCHE ZUSAMMENARBEIT

Implemented by
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Vietnamese-German Cooperation Research Projects on Wind Power

MOIT/GIZ Support for the up-scaling of Wind Power in Vietnam

Summary

Within the scope of the "Support to the Up-Scaling of Wind Power" Project, under the Technology Cooperation Action Area, GIZ Energy Support Programme had launched a call for research proposals on Wind Power in Vietnam in June 2016. Accordingly, consortia of German and Vietnamese researchers had three months to submit project proposals for financial supports. Specifically, selected projects will receive a grant of EUR 100,000 from the GDE/GIZ DKTI Wind Project in addition to their own costs and contribution for research implementation during the next two years (2017 & 2018).

This call was the outcome of the match-making event for researchers in May 2016 and was a successful competition. After the deadline on 9th September 2016, 09 research proposals were submitted, with high quality and good balance of universities applying as well as with diverse topics, ranging from economics; technology to policy. Additionally, GIZ also received 03 other requests asking for the possibility of proposal submission although the deadline was passed, showing high interests of Vietnamese and German researchers in cooperation for working on the wind power sector in Vietnam.

Evaluation process and selection criteria

To guarantee a transparent and fair selection process, GIZ had established an evaluation committee of 05 members, including technical researchers from universities, academic cooperation expert from DAAD, and GIZ's officers.

All submitted proposals were evaluated based on a common score sheet that ensured an in-depth and fair assessment. Each evaluator had graded 09 projects by giving them scores on a scheme of 35 criteria (equivalent to 100 points in total). Generally, all criteria were grouped into 7 major sections, including:

- Aims and Impacts: 18%
- Scientific Merit: 21%
- Implementation Plan and Resources: 18%
- Quality of Research Team: 15%
- Partnership and Cooperation Benefit: 15%
- Budget Feasibility: 8%
- Quality of the Proposal: 5%

Final score of each proposal is the average of scores given by each evaluator. The 03 highest scored projects were selected to receive the financial support.

Results

Following the above described selection process, with careful and in-depth discussion, the committee has selected 03 following proposals which are the most appropriate within the context of the Vietnamese wind power sector:

1. **Development of DeVie (small) Wind Turbine:** cooperation between Fraunhofer Institute IWES, Ho Chi Minh University of Technology and Vietnamese-German University
2. **Analysis of Large-Scale Integration of Renewable Power into the Future Vietnamese Power System:** cooperation between University of Oldenburg, Frankfurt University, Da Nang University and EVN National Load Dispatch Centre
3. **Development of an Efficient Drinking Water Disinfection System for Rural Areas in Vietnam powered by Wind Energy (DisinVieW):** cooperation between TU Dresden and Hanoi University of Science and Technology

Project Development of DeVie (small) Wind Turbine

Partners

- Fraunhofer Institute IWES, Germany
- Ho Chi Minh University of Technology (HCMUT)
- Vietnamese-German University (VGU)

Research description

Since 2008, HCMUT has been working on small wind turbines with less than 2kW power, of which a number were produced at HCMUT and sold at cost price. However, HCMUT has not been able to scale up to higher power. Under cooperation with Fraunhofer IWES and VGU (i.e., German expertise), HCMUT will carry out a preliminary design of a medium size wind turbine (100 kW). The resulting turbine design (i.e., outcome of this project) will be used as a basis for further research such as developing the prototype of a commercial local wind turbine. The design process will also serve as a focal point for knowledge exchange between German and Vietnamese partners, which will take place through exchange of people, teaching materials and the shared experience of actually designing the turbine together.

Outcomes

The expected outcomes of the project include, but are not limited to:

1. Preliminary design for a 100 kW wind turbine, describing the main lay-out of the machine
2. Material for wind turbine design and related courses at HCMUT and VGU
3. "Training of trainers" by IWES staff members for HCMUT and VGU staff
4. Exchange and building of long-lasting contacts between the three partners
5. Basis for the commercial design in a follow-up project, that can also target markets in neighbouring countries like Cambodia, Laos, Thailand and others. Thailand for example has already developed a 10kW wind turbine and went mass production at cost of 3 USD/W.

Expected contribution to energy sector

Although there is a real need from small to medium business for 100kW systems, profitable production will pose a challenge for the limited engineering resource in Vietnam, which presents a drawback to greener future. Eventually, the development of a MW class turbine by HCMUT will present a first opportunity for the research environment of Vietnam to partake in the building of local turbine production. Optimal economical design for manufacturing of wind turbine parts, such as generator, tower, hub and inverter according to local manufacturing and sales market conditions in Vietnam will be undertaken as a part of this project.

Project Analysis of Large-Scale Integration of Renewable Power into the Future Vietnamese Power System

Partners

- University of Oldenburg, Germany (UniOl)
- Frankfurt Institute for Advanced Studies, Germany (FIAS)
- University of Danang (UDN)
- EVN – NLDC

Research description

This research project aims to implement a fully open model of the Vietnamese power system that can be used to investigate the questions arising around the issue of a renewable future such as: (1) How and where should capacities be installed? (2) How does to transmission grid need to be expanded and reinforced? (3) What market mechanism can lead the transformation of the Vietnamese power system in an efficient way? (4) What are cost-efficient pathways towards 2030 (and beyond)? etc.

The fully open model is to be implemented in PyPSA which is an open source modeling toolbox for power system analysis and optimization developed at FIAS. Simulations will, after the construction of the model is completed, be performed using PyPSA and PSS/E for different scenarios of the energy mix. To enable data transfer between PyPSA and PSS/E an interface will be provided.

Outcomes

The expected outcomes of the project include, but are not limited to:

1. Find cost-optimal pathways for the renewable expansion of the Vietnamese power system by calculating welfare-optimal solutions of generation and transmission grid extensions under different constraints.
2. The impact of wind power forecasting on the Vietnamese power system operation and electricity market.
3. Analysis of Vietnamese power system operation with integration of wind and other kinds of renewable energy in different scenarios, realized in PSS/E and open model of the PyPSA.
4. One workshop in Vietnam to disseminate knowledge and results from the research project to Vietnamese community of power engineers.
5. Presentation of the project findings at an international scientific conference.
6. Publication of two joint papers in international journals.

Expected contribution to energy sector

The published model will allow interested researchers to perform consecutive studies on the Vietnamese power system thereafter.

Furthermore, the model can be expanded and used by interested experts to cover further aspects of future power systems or to investigate different scenarios. This simple model to investigate a wide range of scenarios (e.g. cost-development scenarios) is used to derive and communicate robust recommendations to be taken on the path towards high shares of renewable power in the future.

Project Development of an Efficient Drinking Water Disinfection System for Rural Areas in Vietnam powered by Wind Energy (DisinVieW)

Partners

- Institute of Water Chemistry, Technische Universität Dresden, Germany (TU Dresden)
- Institute for Research Development of Natural Products, Hanoi University of Science and Technology (INAPRO)

Research description

Within this project, a concept for an improvement of drinking water supply for such rural areas, in consideration of energy demand and cost efficiency will be developed and proved at a selected rural site. The intended techniques should be oriented towards a decentralized treatment, low energy demand and low costs. This project tackles these problems by a simple innovative approach of a treatment technology (UV irradiation and electrochemical treatment) in combination with small-scale wind energy systems. The technical approach consists of a self-sufficient overall concept of a robust drinking water disinfection system in combination with small-scale but safe wind energy supply for decentralized use.

Outcomes

The expected outcomes of the project include, but are not limited to:

1. Establishment of disinfection concept & model experiments
2. Efficient disinfection with an emphasis on low energy demand
3. Installation of the water and energy coupling technology at a selected field site in Vietnam
4. Safe disinfection under specific boundary conditions in rural areas in Vietnam

Expected contribution to energy sector

The approach of a disinfection hybrid treatment will be optimized within the research project. The resulting technology concept can be used as an efficient, inexpensive, robust and long-time stable disinfection system (and could be extended to desalination) in rural areas of Vietnam and in other developing countries. Various advantages, as for example robustness, no need of trained staff and energy independence, guarantee a long-term use of constructed plants and the further spread of the technology to other regions with water quality problems. Furthermore, a rise of demand for small-scale wind turbines can be expected. This leads to an economic upswing of small regional enterprises, producing such plants, due increasing market chances.