Developing wind power projects in Vietnam:
From regulatory to technical considerations

Power and Electricity World Vietnam 2017
1. Guidelines on legal procedures of wind power investment

2. MOIT/GIZ Wind measurement campaign from 2012 – 2017: assessment of resource

3. Wind project development clinic (PDC): technical concerns and expert’s support
Guidelines on legal procedures of wind power investment
Investment into wind power projects in Vietnam

Needs a for a guidelines

- Too many steps
- Applied differently in different provinces
- Too complicated and must follow different regulations: 38
  - Legal documents related to power system: 14
  - Legal documents related to wind energy: 2
  - Legal documents related to investment: 2
  - Legal documents related to construction, environment: 15
  - Legal documents related to completion & operation: 5
Project development procedure
Overview of Wind Investment Guidelines

Phase A
Preliminary development
- Site selection
- Pre-FS
- Decision on investment/Investment registration certificate

Phase B
Development
- FS phase
- Agreements
- Technical design
- Land use right
- Secure funding
- Construction permit

Phase C
Implementation
- Detailed design
- Financing
- Construction

Phase D
Operation and maintenance
- Operation license
- Commissioning/Testing
- Electricity generation license

Phase E
Decommissioning

Legend:
- Process
- Agreement with Vietnamese authorities
Process – Preliminary development phase

Critical steps:

1. Site identification
2. Is the site already included in PWPDP?
   - Yes: Request for Decision on investment
   - No: Request for site study
3. Site exclusivity
4. Temporary land lease
5. Wind measurement
6. Pre FS
7. Request for inclusion in PWPDP/NFDP/PPDP
8. Acceptance for the project to be included in PWPDP/NFDP/PPDP
9. Decision on investment
   - Foreign investor
   - Local investor
   - Investment registration certificate
   - Escrow account
   - Development stage
   - Preliminary PPA acceptance

Legend:
- Process
- Agreement with Vietnamese authorities
Process – Preliminary development phase

Requirements for Wind measurement:
- Minimum measurement period is 12 consecutive months;
- Projects of more than 50 MW, at least 2 wind measurement masts (met masts);
- Recording of all measured data shall be at least in 10-min intervals.

Site survey & Wind measurement

Site exclusivity
Temporary land lease
Wind measurement
Request for inclusion in the PWPDP/ NPDP/ PPDP

- Project > 50 MW: included in the NPDP
- Project ≤ 50 MW: included in the PWPDP/ PPDP
- Process:
  + Project > 50 MW: request from GDE/ MOIT, PM; to the NPDP
  + Project ≤ 50 MW: request from Provincial PC, MOIT to the PWPDP/ PPDP.

Contents of the requested documents:

+ Rationale and description of the project: key figures in terms of size, capacity, energy production, location and layout, land requirement.
  + Connection grid alternatives, analysis of the impact to power network.
  + Preliminary total investment amount, determination of socio-economic impacts.
- Time line:
  + For NPDP: around 120 working days
  + For PWPDP/ PPDP: around 60 working days
The deposit is divided into **three levels** depending on volume of total project investment. Wind power project belongs to special preferential industries, a reduction of 50% for the value of escrow account can be applied as compared to normal projects.

- **Projects ≤ 300 mil. VND:** 1.5%
- **Projects from 300 – 1,000 mil. VND:** 1.0%
- **Projects > 1,000 mil. VND:** 0.5%
Process – Development and Implementation phase

Critical steps

- Feasibility Study
  - Comment on FS document
  - Acceptance letter to the FS document
  - Approval of the Feasibility Study
  - Technical design
  - Comment on technical design
  - Acceptance letter to Technical design
  - Approval of the Technical design and Total investment estimate

- Grid Connection agreement
- Metering agreement
- SCADA/EMS (DMS) agreement
- Protective relay system agreement
- Preliminary PPA acceptance

- PPA
  - Fire prevention & fighting
  - Agreement on securing funding of the project
  - Environmental Impact Assessment

Legend:
- Process
- Agreement with Vietnamese authorities
Wind measurement campaign

Objectives

- Reliable wind data: wind atlas, provincial wind power development plan, open data
- Capacity building on technical requirements and standards

Approach

- National and international consultant
- IEC standard of installation, commission and report
- Ammonit equipment; changed after 3 years
- Site visit and criterion to select sites
At height of 80m, sensors at 40, 60 and 80m

- 2012-2015: 10 sites
- 2015-2017: 5 sites

<table>
<thead>
<tr>
<th>No.</th>
<th>Station</th>
<th>Province</th>
<th>Average wind speed results (period 2012-2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ia Der</td>
<td>Gia Lai</td>
<td>5.44</td>
</tr>
<tr>
<td>2</td>
<td>Kon Dong</td>
<td>Gia Lai</td>
<td>5.57</td>
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<td>3</td>
<td>Ea Phê</td>
<td>Dak Lak</td>
<td>5.19</td>
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<tr>
<td>4</td>
<td>Ea Drăng</td>
<td>Dak Lak</td>
<td>4.41</td>
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<tr>
<td>5</td>
<td>Đà Loan</td>
<td>Lam Dong</td>
<td>5.10</td>
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<tr>
<td>6</td>
<td>Hải Ninh</td>
<td>Quang Binh</td>
<td>5.68</td>
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<td>7</td>
<td>Mỹ Thanh</td>
<td>Binh Dinh</td>
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<td>Xuân Hòa</td>
<td>Phu Yen</td>
<td>5.09</td>
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<td>9</td>
<td>An Ninh Đồng</td>
<td>Phu Yen</td>
<td>5.88</td>
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<tr>
<td>10</td>
<td>Thành Hải</td>
<td>Ben Tre</td>
<td>6.15</td>
</tr>
</tbody>
</table>
Thank you

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

mai.vu@giz.de
Wind project development clinic: technical concerns and expert’s support
1. Overview of MOIT-GIZ-Lahmeyer capacity building mission

2. Insights in GIZ wind development clinic (PDC)
Overview of MOIT-GIZ-Lahmeyer mission

How do we work?

MOIT/GIZ Energy Support Program

Action Areas

Legal and Regulatory Framework Conditions
- Policy Strategies
- Support Mechanisms
- Regulations Guidelines
- Institution Building

Capacity Development
- Government Institutions
- Project Developers and Investors/Financial Institutions
- TVET

Technology Cooperation
- Research
- Education
- Private Sector

Knowledge Sharing; Thematic Studies; Pilot Projects
Organization for delivery of Capacity Development

Lahmeyer
(3 intl. + 3 local experts)

RENAC
(2 intl. experts)
Financial trainings

BZEE
(1 intl. expert)
Technical trainings
Wind turbine technician trainings

Capacity Development for the Up-Scaling of Wind Power in Viet Nam
Capacity Development Support to the Up-scaling of Wind Power (Wind DKTI)

- **Capacity needs assessment** / capacity development strategy
- Trainings on **project development** (technology, measurements, project design, etc.)
- Trainings on **project financing** with local commercial banks (due diligence, project valuation, risk assessments)
- Advanced trainings for local **consultants**
- Trainings for **Ministry authorities** (DoITs)
- Trainings for **E VN-NLDC** on power grid issues (study trip to GridLab in Germany, practical expert training on grid integration of wind farms)
- **Wind Power Class** for universities in Hanoi, HCMC, Danang, Can Tho
- Technical training for **O&M (TVET)**

**Project Development Clinic (PDC)** – response facility for local developers and banks
Lead expert of PDC - Roland Ries

1984-1991  
Master Course Nuclear Physics, Johannes Gutenberg University of Mainz, Germany

1991-1995  
Research Atmospheric Physics, University of Mainz (Mesoscale and Microscale Modelling of Wind Flow and Air Pollution Dispersion)

since 1993  
Employee Lahmeyer International GmbH (Department Wind Energy)

since 2001  
assigned to Lahmeyer International Korean Office

since 2015  
Head of Lahmeyer International Korean Office

since 2016  
assigned to Vietnam to execute Capacity Development for Wind Power under GIZ

→ 2 Research  →  7 years Head Office  →  15 years Korea  →  2 years Vietnam

(26 years in wind)

Contact  
roland.ries@de.lahmeyer.com or capdev-wind-vietnam@giz.de
Knowledge base for WPP Development

Assist particularly domestic WPP developers

Provide Technical Support and Advice for specific project issues

One-stop E-Mail contact to access our German network of wind power experts

Service free of charge during the Up-Scaling of Wind Power Project
Siting/Planning /Permit Issues

- Provide evidence cases from other countries

Wind Measurement Issues

- Advise specifications of measurement for bankable requirements;
- Review suspicious wind data and advice for troubleshooting

Project Documentation Issues

- Respond to any specific question in relation to preparation of a bankable FS Report or a Tender Specification for Wind Turbines
Language

- The preferred language is English, because our German wind power experts have to understand the issue;
- Inquiries sent in Vietnamese may need longer response time

Information & Confidentiality

- Depending on the nature of the inquiry GIZ will require certain documentation of the issue in form of project relevant documents and data (e.g. installation report or data samples of wind measurement)
- GIZ commits to have measures in place to ensure that all received documents and data are kept internal and confidential, however, GIZ cannot be held responsible for any documents or data becoming known to public by others than our internal organization or our engaged expert network
PDC – Inquiry Form

1. Personal information:

<table>
<thead>
<tr>
<th>Company data and contact person – optional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company/Institution Name/Department:</td>
</tr>
<tr>
<td>Last Name, First Name:</td>
</tr>
</tbody>
</table>

2. Your questions/issues (fill or attach separate documents):

<table>
<thead>
<tr>
<th>No.</th>
<th>Question/issue</th>
<th>More explanation and background if needed</th>
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<tbody>
<tr>
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</tbody>
</table>

3. PDC’s responses and discussion:

<table>
<thead>
<tr>
<th>No.</th>
<th>PDC’s responses</th>
<th>Your opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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</tbody>
</table>
Initial contact shall be by E-Mail to: capdev-wind-vietnam@giz.de
<table>
<thead>
<tr>
<th>Topic</th>
<th>Category</th>
<th>Services provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>already constructed wind farm with foundation issues</td>
<td>Consultant</td>
<td>advice on handling/responding to the following issues:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1) Repairs were performed, but no documentation on procedure and execution</td>
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<tr>
<td></td>
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<td>(2) As-built situation different from design</td>
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<tr>
<td></td>
<td></td>
<td>(3) Insufficient available QA/QS documentation</td>
</tr>
<tr>
<td>intent to build small wind farm to promote tourism</td>
<td>Developer</td>
<td>pre-assessment of wind situation for 2 sites</td>
</tr>
<tr>
<td>planning wind farm, status: MM installation</td>
<td>Developer</td>
<td>wind data analysis and support in using wind farm planning software</td>
</tr>
<tr>
<td>Design review</td>
<td>Consultant</td>
<td>• independent wind data analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• review of proposed wind farm layouts (developer /turbine supplier layouts)</td>
</tr>
<tr>
<td>planning to develop wind farm from scratch</td>
<td>Developer</td>
<td>Site visit, pre-assessment of wind resource, advice for further steps</td>
</tr>
<tr>
<td>planning wind farm, status: MM installation</td>
<td>Developer</td>
<td>• advice on measurement location</td>
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<td>• advice on measuring equipment specification</td>
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<td></td>
<td>• general support to ensure bankable wind measurement</td>
</tr>
<tr>
<td>Topic</td>
<td>Category</td>
<td>Services provided</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
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<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>feasibility report review</td>
<td>Consultant</td>
<td>review wind potential assessment part of report</td>
</tr>
<tr>
<td>project funding</td>
<td>Bank</td>
<td>advice on structure and content of a Project Information Memorandum and required key documents for project valuation</td>
</tr>
<tr>
<td>planning wind farm, status: wind measurement completed</td>
<td>Developer</td>
<td>independent wind data analysis</td>
</tr>
<tr>
<td>intent to install small wind turbine on university campus</td>
<td>Research</td>
<td>• provide wind data and reports from GIZ campaign</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• connect to concerned authorities for questions on permitting</td>
</tr>
<tr>
<td>learning project finance</td>
<td>Bank</td>
<td>provide materials and models for self-study of project finance topics</td>
</tr>
<tr>
<td>turbine market overview, how to chose the right turbine model for a site</td>
<td>Research</td>
<td>provide relevant available specification documents of wind turbines from suppliers who are active in the VN market</td>
</tr>
<tr>
<td>planning wind farm, status: wind measurement completed</td>
<td>Developer</td>
<td>site visit, wind data analysis, preparation and sharing of WindPRO model including CFD wind map, sample calculations for various layouts</td>
</tr>
<tr>
<td><strong>Topic</strong></td>
<td><strong>Category</strong></td>
<td><strong>Services provided</strong></td>
</tr>
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</tr>
</tbody>
</table>
| Considering investing in two planned wind farms with completed FS reports | Investor | • re-evaluation of feasibility based on different support (e.g. tariff) scenarios  
• general review of projected AEPs incl. losses  
• general advice on technology choice (in terms of IEC Class)  
• advice on key drivers for project value |
| Planning wind farm, status: Pre-FS completed, seeking investment support | Developer | • advice on strategic options /timings for selling project  
• advice on location for new additional wind measurement |
<p>| Various questions (1) how to chose a suitable wind turbine, (2) rotor blade maintenance, (3) negative environmental impacts of wind farms in VietNam | Research | provide answers with explanations, back data, evidence documents |
| Acquisition of wind farm planning software | Research | overview on required software /modules for their purpose and its cost |
| Reviewing a small planned wind farm and curious about its feasibility | Research | pre-assessment of wind conditions, sample calculations with different wind turbine models, discussion of results |</p>
<table>
<thead>
<tr>
<th>Topic</th>
<th>Category</th>
<th>Services provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>wind farm in early planning stage, wants general learning about wind power</td>
<td>Developer</td>
<td>provide training materials and sample reports</td>
</tr>
</tbody>
</table>
| planning wind farm on industrial park area                          | Developer (foreign) | • site visit, advice on wind resource, turbine choice, overall feasibility  
<pre><code>                                                                                                                                              |                | • comment on proposed PPA /metering options                           |
</code></pre>
<p>| wind resource pattern of VietNam                                     | Research       | discuss /teach on wind flow dynamics on different scales                           |
| offshore cable lines                                                | Research       | provide information on construction of cable lines for offshore projects           |
| seeking information on ESS for planned island project               | Developer      | provide show cases with capacity, maker, cost from Korean projects                 |
| Wind turbine blade design                                           | Research       | provide guidance to relevant articles and applied software                         |</p>
<table>
<thead>
<tr>
<th>Topic</th>
<th>Category</th>
<th>Services provided</th>
</tr>
</thead>
</table>
| planning nearshore wind farm - various questions                    | Developer              | • wake loss differences onshore <--> offshore  
• give examples for installation methods in intertidal areas (e.g. Pakistan)  
• general advice on selecting suitable foundation types  
• advice on offshore specifics, such weather windows for installation and O&M, specific turbine requirements, cost of sea cable vs. pier solution, etc. |
| wind farm in tendering stage                                        | Developer              | advice on preparing RfQ to turbine suppliers  
• opinion on expected wind resource in the area based on data from GIZ campaign, sharing of available information |
| considering acquiring a wind farm in early planning stage           | Developer (foreign)    |  
• opinion on expected wind resource in the area based on data from GIZ campaign, sharing of available information |
| acquisition of wind farm planning software                          | Consultant             | overview on required software /modules for their purpose and its cost |
Thank you

GIZ Capacity Development

capdev-wind-vietnam@giz.de