

Viet Nam Energy Partnership Group

Technical Working Group 5 – Energy Data and Statistics

Report of the 5th Meeting

Date: 30 November 2019
Location: MOIT meeting room 101, 25 Ngo Quyen, Hanoi
Time: 15:00 – 17:00

Key agenda points:

1. **Viet Nam Energy Information System (VEIS) implementation** update
2. **Power Development Plan VIII (PDP 8)** update in the context of other sector planning including the **Energy Master Plan**

Chair and Co-Chair:

- **Mr. Nguyễn Tuấn Anh**, Deputy Director General Electricity and Renewable Energy Authority (EREA/MOIT)
- **Ms. Trần Hồng Việt**, Interim Co-chair, Senior Programme Manager, Embassy of Denmark

Agreed Conclusions and Actions: (See next page)

Agenda: See Annex 1
Participants: See Annex 2
Minutes: See Annex 3
Inputs: See Annex 4 - Presentations

Agreed Conclusions and Actions:

Conclusion / Decision	Action
<ul style="list-style-type: none"> The Chair and Co-Chair thanked all members of TWG 5 participants for joining and for the very active and constructive participation in the meeting. The Chair and Co-Chair thanked the VEPG Secretariat for successfully organizing the first hybrid meeting to feature both Vietnamese and English channels for online participants. 	Chair and Co-chair of the TWG
<ul style="list-style-type: none"> Ms. Amber Sharick, the International Coordinator and Technical Advisor of the VEPG Secretariat highlighted that this is the first meeting of the VEPG to feature both English and Vietnamese channels for online participants, allowing wider participation from all over Viet Nam and around the World. Ms. Amber Sharick also informed the members of the TWG that after discussions with stakeholders, it was decided that the High-level Meeting in 2020 will not take place. The VEPG Secretariat will use the budget and resources to support other high-level, content-based interventions including to support MoIT during the ASEAN Ministers on Energy Meeting 38 and planned VEPG cross-cutting networking events. The VEPG will also conduct the annual partners' project survey before the end of 2020 and will reach out to all partners for their inputs. 	
<p><u>VEIS implementation</u></p> <ul style="list-style-type: none"> The legal framework for the VEIS has been established. The next steps include the introduction of the Circular on the VEIS, the Development of the VEIS Operational Manual, and the Management of the Viet Nam Energy Information Center (VEIC). EREA recognized the support for the VEIS from international partners and encourages continued support for the VEIS and the VEIC in the future. 	VEPG Secretariat Members of the TWG
<p><u>Update on the Technology Catalogue for Power Generation</u></p> <ul style="list-style-type: none"> The Technology Catalogue is in the development phase with experts. All comments and data inputs are welcome. Such inputs can be sent to the expert team or to Ms. Trần Hồng Việt, Danish Embassy. The final draft of the Technology Catalogue will be shared before the publication 	VEPG Secretariat Members of the TWG
<p><u>PDP8 Development</u></p> <ul style="list-style-type: none"> 2nd Workshop on the PDP8 was organized on 28/09/2020. The PDP 8 will be submitted to the Prime Minister for approval in October 2020. The PDP8 is expected to be approved at the end of 2020/ beginning of 2021. MOIT welcomed support for energy data and statistics as inputs for PDP8 and the Energy Master Plan 	VEPG Secretariat Members of the TWG

ANNEX 1 - AGENDA

15.00-15.05 Log-In & Guidance for Webinar Users

15.00-15.15 Welcome Remarks & Secretariat Report

Mr. Nguyễn Tuấn Anh / Ms. Trần Hồng Việt

- Welcome and Meeting Agenda Introduction

Ms. Amber Sharick, Viet Nam Energy Partnership Group (VEPG) International Coordinator

- Report of the Secretariat on VEPG planning 2020

15.15-15.50 Update on VEIS implementation

- EREA/MOIT: Update on implementation of the Viet Nam Energy Information System and plans for the Viet Nam Energy Information Center
- EVEF/GIZ/TWG partners: Information System support activities
- Roundtable Discussion

15.50-16.00 Update of Technology Catalogue

- Danish Energy Agency: Update of Technology Catalogue (power generation) to get feedback/input from TWG 5 members
- Roundtable Discussion

16.00-16.55 PDP 8 Development

- Institute of Energy: Power Development Plan VIII (PDP8) data & input for scenarios and alignment with Energy Master Plan
- WB/US VLEEP/DEN: Support Activities in Energy Planning
- Roundtable Discussion

16.55-17.00 Closing of the meeting

Mr. Nguyễn Tuấn Anh / Ms. Trần Hồng Việt

ANNEX 2 - PARTICIPANTS

Co-Chairs

- **Mr. Nguyễn Tuấn Anh**, Director Planning Division, Electricity and Renewable Energy Authority (EREA/MOIT)
- **Mr. Jakob Stenby Lundsager**, Long Term Adviser, Danish Energy Partnership Programme, Denmark

Participants

- **Mr. Nguyễn Hoàng Linh**, Ministry of Industry and Trade (MOIT)
- **Mr. Nguyễn Thanh Tùng**, Ministry of Natural Resources and Environment (MONRE)
- **Mr. Đinh Gia Nghiê**m, Ministry of Science and Technology (MOST)
- **Mr. Dương**, Institute of Energy (IoE)
- **Ms. Nguyễn Thị Loan**, General Statistics Office (GSO)
- **Ms. Margherita Tenedini**, Italian International Cooperation Agency (AICS)
- **Mr. Christopher Starling**, Asian Development Bank (ADB)
- **Mr. Ian Yao**, ADB/ Lantau Group
- **Ms. Vũ Thị Thu Hằng**, United Nations Development Programme (UNDP)
- **Mr. Robin Bednall**, Australia
- **Ms. Camila Holbech**, Denmark
- **Ms. Trần Thùy Dương**, Delegation of the European Union to Viet Nam (EUD)
- **Ms. Đỗ lan Anh**, GIZ
- **Ms. Phạm Lan Phương**, GIZ
- **Ms. Hà Thu Hương**, GIZ
- **Ms. Phạm Quang Anh**, GIZ
- **Ms. Võ Thanh Tùng**, GIZ
- **Mr. Henri Wasnich**, IoE
- **Mr. Hà Đăng Sơn**, USAID/Viet Nam Low Emission Energy Programme (VLEEP)
- **Mr. Nguyễn Hải Đức**, USAID/V-LEEP
- **Mr. Nguyễn Văn Hòa**, US Embassy
- **Ms. Cristina Blanco Munoz**, Spain
- **Mr. Juan Fernandez-Cuervo**, Spain
- **Mr. Phạm Minh Thành**, Wartsila
- **Mr. Bryan Tsang**, AES Corporation
- **Mr. Nguyễn Mỹ Linh**, AES Viet Nam
- **Ms. Nguyễn Thanh Hà**, AES Viet Nam
- **Ms. Lê Trà**, FinSEA
- **Mr. Joo Duk Vancoppenolle**, Elia Grid International
- **Mr. Rainer Bohm**, Independent Consultant

VEPG Secretariat

- **Ms. Amber Sharick**, VEPG Secretariat
- **Ms. Nguyễn Phương Thảo**, VEPG Secretariat
- **Mr. Đỗ Quang Nhật**, VEPG Secretariat

ANNEX 3 - SUMMARY MINUTES

Agenda item	Summary
Opening remarks, overview of the agenda	<p><u>Mr. Nguyen Tuan Anh, EREA/MOIT, Chair of the Technical Working Group (TWG)</u> on Energy Data and Statistics welcomed participants online and in-person to the 5th meeting of the group. The Chair summarized the outcome of the 4th meeting including the inputs of the members of the TWG on the draft Circular on the implementation of the Viet Nam Energy Information System (VEIS) and the Action Plan to establish the Viet Nam Energy information Center (VEIC). The Viet Nam Energy Outlook 2019 was also discussed as an input for the development of the Power Development Plan VIII (PDP8) as well as the updates on PDP8 in the previous meeting. On 28 September 2020, the EREA organized the 2nd workshop on the development of PDP8 with active participation and useful input from energy sector stakeholders. The Draft of the PDP8 will be submitted to the Prime Minister (PM) in October 2020.</p> <p><u>Ms. Tran Hong Viet, Danish Embassy/ Interim Co-chair of the TWG</u> welcomed all participants online and in person. The interim Co-chair also highlighted that the TWG has made significant progress as well as provide significant contributions to the energy sector planning since the establishment of the group.</p> <p><u>The Chair and Co-chair</u> introduced the focus topics of the meeting and encouraged the active discussions and participation from all participants.</p>
Secretariat Report	<p><u>Ms. Amber Sharick, International Coordinator and Technical Advisor of the VEPG Secretariat</u> introduced the agenda of the meeting and briefly presented the planning of the VEPG through 2020 (Annex 4).</p> <p><u>Ms. Amber</u> also highlighted that this is the first meeting of the VEPG to feature both English and Vietnamese channels for online participants, allowing wider participation from all over Viet Nam and around the World.</p> <p><u>Ms. Amber Sharick</u> also informed the members of the TWG that after discussions with stakeholders, it was decided that the High-level Meeting in 2020 will not take place. The VEPG Secretariat will use the budget and resources to support other high-level, content-based interventions including to support MoIT during the ASEAN Ministers on Energy Meeting 38 and planned VEPG cross-cutting networking events. The VEPG will also conduct the annual partners' project survey before the end of 2020 and will reach out to all partners for their inputs.</p>
Update on VEIS implementation	<p><u>Mr. Nguyễn Hoàng Linh, EREA/MOIT</u> updated the members of the TWG on the development of the legal framework for the VEIS (Annex 4). the highlights of the presentation include:</p> <ul style="list-style-type: none"> - <u>Workshop to introduce the Circular on the VEIS</u>: the workshops are expected to be held in Q4/2020 in Hanoi, Da Nang, and Ho Chi Minh City.

	<ul style="list-style-type: none"> - <u>The VEIS Operation Manual</u>: the Manual will outline the roles and responsibilities of the member of the VEIS as well as methods of implementation. The manual is expected to be completed in Q1/2021 - <u>Management model for the VEIC</u>: the management models will set a clear distribution of responsibilities and ensure the effective operation of the Center as well as setting strategic goals for the VEIC. The Model is expected to be completed in Q2/2021. <p><u>Mr. Nguyễn Tuấn Anh, EREA/MOIT Chair of the TWG</u> recognized the support from GIZ/EVEF for the development of the VEIS.</p> <p><u>The EU</u> reaffirms the commitment to support the VEIS/VEIC through the next phase of the Budget Support.</p> <p>The members of the TWG reflected and discussed the agenda item. The highlight of the discussion is highlighted below:</p> <ul style="list-style-type: none"> - <u>The establishment of the VEIS</u>: With the Circular 34/TT-BCT stipulating the Viet Nam Energy Information System came into effect on 01/04/2020 and the pilot activities are implemented, EREA has submitted the proposal on the investment for the VEIS to the Ministry of Planning and Investment (MPI) for comments. Once the proposal is approved, EREA will conduct steps to establish the VEIC based on the feasibility study. The PM will then approve the feasibility study to create the legal framework to establish the structure of the VEIC. <p>The MOIT has already issued a Decision for the establishment of the VEIC since the proposal is approved.</p> <p>EREA is also developing the instruction manual to operate the systems and budget to straining to set up the VIEC.</p>
<p>Update of Technology Catalogue</p>	<p>Ms. Trần Hồng Việt, Danish Embassy, Interim Co-chair presented the Technology Catalogue for Electricity Generation (technology catalogue) (Annex 4)</p> <p>The members of the TWG reflected and discussed on the presentation on the Technology Catalogue. The highlights of the discussion are summarized below:</p> <ul style="list-style-type: none"> - <u>Change in thermal power plants</u>: the data show a 10% drop in the price for solar and wind technology, however, the data collection for the thermal power plant is not present. - <u>Additional information on new technology</u>: EREA and Denmark called for support from stakeholders to provide inputs to update the Technology Catalogue. The stakeholders can contact the Interim Co-chair and colleagues at the Danish Embassy for inputs. - <u>Connection between TC and PDP8</u>: only selected technologies will be included and presented in the PDP8 and the EOR 21. The EOR 21 will provide more information on the development of the power sector and provide inputs for the policies for the development of the power

	sector. EOR will also provide support for the calculation for the CO2 emission reduction for PDP8.
PDP 8 Development	<p>The Institute of Energy as the consultant for the PDP8 presented the updates on the development of the PDP8 (Annex 4)</p> <p>The members of the TWG reflected and discussed on the presentation on the update on the development of the PDP8. The highlights of the discussion are summarized below:</p> <ul style="list-style-type: none"> - <u>Next steps for PDP8:</u> The second workshop for the PDP8 was organized on 28/09/2020. The next workshop will focus on the Energy Master Plan. EREA will submit the draft PDP8 in October 2020 to the Prime Minister for approval. It is expected the approval of the PDP8 at the end of 2020 or in the first month of 2021. - <u>Offshore wind projects in PDP8:</u> Offshore wind power has been included in the PDP8 including 3.1 GW included in the baseline. By 2040-2045, there will be 14GW of offshore wind. <p>Offshore win technology is relatively new in Viet Nam. With support from Denmark and the World Bank, the MOIT is developing the roadmap for offshore wind development with a 20-year vision. In addition, there is a need for a pilot project for offshore wind. For this, a road map, a feasibility study will be conducted to propose an auctioning mechanism and choose a suitable project for the offshore wind. The PDP8 will also submit a proposal for the development of technology.</p> <ul style="list-style-type: none"> - <u>High-voltage direct current (HVDC) in PDP8:</u> PDP8 does include HVDC. Since the capacity increased in the North while that decreased in the South, IOE has developed a scenario with HVDC from the South to the North. However, HVDC is not mentioned in the baseline scenario.
Closing of the meeting	<p><u>Mr. Nguyễn Tuấn Anh, EREA/MOIT, Chair of the TWG</u> closed the meeting and thanked all participants for their active discussion and contribution to the development of the VEIS and the PDP8. The Chair also noted that the meeting was organized at a good time since the legal framework of the VEIS has been approved. In addition, international support for energy data and statistics such as the EOR 2019 has provided important input for the PDP8 and the Energy Master Plan.</p> <p><u>Ms. Trần Hồng Việt, Danish Embassy, Interim Co-chair of the TWG</u> also thanked all participants online and in-person for their active participants. The Interim Co-Chair also thanked the Secretariat of the VEPG for its successful organization of the first hybrid meeting to feature both English and Vietnamese for online participants.</p>



ANNEX 4 - PRESENTATIONS



Viet Nam Energy Partnership Group Energy Data & Statistics – Technical Working Group

5th Meeting – 30 September 2020
Ministry of Industry and Trade, Ha Noi

1

Topic 1. Opening Remarks and Overview of the Agenda

Energy Data & Statistics Technical Working Group Chair:

Mr. Nguyễn Tuấn Anh, Deputy Director General, Electricity and Renewable Energy Authority, Ministry of Industry and Trade (EREA/MOIT)

Energy Data & Statistics Technical Working Group Co-Chair:

Ms. Trần Hồng Việt, Acting Co-chair, Senior Programme Manager, Embassy of Denmark

2

Key Objectives of the Meeting

- Viet Nam Energy Information System implementation update
- Technology Catalogue for Power Generation update
- Power Development Plan VIII (PDP 8) update in the context of other sector planning including the Energy Master Plan

3

Agenda

Time	Subject
15.00-15.15	1. Opening remarks & overview of the agenda Mr. Nguyễn Tuấn Anh / Ms. Trần Hồng Việt
	2. Report of the VEPG Secretariat Ms. Amber Sharick
15.15-15.50	3. Update on VEIS Implementation & Roundtable Discussion <ul style="list-style-type: none">• EREA/MOIT: Update on implementation of the Viet Nam Energy Information System and plans for the Viet Nam Energy Information Center• EVEF/GIZ/TWG partners (tbc): Information System support activities
15.50-16.00	4. Technology Catalogue Update & Roundtable Discussion <ul style="list-style-type: none">• Danish Energy Agency: Update of Technology Catalogue (power generation) to get feedback/input from TWG 5 members
16.60-16.55	5. PDP8 Development & Roundtable Discussion <ul style="list-style-type: none">• Institute of Energy (tbc): Power Development Plan VIII (PDP8) data & input for scenarios and alignment with Energy Master Plan• WB/US VLEEP/DEN (tbc): Support Activities in Energy Planning
16.55-17.00	6. Conclusions and closing remarks Mr. Nguyễn Tuấn Anh / Ms. Trần Hồng Việt

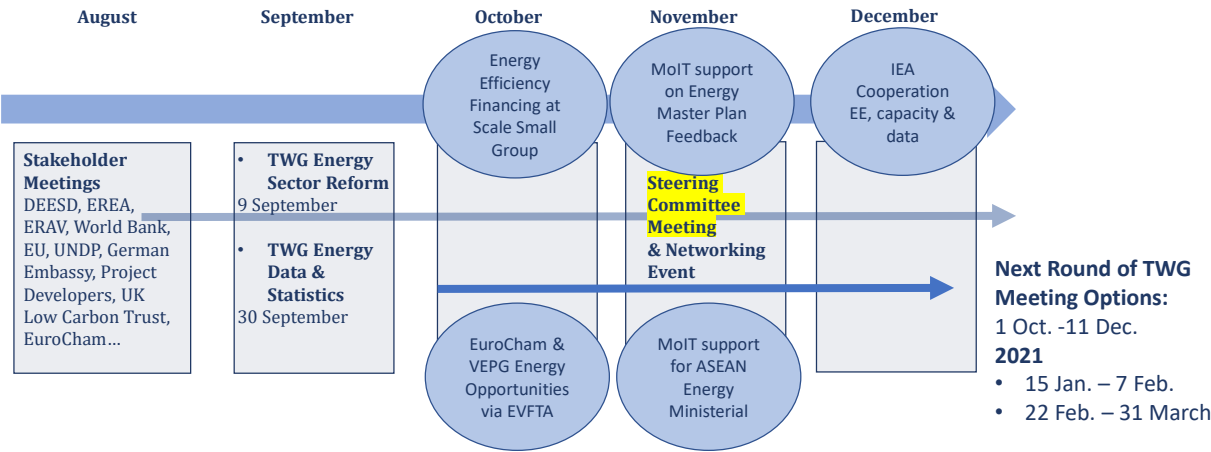
4

Topic 2. VEPG Secretariat Report

VEPG Secretariat:
Ms. Amber Sharick, International Coordinator

5

VEPG – Timeline through 2020



6

High-Level Meeting 2021 – AUGUST



For the rest of 2020 and early 2021, the VEPG Secretariat team will focus on leveraging time and resources to support high-level, content-driven interactions.

The August 2021 High-Level Meeting will be the last before the end of this funding cycle.

Overview of Technical Working Group Meetings

TWG	5th Meeting	Key Topics/Highlights
Renewables 	18 June 2020	<ul style="list-style-type: none">Stakeholder Comments on Draft MOIT Circular on the Project Development and Standardized Power Purchasing Agreement for Solar Power Project incorporatedSolar Power Auctioning Options developed by GoVN, WB, ADB to be submitted to Deputy Prime Minister
Efficiency 	24 June 2020	<ul style="list-style-type: none">Updates on implementation of VNEEP3 / National EE Action Plan (NEEAP)Focus topic: Exploring the concept of an Energy Efficiency Foundation in Viet Nam
Reform 	09 Sep. 2020	<ul style="list-style-type: none">Report on Wholesale Electricity Market operation and perspective on developing the Retail MarketUpdate on DirectPPA pilotDiscussion including technical assistance needs, opportunities, challenges & next steps
Access 	30 June 2020	<ul style="list-style-type: none">Update on Target Programme for Rural ElectrificationFocus Topic Bioenergy for Rural Areas – Agri-Food processing and Waste Management
Data 	30 Sep. 2020	<ul style="list-style-type: none">Focus Topic: the Power Development Plan VIII (PDP 8)Technology Catalogue for Power Generation updateUpdate on Implementation of the Viet Nam Energy Information Systems (VEIS) and Viet Nam Energy Information Centre (VEIC)

VEPG Partner Support – Development Partners Project Survey



MAPPING OF CURRENT DONOR AND INTERNATIONAL EFFORT IN VIETNAM ENERGY SECTOR

Donor/Agency	Project name	Description/Description of interventions	Type of support	Time frame	Implementing agency	RE	EE	EMR	EA	EDS
ADB	Power Transmission Investment Program- Tranche 1	Australia and the UK are providing funds to a World Bank led project, the Vietnam Climate Innovation Center (VICIC). The project supports entrepreneurs/ SMEs in developing and commercializing innovative solutions in green economic sectors such as energy.	Loan (sovereign)	2011-2017	National Power Transmission Corporation (NPT)				x	
ADB	Power Transmission Investment Program- Tranche 2	The second tranche of the multibanche loan facility will finance the expansion of the transmission network, improve the operational effectiveness and efficiency of the National Power Transmission Corporation, and project implementation support.	Loan (sovereign)	2012-2017					x	
ADB	Power Transmission Investment Program- Tranche 3	The Asian Development Bank is working with Viet Nam to improve the transmission network to balance power loads in northern, central, and southern Viet Nam. The project is upgrading 500 kilovolt and 220 kilovolt transmission lines and improving the operational effectiveness and efficiency of the National Power Transmission Corporation.	Loan (sovereign)	2015-2020					x	
ADB	Ha Noi and Ho Chi Minh City Power Transmission Development Sector project	The project's indicative outputs are: (i) strengthened institutional capacities of HNPCC and HCMPC; and (ii) the development and rehabilitation of 220 kV and 110 kV transmission lines and substations of Ha Noi and Ho Chi Minh City. It is co-financed by ADB with Asian Infrastructure Fund (AIF) and US\$100 million from Vietnam Government.	Loan (sovereign)	2014-2018	Hanoi and HCMC Power Corporations				x	
ADB	Renewable Energy Development Network Expansion and Rehabilitation for Remote Communes Sector	The primary objective of the sector Project is to develop rural electrification and renewable energy in Viet Nam to benefit ethnic minority communities inhabiting remote and poorer parts of the country. The Project consists of two investment components: (i) development of mini-hydroelectric plants in mountain provinces, and (ii) network expansion and rehabilitation of distribution networks serving poor provinces. The Project will include an associated technical assistance (TA) grant for capacity building for renewable energy development.	Loan (sovereign)	2009-2017	NPC, CPC, SPC				x	
ADB	Renewable Energy Development and Network Expansion and Rehabilitation for Remote Communes Sector Additional Financing		Grant	2015-2017		x				
ADB	Capacity Building of Renewable Energy Development		TA	2009-2017		x				
ADB	Establishing the Wholesale Electricity Market	The impact of the TA is that national electricity growths are met sustainably through deregulation. The activities of the TA include (i) Basic and advanced trainings on generic wholesale market mechanisms; (ii) Recommendation on new functions and critical requirements of Power Corporations and NLDC (SMO) for the WEM; (iii) Review the current ICT infrastructure of Power Corporation and NLDC (SMO); and recommendation for upgrading ICT infrastructure for the WEM.	TA	2015-2018	ERAU			x		
ADB	Rural Electrification	The project preparatory technical assistance (PPTA) will conduct a feasibility study for the Asian Development Bank (ADB)'s supported Rural Electrification (RE) Project in Viet Nam, which should include: (i) rationalization of the rural electrification project; (ii) assessments of the project's costs proposed by the government; (iii) full feasibility study for the selected project sites; and (iv) preparation of all project documents required by ADB for the investment of the project.	TA	2015-2018	MOIT and EVN				x	

- Overview of VEPG partner projects in the energy sector (<http://vepg.vn/resources/vepg-documents/>)
- 80 partner projects with key information included
- New survey update expected by December 2020

VEPG Legal Database

VEPG Secretariat Planning: Where should this database live long-term?

RECENT LEGAL DOCUMENTS

MOIT Circular 05/2019/TT-BCT amending Circular 16/2017/TT-BCT on Standardized PPA for Solar Power projects

- **Effective date:** 25/04/2019
- **Legislation type:** Circular
- **Signer:** MOIT Minister Trần Tuấn Anh

[DOWNLOAD FOR DETAILS >](#)

EVN Guidelines 1532/EVN-KD for the Implementation of Rooftop Solar Projects

- **Effective date:** 27/03/2019
- **Legislation type:** Guidelines
- **Signer:** Vice President of EVN Võ Quang Lâm

[DOWNLOAD FOR DETAILS >](#)

DRAFT Decision on the Mechanisms to Promote Development of Solar Power Projects in Viet Nam

- **Effective date:** 15/04/2019
- **Legislation type:** Decision

[DOWNLOAD FOR DETAILS >](#)

MOIT Decision 648/QĐ-BCT on Adjustment of Average Electricity Retail Price and Regulations on Electricity Price

- **Effective date:** 20/03/2019
- **Legislation type:** Decision
- **Signer:** MOIT Minister Trần Tuấn Anh

[DOWNLOAD FOR DETAILS >](#)

Consultation on Draft Decision on the new Solar FIT

- **Effective date:** 15/04/2019

[DOWNLOAD FOR DETAILS >](#)

PM Decision 280/QĐ-TTg on the Approval of the National Energy Efficiency Programme (VNEEP) for the period of 2019-2030

- **Effective date:** 13/03/2019
- **Legislation type:** Decision
- **Signer:** Deputy Prime Minister Trịnh Đình Dũng

[DOWNLOAD FOR DETAILS >](#)

- online and regularly updated
- legal documents in original Vietnamese and **translated into English**
- **expanding coverage** of standards and regulations (PM Decisions, MOIT documents, Consultation Documents, EVN guidelines, etc.)

➤ www.vepg.vn

Steering Committee Meeting November 2020

- Present key aspects of the VEPG operational plan through 2021
- VEPG Beyond 2021
- Timely Policy Recommendations to Support Sector Decision-Making

Topic 3. Update on VEIS Implementation & Roundtable Discussion

Topic 4. Technology Catalogue Update & Roundtable Discussion

V-LEEP presentation

- Presentation by Ms. Trần Hồng Việt, Danish Embassy
- Stakeholder Feedback & Discussion

Topic 5. PDP8 Development & Roundtable Discussion

- Institute of Energy (tbc): Power Development Plan VIII (PDP8) data & input for scenarios and alignment with Energy Master Plan
- Development Partner Activities

Topic 6. Closure of the Meeting

Energy Data & Statistics Technical Working Group Chair:

Mr. Nguyễn Tuấn Anh, Deputy Director General, Electricity and Renewable Energy Authority, Ministry of Industry and Trade (EREA/MOIT)

Energy Data & Statistics Technical Working Group Co-Chair:

Ms. Trần Hồng Việt, Acting Co-chair, Senior Programme Manager, Embassy of Denmark



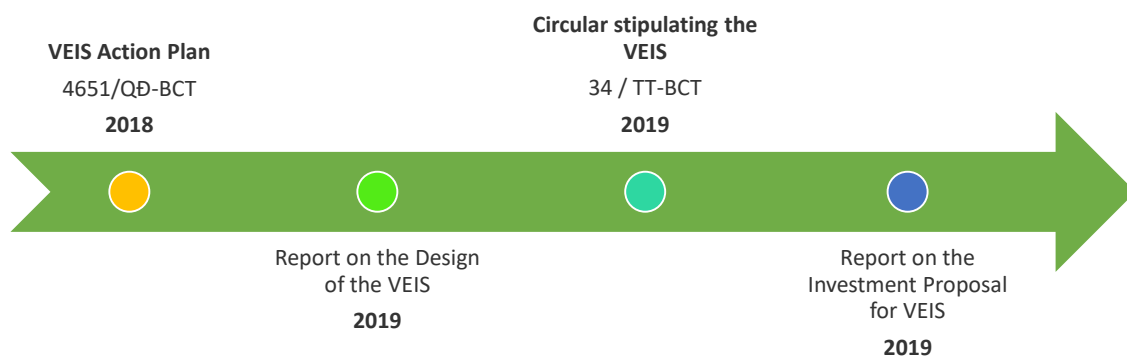
EU – Viet Nam Energy Facility

Developing legal framework for Vietnam Energy Information System (VEIS) - TWG 5

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

1

Hệ Thống Thông Tin Năng Lượng VEIS – Công việc đã thực hiện



2

Viet Nam Energy Information Systems (VEIS) - Completed Activities

- **VEIS Action Plan:**

Development of a roadmap to complete and improve the legal framework, develop quality human resources and invest in the infrastructure to form and implement the VEIS in the period of 2019 – 2024

- **Report on the Design of the VEIS:**

The Report presents an information systems model with the management role of the Electricity and Renewable Energy Authority (EREA) with the participation of the stakeholders to collect, analyze and calculate important indicators for the energy sector for the Energy Balance Sheets and Energy Efficiency Index. The report also provides important analysis to build a suitable legal basis for the formation and development of the energy information system.

- **Circular stipulating the Viet Nam Energy Information System (VEIS)**

The circular provides legal foundation for the establishment, management and operation of the energy information system as well as the organization, development, and utilization of the energy information system.

29/09/2020

The EU - Viet Nam Energy Facility

3

3

Viet Nam Energy Information Systems (VEIS) - Action Plan

- **Workshop to introduce the Circular on the Energy Information System:**

- Take place in Hanoi, Da Nang and Ho Chi Minh City
- Expected completion time Q4/2020
- Participants: stakeholders with roles and related responsibilities in the Viet Nam Energy System.
 - Ministry of Industry and trade, EREA, ERAV, DEESD, and Department of Coal, Oil and Gas.
 - Department of Industry and Trade in provinces and cities.
 - EVN, PVN, TKV and Petrolimex
 - Other agencies and Ministries: General Statistics Office, Ministry of Agriculture and Rural Development, and Ministry of Transport



29/09/2020

The EU - Viet Nam Energy Facility

4

4

Viet Nam Energy Information Systems (VEIS) - Action Plan

• VEIS Operational Manual

- Develop a rigorous and detailed process for collecting, process, analyzing and reporting
- The manual will specify the methods of implementation, problems that may be countered when collecting and analyzing data and solutions to emerging problems.
- The manual will outline the roles and responsibilities of the members of the energy information systems
- The contract with the International Consultant was signed. The contract with Local Consultant is in the process of negotiation and signing.
- The task is expected to be completed in Q1/2021



29/09/2020

The EU - Viet Nam Energy Facility

5

5

Viet Nam Energy Information Systems (VEIS) - Action Plan

• Development of the Management Model for the Viet Nam Energy Information Center (VEIC)

- Develop a modern management models with clear distribution of responsibilities, ensure the effective operation of the Center
- Complete appropriate regulations, legal framework, and ensuring smooth system operation.
- Set strategic goals with appropriate development plans in the immediate and long term.
- Contract with International Consultant has been signed. Contract with Local Consultant is the process of negotiating and signing.
- The task is expected to be completed in Q2/2021



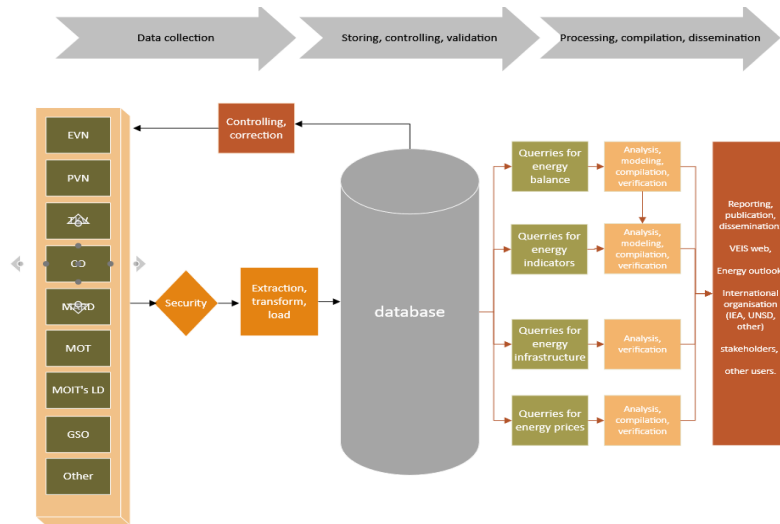
29/09/2020

The EU - Viet Nam Energy Facility

6

6

Circular on the establishment of VEIS



29/09/2020

The EU - Viet Nam Energy Facility

7

7

Thank you for your attention

8



1

What is a Technology Catalogue?

The TC is a comprehensive report that includes both a quantitative and a qualitative description of energy technologies



2

What is a Technology Catalogue?

A. Quantitative description

- Performance data (Efficiency, life time, availability, start up time)
- Financial data (Investment cost, O&M cost)
- Environmental data (emissions)
- Data sets for e.g. 2015, 2020, 2030, (2014) and 2050

Technology	20 Large wind turbines on land									
Year of final investment decision	2015	2020	2030	2050	Uncertainty (2020)		Uncertainty (2050)		Note	Ref
Energy/technical data					Lower	Upper	Lower	Upper		
Generating capacity for one unit (MW)	3.5	3.5	4	5	2.0	6.0	1.5	8.0	A1	3
Average annual full-load hours	3100	3150	3200	3300	2000	4000	2000	4500	A, L	3
Forced outage (%)	3.0%	2.5%	2.0%	1.5%	1.0%	5.0%	1.0%	5.0%	B	4
Planned outage (%)	0.3%	0.3%	0.3%	0.3%	0.1%	0.5%	0.1%	0.5%	C	4
Technical lifetime (years)	25	27	30	30	25	35	25	40	D	14
Construction time (years)	1.5	1.5	1.5	1.5	1	3	1	3	E	4
Space requirement (1000m ² /MW)	—	—	—	—	—	—	—	—	F	
Regulation ability										
Primary regulation (% per 30 seconds)									G	
Secondary regulation (% per minute)									G	
Financial data (in 2015€)										
Nominal investment (M€/MW) incl grid connection	1.07	0.99	0.91	0.83	0.9	1.1	0.7	1.0	H	16, 2, 4
Nominal investment (M€/MW) excl. grid connection (5% of nom. investment)	1.02	0.94	0.86	0.79	0.8	1.0	0.6	0.9	I, M	16, 2, 4
- of which equipment	75%	75%	75%	75%	70%	80%	70%	80%		A
- of which installation	25%	25%	25%	25%	20%	30%	20%	30%		A
Fixed O&M (€/MWh/year)	25,600	23,900	22,300	21,200	21,510	26,290	16,960	25,440	J, N	4
Variable O&M (€/MWh)	2.6	2.5	2.3	2.1	2.3	2.8	1.7	2.5	J, N	4, 15, 18
Technology specific data										
Rotor diameter	120	120	130	150	90	130	100	150	K	4
Hub height	90	90	100	110	85	120	85	150		4
Specific power (W/m ²)	309	309	301	283	270	350	250	350		
Average capacity factor	37%	37%	38%	39%	23%	46%	23%	51%		A
Average availability (%)	97%	97%	98%	98%	95%	99%	95%	99%		A

What is a Technology Catalogue?

B. Qualitative technology descriptions

- Input
- Output
- Co-products and By-products
- Typical capacities
- Regulation ability
- Space requirements
- Advantages and disadvantages
- Research and development
- Costs etc.

20 Wind Turbines onshore

Contact information:
 Danish Energy Agency (DEA) (DEA) (DEA)
 Author: Mads V. Jensen / The National (DEA)

Publication date:
 August 2019

Amendments after publication date:
 Date: Description:

Qualitative description

Wind technology description

The typical onshore wind turbines being installed today is a three-bladed, three-bladed, upwind, grid connected turbine using active pitch, variable speed and yaw control to optimize generation at varying wind speeds.

Wind turbines work by converting the kinetic energy in the wind into the rotor blades and transferring it to the drive shaft. The drive shaft is connected either to a speed-increasing gearbox coupled with a medium- or high-speed generator, or to a low-speed, direct-drive generator. The generator converts the rotational energy of the shaft into electrical energy. In modern wind turbines, the pitch of the rotor blades is controlled to maximize power production at low wind speeds, and to maintain a constant power output and limit the mechanical stress and loads on the turbine at high wind speeds. A general description of the turbine technology and electrical system, using a general turbine as an example, can be seen in Figure 1.

Figure 1: General turbine technology and electrical system.

Wind turbines are designed to operate within a wind speed range which is bounded by a low 'cut-in' wind speed and a high 'cut-out' wind speed. When the wind speed is below the cut-in speed the energy in the wind is too low to be utilized. When the wind reaches the cut-in speed, the turbine begins to operate and produce electricity. As the wind speed increases, the power output of the turbine increases, and at a certain wind speed the turbine reaches its rated power. At higher wind speeds, the blade pitch is controlled to maintain the rated power output. When the wind speed reaches the cut-out speed, the turbine is shut down or operated in a reduced power mode to prevent mechanical damage.

Onshore wind turbines can be installed as single turbines, clusters or in larger wind farms.

Commercial wind turbines are operated unattended, and are monitored and controlled by a supervisory control and data acquisition (SCADA) system.

Input
 Input is wind.

Output
 Output is electricity.

Rated power generation wind speed: 10-12 m/s, depending on the specific power (defined as the ratio of the rated power to the swept rotor area).

Cut-out or transition to reduced power operation at wind speed: 25 m/s.

In the future, it is expected that manufacturers will apply a soft cut-out for high wind speeds (indicated with dotted line in Figure 2) resulting in a less cut-out wind speed around 30 m/s.

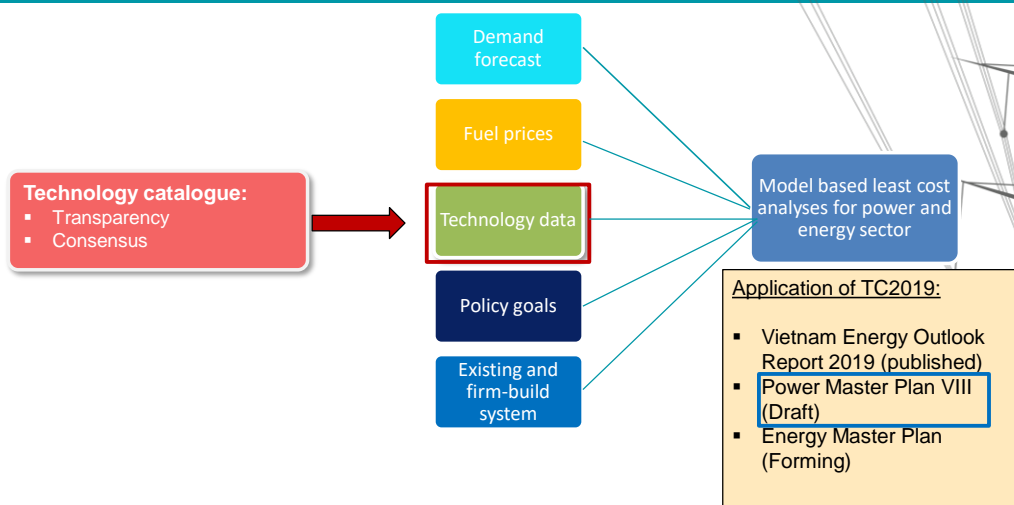
Figure 2: Typical power curve (reference) from swept area to rated power. (e.g. 1.5 MW with 100 m rotor diameter (100 m) and 1.5 MW with 100 m rotor diameter (100 m)).

Uses of the technology catalogue

- Energy Modelling
 - Policy making and technology assessment
 - Used in Vietnam Energy Outlook Report 2019
- Levelized Cost of Electricity assessment
 - Estimation of **tariffs (FIT)** and **PPA price**



Energy Modelling



7

Why do we need to update the TC2019?

- In Vietnam, new wind and solar power projects have significant lower investment cost compare to TC2019:

Projects	Operation date	MWac	Mil.USD/ MWac	TC 2019
Solar Farm Nhon Hai-Ninh Thuan	9/7/2020	28	0.94	Solar power 2020: 1.1 mil.USD/MWac
SPP Thien Tan 1.2 – Ninh Thuan	12/2020 (under construction)	80	0.87	
SPP Phuoc Ninh – Ninh Thuan	23/6/2020	36	0.96	
WPP Phuoc Dinh – Ninh Thuan	11/4/2019	37.6	1.50	Wind power onshore 2020: 1.6 mil.USD/MW
WPP Tay Nguyen – Dak Lak	17/9/2019	28.8	1.66	
WPP Trung Nam phase 1- Ninh Thuan	27/4/2019	39.95	1.41	
WPP Trung Nam phase 2- Ninh Thuan	11/5/2020	64	1.39	

- Supplement new technologies: The first TC could not cover all relevant technologies and need to be updated.

Suggestion for new technologies

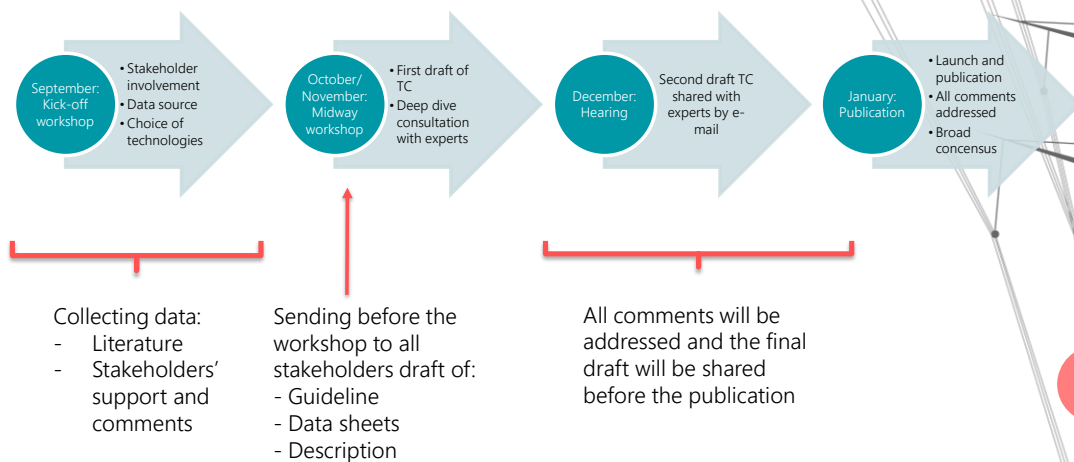
Updating of technologies

- PV
 - + Roof-top solar PV
 - + Floating solar
- Wind
 - + Floating offshore
 - + Low wind speed wind turbines
- Coal
 - + Circulating Fluidized Bed (CFB) boilers
 - + Enhanced flexibility of coal power plants
 - + Technologies to reduce pollution
- Diesel
 - + Flexible Engine (LNG)

New technologies

- Concentrated Solar Power (CSP)
- Industrial co-generation
- Wave and tidal power
- Nuclear power
- Carbon Capture and Storage
- Transmission overhead lines and cables (HVAC/HVDC)

Process



11



12



THE NATIONAL POWER DEVELOPMENT PLAN IN THE PERIOD 2021-2030, VISION TO 2045



UPDATES ON THE DEVELOPMENT OF THE PDP 8

Hanoi, September 2020

1



CONTENTS

1. UPDATES ON THE DEVELOPMENT OF THE PDP 8

2. LOAD FORECAST

3. DEVELOPMENT SCENARIOS OF POWER SOURCES

2

2

UPDATES ON THE DEVELOPMENT OF THE PDP 8

3

3

Development progress of the PDP 8

No.	Contents	Month (since starting to provide services)									
		1	2	3	4	5	6	7	8	9	10
1	Data collection with central agencies, ministries, sectors, institutes, economic corporations (EVN, PVN, TKV), power plants, power transmission lines and localities.										
2	Chapter 1, Chapter 2: Current situation of the national power, implementation results of power development in the period 2011-2015										
3	Chapter 3, Chapter 5, Chapter 6: Overview of the socio-economic situation, economical and efficient use of power, power demand forecast										
4	Chapter 4, Chapter 7, Chapter 8: Input criteria and parameters for planning, Primary energy for power generation, renewable energy (RE) for power generation										
5	Chapter 9: Power source development program										
6	Chapter 10, Chapter 11: Program on grid development and grid connection with neighbouring countries										
7	Chapter 12, Chapter 13: Rural power development orientations and information dispatch										
8	Chapter 14, Chapter 15, Chapter 17: National power development investment program, Evaluation on socio-economic efficiency in power development, Land use demand summarization										
9	Chapter 16: Environmental protection and sustainable development in power development										
10	Chapter 18, Chapter 19: Mechanisms and solutions for planning implementation: Conclusion and Recommendations										

**First Workshop 1:
Report on the first 9
chapters
(8/7)**

**Hội thảo Lần 2:
Report on the last 9 chapters
(28/9)**

4

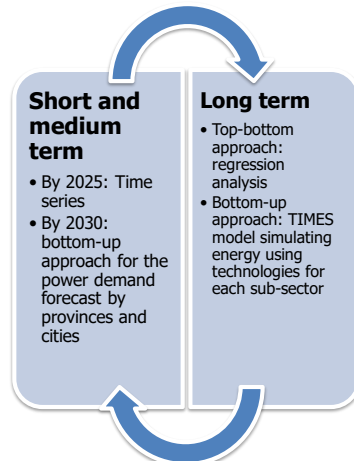
LOAD FORECAST

5

5

POWER DEMAND FORECAST METHOD

- Available important variables:
 - GDP forecast by industries and regions;
 - Population, urbanization rate;
 - Power demand forecast of provinces and cities.
- Combined forecast method:
 - **Top-down** method:
 - **Regression analysis** of the power consumption by main variables such as GDP, population, urbanization, electricity tariff, etc.
 - Time-series analysis:
 - **Bottom-up** method:
 - Collection of **provincial power demands and crucial loads**.
 - Use of **TIMES model** to assess the power demand of each sub-sector in the energy demand.

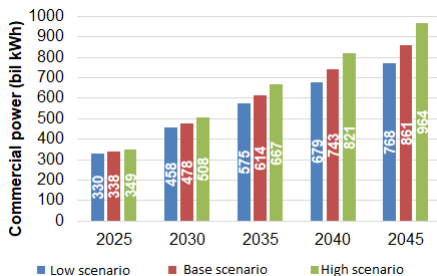


✓ **$LN(\text{Total commercial power}) = 1.4783(B) + 1.0156 * LN(\text{GDP per capita}) - 0.22457 * LN(\text{Informed electricity tariff}) + 0.56577 * LN(\text{Percentage of industrial sector in GDP}) + 2.552 * LN(\text{percentage of urban population})$**

6

6

- ✓ Commercial power: 478 billion kWh in 2030 and 861 billion kWh in 2045;
- ✓ Power production: 537 billion kWh in 2030 and 959 billion kWh in 2045;
- ✓ Commercial power will steadily increase by 8.3% in the period 2021-2030 and then reduce to 3.5%/year in the period 2031-2045.
- ✓ Electricity elasticity coefficient for 5-year GDP is projected to decrease to 1.13 in 2030 and 0.58 in 2045.



Commercial power in 2019: 210.5 TWh.

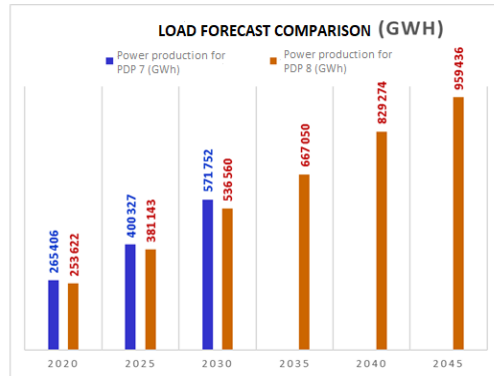
Growth of commercial power	Elasticity coefficient	GDP(%)
2019-2020: 2.2%/year		
2021-2025: 9.4%/year	1.38	6,8
2026-2030: 7.2%/year	1.13	6,4
2031-2035: 5.1%/year	0.87	5,9
2036-2040: 3.9%/year	0.72	5,4
2041-2045: 3.0%/year	0.58	5,2

7

7

Forecast of GDP growth (base case)

Giai đoạn	KB Cơ sở QHĐ 7 HC				Dự báo cập nhật QHĐ8			
	Toàn quốc	Miền Bắc	Miền Trung	Miền Nam	Toàn quốc	Miền Bắc	Miền Trung	Miền Nam
2016-2020	7.0	6.3	6.5	7.4	4,9	8.56	5.26	4.85
2021-2025	7.0	6.4	6.6	7.5	6,8	7.15	6.74	6.45
2026-2030	7.0	6.4	6.6	7.5	6,4	6.75	6.35	6.06
2031-2035	7.0	6.4	6.6	7.5	5,9	6.23	5.83	5.54
2036-2040					5,4	5.72	5.33	5.03
2041-2045					5,2	5.57	5.18	4.88
2046-2050					5,0	5.32	4.95	4.64



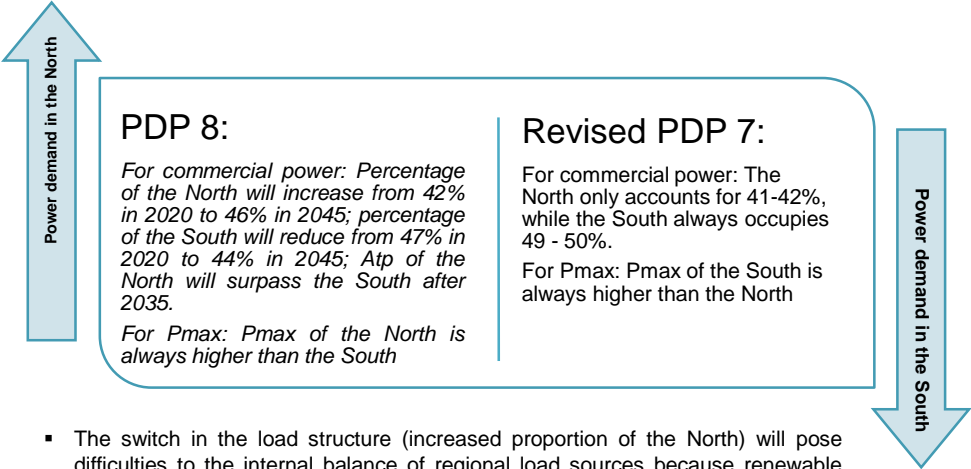
1. Load forecast nationwide in the PDP 8 is lower than the revised PDP 7:

- In 2030: The volume of commercial power and production power in the PDP 8 are respectively 28 billion kWh and 35 billion kWh lower than the revised PDP 7; Pmax 2030 in the PDP 8 is 6.5 GW lower than the revised PDP 7.
- Mainly because of the GDP in the PDP8 projected lower than the revised PDP 7

8

8

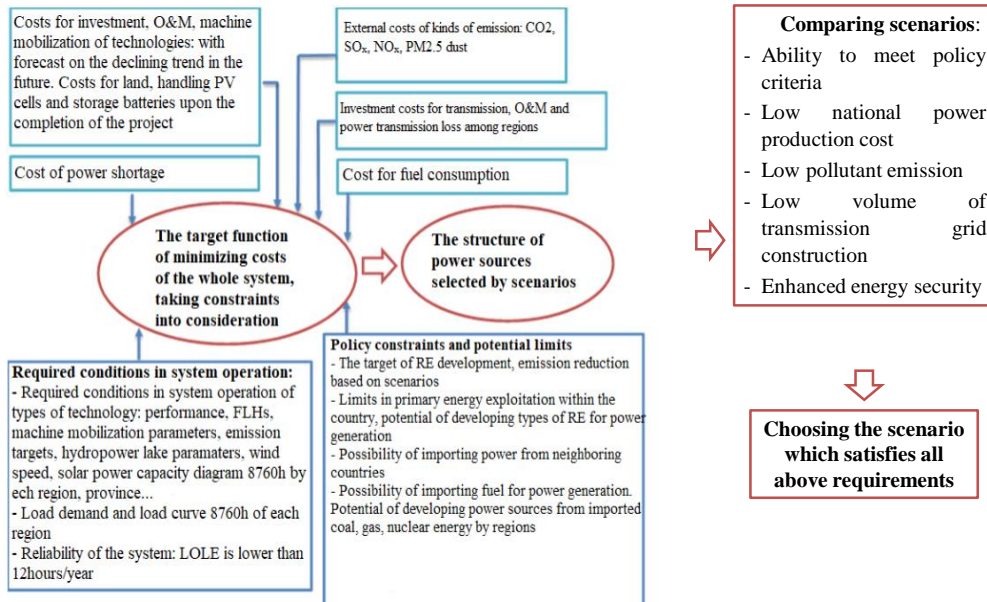
2. **Changes in the share** of power demand in the North and South:



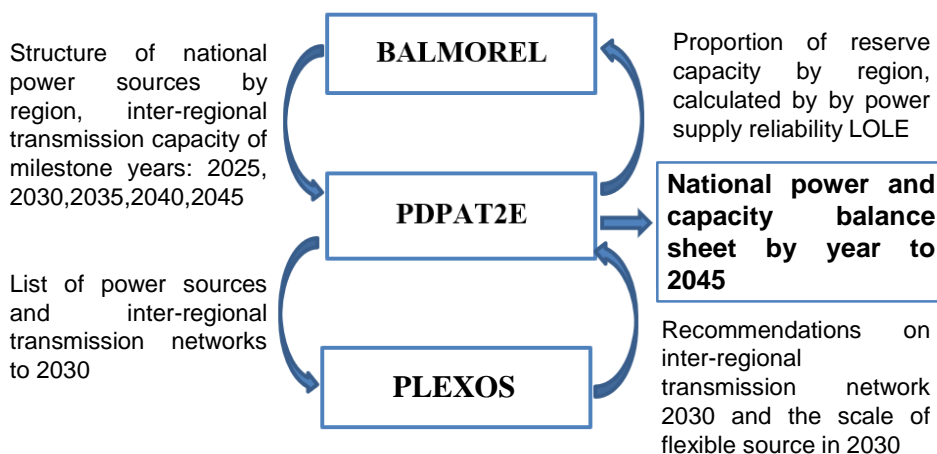
- The switch in the load structure (increased proportion of the North) will pose difficulties to the internal balance of regional load sources because renewable energy sources concentrate in the South, South Central Coast and Central Highlands.

SCENARIOS OF POWER SOURCE DEVELOPMENT



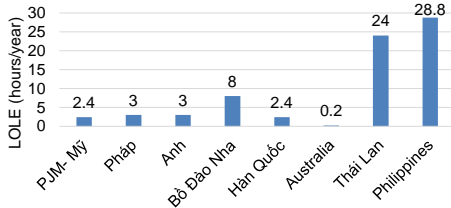


11

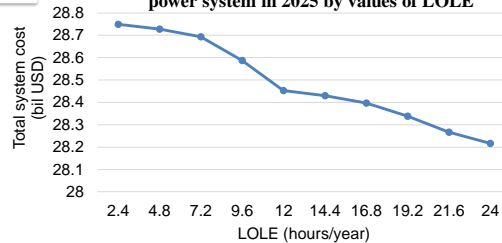


12

1. Reliability in power supply of the system



Power production cost in the whole Viet Nam power system in 2025 by values of LOLE



Selecting Loss of Load Expectation (LOLE) is considered a policy which relies on the cost of losses for failing to provide enough power and meet macroeconomic development targets
→ use LOLE for less than 12 hours/year for each regional power system ~ reliability of 99,86%

2. Some technological requirements for a power plant:

- Ultra-supercritical power plants which almost reach the end of their life cycle are only considered for continuous investments in ones firing domestic coal if it cannot be burned in more improved kilns.
- For imported coal, only power plants, which are at least advanced ultra-supercritical will be built in the period 2021-2025; at least over advanced ultra-supercritical in the period 2025-2035; and improved over advanced ultra-supercritical after 2035
- Newly constructed or improved thermal power plants must all use highly flexible new technological equipment and advanced and high-efficiency technologies to reduce emissions to the environment. It is necessary to establish additional anti-pollution equipment in the current plants

13

KB0

Business as Usual: In line with the revised PDP 7, all kinds of power source are selected for development solely based on the competitiveness in terms of costs, excluding the external one (KB0A_QHD7HC)

KB1

The target of RE following the RE development strategy and Decree No. 55-NQ/TW: 38%-2020, 32%-2030, 40.3%-2045, 43%-2050, excluding external cost (KB1A_CLNLTT), including external cost (KB1B_CLNLTT)

KB2

The target of RE increasing linearly and achieving the strategy in 2050: 38%-2020, 39%-2030, 42%-2045 and 43%-2050, excluding external cost (KB2A_CLNLTT), including external cost (KB2B_CLNLTT)

KB3

The target of high RE: 38%-2020, 42%-2030, 48%-2045 and 50%-2050, excluding external cost (KB3A_CLNLTT), including external cost (KB3B_CLNLTT)

KB4

The target of reducing green house gases (GHGs): reducing 25% of GHGs compared to BAU, excluding external cost (KB4A_CO2), including external cost (KB4B_CO2)

KB5

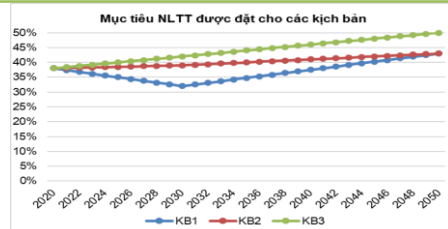
No more new construction of coal-fired power plants after 2030: The target of RE follows the strategy, taking external cost into consideration (KB5B_Nonewcoal)

KB6

Development of nuclear power after 2035: set the policies on developing 1000MW nuclear power in 2040 and 5000MW nuclear power in 2045. The target of RE follows the strategy, including external cost (KB6B_Nuclear)

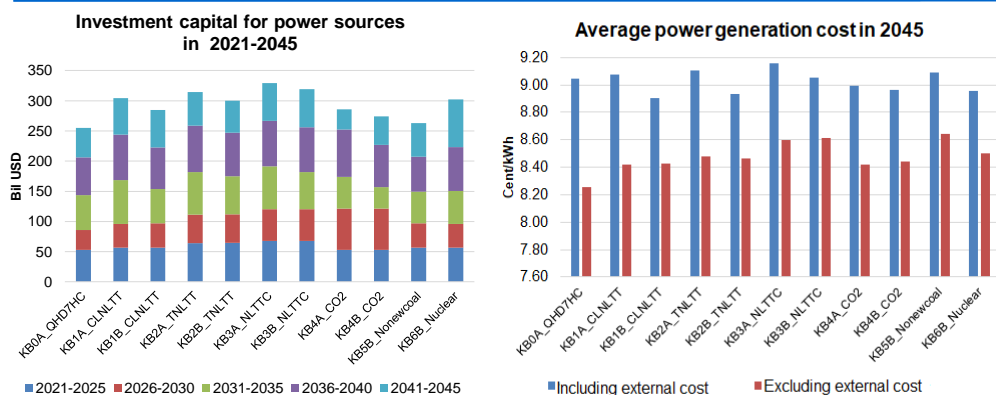
- The target of RE is the rate of power generated from RE (including big hydropower) in the total power production nationwide
- NQ55_NQ/TW: the share of RE in the total supply of primary energy reaches 15-20% in 2030 and 25-30% in 2045, equivalent to the rate of RE power in the total power production of ~ 30% in 2030 and 40% in 2045

**Calculating 11 main scenarios with base inputs
⇒ Selecting 1 scenario from the main ones**



14

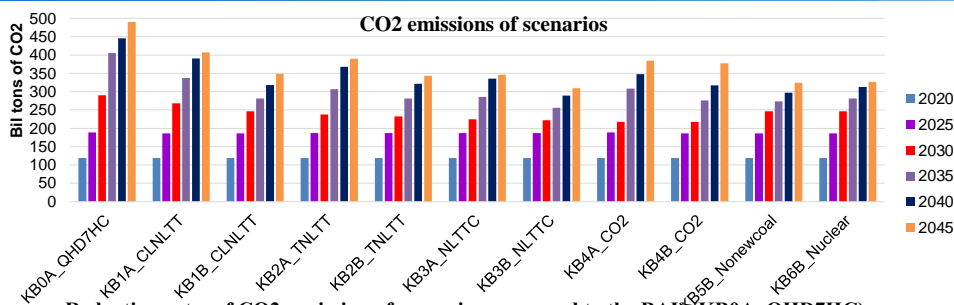
14



- **KB0A_QHD7HC** has the lowest cost if excluding external cost, but it is of a higher cost than most of the other scenarios if including external cost.
- **Scenarios 3, 4 & 5** has the highest cost in both cases of external cost excluded and included and higher capital investment than the other scenarios
- The scenarios having the lowest costs (if including external cost) and medium costs (if excluding external cost) are **KB1B_CLNLTT**, **KB2B_TNLTT** and **KB4B_CO2**

15

15



Reduction rates of CO2 emission of scenarios compared to the BAU (KB0A_QHD7HC)

Scenario/year	2030	2035	2040	2045
KB1A_CLNLTT	8%	17%	12%	17%
KB1B_CLNLTT	15%	31%	29%	29%
KB2A_TNLTT	18%	24%	17%	20%
KB2B_TNLTT	20%	31%	28%	30%
KB3A_NLTTC	23%	30%	25%	29%
KB3B_NLTTC	24%	37%	35%	37%
KB4A_CO2	25%	25%	25%	25%
KB4B_CO2	26%	26%	27%	27%
KB5B_Nonewcoal	15%	32%	33%	34%
KB6B_Nuclear	15%	31%	30%	33%

16

16

HHI indicator and % of import in main scenarios

Scenario	HHI			% of Import		
	2020	2030	2045	2020	2030	2045
KB0A_QHD7HC	2433	1999	2146	16%	46%	59%
KB1A_CLNLTT	2433	1739	1567	16%	41%	47%
KB1B_CLNLTT	2433	1500	1341	16%	39%	47%
KB2A_TNLTT	2433	1468	1480	16%	34%	45%
KB2B_TNLTT	2433	1425	1328	16%	34%	45%
KB3A_NLTTC	2433	1387	1318	16%	31%	39%
KB3B_NLTTC	2433	1371	1208	16%	31%	39%
KB4A_CO2	2433	1349	1408	16%	30%	49%
KB4B_CO2	2433	1356	1431	16%	30%	51%
KB5B_Nonewcoal	2433	1500	1393	16%	39%	46%
KB6B_Nuclear	2433	1500	1198	16%	39%	43%

- HHI indicator is the sum of the squares of the power percentage of all kinds of power source. The lower the HHI is, the more diverse the structure of power sources will become
- % of import: the % of power of all kinds of power source which are imported and use imported materials

➔ KB3B_NLTTC and KB6B_Nuclear are scenarios with the highest levels of energy security

17

17

Scenario (Ranking)	Ability to meet policy criteria	Low cost in the whole system	Low CO2 emission	Low volume of transmission grid construction	Diversification of power sources
KB0A_QHD7HC (11)	☆☆☆☆☆	★★★★☆	☆☆☆☆☆	★★★★★	☆☆☆☆☆
KB1A_CLNLTT (10)	★★★★☆	★★★★☆	★☆☆☆☆	★★★★★	★★★★☆
KB1B_CLNLTT (1)	★★★★★	★★★★☆	★★★★☆	★★★★★	★★★★☆
KB2A_TNLTT (9)	★★★★☆	★★★★☆	★★★☆☆	★★★★★	★★★★☆
KB2B_TNLTT (3)	★★★★★	★★★★☆	★★★★☆	★★★★★	★★★★☆
KB3A_NLTTC (5)	★★★★★	★☆☆☆☆	★★★★★	★★★☆☆	★★★★☆
KB3B_NLTTC (4)	★★★★★	★★★☆☆	★★★★★	★★★☆☆	★★★★★
KB4A_CO2 (8)	★★★★☆	★★★☆☆	★★★★☆	★★★★★	★★★★☆
KB4B_CO2 (7)	★★★★☆	★★★☆☆	★★★★☆	★★★★★	★★★★☆
KB5B_Nonewcoal (6)	★★★★★	★★★☆☆	★★★★☆	★★★☆☆	★★★★☆
KB6B_Nuclear (2)	★★★★★	★★★☆☆	★★★★☆	★★★★★	★★★★★

KB1B_CLNLTT is selected because this is the scenario that satisfy all criteria

18

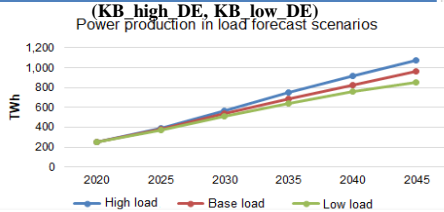


SENSITIVITY- ANALYZING SCENARIOS

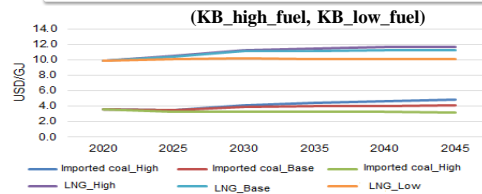


Implemented based on the selected base scenario (KB1B_CLNLTT), changes in power source size in 7 sensitivity scenarios will be considered for addition to the base scenario for extra precaution in dry year when the load is high in the medium.

1. Scenarios analyzing the sensitivity of load forecast



2. Scenarios analyzing the sensitivity of primary material costs



3. Scenarios analyzing the sensitivity of power source construction

World Energy Outlook 2019

KB_offshore: The offshore wind technology has just been developed currently with the potential of reducing investment cost to tentatively 7% in 2025-2029, 15% in 2030-2039 and 25% in 2040-2045 in comparison to data in Technology handbook 2019 and in line with studies supporting the PDP 8 done by Denmark

4. Scenarios analyzing the sensitivity of climate

KB_dry_year: For the dry year, scenarios of hydropower sources will have the hydrological parameters corresponding to the water frequency of 75% nationwide and the electricity of hydropower will decrease by 20% compared to the average year

5. Scenarios analyzing sensitivity of CO2 price

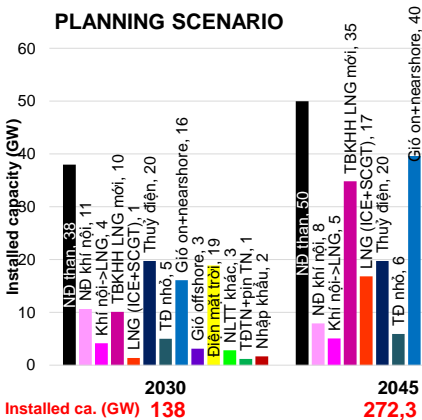
KB_CO2_price: Provided the government applies the CO2 tax policy to control the energy market. The assumed CO2 tax rate is 5 USD/ton in 2021-2025, 8 USD/ton in 2026-2030, 10 USD/ton in 2031-2045

19

19



DEVELOPMENT PROGRAM FOR SELECTED POWER SOURCE



INSTALLED CAPACITY (2025-2030-2035-2045)

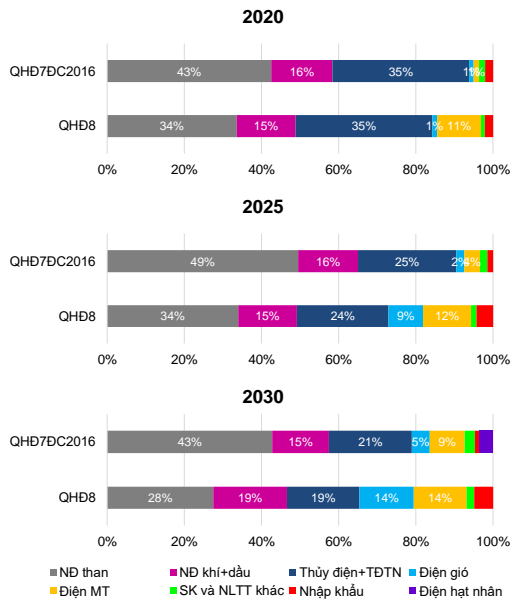
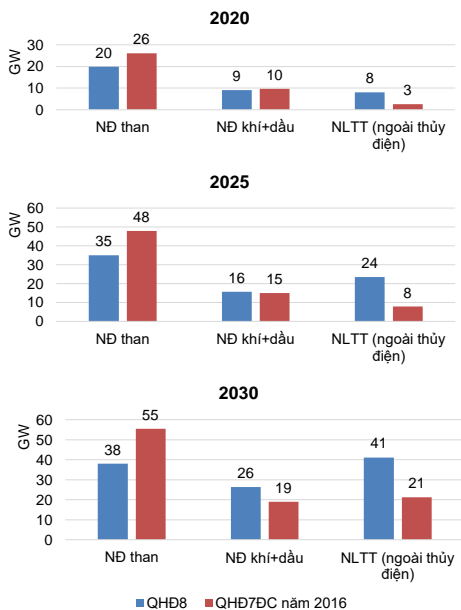
Region	Coal	LNG-CCGT	Wind	Solar
North	13 14 15 22	4 9 17	0 1 1 1	0 2 4 9
North Central	7 7 9 10	0 1 3	0 1 1 2	0 1 1 2
Middle Central Coast	0 0 1 1		1 2 3 3	0 0 1 2
Central highlands			2 4 6 10	1 2 2 3
South Central Coast	7 8 8 8	0 1 2 2	2 6 11 25	5 5 6 7
South	8 9 9 9	2 5 12 13	4 7 11 19	6 9 14 31

Structure of PSs	2030	2045
Coal-fired power plant	28%	18%
Gas-fired power plant	19%	24%
Hydropower	18%	9%
Wind power	14%	22%
Solar power	14%	20%
Biogas and other RE	2%	2%
Energy storage	1%	3%
Import	5%	2%

- The planning scenario meets the target of RE following the strategy and Decree No. 55, satisfies Vietnam's international commitments in reducing pollution, ensuring the security of power supply and low costs.
- The North will receive power from the Central from 2023. Projects supplying power for the North will be developed with priority.
- The Central and South will focus on developing RE; coal-fired and LNG-CCGT power plants will be developed at a very limited scale.
- After 2025, flexible sources: ICE and SCGT using LNG, energy storage sources will be developed to ensure peak cover and prevention for RE

20

IE COMPARING THE SIZE OF POWER SOURCES WITH THE REVISED PDP 7



21

21



Thank your for your attention!

Institute of Energy

Nº 6 Ton That Tung st, Dong Da dis, Hanoi
Tel: (8443) 8 523 730 - 8 529 310 - 5 743 279
Fax: (8443) 8 539 302 - 8 523 311
Website: <http://www.ievncom.vn>



22

22