

Accelerating Vietnam's Energy Transition: A Retrospective of VIETSE's Activities

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Introduction

The Vietnam Initiative for Energy Transition Social Enterprise (VIETSE), established in 2018, was dedicated to fostering Vietnam's shift to a net-zero carbon society. By the close of 2022, VIETSE was operating with approximately 12 staff members from its central office in Hanoi. However, due to the arrest of VIETSE's executive director, the organization's activities were indefinitely halted as of September 15, 2023. This report collects the memory of VIETSE productions during its five years of activity.

The contents is based on archives available to us at the end of 2023: the annual reports *2022 VIETSE in Brief* and *2021 VIETSE's in Brief* – both published online – ; along with the *VIET 2020 Activity report, deliverable D3.1* and the *2019 Activity and financial report, deliverable D4.1* – both prepared as internal reports to the funders. This version is a preliminary release, and may be revised as more information becomes available.

The activities of the Vietnam Initiative for Energy Transition Social Enterprise (VIETSE) from its establishment in 2018 until its operations were suspended in September 2023 have been multifaceted. For each year, this report is an annotated list of scientific articles, technical studies, dissemination events and other activities.

- VIETSE has made notable contributions to Vietnam's energy transition through rigorous technical studies, such as the analysis of Vietnam's Energy Security and the prospects for Green Hydrogen Development, which have provided strategic insights for the nation's pivot away from traditional energy sources towards renewables.
- VIETSE's efforts in organizing public events and webinars have facilitated critical discussions on topics like Electricity Prices and Flexible System Operation, engaging over 200 participants in a single webinar and contributing to the national dialogue on energy policy. The enterprise's participation in both domestic and international platforms, including the Berlin Energy Transition Dialogue and various OECD webinars, has enabled it to influence energy transition financing and renewable energy strategies on a global scale.
- Additionally, VIETSE has been proactive in other initiatives, supporting projects like the Green Jobs project and contributing to the development of the JETP Secretariat, solidifying its role as an advocate for sustainable employment and international cooperation in energy transitions.

Despite the abrupt pause in activities, the legacy of VIETSE's five years of operation is a testament to its dedicated pursuit of an equitable and sustainable energy future for Vietnam, leaving a repository of research and policy recommendations that can continue to inform the nation's energy transition path. With ten technical reports and fourteen events in 2022 alone, attracting over 1000 participants, VIETSE has demonstrated a robust engagement with stakeholders across the energy sector, from policymakers to academia and industry players. The organization's influence on policy, such as advocating for the amendment of the electricity law and providing recommendations for Vietnam's carbon market development, reflects its commitment to shaping the country's energy framework.

The accomplishments of VIETSE would not have been possible without the dedication and expertise of its members. Their unwavering commitment has been the driving force behind the organization's achievements. Each report published, event organized, and policy influenced bears the imprint of their hard work and collaborative spirit. With up to 12 staff members operating from the Hanoi offices, their collective efforts have left an indelible mark on the landscape of Vietnam's energy sector. We extend our deepest gratitude to the VIETSE team for their tireless contributions, innovative thinking, and the resilience they have shown, especially in the face of the organization's unforeseen operational halt. Their professional excellence and personal investment in VIETSE's mission have not only propelled the organization forward but have also laid a solid foundation for future endeavors in Vietnam's journey toward a sustainable energy future.

1. Technical reports

VIETSE published a series of bilingual reports in 2023, focusing on critical aspects of Vietnam's energy sector:

Vietnam's Energy Security in 2023: Global Coal and LNG Markets

Authored by Dr. Ha-Duong Minh Xavier, this report addressed Vietnam's energy security concerns amidst fluctuating global coal and LNG markets. It proposed strategies for energy demand management, highlighting energy efficiency and the adoption of decentralized solar power. The development and exploitation of the Block B gas field were recommended to ensure domestic energy stability. The report also advocated a transition towards renewable energy sources and called for regulatory reforms to facilitate this shift.

Options for Green Hydrogen Development in Vietnam

This report, authored by Pham Duy Hoang and Ngo Thi To Nhien, delved into the potential for green hydrogen production in Vietnam, estimating an annual theoretical capacity of 52.9–58.5 million tons. It advised the replacement of grey hydrogen with green alternatives in the refinery and fertilizer sectors and encouraged post-2030 adoption in steel and cement production.

The Impact Analysis of Future Power Generation Mix on the Electricity Prices

A team of experts, including Mai Thanh Tam, Tran Thai Trung, Nguyen Hong Phuong, and Ngo Thi To Nhien, explored how evolving power generation strategies could affect electricity prices. Using machine learning models, they predicted an increase in prices by 2025 due to new power plant introductions and greater integration of renewable energy sources.

2. Public Events and Webinars

Dialogue on Electricity Prices and Flexible System Operation in Vietnam

A webinar held on May 31st, 2023, brought together over 200 participants to discuss Vietnam's power system and the role of storage in ensuring operational flexibility.

VEAM 2023 – Special Session on Green Energy Finance and Economics

During the Vietnam Economist Annual Meeting at Danang University, VEAM hosted a session focused on green energy finance, where a prize was awarded for research on the economic impacts of climate change.

Participation in Domestic and International Events

VIETSE representatives actively participated in various events, including the Berlin Energy Transition Dialogue, an OECD-hosted webinar on low-carbon hydrogen, and multiple seminars discussing energy transition financing and renewable energy.

3. Other activities

In addition to the public events and technical studies, VIETSE engaged in several other initiatives before the suspension of its operations. These included collaboration on the IKI CASE project, endorsing the Green Jobs project aimed at youth career development, and supporting the establishment of the JETP Secretariat. The organization also completed an analysis of the PDP8 in alignment with national climate commitments.

The think tank published ten technical reports and organized fourteen events attended by over 1000 participants.

I. Technical reports

Auction roadmap for ground mounted solar PV in Vietnam : a technical-economic assessment.

VIETSE's research showcases that a competitive auction mechanism for investor selection will help deploy renewable energy projects more effectively and transparently. The research suggests taking the following steps: Setting up auction targets per installed capacity, Determining the designated areas for bidding Assessing the impact of each area on the transmission lines and the generation capacity of each area in an entire year VIETSE proposes to implement an initial auction round for 500MW of ground solar power in the North-Central region which is in good technical and release capacities for grid congestion, and the next rounds will be conducted in other regions. In addition, provinces and cities should join with the investors from the very first steps of project development for being selected, therefore improving the project implementation efficiency, and developing renewable energy sources in a reasonable. cost-effective, and transparent manner.

Potential for optimizing the inter-reservoir operations for hydropower by a forecasting system for decision support.

Hydropower is considered a renewable source with high flexibility in operation, playing a crucial role in a power system with a high renewable share. Over the years, hydropower reservoir operation in line with the inter-reservoir operation process has come up with important outcomes, decreasing downstream floods. but not fully utilizing the hydropower potentials, particularly in the context of the power system in need of a more flexible operation to adapt with the request of balancing system, emissions reduction, and ncreasing renewable sources. The research "Optimizing the inter-reservoir operation for hydropower by a decision-support system by VIETSE in collaboration with the National Center for Hydro-Meteorologica) Forecasting (NCHMF) and the Danish Hydraulic Institute (DH)), highlights the importance of applying automatic algorithm model to an inter-reservoir operation based on real-time hydrometeorological measurement data. This model will help decision making for reservoir regulation get science based support, therefore improving the accuracy of the decisions and regulating the operation with the most suitable decisions in the shortest period.

Assessment of poteential and suitable technology to treat solid waste in Vietnam.

In the context of municipal solid waste surges, along with the rapid urbanisation rate and the trend of migration from rural to urban areas: VIETSE develops scenarios for solid waste potential in Vietnam and technical solutions for optimizing the exploitation of this resource under the principle waste is al resource Based on the research's outcomes. VIETSE demonstrates a virtual tool for municipal solid waste at urban and industrial scales, contributing to fostering the future potential of this sector in the energy transition process with the goals of environmental pollution reduction and climate protection This virtual tool will support the process of investment decision-making as well as developing efficient policies for waste management and treatment advancing the development of the energy sector and environmental protection)

Policy recommendations : Amending and supplementing the electricity law.

The transmission grid is considered the "backbone" of Vietnam's power system, making a significant contribution to the country's economic growth by providing consistent, safe, and stable electricity. However, meeting the country's electricity demand in the future, especially in the context of the load increasing rapidly in the Northern and Southern regions while new power generation sources being located in the Central region, along with the trend of shifting from fossil fuels to uncertain renewable sources such as wind and solar in the

Central and Southern provinces, and the requirement for new investment and improvement of the transmission grid is a substantial challenge VIETSE develops 3 scenarios for grid investment in Vietnam between 2021 and 2030. The results showcase that if only based on the existing sources, it's tough to meet the big financial demand for grid investment projects. The research proposes innovative solutions to diversify the financial sources for transmission system development, as well as solutions for land release to build the new national grids, and solutions for resource optimization for maintenance in power system operation

Carbon pricing : resource to shape vietnam's climate strategies.

VIETSE's research on "Carbon pricing instruments - international experiences and recommendations for Vietnam" analyses the emissions trading systems (ETS) in the world, designs a domestic carbon market from the existing legal framework, and proposes international experiences and appropriate recommendations for Vietnam. The research aims to support applying carbon pricing instruments, especially the sustainable and efficient development of Vietnam's carbon market, toward a low-carbon economy, to achieve the net-zero target by 2050 in line with the commitment at COP26 in & Glasgow, Scotland.

The goal and strategy for green hydrogen development in Vietnam.

Vietnam has been striving for clean energy sources with high potential development, including green hydrogen, to achieve the net-zero target by 2050. This fuel source will contribute meaningfully to the strategy of power generation diversification, and has huge potential to replace fossil fuels in industrial production and transport sectors, accelerating a low-carbon economy in Vietnam. VIETSE's research on scenarios for green hydrogen development in Vietnam proposes 3 breakthrough options and policies, piloting innovative technological applications, and solutions to promote appropriate resources to form a complete national green hydrogen supply chain.

2. Events

In 2022, our major events and dialogues contribute progressively to strengthening the information exchange among relevant stakeholders, supporting the sustainable energy transition in Vietnam.

With the participation of distinguished speakers and panelists from relevant legislative bodies, state management agencies, development partners, academia, universities and businesses, our events attracted more than 1,000 participants in 2022, establishing platforms for multidimensional and informative dialogues on energy transition and climate protection. Last year VIETSE contributed and delivered our insight at 23 key international and domestic events on energy transition and climate change, such as the COP27, Sydney Energy Forum, Asia Energy Forum, Asia Berlin Summit, Vietnam Wind Power Summit.

- Auction mechanism for sustainable development of the renewable energy market (11.01.2022). Policy dialogue, over 240 participants.
- Roundtable on Offshore Wind Power Auction Scheme (08.03.2022) Policy dialogue, in collaboration with EREA, METI, IEEJ. Over 50 participants.
- Energy transition trends and solutions for sustainable development of Vietnam (14-18.03.2022) Field trip, over 16 participants.
- Optimizing the inter-reservoir operation for hydropower by a decision-support system (20.05.2022)
- « Optimizing the exploitation of Solid waste potential in Vietnam » and « Roadmap for the C&SC toward Net-Zero Emission in Energy SOEs » (19.07.2022) Policy dialogue, over 80 participants.
- Energy Transition-Roadmap to Net Zero in 2050 (05.08.2022). Workshop in partnership with VN National Assembly, over 100 participants.

- Diversifying capital sources for construction & operation of transmission grids to meet the requirements of the energy transition in VN (06.09.2022) Policy Dialogue, in partnership with Nhan Dan newspaper, over 30 stakeholders from the government.
- Carbon pricing-Resource to shape Vietnam's climate strategies (27.09.2022) Policy Dialogue, over 200 participants
- Prospect of green hydrogen in Vietnam's low carbon economy (18.10.2022) Policy Dialogue, over 200 participants
- Notes from COP27-the impact on Vietnam's climate policy (21.11.2022) over 15 journalists

VIETSE activities in 2021

VIETSE research activities in 2021 contributed the scientific evidence to accelerate the energy transition in Vietnam. The think tank published five international peer reviewed contributions, nine technical studies and organized six events attended by over 1000 participants.

1. Peer reviewed publications

- “Options for Zonation and Grid Integration of Offshore Wind in Vietnam” and “Planning, policy and integration for sustainable development of offshore wind energy in Vietnam 2022 – 2030”. In Proceedings of the 2nd Vietnam Symposium on Advances in Offshore Engineering (VSOE2021). Volume 208 of the Lecture Notes in Civil Engineering book series.
- “Economics of Co-Firing Rice Straw in Coal Power Plants in Vietnam.” In Renewable and Sustainable Energy Reviews 154: 111742. <https://doi.org/10.1016/j.rser.2021.111742>.
- “Subjective satisfaction and objective electricity poverty reduction in Vietnam, 2008-2018”. In Fullbright Review of Economics and Policy, Vol. 1 No. 1, pp. 43-60. <https://doi.org/10.1108/FREP-03-2021-0022>.
- “On technology transfer and utility-scale power storage”. In IAEE Energy Forum vol. 30, pp 30-31, 2021 Q4.

2. Technical reports

Offshore wind will drive clean energy development this decade.

series of studies by VIETSE in 2019 – 2020 has initiated and driven the debate on offshore wind (OSW) development in Vietnam, provided scenarios demonstrating that 10 GW of offshore wind farm is technically achievable by 2030. In 2021, VIETSE continued to expand our research on this topic with 3 studies focusing on different angles of OSW: (i) regulations on Environmental and Social impact assessment (ESIA), (ii) harbours and infrastructures, and (iii) development of OSW supply chain. These studies have provided insights on the other key elements of offshore wind beyond technical aspects.

Vietnam has the resources to reduce 2030 CO₂ emissions in the power sector much more than currently planned.

VIETSE’s study, in collaboration with Rocky Mountain Institute funded by Energy Transition Partnership under Energy Transition Council, provided insights before COP26 on Vietnam’s power system’ potential to be decarbonized reliably and sustainably. The scenarios developed through rigorous modelling work show that a 60% CO₂ emissions reduction in 2030 compared to updated NDC’s BAU is achievable through enhancing energy efficiency measures, increasing renewable energy, optimizing the use of domestic energy resources and reducing the use of fossil fuel.

Just energy transition in Vietnam will deliver a large part of GHG emission mitigation, provide access to clean energy and create opportunities for all.

VIETSE, in collaboration with Climate Sense, has published the report “Prospects for a Socially Just Energy Transition in Viet Nam: 2021 and beyond” with support from Friedrich-Ebert-Stiftung. The report, co-authored by VIETSE’s Executive Director, emphasized the necessity of a socially just and inclusive energy transition, highlighted the barriers as well as provided recommendations to ensure a just transition, accelerating renewables deployment and developing strategic partnerships.

Widening Lens Beyond Net Zero to Enable Immediate Action.

Together with other leading climate and energy think-tanks in Southeast Asia, VIETSE has co-authored a report titled “Beyond Net Zero: Empowering Climate Mitigation by Linking to Development Goals” in collaboration with NewClimate Institute and Agora Energiewende. The report, released just before COP26 concluded as part of the Clean, Affordable and Secure Energy for Southeast Asia (CASE) project, provides a new perspective on the critical international climate discussions by arguing that countries’ climate plans can be implemented in a more effective, timely, and sustainable manner if integrated into their overall development planning to meet the needs of their populations.

Digital transformation together with new technical solutions in the power sector will enhance flexibility and support the power system’s operation in the transition process.

Looking at the challenges for Vietnam’s power system to accommodate a higher share of variable renewables, VIETSE has conducted two (02) studies on (i) Energy Storage System and (ii) Virtual Power Plants (VPP). The first study highlighted recommendations on developing a roadmap for an energy storage system in the short, medium, and long term. The function of the energy storage system should be linked to the pricing of ancillary services to encourage investment and assure economic efficiency. The second study introduced VPP as a solution to help small individual power generating sources participate in the power market by aggregating them via a digital platform.

Scale-up clean energy finance and investment will unlock the enormous potential for Vietnam to realize a clean energy transition.

VIETSE has collaborated with OECD under Clean Energy Finance and Investment Mobilisation (CEFIM) project to conduct a report “Clean Energy Finance and Investment Policy Review of Vietnam”. The report provides a comprehensive overview of the current policy framework, highlighting progress and identifying untapped opportunities for strengthening policy interventions to help scale up clean energy finance and investment. It also provides several tailored recommendations for the Government of Viet Nam and development partners.

3. Events

VIETSE organized and co-organized six events :

- Meteorology forecasting and nowcasting for power generation (28 jan 2021), over 50 researchers
- Harbour and infrastructure requirements for offshore wind energy development in Vietnam (10 jun 2021), over 200 participants, in collaboration with EREA and the Netherlands Embassy
- Prospects for a socially just energy transition in Vietnam : 2021 and beyond (27 jul 2021) over 200 participants, organized with FES and Climate Sense
- Offshore wind development in Vietnam : Environmental and social impact assessment regulations (18 aug 2021), over 300 participants, organized with VUSTA
- Virtual power plant and Energy storage – Digital transformation trends for Vietnam’s power system (17 sep 2021), over 250 participants
- Block seminar « Introduction to wind power technology, grid integration, forecasting and electrical engineering » (15-19 nov 2021), over 60 participants.

In addition, VIETSE representatives spoke at over 24 national and international events such as the COP26, Asia Clean Energy Forum, or the Singapore International Energy Week.

1. Technical reports

Offshore Wind - Best Practice on Grid Connection Policy and Grid Reinforcement.

The Power Development Plan 8 (period 2021-2030) needs to complete at the end of 2020, VIET identifies that the offshore wind development is very new but important in the Vietnam energy sector in next decades. This study will provide evidence and approach directly the leaders of the Electricity and Renewable Energy Authority (EREA/MOIT) since they are responsible to develop PDP8 in different perspectives, especially: (1) To understand of the current and future situation of power networks in the south of Vietnam, and (2) To provide analysis and recommendations of technical solutions suitable for offshore wind power integration in Vietnam

Offshore Wind - Best Practice on Site Identification and Leasing.

Review international lessons learned about zonation and leasing for offshore wind energy. Based on past similar projects, available information, data, and technical standards update, prepare, and propose suitable technical solutions, regarding zonation and leasing for offshore wind energy of Vietnam. Prepare the corresponding reports for communicating NA/MOIT.

Institutional innovation for development of ESCO in Vietnam.

To initiate and foster the Energy Services Companies (ESCO) market, it is recommended to supplement the legislation an accreditation system for ESCO company as well as the viral monitoring and-verification procedures for energy-saving projects. The subsidy on the electricity price for the industry also needs to consider to be revised as it will help to increase interest in ESCO projects. On the other hand, any financial incentives for the ESCO project also very inspired for enterprises to form and executed energy efficiency projects. As the ESCO market still at the initial stage, super ESCO may be a suitable answer to support and encourage the private ESCOS in terms of technical and financial.

Options for Solar and Wind (onshore/nearshore): The Ability of Grid up to 2022.

The study aims to answer several research questions includes: What is the current status of the power grid system of Vietnam ? Where is the grid could and could not absorb more power generation sources from renewable energies until 2022? In case of the saturation of the power grid up to 2022, what actions and recommendations should be taken?

2. Events

In spite of the COVID lockdowns, VIETSE organised three events:

- Supporting mechanism for Wind Power Development in Vietnam (18 apr 2019) 180 participants online
- Option to integration of Renewable Energy to Vietnam's power grid system (19 jun 2020) 132 participants online
- Field trip assessing the current development of RE in Vietnam (1-5 jul 2020) 11 participants

3. Other

VIETSE launched the Vietnam Power Transition Information System website. This tells the national power system history based on an interactive online map.

1. Academic achievements

- Truong, Patrizio, Leduc, Kraxner, and Ha-Duong (Apr. 1, 2019) Reducing emissions of the fast growing Vietnamese coal sector: the chances offered by biomass co-firing. *Journal of Cleaner Production* 215, pp. 1301–1311. (doi:10.1016/j.jclepro.2019.01.065)
- Hoai-Son Nguyen (2019) Exploring the determinants of household electricity demand in Vietnam in the period 2012 – 16. PhD thesis from Université de Paris-Saclay, defended on 2019-06-24. ⟨tel-02294630⟩
- An Ha Truong (2019) Sustainability indicators for biomass energy in Vietnam. PhD thesis from University of Science and Technology of Hanoi, defended on 2019-08-09.

2. Technical reports

Alternative power development plan modeling.

The study aims to provide a technical and economic analysis of long-term energy and power development plans (robust analysis of Vietnam's electricity supply and demand development,, the need for additional RES integration infrastructures: grid reinforcement, interconnection with neighboring countries, storage between 2020 and 2035) for Viet Nam, in the context that the government of Vietnam is preparing to develop the 8th Power Development Plan for the period 2020-2030 with a long-term vision for 2050. The power development plan is expected to include an ongoing expansion of coal power for Vietnam, some increase in renewables, and a large demand growth projection. The work was conducted by University of Technology Sydney (UTS), in collaboration with VIET and Agora.

Seven insights on Vietnam's energy transition.

This study is the first VIET's paper as a think tank on the energy transition in Vietnam, to respond to some research questions: - Why should Vietnam conduct energy transition? - Where is Vietnam's energy transition in the world? - What can be done to improve Vietnam's energy transition? The technical report was accompanied by a position paper: Ha-Duong, Truong (2019) Seven insights for Vietnam's power sector energy transition. Policy Brief.

Three scenarios for coal power in Vietnam.

Coal is still dominant in term of installed capacity in the previous PDP 7 (2011) and current planning PDP 7R (2016). This study aims to provide three narratives about the future of coal-based electricity generation in Vietnam.

Options for wind power in Vietnam in 2030.

Vietnam has an excellent wind resource, and the cost of producing electricity from wind has decreased continuously over the last decade. After the feed in tariff for onshore wind power was raised to 8.5 UScents / kWh in 2018, the sector is finally taking off. The inventory of existing onshore wind power projects in Vietnam shows that the sector is on track to meet the government targets for 2020 and 2025. The research question is the role of wind in meeting the growing Vietnam electricity demand? What are the policy implications? How to realize the large potential of offshore wind power?

3. Events

VIETSE organized seven events from October 2018 to October 2019:

- Training Seminar on Energy planning and sustainable development (18-19 oct 2018) at and with the University of Science and Technology of Hanoi, 45 participants
- Round table, discussion on COP24 and NDC media talk (28 nov 2018) at and with University of Science and Technology of Hanoi, 16 journalists.
- Capacity building on energy, environment and climate (oct-dec 2018) at and with University of Science and Technology of Hanoi. The project included a students competition on Environment, Energy and Climate Change on the topic “Solutions for Green Home”, a training course on “Project development & management in Environmental & Sustainable development sector” and a workshop on “Environment, Energy & Climate Change”. Over 50 students from various technical universities in Hanoi were reached.
- Alternative power development plan modelling workshop (11-12 dec 2018) Hanoi, 16 participants
- Special session on Energy Economics and Policy at the 11th Vietnam Economist Meeting (17-18 jun 2019), Da Lat University
- The story of energy (3 aug 2019) at L’Espace – Trang Tien – Hanoi, over 50 participants
- VIET Launching event (19 sep 2019) at Army Hotel – Nguyen Tri Phuong – Hanoi, 76 participants

4. **Communications**

- Ha-Duong and Ngô Tố Nhiên (June 4, 2019). Policy briefs on RE Law and Auctions in Vietnam. Tech. rep., p. 27. EN and VN versions confidential.
- Hoai Son Nguyen: Income and electricity poverty in Vietnam 2012-2016. Special session on Energy Economics and Policy at 11th Vietnam Economist Annual Meeting, Da Lat
- An Ha Truong: Costs and benefits of co-firing rice straw in two Vietnamese coal power plants. Special session on Energy Economics and Policy at 11th Vietnam Economist Annual Meeting, Da Lat
- Hoang Anh Nguyen Trinh: A critical review of energy scenarios in Vietnam: Low-carbon options and policy implications. Special session on Energy Economics and Policy at 11th Vietnam Economist Annual Meeting, Da Lat
- Hoang Anh Nguyen Trinh: Price elasticity of residential electricity demand in Vietnam 2012-2016, communication to the 7th International Symposium on Environment and EnergyFinance Issues (ISEFI-2019)
- An Ha Truong: Regional integration and insights for Vietnam’s energy transition in power sector, ASEAN - China Think tanks network (NACT) meeting contribution
- Vietnam Sustainability Forum (VSF) 2019 Invited keynote. Minh Ha-Duong
- Solar and Energy Storage World 2018 Keynote opening talk. Minh Ha-Duong