



Future of Electricity
Vietnam (FE-V)

POLICY DIALOGUE

SUMMARY REPORT

5 June 2023, Hanoi



Future of Electricity Vietnam (FE-V) is a science-to-policy initiative of the Australian Embassy in Hanoi, with the support from the Central Economic Committee of the Communist Party of Vietnam (CEC).



FE-V is made up of policy dialogues aimed at leveraging the Australian experience in energy transition to support Vietnam in exploring practical and feasible interventions for a decarbonised, reliable and affordable power system.



FE-V is delivered by the Australia - Mekong Partnership for Environmental Resources & Energy Systems (AMPERES) and Australia's Partnerships for Infrastructure (P4I), together with the Australian National University (ANU) and Commonwealth Scientific Industrial Research Organisation (CSIRO). Led by the Australian Department of Foreign Affairs and Trade, P4I is implemented by EY, Adam Smith International, The Asia Foundation and Ninti One.



Australian National University

Executive summary

CONTEXT

Under the FE-V program, a one-day Policy Dialogue was held on 5th June 2023 to share experience and learning from the Australian energy transition and to open opportunities for peer-to-peer exchange between Vietnamese and Australian Energy Stakeholders.

The dialogue was structured as three plenary sessions: managing power systems, managing markets and the role of the private sector and state-owned enterprises. Each session started with keynote presentations that presented evidence to the plenary. A panel of regional experts then responded to the presentations before opening for a facilitated plenary discussion.

One hundred and four (104) participants joined the dialogue from governments, academia, industry, and civil society. The event was co-chaired by the Australian Ambassador in Vietnam, Mr Andrew Goledzinowski and Mr Nguyen Duc Hien, Vice Chair of CEC and included keynote presentations and panel interventions from:

- **Vietnamese experts:** Dr Nguyen Manh Cuong, Director of the Power System Development Department, Institute of Energy (IE); Mr Pham Quang Huy, Deputy Director General of the Electricity Regulatory Authority of Vietnam (ERAV); Mr Hoang Tien Dung, Director-General of Electricity & Renewable Energy Authority (EREA); Mr Nguyen Xuan Quynh, Director Energy Board (PC1 Group), Mr Pham Tien Dung, Vice President of PetroVietnam (PVN).
- **Australian experts:** Professor Ken Baldwin, Emeritus Professor, Founding Director of Zero Carbon Energy for the Asia Pacific, the Australian National University (Generation); Dr Thomas Brinsmead, Power Systems Team Lead from Commonwealth Scientific & Industrial Research Organisation (CSIRO) (Grid); Ms Celine Luke, Partner, Ernst & Young Australia (Demand), Ms Katharine McKenzie, Director, Energy Transitions, Ernst & Young Australia (Market & Fuels); Dr Nikolai Kinaev, Leader, Hydrogen Energy Systems Future Science Platform (CSIRO) (Fuels); Mr Craig Mickle, Partner, Ernst & Young Australia (Market), Mr Yi-Hua Lu, Head of Origination Asia Pacific (Corio Generation), Ms Amanda Ashworth, Director of Sales, Strategy & Commercial (Entura).

KEY TAKEAWAY MESSAGES

On the value proposition for Australia – Vietnam energy cooperation

Australia and Vietnam's power systems are in the middle of major transformations with widespread implications for national economies.

- **There are many similarities and differences between the Australian and Vietnamese systems, meaning that sharing lessons advancing the energy transition is of significant, strategic, and mutual benefit.**
 - **Similarities:** Both Australia and Vietnam manage long interconnected grid transmission systems, with similar size installed generation capacity. Both manage wholesale electricity markets and involve governance arrangements with strong state-control and oversight of electricity markets, and both have experienced rapid, recent, deployment of renewable energy (RE), causing system infrastructure, governance, and market issues for the power systems.
 - **Differences:** On the other hand, there are other differences in retail tariff structure, and future electricity demand growth trajectories, with Vietnam's demand projected

to continue to grow significantly each year up until 2050, while Australia's demand is currently stagnant. Vietnam has introduced a wholesale electricity market; however, progress on instituting a competitive retail market has been slow; by contrast, Australia has a competitive retail energy market and almost a dozen other markets for demand services, Frequency Control and Ancillary Services (FCAS) amongst others.

- **Similarities and differences considered, today, there is also a strategic timing for Australia – Vietnam cooperation.** The Prime Ministers announcement of a net zero commitment at COP 26, and the recent approval of PDP8 place Vietnam on the cusp of a major energy transition for the power sector. At this crucial time, the Vietnamese power sector shares many similarities in size, structure and RE penetration to Australia's power system which faced the advent of the energy transition in the mid-2010s. There is a strategic window of opportunity for the two countries to share lessons and better prepare for Vietnam's energy transition. Consequently, and in commemoration of 50 years of diplomatic relations, Australia is committed to delivering a major new investment in energy cooperation in Vietnam, of which The Future of Electricity Vietnam (FE-V) is the flagship first project.
- **The recent approval of Vietnam's 8th National Power Development Plan (PDP8) consolidates earlier high-level commitments of the government to decarbonisation and sets specific targets for the power sector.** By 2050, Vietnam aims to have 75% of its energy come from renewable energy, and in the last few years, Vietnam's energy transition has made significant progress. For example, Vietnam was among the top 10 countries with the most solar capacity installed in the world just in four years (from 2016-2020).

On managing the Vietnamese power system under energy transition

The technological, economic and infrastructure landscape for power systems is changing. Discussions at the FE-V Policy Dialogue distilled five key take-away messages for the power system.

- **Energy security remains a central priority for the Vietnamese power system** as the deployment of new generation struggles to keep up with persistent growth in energy demand.
- **Decarbonisation has emerged as an essential part of energy security.** In Vietnam, domestic resources for traditional primary energy sources are declining, and geopolitical conflicts are impacting supply chains and fuel commodity prices, which means that fossil-fuel generation imbues significant vulnerability into the national energy system. Reducing Vietnam's reliance on fossil fuels through domestic RE generation is an important component of national energy security.
- **Resilience is also an essential ingredient for energy security.** Climate change impacts the hydrological cycle, and the increasing severity and frequency of drought significantly reduces the generation from Vietnam's fleet of hydropower, which also impacting energy security. The transition to renewables (solar, onshore wind, offshore wind), for which Vietnam has an immense domestic resource potential, is therefore a key ingredient in Vietnam's future energy security agenda.
- **Vietnam's roll-out of renewable energy needs to progress much faster and at a larger scale.** Vietnam's PDP8 confirms that there will be no new coal after 2030, and no new gas after 2035, yet total national demand will double over the next 7 years from current levels. Meeting this massive need for new capacity will need the deployment of renewables at an unprecedented scale, especially if capacity factors and variability inherent to wind and solar are taken into account.

- **Vietnam needs to plan today for dispatchable power.** The growth in variable renewable energy is and will continue to cause challenges for the Vietnamese grid. Issues like grid congestion, voltage, and frequency fluctuation, as well as a growing disparity between the timing of peak demand and peak generation. Managing these challenges will require significant deployment of dispatchable power that can be turned on and off to balance system needs. Pumped Storage Hydropower (PSH) and Battery Energy Storage Systems (BESS) offer efficient, decarbonised potential for dispatchable power suitable for timescales from milliseconds to hours. Vietnam's large, planned deployment of gas also has the potential to provide dispatchable reliability if the gas infrastructure and plant operations are focused on providing peaking capacity, not as a source of baseload generation. However, there remains a lack of legal framework and markets for dispatchable power. Addressing these gaps are essential for the success of Vietnam's decarbonisation agenda.

On managing the Vietnamese power market under energy transition

Vietnam's road map for market transformation was enshrined in the 2004 Electricity Law, but progress has been slower than planned. Discussions at the FE-V Policy Dialogue distilled five key take-away messages for Vietnam's power market.

- **Good progress has been made, but insufficient policy certainty and market forces are impeding the energy transition.** Policy certainty is extremely important to attract investment and reduce unnecessary costs for investors. To attract investment and to meet the rapid energy transition, it is necessary to simplify legal procedures and clear guidelines while promoting the Direct Power Purchase Agreement (DPPA) and develop markets for flexible and auxiliary power sources. In addition, one of the suggested solutions for Vietnam was to strengthen domestic capacity, localise electrical equipment, build & develop the electrical industry, and monitor the implementation of PDP8 to achieve the net zero target. To a significant extent, approval of PDP8 bolsters the policy commitment to the energy transition, but progress on market reforms in Vietnam remains slow. The Australian experience demonstrates that open and transparent markets are central to Australia's progress on energy transition, with the market pushing all new generations towards wind and solar – the cheapest generation technologies on earth. Vietnam needs to progress competition and transparency in the wholesale electricity market and accelerate reforms towards a competitive retail market.
- **Progress on market implementation is essential, but Vietnam also needs to diversify and expand the types of markets in the power system beyond energy-only markets.** Power systems are based on the generation, transmission, and consumption of electricity (kWh); however, under energy transition, power systems require other services beyond kWhs. Australia currently has approximately 10 markets in the National Electricity Market (NEM), with specific markets for Frequency Control and Ancillary Services (FCAS), and exploration of a capacity market. In Australia, this diversity in markets has been essential in bolstering the economic case for new types of technology required by the energy transition – for example, the FCAS market has made big batteries extremely profitable.
- **Advancing market reforms will require reform in information technology (IT) systems.** As markets become more sophisticated and clearance timeframe reduces, Vietnam's power system will require significant modernisation of the IT infrastructure used to operate the market.
- **Regulatory ease of participating in the Vietnamese power market needs to be improved.** Whether for Rooftop Solar (RTS) or utility-scale RE, the government needs to make it easier for actors to deploy RE and to propose policy incentives that encourage the appropriate RE deployment.

CONCLUDING REMARKS

The closing of the FE-V Policy Dialogue opened a new chapter of collaboration between Vietnam and Australia with the speech from Mr Mark Tattersall, Deputy Head of Mission, Australian Embassy in Vietnam. Mr Tattersall emphasised that energy and climate were the main concerns in discussions between the two governments during Prime Minister Anthony Albanese's recent visit to Vietnam. He shared about Prime Minister Anthony Albanese's announcement of a support of 105 million Australian dollars for Vietnam to cooperate on infrastructure, climate change response, and energy transition. Mr Nguyen Ngoc Trung, Director General of the Industry Department of the Communist Party of Vietnam (CEC), also delivered a comprehensive closing remark which appreciated the support of FE-V for CEC, MOIT and other ministries and complemented the content of the policy dialogue. This suggests that FE-V will need to adapt to a new context and support the Vietnam Power sector by working closely with relevant agencies of the Vietnam Power sector to update research themes and contribute to the successful implementation of PDP8.



Agenda of the Policy Dialogue

Opening Session	Welcome Remarks
Session 1 Managing the power system under energy transition	Keynote 1: Power Development Plan 8 (PDP8) and the Future orientation of the Vietnamese Energy transition Keynote 2: Australia's energy transition progress to date and challenges looking forward Australia – Vietnam cooperation in electricity sector: opportunities for collaboration on the road to decarbonisation Panel Discussion 1 Audience Q&A
Session 2 Managing markets under energy transition	Keynote 3: Structure, dynamics and challenges for the Vietnamese power market & trends in electricity demand Keynote 4: Australian electricity market reform and the energy transition Panel Discussion 2 Audience Q&A
Session 3 Vietnam and Australia Private Sector Panel Discussion	Panel Discussion 3 Audience Q&A
Closing Session	Overview Summary Closing Remarks



Opening plenary

The opening plenary includes two welcome remarks by **Mr Andrew Goledzinowski**, Australian Ambassador in Vietnam and **Mr Nguyen Duc Hien**, Vice Chair of the Central Economic Commission of the Communist Party of Vietnam (CEC).

Mr Andrew Goledzinowski showed his pleasure in delivering the dialogue with the support of the CEC. In terms of how to deal with the challenges of the energy transition, Australia and Vietnam share a lot of similarities. The two countries have made a commitment to achieving net zero by 2050 and are working hard on the transition to renewables but they have a great deal further to go. Recently, Vietnam has released the Power Development Plan (PDP8), a much greener plan than any that had come before in the country. Vietnam is also working strongly with the international community and private sector. However, it is worth noting that whatever the government does will not be enough if the private sector does not do the heavy lifting. As the pattern of development assistance is changing in Asia because of a variety of critical economic shifts, countries in the region, including Vietnam will be looking to achieve this complex and challenging energy transition and will be depending on mobilising from private finance and drawing on the multilateral and regional banking systems. Ambassador Goledzinowski reiterated that Australia has identified Vietnam as one of its critical partners and will continue to work with Vietnam, making sure the two countries move forward together in the journey of the energy transition.



Mr Andrew Goledzinowski, Australian Ambassador in Vietnam

From Vietnam's side, **Mr Nguyen Duc Hien** expressed that the dialogue is very valuable for CEC, Ministry of Industry and Trade (MoIT) and other agencies operating in the energy sector in Vietnam as a forum for exchanging views on energy policy with Australia. Mr Hien also shared a summary of key difficulties for Vietnam's energy sector, which included implementing Resolution 55 on the development of the electricity industry, attracting international investors to Vietnam's energy sector, as well as developing and now implementing PDP8. He reiterated the objectives of the PDP8 as the basis for Vietnam's energy transition, such as ensuring energy security, providing enough electricity to meet the needs of socio-economic development, and reducing emissions. He emphasised that the renewable energy (RE) industry is one of the six fundamental industries that need to be prioritised for national development. Besides, the power industry also aims to diversify its investment and capital sources by attracting domestic and foreign capital.



Mr Nguyen Duc Hien, Vice Chair of the Central Economic Commission of the Communist Party of Vietnam

The CEC's representative also hoped that the discussion would focus on issues and solutions for the energy transition in Vietnam through five major topics of generation, fuels, grids, electricity, demand, and market. He also looked forward to exchanging experiences among the experts and clarifying the actors participating in the electricity sector from the state, private and foreign investment. Regarding power generation for the future, Vice Chairman Hien suggested that there should be solutions on pricing, together with RE as well as energy storage so that RE can become a main source of electricity generation. In terms of future fuels, Mr Hien looked forward to the experience of Australia in limiting dependence on imported fuel sources, technologies, and policies to develop green hydrogen associated with wind power projects, and solutions for stranded assets at LNG-fired power plant projects. In addition, building inter-regional power networks for RE zones, upgrading, modernising the power system, dispatching in real time, accessing electricity for remote areas, and attracting private investment need to be further discussed in the framework of the dialogue as well as the documents on the power grid.

Session 1

Managing the power systems under energy transition

Session 1 includes three presentations and one panel discussion on the topic of "**Managing power systems under energy transition**".

Technical keynote 1 by **Dr Nguyen Manh Cuong**, Director of the Power System Development Department, Institute of Energy (IE), provided an overview of PDP8 and the future orientation of the Vietnamese energy transition. Dr Cuong presented five perspectives of PDP8, including:

- Build in surplus generation capacity.
- Reduce import dependence on fuel, and energy security at the lowest cost.
- Scientific foundation for adopting renewables.
- Cross sector development with electrification
- Circular economy ensuring the role of power sector; energy security according to the principle of overall optimisation; scientific, inheritance, and open aspects; the role of economic sectors; and energy transition orientation.



Dr Nguyen Manh Cuong, Director of the Power System Development Department, Institute of Energy (IE)

Dr Cuong also pointed out three overall objectives: national energy security, just energy transition, and industrial ecosystem & renewable services. The power demand forecast in 2030 and 2050, as well as the power generation development by 2030 and by 2050, were presented by the IE's representative. He then outlined the plans for power transmission development and the power system interconnection, followed by an estimated investment capital for the development of power source and transmission grid, and the five environmental aspects. Apart from requirements on firmly ensuring national energy security, several technical, financial, and policy challenges were mentioned during the presentation, such as the rapid decline in traditional primary energy resources, geopolitical conflicts, the large capital demand for electricity development, or the issue of social security for workers in the fossil fuel production field.

Finally, Dr Cuong summarised several solutions and resources to tackle the above problems, including strengthening domestic capacity, localising electrical equipment, building & developing the electrical industry and monitoring the implementation of PDP8.

Technical keynote 2 featured the topic "*Australia's energy transition progress to date and challenges looking forward*" by **Dr Thomas Brinsmead**, Power Systems Team Lead from the Commonwealth Scientific & Industrial Research Organisation (CSIRO).

Dr Brinsmead introduced the power grids in Australia as well as the players in the Australian power market, and compared the two main Australian electricity markets, which include National Electricity Market (NEM) and Western Australia's Wholesale Electricity Market (WEM), with the Vietnamese wholesale (VWEM).

The presentation outlined changes in the energy mix framed by the two key challenges of energy reliability and grid security. Lastly, Dr Brinsmead pointed out several solutions to these challenges focusing on the four key aspects:

- Power Technology Devices, such as: Accelerating large-scale energy storage (battery and pumped hydro), synchronous condensers, and updating technical standards for inverter-based resources (for example, fault ride-through capability, current fault provision, frequency control capability).
- Power System Operator Capability, such as: Developing tools and methods to aid real-time decision-making and management of power system security.
- Network Capacity, such as Grid strengthening, Connecting to new RE zones.
- Distributed Energy Resources, such as: Understanding inverter characterisation and coordinating distribution scale power technology devices.



Dr Thomas Brinsmead, Power Systems Team Lead from Commonwealth Scientific & Industrial Research Organisation (CSIRO)

Moving to the third presentation on the topic "*Australia – Vietnam cooperation in the electricity sector: opportunities for collaboration on the road to decarbonisation*", **Mr Tarek Ketelsen**, Director-General of AMPERES, compared the three-electricity market (WEM, NEM and VEM) in terms of the power network, market structure, market government structure, and installed capacity.

By comparing the similarities and differences between the Australian and Vietnamese power systems, Mr Ketelsen was able to chart a value proposition and pathway for cooperation between Australia and Vietnam based on peer-to-peer sharing between governments, industry, and academia of the two countries.

Finally, and as a first flagship step in Australia-Vietnam cooperation, he introduced the Future of Electricity Vietnam (FE-V) program, which aims to leverage the Australian experience in the energy transition to support Vietnam in exploring practical, feasible interventions for a decarbonised, reliable, and affordable power system.



Mr Tarek Ketelsen, Director-General, AMPERES

Panel discussion 1

Facilitator: **Tarek Ketelsen**, Director-General, AMPERES

Panellists:

- **Dr Nguyen Manh Cuong**, Director, Power System Development Department, Institute of Energy (IE);
- **Dr Thomas Brinsmead**, Grids Lead, Commonwealth Scientific & Industrial Research Organisation (CSIRO);
- **Mr Hoang Tien Dung**, Director-General, Electricity & Renewable Energy Authority (EREA);
- **Dr Nikolai Kinaev**, Leader, Hydrogen Energy Systems Future Science Platform (CSIRO).

To begin with, **Mr Hoang Tien Dung** shared his thoughts about the presentations on Session 1 and the energy transition. He saw similarities between the Australian and Vietnamese power systems, which, in the past, depended on fossil fuels but are now strongly shifting to RE. Despite many differences, he believed there were many opportunities for cooperation between the two countries' governments and businesses. **Dr Nikolai Kinaev** then added the difference in role and reliance on natural gas: in Australia, around a third of electricity generation is from natural gas, mainly for manufacturing and heating. Also, Australia is a net exporter of energy, while Vietnam is a net importer of energy.

Regarding PDP 8, Mr Dung mentioned that this plan relied heavily on RE despite many early-stage technologies in Vietnam, such as storage batteries, green hydrogen, or green ammonia. RE development must also go along with the expansion of the power grid. In the future, the higher the proportion of RE in the generation mix, the greater the challenge, especially the challenge of raising capital, while the current policy mechanism is not so attractive to investors. He considered the most important point is how to successfully implement PDP8 so that an implementation plan must be developed in the next few months. Additionally, several policies need to be updated, such as Renewable Energy Law, the revised Electricity Law, Direct Power Purchase Agreement (DPPA) mechanism, and the investment mechanism. He mentioned that the role of EREA and MOIT is to check and monitor large power sources to detect and solve difficulties and problems in case it is necessary to replace them with another power source.

Comparing with Australia's power planning process – the Integrated Systems Plan (ISP), Dr Thomas Brinsmead shared that the ISP was initiated in 2018 and updated every two years to integrate generation and grid infrastructure planning better. The ISP is an integrated spatial planning process that includes demand forecasting, and the use of scenario simulations to ensure flexibility and resilience of the power system. He stated that the advantage is having a common optimisation framework, from which Australia can determine the optimal cost, ensuring greater consistency than doing separate plans. This results in significant cost savings.



Panel discussion session 1

Sharing about PDP 8, Dr **Cuong** said that the PDP8 had been developed since 2019 based on gas and coal, but it went through a number of recalculations to reach the Prime Minister's Net zero commitment. PDP 8 stated that there will be no developed coal power plants after 2030, except for projects under construction, and no gas development after 2035. In addition, there are four coal-fired power projects included within the plan, which will be replaced with RE if they cannot raise capital within 2 years. He also mentioned a large, required investment to replace coal power because the operating hours of wind or solar are much lower than coal power. In addition, the IE's representative also mentioned how PDP 8 addresses grid-related challenges to integrating more RE into the system, such as establishing RE zones to connect to the power grid with large load centres being invested by the state while encouraging private investment in the power grid. Also, it is necessary to focus on investment in hydroelectricity and prevent power systems' frequency control from rapidly declining.

About the trade-off between energy security and a decarbonisation agenda, Mr **Dung** said that as a net importer of energy, Vietnam must diversify energy sources, especially RE sources. Therefore, in PDP 8, coal and gas imports have been reduced compared to the previous draft, with many LNG and coal-fired plants still being developed.

Regarding the role of hydrogen, Dr **Nikolai Kinaev** talked about the role of hydrogen in energy transition. He mentioned that hydrogen use must be targeted to niche areas where the fuel technology has an advantage, such as long-term energy storage and industrial feedstocks. With the technology for larger transport capacity being developed, hydrogen can also support industrial processes. However, he emphasised that hydrogen should not be considered as a transitional fuel to achieving net zero, a lot of progress is needed to make hydrogen commercially viable, and this will take time, while progress on net zero needs urgent, short-term solutions that are already viable like RE, pumped storage hydro and batteries. Australia developed the national hydrogen strategy which is based on the planning and delivery of hydrogen hubs to solve the problems of each industry: producing, storing, and transporting hydrogen. These hubs will receive support from federal, state, and inter-regional regulatory agencies. However, the Australian national hydrogen strategy is currently being revised.

Regarding the role of natural gas, the CSIRO's expert also talked about how gas is used in the Australia energy mix under transition, and how to make LNG infrastructure H2 ready. He stated that due to environmental problems, costs and drastic changes in gas prices, gas is never used in Australia as a baseload power source. He recommended that for similar economic and environmental reasons, Vietnam should not use gas as a baseload replacement but only use gas as a dispatchable

power source to balance the variability of RE generation. On the other hand, switching existing coal power plants to biomass and waste for power generation strongly depends on the availability & suitability of feedstock. From this point of view, Vietnam may be in a better position compared to Australia.

When it comes to Australian experience in energy storage, Dr Thomas Brinsmead shared that pumped storage hydro (for long-time usage) and large-scale batteries (for short-time usage) are the two main options to choose from the market. Both these technologies are regularly used in the Australian power system providing flexible, dispatchable electricity into the system. For shorter-duration storage, the presence of a market for Frequency Control and Ancillary Services (FCAS) offers additional market benefits for large-scale batteries, and this has provided more revenue for private developers than using them for arbitraging across differences in wholesale energy prices over time. As the penetration of RE increases in the Vietnamese grid, there will be a growing need for similar FCAS services; establishing a financial incentive for these ancillary services may greatly improve both the economics and pace of deployment for energy storage in Vietnam.

Mr Nguyen Ngoc Trung, Director-General of the Industry Department, the Central Economic Commission of the Communist Party of Vietnam (CEC), raised a question on Australia's experience in infrastructure in developing renewable energy projects. **Dr Brinsmead** answered that transmission and distribution infrastructure is subject to strict regulation of costs and revenues, preventing manipulation. At the same time, legal contracts help to ensure the sharing of risks and benefits between the parties.

Professor Ken Baldwin from the Australian National University questioned the impact of climate change on hydropower development plans in Vietnam as the reliance on hydropower coupled with the increasing variability of water due to climate change introduces further risk in generation planning. **Mr Cuong (IE)** stated that modelling was undertaken based on the principle of cost minimisation. In the power source expansion model, the combination of sources was considered to achieve the minimum cost, with Loss of Energy (LoE) being constrained to under 12 hours a year (similar to Japan). Considering the case of the El Nino years, the model mobilised energy storage (pumped hydro, batteries) along with solar and wind to make up the hydro generation shortfall.

Mr Truong Van Thien from Power Engineering Consulting Joint Stock Company 2 (PECC2) asked about the timing of peak emissions as Vietnam has less than 20 years to reduce emissions to Net Zero from the emission peak (much less than Australia) and Australia's plan to export surplus RE in the future. **Dr Kinaev** shared that Australia is taking advantage of available RE to accelerate the process of reaching Net zero. On the other hand, he said that Vietnam also has advantages in RE sources, in which biomass in Vietnam has many advantages compared to Australia. To some extent, Vietnam can also take advantage of this source to accelerate the energy transition. Finally, he mentioned that Australia would aim to connect to Asian countries' power grids, especially the ASEAN region, to export excess electricity in the future.

Session 2

Managing markets under energy transition

Session 2 includes two keynote presentations and one panel discussion on the topic of "**Managing markets under energy transition**".

Technical keynote 3 by Mr Pham Quang Huy, Deputy Director-General of the Electricity Regulatory Authority of Vietnam (ERAV), provided an overview of the legal framework for the Vietnam electricity market based on the Electricity Law (2004), revised in 2014. The roadmap to transform the electricity

market into the wholesale market (VWEM) from 2012 to 2019, and from 2020, the retail market has been designed and aligned with Resolution No. 55, which emphasises reforming the electricity market. ERAV has achieved impressive progress while operating its market, such as improving the reliability, availability, and efficiency of the power system; transparency in the schedule for mobilising power plants in the market; gradual removal of EVNs monopoly in the wholesale generation market.

However, there are still several challenges in operating the Vietnam electricity market, such as:

- The retail price of electricity does not accurately and fully reflect the costs of all stages of the electricity.
- Information technology (IT) infrastructure serving VWEM is still weak and needs to be developed to decrease the wholesale market trading interval to 5 minutes.
- Installed capacity of power plants directly participating in the market is low (currently around 39%)



Mr Pham Quang Huy, Deputy Director General of the Electricity Regulatory Authority of Vietnam (ERAV)

Mr Huy also proposed the development orientations in the coming period of the electricity market, including:

- Amend the Electricity Law and related regulatory provisions.
- Restructure for each stage of the electricity sector.
- Improve the Information Technology Infrastructure system for VWEM operation.
- Propose a mechanism to encourage participation in the electricity market for specific types of power sources, such as BOT power plants, and strategic multi-purpose hydropower plants (SMHP).
- Implement solutions in Decision No. 500/QĐ-TTg dated 15th May, 2023, of the Prime Minister to put the master plan into action.

Technical keynote 4 on the topic of the Australian Electricity market and Energy Transition was presented by **Professor Ken Baldwin**, Emeritus Professor, Founding Director of Zero Carbon Energy for the Asia Pacific, the Australian National University.

The presentation provided an overview of the Australian Electricity market and the role of the market in galvanising the world's fastest renewable energy transition. It is a fact that in Australia, like most countries around the world, RE's price (solar and wind) has become much cheaper than electricity generated from coal, which accelerates the adoption of RE generation and penetration in the energy mix. Australia has applied several price discovery methods, including FIT, reverse auction with

contracts-for-difference, the Renewable Energy Target and widespread generator participation in wholesale energy markets to help the electricity system take advantage of the low technology costs of solar and wind.

In Australia, the Australian Energy Market Operator (AEMO) Integrated Systems Plan (ISP) coordinates RE deployment for the NEM in Renewable Energy Zones (REZs) linked by high-voltage DC interconnectors to support the transmission of electricity from generation sites to customer loads and a large number of ancillary markets that ensure reliability and frequency/voltage stability.

Australia's National Electricity Market (NEM) includes eight Frequency Control and Ancillary Services (FCAS) markets over a range of timescales, as well as network control services, a system restart service, and Regulatory Investment Test for Transmission (RIT-T). The Australian government is also in the process of designing and piloting a firming renewable energy capacity market (the Capacity Investment Scheme) to encourage RE developers to integrate battery and pumped hydro storage into their projects to balance variability in RE generation and guarantee supply at periods of high demand, while also reducing the exposure of the NEM to geopolitical shocks from fossil fuel prices.



Professor Ken Baldwin, Emeritus Professor, Founding Director of Zero Carbon Energy for the Asia Pacific, the Australian National University

Lastly, Prof. Baldwin noted that the Australian experience of managing the trilemma of the energy transition – sustainability, affordability and security – has some important lessons for Vietnam.

1. First and foremost, Vietnam should allow different forms of price discovery on the path to a widespread wholesale electricity market while ensuring a level-playing field between RE and fossil fuel generation. The use of a range of price discovery mechanisms will unlock rapid RE deployment and lower the cost of generating electricity.
2. Consider carbon prices. Already, RE is, for most countries in the world, the cheapest form of generation, and it becomes even cheaper when the environmental costs of fossil fuel generation (like CO₂ emissions and other air pollution) are factored in. Without a carbon price, the electricity market is skewed towards fossil fuel generation, and economists worldwide believe that carbon pricing is the most effective mechanism to support the energy transition. The Australian experience clearly shows that adding a price for carbon emissions is an effective economic tool to unlock a switch to Renewables; however, carbon prices can be politically challenging to implement.
3. Focus on overlaying the new generation on top of the existing generation and allow the energy transition to play out by expanding competition in the wholesale market. There is a lot of interest in the early closure of existing power plants, but this is more complicated and challenging than simply switching all new generation deployments to renewables. Vietnam

should focus on the future generation pipeline and avoid new fossil fuel deployment to reduce electricity prices and minimise the risk of future stranded assets.

Panel discussion 2

Facilitator: **Mr Giles Cooper**, Partner, Allens Linklater

Panellists:

- **Mr Pham Quang Huy**, Deputy Director-General (ERAV);
- **Prof. Ken Baldwin**, Emeritus Professor and Founding Director of Zero Carbon Energy for the Asia Pacific, Australia National University;
- **Dr Celine Luke**, Partner, Ernst & Young Australia,
- **Ms Katharine McKenzie**, Director, Energy Transitions, Ernst & Young Australia

To begin the session, **Mr Giles Cooper** agreed that Australia and Vietnam's electricity markets have both similarities and differences. Australia has a market that allows private investment but has lacked consistent policies at the central level. In the past few years, Vietnam used some policy incentives to attract investors, while the lack of adequate market limits the ability to commercialise RE projects and hinders the rapid transition. In fact, both the central-level policy and an adequate market are equally important. Australia and Vietnam share the same goal of ensuring an energy transition that creates fair opportunity and competition for participants and shared economic performance.

Mr Giles had a question on Australia's experience in attracting investment in RE in the context that FIT price is no longer available. According to **Prof. Baldwin**, we must solve the climate problem with strong and consistent political will. It is critical to harmonise the approach, and Australia is fortunate to have a favourable system: now that there is a federal policy goal and good interstate cooperation, which is a prerequisite to support the federal government. The federal government, given that energy is a state responsibility, also has policies to attract the private sector to participate through the Renewable Energy Target, which helps and supports state governments on RE policies. As such, the role of government is crucial.



Panel discussion session 2

Regarding PDP 8, **Mr Huy** shared that the challenge is how to implement it. Recently, ERAV has been researching the DPPA with support from USAID. ERAV reported to the government in consultation and has posted a website consultation. Currently, there are also some problems: the model must properly calculate all the costs (transmission, distribution, unseen services) for buyers and sellers to trade on the spot market. In 2024, the Electricity Law will be revised and will create fundamental

calculations for the model. To ensure large clients have a clean energy commitment, Contracts for Differences (CFDs) can be signed to back up financial risk. Some argue that DPPA should be implemented immediately because of the great need; however, some parties believe that a complete model is needed. Therefore, DPPA is still under review for approval by the Deputy Prime Minister.

In terms of managing distributed energy resources (DER) in Australia, such as rooftop solar, batteries, electric vehicles and flexible sources, **Dr Luke** shared that the need to address "minimum load" is a problem, especially in the middle of the day when solar power is abundant, some households need to use electricity from their home systems, but there are also many households that want to export more to the grid to enjoy FIT which poses difficulties for distributors. In addition, there is a need to manage the increase in demand for electric vehicles. Australian experience demonstrates that there is a need for incentive mechanisms and for such two-way load management. It is essential to give price signals to consumers using electricity from their rooftop solar power or the grid. **Ms McKenzie** said that the timing of incentive mechanisms is a big lesson for Western Australia when buying electricity from the storage system. There should be a mechanism to pay for spare capacity, and the government must reduce the price curve. The benefit is increased supply flexibility. Currently, the supplementary capacity program is being implemented to prevent power outages and during increased demand. The government also introduced a medium-term electricity and gas exemption mechanism to supplement RE.

Mr Huy shared that in the last three years, RE flourished, with 21GW, accounting for a quarter of the installed capacity due to the FIT encouragement. But now Vietnam must reconsider both legal and technical mechanisms to develop RE steadily. During the holidays and festivals in Vietnam, the generating capacity of RE exceeds the load, which is difficult for operation, and results in forced curtailment. RE development must align with the development of the grid, which often takes a long time to develop.

Regarding Electric Vehicles (EVs) in Vietnam, **Mr Huy** foresees significant future potential in Vietnam. This is both a challenge and an opportunity. EV deployment has the potential to increase further the demand for electricity, which is already high and growing in Vietnam. Keeping up with this generation growth will increase the energy security challenge for Vietnam. At the same time, EVs could constitute a major DER source of flexible capacity in the Vietnamese system if properly managed and incentivised to provide grid-scale services.

Regarding electricity prices and attracting market investment, Vietnam's demand for electricity will double by 2030 from present-day levels and will continue to grow in the long term. Meeting this demand requires substantial investment in the energy sector, in the order of USD 13 billion per year. The low cost of electricity retail tariffs is a major impediment to further investment in the energy sector, especially for Foreign Direct Investment. If the market is not attractive, there is no one to participate in it.

Ms Le Thanh Ha from the Vietnam Chamber of Commerce and Industry (VCCI) raised a question regarding Rooftop Solar (RTS) for commercial and industrial use. It is not clear if businesses need permission from the Department of Construction and Firefighting & fire protection department when installing RTS since there are no guidelines on rooftop fire protection. Even though businesses have financial resources, unclear guidelines are the main hindrance to the further deployment of RTS.

Prof. Baldwin and **Dr McKenzie** shared that there are clear standards for RTS power connections in Australia, so that certifications are given to private companies that meet standards to participate in RTS installations and meet demand. Instead of focusing on the government, RTS in Australia follows a different model by reducing the transaction costs of approvals and procedures. The transition process needs to happen quickly, so the procedures need to be harmonised and provide a low regulatory burden.

Session 3

Role of private sector and SOEs in energy transition

Facilitator: **Mr Michael DiGregorio**, Country Representative, The Asia Foundation in Vietnam

Panellists:

- **Mr Yi-Hua Lu**, Head of Origination APAC of Corio Generation.
- **Ms Amanda Ashworth**, Director of Sales, Strategy & Commercial of Entura;
- **Mr Nguyen Xuan Quynh**, Director Energy Board of PC1.
- **Mr Pham Tien Dung**, Vice President PetroVietnam (PVN).

This panel discussion started with a question for **Mr Yi-Hua**, when developing a country risk profile, what are the key factors that Corio Generation would consider.

Mr Yi-Hua indicated three key factors. The first one includes the ability of legal systems, particularly the recognition of private property and the openness of private sector investment in the key sectors. Secondly, the company also looks at the market fundamentals, for example, whether there is an abundance of offshore wind potential that is suitable to be developed. And the last factor to consider is the supportiveness of the RE, particularly an attractive market is where there is either a national-level, a state or provincial-level support. In addition, there should be a clear incentive framework that allows the private sector to develop and commit to a risky early development. Then the level of regulatory support is also considered, such as the availability of FIT or an ocean framework.

Following the discussion, **Mr Nguyen Xuan Quynh** added his view on the three main concerns over a decision to invest in a power project. The first concern is the benefit that investors can obtain. If a policy is attractive enough, there will be many investors to participate in. However, it is important that the benefits are shared among different stakeholders, such as investors, suppliers, power grid operators and users. Second, policy certainty over the long term is required so that the investors, as well as financial organisations, can guarantee the project's profitability. It is hoped that the policy is stable to help de-risk investment so that the investors can access a good loan. Lastly, the policy must be easy to comply, for example, with regards to allowing the private sector to participate in grid development, it is expected that the legal system will be clearer and simpler to reduce the procedure time and cost.

According to **Ms Amanda Ashworth**, Entura collaborates with state-owned enterprises, private enterprises, banks, and donors. All stakeholders participate in the market and contribute to the success of many projects. She mentioned the concept of "Time to market", it is necessary to have a risk management mechanism for the project in a timely manner, and a suitable governance mechanism to ensure the effectiveness of the projects. In fact, the typical challenge is that it can be difficult to forecast market returns for investors. That is why the government plays a role in ensuring limited risks and avoiding market distortions. Developers will accept a certain risk level. Therefore, policies that support investment are essential. RE and battery storage have a lot of potentials, but centralised mechanisms from the government are needed to unlock these potentials.



Session 3 consisted of a sharing discussion

Mr Pham Tien Dung then also shared the view of a state-owned enterprise that is looking into investing in offshore wind projects. As he noted, compared to the private sector, a state-owned enterprise is often less active in the market as it has its own regulatory constraints, despite its resources and professional capabilities. According to Resolution 41, PVN cannot include offshore wind projects (or any other power projects in general) in its investment portfolio. Meanwhile, as a major state-owned enterprise, PVN has strong human and financial resources, and infrastructure near the coast. It can be seen around the world that most offshore wind developers are former petrol corporations. This is a common trend that PVN will also follow.

Based on PVN's estimation, its existing resource could cover about 45% of the lifespan cost of an offshore wind project; therefore, its potential to contribute to the off-wind industry is enormous. PVN considers the cooperation of international developers to be key and would generate a sustainable consortium that is firm and flexible at a time. What is urgently needed now are clear policy and legal framework so Vietnam can start the work. This point was then elaborated during the discussion with the audience. As Mr Dung highlighted, the approval of PDP is just the very first step; the investors still need to wait for the legal instruments such as ones that regulate investor selection mechanisms, ocean surveys, offshore-wind protocols, pricing, and transmissions development for offshore wind projects. To support the development of these regulations, the private sector can continue to raise its voice and exchange ideas with key governmental agencies such as CEA, MOIT or MONRE.

Closing plenary

Overview Summary by **Mr Tarek Tekelsen**

Vietnam's electricity sector has made progress in energy transition, and the approval of PDP 8 in May 2023 has set the target for the power sector to move forward to achieve decarbonisation goals. However, Vietnam's electricity market is facing many challenges, such as retail electricity prices not reflecting properly and sufficient costs, the restructuring of the electricity industry is slow, IT infrastructure has not met the requirements, the capacity rate participating in the electricity market is still low, high load growth rate, fast-growing renewable energy sources with many uncertain factors, lack of legal corridor for flexible sources.

Therefore, there are several experiences and lessons learnt that have implications for Vietnam's recent RE development to effectively manage its power sector. The transition will require Vietnam to update policies and regulations; for example, Vietnam has plans to amend the Electricity Law, or promulgate the RE law in the near future, along with a series of projects of MOIT and EVN to address the above challenges. In addition, incentive mechanisms in the appropriate timeline are necessary to create an initial push and prevent adverse impacts on society and distortion of the market. Policy certainty is extremely important to attract investment and reduce unnecessary costs for investors. To attract investment and to meet the rapid energy transition, it is necessary to simplify legal procedures and clear guidelines while promoting the DPPA and developing markets for flexible and auxiliary power sources.

Closing remarks

The closing remarks were presented by **Mr Mark Tattersall**, Deputy Head of Mission, Australian Embassy in Vietnam and **Mr Nguyen Ngoc Trung**, Director General of the Industry Department of the Communist Party of Vietnam (CEC).

Mr Mark Tattersall emphasised the deep partnership between the Australian and Vietnamese governments in many areas, such as education, infrastructure, the economy, and diplomacy over the past 50 years. He also emphasised that energy and climate were the main concerns in discussions between the two governments during Prime Minister Anthony Albanese's recent visit to Vietnam. He shared about Prime Minister Anthony Albanese's announcement of a support of 105 million Australian dollars for Vietnam to cooperate on infrastructure, climate change response, and energy transition.

Regarding the dialogue "Future of Electricity Vietnam", the representative of the Australian Embassy to Viet Nam said that this is a critical event in the context that both countries have commitments to Net Zero by 2050 and have similar difficulties and challenges related to market reform, electricity networks, and policies to attract investments. He added that Australia faced difficulties in policy when starting the energy transition but is becoming one of the major powers in renewable energy. Australia aims to promote the energy transition and build international cooperation with strategic partners, including Vietnam. He also thanked the participation of the delegates and the coordinating units for organising this meaningful event, such as CEC, P4I, AMPERES, TAF, EY, ANU, and VAC.



Mr Mark Tattersall, Deputy Head of Mission, Australian Embassy in Vietnam

Mr Nguyen Ngoc Trung – Director-General of the Industry Department (CEC), said that the speech of the Ambassador and Mr Hien emphasised the importance of Australia – Vietnam cooperation and the orientation on the development of the electricity sector of Vietnam.

The policy dialogue provided critical content for CEC, MOIT and other ministries. The approval of PDP 8 is just the beginning; more challenges are lying in the implementation of PDP 8. First, the implementation will require enormous resources and active support and participation from stakeholders. The FE-V project was implemented before the approval of PDP 8; therefore, in phase 2 of the project, there is a need to update the current context of Vietnam's power sector and revise the discussion papers and work closely with relevant agencies to update research themes. This policy dialogue also plays an important role and contributes to the evaluation process of the 3-year implementation of Resolution 55 of CEC.



Mr Nguyen Ngoc Trung gave his closing remark

FE-V

Future of Electricity
Viet Nam

A science - to - policy initiative
of the Australian Embassy in Hanoi, with the
support from the Central Economic Committee of
the Communist Party of Vietnam (CEC)

Australian Embassy
in Hanoi

8 Dao Tan Street
Ba Dinh District
Hanoi, Vietnam