

**Vietnam Energy Partnership Group**  
**TECHNICAL WORKING GROUP 3:**  
**GRID INTEGRATION AND GRID INFRASTRUCTURE**  
**FIRST MEETING 2022**

**Date:** 27 June 2022  
**Venue:** Saigon Morin Hotel, Thừa Thiên Huế  
**Time:** 13:30 – 17:30

**Main content:**

1. Discussing the operation of the power system when the power grid has a high share of renewable energy, international development trends and suggestions for Vietnam
2. Sharing experiences in smart grid development in Vietnam and the UK
3. Agreeing on the focused topic, the 2022 operational plan for the TWG on Grid integration and grid infrastructure

**Chair and co-chair:**

- **Mr. Trần Tuệ Quang**, Deputy General Director, ERAV, MOIT
- **Mr. Gareth Ward**, British Ambassador in Viet Nam

**Participants: more than 60 in-person participants including:**

- Representatives from MOIT: ERAV, EREA, Department of Oil, Gas and Coal, DEESD.
- Representatives from DOIT of Hue Province, EVN and Power Corporations, NLDC
- Representatives from Embassies, Development partners and international organizations: UK, Australia, Denmark, GIZ.
- Representatives from the private sector.

**Conclusion:** (see next page)

**Agenda:** see Annex 1

**Brief report:** see Annex 2

**References:** see Annex 3

## CONCLUSION AND ACTION:

Conclusion	Responsible party
<p>Operations of the Viet Nam power system and the challenges:</p> <ul style="list-style-type: none"> <li>• In order to achieve the goal of reducing carbon emissions and neutralizing carbon as stated by Viet Nam at COP26, Viet Nam needs to continue to develop renewable energy sources. However, at the same time, there should be solutions for the power grid system to ensure the stable operation of the power system and national energy security.</li> <li>• ERAV continues to research solutions to ensure flexibility for the power systems with high share of renewable energy, strengthen the forecasting work and development of auxiliary services.</li> </ul>	ERAV
<p>World trends and potential solutions for Vietnam in the future:</p> <ul style="list-style-type: none"> <li>• Smart Grid</li> <li>• Battery storage</li> <li>• Interconnection</li> </ul>	ERAV The British Embassy Development partners
<p>Proposed operation plan of the Technical Working Group and VEPG in the second half of 2022:</p> <ul style="list-style-type: none"> <li>• GIZ handed over VEPG secretariat to Stantec: 30/ 6/2022</li> <li>• Meeting of TWG 1 on Strategic Planning of Electricity Sector</li> <li>• 2<sup>nd</sup> Round of Meeting of TWGs: August to October 2022</li> <li>• Steering Committee Meeting: October to November 2022</li> <li>• High Level Meeting 2022: end of November or end of December 2022</li> </ul>	VEPG Secretariat
<p>Priority topics proposed to be discussed in the next sessions of the TWG include:</p> <ul style="list-style-type: none"> <li>• develop a roadmap, legal framework and financial mechanism for the development of smart grids and battery energy storage systems,</li> <li>• load forecasting and supply-demand balance when the power grid has a high share of renewable energy and increases the flexibility of the grid system.</li> <li>• invest in power grids to respond to energy transition at a reasonable cost that is recovered through electricity prices</li> <li>• develop a grid investment mechanism for the private sector</li> <li>• standards and technical requirements for the connection and operation of the power grid; regulation of power transmission and distribution systems;</li> </ul>	ERAV The British Embassy
<p>The Secretariat is tasked with compiling the contents discussed during the meeting and proposing the establishment of necessary taskforce.</p>	VEPG Secretariat

## Annex 1 – Agenda

<b>8.30 – 10.30</b>	<b>Visit phong Dien 2 solar power plant</b>
	<ul style="list-style-type: none"> <li>• Company representatives present the status and operation of the factory</li> <li>• Visit at Phong Dien Solar Power Plant 2</li> </ul>
<b>12.00 – 13.00</b>	<b>Lunch</b>
<b>13.00 - 13.30</b>	<b>In-person registration / Online login</b>
<b>13.30 - 13.40</b>	<b>Opening remarks</b>
	<p><i>Mr. Trần Tuệ Quang / Mr. Gareth Ward</i></p> <ul style="list-style-type: none"> <li>• Opening remarks and introduction of the agenda</li> </ul>
<b>13.40 - 13.50</b>	<b>Report from the VEPG Secretariat</b>
	<p><i>Mr. Sven Ernedal – VEPG Secretariat and development partners</i></p> <ul style="list-style-type: none"> <li>• Update on amendment of VEPG terms of reference after 2021</li> <li>• Recommendations on focused topics and 2022 operational plans</li> <li>• Updates from Development Partners</li> <li>• Q&amp;A</li> </ul>
<b>13.50 – 14.05</b>	<b>Operation of the Viet Nam's electricity system: Legal aspects</b>
	<i>Mr. Nguyễn Hồng Minh – officer from Electrical System Department, ERAV</i>
<b>14.05 – 14.20</b>	<b>Smart grid: The world's development trends and potential solutions for Vietnam</b>
	<i>Dr. Nguyễn Đức Tuyên, Director of the Electricity and Renewable energy system Training program, Hanoi University of Technology; Associate Professor Faculty of Electricity, Shibaura Institute of Technology</i>
<b>14.20 – 14.50</b>	<b>Experience from power companies: Share experiences in smart grid development and strategic plans to support the integration of power grids with a high share of renewable energy</b>
	<i>Representatives from EVNCPC</i>
<b>14.50 - 15.00</b>	<b>Q&amp;A</b>
<b>15.00 - 15.15</b>	<b>Break</b>
<b>15.15 - 15.35</b>	<b>Experience from UK Grid Corporation: Converting grids for fossil fuel power sources to carbon-free power systems</b>
	<i>Mr. James Greenhalgh – Head of Market Operations, National Grid Operations Authority, UK Grid Corporation (NGC)</i>
<b>15.35 – 16.00</b>	<b>Experience from the Office of Gas and Electricity Markets, UK: the role of supporting the development of distribution and transmission regulations</b>
	<i>Representative of the Office of Gas and Electricity Markets, United Kingdom (Ofgem)</i>

<b>16.00 – 16.10</b>	<b>Experience from the enterprise: Storage battery system for solar power – the solution to achieve 100% renewable energy in industry and trade.</b>
	<i>Mr. Mark Shorrocks, CEO, Shire Oak International</i>
<b>16.10 – 16.30</b>	<b>Q&amp;A</b>
<b>16:30 – 16.50</b>	<b>Discuss focused topics and 2022 operational plans</b>
	<p><i>Mr. Trần Tuệ Quang/Mr. Gareth Ward/VEPG Secretariat/Development Partners</i></p> <ul style="list-style-type: none"> <li>• Discuss and agree on the TWG's focused topics</li> <li>• Discuss the establishment of dedicated taskforces</li> </ul>
<b>16.50 – 17.00</b>	<b>Concluding and Closing</b>
	<i>Mr. Trần Tuệ Quang / Mr. Gareth Ward</i>
<b>18.30 – 20.00</b>	<b>Dinner</b>

## Annex 2 – Brief Report

Speaker	Main content
<p><b>Opening remark</b></p>	<p><b><u>Mr. Trần Tuệ Quang, Deputy General Director, ERAV, MOIT</u></b>, chairman of the TWG provided opening remark, welcoming participants in-person and online.</p> <p>With the attention of the state and the Prime Minister, the smart grid of Viet Nam has developed a lot since 2012, but still faces many challenges in the context of the need to integrate the increasing proportion of renewable energy to fulfill Vietnam's commitment to net-zero in COP26.</p> <p>He stated the objective of the meeting to discuss the situation of electricity system operation in the context of integrating the power grid with a high share of renewable energy, international development trends and suggestions for Viet Nam; at the same time sharing experiences in developing smart grids in Viet Nam and the UK; combining field visits to The Distribution Power Grid Control Center of Thua Thien Hue Power Company, Substation No. 110kV Phu Bai 2 and Phong Dien Solar Power Plant 2.</p> <p><b><u>Mr. Gareth Ward, The UK Ambassador in Viet Nam</u></b>, thanked the chairman and provide co-chairing opening remark</p> <p>The energy sector accounts for about 70% of total greenhouse gas emissions in Viet Nam, so the transition of the energy sector is especially important for Viet Nam to achieve its net emissions target of "net zero". It is necessary to switch from fossil fuels to renewable energy soon. Viet Nam should stop planning to deploy new coal-fired power plants, develop wind and solar power, and ensure more flexible infrastructure to better integrate renewable energy.</p> <p>A major challenge for Viet Nam is that the grid system needs to be upgraded and integrated with storage solutions. New points in recent regulations have allowed the private sector to participate in grid infrastructure investments. The Vietnamese government will also need to renew its approach to public investment to receive financing for green projects.</p> <p>Following the success of COP26, the UK government looks forward to continuing to work with Viet Nam, supporting Viet Nam in fulfilling its new climate commitments and energy transition based on international climate finances.</p>
<p><b>Report of the VEPG Secretariat</b></p>	<p><b><u>Mr. Sven Ernerdal, International Coordinator, VEPG Secretariat</u></b> briefly introduced the activities of the VEPG, the reform of the TWGs and proposed focused topics and 2022 operational plan of the TWG on Grid integration and Grid infrastructure.</p> <p>The Vietnam Energy Partnership Group (VEPG) is a policy exchange forum for the energy sector chaired by the Ministry of Industry and Trade of Vietnam, the European Union and the World Bank. In the previous period, VEPG's activities mainly revolved around the topic of promoting renewable energy, energy efficiency and energy information. At the 4th HLM in January 2022, the VEPG Steering Committee adopted an amendment to VEPG's Terms of reference, officially launching new TWGs with the participation of</p>

	<p>new chairs and co-chairs, including the TWG on Grid Integration and Grid Infrastructure co-chaired by the Electricity Regulatory Agency of Viet Nam (ERAV) and the British embassy.</p> <p>In the new phase, the TWGs will have in depth discussion on policies and techniques to make practical recommendations for the sustainable energy transition, through the establishment and operation of specific taskforce.</p> <p>The Secretariat proposed the operational plan for the TWG until the end of 2022 including the scheduled time for the 2nd meeting of the TWG, the VEPG Steering Committee meeting and the VEPG High level meeting after handing it over to the new Secretariat at the end of June 2022.</p> <p>The operational topics of the working group proposed by the Secretariat include:</p> <ul style="list-style-type: none"> <li>• Integrate variable power sources into the grid</li> <li>• Smart grid, connection mechanism</li> <li>• Energy storage system, battery storage,</li> <li>• Distributed power generation model</li> </ul>
<p><b>Operation of the Viet Nam's electricity system: Legal aspects</b> <b>_ERAV_</b></p>	<p><i>Mr. Nguyễn Hồng Minh, ERAV, MOIT</i> presented the overview of the Viet Nam power system, dispatching methods of the power system and the issues in green energy transition.</p> <p>According to a report by the ERAV, the total installed capacity of Viet Nam's electricity system by the end of 2021 has reached 78,682 MW, of which the majority is still traditional power sources, coal-fired power still accounts for the largest proportion (32.28%). However, renewable energy sources have developed strongly, the installed capacity of renewable energy sources accounts for 27.39% of the power supply structure, including solar, wind, biomass electricity. Renewable energy sources are invested and developed mainly in the central and southern regions, but due to the instability of renewable energy sources, the current power system still depends on traditional power sources from the North and Central.</p> <p>Vietnam is one of the countries with high growth of electricity demand compared to the world, although during the Covid 19 pandemic, electricity demand remained high, and continued the upward trend in the future. The Industry sector and Construction and Residential Consumption Management sector are the two sectors that consume the most electricity in load components.</p> <p>The issue of dispatching Viet Nam's electricity system is managed by the national dispatch system, which is decentralized into 3 levels with clear regulations on the dispatch right.</p> <ul style="list-style-type: none"> <li>• Dispatch of the National power system (500kV grid and large power plants of 110kW or more);</li> <li>• Dispatch of the Regional power system (66kW – 110kW- 220kW grid, except for the authorized 110kW grid; and large power plants connected to 110kW, 220kW grid)</li> </ul>

	<ul style="list-style-type: none"> <li>Dispatch of the Distribution grid (authorized medium voltage grid and 110kW grid; decentralized power grids below 35 kW and small power plants)</li> </ul> <p>In the period of 2016-2021, Vietnam has made a strong transition in green energy development, especially solar and wind power sources. This is the result of the incentive mechanisms of the Ministry of Industry and Trade. However, the development of renewable energy has caused some challenges in the issue of regulating the national power system, because solar power only operates when there is solar radiation, wind power plants have not reached the maximum capacity.</p> <p>In order to solve the problem of regulating the power system with a high proportion of renewable energy sources, ERAV is currently studying to prevent and limit the problem of grid overload, reverse transmission and loss of capacity, power quality management, voltage, harmonic wave, system inertia, capacity fluctuations; focusing on the forecasting work of renewable energy, the stability of wind and solar sources. At the same time, developing ancillary services and mechanisms for ancillary services when the proportion of renewable energy increases, promoting research on mechanisms for development of energy storage battery systems accompanying RE and mechanisms for the implementation of DSM/DR services.</p>
<p><b>Smart grid: The world's development trends and potential solutions for Vietnam</b> _ HUST _</p>	<p><i>Mr. Nguyễn Đức Tuyên, energy expert, HUST</i> presented the smart grid, the world's development trends and the potential solutions for Viet Nam.</p> <p>In the context of the strong development of renewable energy sources, the urgent need for the grid system to integrate this new energy source is to simultaneously develop the smart grid system.</p> <p>In Vietnam, the Prime Minister has approved the smart grid development project in Vietnam since 2012, so far EVN Hanoi has completed a detailed roadmap to develop smart grid in the period of 2021-2025.</p> <p>From the perspective of a smart grid researcher, three important topics when building and developing smart grids include communication protocol, grid and market. Technical issues have been introduced and analysed specifically in the presentation in Appendix 3 of this report.</p> <p>Communication protocol: Develop separate standards for Viet Nam's smart grid through learning from international standards; Network security for smart grids.</p> <p>Grid: development of distributed grid system, application of high technology for smart grid such as artificial intelligence and machine learning technology, development of battery system to store energy.</p> <p>Recommendations:</p> <ul style="list-style-type: none"> <li>Deploying infrastructure for smart grids</li> <li>Strengthening the legal framework for smart grid investment and technology</li> </ul>

	<ul style="list-style-type: none"> <li>• Capacity building for the workforce</li> <li>• Implementing pilot projects</li> </ul>
<p><b>Experiences in smart grid development and strategic plans to support the integration of power grids with a high share of renewable energy</b> <b>_EVNCPC_</b></p>	<p><u>Mr. Nguyễn Quang Thắng, EVNCPC</u> shared the experience of EVNCPC regarding the development of smart grid.</p> <p>Overview on EVNCPC: EVNCPC currently manages and operates the power grid of 110kV and lower voltage grid in 13 provinces and cities in the Central - Central Highlands. In 2021, EVNCPC's maximum capacity reached 3,375 MW. Commercial electricity output in 2021 reached 20.33 billion kWh.</p> <p>Although the situation of electricity supply operation in the Central and Central Highlands has many disadvantages, extreme heat in the dry season, prolonged floods in the rainy season, EVNCPC still managed to well implement the operation of the power grid to quickly overcome the damage to the power grid, restore the power supply in time for customers in severe heat waves, prolonged rainstorms.</p> <p>Smart Grid project at EVNCPC: In 2012, implementing the Prime Minister's Decision No. 1670/QĐ-TTg dated November 8, 2012 on approving the smart grid development project in Viet Nam, EVNCPC began researching and developing the project "Smart grid development roadmap for EVNCPC" and was officially approved for implementation in 2013.</p> <p>The project includes four components and aims to be completed by 2020</p> <ul style="list-style-type: none"> <li>• Component 1: Modernization of the metering system serving for electricity business with the requirement that the entire meter system be replaced by electronic meters and data is collected automatically.</li> <li>• Component 2: automating the distribution power grid to optimize the system and increase the reliability of power supply in the distribution work.</li> <li>• Component 3: building specialized telecommunications systems and information technology infrastructure with focus, reliable and effective operation to ensure high security and redundancy</li> <li>• Component 4: integration of renewable and new energy sources such as solar, wind energy ... into the distribution power grid to effectively exploit these sources.</li> </ul> <p>Up to this point, the project has been completed and achieved many positive results.</p> <p>Meeting the increasingly strong requirements of the integrated economy, in the period of 2022-2025, EVNCPC continues to promote the smart grid development program with the following plan:</p> <ul style="list-style-type: none"> <li>• Effectively utilise the equipped SCADA/DMS system: investment and upgrading of SCADA/DMS system at the control center, Completing and synthesizing the system of operational report forms,</li> </ul>

	<ul style="list-style-type: none"> <li>• Developing smarter grids: Continue to improve smart grid indicators, Build distribution grid automation systems, Analyze and evaluate the deployed 110kV digital substation</li> </ul>
<p><b>Converting grids for fossil fuel power sources to carbon-free power systems _NGC_</b></p>	<p><u>Mr. James Greenhalgh, The UK National Grid Corporation - NGC</u> shared the experience from the UK in the progress of transforming the power grid designed for fossil fuel power sources to the carbon free power system.</p> <p>To achieve the goal of reducing carbon emissions in the electricity system by 2035, the UK has implemented a three-phase roadmap including: phase 1 from 2009 to 2017: applying zero-carbon generation technologies; Phase 2 from 2017 to 2017: using mainly zero-carbon solutions, phase 3 from 2027 will completely replace the carbon emission power generation method.</p> <p>The process has achieved some tangible results, including a significant change in the power structure from 2010 to 2019, specifically the proportion of renewable energy increased significantly from 7% of total power sources in 2010 to 37% in 2019. Coal-fired power decreased significantly from 28% of the total power structure in 2010 to 2% in 2019. Nuclear and gas power changes are not significant in the UK's power structure.</p> <p>Reducing emissions in the UK's electricity system has led to a number of results as follows: Reduction of dispatchable electricity generation, addition of variable power sources, increased non-synchronous power generation, transmission of electricity from the source to different load areas. However, this process is also accompanied by a number of technical challenges such as frequency, stability, inertia, heat limit and voltage control.</p> <p>The commitment to carbon neutrality has become an incentive for countries to concretize their tasks and goals for the development of the electricity sector, including electrification of nearly all activities and sectors; Wind and solar power are considered the most important solutions, however developing these renewable energy sources requires high flexibility of the grid and transmission systems. Therefore, in order to ensure the power system operates well in the context of integrating electricity with a high proportion of renewable energy, the government needs to develop the power grid in the above direction – set a target for 2050 and determine a specific step to achieve this goal. At the same time, it is necessary to thoroughly reform the market to achieve the capacity target and strengthen the guarantee for investors – always need to change and adapt to the new situation.</p> <p><u>Representative of EVNNPT National Power Transmission Corporation:</u> In the current situation of volatility and crisis of the world energy market, how the UK Government's carbon neutralisation target will be affected and changed.</p> <p><u>Mr. James Greenhalgh, NGC:</u> The change in energy prices will affect the carbon neutralization goal. In the last 6 months, the energy market in the UK has witnessed many major fluctuations, but this has also been forecasted by experts, this volatility can lead to some changes in the system, for example to integrate more renewable energy requires a battery system to store energy to balance the supply and demand of electricity. Currently, investing in storage technologies will minimize the cost to the grid in the future. In the long run costs will rise, the challenge is that electricity prices will rise which consumer will have to pay, so the UK government will also have a solution to solve this problem. Currently facing the risk of rising energy prices and gas</p>

	<p>shortages for the coming season, to ensure national energy security, the UK will continue to exploit existing fossil energy sources, but the target of carbon neutralisation remains unchanged. The UK Government will take all appropriate measures to continue to achieve its stated objectives, taking into account the social aspects.</p> <p><i>The British Ambassador:</i> The increase in electricity prices does not mean that people will have to suffer, as over the next three years it is expected that people's incomes will also increase significantly more significantly comparing to the increase in electricity prices, with the increase, some businesses may be willing to pay higher rates for clean energy sources.</p>
<p><b><i>Experience from the Office of Gas and Electricity Markets, UK: the role of supporting the development of distribution and transmission regulations</i></b> <b><i>_Ofgem_</i></b></p>	<p><u>Mr. Andrew Flagg, Ofgem</u> presented overview on the Office of Gas and Electricity Markets, UK – Ofgem, which is an independent energy body that works to protect energy consumers, particularly vulnerable/vulnerable users, by ensuring every consumer is treated fairly and benefits from a greener and cleaner environment.</p> <p><u>Mr. Joseph Slater, Ofgem</u> explained the method of controlling network price following RIIO mechanism.</p> <p>All of the power grid companies regulated by Ofgem through the RIIO mechanism are natural monopolies in the region – customers in the operating area of these power grid companies have no choice but to use the services provided by them.</p> <p>RIIO is an eight-year electricity price control mechanism, enacted and applied to the power transmission (ET), gas transmission (GT) and gas distribution (GD) sectors in 2013, and the electricity distribution (ED) sector in 2015. The RIIO-ET/GD/GT2 mechanism was introduced last year.</p> <p>RIIO differs from previous price control mechanisms in the way it approaches incentives, funding, and environments that promote the improvement of the quality of service and operations of a particular company instead of just approaching from a cost-effective perspective.</p> <p><u>Mr. Okon Enenihi, Ofgem</u> presented the UK's interregional connectivity policy, it is seen as key to helping the UK achieve its carbon emissions reduction targets. The UK began interregional connections a long time ago, the first connection being between the UK and France in 1986, over the next 30 years the UK developed regional connections with three countries: Northern Ireland, the Netherlands, the Republic of Ireland and will continue to expand its connections with other European countries in the future.</p> <p>The two main interregional connectivity models that have been implemented in the UK are non-regulatory models that allow different approaches to be adopted in each country and the default cost and revenue level is 50:50; and the regulated model with ceiling and floor regulation mechanism is applied to 100% of investment projects, in which both countries participate in regulation activity.</p> <p>The UK aims to reach 15.9GW of inter-regional linkages, to achieve this goal the UK has issued a number of policies and supporting documents such as: The first policy document on the ceiling and floor regulatory model in 2010; Confirmation of ceiling and floor mechanism in 2014; Approval of 10 new interregional connectivity infrastructures; Spent more than £20 billion on customer welfare and £9-10 billion on new investment. Currently, the UK is</p>

	<p>constructing two new projects along with Nemo Link, IFA2 and NSL online – a minimum of 11.7 GW (Eleclink 1 GW) of total capacity, up from 4 GW previously.</p> <p><u>Mr. Andrew Flagg</u> introduced the Regulatory Energy Transition Accelerator (RETA) programme established by Ofgem to achieve the objectives committed in COP26. The RETA programme has received financial support from the UK government, and works with international partners such as the International Energy Agency (IEA), the International Renewable Energy Agency (IRENA), the World Bank to implement the energy transition targets including five main objectives: (1) Building a flexible power system with integrated renewable energy sources, (2) Completing the legal framework for energy transition, (3) Network planning for wide-ranging electrification deployment, (4) Interconnection, (5) Just energy transition</p> <p><u>Representatives from the US Embassy</u>: Could introducing a cap/ceiling price lead to energy shortage in the UK, and does the UK plan to change the price cap?</p> <p><u>Mr. Okon Eyenih, Ofgem</u>: In terms of determining the ceiling-floor mechanism and the risk of energy shortages, Ofgem's experts have thoroughly assessed the issue based on the purchase contracts and divided the costs into two groups: the regulatable group and the non-regulatable group. Regulatable prices will be controlled at a certain stable level and reviewed regularly for 25 years. In addition, Ofgem has specific regulations on the purchase and use of energy on the grid system, controlling prices properly, so currently Ofgem is still well controlling the dispatch work and there are no concerns about the lack of electricity when implementing the ceiling-floor mechanism.</p>
<p><b>Overview on the battery energy storage systems BESS</b></p> <p><b>_Shire Oak International_</b></p>	<p><u>Mr. Mark Shorrocks, Shire Oak International</u> provided some assessments on the overview of the Viet Nam's energy market, some issues of renewable energy development, thereby offering energy storage system solutions.</p> <p>Viet Nam is a country with increasing demand for energy, in which although the share of renewable energy in the energy structure is still small, it has started to develop strongly in recent years and will continue to increase due to the orientation of Viet Nam's sustainable energy transition.</p> <p>In terms of potential, Viet Nam has abundant potential to develop renewable energy such as solar energy (about 434GW), onshore wind power (217 GW); offshore wind power (about 153GW). However, Viet Nam also faces many challenges exploiting this potential source due to the lack of flexibility of the power grid and power sector infrastructure to integrate large amounts of renewable energy sources.</p> <p>To address that challenge, the energy storage system will play an important role in the goal of carbon neutralization in the future as this is the optimal solution for the grid with a high proportion of renewable energy. The storage system not only helps balance supply and demand for power load areas between day and night, between peak and low peak times, but also saves the cost of upgrading the transmission line.</p> <p>The presentation provided specific information on the technology of energy batteries and energy storage technologies, estimated the price for storage systems, solutions that Shire Oak has implemented in Vietnam.</p>

	<p><u>Mr. Nguyễn Đức Tuyên, HUST:</u> What is the basis for building prices for energy storage battery systems?</p> <p><u>Mr. Mark Shorrocks:</u> Currently, the purchase price of solar power is about 8.4 cents / kWh, this is the basis for calculating the price with the storage battery system, the electricity generation price of the 20 MW / 80MWh battery introduced by Shire Oak has decreased by 10% compared to the current electricity price even during peak hours. Shire Oak applies this price to a large-scale battery energy storage system, with investment from South Korea. When implementing a very large-scale project, Shire Oak needs to consult with the Ministry of Industry and Trade and EVN.</p> <p>Battery energy storage policy in Vietnam?</p> <p><u>Representative of Production Engineering Department, Vietnam Electricity Corporation - EVN:</u> BESS is a form of ancillary service provision. Currently, EVN is planning to implement a pilot project using BESS to adjust the voltage on the Northern power system, but the project still faces many challenges in terms of mechanisms and legal frameworks related to how the investment capital for the pilot project is collected when the use of BESS sources is not preferential for power generation purposes and practically serves the ancillary service of voltage control on the grid.</p> <p><u>Mr. Trần Tuệ Quang, chairman:</u> Currently, BESS is applied in the world, in the UK, Australia market as an independent power generator, providing the form of energy as an ancillary service. In ancillary service markets, BESS operates on market mechanisms and without any specific mechanisms. Using BESS for power distribution or power transmission units that provides support to the power system is not yet popular in the world. In long-term, BESS will evolve towards being independent generators and follow market mechanisms.</p>
<p><b>Conclusion _ Chairman and co-chairman_</b></p>	<p>The Chairman summarized a review of the main content of the presentations, shared experiences and issues discussed in the meeting.</p> <p>Focused topics discussed in the next sessions of the proposed CKT group include:</p> <ul style="list-style-type: none"> <li>• develop a roadmap, legal framework and financial mechanism for the development of smart grids and battery energy storage systems,</li> <li>• load forecasting and supply-demand balance when the power grid has a high share of renewable energy and increases the flexibility of the grid system.</li> <li>• invest in power grids to respond to energy transition at a reasonable cost that is recovered through electricity prices</li> <li>• develop a grid investment mechanism for the private sector</li> <li>• standards and technical requirements for the connection and operation of the power grid; regulation of power transmission and distribution systems;</li> </ul>
<p><b>Closing Remarks</b></p>	<p>Mr. Trần Tuệ Quang, chairman of the meeting thanked the speakers for giving presentations with many specific contents in detail, thanking the delegates online and in-person for contributing opinions and discussions. After more than 4 hours of work, the working group achieved the contents and objectives set out for the meeting. These contents and the</p>

recommendations of the delegates will be compiled by the Secretariat in the report after the meeting and sent to the delegates for mutual agreement and discussion in the next sessions.

Mr. Gareth Ward, co-chairman of the meeting thanked the delegates and the chairman. The Ambassador highly appreciated that the Government of Viet Nam always listened to the comments and received experiences from other countries. The UK, together with other international development partners, will continue to accompany and support the Government of Viet Nam to overcome challenges to deliver on its commitments.

### **Annex 3: List of references**

The presentations in the meeting can be accessed and downloaded via the following link:

English version:

[https://vepg.vn/documents-of-the-twg-3-meeting-on-gi\\_27-28-june/](https://vepg.vn/documents-of-the-twg-3-meeting-on-gi_27-28-june/)

Vietnamese version:

[https://vepg.vn/tai-lieu-phien-hop-nhom-ctkt-ve-thld\\_htld\\_27-28-06-2022/](https://vepg.vn/tai-lieu-phien-hop-nhom-ctkt-ve-thld_htld_27-28-06-2022/)