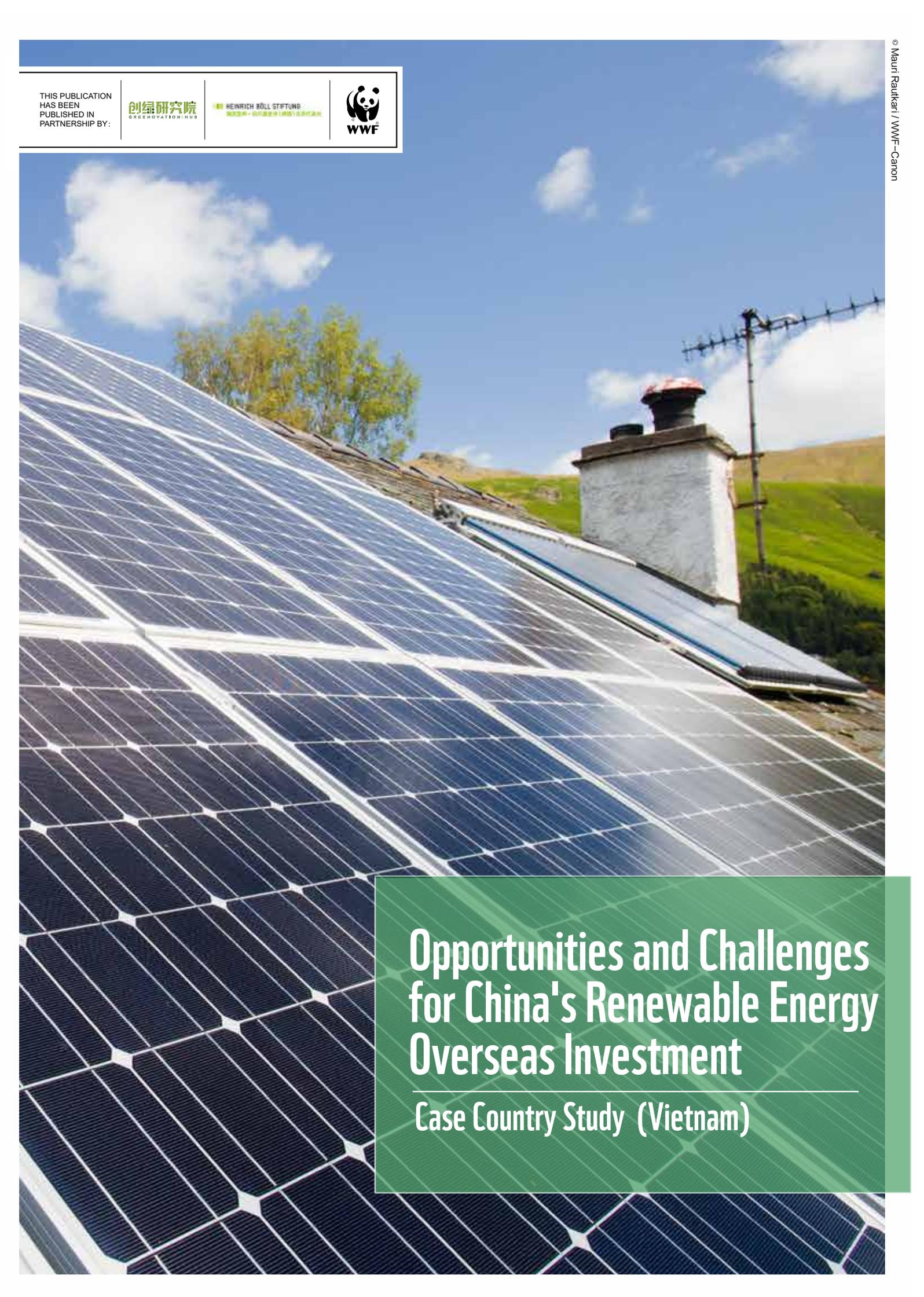


THIS PUBLICATION
HAS BEEN
PUBLISHED IN
PARTNERSHIP BY:

创绿研究院
GREENOVATION HUB

HEINRICH BÖLL STIFTUNG
绿色和平 - 德国基金会 | 绿色和平中国

A photograph of a roof covered in solar panels, with a white chimney and a utility pole in the background under a blue sky with clouds.

Opportunities and Challenges for China's Renewable Energy Overseas Investment

Case Country Study (Vietnam)

Acknowledgment

We would like to thank Heinrich Böll Stiftung Beijing Representative Office for funding this report and World Wide Fund for Nature (WWF) for disseminating this report.

This report was developed by Li Xiulan, a researcher at Greenovation Hub. We would like to thank the following organizations and experts (listed in no particular order) for their valuable information and support during the report development:

Mr. Nguyen Tuan Anh, Deputy Director, Department of Science, Education, Natural resources and Environment, Ministry of Planning and Investment, Viet Nam

Ms. Nhung Pham, Programme Coordinator, Energy&Climate, WWF-Vietnam

Mr. Le Viet Phu, PhD, Fulbright School of Public and Management, Fulbright University Vietnam

SolarBK

Climate & Energy and Green Finance Project Team, WWF China Beijing Office

During the research and writing of the report, Guo Hongyu, Director of the Climate and Energy Project of Greenovation Hub, Chen Jingwen, Specialist of Belt and Road Green Growth Project, and interns Liu Jingting and Zheng Yue also offered support.

We would like to appreciate the support and help from all the organizations, experts and colleagues. We hope the contents and suggestions hereof could, to a certain extent, benefit and inspire readers. Any feedback or suggestions for improvement will be gratefully accepted.

TABLE OF CONTENTS

Introduction	1
Chapter I Status Quo, Opportunities and Challenges of Renewable Energy Development in Vietnam	3
1.1 Overview of the Socio-economic Development of Vietnam	3
1.2 Major Environmental Conditions and Risk Factors in Vietnam	4
1.3 Status Quo of Energy Mix and Power Development in Vietnam	5
1.4 Basic Environmental Laws and Regulations and Foreign Investment Policies of Vietnam	7
1.5 Status Quo, Obstacles and Potential of Renewable Energy Development in Vietnam	9
Chapter II Renewable Energy Development and Investment Demand in Vietnam	12
2.1 Nationally Determined Contribution Goals and Green and Low-carbon Development Policies of Vietnam	12
2.2.1 Energy, Climate Goals and Relevant Policies	12
2.2.2 Green and Low Carbon Development Policy	14
2.2 Renewable Energy Investment Demand and Opportunities in Vietnam	16
Chapter III Vietnam’s Renewable Energy Investment Environment and Risks	18
3.1 Vietnam Renewable Energy Investment Policy	18
3.2 Vietnam’s Renewable Energy Investment Environment and Risk Analysis	24
Chapter IV China’s Renewable Energy Investment Opportunities and Risks in Vietnam	26
4.1 Status of China’s Renewable Energy Investment in Vietnam	26
4.2 China’s Renewable Energy Investment Opportunities and Risks in Vietnam	30
Chapter V Conclusions and Suggestions	31

INTRODUCTION

Against the backdrop of addressing climate change and achieving the goal of sustainable development, energy transformation and revolutionary change of energy system are imperative. China is not only a major producer and consumer of energy, but also an important driver of energy technology. Over the past decade, China has promoted the continuous decline of renewable energy cost through a range of policy measures and technological means, achieving grid parity of renewable energy faster than expected. In January 2019, China's National Development and Reform Commission and National Energy Administration jointly issued The Notice on Active Promotion of the Work on Grid Parity of Wind Power and Photovoltaic Power without Subsidies, in a bid to promote the development of wind power and photovoltaic power without subsidies through electricity market transaction. The official implementation of this policy suggests that grid parity of renewable energy will be available soon in China, providing experience and reference for other developing countries to boost the development of renewable energy and grid parity. According to the Global Trends in Renewable Energy Investment 2018, China boasts a third of the wind power capacity, 4 of the top ten wind turbine manufacturers and 6 of the top ten solar panel manufacturers, and a quarter of the solar power capacity in the world. Moreover, China has become the world's largest investor in renewable energy, with renewable energy investment accounting for one third of the world's total, with rich experience in renewable energy project construction, operation, equipment manufacturing and export, overseas engineering procurement construction (EPC), mergers and acquisitions (M&A), and R&D. In 2018, global investment in renewable energy totaled USD 288.9 billion, including USD 139.7 billion for solar energy and USD 134 billion for wind energy. China is the largest solar energy investor, with a total investment of USD 91.2 billion. In recent years, China has increased overseas investment in renewable energy. In 2016, China's outbound investment in renewable energy projects rose to USD 32 billion, an increase of 60% as compared with 2015. Large Chinese companies also take leading positions in the global renewable energy value chain. In early 2017, China announced it would provide USD 360 billion for the renewable energy industry by 2020 and scrapped plans to build 85 coal-fired power plants.

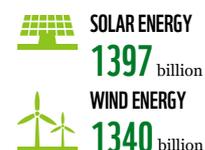
Renewable energy has become a key area for China and the world to achieve energy transformation and tackle climate change.

With the proposal of The Belt and Road (B&R) Initiative and the deepening of cooperation with the countries along the B&R routes, China captures increasing shares in renewable energy market year by year, becoming the largest international investor in the renewable energy sector¹. Meanwhile, as the largest developing country, China has abundant experience in reducing carbon emission intensity. According to China's Policies and Actions for Addressing Climate Change (2018), China's greenhouse gas emissions per unit of GDP in 2017 fell by about 46% from 2005, enabling the country to achieve the goal of reducing carbon emission intensity by up to 40-45% by 2020 three years ahead of schedule. The rapid development of renewable energy is one of the key factors for China's decline in carbon emission intensity, as Chinese government has taken a series of measures to adjust industrial structure, optimize energy mix, improve energy efficiency, conserve energy and increase carbon sinks to achieve the goal of reducing carbon intensity. In a word, with the rapid development of renewable energy and the deepening of China's cooperation with overseas partners, China is gradually becoming one of the main sources to meet the world's energy demand and advanced technology in the industry. Its rich experience in promoting the development of



GLOBAL INVESTMENT
IN RENEWABLE ENERGY
TOTALLED USD

288,9 billion



SOLAR ENERGY
INVESTMENT IN CHINA

912 billion

¹ <http://oversea.huanqiu.com/article/2018-01/11517823.html?agt=15435>

renewable energy and reducing greenhouse gas emission intensity could also provide a reference for other developing countries. Nevertheless, compared with the investment in fossil energy and electricity, there is still much room for the development and growth of China's outbound investment in renewable energy.

In recent years, a growing number of countries have started to make great efforts to develop renewable energy, with the improvement of environmental awareness, stricter measures to deal with climate change, gradual decrease of renewable energy power generation cost and constant breakthroughs in new technologies, so as to enhance the level of national environmental governance, achieve national climate goals and improve people's health. In this context, China has become more aware of the potential risks in environment, society, health and stranded assets, in terms of outbound energy & power investment. As a result, it values zero impact and risk management of outbound energy & power investment than ever before. For now, however, China is still faced with a number of obstacles in outbound investment and cooperation in renewable energy, such as high financing cost, less project financing channels and amount, mismatch between return on investment and risk-taking, high risks of outbound investment and great difficulty in risk management & control, unclear plans and targets for renewable energy and insufficient supporting policies of the countries along the B&R routes and trade and technical barriers. These, to some extent, have exerted an influence on China's investment and cooperation in renewable energy along the B&R routes.

With the development of economy and society, the B&R routes have become the area with the fastest-growing demand for energy & power on a gradual basis. However, most of these countries are located in the sensitive and vulnerable areas of ecological environment, with relatively high vulnerability to climate change. Therefore, the green and sustainable development of the energy and power industries is crucial for countries along the B&R routes to attain their own socio-economic development, protect the ecological environment and people's health, effectively cope with climate change and achieve the goal of sustainable development. On top of that, most countries along the B&R routes have rich renewable energy and resources, such as wind power resources (in Vietnam, Laos and Thailand, etc.), solar energy resources, biomass energy and geothermal resources. With great development potential of renewable energy, these countries have become the hotspot for global renewable energy investment. Nonetheless, due to the imperfect political environment, laws and regulations system, investment environment and development planning of the countries along the B&R routes, there are considerable risks and challenges in renewable energy investment in these countries. Therefore, the energy and power industries in the countries have a huge need for capital. Take ASEAN as an example, ASEAN countries need at least USD 290 billion

to meet their development goal of 23% renewable energy in primary energy by 2025, according to the report released by International Renewable Energy Agency (IRENA) in 2016. Against this background, some countries along the B&R routes take steps on a gradual basis to develop a range of policies to promote the reform of their energy & power mix and the development of renewable energy, so as to improve the investment environment, attract international capital and leverage social capital to participate in the development of renewable energy, thus boosting national sustainable development and the realization of climate goals.

Vietnam is taken as an example in this report which makes an analysis on the development status and trend of renewable energy in this country by summarizing energy and power planning (especially renewable energy planning) of the country, actions to cope with climate change, environmental laws, regulations and governance objectives and the cooperation with China in energy & power sector under the initiative of B&R Initiative. Discussions are also made in this report on the risks, obstacles and opportunities of Chinese investment in renewable energy and electricity (mainly solar power generation) in Vietnam. At the same time, this report also focuses on summary and analysis of the construction and development of Vietnam's nationally determined contributions (NDC) goals and green financial system, providing a reference for Chinese investors (including financial institutions and businesses) to consider the conformity of the environment, climate and energy risks of host countries with their environmental and climate development goals and to effectively avoid and control potential risks when investing in the energy sector in countries like Vietnam. The report also proposes feasible suggestions for the policy support and actions that the Chinese government, financial institutions and relevant Vietnamese authorities need to provide to promote China's renewable energy investment in Vietnam.

CHAPTER I STATUS QUO, OPPORTUNITIES AND CHALLENGES OF RENEWABLE ENERGY DEVELOPMENT IN VIETNAM

Overview of the Socio-economic Development of Vietnam

Located in the east of Indo-China Peninsula, Vietnam, close to South China Sea in the east and southeast, borders China in the north, as well as Laos and Cambodia in the west. There are two plains in Vietnam, the Red River Delta and the Mekong River Delta, which are the main agricultural production areas. In recent years, as a member of World Trade Organization (WTO), the Association of Southeast Asian Nations (ASEAN), and Asia-Pacific Economic Cooperation (APEC), Vietnam has maintained rapid economic growth and achieved certain progress in socio-economic development². In 2017, Vietnam's human development index (HDI) was 0.694, which was in the medium human development category, ranking 116 out of 189 countries and regions, with an annual growth rate of only 1.41% since 1990³. According to the statistical data released by the Ministry of Planning and Investment of Vietnam, the country's GDP growth rate reached 7.08% in 2018, which not only exceeded the set target of 6.7%, but also reached the highest level since 2008, higher than that of other ASEAN countries (such as Singapore, Malaysia, Thailand, the Philippines and Indonesia). According to the Five-year Socio-economic Development Planning (2016-2020) passed by National Assembly of Vietnam, Vietnam's average annual growth of GDP will hit 6.5%-7% in 5 years, and the per capita GDP will reach USD 3,200-3,500 by 2020; the industrial and service sectors will account for 85% of GDP; the total investment of the whole society will account for 32%-34% of GDP; energy consumption per unit of GDP will fall by an

average of 1%-1.5% annually; the urban unemployment rate will be kept below 4%.

In addition to cooperation with other countries to actively promote the development of foreign trade, Vietnam's rapid economic development also benefited from a large influx of foreign funds giving fresh impetus to its manufacturing industry. Foreign direct investment (FDI) in Vietnam rose by 9.1% year on year to USD 19.1 billion in 2018, hitting a record high for 6 years in a row, according to the data released by the Vietnamese government in early 2019. As of 2018, Vietnam had attracted more than 10,000 foreign businesses, according to a report of the World Bank.⁴ According to Vietnam's official statistics, in 2017, Vietnam's contract amount concerning attraction of foreign investment reached USD 35.88 billion, the highest in recent 9 years, with USD 17.5 billion actually paid, an increase of 44.4% and 10.8% over 2016, respectively. The investment projects saw a significantly expanded scale. In the energy sector, contracts were signed for 3 large BOT projects with an investment of more than USD 2 billion. Among the 125 countries and regions investing in Vietnam, South Korea ranked first with a registered capital of USD 57.66 billion, accounting for 18.1%, followed by Japan with a registered capital of USD 49.46 billion, making up 15.5%.

Vietnam has a tropical monsoon climate. About two-thirds of Vietnam's water resources are from abroad, and its domestic

² It is reported that in 2018 Vietnam's annual GDP growth rate reached 7.08%, a higher economic growth rate among ASEAN countries.

³ Human Development Indices and Indicators: 2018 Statistical Update, United Nations Development Programme (UNDP), 2018

⁴ <http://news.cri.cn/20190312/882928a0-adaa-359a-e829-7bc26c6bf2d8.html>

and international catchment areas total nearly 1.2 million km², three times the size of the country. All the rivers flowing through Vietnam supply about 225 billion m³ of water a year, but only 53 billion m³ water resources are available in the country every year due to a lack of complete physical infrastructure and adequate financial support. Despite an annual mean precipitation of 1,960 mm, many places also face water shortages due to the uneven distribution of precipitation during the dry season. Vietnam is rich in groundwater resources. The annual potential exploitable reserves of aquifers are estimated to be 60 billion m³, but only 5% of the total is actually utilized. In some regions, over-exploitation has led to the drop of groundwater level, as well as land subsidence and salinity intrusion, particularly in the

Mekong River Delta region.

Vietnam is a traditional agricultural country, with rice as the main crop. Vietnam has 19 million hectares of forest land, including 9,117,000 hectares of forest, with forest coverage rate of 28% and 580 million m³ of forest growing stock. A study shows that Vietnam ranks the 16th place among the 25 most biodiverse countries in the world. Vietnam is rich in mineral resources with various types, mainly including more than 50 kinds of energy, metal and non-metal. Energy mineral resources are mainly coal, oil and natural gas. Proven recoverable reserves of natural gas and coal stand at 250 million tons, 300 billion m³ and 3.8 billion tons respectively, which can be exploited for 35 years and 95 years.

Major Environmental Conditions and Risk Factors in Vietnam

According to a study by the National Economics University in Vietnam at the end of 2016, environmental pollution in the country cost 5% of its GDP⁵ per year, and the proportion was still rising. A report released by the National Economics University in Vietnam suggests that the economic loss caused by air pollution in the country is as high as USD 10 billion each year; in 2018, the economic loss was about USD 10.8-13.2 billion, equivalent to 4.45%-5.64% of its GDP. Nearly 80% of Vietnam's industrial zones violate environmental laws and regulations, according to the data of General Statistics Office of Vietnam. Foreign-invested enterprises account for 60% of the enterprises with illegal pollution discharge. Foreign investment projects are concentrated in the garments & textiles, steel, paper and other industries, causing a lot of environmental pollution. According to the climate change vulnerability index by Maplecroft, Vietnam ranked 23rd out of the 193 countries on the list. Vietnam is also one of the top 30 countries in the world at "great risk" of environmental pollution.

Air pollution is one of the main environmental problems in Vietnam. According to the 2013 National Environmental Report of Vietnam, a large number of gases with high concentration of harmful substances from industrial production caused considerable air pollution. There is huge amount of SO₂, CO₂ and total suspended particulates (TSP). The industries with the greatest impact on air quality include coal mining and processing, steel industry, building materials production and thermal power plant. Due to the lack of funds and unclear policies and regulations on atmospheric environment management, it is difficult for the government to supervise and deal with illegal acts.

Vietnam has achieved some of its millennium development goals and indicators, such as eradicating extreme poverty and hunger, providing universal primary education, and promoting gender equality in education. Environmental

sustainability regulations have been incorporated into national development policies, with an increase of forest coverage rate. In 1943, the area of forest resources in Vietnam was 14.3 million hectares, with a coverage rate of 43%. In 1995, the forest area decreased to 9.12 million hectares, with the forest coverage rate dropping to 28%. Vietnam's forests are shrinking at a rate of 110,000 hectares a year, according to the Vietnam Administration of Forestry. Except the southern highlands and the Vietnamese-Laos border, Vietnam has no large area of forest. Deforestation has led to the loss of forest resources and the destruction of wildlife habitat, coupled with unrestrained hunting, some large animals on the verge of extinction. Moreover, attention is only paid to a couple of tree species in forest regeneration and natural forest regeneration is ignored, leading to the extinction of some tree species.

Vietnam is an energy-intensive country with economy driven by energy and the energy intensity hits more than 70%. With the development of economy, energy efficiency will be inevitably improved. Vietnam has set out five implementation goals in the Draft of Action Plan for Climate Change under the Paris Agreement, but these goals can only be achieved with appropriate financial support from the international community. Climate change has led to frequent extreme disasters, such as typhoons, droughts and floods in Vietnam, resulting in severe economic losses.

According to the analysis of publicly available information, the construction and improvement of infrastructure and the transformation of energy mix will be the focus of Vietnam for social-economic development for a long time to come. So far, Vietnam is faced with serious ecological and environmental problems, with the environmental management level to be improved. There are also issues to be addressed urgently concerning serious air pollution, low water resource utilization rate, over-deforestation, biodiversity protection, and strong energy demand, structural adjustment and transformation.

⁵ <http://www.cdmfund.org/zh/world/25095.jhtml>

At the same time, Vietnam's climate vulnerability is obvious, seriously affected by climate change, and there is great pressure to tackle climate change. Due to the problems of resource endowment, labor cost and economic development structure, foreign investments in Vietnam are mainly in the fields with high pollution and emission, posing great pressure and challenges to the country's ecological environment protection and response to climate change. It is suggested

that Chinese financial institutions and enterprises engaged in investment and financing in Vietnam should pay special attention to biodiversity protection, the rational utilization of forest resources, the investment in energy field and its efficiency improvement, and the control and management of environmental risk factors, such as climate change and greenhouse gas emissions.

Status Quo of Energy Mix and Power Development in Vietnam

Rich in energy resources, Vietnam is the third largest oil producer in Southeast Asia after Malaysia and Indonesia. The proven reserves of coal, oil and natural gas showed a general increasing trend from 1996 to 2016. In 2016⁶, Vietnam had 4.4 billion barrels of oil reserves, or 0.3% of the world's total. The country's reserves of natural gas hit 0.6 Mm³, or 0.3% of the world's total. Its coal reserves total 3.36 billion tons, or 0.3% of the world's total, which are mainly high-quality coal; there are about 3.12 billion tons of anthracite and bituminous coal, accounting for 92.7% of the total reserves, and there are 244 million tons of sub-bituminous coal and lignite. Vietnam is rich in renewable energy, which, however, has not been exploited effectively. In addition, it has 27.75 GW of wind-energy potential, and only three grid-connected wind power plants with a combined installed capacity of 52 MW. From a technical point of view, the potential of solar power generation in Vietnam can reach 13 GW, but at present, the

total installed capacity of solar power in the country is 4 MW merely, mainly used for scientific research and rural electrification⁷.

From 2015 to 2016, Vietnam's primary energy consumption rose by 1.7%, from 63.7 Mtoe in 2015 to 64.8 Mtoe in 2016. In 2016, the consumption of natural gas was basically the same as that in 2015, at 9.6 Mtoe, equivalent to the output. The consumption of oil and hydropower increased significantly. The consumption of oil grew from 18.8 Mtoe to 20.1 Mtoe, or 6.9%, which is the highest growth rate. Hydropower increased by 6.2%, from 12.9 Mtoe to 13.7 Mtoe. In that year, only coal consumption in primary energy showed a decline trend, and the decline was large, from 22.3 Mtoe to 21.3 Mtoe, a decrease of 4.3%. Aside from that, in 2016, Vietnam's consumption of renewable energy other than hydropower achieved breakthrough of zero, reaching 0.1 Mtoe.

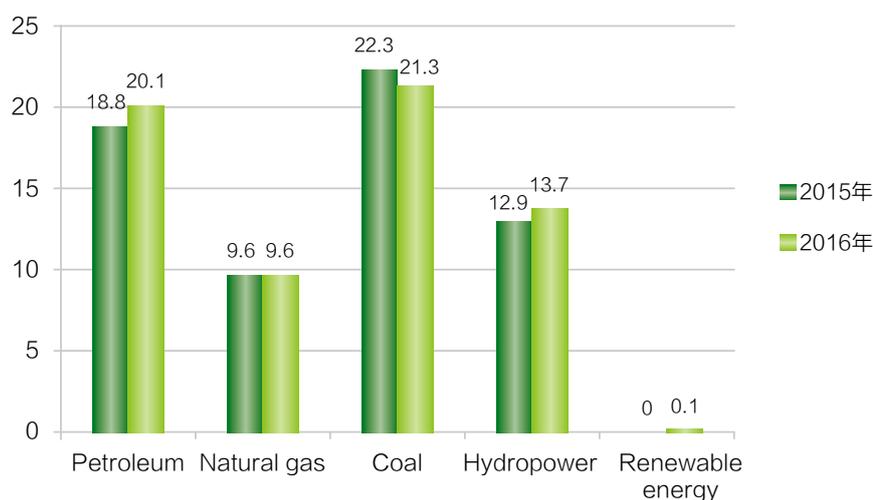


Fig. 1-1 Vietnam's Primary Energy Consumption Structure in 2015-2016 (Mtoe)

Source: consolidated from Statistical Review of World Energy⁸ by BP

⁶ Asian Development Bank (ADB): Viet Nam: Environment and Climate Change Assessment, 2013, page 4, as detailed in <https://www.adb.org/sites/default/files/institutional-document/33916/files/viet-nam-environment-climate-change.pdf>.

⁷ Asian Development Bank: Viet Nam Energy Sector Assessment, Strategy, and Road Map, 2015, page 8-9, as detailed in <https://www.adb.org/sites/default/files/institutional-document/178616/vie-energy-road-map.pdf>

⁸BP: Statistical Review of World Energy, 2017.

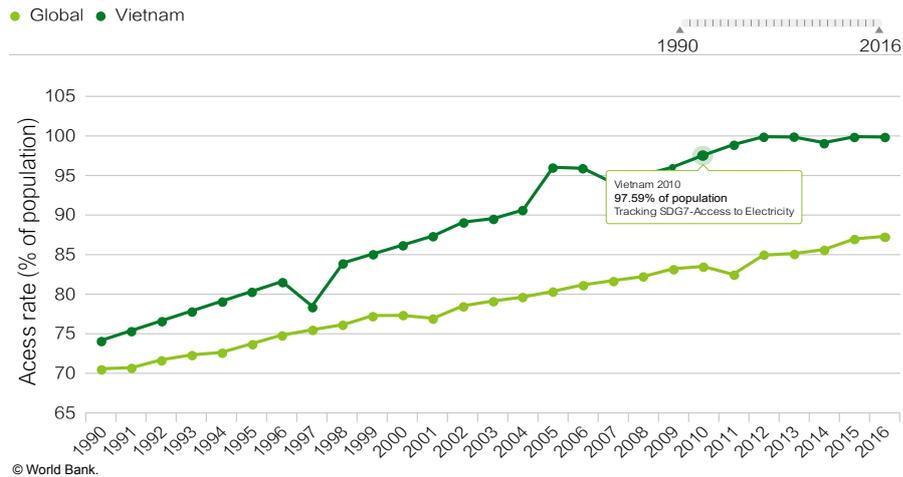


Fig. 1-2. Comparison between Energy Acquisition Rate Per Capita in Vietnam and Global Average

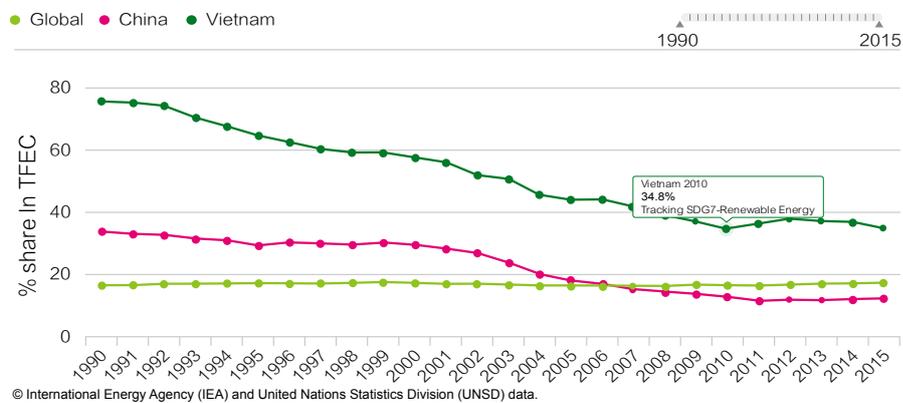


Fig. 1-3. The Proportion of Renewable Energy in Electricity Consumption, Comparison among Vietnam, China and World Average

Over the past decade, the continuous growth of Vietnam's economy has driven the continued increase of domestic power demand. With the increasingly complete development of hydropower resources, new electricity demand in Vietnam in recent years has been mainly supplied by new coal power which has become the second largest source of electricity, and the country's renewable energy power generation is still in its early stages. According to the data from Electricity of Vietnam (EVN)⁹, in 2015, the country's generating capacity reached 1,643.1 TWh, the consumption of electricity was 1,434 TWh, and the per capita household electricity consumption hit 1,565 kWh, 1.6 times that of 2010. Electricity consumption was mainly from industry and housing industry. In 2015, the installed power-generating capacity of Vietnam was 38,553 MW, with hydropower accounting for 38%, coal power for 33.5% and natural gas for 20.7%. Except for small hydropower, renewable energy made up 0.4% merely,

and other installed capacity mainly involved oil and small hydropower. At the same time, Vietnam's electricity imports also showed a decreasing trend. From 2011 to 2015, EVN imported 147 TWh of electricity from China, 14.14TWh from Laos and 72 TWh from Cambodia. According to the statistics, in 2015, 61.2% of the total installed capacity in Vietnam was owned by EVN and its holding companies, and the remaining installed capacity was contributed by the BOT model of domestic independent power producers (IPPs) and foreign investors.

According to the comparative analysis of greenhouse gas emissions, Vietnam is one of the countries with low greenhouse gas emissions in the world, but its per capita carbon emissions are growing very fast. Statistically, the per capita carbon emissions of Vietnam increased from 0.3 tons of CO₂ in 1990 to 1.71 tons of CO₂ in 2010, a nearly six-

⁹ Vietnam's largest state-owned power purchasing company, which reports directly to the prime minister, has a virtual monopoly on the power purchase, transmission and distribution system in the country.

fold increase in a decade, far higher than the growth rate of per-capita carbon emissions of China (3 times), South Korea (2.5 times) and Thailand (2 times). With the rapid development of economy and society, the absolute amount of carbon emissions and per capita emissions of Vietnam are also continuously increasing. As of 2014, Vietnam's power sector emitted 500,000 tons of CO₂ equivalent, or 39% of energy-related emissions. As the power generation industry in Vietnam is still dominated by hydropower, the carbon emission intensity of the power sector in 2014 was only 349 g CO₂/kWh. Compared with 2011, the greenhouse gas emissions of the power sector increased by 53% and the carbon intensity grew by 12%. The increase in carbon emissions and emissions intensity is mainly due to the rapid increase in coal power projects. In terms of Vietnam's current energy demand and energy mix, the trend and potential of greenhouse gas emissions in the power sector continue to rise. To achieve its

action plan on climate change and sustainable development goals, more efforts and attempts are required in the green and low-carbon development of the energy and power industries.

Based on the Vietnam's Renewable Energy Development Strategy 2016–2030 (REDS) with outlook until 2050 (hereinafter referred to as the Strategy), Vietnam adjusted the National Power Development Planning in March 2016, aiming to increase the proportion of renewable energy in power supply and improve the diversity of energy supply and limit the greenhouse gas emissions of the energy industry so as to achieve its nationally determined contribution goal submitted in 2015. According to the Strategy, renewable energy should account for 7% of Vietnam's gross generation by 2020 and 10% by 2030.

Basic Environmental Laws and Regulations and Foreign Investment Policies of Vietnam

Basic Environmental Laws and Regulations

Ministry of Natural Resources and Environment, Vietnam's competent environmental protection authority, is mainly responsible for the work concerning management of national land, environmental protection, climate change, geology and mineral resources, ground mapping, water resources, hydro meteorology, as well as marine and island resources and comprehensive management.

Vietnam's basic environmental laws and regulations include the Law on Environmental Protection, the Land Law, the Decree Prescribing Environmental Protection Master Plan, Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Plan, Decree: Detailing the Implementation of Some Articles of The Law on Environmental Protection¹⁰, and the Penalties for Administrative Violations Against Regulations on Environmental Protection¹¹. On June 23, 2014, the National Assembly of Vietnam approved the Law on Environmental Protection, which took effect on January 1, 2015. The law encourages the protection, rational use and conservation of natural resources and strictly prohibits the destruction and illegal exploitation of natural resources, and the use of destructive tools and methods to exploit biological resources and import machinery and equipment that do not meet the environmental protection standards.

According to relevant laws and regulations of Vietnam, the construction of domestic projects must undergo strict and regular environmental inspection prior to commencement,

and the enterprises failing to meet the standards after inspection must immediately stop work for rectification and be punished. All manufacturers shall install pollution control and treatment equipment to ensure compliance with relevant environmental standards. On November 18, 2016, Vietnam rolled out No.155/2016/ND-CP resolution on provisions of administrative penalties for environmental protection, which increased administrative penalties for violation of environmental protection laws and regulations, and specified in detail that the amount of the fine is determined according to the violation of environmental regulations of different industries by different subjects (individuals or organizations).

In February 2016, Vietnam issued government No. 12 (12/2016/ND-CP) document on environmental protection fees for exploitation of mineral resources. According to the regulations, the charging standard of environmental protection fee is 100,000 VND/ton for crude oil, 50 VND/m³ for natural gas and coal gas, and 35 VND/m³ for natural gas during the exploitation process of crude oil (natural gas). The environmental protection fees for development of oil, natural gas and coal gas shall belong to the state revenue and shall be 100% turned over to the central government. The environmental protection fees for mineral resources development (excluding crude oil, natural gas and coal gas) shall be 100% owned by the local government to support environmental protection and investment.

All the enterprises operating in Vietnam must comply with the country's national standard (TCVN) on environmental protection and related technical specifications (QCVN).

¹⁰ The law went into effect on April 1, 2015.

¹¹ The law went into effect on February 1, 2017.

Standards are published and adopted voluntarily by relevant organizations, while technical specifications are issued and enforced by functional departments of the state. Vietnam's national standard systems on environmental protection mainly include environmental quality of surroundings and environmental protection standards for waste discharge¹². As for the technical requirements, at the end of 2009, Vietnam's Ministry of Natural Resources and Environment revised and promulgated 21 technical requirements concerning environment, covering the fields of treatment of wastewater from natural rubber industry, heavy metal content in the land, air quality around the project, groundwater quality and sewage discharge from textile industry and thermal power industry.

Environmental impact assessments are required before construction projects are approved and such investments or engineering projects include those approved by the Vietnamese National Assembly, government and the prime minister; projects that use parts of land of nature reserves, national parks, historical cultural relics and remains and tourist attractions; construction, building material production, transportation, electronics, energy and radioactivity, water conservancy and forest planting and development, mineral exploration and development and processing, oil and gas, waste treatment, mechanical metallurgy, food production and processing; projects that may adversely affect inland river basins, coastal areas and ecological reserves; construction projects of industrial zone, economic zone, high-tech zone and export processing zone; construction projects of new cities and residential areas; large-scale development and utilization projects of groundwater and natural resources; projects with great potential negative impact on the environment. Environmental assessment results will be used as one of the bases for project approval. Vietnam's Ministry of Natural Resources and Environment is responsible for organizing environmental assessments of projects approved by the national assembly, the government and the prime minister. Relevant ministries and commissions of the government are responsible for organizing environmental assessments of the projects approved by their own departments, while provincial governments are responsible for environmental assessments of the projects approved by their own provinces.

Foreign Investment Policy of Vietnam

Vietnam's investment authority is the Ministry of Planning and Investment which is responsible for the management

of domestic and foreign investment, industrial zones and free trade zones. It is in charge of the use of official development assistance, the management of bidding for some projects, the establishment and development of economic zones and enterprises, etc.

Vietnam promulgated the Law on Foreign Investment in Vietnam on November 12, 1996 and amended it on June 9, 2000. The law provides a basic legal basis for foreign direct investment (FDI) in Vietnam. It not only defines the scope and form of FDI, but also clearly provides the List of Encouraged Investments, List of Restricted Investments and List of Prohibited Investments. In the "List of Restricted Investments", in addition to the projects endangering national security and interests, the projects harmful to cultural and historical sites, morality and customs, people's health, resources and environment are also included. The production of new energy, especially the application of such new energies as solar energy, wind energy, bio-gas, geothermal energy and tidal energy, is listed in the List of Encouraged Investments, while the application of advanced technology, industries conducive to ecological and environmental protection, and the effective use of natural resources are all the investment fields clearly specified in the list. The law also makes it clear that Vietnam will not allow foreign institutions to invest in any project that may adversely affect its national security, defense, cultural and historical heritage, fine customs and traditions and ecological environment.

The Law on Foreign Direct Investment in Vietnam also specifies that the Vietnamese government should treat all foreign institutions investing in Vietnam impartially and equitably, and provide detailed regulations on investment guarantee measures. It also specifies the rights and obligations of foreign institutions investing in Vietnam. Article 51 of the law states that foreign institutions investing in Vietnam must comply with relevant provisions of its environmental protection laws and regulations.

Investment appeal of Vietnam

According to the Doing Business 2018 issued by the World Bank, Vietnam ranked 68th out of 190 economies worldwide, up 16 places from a year earlier. The Global Competitiveness Report 2017-2018 issued by the World Economic Forum shows that Vietnam ranked 55th among the 137 most competitive countries and regions in the world.

◆ With stable political situation, rapid economic and

¹² Ambient environmental quality standards include environmental protection standards of land for various purposes, environmental standards for surface water and groundwater, environmental protection standards of coastal waters for aquaculture and recreation, air standards for urban and rural residential areas, and environmental standards for noises in residential area. Environmental protection standards for waste material discharge include those for discharge of wastewater from industrial and agricultural production, industrial gas and fixed discharge and toxic substance discharge. The technical specification system for environmental protection of Vietnam mainly includes 21 technical specifications of wastewater discharge, 8 technical specifications of exhaust gas and noise, 6 technical specifications of hazardous sludge (soil) pollution and 6 technical specifications of water source and domestic water.

social development, and sustainable policies, Vietnam has GDP growth rate of 5%-7% in recent years and

- ◆ relatively low labor costs. According to the regulations of Vietnamese government, starting in 2018, the minimum monthly salary for domestic labor forces shall be 2.67-3.98 million VDN (about RMB 800-1,200).

- ◆ Vietnam enjoys a good geographical location. It has a 3,260 kilometers long coastline, with numerous ports and convenient transportation.

- ◆ The investment law is relatively open and perfect, offering comprehensive basic legal guarantee and more preferential policies for foreign investment.

- ◆ Vietnam also has a high degree of openness to the outside world. The country pursues a comprehensive and diversified diplomatic route; maintains friendly relations with traditional neighbors; actively develops friendly cooperation with ASEAN countries; and focuses on development of relations with major economies such as China, America, Russia, Japan, India, the European Union and other international multilateral development financial institutions, including the World Bank and Asian Development Bank (ADB). Vietnam joined the World Trade Organization (WTO) in 2007. At present, it has signed or is

promoting 16 free trade agreements.

- ◆ Vietnam has a huge potential for infrastructure demand. According to the infrastructure construction planning of Vietnam in 2020, it will make great efforts to develop and construct highway, railway, inland water transport, maritime transportation department, air transportation and other sectors.

Meanwhile, Vietnam's economy is largely dependent on exports and vulnerable to the international economic environment, and the government has so far failed to come up with effective solutions to problems, such as government bonds and excessive bad debt. Although the laboring population is abundant, only about 20% of them have received good education and vocational skills training, and their quality needs to be improved. The domestic supporting industry is backward, and most of the equipment and raw materials for production have to be imported. At the same time, Vietnam has strict control of foreign exchange; the use of American dollars by investors is restricted and the exchange rate is unstable. In addition, the efficiency of Vietnamese government departments is low, and state-owned enterprises also have the risk of default, which is quite risky for investors.

Status Quo, Obstacles and Potential of Renewable Energy Development in Vietnam

Vietnam's power system is now in transition. Over the past five years, power loads have been growing rapidly with an average annual growth rate of 10%. Vietnam needs an investment of USD 150 billion to support the upgrading of its power system, according to the estimates by Electricity of Vietnam (EVN). As Vietnamese government debt nears a specified limit, how to leverage enough funds to invest in the power sector to solve the problem of power shortage is one of the issues that the government pays great attention to in the energy and power industries. A proper solution to this problem will have a profound impact on Vietnam's GDP growth potential, trade balance, environmental performance and energy security.

Rich in fossil energy and renewable energy resources, Vietnam is one of the most efficient electricity markets in southeast Asia, with domestic electrification rate of 99%. It also has lower electrification costs than its neighbors. To meet the increasing demand for electricity due to socio-economic development, energy demand growth needs to be

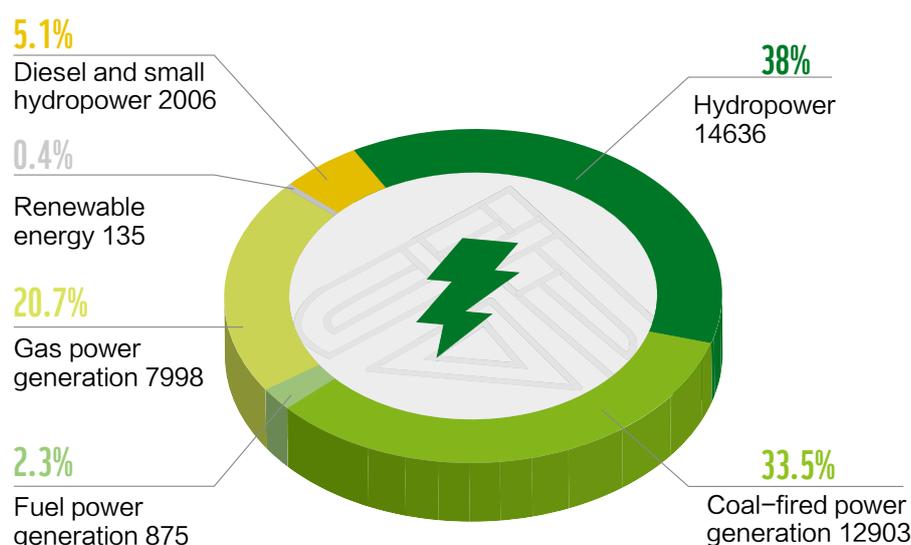
maintained at more than 10% a year for the next five years, and the installed power capacity needs to be doubled. The government is working hard to develop renewable energy sources to ensure energy security and meet the growing demand for electricity.

Vietnam has diversified energy sources, including coal, oil, natural gas, hydropower and other renewable energy. According to the Vietnam Renewable Energy Report 2018, hydropower and coal power accounted for the largest proportion of all electricity generation sources. As of 2017, coal power accounted for about 34% of the country's electricity supply (including wind power, biomass and solar energy), hydropower for 38% and natural gas for 18%. Renewable energy (excluding hydropower) accounted for 10% of electricity supply in 2017, thanks to a range of government incentives to boost investment in renewable energy¹³. Compared with 2015, both coal power and renewable energy increased in Vietnam's national electricity supply, as shown in the figure below¹⁴:

¹³ In 2015, renewable energy accounted for about 0.4% of electricity supply, hydropower for 38%, natural gas for 20.7% and coal power for 33.5%.

¹⁴ <https://www.vir.com.vn/vietnam-renewable-energy-report-2018-63034.html>

Power generation by fuel type (December 2015)



Graphic ©Asia Briefing Ltd.

According to the statistics of Vietnamese government, as of 2017, the actual installed capacity of solar energy in Vietnam is 8 MW, and the potential installed capacity can reach 7,140 MW. The installed capacity of wind power is 189.2 MW, and its development potential is about 26,763 MW. It is estimated that the annual growth rate of Vietnam's energy demand will exceed 10% from 2016 to 2020, and about 8% from 2021 to 2030 to meet the country's economic and social development. By 2030, electricity consumption is expected to be about four times that of 2014. According to the government's electricity development planning, coal power and hydropower remain the main sources of electricity supply in the short run. The share of nuclear and renewable energy, especially wind energy and solar energy, is set to grow substantially.

Vietnam has considerable solar energy and wind energy endowment, and the cost of solar and wind power has fallen significantly over the past five years (including a 75% reduction in the cost of solar power and a 30% reduction in the cost of wind power), bringing the levelized cost of renewable power supply down to a level similar to that of conventional fossil-fuel power generation. At the same time, renewable energy generation projects have lower potential risks, shorter construction cycle than conventional generation of energy, and more flexible site selection, which is more conducive to meeting Vietnam's growing demand for power. In addition, Vietnam's large installed hydropower capacity and natural gas reserves allow it to diversify its renewable energy portfolio with a cheaper price than other countries'. As wind and solar power technologies mature, the trend of cost decline slows down on a gradual basis, but the market generally believes that the investment cost of renewable energy will continue to drop, which will promote renewable energy to become a cheaper power resource than conventional fossil energy.

Vietnam has very good solar energy resources. The average solar radiation in Vietnam is 4.6 kWh/m² per day. As more and more distributed solar power generation models are applied in rural and remote areas, the proportion of solar power generation will increase significantly. Vietnam has relatively rich wind resources, mainly concentrated in the central coast of south-central region, the central highlands and the south coast.

At present, the total potential of regions with wind speed of at least 6 m/s in Vietnam is about 8,000 MW, while the regions with wind speed of at least 6 m/s have greater development potential of wind power. The potential of solar power is 4-5 kWh/m², subject to the location of the solar power plant. Currently, there are only residential and demonstration projects of 4MW and the installed geothermal potential is about 200 MW.

Due to its abundant wind power resources, Vietnam has made wind power a priority for development in its energy and power industries. Since June 2011, the government has set a fixed price of 1,614 VND/KWh, or EUR 0.00006 per KWh, for EVN's wind power, while giving EVN a subsidy of 207 VND for every KWh of wind power. Since August 2011, wind power developers have been exempted from equipment import duties and taxes on enterprises.

In September 2011, the Vietnamese government began implementing the National Electricity Development Planning to improve the country's energy security, efficiency, deployment of renewable energy and liberalization of electricity market. The goal of the planning is to increase the proportion of renewable energy power generation from 3.5% in 2010 to 4.5% and 6% by 2020 and

2030, respectively. The planning also includes the target of installed capacity of each type of technology.

In November 2015, the Vietnamese government released the Renewable Energy Development Strategy 2016-2030 with outlook until 2050, which took effect in 2016. As a guiding document for development of national renewable energy, the planning has set clear medium to long-term objectives, with a focus on such fields as biomass energy, wind power and solar energy technology. According to the planning, Vietnam's renewable energy generation will reach 7% of its gross generation by 2020 and 10% by 2030. Vietnam will also slash its coal and oil imports to meet the targets of cutting greenhouse gas emissions by 5% by 2020, 25% by 2030 and 45% by 2050.

At present, there are many obstacles in the development of global renewable energy in countries worldwide, including Vietnam. Vietnam is opening up the electricity market and promoting its privatization through some policies and measures to drive the development of domestic renewable energy, so as to meet its objectives of national energy planning and NDC. Despite the growth of both domestic and foreign investment in renewable energy and the gradual opening and liberalization of the electricity market in Vietnam in recent years, investors are still faced with a number of difficulties. Examples:

◆ Economic barriers: currently, some renewable energy technologies are quite cost competitive, but without consideration of the negative external cost, most renewable energy projects still cannot compete with power generation projects of conventional fossil fuel subsidized by the government and the electricity tariff cannot reflect the real cost of production. As a result, the income on investment of the renewable energy generation technology is not very high.

◆ Laws, regulations and administrative management obstacles: EVN's management procedures are complex and opaque, and it is difficult to negotiate power purchase contracts with EVN, resulting in significant increase of investors' capital and time costs. Moreover, the planning and approval procedures for Vietnam's renewable energy industry are complex and time-consuming, increasing the time cost and the unpredictability and risks of future development. The uncertainty of future retail prices in Vietnam also hinders investors from making investment decisions.

Standard power purchase contracts are not investable. For instance, the standard PPA provisions of the wind power department set up many obstacles for banks to provide debt financing for new wind power projects, and the power purchase terms expose investors, especially foreign investors, to a series of investment risks. EVN faces numerous financial hurdles, with no credit assurance. Project developers and financiers worry that EVN may not pay for electricity as contracted. The risk is more serious for foreign developers and investors. At the same time, the development trend of

laws and regulations in Vietnam's renewable energy and power industries is quite uncertain. So far, no clear laws and regulations on renewable energy industry have been promulgated to promote and regulate the development of the industry.

◆ Financial barriers: it is difficult to obtain financing funds with acceptable costs. Since renewable energy is in the development stage in Vietnam, there are a few projects, and commercial banks lack experience in project evaluation. The loan interest rate of renewable energy projects of local commercial banks is relatively high, with an annual interest rate of at least 10%. The loan term is relatively short, usually 10 years. International banks can provide loans with a lower interest rate (lower than 5%) under the condition of government guarantee. The lack of adequate funds and appropriate financing channels makes it difficult for developers of renewable energy projects to obtain long-term funding support with financial feasibility. There is not enough incentive system to promote the investment and development of the renewable energy industry with high cost; despite the government's aggressive efforts to privatize and liberalize the power department, Vietnam's electricity market remains uncompetitive; so far, there is no long-term, unified renewable energy development planning to provide legal and regulatory guarantee and guidance for the financing, site, developer and business license of renewable energy.

◆ Technical barriers: there is a lack of human resources with relevant knowledge and skills in the renewable energy sector, and the overall industrial and technological supply chains need to be developed, and there are a few renewable power equipment manufacturers. Strengthening the supply chain in the renewable energy sector will help meet its renewable energy development goals and create economic value for the local.

With reference to the development history and experience of renewable energy in other countries, a single policy is not enough to address the multiple barriers to renewable energy development. Current challenges and risks will not be addressed until efforts are made in technology, finance, economy, market and other fields.

CHAPTER II RENEWABLE ENERGY DEVELOPMENT AND INVESTMENT DEMAND IN VIETNAM

Nationally Determined Contribution Goals and Green and Low-carbon Development Policies of Vietnam

Energy, Climate Goals and Relevant Policies

Globally, Vietnam's greenhouse gas emissions are relatively low. However, Vietnam's per capita greenhouse gas emissions are high, ranking the 34th place in the world. Vietnam's carbon dioxide emissions per unit of GDP are much higher than any similar neighbor in Southeast Asia. With the rapid socio-economic development, Vietnam's greenhouse gas emissions will increase dramatically and are expected to reach 466 million tons of carbon dioxide by 2020 and 765 million tons by 2030, mainly from the energy sector. The Vietnamese government has introduced a series of policies to cope with climate change and achieve energy transformation. According to publicly available information, Vietnam's current green and low-carbon development policies mainly include:

- National Target Programme to Respond to Climate Change (NTPRCC) (2012-2015)
- National Target Program on Energy Efficiency (NTPEE) (2012-2015)
- Vietnam Green Growth Strategy (VGGS) in 2012
- Support Programme to Respond to Climate Change (SPRCC)

- Vietnam Green Growth Strategy (VGGS) on September 25, 2012
- The Green Growth Action Plan (GGAP) (2014-2020) of Vietnam, on March 20, 2014
- Nationally Determined Contribution Implementation Plan, on October 28, 2016
- Resolution on the Orientation of the National Energy Development Strategy of Vietnam to 2030, with a Vision to 2045, on February 11, 2020

Vietnam Green Growth Strategy (VGGS), promulgated in 2012, sets out three strategic tasks. The first is to reduce greenhouse gas emission intensity and promote the use of clean and renewable energy according to relevant targets. The National Action Plan on Green Growth in Vietnam for the Period of 2014-2020, formally approved in 2014, divides the national action plan on green growth into four main directions. The second category is to “reduce greenhouse gas emission intensity and improve the utilization of clean and renewable energy”. The action plan of this category includes:

Initiatives	Contents	Lead Agency	Fund Source
Formulation of relevant policies, giving priority to the development of clean energy/ optimization of systems (2013-2014)	<ul style="list-style-type: none"> —Review and revise the master plan of hydropower development —Develop investment, tax and pricing policies and use market economy policies and tools to encourage the development and use of natural gas —Use economic policies to promote the production and consumption of new energy sources (solar energy, wind energy, biomass, thermal energy and biofuel) and to monitor the implementation effect of policies. 	<p>MoIT/ Ministry of Planning and Investment/Ministry of Science and Technology/Ministry of Natural Resources and Environment/Ministry of Finance/ provincial PPC</p>	National budget
Support of R&D of new energy sources (wind energy, solar energy, tidal energy, geothermal energy, biomass and biofuel), including technology, innovation and structural adjustment (2014-2020)	<p>Provide supports for new energy and renewable energy utilization projects, such as investigate and survey, research and production experiments and best practices:</p> <ul style="list-style-type: none"> - Protect intellectual property rights and technological innovations that promote the commercial development of renewable energy; - Give priority to providing tariff preference for imported new technology and equipment; - Support investment in new energy production equipment and provision of domestic services. 	<p>MoST/Ministry of Planning and Investment/ Ministry of Industry and Trade/ Ministry of Agriculture and Rural Development/ Ministry of Finance/ provincial PPC/Metnam Energy Association</p>	<p>National budget Enterprise investment International technical assistance</p>
Improvement of the legal system construction of clean air. Implementation of greenhouse gas inventory, monitoring of GHG emissions and management of GHG mitigation measures/system improvement (2013-2015)	<ul style="list-style-type: none"> - Investigate, evaluate and establish a legal framework for clean air; - Provide supports for the establishment of a regular GHG emission inventory, such as improvement of the capacity of government officials and establishment of a database; - Strengthen interdepartmental coordination, monitor GHG emissions on a regular basis and manage GHG mitigation actions and measures. 	<p>MoNRE/ Ministry of Science and Technology/Ministry of Industry and Trade/Ministry of Transport/Ministry of Construction/Ministry of Agriculture and Rural Development/provincial-level PPC</p>	<p>National budget International technical assistance</p>

With the growth of population, improvement of living standard and economic development, Vietnam's energy demand increases year by year. Vietnam needs to build a clean, affordable and reliable power supply system that meets increasing energy demands while minimizing environmental and social risks caused thereby. Vietnam's documents on energy development goals and policies include the Nationally Determined Contributions and the Vietnam Power Development Plan for the 2011-2020 Period (revised). To promote the development of the power industry and renewable energy, the Vietnamese government issued the

Electricity Law and the Renewable Energy Development Strategy 2016-2030 with outlook until 2050, of which the Electricity Law provides a legal basis for the development planning and investment of the power industry, and stipulates the rights and obligations of institutions and individuals involved in the power industry. The law involves the functions, obligations and powers of power operation, anti-monopoly, and opens up the power production industry to ensure the fairness and justice of power supply and consumption.

According to the Nationally Determined Contributions (NDC), Vietnam has pledged to reduce GHG emissions by 8% below the baseline scenario by 2030, and to reduce carbon emission intensity per unit of GDP by 20% as compared with 2010. If supported by international funds and technologies, Vietnam can increase its GHG emission by 25% based on the baseline scenario, and its carbon emission per unit of GDP will be 30% lower than that in 2010. Vietnam's NDC also made clear the measures and actions it plans to take to achieve the emission reduction target, such as strengthening government guidance; improve the effectiveness and efficiency of energy utilization and reduce the total energy consumption; promoting the development and application of renewable energy; strengthening international cooperation. Vietnam's NDC expects that in the future the main domestic energy

demand will be met with coal power, hydropower and natural gas, which will be replaced with nuclear power and renewable energy on a gradual basis.

To implement the goal of NDC, the Vietnamese government approved the Revision of Power Development Plan for the 2011-2020 Period in March 2016. The revised plan lowers the growth forecast for electricity demand and encourages the use of renewable energy, such as solar energy, biomass energy and geothermal energy. The revised plan reduces the annual growth rate of GDP between 2016 and 2030 to 1.5%-7.0%. Such an adjustment reduces the electricity demand by 20% in 2020 and by 18% in 2030. The plan is an important measure for Vietnam to achieve its goal of nationally determined contributions under the Paris Agreement.

Renewable energy	2015	2020	2030	2050
Production (Mtoe)	25	37	62	138
The proportion of total primary energy consumption	31.8%	31%	32.3%	44%
Power generation (GWh)	58 (35%)	101 (38%)	186 (32%)	253 (43%)
Hydroelectric generation (GWh)	56	90	96	
Pumped storage capacity (MW)	N/A	N/A	2400	8000
Biological energy (toe)	0.3	1.8	9	20
Wind energy (GWh)	180000 kWh	2.5 (1%)	16 (2.7%)	53 (5%)
Solar Energy (GWh)	0.01	1.4 (0.5%)	35.4 (6%)	10 (20%)

Table 2-1 Main Goal of Vietnam's Renewable Energy Development Strategy by 2050

Note: kWh=kilowatt-hour, Mtoe=million tons of oil equivalent

Source: consolidated from IEA data

Green and Low Carbon Development Policy

Since its economic and political reforms in 1986, Vietnam has grown from the world's poorest country to a low and middle income country. During the process, Vietnam has also completed the supply of education, health and other basic services and infrastructure (e.g., electricity and health facilities). Vietnam is improving its ability to cope with its vulnerability to climate change, such as resource exhaustion, air pollution, biodiversity destruction, deforestation and degradation, through institutional reforms and investment to promote sustainable and green development of the country.

Vietnam ratified the Paris Agreement in 2016, pledging to increase its forest covered area to 45% and offering to cut GHG emissions by 8% by 2030, based on the baseline scenario. Vietnam has formulated the National Green Growth Strategy for the Period 2011-2020, which covers carbon emission reduction targets and GHG emission monitoring, assessment and reporting programme, as well as a phased action plan for the establishment of a carbon trading market. In addition, Vietnam has promulgated the National Action Plan on Green Growth for Period 2014- 2020 to encourage the development of clean and renewable energy.

Vietnam's banking and financial systems are booming. From

2015 to 2017, the Vietnamese government introduced a range of sustainable financial policies and guidelines to support the implementation of the National Action Plan on Green Growth for Period 2014- 2020. The State Bank of Vietnam (SBV) has promulgated three green financial regulations and guidelines, which are currently in the implementation stage, including:

In 2015, it issued the Directive on Promoting Green Credit Growth and Environmental and Social Risks Management in Credit Granting Activities (hereinafter referred to as Directive) and the Action Plan of the Banking Sector to Implement the National Green Growth Strategy until 2020.

To promote the positive improvement of banking business and activities, the Directive encourages all credit institutions, including commercial banks, financial companies, financial lending companies, cooperative banks and branches of foreign banks, to research and develop a set of environmental and social risk management system for their credit activities, and to regularly monitor and supervise the environmental and social risk management of the customers receiving their loans.

The Directive requires credit activities to consider environmental protection, natural resources and energy efficiency improvement, as well as to improve environmental quality and protect people's health. All credit institutions

(i.e. commercial banks, cooperative banks, non-bank credit institutions, microfinance institutions, people's credit funds and branches of foreign banks) must establish and implement environmental and social risk management systems and report to SBV on a quarterly basis. The Directive encourages credit institutions to give priority to providing financial support for project activities that effectively save, develop and utilize natural resources, and to support research and development of green credit products, and develop credit incentives for projects, production and commercial activities promoting green growth.

In 2016, Vietnam issued the Circular Prescribing Lending Transactions of Credit Institutions or Foreign Bank Branches with Customers (hereinafter referred to as Circular) to regulate the usual lending rules. The Circular clearly indicates that the compliance with environmental laws and regulations must be one of the principles for credit institutions to extend loans to customers.

In 2017, SBV issued complementary initiatives, including the Green Project Catalogue (defining green projects and industries), the Guidelines and Requirements of Statistics on Green Credit of Credit Institutions and the Master Credit Program (providing financial incentives, such as interest rates or preferential clauses, for green projects).

- The Directive and the Circular require all credit institutions to develop policies for environmental and social risk management, but fail to provide guidance and suggestions on how credit institutions should establish their policies and systems.
- The Directive applies to the banking sector. Similarly, these policies can provide a reference for other financial activities, including asset management, private equity investment or insurance.
- The Directive indicates that climate change, as an environmental risk, requires analysis and assessment. In the future, climate strategies need to be incorporated.
- Vietnam's relevant departments in charge may consider referring to the best practices of international industry and encourage financial institutions to join international initiatives in the future.

Meanwhile, Vietnamese government has promulgated a series of fiscal and tax policies to promote green transformation, thus building a green economy system. For instance, the Environmental Tax Law promulgated in 2010 and formally took effect in 2012 introduced the environmental protection tax officially, making Vietnam become a pioneer in the reform of environmental tax among Southeast Asian countries. Under the law, refined fuels, coal and other environmentally harmful substances (HCFCs, pesticides and soft plastic bags) are taxed in the form of unit consumption tax. In addition to the environmental tax, the government has

levied environmental protection fees on sewage, solid waste and extractive industries (including coal gas, natural gas, crude oil, metals and non-metallic minerals) since 2003, 2007 and 2008 respectively. Vietnam's Ministry of Planning and Investment has also considered development of a road map for implementation to identify more effective fiscal incentives, such as levying carbon tax and shifting public investment to energy efficiency and renewable energy, with a view to promoting the green growth strategy and achieving its economic and environmental goals.

Renewable Energy Investment Demand and Opportunities in Vietnam

With the economic and social development, Vietnam has become one of the ASEAN countries with the most investment appeal. In terms of the proportion in GDP, Vietnam's FDI has surpassed China and India, so Vietnam has become the ASEAN country with the highest proportion of foreign investment, except Malaysia. In 2017, Vietnam's FDI reached USD 17.5 billion, hitting a record high. Registered FDI in Vietnam has nearly doubled over the past four years, from USD 20 billion in 2014 to USD 36 billion in 2017, according to Ministry of Planning and Investment.

By the end of 2017, 115 countries and regions had invested in Vietnam. Vietnam's foreign investors include Japan (USD 9.11 billion, 25.4% of total foreign investment), South Korea (USD 8.49 billion, 23.7%), Singapore (USD 5.3 billion, 14.8%), and China (USD 2.17 billion, 6.1%). The cumulative amount of Amiran investment agreements in Vietnam is USD 11 billion, ranking the ninth place in terms of the source of foreign investment, accounting for 3.5% of the total amount of foreign investment in Vietnam. Russia's investment in Vietnam was USD 1.1 billion, or 0.3% of the total foreign investment in Vietnam. Nine ASEAN countries' amount of investment in Vietnam was USD 65.9 billion, or 20.7% of the total foreign investment in Vietnam. Since 1992, Japan's ODA to Vietnam has totaled 2.8 trillion yen (about USD 27 billion), making Japan become Vietnam's largest donor. The EU is an important trade partner and source of aid for Vietnam. By the end of 2017, EU's investment in Vietnam amounted to USD 19.83 billion, accounting for 6.2% of the total foreign investment in Vietnam, with 1,764 investment projects in Vietnam.

According to the distribution of foreign investment¹⁵, the processing and manufacturing industry is the most attractive field, with the amount invested hitting USD 15.88 billion, accounting for 44%. The second attractive field is electrical production and distribution industry, with the amount invested hitting USD 8.37 billion, accounting for 23%. Among the 59 provinces and cities in Vietnam, Ho Chi Minh City has

the most foreign investment, which totals USD 6.5 billion and accounts for 18% of the total amount of foreign investment in the country, followed by Bac Ninh Province (USD 3.4 billion or 9.5%) and Thanh Hoa Province (USD 3.17 billion or 8%).

In recent years, although Vietnamese government actively promotes the development and implementation of foreign investment policies, there are still many problems and obstacles. At present, the main obstacles of foreign investment in Vietnam include imperfect laws and regulations, poor regulation and complicated management procedures of the country. At the same time, Vietnam's financial and banking systems feature high risks, weak financial structure and high inflation risks. To address these problems and attract foreign investment, Vietnam must improve its policy and regulatory system and develop efficient public management mechanisms for foreign investment. In the meantime, it is necessary to strictly screen foreign investment projects and carefully issue investment licenses for those invalid and inefficient projects.

Foreign investors have diversified forms of investment in Vietnam, such as bonds, equity, real estate, goods, hedge funds and private equity investment. Financial derivative instruments are relatively rare in Vietnam. The government is studying and establishing the necessary laws and regulations to encourage R&D and innovation of financial derivatives.

Vietnam boasts rich renewable resources and energy, with great development potential. According to the country's master plan for renewable energy development, the government plans to increase the installed wind power capacity from 140 MW to 800 MW by 2020 and to 6,000 MW by 2030. In 2020, the installed capacity of solar power generation is expected to increase from the existing 850 MW to 4,000 MW and to 12,000 MW by 2030. The Vietnamese government is increasing the proportion of renewable energy in power supply through policies and actions, which is expected to increase to 5.6% by 2020 and to 9.4% by 2030.

Main participating organizations of Vietnam's electricity market and the participation mode of foreign investment

Market Participants	Opportunities
EVN	It requires external support to meet anticipated requirements
Independent power producers (IPPs)	With the opening of the electricity market, they are expected to play more roles
Privatized power producers	Previously, they were unable to participate in the electricity market
BOT projects	Laws and regulations need to be improved

¹⁵ The statistical data in 2017 is also taken as the basis.

In 2015, Vietnam's installed capacity reached 39.35 GW; coal (3.5%), natural gas (22.5%) and large and medium-sized hydropower (37.5%) were the three pillars of power production, while renewable energy accounted for 5.4% merely, including small hydropower, biomass energy, wind energy and solar energy. In the same year, Vietnam issued the National Renewable Energy Strategy (RES), with relevant goals reflected in the Revised National Power Development Master Plan (revised PDP VII). According to the revision of PDP VII, Vietnam currently plans to increase the proportion of renewable energy in gross generation to more than 10% by 2030. Later in 2016, Vietnam decided not to go nuclear and halted preparations for two nuclear plants with installed gross capacity of 4,000 MW. This capability gap provides a window of opportunity for increasing solar and wind energy.

investors are actively participating in the investment in the manufacturing sector, and the government has created a positive policy environment for private capital to invest in renewable energy power production and manufacturing, despite the problems in the renewable energy power sector, such as the regulatory environment to be developed and the high price of electricity. To promote renewable energy development and create a market that can unleash the potential of private investment, Vietnam is taking active measures, such as raising the on-grid electricity tariffs for renewable energy projects and promoting the construction of a green financial system to leverage the flow of funds to green and low-carbon industries, including renewable energy enterprises. At the same time, it is also actively driving the reform of the management system, promoting the liberalization and privatization of the electricity market, and has worked out a relatively clear schedule and roadmap.

Vietnam shows a strong economic growth. Foreign

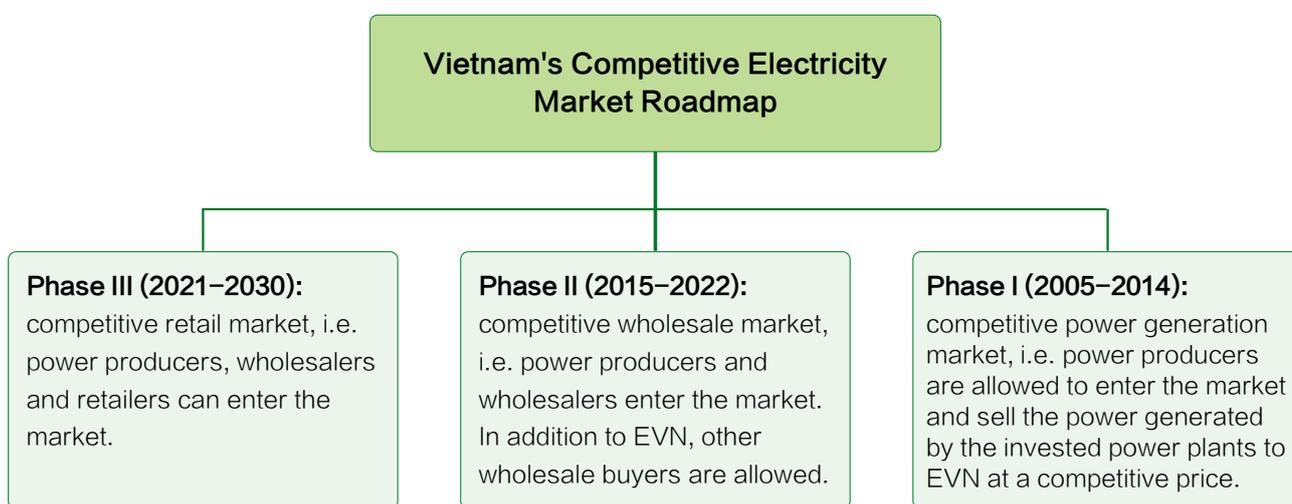


Fig. 2-6 Vietnam's Competitive Electricity Market Roadmap

According to Vietnam's renewable energy development plan, renewable energy projects enjoy tariff exemption for imports of fixed assets, raw materials and semi-processed products. The tax holiday is applicable to the taxes on enterprises; taxes are exempted for the first four years and 50% for the next 9 years. Other financial incentives include credit priority, land use and fees for environmental activities. To ensure continuous reporting for investors, an approved electricity

tariff (cost-based electricity tariffs and on-grid electricity tariffs can be avoided) is implemented for the grid-connected renewable energy power generation projects, including standardized power purchase contracts (with 20 years), and EVN is required to give priority to the grid connection and dispatching of renewable energy power generation projects and purchase of power with the approved electricity tariff.

CHAPTER III VIETNAM'S RENEWABLE ENERGY INVESTMENT ENVIRONMENT AND RISKS

Vietnam Renewable Energy Investment Policy

Vietnam is dominated by hydropower and thermal power, with a total capacity of 43,010 MW, ranking second among ASEAN countries. According to Vietnam's seventh power development plan, total national electricity demand will reach 340-370 billion kWh by 2020. Renewable energy power generation, especially wind power, together with thermal power and nuclear power, will become the focus of Vietnam's power development in the future. Chinese-funded enterprises have strong competitiveness in the Vietnamese power market. The completed and ongoing power projects include: Hai Phong Phase I and II Thermal Power Projects, Cam Pha Phase I and Phase II Thermal Power Projects, Quang Ninh Phase I and Phase II Thermal Power Projects, and Son Dong Power Plant Project, Vinh Tan Phase II Thermal Power Project, Duyen Hai Phase I and Phase III Thermal Power Project, Hai Duong Thermal Power Plant, Mao Khe Thermal Power Plant and Thang Long Thermal Power Plant, etc.

Vietnam's power demand has grown rapidly, power supply has been in short for a long time, and power curtailment has occurred from time to time. The Ministry of Industry and Trade is the government ministry responsible for electric power, and the Electricity of Vietnam (EVN) is a hub enterprise that integrates national power production, supply, distribution and dispatch. In order to adapt to the trend of clean energy development and reduce environmental pollution, the Vietnamese government encourages investment in clean energy, such as solar energy and wind energy. In June 2011, the Vietnamese government issued Decision No. 37/2011/QĐ-TTg on Mechanisms for Support and Development of Wind Power Projects in Vietnam, which

proposed policies and measures to encourage wind power development, including raising the integration cost of wind power to 7.8 cents/kWh (5.5 cents/kWh for thermal power and hydropower), and included wind power in Vietnam's seventh power development plan, and planned to increase wind power to 1 million kilowatts by 2020. In addition, Vietnam also encourages to use renewable energy sources such as solar energy, biomass energy and geothermal power to generate electricity. In mid-April 2017, the Prime Minister of the Vietnamese Government issued Decision No. 11/2017/QĐ-TTg on Mechanisms for Encouragement of Development of Solar Power in Vietnam, to exempt imported goods that constitute fixed assets of solar projects from taxation, and to exempt or reduce the use fees and lease fees of land and water for power generation and substation projects. At the same time, it is stipulated that the EVN should purchase all the electricity produced by the grid-connected solar power station at 2,086 dong/kWh (about 9.35 cents/kWh).

From 2011 to 2015, the scale and coverage of Vietnam's national power grid continued to expand, and the production continued to increase. In the past 5 years, the average annual growth rate of electricity supply and sales reached 10.84%. The average annual power supply in industry and construction increased by 9.6%, while the power supply in trade services and agriculture increased by 14.1% and 20.1% respectively. The total investment of EVN reached VND 479.62 trillion (approximately USD 22.8 billion), which was 1.37 times that of the previous five years. A total of 73 power plants of EVN have been put into operation, with a total power of 17,929 MW; the construction of 10 power projects

has been started, with a total power of 5,629 MW. During the period from 2016 to 2020, EVN will raise more than 600 trillion dong (approximately USD 28.5 billion) to invest in key projects in a targeted manner to ensure projects' quality and progress of construction. According to the plan, EVN will build and put into operation 11 power projects with a total installed capacity of 5,819 MW in the next five years.

Vietnam is a representative of developing countries that continue to maintain rapid economic growth, and is also one of the ten countries with high vulnerability to climate change. In order to meet its energy demand, coal power will be a major part in the short- and medium-term power generation increment. But in the long run, with the reduction in renewable energy costs and the strengthened actions to combat climate change, the proportion of renewable energy in new generation installed capacity is expected to increase remarkably.

In order to promote the development of renewable energy, create a better investment environment for it, and mobilize social capital to flow into the renewable energy industry, as well as to optimize the energy structure, meet the growing energy demand, improve energy security, and promote the further development of the economy and society, while achieving a green and low-carbon transformation of economic institutions, the Vietnamese government has issued a series of laws and regulations to improve the energy and power market. The basic laws and regulations are as follows:

- ◆ Electricity Law (2004)

- ◆ Electricity Law (revised in 2012)

- ◆ Decree No. 137/2013/ND-CP

- ◆ Supporting laws

- Investment law

- Enterprise law

- Decree No. 63/2018/ND-CP on the Public Private Partnership Investment Form

Electricity Law provides a legal basis for the development planning and investment of the power industry, and stipulates the rights and obligations of organizations and individuals involved in the activities and utilization of electric power. The law involves the functions, obligations and powers of power operation, anti-monopoly, and opens up the power production industry to ensure the fairness and justice of power supply and consumption. The law establishes institutions and mechanisms for the power sector, such as: In order to create an environment for business activities, ensure that the power industry is financially attractive to investors, encourage power saving, efficient power utilization, and protect the environment, the electricity tariff covers all costs and reasonable profits in the consideration of providing

government subsidies for rural electrification to help achieve the social development goals of Vietnam. The relevant content about renewable energy of this law:

- 1) In order to meet the demands of the people's life and social and economic development for the power industry, the sustainable development of the power sector should be promoted as much as possible on the basis of reasonable energy development.

- 2) Establish and develop the electricity market.

- 3) Adopt advanced technology to promote the improvement of power saving and energy consumption efficiency, and protect the ecological environment.

- 4) Improve the development and utilization of new energy and renewable energy in the power industry.

In order to achieve green and low-carbon development goals and NDC goals, Vietnam has also formulated corresponding energy and power development plans. In 2016, the Vietnamese government approved the National Power Development Master Plan for the period of 2011-2020, with outlook to 2030 (Revised Version). In particular, in the 2011 version, fossil fuels were the main areas encouraged by the Vietnamese power sector. But in the revised version, the coal production target in 2030 has been reduced by about 30%, from the previous 76GWh to 55 GWh. On the contrary, renewable energy, especially solar power, will play an important role in the 2030 plan.

The Master Plan hopes to increase the share of renewable energy to 7% by 2020 and more than 10% by 2030, while reducing the use of electricity generated by imported coal power plants to ensure energy security, respond to climate change, protect the environment, and promote economic and social sustainable development. By 2020, 2025 and 2030, the government plans to increase the installed power capacity to 60,000 MW, 96,500 MW and 129,500 MW, respectively. In addition to proposing specific development goals, the plan has also formulated a series of incentive policies to promote the development of renewable energy, which are actively promoted to improve and implement. The details are as follows:

Laws and regulations	Contents	RE goals / incentive policies
Decision No. 1855/QĐ-TTg, released on December 27, 2007	Approved Vietnam National Energy Development Strategy to 2020 with an outlook to 2050	The proportion of renewable energy in primary energy: 3%-2010 5%-2020 11%-2050
Resolution No. 1208/QĐ-TTg, released on July 21, 2011	Approved National Power Development Plan for the 2011-2020 period with a vision to 2030 (the National Electric Power Master Plan No.VII)	The proportion of renewable energy in gross generation: 3.5%--2010 4.5%-2020 6.0%-2030
Decision No. 2068/QĐ-TTg, released on November 25, 2015	Approved Vietnam Renewable Energy Development Strategy up to 2030 with an outlook to 2050	-Tax incentive policy: Exempt or reduce import tax and corporate income tax; -Incentive policy for land use: Exempt or reduce the fees of land use or lease
Decision No. 428/QĐ-TTg, released on March 18, 2016	Approved Revised National Power Development Plan for the 2011-2020 period with a vision to 2030 (Revised National Electric Power Master Plan No.VII)	The proportion of renewable energy in gross generation: 7%--2020 10%-2030
Resolution No.55 of the Political Bureau of the Central Committee of the Communist Party of Vietnam, February 11, 2020	Resolution on the Orientation of the National Energy Development Strategy of Vietnam to 2030, with a Vision to 2045	In 2030, the total installed power capacity will reach 125GW ~ 130GW. The proportion of renewable energy in the total primary energy supply: 15%-20%, 2030; 25%-30%, 2040.

Investment environment

As Vietnam's public debt continues to rise, the government is trying to expand financing channels, so the Vietnamese power sector is fully open to private investors. Since 2012, the government has adopted a series of measures to encourage investment and establish a competitive electricity market. In 2016, the government promulgated the National Power Development Master Plan for 2016-2030, which emphasized the need to increase the proportion of renewable energy power generation. It was expected that the proportion of wind, solar and biomass power generation in 2020 would increase to 7%. In 2017, non-hydroelectric renewable energy generation was only 0.5% of the total power generation. As of the end of 2018, the total installed capacity of renewable energy accounted for 2.1% of the total installed power capacity in Vietnam.

Renewable energy development is conducive to alleviating demand pressure on Vietnam's electricity and is one of

Vietnam's top priorities. According to the National Renewable Energy Development Plan for 2015-2030, Vietnam's renewable energy power output will increase from 58 billion kWh in 2015 to 101 billion kWh in 2020, reach 186 billion kWh in 2030 and increase to 452 billion kWh in 2050 or 42% of the total electricity generation. The plan recognizes the contribution of hydropower to national economic and social development and power security. At the same time, based on the assessment of the impact on the ecological environment, it decides to develop more small and medium-sized hydropower projects. Compared with 56 billion kWh in 2015, total hydropower output is expected to reach 90 billion kWh in 2020 and about 96 billion every year in 2030 and beyond. Meanwhile, the document points out to prioritize the development of biomass power generation, and drive the development of solar power to supply electricity to remote areas. The total output of solar power is planned to increase to 1.4 billion kWh in 2020, accounting for 0.5% of the total power output, 35.4 billion kWh by 2030, accounting for 6% of the total output, and 210 billion kWh or 20% in 2050. At

present, the development of onshore wind power is mainly promoted, but from 2030, the development and utilization of offshore power generation will be the focus. The total output of wind power is expected to reach 2.5 billion kWh by 2020, accounting for 1% of the total power generation, 16 billion kWh in 2030, accounting for 2.7%, and 53 billion kWh by 2050, accounting for 5.0%.

In order to achieve the above goals, the government has issued a series of preferential policies, including credit access, the exemption and reduction of taxation and land lease, as well as fixed on-grid pricing mechanisms for solar, wind and biomass power generation. Please refer to the table below for details.

Category	Supporting mechanism	Price (cents/kWh)
Solar	On-grid tariff	9.35
Wind	On-grid tariff	7.8
Small hydro	Avoidable cost price	~5, depends on seasonal peaks and daily peaks
Biomass	On-grid tariff	7.34-7.55
Utilization of solid waste energy	On-grid tariff	7.28-10.05

Table 3-1 Electricity Tariff Incentive Mechanism to Improve the Environment of Laws and Regulations

Government departments relating renewable energy policy and investment

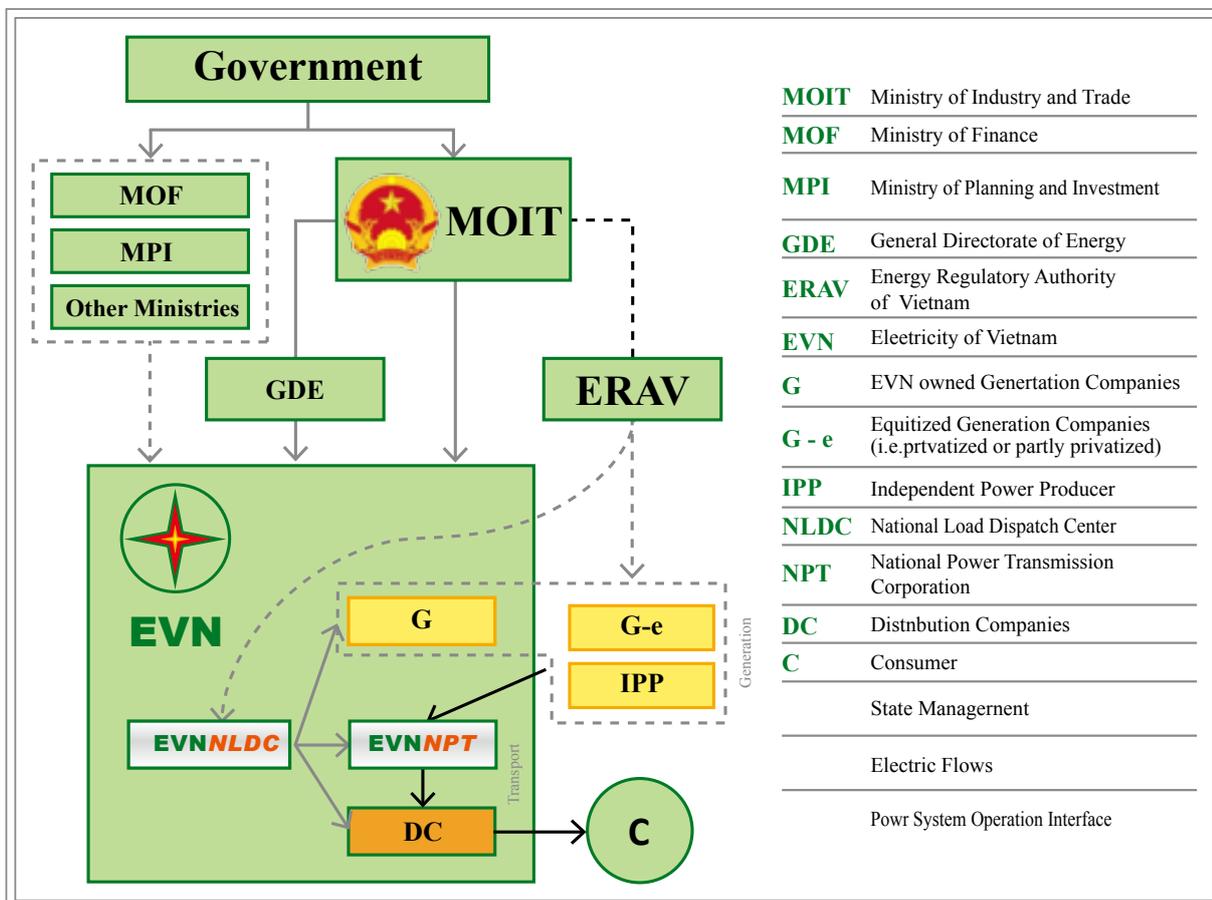


Figure 3-1 Vietnam’s Energy and Power Agencies and Their Responsibilities

The figure above shows the relevant government agencies in the field of energy and power in Vietnam and their relationship. The specific responsibilities of each agency are as follows:

1) Ministry of Industry and Trade: Regularly review and supervise project investors and contractors, promptly guide and remove obstacles in the investment process, and promote projects to operate efficiently according to approved schedules. Report to the Prime Minister on the postponement of the project in order to resolve relevant issues; closely monitor the progress of power supply and consumption, power generation and power grid projects to determine or adjust the project progress. Or according to the actual needs of economic and social development in different periods, report to the Prime Minister whether to approve new projects to join the master plan or cancel non-essential projects; guide the formulation, evaluation and approval of the site, thermal power center and hydropower plans in the master plan. Manage the development and import of natural gas, coal and other resources to meet the needs of power, industry, or other necessary industries; publish approval project and investor list of the master plan, and submit it to the Prime Minister for approval; organize international bidding to select investors of power projects. If a contract party needs to be appointed, relevant departments will be coordinated and submitted to the Prime Minister for review; the financing plans for power development will be reported to the Prime Minister;

2) Ministry of Planning and Investment: develop mechanisms and policies to attract foreign investment, ODA and private capital, and promote the balance and sustainable development

of the power sector; coordinate with the Ministry of Industry and Trade to provide an adequate budget for the formulation and publishing of the power sector development master plan.

3) Ministry of Finance: Lead and coordinate relevant departments and agencies to formulate financial and capital mechanisms to promote the development of the power sector; coordinate the Ministry of Industry and Trade to formulate electricity tariff policies based on market mechanisms.

4) State Bank of Vietnam: Guide and coordinate relevant departments and agencies to formulate appropriate policies and mechanisms to improve banks' ability to meet the funding needs of power projects in the master plan.

5) Electricity of Vietnam: According to the planned timetable, invest in power generation and grid projects and ensure their commissioning and operation. Be responsible for purchasing electricity, importing electricity, managing and operating the power transmission and distribution system to ensure the national power supply; participate in the detailed planning of the site and the thermal power center in the national power master plan, and submit it to the Ministry of Industry and Trade department for approval; be responsible for the investment and construction of infrastructure projects for the thermal power center, mainly responsible for the investment in power projects; take measures to further reduce power losses in the process of power production, transmission and distribution, formulate power-saving plans, and promote the sustainable development of the power industry; guide the national power transmission company to construct 500 kV and 220 kV power transmission projects.

Vietnam's solar power investment potential and related policies

Vietnam is one of the countries with the highest annual sunshine time in the world, with an average of about 2000 ~ 2500 hours. Its solar energy production potential is huge. According to the solar resource map of Vietnam, the southern region has sound solar radiation, with an average solar energy intensity of 5 kWh/m²/day, becoming the most suitable place for developing solar resources. By 2030, Vietnam is expected to increase its annual solar production capacity to 12GW.

Due to lower on-grid electricity tariffs, Vietnam's solar power generation capacity is lower. MOIT has proposed to provide preferential policies for the development of solar energy, and it is expected to increase its on-grid electricity tariffs to 0.112 ~ 0.167 USD/kWh. The specific price depends on electricity consumption and production. In island areas, electricity tariffs may increase to 0.19 USD/kWh. In addition to electricity tariffs, there are also supporting preferential policies involving land, investment, import tariff and corporate income taxation. Vietnam has also upgraded its installed capacity of solar power from almost zero to 0.8GW in 2020 and 12GW in 2030 in its power development plan.

The latter accounted for about 3.3% of total energy output that year. At the same time, with the substantial decline in equipment prices, the price of solar panels has dropped from 3-4 USD/W at peak to below 0.5 USD/W. Vietnam's natural resource conditions, like an average solar irradiance of 4.5-5.5 kWh/m²/day, are very conducive to the solar power generation projects. Therefore, with the increase in electricity tariffs, the implementation of supporting preferential policies, the reduction of equipment prices and the reduction of operating costs, Vietnam's renewable energy, especially solar power, will have dramatically increased investment potential.

In April 2017, the Prime Minister of Vietnam issued a Resolution on the Incentive Mechanism for the Solar Power Generation Industry. One of the key government support policies indicates that the Vietnamese government has committed to a guaranteed price of 0.0935 USD/kWh (2,086 VND) for the purchase of electricity generated by solar power projects and it would last for 20 years. This clause guarantees the profitability of solar power projects and promotes the influx of domestic and foreign capital to solar power projects

in Vietnam. Solar project operators who were able to sign electricity purchase agreements with the Electricity of Vietnam (EVN) in June 2019 would enjoy incentives in terms of capital, corporate tax, equipment and venues. At the same time, the government stated that it would not provide the guaranteed price for those who signed after June.

To fully understand the relevant provisions of Article 11 (Solar Power Project Incentive Mechanism) and its accompanying guidelines, and to analyze the opportunities and challenges of the Vietnamese power market, will help investors make better investment decisions. The following are some regulations related to solar power generation:

- ◆ **Fund Raising:** Organizations or individuals involved in solar power projects may need to raise funds from domestic or international financial institutions or financial markets. Decree 32/2017/-ND-CP issued on March 31, 2017 stated that the loan amount of solar power project investors to the Vietnam Development Bank should not exceed 70% of their total investment funds.
- ◆ **Preferential policies for taxation:** 1) Imported goods as fixed assets of solar power projects enjoy tax exemption. If the imported goods used for solar power projects are not available in the domestic market, they can enjoy tax exemption; 2) solar power projects enjoy corporate income tax reduction or exemption.
- ◆ **Preferential policies for land use:** 1) Solar power grid-connection and power transmission and distribution projects enjoy preferential prices for land acquisition, lease and surface water use; 2) The government should promote land planning and implementation of solar power projects.

After the promulgation of the decree, Vietnam's solar power project approval applications and construction began to grow rapidly. By September 2018, the number of approved solar power projects reached 121, with a total installed capacity of 9,200 MW. At the same time, 211 projects with an installed capacity of 16,800 MW are still under review and approval. The renewable energy development plan requires that the total installed capacity of solar energy should reach 850 MW in 2020 and increase to 4,000 MW in 2025. However, due to the promulgation of the decree, as of November 2019, Vietnam's operated and approved installed solar power capacity have reached 7,000 MW, far exceeding the total installed capacity in 2025. However, the existing power grid infrastructure in Vietnam is too weak, and the existing projects cannot be connected to the grid in time to generate electricity.

The explosive growth of Vietnam's solar power projects has overwhelmed Vietnam's finances and power grid. In order to solve the existing problems, the Vietnamese Prime Minister signed Notice No. 402/TB-VPCP¹⁶ on November 22,

2019, announcing: 1) to stop providing subsidies to ground photovoltaic power generation projects, cancel the on-grid electricity tariff mechanism and re-introduce grid-bidding; 2) rooftop photovoltaic projects and certain approved ground projects still use the fixed on-grid electricity tariff model; 3) Ninh Thuan photovoltaic projects within 2GW can still enjoy the subsidized electricity tariff in 2017, the qualification is determined based on the order of construction time. At the same time, the Vietnamese government requires the Ministry of Industry and Trade of Vietnam (MoIT) to introduce specific measures as soon as possible to implement the content of the above notice. According to reports, MoIT is recommending that the government maintain the on-grid subsidies for large-scale photovoltaic power plants instead of directly turning to grid-bidding. The specific recommendations are: To maintain the on-grid electricity tariff of ground photovoltaic projects at USD 0.0709 per kWh, and to maintain the on-grid electricity tariff of floating photovoltaic power plants at USD 0.0769 per kWh, only for projects approved before November 23, 2019.

According to the relevant laws and development status of solar power generation in Vietnam, Vietnam currently is in urgent need for appropriate technology and policy solutions to solve the problem of connecting solar and wind plants with the national grid. The more connections between wind and solar power plants and the national grid, the higher the operational risk. Therefore, the improvement of Vietnam's domestic transmission and distribution system is extremely important for the development of renewable energy power.

¹⁶ <http://www.chinapower.com.cn/sogjxw/20191209/1292524.html>

Vietnam's Renewable Energy Investment Environment and Risk Analysis

To promote competition in the electricity market, the government has privatized three major power producers, including Electricity of Vietnam (EVN), PetroVietnam (PVN) and Vietnam National Coal and Mineral Industries Holding Limited (Vinacomin). The reorganization of the three companies was expected to be completed in 2018 to open the electricity retail market to private investors. In June 2017, after EVN ended its role as the only buyer of the electricity production market, laws and regulations on the competition of the wholesale electricity market were completed accordingly. Subsequently, the privatization of electricity retail also started accordingly. The Vietnamese government requires the Ministry of Industry and Trade (MOIT) to cooperate with EVN to promote the privatization of the Vietnamese power sector by 2023.

Vietnam is one of the countries with the richest solar energy resources in the world. The country has also insisted on encouraging to invest in renewable energy to meet the sustainable development goals of its energy industry. The National 2030 Renewable Energy Development Plan requires solar power to reach 10 million kWh in 2015, 1.4 billion kWh in 2020, and 35.4 billion kWh in 2030. According to the Ministry of Investment and Trade of Vietnam, as of the end of June 2018, more than 100 solar projects have been approved. As of 2020, these projects are expected to provide 4.7 GW of electricity. To encourage the development of solar energy, the government actively cooperates with five regions suitable for solar power projects. These areas are mainly Binh Thuan and Ninh Thuan in central Vietnam and Dak Lak province in the central highlands, and Long an and Tay Ninh provinces in the south. For solar projects, the project site is an area with less rainfall throughout the year and at least 250 days of sunshine that lasts for more than 10 hours a day. Ninh Thuan is the most ideal solar power generation site, with up to 2,800 hours of sunshine per year. According to the speech of the Deputy Minister of Planning and Investment of the province, the province has approved 15 wind power projects and 27 solar power projects. Once these 42 projects are put into production, they will supply 800 MW and 1,800 MW of electricity respectively. In May 2018, Dak Lak province approved 18 investors to build 4 new solar projects. As of 2020, the existing 12-13 projects will generate 1,980 MW of energy, and it is expected that by 2030, 30 projects will provide 9,800 MW of power. Tay Ninh province in the south of Vietnam also approved a number of renewable energy projects, including Dau Tieng Phase 1 and Phase 2 solar power plants, which were Vietnam's largest solar projects. The first phase was expected to be put into production in 2018 with an installed capacity of 150 MW and the second phase was expected to be put into operation in 2019 with an installed capacity of 200 MW.

However, if investors hoped that the above projects would be put into operation in June 2019, there were still some technical obstacles to overcome. As of the end of July

2018, the solar project of 12,622 MW was still in the pre-investment stage, the project of 1,432 MW was in the design and feasibility study stage, the project of 1,002 MW was in the construction stage, and only the project of 8 MW (0.1%) was put into operation. According to current policy signals, the Vietnamese government will continue to promote its renewable energy investment policies, including wind power and solar power. If these goals can be achieved, Vietnam's solar power industry will lead the world.

Due to low on-grid electricity tariffs, the development of wind power is more difficult than solar power. Only the 5,700 MW wind power project is in the early stage of investment, design and feasibility study, construction or operation, which is far slower than the solar project. The four provinces of Bac Lieu, Soc Trang, Binh Thuan, Ninh Thuan and Ben Tre have relatively high installed wind power capacity.

As renewable energy is at an initial development stage, developers face many challenges and risks, like the legal risks of the electricity purchase agreement. Because the power purchase agreement is difficult to negotiate and implement, foreign borrowers believe that renewable energy projects lack profitability. Even if an electricity purchase agreement is signed, the fixed low on-grid electricity tariff will have a great impact on the profitability of the project and the payback period. At the same time, developers also face many operational risks, such as project delays, overloading of transmission systems in remote areas, and low quality of purchased equipment.

Vietnam has planned and approved many renewable energy projects, but due to insufficient funds, the conversion rate is very low. Most projects obtain funds through international banks, and local banks only participate in project investments by providing guarantees. At present, Vietnam can only provide funds for renewable energy projects with an installed capacity of 1,000-2,000 MW. There are still renewable energy projects with an installed capacity of 10 GW needing funds. Insufficient existing funds and long-term funds make it difficult for developers to apply for long-term loans from domestic financial institutions.

In recent years, private investment in the power industry has continued to grow. Most of the investment is in the form of BOT, that is, foreign investors build power generation projects, which will be handed over to the Vietnamese government after a period of operation. There are no restrictions on foreign investment in such projects. As the market continues to open and liberalize, Vietnam's foreign-invested power projects are showing steady growth. In 2015, the installed capacity of foreign-invested power plants reached 2,800 MW. Foreign-invested enterprises that are relatively active in Vietnam are diversified. For example, GE, Mainstream Renewable Power and Phu Cuong Group have jointly invested in a wind farm with an installed capacity of

800 MW in Soc Trang Province. At the beginning of June 2017, a cooperation agreement with a total price of USD 2 billion was signed. Other investors in renewable energy projects include AES Group (USA), Xuan Thien Daklak and

Long Thanh Infrastructure Development and Investment Company (Vietnam), Fujiwara (Japan) and Solar Park Global (South Korea). The total value of these projects ranges from 45 million to USD 2.2 billion.

Status of photovoltaics in Vietnam

As of July 2018, projects with a total of 12.622 GW in Vietnam were in the pre-investment stage, and other projects with 1.432 GW were in the development and feasibility study stage. Projects with about 1GW were under construction, and the installed capacity of photovoltaic projects that had been put into operation was only 8MW. Also as of July 2018, there were 748 rooftop photovoltaic projects in operation in Vietnam, with a total installed capacity of 11.55 MW. The installation of rooftop photovoltaic is mainly carried out by Intel, AveryDennison and DeutscheBekleidungswerke.

Although there are no restrictions on foreign ownership in the photovoltaic industry in Vietnam, PPP projects using the BOT model are more popular due to government guarantees and incentives. At present, the major investors in photovoltaics in the Vietnamese market are: German ASEAN Power, B. Grimm Power Public Co Ltd, Trina Solar, Siemens, JA Solar, Schletter Group, Sunseap International, Nippon Sheet Glass, Ecoprogetti, Tata Power, Shapoorji Pallonji Infrastructure Capital, Gulf Energy Development, InfraCo Asia Development, ACWA Power.

Challenges faced by Vietnam in developing photovoltaic projects

Although more and more domestic and foreign investors are starting to operate renewable energy projects in Vietnam, there are still many problems in Vietnam that need to be resolved to ease investors' concerns. Although Vietnam's policies have been relaxed in the past few years, investors still face many obstacles, such as: lack of capital financing channels, the contradiction between low electricity tariffs and high investment costs brought by new technologies, lack of qualified human resources and supporting industries, the supply chain that needs to be developed, weak power grid, PPA that is not profitable, complicated regulatory system and regulatory procedures that make large projects delayed, and the trend of electricity tariffs that lacks predictability and transparency.

By 2020, Vietnam needs about USD 8 billion per year, and between 2021-2030, it needs about USD 10.8 billion per year to support the development of the power industry, including power production and grid construction (except BOT). Due to the high capital requirements for the development of the power sector, the Vietnamese government allows foreign companies to enter the energy and power sectors. Alternative investment methods for foreign investors include: 100% foreign holding companies, joint ventures and PPP (in the form of BOT contracts). Due to low on-grid electricity tariffs and high production costs, PPP may be the most effective way

to enter the Vietnamese energy and electricity market.

According to estimates by the Asian Development Bank, Vietnam's investment to achieve the new power development plan and power development goals under the NDC scenario is approximately USD 209 billion, with coal power investment accounting for 34% of the total investment. Renewable energy and power grid account for 30% and 26%, respectively. According to IFC's estimates, Vietnam's renewable energy investment needs to be about USD 59 billion by 2030, of which photovoltaic and small hydropower projects needs investment of USD 31 billion and USD 19 billion, respectively.¹⁷

In order to meet the funding needs of the energy goals, Vietnam will establish a sustainable clean energy fund, which includes the national budget and environmental cost of fossil fuels. According to the renewable energy development strategy, the government will launch the Renewable Portfolio Standard as a policy mechanism to guide the deployment of renewable energy. In addition, Vietnam will also implement net energy metering and tax preferential policies, and rules and management procedures for land use and environmental permits will be gradually established and implemented. This will create an excellent investment and policy environment for the development of renewable energy.

¹⁷ International financial institutions: Climate Investment Demands in Emerging Economies, 2016.

CHAPTER IV CHINA'S RENEWABLE ENERGY INVESTMENT OPPORTUNITIES AND RISKS IN VIETNAM

Status of China's Renewable Energy Investment in Vietnam

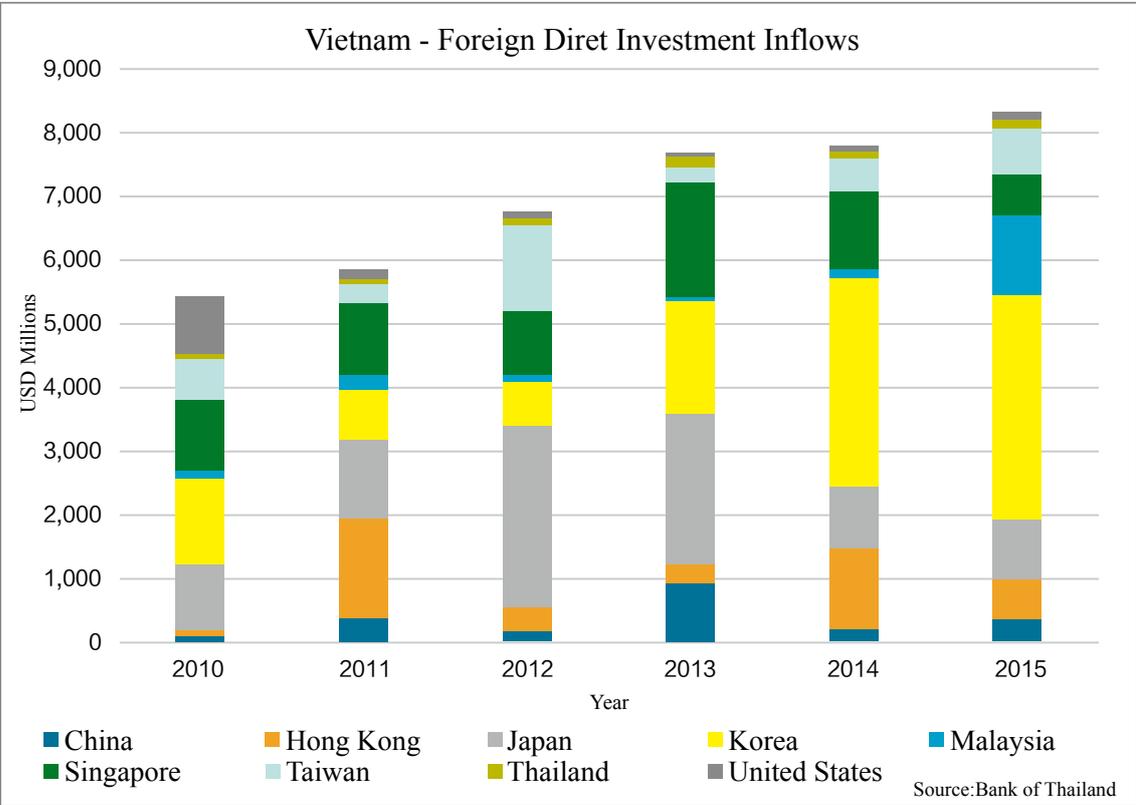


Figure 4-1 Foreign direct investment volume in Vietnam

As shown in the figure, Vietnam's foreign direct investment mainly comes from Japan, South Korea, Singapore, Taiwan, Hong Kong, the United States, Malaysia, China and Thailand. In the field of renewable energy, the largest foreign direct investment comes from the United States, while South Korea is quite competitive in the Asian wind power equipment manufacturing market. The direct investment of the United States and Japan is mainly concentrated in the solar hardware manufacturing industry, while China's investment in the field of renewable energy in Vietnam has increased with the closer cooperation under the Belt and Road Initiative in recent years, as well as the gradual opening and improvement of the Vietnamese power market.

At the end of 1992, China and Vietnam signed the Agreement Between The Government Of The People's Republic Of China And The Government Of Vietnam On The Encouragement And Reciprocal Protection Of Investment. In 2004, Vietnam proposed to China to jointly build "Two Corridors and One Ring"¹⁸. Since 2006, China and Vietnam have cooperated within the framework of the "Two Corridors and One Ring". In particular, the northern provinces and cities of Vietnam and southwestern China have cooperated on infrastructure interconnection and trade facilitation around the "Two Corridors and One Ring". In August 2009, China and the Ministers of Economy and Trade of the ten ASEAN countries jointly signed an Investment Agreement the on China-ASEAN Free Trade Area, and the two sides further cooperated under the China-ASEAN cooperation framework.

In the following years, China-Vietnam economic and trade cooperation developed rapidly, and China has been Vietnam's largest trading partner for 12 consecutive years. In October 2011, the two countries signed the Five-Year Development Plan for China-Vietnam Economic and Trade Cooperation. In October 2013, both sides signed the Memorandum of Understanding on the Construction and Development of Cross-border Economic Cooperation Zones. In November 2017, China and Vietnam signed the Memorandum of Understanding on Promoting the Connection of the "Two Corridors and One Ring" Framework and the "Belt and Road" Initiative, as well as cooperation documents involving capacity, energy, cross-border economic cooperation zones, e-commerce, human resources, trade, finance, culture, health, news, social sciences, border defense and other fields. Carrying out the construction connection between the "Two Corridors and One Ring" and the "Belt and Road" will create more opportunities for companies of the two countries to participate deeply in regional and global value chain production, and will strengthen the cooperation of the two side in environmental protection, response to climate

change, and the use of natural resources. In the same month of the same year, the two sides also signed the Memorandum of Understanding on Confirming the List of Key Cooperation Projects in the Five-Year Development Plan for China-Vietnam Economic and Trade Cooperation in 2017-2021 and the Memorandum of Understanding on Cooperation in Electricity and Renewable Energy.

At present, Vietnam has become China's largest trading partner among ASEAN countries. Vietnam welcomes Chinese companies, especially advanced companies that can represent China's development level, to increase investment and business activities in Vietnam, and strengthen cooperation in fields where China has advantages and Vietnam needs, such as infrastructure construction, manufacturing, high-end talent training, clean energy, etc. At the same time, Vietnam also stated that it will, as always, create convenient conditions for Chinese enterprises to enter ASEAN and the world market. According to Chinese customs statistics, the bilateral trade volume reached USD 95,966 million in 2015, an increase of 14.74% over the previous year. Chinese exports to Vietnam amounted to USD 66,124 million, increasing by 3.75%; imports from Vietnam increased by 49.93% to USD 29,842 million. As of the end of March 2016, China had 1,354 effective investment projects in Vietnam, with a total investment of USD 10.43 billion. At present, China's investment in Vietnam is mainly concentrated in processing and manufacturing, real estate and construction industries, and there is not much investment in supporting industries, high-tech industries, infrastructure and other sectors where the Vietnamese government encourages foreign investment.

At present, there are many companies investing in wind power and solar projects in Vietnam, but many projects have not entered the construction stage. This is a problem that needs to be addressed for the renewable energy development in Vietnam in the future. As of the first half of 2019, we have sorted out information on solar and wind power projects involving various Chinese companies and financial institutions investing in Vietnam in various forms. The details are as follows:

¹⁸ Two Corridors and One Ring", namely economic corridors of "Kunming-Lao Cai-Ha Noi-Hai Phong-Guangning" and "Nanning-Lang Son-Ha Noi-Hai Phong-Guangning" and Beibu Gulf Economic Rim, involving Guangxi, Guangdong, Yunnan, Hainan, Hong Kong and Macau in China and 10 coastal zones in Vietnam.

Enterprise	Investment Form	Time	Investment Content
HydroChina Corporation/POWERCHINA Chengdu	EPC	Jul. 2015 Bidding Nov. 2016 Completed	Vietnam PHC LAC wind farm project, with an investment of EUR 32.62 million. ¹⁹
HydroChina Corporation	Equipment supply	Sept. 2015 Signed the contract	The construction of a 24 MW Phu Lac wind farm project in Tuy Phong in the southeastern Vietnam provides 12 units of 100V-2.0 MW wind turbines. ²⁰
China Southern Power Grid	EPC (to be confirmed)	Sept. 2016 Signed the contract	The Tay Nguyen wind power project is located in Vietnam's Dak Lak province, with a planned installed capacity of 210 MW, and a total investment of approximately USD 300 million. ²¹
GE	Participate in investment and construction	Jun. 2017 Signed the contract	Cooperate with Phu Cuong Group of Vietnam to develop and build an 800 MW wind farm; ²² in November, Silk Road Fund and GE established a joint investment platform for energy infrastructure. ²³
GCL Group and SEP-COIII	EPC (GCL Group); project construction (SEPCOIII)	Sept. 2017 Won the bidding	Vietnam Phuong Mai 30MW wind power project ²⁴ has a construction period of 1 year.
Mekong Wind Power Company	Project construction	Nov. 2017 Started construction	Binh Dai wind power project (a total investment of nearly VND 1.5 trillion) ²⁵ .
Sinoma Int. (Nanjing)	Contracting	May, 2017 Signed the contract	Long Son Group of Vietnam 170 MWP photovoltaic power generation phase I of 100 MWP ²⁶
POWERCHINA Huadong Engineering Corporation Limited	Financing +EPC contracting	Jun. 2018 Signed the contract Jun. 2019 Started operation	Vietnam Dau Tieng 500 MWp photovoltaic project (the largest photovoltaic project in Southeast Asia) ²⁷ with a total investment of USD 4 billion.
Trina Solar	Equipment supply	Jul. 2018 Signed contract Jun. 30, 2019 Completed	Trina Solar would provide 258MW of single crystal PERC double-glazed modules to private solar projects in Vietnam, with a total investment of approximately 1.45 billion yuan. The project is <u>the first hybrid wind-solar farm project in Vietnam</u> . ²⁸
POWERCHINA	EPC	Jul. 2018 Signed contract Jun. 2019 Completed	The project has a capacity of 420MW and the facility is located in Tay Ninh in southwestern Vietnam. It was scheduled to start operations in June 2019. The project is estimated to cost approximately USD 420 million in total ²⁹ .
POWERCHINA International Group Limited	EPC	Aug. 2018 Signed contract Jun. 2019 Officially put into use	The Hong Phong 325MW photovoltaic power generation project in Vietnam can provide 520 million kWh of clean electricity every year, save 175,000 tons of standard coal, and reduce carbon dioxide emissions by 439,000 tons. It was expected to be completed and generate electricity in June 2019. ³⁰

¹⁹ <http://news.bjx.com.cn/html/20150728/646651.shtml>

²⁰ <http://news.bjx.com.cn/html/20150925/667320.shtml>

²¹ <http://news.bjx.com.cn/html/20160919/773698.shtml>

²² <http://news.bjx.com.cn/html/20170602/828745.shtml>

²³ <https://www.yidaiyilu.gov.cn/xwzx/gnxw/33956.htm>

²⁴ http://www.ceeia.com/News_View.aspx?newsid=70742&classid=2

²⁵ <http://www.caexpo.org/index.php?m=content&c=index&a=show&catid=120&id=220342>

²⁶ <http://kns.cnki.net/KXReader/Detail?TIMESTAMP=637025270238668750&DBCODE=CJFQ&TABLEName=CJFDLAST2018&FileName=SNGC201803007&RESULT=1&SIGN=4vUVpPtacXyEQnLZK0HbNshQ%2fWU%3d>

²⁷ <http://solar.in-en.com/html/solar-2343044.shtml>

²⁸ <http://news.cableabc.com/gc/20180805227014.html>

²⁹ <http://news.cableabc.com/gc/20180711093610.html>

³⁰ http://www.cpn.com.cn/djjs/djyw/201907/t20190722_1144624.htm

Enterprise	Investment Form	Time	Investment Content
Sungrow Power Supply Co., Ltd. (Sungrow)	Equipment supply	Aug. 2018	Signed an agreement with Vietnam's DaiHaiPower to provide inverter products for a 100MW photovoltaic project in Vietnam ³¹
Power Construction Corporation of China	EPC	May, 2019 (grid-connection)	The DAMI floating photovoltaic project in Vietnam (the largest floating photovoltaic project under construction in Southeast Asia) has a total installed capacity of 47.5 MWp. ³²
Complant	EPC	Jun. 12, 2018 Signing the contract	Binh Phuoc province, Vietnam - 250 MWp Loc Thien photovoltaic power station project (including 100 MWp Loc Thien photovoltaic power plant, 100 MWp Loc Thien photovoltaic power plant and 50 MWp Loc Thien photovoltaic power plant). ³³
Jinko Solar	Equipment supply	Jun. 2019	The project is a wind-solar complementary project, supplying monocrystalline modules for Trung Nam Group's 258 MW photovoltaic power plant and 90 MW wind farm complementary operation project.
Shanxi Industrial Equipment Installation Co., Ltd.	Project construction	Jan. 2019 Signed the contract	The wind power project of Vietnam's national energy infrastructure construction has a total contract value of USD 520 million. ³⁴
CGGC International Ltd.	EPC	Jun. 2019 Signing the contract	Vietnam Hanbaran 117MW wind power project (in cooperation with Landville Energy of South Korea) ³⁵

According to the current investment of Chinese investors in the renewable energy sector in Vietnam, Chinese companies currently hold fewer power generation projects, and mostly invest through equity investment, asset mergers and acquisitions, equipment export and assembly, and EPC engineering services. At the same time, there are fewer renewable energy projects that Chinese financial institutions participate in. However, with the deepening of China-Vietnam bilateral cooperation under the Belt and Road Initiative and planning in the areas of energy and environmental protection, more and more Chinese companies have begun to participate in renewable energy investment in Vietnam, such as cooperating with local renewable energy companies to take part in the investment of power generation projects,

equipment sales, and the provision of local grid solutions. According to reports, in early 2017, Trina Solar completed the investment and construction of the solar photovoltaic cell manufacturing base in Bac Giang province, the largest base for the solar photovoltaic cell in Vietnam at the time with a total production capacity of 1GW. Trina Solar Co., Ltd. signed a cooperation agreement on a power plant project with the Eleventh Joint Stock Company of Song Da Group of Vietnam in April 2019 to jointly promote the development of renewable energy in Vietnam. The project is one of the first batch of large-scale ground photovoltaic power stations in Vietnam to be constructed³⁶. This is a typical case of Chinese companies investing in renewable energy in Vietnam.

³¹ <http://news.cableabc.com/enterprise/20180822971918.html>

³² <http://www.bjpsb.com/hdhuabao/49034.html>

³³ <http://www.bhi.com.cn/ydyj/gwdt/51645.html>

³⁴ <http://www.nengyuanjie.net/article/23065.html>

³⁵ <http://dy.163.com/v2/article/detail/EJ08GQVF051188EC.html>

³⁶ <https://www.trinasolar.com/cn/resources/newsroom/fri-04262019-1017>

China's Renewable Energy Investment Opportunities and Risks in Vietnam

Vietnam's long coastline and abundant sunshine resources provide considerable resources and huge potential for the development of renewable energy in Vietnam, particularly wind power and solar power. Renewable energy helps to ensure Vietnam's national energy security and promote its power industry's sustainable development. The government expects to increase the total installed capacity of wind and solar power to 18GW by 2030 when the electricity market will be further opened and the privatization process will be completed. With the improvement of renewable energy power generation technology and the reduction of investment costs, renewable electricity will gradually replace fossil fuels and become the main form of electricity.

In order to achieve NDC goals and promote the sustainable development of the power sector, the government is shifting its investment focus to renewable energy. For example, according to the revised version of the Power Development Plan, large power companies (annual output value exceeding 1 GW) should increase their renewable energy power generation output to over 3%, 10%, and 20% in 2020, 2030, and 2050, respectively. At the same time, the Vietnamese government is actively promoting energy and electricity market reforms, including electricity tariff reforms and competitive energy retail market reforms, promulgating long-term renewable energy development plans with appropriate incentives, increasing renewable energy on-grid prices, and building green finance system, etc., through these measures and actions to create a sound investment environment, attract foreign capital and technology to the renewable energy and power industries, and help the realization of Vietnam's energy and power development plan and NDC goals.

Vietnam is seeking cooperation with different countries in the power generation industry, and China is one of many investors. The energy and power cooperation between China and Vietnam under the "Belt and Road" framework has just started. Under the "Belt and Road" initiative, China's energy and power industry should sort out and analyze the host country's climate goals and energy development plans in the process of going out, integrate them into the investment and cooperation for energy and power in the "Belt and Road" initiative, and grasp the energy and power development trends of different countries, specific plans and goals for renewable energy to reduce investment risks and contribute to the host country's climate and sustainable development goals.

Based on the huge demand for foreign funds in the Vietnamese renewable energy industry, as well as the gradual improvement of Vietnam's investment environment, laws and regulations on foreign investment in renewable energy and the return on investment, Chinese investors should utilize their investment strategies to further improve the renewable energy portfolio, promote the development

of global renewable energy, and contribute to the global response to climate change and the achievement of the 2030 Sustainable Development Goals within the framework of the Belt and Road Initiative. As in Chapter III of this report, Vietnam's renewable energy investment has obstacles and challenges in terms of economy, finance, technology, management, and legal and regulatory framework. Chinese institutions and enterprises investing in Vietnam also face similar problems.

At present, although China and Vietnam have signed cooperation documents related to energy, electricity, ecological environment and climate change under the Belt and Road Initiative, specific cooperation plans and guidelines need to be improved. In the national investment guide announced by the authority, there are not many relevant contents for key cooperation industries, and there are very few contents concerning ecological environment protection and climate change in investment risks.

Meanwhile, Chinese financial institutions have conducted relatively few business and investment activities in Vietnam, and have little knowledge and experience of the development status, potential risks and opportunities of the Vietnamese energy and power industry. Since Chinese financial institutions have not yet formulated detailed industry investment policies and disclosed them in a timely manner, they cannot meet the basic requirements of the Vietnamese government for financial institutions that conduct business locally, nor can they provide strong financial support to Chinese investment companies in Vietnam. Competing with financial institutions of other countries, they may lose the opportunity. Chinese enterprises invest in Vietnam in a relatively simple way, with little experience and few investment projects which are at the initial stage. At the same time, they don't know much about the overall planning and development trends of Vietnam's energy and power, its policies and actions to deal with climate, the development of the green financial system, the concerns and relevant actions of local social organizations, and the potential environmental and social risks.

CHAPTER V CONCLUSIONS AND SUGGESTIONS

It is predicted that by 2040, energy demand in Southeast Asia will increase by two thirds. For countries in Southeast Asia, how to promote the sustainable development of energy systems is an important issue to consider. As an emerging economy that actively promotes domestic green investment and energy transformation, Vietnam may provide some reproducible solutions for other countries in Southeast Asia. As the largest developing country, China has extensive experience in industrial restructuring, energy transformation, promoting the development of renewable energy, and responding to climate change. In addition, the “Belt and Road” initiative has entered a stage in which it is implemented deeply. In-depth cooperation and exchanges in policies and industries will “send out” green development experience, and at the same time “introduce” the experience and lessons learned when investing locally to further promote green and low-carbon development in the country.

Through the review and analysis of the first four chapters, in order to further promote China’s investment in renewable energy, help Vietnam achieve the climate, energy and sustainable development goals, and promote the greening process of China’s outward investment, the following recommendations are made:

Vietnam

The development of renewable energy in Vietnam is inseparable from the government’s incentive policies and positive actions. Based on sorting out existing obstacles in the Vietnamese energy industry, it is recommended that the Vietnamese government:

- ◆ Should promote the further improvement of industry policies, such as refining the national renewable energy development plan (especially the improvement and implementation of incentive policies), fully integrating energy planning with NDC goals, improving policy implementation, and formulating the environment laws and regulations for power industry, etc.;

- ◆ Improve the investment environment: further open up the electricity market, reduce monopoly, and enhance competition and transparency. Improve the predictability and development trend of long-term electricity tariffs, improve foreign investment laws, formulate incentive policies to attract foreign banks to enter the Vietnamese electricity market, and solve problems such as funding gaps and obstacles in financing channels. At the same time improve the long-term planning and stability of industry policies to reduce policy risks;

- ◆ Improve the efficiency and transparency of management processes and approval procedures: conduct the bidding model in the power industry that can provide investors with a clear legal and regulatory framework and a reasonable incentive system, formulate detailed and effective implementation rules for renewable energy and improve its transparency and the speed and efficiency through the entire process, promptly disclose the progress of examination and approval, and provide guidance for local and foreign banks to establish an environmental and social security system in line with national policies;

- ◆ Promote industry research and data information collection and disclosure: improve the data source and quality of the renewable energy sector to ensure investors can understand the construction site, infrastructure capacity and government goals; enhance human resource capacity building; establish an open data and information platform for investors to timely understand the relevant policies and industry development status, etc.;

- ◆ Promote the construction and improvement of renewable energy value chains and supply chains: supporting industries play a key role in the development and rapid application

of renewable energy technologies; the government should motivate small and medium-sized enterprises with incentive policies such as preferential taxation and subsidies; the

construction of a competitive supporting industry will further reduce the investment cost and price of renewable energy projects.

China

Government departments: To further improve the energy investment planning in the framework of cooperation with Vietnam in the Belt and Road Initiative, provide detailed national and industry policies and guidelines about investment and cooperation for Chinese financial institutions and enterprises, and improve the list of industries that encourage foreign investment; cooperate with the Vietnamese government to help it improve energy and power planning, green and low-carbon development planning and other policies; carry out capacity building and talent exchange activities with Vietnam to further improve the human resources of the renewable energy sector in Vietnam; carry out exchanges and dialogues to share China's experience on dealing with climate change, energy transformation, green finance and carbon market construction and operation with the Vietnamese government for reference.

Financial institutions: establish and disclose industry investment strategies (such as renewable energy investment policies, etc.) on the basis of complying with relevant policies of China and the host country and drawing on international advanced experience; on the basis of fully understand the host country's laws and regulations, NDC goals and sustainable development goals, formulate specific policies about environmental and social risk management and climate investment to provide a basis and reference for local project investment decisions and

risk management; figure out the host country's investment environment, actively deploy renewable energy investment portfolios, and seize the opportunities of international market competition; R&D investment tool portfolio to provide sufficient financial support for Chinese investors in Vietnam's renewable energy.

Investment enterprises: actively carry out pre-investment investigation to understand the industry's development status and trends of the host country; seek multiple financing channels to obtain sufficient and stable financial support; conduct demonstration projects to verify the feasibility of investment and operating models; learn and share experiences and practices, and actively communicate with the government to understand the current difficulties and problems; analyze the host country's industry laws and regulations, foreign investment regulations, environmental climate and energy goals, etc., and fully integrate the relevant content into project construction, operation and enterprise ESG management; actively communicate with banks to understand their environmental and social management policies and industry investment policies for customers and investment projects; be familiar with China's relevant policies and guidelines for enterprises on foreign renewable energy investment.

