

RESPONDING TO THE CHALLENGES OF CLIMATE CHANGE: VIETNAM'S NATIONAL POWER DEVELOPMENT PLAN

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Case Studies contain preliminary research, analysis, findings, and recommendations on previous long-term planning exercises. They are circulated to stimulate timely discussion and critical feedback and to influence ongoing debate on emerging issues.

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Vietnam's energy economy changed radically over the last several decades as the country transformed itself from an agricultural society relying primarily on traditional biomass fuels to a modern mixed middle-income economy (World Bank 2010). Per capita gross domestic product (GDP) increased by a factor of almost 20 in less than 30 years, rising from US\$114 in 1990 to \$1,169 in 2010 and \$2,200 in 2016 (DanSo n.d.).

With almost 97 million people, Vietnam is now one of world's most populous countries. It is also increasingly urban. The urban share of the population increased from 19.3 percent in 1986 to 30.2 percent in 2010 and 34.7 percent in 2016 (DanSo n.d.). Urbanization increased access to the electricity grid, bringing grid power to almost the entire population (99.98% of communes and 98.83% of rural households in 2017) (Vna 2019). Economic growth has led to higher and higher energy demand. Commercial and industrial electricity output grew by about 10.1–10.4 percent a year for five years. Most of it comes from coal, which creates huge emissions of greenhouse gases (GHGs) and environmental damage.

The Vietnamese government participates in regional and international development bodies, such as the United Nations Framework Convention on Climate Change (UNFCCC) and the Association of Southeast Asian Nations (ASEAN). It has made significant efforts in responding to the challenges of climate change, adopting important policies such as the Vietnam Green Growth Strategy, the Green Growth Action Plan, the Sustainable Development Strategy of Vietnam for 2011–20, and the Renewable Energy Strategy, among others.

This case study describes Vietnam’s Power Development Plan (PDP)—the instrument it uses to make long-term plans for the power sector. The essay is organized as follows. Section 1 describes the objectives of Vietnam’s national power development plan. Section 2 identifies the plan’s limitations. Sections 3 and 4 describe the process by which Vietnam set targets and approved and implemented its plan. Section 5 draws lessons from Vietnam’s experience.

OBJECTIVE OF VIETNAM’S NATIONAL POWER DEVELOPMENT PLAN

Vietnam faces a serious threat from global climate change. To address the challenge and ensure that Vietnam’s development takes a more sustainable path, it agreed to reduce greenhouse gas emissions by 8 percent by 2030 compared with a business-as-usual scenario through domestic efforts and by up to 25 percent with international support. Its nationally determined contribution (NDC) proposes 17 energy efficiency and renewable energy measures to reduce GHG emissions.

The Power Development Plan is a strategic tool for national power development and the basis for investment projects in the power sector for a period of 10 years. It is adjusted to reflect socioeconomic conditions every five years.

The PDPVII was the National Power Development Plan for 2011–20, with a vision to 2030. The revised plan (the RPDPVII) covers 2015–20, with a vision to 2030. Both plans survey the current conditions of the national electricity system; review the performance of the previous PDP, to identify whether the targets of power generation capacity and the transmission system were achieved and the factors that could affect PDP implementation and real demand growth; and forecast growth in electricity demand. The plans review the availability of primary energy sources in Vietnam to provide for power production and the potential for imports and exports of energy.

The PDPVII focused on expanding conventional generation projects, such as gas-fired combined cycle gas turbines (CCGT), coal-fired steam, and large hydro.

The PDPVII projected the growth in electricity demand by taking into account economic and social development trends and the most effective, least-cost power generation options for meeting future power demand. It included only a small proportion of renewable energy generation and only modest energy-saving and efficiency on the demand side. It forecast emissions increases by 2030 of about 443.8 thousand tons of carbon dioxide (CO₂), 246.4 thousand tons of sulfur dioxide (SO₂), 34.5 thousand tons of particulate matter, and 198.2 thousand of nitrogen oxide (NO_x). The largest source of atmospheric pollution in Vietnam is high-pollutant emissions from thermal power stations, especially coal-fired plants. They are also a source of GHG emissions and pollutants and contribute to other environmental problems.

The RPDPVII reflects some changes in the policy and institutional environment. National objectives for CO₂ emissions reductions, sustainable development, and environmental protection are more transparent, and regulations are stricter. The RPDPVII was used to analyze scenarios that increase the proportion of renewable energy and energy efficiency measures and reduce the coal-fired generation ratio in the plan. This analysis, which yielded lower projections of power demand, is more realistic. Significantly reducing coal-fired generation is also an important way to reduce air pollution and GHG emissions, as required by the government.

The proposed development plan/scenario of the RPDPVII was adjusted to reduce projected total generation capacity in 2030 from 146,800 MW in the PDPVII to 129,500 MW:

- ◆ Coal-fired capacity is reduced from 75,000 MW to 55,300 MW.
- ◆ Natural gas– and oil-fired generation capacity rises from 17,300 MW to 19,000 MW.
- ◆ Other renewable energy (including hydro) rises from 31,300 MW (including 17,400 MW from hydropower sources) to 47,800 MW (including 27,800 MW from hydropower sources).
- ◆ Nuclear power and power imported from neighboring countries falls from 10,700 MW and 7,000 MW, respectively, to 4,600 MW and 1,500 MW, respectively.

The main changes in the RPDPVII are the reduction in coal-fired power generation and the increase in the amount of renewable energy, which will reduce GHG emissions by more than 100 million tons of CO₂ equivalent a year by 2030 (to 335.9 thousand tons) and reduce emissions of other air pollutants as well. The reduction in CO₂ emissions corresponds to the voluntary reduction level of about 20 percent, as promulgated in the Vietnam Green Growth Strategy.

More rapid growth of the power sector will be needed in Vietnam to meet the needs of the national Socio-economic Development Plans (SEDPs) for 2011–20.¹ Power development aims to achieve the following goals:

- ◆ Meet electricity demand for socioeconomic development at least cost.
- ◆ Ensure national energy security.
- ◆ Efficiently use indigenous primary energy resources and import electricity and fuel in a rational way in order to diversify primary energy sources for electricity production.
- ◆ Prioritize the development of renewable energy.
- ◆ Reduce the negative impacts of electricity production on the environment.
- ◆ Meet national targets for response to climate change, GHGs, pollutant emissions, and environmental protection.

Over the last decade, the power sector's strategic planning evolved. It now includes social and environmental issues and climate change as an integral part of the planning process. The least-cost planning applied in the PDPVII results in development that prioritizes available and exploitable domestic energy resources with lowest cost, such as hydro, coal, and gas—all of which have serious negative environmental impacts. By integrating least-cost planning with sustainable development objectives, the RPDPVII prioritized other energy resources, such as renewable energy and nuclear power, with higher costs but lower negative environmental impacts. These wider aspirations reflect changing thinking about the nature of development in Vietnam that is enshrined in key policy and legislation developments.

LIMITATIONS OF THE POWER DEVELOPMENT PLAN

Vietnam has three distinct regions, each with a different main source of fuel. North Vietnam is rich in coal, Central Vietnam in hydropower, and South Vietnam in natural gas. To ensure the delivery of electricity throughout the country, Vietnam built long, high-voltage 500 kV power transmission lines. The length of the lines means that transmission losses are high, and it is difficult to transport electricity produced in northern Vietnam to southern Vietnam, where demand is higher. More attention will need to be paid to this issue, with further development of renewable energy resources, as planned in the RPDPVII, to address inadequate transmission capacity and localized demand in the southern region.

The PDP methodology has several drawbacks:

- ◆ Energy efficiency and conservation as well as demand-side management programs receive inadequate attention. Projections of future electricity demand depend on national, regional and sectoral growth, socioeconomic development, and patterns of consumption. The RPDPVII was based on estimated annual economic growth of 7 percent throughout the plan period (2015–20). This rate of economic growth is estimated mainly on the basis of the development aspirations of state and provincial leaders, which results in an unrealistic level of growth of electricity demand.
- ◆ The focus is on traditional power generation development, with little attention paid to development of the transmission grid or power distribution networks, leading to inadequate transmission from regions with excess capacity to power load centers. The same problem affects renewable energy.
- ◆ The electricity, coal, oil, gas, and renewable energy sectors are not based on the overall strategy for the energy sector, leading to inconsistent development of energy subsectors as well as the lack of a uniform and harmonious vision for the entire energy sector.
- ◆ The energy efficiency and renewable energy objectives have been changed so much that they will need to be updated.

- ◆ The different development planning periods for energy subsectors (coal, oil, gas, electricity) make it difficult to analyze total energy needs. Approaches and methods for planning for each subsector are also different and not aligned with national planning.
- ◆ Many goals in national plans and strategies appear to be unrealistic.
- ◆ The current balance of primary energy supply and demand presents some risks for ensuring energy security.
- ◆ The infrastructure that supports Vietnam’s massive coal imports cannot ensure stable coal supply at reasonable prices.
- ◆ Although the supply of electricity will still depend largely on the development of coal-fired thermal power plants, there are no suitable policies or regulations for managing environmental impacts, such as emissions standards; emissions trading; or the application of clean coal technology, such as ultra supercritical (USC), carbon capture and storage (CCS), or integrated gasification combined cycle (IGCC) technologies.

SETTING TARGETS

Targets from national policies, strategies, and plans

The definition of the scope and objectives of the PDP are stated above. The objectives, priorities, and targets of Vietnam’s existing policies and legislation were considered during the Strategic Environmental Assessment (SEA), as shown in Table 1. These objectives can be general (such as minimizing ecosystem degradation) or specific (such as increasing the share of renewable energy ratio in order to maximize the reduction of CO₂ emissions from power generation). The results of the SEA are reflected in the PDP revision. They reveal greater emphasis on renewable energy and energy efficiency, integrating these wider policy agendas.

These policies set targets for developing new power generation sources in the PDPVII and RPDPVII that reflect the new conditions with regard to solar, wind, biomass materials, agricultural residues, and municipal solid waste. As a result, the new PDP process is aligned with key policy and strategy documents published in recent years.

Table 1: National development and energy policies and their targets in Vietnam

POLICY	YEAR APPROVED	NATIONAL TARGETS RELATED TO POWER SECTOR
Overall development policies		
Sustainable Development Strategy for 2011–20	2012	<ul style="list-style-type: none"> ◆ Increase electricity supply to meet economic and social demand. ◆ Reduce energy needed to produce a unit of GDP. ◆ Increase share of renewable energy in power generation. ◆ Reduce loss of forest cover and degradation of ecosystems. ◆ Reduce water pollution and degradation of water resources. ◆ Reduce air pollution.
National Strategy on Green Growth Prioritizes use of technologies that ensure greater efficiency in resource use and minimization of GHGs; includes specific targets relevant to development of a PDP	2012	<ul style="list-style-type: none"> ◆ Reduce GHG emissions intensity by 8–10% between 2010 and 2020. ◆ Reduce annual energy consumption by 1–1.5% of GDP between 2010 and 2020. ◆ By 2020, reduce GHG emissions produced by energy activity from 10% to 20% (10 voluntary, 10% depending on international support). ◆ Reduce annual GHG emissions by at least 1.5–2% in 2030. ◆ By 2030, reduce GHG emissions produced by energy activities from 20% to 30% (20% voluntary, 10% depending on international support).
Energy sector policies and strategies		
Law on Electricity (2004), National Energy Development Strategy up to 2020 and Vision 2050 (2007), and Law Amending and Supplementing a Number of Articles of the Electricity Law (2012)	2004, 2007, 2012	Development of energy sources should contribute to socioeconomic development, be based on a balanced range of supply options, and take into account environmental sustainability as a key issue.
Law no. 50/2010/QH12	◆ 2010	Recognizes the need to improve efficiency and sustainability in power generation and states that the preparation of power sector plans should seek to maximize opportunities for energy efficiency.

Table 1: National development and energy policies and their targets in Vietnam (Cont'd)

POLICY	YEAR APPROVED	NATIONAL TARGETS RELATED TO POWER SECTOR
Renewable Energy Strategy up to 2030, with an Outlook to 2050	<ul style="list-style-type: none"> ◆ 2015 	<p>These objectives are the foundation for increases in renewable energy in the RPDPVII. They include the following:</p> <ul style="list-style-type: none"> ◆ Increase the rate of access to clean energy and electricity of people in rural, mountainous, remote, border, and island areas. ◆ Develop and use renewable energy sources to contribute to the achievement of sustainable environmental goals and the development of a green economy. ◆ Mitigate GHG emissions in energy activities by 5% by 2020, 25% by 2030, and 45% by 2050. ◆ Reduce the consumption of coal by 40 million tons and consumption of oil products by 3.7 million tons by 2030. ◆ Reduce the consumption of coal by 150 million tons and consumption of oil products by 10.5 million tons by 2050. ◆ Increase the production of renewable energy from 25 million tons of oil equivalent (TOE) by 2015 to 37 million TOE by 2020, 62 million TOE by 2030, and 138 million TOE by 2050. ◆ Increase the share of renewable energy in total primary energy consumption from 31.8% in 2015 to 32.3% by 2030 and 44.0% by 2050. ◆ Increase the share of electricity output produced from hydropower from 56 billion kWh in 2015 to 90 billion kWh by 2020 and 96 billion kWh by 2030. ◆ Increase electricity output produced from biomass from 0.6 billion kWh in 2015 to nearly 7.8 billion kWh in 2020, 37 billion kWh by 2030, and 85 billion kWh in 2050. ◆ Increase the share of electricity produced from biomass sources from 1.0% in 2015 to 3.0% in 2020, 6.3% by 2030, and 8.1% by 2050. ◆ Increase the share of electricity output produced from wind power from 180 million kWh in 2015 to 2.5 billion kWh by 2020, 16 billion kWh in 2030, and 53 billion kWh in 2050. ◆ Increase the share of electricity produced from wind power from the negligible current rate to 1.0% by 2020, 2.7% by 2030, and 5.0% by 2050. ◆ Increase the share of electricity produced from solar power from 10 million kWh in 2015 to 1.4 billion kWh in 2020. 35.4 billion kWh in 2030, and 210 billion kWh in 2050. ◆ Increase the share of electricity produced from solar energy from the currently insignificant level to 0.5% by 2020, 6% by 2030, and 20% by 2050.
Documents of prime minister approved to support development of nontraditional forms of power generation	<ul style="list-style-type: none"> ◆ 2010–17 	<p>Documents include the following:</p> <ul style="list-style-type: none"> ◆ Support Mechanisms for the Development of Wind Power Projects in Vietnam (2010) ◆ Support Mechanisms for the Development of Biomass Power Projects in Vietnam (2014) ◆ Support Mechanisms for the Development of Power Generation Projects Using Solid Waste in Vietnam (2014) ◆ Support Mechanisms for the Development of Solar Power in Vietnam (2017)

National targets governing the RPDPVII

Targets set out in the RPDPVII include annual growth of electricity for commercial and industrial use of about 10.1–10.4 percent in 2016–20 and 8.0 percent in 2021–30. This growth rate ensures that the annual GDP growth target of about 7 percent for 2016–30 will be met.

Vietnam’s installed capacity is substantial—more than 90,000 MW, with 40,000 MW of coal-fired power generation—and demand is growing rapidly, thanks to industrialization and economic growth. Since 2016, when the government announced an end to the construction of nuclear power projects, the power sector has intensified the development of wind and solar power, liquefied natural gas imports, a gas turbine from blue whale gas fields, and electricity imports from the Lao People’s Democratic Republic.

The analysis in the RPDPVII was based on three scenarios, which reflect the outcomes of the PDPVII SEA:

- ◆ *Scenario 1:* The base case reflects adjusted projections for economic development growth (7% a year throughout the plan period of 2015–30) and the growth in demand for power. Projected demand is much lower than in the PDPVII, as a result of lower projected socioeconomic development and significant energy savings, thanks to a sustained national program for energy efficiency and a significant increase in renewable energy.
- ◆ *Scenario 2:* Scenario 2 is based on the same patterns of growth in demand as in Scenario 1, including energy efficiency saving, but includes a larger increase in the proportion of future generating capacity from renewable energy sources other than large hydropower (to 6.5% of the total generation capacity). Total generating capacity in 2030 under this scenario is greater than in the base case, reflecting the variable nature of some renewable energy and the consequent need for greater generating capacity to ensure the continuity of electricity. The levels of renewable energy in this scenario are the highest feasible at the time of the analysis.

- ◆ *Scenario 3:* This is the high-load scenario if energy efficiency savings are not achieved, causing higher demand than in the base case of the RPDPVII. This scenario would increase renewable power and coal power generation. This scenario can be considered a sensitivity analysis to test the implications of failing to achieve energy efficiency savings. It is considered the least likely to transpire.

Moving away from a focus on least-cost toward sustainable power development

PDPs traditionally focused on the technical and financial aspects of power sources and grid expansion options as the least-cost power development pathway. This emphasis changed under the RPDPVII, which considers more sustainable power development options that consider environmental protection, GHG emissions reduction, and social justice. Further work is needed to strengthen the analysis of social and environmental issues in future PDPs.

Sector-specific pathways

Reducing future electricity demand requires improving electricity applications and the power generation process and changing consumers’ behavior. The Law on Energy Conservation and Efficiency (Law no. 50/2010/QH12), passed in 2010, includes policies and measures to promote efficient use of energy and increases awareness of the rights, obligations, and responsibilities of organizations, households, and individuals to use energy efficiently.

The RPDPVII sets targets for reducing energy use by 10 percent by 2030, increasing power generation of renewable energy to 21 percent of the power generation mixture, and reducing coal-fired power generation to less than 45 percent of the generation mix. To achieve these targets, it is expected that almost all electricity equipment will be renovated and replaced by electricity-saving equipment. Technology must be renovated and new and advanced technologies adopted in industrial sectors, in particular power production industries, to

reduce energy consumption. The power generation industry is encouraged to use the next-generation technology of combined cycle gas turbine, USC, and advanced USC technologies for coal-fired power units to boost their efficiency to more than 42 percent; increase the renewable energy ratio; improve and modernize operations and management; strengthen relevant legal regulations; increase transmission grid capacity; and apply smart grid technology and automatic control and instrumentation.

APPROVING AND IMPLEMENTING THE PLAN

Vietnam's economy is centrally managed by sectorial development strategies and plans. Ministries, ministerial-level agencies, governmental agencies, other central agencies and provinces, central cities, state economic enterprises, and state-owned corporations formulate long-term, medium-term, and short-term national socioeconomic and sectorial development plans. The government synthesizes these plans and submits its budget based on them to the National Assembly for approval.

Annual and five-year national financial plans must be submitted for parliamentary approval. The budget plan is the basis for allocating investment capital (from the national budget, bonds, and loans) to develop the investment projects listed in the approved sector plans. Investment capital is decentralized and allocated through state budget funds, in compliance with the Law on Public Investment and the Law on State Budget. Power investment projects in poor and undeveloped regions of Vietnam are prioritized, in order to improve socioeconomic conditions there.

Institutional responsibilities

To implement the RPDPVII effectively, Vietnam has divided responsibilities as follows:

- ◆ The Ministry of Industry and Trade provides direction, periodic inspection, and monitoring; coordinates with ministries, sectors, and localities in implementing approved projects; invites investors; improves the infrastructure, including ports, for importing coal and liquefied natural gas (LNG); studies and promulgates regulations on types of imported coal and coal-fired thermal power plants to meet environmental standards and reduce CO₂ emissions; works with the People's Committees of provinces and cities to reserve the land for electricity projects; conducts research on trends in grid connection in other countries in the region, in order to improve the reliability of the power system; and issues standards and regulations on the quality of imported coal and coal-fired thermal power technology, to ensure compliance with environmental regulations.
- ◆ The Ministry of Planning and Investment formulates mechanisms and policies to attract investment and use overseas development assistance in ways that create conditions for balanced, rational, and sustainable development of the electricity industry.
- ◆ The Ministry of Finance leads and coordinates with concerned ministries and sectors in formulating mechanisms to mobilize investment capital for the electricity industry, in order to promptly and adequately meet Vietnam's electricity demand.

- ◆ The State Bank of Vietnam directs domestic commercial banks to consider and arrange investment for planned electricity projects, to ensure the stable development of the power sector.
- ◆ Electricity of Vietnam ensures the safe and stable supply of electricity for socioeconomic development; invests in power source projects and the development of synchronous electricity grids, in order to increase investment efficiency; and applies measures that reduce electricity losses and save power in production and consumption and increase labor productivity.
- ◆ PetroVietnam studies the exploitation of gas resources, imports LNG for power gas turbine combined cycle projects, ensures efficiency and suitability with use demand, invests in power projects, and coordinates with domestic and foreign private investors to build infrastructure for importing LNG.
- ◆ The Vietnam National Coal and Mineral Industries Group (Vinacomin) secures coal for electricity production and other needs of the national economy from domestic and imported coal sources, invests in power projects, and invests in coal port construction.
- ◆ The People's Committees of provinces and cities prepare sites for power source and grid projects and update, allocate, and publicize land funds for approved electricity works in land use planning.

The Strategic Environmental Assessment and public participation

Since 2005, preparation of the PDP has required a strategic environmental assessment. This requirement has led to the gradual modification of the PDP process to integrate the main environmental and societal issues under consideration. SEAs have led to significant changes in PDPs and improved their alignment with national development policies and goals.

During preparation of the PDP and SEA, workshops are held to collect comments and views regarding methodology, purpose, important issues, and input data. When a draft PDP is completed, the Electricity and Renewable Energy Agency (of the Ministry of Industry and Trade) is responsible for establishing an assessment committee to collect views on the draft PDP. Members of the assessment committee are mainly representatives of relevant ministries, departments, and other organizations; experts on investment and planning, agriculture and rural development, finance, the environment and natural resources, science and technology, and construction; energy enterprises, including Electricity of Vietnam, PetroVietnam, and Vinacomin; and the Vietnam Academy of Science and Technology.

Further consultations are held with key stakeholders after the draft PDP and SEA are completed. They solicit suggestions from the People's Committees of Vietnam's provinces on the locations of power plants, 500 kV and 200 kV transmission lines, and substations.

Preparation of the SEA requires public consultation to consider potential social and environmental impacts. To date this process has principally involved consultation with provincial

authorities, environmental specialists, functional authorities, and representatives of affected communities. Some attempts have also been made to consult with civil society organizations.

All comments from workshops are considered and taken into account in adjusting the PDP. The consultation processes are not public.

LESSONS LEARNED

The negative impacts of the rapid expansion of coal-fired generation in the PDPVII needed to be addressed in the PDPVII revision, as stipulated by the Electricity Law. The revision led to a substantial reduction in the potential negative impacts of the growth of the power sector on Vietnam's people and environment.

The RPDPVII proposes expanding generating capacity to meet forecast demand for power while addressing the mix of power generation sources, investment and fuel costs, social and environmental impacts, the reliability of power supplies, and the effects of climate change. It reduces the impacts on the environment without compromising the technical and financial viability of the proposed expansion.

Implementation of the RPDPVII began only in 2016, but achievements are already evident:

- ◆ Despite the reduction in coal-fired power generation, growth in power generation from all sources combined met the increased electricity demand that accompanied Vietnam's rapid economic expansion. No power outages occurred during periods of peak demand.
- ◆ The share of renewable power sources, especially solar power, increased significantly, with renewable energy capacity rising from about 13,000 MW (included small hydropower) in the PDPVII to 28,000 MW in the RPDPVII. The share of renewable energy in the electricity system is much higher than in the RPDPVII target.

- ◆ The power sector is attempting to increase energy efficiency and conservation.
- ◆ Specifying and allocating investment capital appropriately and paying attention to the private investment source have allowed for the rapid growth of energy infrastructure.
- ◆ Energy saving, efficient usage, and environmental protection measures have been managed in a uniform and efficient, step-by-step manner.

Some shortcomings are also apparent. Transmission lines meet only about 65 percent of the RPDPVII's objective, and the current investment structure is not in accordance with the RPDP, largely because of insufficient allocation of investment capital for the power transmission system. Rapid development of renewable energy sources would exceed the system's operating capacity. Rapid improvement and modernization of power transmission infrastructure needs to complement renewable energy expansion. Without such modernization, the RPDPVII's target of saving and using energy more efficiently will be difficult to achieve.

Vietnam has undertaken a wide range of policy and legislative initiatives over the last decade. It has increasingly emphasized social and environmental responsibility, expansion of energy efficiency and renewable energy, mitigation of and adaptation to the impacts of climate change, sustainability and green growth, and private sector participation. Power sector planning has moved from a traditional least-cost approach to a multipurpose approach. Sustained action is needed if the full process of change and reform taking place at the national level is to be reflected in power sector planning.

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ENDNOTES

1. The SEDP is a national master socioeconomic development plan that provides the foundation for sectoral development plans.

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Huyen is a member of the preparation group for national plans on energy, power, renewable energy, energy conservation and efficiency as well as participate in the assessment, inspection of these implementation processes.

She is also an Advisor to the Ministry of Industry and Trade on strategic environmental assessment for National Development Master Plans on energy, power, biomass, wind, solar, renewable energy, hydropower, and environmental impact assessment for thermal, hydro, renewable power plant projects and transmission lines and transformer stations.

Regarding environment and climate change caused by energy development, Huyen has studied integration of environmental and social issues into national plans as a policy tool. Topics studied include GHG emissions, climate change, air pollution by flue gas from thermal power plants, strengthening renewable energy, energy conservation and efficiency, and movement and resettlement.

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