



INCLUSIVE GREEN, DIGITAL TRANSFORMATION FOR SUSTAINABLE DEVELOPMENT IN VIETNAM

NGUYỄN ĐÌNH THỌ¹, NGUYỄN THỊ MINH TÂM¹

¹ Institute of Strategy and Policy on Agriculture and Environment

Abstract

Sustainable development requires linking economic development with social progress and environmental protection. Resolution 39-NQ/TW on improving the efficiency of management, exploitation, use and promotion of economic resources, including human, material and financial resources, plays an important role in the green transformation, digital transformation and inclusive transformation so that Vietnam can continue to participate in global trade and investment activities, integrating sustainable production and consumption into the global supply chain. Using flexible economic tools and market-based solutions instead of rigid administrative management and criminal procedures are the basis for Vietnam to move from a traditional society to a pre-take-off stage, and to take off stage according to the Rostow economic growth model, towards a modern industrial stage, and a modern post-industrial society in the future.

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1. OVERVIEW OF GREEN TRANSFORMATION, DIGITAL TRANSFORMATION, INCLUSIVE TRANSFORMATION FOR SUSTAINABLE DEVELOPMENT

The world is facing three planetary crises: climate change, environmental pollution, and biodiversity loss. Global investors are increasingly interested in investing in assets that have a positive impact on the environment, in order to meet voluntary and mandatory ESG (Environmental, Social, and Governance) standards. Vietnam has committed to implementing the National Green Growth Strategy to 2030, with a vision to 2050, in the context of increasing international requirements for environmental protection and sustainable development. Vietnam is committed to building a green, circular economy, ensuring water resource security, developing sustainable agriculture, and increasing the resilience of ecosystems and societies to the negative impacts of natural disasters and climate change. The strategy for 2030 will focus on reducing water and land degradation, ensuring water supplies for key economic sectors, and transforming agriculture towards climate-smart agriculture. Forest cover will also be maintained at at least 42%, while the area of terrestrial and marine nature reserves will continue to expand. By 2050, the goal of effectively managing natural resources, protecting biodiversity, and ensuring that all people have access to clean, safe water and health care services will be fully achieved.

Green transformation, digital transformation, and inclusive transformation are the foundations for improving the efficiency of management, exploitation, use, and promotion of green human resources, green material resources, and green financial resources for sustainable development, realizing Vietnam's commitment to zero net emissions by 2050 at COP26. Green transformation, digital transformation, and inclusive transformation allow for resource management from the center of the earth to the end of the atmosphere. National resource management based on spatial data is based on national geography, the national spatial data infrastructure NSDI (National Spatial Data Infrastructure) and the national cadastral database NDCD (National Digital Cadastral Database). All national resources are stored with characteristics according to traditional databases and coordinates according to the GIS (Global Information System) spatial database. The national sustainable development strategy needs to be established, implemented, checked, inspected, and monitored based on statistics, inventories, accounting and auditing according to the integrated land use landscape management method, applying multi-layer thematic mapping technology to national resource management.

National sovereign territory includes underground layers, land areas, sea areas, continental shelves, airspace and atmospheric layers. Applying digital transformation to integrated landscape management of national land use to allocate land according to space of use (underground, ground and air) for socio-economic

development, national defense, security, environmental protection, biodiversity and climate change adaptation goals based on land potential and land use needs of sectors and fields for each socio-economic region and administrative units. Multi-layer thematic map technology is built on the basis of exploiting digital transformation technologies that are popular in the world today: i) Applying big data technology to store data in many independent data layers implemented by sector management ministries, specialized management agencies and local areas managing the area; ii) Applying artificial intelligence (AI) and machine learning to approve and confirm spatial database information collected through satellites, drones, street view cameras and information provided by public service users, updated daily; iii) Applying cloud technology so that the state can centrally manage data and people can access it anytime, anywhere, using a unified citizen identification numbers; iv) Apply blockchain technology to store data over time and record adjustments on the database information system. Administrative procedures can be carried out and public data can be accessed according to citizen identification numbers.

2. GREEN TRANSFORMATION, DIGITAL TRANSFORMATION, AND INCLUSIVE TRANSFORMATION ARE REQUIRED FOR VIETNAM TO CONTINUE PARTICIPATING IN THE GLOBAL TRADE AND INVESTMENT SYSTEM

Vietnam has participated in a number of new generation FTAs, notably the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), with required sustainable and inclusive measures. Sustainable and inclusive development is the new rules of the game in trade and investment, a mandatory requirement to comply with climate, environment, biodiversity, trade and investment commitments, and a condition for Vietnam to be able to integrate into the global food system, energy security, finance, trade, investment and supply chain systems. From January 2023, the Non-Financial Reporting Directive (NFRD) came into force, requiring large companies to disclose information about the environmental impact of their business activities. The Corporate Sustainability Reporting Directive (CSRD) extends sustainability reporting requirements to listed small and medium-sized enterprises. The Corporate Sustainability Due Diligence Directive (CSDDD) requires companies to monitor and report sustainability risks in their

supply chains. The European Union Deforestation Regulation (EUDR) requires companies exporting products to the EU to ensure that their products have not been deforested after 31st December 2020. Under the Carbon Border Adjustment Mechanism (CBAM), companies producing and exporting products such as steel, cement, aluminium, and fertilisers to the EU must measure and report their carbon emissions from 1st October 2023, and buy carbon credits to offset their emissions from 2026.

Vietnam's major trading partners have all issued policies on emission reduction to fulfill their commitments on climate goals. The European Union (EU) has implemented an Emissions Trading Scheme (ETS) to reduce emissions by 55% from 1990 levels by 2030 and extend its carbon policy framework by 2040, aiming to achieve net zero emissions by 2050. The United States aims to reduce emissions by 50-52% from 2005 levels by 2030 through its national emissions reduction program and will increase the adoption of clean energy technologies by 2040, with the ambition to achieve net zero emissions by 2050. China, with a carbon trading scheme, is expected to peak emissions by 2030 and reduce emissions intensity by 60-65% from 2005 levels by 2040, aiming to achieve net zero emissions by 2060. The United Kingdom is committed to reducing emissions by 68% from 1990 levels by 2060. 2030 and is investing heavily in renewable energy and sustainable infrastructure, with a goal of achieving net zero emissions by 2050. Canada aims to reduce emissions by 40-45% from 2005 levels by 2030 through a carbon tax program and increased development of renewable energy technology to achieve net zero emissions by 2050. Japan, with its climate action plan, will reduce emissions by 26% from 2013 levels by 2030, and focus on increasing renewable energy capacity to achieve net zero emissions by 2050.

The current global context shows that the need to respond to climate change has become an irreversible trend, with profound impacts on all areas such as economics, politics, diplomacy and national security. With specific goals, Vietnam aims to reduce greenhouse gas emissions and achieve net zero emissions by 2050, a task that is not only mandatory for sustainable development but also an opportunity to promote economic restructuring in an environmentally friendly direction and enhance competitiveness, in line with the requirements of the Paris Agreement and global trends after the COP26 Conference. Vietnam has great potential for renewable energy, especially solar

**Emission reduction roadmaps of Vietnam's trade and investment partners**

Nation	Policy	Target by 2030	Target by 2040	Target by 2050
European Union (EU)	- Emissions Trading System (ETS)	- Reduce emissions by 55% compared to 1990	- Expanded carbon policy framework	- Achieve net zero emissions
	- Carbon tax directive	- Developing carbon tax systems in member states	- Increase carbon tax for key sectors	- Building a comprehensive carbon tax system
USA	- National Emission Reduction Program	- Reduce emissions by 50-52% compared to 2005	- Increase the application of clean energy technology	- Achieve net zero emissions by 2050
	- Emission management from industries	- Implement stricter regulations for the industry	- Strengthening the development of renewable energy	- Reduce emissions in all sectors
China	- Carbon trading mechanism	- Peak emissions by 2030	- Reduce emission intensity by 60-65% compared to 2005	- Achieve net zero emissions by 2060
	- Invest in renewable energy	- Increase renewable energy capacity to 1,200 GW	- Increase the proportion of renewable energy in total energy consumption	- Achieve 80% renewable energy ratio
United Kingdom	- Emissions trading mechanism	- 68% reduction in emissions compared to 1990	- Implement additional emission reduction measures	- Achieve net zero emissions by 2050
	- Clean energy investment support program	- Invest £20bn in renewable energy and sustainable infrastructure	- Increase investment in green technology	- Building a completely sustainable infrastructure
Canada	- Carbon tax program	- Reduce emissions by 40-45% compared to 2005	- Strengthen carbon taxes and other emissions reduction policies	- Achieve net zero emissions by 2050
	- Investing in green technology	- Strengthening the development of renewable energy technology	- Invest in research and development of new technology	- Promote investment in emission reduction technology
Japan	- Climate Action Plan	- 26% reduction in emissions compared to 2013	- Strengthening the development of renewable energy technology	- Achieve net zero emissions by 2050
	- Invest in renewable energy	- Increase renewable energy capacity to 36-38% of total consumption	- Improve renewable energy capacity	- Building a sustainable energy system

Source: Author's compilation. Goals and policies may vary according to the actual situation and commitments of each country or region

energy, wind energy and biomass. The development of renewable energy helps reduce dependence on increasingly depleted fossil energy sources, causing environmental pollution and affecting climate change. Renewable energy not only provides a sustainable source of energy but also reduces greenhouse gas emissions, thereby contributing to global efforts to combat climate change.

3. SOLUTIONS TO MOBILIZE GREEN HUMAN RESOURCES, GREEN MATERIAL RESOURCES, GREEN FINANCE FOR SUSTAINABLE DEVELOPMENT IN VIETNAM

On October 1st, 2021, the Prime Minister issued Decision 1658/QĐ-TTg, approving the National Strategy on Green Growth for the 2021-2030 period, with a vision to 2050. This strategy aims to promote

economic restructuring associated with growth model innovation, increasing competitiveness and resilience to external shocks. Green growth is an important method for sustainable development, contributing to reducing greenhouse gas emissions and moving towards a carbon-neutral economy. This strategy puts people at the center, encourages responsible lifestyles, improves quality of life and resilience to climate change. Green growth relies on institutions, modern science and technology and high-quality human resources, orienting investment in advanced technology, digital transformation and sustainable infrastructure. The National Climate Change Strategy to 2050, approved under Decision No. 896/QĐ-TTg dated July 26th, 2022, demonstrates Vietnam's strong commitment to responding to the enormous challenges posed by climate change. Decision No. 215/QĐ-TTg dated March 1st, 2024 of the Prime Minister of Vietnam approving the National Energy Development Strategy to 2030, with a vision to 2045, sets out important goals in ensuring energy security and sustainable development. Power Master Plan VIII emphasizes the importance of promoting renewable energy projects such as solar power, wind power and small hydropower, while gradually reducing dependence on coal and gas power projects to limit greenhouse gas emissions and negative impacts on the environment. Decision No. 749/QĐ-TTg approving the "National Digital Transformation Program to 2025, with a vision to 2030" sets out a vision for Vietnam to become a digital, stable and prosperous country, and identifies the goals for developing a digital government, digital economy and digital society. Specifically, by 2025, the program sets a target of 80% of online public services reaching level 4, 100% of reporting and statistical indicators being connected and sharing data on the Government Reporting Information System. By 2030, this target will be expanded, with 100% of online public services and 100% of assignments at the ministerial and provincial levels being processed online. The program emphasizes the role of awareness in digital transformation, considering people as the center and promoting the development of digital platforms and digital infrastructure as breakthrough solutions to reduce costs and increase efficiency in management and operation activities.

Green workforce plays a key role in the transition to an environmentally friendly economy, focusing on industries such as renewable energy, waste treatment, sustainable agriculture and clean manufacturing.

The workforce needs to be equipped with the necessary knowledge and skills to apply advanced technological solutions to minimize negative impacts on the environment, while developing new industries with high added value and contributing to reducing greenhouse gas emissions. In addition, digital transformation is also opening up many opportunities for Vietnam, especially in the context of the Fourth Industrial Revolution, which is promoting strong digitalization in all fields. Human resources in this field need to have high expertise in information technology, data, artificial intelligence (AI), and other emerging technologies. Human resources in this field require not only professional skills but also a deep understanding of social policies and laws, especially those related to gender equality, labor rights, and a safe working environment. The major challenge for Vietnam today is to ensure that the workforce can adapt to rapid changes in the labor market, helping the country not only keep up but also lead in green, digital, and inclusive transformation.

Vietnam is facing increasing water scarcity and pollution due to the impacts of climate change, urbanization and population growth. Investing in green infrastructure is an important factor in building environmentally friendly structures such as energy-efficient buildings, modern public transport systems that reduce emissions, and efficient wastewater and waste treatment infrastructure, facilitating improvements in living environment quality, promoting green and digital economic growth through creating new jobs and encouraging the development of green industries. Water management using an integrated, landscape approach focuses on the use of advanced technologies and sustainable management methods to conserve water resources and improve water quality by building water reuse systems, efficiently using water resources in agricultural and industrial production, and protecting freshwater ecosystems. Vietnam has introduced policies to strictly manage the exploitation and use of groundwater, while encouraging businesses and local communities to participate in water resource protection programs and develop infrastructure such as reservoirs, dams and sustainable water distribution systems. Centralized, circulating, low-emission wastewater treatment infrastructure is an integral part of the wastewater management strategy towards sustainable development and climate change mitigation in Vietnam. Emission reduction measures in wastewater treatment include optimizing biological



Digital transformation not only modernizes the economy but also provides powerful tools to promote green growth

treatment processes, improving treatment technology to reduce nitrogen and phosphorus in wastewater, using anaerobic systems combined with measures to recover and reuse methane gas as an energy source, instead of letting this gas escape into the air, helping to convert emissions into clean energy for the plant.

The big challenge for Vietnam is to mobilize enough green capital to train green human resources and implement green infrastructure projects on a national scale, especially in the context of the economy being under pressure from rapid development and serious environmental issues. Opportunities to mobilize climate finance and green finance from international organizations, investment funds, the financial system, multinational companies and development partners for green transformation, digital transformation, and water resource management in Vietnam are opening up great potential to promote sustainable development and achieve emission reduction targets. These funds are dedicated to projects with clear goals of mitigating the impacts of climate change, improving energy and water efficiency, and promoting digital technology solutions in resource management. Global climate funds such as the Green Climate Fund (GCF) and the Global Environment Facility (GEF) are opening up funding opportunities and technical assistance for Vietnam to

invest in green infrastructure, renewable energy, and sustainable water management projects. Investment funds can provide abundant financial resources for green projects, helping to realize environmental protection and sustainable development initiatives. The financial system, through the provision of financial products such as green bonds and green credit, can support businesses in deploying clean technology solutions. Vietnamese businesses, especially in the energy, technology and infrastructure sectors, can access this capital by meeting standards on sustainable development and environmental transparency. Green bond issuance has been successfully implemented in many countries around the world, and Vietnam also has the potential to apply this model to mobilize capital for digital transformation projects combined with water resource protection, pollution reduction and carbon emissions.

Integrating green finance into economic development strategies will create strong momentum for sectors, from agriculture, industry to services, to adopt sustainable production models, reduce emissions and optimize resources. The Vietnamese government needs to develop a green taxonomy, play an important role in promoting the legal framework and facilitating the development of the green finance

market, including the development of digital financial infrastructure, environmental monitoring and assessment systems, to enhance transparency and social responsibility in the use of climate finance. The strategy promotes the development of financial mechanisms and carbon markets to encourage investment shifts to low-emission economic activities, creating conditions for businesses and individuals to actively participate in climate protection and building a sustainable and prosperous Vietnam in the future.

People often act on personal motives, so the best way to mobilize and exploit the country's resources is to base on the design of institutional arrangements and create financial incentives so that personal interests coincide with national interests, motivating people to pursue personal interests while simultaneously contributing to national interests. In the private sector, the performance-based salary model is the foundation for building a self-conscious working mechanism. In financial and budget management, the government regulates income inequality through taxes, improving people's quality of life through an effective public service system. Implementing results-based budget management to motivate people and businesses to develop.

Digital transformation and the use of unified personal identification codes according to the Law on Citizen Identification are the first steps for people to use unified public services such as: Social insurance, health insurance, tax codes, population management, electronic medical records, online student codes, civil servant and public employee codes, public service user codes, bank accounts, treasury to fulfill financial obligations to the State, pay fines, collect fees, road fees, parking, etc. In the green and digital era, the most valuable asset is the user. It is necessary to develop personal identification codes for public service users, develop the digital ecosystem and Vietnamese social networks to exploit the resources of the population of more than hundred millions of people in Vietnam.

It is necessary to apply digital transformation to change the way of managing the state budget in spatial criteria, using multi-layer thematic maps to improve the effectiveness of state budget management. The state budget needs to be managed through results (performance-based budgeting) instead of controlling expenditure items (line-item budgeting); implementing medium-term expenditures according to the development strategy; rolling annually to ensure flexibility. Both concurrent and

investment expenditures must implement medium-term expenditures in line with the development strategy, managed by outputs and outcomes. Digital transformation allows the management of the state budget by spatial criteria using multi-layer thematic maps to identify areas lacking in schools, hospitals, transport infrastructure, culture, sports, or with high unemployment rates, which are prioritized for budget allocation, resource, finance, and investment based on statistical data, inventory, and spatial accounting.

Digital transformation is not only a trend but also an essential tool in implementing green transformation and sustainable, inclusive development. Through the application of digital technology, organizations and businesses can optimize production processes, manage resources more effectively and minimize negative impacts on the environment. Digital transformation also promotes the creation of environmentally friendly products and services, supports sustainable economic development and creates social value. By combining technology and sustainable development strategies, we can build a greener future, while ensuring fairness and inclusion for all members of society ■

REFERENCES

1. Government of Vietnam. (2022). *National strategy on climate change to 2050*. Decision No. 896/QĐ-TTg dated July 26, 2022.
2. Government of Vietnam. (2023). *Vietnam's updated nationally determined contributions (NDC)*.
3. IPCC. (2021). *Sixth Assessment Report (AR6): Climate change, impacts and adaptation*. Intergovernmental Panel on Climate Change (IPCC).
4. Ministry of Natural Resources and Environment. (2022). *Report on the National Climate Change Adaptation Plan for the 2021-2030 period, with a vision to 2050*.
5. OECD. (2020). *Sustainable development in the era of climate change: Challenges and solutions*. Organisation for Economic Co-operation and Development (OECD).
6. UNDP Viet Nam. (2021). *Assessment of resilience and adaptation to climate change in Viet Nam*. United Nations Development Programme (UNDP).
7. United Nations. (2015). *Paris Agreement on Climate Change*. Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21), Paris.
8. World Bank. (2021). *Vietnam: Towards a Green Economy and Sustainable Development*. World Bank Report on Low Emission Economy.