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Market Report: Vietnam

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# List of Abbreviations

| Full Meaning | Abbreviation |
|---|---|
| France's Development Agency | AFD |
| Artificial Intelligence | AI |
| Advanced Metering Infrastructure | AMI |
| Air-Pollution Control | APC |
| Business-As-Usual | BAU |
| Battery Energy Storage Systems | BESS |
| Balance Of System | BOS |
| Compound Annual Growth Rate | CAGR |
| Carbon Capture and Storage | CCS |
| Carbon Capture, Utilization, And Storage | CCUS |
| Conformitè Europëenne | CE |
| Continuous Emissions Monitoring Systems | CEMS |
| Methane | $CH_4$ |
| Corporate Income Tax | CIT |
| Carbon Monoxide | CO |
| Carbon Dioxide | $CO_2$ |
| UN Climate Change Conference of the Parties | COP |
| Comprehensive And Progressive Agreement for Trans-Pacific Partnership | CPTPP |
| Department Of Environmental Pollution Control | DEPC |
| Departments Of Natural Resources and Environment | DONREs |
| Direct Power Purchase Agreement | DPPA |
| Direct Reduced Iron | DRI |
| European Economic Area | EEA |
| Eco-Industrial Parks | EIP |
| Electro-Magnetic Compatibility | EMC |
| Engineering, Procurement, And Construction | EPC |
| Energy Service Companies | ESCOs |

| Full Meaning | Abbreviation |
|---|---|
| Environmental, Social, And Governance | ESG |
| Electrostatic Precipitators | ESP |
| Emissions Trading System | ETS |
| European Community | EU |
| Eu–Vietnam Free Trade Agreement | EVFTA |
| Vietnam Electricity | EVN |
| National Power Transmission Corporation | EVNNPT |
| Flue-Gas Desulfurization | FGD |
| Foreign-Invested Enterprises | FIEs |
| Feed-In Tariff | FIT |
| Free Trade Agreements | FTAs |
| Government-To-Government | G2G |
| Greenhouse Gas | GHG |
| Hazardous Solid Waste | HSW |
| Heating, Ventilation, and Air Conditioning | HVAC |
| High Voltage Direct Current | HVDC |
| International Energy Agency | IEA |
| Internet Of Things | IoT |
| International Organization For Standardization | ISO |
| Industrial Solid Waste | ISW |
| Just Energy Transition Partnership | JETP |
| Ministry of Agriculture and Environment | MAE |
| Membrane Bioreactors | MBR |
| Machine Learning | ML |
| Ministry Of Industry And Trade | MOIT |
| Ministry Of Labour, Invalids And Social Affairs | MOLISA |
| Ministry Of Natural Resources And Environment | MONRE |
| Ministry Of Science And Technology | MOST |
| Minister Of Planning And Investment | MPI |

| Full Meaning | Abbreviation |
|---|---|
| Municipal Solid Waste | MSW |
| Nitrous Oxide | $N_2O$ |
| Nationally Determined Contribution | NDC |
| Nitrogen Oxides | NOx |
| Operation And Maintenance | O&M |
| Official Development Assistance | ODA |
| Original Equipment Manufacturers | OEMs |
| Pollution Control Department | PCD |
| Power Development Plan 8 | PDP VIII |
| Phasor Measurement Units | PMUs |
| Public–Private Partnerships | PPPs |
| Photovoltaic | PV |
| National Technical Regulation | QCVN |
| Quality Management System | QMS |
| Resource-Efficient And Cleaner Production | RECP |
| Reverse Osmosis | RO |
| Sustainable Development Goals | SDGs |
| Small And Medium-Sized Enterprises | SMEs |
| Selective Non-Catalytic Reduction | SNCR |
| Sulfur Dioxide | $SO_2$ |
| National Technical Standards | TCVN |
| Terajoules | TJ |
| Tons Of Oil Equivalent | TOE |
| United Nations Development Programme | UNDP |
| UN Framework Convention on Climate Change | UNFCCC |
| United Nations Industrial Development Organization | UNIDO |
| Vietnam Energy Efficiency Program / Programme | VNEEP 3 |
| Volatile Organic Compounds | VOCs |
| World Health Organization | WHO |

| Full Meaning | Abbreviation |
|---|---|
| Waste-To-Energy | WtE |
| Wind Turbine Installation Vessels | WTIV |

# 1. Foreword

Vietnam's green machinery market is entering a decisive new phase of growth, fueled by the government's strong net-zero commitment, rapid industrial expansion, and rising domestic and foreign investment in clean technologies. In recognition of this transformation, Switzerland Global Enterprise (S-GE), in collaboration with Dezan Shira & Associates (DSA), has developed this report to provide Swiss companies with a strategic perspective on Vietnam's evolving green machinery landscape. Drawing on S-GE's extensive experience in supporting Swiss exporters and investors across Southeast Asia and DSA's deep local expertise, this publication combines regional insights with practical guidance on Vietnam's regulatory, operational, and investment environment. It offers a comprehensive view of the opportunities and challenges shaping the country's green transition.

Sincere appreciation is extended to the teams at S-GE and DSA for their close collaboration, as well as to the many Vietnamese and Swiss partners, chambers, and enterprises whose valuable input has enriched this study. Their shared commitment to advancing Swiss – Vietnamese economic cooperation in sustainable industries has made this publication possible. It is our hope that the findings presented here will assist Swiss companies in navigating Vietnam's expanding green machinery market and in building sustainable, high-value partnerships that contribute to both economic growth and environmental progress in this dynamic region.

Fabian Stiefvater
Head of Swiss Business Hub Southeast Asia

fabian.stiefvater@eda.admin.ch

**Swiss Business Hub Southeast Asia + Pacific**
**Switzerland Global Enterprise**
Stampfenbachstrasse 85
8006 Zürich
Switzerland

# 2. Executive Summary

## Market Overview

Vietnam's green machinery market is entering a decisive growth phase, driven by the government's strong net-zero commitment, foreign investment inflows, and a rising domestic demand for clean technologies. In 2024, the total market value reached approximately US$5.4 billion and is projected to expand to US$7.8 billion by 2029, reflecting an average annual growth rate of 6–7%. The sector encompasses renewable energy generation technologies, waste and water treatment systems, and energy-efficient manufacturing and smart building solutions.

Renewable energy machinery remains the largest component, accounting for about US$1.9 billion in 2024, or slightly more than one-third of the market. Solar power continues to dominate, though wind power is expected to accelerate following renewed regulatory clarity under the revised Power Development Plan VIII (PDP VIII). Vietnam currently operates 17 GW of solar capacity, the highest in Southeast Asia, while wind projects are gaining traction in the Mekong Delta and Central Highlands. The industrial energy-efficiency and smart-building segments also exhibit solid momentum, with market values of US$642 million and US$540 million, respectively. Meanwhile, the water and wastewater treatment machinery market is estimated at US$294 million, and the waste-to-energy segment at US$48 million, both expected to expand significantly due to infrastructure modernization and environmental mandates.

Vietnam's net-zero roadmap, targeting carbon neutrality by 2050, provides a robust framework for sustainable growth. The National Climate Change Strategy (Decision 896/QD-TTg, 2022) sets emission reduction targets across all sectors and mandates GHG reduction measures for high-emission facilities. Complementary programs such as the National Energy Master Plan (Decision 893/QD-TTg, 2024) and Vietnam Energy Efficiency Program (VNEEP 3) aim to reduce energy intensity by 8–10% by 2030, further driving demand for efficient machinery and clean energy technologies.

## Sector Demand and Application Areas

**Renewable energy:** Vietnam's renewable energy landscape has transformed dramatically over the past decade. The total installed renewable capacity surged from under 1 GW in 2014 to over 24 GW by 2024, with solar and wind driving this expansion. Under the revised PDP VIII (Decision 768/QD-TTg, 2025), wind capacity is targeted to reach up to 55 GW by 2030 and 230 GW by 2050, while solar power is expected to expand from 73 GW in 2030 to nearly 296 GW by 2050. Rooftop solar, accounting for nearly half of solar capacity additions to date, indicates the growing decentralization of Vietnam's energy system. This rapid growth translates directly into increased demand for modern turbines, photovoltaic modules, grid integration technologies, and storage systems.

**Water treatment, waste-to-energy, other environmental technology:** Vietnam's rapid urbanization is straining water and waste infrastructure. While 94% of the urban population has access to clean water, only 18% of wastewater is collected and treated. Industrial zones treat roughly 812,000 $m^3$/day, far below capacity, and rural coverage remains minimal. These deficits are driving investments in advanced pumping, filtration, and treatment machinery. In parallel, municipal solid waste generation has reached 70,000 tons per day, but less than 20% is treated by modern methods. Government targets under Decision 491/QD-TTg require 85–90% of urban waste to be treated by advanced technologies by 2025, reducing landfilling below 30%, a shift expected to accelerate demand for energy-efficient WtE systems.

**Energy efficiency and Smart buildings:** Electricity consumption in Vietnam has more than doubled in a decade, from 1,200 kWh per capita in 2012 to over 2,600 kWh in 2022, making energy efficiency a national priority. The VNEEP 3 program calls for energy savings of 8–10% by 2030 and aims for 150 certified green buildings nationwide. Industrial sectors such as steel, cement, and textiles must cut energy use by 5–25% compared with 2015–2018 levels, stimulating demand for energy-saving industrial equipment, automation technologies, and high-efficiency motors and control systems.

## Competitive Landscape

Vietnam's green machinery market combines a dynamic mix of domestic and international players. Local conglomerates such as Trung Nam Group, TTC Group, PC1 Group, and Bamboo Capital Group (BCG) are leading renewable project development across solar, wind, and hydropower segments. Foreign companies, especially from China, Japan, and Europe, dominate equipment manufacturing and supply, including LONGi, JA Solar, Trina Solar, Jinko Solar, VSUN Solar, Vestas, and GE Renewable Energy.

Imports account for a significant share of high-technology machinery, particularly in wind turbines, photovoltaic modules, and control systems. Vietnam's reliance on imported green technologies indicates the market's openness to international cooperation, technology transfer, and foreign direct investment. As domestic capacity grows, joint ventures and OEM collaborations have become more common, creating a fertile environment for global suppliers to establish local manufacturing or assembly operations.

## Opportunities for Swiss Businesses

Vietnam's accelerating clean energy transition presents a wide range of opportunities for Swiss enterprises specializing in precision engineering, automation, and sustainable technology. The government's clear policy trajectory toward decarbonization and energy efficiency provides a stable foundation for market expansion.

Export opportunities exist in high-quality renewable energy machinery, such as hydropower components, wind turbine systems, advanced inverters, and grid management technologies. Swiss suppliers can leverage their reputation for efficiency and reliability to cater to Vietnam's growing need for modern and durable equipment. In water and wastewater management, Swiss firms with expertise in membrane filtration, control instrumentation, and smart monitoring solutions will find a receptive market as Vietnam prioritizes the modernization of treatment systems under its 2030 environmental roadmap.

Sourcing opportunities are growing as Vietnam positions itself as a regional manufacturing hub for renewable energy equipment. Several leading global firms, including major solar manufacturers, are already operating in Vietnam, and are producing for export. Swiss companies can benefit from lower-cost component sourcing while maintaining quality control and compliance with international standards.

Investment opportunities are supported by Vietnam's Just Energy Transition Partnership (JETP) and expanding industrial base. Joint ventures with established local players can facilitate entry into solar, wind, and waste-to-energy projects, especially as the government encourages technology transfer and local value addition. With growing demand for ESG-compliant manufacturing and green industrial parks, Swiss companies can align their investments with both profitability and sustainability goals.

## Regulatory Environment and Market Entry Strategy

Vietnam maintains an increasingly transparent framework for green technology and machinery imports. Most renewable energy equipment benefits from reduced import duties, especially those classified under environmental protection categories. Technical standards are harmonized with ASEAN and ISO norms, with certification required from the Directorate for Standards, Metrology and Quality (STAMEQ). Safety and environmental regulations are defined under the Law on Environmental Protection (2020) and supporting decrees.

For Swiss firms, the EU–Vietnam Free Trade Agreement (EVFTA) and the European Free Trade Association – Vietnam (EFTA–Vietnam) framework negotiations offer an improving trade environment, reducing tariff and non-tariff barriers. This, combined with Vietnam's expanding carbon market (pilot phase 2025–2028, full operation from 2029), creates favorable conditions for sustainable business operations.

Market entry pathways depend on scale and strategic intent. Direct export through local distributors offers a low-risk entry point for specialized machinery. Joint ventures with established Vietnamese energy developers can accelerate market penetration and ensure regulatory compliance. For long-term engagement, establishing local subsidiaries or service centers in major industrial hubs such as Ho Chi Minh City, Da Nang, or Hai Phong enables after-sales support and closer collaboration with end users. Finally, strategic alliances involving licensing, OEM cooperation, or technology transfer can position Swiss firms as long-term partners in Vietnam's green transition.

# 3. Market overview

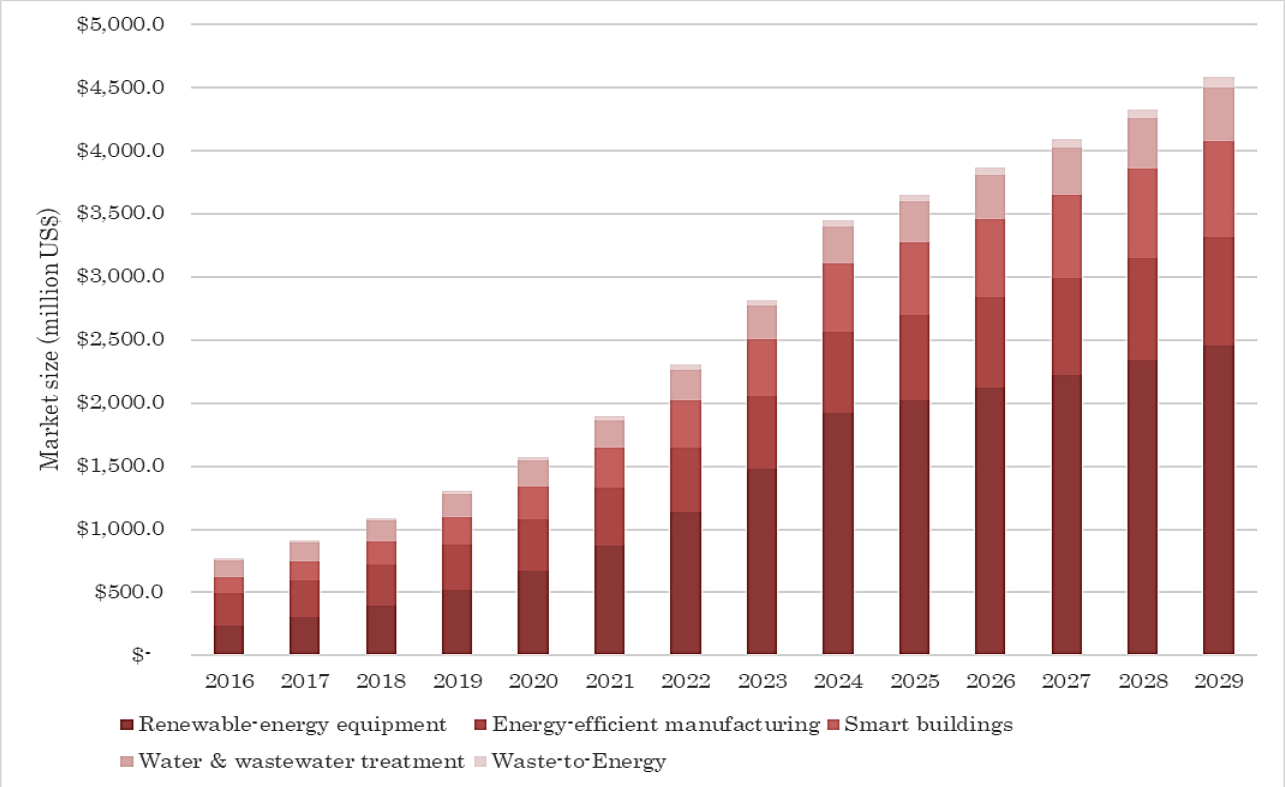
To better understand the green machinery market in Vietnam, this section provides an overview, including market size and growth, key market trends, and growth drivers. These insights establish a forward-looking context for evaluating the role of green machinery in Vietnam's rapidly evolving business landscape.

## 3.1. Market size and growth

The green machinery sector includes equipment and technologies for renewable energy generation, water treatment, waste-to-energy systems, energy-efficient manufacturing and smart buildings, supporting the transition toward cleaner and more sustainable industries.

Vietnam's green machinery market is entering a decisive growth phase, supported by strong government commitments, foreign capital inflows, and rising domestic demand for cleaner technologies. In 2024, the total market was valued at approximately US$5.4 billion and is forecast to expand to around US$7.8 billion by 2029, reflecting an annual growth rate of roughly 6–7%.

**Figure 1 – Vietnam's green machinery market size (US$ million), 2016 – 2029**




Source: Dezan Shira & Associates' analysis, 2025

Renewable-energy machinery remains the dominant component, accounting for roughly $1.9 billion in 2024, or just over one-third of the total market. Solar equipment continues to lead, but wind power is expected to accelerate fastest post-2025 as regulatory clarity returns following delays in power purchase agreements. Vietnam is Southeast Asia's largest solar equipment market by installed base, with more than 17 GW of capacity deployed, and new tenders in the Mekong Delta and central highlands are expected to renew equipment orders in 2026–2029.

The industrial energy-efficiency and smart-building segments are expanding in size and of strategic importance within the domestic economy as well. Energy-efficient manufacturing systems, valued at about US$ 642 million in 2024, are benefitting from rising electricity tariffs, new corporate sustainability reporting requirements, and FDI-driven modernization in electronics and automotive supply chains. Smart-building technologies contribute approximately US$540 million, driven by rapid urbanization and the entry of foreign property developers integrating advanced HVAC, and control systems to meet LEED and EDGE certification standards.

In parallel, Vietnam's water and environmental technology markets are seeing renewed policy attention. The water and wastewater treatment segment, estimated at US$294.3 million, is supported by ongoing government initiatives to expand treatment capacity and improve urban water quality. Notable projects include the Yen Xa Wastewater Treatment Plant in Hanoi, one of northern Vietnam's largest facilities, and multiple urban wastewater projects in Ho Chi Minh City aimed at processing several million cubic meters of wastewater daily. These projects reflect the sector's growing modernization and the government's focus on sustainable water infrastructure.

Waste-to-energy technologies, currently a smaller niche at around US$48.2 million, are expected to scale as Hanoi, Ho Chi Minh City, and Da Nang accelerate landfill diversion and energy recovery initiatives, with Japan, Korea, and Singapore emerging as leading technology partners.

## 3.2. Key market trends

### 3.2.1. Net-zero transition and carbon neutrality roadmap

Net-zero entails reducing all greenhouse gas (GHG) emissions, including carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), and others, to the lowest possible level, with any residual emissions balanced through measures such as carbon capture, storage, or reforestation. It is typically framed as a long-term goal, such as 2050, and requires systemic transformation across energy systems, industry, and consumption patterns. Carbon neutrality, by contrast, usually applies only to $CO_2$, and is achieved when an organization, product, or activity balances its carbon output through verified offsets or sequestration. While some definitions extend carbon neutrality to all GHGs, in practice it is often applied at a narrower scope, making it a less stringent commitment compared to net-zero.

Building on these concepts, international climate cooperation is anchored in the Paris Agreement (2015), which committed nations to limiting global temperature rise to well below 2°C, with efforts to pursue 1.5°C. The Agreement calls for achieving a balance between anthropogenic emissions and removals in the second half of the century, a foundation for today's net-zero pledges. Progress is reviewed annually at the UN Climate Change Conference of the Parties (COP), most recently COP29 in November 2024. These forums set long-term emissions reduction goals, financial commitments from developed to developing economies, and accountability mechanisms, forming the backbone of the global net-zero transition.

Progress is broadening across stakeholders. As of June 2024, 107 countries, covering 82% of global GHG emissions, have formalized net-zero pledges. More than 9,000 companies, 1,000 cities, 1,000 educational institutions, and 600 financial institutions have also joined the "Race to Zero" campaign[1]. This indicates that governments alone cannot drive the transition. Instead, businesses, investors, and civil society must embed net-zero into long-term strategies alongside public policy and regulation.

While global participation has expanded, challenges persist. At COP29 in 2024, developed countries pledged to scale up climate finance, with aspirations to mobilize US$300 billion annually for clean energy in developing economies by 2035[2]. This marked an important step but still fell short of the amount required to achieve global net-zero targets[3], highlighting the persistent gap between commitments and actual funding needs. Bridging this gap will require a balance of public and private investment: public finance to provide essential support and risk mitigation, and private capital to scale renewable energy projects. Despite uncertainties in some major economies, many developed and emerging countries remain firmly committed to climate goals, creating continued opportunities for capital flows into renewable energy projects in high-potential markets such as Vietnam, where demand for clean power is accelerating.

Within Southeast Asia, Vietnam emerges as a frontrunner in the region's climate transition, combining strong ambition with tangible policy progress. In 2024, the country's green economy (decarbonization maturity) index score rose to 38 (+5 vs. 2023), ranking second only to Singapore in ambition (55, +3 vs. 2023). Vietnam also recorded the region's highest improvement in its decarbonization roadmap (21, +19), signaling rapid advances in planning and policy direction, even though its absolute score still trails Singapore (77).

Despite strong ambition and momentum, Vietnam faces structural barriers in translating plans into large-scale investment and sustained decarbonization. Its performance in accelerators (39, –1) and investment (1, –2) reveals persistent weaknesses in financing mechanisms, policy implementation, and enabling infrastructure. Another major challenge is the high cost of capital: according to the International Energy Agency (IEA), clean energy projects in Vietnam and across Southeast Asia face financing costs at least two times higher than in advanced economies or China[4]. This makes renewable projects less competitive unless supported by concessional funding or risk-sharing mechanisms from multilateral development banks and climate funds.

[1] United Nations Climate Change, For a livable climate: Net-zero commitments must be backed by credible action, accessed 15 September 2025.
[2] United Nations Climate Change (2024), COP29 UN Climate Conference Agrees to Triple Finance to Developing Countries, Protecting Lives and Livelihoods, accessed 15 September 2025.
[3] UN News (2024), COP29 climate talks end with $300 billion annual pledge, Guterres calls deal a 'base to build on', accessed 15 September 2025.
[4] IEA (2024), Southeast Asia Energy Outlook 2024, accessed 15 September 2025.

**Table 1 – Green Economy Index (Index of decarbonization maturity) across 10 Southeast Asia countries, 2024**

| Country | Year | Ambition | Progress | Roadmap | Accelerators | Investment | Overall Index |
|---|---|---|---|---|---|---|---|
| Singapore | 2024 | 62 | 18 | 77 | 82 | 19 | **55** |
| | vs. 2023 | +2 | +1 | +18 | - | -16 | **+4** |
| Malaysia | 2024 | 50 | 33 | 49 | 59 | 4 | **43** |
| | vs. 2023 | +1 | +1 | +8 | - | +3 | **+2** |
| Indonesia | 2024 | 43 | 64 | 27 | 42 | 1 | **41** |
| | vs. 2023 | - | +4 | +6 | -3 | +1 | **+2** |
| Thailand | 2024 | 49 | 43 | 32 | 46 | 1 | **39** |
| | vs. 2023 | +1 | +1 | +8 | +1 | - | **+2** |
| Philippines | 2024 | 22 | 58 | 29 | 52 | 9 | **39** |
| | vs. 2023 | +2 | - | +4 | +5 | +3 | **+3** |
| Vietnam | 2024 | 55 | 51 | 21 | 39 | 1 | **38** |
| | vs. 2023 | +3 | +3 | +19 | -1 | -2 | **+5** |
| Cambodia | 2024 | 42 | 60 | 19 | 46 | 0 | **38** |
| | vs. 2023 | - | +7 | +8 | -1 | - | **+3** |
| Laos | 2024 | 33 | 59 | 5 | 22 | 22 | **30** |
| | vs. 2023 | - | +1 | - | - | +12 | **+2** |
| Myanmar | 2024 | 25 | 69 | 4 | 17 | 0 | **27** |
| | vs. 2023 | - | - | - | -1 | - | **-** |
| Brunei | 2024 | 33 | 3 | 0 | 4 | 0 | **8** |
| | vs. 2023 | - | - | - | - | - | **-** |

Source: Bain & Company, GenZero, Standard Chartered, and Temasek, 2024

Nonetheless, Vietnam's long-term vision remains significant. Vietnam leads Southeast Asia in terms of the scale of its long-term climate targets. At the 26th UN Climate Change Conference in Glasgow (COP26) in 2021, the country announced that it would aim to achieve net-zero emissions by 2050, the most aggressive goal among Southeast Asian countries at the time. Its 2050 target puts it well ahead of larger regional peers such as Indonesia (2060) and Thailand (2065)[5]. This earlier timeline implies a faster and deeper market transformation, including the accelerated uptake of renewable energy technologies. For international investors, it signals growing demand for renewable energy infrastructure and financing, placing Vietnam as one of the most attractive emerging markets for green investment.

In line with its net-zero vision, Vietnam has taken on several complementary commitments that reinforce its pathway toward carbon neutrality. Vietnam signed on to the Global Methane Pledge, promising a 30% reduction in methane emissions from 2020 levels by 2030[6]. It also agreed, under the Global Coal to Clean Power Statement, to phase out unabated coal power by the 2040s[7]. These actions target two of the most carbon-intensive sources (methane and coal) and are therefore critical to achieving net zero.

To operationalize these pledges, the government introduced key policy frameworks, including the National Climate Change Strategy for 2050 (Decision 896/QD-TTg) and the Long-Term Strategy on Environment to 2030 with a vision to 2050 (Decision 450/QD-TTg). Both strategies provide the institutional foundation to align medium-term measures with the long-term goal of carbon neutrality and net-zero.

[5] IEA (2024), Southeast Asia Energy Outlook 2024, accessed 15 September 2025.
[6] Prime Minister (2021), COP26: PM attends launch ceremony of Global Methane Pledge, accessed 15 September 2025.
[7] Government News, Socialist Republic of Viet Nam (2025), Gov't adopts action plan to implement Global Coal to Clean Power Transition Statement, accessed 15 September 2025.

Vietnam further strengthened its climate agenda in October 2022 by updating its Nationally Determined Contribution (NDC) under the Paris Agreement, committing to cut emissions by 15.7% unconditionally and up to 43.5% with international support, compared to a business-as-usual (BAU) pathway[8]. Building on this, the country entered a landmark US$15.5 billion Just Energy Transition Partnership (JETP) in December 2022 with the International Partners Group, which includes the EU, the UK, the US, Japan, and several others. Under the JETP, Vietnam agreed to peak emissions at 170 million metric tons (Mt $CO_2e$) by 2030 and generate at least 47% of its electricity from renewables, contingent on partners fulfilling their commitments[9].

**Table 2 – Net-zero target year and commitment comparison between Vietnam, Indonesia, and Thailand**

| Country | Net-Zero Target Year | National Strategy* | International Commitments** |
|---|---|---|---|
| Vietnam | 2050 | • National Climate Change Strategy to 2050 (Decision No. 896/QD-TTg, 2022) | • Announced at COP26 (2021)<br>• NDC submitted to UNFCCC (2022) |
| Indonesia | 2060 (or earlier) | • Long-Term Strategy for Low Carbon and Climate Resilience 2050 (LTS-LCCR, 2021) | • Declared in COP26 statements (2021)<br>• LTS-LCCR submitted to UNFCCC (2021) |
| Thailand | 2065 | • Long-Term Low Greenhouse Gas Emission Development Strategy (LT-LEDS 2021, revised 2022) | • Announced at COP26 (2021)<br>• LT-LEDS submitted to UNFCCC (2022) |

*,**Non-exhaustive lists

Source: UNFCCC, Dezan Shira & Associates' compilation, 2025

According to Vietnam's National Climate Change Strategy to 2050, set out in Decision No. 896/QD-TTg dated July 26, 2022, one of the overall objectives is to strive for net zero GHG emissions by 2050, actively and responsibly contribute to global efforts to protect the Earth's climate system, and enhance growth quality and economic competitiveness. This roadmap is further translated into specific objectives as follows.

**Table 3 - GHG Emission Reduction Objectives in Vietnam's National Climate Change Strategy to 2050**

| Sector | Target by 2030 | Target by 2050 |
|---|---|---|
| **Overall target** | • Reduce total national GHG emissions by 43.5% compared to BAU. | • Emissions peak by 2035 and decline rapidly thereafter.<br>• Achieve net zero |
| **Energy** | • Reduce by 32.6%<br>• ≤ 457 Mt $CO_2e$ | • Reduce by 91.6%<br>• ≤ 101 Mt $CO_2e$ |
| **Agriculture** | • Reduce by 43.0%<br>• ≤ 64 Mt $CO_2e$ | • Reduce by 63.1%<br>• ≤ 56 Mt $CO_2e$ |
| **Forestry & Land Use** | • Reduce 70% of emissions<br>• Increase absorption by 20%<br>• Achieving ≥ –95 Mt $CO_2e$ net balance | • Reduce 90% of emissions<br>• Increase absorption by 30%<br>• Achieving ≥ –185 Mt $CO_2e$ net balance |
| **Waste** | • Reduce by 60.7%<br>• ≤ 18 Mt $CO_2e$ | • Reduce by 90.7%<br>• ≤ 8 Mt $CO_2e$ |
| **Manufacturing (Industrial Processes)** | • Reduce by 38.3%<br>• ≤ 86 Mt $CO_2e$ | • Reduce by 84.8%<br>• ≤ 20 Mt $CO_2e$ |

[8] UNFCCC (2022), Socialist Republic of Viet Nam - Nationally Determined Contribution (NDC), accessed 15 September 2025.
[9] Vietnam Briefing, Dezan Shira & Associates (2022), Unpacked: Vietnam's US$15.5 Billion JETP Agreement, accessed 15 September 2025.

| Sector | Target by 2030 | Target by 2050 |
|---|---|---|
| **Manufacturing (Facility-level requirement)** | • Facilities emitting ≥ 2,000 $tCO_2e$/year must implement GHG reduction measures. | • Facilities emitting ≥ 200 $tCO_2e$/year must implement GHG reduction measures. |

Notes:

- GHG – Greenhouse gases ($CO_2$, $CH_4$, $N_2O$) that trap heat in the atmosphere and cause climate change.
- BAU (Business-as-Usual) – The emissions scenario if no additional climate actions are taken.
- Net zero – Balance between GHG emitted and GHG absorbed/removed from the atmosphere.
- $CO_2e$ – Carbon dioxide equivalent, comparing the warming impact of different GHGs to $CO_2$.
- Mt – Million tons (1 Mt = 1,000,000 tons).
- Carbon absorption – The ability of forests, soils, and land use to capture and store $CO_2$ from the air.
- Facility-level requirement – Rules for factories, plants, or other sites that emit large amounts of GHG, requiring to cut emissions.

Source: Decision No. 896/QD-TTg (2022), Dezan Shira & Associates' compilation, 2025

Vietnam's climate goals show a clear commitment to cutting emissions and reaching net zero by 2050, with major progress expected by 2030. The plan sets specific targets for energy, farming, forestry, waste, and industry, while also tightening rules on big polluters. Forests will be a key tool for absorbing carbon, while rules for polluting facilities will get stricter over time. At the same time, the strategy emphasizes linking emissions reduction with improved growth quality, economic competitiveness, and resilience, showing that Vietnam views climate action not only as an environmental necessity but also as an opportunity for economic transformation and responsible contribution to the international community. Ultimately, the strategy's energy and industrial targets will drive demand for high-efficiency turbines, grid stabilization equipment, and advanced energy management systems, while waste and water targets will increase the need for treatment machinery and process automation.

### 3.2.2. Rise in solar and wind capacity

Following the national net-zero roadmap, Vietnam has prioritized renewable electricity generation, creating sustained demand for solar and wind-related machinery and infrastructure. Wind and solar energy have become a significant part of Vietnam's power generation mix. Since 2017, the Government has implemented a series of policies to promote renewable energy development and attract private sector investment.

Vietnam's renewable energy sector reached a significant turning point with the issuance of Decision No. 11/2017/QD-TTg, establishing the Mechanism for Encouragement of the Development of Solar Power Projects. The decision introduced Vietnam's first feed-in tariff (FIT) framework, under which the government committed to purchasing electricity from solar projects at a fixed rate. The FIT was set at 9.35 US¢/kWh (approximately 2,086 VND/kWh at the 2017 exchange rate) and applied for 20 years, providing strong incentives for investment[10].

The government expanded preferential pricing mechanisms to wind energy through Decision No. 39/2018/QD-TTg. The regulation established FITs of 8.5 US¢/kWh (around 1,928 VND/kWh) for onshore wind projects and 9.8 US¢/kWh (approximately 2,219 VND/kWh) for offshore wind[11]. These long-term, guaranteed purchase prices were designed to address cost barriers, reduce financial risks, and accelerate deployment of both onshore and offshore wind infrastructure.

However, these preferential rates were only temporary. Once the first phase of solar incentives expired in mid-2019, the guaranteed purchase price for large-scale solar projects was reduced. In contrast, rooftop solar projects continued to receive more attractive pricing, which encouraged households and businesses to install solar panels on a wide scale. This shift not only sustained investment trends but also diversified Vietnam's renewable energy portfolio.

The rapid growth of solar and wind power during this period made an important contribution to energy security. It helped ease the risk of power shortages that had been looming in 2018–2019 and provided the

[10] Government News, Socialist Republic of Viet Nam (2017), Decision No. 11/2017/QD-TTg of the Prime Minister: On the mechanism to encourage the development of solar power projects in Vietnam, accessed 18 September 2025.
[11] Government News, Socialist Republic of Viet Nam (2018), Decision No. 39/2018/QD-TTg of the Prime Minister: Amending and supplementing a number of articles of Decision No. 37/2011/QD-TTg dated June 29, 2011, of the Prime Minister on the mechanism to support the development of wind power projects in Vietnam, accessed 18 September 2025.

national grid with a cleaner, more resilient supply. As of 2021, solar and wind capacity together reached roughly 20 GW, accounting for nearly one-quarter of the country's total installed capacity of around 76 GW[12]. By 2024, combined capacity had surpassed 24 GW, highlighting solar and wind energy as key sources for meeting Vietnam's growing electricity demand and advancing climate goals.

**Table 4 - Capacity of solar and wind power sources (MW), 2021 – 2024**

| Power sources | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|
| **Solar power** | 16,660 | 16,697 | 18,587 | 18,666 |
| **Wind power** | 4,118 | 5,065 | 5,888 | 6,185 |

Source: IRENA, 2025

Looking forward, Vietnam's rapid growth in solar and wind power highlights a strong and expanding market for green machinery. As renewables now account for a significant share of the country's energy mix, there is increasing demand for modern equipment that can support the installation, operation, and integration of clean energy projects.

For businesses, this translates into opportunities to supply machinery that improves efficiency and supports long-term sustainability, from manufacturing and installation to grid connection and system maintenance. The speed of Vietnam's renewable expansion also shows the country's readiness to scale when incentives align, suggesting continued momentum and a favorable environment for investment in advanced, energy-efficient technologies. Overall, the clean energy shift is creating a broader market for green machinery, positioning suppliers to play a key role in Vietnam's transition toward a more secure and sustainable power system.

### 3.2.3. Increasing demand for waste-to-energy, water treatment, and energy-efficient systems

#### 3.2.3.1. Waste-to-energy (WtE)

Beyond renewable generation, Vietnam's environmental infrastructure is another critical driver of machinery demand, particularly in waste management where energy recovery is becoming a strategic priority.

Vietnam's growing waste challenge is creating unprecedented momentum for Waste-to-Energy (WtE) solutions. Under the Law on Environmental Protection (2014) and Government Decree No. 38/2015, solid waste is classified into three groups: municipal solid waste (MSW) – generated from human daily activities, industrial solid waste (ISW) – arising from production and service activities, and hazardous solid waste (HSW) – containing elements such as toxicity, radioactivity, infectiousness, flammability, explosiveness, corrosiveness, poisoning, or other dangerous characteristics.

In practice, WtE are applied mainly to MSW due to its large volume and combustible composition, with limited applications to certain types of ISW such as paper sludge, plastic residues, and rubber waste. For HSW, treatment is focused primarily on safe destruction and environmental protection rather than energy recovery.

The pressure for WtE adoption stems above all from the rapid rise in MSW. Urban areas now generate about 38,000 tons per day, with a collection rate slightly above 85%, while rural areas add another 32,000 tons per day but capture only about 55%. This translates into roughly 25 million tons of MSW each year. According to the United Nations Development Programme (UNDP), urban MSW increased by 10–16% annually during 2016–2020[13]. Yet, despite this surge, only 15–20% of waste is treated through modern methods like incineration or recycling. Most of MSW continues to be landfilled, with more than 660 landfill sites nationwide

[12] MoIT - Electricity and Renewal Energy Authority (2022), Renewable Energy Development Strategy of Vietnam to 2030, Outlook to 2050 - Report on Implementation by 2021, accessed 18 September 2025.
[13] People's Representative Newspaper, Office of the National Assembly (2024), "Leverage" to promote waste treatment according to the circular economic model, accessed 18 September 2025.

but only around 120 meeting sanitary standards[14]. This imbalance between soaring volumes and limited treatment capacity highlights the abundant input resources and urgent demand for WtE technologies.

Government policy further amplifies this demand. Since 2014, the Vietnamese government has introduced favorable FIT policies to encourage investment in WtE projects. Under Decision 31/2014/QD-TTg, electricity generated from direct incineration of waste is entitled to 10.05 US¢/kWh, while electricity from landfill gas recovery receives 7.28 US¢/kWh[15]. These are the highest FIT rates among renewable energy sources in Vietnam, highlighting the state's priority in promoting WtE development.

Additionally, decision No. 491/QD-TTg, issued in 2018 as part of the National Strategy on Integrated Solid Waste Management to 2025 with a vision to 2050, set the framework for modernizing Vietnam's waste sector. The decision reflects the government's recognition that uncontrolled landfilling was no longer sustainable, particularly in fast-urbanizing cities.

Under this roadmap, Vietnam established the 2025 target of treating at least 85% of urban MSW with advanced technologies. Treatment must increasingly integrate recycling, reuse, and energy recovery, while direct landfilling should fall below 30% and new facilities must ensure post-treatment landfill rates under 20%[16]. These requirements directly push cities toward WtE adoption, especially as landfill space becomes increasingly scarce.

At the same time, the closure of old landfills and strict caps on new landfilling create an urgent need for alternative treatment capacity, while nationwide efforts to improve recycling and waste segregation make WtE plants more efficient and attractive to investors. Taken together, these measures translate into a rapidly expanding market demand for WtE solutions across both urban and rural areas.

**Table 5 – Waste Management Targets to 2025 under Vietnam's National Strategy on Integrated Solid Waste Management to 2025 with a vision to 2050**

| Area | Key Targets |
|---|---|
| **Urban MSW** | • 90% of waste must be collected and treated with modern methods<br>• Direct landfilling cut to below 30%<br>• New plants must keep landfilling under 20%. |
| | • Cities must build recycling facilities and use eco-friendly plastic bags. |
| | • Old landfills (90–95%) must be closed and rehabilitated. |
| **Rural MSW** | • 80% of waste must be collected and treated<br>• Organic waste should be reused or composted |
| | • Closed or unplanned dumps must be rehabilitated<br>• New facilities must also landfill less than 20%. |

Source: Decision No. 491/QD-TTg

Beyond energy considerations, mounting environmental and social pressures are also driving demand for WtE solutions. Landfill-related disputes have become common in major urban areas such as Hanoi and Ho Chi Minh City, while the costs of landfilling and the scarcity of land for new sites continue to rise. These challenges underscore the urgency of adopting alternatives, positioning WtE as a strategically important solution for both waste management and climate policy.

Against this backdrop, Vietnam's growing waste challenge and strong government support for WtE adoption point to a clear and rising demand for modern, energy-efficient machinery. As urban waste volumes climb and

[14] Central Vietnam Association for Clean Water and Environment (2025), Environment and Life Electronic Magazine - Topic: Turning waste into resources – The direction for sustainable development, accessed 18 September 2025.
[15] Government News, Socialist Republic of Viet Nam (2014), Decision No. 31/2014/QD-TTg of the Prime Minister: On the mechanism to support the development of power generation projects using solid waste in Vietnam, accessed 18 September 2025.
[16] Government News, Socialist Republic of Viet Nam (2018), Decision No. 491/QD-TTg of the Prime Minister: Approving the adjustment of the National Strategy on integrated solid waste management to 2025, with a vision to 2050, accessed 18 September 2025.

landfilling becomes increasingly unsustainable, advanced technologies for waste sorting, treatment, and energy recovery will be essential.

Supportive measures such as FITs for WtE electricity further strengthen the business case for investment in modern equipment and technologies. In short, Vietnam's transition toward sustainable waste management will drive greater reliance on green machinery that delivers efficiency, reliability, and compliance with environmental goals.

#### 3.2.3.2. Water treatment

In parallel, the expansion of urban and industrial zones has intensified pressure on water supply and treatment infrastructure, stimulating demand for advanced pumping, filtration, and control machinery.

Vietnam's rapid growth and industrialization have increasingly strained the environment and natural resources. The country is among the world's most vulnerable to climate change, with typhoons, floods, droughts, and landslides frequently threatening its densely populated coastal areas and economic assets. As a result, demand for both clean water supply and wastewater treatment has intensified. Although infrastructure coverage has expanded in cities and industrial zones, gaps remain in treatment efficiency, rural access, and system sustainability.

As strong economic momentum increasingly drives urbanization, many rural areas have upgraded into towns and cities. As of May 2025, Vietnam had around 900 urban areas, including two special-class cities (Hanoi and Ho Chi Minh City), 23 class-I cities such as Hai Phong and Da Nang, and dozens of smaller class-II to V cities ranging from regional hubs to small towns. The urbanization rate has reached 44.3%[17], and national development plans target more than 50% by 2030 and about 70% by 2050, with 1,000–1,200 urban areas expected in total[18].

This rapid shift toward urban living brings higher incomes and growing expectations for quality of life, particularly reliable access to clean water and a healthier environment. However, urban wastewater volumes are expanding far faster than existing treatment capacity. This imbalance is creating mounting environmental and social pressures, fueling the urgent and rising demand for water treatment solutions across the country.

In terms of water supply, urban areas show relatively strong performance. By the end of 2024, around 250 water supply enterprises operated over 1,000 plants with a total capacity of approximately 13.2 million $m^3$ per day. The proportion of the urban population with access to clean water reached 94%, while the rate of clean water loss and non-revenue water stood at 15.5%[19].

In contrast, rural areas remain fragmented. There are about 18,000 centralized clean water facilities and 10 million household-scale water supply works. However, only 32% of these facilities operate sustainably, 26.3% operate relatively sustainably, while 41.8% are poorly sustainable or non-operational. In several provinces, the share of the rural population with access to clean water meeting standards from centralized facilities remains low, such as Ha Giang and Gia Lai (7.7%), Yen Bai (11.4%), Cao Bang (12.6%), and Lam Dong (12.8%). Non-sustainable or non-operational facilities have directly affect around 200,000 rural households[20].

Rural water supply systems face operational challenges due to fragmented and inconsistent management models, low tariffs that fail to recover costs, and limited financial support. At the same time, freshwater resources are under growing pressure from pollution, depletion, and climate change impacts such as droughts, floods, and saltwater intrusion. These combined factors have forced many facilities to operate below capacity or shut down, undermining the reliable and sustainable provision of clean water to rural communities.

[17] VnEconomy (2025), The whole country has 900 urban areas, the urbanization rate is estimated at 44.3%, accessed 18 September 2025.
[18] Government News, Socialist Republic of Viet Nam (2024), Decision No. 891/QD-TTg of the Prime Minister: Approving the Planning of the urban and rural system for the 2021 - 2030 period, with a vision to 2050, accessed 18 September 2025.
[19] Ministry of Construction (MoC) (2024), Submission Report on the Draft Law on Water Supply and Drainage submitted to the Government of Vietnam, accessed 18 September 2025.
[20] Nhan Dan Newspaper (2024), Overcoming shortcomings in clean water supply in rural areas, accessed 18 September 2025.

**Wastewater treatment**

In terms of wastewater treatment, overall, Vietnam's treatment system has made notable progress, especially in industrial zones and urban areas, but still faces challenges with efficiency, coverage, and rural access. Specifically, the current state of wastewater treatment in Vietnam shows clear differences across industrial zones, urban areas, and rural areas.

Since 2023, 92% of operational industrial zones had established centralized wastewater treatment systems meeting environmental standards[21]. However, while their designed treatment capacity was about 1.218 million $m^3$/day, the actual treated volume reached only 812,000 $m^3$/day, equivalent to an operating efficiency of 66.7%[22].

By the end of 2024 there were 83 wastewater treatment plants with a total designed capacity of 2.064 million $m^3$/day, but only 1.063 million $m^3$/day was treated in urban areas. On average, only 18% of total urban wastewater generated is collected and treated[23], which is significantly lower than in industrial zones. Meanwhile, in rural areas, centralized treatment systems are almost nonexistent, with most domestic and production wastewater discharged directly into the environment.

As a result, Vietnam's water sector challenges, ranging from fragmented rural systems to insufficient wastewater treatment, are creating a significant demand for modern, efficient, and environmentally friendly machinery. Rapid urbanization and industrialization, combined with climate pressures such as pollution and saltwater intrusion, highlight the urgency of upgrading water infrastructure.

**Demand for water treatment systems**

In water supply, the demand is growing for advanced pumping systems, energy-efficient filtration, and leak detection technologies to reinforce urban networks while expanding reliable access in rural regions. On the wastewater side, modern treatment equipment, sludge management systems, and decentralized solutions are increasingly needed to expand treatment coverage in both cities and rural communities.

Industrial operations also represent a major market, as businesses face stricter requirements for wastewater treatment and discharge standards, driving the adoption of cleaner, automated, and energy-saving machinery. At the same time, climate-related pressures, such as saltwater intrusion and pollution, are creating demand for smart monitoring tools, renewable-powered water systems, and machinery designed to improve resilience and sustainability.

Taken together, Vietnam's efforts to address its water supply and wastewater treatment challenges signal rising demand for green machinery that can deliver efficiency, reliability, and long-term sustainability.

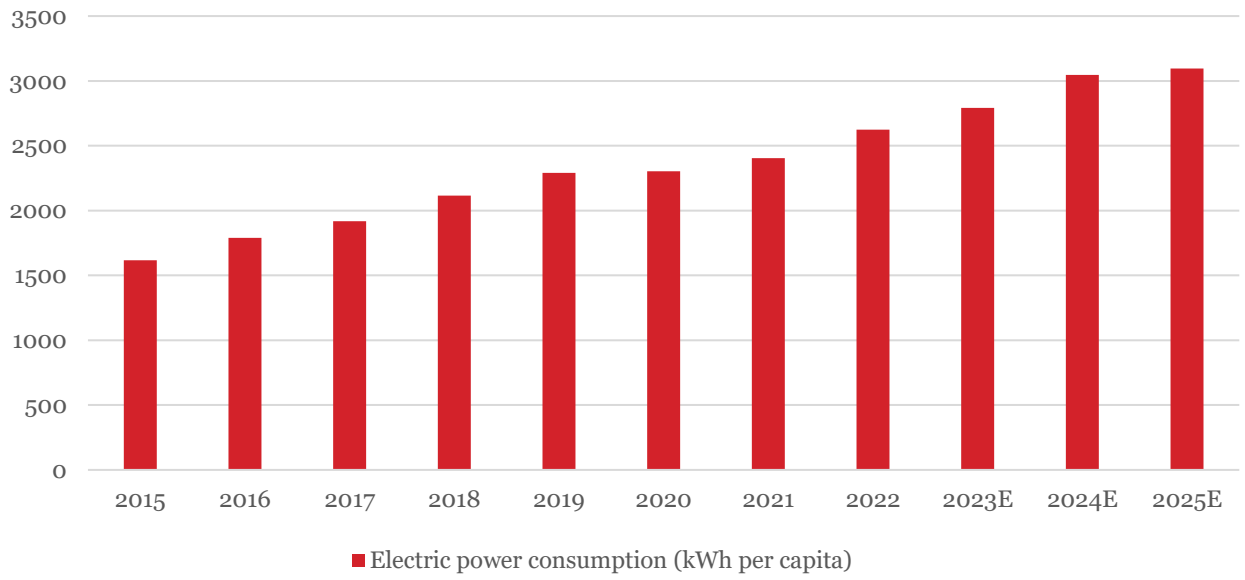
### 3.2.3.3. Energy-efficient systems

To complement renewable supply expansion, Vietnam is focusing on energy efficiency as the most practical means of balancing demand growth and sustainability, driving machinery upgrades across manufacturing and construction.

Electricity consumption per capita has risen steadily over the past decade, from approximately 1,600 kWh in 2015 to an estimated level exceeding 3,000 kWh by 2025, nearly doubling within ten years. The period between 2022 and 2024 marks one of the most pronounced accelerations, with per-capita usage increasing from around 2,624 kWh to more than 3,000 kWh. According to sectoral assessments, this surge is linked to more frequent and prolonged heatwaves, heightened demand for cooling in residential and commercial buildings, and broader structural trends including rapid industrialization, urbanization, and higher household living standards.

[21] GSO (2025), Wastewater treatment and environmental protection in Vietnam and lessons from Denmark, accessed 18 September 2025.
[22] VnEconomy (2024), Why do many industrial zones not have centralized wastewater treatment systems? accessed 18 September 2025.
[23] Ministry of Construction (MoC) (2024), Submission Report on the Draft Law on Water Supply and Drainage submitted to the Government of Vietnam, accessed 18 September 2025.

**Figure 2 – Vietnam electric power consumption (kWh per capita), 2015 – 2025E**




Source: World Bank, DSA's calculation & analysis, 2025

Despite this rapid growth in electricity use, Vietnam's energy consumption remains highly inefficient, particularly in industrial production. Key sectors such as cement, steel, ceramics, cold storage, and consumer goods could reduce consumption by more than 20% through efficiency improvements. In civil construction and transportation, potential savings exceed 30%. Unlocking this efficiency potential is seen as the most practical and cost-effective way to secure Vietnam's energy future.

Recognizing these challenges, the government has made energy efficiency a national priority. On March 13, 2019, the Prime Minister approved Decision No. 280/QD-TTg, launching the Vietnam Energy Efficiency Program (VNEEP 3)**.**

**Table 6 – Vietnam's 2030 targets under VNEEP 3 for the 2019 – 2030 period**

| Target Area | 2030 Goal |
|---|---|
| **National energy savings** | Save 8–10% of total national energy consumption (2019–2030). |
| **Electricity losses** | Reduce to below 6%. |
| **Industrial energy consumption reduction** | Compared to 2015–2018:<br>(i) Steel: 5.00–16.50% (depending on product/technology)<br>(ii) Chemicals: ≥10.00%<br>(iii) Plastics: 21.55–24.81%<br>(iv) Cement: ≥10.89%<br>(v) Textiles & garments: ≥6.80%<br>(vi) Alcohol, beer & beverages: 4.60–8.44% (depending on product/scale)<br>(vii) Paper: 9.90–18.48% (depending on product/scale) |

| Target Area | 2030 Goal |
|---|---|
| **Transport fuel consumption** | Reduce by 5% compared with projected demand to 2030; introduce fuel efficiency standards for new two-wheel motorcycles and passenger cars (up to 9 seats). |
| **Industrial zones & clusters** | 90% of industrial zones and 70% of industrial clusters adopt energy efficiency solutions. |
| **Building materials** | 50% of insulation-related construction materials carry energy labels. |
| **Local action plans** | 100% of provinces and centrally governed cities develop and approve energy efficiency plans/programs. |
| **Green buildings** | At least 150 certified green buildings. |
| **Energy professionals** | Training and certification for 5,000 energy management/energy auditing professionals. |
| **Educational activities** | 100% of schools implement communication and educational activities on efficient and economical energy use. |

Source: Decision No. 280/QD-TTg on VNEEP 3

Therefore, Vietnam's 2030 roadmap for energy efficiency creates strong momentum for the adoption of green machinery and equipment across industries. Stricter targets on reducing energy intensity in steel, cement, textiles, plastics, paper, and chemicals will encourage businesses to upgrade to modern, energy-efficient technologies.

In transportation, fuel efficiency standards will accelerate demand for cleaner engines and advanced vehicle components. The promotion of green buildings and energy-labeled construction materials will further stimulate the use of machinery that supports sustainable construction practices.

This policy signals a growing market for machinery that delivers measurable energy savings, reduces emissions, and meets international standards of efficiency. Companies that provide advanced, low-carbon solutions will be well-positioned to capture opportunities in Vietnam's industrial modernization and sustainable growth agenda.

## 3.3. Growth drivers

### 3.3.1. Government incentives and net-zero commitment

Vietnam's strong regulatory commitments to climate action and clean energy are emerging as a major growth driver for green machinery. National strategies such as the Climate Change Strategy (Decision 896/QD-TTg), Energy Master Plan (Decision 893/QD-TTg), and revised Power Development Plan VIII (Decision 768/QD-TTg) all set ambitious targets for renewable energy expansion, industrial decarbonization, and energy efficiency improvements. In addition, a series of government plans are being issued and refined to guide the transition of the energy system toward the net-zero goal by 2050, covering electricity, transport, carbon markets, and sector-specific action programs.

**Table 7 – Overview of Vietnam's key energy and climate initiatives (non-exhaustive list), 2020 – 2025**

| Year | Regulatory document | Topic | Target |
|---|---|---|---|
| **Vietnam's International & Political Commitments** | | | |
| 2022 | Nationally Determined Contribution (NDC) | Vietnam's report on addressing climate change at COP21 | Emission reduction targets, society-wide: unconditional 15.8% reduction (146.3 Mt CO2eq), and conditional 43.5% reduction (403.7 Mt CO2eq) in 2030 compared to BAU |
| 2020 | Resolution 55-NQ/TW | Orientation for National Energy Development Strategy | Share of renewable energy sources in primary energy supply:<br>• 15–20% by 2030<br>• 25–30% by 2045<br>Emission reduction targets:<br>• 15% by 2030<br>• 20% by 2045 |
| **Vietnam's National Strategy** | | | |
| 2022 | Decision 896/QD-TTg | National Strategy on Climate Change Up To 2050 | **Net-zero pathway: deep emissions cuts across energy and industry, enhanced forestry absorption, with mandatory reductions for major emitters and near-complete decarbonization across all sectors by 2050.**<br>By 2030 (vs. BAU, -43.5% total):<br>• Energy: -32.6% (≤457 $MtCO_2e$)<br>• Agriculture: -43% (≤64 $MtCO_2e$)<br>• Forestry & land use: -70% emissions, +20% absorption (≥-95 $MtCO_2e$)<br>• Waste: -60.7% (≤18 $MtCO_2e$)<br>• Industrial processes: -38.3% (≤86 $MtCO_2e$)<br>• Mandatory cuts for facilities ≥2,000 $tCO_2e$/year<br>By 2050 (Net-zero):<br>• Energy: -91.6% (≤101 $MtCO_2e$)<br>• Agriculture: -63.1% (≤56 $MtCO_2e$)<br>• Forestry & land use: -90% emissions, +30% absorption (≥-185 $MtCO_2e$)<br>• Waste: -90.7% (≤8 $MtCO_2e$)<br>• Industrial processes: -84.8% (≤20 $MtCO_2e$)<br>• Mandatory cuts for facilities ≥200 $tCO_2e$/year |

| Year | Regulatory document | Topic | Target |
|---|---|---|---|
| 2024 | Decision 893/QD-TTg | National Energy Master Plan for the 2021-2030 period, with a vision to 2050 | **Clean Energy Roadmap: Gradual fossil fuel reduction with domestic resource use while aggressively scaling up renewables and green hydrogen.**<br>Just Energy Transition<br>• Renewable share: 15–20% of primary energy by 2030; 80–85% by 2050.<br>• Energy savings: 8–10% by 2030; 15–20% by 2050 (vs. BAU).<br>• GHG emissions: 399–449 $MtCO_2e$ by 2030; ~101 $MtCO_2e$ by 2050. Reduction: 17–26% by 2030; ~90% by 2050 (vs. BAU). Peak emissions targeted in 2030, conditional on full JETP implementation.<br>Clean & renewable energy industry<br>• By 2030: establish renewable energy hubs (production, equipment manufacturing, oil & gas processing, construction, services) in Northern, South-Central, and Southern regions.<br>• Green hydrogen: 100–200k tons/year by 2030; 10–20 Mt/year by 2050. |
| 2023, revised 2025 | Decision 768/QD-TTg (revised PDP VIII) | National Power Development Plan for the 2021-2030 period, with a vision to 2050 | **Clean Electricity Roadmap: Targeting nearly 40% renewables by 2030 (up to 70% by 2050), emission peaking by 2030, and large-scale investment in smart grids, export capacity, and renewable industry hubs.**<br>Just Energy Transition<br>• Renewables (excl. hydropower): 28–36% by 2030; 74–75% by 2050.<br>• Power sector emissions: 197–199 $MtCO_2e$ by 2030; around 27 $MtCO_2e$ by 2050. Peak ≤170 $MtCO_2e$ in 2030 (conditional on full JETP delivery).<br>• Smart grid: Develop a modern grid to safely integrate large-scale renewables.<br>Renewable Energy Industry & Service Ecosystem<br>• By 2030: Form two inter-regional renewable energy and service hubs (covering production, transmission, manufacturing, and related services) in potential regions such as the North, South-Central, and South.<br>• Expand renewable power and new energy exports (to Singapore, Malaysia, etc.), targeting 5,000–10,000 MW by 2035, ensuring economic efficiency and energy security. |
| **Vietnam's Action Plans & Implementation Programs** | | | |
| 2022 | Decision 876/QD-TTg | Action Program on green energy conversion in the Transport Sector | **Transport Sector Energy Transition: Early adoption in ready segments by 2030, moving towards complete green transport by 2050.**<br>• By 2030: Improve energy efficiency and accelerate the shift to electricity and green energy in transport modes that are technologically and institutionally ready, in line with Vietnam's NDC commitments and methane reduction targets.<br>• By 2050: Rationally develop transport modes and achieve a full transition of vehicles, equipment, and infrastructure to electricity and green energy, aiming for net-zero GHG emissions by 2050. |

| Year | Regulatory document | Topic | Target |
|---|---|---|---|
| 2022 | Decision 942/QD-TTg | Action Plan to reduce Methane emissions by 2030 | **Methane Reduction Roadmap: Substantial methane cuts by 2030, with the largest reductions expected in agriculture, waste management, and fossil energy sectors.**<br>• By 2025: Total methane emissions capped at ≤96.4 $MtCO_2e$ (–13.34% vs. 2020).<br>• By 2030: Total methane emissions capped at ≤77.9 $MtCO_2e$ (–30% vs. 2020). |
| 2025 | Decision 232/QD-TTg | Project to establish and develop a Carbon market in Vietnam | **Carbon Market Development: Pilot domestic exchange by 2025, scaling up through 2028, and full national operation from 2029 onward.**<br>• By mid-2025: Establish legal framework, infrastructure, and capacity to prepare for carbon market piloting.<br>• 2025–2028: Strengthen infrastructure, run the pilot domestic carbon exchange, refine regulations, and build stakeholder readiness.<br>• From 2029: Officially launch the national carbon exchange, with continued legal, infrastructure, and capacity improvements. |

Source: Dezan Shira & Associates' compilation, 2025

These commitments are creating strong incentives for industries to adopt energy-efficient, low-emission technologies. Demand for advanced, environmentally friendly machinery, including renewable energy equipment, energy-efficient industrial machinery, smart grid systems, and electric transport equipment, is expected to accelerate, making green machinery a central enabler of Vietnam's net-zero pathway.

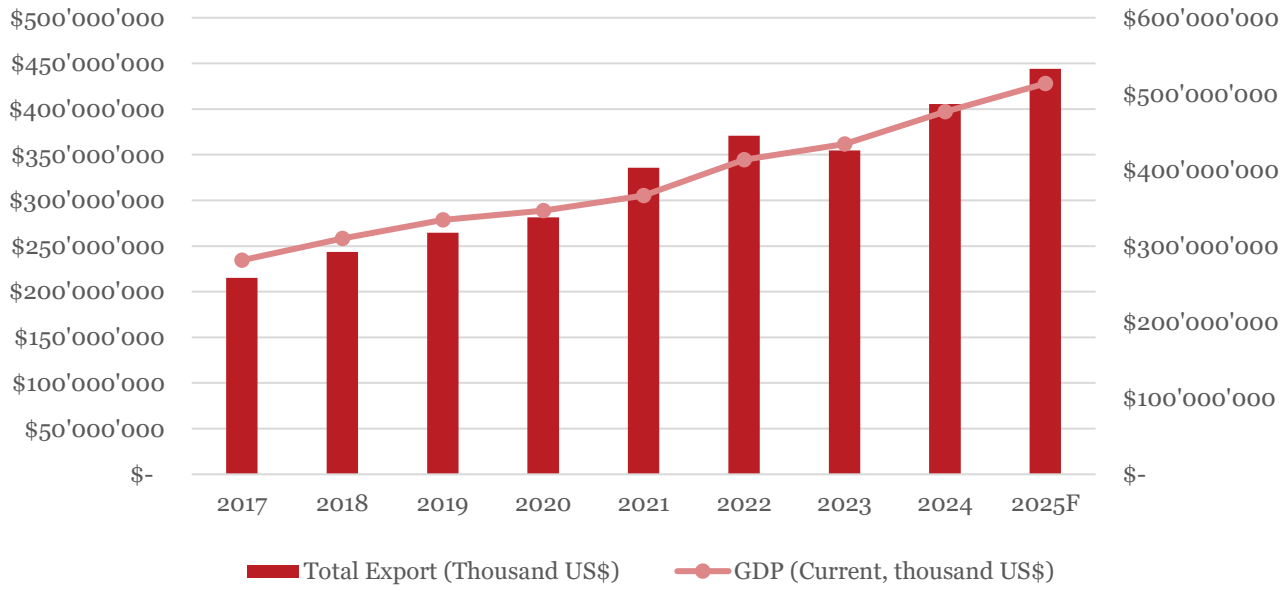
### 3.3.2. Manufacturing sector's push for energy efficiency and ESG compliance

Vietnam's manufacturing sector is moving beyond the long-standing "low-cost production" model toward a new paradigm of "responsible production," where energy efficiency and ESG (environmental, social, and governance) compliance are becoming central to competitiveness. This shift is driven by two converging forces: rising global market expectations and a stronger domestic policy agenda promoting sustainable growth.

ESG compliance, once considered a voluntary corporate effort, is now a baseline requirement for accessing international capital and maintaining Vietnam's position in global supply chains. International regulations such as the EU's Carbon Border Adjustment Mechanism, the Corporate Sustainability Reporting Directive, and U.S. supply chain due diligence rules are tightening standards. Global buyers and investors increasingly demand transparent reporting, responsible sourcing, and measurable progress in carbon management, pushing manufacturers in Vietnam to adopt more energy-efficient technologies and sustainability practices.

The manufacturing sector, particularly in electronics and machinery, remains the backbone of Vietnam's industrial structure and the primary driver of FDI inflows. Export-oriented production has anchored Vietnam in global value chains, leveraging its extensive network of free trade agreements. While domestic consumption is rising, exports still dominate GDP growth, with high-tech goods accounting for an expanding share of shipments. This export-driven model, coupled with global supply chain realignments and nearshoring strategies, is reinforcing Vietnam's role as a critical hub in regional manufacturing networks.

**Figure 3 – Vietnam's total export value and GDP (Thousand US$), 2017 – 2025F**




Source: GSO, World Bank, Dezan Shira & Associates' calculation, 2025

As investment expands in electronics, machinery, and other high-value sectors, manufacturers face mounting demand for modern facilities that can support advanced technologies while complying with ESG requirements. As Vietnam moves deeper into global supply chains, the expansion of investment in electronics, machinery, and other export-driven sectors has spurred growing demand for industrial real estate. Manufacturers and suppliers are increasingly seeking modern factories, logistics hubs, and infrastructure that can accommodate advanced production technologies, comply with stringent ESG requirements, and meet the operational standards of multinational corporations.

Vietnam is increasingly steering its manufacturing sector toward global sustainability standards, with eco-industrial parks (EIP) serving as a key example. Initiated in 2014 through partnerships with international organizations, the eco-IP model highlights the country's efforts to integrate ESG principles and circular economy practices into its development agenda.

During the 2015-2019 period, Vietnam's Minister of Planning and Investment (MPI) and the United Nations Industrial Development Organization (UNIDO) piloted several EIP initiatives in three key Vietnamese provinces with funding from other international organizations, including: Khanh Phu Industrial Park and Gian Khau Industrial Park in Ninh Binh; Hoa Khanh Industrial Park in Da Nang; and Tra Noc Industrial Park 1 and 2 in Can Tho.

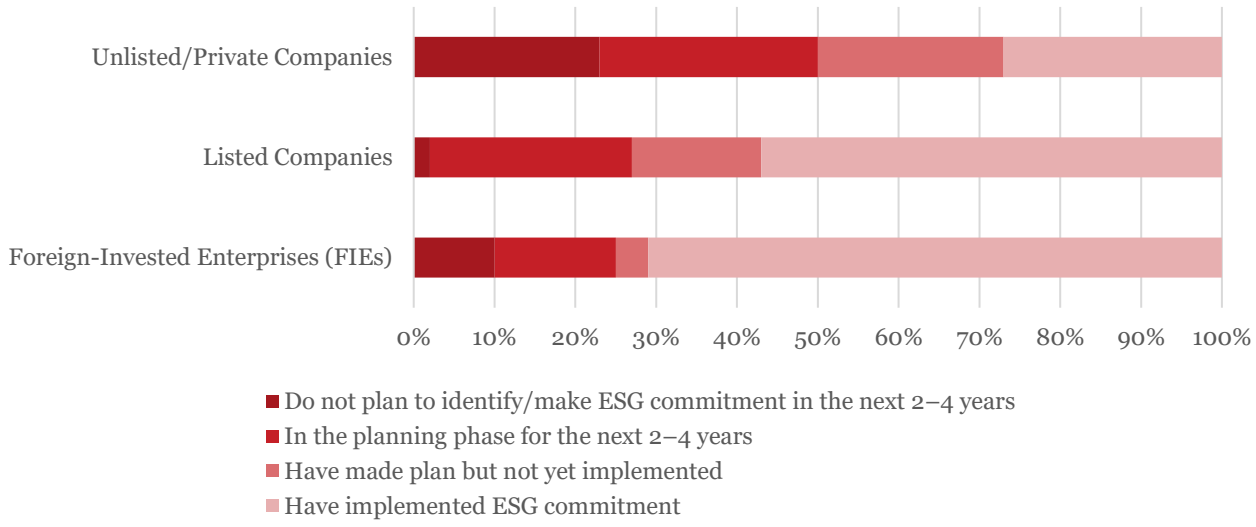
Innovation in these pilot zones has helped 72 businesses save more than 22,000 MWh of electricity, 600,000 m3 of water, 140 terajoules (TJ) of fossil fuel, nearly 3,600 tonnes of chemicals and waste, and more than VND76 billion (US$2.99 million) each year. The private sector has contributed over VND207 billion (US$10.62 million) to these eco-industrial parks, helping to reduce 32 kilotonnes of CO2 annually[24].

The MPI, with funding from the Swiss government, worked with UNIDO to expand EIP initiatives in Hai Phong, Dong Nai, and Ho Chi Minh City. As of 2024, the program had supported 90 enterprises, introducing 899 practical Resource-Efficient and Cleaner Production (RECP) solutions across industrial zones including Hiep Phuoc (HCMC), Amata (Dong Nai), Deep C–Dinh Vu (Hai Phong), and Hoa Khanh (Da Nang)[25].

While Vietnam has made notable progress in developing EIPs, the adoption of ESG practices remains at a relatively early stage compared to peers such as Singapore and Malaysia, where regulatory frameworks and disclosure requirements are more mature. Large corporations and foreign-invested enterprises (FIEs) are advancing more quickly, often applying global standards and best practices from their parent networks. In contrast, small and medium-sized enterprises (SMEs) face greater barriers, including limited financial resources, lack of expertise, and challenges in systematically integrating ESG.

The ESG Progress Tracker Report 2025 highlights both encouraging momentum and persistent unevenness in this transition. Nearly 9 out of 10 companies (89%) have either already made or plan to make ESG commitments within the next 2–4 years, up from 80% in 2022. The share of firms with no ESG plans has fallen to just 11%. However, commitment does not necessarily translate into implementation. Only about half (54%) of companies have acted on their commitments. Among them, FIEs lead with 71% having implemented ESG initiatives, listed companies follow at 57% under investor and regulatory pressure, while private and unlisted firms lag significantly. Within this latter group, only 27% have begun implementation, about half are still in the planning phase, and 23% have no plans at all[26]. This uneven adoption indicates the structural barriers that smaller businesses face in advancing ESG.

**Figure 4 – Vietnam's ESG commitment status, 2025**




Source: PwC, 2025

[24] Vietnam Briefing, Dezan Shira & Associates (2024), Eco-Industrial Parks in Vietnam: Implementation and Key Goals, accessed 18 September 2025.
[25] Vietnam Briefing, Dezan Shira & Associates (2024), Eco-Industrial Parks in Vietnam: Implementation and Key Goals, accessed 18 September 2025.
[26] PwC (2025), Beyond compliance: The ESG Reinvention for Business in Vietnam, ESG Progress Tracker Report 2025, accessed 18 September 2025.

In response, the Vietnamese government is working to create a more supportive policy and financial ecosystem. One example is the new Direct Power Purchase Agreement (DPPA) decree, which allows manufacturers and service providers to procure renewable electricity directly from generators. This mechanism not only supports corporate renewable energy mandates but also reduces bureaucratic hurdles, making sustainability efforts more practical and strategically advantageous rather than just a compliance burden.

As a result, ESG compliance has become a prerequisite for companies seeking to remain in global supply chains. Multinational corporations are no longer satisfied with low-cost production alone; they increasingly expect suppliers to meet rigorous sustainability standards. In Vietnam, firms like Heineken have already upgraded technology to cut carbon emissions, expanded solar power use, and turned agricultural waste into biofuel for brewery operations[27]. Major players such as Samsung, Apple, and Nike are likewise imposing strict requirements on their Vietnamese suppliers, including publishing sustainability reports and setting clear roadmaps for emission reduction.

[27] Heineken (2023), Brewed with 100% renewable energy in Vietnam, Heineken® continues to create good times with consumers, accessed 18 September 2025.

# 4. Sector Demand and Application Areas

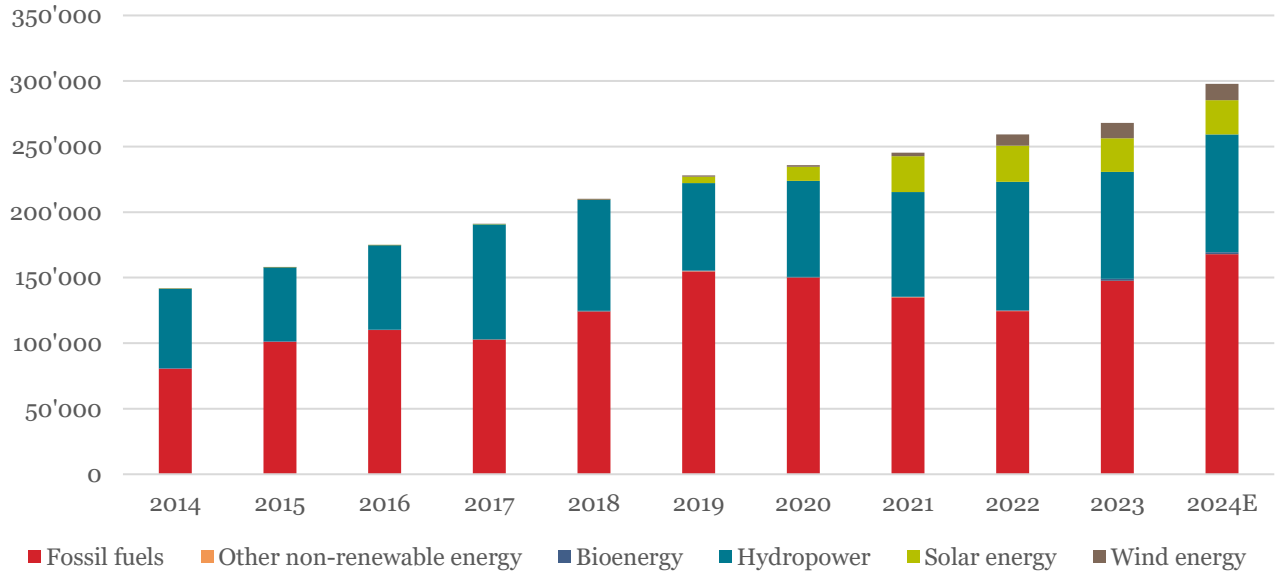
For companies supplying green machinery, Vietnam's demand landscape shows strong growth prospects but varies widely across industries. The opportunities depend on sector-specific characteristics and the pace of technological adoption. To highlight where demand is emerging, this section examines three sectors: renewable energy; water treatment, waste-to-energy and other environmental technology; and energy-efficient manufacturing and smart buildings. By mapping demand and application areas across these domains, it provides a comprehensive view of how green machinery can enhance productivity, sustainability, and innovation within Vietnam's industrial development.

## 4.1. Renewable energy

### 4.1.1. Industry overview

From 2014 to 2023, fossil fuels and hydropower remained Vietnam's dominant electricity generation. However, new renewables, especially solar and wind, emerged as transformative forces. Before 2017, their contribution was minimal. After the FIT policy, solar generation jumped from nearly zero before 2018 to 4,987 GWh in 2019, soaring to 27,314 GWh by 2021, while wind generation steadily grew to 11,593 GWh by 2023. Although still smaller than fossil fuels in overall share, this rapid expansion marks a major shift, laying a strong foundation for Vietnam's energy transition and diversification.

**Figure 5 – Vietnam's non-renewable and renewable electricity generation (GWh), 2014 – 2024E**




*The 2024 electricity-generation estimates are based on ETS trend-based modeling, with adjustments applied to account for historical volatility, non-linear growth patterns, and sector-specific operational realities. As no significant policy interventions/implementations or major market shifts occurred during 2024, the projections reflect a continuation of recent electricity-generation trends. These estimates are indicative projections for planning and investment purposes. Actual figures may vary due to unforeseen regulatory changes, weather events, or other factors beyond the scope of the model.

Source: IRENA, DSA's calculation and analysis, 2025

Building on this installed base, the 2025 revision of PDP VIII establishes ambitious long-term capacity targets that define the demand outlook for renewable-energy machinery suppliers. The plan focuses on the strong expansion of renewable energy sources, particularly solar and wind power. Installed capacity targets are

ambitious: wind power is expected to reach up to 55,061 MW by 2030 and nearly 230,497 MW by 2050, while solar power is projected to grow from around 73,416 MW in 2030 to nearly 295,646 MW by 2050. The plan emphasizes rooftop solar for self-consumption, large-scale solar with energy storage, and the development of offshore wind to support new energy production for both domestic use and export[28].

**Table 8 - Vietnam's wind and solar power targets for 2030 and 2050 under the 2025 revised PDP VIII**

| Energy Type | Technical Potential (MW) | Target 2030 (MW) | % of Total 2030 | Target 2050 (MW) | % of Total 2050 |
|---|---|---|---|---|---|
| Wind – Onshore (& Nearshore) | 221,000 | 26,066 – 38,029 | 14.2 – 16.1% | 84,696 – 91,400 | 10.9% |
| Wind – Offshore | 600,000 | 6,000 – 17,032 | 2.6 – 7.2% | 113,503 – 139,097 | 14.7 – 16.6% |
| Total Wind Power Target | ~ 821,000 | 32,066 – 55,061 | 16.8 – 23.3% | 198,199 – 230,497 | 25.6 – 27.5% |
| Total Solar Power Target (Ground, Floating, Rooftop) | 963,000 | 46,459 – 73,416 | 25.3 – 31.1% | 293,088 – 295,646 | 35.3 – 37.8% |
| **Total Power Target (Wind & Solar)** | **~ 1,784,000** | **78,525 – 128,477** | **42 – 54%** | **491,287 – 526,143** | **61 – 65%** |

Source: Decision No. 768/QD-TTg dated April 15, 2025 (Revised PDP VIII), Dezan Shira & Associates' compilation, 2025

From 2014 to 2024, Vietnam's renewable electricity capacity has been largely driven by hydropower, which consistently accounted for the majority of the country's renewable capacity throughout the period. Hydropower started at around 15,745 MW in 2014 and steadily grew to 23,707 MW by 2024, forming the backbone of the renewable energy mix. This steady growth was supported by Vietnam's favorable river systems and long-established hydropower infrastructure, which provided a reliable and consistent source of renewable energy.

However, significant growth in solar and wind power can be observed following government initiatives starting in 2017. FITs introduced in 2017 were the main driver that subsequently attracted foreign investment and accelerated deployment from 2018 onward. As a result, solar photovoltaic (PV) capacity remained minimal in 2017 but then surged dramatically from 105 MW in 2018 to 16,660 MW in 2020, showing the rapid adoption of solar energy following supportive policies. By 2024, solar capacity reached 18,666 MW, nearly matching hydropower growth in absolute terms. This explosive expansion was largely driven by FITs, streamlined permitting processes, and increased foreign investment, which encouraged both large-scale utility projects and rooftop solar installations.

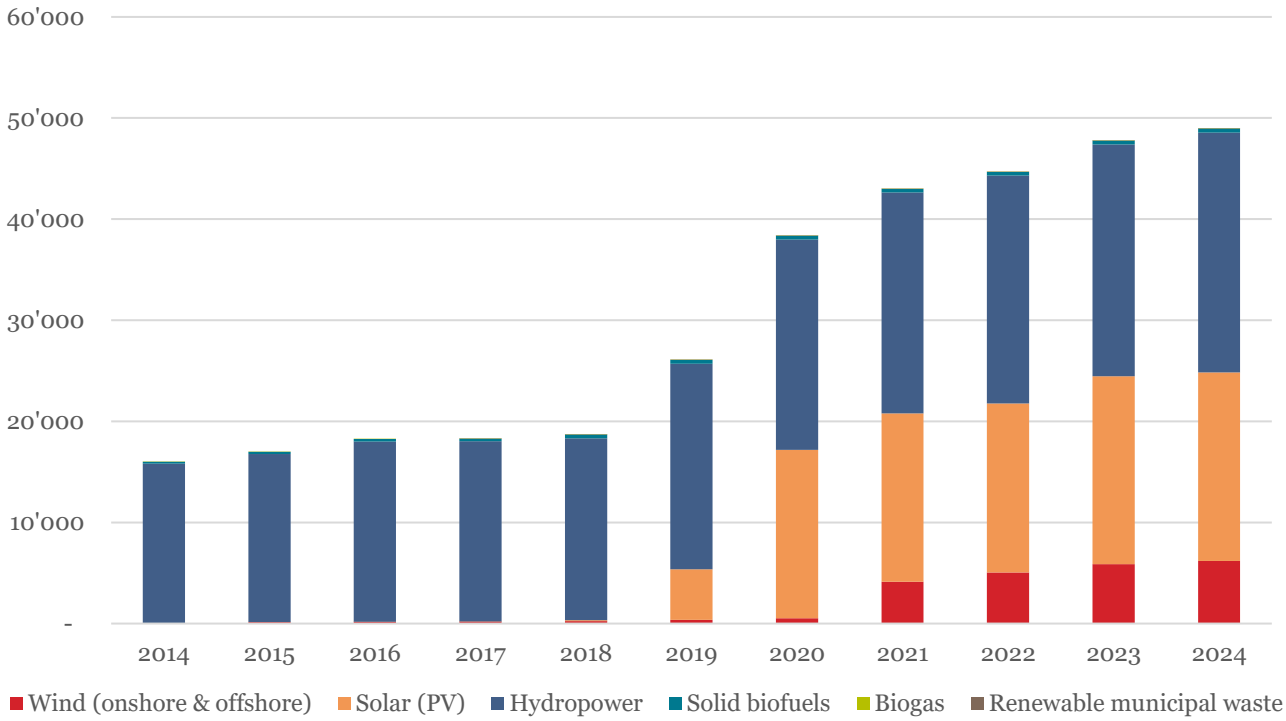
Meanwhile, wind energy, though starting from a very low base, began to accelerate later, particularly from 2021 onwards. Wind capacity jumped from 518 MW in 2020 to 4,118 MW in 2021 and continued increasing to 6,185 MW by 2024, reflecting a later but robust government-driven expansion. Offshore wind projects, in particular, began contributing more significantly to capacity, highlighting Vietnam's efforts to diversify its renewable portfolio beyond traditional hydropower and onshore renewables.

This pattern highlights how government initiatives have successfully diversified Vietnam's renewable energy mix, with solar leading the early post-2017 surge and wind joining the growth wave later. It also indicates a

[28] Government News, Socialist Republic of Viet Nam (2025), The Prime Minister approved the Adjustment of Power Planning VIII, accessed 18 September 2025.

strategic shift toward balancing energy security with environmental sustainability, reducing reliance on fossil fuels, and preparing the energy sector for future demand growth. Overall, Vietnam's experience demonstrates how targeted policy interventions can rapidly transform the energy landscape within a relatively short period.

**Figure 6 – Vietnam's renewable electricity capacity (MW), by technology, 2014 – 2024**




Source: IRENA, 2025

The 2024 solar figures show a solid base to hit the revised PDP VIII's 2030 targets, where Vietnam has already demonstrated rapid deployment capability when policies are clear. The most striking development was the "massive boom" in rooftop solar installations, with 104,000 systems nationwide reaching a combined 9,580 MWp (7,600 MWac) by the end of 2020[29], signaling a shift toward a decentralized, consumer-driven market.

Building on this momentum, and with solar capacity already at 18,666 MW by 2024, Vietnam has established both the technological base and investor confidence for rapid expansion. While the 2030 solar target of 46,459–73,416 MW is ambitious, past performance demonstrates the country's capacity to accelerate deployment when backed by clear and consistent policy incentives.

While onshore wind currently holds the dominant share within Vietnam's wind energy sector, largely due to its lower capital intensity and a more familiar regulatory framework, offshore wind represents the most significant long-term opportunity, particularly as floating wind technologies enable development in deeper waters. The market is supported by a sizeable pipeline of projects, though many remain delayed rather than actively under construction.

A major bottleneck lies in grid connection: historically, investment projects can face potential risks if they cannot secure approval from the state-owned utility, Vietnam Electricity (EVN)[30]. Beyond grid congestion, challenges such as slow permitting, uncertain power purchase agreements, and high financing costs also weigh on project development. For investors, this highlights that opportunities extend not only to project ownership but also to technology and service providers specializing in grid modernization, smart grid infrastructure, and energy management systems.

Nonetheless, these opportunities are becoming more accessible as EVN's traditional monopoly over transmission and power trading gives way to regulatory reforms that expand private sector participation. This

[29] TechSci Research (2023), Vietnam Solar Photovoltaic Equipment Market to Grow at a high CAGR until 2028, accessed 18 September 2025.
[30] MoIT, GIZ (2016), Wind Power Investment Guidelines, accessed 18 September 2025.

shift is reinforced by Resolution 70 -NQ/TW issued in August 2025, on ensuring national energy security until 2030, with a vision to 2045, which enhances customers' rights to access and choose electricity suppliers[31].

### 4.1.2. Key players and potential demand for green machinery

#### 4.1.2.1. Key players

**Table 9 – Vietnam's renewable energy key players**

| Company Name | Categories | Brief Introduction | Country |
|---|---|---|---|
| **Trung Nam Group** | Solar, Wind, Hydropower Energy | Website: https://trungnamgroup.com.vn/<br>Trung Nam Group, founded in 2004, is a leading Vietnamese private conglomerate specializing in renewable energy, infrastructure, construction, real estate, and electronics manufacturing services. As of October 2021, the group has developed over 1.6 GW of renewable energy capacity, making it the largest private renewable energy investor in Vietnam.<br>• Solar Power: several significant solar projects, including the 450 MW Trung Nam Thuan Nam Solar Power Plant in Ninh Thuan Province.<br>• Wind Power: developed both onshore and offshore wind projects, such as the 400 MW Ea Nam Wind Power Project in Dak Lak province and the 100 MW Dong Hai 1 Offshore Wind Power Project in Tra Vinh province.<br>• Hydropower: owns and operates several hydropower plants, including Dong Nai 2 (70 MW), Krong No 2 (30 MW), and Krong No 3 (18 MW). | Vietnam |
| **TTC Group** | Solar, Wind, Hydropower Energy | Website: https://www.ttcgroup.vn/<br>TTC Group, established in 1979 and headquartered in Ho Chi Minh City, is a leading Vietnamese conglomerate with diversified interests across energy, agriculture, real estate, and education sectors. In the energy sector, TTC Group has emerged as a significant player in Vietnam's renewable energy landscape, focusing on solar, wind, and hydropower projects.<br>• Solar Power: TTC Group has developed several large-scale solar power plants, including the TTC Phong Dien Solar Power Plant in Thua Thien – Hue Province, with a capacity of 35 MW, and the TTC Krong Pa Solar Power Plant in Gia Lai Province, with a capacity of 49 MW.<br>• Wind Power: Through joint ventures such as Mekong Wind Power, TTC Group has invested in wind energy projects like the Binh Dai Offshore Wind Farm in Ben Tre Province, with a capacity of 310 MW.<br>• Hydropower: TTC Group owns and operates multiple hydropower plants, contributing to Vietnam national grid's capacity. | Vietnam |

[31] Government News, Policy and Law making (2025), Resolution 70-NQ/TW on ensuring national energy security to 2030, with a vision to 2045, accessed 18 September 2025.

| Company Name | Categories | Brief Introduction | Country |
|---|---|---|---|
| **BCG (Bamboo Capital Group)** | Solar, Wind, Waste-to-Energy | Website: https://bamboocap.com.vn/<br>Bamboo Capital Group (BCG), established in 2011 and headquartered in Ho Chi Minh City, is a diversified Vietnamese conglomerate with a strong focus on renewable energy. Through its subsidiary, BCG Energy, the group has become a prominent player in Vietnam's clean energy sector, investing in solar, wind, and waste-to-energy projects. Strategic Partners include SP Group (Sigapore) and SK Ecoplant (South Korea).<br>• Solar Power: BCG has developed several large-scale solar projects, including the 330 MW Phu My Solar Power Plant in Binh Dinh Province, which began commercial operations in 2020. The plant generates approximately 520 million kWh annually, serving around 200,000 households and reducing $CO_2$ emissions by about 146,000 tons.<br>• Wind Power: The group is actively expanding its wind energy portfolio, with projects in Ca Mau, Soc Trang, and Tra Vinh provinces, totaling 550 MW upon completion. | Vietnam |
| **PC1 Group Joint Stock Company** | Solar, Wind, Hydropower Energy | Website: https://www.pc1group.vn/<br>PC1 Group, founded in 1963 and headquartered in Hanoi, is a leading Vietnamese conglomerate specializing in electrical construction, renewable energy, and industrial manufacturing. With over 60 years of experience, the company has become a key player in Vietnam's renewable energy sector, focusing on solar, wind, and hydropower projects.<br>• Solar Power: PC1 Group has been involved in several large-scale solar projects, including the Dau Tieng Solar Power Project, Southeast Asia's largest clean energy project, with a capacity of 500 MW.<br>• Wind Power: PC1 Group has constructed multiple wind farms across Vietnam, including projects in Phong Nguyen, Lien Lap, and Quang Tri provinces.<br>• Hydropower: The company is investing in the development of five hydropower plants in Cao Bang and Dien Bien provinces, with a total capacity of nearly 200 MW, contributing to Vietnam's renewable energy capacity. | Vietnam |
| **Jinko Solar** | Solar Energy | Website: https://www.jinkosolar.com/<br>Jinko Solar, founded in 2006 and headquartered in Shanghai, China. The company has strong presence in Vietnam, building a vertically integrated solar product value chain, from silicon ingots and wafers, through solar cells, to high-performance solar modules, and offers panels for utility-scale, distributed rooftop, and hybrid solar-wind projects. In 2020, Jinko Solar supplied over 2.5 GW of solar modules to the Vietnamese market, making it the No. 1 PV module brand in Vietnam by that measure. | China |

| Company Name | Categories | Brief Introduction | Country |
|---|---|---|---|
| **LONGi** | Solar Energy | Website: https://www.longi.com/<br>LONGi is a leading Chinese solar technology company specializing in high-efficiency monocrystalline silicon wafers, solar cells, and modules. In Vietnam, LONGi has established a significant presence in both manufacturing and market deployment of solar systems. In 2020, LONGi signed a framework agreement to acquire Vietnam-based OEM Vina Solar (with 3 GW cell capacity and 7 GW module assembly) to consolidate its manufacturing footprint in Vietnam and the region. | China |
| **Trina Solar** | Solar Energy | Website: https://www.trinasolar.com/<br>Trina Solar, a global leader in photovoltaic (PV) products, PV systems, and smart energy solutions, has established a significant footprint in Vietnam. It operates one of its largest manufacturing facilities outside China in Thai Nguyen Province (with initial investment of around US$203 million), demonstrating its strategic commitment to the Vietnamese renewable energy market. | China |
| **JA Solar** | Solar Energy | Website: https://www.jasolar.com<br>JA Solar Vietnam Co., Ltd. is a subsidiary of JA Solar Technology Co., Ltd., a global leader in high-performance solar PV products headquartered in Beijing, China. Established in 2020, JA Solar Vietnam operates one of the company's major overseas manufacturing bases, located in Bac Giang Province, Vietnam.<br>• Products: Monocrystalline and polycrystalline solar cells and modules.<br>• Capacity: The Bac Giang plant has a production capacity of over 3 GW per year (as of 2023).<br>• Purpose: Supports exports to global markets while contributing to Vietnam's renewable energy industry and local job creation. | China |
| **VSUN Solar** | Solar Energy | Website: https://www.vsunsolar.com/<br>VSUN Solar is a global solar energy company headquartered in Tokyo, Japan. The company has established significant manufacturing operations in Vietnam. VSUN Solar Vietnam operates large-scale solar module manufacturing facilities in Bac Giang Province, with an annual production capacity exceeding 4 GW (as of 2024).<br>• Products: The company produces monocrystalline and bifacial PV modules, including PERC, TOPCon, and N-type technologies for utility, commercial, and residential applications.<br>• Market Reach: VSUN's Vietnamese factory exports PV modules to Asia-Pacific, Europe, and North America, supporting international solar developers and EPC contractors. | Japan |

| Company Name | Categories | Brief Introduction | Country |
|---|---|---|---|
| **Sao Mai Group** | Solar Energy | Website: https://saomaigroup.com/en/<br>Sao Mai Group, founded in 1988 and headquartered in An Giang Province, Vietnam, is a diversified conglomerate with approximately 12,000 employees and charter capital of around 7,433 billion VND (US$ 281.45 million). Sao Mai Solar (a subsidiary) has commissioned large solar farms, including the 210 MWp An Hao Solar Power Plant in An Giang Province, and the 50 MWp Europlast Solar Power Plant in Long An Province. It has installed rooftop solar systems across many of its own production and industrial facilities. The Group's rooftop solar portfolio includes an initial 1.07 MWp plant (in 2017) and has expanded to over 10 MWp in multiple roofs of their factories and facilities. | Vietnam |
| **BIM Group** | Wind and Solar Energy | Website: https://www.bimgroup.com/en/<br>BIM Group, founded in 1994 and headquartered in Vietnam, is a major multi-sector conglomerate with core businesses in real estate, agriculture & food, consumer services, and renewable energy. BIM Energy is the arm of BIM Group responsible for its renewable energy initiatives. The group aims to generate at least 1,000 MW of clean (solar + wind) energy in 2025.<br>• Solar power cluster in Ninh Thuan: Consists of three solar PV plants, BIM 1 (30 MWp), BIM 2 (250 MWp, plus an extension), BIM 3 (50 MWp). Together they reach around 330 MWp capacity. They produce around 600 million kWh/year, enough for roughly 200,000 households.<br>• Wind Power: The group has built an 88 MW wind farm (22 turbines) in Thuan Nam district, Ninh Thuan province. It went into commercial operation on September 30, 2021. It produces around 317–327 GWh/year, enough electricity for around 50,000 households, and helps reduce $CO_2$ emissions by hundreds of thousands of tons annually. | Vietnam |
| **Mainstream Renewable Power** | Wind and Solar Energy | Website: https://www.mainstreamrp.com/markets-projects/asia-pacific/vietnam/<br>Mainstream Renewable Power, founded in 2008 and headquartered in Dublin, Ireland, is a leading global developer of renewable energy projects focused on onshore and offshore wind and solar power. In Vietnam, Mainstream has partnered with local developers and international investors to advance large-scale wind projects aligned with PDP VIII goals.<br>• Offshore Wind: Mainstream is developing several offshore wind projects off the southern coast of Vietnam, particularly in Binh Thuan and Ba Ria–Vung Tau provinces, with a potential combined capacity of over 2 GW.<br>• Partnerships: In 2021, Mainstream signed a cooperation agreement with Phu Cuong Group to jointly develop the | Ireland |

| Company Name | Categories | Brief Introduction | Country |
|---|---|---|---|
| | | Phu Cuong Soc Trang Offshore Wind Farm, with a total planned capacity of 1.4 GW—one of the largest offshore wind projects in Southeast Asia. | |
| **GE Renewable Energy Vietnam** | Wind Energy | Website: https://www.ge.com/news/taxonomy/term/2245<br>Founded as part of the global conglomerate GE, GE Vietnam is a major player in Vietnam's energy, industry, healthcare, and aviation sectors. GE provides wind turbine technology and equipment for onshore and offshore wind projects in Vietnam, including local manufacturing and supply operations.<br>• GE secured projects including an 88 MW onshore wind farm in Ninh Thuan with BIM Group.<br>• Ge provided turbines for the Thuan Nhien Phong (TNP) wind farm in Binh Thuan, as well as the Phuoc Minh wind farm (27.2 MW) in South Central Vietnam. | U.S. |
| **Vestas** | Wind Energy | Website: https://www.vestas.com/en<br>Vestas, a global leader in wind turbine technology, has been active in Vietnam with multiple orders, installations, services, and local presence. They supply, install, and service wind turbines in various terrains (mountainous, coastal, intertidal). Notable projects include:<br>• Phong Lieu Wind Project in Quang Tri Province: 12 V150-4.2 MW turbines delivered in 4.0 MW mode; includes 10-year AOM5000 service agreement.<br>• Lien Lap, Phong Huy, and Phong Nguyen Wind Projects in Quang Tri Province: total capacity of 144 MW using 36 V150-4.2 MW turbines; Vestas handled supply, transport, installation, and commissioning.<br>• Hoa Binh 1 Intertidal Wind Farm in Bac Lieu Province: ~50 MW nearshore project utilizing turbines adapted for shallow coastal waters; among Vietnam's first intertidal wind projects. | Denmark |
| **Tan Hoan Cau (THC Group)** | Solar, Wind, Hydropower Energy | Website: https://tongcongtytanhoancau.com.vn/<br>THC Group, established in 1991, is a diversified Vietnamese private enterprise engaged in renewable energy, real estate, tourism, and construction. THC Group is known for pioneering hydropower development and expanding into solar and wind power to support Vietnam's energy transition.<br>• Hydropower: Invested in and operates several hydropower plants, such as Dakring Hydropower Plant (12 MW), Dakre Hydropower Plant (60 MW), and Song Bung 2 Hydropower Plant (100 MW) in Quang Nam and Quang Ngai provinces<br>• Solar Power: Developed major projects like the Tan Hoan Cau Solar Power Plant (35 MW) in Quang Ngai province and additional projects in the Central Highlands. | Vietnam |

| Company Name | Categories | Brief Introduction | Country |
|---|---|---|---|
| | | • Wind Power: Has been developing wind projects in Quang Tri and Quang Ngai provinces, contributing to Vietnam's renewable energy targets. | |
| **EVN (Vietnam Electricity Corporation)** | Hydropower Energy, with expansion to Solar, Wind Energy | Website: https://www.evn.com.vn/<br>Vietnam Electricity (EVN), established in 1995, is a state-owned enterprise and the largest power company in Vietnam. It plays a pivotal role in the nation's electricity sector, overseeing power generation, transmission, and distribution across the country. In recent years, EVN has been expanding its renewable energy portfolio through investments in solar, wind, and hydropower projects, as well as by purchasing electricity from independent renewable producers. Key hydropower projects include:<br>• Son La Hydropower Plant (2,400 MW)<br>• Lai Chau Hydropower Plant (1,200 MW) | Vietnam |
| **ANDRITZ Hydropower** | Supplier for Hydropower Energy Sector | Website: https://www.andritz.com/hydro-en/about-andritz-hydro/locations/hanoi-vietnam<br>ANDRITZ Hydropower is a supplier and contractor providing turbines, generators, and technical services for Vietnam's hydropower plants. The company delivered turbines, generators, and automation systems for multiple Vietnamese hydropower projects, such as Son La (2,400 MW), Lai Chau (1,200 MW), and Huoi Quang (520 MW) — among the largest in the country. | Austria |

Source: Dezan Shira & Associates' compilation, 2025

#### 4.1.2.2. Potential demand for green machinery

Vietnam's revised National Power Development Plan VIII (PDP VIII), approved in April 2025, sets the foundation for Southeast Asia's most ambitious clean energy build-out. Between 2026 and 2030, Vietnam will require US$136.3 billion in investment to expand solar, wind, and energy storage capacity while modernizing its power transmission network[32]. This aggressive transition phase is driven by two imperatives: achieving rapid growth in renewable generation and ensuring grid stability through large-scale deployment of energy storage systems and advanced transmission infrastructure.

The policy environment is now uniquely favorable for machinery suppliers. The revised PDP VIII provides precise capacity targets, while new regulations such as Decree 57/2025/ND-CP[33], which formalizes the Direct Power Purchase Agreement (DPPA) mechanism, enable renewable developers to transact directly with major industrial consumers. This regulatory shift reduces dependency on the state utility, Vietnam Electricity (EVN), and accelerates procurement timelines by allowing private financing for generation and dedicated transmission assets. Together with Resolution 70-NQ/TW[34], which broadens consumer rights to choose electricity suppliers, Vietnam's policy framework now provides unprecedented investment certainty for equipment manufacturers and project developers alike.

Meeting the 2030 capacity targets requires an extraordinary expansion in installation activity. Solar power capacity must rise from 18,666 MW in 2024[35] to around 46,459–73,416 MW by 2030, while onshore wind will expand to nearly 26,066–38,029 MW and offshore wind to 6,000–17,032 MW[36]. The most dramatic increase, however, lies in battery energy storage, which will surge 300 MW in previous plans to an ambitious 10,000–16,300 MW by 2030. Achieving these targets will require maintaining annual installation rates of over 9,000 MW of solar and 5,000 MW of onshore wind, supported by the continuous procurement of specialized machinery such as high-torque piling rigs, turbine components, and power conversion systems.

**Table 10 – Vietnam's PDP VIII capacity targets and potential green machinery demand (2025–2030)**

| Sector | 2024 Base capacity (MW) | 2030 Target capacity (MW) | Net-addition (MW) | Potential annual installation rate (MW/Year) | Potential demand for green machinery & equipment |
|---|---|---|---|---|---|
| **Solar PV (Utility / Rooftop)** | 18,666 | 46,459–73,416 | 27,793–54,734 | 4,632 – 9,122 | Piling rigs, PV modules, String inverters, DC cabling |
| **Onshore / Nearshore Wind** | 6,185 | 26,066–38,029 | 19,881-31,815 | 3,313 – 5,302 | Turbine components (blades, nacelles), foundation equipment |
| **Offshore Wind** | Minimal | 17,032 | 17,032 | apx. 2,838 | WTIVs, Heavy lift cranes, Submarine cables, Floating platforms |
| **Battery Energy Storage (BESS)** | 300 | 10,000–16,300 | 9,700–16,000 MW | apx. 2,716 | Containerized BESS units, power conversion systems, specialized rigging |

Source: Dezan Shira & Associates' analysis, 2025

[32] Government News, Socialist Republic of Viet Nam (2025), The Prime Minister approved the Adjustment of Power Planning VIII, accessed 18 September 2025.
[33] Government News, Socialist Republic of Viet Nam (2025), Decree No. 57/2025/ND-CP of the Government: Regulations on the mechanism for direct electricity purchase and sale between renewable energy generators and large electricity users, accessed 18 September 2025.
[34] Government News, Policy and Law making (2025), Resolution 70-NQ/TW on ensuring national energy security to 2030, with a vision to 2045, accessed 18 September 2025.
[35] IRENA (2025), Renewable Energy Statistics 2025, accessed 18 September 2025.
[36] Government News, Socialist Republic of Viet Nam (2025), The Prime Minister approved the Adjustment of Power Planning VIII, accessed 18 September 2025.

In solar energy, the demand for compact, efficient foundation machinery and advanced photovoltaic components is intensifying. Vietnam's rapid utility-scale solar expansion will rely on imported high-efficiency modules, inverters, and tracking systems, as the local manufacturing base remains relatively limited and dominated by foreign-invested firms[37]. The same dynamic applies to the wind sector, where high-value components such as nacelles, blades, and offshore cables must still be sourced internationally. Offshore wind, although rich in potential, is currently constrained by regulatory ambiguity surrounding sea-area allocation and survey procedures[38]. Once these legal issues are clarified, the market for specialized vessels and heavy-lift equipment such as wind turbine installation vessels (WTIVs) is expected to grow rapidly.

The most immediate and certain growth area possibly lies in battery energy storage systems (BESS). Driven by binding regulations issued under Circulars 09/2025/TT-BCT, 12/2025/TT-BCT, and 17/2025/TT-BCT, all large-scale renewable projects must integrate BESS with at least 10 percent of their installed capacity[39]. This regulatory mandate guarantees sustained demand for lithium-ion battery systems, containerized enclosures, power conversion units, and control software. The installation of these large and sensitive systems will further drive demand for heavy-lift cranes, rigging equipment, and specialized logistics services. In parallel, EVN is directly investing in BESS infrastructure for grid management, ensuring both state-backed and private-sector procurement streams through the end of the decade.

Vietnam's most critical energy challenge – grid congestion – has become the centerpiece of its modernization strategy. The National Power Transmission Corporation (EVNNPT) is accelerating the implementation of 74 transmission projects between 2025 and 2027[40], with international financing secured through the Just Energy Transition Partnership (JETP) and France's development agency (AFD)[41]. This funding structure significantly reduces payment and investment risks for suppliers of high-voltage transformers, switchgear, transmission towers, and other long-lead infrastructure components.

Beyond traditional systems, the integration of high shares of variable renewable energy is creating new demand for high voltage direct current (HVDC) technology and flexible AC transmission systems (FACTS), essential to maintaining grid stability. These high-tech systems, alongside digital monitoring infrastructure such as phasor measurement units (PMUs) and advanced metering infrastructure (AMI), represent an emerging, high-margin market segment for global equipment providers.

While Vietnam remains dependent on imports of its renewable energy equipment, this also represents an open door for foreign machinery suppliers to establish local partnerships or invest in high-value manufacturing operations. The combination of strong policy signals, international financing, and clear procurement mechanisms has effectively derisked Vietnam's renewable energy market.

For machinery suppliers, strategic focus should align with the country's immediate and regulatory-backed priorities. In the near term, from 2025 to 2027, the most secure opportunities lie in supplying high-voltage grid equipment and flexibility technologies, supported by stable JETP financing.

In parallel, suppliers should position themselves within the mandated BESS ecosystem, offering both storage hardware and installation machinery. Offshore wind presents a longer-term, capital-intensive opportunity, best approached through early engagement in survey, foundation, and pre-installation phases while regulatory clarity is achieved.

Finally, companies should leverage the DPPA mechanism to participate in projects financed directly by multinational corporations seeking 100 percent renewable power, as these off-grid developments offer faster procurement cycles and reduced reliance on public utility schedules.

[37] VietnamNet (2024), Vietnam's renewable energy sprung up, but localization is slow, accessed 18 September 2025.
[38] Watson Farley & Williams (2024), Vietnamese Offshore Wind – Status and recent developments, accessed 18 September 2025.
[39] Energy Storage News (2025), Vietnam's path from zero BESS deployments to meeting ambitious 2030 energy storage targets, accessed 18 September 2025.
[40] EVN (2025), EVN units ready for 2025 targets, accessed 18 September 2025.
[41] EVN (2025), EVNNPT and AFD sign €67 million financing agreement to strengthen Vietnam's power transmission network, accessed 18 September 2025.

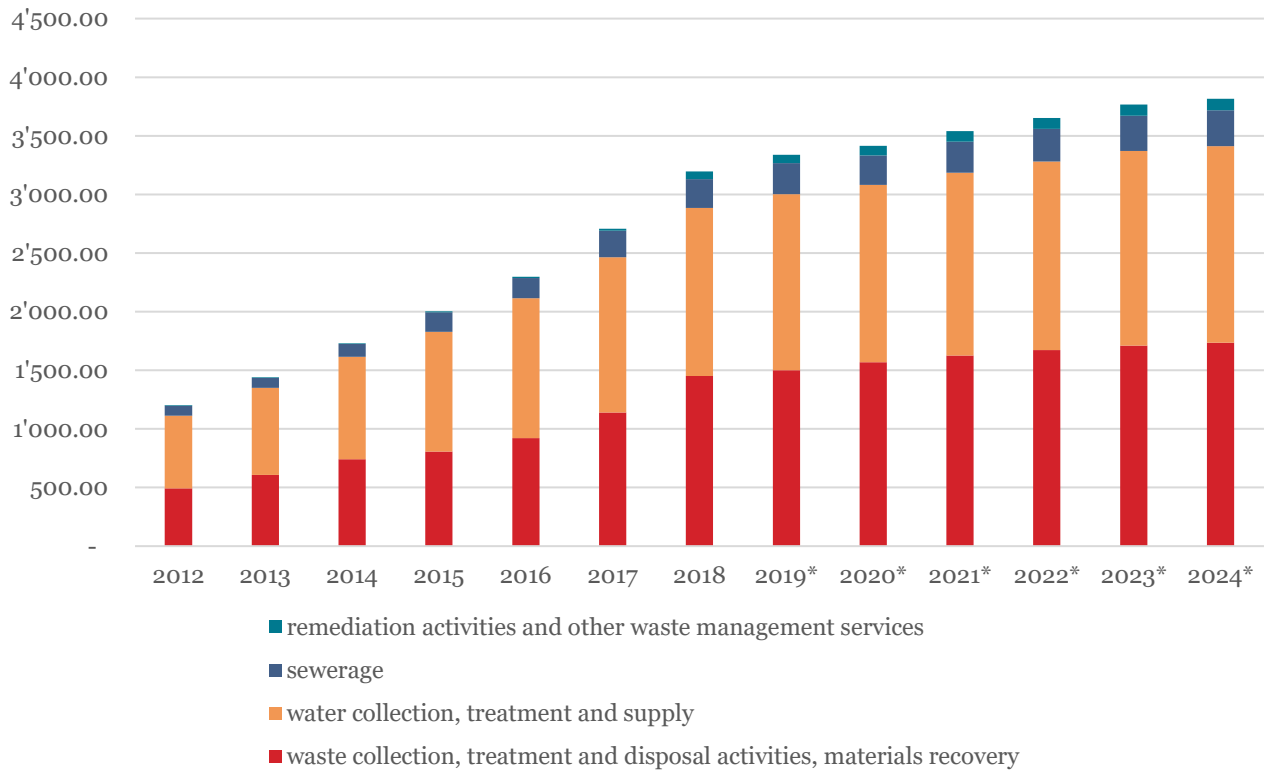
## 4.2. Water treatment, waste-to-energy and other environmental technology

### 4.2.1. Industry overview

#### 4.2.1.1. Water treatment

From 2012 to 2024, Vietnam's total market size for the water supply, sewerage, waste management, and remediation activities industry expanded significantly, rising from about US$1,203 million in 2012 to a forecasted US$3,815 million in 2024. This steady overall increase reflects Vietnam's ongoing investment in environmental infrastructure, waste management, and clean water systems.

**Figure 7 – Market size of water supply, sewerage, waste management & remediation activities in Vietnam (US$ million), 2012 – 2024**

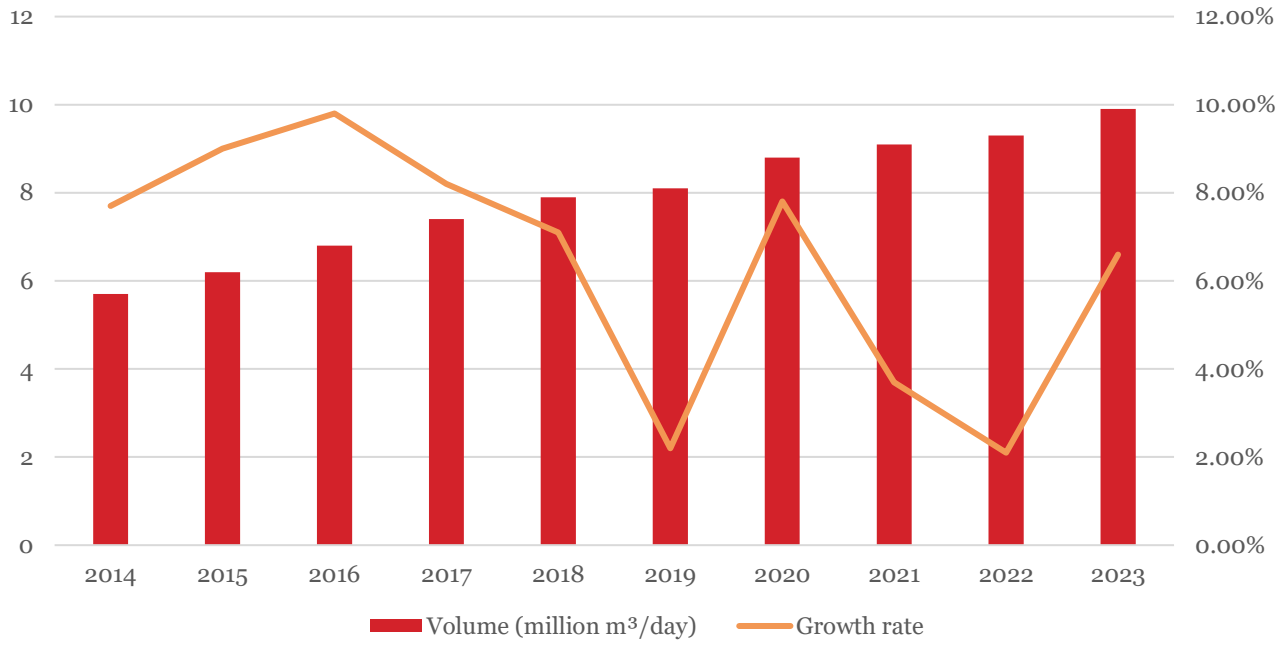



Source: Statista, 2025

The waste collection, treatment, and disposal activities (including materials recovery) segment represents the largest portion of the market. It expanded from US$493.67 million in 2012 to an expected US$1,734.6 million in 2024, demonstrating a consistent rise over time. This strong growth indicates increasing demand for waste management services, driven by rapid urbanization, population growth, and stricter environmental regulations in Vietnam. The water collection, treatment, and supply segment also plays a major role in the industry, growing from US$619.99 million in 2012 to a forecasted US$1,677.8 million in 2024. This reflects improvements in water infrastructure and the government's commitment to expanding clean water access across both urban and rural areas. The sewerage segment, though smaller in value, shows steady progress, increasing from US$84.36 million in 2012 to US$304.80 million in 2024, as Vietnam continues upgrading its sanitation and wastewater treatment systems. Meanwhile, remediation activities and other waste management services represent the smallest but fastest-growing segment. Its revenue rose from US$4.56 million in 2012 to US$97.57 million in 2024, marking almost twentyfold increase. This rapid growth signifies Vietnam's growing attention to environmental rehabilitation and pollution control efforts, particularly in response to industrial expansion and environmental challenges. These dynamics translate directly into increased demand for high-efficiency environmental machinery, including smart monitoring systems, waste-sorting technologies, and modular treatment units.

Overall, Vietnam's water sector has exhibited sustained growth, proving its crucial role in supporting both economic development and quality of life. As industrialization and urbanization accelerate, the demand for clean and treated water continues to rise. Between 2014 and 2024, the country's commercial water output expanded at an average annual rate of around 6.3%. Looking ahead, the industry is projected to maintain a positive trajectory, with production output expected to increase by 5%–7% annually, accompanied by a moderate price rise of 3%–4% per year[42].

**Figure 8 – Commercial treated water volume* in Vietnam, 2014 – 2023**




Source: Fiin Ratings, Vietnam Water Supply and Sewerage Association (VWSA), 2025

*Notes: Commercial treated water volume = Total treated water volume – Water loss volume

Vietnam's water treatment sector encompasses several major segments: municipal and wastewater treatment, industrial wastewater management, treatment chemicals, and residential purification systems. Municipal treatment efforts focus on expanding water and wastewater infrastructure in fast-growing cities such as Ho Chi Minh City, Hanoi, and Da Nang. Industrial wastewater treatment is critical in southern provinces like Binh Duong and Dong Nai, where manufacturing clusters generate large volumes of effluent. The chemical treatment segment includes coagulants, disinfectants, and corrosion inhibitors used in both municipal and industrial applications. The household water purifier market is thriving, led by local brands such as Karofi, Kangaroo, and Sunhouse.

Several key drivers are fueling the industry's growth. Rapid urbanization and industrialization are increasing the demand for clean water and effective wastewater management. Environmental concerns and rising awareness of waterborne diseases are pushing both consumers and industries toward better water treatment solutions. The Vietnamese government has also introduced stricter environmental regulations and infrastructure development plans, aligned with its National Green Growth Strategy (2021–2030)[43] and the Sustainable Development Goals (SDGs). Additionally, technological innovation, including membrane filtration, smart monitoring systems, and water reuse technologies, is making treatment processes more efficient and sustainable.

Despite these positive developments, several challenges persist. Vietnam's wastewater treatment coverage remains limited, with only a fraction of wastewater being properly collected and treated. Regional disparities are evident: southern provinces possess more advanced infrastructure compared to northern and central

[42] Fiin Ratings (2025), Sustainable Investment Opportunities for Long-Term Growth – Clean Water, accessed 5 October 2025.
[43] Government News, Socialist Republic of Viet Nam (2021), National Green Growth Strategy for 2021-2030, vision towards 2050, accessed 18 September 2025.

regions, where many rural areas still lack adequate facilities. The sector continues to rely on imported technologies for high-end components such as membranes and control systems, increasing costs and constraining domestic capabilities. Financial and operational issues, including low tariffs, funding gaps, and maintenance difficulties, also affect municipal system performance. Inconsistent enforcement of environmental regulations further allows some industries to remain non-compliant.

Looking ahead, Vietnam presents significant opportunities for both local and foreign investors. The government is actively promoting public–private partnerships (PPPs) to attract investment in large-scale water and wastewater projects. Growth prospects are especially strong in areas such as wastewater reuse and recycling, smart water management, and eco-friendly treatment technologies. Specific areas of demand include drinking water and processing and produced water solutions, such as engineering and design services, monitoring equipment, non-revenue water control software, low-loss distribution and storage equipment, advanced and membrane filtration systems, reverse osmosis, UV disinfection, ion exchange technology, secondary wastewater and sludge treatment technologies, and reuse solutions[44]. As the country continues to urbanize and industrialize, water treatment will remain a critical infrastructure priority, one that offers long-term potential for innovation, investment, and sustainable development.

[44] U.S. International Trade Administration (2024), Environmental Technology, accessed 18 September 2025.

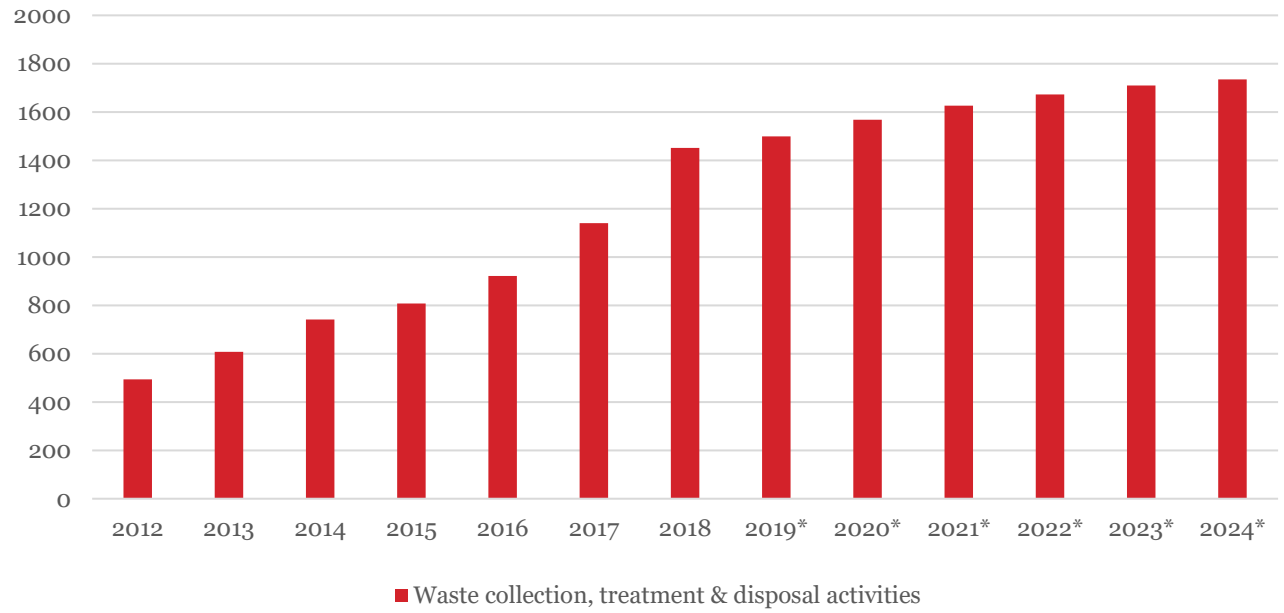
#### 4.2.1.2. Waste-to-energy

From 2012 to 2024, Vietnam's market size for the waste collection, treatment, and disposal activities (including materials recovery) industry expanded significantly, increasing from about US$494 million in 2012 to a forecasted US$1,735 million in 2024. This consistent upward trend demonstrates Vietnam's growing commitment to improving its waste management infrastructure and addressing the environmental challenges associated with rapid industrialization and urban growth.

The steady increase in market value reflects ongoing investments in waste collection systems, recycling facilities, and treatment technologies aimed at minimizing environmental impact and promoting resource recovery. Between 2012 and 2018, the industry more than doubled in size, rising to approximately US$1,452 million, driven by stronger government regulations, public awareness of waste reduction, and private sector participation.

The estimated market size of US$1,735 million in 2024 suggests that Vietnam will continue to prioritize sustainable waste management practices and circular economy initiatives. The expansion of this sector highlights not only the country's environmental progress but also its recognition of waste management as an essential component of long-term sustainable development and public health improvement.

**Figure 9 – Market size of waste collection, treatment & disposal activities in Vietnam (US$ million), 2012 – 2024**




Source: Statista, 2025

According to Vietnam's Department of Environmental Pollution Control (DEPC), as of the end of 2023, there were approximately 1,712 MSW treatment facilities nationwide. These include 467 MSW incinerators, 38 compost production lines, and about 1,207 MSW landfills, many of which are non-sanitary. Several integrated treatment complexes or facilities have applied waste incineration combined with energy recovery for power generation, or a combination of incineration, landfilling, and composting.

According to preliminary statistics, about 64% of the total volume of MSW nationwide is treated through direct landfilling (a decrease of 6% compared to 2019); around 16% is treated at composting plants (unchanged from 2019); and approximately 20% is treated by incineration (9.3% with energy recovery and 10.7% without energy recovery, recording an increase of 7% compared to 2019) and by other methods such as recycling, gasification, and production of refuse-derived fuel pellets[45].

[45] Environmental Industry Electronic Magazine, Vietnam Environmental Industry Association (2024), There are currently about 15 waste-to-energy projects under construction nationwide, accessed 18 September 2025.

According to Vietnam's DEPC, the total amount of MSW generated nationwide is approximately 67,110 tons per day, an increase of 2,452 tons per day compared to 2019. Of this, the urban areas account for about 36,875 tons per day, an increase of 1,251 tons per day compared to 2019. Hanoi and Ho Chi Minh City alone generate about 23% of the country's total MSW, equivalent to 46% of the MSW produced in all urban areas nationwide.

**Table 11 – Vietnam's situation of MSW generation**

| No. | Economic Region | MSW Volume (tons/day) | Percentage (%) |
|---|---|---|---|
| 1 | Red River Delta | 16,159.3 | 24.0 |
| 2 | Northern Midland and Mountainous Area | 6,638.3 | 9.9 |
| 3 | North Central and Central Coastal Region | 13,737.4 | 20.5 |
| 4 | Central Highlands | 3,745.1 | 5.6 |
| 5 | Southeast Region | 16,665.5 | 24.8 |
| 6 | Mekong River Delta | 10,164.4 | 15.2 |
| | **Total** | **67,110** | **100.0** |

Source: Vietnam's Department of Environmental Pollution Control (DEPC), 2023

Assessing the results achieved in 2023, the DEPC stated that the management of MSW has been implemented in a synchronized manner, following an appropriate roadmap that meets practical needs. The rate of MSW collection and recycling has continuously increased, while the proportion of waste sent to landfills has decreased. The collection and treatment rate of MSW in urban areas in 2023 was estimated at about 95%, meeting the target set in Vietnam's 2023 Socio-Economic Development Plan[46].

However, several challenges and obstacles remain to be addressed: The proportion of MSW directly landfilled remains high, waste treatment technologies in many localities have not met required standards, many waste treatment facilities are small in scale, have low treatment capacity, and face difficulties in adopting modern technologies. The treatment capacity of existing facilities does not meet the growing volume of waste generated, while investment in new or expanded projects faces shortages of financial and land resources.

Looking ahead, Vietnam's solid waste management sector is expected to focus on promoting modern and sustainable treatment technologies, with a particular emphasis on WtE development to reduce reliance on landfilling. Efforts will likely prioritize accelerating investment in advanced waste treatment systems, upgrading existing facilities, and expanding recycling and composting programs. In addition, opportunities are emerging across municipal and industrial wastewater treatment, including technologies and services such as waste handling equipment; engineering, procurement, and construction (EPC) services; advanced and membrane filtration; WtE systems; anaerobic digestion; nitrification and biological denitrification; monitoring and testing equipment; air flotation; operations services; and integrated water drainage and wastewater treatment systems[47]. Vietnam will likely diversify funding sources through mechanisms such as PPP, international cooperation, and green financing, while also providing incentives for enterprises that invest in environmentally friendly technologies.

[46] Environmental Industry Electronic Magazine, Vietnam Environmental Industry Association (2024), There are currently about 15 waste-to-energy projects under construction nationwide, accessed 18 September 2025.
[47] U.S. International Trade Administration (2024), Environmental Technology, accessed 18 September 2025.

#### 4.2.1.3. Other environmental technology

Vietnam is increasingly treating environmental technology as a key pillar for sustainable development, green growth, and responding to climate change. The major sub-sectors in the environmental technology industry in Vietnam can include air-pollution control (APC) and related environmental technologies. This growing focus reflects Vietnam's commitment to integrating cleaner technologies across its industrial base, strengthening air quality monitoring infrastructure, and accelerating the transition toward a low-emission.

In Vietnam, as the economy continues to expand, air pollution from vehicle emissions, industrial operations, and construction activities has become a significant environmental issue. In 2024, IQAir's annual report ranked Viet Nam as the second most polluted country in the ASEAN region and the 22nd most polluted globally. Pollution levels in 2023 rebounded to pre-pandemic levels, with concentrations of fine particulate matter (PM2.5) rising by 9%. On average, Viet Nam's PM2.5 levels last year were nearly six times higher than the limits recommended by the World Health Organization (WHO)[48].

Although pollution sources vary by region, automobiles are the primary contributors to air pollution in most urban centers. In particular, carbon monoxide (CO) and volatile organic compounds (VOCs) released from vehicles are major pollutants. Other key pollutants include nitrogen oxides (NOx) and sulfur dioxide ($SO_2$). NOx primarily originates from transportation and industrial activities, while $SO_2$ mainly comes from industrial processes. In mining regions, dust generated from extraction activities further worsens air quality. These various forms of pollution have had serious negative effects on public health and the environment. In response, government authorities have implemented several countermeasures, such as monitoring air quality, enforcing stricter regulations, and intensifying inspections and penalties for violations[49].

The APC equipment industry in Vietnam is entering a phase of rapid expansion, driven by tightening environmental regulations, industrial modernization, and the government's new emissions-trading initiatives. Although the market remains smaller compared to major regional economies such as China or India, it is developing quickly due to growing enforcement of air quality standards and increased attention to industrial emissions.

The network of fixed automatic air environmental monitoring stations managed by the Ministry of Natural Resources and Environment (MONRE) represents a key technological infrastructure for air quality assessment in Vietnam. These stations are equipped with advanced monitoring devices and data transmission systems designed to continuously measure and record air pollutant concentrations. This technological network plays an essential role in environmental management by providing real-time data to support air quality regulation, pollution control, and policy decision-making. The system includes two main components:

- National Air Quality Monitoring Network: comprising 17 operational stations and 18 stations currently being installed, managed by the Pollution Control Department (PCD) under MONRE, and

- Provincial Air Quality Monitoring Network: consisting of 94 existing stations managed by provincial Departments of Natural Resources and Environment (DONREs).

Additionally, recent circulars issued by the MONRE have strengthened emissions monitoring and reporting requirements. In parallel, the country launched a pilot carbon emissions trading system (ETS) in 2025, initially targeting heavy-emitting sectors such as cement, steel, and thermal power[50]. This ETS aims to incentivize the adoption of pollution abatement and carbon reduction technologies, which in turn increases demand for APC solutions like flue-gas desulfurization (FGD) systems, electrostatic precipitators (ESP), and low-NOx combustion equipment. The landscape also includes a wide range of equipment, including fabric filters and baghouses, electrostatic precipitators, cyclones, and wet or dry scrubbers for dust and gas control, thermal oxidizers, catalytic systems, adsorption units for VOC removal, and continuous emissions monitoring systems (CEMS) for compliance reporting. Increasingly, industrial clients are seeking integrated solutions that combine pollution control with digital monitoring and performance analytics.

[48] UNDP (2024), Viet Nam's heavy air pollution needs stronger action, accessed 18 September 2025.
[49] Enviliance ASIA (2025), Vietnam, air polution control, accessed 6 October 2025.
[50] Reuters (2025), Vietnam launches first phase of emissions trading scheme, accessed 18 September 2025.

Looking ahead, Vietnam's growing commitment to environmental technology marks a pivotal step toward achieving sustainable development and green growth. As the government continues to strengthen its policy framework and invest in cleaner technologies, the APC sector will remain a central component of this transition. Demand is expected to accelerate for advanced monitoring systems, integrated emission reduction equipment, and energy-efficient industrial processes that align with both national air quality goals and global climate commitments. The expansion of CEMS, fenceline and ambient air quality monitoring networks, and advanced abatement technologies such as multi-pollutant scrubbers, selective non-catalytic reduction (SNCR) controls, and high-efficiency particulate filters illustrates the country's shift toward data-driven and performance-based environmental management.

At the same time, innovation in related industrial technologies, such as specialty cements, improved combustion systems, and alternative fuel applications for cement kilns, will help reduce emissions at the source while improving operational efficiency. Engineering, design, and leak detection solutions are also expected to gain prominence as industries modernize and seek comprehensive approaches to compliance and sustainability[51]. Together, these advancements reflect Vietnam's broader vision of integrating environmental protection with economic growth. By embedding clean technologies into its industrial base, strengthening emissions monitoring infrastructure, and promoting low-carbon production methods, Vietnam is laying the foundation for a more resilient, competitive, and environmentally sustainable economy in the years to come.

[51] U.S. International Trade Administration (2024), Environmental Technology, accessed 18 September 2025.

### 4.2.2. Key players and potential demand for green machinery

#### 4.2.2.1. Key players

**Table 12 –Vietnam's key water purifier manufacturers in Vietnam**

| Company Name | Categories | Brief Introduction | Country |
|---|---|---|---|
| **Sunhouse Group Joint Stock Company** | Home Appliances, Kitchen Equipment, Water Purifiers | Website: https://sunhouse.com.vn/<br>Sunhouse Group is one of Vietnam's leading manufacturers and distributors of household and kitchen appliances. The company's product portfolio includes cookware, electrical appliances, kitchen equipment, and water purifiers designed to meet the needs of modern families. With a strong distribution network across Vietnam and international markets, Sunhouse has become a trusted Vietnamese brand recognized for quality, innovation, and value. | Vietnam |
| **Karofi Group Joint Stock Company** | Water Purifiers; Water Dispensers; Spare Parts & Filter Systems | Website: https://karofiglobal.com/<br>Karofi is Vietnam's leading water purification company, established in 2006. It designs, manufactures, and distributes a wide range of water purifiers, including under-sink RO, floor-standing, hot & cold dispensers and associated spare parts. Its product innovations include the SMAX filtration technology offering double efficiency and longer filter lifespan, and filters certified to meet Vietnam's bottled pure drinking water standard (QCVN 6-1:2010/MOH). Karofi operates Southeast Asia's largest water filter factory (36,000 m²), exports its products to over 50 countries, and has built a strong retail and service network domestically. | Vietnam |
| **The Kangaroo Group Joint-Stock Company** | Water Purifiers; Home & Kitchen Appliances; Consumer Electronics; Energy Solutions | Website: https://kangaroo.vn/<br>Kangaroo, founded in 2003, is a major Vietnamese manufacturer of water purification systems and household appliances. Its core strength lies in RO (reverse osmosis) water purifiers, including multi-stage RO, hot & cold dispensing models, and advanced types that generate hydrogen/alkaline water via electrolysis, plus technologies like the Vortex RO membrane that reduce wastewater. Headquartered in Hanoi, Kangaroo operates 2 factories in Vietnam, an international presence with branches in Myanmar (and neighboring countries), over 2,000 employees, 40,000+ retail points, and nearly 700 product models spanning water purifiers, kitchen & home electrical appliances, and energy solutions. | Vietnam |
| **Daikiosan (Daiviet Group)** | Water Purifiers; Home Health & Wellness Appliances; Kitchen & | Website: https://tapdoandaiviet.com.vn/<br>Daikiosan is a well-known Vietnamese brand under Dai Viet Group, founded in the early 2000s. Their product lines include water filtration systems (RO & alkaline water purifiers), massage chairs, eye/neck/foot massage devices, fans, exercise equipment, timers, and various | Vietnam |

| Company Name | Categories | Brief Introduction | Country |
|---|---|---|---|
| DAIKIOSAN | Household Electricals | other household and health-care appliances. It is among the top-ranked Vietnamese companies in industry growth (e.g. in FAST 500), and in 2021 was listed among the top private enterprises in Vietnam. The company also holds ISO 9001:2015 certification for its quality system covering manufacturing of electronics, home appliances, and water treatment equipment. | |
| **Mutosi Group Joint Stock Company** MUTOSI | Water Purifiers; Hot & Cold-Water Dispensers; Kitchen Appliances; Air Purifiers; Environmental Care Systems | Website: https://mutosi.com/<br>Mutosi is a Vietnamese company founded in 2018, focused on water care (water purifiers, hot/cold water dispensers), safe kitchen appliances, air purifiers, environmental care systems (including raw water treatment). Products use RO filtration combined with mineral supplement filters, with many models meet Vietnamese drinking water regulatory standards (QCVN 6-1:2010/BYT). They also offer premium features like hydrogen-alkaline or ionized water modes, multiple water temperature settings, and smart filtration-maintenance alerts. | Vietnam |

Source: Dezan Shira & Associates' compilation, 2025

**Table 13 – Vietnam's key players and investment projects for solid waste treatment facility with electricity generation**

| Company | Categories | Brief Introduction & Projects | Country |
|---|---|---|---|
| **Everbright Environmental Energy Ltd.** 光大環境 EVERBRIGHT ENVIRONMENT | MSW treatment / WtE | Website: https://www.cebenvironment.com/en/global/home.php<br>In Vietnam, the company operates through subsidiaries such as EB Environmental Energy (Thua Thien Hue) Co., Ltd and Can Tho Everbright Environmental Protection Holdings Ltd (EB Can Tho). These entities are wholly owned by China Everbright Environment Group.<br>• Can Tho MSW Treatment Plant: Treats 400 tons/day of household solid waste; generates 150,000 kWh/day. Total investment VND 1,050 billion (US$45-47 million). Operates under a BOO (Build-Own-Operate) model with 22 years' term.<br>• Phu Son Waste-to-Energy Plant (Thua Thien Hue Province): Designed to treat 600 tons/day (220,000 tons/year) of municipal solid waste. Generates 93 million kWh/year of green electricity. | China |
| **Thien Y Environmental Energy JSC** VNTY | MSW treatment / WtE | Website: https://vnty.com.vn<br>Hanoi Thien Y Environmental Energy Joint Stock Company is a Vietnamese company investing in, constructing, and operating large-scale municipal solid waste treatment facilities. It is the investor/operator of the Soc Son Waste-to-Energy Plant in Soc Son District, Hanoi.<br>• Soc Son Plant: treats 4,000 tons/day of municipal solid waste, with reception capacity up to 5,000 | Vietnam |

| Company | Categories | Brief Introduction & Projects | Country |
|---|---|---|---|
| | | tons/day; power generation capacity reaches 75–90 MW depending on phases. | |
| **Green Star Environment Co., Ltd.** | MSW & Industrial waste Treatment / WtE | Website: https://crevietnam.com<br>Green Star Environment (Vietnam) is a private enterprise active in solid waste management, waste-to-energy, industrial & household waste treatment, environmental cleaning, and non-hazardous hazard waste management. In 2023, Green Star partnered with Korean firms (Chosun Refractory Engineering and SK ecoplant).<br>• Green Star CRE Energy Plant: treats 180 tons/day of industrial and MSW; generates 6.1 MW of electrical power; produces 40 million kWh/year. Investment is US$ 33 million, procured via joint venture structure. | Vietnam |
| **T&J Green Energy Co., Ltd.** | MSW & Industrial waste Treatment | Website: https://tjgreenenergy.com<br>T&J Green Energy is a joint venture between Thuan Thanh Environment JSC (Vietnam) and JFE Engineering Corporation (Japan), established in 2020. The company is constructing a modern WtE plant in Thuan Thanh District, Bac Ninh Province.<br>• The plant is designed to incinerate 500 tons/day of waste (350 tpd MSW + 150 tpd non-hazardous industrial solid waste). | Japan – Vietnam |
| **Thang Long Energy Environment JSC** | MSW treatment / WtE | Thang Long Energy Environment Joint Stock Company is a Vietnamese investor in high-technology WtE projects.<br>• Its flagship project is the Thang Long – Bac Ninh WtE Plant in Que Vo Town, Bac Ninh Province, with total investment of around VND 1,400 billion (US$58–60 million). The waste processing capacity is 500 tons/day, and power generation capacity is 11 MW. The official starting date is 5 May 2025. | Vietnam |
| **BCG (Bamboo Capital Group)** | Solar, Wind, WtE | Website: https://www.bcgenergy.com.vn<br>Bamboo Capital is a multi-industry Vietnamese conglomerate with a growing focus on clean energy. Its energy arm, BCG Energy (BGE), develops, owns and operates solar farms, rooftop solar, and is expanding into wind power and WtE.<br>• The Tam Sinh Nghia WtE plant project in HCMC is under BCG Energy; phase 1 is 60 MW, processing 2,000 – 2,600 tons/day. | Vietnam |
| **Vietstar Environmental JSC** | MSW treatment / WtE | Vietstar Environmental is a non-state joint stock company operating in solid waste treatment, recycling and WtE initiatives. The firm is developing the VietStar Integrated MSW treatment Plant at the Northwest MSW complex in Cu Chi District, Ho Chi Minh City. | Vietnam |

| Company | Categories | Brief Introduction & Projects | Country |
|---|---|---|---|
| | | • Cu Chi Plant: capacity to treat 2,000 tons/day of MSW. Total investment is around VND 3,500 billion (US$137 million) for the 2,000 tons/day facility. | |

Source: Dezan Shira & Associates' compilation, 2025

#### 4.2.2.2. Potential demand for green machinery

Vietnam's environmental technology and green machinery market is entering a phase of accelerated expansion between 2025 and 2030, driven by strong regulatory convergence, government-backed financing, and rising industrial and urban demand. The sector, encompassing water, waste, and air management technologies, has grown steadily and is now poised for an investment-driven growth cycle. This momentum reflects Vietnam's ambition to make the environmental industry a core pillar of its green transition and a standalone economic sector.

From 2025 onward, a wave of new regulations and compliance deadlines is expected to drive substantial capital expenditure across industrial and municipal sectors. Three areas are emerging as immediate investment hotspots: water treatment, waste-to-energy (WtE), and environmental technologies, particularly air pollution control (APC). Equipment procurement in both the short and medium term is anticipated to be concentrated within these segments.

Regarding water treatment, demand is primarily driven by the enforcement of new national technical standards, notably QCVN 40:2025/BTNMT, issued under Circular No. 06/2025/TT-BTNMT by the Ministry of Agriculture and Environment (MAE, previously MONRE). Effective from September 1, 2025, this regulation requires all industrial facilities discharging wastewater to ensure that pollution parameters remain within permissible limits. It applies to all entities releasing industrial effluent into receiving water bodies, except for offshore oil and gas operations, livestock, domestic, or urban wastewater[52]. While facilities already in operation or approved before the effective date may continue following existing standards until December 31, 2031, the stricter discharge requirements under QCVN 40:2025/BTNMT are expected to drive significant upgrades in industrial wastewater treatment, creating strong demand for advanced technologies such as membrane bioreactors (MBR), reverse osmosis (RO), and tertiary treatment solutions.

Regarding waste-to-energy (WtE), demand is expected to arise from the government's active transition away from landfill dependency toward integrated incineration, anaerobic digestion, and other biological treatment systems that meet modern environmental and emissions standards. This strategic shift is driving strong market potential for green machinery and advanced processing technologies, including low-emission incinerators, biomass gasifiers, waste sorting equipment, and high-efficiency energy recovery systems.

Regarding air pollution control (APC) and greenhouse gas (GHG) abatement, demand is expected to rise following the launch of Vietnam's pilot Emissions Trading System (ETS) in August 2025 under the revised Decree No. 06/2022/ND-CP[53]. The system covers three of the country's most carbon-intensive sectors (thermal power, cement, and steel) and is scheduled to transition to a fully operational carbon market by 2029. Under the new framework, facilities must closely monitor and reduce their emissions intensity, spurring mandatory investment in CEMS and advanced flue gas treatment technologies such as flue-gas desulfurization (FGD) and selective non-catalytic reduction (SNCR). The ETS's allowance-based compliance structure, coupled with stricter emissions benchmarks and potential future auctioning of carbon credits, is expected to drive strong demand for green machinery and retrofitting solutions. This includes high-efficiency boilers, low-NOx burners, carbon capture and storage (CCS) systems, and process optimization equipment to reduce fuel consumption and emissions. As the system expands sectoral coverage toward 2029, investment needs in industrial decarbonization technologies are anticipated to accelerate significantly.

A pivotal turning point for the industry arrived in August 2025 with the implementation of Vietnam's Green Taxonomy under Decision 21/2025/QD-TTg[54]. This framework establishes standardized environmental criteria to verify whether investment projects qualify as "green." Once classified, projects gain privileged access to a rapidly expanding pool of green finance, along with preferential tax and credit policies. Data from the State Bank of Vietnam indicate that outstanding green credit reached VND 730 trillion (US$31 billion) by mid-2025, reflecting an average annual growth rate of 21.2% between 2017 and 2024[55]. With substantial investment

[52] VnEconomy (2025), New industrial wastewater standards take effect in Sept. 2025, accessed 8 October 2025.
[53] International Carbon Action Partnership (2025), Vietnam issues rules for pilot ETS, launching August 2025, accessed 8 October 2025.
[54] Government News, Socialist Republic of Viet Nam (2025), Decision No. 21/2025/QD-TTg of the Prime Minister: Regulations on environmental criteria and confirmation of investment projects in the green classification list, accessed 8 October 2025.
[55] Vietnam News (2025), Vietnam plans green loan boost for eco-friendly projects, accessed 8 October 2025.

flowing into this sector, projects involving modern incineration, wastewater treatment, desalination, and advanced emission-reduction systems are explicitly eligible for green financing and related incentives.

Additionally, the government's Environmental Industry Development Program, approved under Decision 1894/QD-TTg issued in September 2025, outlines ambitious localization targets by 2030. Vietnam aims to meet 70–80% of domestic demand for wastewater treatment technologies and equipment, 60–70% of air pollution control requirements, and 50–70% of solid and hazardous waste treatment needs through locally produced technology[56]. This localization agenda fundamentally reshapes the competitive landscape, as foreign original equipment manufacturers (OEMs) will no longer succeed by merely exporting high-end components. Instead, they will need to commit to technology transfer, local assembly, or joint venture partnerships with Vietnamese firms to remain eligible for large-scale public or PPP projects.

**Table 14 - Vietnam's key initiatives on water treatment, waste-to-energy and other environmental technology and potential green machinery demand**

| Sector | Vietnam's Initiatives & Policy Drivers* | Potential demand for green machinery & equipment |
|---|---|---|
| **Water Treatment** | • **QCVN 40:2025/BTNMT (Circular 06/2025/TT-BTNMT)**: Requires all industrial facilities to meet stricter wastewater discharge standards from September 2025.<br>• **Decision 21/2025/QD-TTg**: Projects involving wastewater treatment and desalination are eligible for green finance, tax incentives, and green credit.<br>• **Decision 1894/QD-TTg**: Localization target to meet 70–80% of domestic demand for wastewater treatment equipment by 2030. | • Advanced wastewater treatment systems (MBR, RO, tertiary treatment).<br>• Sludge dewatering and drying units.<br>• Desalination and water reuse systems.<br>• Smart monitoring and control systems.<br>• Modular and containerized treatment units. |
| **Waste-to-Energy (WtE)** | • **National Waste Management Strategy**: Transition from landfill dependency to integrated incineration and biological treatment.<br>• **Decision 21/2025/QD-TTg**: WtE projects eligible for green bonds, green credit, and fiscal incentives.<br>• **Decision 1894/QD-TTg**: Localization target to meet 50–70% of domestic demand for solid and hazardous waste treatment (collection, sorting, and recycling). | • Low-emission incinerators and biomass gasifiers.<br>• Waste sorting and segregation lines.<br>• Heat recovery and power generation systems.<br>• Flue gas cleaning and emission monitoring equipment.<br>• Composting and anaerobic digestion units. |
| **Other environmental technology (APC & GHG Abatement)** | • **Decree 06/2022/ND-CP (Revised)**: Pilot Emissions Trading System (ETS) launching August 2025, with full carbon market by 2029; mandates emissions monitoring and reduction in power, cement, and steel sectors.<br>• **Decision 21/2025/QD-TTg**: Emission reduction and air quality improvement projects eligible for green financing.<br>• **Decision 1894/QD-TTg**: Localization target to meet 60–70% of domestic demand for air pollution control equipment by 2030. | • Continuous emissions monitoring systems (CEMS).<br>• Flue-gas desulfurization (FGD) and DeNOx (SNCR/SCR) systems.<br>• High-efficiency boilers and low-NOx burners.<br>• Electrostatic precipitators and fabric filters.<br>• Carbon capture, utilization, and storage (CCUS) technologies. |

*Non-exhaustive lists

Source: Dezan Shira & Associates' analysis, 2025

[56] Government News, Socialist Republic of Viet Nam (2025), Decision No. 1894/QD-TTg of the Prime Minister: Approving the Program for developing Vietnam's environmental industry for the period 2025 – 2030, accessed 8 October 2025.

Despite this promising outlook, Vietnam's environmental technology sector still faces structural challenges. The supply chain remains dependent on imported components, particularly in advanced filtration membranes, emission monitoring sensors, and automation systems, which inflates project costs and slows domestic capability building. Municipal utilities also face operational inefficiencies and financial constraints, often requiring robust, low-maintenance technologies and innovative service models to ensure long-term viability.

To succeed in this evolving landscape, foreign investors and technology providers must adopt a strategic, partnership-oriented approach. Building local manufacturing and technology transfer capacity will be essential to align with national localization goals and qualify for major tenders. Leveraging expertise in green finance structuring and project certification will also provide a competitive advantage, enabling clients to access preferential loans and tax incentives under the Green Taxonomy framework.

Between 2025 and 2030, Vietnam's environmental technology market is expected to transition from fragmented development to structured, compliance-driven growth. The convergence of regulatory mandates, green finance, and localization policy is transforming the country into a dynamic hub for green industrial equipment and sustainable infrastructure investment. For forward-looking companies, this period represents a unique window to align with Vietnam's green industrial strategy and establish long-term positions in one of Southeast Asia's most rapidly developing environmental markets.

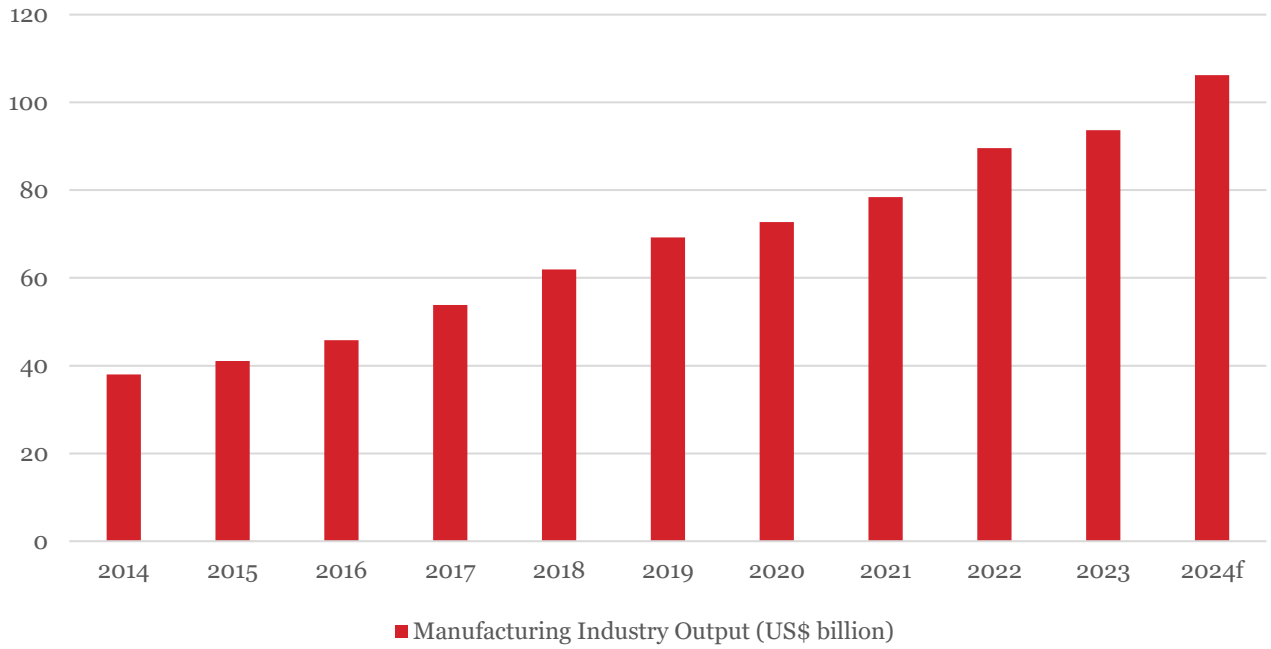
## 4.3. Energy-efficient manufacturing and smart buildings

### 4.3.1. Industry overview

#### 4.3.1.1. Energy-efficient manufacturing

Manufacturing is the core of Vietnam's economic engine[57], serving as a key driver of growth, exports, and employment. Over the past decade, the sector has experienced remarkable expansion, rising from US$38 billion in 2014 to a projected US$106.2 billion in 2024, reflecting Vietnam's rapid industrialization and growing global manufacturing presence. However, as the backbone of national development, it is also among the most energy-intensive sectors. This dual role makes energy efficiency essential not only for reducing waste but also for maintaining competitiveness and achieving sustainability goals.

**Figure 10 - Vietnam's manufacturing industry output at current prices (US$ billion), 2014 – 2024**




Source: GSO, 2025

The industrial production sector in Vietnam continues to demonstrate strong growth, particularly in key energy-intensive industries such as cement, steel, porcelain, cold-chain, and frozen goods. Cement production, as part of the non-metallic mineral sector, grew 15.3% in the first nine months of 2025, while steel production and metal products increased by 11.3–12.7%, and porcelain and ceramic products expanded 15.6%. In the food sector, processed foods and aquaculture feed rose 10.6% and 14.2%, respectively, reflecting the rapid expansion of cold-chain and frozen goods systems. With such robust growth, these sectors are major consumers of energy, including electricity for kilns, furnaces, and refrigeration systems[58]. Consequently, there is an urgent need for systematic energy-efficiency measures, as improvements in these industries could yield energy savings exceeding 20%[59], supporting both industrial competitiveness and sustainability goals.

Among these sectors, the iron and steel industry stands out as both a cornerstone of Vietnam's industrial expansion and one of its most energy-intensive. Steel production has doubled in just five years, driving rapid increases in energy demand[60]. Improving efficiency in this sector will require investments in modern production technologies, such as electric arc furnaces and direct reduced iron (DRI) processes, alongside the

[57] McKinsey & Company (2023), Boosting Vietnam's manufacturing sector: From low cost to high productivity, accessed 8 October 2025.
[58] Brand and Public Opinion of the Central Agency of Vatap Association (2025), Industrial production index in the third quarter of 2025 is estimated to increase by 10.0% over the same period last year, accessed 8 October 2025.
[59] U.S. International Trade Administration (2022), Vietnam Energy Efficiency, accessed 8 October 2025.
[60] ASEAN Centre for Energy (2022), The 7th ASEAN Energy Outlook 2020 - 2050, accessed 8 October 2025.

exploration of cleaner fuels like biomass and hydrogen. Strengthening scrap collection, sorting, and recycling systems can also reduce material use and overall energy consumption.

While traditional heavy industries like steel remain major energy consumers, Vietnam's shift toward high-tech manufacturing introduces new efficiency challenges, most notably in cooling systems. Refrigeration and HVAC operations alone account for 20% to 30% of national electricity consumption. As high-value sectors such as semiconductors, precision electronics, and data centers expand, energy-optimized cooling and cleanroom solutions will be vital to meeting the 2050 net-zero goal[61]. Investment in these specialized, high-impact systems directly links energy savings to productivity and quality control, offering greater returns than generic efficiency upgrades.

**Table 15 - Industrial production growth rate, by key industrial sectors & products, first 9 months of 2025**

| Sector | Growth (Jan – Sep 2025 vs. Jan – Sep 2024) |
|---|---|
| **Cement** | • Non-metallic mineral products: +15.6%<br>• Cement: +15.3% |
| **Steel / Metals** | • Metals: +11.3%<br>• Metal products (except machinery): +12.7%<br>• Rolled Steel: +14.7% |
| **Porcelain / Ceramics** | • Non-metallic mineral products: +15.6% |
| **Cold chain / Refrigerated foods** | • Food processing: +10.6%<br>• Aquaculture feed: +14.2% |
| **High-tech manufacturing** | • Electronics, Computers & Optical Products: +7.9%<br>• TVs: +21.8% |

Source: GSO, 2025

Addressing these sectoral inefficiencies requires strong, coordinated national policies. Under the direction of the Prime Minister, the Ministry of Industry and Trade (MOIT) leads the implementation of the National Energy Efficiency Programme 2019 – 2030 (VNEEP3), approved under Decision No. 280/QD-TTg dated March 13, 2019. The Programme aims to achieve energy savings of 8–10% of total final energy consumption by 2030 – equivalent to approximately 60–80 million tons of oil equivalent (TOE) under a normal development scenario[62].

Building on this framework, progress at the local level has been gradual but steadily advancing since 2020, laying the groundwork for stronger acceleration through 2025. Following Vietnam's administrative consolidation, which reduced the number of provincial-level units from 63 to 34 (comprising 28 provinces and 6 centrally run cities), newly formed provincial and municipal authorities are now finalizing updated local implementation plans under VNEEP3. Between 2020 and 2022, limited central funding constrained large-scale implementation, so activities primarily centered on capacity building, public awareness, and institutional strengthening. The MOIT also strengthened inspection and supervision mechanisms to ensure compliance with national regulations and deepened international partnerships with the European Union, World Bank, Asian Development Bank, and the Government of Denmark[63].

By the end of 2022, the MOIT had guided the former 63 provinces and centrally run cities to develop and issue their local implementation plans. At that stage, 60 localities had completed and released their plans, while the remaining three provinces, including Khanh Hoa, Nam Dinh, and Tuyen Quang, were finalizing theirs. At that time, most local plans adopt national energy-saving targets, though many still lack adaptation to local socio-

[61] Vietnam Investment Review (2025), Vietnamese industry moves towards greener and high-tech future, accessed 18 September 2025.
[62] Government Electronic Information Portal, Socialist Republic of Vietnam (2019), Decision No. 280/QD-TTg of the Prime Minister: Approving the National Program on economical and efficient use of energy for the 2019 - 2030 period, accessed 18 September 2025.
[63] Vietnam Energy Efficiency Office (2023), Vietnam energy efficiency programme period 2019 – 2030, report of implementation in 2022, accessed 18 September 2025.

economic conditions or specific energy-saving potentials. To further accelerate progress, the Prime Minister issued Directive No. 20/CT-TTg (May 7, 2020), setting a national target to save at least 2% of total electricity consumption annually during 2020–2025. These efforts focus on five key sectors: offices, public lighting, households, commercial and service establishments, and manufacturing enterprises[64].

As these foundational efforts took hold, 2023 marked a clear transition from planning and capacity building to regulatory clarification and technical advancement based on the VNEEP3. During the year, the MOIT, through the Energy Efficiency and Sustainable Development Department (EESD), made substantial progress in strengthening Vietnam's regulatory framework for energy efficiency and power conservation. Key achievements included drafting amendments to the Law on Economical and Efficient Use of Energy and the Electricity Law, ensuring alignment with national energy transition goals and global sustainability commitments[65].

**Table 16 - Key policy instruments for Vietnam's for long-term energy efficiency**

| Policy/Legal Document | Date of Issue | Issuing Authority | Key Objectives/Description |
|---|---|---|---|
| Decision on the 2022 List of Key Energy-Using Enterprises | 2023 | MOIT | Identifies major energy-consuming entities nationwide to enhance monitoring, reporting, and management of industrial energy use. |
| Decision No. 14/2023/QĐ-TTg | May 2023 | Prime Minister of Vietnam | Roadmap to phase out low-efficiency equipment and restrict new construction of inefficient power generation units. |
| Directive No. 20/CT-TTg | June 2023 | Prime Minister of Vietnam | Mandates nationwide electricity-saving actions for the period 2023–2025 and subsequent years, strengthening demand-side management. |

Source: Vietnam Energy Efficiency Office, 2024

Throughout 2023, the EESD led inspection programs across 20 entities, including provincial Departments of Industry and Trade (DoIT), key energy-consuming enterprises, and product distributors. Most entities demonstrated strong compliance with national laws on energy efficiency. By November 2023, the Ministry had processed 1,478 energy labeling applications (702 online submissions), signaling a growing commitment by manufacturers and importers to meet efficiency standards[66].

Complementing these oversight efforts, the third phase of VNEEP3 advanced from regulatory compliance to implementation, emphasizing tangible actions to improve industrial and commercial energy performance. In 2023, activities centered on: developing technical standards and performance benchmarks for energy-intensive equipment; supporting small and medium-sized enterprises (SMEs) in implementing energy management systems and conducting energy audits; expanding demonstration projects and technology pilots for energy-saving solutions; and organizing nationwide training and awareness programs to build local capacity. In total, 50 program tasks were implemented, 11 through direct commissioning and 39 via open bidding[67].

[64] Vietnam office for energy efficiency and saving (2023), Vietnam energy efficiency programme period 2019 – 2030, report of implementation in 2022, accessed 18 September 2025.
[65] Vietnam Energy Efficiency Office (2024), National Program on Energy Efficiency and Conservation Period 2019 – 2030, report of implementation in 2023, accessed 18 September 2025.
[66] Vietnam Energy Efficiency Office (2024), National Program on Energy Efficiency and Conservation Period 2019 – 2030, report of implementation in 2023, accessed 18 September 2025.
[67] Vietnam Energy Efficiency Office (2024), National Program on Energy Efficiency and Conservation Period 2019 – 2030, report of implementation in 2023, accessed 18 September 2025.

In 2024, the implementation of VNEEP3 continued to advance with a stronger emphasis on project execution, institutional strengthening, and international cooperation. The EESD implemented 44 program tasks under VNEEP3, all completed and settled in accordance with regulations and schedules. Capacity building remained a key focus: by the end of 2024, the EESD had organized 28 national training courses on energy management (granting 596 certificates) and 3 courses for energy auditors (granting 53 certificates). These efforts aim to strengthen human capital for industrial efficiency and compliance across provinces and enterprises. Importantly for foreign partners, 2024 saw continued international collaboration as a central pillar of VNEEP3 implementation[68]. Key ongoing initiatives included:

- The Vietnam–Denmark Energy Partnership Programme, Phase III (DEPP3, 2020–2025);
- The Vietnam–EU Sustainable Energy Transition Programme;
- The Low Emission Energy Programme II (VLEEP II); and
- The Project on Promoting Investment in Energy Efficiency in Industry and Supporting the Implementation of Vietnam's Green Growth Action Plan.

These collaborations reinforce Vietnam's commitment to a transparent, market-oriented energy transition and create expanded opportunities for foreign investors in energy services, green technology, and efficiency financing.

Looking toward to 2025, the Program targets national energy savings of 5–7% of total final consumption. Efforts will focus on reducing energy intensity per GDP unit, restructuring the economy toward low-energy and high-value-added industries, and improving efficiency across industry, construction, and transportation. MOIT will continue refining market mechanisms, expanding energy labelling, and promoting carbon emission trading. Strengthening law enforcement, inspections, and public disclosure of violations will ensure greater compliance and accountability. Collectively, these measures aim to enhance energy efficiency within Vietnam's manufacturing sector, ensuring that industrial growth aligns with long-term sustainability and the country's net-zero 2050 objective.

[68] Vietnam Industry and Trade Magazine – Information Agency of The MoIT (2025), Summary of activities in 2024, deployment of tasks in 2025 on Energy Saving and Sustainable Development of the Industry and Trade sector, accessed 18 September 2025.

#### 4.3.1.2. Smart buildings

Smart buildings represent a new generation of intelligent infrastructure that leverages advanced technologies to enhance performance, improve energy efficiency, and increase occupant comfort. These buildings integrate sensors, control systems, and software platforms that work together to collect and analyze real-time data from multiple sources. By monitoring key factors such as temperature, lighting, humidity, occupancy, and energy usage, smart buildings can automatically adjust operations to achieve optimal efficiency.

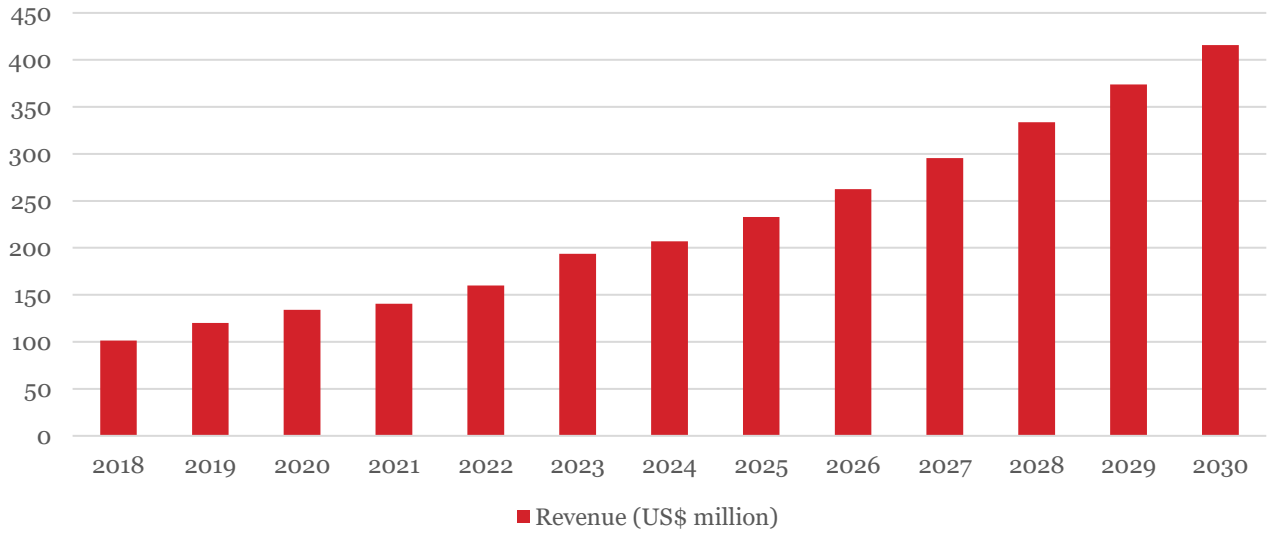
A major advantage of smart buildings lies in their ability to conserve energy. Through continuous monitoring and automation, they help reduce energy waste, lower operational costs, and minimize carbon emissions. At the same time, smart systems improve overall comfort and productivity by ensuring better lighting, air quality, and climate control.

In Vietnam, smart buildings are being developed across various sectors, including commercial, residential, and public infrastructure, each designed to meet specific functional and operational requirements. Within the broader context, smart buildings form a key component of Vietnam's emerging smart city initiatives, contributing to the digital transformation of urban spaces through intelligent energy management, automation, and sustainable design.

The smart cities market in Vietnam has been experiencing steady and significant growth over the past several years, and this trend is expected to continue into the coming decade. In 2018, the market generated approximately US$101.34 million in revenue, which increased to US$120.18 million in 2019 and further grew to US$134.08 million in 2020. Despite global challenges, the market maintained momentum, reaching US$140.48 million in 2021 and US$160.14 million in 2022. By 2023, the market had expanded to US$193.83 million and is projected to reach US$206.89 million in 2024.

Looking ahead, the Vietnamese smart cities market is expected to see even stronger growth, with revenues anticipated to reach around US$233.01 million by 2025. Over the subsequent five-year period, from 2025 to 2030, the market is forecast to maintain a robust CAGR of 12.29%, ultimately achieving a market volume of approximately US$415.92 million by 2030. This upward trend reflects Vietnam's strategic investments in digital infrastructure, intelligent transportation systems, and sustainable urban development initiatives aimed at improving the overall quality of urban life.[69]

**Figure 11 – Vietnam's smart cities market size (US$ million), 2018 – 2029**




Source: Statista, 2025

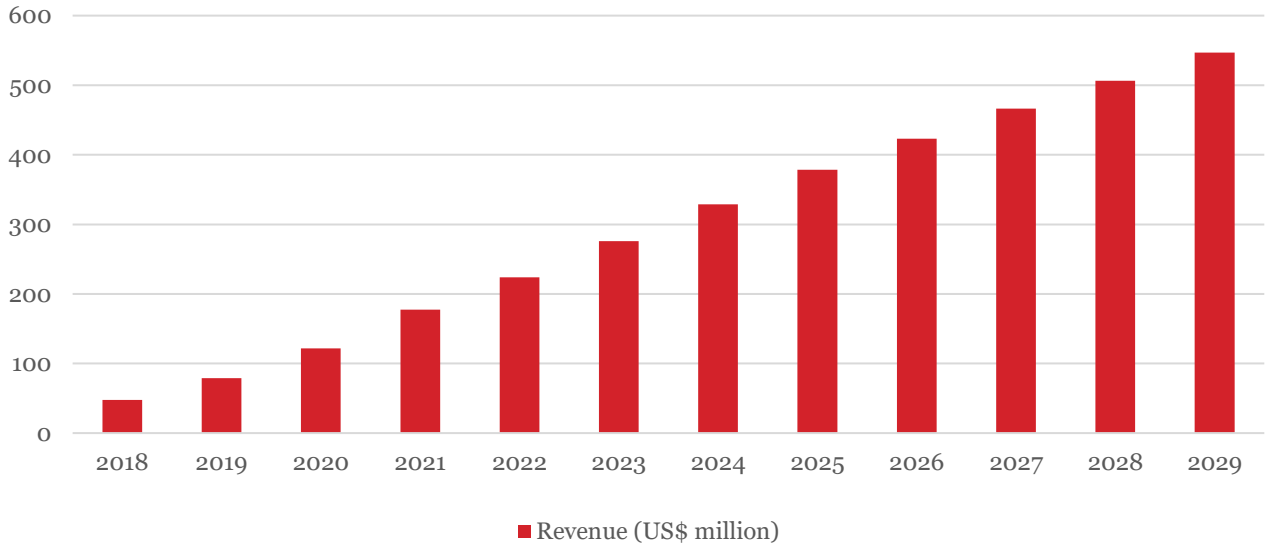
Similarly, the smart home market in Vietnam has been experiencing rapid growth over the past several years, and this momentum is expected to continue through the end of the decade. In 2018, the market generated

[69] Statista (2025), Smart Cities – Vietnam, accessed 18 September 2025.

US$47.5 million in revenue, which expanded to US$78.9 million in 2019 and further increased to US$121.9 million in 2020. The sector continued its upward trajectory with revenues reaching US$177.6 million in 2021, US$224 million in 2022, and US$275.9 million in 2023, followed by US$328.6 million in 2024.

Looking forward, the smart home market is forecast to reach US$378.5 million in 2025. From 2025 to 2029, the market is expected to maintain a healthy CAGR of 9.64%, with revenues projected to rise to US$423.2 million in 2026, US$466.3 million in 2027, US$506.3 million in 2028, and ultimately US$547 million by 2029. This growth reflects increasing household adoption of smart home technologies, which is expected to climb from 76.6% in 2025 to 87.8% by 2029, with the average revenue per smart home estimated at US$13.11[70].

**Figure 12 – Vietnam's smart home market size (US$ million), 2018 – 2029**




Source: Statista, 2025

The rapid growth of smart buildings in Vietnam is driving the adoption of green machinery. Green machinery, including energy-efficient HVAC systems, renewable energy installations, water-saving devices, and smart lighting, is essential for achieving the sustainability goals of modern buildings. By incorporating these technologies, smart buildings reduce operational costs and lower their environmental impact.

Smart buildings enable more efficient use of green machinery through monitoring and automation systems. IoT sensors track energy use and equipment performance in real time, allowing systems to optimize operations. This ensures that devices such as air conditioners, pumps, and elevators work efficiently, reducing energy waste and extending equipment life. AI and machine learning also support predictive maintenance, helping detect potential issues early and lowering maintenance costs.

The integration of renewable energy, such as solar panels and energy storage, further enhances the benefits of green machinery. Smart management systems can balance energy production and consumption, switching between grid and renewable sources to improve efficiency and reduce carbon emissions. Advanced water and waste management systems in smart buildings also help conserve resources and minimize environmental impact.

In Vietnam, the implication of smart building growth for green machinery extends beyond operational efficiency. It fosters innovation in the design and manufacturing of eco-friendly equipment, encourages adoption of global sustainability standards, and stimulates investment in R&D for energy-saving solutions. As demand for smart buildings rises across commercial, residential, and public sectors, green machinery is expected to become a standard component of modern construction projects, driving a transition toward more resilient and environmentally responsible urban infrastructure.

[70] Statista (2025), Smart Home – Vietnam, accessed 18 September 2025.

### 4.3.2. Key players and potential demand for green machinery

#### 4.3.2.1. Key players

**Table 17 – Key players in Vietnam's energy-efficient manufacturing**

| Company Name | Categories | Brief Introduction | Country |
|---|---|---|---|
| **Hoa Phat Group** | Steel, Iron, Industrial Materials | Website: https://www.hoaphat.com.vn/en<br>Hoa Phat Group, founded in 1992 and headquartered in Hanoi, is Vietnam's largest steel manufacturer and a significant player in energy-efficient industrial production. The group produces over 8 million tons of steel annually, accounting for more than 80% of its revenue. Other energy-efficient initiatives include using excess heat from coke oven gases, applying CDQ dry cup stamping technology, and utilizing blast furnace wind energy recovery turbines. | Vietnam |
| **Formosa Ha Tinh Steel** | Steel, Industrial Materials | Website: https://www.fhs.com.vn/home<br>Formosa Ha Tinh Steel Corporation (FHS), established in 2008 and located in the Vung Ang Economic Zone, is Vietnam's second-largest integrated steel producer. A subsidiary of Taiwan's Formosa Plastics Group, FHS integrates advanced technologies to enhance energy efficiency and reduce environmental impact. Notably, it employs a coke dry quenching (CDQ) system, which recovers heat from hot coke, converting it into electricity and reducing emissions. Additionally, FHS utilizes ultra-high performance and low energy consumption blast furnace technology, incorporating features like BCQS 'no-bell top' distributors and slag granulating drums to optimize energy use. | Vietnam |
| **SCG Cement-Building Materials (SCG Group)** | Cement, Construction Materials | Website: https://www.fhs.com.vn/home<br>SCG (Siam Cement Group), a large ASEAN conglomerate, has been operating in Vietnam since 1992. Under cement – building materials, SCG Vietnam produces and supplies a broad portfolio: white cement, ready-mixed concrete, concrete roofing, fiber-cement boards and wood substitute products, thermal & acoustic insulation, sanitary ware/fittings, plus tiles and other ceramic products.<br>In Vietnam, SCG has developed a product line called "low carbon cement" (or SCG Low Carbon Super Cement) which reduces $CO_2$ emissions by about 20% compared to conventional cement. The company also waste heat recovery (WHR or Waste Heat Power Generation) systems in some plants to capture excess heat and convert it back into usable energy, thus reducing energy waste. | Thailand – Vietnam |

| Company Name | Categories | Brief Introduction | Country |
|---|---|---|---|
| **Vu Phong Energy Group** | Renewable Energy, EPC Services | Website: https://vuphong.vn/<br>Vu Phong Energy Group, originally founded in 2009 (as Vu Phong Solar Power Joint Stock Company), is now one of Vietnam's leading companies in renewable energy. The company provides engineering, procurement, and construction services, supporting factories and industrial zones in implementing energy-efficient systems. Vu Phong has also established "VP Carbon," a subsidiary focusing on carbon neutrality solutions, including renewable energy certificates (I-RECs), and emissions reduction consulting. | Vietnam |
| **Vinachem** | Chemicals, Fertilizers | Website: https://www.vinachem.com.vn/<br>Vietnam National Chemical Group (Vinachem), established in 1995 and headquartered in Hanoi, is Vietnam's leading state-owned enterprise in the chemical industry, specializing in fertilizers, basic chemicals, rubber, and consumer chemical products. The group produces over 3 million tons of fertilizers annually, alongside a wide range of industrial and household chemical materials, contributing significantly to national agricultural and manufacturing supply chains. In recent years, Vinachem has advanced its commitment to energy-efficient and environmentally responsible production by modernizing key facilities, applying cleaner production technologies, and enhancing waste and emission control systems. | Vietnam |

Source: Dezan Shira & Associates' compilation, 2025

**Table 18 – Key players in Vietnam's smart buildings**

| Company Name | Categories | Brief Introduction | Country |
|---|---|---|---|
| **Schneider Electric Vietnam** | Smart Building Solutions, Energy Management, Automation | Website: https://www.se.com/vn/en/<br>Schneider Electric Vietnam, established in 1994 and headquartered in Ho Chi Minh City, is the Vietnamese subsidiary of the global energy management and automation group Schneider Electric. Schneider Electric provides energy-efficient management systems, and IoT-based automation. Through its EcoStruxure Building platform, Schneider Electric integrates systems such as lighting, HVAC, security, and energy monitoring into a unified digital network, enabling real-time control and data-driven optimization. In recent years, the company has strengthened its role in Vietnam's smart building transformation by promoting IoT-enabled infrastructure, developing green office models, and partnering with local firms to deploy energy-efficient and low-carbon building technologies. | France |

| Company Name | Categories | Brief Introduction | Country |
|---|---|---|---|
| **Siemens Vietnam** SIEMENS | Building Automation, HVAC Control, Smart Infrastructure | Website: https://www.siemens.com/vn/vi.html<br>Siemens Vietnam, established in 1993 and headquartered in Ho Chi Minh City, is the local arm of the global Siemens AG focused on electrification, automation and digitalization solutions across infrastructure and industry. The company provides integrated building technologies including Building Management Systems (BMS), fire alarm and safety systems, HVAC controls, lighting, and energy-management platforms. Through its Smart Infrastructure offerings, Siemens facilitates real-time energy monitoring, sensor-driven automation, and remote operational control to optimize building performance and reduce carbon emissions. | Germany |
| **GREE Electric Appliances Vietnam** GREE | HVAC, Smart Cooling Systems | Website: https://gree.com.vn/<br>GREE Electric Appliances Vietnam, operating under the global GREE Group and present in Vietnam since around 2012, specializes in importing and distributing residential and commercial air-conditioning systems, plus related HVAC products. The company offers inverter technology units, commercial chillers including VRF/VRV systems, and uses environmentally friendlier refrigerants like R32, R410A, etc., aiming to improve energy efficiency in building cooling systems. It also participates in ESG-oriented initiatives, aligning with global/ASEAN sustainability strategies, emphasizing better indoor air quality, lower energy consumption, and cleaner technologies. | China |
| **Honeywell** Honeywell | lighting, HVAC, security, and energy monitoring control system | Website: https://www.honeywell.com/vn/vi<br>Honeywell Vietnam, established with offices in Hanoi and Ho Chi Minh City, is the Vietnamese subsidiary of the U.S.-based Fortune 500 company Honeywell International Inc. Honeywell provides integrated solutions across building automation, industrial automation, and energy sectors. In 2024, the company signed a Memorandum of Understanding with The Green Solutions Group Corporation to develop Vietnam's first green hydrogen plant in the Mekong Delta, with Honeywell's Battery Energy Storage System as a key component to reduce carbon emissions and enhance grid stability. | U.S. |
| **FPT Smart Solutions (FPT Corporation)** FPT Smart Cloud | IoT Platforms, Smart Building Software | Website: https://fptsmartcloud.com/<br>FPT Corporation (FPT Smart Solutions), headquartered in Hanoi and founded in the 1980s, is Vietnam's top technology conglomerate offering end-to-end digital transformation and smart building solutions. Its services include smart IoT platforms, home/building automation (via FPT Smart Home, Building IoT), energy | Vietnam |

| Company Name | Categories | Brief Introduction | Country |
|---|---|---|---|
| | | management, cloud & AI platforms (FPT.AI, FPT Smart Cloud), and systems integration. | |
| **Viettel Solutions** viettel solutions | IoT, Smart Home, Smart Building Connectivity | Website: https://solutions.viettel.vn/vi<br>Viettel Solutions (Viettel Business Solutions Corporation), headquartered in Hanoi and part of Viettel Group, is a leading Vietnamese provider of ICT and digital transformation solutions, specializing in smart building, smart city, IoT, and 5G-enabled systems. The company's offerings include Intelligent Operations Centers (IOCs), smart building and home systems, smart lighting, environmental monitoring, security and fire-safety surveillance, and automatic meter reading (AMR) for utilities. In recent years, it has also expanded its smart factory solutions using private 5G networks (5G2B) to enable real-time monitoring, automation, and AI-based analytics in industrial settings. | Vietnam |
| **Panasonic Vietnam** Panasonic | HVAC, Energy-Efficient Appliances, Smart Systems | Website: https://www.panasonic.com/vn/<br>Panasonic Vietnam, established with its holding company licensed in July 2005 and operating subsidiaries like Panasonic Eco Solutions (wiring devices, circuit breakers) in Binh Duong and home appliances & R&D in Hung Yen and Hanoi, is a major player in smart-building-oriented technologies and solutions. The company offers total solutions for "green & smart" buildings, integrating systems for indoor air quality (IAQ) through ventilation, purification, temperature, humidity and airflow control, energy-efficient air conditioning (including VRF systems with high EER values), and solar technologies like HIT solar panels for energy generation. | Japan |
| **ABB Vietnam** ABB | Building Automation, Smart Energy, Electrical Systems | Website: https://new.abb.com/vn<br>ABB Vietnam, established in the 1990s and headquartered in Ho Chi Minh City, is the local branch of global ABB Group focused on electrification, automation, and smart infrastructure. The company offers integrated building technologies such as energy management systems (e.g. ABB Ability™ Energy Manager), smart power distribution (System pro E Power switchboards, smart circuit breakers, multi-function meters), and building automation, which includes control of lighting, HVAC, and safety systems. In recent years, ABB Vietnam has increased its contribution to smart building development by deploying its solutions in high-profile projects like the National Innovation Centre (Hoa Lac Hi-Tech Park) to optimize energy consumption, reduce $CO_2$ emissions, improve real-time monitoring, and partner with institutional clients to deliver reliable, low-carbon, digitally enabled infrastructure. | Switzerland / Sweden |

Source: Dezan Shira & Associates' compilation, 2025

#### 4.3.2.2. Potential demand for green machinery

Vietnam is entering a decisive phase in its green transition, driven by the government's Net Zero 2050 commitment and national programs such as the Power Development Plan VIII (PDP VIII) and the National Energy Efficiency Program (VNEEP3). Together, these initiatives are transforming the country's industrial landscape and setting a new direction for sustainable growth. The combination of stronger regulation and expanding access to green finance is creating a clear and accelerating demand for energy-efficient and renewable machinery, particularly within the manufacturing and smart building sectors.

In manufacturing space, demand is increasingly shaped by the implementation of mandatory efficiency standards. The introduction of Minimum Energy Performance Standards (MEPS) under Decision 14/2023/QD-TTg[71], building on earlier national frameworks such as Decision 04/2017/QD-TTg and Circular 36/2016/TT-BCT, is driving factories to replace or upgrade outdated systems such as electric motors, boilers, lighting, and transformers to meet national energy benchmarks. From April 2025, the scope of regulation will expand to include additional product categories, reinforcing Vietnam's commitment to eliminating low-efficiency equipment across industrial operations. This regulatory tightening reflects a broader market shift toward energy-efficient manufacturing, as both domestic and foreign-invested enterprises prioritize compliance and operational optimization. In turn, the market is creating stable, long-term opportunities for suppliers of certified high-efficiency machinery and components, particularly those aligned with international testing and labelling standards recognized by the MoIT.

Beyond compliance, a more dynamic wave of demand is also emerging from the integration of digital and renewable technologies. Manufacturing facilities and urban infrastructure are adopting solutions such as BESS, Building Management Systems (BMS), and high-efficiency HVAC equipment to optimize energy performance and meet corporate sustainability targets. These segments are expanding rapidly, supported by urbanization, rising electricity costs, and the growing importance of green certification in commercial property and industrial parks.

While the market outlook is highly positive, challenges remain. Many local enterprises still face technical limitations, high upfront costs, and limited familiarity with advanced systems such as BESS and BMS. To address these barriers and capture growth potential, equipment suppliers can focus on several strategic directions: aligning product offerings with upcoming MEPS compliance requirements, collaborating with energy service companies (ESCOs) to deliver turnkey solutions, and targeting early adopters in green industrial parks and high-end property developments. Providing integrated solutions that combine machinery, digital monitoring platforms, and after-sales performance optimization will help build trust and long-term customer relationships.

Overall, Vietnam's demand for green machinery is shifting from optional to inevitable. Energy-efficient and renewable technologies are no longer seen as cost burdens but as essential investments in competitiveness and resilience. With firm policy backing and rising awareness of sustainability standards, the country is emerging as one of Asia's most promising markets for energy-efficient and renewable machinery between 2025 and 2031.

[71] Government News, Socialist Republic of Viet Nam (2023), Decision No. 14/2023/QD-TTg of the Prime Minister: Promulgating the List and roadmap for energy-using vehicles and equipment that must be eliminated and low-efficiency power generators that cannot be newly built, accessed 8 October 2025.

# 5. Competitive Landscape

To better understand the competitive dynamics of Vietnam's green machinery market, this section examines the key players shaping its structure and performance. It highlights the roles of international corporations and domestic firms, outlining how each contributes to the market's evolution. The analysis is organized into three subsections: general assessment, key local competitors, import value and international players. By examining these dimensions, this section assesses Vietnam's hybrid "local investor–international technologist" model, which remains import-driven as domestic firms depend on foreign technology and high-value equipment to support the country's rapid development goals.

## 5.1. General assessment

The competitive landscape of Vietnam's green and renewable machinery market is defined by a hybrid structure that blends domestic capital with international technology. This "local investor – international technologist" model is the dominant operating framework across all major segments, reflecting both Vietnam's rapid development ambitions and its continued reliance on foreign expertise. The market remains relatively import-driven, as most core technologies and high-value machinery are sourced from abroad due to limited domestic production capacity in advanced energy and automation equipment.

While domestic firms dominate project development, the majority of advanced components, such as turbines, inverters, and control systems, are imported, highlighting clear openings for specialized foreign machinery suppliers. Local conglomerates such as Trung Nam Group and T&T Group possess the financial resources and regulatory familiarity required to secure project rights and navigate complex licensing frameworks. Meanwhile, international original equipment manufacturers (OEMs), including Vestas, Siemens Gamesa, LONGi, and Schneider Electric, supply the high-value, technology-intensive machinery that underpins these projects.

This structural interdependence has created a bifurcated competitive environment. Domestic players act as project developers and investors, while international companies compete primarily on the basis of technological performance, operational reliability, and long-term service agreements. As a result, competition in Vietnam's renewable sector is increasingly service-oriented rather than purely price-driven. Long-term operation and maintenance (O&M) contracts, such as Vestas' 15-year AOM 4000 model, have become a strategic differentiator, securing recurring revenue streams for suppliers while reducing operational risk for local investors.

Competition within Vietnam's green machinery ecosystem is highly segmented by sector. In renewable energy, global turbine and solar equipment suppliers dominate due to their technological edge and ability to guarantee performance. Meanwhile, in industrial efficiency and smart building technologies, the market is led by multinational automation and controls companies, notably Siemens and Schneider Electric, which leverage digital integration, IoT capabilities, and alignment with international green building certifications (LEED, EDGE) to sustain market leadership. In water and environmental infrastructure, the landscape is largely shaped by official development assistance (ODA) and government-to-government (G2G) projects, where competition favors firms from countries providing bilateral aid packages, such as Japan and Spain.

Entry barriers across the market remain high. The dependence on imported core technologies, complex regulatory frameworks (particularly in Power Purchase Agreements), and capital-intensive project requirements limit opportunities for new entrants. Success in this environment hinges on strategic partnerships, local alignment, and proven technological credibility rather than aggressive pricing.

An emerging trend in Vietnam's competitive landscape is cross-sector convergence. Energy, environmental, and digital systems are becoming increasingly integrated, illustrated by collaborations such as Siemens' partnership with EVN to embed smart HVAC control systems into national grid management. This reflects a broader shift toward end-to-end energy efficiency and digitalized infrastructure solutions. In parallel, local firms such as KIMSEN Industrial Corporation are strengthening Vietnam's role in the regional supply chain by manufacturing high-quality Balance of System (BOS) components for solar installations, signaling gradual industrial upgrading and localization.

Looking ahead, the most dynamic competitive arenas will be in wind power and WtE, driven by municipal mandates for landfill diversion and sustainability goals. In both sectors, competitive advantage will favor companies that combine advanced technology with strong financial and operational structuring capabilities, particularly within PPP models.

## 5.2. Key local competitors

**Table 19 - Key local players in Vietnam's green machinery sector**

| Company Name | Categories | Brief Introduction | Country |
|---|---|---|---|
| **Trung Nam Group** | Renewable Energy | Website: https://trungnamgroup.com.vn/<br>Founded in 2004, Trung Nam Group is Vietnam's largest private renewable energy investor with over 1.6 GW installed capacity. The group develops onshore and offshore wind, solar, and hydropower projects. Key projects include the 450 MW Trung Nam Thuan Nam Solar Plant, Ea Nam Wind Power (400 MW), and Dong Hai 1 Offshore Wind (100 MW). Acts as a strategic partner for global OEMs such as Vestas and Siemens Gamesa. | Vietnam |
| **T&T Group** | Renewable Energy | Website: https://ttgroup.vn/<br>Founded in 1993, T&T Group is a major Vietnamese conglomerate and a key player in the country's green and clean power machinery sector, with a renewable energy portfolio exceeding 2.8 GW in operation and development. The group invests across solar, wind, LNG-to-power, and energy storage segments, driving Vietnam's transition toward low-carbon growth. Key projects include the Hai Lang LNG Power Project (1,500 MW) in Quang Tri Province, the Savan 1 Wind Power Plant (495 MW) in Laos exporting electricity to Vietnam, and large-scale offshore wind developments in partnership with Ørsted totaling up to 10 GW. T&T acts as a strategic partner for leading global firms such as Ørsted, Marubeni, Hanwha, and SK Group to localize technology and strengthen Vietnam's clean energy supply chain. | Vietnam |
| **KIMSEN Industrial Corporation** | Renewable Energy | Website: https://kimsencorp.com/<br>Founded in 2013, KIMSEN Industrial Corporation is a Vietnamese manufacturer specializing in aluminum extrusion, CNC machining, stamped parts, and full assemblies for sectors including thermal solutions, solar energy, and automotive/machinery, operating from a 35,000 m² factory in Yen Phong Industrial Park, Bac Ninh. It has output capacity of about 10,000 tons of aluminum profiles per year along with tens of millions of components. KIMSEN | Vietnam |

| Company Name | Categories | Brief Introduction | Country |
|---|---|---|---|
| | | supplies products such as solar mounting & racking components, heat sinks, automotive & machinery parts, and various surface-treated aluminum profiles. Acts as a strategic partner to international OEMs and customers in North America, Europe, Japan, etc., while also investing in ancillary & environmental systems (wastewater treatment, rooftop solar mounting, etc.) to support sustainability. | |
| **Viet Water JSC** | Water & Wastewater Treatment | Website: https://www.vietwaterjsc.com/<br>Founded in 2014, Viet Water JSC is a Vietnamese environmental technology company specializing in wastewater treatment and emission control solution. The company provides turnkey systems including design, construction, technology transfer, and operation, offering efficient, cost-effective treatment of wastewater, gas emissions, and industrial pollutants. Key projects include wastewater treatment systems for FPT Education's primary-to-high school campus in Hau Giang, a 1,000 $m^3$/day dairy-processing facility in Binh Duong (Nutifood), and emission/ash gas treatment for residential and generator installations. | Vietnam |
| **Hanoi Urban Environment Company Limited (URENCO)** | Waste-to-Energy (WtE) | Website: https://urenco.com.vn/<br>Founded in 2007, Hanoi Urban Environment Company Limited (URENCO) is a state-owned enterprise and a significant player in Vietnam's WtE sector. The company specializes in MSW management and operates waste treatment facilities that convert waste into electricity. Key projects include the Nam Sơn Waste Treatment Complex, which houses a WtE plant designed to process methane emissions from decomposing garbage to generate electricity | Vietnam |

Source: Dezan Shira & Associates' compilation, 2025

## 5.3. Import value and international players

### 5.3.1. Import value

Vietnam's imports of green machinery totaled approximately US$8.2 billion in 2023, reflecting a broad range of transactions that include complete systems, components, capital goods for local assembly, and temporary or re-exported shipments. In contrast, the estimated market size, valued at US$5.4 billion in 2024 and projected to reach US$7.8 billion by 2029, represents the domestic market for installed and operational equipment within Vietnam. It is important to note a definitional distinction between the trade figures and the market sizing estimates, as they are derived from different measurement bases and time-frame. Nevertheless, both perspectives offer valuable insights: import data capture the breadth of supply chain activity and investment inflows linked to Vietnam's green machinery sector, while market size estimates reflect the country's underlying demand and the value of installed operational capacity within the domestic market.

**Table 20 – Vietnam's total import value of Green Machinery (US$), 2023**

| HS Code | Product description | Import Value (US$) |
|---|---|---|
| **4418** | **Builders' joinery and carpentry of wood, including cellular wood panels, assembled flooring panels, shingles and shakes** | |
| 441873 | Assembled flooring panels: Of bamboo or with at least the top layer (wear layer) of bamboo | 384,107 |
| **8402** | **Steam or other vapour generating boilers (other than central heating hot water boilers capable also of producing low pressure steam); superheated water boilers** | |
| 840290 | Parts | 4,269,344 |
| **8404** | **Auxiliary plant for use with boilers of heading 8402 or 8403 (for example, economisers, superheaters, soot removers, gas recoverers); condensers for steam or other vapour power units** | |
| 840410 | Auxiliary plant for use with boilers of heading 8402 or 8403 | 2,877,206 |
| 840420 | Condensers for steam or other vapour power units | 862,778 |
| 840490 | Parts | 3,114,295 |
| **8406** | **Steam turbines and other vapour turbines** | |
| 840690 | Parts | 11,941,292 |
| **8411** | **Turbojets, turbopropellers and other gas turbines** | |
| 841182 | Other gas turbines: Of a power exceeding 5000 kW | 6,252,828 |
| 841199 | Parts: Other | 32,516,269 |
| **8412** | **Other engines and motors** | |
| 841290 | Parts | 8,049,852 |
| **8417** | **Industrial or laboratory furnaces and ovens, including incinerators, non-electric** | |
| 841780 | Other | 71,884,911 |

| HS Code | Product description | Import Value (US$) |
|---|---|---|
| 841790 | Parts | 21,652,766 |
| **8419** | **Machinery, plant or laboratory equipment, whether or not electrically heated (excluding furnaces, ovens and other equipment of heading 8514), for the treatment of materials by a process involving a change of temperature such as heating, cooking, roasting, distilling, rectifying, sterilising, pasteurising, steaming, drying, evaporating, vaporising, condensing or cooling, other than machinery or plant of a kind used for domestic purposes; instantaneous or storage water heaters, non-electric** | |
| 841912 | Solar water heaters | 909,699 |
| 841933 | Dryers: Lyophilisation apparatus, freeze drying units and spray dryers | 7,990,451 |
| 841939 | Dryers: Other | 74,778,339 |
| 841960 | Machinery for liquefying air or other gases | 2,428,420 |
| 841989 | Other machinery, plant and equipment: Other | 112,077,949 |
| 841990 | Parts | 14,732,386 |
| **8421** | **Centrifuges, including centrifugal dryers; filtering or purifying machinery and apparatus, for liquids or gases** | |
| 842121 | For filtering or purifying water | 116,006,928 |
| 842129 | Filtering or purifying machinery and apparatus for liquids: Other | 56,506,775 |
| 842132 | Filtering or purifying machinery and apparatus for gases: Catalytic converters or particulate filters, whether or not combined, for purifying or filtering exhaust gases from internal combustion engines | 6,199,314 |
| 842139 | Filtering or purifying machinery and apparatus for gases: Other | 199,186,107 |
| 842199 | Parts: Other | 141,227,460 |
| **8474** | **Machinery for sorting, screening, separating, washing, crushing, grinding, mixing or kneading earth, stone, ores or other mineral substances, in solid (including powder or paste) form; machinery for agglomerating, shaping or moulding solid mineral fuels, ceramic paste, unhardened cements, plastering materials or other mineral products in powder or paste form; machines for forming foundry moulds of sand** | |
| 847420 | Sorting, screening, separating or washing machines | 55,478,839 |
| 8479 | **Machines and mechanical appliances having individual functions, not specified or included elsewhere in this chapter** | |
| 847982 | Mixing, kneading, crushing, grinding, screening, sifting, homogenising, emulsifying or stirring machines | 158,327,579 |
| 847989 | Other | 1,583,143,979 |
| 847990 | Parts | 142,347,218 |

| HS Code | Product description | Import Value (US$) |
|---|---|---|
| **8501** | **Electric motors and generators (excluding generating sets)** | |
| 850164 | AC generators (alternators), other than photovoltaic generators: Of an output exceeding 750 kVA | 22,946,669 |
| 850180 | Photovoltaic AC generators | 22,570 |
| **8502** | **Electric generating sets and rotary converters** | |
| 850231 | Other generating sets: Wind-powered | 77,931,076 |
| 850239 | Other generating sets: Other | 265,240,631 |
| **8503** | **Parts suitable for use solely or principally with the machines of heading 8501 or 8502** | |
| 850300 | Parts suitable for use solely or principally with the machines of heading 8501 or 8502 | 326,654,848 |
| **8504** | **Electrical transformers, static converters (for example, rectifiers) and inductors** | |
| 850490 | Electromechanical domestic appliances, with self-contained electric motor, other than vacuum cleaners of heading 8508 | 257,660,348 |
| **8514** | **Industrial or laboratory electric furnaces and ovens (including those functioning by induction or dielectric loss); other industrial or laboratory equipment for the heat treatment of materials by induction or dielectric loss** | |
| 851419 | Resistance heated furnaces and ovens: Other | 41,595,172 |
| 851420 | Furnaces and ovens functioning by induction or dielectric loss | 19,606,955 |
| 851431 | Electron beam furnaces | 5,451,653 |
| 851432 | Plasma and vacuum arc furnaces | 3,170,012 |
| 851439 | Other furnaces and ovens: Other | 151,071,341 |
| 851490 | Parts | 10,768,747 |
| **8541** | **Semiconductor devices (for example, diodes, transistors, semiconductor-based transducers); photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light-emitting diodes (LED), whether or not assembled with other light-emitting diodes (LED); mounted piezo-electric crystals** | |
| 854142 | Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light-emitting diodes (LED): Photovoltaic cells not assembled in modules or made up into panels | 1,320,171,256 |
| 854143 | Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light-emitting diodes (LED): Photovoltaic cells assembled in modules or made up into panels | 180,503,662 |
| **8543** | **Electrical machines and apparatus, having individual functions, not specified or included elsewhere in this chapter** | |

| HS Code | Product description | Import Value (US$) |
|---|---|---|
| 854390 | Parts | 54,354,999 |
| **9013** | **Lasers, other than laser diodes; other optical appliances and instruments, not specified or included elsewhere in this chapter** | |
| 901380 | Other devices, appliances and instruments | 290,358,223 |
| 901390 | Parts and accessories | 44,997,161 |
| **9015** | **Surveying (including photogrammetrical surveying), hydrographic, oceanographic, hydrological, meteorological or geophysical instruments and appliances, excluding compasses; rangefinders** | |
| 901580 | Other instruments and appliances | 7,960,704 |
| **9026** | **Instruments and apparatus for measuring or checking the flow, level, pressure or other variables of liquids or gases (for example, flow meters, level gauges, manometers, heat meters), excluding instruments and apparatus of heading 9014, 9015, 9028 or 9032** | |
| 902610 | For measuring or checking the flow or level of liquids | 37,589,474 |
| 902620 | For measuring or checking pressure | 53,720,703 |
| 902680 | Other instruments or apparatus | 88,921,673 |
| 902690 | Parts and accessories | 25,548,902 |
| **9027** | **Instruments and apparatus for physical or chemical analysis (for example, polarimeters, refractometers, spectrometers, gas or smoke analysis apparatus); instruments and apparatus for measuring or checking viscosity, porosity, expansion, surface tension or the like; instruments and apparatus for measuring or checking quantities of heat, sound or light (including exposure meters); microtomes** | |
| 902710 | Gas or smoke analysis apparatus | 25,133,182 |
| 902720 | Chromatographs and electrophoresis instruments | 24,985,745 |
| 902730 | Spectrometers, spectrophotometers and spectrographs using optical radiation (UV, visible, IR) | 31,562,414 |
| 902750 | Other instruments and apparatus using optical radiation (UV, visible, IR) | 17,202,199 |
| 902781 | Other instruments and apparatus: Mass spectrometers | 342,822 |
| 902789 | Other instruments and apparatus: Other | 140,637,178 |
| 902790 | Microtomes; parts and accessories | 82,890,532 |
| **9031** | **Measuring or checking instruments, appliances and machines, not specified or included elsewhere in this chapter; profile projectors** | |
| 903149 | Other optical instruments and appliances: Other | 152,223,417 |
| 903180 | Other instruments, appliances and machines | 976,267,715 |

| HS Code | Product description | Import Value (US$) |
|---|---|---|
| 903190 | Parts and accessories | 144,444,948 |
| **9032** | **Automatic regulating or controlling instruments and apparatus** | |
| 903289 | Other instruments and apparatus: Other | 283,789,727 |
| 903290 | Parts and accessories | 187,591,831 |
| **9033** | **Parts and accessories (not specified or included elsewhere in this chapter) for machines, appliances, instruments or apparatus of Chapter 90** | |
| 903300 | Parts and accessories (not specified or included elsewhere in this chapter) for machines, appliances, instruments or apparatus of Chapter 90 | 37,020,680 |
| | **Vietnam's import value of Green Machinery (US$), 2023** | **8,225,486,260** |

Source: UN Comtrade, Dezan Shira & Associates' compilation, 2025

### 5.3.2. International players

**Table 21 – Key international players in Vietnam's green machinery sector**

| Company Name | Categories | Brief Introduction | Country |
|---|---|---|---|
| **Vestas** | Renewable energy – Wind Turbine Manufacturing & O&M | Website: https://www.vestas.com/<br>Founded in 1945, Vestas Wind Systems A/S is a global leader in wind energy technology and a key international player in Vietnam's green machinery sector. The company designs, manufactures, and installs onshore and offshore wind turbines, providing comprehensive solutions for renewable power generation.<br>Key projects in Vietnam include supplying turbines for Trung Nam Thuan Nam Solar-Wind Hybrid Project, Ea Nam Wind Power (400 MW), and Dong Hai 1 Offshore Wind (100 MW). Vestas acts as a strategic technology partner for local developers such as Trung Nam Group and T&T Group, supporting Vietnam's energy transition through advanced turbine solutions, predictive maintenance, and grid integration expertise. | Denmark |
| **Siemens Gamesa Renewable Energy** | Renewable energy – Wind Turbine Manufacturing | Website: https://www.siemensgamesa.com/global/en/home.html<br>Founded in 1847, Siemens Gamesa is a global technology leader, providing advanced solutions across power generation, renewable energy, smart grid, and energy-efficient industrial systems. The company delivers integrated machinery and digital solutions for wind, solar, and energy storage projects, as well as electrification and automation infrastructure.<br>Key engagements in Vietnam include supplying 4.X platform turbines for the 117 MW Hanbaram Wind Power Project in Ninh Thuan, providing long-term maintenance and technology transfer to local EPCs, and delivering advanced HVAC, grid, and automation systems. | Spain / Germany |
| **JinkoSolar Holding Co. Ltd.** | Renewable energy – Solar Panel Manufacturing | Website: https://www.jinkosolar.com/<br>Founded in 2006, JinkoSolar Holding Co., Ltd. is a global leader in solar technology, providing advanced solutions across solar panel manufacturing, energy storage, and integrated renewable energy systems. The company operates a 7 GW monocrystalline ingot and wafer facility in Quang Ninh Province, Vietnam.<br>Key engagements in Vietnam include supplying high-efficiency PERC modules for large-scale solar projects, such as the 258 MW hybrid PV-wind project in Ninh Thuan Province developed by Trung Nam Group. JinkoSolar also delivered a 1.06 MWh energy storage system for a commercial and industrial (C&I) project in Vietnam, enhancing grid stability and energy efficiency. | China |
| **LONGi Solar** | Renewable energy – Solar | Website: https://www.longi.com/ | China |

| Company Name | Categories | Brief Introduction | Country |
|---|---|---|---|
| LONGi Solar | Module Manufacturing | Founded in 2000, LONGi Solar is a global leader in solar technology, providing advanced solutions across solar power generation, energy storage, and industrial electrification. The company delivers integrated solar modules and digital solutions for rooftop, commercial, and industrial PV projects, as well as energy storage and electrification infrastructure.<br><br>Key engagements in Vietnam include supplying Hi-MO X6 and Hi-MO 5 modules for large-scale rooftop installations, such as the 11 MWp Tan De rooftop project in Hanoi, the 2 MWp Binh Duong residential project, and the 11.4 MWp Bac Giang electronics facility, all developed in partnership with Solar Electric Vietnam (SEV). | |
| **Schneider Electric SE**<br>Schneider Electric | Smart buildings & Energy management | Website: https://www.se.com/<br><br>Founded in 1836, Schneider Electric is a global technology leader and a key international player in Vietnam's smart buildings sector, providing advanced solutions across energy management, automation, and building management systems. The company delivers integrated machinery and digital solutions for HVAC control, lighting, energy monitoring, and automation in commercial, industrial, and residential buildings.<br><br>Key engagements in Vietnam include supplying SE7000 series smart room controllers, implementing EcoStruxure Building Management Systems, and supporting LEED and EDGE certifications for sustainable buildings. | France |
| **Daikin Industries Ltd.**<br>DAIKIN | Smart buildings – HVAC & Air Conditioning | Website: https://www.daikin.com/<br><br>Founded in 1924, Daikin Industries Ltd. is a global leader in air conditioning and HVAC systems. The company delivers integrated solutions encompassing smart HVAC control, energy-efficient systems, and building automation for commercial, industrial, and residential applications.<br><br>In Vietnam, Daikin has established a strong presence with its headquarters and flagship Daikin Air Tower in Ho Chi Minh City, designed to meet LEED, LOTUS, and WELL Platinum standards. The company also operates manufacturing facilities in Hung Yen Province, producing energy-efficient HVAC equipment and components for domestic and regional markets. | Japan |
| **JFE Engineering Corp.**<br>JFE Engineering Corporation | Water & Wastewater Treatment, Waste-to-Energy (WtE) engineering | Website: https://www.jfe-eng.co.jp/<br><br>Founded in 2002, JFE Engineering Corporation is a leading Japanese firm specializing in green machinery for water and wastewater treatment in Vietnam. The company delivers advanced solutions for municipal and industrial wastewater, including nitrogen and phosphorus removal, energy-efficient treatment, and waste-to-energy systems.<br><br>Key projects include the Yen Xa Wastewater Treatment Plant (270,000 $m^3$/day) in Hanoi, the Hoa Lac Hi-Tech Park Plant (36,000 $m^3$/day), and the Bac Ninh Waste-to-Energy Plant (500 tons/day, 11.6 MW). Through local investments, technical | Japan |

| Company Name | Categories | Brief Introduction | Country |
|---|---|---|---|
| | | cooperation with JICA, and partnerships with Vietnamese water authorities, JFE Engineering supports technology transfer, operational efficiency, and sustainable urban water management across the country. | |
| **Tsukishima JFE Aqua Solution** TSUKISHIMA JFE AQUA SOLUTION TJAS | Water & Wastewater Treatment | Tsukishima JFE Aqua Solution Co., Ltd. is a prominent Japanese firm specializing in water and wastewater treatment technologies, with a growing presence in Vietnam's green infrastructure sector. Established in October 2023 through the merger of Tsukishima Aqua Solution Co., Ltd. and JFE Engineering Corporation's domestic water engineering business, the company integrates advanced Japanese technologies to address global environmental challenges.<br>In Vietnam, Tsukishima JFE Aqua Solution has significantly contributed to sustainable water management. A notable project is the Yen Xa Wastewater Treatment Plant in Hanoi, completed in May 2025. This facility, with a daily treatment capacity of 270,000 cubic meters, serves approximately 1 million residents and incorporates advanced nitrogen and phosphorus removal technologies | Japan |
| **ACCIONA S.A.** acciona | Water & Infrastructure EPC | Website: https://www.acciona.com/<br>ACCIONA S.A. is a Spanish multinational infrastructure firm recognized for its leadership in sustainable water treatment solutions.<br>In Vietnam, ACCIONA has established a significant presence, notably through its involvement in the Nhieu Loc–Thi Nghe Wastewater Treatment Plant project in Ho Chi Minh City. This €200 million initiative, awarded in March 2019, is a collaboration with VINCI Construction Grands Projets, with ACCIONA responsible for the design-build phase of the plant, which boasts a peak capacity of 480,000 cubic meters per day. | Spain |

Source: Dezan Shira & Associates' compilation, 2025

# 6. Opportunities for Swiss Businesses

Vietnam's transition toward a low-carbon economy is opening new opportunities for Swiss businesses in the green machinery sector. Companies can benefit from growing export demand for advanced green technologies, competitive sourcing options from Vietnam's expanding supplier base, and investment prospects in local production and joint ventures. This section explores these three dimensions: including export opportunities, sourcing potential, and investment avenues for Swiss businessesin Vietnam's green machinery market.

## 6.1. Export opportunities

As the world transitions toward a low-carbon economy, global demand for environmentally friendly goods and services is rapidly expanding. According to UNCTAD, green industries are expected to boom as countries intensify efforts to combat climate change and reduce emissions[72]. This shift presents opportunities for firms to develop new sustainable products and services while shifting export advantages toward markets like Vietnam, where cleaner production techniques are increasingly prioritized.

In Southeast Asia, Vietnam has emerged as one of the leading markets for green machinery, particularly in renewable energy technologies. Between 2000 and 2020, the country's imports of environmental goods grew at an impressive average annual rate of 22%. By 2020, Vietnam had become the region's second-largest importer of environmental goods, valued at US$15.6 billion, only after Singapore. Vietnam's main suppliers include China, the Republic of Korea, and Japan[73].

Among green technologies, renewable energy products represented the largest share, accounting for over 60% of total imports, equivalent to approximately US$7.9 billion[73]. Vietnam has established a relatively strong capacity in manufacturing solar PV components for solar energy generation; however, the country still lacks the necessary machinery and technology to fully capitalize on other renewable sources. For example, under PDP VIII, Vietnam targets a total installed capacity of 21,880 MW for onshore wind and 6,000 MW for offshore wind by 2030[74].

However, as of 2024, the country's wind power capacity stands at only about one-fifth of these targets, underscoring substantial room for growth and strong domestic demand for wind turbines. Despite this potential, domestic turbine production remains limited, with CS Wind being the only recently established foreign manufacturer in the market[75]. Similarly, in the hydropower sector, most small-scale projects continue to depend on imported equipment, mainly from China, which is affordable and offers medium-quality technology. To achieve its net-zero emissions target and unlock its full renewable potential, Vietnam will need to continue importing high-quality green machinery and advanced technologies from global suppliers.

The second-largest category of green machinery imports involves technologies for solid and hazardous waste management. According to the Department of Environmental Pollution Control, Vietnam is developing 15 waste-to-energy projects nationwide, with three of these already operational in 2024[76]. The rapid expansion of industrial parks has also further exposed gaps in wastewater and solid waste treatment systems, driving demand for modern, efficient equipment and technology. In this context, adopting advanced wastewater treatment and WtE technologies from Switzerland and other developed countries will be critical to

[72] UN Trade and Development (2025), Global trade slows, but 'green goods' grow, accessed 30 September 2025.
[73] World Bank (2022), No time to waste – The challenges and Opportunities of cleaner trade for Vietnam, accessed 30 September 2025.
[74] Vietnam Briefing, Dezan Shira & Associates (2025), Vietnam Revises PDP8: Targets of the National Power Development Plan, accessed 30 September 2025.
[75] MoIT (2025), Tuabin điện gió 'made in Việt Nam' chuẩn bị được lắp đặt tại dự án ngoài khơi Hàn Quốc, accessed 30 September 2025.
[76] Vietnamplus (2024), Waste-to-energy projects need to be accelerated to address environmental pollution, accessed 30 September 2025.

strengthening Vietnam's environmental infrastructure and accelerating its transition toward a sustainable, low-carbon economy.

A recent study revealed that Vietnam's industrial and infrastructure sectors still experience substantial energy waste. Industries such as cement, steel, ceramics, cold-chain logistics, and consumer goods could cut energy consumption by more than 20% through improved efficiency measures, while the construction and transport sectors could achieve savings exceeding 30%[77]. Thus, this presents strong opportunities for international companies to supply advanced energy efficiency technologies and solutions, including infrastructure engineering and design, energy monitoring systems, battery energy storage, smart grids, cooling storage, eco power meters, intelligent building management systems, and waste heat recovery systems.

As Vietnam benefits from extensive global market access through 17 free trade agreements (FTAs) as an export-oriented economy, these agreements increasingly incorporate sustainability, energy efficiency, and climate commitments, including adherence to the Paris Agreement, binding Vietnam to higher environmental responsibility. Moreover, as a key player in global value chains, Vietnam faces growing pressure from international buyers to reduce greenhouse gas emissions and improve production sustainability.

Demand for green machinery in Vietnam is expected to come primarily from traditional industrial sectors that are known for their high GHG emissions.

- The textile, apparel, and footwear sector presents strong potential to reduce its carbon and environmental footprint through the adoption of integrated energy management systems. These technologies can lower both energy demand and supply costs by incorporating distributed renewable energy solutions, such as rooftop solar installations.

- The food processing and agribusiness sector is another major area of opportunity. This sector remains among the most energy-intensive in the region, with an energy intensity of 173.59 tons of oil equivalent per billion U.S. dollars of output. Given its substantial energy use and GHG emissions, the sector offers significant potential for efficiency improvements. By optimizing material and energy use, enhancing recycling, and reusing by-products or waste, firms could achieve energy savings of 30 - 40%[78].

- The cement, construction materials, and chemical industries are also heavy energy consumers but have notable potential for emission reductions. These sectors could cut electricity consumption by up to 30% through fuel switching, using industrial or hazardous waste, or biomass as alternative fuels for kilns, and by developing waste heat recovery systems for power generation. However, only a limited number of cement producers have implemented waste heat-to-power systems, despite existing regulations promoting such measures since 2016[78].

Given these dynamics, Swiss businesses are well-positioned to seize opportunities in Vietnam's expanding green technology market. With expertise in clean energy solutions, precision manufacturing, and environmental innovation, Swiss firms can serve as strategic partners in Vietnam's sustainable transition.

**Table 22 - Vietnam Top 20 Environmetnal goods Imports in 2023, Classified across Five sectors**

| HS Code | Commodities shorten name | Import value (thousand US$) | Sector | | | | |
|---|---|---|---|---|---|---|---|
| | | | Renewable energy | Wastewater treatement | Solid / hazodous waste treatment | Energy efficiency | Other |
| 847989 | Shredders, presses, dust collectors, water/wastewater samplers, biogas digesters, leachate | 1,583.14 | | ☑ | ☑ | | |

[77] US Department of Commerce (2022), Vietnam Energy Efficiency, accessed 30 September 2025.
[78] World Bank (2022), No time to waste – The challenges and Opportunities of cleaner trade for Vietnam, accessed 30 September 2025.

| HS Code | Commodities shorten name | Import value (thousand US$) | Sector | | | | |
|---|---|---|---|---|---|---|---|
| | | | Renewable energy | Wastewater treatement | Solid / hazodous waste treatment | Energy efficiency | Other |
| | and soil treatment equipment, composting machines, etc. | | | | | | |
| 854142 | Photovoltaic cells (unassembled) | 1,320.17 | ☑ | | | | |
| 903180 | Vibrometer, hand vibration meter, catalytic convertor | 976.27 | | | | ☑ | |
| 850300 | Parts for electric generators and transformers | 326.65 | ☑ | | | | |
| 901380 | Solar heliostats | 290.36 | ☑ | | | | |
| 903289 | Automatic control instruments | 283.79 | | | | ☑ | |
| 850239 | Renewable energy generating equipment | 265.24 | ☑ | | | | |
| 850490 | Parts for electrical transformers and converters | 257.66 | | | | | ☑ |
| 842139 | Catalytic converters, gas separation equipment, pneumatic fluid power filters, industrial gas cleaning equipment | 199.19 | | | | | ☑ |
| 903290 | Parts for control instruments | 187.59 | | | | ☑ | |
| 854143 | Photovoltaic cells (assembled in panels) | 180.50 | ☑ | | | | |
| 847982 | Mixing, crushing, and grinding machines | 158.33 | | ☑ | ☑ | | |
| 903149 | Optical measuring instruments | 152.22 | | | | ☑ | |

| HS Code | Commodities shorten name | Import value (thousand US$) | Sector | | | | |
|---|---|---|---|---|---|---|---|
| | | | Renewable energy | Wastewater treatement | Solid / hazodous waste treatment | Energy efficiency | Other |
| 851439 | Industrial furnaces and ovens | 151.07 | | ☑ | ☑ | | |
| 903190 | Parts for measuring instruments | 144.44 | | | | ☑ | |
| 847990 | Parts of special-purpose machinery | 142.35 | | | | | ☑ |
| 842199 | Centrifuges and filtering machinery | 141.23 | | ☑ | | | |
| 902789 | Measuring and control instruments (other) | 140.64 | | | | ☑ | |
| 842121 | Water filtering and purification equipment | 116.01 | | ☑ | | | |
| 841989 | Industrial thermal-processing machinery | 112.08 | | | | | ☑ |

Notes:

- DSA conducted analysis on the 54 environmental goods identified by the Asia-Pacific Economic Cooperation (APEC) and the World Trade Organization (WTO), each classified under a six-digit Harmonized System (HS) code. According to World Bank, these product was defined as "products that are manufactured or services that are rendered for the main purposes of achieving environmental objectives."
- The import figures include include complete systems, components, capital goods for local assembly, and temporary or re-exported shipments.

Source: UN Comtrade, Dezan Shira & Associates' compilation, 2025

## 6.2. Sourcing opportunities

Vietnam offers potential as a sourcing hub for green machinery, driven by its rapid expansion in environmental goods exports, particularly renewable energy products. From 2002 to 2020, the country's exports of environmental goods grew from US$18.1 million to US$6.5 billion, positioning Vietnam as the third-largest exporter in Southeast Asia after Singapore and Malaysia[78].

Renewable energy products accounted for over half of this value, increasing from US$3.5 million to US$5.1 billion during the same period, especially solar PV cells and modules. In Vietnam, Solar PV manufacturing accounts for 5% of global demand, with extended production capactity and is capable of manufacturing wafer and cells rather than conduct simple module assembly[78].

Below is the list of notable companies in the field of Solar manufacturing:

**Table 23 - Notable companies in Solar PV Manufacturing in Vietnam**

| Company Name | Company Introductory |
|---|---|
| Jinko Solar (Vietnam) Industries | Website: https://www.jinkosolar.com/en<br><br>Jinko Solar is one of the world's largest manufacturers of solar modules, wafers, and cells, headquartered in China.<br><br>The company has established a strong presence in Vietnam and has supplied over 2.5 GW of solar modules to Vietnam's domestic market as of 2020, ranking as the country's top PV brand, particularly in large-scale solar farm projects.<br><br>In 2023, company invested US$ 709 billion in building a large-scale manufacturing facility in the Song Khoai Industrial Park, Quang Ninh Province to produce photovoltaic cells, modules, and wafers for export and domestic use. Jinko's Quang Ninh factory now accounts for about half of the company's total production outside China, making it a crucial part of its global supply chain. |
| Trina Solar (Vietnam) Wafer | Website: https://www.trinasolar.com/<br><br>Trina Solar is a global leader in photovoltaic technology and smart energy solutions, producing wafers, solar cells, and modules while also offering integrated energy storage and EPC services.<br><br>In Vietnam, the company operates a major manufacturing plant in Thai Nguyen Province, producing 210mm monocrystalline wafers and high-efficiency solar cells. Trina Solar has also participated in several local solar power projects, including the 35 MW Trung Son solar power plant and the Phong Phu project, where it provided both technology and EPC services. |
| Longi Solar Technology | Website: https://www.longi.com/en/<br><br>Longi is widely recognized as a global leader in monocrystalline silicon technology and one of the largest producers of solar wafers and modules. |

| Company Name | Company Introductory |
|---|---|
| | In Vietnam, Longi has become a major technology supplier for utility-scale solar projects, including the Xuan Thien Ea Sup project in Dak Lak Province, Southeast Asia's largest solar plant, where it supplied 273 MW of solar modules. The company is also active in the commercial and industrial rooftop segment, providing 45 MWp of Hi-MO7 panels to Ho Chi Minh City through its partnership with DAT Group and SPower.<br><br>Longi's panels have been used in several rooftop solar projects across Vietnam, including installations at AEON Mall and local garment factories, highlighting its growing role in both large-scale and distributed solar applications. |
| JA Solar | Website: https://www.jasolar.com/html/en/<br><br>JA Solar, another leading Chinese solar technology firm, specializes in the production of high-performance solar cells, modules, and wafers.<br><br>The company has made notable investments in Vietnam, particularly in Bac Giang Province, where it has expanded operations related to PV cell and wafer production, supplying advanced modules to various solar farms and industrial installations throughout Vietnam. |
| Canadian Solar Manufacturing Vietnam | Website: https://www.canadiansolar.com/<br><br>Headquartered in Canada, Canadian Solar is a globally recognized producer of solar modules and a developer of solar power and energy storage projects. Canadian Solar's operations appear to focus primarily on the import and distribution of high-quality solar panels and EPC collaboration with local partners.<br><br>The company entered Vietnam in 2015, initially investing in a 16,000 sq.m facility for module production, which was later converted in 2023 to new material manufacturing, including EVA and junction boxes. |
| First Solar Vietnam Manufacturing | Website: https://www.firstsolar.com/<br><br>First Solar Vietnam Manufacuturing is a subsidary of First Solar in the US, which is known for its thin-film solar technology and large utility-scale installations worldwide.<br><br>In Vietnam, the company has established a strong presence with a workforce of over 1,300 employees and a manufacturing facility located in Dong Nam Industrial Park, Binh My Commune, Cu Chi District, Ho Chi Minh City. This facility serves both the domestic and international solar markets. |
| Boviet Solar Technology | Website: https://bovietsolar.com/<br><br>Boviet Solar, estabilised in 2013, is a Vietnamese solar cell and module manufacturer headquartered in Bac Giang Province. It is one of the few domestic producers with a significant presence in both local and export markets. |

| Company Name | Company Introductory |
|---|---|
| | The company manufactures monocrystalline and polycrystalline solar modules and has gradually expanded its production capacity. Boviet has also gained traction internationally, exporting products to North America and Europe, while maintaining a key role in supporting Vietnam's solar manufacturing ecosystem. |
| Vietnam Sunergy (VSUN Solar) | Website: https://www.vsun-solar.com/<br><br>VSUN Solar is a subsidiary of the Abalance Group, a Japan-based company specializing in green, construction machinery, and information technology. In Vietnam, VSUN Solar primarily focuses on module manufacturing and EPC services for rooftop and small-scale solar projects nationwide. With strong expertise in solar module R&D and production, the company currently operates with a global manufacturing capacity of 4 GW of modules, 4 GW of TOPCon cells (Phase I), 4 GW of cells (Phase II), and 4 GW of silicon wafers.<br><br>Company was named the No. 1 solar module producer in Vietnam in 2020 by the Scientific Council of Vietnam Energy Magazine and Tier 1 Solar Manufacturer, awarded by Bloomberg NEF. |
| Dehui Solar Power (Vietnam) | Website: https://www.dehui-technology.com/#eluid69d555c4<br><br>Dehui Solar, heaquartered in Singapore, is a photovoltaic manufacturer involved in the production of solar modules and cells. With its production facility in Vietnam, company engages in a vertical supply chain, including solar cells, PV modules, energy storage systems, and project development. In 2021, Company's Cell capacity reached 2.5GW & module capacity reached 3GW. |

Source: Dezan Shira & Associates' compilation, 2025

Vietnam also emerged as a promising source of raw materials for green technology manufacturing, supported by substantial mineral reserves and a growing industrial base. The country ranks 12th globally in crude steel production[79], supplying essential materials for wind turbine towers, solar mounting systems, and hydropower infrastructure. With an estimated 5.8 billion tonnes of bauxite concentrated in the Central Highlands, Vietnam is also well positioned to develop a competitive alumina and aluminum industry[80], which could strengthen domestic manufacturing of solar panel frames, cables, and lightweight components for energy-efficient construction. Local producers such as Phu My Float Glass and Viglacera further contribute by supplying solar glass and low-emission materials for the renewable and building sectors.

However, Vietnam's material base remains constrained by its dependence on imported high-grade mechanical steel and copper, both critical to high-technology and renewable applications. The country also holds approximately 3.5 million tons of rare earth reserves[81], yet industrial-scale refining capacity remains limited, preventing full value-chain development. Similarly, while Vietnam has become a global hub for electronics assembly, it continues to rely on imported semiconductors and precision sensors, key components for smart grids, energy management, and intelligent building systems.

[79] Viet Nam News (2024), VN's Steel industry ranks 12th in world crude steel production, accessed 05 October 2025
[80] VNexpress (2023), Vietnam aluminum mining to increase exponentially, accessed 05 October 2025
[81] U.S Geological Survey (2025), Mineral commodity summaries 2025, accessed 05 October 2025

The table below lists notable local companies for sourcing opportunities in Vietnam.

**Table 24 - Notable local companies for sourcing materials in Vietnam**

| Company | Specialization | Company information |
|---|---|---|
| **Masan High-tech Material** | Metal tungsten and high-performance carbides | Website: https://masanhightechmaterials.com/<br><br>Masan High-Tech Materials (MHT) is a leading global supplier of midstream tungsten products across critical industries such as, automotive, aviation, chemical production, construction, electronics, energy, engineering, mining, and tool making.<br><br>In 2010, MHT acquired a controlling interest in Nui Phao Mining. Nui Phao Mining owns an open pit mine located in Thai Nguyen Province in Northern Vietnam containing mineral deposits of tungsten, fluorspar, bismuth and copper.<br><br>MHT represents a strategic source of supply for customers seeking high quality products made from primary or recycled tungsten units. From Vietnam, Masan Tungsten Company provides high quality APT, BTO & YTO units from primary concentrate, while through the recently acquired H.C. Starck Tungsten Powders, one of Europe's largest tungsten recyclers, provides high quality powders and carbides produced locally in Germany, China, or Canada to the exacting requirements of local customer base.<br><br>MHT's quality position is underpinned through its in-house R&D facilities in Germany & Vietnam supported by its 100% owned commercial laboratory ChemiLytics. ChemiLytics is the #1 Refractory Analytical Laboratory in Europe and is one of the largest industrial laboratories in Germany for inorganic elemental analysis and powder characterisation.<br><br>Through the 100% owned Nui Phao Mining Company, MHT operates the largest single fluorite mine outside of the two major sources (China and Mexico) accounting for 6-7% of total global supply of acid-grade fluorspar. |
| **Dong Viet Non-ferrous Metals & Plastic (DOVINA)** | Metal, iron, steel, etc | Website: https://dovinametal.com/<br><br>Dong Viet Non-ferrous Metals & Plastics Joint Stock Company, brand name is DOVINA, was established in mid 2008. DOVINA is considered as a unit producing non-ferrous metals (Copper, Aluminum & Plastic) applying the most advanced technology today with ability to provide high quality products according to Japanese, European & American standards.... Output per month reaches over thousands of tons.<br><br>The company provides high quality copper - aluminum non-ferrous metal products in the fields of: electric cables, electromagnetic wires, telecommunications cables, shipbuilding, etc. |

| Company | Specialization | Company information |
|---|---|---|
| | | In 2021, Dovina is in the Top 500 "Fastest Growing Enterprises in Vietnam" |
| **Bac Viet Group (BVG)** | Mold, hot-dip galvanizing, steel processing and plastic injection | Website: https://www.bacvietgroup.com/<br><br>Established in 2000, Bac Viet Group is a pioneer in the fields of Mold, hot-dip galvanizing, steel processing and plastic injection. The company has 3 members: Bac Viet Technology JSC (BVIT), Bac Viet Steel Structure Company Limited (BSSB) and Bac Viet Industry Joint Stock Company (BVI).<br><br>Main business sectors<br>• Producing and trading in steel plates, sheets and shapes<br>• Producing and trading in steel pipes, pre-engineered steel buildings, lifting equipment<br>• Logistics transportation service and provide school office furniture<br>• Producing molds, high-grade plastic<br>• Producing scaffolding, construction formwork<br>• Construction, construction design consulting |
| **Viet Nhat Steel Production and Trading** | Steel Production | Website: https://vietnhatsteel.com/<br><br>Established in 2020, Viet Nhat Steel Production and Trading Joint Stock Company is a leading Vietnamese manufacturer and distributor of derusted steel coils, cold-rolled steel coils, galvanized steel coils, color-coated steel coils, and square steel pipes. The company's head office and manufacturing facility are located on Road D.20, Chau Duc Industrial Park, Huu Phuoc Village, Suoi Nghe Commune, Chau Duc District, Ba Ria – Vung Tau Province, with a total production capacity of 500,000 tons per year.<br><br>Viet Nhat Steel has developed a broad distribution network across Vietnam, supplying products from northern provinces such as Hanoi, Hai Phong, and Bac Giang to southern regions including Binh Dinh, Nha Trang, Ninh Thuan, Binh Thuan, Lam Dong, Binh Duong, Dong Nai, Ba Ria – Vung Tau, Ho Chi Minh City, and the Mekong Delta provinces. |
| **KIMSEN Industry JSC** | Manufacturing aluminum | Website: https://kimsen.vn/ |

| Company | Specialization | Company information |
|---|---|---|
| KIMSEN | products and components | KIMSEN Industry JSC was established in 2013 with the goal of manufacturing and manufacturing aluminum profiles, components & system complexes with Vietnamese brand names with international standards; meet the increasing quality requirements of the market.<br><br>KIMSEN factory is capable of supplying 10,000 tons of aluminum profiles and 7,000,000 components/year. KIMSEN's products are diverse in types and profiles, widely used in many fields such as Architecture, Energy, Electronics, Mechanics, Transportation, etc. and many processed products at the request of customers. customer.<br><br>KIMSEN has been certified by the authorized representative organization of the UK Standards Institute to ISO 9001: 2015 and ISO 14001: 2015. KIMSEN aluminum products have achieved many international standard certifications such as JIS H4100:2015, EN 755-9:2016, RoHS 2011/65/EU, etc. |
| **Hoa Phat Group** | Steel & Industrial Manufacturing | Website: https://thep.hoaphat.com.vn/en<br><br>Hoa Phat Group is Vietnam's leading industrial manufacturing conglomerate, with steel production and related products as its core business. With a total crude steel capacity of up to 15 million tons per year, Hoa Phat is the largest steel producer in Southeast Asia and ranks among the Top 30 largest steel enterprises globally.<br><br>The group holds the No. 1 market share in Vietnam for long steel and is the only private enterprise in the country capable of producing hot-rolled coil and a variety of high-quality steel products. In addition to steel, Hoa Phat has diversified into sectors such as home appliances, construction equipment, and industrial real estate, supporting Vietnam's industrialization and export competitiveness. |
| **Phu My Clear Float Glass** | Solar Glass | Website: https://pfg.com.vn/<br><br>A subsidiary of Viglacera Corporation, Phu My Ultra Clear Float Glass Co., Ltd (PFG) officially launched in 2023, introducing Vietnam's first domestically produced ultra-clear glass to the market. The company's manufacturing facility is located in Phu My 2 Expansion Industrial Park, Phu My Town, Ba Ria – Vung Tau Province, covering an area of nearly 150,000 $m^2$.<br><br>Equipped with modern, energy-efficient technology, the factory has a designed capacity of 1,500 tons of molten glass per day, divided into Phase 1 (600 tons/day) and Phase 2 (900 tons/day). PFG produces ultra-clear glass |

| Company | Specialization | Company information |
|---|---|---|
| | | with standard thicknesses from 3mm to 12mm, and sizes up to 3,658mm x 4,000mm, catering to the growing demand for high-quality glass in large-scale architectural projects both domestically and internationally. |

Source: Dezan Shira & Associates' compilation, 2025

## 6.3. Investment opportunities

Vietnam is emerging as one of Asia's most dynamic markets for green technology investment, driven by its strong commitment to a low-carbon future and ambitious Net Zero by 2050 target. With a supportive policy framework, expanding energy demand, and a fast-developing industrial base, the country offers diverse opportunities for both energy technology suppliers and energy users to participate in its green transition

To attract investment in renewable and new energy development, Decree No. 58/2025/ND-CP, effective as of March 3, 2025, implements several provisions of the Electricity Law to underscore the government's commitment to advancing research and technological innovation in wind and solar energy. It encourages domestic and foreign enterprises to invest in the manufacturing of solar panels, wind turbines, and power conversion equipment, supported by prioritized science and technology programs.

Projects producing new electricity entirely from green hydrogen, green ammonia, or their mixtures and supplying power to the national grid are eligible for preferential treatment if they are the first of their kind in each energy category. Incentives include:

Maritime area fee exemption during construction (up to three years) and a 50% reduction for the following nine years;

- Land use and rental fee exemption during the construction phase (up to three years), followed by preferential rates in line with investment and land regulations;
- A guaranteed minimum contracted electricity output of 70% during the loan repayment period (up to 12 years), unless otherwise agreed by both parties.
- These incentives, combined with Vietnam's growing demand for clean energy infrastructure, make the country an appealing destination for foreign suppliers of renewable energy technology, including producers of turbines, solar modules, grid equipment, and green hydrogen technologies.

For Energy Users, Vietnam also offers compelling incentives for industrial users and investors' production of renewable energy, clean energy, energy from waste disposal; environmental protection and energy-saving products. According to the Law of Corporate Income Tax (CIT) 2025, the government provides CIT incentives, import duty exemptions, land use fee reductions, as well as tax benefits. Such incentives aim to accelerate the deployment of advanced clean technologies, including: battery storage systems; green hydrogen; carbon capture, utilization, and storage; Smart grid technologies; High-efficiency industrial systems.

In parallel, the WtE sector is emerging as another promising area of investment. Under Decision No. 31/QD-TTg, WtE projects receive substantial policy support, including low-interest loans, tax incentives, land rent exemptions, and import duty waivers. As urbanization drives higher waste generation and energy demand, WtE investments align with Vietnam's dual goals of energy security and environmental sustainability.

Through a combination of fiscal incentives, technology promotion, and clear policy direction, Vietnam is positioning itself as a leading regional destination for green technology investment. The country's commitment to renewable energy, new energy innovation, and environmental protection opens wide-ranging opportunities for foreign companies, from energy technology manufacturers to industrial energy consumers, looking to invest in a sustainable future.

**Table 25 - Notable foreign investment into green machinery market in Vietnam**

| Company | Year | Company information |
|---|---|---|
| **Renewable Energy Machinery** | | |
| CS Wind (Korea) | 2024 | Inaugurates an $80 million offshore wind tower facility in Ba Ria-Vung Tau, Vietnam, expected to achieve an impressive annual output of wind towers, totaling 360,000 tons. |
| Aurea Solar (Taiwan) | 2024 | Announced construction of an $80 million solar panel factory to increase supply for the Southeast Asian market. |
| **Waste-to-Energy Technology** | | |
| Everbright Environment (China) | 2024 | Developing large-scale Waste-to-Energy (WtE) plants in Hue, with project valued at approximately $69.6 million, to address urban waste crises. With a daily capacity of processing 720 tons of waste, the factory's electricity output can reach 240,000 kWh a day. |
| **Smart Building & Energy Efficiency** | | |
| Schneider Electric (France) | 2023-2024 | Deployment of its EcoStruxure Building Operation platform across 50 commercial buildings in Hanoi, demonstrating 18% energy efficiency improvements through IoT-enabled automation and smart management. |
| **Wastewater & Waste Treatment Technology** | | |
| Sembcorp (Singapore) | - | Integrating advanced wastewater treatment and solid waste management facilities into its VSIP industrial parks, to meet higher environmental standards. |

Source: Dezan Shira & Associates' compilation, 2025

# 7. Regulatory, Standards, and Certification

Vietnam's green technology market is expanding rapidly as the country advances its renewable energy transition and sustainability goals. However, participation in this market involves navigating a complex web of environmental regulations and certification requirements. This section examines two key aspects: import duties and customs procedures, and the environmental and technical standards governing compliance for domestic and foreign suppliers.

## 7.1. Import duties & customs

Vietnam has made substantial progress in modernizing its customs framework to align with international standards. Through the 2006 Customs Law and related regulations, the country adopted the WTO Customs Valuation Agreement, significantly improving the transparency and accuracy of customs valuation procedures.

However, despite these reforms, foreign exporters, including those from Switzerland, continue to report challenges in customs clearance. The most commonly cited issues include slow processing times, ambiguous regulations, administrative red tape, and corruption at certain stages of the procedure.

In response, the Vietnam National Assembly enacted a new Customs Law in 2014, which came into effect in 2015, marking another step toward modernizing customs operations. The revised law introduces a single national customs window based on risk management principles, while establishing clearer procedures for customs declaration and clearance. It also defines new rules regarding: the organization and authority of the Customs Department; the power of customs authorities to determine the origin of goods; the requirements for customs agents; and specific timeframes for customs clearance procedures. These reforms aim to streamline import-export processes and strengthen Vietnam's compliance with global trade practices.

Below is an overview of import tariffs for selected green machinery products, reflecting Vietnam's continuing efforts to facilitate industrial and technological trade.

**Table 26 - Vietnam Tariffs on Imports of Environmental Machineries from Switzerland, 2025**

| HS Code | Product description | Vietnam's tariff tax (%) |
|---|---|---|
| **4418** | **Builders' joinery and carpentry of wood, including cellular wood panels, assembled flooring panels, shingles and shakes** | |
| 441873 | Assembled flooring panels: Of bamboo or with at least the top layer (wear layer) of bamboo | 3 - 5% |
| **8402** | **Steam or other vapour generating boilers (other than central heating hot water boilers capable also of producing low pressure steam); superheated water boilers** | |
| 840290 | Parts | 0% |
| **8404** | **Auxiliary plant for use with boilers of heading 8402 or 8403 (for example, economisers, superheaters, soot removers, gas recoverers); condensers for steam or other vapour power units** | |

| HS Code | Product description | Vietnam's tariff tax (%) |
|---|---|---|
| 840410 | Auxiliary plant for use with boilers of heading 8402 or 8403 | 0% |
| 840420 | Condensers for steam or other vapour power units | 0% |
| 840490 | Parts | 0% |
| **8406** | **Steam turbines and other vapour turbines** | |
| 840690 | Parts | 0% |
| **8411** | **Turbojets, turbopropellers and other gas turbines** | |
| 841182 | Other gas turbines : Of a power exceeding 5000 kW | 0% |
| 841199 | Parts : Other | 0% |
| **8412** | **Other engines and motors** | |
| 841290 | Parts | 0% |
| **8417** | **Industrial or laboratory furnaces and ovens, including incinerators, non-electric** | |
| 841780 | Other | 0% |
| 841790 | Parts | 0% |
| **8419** | **Machinery, plant or laboratory equipment, whether or not electrically heated (excluding furnaces, ovens and other equipment of heading 8514), for the treatment of materials by a process involving a change of temperature such as heating, cooking, roasting, distilling, rectifying, sterilising, pasteurising, steaming, drying, evaporating, vaporising, condensing or cooling, other than machinery or plant of a kind used for domestic purposes; instantaneous or storage water heaters, non-electric** | |
| 841912 | Solar water heaters | 5% |
| 841933 | Dryers : Lyophilisation apparatus, freeze drying units and spray dryers | 0% |
| 841939 | Dryers : Other | 0% |
| 841960 | Machinery for liquefying air or other gases | 0% |
| 841989 | Other machinery, plant and equipment : Other | 0% |
| 841990 | Parts | 0% |
| **8421** | **Centrifuges, including centrifugal dryers; filtering or purifying machinery and apparatus, for liquids or gases** | |
| 842121 | For filtering or purifying water | 5% |
| 842129 | Filtering or purifying machinery and apparatus for liquids : Other | 0% |

| HS Code | Product description | Vietnam's tariff tax (%) |
|---|---|---|
| 842132 | Filtering or purifying machinery and apparatus for gases : Catalytic converters or particulate filters, whether or not combined, for purifying or filtering exhaust gases from internal combustion engines | 0% |
| 842139 | Filtering or purifying machinery and apparatus for gases : Other | 0% |
| 842199 | Parts : Other | 0% |
| **8474** | **Machinery for sorting, screening, separating, washing, crushing, grinding, mixing or kneading earth, stone, ores or other mineral substances, in solid (including powder or paste) form; machinery for agglomerating, shaping or moulding solid mineral fuels, ceramic paste, unhardened cements, plastering materials or other mineral products in powder or paste form; machines for forming foundry moulds of sand** | |
| 847420 | Sorting, screening, separating or washing machines | 2% |
| 8479 | **Machines and mechanical appliances having individual functions, not specified or included elsewhere in this chapter** | |
| 847982 | Mixing, kneading, crushing, grinding, screening, sifting, homogenising, emulsifying or stirring machines | 0% |
| 847989 | Other | 0% |
| 847990 | Parts | 0% |
| **8501** | **Electric motors and generators (excluding generating sets)** | |
| 850164 | AC generators (alternators), other than photovoltaic generators : Of an output exceeding 750 kVA | 0% |
| 850180 | Photovoltaic AC generators | 0 – 20% |
| **8502** | **Electric generating sets and rotary converters** | |
| 850231 | Other generating sets : Wind-powered | 0% |
| 850239 | Other generating sets : Other | 0% |
| **8503** | **Parts suitable for use solely or principally with the machines of heading 8501 or 8502** | |
| 850300 | Parts suitable for use solely or principally with the machines of heading 8501 or 8502 | 5% |
| **8504** | **Electrical transformers, static converters (for example, rectifiers) and inductors** | |
| 850490 | Electromechanical domestic appliances, with self-contained electric motor, other than vacuum cleaners of heading 8508 | 0 - 5% |

| HS Code | Product description | Vietnam's tariff tax (%) |
|---|---|---|
| **8514** | **Industrial or laboratory electric furnaces and ovens (including those functioning by induction or dielectric loss); other industrial or laboratory equipment for the heat treatment of materials by induction or dielectric loss** | |
| 851419 | Resistance heated furnaces and ovens : Other | 0% |
| 851420 | Furnaces and ovens functioning by induction or dielectric loss | 0% |
| 851431 | Electron beam furnaces | 0% |
| 851432 | Plasma and vacuum arc furnaces | 0% |
| 851439 | Other furnaces and ovens : Other | 0% |
| 851490 | Parts | 0% |
| **8541** | **Semiconductor devices (for example, diodes, transistors, semiconductor-based transducers); photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light-emitting diodes (LED), whether or not assembled with other light-emitting diodes (LED); mounted piezo-electric crystals** | |
| 854142 | Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light-emitting diodes (LED) : Photovoltaic cells not assembled in modules or made up into panels | 0% |
| 854143 | Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light-emitting diodes (LED) : Photovoltaic cells assembled in modules or made up into panels | 0% |
| **8543** | **Electrical machines and apparatus, having individual functions, not specified or included elsewhere in this chapter** | |
| 854390 | Parts | 0% |
| **9013** | **Lasers, other than laser diodes; other optical appliances and instruments, not specified or included elsewhere in this chapter** | |
| 901380 | Other devices, appliances and instruments | 0% |
| 901390 | Parts and accessories | 0% |
| **9015** | **Surveying (including photogrammetrical surveying), hydrographic, oceanographic, hydrological, meteorological or geophysical instruments and appliances, excluding compasses; rangefinders** | |
| 901580 | Other instruments and appliances | 0% |
| **9026** | **Instruments and apparatus for measuring or checking the flow, level, pressure or other variables of liquids or gases (for example, flow meters, level gauges, manometers, heat meters), excluding instruments and apparatus of heading 9014, 9015, 9028 or 9032** | |

| HS Code | Product description | Vietnam's tariff tax (%) |
|---|---|---|
| 902610 | For measuring or checking the flow or level of liquids | 0% |
| 902620 | For measuring or checking pressure | 0% |
| 902680 | Other instruments or apparatus | 0% |
| 902690 | Parts and accessories | 0% |
| **9027** | **Instruments and apparatus for physical or chemical analysis (for example, polarimeters, refractometers, spectrometers, gas or smoke analysis apparatus); instruments and apparatus for measuring or checking viscosity, porosity, expansion, surface tension or the like; instruments and apparatus for measuring or checking quantities of heat, sound or light (including exposure meters); microtomes** | |
| 902710 | Gas or smoke analysis apparatus | 0% |
| 902720 | Chromatographs and electrophoresis instruments | 0% |
| 902730 | Spectrometers, spectrophotometers and spectrographs using optical radiation (UV, visible, IR) | 0% |
| 902750 | Other instruments and apparatus using optical radiation (UV, visible, IR) | 0% |
| 902781 | Other instruments and apparatus : Mass spectrometers | 0% |
| 902789 | Other instruments and apparatus : Other | 0% |
| 902790 | Microtomes; parts and accessories | 0% |
| **9031** | **Measuring or checking instruments, appliances and machines, not specified or included elsewhere in this chapter; profile projectors** | |
| 903149 | Other optical instruments and appliances : Other | 0% |
| 903180 | Other instruments, appliances and machines | 0% |
| 903190 | Parts and accessories | 0% |
| **9032** | **Automatic regulating or controlling instruments and apparatus** | |
| 903289 | Other instruments and apparatus : Other | 0% |
| 903290 | Parts and accessories | 0% |
| **9033** | **Parts and accessories (not specified or included elsewhere in this chapter) for machines, appliances, instruments or apparatus of Chapter 90** | |
| 903300 | Parts and accessories (not specified or included elsewhere in this chapter) for machines, appliances, instruments or apparatus of Chapter 90 | 0% |

Notes: DSA conducted analysis on the 54 environmental goods identified by the Asia-Pacific Economic Cooperation (APEC) and the World Trade Organization (WTO), each classified under a six-digit Harmonized System (HS) code. According to World Bank, these product was defined as "products that are manufactured or services that are rendered for the main purposes of achieving environmental objectives."

Source: UN Comtrade, Dezan Shira & Associates' compilation, 2025

Vietnam's participation in a growing network of regional and bilateral trade agreements further enhances its appeal as a destination for sustainable and responsible trade and investment.

**EU–Vietnam Free Trade Agreement (EVFTA)**

The EVFTA, in effect since August 1, 2020, includes a dedicated Trade and Sustainable Development Chapter, under which both the EU and Vietnam commit to maintaining high levels of environmental protection. The agreement explicitly prohibits lowering environmental standards or relaxing environmental laws to attract trade and investment.

Both parties reaffirm their commitments to the Paris Agreement, the UN Framework Convention on Climate Change (UNFCCC), and the Kyoto Protocol. In this context, they agree to cooperate in:

- Building capacity for low-carbon and climate-resilient economies;
- Sharing information and best practices on carbon pricing mechanisms and carbon markets;
- Promoting energy efficiency, low-emission technologies, and renewable energy development.

The EVFTA also includes a dedicated dispute settlement mechanism tailored to environmental and sustainability-related issues, underscoring both sides' commitment to effective implementation.

**Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)**

Under the CPTPP, Vietnam and other member countries commit to pursuing high levels of environmental protection while promoting sustainable trade. Chapter 20 of the agreement requires members to:

- Enforce environmental laws effectively and not weaken them to gain trade or investment advantages;
- Ensure transparency and public participation in environmental decision-making;
- Take measures to control ozone-depleting substances in accordance with the Montreal Protocol; and
- Support trade in environmental goods and services by reducing barriers and promoting clean technologies.

The CPTPP's binding dispute resolution process reinforces accountability among members, ensuring that environmental commitments remain enforceable within the framework of international trade.

Through these legislative and institutional advancements, Vietnam continues to enhance its trade environment, integrating sustainability principles and environmental protection into its economic development strategy. This creates a more predictable, transparent, and green investment climate for international businesses seeking to engage in Vietnam's expanding industrial and technological sectors.

## 7.2. Technical standards and safety regulations

### 7.2.1. Technical standards

In Vietnam, The Ministry of Science and Technology (MOST) is the key authority overseeing standards, measurement, and quality management. MOST issues national technical standards (TCVN) and regulations (QCVN) for machinery and equipment, and is responsible for licensing the import of used machinery, in coordination with other ministries and designated inspection agencies. While Vietnam maintains its own TCVN and QCVN frameworks, these are increasingly aligned with global benchmarks, allowing machinery certified under ISO or bearing the CE marking to be more readily accepted.

**Table 27 - Technical standards that are to be considered in the machine, electrical and metal industry for machinery and plant construction**

| Comparison Table | TCVN (Tieu Chuan Viet Nam) - ISO | QCVN (Quy Chuan Viet Nam) | CE Marking (European) | ISO 9001:2015 (International) |
|---|---|---|---|---|
| Purpose of Using | Regulations on technical characteristics and used as standards for classification and quality assessment | Regulations on limits of technical characteristics and requirements for subjects to be obligated to comply | Administrative marking on European health, safety, and environmental protection standards for products sold within the European Economic Area (EEA) | A set of principles and requirements to ensure that every aspect of the Quality Management System (QMS) in an enterprise is controlled and the desired performance is achieved. |
| Symbol system | • TCVN (Tieu Chuan Viet Nam) – which means National Standards<br>• TCCS (Tieu Chuan Co So) – which means Standard Basis | • QCVN (Quy Chuan Viet Nam) – which means National Regulations<br>• QCĐP (Quy Chuan Dia Phuong) – which means Local Regulations | • Conformitè Europëenne (CE) Mark | • ISO (International Organization for Standardization)<br>• ISO 9001:2015 (the latest updated) |
| Classification | • Basic standard<br>• Terminology standard<br>• Standard technical requirements<br>• Standard method<br>• Standards on the form, transportation and preservation of products and goods | • General technical regulation<br>• Safety technical regulations<br>• Environmental technical regulations<br>• Process technical regulations<br>• Service technical regulations | • 23 product groups requiring CE marking include: Machinery Directive; Electro-magnetic Compatibility (EMC); Medical Device; Lifts Directive; Pressure Equipment; etc.<br>• Products that do not need CE marking: Chemicals, drugs, food, cosmetics. | Clearly define the tasks, PIC and how to do it:<br>• The organization needs to standardize the activities of the stages into operating procedures/instructions<br>• The organization's leaders need to decide to select and appoint a number of key personnel of the departments to form a group of personnel to deploy, develop and apply ISO.<br>• Operational procedures/instructions |

| Comparison Table | TCVN (Tieu Chuan Viet Nam) - ISO | QCVN (Quy Chuan Viet Nam) | CE Marking (European) | ISO 9001:2015 (International) |
|---|---|---|---|---|
| | | | | need to be specific, accurate, and divided into easy-to-implement steps for each position in the organization. |
| Application | Not mandatory, organizations voluntarily issue and enforce | Compulsory | Compulsory on products exported or consumed in the 27 EU countries and also in Iceland, Liechtenstein and Norway | Not mandatory, companies may operate without the certification |
| In trading | Products which could not meet the TCVN, are still allowed to trade | Products which could not meet the QCVN are not allowed to trade | According to the Law of the European Community (EU), most electrical and electronic products must carry the CE mark to be circulated on the European market | Companies which could not meet the ISO 9001:2015, are still allowed to trade |
| Authorized department to announce | • Government Departments<br>• Public Non-business Unit<br>• Social - Professional Organizations<br>• Economic Organizations | Government Departments | • Large-scale, global companies with their own laboratories meeting international standards are allowed to authorize the products themselves<br>• SMEs will have to find organizations such as TUV or SGS, etc. to test and evaluate products before releasing them to the market | After the QMS has been put into operation, enterprises need to register for ISO 9001: 2015 certification at an authorized certification organization |

Source: Dezan Shira & Associates' compilation, 2025

### 7.2.2. Safety regulation

The Ministry of Labour, Invalids and Social Affairs (MOLISA), focuses primarily on occupational safety and industrial hygiene. In Vietnam, MOLISA is authorized to issue the "List of machinery, equipment, materials, and substances subject to strict occupational safety and hygiene requirements." Any machinery included on this list, whether new or used, must comply with stringent labor safety regulations.

The machinery and equipment have strict requirements on occupational safety and health, which are specified in ***Clause 1, Article 30*** of the **Law on Occupational Safety and Hygiene 2015**. Details as following:

- Must have a clear origin, within the shelf life, quality assurance;

- Must be inspected according to the following regulations (unless there are other requirements provided by specialized law):

- Machines, equipment and supplies with strict requirements on occupational safety must be inspected not only before being put into use, but also periodically during use by an organization conducting technical safety inspection.

In addition, there is Decision 18/2019/QG-TTg on the Import of Used Machinery, Equipment, and Technological Lines. Based on Article 5 (Import criteria for used technological lines), a used technological line may be imported if it is manufactured in accordance with:

a) National Technical Regulations (QCVN) on safety, energy saving, and environmental protection;

b) In case of unavailability of National Technical Regulations (QCVN) for a technological line to be imported, it must be manufactured in conformity with technical indicators of Vietnam's Standards (TCVN) or Standards of G7 countries or Korea with regard to safety, energy saving, and environmental protection.

If company plans to import a technology comprised in the technological line, it must be a technology that is already applied by at least 03 manufacturers of member countries of Organization for Economic Cooperation and Development (OECD). Besides, other aspects such as the remaining capacity and the limit on the amount of raw materials or energy consumed by the technological line are also mentioned in Article 5.

For the used machinery and equipment, according to Article 6, a piece of used machinery or equipment may be imported if it satisfies the following criteria:

1. Its age does not exceed 10 years. Ages of machinery and equipment in certain specific fields are provided for in the enclosed Appendix I for reference.

2. It is manufactured in accordance with:

a) National Technical Regulations (QCVN) on safety, energy saving, and environmental protection;

b) In case of unavailability of National Technical Regulations (QCVN) for the type of machinery or equipment to be imported, it must be manufactured in conformity with technical indicators of Vietnam's Standards (TCVN) or Standards of G7 countries or Korea with regard to safety, energy saving, and environmental protection.

# 8. Market Entry Strategy

For Swiss green machinery companies, Vietnam offers significant growth opportunities, driven by the country's commitment to sustainable development and its increasing demand for renewable energy and environmental technologies. However, challenges such as regulatory complexity, local market dynamics, and the need for technology adaptation must also be considered. The right market entry strategy will depend on the level of investment a company is willing to make, its desired level of control, and the nature of the technology being introduced. To better navigate the Vietnamese market, it is crucial to evaluate different entry options, ranging from low-commitment distribution partnerships to more capital-intensive joint ventures, wholly owned subsidiaries, and strategic alliances with local energy developers or OEMs.

## 8.1. Direct export via distributors or agents

Exporting through local distributors is often the first step for foreign suppliers of renewable energy and environmental machinery. This is especially suitable for equipment that is standardized and relatively easy to transport, such as solar inverters, smaller-scale water treatment units, energy-efficient HVAC systems, or building automation devices for smart buildings.

Vietnam has an established network of distributors specializing in renewable energy and environmental technologies. Some focus on solar and wind project components, others on industrial water treatment or building efficiency solutions. Working with such distributors allows foreign firms to access existing client networks across industrial parks, construction projects, and municipal authorities.

However, foreign investors must be highly selective when choosing distributors. Beyond sales capacity, distributors must demonstrate technical expertise, regulatory knowledge, and a reliable service infrastructure. In green technology sectors, after-sales service is critical. Machinery such as waste-to-energy boilers or smart building systems must operate reliably for decades. Distributors without maintenance capacity pose risks to brand reputation.

By contrast, relying solely on sales agents is less advisable. Agents often lack responsibility for warranty, compliance, or service. In sectors where system reliability and environmental performance are tightly monitored, this gap can cause serious setbacks. For this reason, distributors with technical depth and proven project experience are generally the preferred channel.

## 8.2. Joint ventures with local partners

Joint ventures can be an efficient way for foreign companies to establish a presence in Vietnam's renewable energy and environmental sectors. Local partners may include EPC contractors, industrial groups, or state-owned enterprises active in energy, water, or waste management. By combining foreign technology with local project execution capacity, joint ventures can secure larger contracts, access financing, and benefit from government incentives.

For example, renewable energy developers in Vietnam often prefer local assembly or partial production of components such as solar mounting systems, biogas digesters, or water treatment modules. Joint ventures allow foreign firms to do this while meeting local content requirements in government contracts. These partnerships also enable foreign companies to share risks in large projects that often need close collaboration with local authorities at provincial or national level.

However, joint ventures in this sector need to be carefully planned. Technology transfer should be managed to protect important intellectual property while allowing local partners to operate and maintain the equipment. Contracts must clearly define responsibilities for financing, operation, and long-term environmental compliance. For green projects, reputation risks are particularly high, as failures in waste-to-energy or water treatment facilities can quickly draw public scrutiny.

### 8.3. Wholly owned local subsidiary (sales, service, or assembly)

For foreign firms with long-term ambitions and significant resources, establishing a wholly owned subsidiary provides the highest degree of control. This model is well suited for companies aiming to build a lasting brand presence in Vietnam, serve large industrial clients, or participate in national-scale projects where direct accountability is required.

A typical entry path begins with a sales and service subsidiary. This allows the company to market its equipment directly to Vietnamese customers and provide technical support, maintenance, and warranty services under its own brand. Over time, subsidiaries may expand into demonstration centers for renewable energy technologies, local training facilities for engineers, or even assembly operations for bulky equipment such as wind turbine towers or water treatment modules.

Vietnam's government increasingly views foreign investment in high-tech and green sectors favorably, and subsidiaries may qualify for incentives if they locate in high-tech parks. However, establishing a wholly owned operation requires dealing with complex legal requirements, including business licensing, environmental regulations, and technology transfer approvals. It also demands a long-term commitment of capital and managerial resources.

### 8.4. Strategic alliances (partnership with OEMS, licensing or technology transfer)

Strategic alliances are particularly relevant for green machinery, as they allow foreign firms to scale rapidly and introduce their technologies into Vietnam's expanding energy and environmental infrastructure. In this model, Swiss firms supply advanced subsystems, such as energy-efficient motors, water filtration membranes, or digital control systems, that are integrated into equipment built or installed by Vietnamese partners.

These alliances can take the form of licensing agreements, where local manufacturers are authorized to produce machinery using foreign technology; technology transfer contracts, where selected know-how is shared under strict conditions; or co-development projects targeting specific markets such as smart buildings or energy-efficient industrial parks.

By partnering with local EPC contractors or OEMs, Swiss firms can lower logistics costs, adapt solutions to Vietnamese conditions, and accelerate adoption of new technologies. For instance, bulky equipment for waste-to-energy plants or water treatment facilities can be partly manufactured in Vietnam, reducing shipping costs and ensuring compliance with local regulations. At the same time, embedding Swiss components ensures international performance standards are met.

The success of strategic alliances depends on careful partner selection and setting clear agreements. Intellectual property, product standards, and long-term service responsibilities must be explicitly defined. In the green sector, after-sales support is particularly important because performance guarantees are often tied to financing agreements. Strong alliances can therefore not only expand market reach but also build trust with investors, regulators, and local communities.

# 9. Support and Contacts

We would be delighted to support your expansion plans into these markets and connect you with the appropriate business partners for your projects.

You can determine the level of support you need, whether it is comprehensive assistance, including a full business workshop and market analysis leading up to market entry, or selective support with specific aspects like legal issues. The scope is entirely up to you.

Our renowned experts in Zurich work closely with the Embassy and our specialists at the Swiss Business Hub in Southeast Asia + Pacific, ensuring that you benefit from firsthand information. We look forward to hearing from you!

**GET IN TOUCH**

Christian Michel
Consultant Southeast Asia

CMichel@s-ge.com
+41 44 365 55 57

**Switzerland Global Enterprise**
Stampfenbachstrasse 85
8006 Zürich
Switzerland

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ExportHelp
s-ge.com/exporthelp
exporthelp@s-ge.com
T 0844 811 812

Switzerland Global Enterprise
Stampfenbachstrasse 85
CH-8006 Zürich
T +41 44 365 51 51

Switzerland Global Enterprise
Corso Elvezia 16 – CP 5399
CH-6901 Lugano
T +41 91 601 86 86

Switzerland Global Enterprise
Chemin du Closel 3
CH-1020 Renens
T +41 21 545 94 94
s-ge.com