

# Vietnam Steel Research and Industrial Policy: Rapid Growth, EAF Dominance, and the Infrastructure Imperative

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## Abstract

This document examines Vietnam’s steel research and industrial policy as a rapidly emerging producer with distinctive characteristics of accelerated development, overwhelming EAF dominance, and growth driven by infrastructure and urbanization demands. With 22 million tonnes of annual crude steel production, Vietnam has risen from minimal capacity in the 1990s to rank 11th globally, representing one of the steel industry’s most dramatic growth stories. This analysis explores Vietnam’s 70% EAF share reflecting scrap availability and pragmatic technology choices, the dominance of Hoa Phat Group as private sector champion transforming the industry landscape, policy frameworks balancing rapid industrial growth with gradual environmental tightening, infrastructure bottlenecks in electricity supply, ports, and logistics constraining further expansion, and Vietnam’s ambiguous position navigating between China’s economic orbit and diversification toward ASEAN, US, EU partnerships. The document highlights how Vietnamese steel exemplifies emerging market industrialization in compressed timeframes, with limited policy sophistication but remarkable entrepreneurial dynamism, creating both opportunities for leapfrogging to cleaner technologies and risks of locking in carbon-intensive pathways.

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# 1 Strategic Context: Compressed Industrialization

## 1.1 Production Growth and Global Position

Vietnam's steel ascent represents one of the sector's most rapid transformations:

**2024 Production:** 22 million tonnes crude steel

- Global rank: 11th (moved up from 12th in 2023)
- Historical context: <1 million tonnes in 1990, ~5 million tonnes in 2010
- Growth rate: 12-15% annually (2010-2020), moderating to 8-10% (2020-2025)
- Per capita production: ~220 kg (approaching global average)

**Technology distribution:**

- Electric arc furnace: ~70% of capacity (~15 MT)
- Integrated BF-BOF: ~30% of capacity (~7 MT)
- EAF share among highest globally (similar to Turkey, Italy)
- Trend: EAF share increasing as new capacity predominantly scrap-based

**Consumption drivers:**

- Construction sector: ~70% of steel demand
- Infrastructure boom: Roads, bridges, ports, urban development
- Real estate: High-rise residential and commercial buildings
- Manufacturing: Growing automotive, shipbuilding, machinery sectors
- Export orientation: 15-20% of production exported (growing share)

## 1.2 Economic Development Context

**Industrialization trajectory:**

- GDP growth: 6-8% annually (one of world's fastest)
- Manufacturing share of GDP: 25%+ and rising
- Foreign direct investment: Major driver of industrial development
- Urbanization: Rural to urban migration fueling construction demand
- Middle class expansion: Driving residential and consumer demand

**Policy framework:**

- Communist Party-led market economy ("Doi Moi" reforms since 1986)
- Pragmatic economic policy emphasizing growth and poverty reduction
- Export-oriented development strategy
- Attraction of foreign investment (electronics, textiles, manufacturing)
- Infrastructure investment as government priority

## 1.3 Steel in National Development Strategy

**Strategic prioritization:**

- Steel viewed as foundation for industrialization
- Government support through industrial zones and incentives
- Domestic capacity development to reduce import dependence
- Quality upgrading to serve advancing manufacturing needs
- Regional hub ambitions within ASEAN

## 2 Industry Structure and Major Players

### 2.1 Hoa Phat Group: The Private Sector Champion

#### **Dramatic ascent:**

- Founded: 1992 as small business, entered steel 2000s
- Current capacity: 8 million tonnes (largest in Vietnam)
- Technology: Modern integrated BF-BOF plus EAF facilities
- Vertical integration: Iron ore mining, port infrastructure, distribution
- Chairman Tran Dinh Long: Vietnam's wealthiest individual, steel sector leadership

#### **Major facilities:**

- Dung Quat Integrated Steel Complex (Quang Ngai Province):
  - Investment: \$5+ billion (largest industrial project in Vietnam)
  - Capacity: 5.6 million tonnes integrated BF-BOF
  - Commissioned: 2019-2021 phases
  - Products: Hot rolled coil, cold rolled, galvanized
  - Significance: Vietnam's first world-scale integrated mill
- EAF plants: Multiple locations including Thai Nguyen
- Downstream: Galvanizing lines, pipe manufacturing, construction steel

#### **Business model:**

- Cost leadership: Operational efficiency and scale
- Vertical integration: Controlling raw materials to finished products
- Product diversification: Long and flat products, upstream and downstream
- Domestic focus: Capturing Vietnam's growth while selectively exporting
- Continuous capacity expansion: Aggressive investment and growth

#### **Sustainability initiatives:**

- Energy efficiency: 15% reduction target by 2030
- Environmental controls: Modern facilities meeting Vietnamese standards
- Renewable energy: Solar installations at some facilities
- Waste heat recovery: Power generation from blast furnace gas
- Caution: Sustainability secondary to growth and cost competitiveness

### 2.2 Formosa Ha Tinh Steel

- Taiwanese investment: Formosa Plastics Group
- Location: Ha Tinh Province (central coast)
- Capacity: 7-8 million tonnes integrated BF-BOF
- 2016 environmental disaster: Massive fish kill from toxic discharge (\$500 million penalty)
- Reputation damage: Significant public backlash, stricter monitoring
- Status: Operating under government oversight

### 2.3 Vietnam Steel Corporation (VSC)

- State-owned (legacy producer)
- Capacity: 2-3 million tonnes
- Older EAF and small operations, reform/privatization planned
- Declining market share

## 2.4 Secondary Producers

- Hoa Sen Group: galvanizing/roofing
- Nam Kim Steel: pipes/tubes
- Many small EAFs, mostly construction steel

## 3 Technology Choices and EAF Dominance

### 3.1 EAF Dominance Factors

- Lower capital for EAF, fast deployment
- Scrap supply (domestic + import)
- Flexibility and simplicity
- Short construction time

### 3.2 Scrap Supply Dynamics

- Domestic: ~8-10 Mt/year (vehicles, demolition, manufacturing)
- Imports: ~5-7 Mt/year (US, Japan, Korea, Taiwan, EU)
- Quality: Imported scrap higher grade
- Exports: Limited, mostly to China

### 3.3 Hoa Phat's Integrated Mills

- Flat products for auto/appliances
- Reduce imports
- Export potential
- Challenges: capital, environment, market uncertainty

## 4 Policy Framework and Governance

### 4.1 Steel Industry Strategy to 2025, Vision to 2035

- 20-22 Mt target by 2025 (met), 30-35 Mt by 2035
- Upgrade: flats, specialty grades, meet int'l standards
- Modernization and compliance
- Incentives: zones, tax, trade defense, environmental

### 4.2 Ministry Oversight

**MOIT:** Policy, investment, planning

**Natural Resources/Energy:** Environmental regulation

**Planning/Investment:** FDI and development coordination

**Communist Party:** Strategic and stability oversight

## 5 Infrastructure Constraints

### 5.1 Electricity Supply

- EAF power intensity; grid issues; brownouts 2023-2024; cost and reliability issues
- Generation: Coal ~35%, Hydro ~30%, Gas ~20%, Renewables ~15%
- Power Plan VIII: Expansion by 2030
- Grid, transmission, and renewable projects needed

## 5.2 Ports and Logistics

- Major port congestion; limited deepwater bulk capacity
- Road/rail bottlenecks
- Project: Lach Huyen deepwater, expressways, clusters

# 6 Environmental and Climate Policy

## 6.1 Current Emissions Profile

- Steel: ~40-45 Mt CO<sub>2</sub>/year
- Sector: ~12% industrial, ~4% total
- EAF intensity lower; BF-BOF rising

## 6.2 Climate Commitments

- Paris/NDC: Net zero by 2050 (COP26)
- Just Energy Transition Partnership (JETP), \$15.5B, power sector focus

## 6.3 Decarbonization Pathways

- EAF: Greening grid, scrap quality, efficiency
- Integrated mills: Technology upgrade/hydrogen/BAT
- Policy: Roadmap, incentives, pricing, R&D, capacity building

# 7 Trade and Regional Integration

## 7.1 Export Markets

- ASEAN ~40%, China ~20%, Middle East ~15%, Americas ~10%, others
- Long products: construction; Flats: new export growth

## 7.2 Trade Agreements

- ASEAN/AFTA, CPTPP, EVFTA, RCEP
- Market access, obligations, competition

## 7.3 Trade Defense

- Anti-dumping (US, EU), Vietnamese safeguards

# 8 Future Outlook

## 8.1 Growth Scenarios (2025-2040)

- Optimistic: 30 Mt (2030), 45 Mt (2040); export growth
- Realistic: 28 Mt (2030), 35 Mt (2040); moderate
- Pessimistic: 22-25 Mt stagnation; overcapacity, regulation

## 8.2 Key Uncertainties

- Economic: growth, consumption, RE sector
- Technology/environment: decarbonization policy, enforcement
- Geopolitical/trade: US-China, ASEAN, FTAs, security

## 9 Conclusions

Vietnam's steel industry exemplifies compressed industrialization: achieving in 25 years what took other countries 50-75 years. The EAF-dominant model reflects pragmatic technology choices and entrepreneurial dynamism, particularly Hoa Phat Group's remarkable ascent.

### **Strengths:**

- Rapid capacity growth matching development needs
- EAF dominance providing decarbonization advantage
- Private sector dynamism and competitiveness
- Strategic location and market access
- Strong economic growth trajectory

### **Challenges:**

- Infrastructure constraints (electricity, ports, logistics)
- Policy sophistication lag relative to industry development speed
- Environmental standards and enforcement capacity
- Technology and quality upgrading needs
- Navigating complex geopolitical environment

**Critical juncture:** Vietnam stands at inflection point. Continued rapid growth risks locking in carbon-intensive pathways and infrastructure bottlenecks. Alternatively, strategic policy development leveraging the EAF advantage, attracting green technology investment, and building institutional capacity could position Vietnam as ASEAN's green steel leader. The next 5-10 years will determine which path prevails.

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