El Niño 2026–2027

Impact Assessment for Vietnam's Economy and Vietnam Holding Portfolio



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Section I: Executive Summary & Macro Scenario (El Niño 2026–2027)

The El Niño-Southern Oscillation (ENSO) is characterised by warmer-than-normal sea-surface temperatures in the central and eastern equatorial Pacific and associated shifts in atmospheric circulation, tropical convection and rainfall. In Vietnam, El Niño is typically associated with higher temperatures, seasonal rainfall deficits, reduced river flows, drought, water shortages and saltwater intrusion. The severity of these effects is not linear: outcomes depend on the event's duration and timing, rainfall distribution, reservoir and water-resource conditions, and the exposure and adaptive capacity of individual regions and sectors.

A very strong—potentially historic—El Niño is forecast to persist through the second half of 2026 and into 2027. For Vietnam, the Vietnam Meteorological and Hydrological Administration (VNMHA) frames the outlook through two risk scenarios: a High-Risk case with rainfall 10–20% below normal, and a Very High-Risk case with rainfall 20–40% below normal, deficits above 50% in parts of the South-Central Coast, and saltwater intrusion potentially comparable with the most severe El Niño episodes on record[1].

We see El Niño affecting the Vietnam Holding (VNH) portfolio primarily through three channels: credit quality in the banking core portfolio; household purchasing power and operating costs in the retail sector; and power availability, water stress and input costs in steel and other industrials. A licensed MSCI Physical Risk Assessment used in this report identifies Extreme Heat and Extreme Precipitation as the dominant contributors to VNH's portfolio-weighted business-interruption risk. El Niño is relevant because it can intensify heat and drought over the near term. Section III stress-tests heavy industry, banks and retail, while Section IV translates the findings into our portfolio and engagement priorities.

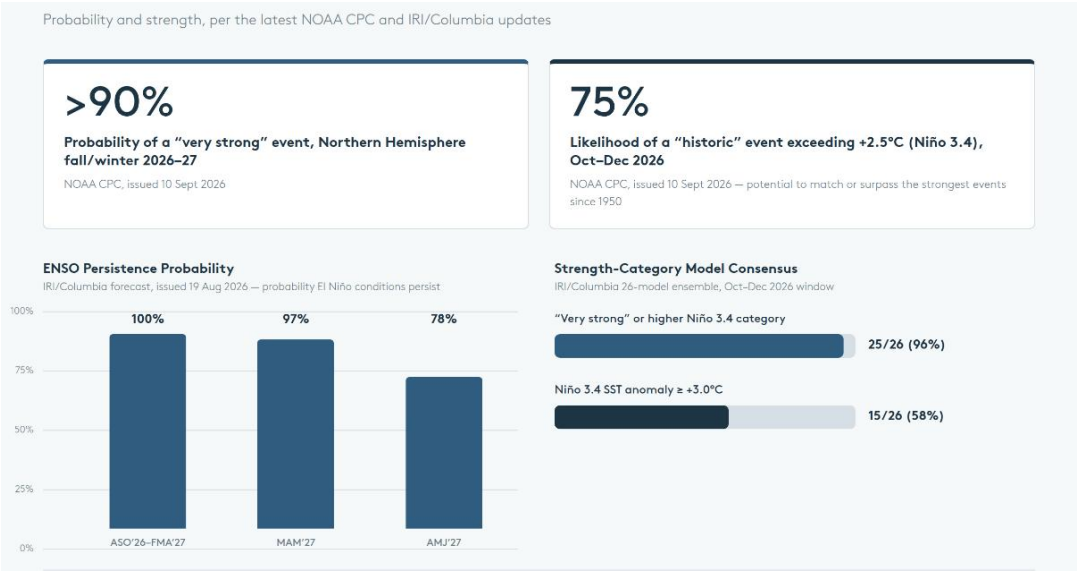
Meteorological Outlook

For the 2026–27 cycle, the key point is that a drier seasonal baseline does not preclude short, intense rainfall events. El Niño is expected to influence temperature, rainfall, river flow, humidity and evapotranspiration through the second half of 2026 and into early 2027, while localised heavy rain, flash floods and landslides can still occur under specific meteorological conditions. We therefore treat drought and heat as the dominant risk channels without assuming uniformly dry conditions across Vietnam.

International forecasters have revised the expected severity of this event sharply higher since early-season projections. September updates from NOAA's Climate Prediction Center (CPC) put the probability of a very strong event at above 90%, with a 75% likelihood of a "historic" event—defined here as a Niño 3.4 anomaly above +2.5°C during October–December 2026. The same update notes that the event could match or exceed the strongest episodes recorded since 1950.

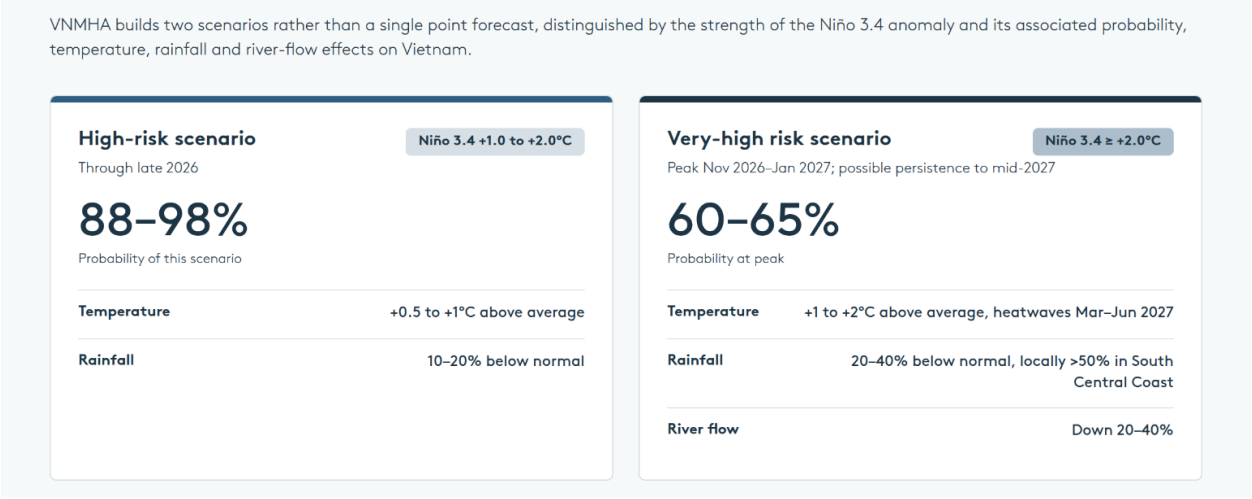
[1] Two El Niño risk scenarios projected for Vietnam in 2026-2027 - VnEconomy

Figure 1 – El Niño 2026–2027: International Forecast Consensus[2]



The Vietnam Meteorological and Hydrological Administration (VNMHA) has developed two risk scenarios for El Niño 2026–27. Rather than averaging model outputs into a single point forecast, the framework is designed for risk management, balancing probability against severity. The scenarios draw on observations, El Niño development forecasts, hydrometeorological projections from August 2026 to May 2027, and evidence from historically strong events. Their purpose is therefore not to predict one precise Niño 3.4 peak, but to define plausible conditions for monitoring, updating risk assessments and reviewing response plans.

Figure 2 – Vietnam's El Niño Forecast 2026–2027 by VNMHA



Against this backdrop, we use VNMHA's Very High-Risk scenario as the main stress case for Vietnam. The scenario points to conditions that are both hotter and drier overall, but not uniformly; therefore, concentrated episodes of extreme rainfall may still occur within an otherwise rainfall-deficient year.

[2] Official NOAA CPC ENSO Strength Probabilities; ENSO forecast, data collected by Dynam in September 2026, illustration by Claude

Figure 3 – Vietnam Climate Outlook 2026–2027: Heat and Rainfall Risk Projections

Timeline	Expected conditions	Detail & source
Jul–Nov 2026 (peak wet season)	Overall drier than normal, but punctuated by concentrated heavy-rainfall and flash-flood events	Despite a 10–50% rainfall deficit, Vietnam is still forecast to see 16–19 episodes of heavy rainfall nationwide; flood peaks on northern rivers and on rivers from Quang Tri to Dak Lak (bracketing Hoa Phat's Dung Quat complex) are projected to reach Level 2–3 (dangerous) on the national flood warning scale [3].
Late 2026 – May 2027	Acute drought, water-shortage and saltwater-intrusion risk intensifies	UNICEF's El Niño 2026–27 early-warning report [4] flags the South-Central Coast, Central Highlands and Mekong Delta as facing the highest risk of drought, water shortages and saltwater intrusion in this window.
Mar–Jun 2027	Heatwave peak (VNMHA's Very High-Risk scenario)	Temperatures 1–2°C above average, rainfall 20–40% below normal, river flows down 20–40% (see Meteorological Outlook above).
Mid-to-late 2027 (beyond this report's horizon)	Possible transition towards La Niña	NOAA CPC gives ~90%+ odds of El Niño persistence through March 2027 before a gradual shift towards ENSO-neutral; historical analogues (1996–97, 2022–23) suggest that La Niña could develop by mid-to-late 2027. Such an ENSO reversal can produce a sharp wet–dry shift; we therefore flag it as a forward monitoring item rather than an in-scope risk.

VNMHA's review of past El Niño episodes in Vietnam highlights a recurring pattern: fewer but more erratic tropical storms and an earlier end to the rainy season; temperatures around 0.5–2°C above average, with earlier and longer heatwaves; rainfall deficits of 20–40% across Central Vietnam, the Central Highlands and the South; river-flow declines of 20–60%; and, in the strongest episodes, severe saltwater intrusion in the Mekong Delta. The organization identifies water resources, agriculture and energy as the most exposed sectors. Importantly, the historical rainfall range—20–40% below normal, locally exceeding 50%—is closely aligned with its Very High-Risk scenario for 2026–27 (Figure 2).

Figure 4 – Historical comparison of El Niño impacts[5]

Episode	Severity	Key figures
1982–83	Strong El Niño (Niño 3.4 peak ~+2.1°C)	Rainfall ran 10–30% above average in the North and North Central regions, while the South-Central Coast, Central Highlands and South ran 20–40% below; river-flow deficits emerged across many systems by the dry season, with widespread water shortages in the South-Central Coast, Central Highlands and South. The North separately recorded nine unusually prolonged cold spells in early 1983 — showing how non-uniform El Niño's regional effects on Vietnam can be (VNMHA, 2026).
1997–98	Very strong El Niño (Niño 3.4 peak ~+2.4–2.5°C)	The storm season started late and ended early; temperatures ran above average across much of the country through the end of 1997 and the first four months of 1998. Drought persisted for six months in the North and through August 1998 in the North Central region, with sharp flow deficits in Central Vietnam and the Central Highlands. In the Mekong Delta, the 1998 flood peak at Tan Chau and Chau Doc was the lowest in over 73 years of record — intensifying that dry season's drought and saltwater intrusion (VNMHA, 2026).

[3] VNMHA, July 2026
[4] El Niño 2026–2027 Early Warning and Preparedness Situation Report No. 1 by UNICEF Vietnam Country Office, August 2026
[5] data consolidated by Dynam from different sources

Episode	Severity	Key figures
2015–16	Strong El Niño (Niño 3.4 peak ~+2.6°C)	US$674m loss (~0.35% of GDP) per Fulcrum/ISEAS; a separate UNDP-sourced estimate puts direct Mekong Delta losses above VND 5,500bn (~US$227m) — the two figures likely differ in scope (national vs. Delta-specific) and are cited separately rather than summed. Saltwater intrusion reached 90km inland; ~70,000 ha of aquaculture and 160,000 ha of land salinized; 6,000+ livestock lost; over 2 million people impacted, ~1 million left food insecure. World Bank: Vietnam's H1 GDP growth slowed from 6.3% (H1 2015) to 5.5% (H1 2016), explicitly citing "severe drought."
2023–24	Strong El Niño (Niño 3.4 peak ~+2.0°C)	Average nationwide temperatures generally ran 0.5–1.5°C above the multi-year average. River flows in the Central-Central Coast, South Central Coast and Central Highlands saw significant shortfalls, and saltwater intrusion in the Mekong Delta arrived earlier and ran higher than the historical average, though at a lesser damage level than in 2015–2016 (VNMHA, 2026). The Ministry of Agriculture and Rural Development (MARD) estimated 73,900 Mekong Delta households left with limited fresh-water access[6].
2026–27 (current)	Very strong, potentially historic	~350,000 ha of Winter-Spring rice already flagged as at risk — materially larger than either prior episode's at-risk area, consistent with both VNMHA's own framing of this event as potentially the most severe on record and NOAA CPC/IRI-Columbia's September/August 2026 forecasts (>90–100% probability of a very strong to historic event).

Figure 5 consolidates VNMHA's regional risk timeline. Water security emerges as the dominant dry-season concern, with the South-Central Coast, Central Highlands and Mekong Delta the most exposed areas. Drought and saltwater-intrusion risk is expected to intensify from late 2026 into May 2027, while extreme rainfall and tropical-cyclone risk remain relevant despite the drier overall backdrop.

Figure 5 – El Niño 2026–27 Impact Forecast for Vietnam: Water Security Is the Primary Risk, but Extreme Rainfall and Tropical Cyclones Remain Relevant[7]



Source: translated and adapted from Việt Nam Meteorological and Hydrological Administration (NCHMF), El Niño impact overview infographic, July 2026. Date ranges and inflow figures follow the source infographic; regional boundaries are illustrative, not precise administrative or hydrological boundaries. Prepared for Dynam Capital.

[6] UNICEF Vietnam Humanitarian Situation Report No. 1 (drought) 27 April 2024 - Viet Nam | ReliefWeb
[7] Source: Viet Nam Meteorological and Hydrological Administration (VNMHA), July 2026; translated by Dynam, design adapted by Claude

How El Niño 2026–27 Transmits to Vietnam's Macro Economy

Agriculture & Commodities

Rice: approximately 350,000 hectares of Winter–Spring rice in the Mekong Delta have been flagged as at risk from water shortages associated with the developing 2026–27 El Niño. During the 2015–16 event, rice production in both Vietnam and Thailand fell by more than 10%. A comparable drought shock would therefore transmit simultaneously through farm incomes, rural consumption, agri-processing costs and export volumes, given Vietnam's importance in the global rice market.

Robusta coffee: Vietnam is the world's largest robusta producer. USDA projects 2026/27 Vietnamese coffee production at roughly 32 million 60-kg bags[8], with growth driven mainly by recently replanted areas reaching stable yields. However, the Central Highlands—including Dak Lak and neighbouring provinces—are particularly exposed to severe weather during critical stages of the growing cycle. Industry representatives have also warned that El Niño remains a material threat to production. During the 2015–16 event, Vietnamese coffee output fell by roughly 10%; a similar shock would pressure both export receipts and smallholder incomes in the Central Highlands.

Aquaculture: Vietnamese reporting on the current cycle[9] identifies aquaculture, alongside rice and fruit trees, as exposed to water shortages in the south. The transmission mechanism is salinity as much as scarcity: Mekong Delta shrimp farming depends on a stable brackish-water zone, while pangasius farming requires consistently fresh water. Both are therefore vulnerable to deeper saltwater intrusion under VNMHA's Very High-Risk scenario. The 2015–16 episode provides the clearest precedent, when saltwater intrusion reached 90 km inland and roughly 70,000 hectares of aquaculture were salinised. We do not yet have a 2026-specific aquaculture loss estimate, so the current assessment remains directional rather than quantified.

Fertiliser: the impact is primarily indirect, operating through drought's effect on planting decisions rather than through the fertiliser market itself. Across Southeast Asian rice markets, farmers have historically responded to prolonged drought by delaying planting, reducing acreage or switching crops[10]. A similar response would weigh on fertiliser volumes in affected regions, even if global fertiliser prices remain supported by unrelated supply-side factors.

Energy & Power Grid

Reduced river flows constrain hydropower generation nationwide. The government's assessment rates hydropower risk as "high" in three of Vietnam's four river-basin groups: the North, the South-Central Coast, and the Southeast/Mekong Delta (Figure 7). It also projects that all 43 major hydropower reservoirs will enter the flood season below design storage, with shortfalls ranging from 15% to 80%. Central Vietnam and the Mekong Delta face the most acute combined water-security pressures once agriculture and domestic supply are included, but the resulting hydropower shortfall—and the associated power-cost and curtailment risk—is national in scope.

To manage potential dry-season power shortages in 2026-27, EVN has prepared measures on both demand and supply: a 3% reduction in total electricity consumption in 2026, roughly a 10% reduction in peak-period demand, and accelerated or newly commissioned coal, gas and rooftop-solar capacity. Even with these measures, EVN sees electricity demand growth reaching 14.1% in an extreme dry-season scenario, versus an 8.5% base case. The Ministry of Industry and Trade (MOIT)'s planning also treats the issue as structural rather than purely seasonal, estimating a potential national capacity shortfall of about 4,256 MW by 2027 and nearly 14,000 MW by 2030 if generation and grid projects remain delayed. Proposed offsets include around 2,800 MW of rooftop solar on public buildings by end-March 2027 and a contingency study for a further ~5,300 MW of coal-fired capacity[11]. Lower hydropower output would therefore increase reliance on more expensive thermal generation, raising system costs and potentially retail tariffs; the related transition-risk implications are discussed in Section II.

[8] Vietnam: Coffee Annual | USDA Foreign Agricultural Service
[9] Vietnam News, 1 July 2026
[10] PBS News, 22 September 2026
[11] Vietnam Environment Magazine

The table below summarises EVN's principal supply-side additions and contingency measures for the 2026–27 dry season and beyond.

Figure 6 – EVN Supply-Side Response: Capacity Additions for the 2026–27 Dry Season and Beyond [12]

Category	Project	Capacity	Status
Coal-fired thermal	Vung Ang II	~1,300 MW	Full commercial operation from April 2026
Coal-fired thermal	Quang Trach I (2 units)	1,403 MW	Unit 1 achieved first electricity in May 2026; commissioning under way. Unit 2 targeted roughly four months later.
LNG-fired	Quang Trach II	1,500 MW (2 × 750 MW)	Converted from coal to LNG, approved Sept 2024; EPC contract signed (~US$972m); under construction.
LNG-fired	Quang Trach III	1,500 MW	Investment policy approved Dec 2025; construction start and completion date not yet disclosed.
Battery storage[13] (BESS)	Northern Power Corporation	530 MW – 2026 target	Not disclosed
Battery storage (BESS)	Hanoi Power Corporation	275 MW – 2026 target	50 MW installed in July 2026
Battery storage (BESS)	National Power Transmission Corporation	~300 MW – 2026 target 800 MW – 2027 target 10,000-16,300 MW – 2030 target[14]	Not disclosed
Renewables	Rooftop solar (nationwide)	HCMC: target 200 - 300MW in 2027 Nationwide: 20% of total installed capacity over 2026-2030[15]	EVN reported 130,811 rooftop solar systems nationwide as of end-July 2026, over 11,200 MWp combined
Fuel & reservoir management	Hydropower reservoir levels	—	Maintained high ahead of dry-season peak

At the city level, EVNHCMC's 2027 dry-season plan projects Ho Chi Minh City peak load rising by 6.5–11.1% year on year to 10,296–10,743 MW[16]. The utility is therefore accelerating grid-reinforcement works and load-management drills with the Southern Regional Dispatch Centre.

Services and Tourism

Prolonged heat raises electricity and water demand across the services sector and can increase operating costs. Tourism may also be affected in locations facing persistent water shortages. Vietnam's hospitality sector is itself water-intensive: hotel benchmarks range from roughly 350 litres per guest-night for standard accommodation to nearly 3,400

[12] Data collected by Dynam from different sources
[13] Vietnam prepares contingency plans for 2026 dry-season power shortages
[14] Improving and perfecting the regulations for the development of gas, power projects and energy storage systems in Vietnam for the period 2026 – 2030 | Tạp chí Năng lượng Việt Nam
[15] Directive No. 10/CT-TTg of the Prime Minister: On Strengthening the Implementation of Electricity Savings and the Development of Rooftop Solar Power
[16] VnExpress

litres for luxury properties[17]. This illustrates the sensitivity of tourism operators to sustained heat and water stress, although the figures are general water-use benchmarks rather than El Niño-specific loss estimates. We do not have sufficiently granular visitor-arrival or spending data to quantify the effect on individual destinations, so this channel remains directional at this stage.

Inflation & SBV Policy

Vietnam's CPI has remained elevated in 2026. Headline inflation first moved above 4.5% in March, at 4.65% year on year, peaked at 5.60% in May, eased to 4.45% in July, and rose again to 4.89% in August, the latest official reading[18]. The eight-month average was 4.45%, while core inflation averaged 4.24%. UOB attributes the overshoot mainly to supply-side pressures, particularly energy, and forecasts full-year inflation of around 5.5%[19]. It nevertheless expects the SBV refinance rate to remain at 4.50% through 2026[20]. For VNH, the key risk is therefore not a reversal of an existing easing cycle, but a narrowing of policy room: a second round of El Niño-related food and energy inflation could make it harder for the SBV to keep rates unchanged while the VND is already under pressure.

Section II: El Niño Physical-Risk Analysis Using MSCI Data

MSCI Physical-Risk Overview: Extreme Heat and Water Stress

We commissioned a licensed MSCI Physical Risk Assessment covering Business Interruption Average Annual Loss (BI AAL, as a percentage of company revenue) and Asset Damage Losses by hazard across portfolio companies under two IPCC-aligned scenarios to 2050: SSP5-8.5, a high-emissions pathway, and SSP1-2.6, a Paris-aligned low-emissions pathway. On the business-interruption measure, Extreme Heat is by far the most material hazard for VNH and the one most directly relevant to El Niño's dry-season mechanism, accounting for the majority of modelled portfolio-weighted business-interruption risk.

MSCI's assessment is a long-horizon, scenario-based model to 2050, not an El Niño-specific forecast. Its relevance here is the overlap in mechanism: NCHMF's 2026–27 scenarios point to rainfall 10–40% below normal and temperatures 0.5–2°C above average, with the Very High-Risk heatwave window concentrated in March–June 2027. We therefore use MSCI to identify structural heat sensitivity, then apply the VNMHA's Very High-Risk scenario to assess how that exposure could become more acute over the next several quarters.

One scoping choice is important. MSCI also identifies Extreme Precipitation and Flooding as material hazards for several holdings, and Flooding is the most material hazard on its separate Asset Damage Loss measure. This paper, however, focuses on the portfolio implications of an El Niño-driven dry season—particularly heat, drought and water scarcity—and on how those risks should inform stock selection and portfolio weighting through Q4 2026 and into 2027.

Water scarcity and salinity intrusion are most relevant to holdings with Mekong Delta or coastal-lowland footprints. The Water Resources Management Department identifies the South-Central Coast and the Southeast/Mekong Delta as the two basin groups facing the most acute 2026–27 dry-season risk, both rated "very high" for domestic and agricultural water security (Figure 7). For VNH, the clearest overlap is HPG's Dung Quat complex in Quang Ngai: its location carries elevated water-security risk, while MSCI separately identifies Hoa Phat as highly exposed to business interruption from Extreme Heat. The two datasets therefore point to a common concentration of physical risk rather than separate, unrelated exposures.

[17] RMIT Vietnam's research
[18] General Statistics Office, released 3 September 2026
[19] Vietnam's economy shows resilience amid cost pressures, external uncertainties: UOB
[20] Vietnam: Inflation surge and SBV policy stance – UOB

Figure 7 - El Niño 2026-27: Vietnam Water-Security Risk by River-Basin Region[21]



Compounding Transition Risks

Physical and transition risks can compound rather than operate independently. If hydropower shortfalls push the grid towards greater coal- and gas-fired dispatch during the 2026–27 dry season, the power system and energy-intensive industrials could face higher emissions and transition-policy exposure at the same time as physical curtailment risk. In other words, the dry-season shock can increase both operational and carbon-related risk within the same window.

Our separately licensed MSCI Transition Climate Risk Assessment shows VNH's aggregate transition risk below the VNAS benchmark—a Policy CVaR of –9.94% under a 1.5°C Net Zero 2050 scenario, versus –11.04% for VNAS[22]—but with pronounced single-name concentration. Hoa Phat accounts for 60.2% of the portfolio's aggregate Policy Climate VaR despite representing roughly 6% of the snapshot weight, with a company-level Policy CVaR of –97.6%. Mobile World Investment Corp is a distant second at 15.1% of total policy risk. This makes Hoa Phat the portfolio's clearest overlap of site-level physical exposure and carbon-policy transition risk.

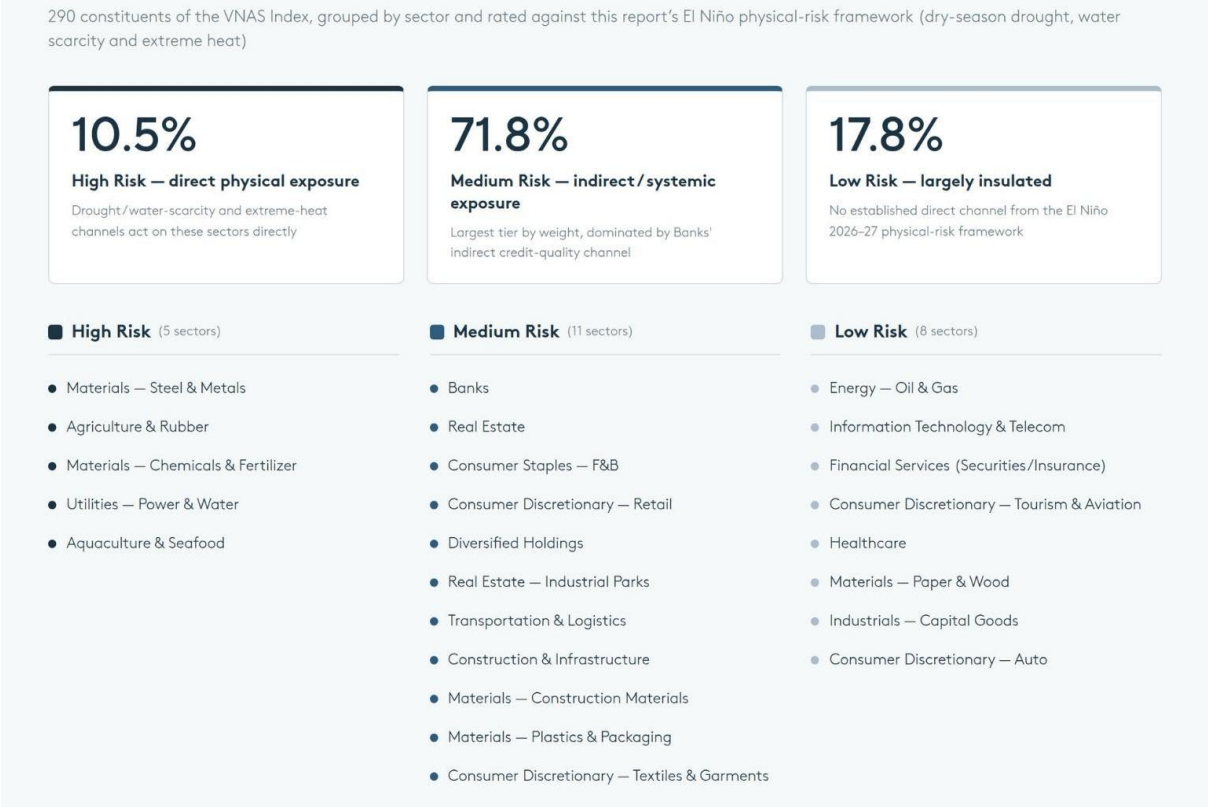
Section III: VNH Portfolio Stress-Test & Vulnerability Assessment

Before turning to individual holdings, we place VNH against the broader market. We classified all 290 constituents of the VNAS Index—a proxy for the investable Vietnamese equity universe—by GICS sector and mapped each to this report's El Niño physical-risk framework. Figure 8 shows that sectors with direct physical exposure, including agriculture, aquaculture, steel, hydropower and fertiliser, account for only about 10% of index weight. The largest tier, at roughly

[21] Illustration by Claude using data from VNMHA's Report on El Niño 2026-27 Impact Forecast, July 2026 and Vietnam's Water Resources Management Department, Report No. 237/BC-TNN, September 2026. Regional boundaries in the illustrative map approximate the four river-basin risk groups and are not precise administrative or hydrological boundaries.
[22] Assessment based on VNH Portfolio as of 30 June 2026

72%, is Medium Risk, driven mainly by banks' indirect exposure through agriculture-linked credit quality rather than direct physical disruption. VNH is somewhat more concentrated than the broader index in High-Risk sectors, primarily because of its HPG overweight.

Figure 8 - El Niño 2026–27 Sector Risk Classification across the VNAS Index (290 Constituents), Rated "High/Medium/Low" against this report's physical risk framework; risk mapping by Dynam Capital



Heavy Industry Focus: Hoa Phat Group (HPG)

Among VNH holdings, HPG is the most concentrated case because Dung Quat combines site-specific heat and water stress with material transition risk. The South-Central Coast location has already been identified in Section II as a high-risk water-security zone. We therefore stress-test three operational channels:

- Power-grid constraints are less severe for Dung Quat than national hydropower statistics alone would imply. Hoa Phat discloses that the complex self-generates more than 90% of its production electricity through a 600 MW closed-loop system. Its two thermal plants, with capacities of 360 MW and 240 MW, recover waste heat from coke production and burn excess coal gas from the steelmaking process. Dung Quat should therefore be largely insulated from dry-season hydropower shortages, although the residual ~10% grid-sourced share remains exposed. A second-order risk is that lower hydropower output shifts incremental generation towards coal, increasing system-wide emissions and potentially raising compliance pressure for a high-emissions producer such as HPG under Vietnam's pilot emissions trading scheme (ETS).
- **Extreme-heat disruption:** heatwaves concentrated in March–June 2027 under the Very High-Risk scenario could increase operational and worker-safety risks for blast-furnace operations. This is consistent with MSCI's identification of Extreme Heat as one of the portfolio's dominant physical hazards, including for Hoa Phat.
- **Raw-material and logistics costs:** broader drought and heat, together with any energy-cost pass-through, could raise input and logistics costs across the steel value chain.

These operational risks sit on top of Hoa Phat's already concentrated transition exposure. The combination, rather than either channel in isolation, is why HPG remains the highest-priority name for engagement in Section IV.

Financial Sector Exposure

For banks, the principal transmission channel is credit quality rather than physical disruption to operations. Reporting on Mekong Delta farm debt[23] shows how the 2016 and 2019 droughts pushed some farmers into a "third-year debt trap", including reliance on high-cost informal borrowing to service formal bank debt. The evidence is case-based rather than statistical, and we have not found sector-wide Vietnamese data that quantify the lag from drought to agricultural NPL formation. We therefore treat the mechanism as directionally credible, not as a precisely measurable timing assumption. The state-owned banks—BID, VCB and CTG—have agricultural exposure within much larger and more diversified loan books. Their MSCI-modelled physical business-interruption risk is also modest relative to industrial holdings, reflecting office and branch networks rather than concentrated production sites.

Consumer & Retail Sector Impact

Retail faces pressure through both demand and operating costs: weaker purchasing power in rural and Mekong Delta areas if food and energy inflation rises, and higher cooling, refrigeration and supply-chain costs during a hotter dry season. MSCI's physical-risk assessment flags MWG, MSN and FRT as having above-average business-interruption exposure within the portfolio, with MSN ranking third highest across all holdings, behind only MWG and HPG (see Annex 2). Extreme Heat is the larger driver across all three stocks, while the secondary driver varies by company. Under El Niño conditions, we would expect Extreme Heat to drive further business-interruption losses through higher operating and energy costs — a risk amplified for businesses with large retail-store networks.

Extreme Precipitation is an unusually prominent secondary factor for MWG, consistent with the exposure of a nationwide store network to multiple physical hazards. MSN's secondary exposure, by contrast, sits almost entirely within All Other Hazards rather than Extreme Precipitation. This is consistent with our view that MSN's physical-risk exposure extends beyond its retail stores, with Masan MeatLife and its FMCG food subsidiaries adding direct livestock- and crop-supply exposure. In addition, it is found that MWG is the largest contributor to VNH's absolute financed emissions, at 69.8% of the portfolio total, primarily because of its reported Scope 3 emissions.

Section IV: Portfolio Management Considerations

Thematic Selection and Weighting Adjustments

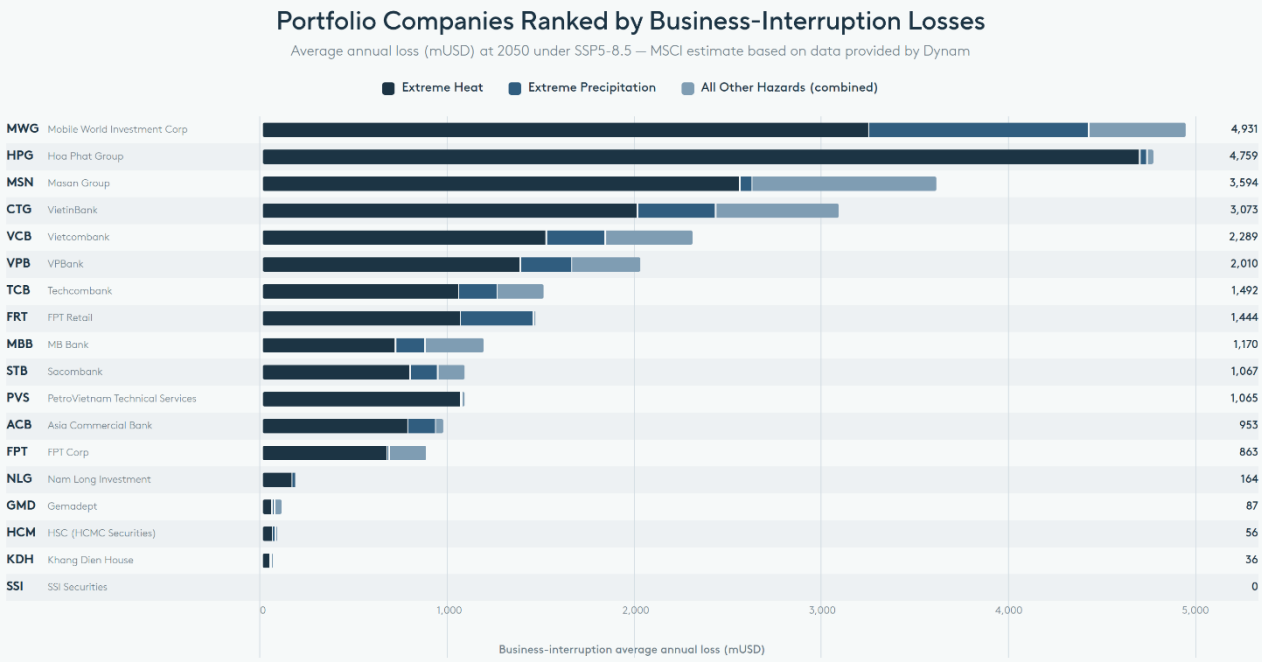
During the El Niño cycle, our risk framework favours asset-light, service-oriented business models over power-intensive or site-concentrated heavy industry and retail networks with high heat or rainfall exposure. Solar-based renewable generation may also benefit from stronger irradiation and from policy efforts to offset hydropower shortages. We also continue to monitor commercial and industrial real-estate holdings with significant Mekong Delta land-bank exposure, where public-data proxies and the government's water-security assessment both point to elevated drought and salinity risk.

[23] In Viet Nam's Mekong Delta, debt can be deadlier than droughts

VNH Portfolio Top 10 Holding and Their Primary Physical-Asset Footprints

#	Ticker	Company	Sector	Region of primary physical assets	El Niño 2026–27 Risk Exposure	Risk Driver (Brief)
1	MWG	Mobile World Investment Corp	Retail	Nationwide	Medium	Dual climate exposure: Supply-chain vulnerabilities in grocery procurement (BHX), counterbalanced by potential revenue upside in electronics retail (DMX) driven by peak heatwave demand for cooling systems.
2	MBB	MB Bank	Banking	Nationwide	Medium	Indirect: agri/SME loan-quality stress in drought-hit provinces
3	HPG	Hoa Phat Group	Steel/Industrials	South Central Coast (Quang Ngai) / North - Red River Delta	High	Energy/water-intensive steelmaking exposed to hydropower shortfall and grid reliability
4	VPB	VPBank	Banking	Nationwide	Medium	Indirect: agri/SME loan-quality stress in drought-hit provinces
5	TCB	Techcombank	Banking	Nationwide	Medium	Indirect: agri/SME loan-quality stress in drought-hit provinces
6	CTG	VietinBank	Banking	Nationwide	Medium	Indirect: agri/SME loan-quality stress in drought-hit provinces
7	DGW	DigiWorld Corp	Retail	Nationwide	Low	Asset-light Market Expansion Services (MES) model; negligible physical climate or nature-related supply-chain risks
8	PVS	PetroVietnam Technical Services Corp	Oil & Gas Services	Southeast coast	Low	Largely insulated; gas dispatch may rise as hydropower shortfalls bite
9	GMD	Gemadept Corp	Logistics/Ports	North (Hai Phong) / Southeast (Cai Mep)	Medium	Exposed to acute physical climate risks (extreme weather disrupting coastal port operations); revenue sensitivity to agricultural export volumes.
10	MSN	Masan Group	Consumer	Nationwide	Medium-High	Its subsidiaries Masan MeatLife and FMCG food brands add direct livestock/crop-supply exposure beyond retail

Portfolio Companies Ranked by Business-Interruption Losses (mUSD) in 2050 under SSP5-8.5 (MSCI Estimate Based on Data Provided by Dynam)[24]



Source: MSCI Physical Risk Assessment (2025), Exhibit G — licensed extract, data provided by Dynam Capital. Eleven modeled hazard categories are grouped into Extreme Heat and Extreme Precipitation (the two hazards identified elsewhere in this report as most material to the portfolio) plus All Other Hazards combined (extreme cold, wind, snowfall, coastal/fluvial/pluvial flooding, wildfire, tropical cyclones, river low-flow). A small number of modeled hazard components carried a slightly negative average annual loss (a modeling artifact, most visible for Nam Long Investment Corp's extreme-cold component); these are floored at zero for display, so bar totals may exceed the unadjusted sum in the source file by an immaterial amount for the affected names. SSI Securities Corporation shows zero modeled business-interruption loss across all hazard categories in the source file.

Data Sources, Methodology & Limitations

This report draws on: (i) VNH Portfolio data as of 31 August 2026; (ii) our licensed MSCI portfolio emissions and Transition Climate VaR extract for VNH Portfolio data as of 30 June 2026; (iii) our licensed MSCI Physical Risk Assessment based on 2025 data; (iv) Report: El Niño 2026–27 Forecast, July 2026 by Vietnam Vietnam Meteorological and Hydrological Administration (VNMHA) – Ministry of Agriculture and Environment (MAE); Report: Preliminary Assessment of the Risk of Water Shortage Due to the Impact of El Niño by UNICEF Viet Nam's El Niño 2026–27 early-warning, September 2026 by Department for Water Resources Management Department - MAE; NOAA CPC and IRI/Columbia ENSO forecasts and probability/strength updates, including ENSO-transition outlooks from Climate Impact Company and El Niño Guide); (v) World Bank, UNDP, ISEAS/Fulcrum and Save the Children/ReliefWeb climate-economy publications; (vi) USDA and industry sources on Vietnamese robusta coffee; (vii) UOB/DBS commentary on SBV monetary policy and Vietnam's General Statistics Office (GSO) monthly CPI releases; (viii) public corporate disclosure for investee facility locations, including Hoa Phat's own reporting on its Dung Quất waste-heat and blast-furnace-gas self-generation capacity, via Hoa Phat Group's website, and Vietnamese press including Vietnam Government News and Thanh Nien.

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[24] The assessment was made in October 2025 by MSCI, with company data provided by Dynam