



SECTOR ANALYSIS

UTILITIES

C. Thompson & S. Frugte | November 2025

i This report examines emissions performance and climate-related financial risk across the Utilities sector, highlighting structural drivers of carbon intensity, regional disparities, and evolving transition pressures for investors.

KEY FINDINGS

Electric Utilities dominate sector emissions, remaining the highest contributors across Scopes 1 and 3 despite ongoing decarbonisation efforts.

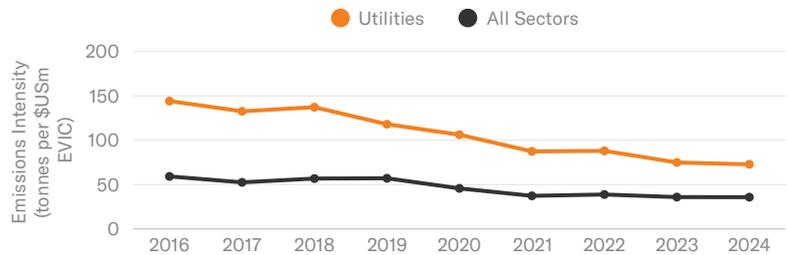
Asian power markets, especially India and China, are the global centre of carbon intensity. This is driven by deep coal reliance, lower thermal efficiency, and slow retirement of ageing capacity.

Transition risk is both structural and escalating, with Electric Utilities facing value losses above 10% in all modelled scenarios and exceeding 60% under Net Zero and Two Degree pathways by 2050.

EMISSIONS INTENSITY

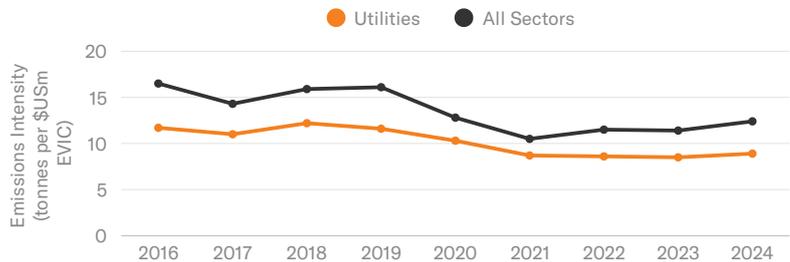
Scope 1

Utilities sit well above the market on Scope 1 emissions. These reflect direct emissions from owned generation assets - Electric Utilities' reliance on fossil fuels, particularly coal and gas, creates a structurally higher baseline. Although fuel switching and renewable build-out have reduced intensities over time, the sector will continue to benchmark high due to the fundamental nature of its operations.



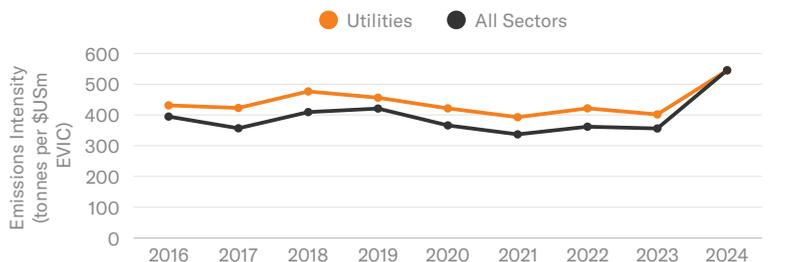
Scope 2

Scope 2 intensity for Utilities is broadly in line with or slightly lower than the market. Because most Utilities generate rather than purchase power, their exposure to purchased electricity is limited. This results in a narrower Scope 2 footprint compared with sectors reliant on grid electricity.



Scope 3

Scope 3 footprints are marginally higher than the market. Upstream fuel extraction, equipment manufacturing, and capital-intensive infrastructure all contribute to significant indirect emissions. These system-wide drivers make Utilities structurally emissions-heavy across the value chain, even for firms advancing decarbonisation.

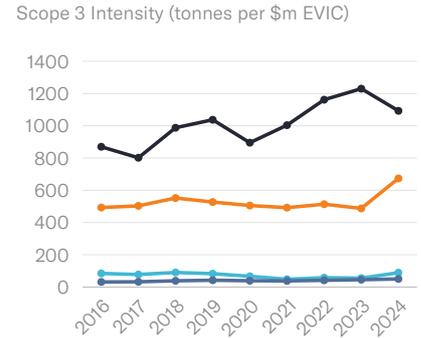
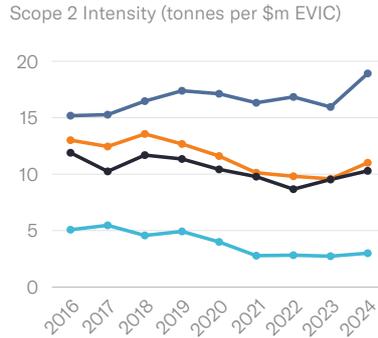


SUB-INDUSTRY EMISSIONS PROFILE

Electric Utilities remain the sector's clear outlier on carbon intensity for Scope 1 and 2 emissions. While progress on renewable deployment continues, the segment still carries the highest operational and value-chain emissions. Gas Distributors rank a distant second (though has the highest Scope 3), while Water Utilities and Alternative Power Generation operate at a fraction of the emissions intensity of the heavy-thermal generators.

FACTSET: INDUSTRY CLASSIFICATIONS

-  Electric Utilities
-  Water Utilities
-  Alternative Power Generation
-  Gas Distributors

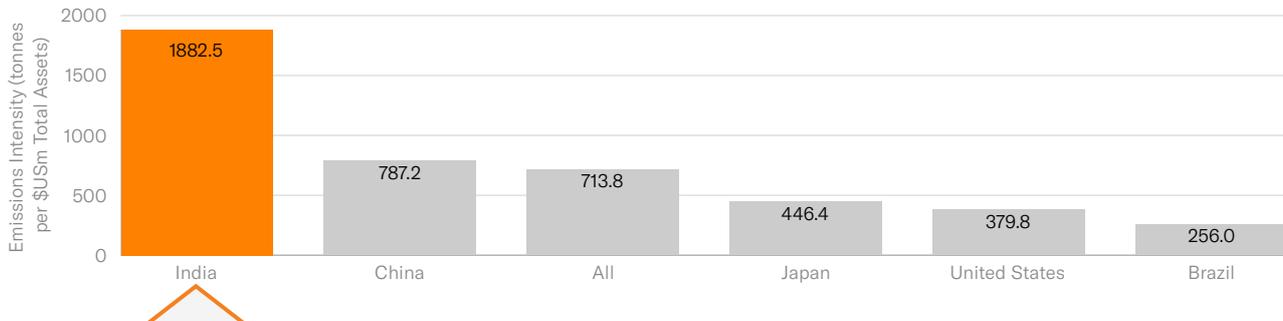


ELECTRIC UTILITIES: REGIONAL INSIGHTS

Filtering for companies with more than US\$100 million in annual revenue, India exhibits the highest average carbon intensity when calculated based on sales, enterprise value, and total assets.

Scope 1 and 2 Emissions per \$USm of Total Assets

Average of listed companies domiciled in each country



India's power system: the details behind the data

Around 60% of India's electricity is generated by coal-fired units, many of which operate at low thermal efficiency, resulting in high emissions per kilowatt-hour. Despite rapid cost declines in solar and wind, state utilities are continuing to sign long-term coal power purchase agreements to meet growing evening and night-time demand, periods when solar output falls, and large-scale storage remains both limited and costly.

Electricity demand in India is projected to more than double over the next decade. In response, authorities are expanding coal capacity and delaying the retirement of inefficient units rather than systematically replacing them. Analysts at Wood Mackenzie now expect India's coal-fired generation to peak in the early 2040s, even as the country maintains a net-zero 2070 target.

While India continues to roll out renewable capacity at scale, these structural pressures suggest that the phase-out of fossil fuels may occur later than previously anticipated.

Country comparison

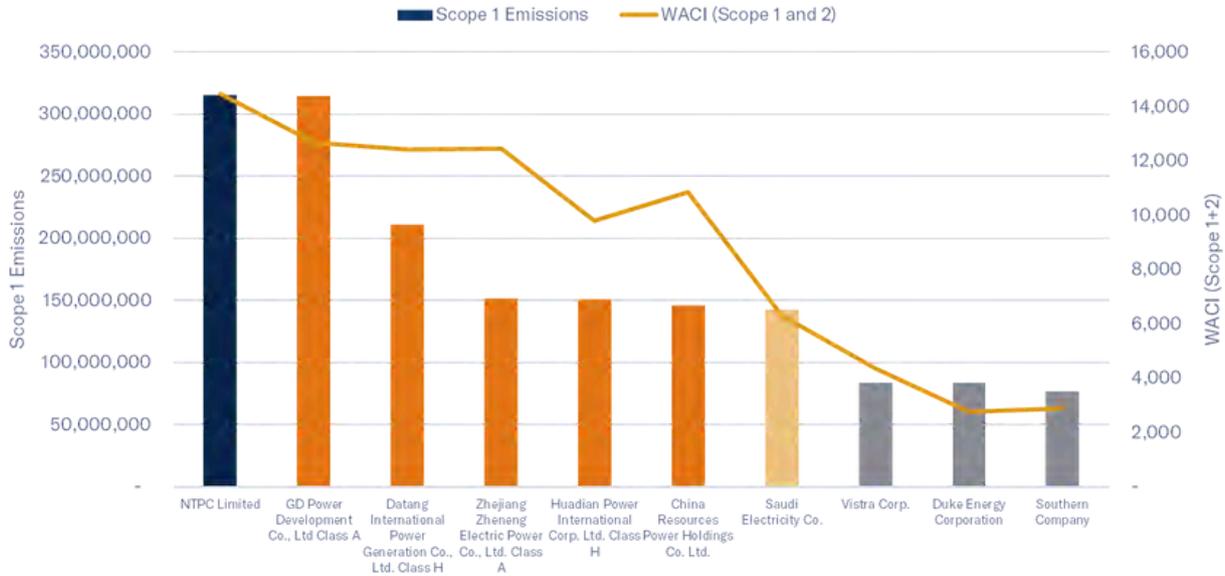
Across major markets:

- India shows the highest Scope 1 and 2 intensities.
- China follows, reflecting its sizeable coal-fired fleet.
- The United States, Japan, and Brazil show comparatively lower intensities due to fuel mix diversification and higher efficiency standards.

TOP EMITTERS: ELECTRIC UTILITIES

NTPC, India's largest integrated power utility, is the highest Scope 1 emitter in the Electric Utilities segment. Dominated by coal generation, NTPC emits over 14,000 tonnes of CO₂e per US\$1m of revenue, compared with the industry average of roughly 2,260 tonnes.

The second-largest Scope 1 emitter is China's GD Power Co., with 314 million tonnes of Scope 1 emissions, a volume slightly higher than the sovereign emissions of Spain. Chinese companies occupy five of the top ten positions globally, reflecting both scale and coal dependency, with one Saudi and three U.S. companies rounding out the group.



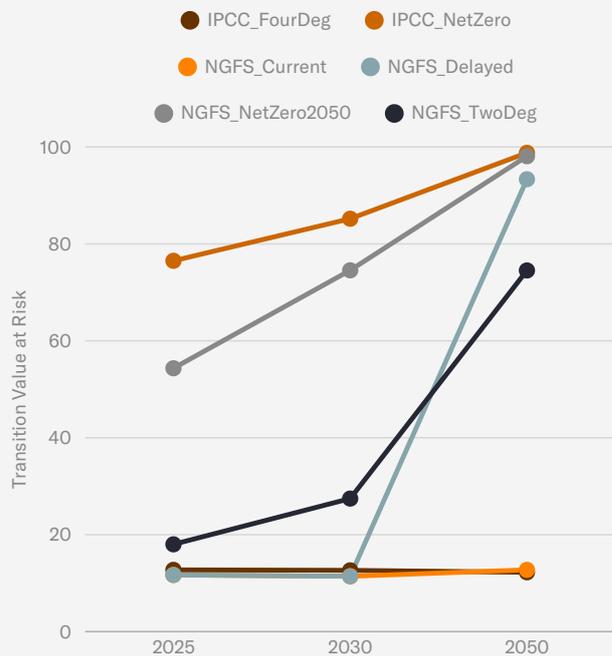
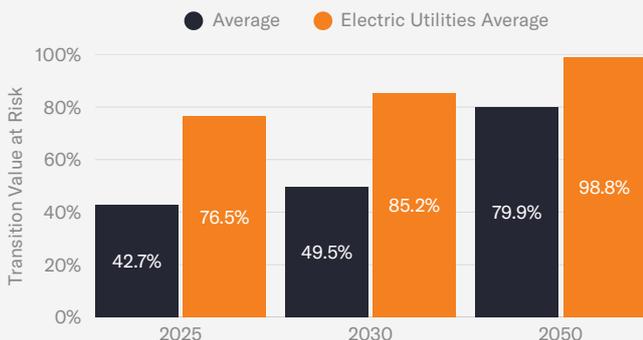
TRANSITION RISK VAR: ELECTRIC UTILITIES

Across all modelled scenarios, Electric Utilities face average transition value-at-risk (VaR) exceeding 10%, rising sharply under more stringent policy pathways.

- Net Zero and Two Degree scenarios show potential value losses above 60% by 2050.
- Current Policies and Delayed Transition scenarios still indicate material downside, reflecting persistent exposure to fossil-fuel-linked revenue streams.
- Electric Utilities exhibit higher transition risk than the listed universe, driven by capital-intensive assets with long useful lives, slower operational flexibility, and elevated emissions baselines.

This underscores the importance of scenario alignment, capital planning, and technology roadmaps in portfolio-level risk assessment.

Transition VaR: IPCC Net Zero



Methodology notes: Our machine learning models achieve strong accuracy across all scopes, with WMAPE (Weighted Average Median Absolute Percentage Error) ranging from 15.3% to 18.1%.

For detailed methodology and validation metrics, read our white papers: [Emmi Resources](#)

This analysis applies to companies classified in the Utilities sector under FactSet industry definitions.

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ABOUT EMMI

Emmi creates climate risk solutions for investors. We provide emissions, transition, and physical risk data for every company and investment - supporting 100% portfolio coverage across both private and public markets for all asset classes.

With our comprehensive climate risk data set, we deliver the transparency and customisation needed to power investment decisions, meet climate reporting obligations, and align with investor mandates.

Emmi is backed by a team of climate and finance experts.

Emmi believes that a low-carbon economy is possible, and that properly incentivising and mobilising capital is the fastest and most cost-effective way to reach Net Zero and beyond.

Quantifying climate risk exposure allows the financial sector to efficiently allocate capital towards this goal.

To achieve this, meet regulatory reporting requirements and investor mandates, there is a need for a broad spectrum of comprehensive climate risk data. We have built Carbon Diagnostics to solve that problem.

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