

## Appendix 3 2030 emissions reduction outlook for the power sector – Methodology and Assumptions

### 1. Analytical objective

This annex explains the methodological approach used to estimate the emissions implications of the FY2030 benchmark design for selected power generation companies (JERA and J-POWER) (See the results of our analysis in Box 4 in the “What’s GX-ETS?” report). The objective is to isolate the impact of the benchmark structure under the Phase 2 GX-ETS rules, without incorporating additional behavioral responses or policy changes. The analysis therefore focuses on how the benchmark design translates into implied allowable emissions in FY2030 under simplified and transparent assumptions.

### 2. Core assumptions

The case study is based on the following assumptions:

- Power generation output remains constant through FY2030
- The fuel composition of each company remains unchanged
- Actual emissions are assessed without external credits (J-Credits or JCM credits) being used
- No additional reductions beyond those required by the benchmark are incorporated
- The benchmark levels evolve according to the Phase 2 design as described in the Interim Summary of the Industrial Structure Council Emissions Trading System Subcommittee<sup>1</sup>

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<sup>1</sup> METI "[Industrial Structure Council Emissions Trading System Subcommittee Interim Summary \(Draft\) – Matters Concerning Implementation Guidelines for Allowance Allocation](#)" December 19, 2025 (p. 35) (in Japanese)

These assumptions allow the analysis to focus solely on the benchmark mechanism itself.

### 3. Data sources

Power generation output data by fuel type are based on the Comprehensive Energy Statistics published by the Agency for Natural Resources and Energy.<sup>2</sup> Benchmark indicator values follow the draft benchmark indicators by sector published by METI.<sup>3</sup> Company-level emissions data are based on publicly disclosed integrated reports.

### 4. Application of the benchmark

Allowances in the power sector are determined by multiplying the baseline activity level by the relevant benchmark emissions intensity. METI guidance specifies that emissions intensities should be calculated based on the average production level over FY2023–FY2025. Because FY2025 data are not yet available, this analysis uses the average of FY2023 and FY2024 as a proxy. The benchmark emissions intensity for FY2030 is set at a level equivalent to the top 32.5% performance within the sector.<sup>4</sup>

For FY2026–FY2028, fuel-specific benchmarks apply. From FY2029 onward, the benchmark gradually transitions toward an all-thermal benchmark. In FY2029, 20% of the benchmark reflects the all-thermal benchmark and 80% remains fuel-specific. In FY2030, the all-thermal share increases to 40%.<sup>5</sup> Under these rules, the effective benchmark for FY2030 reflects a weighted combination of fuel-specific and all-thermal intensities.

### 5. Derivation of implied emissions in FY2030

Implied allowable emissions in FY2030 are derived by applying the relevant benchmark emissions intensity to projected power generation output.

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<sup>2</sup> Agency for Natural Resources and Energy (ANRE) "[Comprehensive Energy Statistics – Aggregated and Estimated Results \(Time Series Tables, Reference Tables\)](#)" (accessed January 21, 2026)

<sup>3</sup> METI "[Benchmark Indicators by Sector \(Draft\)](#)" December 9, 2025 (p. 43) (in Japanese)

<sup>4</sup> METI "[Benchmark Indicators by Sector \(Draft\)](#)" December 9, 2025 (p. 43) (in Japanese)

<sup>5</sup> METI "[Industrial Structure Council Emissions Trading System Subcommittee Interim Summary \(Draft\) – Matters Concerning Implementation Guidelines for Allowance Allocation](#)" December 19, 2025 (p. 35) (in Japanese)

Because the GX-ETS does not impose an overall emission cap and relies on benchmarking at the entity level, the resulting allowable emissions depend directly on each company’s fuel mix and relative efficiency position within the distribution.

Companies with a high share of LNG generation—which already exhibits relatively low emissions intensity among thermal fuels. The phased introduction of the all-thermal benchmark further influences the relative stringency of the system.

## 6. Assessment of required reductions

The implied reduction requirement relative to FY2024 is calculated as the percentage difference between FY2024 actual emissions and the benchmark-implied FY2030 emissions.

Under the assumptions described above:

- LNG-dependent generators may be permitted to maintain emissions close to—or, in certain cases, above—recent historical levels
- Companies relying predominantly on coal-fired generation face stronger tightening once the all-thermal benchmark becomes partially binding

These differences reflect structural features of the benchmark design rather than additional decarbonization measures.

## 7. Interpretation

The results illustrate that the stringency depends on:

- The relative emissions intensity distribution within each fuel category
- The share of LNG versus coal in the generation mix

In addition, the benchmark remains restricted to an all-thermal benchmark, which excludes non-fossil electricity, such as renewable energy and nuclear. Thus, the incentive to transition to non-fossil electricity remains very low. As a consequence, the GX-ETS benchmark requirement may diverge substantially from both company’s own commitment and Japan’s national NDC trajectory.