

#### Investor Briefing - Electric Power Development Co., Ltd (J-POWER) 2023 AGM

Analysis of climate plan; analysis and voting intentions on shareholder resolutions and director re-election

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#### **Executive Summary**

- The Electric Power Development Co., Ltd (J-POWER) is the second largest power utility in Japan, with operations covering power generation, transmission and distribution. Since 2000, it has undertaken assertive international expansion with these assets accounting for a quarter of installed capacity, predominantly in Asia.
- Despite claims of working "steadily to achieve carbon neutrality", J-POWER'S climate transition plan falls far short of aligning with the goals of the Paris Agreement:
  - The company does not have a phase out schedule for domestic coal assets in line with a net zero pathway (which, in OECD countries, requires coal phase-out).
  - Short and medium term emission reduction targets are not Paris-aligned.
- While global energy markets shift towards renewables and many countries implement policies to phase out coal, J-POWER'S current energy
  portfolio still relies heavily on coal-fired power plants. Ongoing investments in coal-fired power plants and in unproven-at-scale technologies to
  prolong their life, like hydrogen/ammonia co-firing and coal gasification with CCS, create a major risk of stranded assets.
- Despite the global trend towards renewables, J-POWER's decarbonisation plan does not reflect a robust commitment to this sector. Vague targets
  and tepid growth plans for renewable energy expose a lack of ambition incompatible with Japan's aggressive renewable energy targets and the
  global shift towards clean energy.
- J-POWER's strategy does not provide clear information on the planned retirement of coal-fired power plants a crucial step towards achieving significant emissions reductions. This ambiguity poses significant risks to the company's climate credibility and long-term shareholder value.
- The combination of a slow transition to renewables, over-reliance on unproven technologies, and lack of clear planning for coal plant closures could jeopardize J-POWER's profitability in an increasingly decarbonising global economy, threatening long-term investor interests and value.
- J-Power must set a credible decarbonisation strategy and science-based short-, medium- and long-term GHG emissions reduction targets aligned
  with the goals of the Paris Agreement and investor expectations.

This presentation outlines the strong case for:

- voting FOR the two shareholder proposals on target alignment with 1.5C and remuneration linkage to GHG reduction
- voting AGAINST the re-election of Director Kanno to the company's Board



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# J-POWER engagement timeline



#### Timeline of engagement

**January 2022 -** ACCR and a US\$3 trillion investor group including Man Group, HSBC Asset Management and Amundi begin co-engaging with J-POWER on its decarbonisation commitments and climate strategy

**May 2022-** Following a lack of progress from corporate engagement, Man, HSBC, Amundi and ACCR file the first ever institutional investor group-led climate shareholder proposals in Japan, containing a set of three shareholder proposals. The proposals received the near-complete backing of the two major proxy advisors Institutional Shareholder Services (ISS) and Glass Lewis.

28 June 2022 - The proposals receive strong votes in support from shareholders at 2022 AGM:

- set a business plan and short- and medium-term emissions reduction targets aligned with the goals of the Paris Agreement (26%)
- disclose how it assesses the alignment of future capital investment against those targets (18%)
- disclose how its remuneration policy incentivises the company's executives to work towards its climate goals (19%)



#### **Timeline of engagement (continued)**

**September 2022 - April 2023 -** co-engagement group continues private corporate engagement with J-Power on its decarbonisation commitments and climate strategy.

**May 2023 -** Amundi, HSBC and ACCR, supported by Man Group file two shareholder proposals with J-POWER. Members of the co-engagement group publicly indicate they will vote "no" against the re-election of Representative Director (Executive Vice President) Hitoshi Kanno, responsible for the company's insufficient decarbonisation plan the 'Blue Mission 2050'.

## Co-filed Shareholder Resolutions at 2023 AGM



### Global asset managers with close to US\$3 trillion AUM are supporting climate shareholder resolutions filed at J-Power

#### Jason Mitchell, Head of Responsible Investment Research at Man Group said:

"Setting a clear decarbonisation strategy with Paris-aligned, credible, short and medium-term targets is vital to protecting J-Power's long-term value given the risks and opportunities associated with the global shift away from fossil fuels."

"Despite a number of meetings over two years, we remain disappointed by the Blue Mission strategy. We do not have confidence that the company's approach to the urgent challenge of decarbonisation will evolve under the current leadership, so we have decided to take voting action."

#### Caroline le Meaux, Head of ESG research, engagement and voting Amundi, said:

"We are concerned by Blue Mission 2050, notably the high emissions from J-Power's coal power business, and the low level of economic and technical feasibility attaching to technologies detailed in the company's plan."

"OECD countries need to be on a pathway to complete coal phase-out by 2030, and J-Power's plans are inconsistent with this critical objective. Its strategy bets against the success of the Paris Agreement, and risks shareholder value in the process."

"As the company's climate strategy is falling short of our minimum requirements, we will continue to vote against the renewal of board members following our voting policy."

#### Sachi Suzuki, Senior Manager – Investment Stewardship, HSBC Asset Management, said:

"We expected the last AGM result would encourage a shift from the current high-cost, coal-based strategy to a more credible decarbonisation strategy, in line with investor expectations. Regrettably, we have not seen evidence of such a shift. Under J-Power's existing plan, shareholder money will continue to be spent on speculative technologies to prolong coal power, rather than focusing on expanding renewables. This would likely expose the company to risks associated with costs, sourcing and adverse regulatory changes and potentially cause a loss of value to investors."

Brynn O'Brien, Executive Director, ACCR, said:

"J-Power's leadership has demonstrated no understanding of how their strategy needs to evolve in line with investor expectations. Despite last year's vote and several meetings this year with Director Kanno, we have seen no material progress."



#### 2023 Shareholder Resolution to J-POWER on Target Alignment with Paris Agreement

Disclosure of a business plan aligned with the goals of the Paris Agreement Partial amendment to the Articles of Incorporation

The following clause shall be added to the Articles of Incorporation:

- To promote the long-term value of the Company, the Company shall set and disclose a business plan to achieve science-based short- and medium-term GHG emissions reduction targets aligned with the goals of the Paris Agreement.
- 2. The Company shall report, in its annual reporting, on its progress against such targets at reasonable cost and omitting proprietary information.



### 2023 Shareholder Resolution to J-POWER on Remuneration Linkage to Targets

#### Disclosure of a remuneration policy linked to short- and medium-term targets

Partial amendment to the Articles of Incorporation

The following clause shall be added to the Articles of Incorporation:

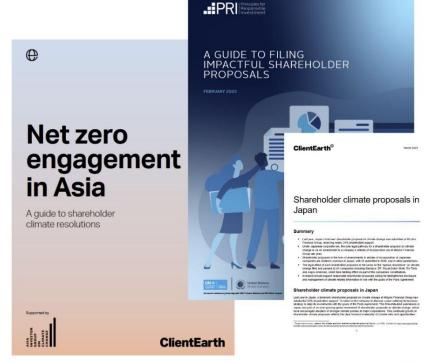
The Company shall disclose, in its annual reporting, details of how the Company's remuneration policies will incentivise progress against the Company's science-based short- and medium-term GHG emissions reduction targets, at a reasonable cost and omitting proprietary information.



Amendment to articles of incorporation:

The only pathway

- UN PRI: Japan is one of the countries with a 'restrictive' framework. Shareholder proposals must take the form of amendments to the articles of association
- Japan Companies Act allows for shareholder proposals in the form of amendment to the articles.
- Legal uncertainty regarding climate proposals in a different form creates a risk of rejection by companies of a shareholder proposal not framed as amendment to the articles
- Shareholder proposal shall preferably not encroach on "management matters" of the Board because:
  - · vocal minority view against it;
  - certain Japanese AM have voting policy against proposals prescribing specific business execution



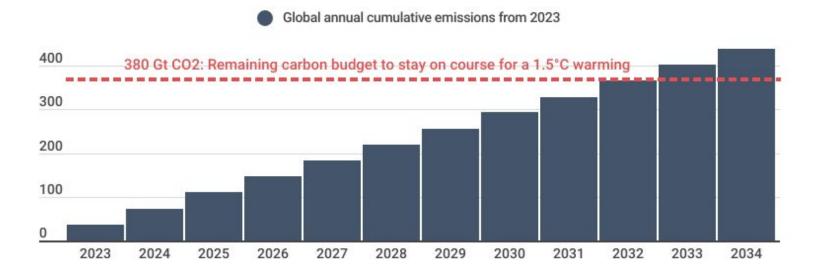




# J-POWER'S emissions footprint & analysis of 'Blue Mission 2050'

Carbon budget: The remaining global carbon budget to stay on course for 1.5C warming is around ~380 GtCO2. Currently, global emissions are around 40 Gt annually, which means the global carbon budget could be exhausted in less than a decade if business continues as usual. This is why is it important for companies to reduce *cumulative* carbon emissions when transitioning, which means reducing absolute emissions now.

Chart: Global annual cumulative emissions vs remaining carbon budget (CO2)





#### Japan's Climate Targets are not aligned with a 1.5°C pathway

Figure: Climate Action Tracker's evaluation of Japan's climate targets, policies and actions



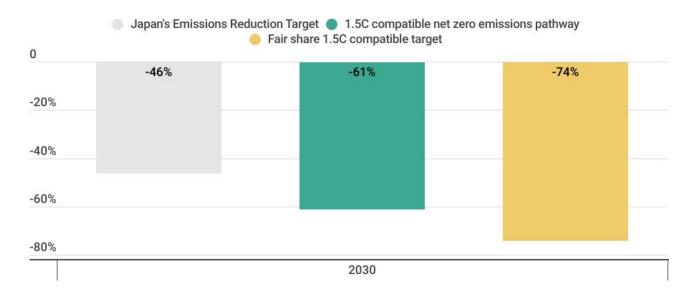
Japan aims to achieve a **46%** (50% as aspirational target) **GHG emissions reduction by 2030** below 2013 levels and **45% energy-related** CO2 emissions reduction by 2030.

The Climate Action Tracker rates this target as "almost sufficient" when compared to required domestic efforts, and "insufficient" when compared to Japan's fair share.



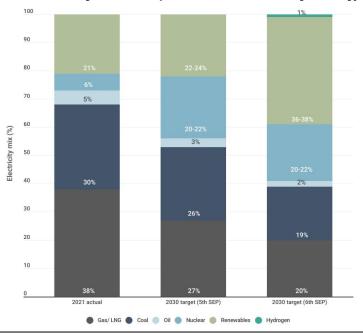
While Japan's current 2030 emissions target is 46%, it lags behind the 61% reduction required by the International Energy Agency's Net Zero Emissions (IEA NZE) 1.5C pathway, and the 74% decrease necessary for a 'fair share' 1.5C target.

Figure: Japan's NDC for 2030 vs 1.5°C IEA NZE Pathway and 'fair share' IEA 1.5C Compatible Pathway (% change on 2013)



**J-POWER trails behind Japan's Strategic Energy Plan (SEP):** Japan's 6th SEP, while representing a positive shift towards renewable energy and decarbonisation, is still insufficient to meet the targets required to limit global warming to 1.5°C as set out in the Paris Agreement.

Figure: Percent changes in Japan's energy generation targets: Comparing 2021 actual with 2030 targets from Japan's 5th and 6th Strategic Energy Plans

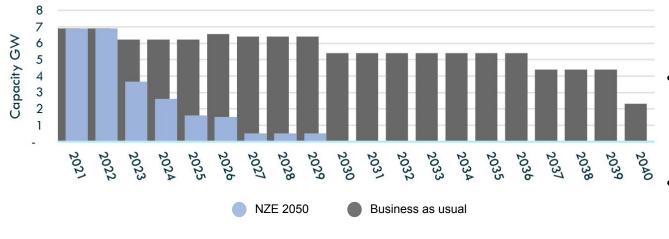


#### Japan's Strategic Energy Plan (SEP)

- 6th SEP (2021) much more confident and ambitious in renewable generation which is a positive step forward.
- Strong emphasis on self sufficiency.
- Coal as a % of the electricity mix expected to reduce from 30% to 19% from 2021 to 2030.
- Hydrogen only makes up 1% of electricity mix in 2030.

### J-POWER does not have a phase out schedule for its domestic coal assets in line with a net zero pathway

Figure: Comparison of J-POWER's Projected Generation Capacity in Gigawatts (GW) for Business-as-Usual (BAU) and Net-Zero Emissions (NZE) Scenarios by 2040



- J-POWER has signalled its intention to continue operating coal-fired power plants in Japan until 2050<sup>1</sup>, and has not committed to the phase-out of unabated coal-fire generation over any timeframe.
  - Carbon Tracker's NZE50 modelling demonstrates that all of J-Power's unabated coal capacity would need to be retired by 2030, with well over half being wound-down by 2024.
- This modelling also found that
  J-Power would be at risk of **US\$2.5 billion in stranding** under the NZE50
  Scenario.



### J-POWER's short and medium term targets: Disconnected from 1.5°C alignment and the Paris Agreement objectives

Figure: J-POWER's domestic and international power generation emissions between FY2013 and 2021, with 2025 and 2030 targets compared to NZE 2050 scenario

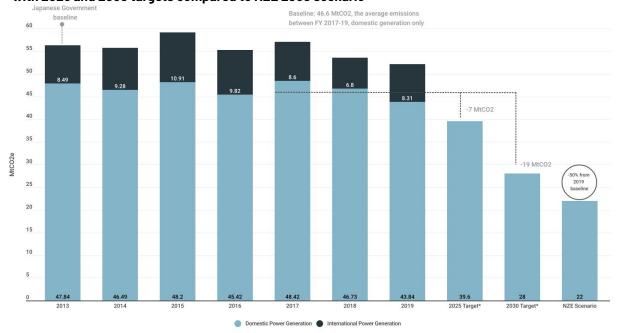


Figure: J-POWER's generation mix between FY2010 and FY2020

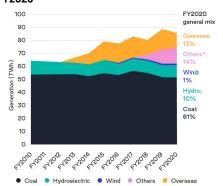
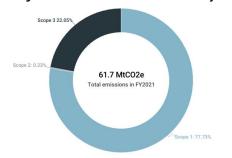


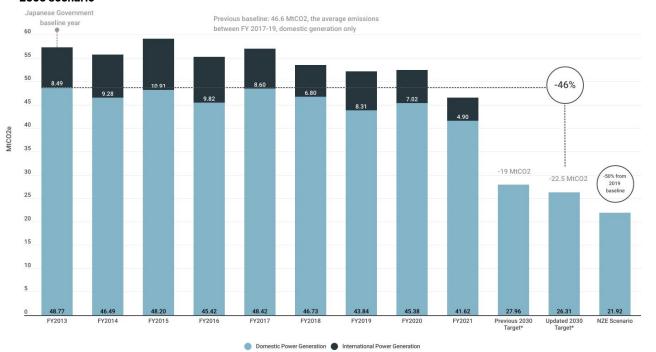
Figure: J-POWER's emissions in FY2021 by scope





#### J-POWER's revised 2030 target: Minimal real impact on carbon emissions

Figure: J-POWER's emissions from FY2013 - FY2021: Comparison of previous and updated 2030 target and the net zero 2050 scenario



#### May 2023 Update:

- Adjustment of emissions baseline to be consistent with the Japanese Government's 2013 reference year.
- Consequently, J-POWER's emissions baseline experienced an increase of 2.17 MtCO2, from 46.60 MtCO2 to 48.77 MtCO2.
- The uplift in ambition of -46% emissions reduction by 2030 effectively represents a real and additional targeted emissions reduction of only 1.3 MtCO2¹.

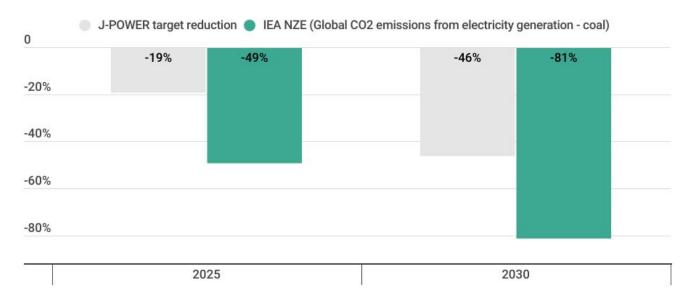


<sup>19 |</sup> accr.org.au

<sup>\*</sup>Pertains to domestic generation only

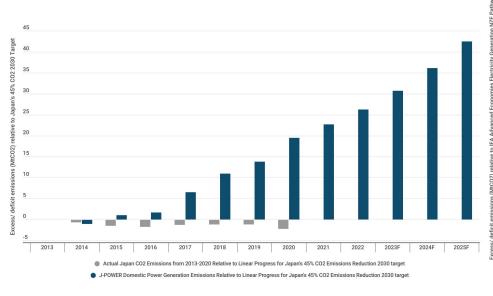
While representing an increase in ambition, J-POWER's emissions reduction targets still appear to be **misaligned with Paris and the International Energy Agency Net Zero Emissions (IEA NZE) pathway** 

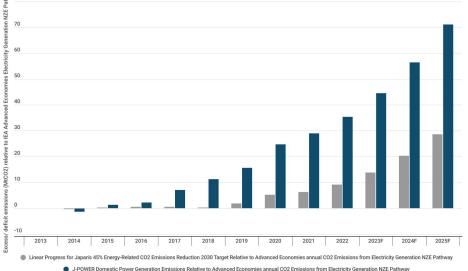
Figure: J-POWER's targets vs 1.5°C IEA NZE Pathway (% change on 2013)



J-POWER and Japan's emissions against national targets and the IEA's NZE Pathway: Despite Japan exceeding its national CO2 emissions reduction target from 2013 to 2020, J-POWER's increasing emissions contrast starkly against both Japan's national progress and the emissions standards set by the NZE Scenario, underscoring the urgency of industry-specific strategies in achieving broader climate goals.

Figures: (Left) Forecast excess/ deficit emissions for Japan (Actual) and J-POWER domestic power generation relative to linear progress for Japan's 2030 45% energy-related emissions reduction target; (Right) Forecast excess/ deficit emissions for Japan's 2030 45% energy-related target and J-POWER's emissions relative to the IEA advanced economies electricity generation NZE pathway.





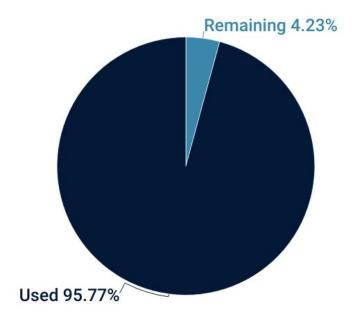


<sup>1.</sup> Reconciles with J-Power's Progress Report on Disclosure items, 24 May 2023 Sources: J-POWER company disclosures, 2022, 2023



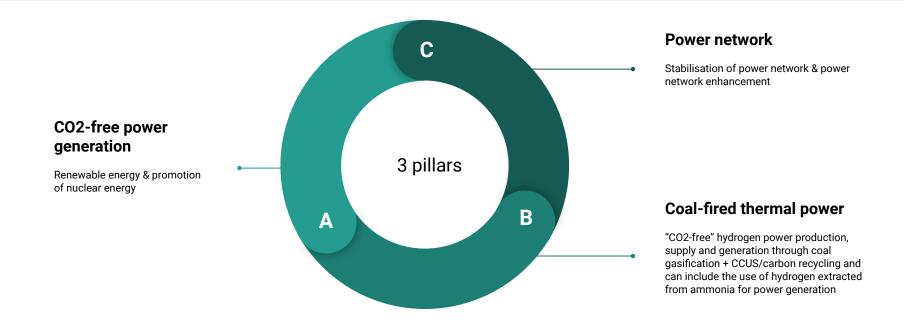
**Forecast of J-POWER's 2025 carbon budget utilisation:** J-POWER's anticipated consumption of 96% of its carbon budget by 2025, under the IEA's NZE 1.5°C pathway, emphasises a pressing need for accelerated transition towards cleaner, sustainable energy sources to prevent overshooting its carbon constraints.

Figure: Projected consumption of J-POWER's Carbon Budget by 2025 Under IEA's NZE 1.5C Pathway



- It is forecasted that by 2025, J-Power will have consumed 96% of its carbon budget as designated under the IEA's NZE 1.5°C pathway.
- This high consumption rate suggests that only 4% of J-Power's carbon budget is projected to remain post-2025.
- These statistics strongly emphasize the need for J-Power to expedite its carbon emissions reduction efforts and shift more rapidly towards sustainable and cleaner energy sources to align with the IEA's NZE 1.5°C pathway.

J-POWER's decarbonisation strategy "Blue Mission 2050" is aligned with delaying substantive climate action rather than making genuine, ambitious moves toward a clean energy transition aligned with 1.5°C target.



**CO2-free power generation:** J-Power's renewable strategy significantly lags behind Japan's national projections and global trends, revealing an underwhelming commitment to transition away from coal and a concerning absence of tangible post-2025 renewable energy targets

#### Renewables Strategy

- Although renewable energy is seen as a part of the plan, too much emphasis is placed on extending the lifetimes of coal power plants when renewable energy should be the main solution.
- Global target of developing renewable energy of 1,500MW or more by FY2025 (compared to FY2017).
- Implies 15% growth in J-Power's renewable energy portfolio between 2019-2025.
- This is in contrast to Japan's 2021 SEP, which indicates combined **solar, geothermal, hydro and wind power will grow 100%-113% between 2019-2030**.
- J-Power plans to develop renewables after FY2025, but the company has presented no numerical target.

Table: Electricity Portfolio Mix, J-Power, Japan Energy Mix (2019), and Japan SEP (%)

Energy mix (%)	J-Power 2019	J-Power 2025F	Japan Energy Mix 2019	SEP 2030
Thermal coal	59%	55%	32%	19%
Renewables	11%	13%	18%	36-38%
Other	30%	32%	50%	41-43%
Total	100%	100%	100%	100%



### **CO2-free power generation:** Nuclear power presents a challenging landscape for J-POWER's Ohma Project

#### **Nuclear Power**

- Japan recently announced it would explore development and construction of new reactors, as well as re-starting several existing nuclear reactors.
- J-Power's Ohma Nuclear power project (1.4GW) began construction in 2008 and has faced various delays as safety standards have significantly tightened post-Fukushima in 2011.
- In addition to safety concerns, high costs and public opinion present significant challenges in Japan.
- No start date has been indicated.





### Power network stabilisation, a missed opportunity for clear decarbonisation pathways in J-POWER's strategy

#### Power network stabilisation and enhancement

- Power network updates are crucial in Japan.
- Japan's power sector has been characterised by regional monopolies, which has led to a lack of interconnection and limited ability to share power between regions.
- J-POWER's focus on network stabilisation suggests that the company has an understanding that for renewable energy to be effectively utilised in Japan, the infrastructure must be in place to manage its variability.
- However, J-POWER's Blue Mission 2050 plan lacks sufficient clarity on how power network stabilisation would directly contribute to significant emissions reductions in line with the goals of the Paris Agreement.
- This lack of clarity raises questions about the true commitment of the company towards comprehensive decarbonisation.





### **J-POWER's risky bet:** Coal-fired thermal power, unproven technologies and questionable climate benefits

#### Prolonging coal use through co-firing with hydrogen, ammonia

#### • Brown coal gasification

- J-POWER's current strategy shows a preference to use brown hydrogen\* as a fuel stock coupled with CCS, "blue hydrogen". This has questionable net climate benefits.
- According to Japan's SEP, hydrogen will be an immaterial input into the electricity grid by 2030, accounting for only 1%.
- Blue hydrogen specifically using coal has not been proven to an industrial scale.
- Investment into adding coal gasification unit to 41-year old Matsushima coal-fired power plant (the GENESIS Matsushima project)
- CCS has also never been proven to reduce emissions at scale.

#### Ammonia

 To meet the company's interim 2030 emissions target, ammonia co-firing of above 40% would be required for all coal capacity, which is not yet technically established or proven to be commercially viable.



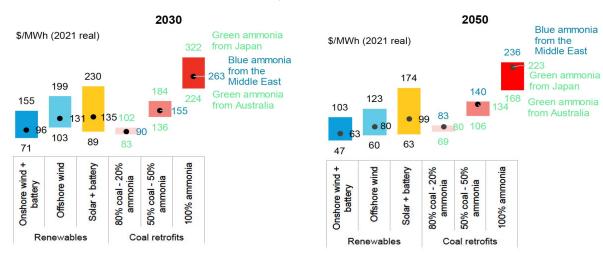


### Co-firing ammonia results in a higher levelised cost of electricity compared to renewables, and continued greenhouse gas emissions

#### LCOE for retrofitting coal-fired power plants for ammonia co-firing

- The CO2 emissions from a coal power plant burning ammonia at a co-firing ratio of below 50% will still emit as much CO2 as a natural gas fueled combined cycle gas turbine.
- Coal power plants co-firing ammonia may also emit more nitrous oxide, a GHG with global warming potential **273 times larger than that of CO2** for a 100-year timescale.
- Additionally, handling ammonia requires more care than coal due to its volatility and toxicity.

#### Figures: Comparison of levelised cost of electricity in 2030, 2050





# Remuneration linkage & alignment



### J-POWER's move to link executive compensation to climate change response is positive, but lacks specificity and transparency

ACCR welcomes J-POWER's recent<sup>1</sup> move to link executive compensation to climate change, however, we have the following concerns:

- **Broad Evaluation Index:** J-POWER's choice to broadly categorise 'Response to Climate Change' as one amongst several evaluation indices, rather than offering a focused, quantifiable climate-related metric, dilutes the emphasis on climate action.
- Lack of Significant Impact: Doubling performance-linked compensation to 20% of total recompense appears progressive, but without a clearer link to climate objectives, its impact on driving climate-focused leadership decision-making remains uncertain.
- Lack of Transparency: While the recognition of non-financial indices in remuneration is a positive step, J-POWER must provide more detailed and transparent breakdowns of how these evaluations are conducted and weighed against non-financial performance.
- Climate Accountability Needs Greater Weight: In an era where climate accountability is paramount, J-POWER's remuneration changes generally seem insufficient. The initiative needs more substance and in addition, demonstrate the company's commitment to the Paris Agreement goals.
- **Investor Engagement Critical:** Investors should engage with J-POWER, pressing for greater clarity on the evaluation process and advocating for stronger links between leadership remuneration and tangible climate action.



### Director Responsibility



### Director responsibility: The co-filing shareholders have individually decided to escalate to voting against Director and Executive Vice President Hitoshi Kanno

- J-POWER's board has been unresponsive to the material shareholder votes at the 2022 AGM responding to material shareholder concerns is a key component of good corporate governance.
- Accountability for managing the risks and opportunities of the energy transition sits at board level.
- Director Kanno is directly responsible for company's decarbonisation plan, 'Blue Mission 2050', which the co-filing shareholders consider insufficiently manages various kinds of risk to shareholder value.
- Direct corporate engagement has now spanned two AGM cycles and the company has been unresponsive to shareholder concerns.
- The engagement has involved multiple direct meetings with Director Kanno, during which each shareholder has had ample opportunity to form a view of his leadership.
- There appears to be a lack of climate competence across the board, limiting development of an effective and credible decarbonisation strategy.
- The co-filing shareholder group has no confidence that risks to shareholder value associated with climate change will be well managed under director Kanno's leadership.



### Summary



### Summary: J-POWER's decarbonisation strategy lacks clarity, innovation, and urgency, undermining long-term investor interests and climate alignment

- 1. **Failure to align with Paris Agreement goals:** J-POWER's decarbonisation targets fall woefully short of the rigorous standards set by the Paris Agreement. The company's lack of urgency in setting and achieving more ambitious near-term goals questions its commitment to a meaningful transition towards a low-carbon future.
- 2. Over-reliance on unproven technologies that prolong the use of coal: J-POWER's strategic reliance on technologies like hydrogen/ammonia co-firing and coal gasification with CCS, which are unproven at scale, is concerning. These strategies, while portrayed as innovative, have not demonstrated commercial viability or effectiveness in achieving large-scale emission reductions, thus making them a risky cornerstone of a decarbonisation plan.
- 3. Underutilisation of renewable energy: Despite the global trend towards renewables, J-POWER's decarbonisation plan does not reflect a robust commitment to this sector. The vague targets and tepid growth plans for renewable energy expose a lack of ambition, which is incompatible with Japan's aggressive renewable energy targets and the global shift towards clean energy.
- 4. **Opaque power network stabilisation plans:** J-POWER's power network stabilisation strategy, while seemingly a step in the right direction, lacks clarity and connection to tangible emissions reductions. This suggests a potential complacency or lack of understanding in how infrastructure modernisation can contribute to climate goals.
- 5. Lack of transparency on coal power phase-out: Concerningly, J-POWER's strategy does not provide clear information on the planned retirement of coal-fired power plants a crucial step towards achieving significant emissions reductions. This ambiguity poses significant risks to the company's climate credibility and long-term shareholder value.
- 6. Remuneration linkage, unconvincing commitment to climate goals: While J-POWER's attempt to link performance-based compensation with Material Issues including climate change is a positive step, it falls short of demonstrating a robust commitment to climate change mitigation. The absence of specific, quantifiable climate-related performance targets within the remuneration structure indicates a potential misalignment between executive incentives and the urgency of the climate crisis.
- 7. **Inadequate leadership on climate accountability:** J-POWER's board of directors bear the responsibility for ensuring that the company's strategy aligns with the urgency of the global transition to a low-carbon economy. The lack of transparent, ambitious climate-related targets and strategies, as well as a lack of clear disclosure around plans for coal power phase-out, raises guestions about the board's commitment to and understanding of the necessary energy transition.
- 8. Threats to long-term profitability and shareholder value: J-POWER's slow renewables transition, reliance on unproven technologies, and lack of coal plant closure planning could threaten long-term profitability and investor value in a decarbonising economy.



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#### Appendix

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Indicator	Investor expectations	J-POWER's ambition	Assessment	Details
Short-term (up to 2025) target	Alignment with 1.5C trajectory, as outlined by IEA NZE scenario.	Add 1,500 MW or more renewable energy capacity compared to FY2017 [i]     -9.2% MtCO2 (19% reduction), limited to domestic power generation business (Baseline: 2013, domestic generation only)		On track to meet renewable energy deployment target, but not 1.5C aligned.  Lack of viable strategies to support emissions reduction beyond reducing coal generation and concrete plans to retire old coal assets.
Mid-term (2026-2030) target	Alignment with 1.5C trajectory, as outlined by IEA NZE scenario - >50% emissions reduction from global electricity generation, from a 2019 baseline by 2030.  This implies an absolute target of 24.3 MtCO2e by 2030 (domestic power generation only).	46% reduction limited to domestic power generation business from average emissions (Baseline: 2013, domestic generation only)  This implies an absolute reduction of 22.5 MtCO2e by 2030.		Target <b>fails to consider its international footprint</b> and is also lacking in ambition.  Target <b>does not include Scope 3</b> emissions.  Considering only domestic fleet, target results in an emissions intensity of 324gCO2/kWh which is more than 2x emissions factor outlined by the IEA NZE scenario.
Long-term (2036-2050) target	For advanced economies like Japan, net-zero by 2035.	Net-zero by 2050, limited to domestic power generation business.		Target fails to include emissions from international activities outside of Japan. Wide implementation gaps exist.  Scope 3 emissions not included.
Decarbonisation strategy	Provide a timeline for the phaseout of thermal coal power generation.  Implementation of mitigation measures in line with scientific emissions reduction pathways.	Outlined in "Blue Mission 2050". Key pillars:  "Clean coal" through CCS, coal gasification and co-firing Hydrogen Renewables		Lack of clear coal retirement schedule.  Presence of high-level strategy, but short on details.
Capital allocation	Commit to aligning capital expenditure with decarbonisation strategy.	Non-disclosure of capital expenditure allocation.		Non-disclosure on capital expenditure allocation and no plans for revenue replacement under NZE scenario.
Remuneration linkage to climate	Remuneration pay plans should contain environmental, social and governance metrics that are material, measurable, clearly linked to company strategy and which have significant weight.	"Response to climate change" was included in the company's performance-linked compensation in February 2023. The performance-linked compensation weighting was also increased from 10% to 20%.		While this is a positive step for the company, it's current compensation program generally lacks sufficient detail, including measurable metrics that are clearly linked to the company's strategy. It is also unclear the weighting afforded to the various material issues identified within the performance evaluation.
38   accr.org	Sources: J-Power company disclosures, IEA Net Zero Scenar J-Power Profile May 2022	io, table based on Transition Zero		- ACCR