

The transition pathway to Net Zero for the Japanese market

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Introduction

Japanese companies face climate transition risks, in addition to the physical risks of climate change. Investors are moving to incorporate rising climate risks within the Japanese market into their investment strategies and increasing allocations towards investment opportunities in green businesses.

More than 130 countries and close to 700 companies globally¹ have announced their commitment to achieving carbon neutrality or have adopted a target of 'net zero' emissions by 2050. These commitments include interim emissions reduction targets aligning with the goals of the Paris Agreement which aims to limit global warming to well below 2°C and preferably to 1.5°C compared with pre-industrial levels. In Japan, former Prime Minister Yoshihide Suga announced in 2020 that Japan will reduce its greenhouse gas (GHG) emissions by 46% by 2030 from 2013 levels and will achieve a 'net zero' emissions reductions by 2050. In line with Japan's climate change ambitions, the Tokyo Stock Exchange (TSE) revised the Securities Listing Regulations pertaining to the revision of Japan's Corporate Governance Code with effect from 11 June 2021. The revised Code enhances the quality and quantity of climate-related disclosure based on the Task Force for Climate-related Financial Disclosures (TCFD) recommendations or equivalent international frameworks of Prime Market listed companies from April 2022 onwards.

¹ Hale, T. et al (2021), Net Zero Tracker. Energy and Climate Intelligence Unit, Data-Driven EnviroLab, NewClimate Institute, Oxford Net Zero. <https://www.zerotracker.net/>

Recognizing Japan's net zero ambition

Climate risk disclosure in line with the TCFD recommendations is now widely adopted within the market, with 527 Japanese companies publicly supporting the TCFD recommendations.² However, despite the growing number of Japanese companies declaring their commitments to a net zero target by 2050 greater specificity is needed over how these goals will be achieved in order to reassure investors. Companies need to urgently disclose specific GHG emissions (across scope 1, 2 and 3) and short, medium and long-term reduction targets, incorporated into management strategies and to clarify management roles and responsibilities. The management quality of climate change varies between companies and sectors, in particular for companies operating in carbon-intensive industries that have a significant impact on climate transition, which has become a major concern for investors.

However, as of 2021, more than half of the power supply in Japan still relies on fossil fuels, with 31.7% of power being sourced from LNG and 26.5% from coal³. With a moderate GHG emission target in the non-power sector (industry, transportation, etc.) major structural changes must be realized at a considerable speed in order to achieve Japan's net zero target by 2050.

Recognizing these changes and Japan's broader climate goals, FTSE Russell, and the Japan Exchange Group (JPX) jointly launched the FTSE JPX Net Zero Japan 500 and the FTSE JPX Net Zero Japan 200 indexes in April 2022. The reference benchmark for the indexes comprises constituents of JPX's market leading TOPIX 500 Index. The FTSE JPX Net Zero Japan 200 is based on the largest 200 stocks by market capitalization in the TOPIX 500 universe. Using FTSE Russell's proprietary Target Exposure index construction methodology, the indexes are designed to enable investors and participants in the Japanese markets to:

- Integrate and implement climate change risk related considerations, including managing exposure to carbon emissions and fossil fuels;
- Capture climate opportunities including the shift towards emergent activities in the green economy;
- Increase exposure to companies aligned with the net zero transition using Transition Pathway Initiative (TPI) Management Quality and Carbon Performance data.

The methodology for both indexes complies with the Climate Transition Benchmark (CTB) requirements set out in the EU Benchmark Regulations to achieve an initial 30% drop in emissions intensity by comparison with the underlying reference benchmark and a 7% year on year reduction in carbon exposure to align with 'net zero' pathways.

FTSE Russell and Transition Pathway Initiative (TPI) data sets and index calculation methodologies provide a transparent, disclosure-based framework and clear standards for companies' climate transition management designed to support investor stewardship activities on climate change.

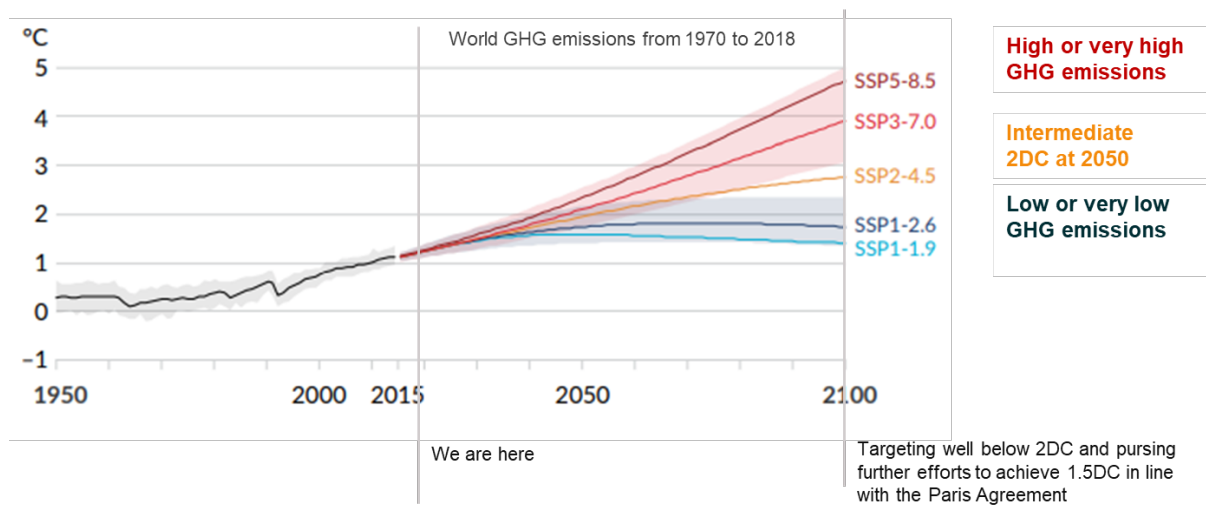
² As at December 2021. The Task Force on Climate-related Financial Disclosures 2021 Status Report. <https://www.fsb.org/wp-content/uploads/P141021-1.pdf>

³ Institute for Sustainable Energy Policies (ISEP – 2022), 2021 Share of Electricity from Renewable Energy Sources in Japan (Preliminary), 5 April 2022 <https://www.isep.or.jp/en/1243/>

Global pathways to a low carbon economic transition toward 2050

The Sixth Assessment Report (AR6) released by the IPCC in 2021 shows five scenarios for future global warming. According to it, the global temperature of the Earth is expected to rise to 4.4°C in 2100 under a business as usual scenario. In order to limit this warming to 2°C or 1.5°C, it is necessary to significantly reduce GHG emissions, including CO₂, in the coming decades.

Figure 1: Five scenarios of changes in global average temperature relative to 1850-1900 (SSP1-1.9, SSP1-2.6, SSP2-4.5, SSP3-7.0 and SSP5-8.5)



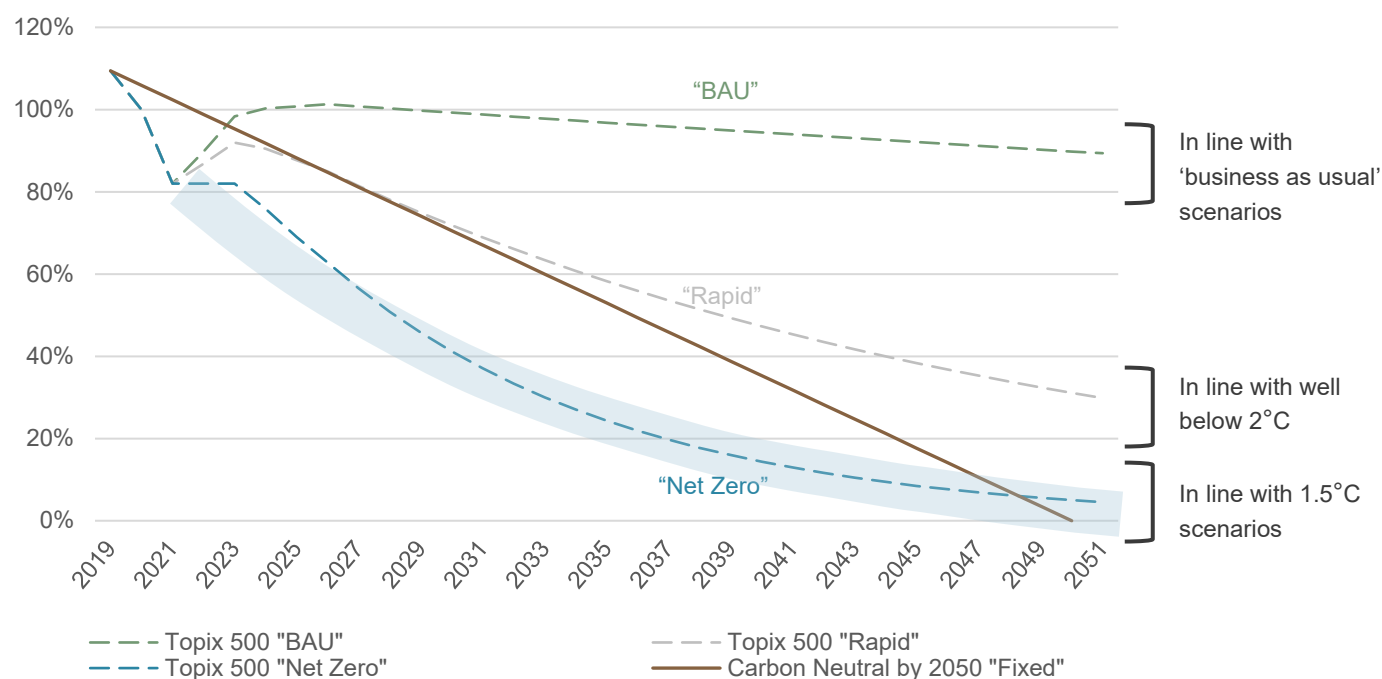
Source: IPCC AR6

The IPCC report shows that global surface temperatures rose by 1.09°C between 2011 and 2020 compared with the period between 1850 and 1900, of which 1.07 is estimated to have been directly caused by anthropogenic activities. Furthermore, in any of these scenarios, the Earth's surface temperatures continue to rise and may exceed 1.5°C by the early 2030s. Unless greenhouse gas emissions are significantly and urgently reduced over the coming decades, it is extremely unlikely that the goals of the Paris Agreement can be achieved. Global climate change is accelerating and human-caused emissions of greenhouse gases are the overwhelming cause, according to [AR6](#) by IPCC.

While many countries and companies are working to reduce greenhouse gas emissions by declaring carbon neutrality goals by 2050, these efforts are currently insufficient to reach a GHG emission reduction at a rate that would keep the earth on course for a 2°C or 1.5°C temperature rise, as set out in the Paris Agreement. As a result, investors are increasingly focused on the transition process and progress of companies toward a low-carbon economy. Investment capital is being oriented towards companies that demonstrate efforts to achieve meaningful reductions in their operating GHG emissions whilst achieving long-term returns on investment.

In response to the need for consistent and clear climate investment frameworks, the EU Benchmark Regulation in 2020 set out regulatory criteria for the Climate Transition Benchmark (CTB) and Paris Aligned Benchmark (PAB). The diagram below shows estimated GHG emission reduction pathways for the FTSE JPX Net Zero Japan 500 Index aligned with the EU CTB requirements.

Figure 2: Estimated GHG Emissions Reduction Pathways for a Net Zero index



Source: FTSE Russell decarbonization pathway for FTSE JPX Net Zero Japan 500 Index simulated as of 31 December 2021

Pursuing a 'net zero' climate trajectory means deep emissions cuts need to be achieved within the next decade before irreversible, negative climate impacts are caused. The Covid-19 pandemic had significant impacts on the global economy in 2020. The global GHG emissions fell in 2020 as a result of the economic slowdown and drop in energy demand. However, according to the latest flagship report released by the IEA⁴, global economies experienced an extremely rapid recovery in 2021 which led to the largest ever year-on-year energy-related GHG emissions increase recorded. The 2021 emissions rebound more than reversed the pandemic-induced reduction in 2020.

Global climate change risks pose a major threat to countries, businesses and the planet. Investors require explicit qualitative and quantitative indicators aligned with global frameworks for understanding how investee companies are managing climate transition risks and opportunities. This trend is likely to continue and intensify among both Japanese investors and companies; in particular those with significant exposure to the risk of climate change whilst market participants demand the acceleration in the pace of transition.

As set out further in this paper, the FTSE JPX Net Zero Japan Index Series starts with a market capitalization weighted index universe, and tilts towards Japanese companies with better management in the transition to a low-carbon economy through risk management of fossil fuel reserves, carbon emissions and, green revenues derived from business activities as an opportunity and TPI-based management quality and carbon performance. The indexes demonstrate that it is possible to set and achieve target exposures aligned with EU CTB and confirm alignment with the long-term transition pathway to achieving net zero in Japanese equity portfolios.

⁴ The report, "Global Energy Review: CO2 Emissions in 2021", was published by the IEA in March 2022

FTSE JPX Net Zero Japan Index Series

Recognizing these changes, FTSE Russell and the JPX Market Innovation & Research, Inc. launched the FTSE JPX Net Zero Japan 500 Index and the FTSE JPX Net Zero Japan 200 Index in April 2022, based on the TOPIX 500 Index. The goal of these indexes is to allow investors and other Japanese market participants to integrate climate considerations into passive investment strategies, using five climate indicators including Transition Pathway Initiative (TPI) data: Carbon Emissions and Fossil Fuel Reserves; green investment opportunities identified by FTSE Russell's proprietary Green Revenues data; Management Quality for assessing climate governance to net zero and Carbon Performance applied to companies in highly carbon-intensive industries. These comprehensive climate considerations are integrated into a single index design.

In addition, the indexes use FTSE Russell's target exposure methodology to manage multiple climate targets aligned with the Climate Transition Benchmark (CTB) of the EU Benchmark Regulation.

Key features of the index series

- **First Japanese TOPIX 500 based index aligned with the EU Climate Transition Benchmark** - These indexes, jointly developed by JPX and FTSE Russell, are the first Japanese climate integrated indexes based on the TOPIX 500 that are aligned with the EU Climate Transition Benchmark requirements
- **Aligns with Net Zero pathways, using FTSE Russell's target exposure methodology** – Reducing 30% emission with the benchmark and driving index portfolio decarbonization at 7% annually, a rate in line with the 1.5°C temperature scenario set out by the IPCC5 to Net Zero
- **Supports the climate transition to a low carbon economy with TPI** - Evaluate companies' climate governance and emissions reduction targets for the transition to a low carbon economy and encourage climate mitigation efforts with TPI Management Quality (MQ) and Carbon Performance (CP) assessment
- **Tilt weights by multiple climate assessments including** - Index constituent weights are tilted with Fossil Fuel Reserves, Carbon Emissions, Green Revenues as well as TPI MQ and CP, which signal companies' progress and performance in the low carbon transition

Methodology overview

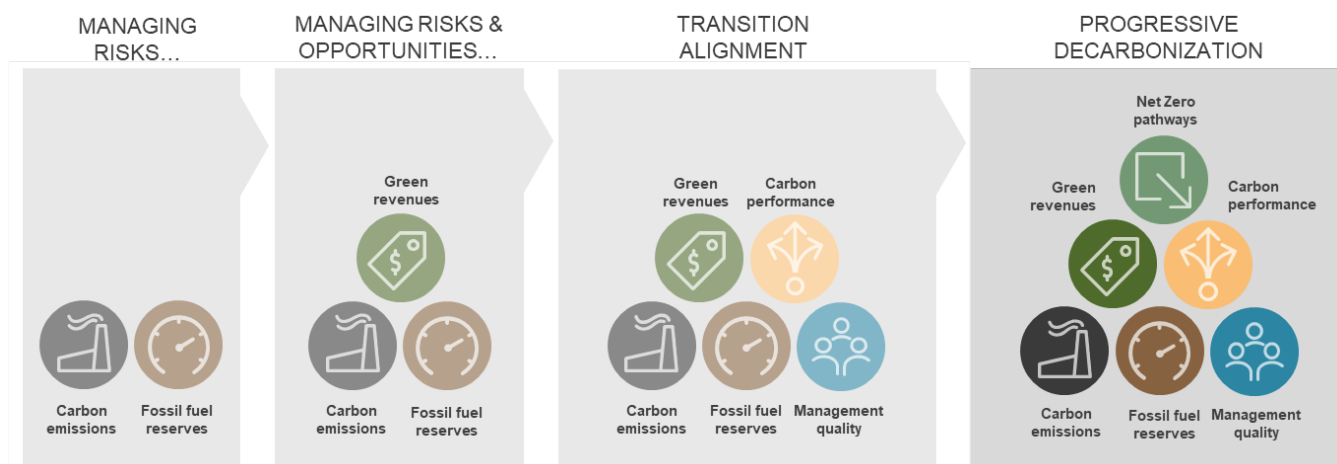
"5 + 1" climate factors for index construction

To enable investors to manage climate risks in their investment portfolios, FTSE JPX Net Zero Japan Indexes exclude or under-weight against carbon intensive companies and industries assessed with their carbon emissions and fossil fuel reserves. In addition to emissions and fossil fuel reserves, indexes in the series provide increased exposure to green investment opportunities such as renewable energy development into consideration using FTSE Russell's Green Revenues data model. Furthermore, the index selects companies that are making efforts to transition to a low-carbon economy through its criteria of "good climate governance". One such

⁵ Intergovernmental Panel on Climate Change. An intergovernmental organization established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP), it publishes an assessment report on climate change every 5-6 years by compiling thousands of scientific papers on climate change drivers, impacts and future risks.

criteria is the management quality assessed by the Transition Pathway Initiative (TPI) with data provided by FTSE Russell, as described below. TPI Carbon Performance data evaluates companies' carbon emissions against different climate scenarios consistent with the UN Paris Agreement. The index incorporates these five climate indicators into its design. In the ultimate stage of the index construction process, company weights are adjusted with FTSE Russell's Target Exposure methodology to achieve multiple climate targets aligned with EU CTB benchmark including annual year on year carbon reduction.

Figure 3: Evolution of climate benchmarks towards Net Zero



Each evaluation element and data is as follows:

1. Carbon Emissions

The FTSE Carbon Emissions data model provides reported and estimated Scope 1 and Scope 2 emissions data on the assets and activities controlled by publicly-listed global companies

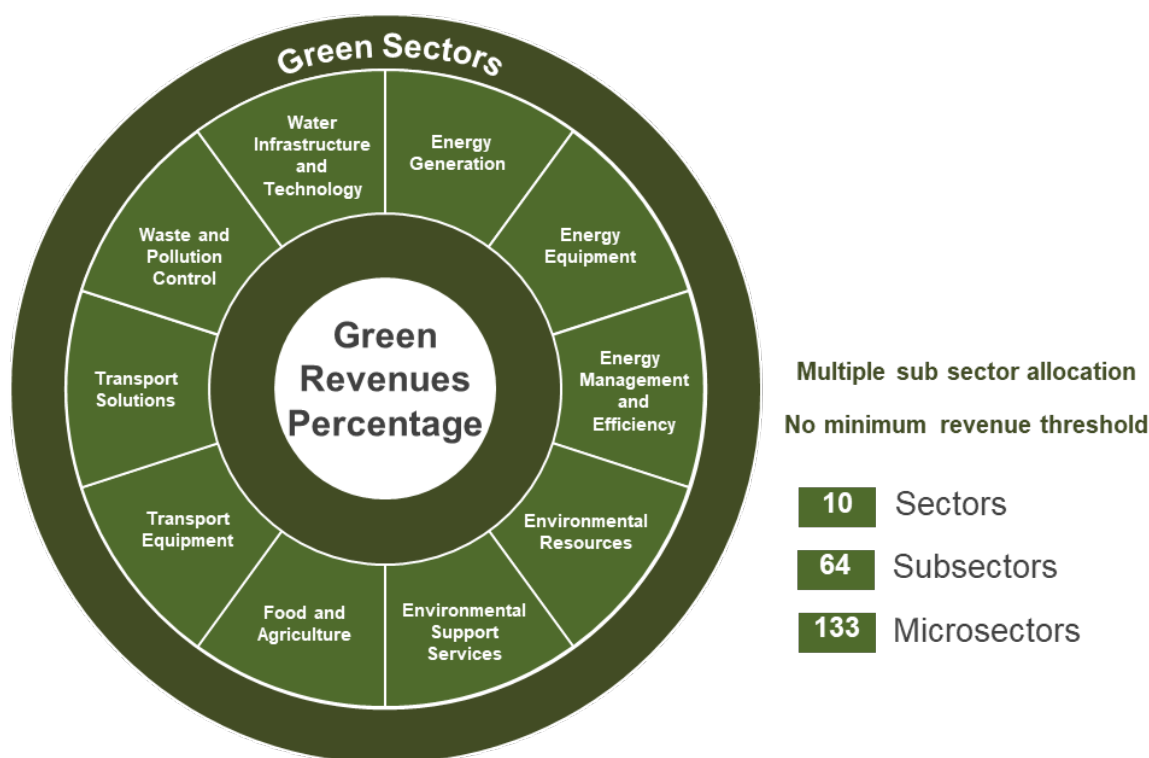
2. Fossil Fuel Reserves

The FTSE Carbon Reserves data model provides granular coverage of fossil fuel reserve ownership among publicly listed companies in developed markets and emerging economies

3. Green Revenues

The FTSE Green Revenues data model assesses the share of companies' revenues derived from green business activities. In order to avoid the risk of greenwashing and identify authentic green businesses, FTSE Russell developed a proprietary Green Revenues Classification System (GRCS 2.0) based notably on the EU Taxonomy. It is divided into 10 sectors, 64 sub-sectors and 133 micro sectors to identify the green revenue percentage of the company

Figure 4: FTSE Russell Green Revenues Data Model



4. TPI Management Quality (MQ)

TPI MQ evaluates a quality of companies' management of their greenhouse gas emissions and of risks and opportunities related to the low-carbon transition. TPI MQ assessment is aligned with the TCFD recommendations.

Corporate management quality (MQ) is a set of indicators covering issues such as corporate policies and emissions reporting and verification of climate change risks and transitions, target settings (short and long-term), strategic risk assessments, and executive compensation. Based on their performance against these indicators, companies are classified into one of five levels in line with their business description and taking into account their GHG emissions, etc.

- Level 0 – Unaware of (or not Acknowledging) Climate Change as a Business Issue
- Level 1 – Acknowledging Climate Change as a Business Issue
- Level 2 – Building Capacity
- Level 3 – Integrated into Operational Decision-making
- Level 4 – Strategic Assessment

5. TPI Carbon Performance (CP)

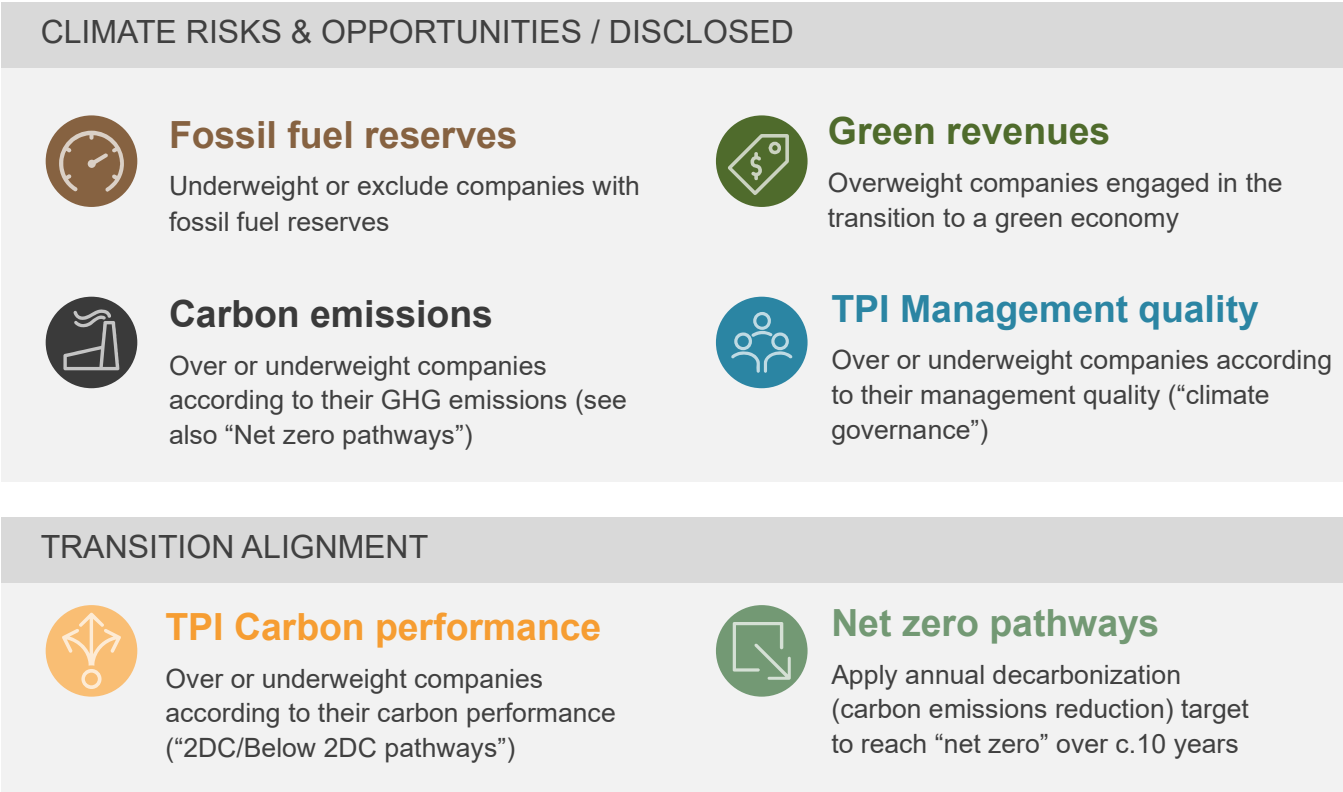
For certain carbon intensive industries with higher CO₂ emissions, in addition to the management quality assessment, an additional evaluation is applied whether their transition pathway is aligned with 2°C or 1.5°C scenario in the Paris Agreement.

Companies' carbon performance is assessed using the modelling conducted by the International Energy Agency (IEA) for its biennial Energy Technology Perspectives report. This modelling is used to translate emissions targets made at the international level into sectoral benchmarks, against which the performance of individual companies can be compared. This framework is known as the Sectoral Decarbonization Approach.

There are three benchmark scenarios, which in most sectors are:

- Paris Pledges, consistent with emissions reductions pledged by countries as part of the Paris Agreement (i.e. NDCs);
- 2.0°C, consistent with the overall aim of the Paris Agreement, albeit at the low end of the range of ambition;
- Below 2.0°C, consistent with a more ambitious interpretation of the Paris Agreement's overall aim.
- Benchmarking is sector-specific and based on emissions intensity (e.g. for electricity utilities, tonnes of CO2 per MWh electricity generated).

Figure 5: FTSE Russell climate assessment methodology



Construction of the FTSE JPX Net Zero Japan Index Series

The FTSE JPX Net Zero Japan Index Series starts by excluding companies with involvement in activities not aligned with the EU Climate Transition Benchmark (CTB) requirements, such as tobacco or controversial weapons production. The construction process first tilts each company by using three factors: fossil fuel reserves, carbon emissions (GHG Intensity), and Green Revenues. Then constituents are tilted on their TPI management quality scores with an additional carbon performance assessment for carbon-intensive industries. Finally, constituent weights are determined using FTSE Target Exposure methodology to achieve index level quantitative climate targets to meet the requirements of the EU Climate Transition Benchmark. This adjustment includes other constraints (industry weight, maximum stock weight, maximum annual turnover, etc.) to produce the final index.

The index construction process is described in the following diagram:

Figure 6: FTSE JPX Net Zero Japan 500 and 200 Index construction steps

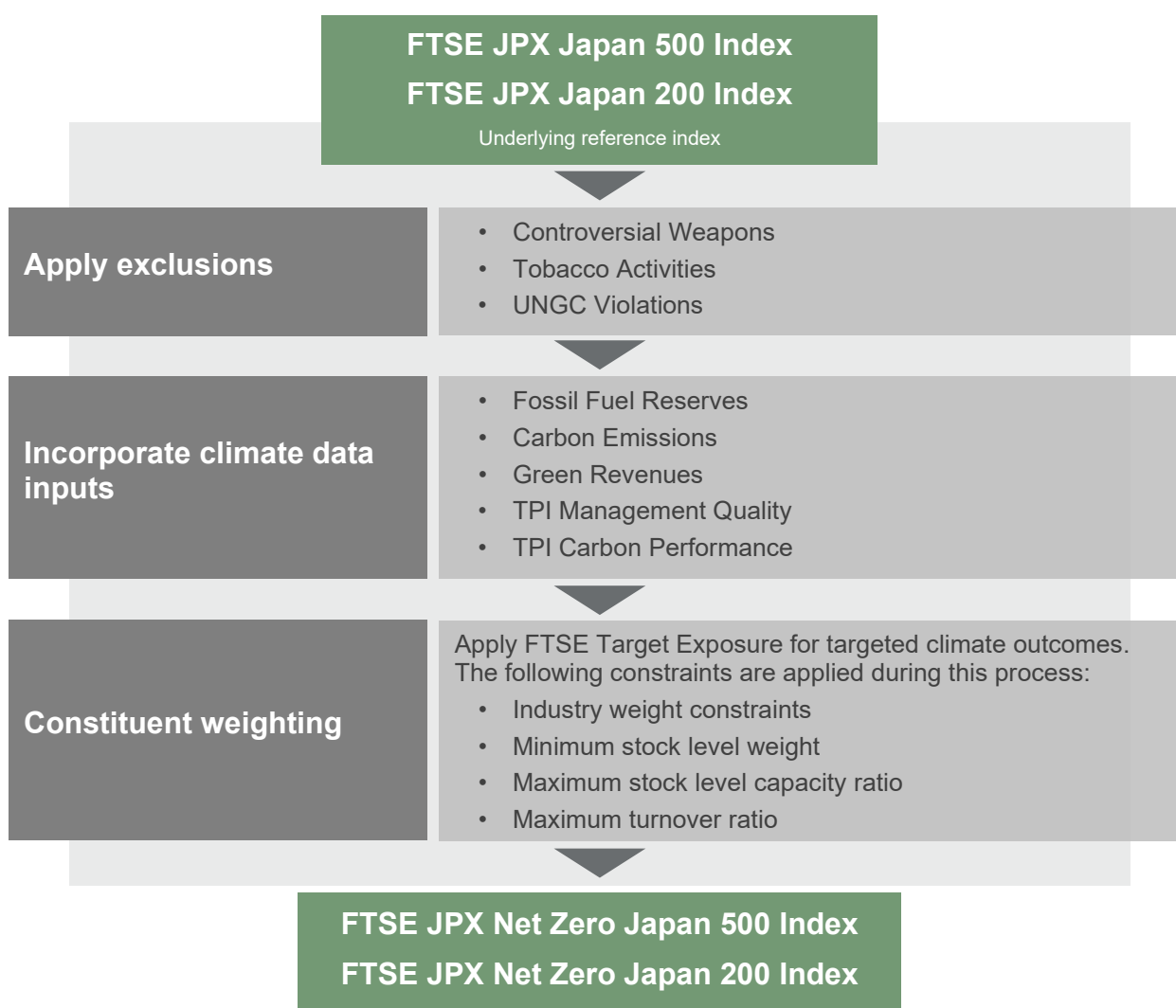


Table 1: FTSE JPX Net Zero Japan 500 and 200 Index parameters⁶

INDEX PARAMETERS	NET ZERO JAPAN 500	NET ZERO JAPAN 200
Benchmark Index	FTSE JPX Japan 500 Reference Index	FTSE JPX Japan 200 Reference Index
Decarbonization Target		
GHG Emissions intensity / Fossil Fuel Reserves Intensity Reduction	>=30% relative to benchmark at each review	
Fossil Fuel Reserves Intensity Reduction Trajectory	>=7% annually on average	
GHG Emission Intensity Reduction Trajectory	>=7% annually on average	
Green Revenue Enhancement Target		
Green Revenue Ratio Uplift	>=70%	>=100%
Forward Looking Emission Targets		
TPI Management Quality (MQ) Score Uplift	>=0.3 σ	>=0.5 σ
TPI Carbon Performance (CP) Tilts	1-tilt based on constituent's CP score	
"Not Aligned" Companies Emission Reduction	60%	
Other Constraints		
Industry Exposure Limits	Banded (+/-2%)	Banded (+/-4%)
Turnover Constraint	20%	30%
Stock-level Maximum Weight	5%	
Stock-level Capacity Ratio	<5x	
Aggregate Active Weight of High Climate Impact Subsectors	0%	
Baseline Exclusions	Controversial Weapons, Tobacco, UNGC violations, Do No Significant Harm,	

⁶ The underlying FTSE JPX Japan 500 Reference Index consists of TOPIX 500 constituents with FTSE Russell free float weights and corporate actions applied and FTSE JPX Japan 200 Reference Index consists of the largest 200 stocks in terms of market value in FTSE JPX Japan 500 Reference Index. Target adjustments for methodological inputs which are not a requirement of the EU CTB methodology (for example, Green Revenues and TPI Management Quality scores) are set at different levels between the FTSE JPX Net Zero Japan 500 and 200 indexes to control investment exposures such as turnover.

Performance analysis

The FTSE JPX Net Zero Japan Index Series is designed to provide similar investment performance to the broader market, based on the TOPIX 500 index, by minimizing deviation from the underlying benchmark, while integrating climate transitions and quantitatively manages climate-related exposure improvements to secure a trajectory to achieve Net Zero in 2050. As shown in the Figure 7 and 8, and Table 2 below, both the FTSE JPX Net Zero Japan 500 Index and the FTSE JPX Net Zero Japan 200 Index demonstrate outperformance against both the reference portfolio⁷ and FTSE All Cap Japan Index. Out performance is set a slight rise in volatility since 2016.

Figure 7: Performance of the FTSE JPX Net Zero Japan 500 Index



Figure 8: Performance of the FTSE JPX Net Zero Japan 200 Index



Source: FTSE Russell simulated results as of March 2022. Past performance is no guarantee of future results. Returns shown may reflect hypothetical historical performance. Please see end for important legal disclosures.

⁷ The reference portfolio is based on constituents of the JPX TOPIX 500 index

Table 2: Annualized Performance and Volatility (Total Return JPY)**Annual Performance – Total Return (JPY)**

Index	YEAR-ON-YEAR RETURN (%)				
	2021	2020	2019	2018	2017
FTSE JPX Net Zero Japan 500 Index	15.6	10.0	20.8	-15.1	21.7
FTSE JPX Net Zero Japan 200 Index	17.5	11.6	22.8	-15.6	21.5
FTSE Japan All Cap Index	13.1	8.0	18.4	-15.8	22.0

Annualized Performance and Volatility – Total Return (JPY)

Index	ANNUALIZED RETURN (%)				VOLATILITY (%PA)		
	1Y	3Y	5Y	Since 18/12/2015	1Y	3Y*	5Y**
FTSE JPX Net Zero Japan 500 Index	4.1	12.5	9.4	7.9	21.3	20.5	15.0
FTSE JPX Net Zero Japan 200 Index	5.9	14.4	10.4	8.5	21.5	21.0	14.9
FTSE Japan All Cap Index	2.1	9.8	7.8	6.2	16.9	18.5	14.8

Source: FTSE Russell simulated results as of March 2022 *Based on weekly data **Based on monthly data

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Appendix

Green Revenues Classification Systems [GRCS]

Sectors and subsectors

ENERGY GENERATION [EG] 19	ENERGY MANAGEMENT & EFFICIENCY [EM] 13	ENERGY EQUIPMENT [EQ] 22	ENVIRONMENTAL RESOURCES [ER] 11
Biofuels Cogeneration Clean Fossil Fuels Geothermal Hydro Nuclear Ocean & Tidal Solar Waste to Energy Wind	Buildings & Property (Integrated) Controls Energy Management Logistics & Support Industrial Processes IT Processes Lighting Power Storage Smart & Efficient Grids Sustainable Property Operator	Biofuels Cogeneration Equipment Clean Fossil Fuels Fuel Cells Geothermal Hydro Nuclear Ocean & Tidal Solar Waste To Energy Wind	Advanced & Light Materials Key Raw Minerals & Metals Recyclable Products & Materials
ENVIRONMENTAL SUPPORT SERVICES [ES] 5	FOOD & AGRICULTURE [FA] 17	TRANSPORT EQUIPMENT [TE] 12	TRANSPORT SOLUTIONS [TS] 9
Environmental Consultancies Finance & Investment Smart City Design & Engineering	Agriculture Aquaculture Land Erosion Logistics Food Safety – Efficient Processing & Sustainable Packaging Sustainable Plantations	Aviation Railways Road Vehicles Shipping	Railways Operator Road Vehicles Video Conferencing
WATER INFRASTRUCTURE & TECHNOLOGY [WI] 10	WASTE & POLLUTION CONTROL [WP] 15	10 SECTORS 64 SUBSECTORS 133 MICRO SECTORS	
Advanced Irrigation Systems & Devices Desalination Flood Control Meteorological Solutions Natural Disaster Response Water Infrastructure Water Treatment Water Utilities	Cleaner Power Decontamination Services & Devices Environmental Testing & Gas Sensing Particles & Emission Reduction Devices Recycling Equipment Recycling Services Waste Management		

The definition of EU Climate Transition Benchmark (CTB)

EU CTB Minimum Criteria				Going Beyond
Climate Scenario	Allocation Constraint	Self-Decarbonization	Baseline Reduction	Green Opportunities
IPCC 1.5C With no or limited emissions overshoot	= or > Exposure to sectors highly exposed to climate change impacts	-7% Minimum average yearly reduction in GHG emissions intensity until 2050	-30% Minimum reduction in GHG emissions intensity compared to market benchmark	> Exposure to transition related opportunities by increasing Green Revenues ratio
Exclusions				Transition Alignment
Baseline Exclusions Controversial Weapons, Tobacco and Conduct (UNGC controversies)	Do no Significant Harm Additional UNGC Environmental Watchlist screening			> Exposure to companies with transition readiness and good climate governance

Source: EU Technical Expert Group On Sustainable Finance.

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