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## Post Issuance Review on the Seventh Series Unsecured Straight Bonds (Green Bonds) issued by NGK INSULATORS, LTD.

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Japan Credit Rating Agency, Ltd. (JCR) has submitted a third-party opinion on Post issuance review of the Seventh Series Unsecured Straight Bonds (Green Bonds) issued by NGK INSULATORS, LTD.

\*Please refer to the following pages for the details of the written opinion.

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## **Third-Party Opinions**

Scope of evaluation: the Seventh Series Unsecured Straight Bonds (Green Bonds)

Issuer: NGK INSULATORS, LTD.

Post-issuance review of  
Alignment to its Green Bond Framework

(Issuance date: December 21, 2021)

September 30, 2022

Japan Credit Rating Agency, Ltd.

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## **I. Positioning and Purpose of this Third-Party Opinions**

In November 2021, JCR evaluated the Green Bond Framework (the Framework) formulated by NGK INSULATORS, LTD. (NGK), and consequently assigned Green 1 (F). This Opinion is intended to confirm whether the bonds issued by NGK in December 2021 (subject to this evaluation) conform to the Framework, which the Company has formulated in advance.

## **II. Items to be confirmed in this Opinion**

The items to be confirmed in this Opinion are described below. This Opinion focuses on the use and reporting of the proceeds of the Seventh Series Unsecured Straight Bonds (Green Bonds) (the Bonds) issued by NGK.

### **1. Use of proceeds**

To confirm whether the projects are in compliance with the eligibility criteria set forth in the Framework. It also addresses and verifies the possible negative impacts the proceeds could have on the environment and society.

### **2. Appropriateness and Transparency concerning selection standard and processes of the use of proceeds**

To confirm that the process for the issuance of this evaluation is in line with the process specified in the Framework.

### **3. Appropriateness and Transparency of management of the proceeds**

To confirm whether the funds raised by the Evaluation are allocated to the eligible project in accordance with the allocation plan set forth in the Framework and whether they are properly tracked and managed in accordance with the Framework.

### **4. Reporting**

To confirm whether the allocation status and impact reporting items are in line with the Framework and whether they are properly disclosed (whether it is clearly planned to be disclosed).

### III. The scope of this evaluation

The subject of this evaluation is the bonds listed in the table below issued on December 21, 2021, based on the Framework established in advance by NGK.

Subject of this evaluation	Issue Amount	Date of Issuance	Redemption Date	Interest rate
Seventh Series Unsecured Straight Bonds (Green Bonds)	JPY 10 billion	December 21, 2021	December 21, 2028	0.180%

### IV. Verification of Conformance with the Framework

#### 1. Use of Proceeds (Allocation status)

The use of proceeds subject to this evaluation is shown in the table below. JCR confirmed that all the projects listed in the table met the eligibility criteria.

After carefully examining the possible negative impacts on the environment and the society of the proceeds through interviews with NGK, JCR confirmed that there were no significant adverse impacts from the proceeds and that they were adding them to the use of proceeds.

Based on the above, JCR affirmed that the use of proceeds subject to this assessment is compatible with the Framework.

#### < Summary of the Use of Proceeds >

##### ■ Use of proceeds for the Bonds

Eligible project categories (ICMA GBP Category)	Eligibility criteria defined in the Framework	Use of proceeds in the Bonds
<b>Batteries</b> (Circular economy adapted products, production technologies and processes and/or certified eco-efficient products)	R&D and manufacturing of batteries that meet the increasingly complex needs for storage batteries and power generation to promote renewable energy and develop smart grids	<ul style="list-style-type: none"> <li>● NAS® batteries manufacturing cost</li> <li>● R&amp;D costs related to the batteries such as Zinc rechargeable batteries</li> </ul>

<p><b>Next-generation power semiconductors</b></p> <p>(Circular economy adapted products, production technologies and processes and/or certified eco-efficient products)</p>	<p>Conventional silicon semiconductors used for motor control and power control/conversion (power semiconductors) will be replaced by ultra-low-power consumption semiconductors (SiC/GaN semiconductors, etc.), with R&amp;D conducted to develop materials and parts required for a carbon-neutral society.</p>	<ul style="list-style-type: none"> <li>● R&amp;D costs related to the next-generation power semiconductors such as DCB and AMB substrates</li> </ul>
<p><b>CCU/CCS and hydrogen/ammonia</b></p> <p>(Circular economy adapted products, production technologies and processes and/or certified eco-efficient products)</p>	<p>R&amp;D focusing on technologies and products essential for capturing, storing and utilizing CO<sub>2</sub> and for promoting utilization of hydrogen and ammonia.</p>	<ul style="list-style-type: none"> <li>● R&amp;D costs related to the CCU/CCS and hydrogen/ammonia</li> </ul>
<p><b>Clean energy utilization</b></p> <p>(Renewable energy)</p>	<p>Development and introduction of carbon neutral technologies and facilities for possible applications to the NGK Group's manufacturing activities (including demonstrations and test operations). Installation of facilities to switch to green electricity for use in the NGK Group's business activities.</p>	<ul style="list-style-type: none"> <li>● Installation fee of the testing kiln with the hydrogen burner and modifying costs for the existing kiln</li> <li>● Installation fee of the photovoltaic system and NAS® batteries for Ena Electric Power Co., Ltd.</li> <li>● Capital investments for Virtual power plant (VPP) demonstration preparation</li> </ul>
<p><b>Energy-efficient manufacturing</b></p> <p>(Energy efficiency)</p>	<p>Installation of high-efficiency facilities to improve energy efficiency of the NGK Group's manufacturing activities.</p>	<ul style="list-style-type: none"> <li>● Renewal costs of air-conditioning and ventilation equipment in the headquarters area building, Substation renewal costs in Chita district, and installation fee of high-efficiency equipment such as replacement of chlorofluorocarbon air conditioners</li> </ul>

## 2. Appropriateness and Transparency concerning selection standard and processes of the use of proceeds

JCR confirmed through interviews with NGK that the process conducted in issuing the subject of this evaluation conformed to the Framework.

In addition, the goals, standards and processes are explained in advance to investors by disclosing the Framework on the NGK website, when issuing the Bonds.

Based on the above, JCR assessed that the process conducted in issuing the Bonds was compatible with the Framework.

## 3. Appropriateness and Transparency of management of the proceeds

The allocation status of the Bonds' proceeds is shown in the table below.

NGK has determined that the total procurement amount was JPY 9,945 million after deducting the costs of issuing the Bonds from the total amount of issuance. The reporting period for FY2021 is from January to March 2022.

Funds allocated during this period amounted to JPY 3,328 million, all of which were used as new financing. JCR confirmed through interviews with NGK and through checking the books that the allocation and the proceeds tracking management with respect to the Bonds was implemented by the method stipulated in the Framework.

Based on the above, JCR affirmed that the fund management system of the Bonds conforms to the Framework.

### ■ The Bonds Funds Allocation Status (from January 2022 to March 2022)

(JPY Million)

Eligible project categories	Allocated amount (January to March 2022)	Breakdown of allocated amount			Unallocated amount
		R&D	Capital Investment	Manufacturing Cost/Expense	
Batteries	1,542	989	-	553	
Next-generation power semiconductors	848	848	-	-	
CCU/CCS and hydrogen/ammonia	637	637	-	-	
Clean energy utilization	231	-	231	-	
Energy-efficient manufacturing	68	-	68	-	
<b>Total</b>	<b>3,328</b>	<b>2,475</b>	<b>299</b>	<b>553</b>	<b>6,617</b>

## 4. Reporting

### a. Reporting on the proceeds allocation

JCR confirmed that NGK disclosed the following items on the NGK website as the reporting items of proceeds allocation status.

- Bond issuance amount, issuance costs, total amount raised
- Allocation amount by eligible project category
- Unallocated funds

- Breakdown of new financing and refinancing
- Scheduled timing of appropriation of unallocated amount

JCR affirmed that the above Disclosures conform to the content contained in the Framework.

**b. Reporting on Environmental Improvement Effects and Social Benefits**

JCR confirmed that NGK disclosed the following items as impact reporting on the NGK website.

**A. Distribution of environmentally friendly products and services**

Eligible project categories	Assumed reporting items defined in the Framework	Impact Reporting Indicators
Batteries	-Technology and product overview -In the case of R&D, • Outline and progress of R&D plan • Overview of projects targeted for research and development and explanation of targeted effects (purpose of use, expected additional effects, expected storage capacity, expected energy density, life expectancy, etc.)	<ul style="list-style-type: none"> <li>● NGK established "Ena Electric Power Co., Ltd." to achieve a Zero-Carbon City through local production and local consumption of renewable energy in April 2021.</li> <li>● The NAS® batteries, which NGK supplied to German chemical group BASF has started operation at BASF's Antwerp Verbund site (Belgium) in September 2021.</li> <li>● Kinmen Energy Storage Demonstration Project for which NGK supplied NAS® batteries for power storage won Gold Award in SDG7 of first "Taiwan Sustainable Action Award (TSAA) 2021" held by Taiwan Institute for Sustainable Energy (TAISE) in November 2021.</li> <li>● NGK and Ricoh Company, Ltd. ("Ricoh") starts a trial project in fiscal 2022 for tracking all processes from renewable energy generation to consumption, including charging and discharging of surplus generated electricity in NAS® batteries for storing electricity. The demonstration test will seek to enable maximum usage of generated renewable electricity in a form that displays its environmental value by using these facilities of Ena Electric Power and a renewable energy distribution record platform that uses blockchain (Distributed Ledger Technology) developed by Ricoh to verify the tracking of the generation, storage, and consumption of renewable electricity.</li> <li>● NGK established "Abashiri Electric Power Co., Ltd." to achieve a Carbon Neutral through local production and local consumption of renewable energy in April 2022.</li> <li>● NGK succeeded to establish the Virtual Power Plant (VPP) technology through NAS® batteries and started to provide adjustment capability in demand adjustment markets for electricity in April 2022.</li> </ul>
Next-generation power semiconductors	-Technology and product overview -In the case of R&D, • Outline and progress of R&D plan	<ul style="list-style-type: none"> <li>● NGK exhibited at CEATEC 2021 ONLINE in October 2021 and showcased the ceramics product for the electrical and electric equipment utilizing our unique ceramic technologies including DCB and AMB substrates.</li> </ul>



	<ul style="list-style-type: none"> <li>• Overview of projects targeted for research and development and explanation of targeted effects (anticipated use purposes, products, etc.)</li> </ul>	
CCU/CCS and hydrogen/ammonia	<p>-Technology and product overview</p> <p>-In the case of R&amp;D,</p> <ul style="list-style-type: none"> <li>• Outline and progress of R&amp;D plan</li> <li>• Explanation of the outline of the businesses targeted for research and development and the expected effects (purpose of use, anticipated final products, equipment of users, expected additional effects, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>● NGK received Incentive Award at 20th Green and Sustainable Chemistry Award for Development of CO<sub>2</sub> Separation and Recovery Technology Using DDR-Type Zeolite Membranes in June 2021.</li> <li>● NGK announced CO<sub>2</sub> Separation Membrane Developed for Industrial Exhaust Gas in November 2021. In testing with simulated industrial exhaust gas, the membrane achieved CO<sub>2</sub> separation factor approximately five times that of conventionally developed DDR-type zeolite membrane used for CO<sub>2</sub> separation. The Company aims to continue with development for further increases in separation performance, aiming for commercialization in 2030 after demonstration testing.</li> </ul>

**B. The NGK Group's business and manufacturing activities for carbon neutral initiatives**

<b>Eligible project categories</b>	<b>Assumed reporting items defined in the Framework</b>	<b>Impact Reporting Indicators</b>
Clean energy utilization	<p>-Overview of facilities</p> <p>-A reduction in CO<sub>2</sub> emissions through use of hydrogen in the manufacturing process</p> <p>-Number of facilities introduced and output capacity of photovoltaic power generation using NAS® batteries</p> <p>-Purchased amount of electricity of renewable energy source</p>	<ul style="list-style-type: none"> <li>● NGK installed the testing kiln with the hydrogen burner and modified the existing kiln from January to March 2022 in order to evaluate the specification of the ceramics products by using hydrogen as fuel.</li> <li>● Ena Electric Power Co., Ltd. which is NGK's subsidiary installed photovoltaic system (1.4MW) and NAS® batteries (0.2MW) in March 2022.</li> <li>● NGK CERAMIC DEVICE CO., LTD., one of NGK's subsidiaries, will install photovoltaic system (2.6MW) with existing NAS® batteries at Tajimi Factory in fiscal year 2022.</li> <li>● NGK will renew existing NAS® batteries at Nagoya in fiscal year 2023.</li> </ul>

	-Avoided CO <sub>2</sub> emissions amount by use of renewable energy													
Energy-efficient manufacturing	<ul style="list-style-type: none"> <li>-Overview of the facility installed</li> <li>-Overview of Initiatives for improving energy efficiency</li> <li>-Status of energy saving (reduction in power consumption/percentage)</li> </ul>	<ul style="list-style-type: none"> <li>● NGK promotes new capital investment of the high-efficiency facilities by using the internal carbon pricing (130 US dollar per ton) from April 2022.</li> <li>● NGK made the capital investment which will be more contributable the reduction of CO<sub>2</sub> emission than existed facilities from January to March 2022.</li> </ul> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Major capital investment</th> <th style="text-align: center;">Receipt amount</th> <th style="text-align: center;">Annual reduction volume of CO<sub>2</sub> emission</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Ventilating and air conditioning system renewal in the building at Nagoya area</td> <td style="text-align: center;">23 Million Yen</td> <td style="text-align: center;">-10t /year</td> </tr> <tr> <td style="text-align: center;">Substation system renewal at Chita area</td> <td style="text-align: center;">13 Million Yen</td> <td style="text-align: center;">-13.6t /year</td> </tr> <tr> <td style="text-align: center;">Renewal of ventilating and air conditioning system with CFC</td> <td style="text-align: center;">12 Million Yen</td> <td style="text-align: center;">-34.9t /year</td> </tr> </tbody> </table>	Major capital investment	Receipt amount	Annual reduction volume of CO <sub>2</sub> emission	Ventilating and air conditioning system renewal in the building at Nagoya area	23 Million Yen	-10t /year	Substation system renewal at Chita area	13 Million Yen	-13.6t /year	Renewal of ventilating and air conditioning system with CFC	12 Million Yen	-34.9t /year
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JCR affirmed that the above Disclosures conform to the content contained in the Framework.

## V. Conclusion

From the above considerations, JCR concluded that the subject of this evaluation aligns to each element of the Framework.

(Analysts in charge) Atsuko Kajiwara, Haruna Goto

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## Important explanation of this third-party opinion

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### 1. Assumptions, Significance, and Limitations of JCR Third-Party Opinions

The third-party opinions assigned and provided by the Japan Credit Rating Agency, Ltd. (JCR) represent JCR's overall opinion at the present time as to the relevance of the Sustainability Finance Framework formulated by the issuers to be evaluated, and do not represent the environmental improvement effects or social benefits brought by the subject evaluation.

This Third Party Opinion evaluates current plans or circumstances based on information provided by the Client and information independently collected by JCR and does not guarantee an assessment of future status. In addition, this third-party opinion does not quantitatively prove the environmental improvement effects and social benefits of the Sustainability Bonds and is not responsible for their effects. JCR verifies the environmental and social effects of the funds raised through the issuance of sustainability bonds are measured quantitatively and qualitatively by the issuer or by a third party requested by the issuer, but in principle this is not directly measured.

### 2. International initiatives, principles, etc. referred to in carrying out this evaluation

In conducting this evaluation, JCRs refer to the following principles and guides developed by ICMA, LMAs, APLMA, LSTA, the Ministry of the Environment, and the Financial Services Agency.

- Green Bond Principles (2021)
- Green Bond Guidelines (2020)

### 3. Relationship with activities related to credit rating business

The conduct of providing this Third-Party Opinion is conducted by JCR as a related business and is different from the conduct related to the credit rating business.

### 4. Relationship with Credit Ratings

The Assessment differs from the Credit Rating and does not promise to provide or make available for inspection a predetermined Credit Rating.

### 5. Third-party character of JCR

There is no conflicts of interest related to capital or human resources relationships between the subject of this evaluation and JCR.

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#### ■ Glossary

Third-party Opinion: This report expresses, at the request of our clients, a third-party opinion on the sustainability bonds issued by the issuers from an independent, neutral and equitable standpoint as to their conformity to the sustainability finance framework developed by the issuers.

#### ■ Registration status as an external evaluator of sustainable finance, etc.

- Members of the Working Group on the Impact Financial Initiative for the United Nations Environment Programme
- Ministry of the Environment's external green bond reviewer registration
- Climate Bonds Initiative Approved Verifier (Climate Bonds Initiative Accreditation Verification Organization)
- ICMA (registration with the International Capital Markets Association as an observer) Principles for Social Bonds, Members of Climate Transition Finance Working Group

#### ■ Status of registration as a credit rating agency, etc.

- Credit Rating Agency: the Commissioner of the Financial Services Agency (Rating) No.1
- EU Certified Credit Rating Agency
- NRSRO: JCR has registered with the following four of the five credit rating classes of the Securities and Exchange Commission's NRSRO (Nationally Recognized Statistical Rating Organization). (1) Financial institutions, broker dealers, (2) insurance companies, (3) general business corporations, and (4) government and local governments. If the disclosure is subject to Section 17 g-7(a) of the Securities and Exchange Commission Rule, such disclosure is attached to the news releases posted on the JCR website (<https://www.jcr.co.jp/en>).

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