



Overview of NEDO Green Innovation Fund Projects and R&D for Next-generation Photovoltaics achieving Carbon Neutral City

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Japan's policies for carbon neutrality in 2050



- In October 2020, Japanese government declared that it aims to achieve carbon neutrality by 2050.
- The Ministry of Economy, Trade and Industry in collaboration with other ministries and agencies, formulated the "Green Growth Strategy through Achieving Carbon Neutrality in 2050".
- This strategy specifies 14 promising fields that are expected to grow and provides action plans for them from the viewpoints of both industrial and energy policies.

14 growth sectors

Energy related industries

-  01_Offshore wind pwr.
Solar, heat energy
-  02_Hydrogen, Fuel Ammonia
-  03_Next generation heat energy
-  04_Nuclear power

Transport/manufacturing industries

-  05_Automobile, Storage batteries
-  07_Shipping
-  09_Food, Agri. fishery, forestry
-  11_Carbon Recycling, Materials
-  06_Semiconductors Info/Com.
-  08_Logistics, people flow, Civil enq.
-  10_Aircraft

Home/Office related industries

-  12_Housing/Building
Next gen. electric power management
-  13_Resource circulation
-  14_Lifestyle related

(Source) Ministry of Economy, Trade and Industry, Japan

2 trillion JPY* fund has been established at NEDO in March 2021 to launch “the Green Innovation Fund Projects”

Continuous support for up to 10 years

From ambitious R&D to social implementation

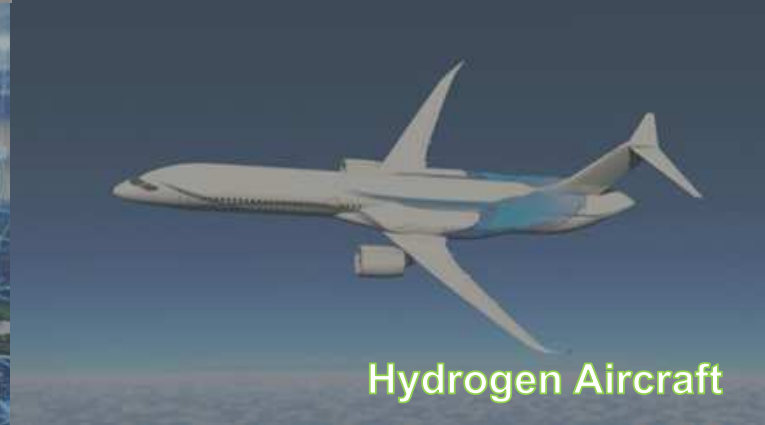
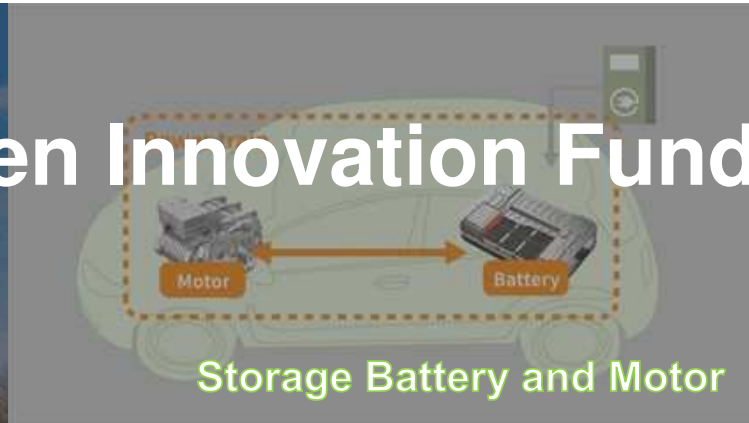
Management commitment

*300 billion JPY has been added to the Fund in the second supplementary budget for FY2022, and 456.4 billion JPY has been added to the Fund in the initial budget for FY2023.

The Green Innovation Fund Projects



The Green Innovation Fund Projects



The Green Innovation Fund Projects



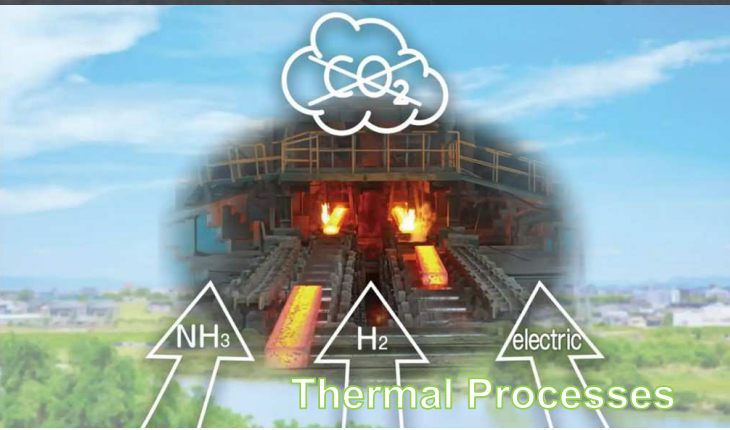
Zero-emission Ship



Agriculture, Forestry and Fisheries



Biomanufacturing



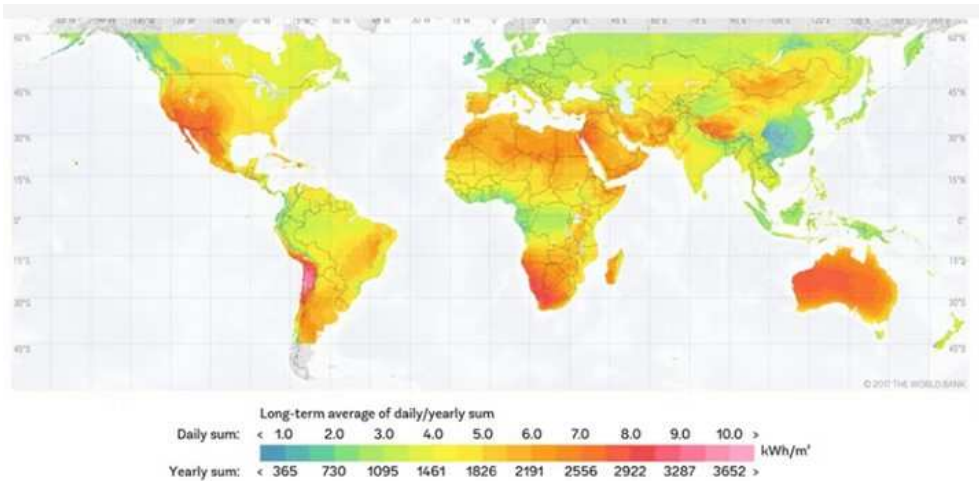
Thermal Processes

Already formulated **19** projects,
allocated over **1.91** trillion JPY
and more coming soon...

Location constraints for solar power generation

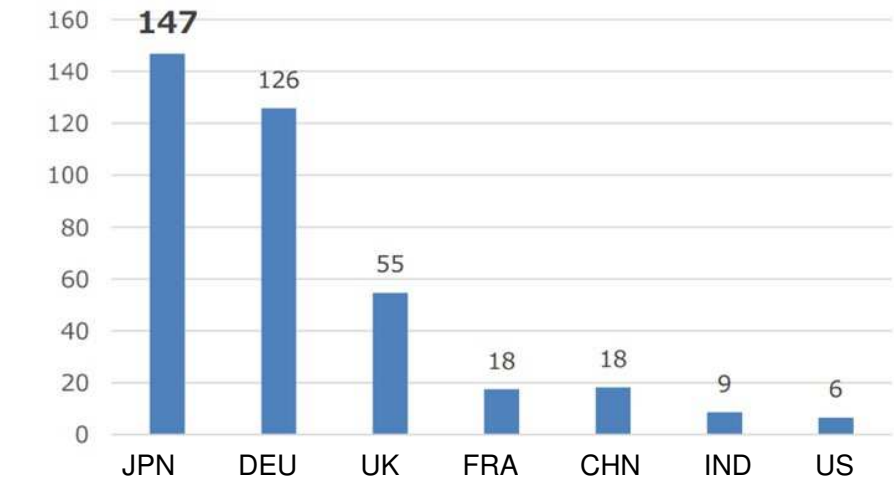
- Currently, it is estimated that a cumulative total of about 1.1TW of solar power generation has been installed worldwide.
- In Japan, many solar power generation have been already installed per national land area.
- In regions such as East Asia and Southeast Asia, where populated area suitable for installing solar power generation are limited, further expansion of solar power generation installations is becoming difficult.

Solar radiation map



(Source) Solar Energy: Mapping the Road Ahead, IEA

(kW/km²) PV installed capacity per national land area



(Source) METI

Carbon Neutral City achieved by Next-generation PV

- One promising solution is practical application of lightweight, flexible, highly efficient next-generation photovoltaics that can be installed on house and building roofs where difficult to install conventional photovoltaics. IEA's estimation show huge potential.
- Perovskite photovoltaics are expected to be a next-generation photovoltaic that meets these conditions. Perovskite modules has potential of significantly lighter than other types, and can even be fabricated on flexible substrates, which will be easily installed in urban areas.

Potential of rooftop PV by IEA

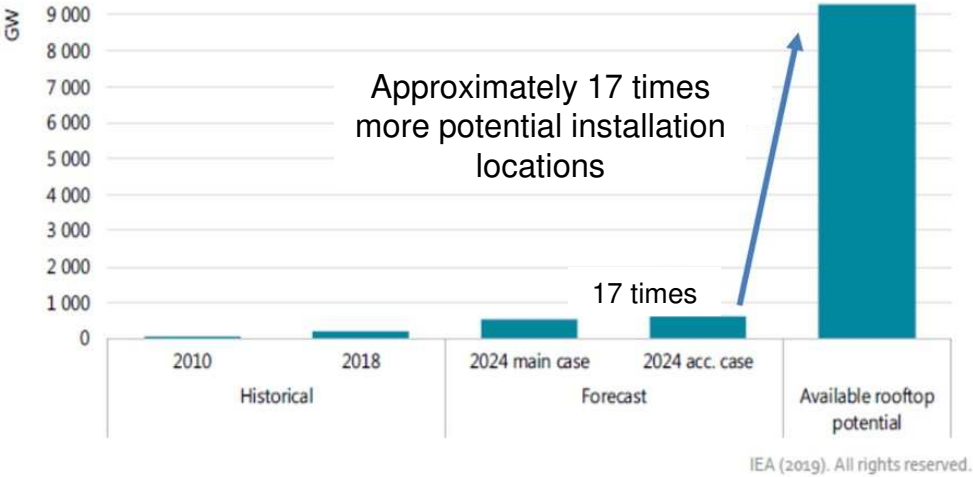
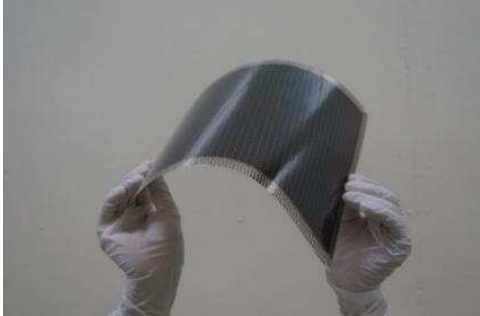


Image of perovskite module



(Source) TOSHIBA CORPORATION

Note: Available rooftop potential is calculated based on IEA (2016), *Energy Technology Perspectives 2016*.

Next-Generation Solar Cell Development

- Overcoming location constraints is the key to expanding solar power. Therefore, this project will develop next-generation photovoltaics (perovskite photovoltaics).
- This project works on three stage from R&D, through developing the underlying technologies (such as high efficiency, large size module and durability) related to commercialization and the production system, and all the way to demonstration and practical use, with aiming for the social implementation of Perovskite photovoltaics by 2030.

〈Images of solar cells development phase〉



R&D target: Achieve a power generation cost of 14 JPY (about 10 cent)/kWh or less under certain conditions (sunshine conditions, etc.) by FY2030

Next-Generation Solar Cell Development

Budget : 49.8 billion JPY (Phase1,2 20.0 billion, Phase3 29.8 billion)

*Theme 3 will be opened call for proposals by progress in theme 1 and 2. .

Bold : Lead-managing company

Theme 1: Development of basic technology for next-generation solar cells

R&D will be carried out on the optimum material composition of perovskite solar cells, elemental technologies for conversion efficiency and reliability, and techniques for analysis/evaluation.

(Entrustment, FY2021-FY2025)

- National Institute of Advanced Industrial Science and Technology (AIST)

Theme 2: Next-generation solar cell practical application development

R&D will be carried out for realizing elemental technologies for manufacturing processes (such as coating processes, electrode formation, and sealing processes) for scaling up products and durability, cooperated with Universities and AIST (Theme1).

(Subsidy (Entrustment only for academia), FY2021-FY2025)

- **SEKISUI CHEMICAL CO.,LTD**, The University of Tokyo, Ritsumeikan University
- **KANEKA CORPORATION**
- TOSHIBA CORPORATION, The University of Tokyo, Ritsumeikan University
- EneCoat Technologies Co., Ltd., Kyoto University
- AISIN CORPORATION, The University of Tokyo

Next-Generation Solar Cell Development

- 5 companies in the project, aim different types of Perovskite photovoltaic module. NEDO supports for these R&D.

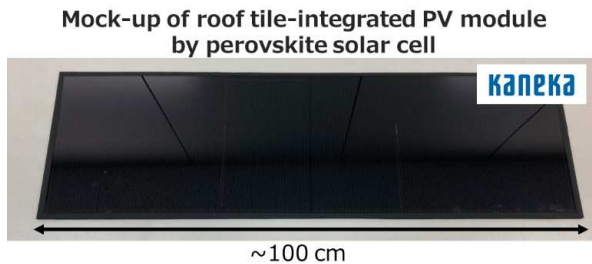
⟨Images of each company's module⟩



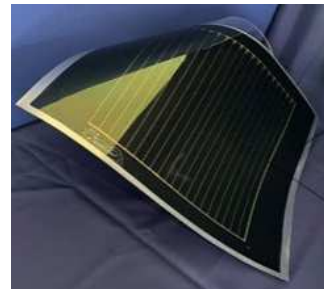
SEKISUI CHEMICAL CO.,LTD,



TOSHIBA CORPORATION



KANEKA CORPORATION



EneCoat Technologies Co., Ltd.,



AISIN CORPORATION

Working toward a carbon-neutral future.

The driving force behind Japan's future growth is the challenge of achieving carbon neutrality.

Now is the time for Japan-A technological superpower
One world-changing innovation after another.

Working together to create a carbon-neutral future.
A new Japan is waiting in 2050.

