Joint R&D Projects and NEDO New Delhi activities

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Overview of NEDO
(New Energy and Industrial Technology Development Organization)

Mission ・Addressing energy and global environmental problems
・Enhancing industrial technology

Organization: Established in 1980
Reorganized in 2015 as a National Research and Development Agency, under the Ministry of Economy, Trade and Industry (METI) of the Japanese government

Head Office: Kawasaki City, Japan

Chairman: Mr. Hiroaki Ishizuka

Personnel: 1,256 (as of 1st April,2021)

Budget: Approx.$1.28 billion (2022FY) * $=122 yen

Fund:

Green Innovation	$16.39 billion
Semiconductor	$5.06 billion
Post 5G	$2.54 billion
Economic Security	$1.02 billion
Moonshot	$207 million

6 Overseas Branch Offices

NEDO's Mission

Positioning of NEDO（New Energy and Industrial Technology Development Organization）

- In its role as an **innovation accelerator**, NEDO formulates project plans and establishes project implementation frameworks by combining the capabilities of industry, academia, and government, including public solicitations of project participants.
- NEDO carries out research and development projects and set targets based on changes in social conditions in order to realize maximum results.

NEDO's Core Technologies

Renewables

Energy Conservation

Electronics / ICT

Materials/Nanotech

Hydrogen /Battery

Water Treatment

Smart Community

Environment/ Next Generation Thermal Power/CCUS

Robotics/AI

NEDO India's Major Activities

Energy Demonstration Projects

Joint R&D Projects in Clean Energy Field

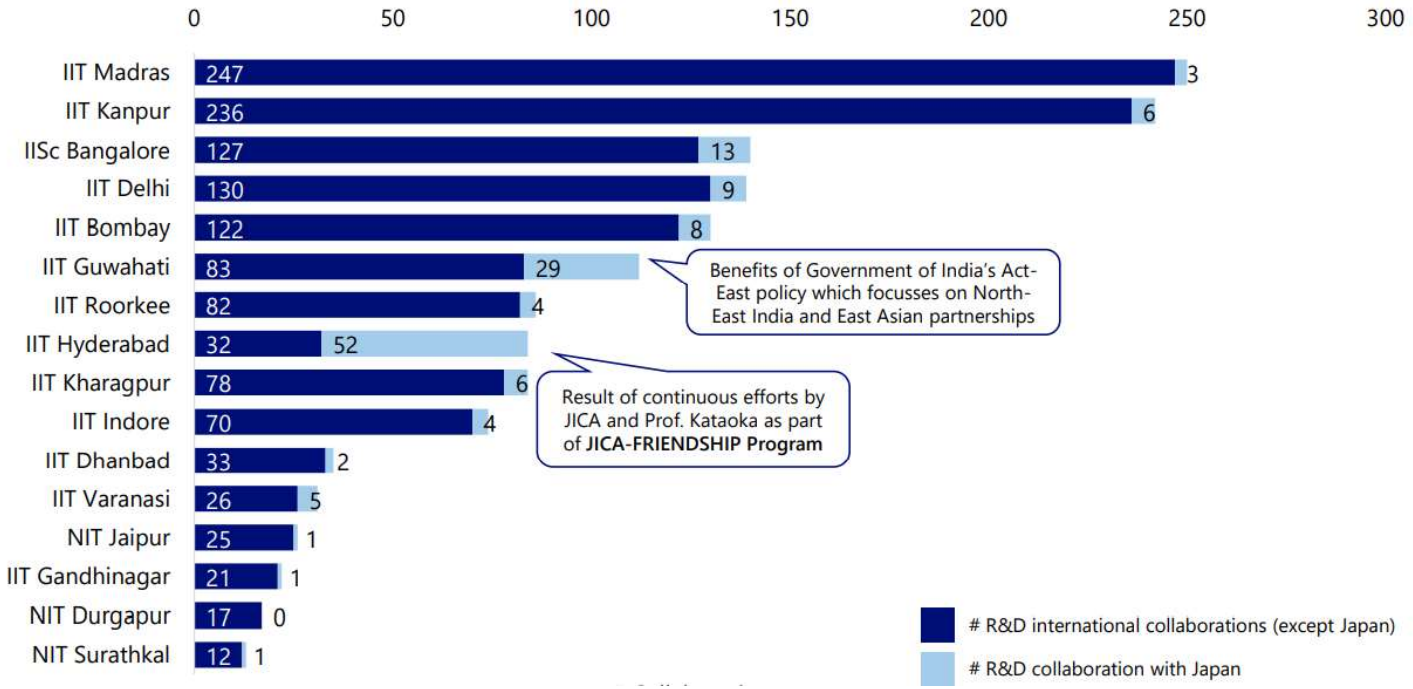
Research / Study

Outreach / Event

Status Survey on International Joint R&D

Summary Report is here: https://www.nedonewdelhi.in/assest/pdf/StatusSurveyInternational.pdf

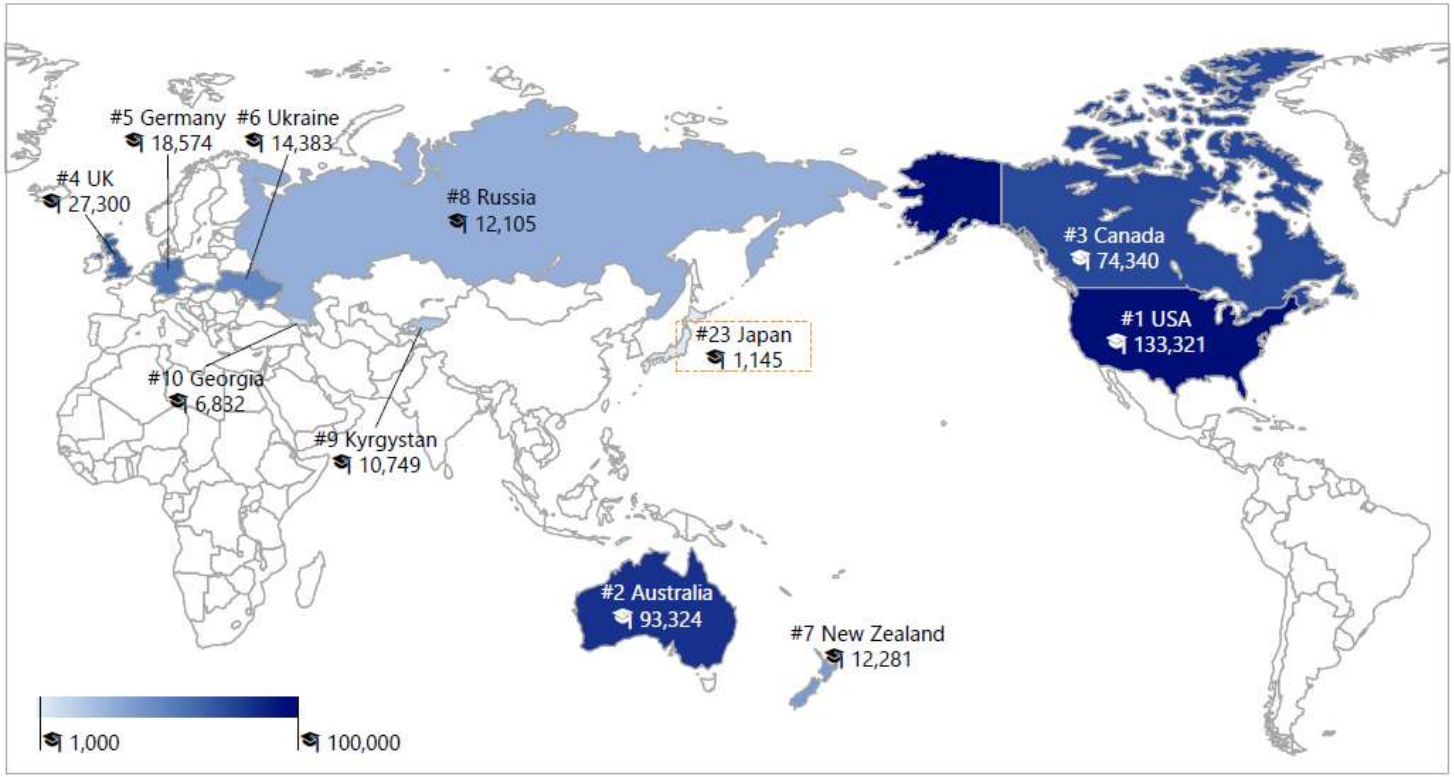
- In March 2022, NEDO India compiled a **Status Survey Report**, concerning international joint R&D and start-up support at Indian universities including IITs. This research was commissioned to NRI India.
- Key Insights (1):
  - ✓ Key Institutes: Older IITs (estd before 2008) and IISc have the highest number of international Joint R&D projects
  - ✓ Industry and Academia: **~75% collaborations are with academia**; lack of collaborative R&D with industry partners
  - ✓ Major Collaborating Countries: **US, European countries** (Germany, France, UK, etc.), **Australia are major collaborators**
  - ✓ Collaboration with Japan: **Contribution from Japan is not as significant except for IIT Hyderabad and IIT Guwahati**



Status Survey on International Joint R&D

- Key Insights (2):
  - ✓ Outbound Indian students are highest in US, Australia & Canada while **Japan lags far behind at 23rd rank** with just ~0.25 % of total outbound students from India

Indian Outbound Students (Top 10 nations + Japan)



Status Survey on International Joint R&D

- Key Insights (3): Way forward for Indo-Japan R&D collaborations
  - ✓ **Develop networking platform**: Enable discussions to foster relationship and spread awareness
  - ✓ **Establish Japan Desk**: The appointed person shall champion the collaboration efforts
  - ✓ **Encourage human resource exchange**: exchange from both countries increases connections & creates ambassadors
  - ✓ **Address language barrier**: Start offering joint degrees in English medium; Increase Japan language courses
  - ✓ **Engage industry players**: It shall ease funding and resource crunch for R&D; develop better career opportunities

Benefits provided by the collaboration with India

Benefits	Details
Cost Savings	Lower cost of **talent, labor and raw material** hence that of setting up industries / production units
Access to young local talent	• Abundant **human resource** capabilities • **Brightest minds** sharpened through cut-throat competition
Access to a large market	**Diverse market** where different value propositions can be provided to different
High-end technology	Research outputs at par with international counterparts
Upskilled Human Resource	Working with Indian counterparts would **improve soft skills**: • Communication Skills • Flexibility in thought • Understanding local needs • Adjusting to local requirements

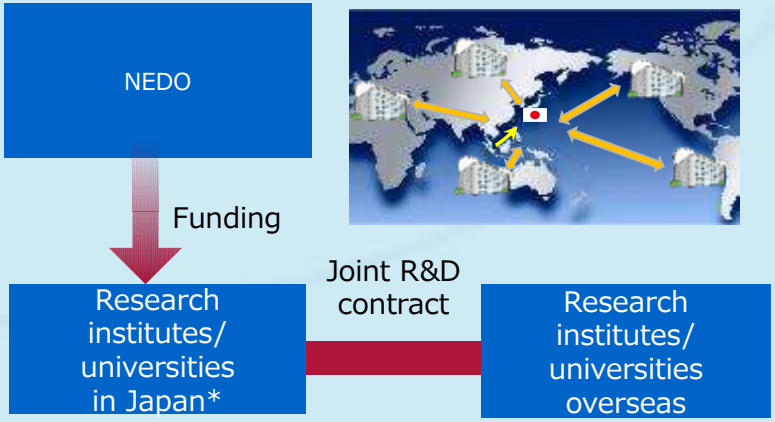
R&D Program for Promoting Innovative Clean Energy Technologies Through International Collaboration

● Program Outline

✓The aim of this program is to develop and strengthen international joint Research and Development between Japan and other countries in order to create new and innovative clean energy technologies that will have practical use after 2030.

✓This program supports Japanese research institutes and universities conducting joint international R&D projects with institutions from G20 member and other countries.

● Program Scheme



※Indian universities and companies may also participate in the program together with Japanese research institutes/universities.

● Project Details

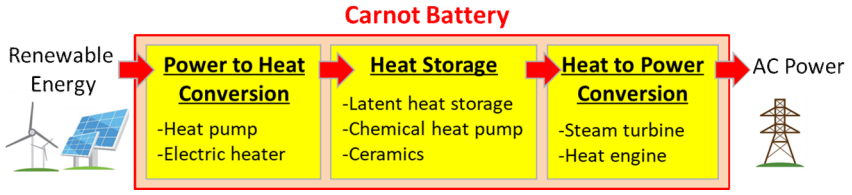
Project scheme	International collaboration between Japanese research institutes/universities and research institutes/universities overseas. Private companies may participate but only when research institutes/universities also participate.
Project budget	Maximum of almost **INR 1.7 crores** per project/per year. Note: NEDO will only fund the Japanese side of the international collaboration.
Project term	**Maximum of 3 years.**
Target technologies	- Clean energy technologies, including RE and energy-saving and environmental technologies that will have practical application after 2030. - 2 R&D themes have been selected for FY2022.
Project with India-Japan collaboration (NEW)	**"Development of Innovative High-temperature Thermal Energy Storage technology" (Hokkaido univ., AIST, IIT Jammu etc.)** has been adopted in FY2021.

International Joint Research and Development of Innovative High-temperature Thermal Energy Storage Technology

Entrusted Parties : Hokkaido University, National Institute of Advanced Industrial Science and Technology (AIST) （2021～2024*） *scheduled

Outline of the Project

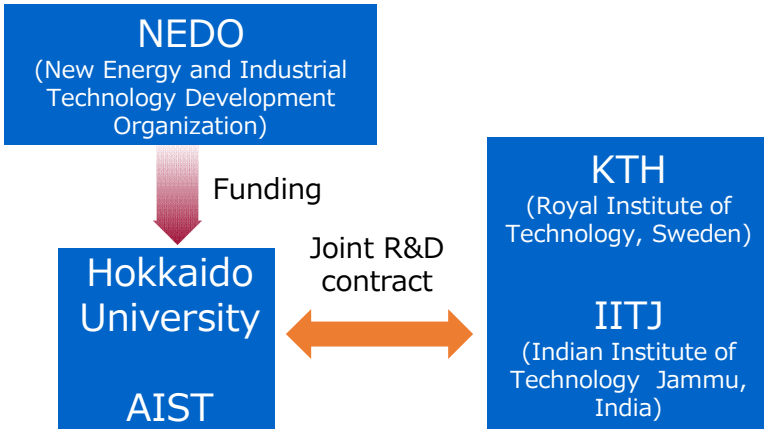
- **Background:** Long-duration energy storage is a key technology to mitigate fluctuation and intermittency of renewable energy.
- **Purpose:** “Carnot Battery”- in which electricity is converted to heat, stored in heat storage system, and converted back to electricity – enables energy storage in large scale with low cost. In order to realize long-duration energy storage using Carnot Battery, this project will carry out R&D for long-duration thermal energy storage at high-temperature.
- **Scope:** This project is developing innovative high-temperature, large-capacity, and high-throughput heat storage systems by utilizing novel heat storage material, h-MEPCM*, and chemical heat pump.
  *__h-MEPCM__ （__H__okkaido univ.- __M__icro __E__ncapsulated __P__hase __C__hange __M__aterial）



Significance of International R&D

- Carnot Battery is an emerging technology as IEA started Annex 36 for it in 2020, and foreign institutes have more knowledge and experience on it. International collaboration will sophisticate the heat storage systems being developed in this project.
- KTH has exceptional expertise in thermo-fluid simulation and designing heat storage systems.
- IITJ has knowledge and experience on designing and developing chemical heat pumps.

Project Scheme



Expected Outcomes

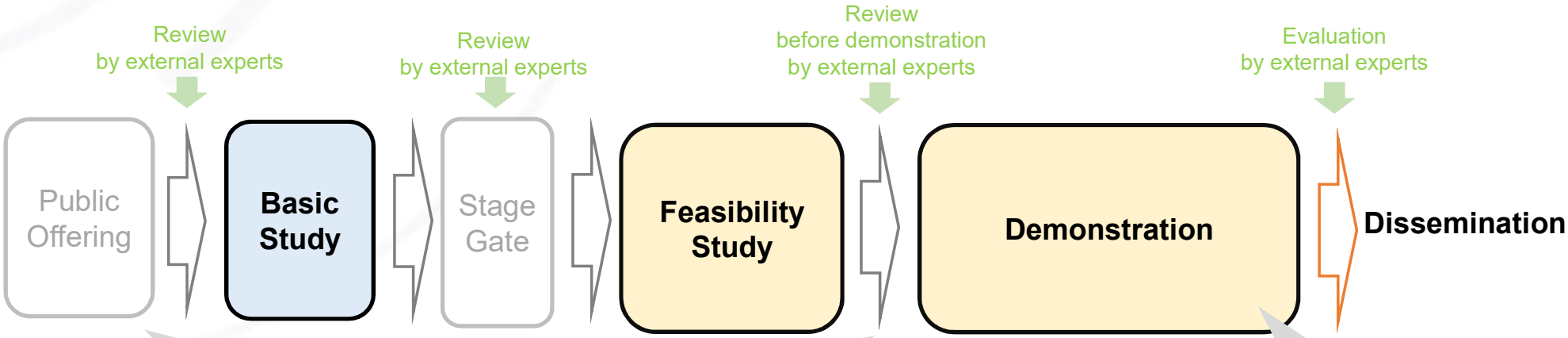
- Long-duration, low-cost and large-scale energy storage system.
- Electrification of industry by supplying heat from the developed high-temperature heat storage systems.
- CO_2 emission of 1.6 Mt/year from coal fired power plant can be reduced by utilizing solar power with Carnot Battery. Annual average of facility utilization rate of solar power is estimated to be increased 1% in 2030.

International Energy Demonstration Project

Purpose

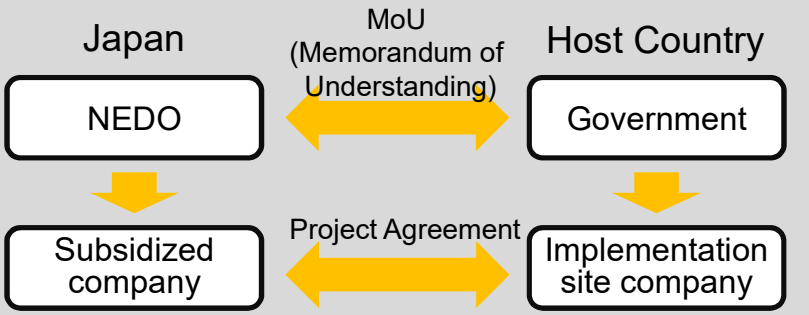
- ✓ Contribute to solving foreign energy problems through a demonstration of Japanese technology and systems for energy conservation.
- ✓ Contribute to obtaining energy security by reducing energy consumption through the dissemination of technology.

Scheme



Next public offerings are planned in **Fall in 2022**

※ Indian companies or universities may participate in the projects, together with Japanese companies which are supposed to apply for the offering.

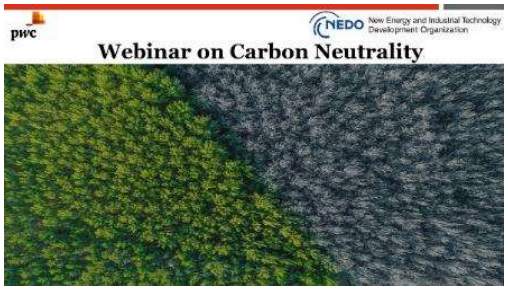


Maximum for each project is around **3 Billion Rupees**

International Energy Demonstration Project (Current Projects)

Project	Companies	Period	Phase
Optimal Control at the Energy Center for Steelworks	Fuji Electric Pacific Consultants	2016~ 2021	Demonstration
Micro-Substation for electrification using transformers for Large-Capacity Instruments	Nissin Electric	2020~	Demonstration
Electric Mobility Operation System for realizing Last-mile Transportation	Panasonic	2020~	FS
Energy optimization in chemical industry	Toyo Engineering Corp.	2020~	Pre FS
NEW Empirical research about LNG delivery by Indian railways and improvement of cold chain infrastructure in India with LNG cold energy for the energy-consumption efficiency & the CO2-emission reduction	Sojitz Corp. JR Freight Suzuki Motor Corp.	2021~	Pre FS

NEDO New Delhi Office Webinar (Launched in 2021)



(1) 4th of February 2021
Theme : India Electricity situation and Renewable energy
Speakers : CEA, SECI, Avaada, Toshiba JSW Power Systems Pvt.

(2) 10th of March 2021
Theme : Power distribution, Grid management
& Energy Distribution Management and Energy Storage
Speakers : NITI Aayog, POSOCO, Tata Power Delhi, Sumitomo Electric, etc.

(3) 24th of March 2021
Theme : Indo-Japanese Drone Ecosystem and Potential Collaborations
Speakers : MOCA, DFI, Gov. of Japan(Cabinet Secretariat, METI), ACSL

(4) 14th of January 2022
Theme : Carbon Neutrality in India
Speakers : NITI Aayog, MOP(BEE), CEEW, Reliance Industries, Mizuho Bank

(5) 15th of February 2022
Theme : Mobility and Battery Storage
Speakers : CESL, ETO Motors, Ather Energy,
TDSG(TDS Lithium ion Battery Gujarat)

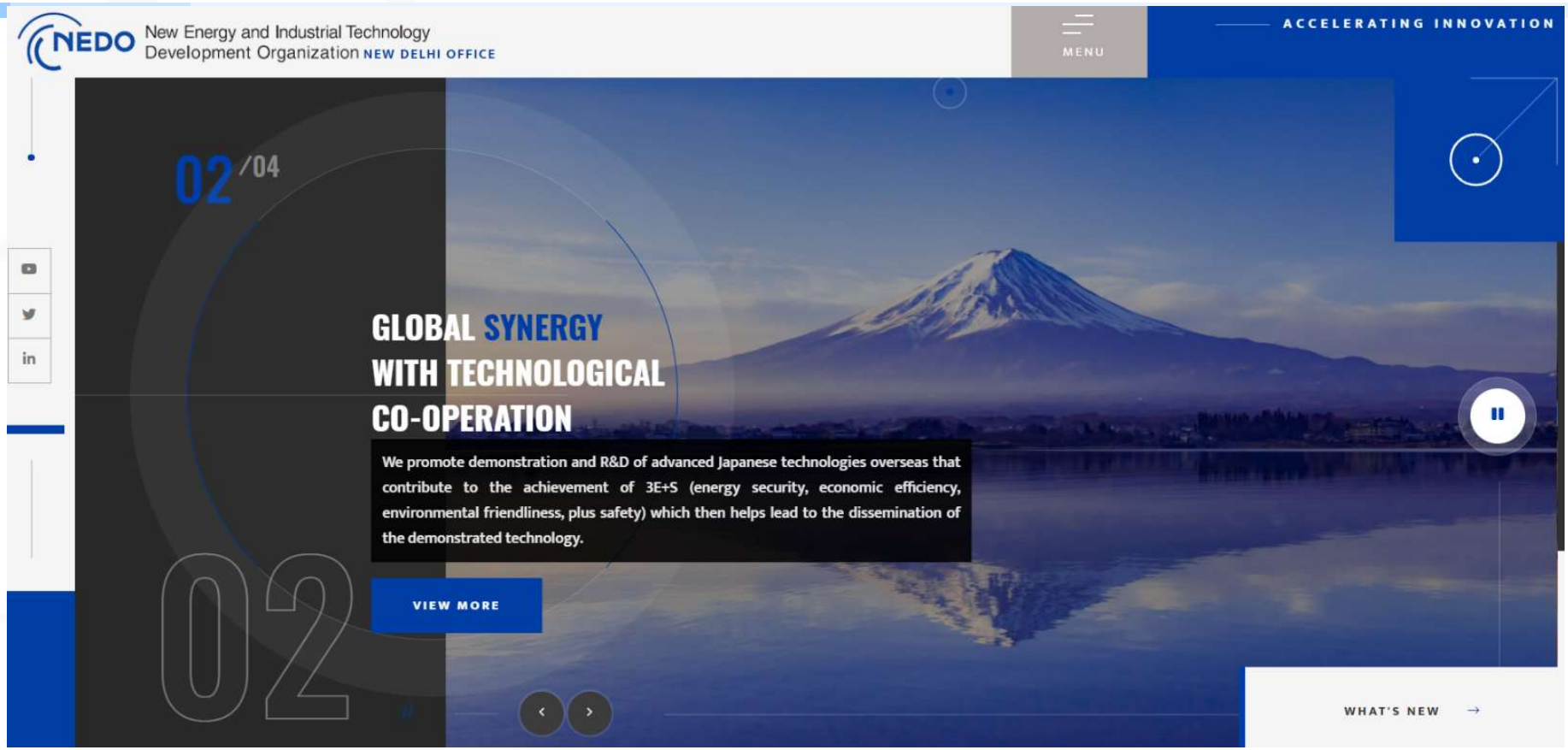
(6) 24th of February 2022
Theme : Biomass Energy
Speakers :MoPNG, PRESPL, IOCL, Hitachi Zosen

(7) 15th of March 2022
Theme : Solar Power and Mini Grid
Speakers : ISA, OMC Power, Gov. of Uttar Pradesh etc.

(8) 24th of March 2022 (Hybrid of Physical & Online)
Theme : Hydrogen
Speakers : NITI Aayog, MNRE, MoPNG(CHT), Kerala State,
TERI, Gateway House, Emb.of Japan in India, JBIC etc.

(9) 30th of March 2022
Theme : Drones
Speakers :Tech-Sci Research

Thank you for your attention!



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