

# Project Name : International Joint Research of Innovative High-Temperature Heat Storage Technology. (2021~2024)

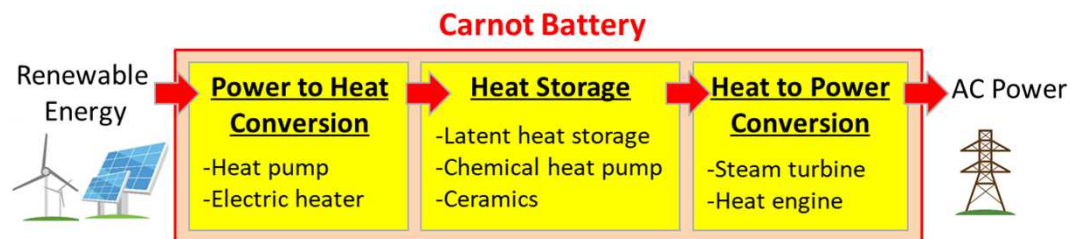


Entrusted Parties : Hokkaido University, National Institute of Advanced Industrial Science and Technology (AIST)

## 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 AIST developed.

\***h-MEPCM** (**H**okkaido univ.- **M**icro **E**ncapsulated **P**hase **C**hange **M**aterial)

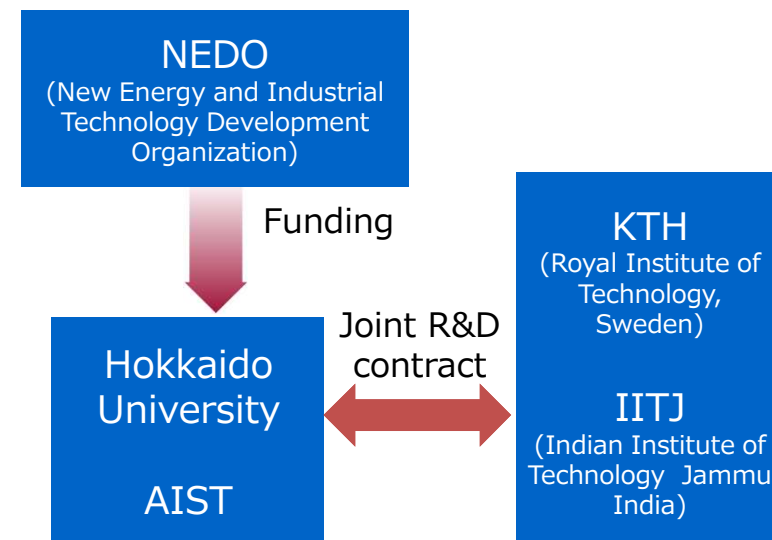


## Significance of International R&D

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.
- Utilization of existing coal-fired power plant by replacing the boiler part to the developed heat storage systems. The replacement is expected to reduce CO<sub>2</sub> emission of 5.5 Mt/year from the boiler.