

COP25 Japan Pavilion



NEDO's Contribution to Addressing Climate Change Issues

December 9, 2019

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President

**New Energy and Industrial Technology Development
Organization (NEDO)**

1. Overview of NEDO
2. NEDO's Recent Activities
3. International Collaboration Between Public and Private Sectors:
 - i) International Demonstration Projects
 - ii) Innovation for Cool Earth Forum

What is NEDO?

| | |
|---------------------|--|
| Organization | National Research and Development Agency |
| Mission | 1. Addressing energy and global environmental problems 2. Enhancing industrial technology |
| Established | 1980 |
| Budget | 1.43 billion US dollars (FY2019) |
| Role | |



For more than 30 years, NEDO has been promoting the development of many kinds of energy-related technologies.



Residential fuel cells

Succeeded in generating power from a 1 kW module in 1995



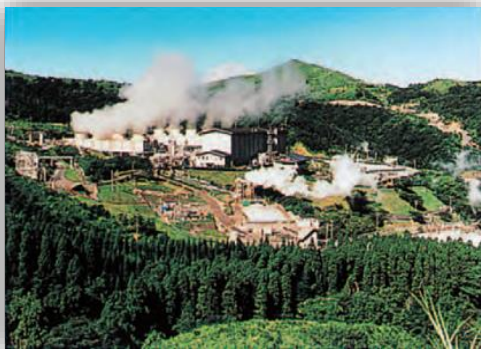
Photovoltaics

Successfully reduced the cost of solar power cell production to less than 1/200 (20,000—30,000 yen/W → 100 yen/W)



Energy storage

Testing was conducted on a 10 MWh single cell battery using materials and data needed to develop a 100 MWh single cell battery and a multi-kWh battery pack



Geothermal

Greatly improved the economic viability of deep geothermal resource exploration



Superconductivity

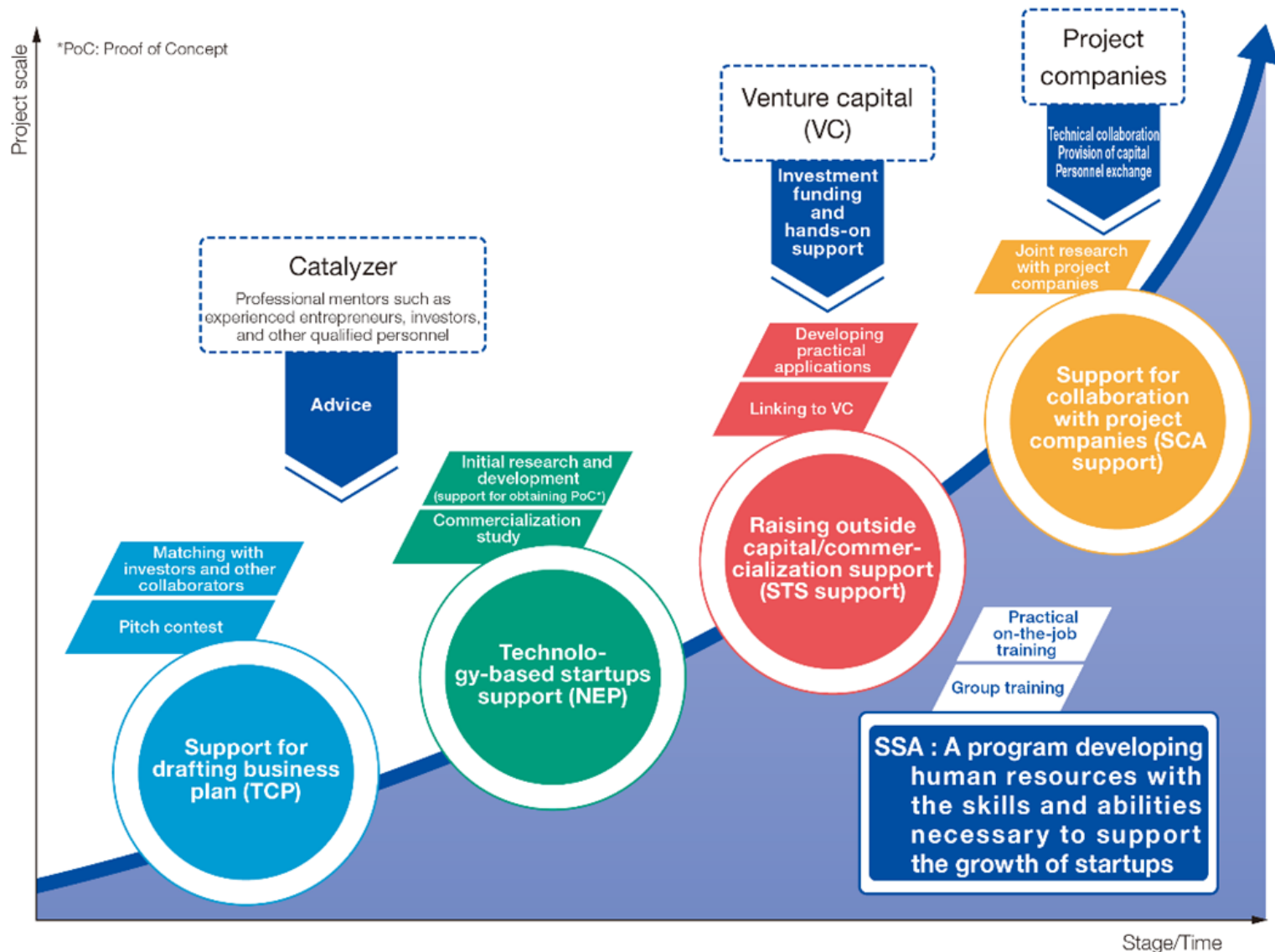
Developed the world's first 70,000 kW superconducting generator and succeeded in producing 80,000 kW over 700 hours



Gas turbines

Succeeded in operating a ceramic gas turbine with an inlet temperature of 1350 °C and achieving a thermal efficiency of 38.6%

Fostering Technology-Based Startups



TCP: Technology Commercialization Program
SCA: Startups in Corporate Alliance

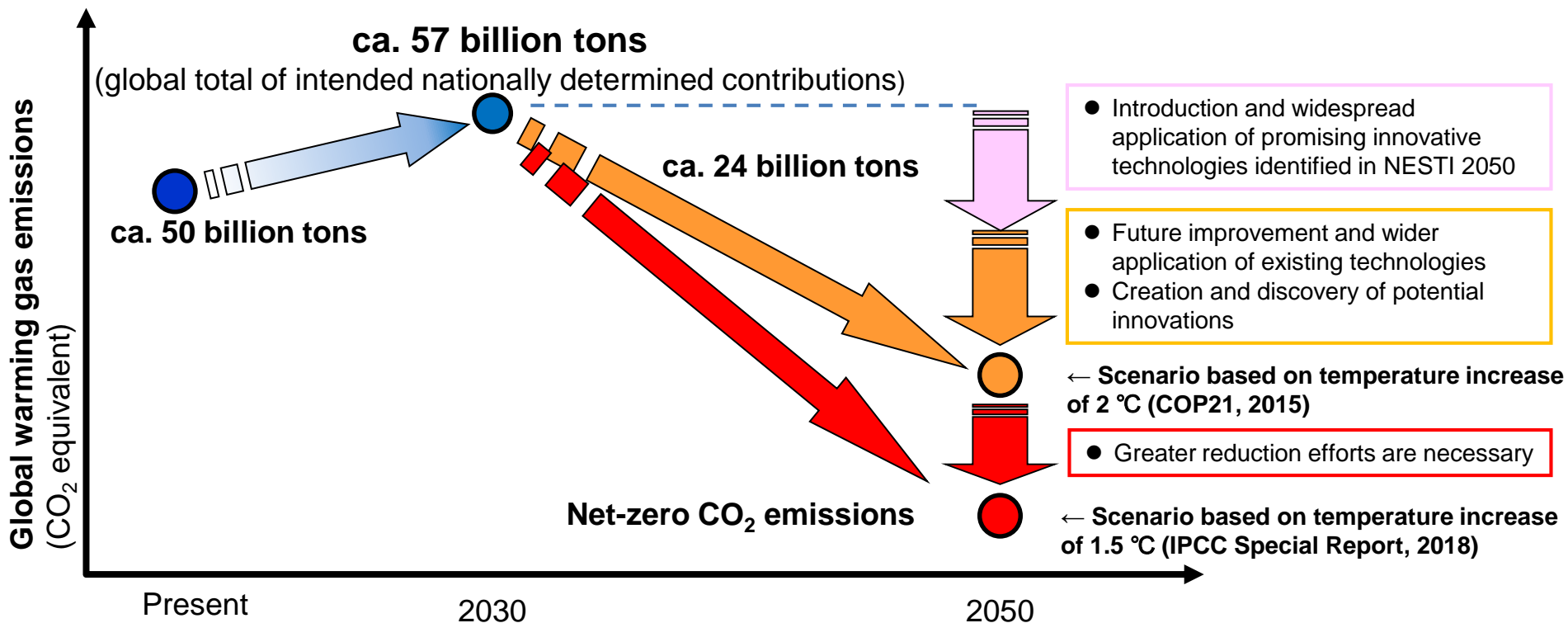
NEP: NEDO Entrepreneurs Program
SSA: Startup Supporters Academy

STS: Seed-Stage Technology-Based Startups

2. NEDO's Recent Activities

Achieving the Paris Agreement's Targets

Promoting the large-scale introduction of variable renewable energy will be important. To decrease up to **80% of the total global greenhouse gas emissions**, promoting **discontinuous innovation** will also be very important.



*The arrows in the diagram corresponding to the following items do not indicate exact emission reduction amounts: “Introduction and widespread application of promising innovative technologies”; “Further improvement and wider application of existing technologies”; and “Creation and discovery of potential innovations.”

*The changes in emission volumes between 2030 and 2050 are presented for illustration purposes only. It should not be assumed that such changes will occur in a linear manner.

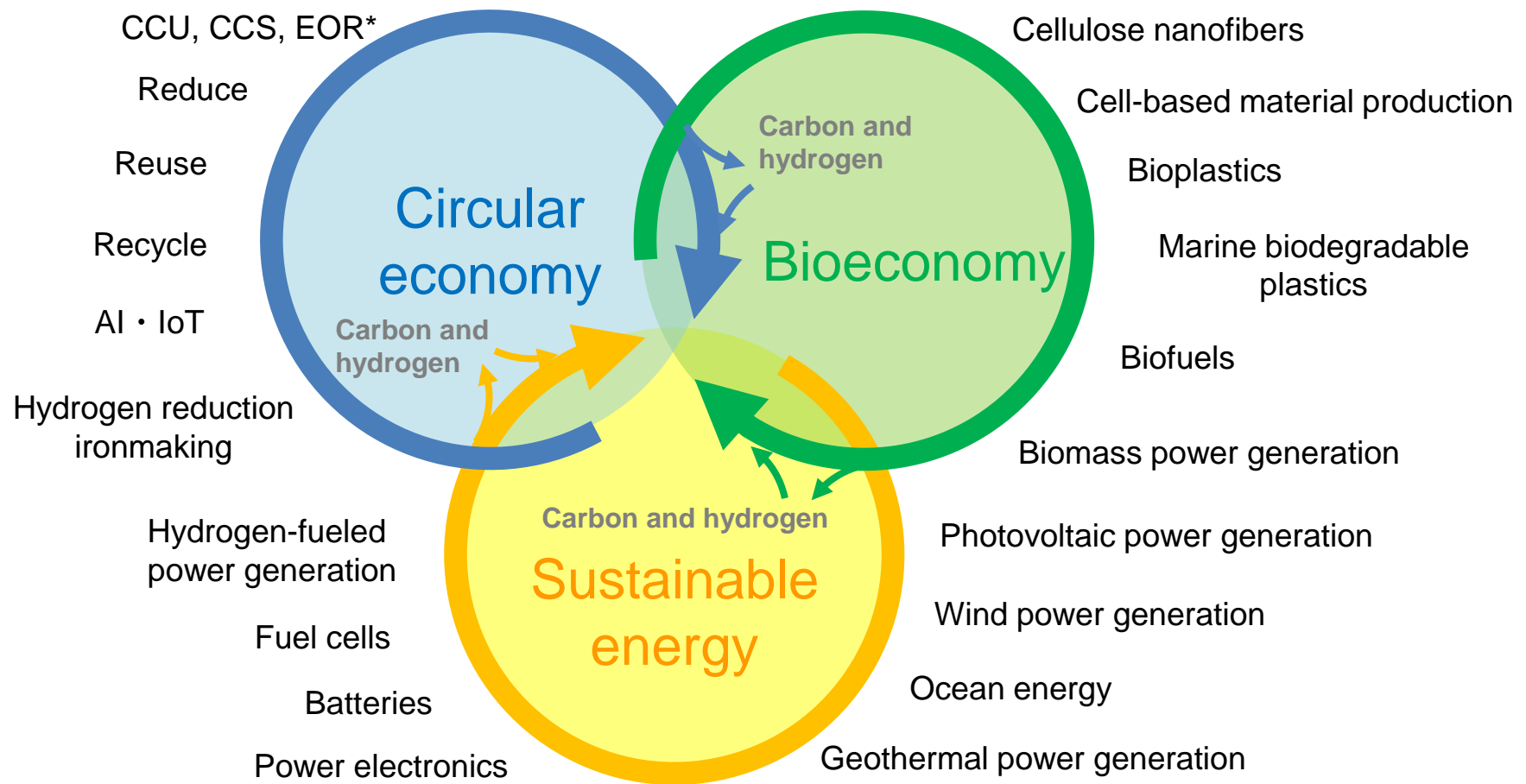
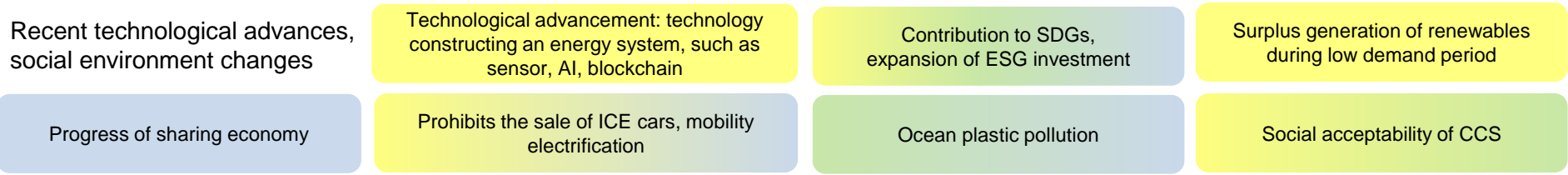
Source:

Prepared by NEDO based on the National Energy and Environmental Strategy for Technological Innovation (NESTI 2050), Cabinet Office

Comprehensive Strategy for Establishing a Sustainable Circular Society (Three Pillars and Examples of Relevant Technologies)



TSC Energy system & Hydrogen Unit



*
 CCS: Carbon dioxide capture and storage
 CCU: Carbon dioxide capture and utilization
 EOR: Enhanced oil recovery (injection of carbon dioxide to enhance oil production combined with CCS)

CO₂ Reduction Potential of Promising Technologies

■ Estimation of how promising technologies can reduce CO₂ emissions by 40 Gt

Circular economy

- 3R, Sharing**
 - Plastic
 - Aluminum
 - Sharing
- 8**
 - Cement
 - Mineralization
 - Chemicals

Bioeconomy

- Bioeconomy**
 - Cellulose nanofibers
 - Bioplastics
 - Biofuels
 - Afforestation

- Renewables**
 - Photovoltaic
 - Geothermal
 - Wind
 - Ocean energy

- Thermal Power Generation**
 - IGCC
 - GTCC
 - Corresponding to load fluctuation

- Conservation**
 - Power electronics
 - Superconductivity
 - Ultralight and super heat-resistant structural materials
 - Innovative manufacturing process

- Hydrogen**
 - Fuel cell vehicle
 - H₂-fueled power generation
 - Hydrogen reduction ironmaking

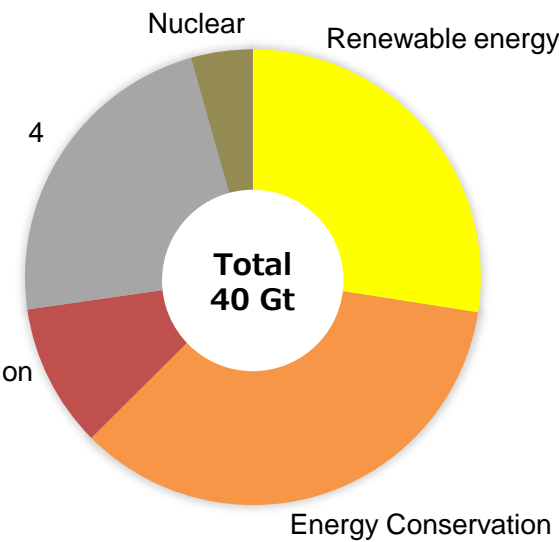
- Electrification**
 - Next generation batteries
 - Electric aircraft
 - Flexible load fluctuation in industrial process

EOR, CCS, etc.

Estimated by NEDO TSC, Reduction potential is assuming 2050, includes some overlapping

Total 40 Gt
(Except CH₄, N₂O, F-gas)

(Reference)
CO₂ reduction in IEA Beyond 2 °C Scenario (2060)



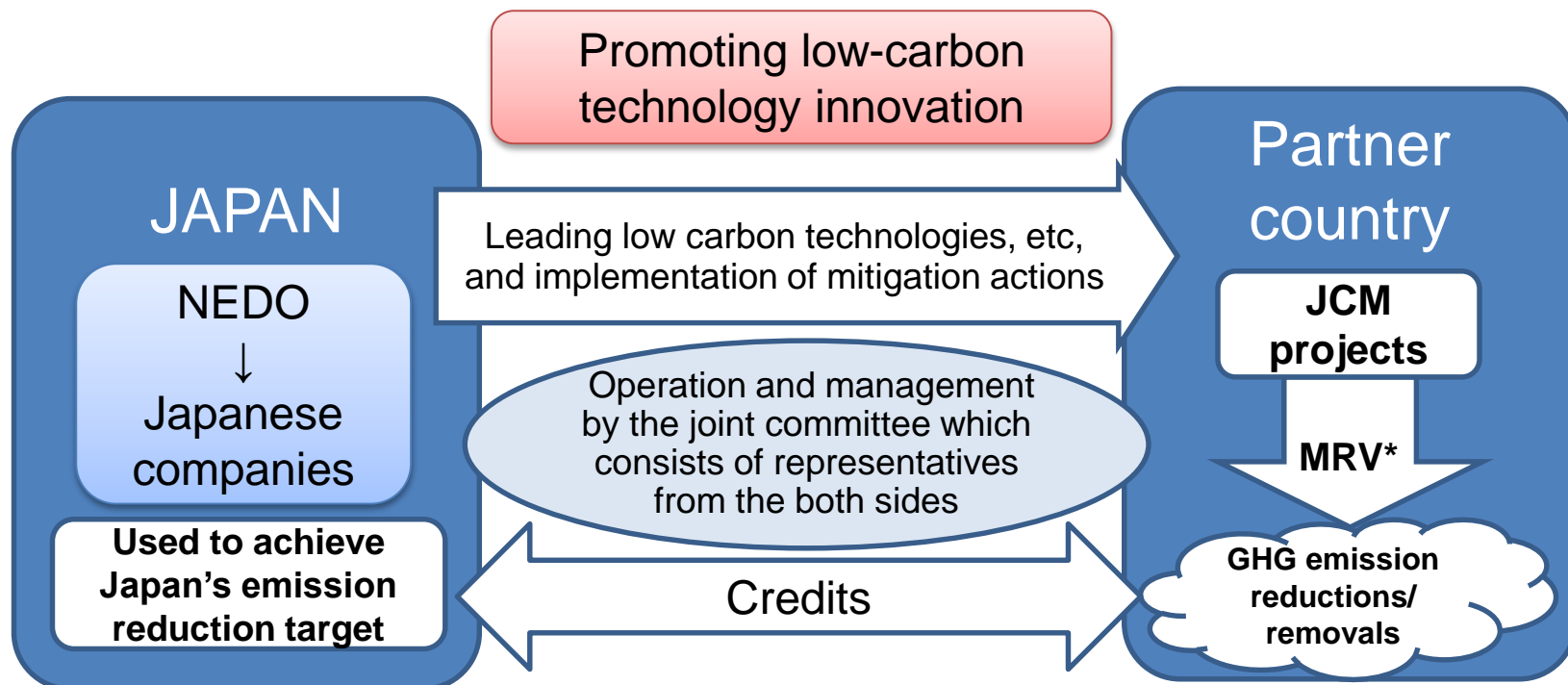
* Calculated from difference between Reference Technology Scenario and Beyond 2 °C Scenario, IEA
Source: Energy Technology Perspectives 2017 (IEA, 2017)

Sustainable energy

3. International Collaboration Between Public and Private Sectors

Joint Crediting Mechanism (JCM)

- Facilitating diffusion of leading **low carbon technologies**, products, systems, services, and infrastructure as well as implementation of mitigation actions, and contributing to the sustainable development of developing countries.
- Japan has held consultations about the JCM with developing countries since 2011 and has established the JCM with **17 countries**: Mongolia, Bangladesh, Ethiopia, Kenya, Maldives, Vietnam, Lao PDR, Indonesia, Costa Rica, Palau, Cambodia, Mexico, Saudi Arabia, Chile, Myanmar, Thailand and the Philippines.



*measurement, reporting and verification 11

Ongoing NEDO JCM Projects

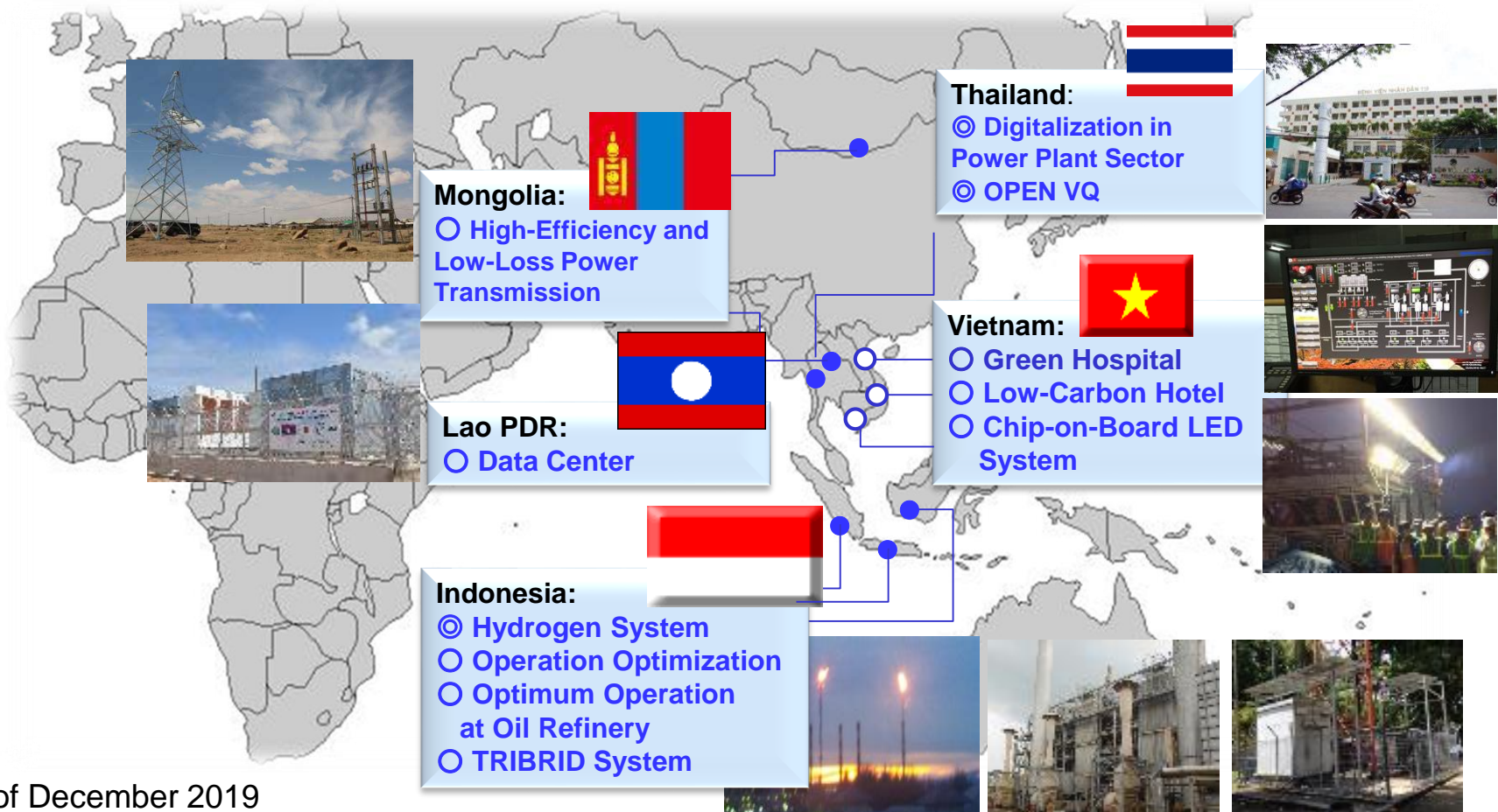


Ongoing: 3 Pre-demonstration projects

Completed: 8 JCM demonstration projects

◎ **Pre-demonstration: 3 projects** (Thailand [2], Indonesia [1])

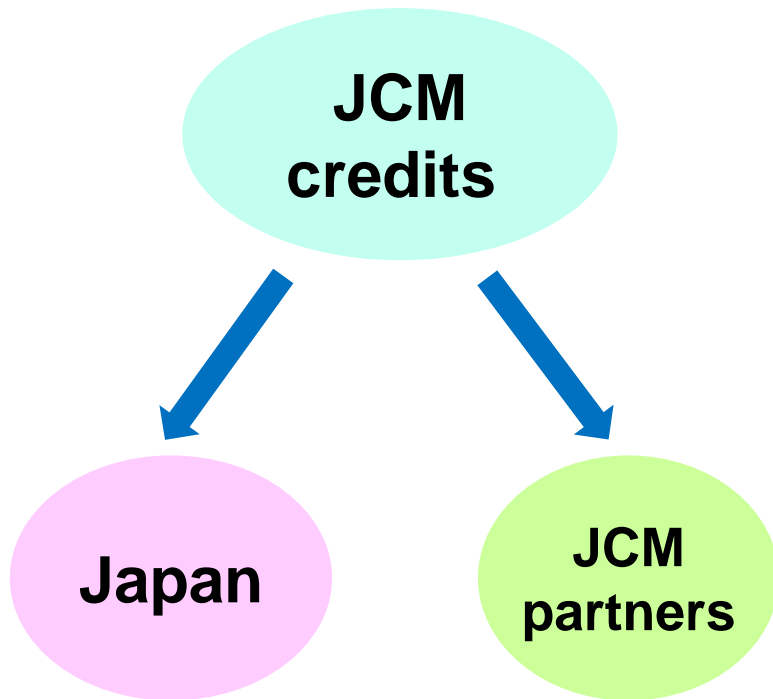
○ **Completed: 8 projects** (Mongolia [1], Lao PDR [1], Indonesia [3], Vietnam [3])



*As of December 2019

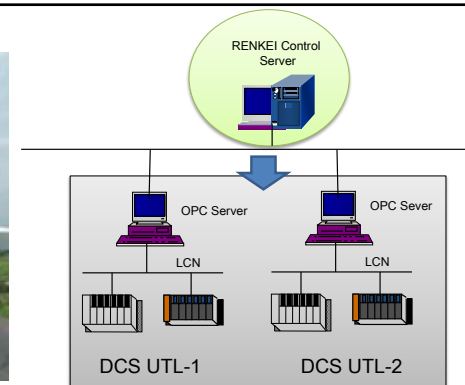
Total amount of expected credits by 8 JCM projects:
 ⇒ **40,000 CO₂ tons** as of December (2019)

Nationally determined contribution (NDC)



Demonstration project in Indonesia

| | |
|----------------------|---|
| Project name | Utility Facility Operation Optimization Technology—"Renkei" Control |
| Term (FY) | 2016—2018 |
| Project participants | Azbil Corp. (JP) PT Pertamina (Indonesia) |
| Expected credits | About 35,000 tons |
| Energy-saving effect | 3 million yen |



Existing Control system

What's ICEF?

About ICEF

- Initiative of Prime Minister Shinzo Abe
- Held in Tokyo every October
- **Participants:** 1000+ leaders in academia, industry and government from 70 countries and regions
- **Aim:** Platform to solve climate change through innovation
- **Main theme:** Achieving “net-zero CO₂ emissions”
- **Hosts:**
 - Ministry of Economy, Trade and Industry (METI)
 - New Energy and Industrial Technology Development Organization (NEDO)
- **Outcomes:**
 - Top 10 Innovations, roadmap, and statement



Industrial Heat Decarbonization Roadmap:

Launch event:

17:30–18:45, December 11 @ Japan Pavilion



These are available on the ICEF website: <https://www.icef-forum.org/>

Thank you for your attention.



<http://www.nedo.go.jp/english/index.html>