Contributing to Society by Accelerating Innovation and Achieving Results in a Timely Manner

Following the two oil crises of the 1970s, NEDO was established in 1980 to promote the development and introduction of new energy technologies. Since then, NEDO has become one of the largest public research and development management organizations in Japan, and it works with the government to implement economic and industrial policies. In this capacity, NEDO undertakes technology development and demonstration activities to carry out the two basic missions of addressing energy and global environmental problems and enhancing industrial technology by integrating the combined efforts of industry, academia, and government. In order to further advance its activities, NEDO’s Technology Strategy Center was established in April 2014. It is designed to formulate technology development strategies with a mid- and long-term perspective, and plan and propose new projects which incorporate its strategies. In addition, a new project manager system has also been introduced not only to improve management capabilities but also to enhance NEDO’s role as an intermediary to facilitate the commercialization of innovative technology seeds.

NEDO’s Fourth Five-Year Plan began in April 2018. In consideration of current trends in the industrial technology, innovation, energy, and environment areas, NEDO will carry out the plan with a focus on its three pillars of achieving results for practical use through technology development management, fostering technology-based startups, and providing a new direction for mid- and long-term technology development.

First, as a specific effort to achieve results for practical use through technology development management, NEDO is striving to further strengthen its management capability to promote challenging research and development activities based on technology strategies. This is expected to help realize maximum results and quickly produce practical applications utilizing such results. Second, NEDO will develop and implement various support measures to foster human resources and technology-based startups, including assistance in formulating project plans, thereby creating innovative new industries. With the aim of facilitating open innovation derived from research and development projects, NEDO will also establish a system to provide consistent support from the seed phase to practical application. NEDO’s aim is to serve as a public-private support hub for venture businesses through cooperation and the exchange of information with other public support organizations. Third, a new direction for mid- and long-term technology development will be established, which will lead to cultivation and practical use of innovation in the future. Technology development strategies utilizing Japan’s competitive advantages will also be formulated by anticipating innovation trends faster and more accurately than in other countries. NEDO will then plan and carry out industry-academia-government collaborative projects.

It is hoped that technological innovation now being developed during the Fourth Industrial Revolution will be incorporated to establish new energy and industrial systems. Society 5.0 is also expected to be realized. To this end, NEDO will continue to make every effort in accordance with its Five-Year Plan so as to contribute to society by providing opportunities to produce innovation through industry-academia-government collaboration and achieving results in a timely manner.

Chairman’s Message

Hiroaki Ishizuka
Chairman
New Energy and Industrial Technology Development Organization
About NEDO

- NEDO plays an important role in Japan’s economic and industrial policies as one of the largest public research and development management organizations. It has the two basic missions of addressing energy and global environmental problems and enhancing industrial technology.
- NEDO coordinates and integrates the technological capabilities and research abilities of industry, academia, and government instead of employing its own researchers. It also promotes the development of innovative and high-risk technologies. NEDO aims to contribute to the resolution of social issues and market creation by demonstrating and producing practical applications of such technologies.

NEDO’s Missions

Addressing energy and global environmental problems

NEDO actively undertakes the development of new energy and energy conservation technologies. It also conducts research to verify technical results. Through these efforts, NEDO promotes greater utilization of new energy and improved energy conservation. NEDO also contributes to a stable energy supply and the resolution of global environmental problems by promoting the demonstration of new energy, energy conservation, and environmental technologies abroad based on knowledge obtained from domestic projects.

Enhancing industrial technology

With the aim of raising the level of industrial technology, NEDO pursues research and development of advanced new technology. Drawing on its considerable management know-how, NEDO carries out projects to explore future technology seeds as well as mid- to long-term projects that form the basis of industrial development. It also supports research related to practical application.

Positioning of NEDO

In its technology development management, 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.

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Background Information

Designation
National Research and Development Agency
New Energy and Industrial Technology Development Organization (NEDO)
Business name: New Energy and Industrial Technology Development Organization (NEDO)

Foundation
Originally established on October 1, 1980; reorganized as an incorporated administrative agency on October 1, 2003

Details of Major Operations
Operations relating to technology development management (national projects and practical application promotion activities)

Minister in Charge
Minister of Economy, Trade and Industry

Governing Laws
Act on General Rules for Incorporated Administrative Agencies
Act on the New Energy and Industrial Technology Development Organization

Personnel
926 (as of April 1, 2018)

Budget
Approximately 1.45 billion US dollars (FY2018)
(Budget amount is calculated at a rate of 110 yen per US dollar.)

Executives
Chairman  Mr. Hiroaki Ishizuka
President  Mr. Hiroshi Oikawa
Executive Directors  Dr. Masayoshi Watanabe, Mr. Shoji Kukita, Dr. Yoshiteru Sato, Mr. Kiyoshi Imai, Mr. Takashi Omote
Auditors  Mr. Hideaki Nakano, Ms. Mime Egami
(as of July 27, 2018)

Organization

Chairman
President
Executive Directors
Auditors
Auditor Support Office

General Affairs Department
Personnel Affairs Department
Accounting Department
Inspection and Operational Management Department
Asset Management Department
Information and Systems Department
Evaluation Department
Public Relations Department
Kansai Branch Office
Overseas Offices
(Washington, D.C., Silicon Valley, Europe, Beijing, Bangkok, New Delhi)

Technology Strategy Center
Project Management Office
Innovation Promotion Department
Robot and Artificial Intelligence Technology Department
AI Promotion Division
Internet of Things Promotion Department
Materials Technology and Nanotechnology Department
Energy Conservation Technology Department
New Energy Technology Department
Advanced Battery and Hydrogen Technology Department
Electricity Storage Technology Development Division
International Affairs Department
Global Environment Technology Promotion Division
Smart Community Department
Environment Department

(as of April 1, 2018)
NEDO History

In the 1970s, the world experienced two oil crises. To improve Japan’s energy diversification, NEDO was established in 1980 to help usher in energy conservation and new energy technologies. In 1988, NEDO added research and development of industrial technology to its activities. Today, it uses its role as a research and development management organization to boost innovation and promote research and development on energy, environmental technology, and industrial technology.

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974</td>
<td>Long-term Sunshine Project aimed at developing new energy technologies started</td>
</tr>
<tr>
<td>1978</td>
<td>Long-term Moonlight Project aimed at developing energy conservation technologies started</td>
</tr>
<tr>
<td>1980</td>
<td>New Energy Development Organization established</td>
</tr>
<tr>
<td>1988</td>
<td>Research and development on industrial technology added. Name changed to New Energy and Industrial Technology Development Organization</td>
</tr>
<tr>
<td>1993</td>
<td>New Sunshine Project started</td>
</tr>
<tr>
<td>1996</td>
<td>Integration with Coal Mine Damage Agency. Coal mine damage compensation program added</td>
</tr>
<tr>
<td>2003</td>
<td>Incorporated Administrative Agency New Energy and Industrial Technology Development Organization established under the Act on the New Energy and Industrial Technology Development Organization</td>
</tr>
<tr>
<td>2006</td>
<td>Kyoto Mechanisms Credit Acquisition Program added</td>
</tr>
<tr>
<td>2007</td>
<td>Transitional operations related to coal mine damage recovery completed</td>
</tr>
<tr>
<td>2012</td>
<td>Coal and geothermal operations transferred to Japan Oil, Gas and Metals National Corporation</td>
</tr>
<tr>
<td>2014</td>
<td>Technology Strategy Center established</td>
</tr>
<tr>
<td>2015</td>
<td>Status changed from incorporated administrative agency to national research and development agency</td>
</tr>
<tr>
<td>2016</td>
<td>Kyoto Mechanisms Credit Acquisition Program discontinued</td>
</tr>
</tbody>
</table>

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NEDO aims to address energy and global environmental problems and raise the level of industrial technology through integrated management of technological development. This ranges from the discovery of technology seeds to the promotion of mid- to long-term projects and support for practical application.

* As only an outline of NEDO’s activities is given below, individual budget amounts do not add up to the total.

1.45 billion US dollars
(FY2018 tentative budget)

Individual Operational Activities

**Energy Systems (481 million US dollars)**

*Areas of focus*
- System provision technology
- Energy storage technology such as batteries
- Technology related to hydrogen production, storage, transport, and use
- Renewable energy technology

**Energy Conservation and Environment (407 million US dollars)**

*Areas of focus*
- Technology to harness unutilized thermal energy
- Environmentally-friendly steel manufacturing technology
- Development of high-efficiency coal-fired power generation technology
- Technology related to sequestration of CO2
- Fluorocarbon recovery technology
- 3R technology, including resource screening and metal refining technology
- International demonstrations, Joint Crediting Mechanism activities, and others

**Industrial Technology (444 million US dollars)**

*Areas of focus*
- Robot and AI technology
- IoT, electronics, and information technology
- Manufacturing technology
- Materials and nanotechnology
- Biotechnology

**New Industry Creation and Discovery of Technology Seeds (53.6 million US dollars)**

*Areas of focus*
- Fostering technology-based startups
- Promotion of open innovation

NEDO promotes development of key future technologies (including technology demonstrations) which are difficult for private enterprises to develop on their own due to the high level of risk leading up to practical application. Instead of hiring its own researchers, NEDO coordinates and integrates the technological capabilities of private enterprises and research abilities of universities. These capabilities are then leveraged in national projects focused on technology development.

NEDO also promotes open innovation and provides support to small and medium-sized enterprises and venture businesses that are becoming new leaders in innovation, thereby discovering promising technology seeds and creating new industries.

*Budget amount is calculated at a rate of 110 yen per US dollar.*
## FY 2018 Project List

### Energy Systems

#### National Projects

<table>
<thead>
<tr>
<th>Project name</th>
<th>Period(FY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstration Project of Advanced Power Grid with Distributed Energy Sources</td>
<td>2014-2018</td>
</tr>
<tr>
<td>Research and Development Project on Technologies to Respond to Power System Output Fluctuations</td>
<td>2014-2018</td>
</tr>
<tr>
<td>Next-Generation Offshore HVDC System Research and Development Project</td>
<td>2015-2019</td>
</tr>
<tr>
<td>Development project for Enhanced photovoltaic Efficiency and Maintenance Technologies</td>
<td>2014-2016</td>
</tr>
<tr>
<td>Development Project for Photovoltaic Recycling Technology</td>
<td>2014-2016</td>
</tr>
<tr>
<td>Development of High-Performance and Reliable PV Modules to Reduce Levelized Cost of Energy</td>
<td>2015-2019</td>
</tr>
<tr>
<td>Research and Development of Wind Power Generation Technologies</td>
<td>2008-2022</td>
</tr>
<tr>
<td>Project for Supporting the Introduction of Wind Power Generation</td>
<td>2013-2022</td>
</tr>
<tr>
<td>Research and Development of Geothermal Energy Generation Technologies</td>
<td>2013-2020</td>
</tr>
<tr>
<td>Development of Production Technologies for Biomass Fuels</td>
<td>2017-2020</td>
</tr>
<tr>
<td>Demonstration Project for Independent Regional Biomass Energy Systems</td>
<td>2014-2020</td>
</tr>
<tr>
<td>Research and Development for Utilization of Heat as Renewable Energy</td>
<td>2014-2018</td>
</tr>
<tr>
<td>Development of Materials Evaluation Techniques for Advanced and Innovative Batteries (phase 2)</td>
<td>2018-2022</td>
</tr>
<tr>
<td>Research &amp; Development Initiative for Scientific Innovation of New Generation Batteries 2</td>
<td>2016-2020</td>
</tr>
<tr>
<td>Development of Advanced PEC Utilization Technologies</td>
<td>2015-2019</td>
</tr>
<tr>
<td>Development of Technologies to Promote Practical Application of SOFCs</td>
<td>2013-2019</td>
</tr>
<tr>
<td>Advancement of Hydrogen Technologies and Utilization Project</td>
<td>2014-2022</td>
</tr>
<tr>
<td>Development of Technologies for Realizing a Hydrogen Society</td>
<td>2014-2025</td>
</tr>
<tr>
<td>Development of Technologies for Hydrogen Refueling Stations</td>
<td>2018-2022</td>
</tr>
</tbody>
</table>

#### Proposal-Based Activities

- NEDO Feasibility Study Program                                             2014-2023

#### International Demonstration and Joint Projects

- International Demonstration Projects on Japan’s Energy Efficiency Technologies 1993-2020
- Program to Facilitate Private-Sector-Led Promotion of Low Carbon Technology Overseas 2011-2022

### Energy Conservation/Environment

#### National Projects

<table>
<thead>
<tr>
<th>Project name</th>
<th>Period(FY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research and Development Project for Innovative Thermal Management Materials and Technologies</td>
<td>2015-2022</td>
</tr>
<tr>
<td>Project to Promote Commercialization of High-Temperature Superconductivity Technology</td>
<td>2016-2020</td>
</tr>
<tr>
<td>Development of Technologies for Next-Generation Thermal Power Generation</td>
<td>2016-2021</td>
</tr>
<tr>
<td>Development of Clean Coal Technologies</td>
<td>2016-2019</td>
</tr>
<tr>
<td>Research and Development of Recycling Technologies for Establishing a High Efficiency Resource Circulation System</td>
<td>2017-2022</td>
</tr>
<tr>
<td>Development of Assessment Techniques for Next-Generation Refrigerant with Low GWP Values</td>
<td>2018-2022</td>
</tr>
<tr>
<td>Research, Development and Demonstration of CCS Technology</td>
<td>2018-2021</td>
</tr>
</tbody>
</table>

#### Proposal-Based Activities

- Strategic Innovation Program for Energy Conservation Technologies           2012-2021
- NEDO Feasibility Study Program                                             2014-2023

#### International Demonstration and Joint Projects

- Demonstration Project for Introducing an Energy-Saving Resource Circulation System in Asia | 2016-2020  |
- Project for International Promotion and Dissemination of Advanced Thermal Power Generation Technologies | 2017-2021  |
- International Demonstration Projects on Japan’s Energy Efficiency Technologies | 1993-2020  |
- Program to Facilitate Private-Sector-Led Promotion of Low Carbon Technology Overseas 2011-2022

### Survey Activities

- Research for Strategy Formulation                                            2000-
As technology development activities become increasingly competitive worldwide, NEDO actively collects information on various fields both inside and outside of Japan. Such information is then used to formulate technology strategies, set milestones, and develop project plans.

1. Managing Technological Development to Utilize Results in Society

Start

Collecting information and formulating strategies for each field

As technology development activities become increasingly competitive worldwide, NEDO actively collects information on various fields both inside and outside of Japan. Such information is then used to formulate technology strategies, set milestones, and develop project plans.

1 to 2 Years Later

Developing technology to support progress in fields with a promising future

NEDO sets goals for technology development by studying domestic and international technology trends and consulting with experts. It aims to use innovation to drive economic growth and solve societal problems. Projects are planned by looking five, ten, and twenty years into the future.

NEDO projects make it possible!

- Mid- to long-term initiatives
- Technological development coordinated with standardization
- Cross-industrial cooperation
- Full-scale demonstration
- International cooperation

NEDO support draws on a wealth of knowledge

Partnership agreements with foreign countries

NEDO enters into agreements with institutions in various countries and actively supports international development.

Taking a global approach through standardization activities and intellectual property strategies

NEDO contributes to the establishment of international standards by offering test data to ISO/IEC technical committees. It also provides support to research teams participating in projects for consensus building regarding intellectual property. This promotes practical application and global market acquisition.

Diverse human resource networks

NEDO organizes committees on project adoption, evaluation, technology, and other issues as needed by making use of its network of outside specialists and experts from industry and science.
NEDO promotes technology development projects and large-scale demonstration projects that are difficult for private sector companies to carry out on their own. It aims to make the most of its results. To do so, it focuses on authentication and systems for society to use, while anticipating future developments from a global perspective.

After a project is completed, an evaluation is conducted by a third party and project results are thoroughly assessed. In addition, NEDO conducts follow-up monitoring of results to examine the economic and social effects of the project. Information collected during monitoring is also used to improve future project management.

In the energy and environment sector, NEDO hopes to help achieve an 80% reduction in greenhouse gas emissions by 2050. It also promotes the discovery and development of revolutionary technology to solve mid- to long-term problems.

In the industrial technology sector, NEDO aims to fuse technology with Japan’s strengths in manufacturing. It hopes to focus on artificial intelligence (AI) and robotics to build Society 5.0 and distill the wisdom of industry, academia, and government to deliver the world’s most advanced technology to society.

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Three Initiatives Based on NEDO’s Fourth Five-Year Plan

2. Fostering Technology-Based Startups

It is important to foster novel and dynamic technology-based startups. These should help revitalize the economy, and lead the way in creating new industries and employment opportunities. Accordingly, NEDO is helping to build a venture ecosystem by providing seamless support for the discovery of technology seeds, acquiring private funding for high-risk/high-return investments, and providing commercialization support. In addition, NEDO aims to raise the level of technology-based startups by strengthening systems for collaboration between regional areas and public support institutions.

Three Initiatives Based on NEDO’s Fourth Five-Year Plan

- Cultivating technology seeds and entrepreneurial candidates having business innovation ability
- Supporting seed-stage technology-based startups in collaboration with venture capital
- Supporting startups that carry out joint research with project companies as a way to accelerate collaboration
- Cultivating specialized human resources that can provide support for the growth of technology-based startups

Providing support for commercialization of technology-based startups

- Matching with investors and other collaborators
- Pitch contest
- Investment funding and hands-on support
- Joint research with project companies
- Developing practical applications
- Linking to venture capital (VC)
- Raising outside capital/commercialization support (STS support)
- Practical on-the-job training
- Group training
- Support for collaboration with project companies (SCA support)

Catalyzer
Professional mentors such as experienced entrepreneurs, investors, and other qualified personnel

Advice

Support for drafting business plan (TCP)

Techno-
gy-based startups support (NEP)

Venture capital (VC)

Raising outside capital/commercialization support (STS support)

SSA: A program developing human resources with the skills and abilities necessary to support the growth of startups

TCP: Technology Commercialization Program
NEP: NEDO Entrepreneurs Program
STS: Seed-Stage Technology-Based Startups
SCA: Startups in Corporate Alliance
SSA: Startup Supporters Academy
3. **Presenting the Direction of Mid- to Long-Term Technology Development**

NEDO’s Technology Strategy Center takes the lead in continually ascertaining and analyzing the movement of social and market trends. It works to discover promising technologies in energy, environmental technology, and industrial technology both within Japan and abroad. It also works to narrow down the technological development Japan should undertake, formulate technology strategies, and plan projects based on them. It aims to incorporate multifaceted analysis in strategy formulation, and uses technology development projects to accelerate economic growth.

NEDO uses an approach it calls allcasting to formulate project themes. Allcasting is a combination of backcasting based on social needs and challenges, and forecasting based on current technological conditions and seeds.
Energy Systems

Energy system technology
Storage batteries, hydrogen energy, smart communities, and system control

Example of all-solid lithium-ion batteries and other innovative storage batteries

Conceptual diagram of demonstration hydrogen energy system using renewable energy

In the field of storage batteries, NEDO is carrying out research and development on all-solid lithium-ion batteries and other types of innovative batteries which surpass the performance of current lithium-ion batteries. In the field of hydrogen energy, it is working to improve the performance of fuel cells and minimize the costs of hydrogen refueling stations. It is also developing hydrogen-based electricity generation to meet broadly expanding demand for hydrogen. To support this effort, NEDO is developing large-scale hydrogen supply chains from overseas and energy system technology that uses renewable energy.

Renewable energy technology
Solar power, wind power, ocean energy, biomass, geothermal, and utilization of heat as renewable energy

Botryococcus and microalgae culture facility for producing biojet fuel

In response to the large-scale introduction of distributed energy sources such as renewable energy, NEDO is aiming to construct an advanced grid system that enables bidirectional electricity trading not just from the supply side but also from demand side entities such as residential homes and commercial offices. NEDO is conducting research and development projects on grid technology in order to realize such a scenario and is also conducting demonstration projects in various environments around the world with the aim of establishing a supply and demand model from both technical and business viewpoints.
NEDO promotes challenging research and development based on its technology development strategy to address various issues facing society. NEDO aims to lead the world in realizing innovation by shifting to new industrial systems, achieving a society that thoroughly conserves energy, and accelerating the adoption of renewable energy.

Energy Conservation and Environment

Energy conservation technologies

Innovative energy conservation technologies, unutilized thermal energy, high-efficiency thermal power generation, carbon capture, effective use and sequestration, and environmentally-friendly steel production processes

Demonstration facilities for oxygen-blown IGCC (Osaki CoolGen Project)

Although coal is an excellent fuel that is distributed throughout the world, CO\textsubscript{2} emissions related to its use must be reduced. NEDO is developing clean coal technology focused on the highly efficient use of fossil fuels to reduce CO\textsubscript{2} emissions per unit of power generated, and is exploring CO\textsubscript{2} capture, utilization and storage (CCUS) technology as well as ultimate CO\textsubscript{2} reduction system technology.

The Ministry of Economy, Trade and Industry’s “Long-Term Energy Supply and Demand Outlook” requires extensive energy conservation that will reduce energy consumption to 50.3 million kiloliters of crude oil equivalent by 2030. NEDO is therefore conducting technology research and development to further enhance Japan’s energy conservation systems. This entails supporting research and development on innovative technologies including thermal management materials and technologies, high-temperature superconductivity, and others.

Environment and resource conservation technology

3R, fluorocarbon countermeasures, and water circulation

In the field of environment and resource conservation technology, NEDO aims to build an effective system for recycling metals through urban mining. In addition, NEDO hopes to accelerate the reuse of resources throughout the world. Hydrofluorocarbon (HFC) greenhouse gas emissions are expected to increase in the future. NEDO is committed to reducing greenhouse gas emissions by developing technologies that accelerate the transition away from refrigeration and air conditioning equipment that use HFC refrigerants to those that use refrigerants which do not contribute significantly to the greenhouse effect. In addition, NEDO is working in such areas as energy conservation, low environmental impact water circulation systems, seawater desalination, and metal recovery from wastewater treatment. By demonstrating Japan’s water processing technologies and systems overseas, NEDO is striving to strengthen the international competitiveness of Japan’s water-related industries.
Industrial Technology

Robot and AI technology
Infrastructure maintenance and disaster response robots, manufacturing robots, service robots, and next-generation artificial intelligence (AI)

NEDO promotes development and demonstration of sophisticated robots that can be used in a variety of social contexts, including infrastructure maintenance, disaster response, manufacturing, and services. Also, NEDO aims to achieve a level of artificial intelligence comparable to, or surpassing, humans. Targeting super-human or human-comparable artificial intelligence, NEDO will develop currently unrealized next-generation robot and artificial intelligence by bringing together global knowledge from industry, academia, and government into one research center. These efforts will not only lead to solutions to societal problems, but will also contribute to building a smart society.

IoT, electronics, and information technology
Internet of Things (IoT), computing, memory, power semiconductors, printed electronics, and optoelectronics

In order to address social challenges by using IoT, AI, and big data, NEDO is collecting real-world data, providing feedback on societal applications for data accumulation, analysis, management and services, and conducting research and development at all stages. In addition, NEDO promotes both hardware- and software-related aspects of relevant technologies, from electronic devices that make low-power high-speed processing possible to cross-sectoral technology development that is fundamental to maintaining security at every level.

NEDO is contributing to the real-world implementation of IoT by creating services that lead to solutions to social problems and to the creation of new businesses that do not rely on existing businesses. In addition to its own research and development, NEDO collaborates with project participants, laboratories, and businesses that use IoT.
Industrial Technology

Super lightweight chassis made with thermoplastic carbon fiber reinforced polymer

Materials and nanotechnology

Structural materials, functional materials, motors, chemical production, and integrated measurement systems

Japan’s metals, plastics, ceramics, and other material industries boast a high level of technology worldwide. They are key industries sustaining the country’s entire manufacturing industry. Nanotechnology (technology to control material structures on the nanoscale of $10^{-9}$m) is being applied to material development in coordination with different industries and disciplines, both upstream and downstream. NEDO aims to strengthen Japan’s industrial technologies by creating innovative materials.

Manufacturing technology

Next-generation laser processing and additive manufacturing

NEDO is developing new manufacturing systems which can greatly reduce energy consumption, such as a system for high-mix and low-volume manufacturing and a system for connecting to cyberspace. Specifically, NEDO is developing additive manufacturing technologies for high value-added production and laser processing technologies based on high-brightness and high-efficiency lasers. By putting these technologies and systems into practical use, NEDO is contributing to realization of Society 5.0.

Biotechnology

Inedible biomass and smart cells

Recent innovations in biotechnology have made strengthening competitiveness in this field an urgent necessity for Japan. In preparation for the future depletion of oil reserves, NEDO is developing processes to manufacture plastics and other chemicals from inedible biomass. It is also working to develop technology to efficiently produce high-performance products using technologies that modify and control the metabolic systems of plants and microorganisms.
JOIC activity

NEDO dream pitch event at Fifth Innovation Leaders Summit

New Industry Creation and Discovery of Technology Seeds

Commercialization support for small and medium-sized enterprises and venture businesses
Carrying out seamless support from discovery of technology seeds and entrepreneurs to development of practical applications

NEDO provides small and medium-sized enterprises and venture businesses with support at various phases. Such support is in line with government strategies such as the “Strategy for Investment in the Future” which acknowledge the importance of venture support. It ranges from support for technology seeds to practical application by businesses. As in the past, NEDO offers support for practical application in renewable energy and welfare equipment fields. At the same time, NEDO is building a cross-sectoral system to support entrepreneurs and startups, and offers support in collaboration with intermediary research institutions. It has also built systems that allow experts to provide advice on topics such as venture capital financing, legal issues, accounting, and intellectual property as they relate to commercialization. In addition to support for the efforts of small and medium-sized enterprises and venture businesses in technology development, the objectives of NEDO’s programs and systems are to improve business plans and expand business domains, thereby facilitating the commercialization of technology seeds.

Encouraging open innovation
Matching support, Japan Open Innovation Council

As international competition intensifies, it will be important to promote open innovation that utilizes outside technologies, ideas, and resources to lead the global market. It will also be vital to tie this effort to the creation of new products and business models. NEDO is strengthening its promotion of open innovation by organizing activities such as matching events that lead to the creation of joint research and technology alliances between NEDO project participants and outside businesses, universities, and other organizations. In addition, the Japan Open Innovation Council (JOIC), for which NEDO serves as the secretariat, investigates and shares success stories from within Japan and abroad. JOIC holds events such as pitch contests with the aim of further deepening and expanding open innovation by businesses and other relevant entities.
NEDO Project Practical Application Case Studies

Impact of NEDO project results

**NEDO Inside Products**

NEDO defines products and processes that use the results of NEDO projects as their core technologies* as “NEDO Inside Products.” As of FY2016, a total of 115 products had been selected. Sales (actual and forecasted), CO₂ emissions reduction, and primary energy savings for these products are calculated in order to ascertain their mid- to long-term effectiveness.

* “Core technologies” refer to technologies at the research and development stage that a NEDO project took the opportunity to commercialize, and without which new products or processes would not have resulted.

<table>
<thead>
<tr>
<th>Economic Effect</th>
<th>Environmental Impact</th>
<th>Energy-Saving Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sales performance</strong></td>
<td><strong>CO₂ emissions reduction</strong></td>
<td><strong>Primary energy savings</strong></td>
</tr>
<tr>
<td>(From launch to FY2016)</td>
<td>(FY2016)</td>
<td>(FY2026)</td>
</tr>
<tr>
<td>477 billion US dollars</td>
<td>47.92 million tCO₂/year</td>
<td>2.48 million kL/year of crude oil equivalent</td>
</tr>
<tr>
<td>115 products</td>
<td>32 products</td>
<td>13 products</td>
</tr>
</tbody>
</table>

**Sales forecast**
(FY2026)
95.91 million tCO₂/year
9.03 million kL/year of crude oil equivalent

**Capital investment**
Approximately 6.57 billion US dollars

**Plan for Global Warming Countermeasures**
329.08 million tCO₂/year

**Long-Term Energy Supply-Demand Outlook**
50.30 million (kL/year of crude oil equivalent)

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**Economic Effect**
- The premise for estimates is actual sales performance and forecasted sales results. Only parts (e.g., materials, components, and products) involved in NEDO projects are included. Sales and other factors along the value chain are not included. Target sales are assumed to be 100% NEDO’s contribution.
- NEDO investment and sales performance have been adjusted to prices of the baseline year (FY2016) using the GDP deflator. Sales forecasts are cumulative amounts for the 10 years from FY2017 through FY2026 (discount rate of 0%).

**Environmental Impact and Energy-Saving Effect**
- NEDO estimates this with reference to the yearly utilization rate and service life based on applicable products when NEDO Inside Products are introduced.

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Follow-up monitoring after NEDO projects are completed

**NEDO Project Success Stories**

http://www.nedo.go.jp/library/pamphlets/BF_201711_jitsuyouka_e.html

NEDO conducts follow-up monitoring to ascertain how technology developed through a project has been utilized in products and services and how project results have been disseminated throughout society. NEDO then interviews businesses and developers about the products and services it has discovered and shares this information through NEDO Project Success Stories.
Introducing Japanese technologies to the world

Activities Around the World

NEDO plays a leading role by carrying out international demonstration projects and introducing stand-alone technologies as well as systems that integrate various technologies. NEDO aims to introduce advanced Japanese technologies to countries and regions around the world having diverse needs and infrastructures.

Europe

Germany
1. Demonstration Project for Large-Scale Hybrid Power Storage System in Niedersachsen
2. Aperiodically Polled Crystals for Realtime Dual-Comb Spectroscopy in the Life Sciences (ACROSS)
3. Development of a Stent Graft with a 3D Printed Shape Memory Polymer Stent Structure

France

Portugal
5. Automated Demand Response Demonstration

Uzbekistan
6. Demonstration Project for a High-Efficiency Cogeneration System Using Distributed Small to Medium-Sized Gas Turbines

Slovenia
7. Smart Grid and Smart Community System Coordinated Research and Demonstration Action

Poland
8. Demonstration Project for Applying Special Protection Scheme

Ukraine
9. Demonstration Project for Efficiency Improvement of a Steam Turbine

Russia
10. Demonstration Project to Develop Infrastructure, Including Wind Power Systems, in the Sakha Republic
11. Demonstration Project on a Self-Controlled Advanced Traffic Signal System in Moscow

Middle East and Africa

Saudi Arabia
12. Demonstration Project for Energy Saving Seawater RO System

Qatar
13. Model Project for an Advanced Seawater Desalination System Applying Heated Discharge Water

Israel
14. Development of Next-Generation Smart Pinch Valve Systems

South Africa
15. Demonstration Project for Energy Saving Environmental Friendly Desalination Technology

South Asia

India
16. Model Project for a Microgrid System Using Large-Scale PV Power Generation and Related Technology
17. Demonstration Project for Smart Grid in Panipat, Haryana
18. Demonstration Project for Optimal Control Technology on Energy Center for Steel Plants
19. Demonstration Project for ICT Based Green Hospital at AIIMS in Delhi
International Demonstration Projects on Japan’s Energy Efficiency Technologies (25 projects)
Program to Facilitate Private-Sector-Led Promotion of Low Carbon Technology Overseas (5 projects)
International Research and Development Co-Funding Projects (4 projects)
Project for International Promotion and Dissemination of Advanced Thermal Power Generation Technologies (1 project)

Carrying out 35 projects around the world
(as of April 1, 2018)

Southeast Asia

Indonesia
20 Demonstration Project for Smart Communities in Industrial Parks
21 Demonstration Project for the Spread of Compressed Natural Gas Vehicles and Refueling Infrastructure, Including Support of Development of Sustainable Environment
22 Energy Saving by Optimum Operation at an Oil Refinery (JCM)
23 Utility Facility Operation Optimization Technology –RENEKI CONTROL– (JCM)
24 Industrial Technology for Low-Carbon BTS with Trivid System (JCM)

Thailand
25 Demonstration Project for an Energy-Saving Cellulosic Sugar Production System Using Bagasse

Malaysia
26 International Demonstration Project for Introducing Electric Vehicle Buses with Fast-Charging System

Philippines
27 Demonstration Project for Mobility as a System

Laos
28 Lao PDR Energy Efficient Datacenter (LEED) (JCM)

Northeast Asia

China
29 Demonstration Project for an Energy Management System Applicable to Aggregation of Power Supply and Demand Adjustment in Guangdong
30 Model Project for an Energy Efficient Building at the Stem Cell and Regenerative Medicine Research Facility of the Research Facilities of Shanghai Advanced Research Institute
31 Model Project for Bioethanol Fuel Production from Potato Starch Residue by Utilizing Acremonium Cellulolyticus

Mongolia
32 Demonstration Project for a Dry Coal Preparation Technology System
33 Demonstration and Verification Project for a High Efficiency and Low Loss Power Transmission and Distribution System (JCM)

Americas

USA
34 Demonstration Project for Electric Vehicle Driving Behavior in California
35 Demonstration Project for Validation of Redox Flow Battery Performance in California
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