

Climate Change

CSR REPORT 2017



SuMi TRUST Group's Eco-Trustution

The Group has coined the word “Eco-Trustution” to represent its environmental financial business based on the concept of providing solutions to ecological issues through the use of our trust function. We will continue to develop and provide solution-based financial instruments and services.

**Solutions that use the unique
functions of a trust bank**

**Support for
Energy Efficiency
(Renewable
Energy, Energy
Conservation)**

**Investment in
Environmentally
Friendly
Companies
(Responsible
Investment)**

**Financing for
Environmentally
Friendly
Companies
(Environmental
Rating Loans)**

**Valuation of
Natural Capital
(Biodiversity)**

**Support for
Environmental
Friendliness in
Real Estate**

**Support for
Smart City
Projects**

**ECO
Trustution**
エコ・トラステーション

Editorial policy

Our CSR-related reports for fiscal year 2017 consist of our full CSR report and feature booklets on the themes of *Climate Change*, *Natural Capital*, *Stewardship*, *Environmentally Friendly Property* and a digest report for seniors (available only in Japanese). We publish these reports so readers can gain a deeper understanding of our Group's proactive initiatives. You can visit our website to learn more about our other CSR initiatives.

<http://smth.jp/en/csr/index.html>

* This booklet introduces various initiatives and activities by our Group, led by SuMi TRUST Bank.

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Keeping Global Temperature Rise below 2°C

Transition to the Societies of Net Zero Carbon Emissions

The Paris Agreement established a framework for signatory nations to adopt measures to mitigate climate change aimed at limiting global temperature rise to below 2°C and transitioning to the societies of net zero carbon emissions.

Based on the scientific consensus that greenhouse gas emissions from human activities are causing global warming, the Paris Agreement has created an international framework for mitigating climate change in the post-2020 era predicated on the common goal of transitioning countries worldwide to the societies of net zero carbon emissions.

The agreement aims to keep global temperature rise to well below 2°C above pre-industrial levels and even limit the increase to 1.5°C with the goal of achieving effective net-zero-emission societies in the second half of this century.

Budgeting Carbon Emissions in Transition to Net-Zero Emission Societies

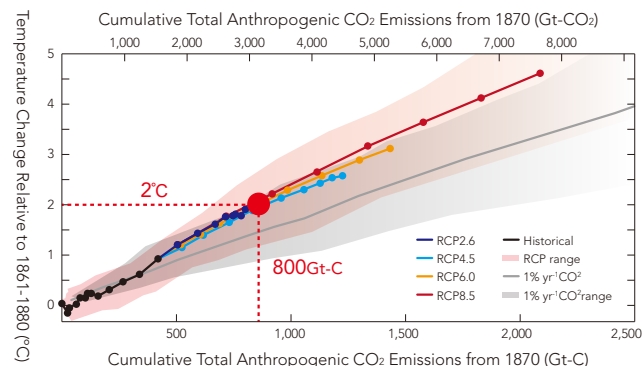
Carbon Budget: The world must limit cumulative CO₂ emissions to about 800Gt-C to achieve the Paris Agreement aim of keeping global temperature rise below 2°C. This is what informs the “carbon budget” concept that sets a ceiling on the planet’s capacity to absorb GHG* emissions.

Limited Remaining Carbon Budget: Past cumulative CO₂ emissions come to about 500Gt-C, so the world is approaching a point where the remaining emission budget is just one-third of the 800Gt-C total, or about 300Gt-C. At present, net global emissions is about 10Gt-C per year, so we are on course to exceed the safe ceiling for emissions within three decades.

Net-Zero Emission Societies: Nations globally must seek to end the fossil fuel dependence of their societies soon. It is likely too late to aim merely for a low-carbon society, so nations face pressure to aim higher and make a full transition to net-zero emissions.

*GHG stands for greenhouse gases.

Global Mean Surface Warming as a Indicator of Cumulative Total CO₂ Emissions*



Source: IPCC fifth assessment review, Working group I, Summary for policymakers, Figure SPM.10

*Estimates derived from many kinds of evidence

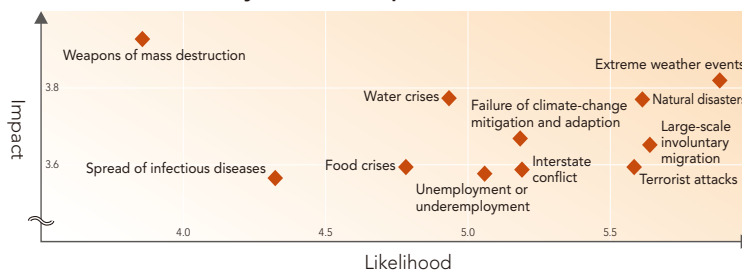
Climate Change Impacts on Economics and Finance

It is widely recognized that among the many social and environmental risks facing the world, climate change will have very substantial impacts on economics and finance. The response to climate change thus calls for precision.

Climate Change Poses Various Risks to Economics

Of the various environmental, social and political issues considered, the issues such as extreme weather events, natural disasters, water crises, food crises, and the spread of infectious diseases which arise from climate change itself as well as the failure of climate change mitigation and adaptation policies are positioned as the risks with the greatest potential impact.

Global Risks Ranked by Potential Impact



Source: World Economic Forum "The Global Risks Landscape 2017 12th edition"

Climate Change Impacts on Financial Sector

The Financial Stability Board (FSB), a global body of national financial authorities, released in June 2017 the final report of Recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) as proposed guidelines for climate-related financial disclosures. With this, financial institutions and the sector as a whole will face calls to go beyond reporting greenhouse gas emissions from their own business activities to monitoring with versatility climate change impacts caused by the companies and projects in their loan and investment portfolios, disclosing such climate-related information, and ensuring thoroughness in risk management.

Transition risks: Financial institutions and corporations may well be exposed to asset value volatility due to risks such as technological advances, public policy changes, market trends, and reputation in the transition to a society of net zero carbon emissions.

Physical risks: Acute risks from extreme weather events such as typhoons, floods and droughts, and chronic risks such as sea level rise and shifting climate patterns.

SuMi TRUST Group's Climate Change Governance

The SuMi TRUST Group recognizes that its response to climate change issues is important for building the Group's corporate value and a sustainable society, and its solutions businesses contribute to addressing climate change issues.

High Priority Issues concerning Climate Change (Materiality)

From a management perspective, the Group recognizes it is important as a financial institution to reduce climate change impacts arising from companies and projects in its loan and investment portfolios. We also recognize the importance of reducing CO₂ emissions from the Group's business activities.

It is our belief that helping to address climate change issues by harnessing our trust function is a matter of critical importance that will direct more business opportunities to the Group.

The Group's climate change-related materiality issues

- Taking into account how borrowers and investees impact society and the environment
- Pursuit of business opportunities with environmental and social themes
- Climate changes (physical impacts, etc.)
- Reducing the Group's environment burden

Action Guidelines for Mitigating Climate Change

1. Implementation of Measures and Support to Help Mitigate Climate Change

In addition to actively taking measures to reduce greenhouse gas emissions in our own business operations, we are making efforts, as a corporate citizen, to support activities that mitigate and adapt to climate change.

2. Provision of Products and Services

We are working on developing and providing products and services that help mitigate climate change. Our financial functions are being leveraged to promote energy conservation and encourage the use of renewable energy.

3. Collaboration with Stakeholders

We engage in dialogue and cooperation with our stakeholders as we work to mitigate climate change.

4. Education and Training

We will ensure that these guidelines are fully implemented at Group companies, and will actively conduct education and training to mitigate climate change.

5. Information Disclosure

We will actively disclose information related to our efforts to mitigate climate change.

Climate Change-related Materiality Management

Materiality (high priority issues) refers to events that have a material impact on the value creation process at companies. The Group defines materiality as priority issues it must address from a medium- to long-term perspective and encourages materiality management that engages at the level of top management.

Materiality Identification and Practice

STEP1

Identifying Materiality Issues

We emphasize the views of ESG investors who pursue corporate value from a long-term perspective. Based on reporting guidelines such as GRI and SASB, we select bank materiality issues emphasized by ESG research companies that provide information to investors.

STEP2

Interviewing Stakeholders

The issues identified in STEP 1 are evaluated from two perspectives: 1) the impact on corporate value in the medium- to long-term, and 2) the impact on stakeholders. We ask all our external directors and external auditors as well as relevant internal departments to evaluate and score issues from the first perspective, and external directors and external auditors as well as external experts to evaluate and score issues from the second perspective.

STEP3

Drawing Materiality Map

The point scores from STEP 2 are plotted on the materiality map (scatter diagram) showing the relationship between the “degree of impact on the Group’s medium- to long-term corporate value” (horizontal-axis) and the “degree of the Group’s impact on society (stakeholders)” (vertical-axis). The issues that fall into the map’s highest materiality zone are designated as the highest priority ESG issues at the Executive Committee, and then reported to the Board of Directors.

STEP4

Implementing Internal Engagement

From among the highest materiality issues, we implement internal engagement with relevant departments on themes where market interest is high. <Results of internal engagement on climate change>

- Adoption of the Equator Principles in project finance
- Greater risk recognition relating to fossil fuels, especially coal

STEP5

Initiatives for Increasing Corporate Value over Long-Term

The materiality issues identified are put into practice through internal engagement, and beyond that, we regard them as environmental and social issues linked to sustainability the Board of Directors ought to address. At the Board of Directors meetings, directors hold wide-ranging discussions on high materiality themes across their multiple aspects and determine the policy direction the Group should take.



Internal Engagement

The CSR Promotion Office of the Corporate Planning Department plays the role of “in-house quasi-investor” that initiates constructive dialogue with departments responsible for matters relevant to high materiality issues. This “internal engagement” process enables departments that do not often have direct discussions with external institutional investors or stakeholders to grasp the relevant issues from an investor viewpoint, and this creates opportunities for investigating concrete ways to address issues.

Climate Change Risk Management for Portfolio Investments

Climate Change and Engagement

SuMi TRUST Bank conducts engagements, calling on companies to disclose information on climate change challenges and assess climate-related risks. The Bank calls on energy companies and electricity utilities, where climate change is expected to have large impacts on shareholder value, to make disclosures on governance, strategy, risk management, and risks and opportunities required by the aforementioned TCFD.

In Japan, since 2016, the Bank has conducted 18 engagements with companies in the electric power, materials, and machinery sectors, which are large CO₂ emitters. Overseas, in 2017, the Bank, for example, voted for shareholder proposals that called on U.S.-based Exxon Mobil to disclose information related to climate change at the time of year when many institutional investors exercise proxy voting rights, and the Bank also carried out activities urging Anadarko Petroleum, a U.S.-based petroleum and natural gas exploration and production company, to disclose information related to climate change.

Examples of Engagement with Large CO₂ Emitters in Japan

Sector	No of engagements	Engagement content
Electricity and gas	8	Confirmed initiatives policies to reduce CO ₂ emissions at power utilities with high dependence on coal-fired power generation
Materials	6	Requested disclosure improvement of environment-related information such as CO ₂ emission and reduction status to those companies like steelmakers, cement makers, and paper mills
Machinery	4	Confirmed medium-term risk recognition about company-owned coal-fired power generators and coal businesses of overseas acquisitions

A Member of Climate Action 100+

SuMi TRUST Bank is a member of Climate Action 100+, a five-year initiative that commenced in December 2017 to implement joint engagement with major corporate greenhouse gas (GHG) emitters. Based on recommendations issued by the TCFD, this initiative brings together partner organizations such as PRI and CERES in a collaborative engagement effort aimed at agreeing on a focus list of the world's top 100 GHG emitters and pressing them on climate-related information disclosures. Responsible for the Asia-Pacific region in this effort, SuMi TRUST Bank is engaging Japanese companies.

The purpose of this engagement is to urge companies where climate change is expected to have large impacts on shareholder value to make climate-related disclosures on governance, strategy, risk management, and risks and opportunities required by the TCFD.



Climate Change Risk Management for Loans

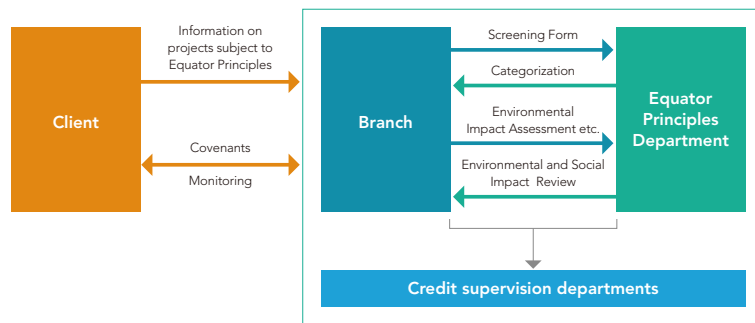
Equator Principles

Based on its Sustainability Policy, the SuMi TRUST Group has drawn up environmental and human rights policies with the aim of moving toward a sustainable society, and it is working to further strengthen its ESG risk management system in line with international standards.

As a part of these efforts, we have specified processes for identifying priority issues (materiality) regarding sustainability. In light of the importance taking into account the environmental and social impacts of investment and loan destinations, SuMi TRUST Bank in February 2016 integrated use of the Equator Principles, guidelines for private-sector financial institutions, into its decision-making processes for loans in project finance and related fields as a risk management tool.

SuMi TRUST Bank is aware that financing large-scale projects such as mine development, oil and gas development, power plants, petrochemical plants and infrastructure development may indirectly have an adverse effect on climate change. It also believes it is the responsibility of a sound financial institution to avert or mitigate risks of deterioration in loan receivables due to project suspensions as a result of environmental or social problems.

Systems and Processes for Evaluating Environmental and Social Considerations



Application processes: Following internal policies based on procedures for evaluating social and environmental considerations, the Equator Principles Department carries out assessments of environmental and social impacts relating to individual projects.

Implementing environmental and social impact reviews: Reviews of the environmental and social impacts of a project proposed by developers take into account its industry, the country where it is sited, and whether it meets the standards called for by the Equator Principles, and from there, a comprehensive risk is judged.

Monitoring compliance: Compliance with important items concerning environmental and social impacts have been reflected into loan agreements, and compliance with these is regularly confirmed through such methods as reports on project compliance status on these fronts.

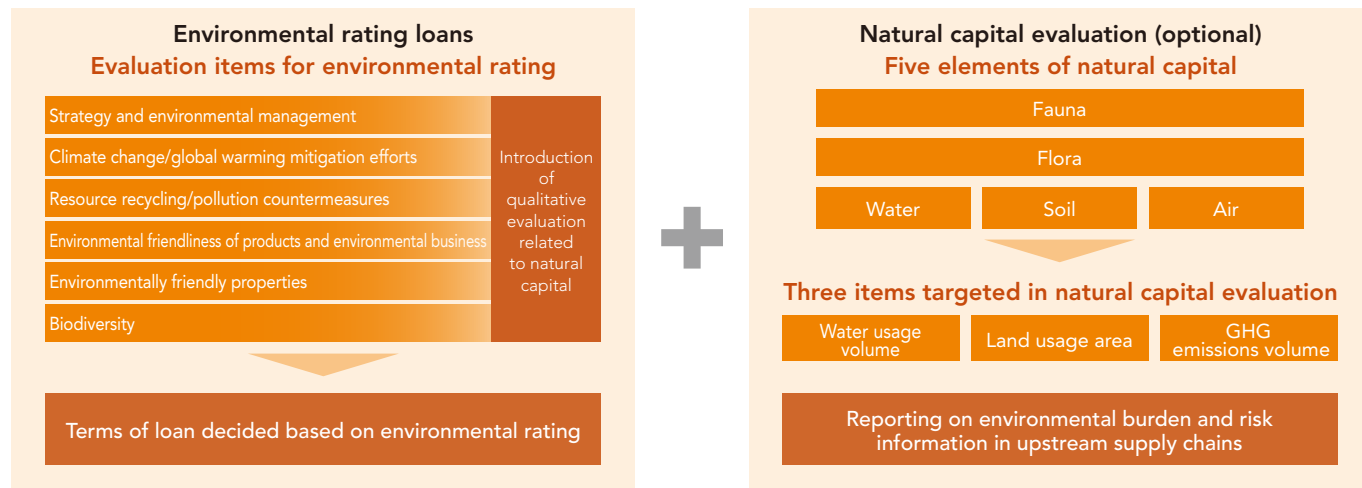
Company training programs: Regular training sessions are provided for employees in departments and sections relating to sales, assessment, and screening to foster a thorough understanding of internal operations supporting environmental and social impact reviews and raise their awareness about related concepts.

Scoring Climate Change Risks in Supply Chains

Environmental Rating Loans with Evaluation of Natural Capital Preservation

Procurement risks for inputs such as resources, raw materials and energy are a source of business continuity risk. Procurement risk management for natural capital in a global supply chain is a high priority issue (materiality) in management strategy.

Since April 2013, SuMi TRUST Bank has quantitatively scored the natural capital dependence and environmental impacts of companies, and offered environmental rating loans with an optional service for natural capital evaluation that provides a basis for identifying risk management scope. With this service, greenhouse gas emissions, as a factor relating to climate change, are calculated for each category of procured input and each region where the input is procured in a borrower's supply chain. We provide risk information such as procured inputs with significant risks and countries where the suppliers are located.



Note: "Optional" refers to ESCHER calculations provided by PwC Sustainability LLC that are not available without loan products.

Toward Attainment of Sustainable Development Goals (SDGs)

The Group strives to deliver value to society and increase the Group's corporate value by harnessing its trust and financial functions to achieve the sustainable development goals (SDGs).

The Sustainable Development Goals (SDGs) adopted at the United Nations Sustainable Development Summit in September 2015 comprise 17 goals and 169 targets that bring together global-scale priority issues that should be addressed worldwide toward 2030. The SuMi TRUST Group, which became a signatory to the United Nations Global Compact in 2005, has pursued various initiatives related to sustainability, and will continue working to provide value to our stakeholders from the perspective of solving the issues raised in the SDGs.

SUSTAINABLE DEVELOPMENT GOALS 17 GOALS TO TRANSFORM OUR WORLD



Goal 13) Climate Action: "Take Urgent Action to Combat Climate Change" Is Linked to Other SDGs

Issues where climate change is a driver: Goal 1) No Poverty; Goal 2) Zero Hunger

Goals where climate change impacts reverberate: Goal 6) Clean Water and Sanitation; Goal 14) Life below Water; and Goal 15) Life on Land

Goals linked to addressing climate change: Goal 7) Affordable and Clean Energy; Goal 9) Industry, Innovation and Infrastructure; Goal 11) Sustainable Cities and Communities; Goal 12) Responsible Consumption and Production; and Goal 17) Partnerships for the Goals

Risks and Opportunities Relating to Climate Change

In the area of climate change, financial institutions are responsible not only for direct impacts arising from their own business activities but also for indirect impacts arising from investee and borrower companies and projects, and the responsibility for the latter are larger. Moreover, an important element for financial institutions in their corporate growth strategies is factoring in the transition to a net-zero emission society into their business models.

Risks Relating to Climate Change

Risk categories*	Risk concepts	Attributes of risks linked to climate change
Transition risks	<ul style="list-style-type: none"> • Risk that stricter regulation and technological advances affect industries and companies and lead to value impairment in the Group's loan and equity portfolios • Risk that business models and corporate strategies may be affected by the regulatory response to reach the goal of staying below 2°C • Risk that carbon pricing may impact market economies and economic competitiveness across multiple nations • Risk that companies may face calls to consider climate change problems in procuring financing and services • Risk that low carbon-oriented market may lead to volatility in supply-demand relationship for products and services and corporate earnings • Reputational risk from assessments that climate change-related disclosures and initiatives are inadequate 	<ul style="list-style-type: none"> • High social expectations that lenders and investors will seek to avert or mitigate risks from indirect impacts arising from the activities of investee and borrower companies or projects • Climate-related risk impacts on the whole supply chain, so risk management in the upstream supply chains of investee and borrower companies will be important • Establishing quantitative risk assessment measures will be important
Physical risks	<ul style="list-style-type: none"> • Risk that natural disasters damage the Group's assets and social infrastructure and puts business continuity at risk • Risk that natural disasters damage the assets of investee and borrower companies • Risk that climate change affects land use, resource procurement, and the productivity of primary industries • Risk that progression in global warming increases the likelihood of heat stroke and pandemics 	

Business Opportunities Relating to Climate Change

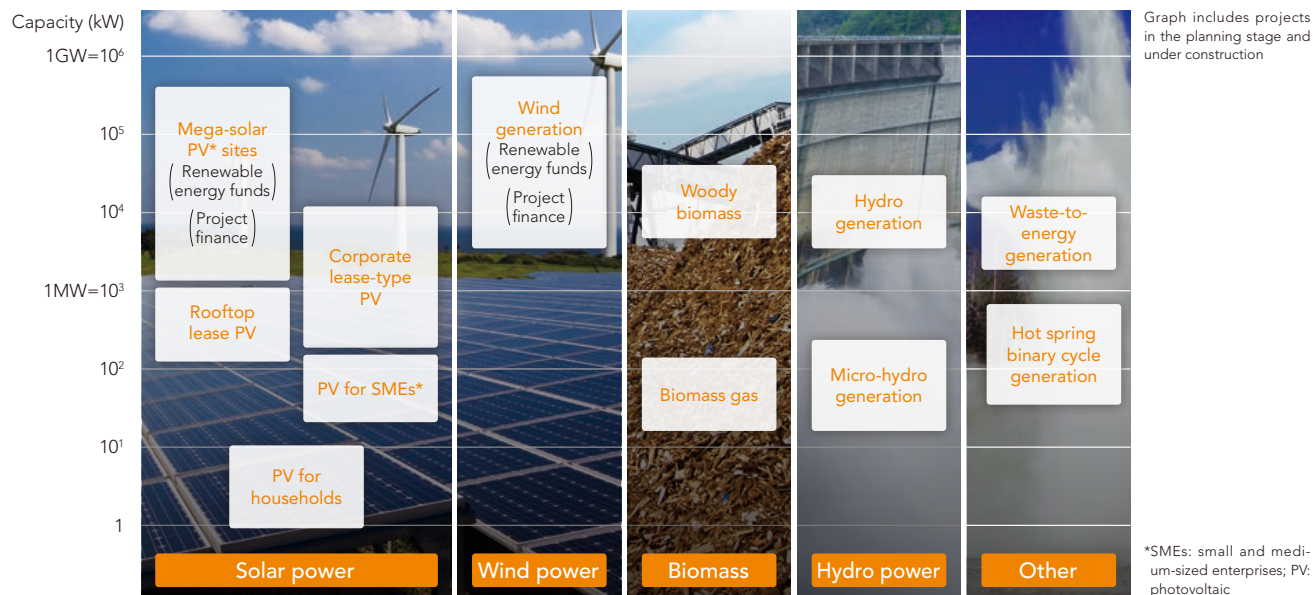
Opportunity categories*	Opportunity concepts	Attributes of opportunities linked to climate change
Opportunities in resource efficiency, energy, products and services, markets, and recovery resilience	<ul style="list-style-type: none"> • There may be more opportunities to offer advisory services and finance to projects and companies that are helping to slow or mitigate climate change • Switch in social infrastructure, such as spreading renewable energy, may open up profitable opportunities over the medium- to long-term • There may be more opportunities to provide finance for infrastructure and technological development that enhances capacity to adapt to climate change • Positive social evaluations as a financial institution helping to address climate change may translate into more business opportunities • Greater social awareness of climate change may support sales of the Group's finance products that factor in environmental considerations 	<ul style="list-style-type: none"> • Climate-related businesses promoting a switch in social systems in areas such as energy and transportation may become the economic mainstream • A social infrastructure changeover in the medium- to long-term on the spread of renewable energy, etc. may translate into an increase in stable profit opportunities for the Group over the medium- to long-term

*Risk and opportunity categories align with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD)

SuMi TRUST Group's Renewal Energy Initiatives

Social structure is significantly changing along with the technological innovation that includes mobility revolution that has accompanied the spread of electric vehicles and automated driving, computer-reliant artificial intelligence, the spread of FinTech, and the application of digital technologies to service industries. Keeping these energy-hungry technologies on track will require de-carbonization of electricity, and we think this can be achieved by adopting renewable sources of energy while concurrently reducing fossil fuel usage.

To support greater adoption and expansion of various forms of renewable energy, the Group offers a diverse array of financing such as project finance, funds, leases, and home renovation loans.



Renewable Energy Finance

SuMi TRUST Bank promotes the adoption of large-scale projects such as wind and solar power generation through project finance and it has set up renewable energy funds and manages for the purpose of investing exclusively in large-scale renewable energy projects.

In project finance, both offshore and onshore wind power generation projects overseas are increasingly large-scale endeavors. In Japan, the number of mega-solar projects to which we provide project finance has further increased. The total potential generation capacity of projects where SuMi TRUST Bank has been involved in supplying project finance comes to 7,322MW. These projects, with annual power output of 19,584GWh, reduced annual CO₂ emissions by 9.45 million metric tons.

Total potential generation capacity of projects supported by renewable energy funds came to 311MW, with annual power output of 362GWh and annual CO₂ emission reductions of 200,000 metric tons.

In financing for installations, Sumitomo Mitsui Trust Panasonic Finance Co., Ltd. mainly provides support for mega-solar projects. Since the feed-in-tariff (FIT) system was introduced, it has supported 26 mega-solar installations with total potential generation capacity of 45MW.

Contributions to CO₂ Reduction via Renewable Energy Finance

Category of power generation	Number of projects	Potential capacity (MW)	Annual output (GWh/year)	CO ₂ reduction effect (10,000t/year)
Solar	70	3,453	5,430	299
Wind	24	1,540	4,241	227
Offshore wind	6	2,489	10,166	434
Other	3	151	109	6
Total	103	7,633	19,947	966

Eligibility inclusion: SuMi TRUST Bank's project initiatives linked to project finance and renewable energy funds. Capacity calculations: Numerical values of potential generation capacity, gigawatt hours of output per year, and CO₂ reduction effect covers all projects in each category.

Subtotals may not add up to totals due to rounding.

Calculation Method for CO₂ Reduction Effect

Annual CO₂ reduction (CO₂ metric tons per year)
= annual power output (kWh/year) x emission coefficient (CO₂ metric tons/kWh)

As a general rule, we use the forecast value for annual power output. As a general rule for domestic projects, we use the most recently calculated emission coefficient of each electricity supplier in the electricity supply system of the region where each project is located.

As a general rule for overseas projects, we use the International Energy Agency (IEA) calculation tools provided at the GHG protocol website to calculate reduction equivalents.

Renewable Energy Project Finance

As renewable energy has become more widely adopted, the capital costs and operating costs for such projects have declined. Overseas, power generation costs for renewable energy are nearing parity with those for other power generation sources, increasing the attractiveness of renewable energy in terms of economic rationality.

Case 1

Mega-solar in Japan

Photovoltaic (PV) panels with total potential generation capacity of about 11MW have been installed on the site of a former golf course in Ibaraki Prefecture that has been repurposed as a mega-solar farm. Installation and construction costs for the project were raised via a single-lender project finance loan from SuMi TRUST Bank. With estimated annual output of 13,700MWh, the project uses the feed-in-tariff (FIT) scheme to wholesale electricity at a fixed rate to the electricity supply system.



Case 2

Overseas Offshore Wind Farm

In Europe, where shallow expanses of continental shelf extend far from the coastline, construction of large-scale offshore wind power farms is increasing. At a site about 32 kilometers off the coast of Norfolk, England with a depth of about 20m is one of the world's largest offshore wind power farms with 67 large turbines that have total potential capacity of 6MW each. The project is expected to supply electricity to 410,000 households in England.



Performance

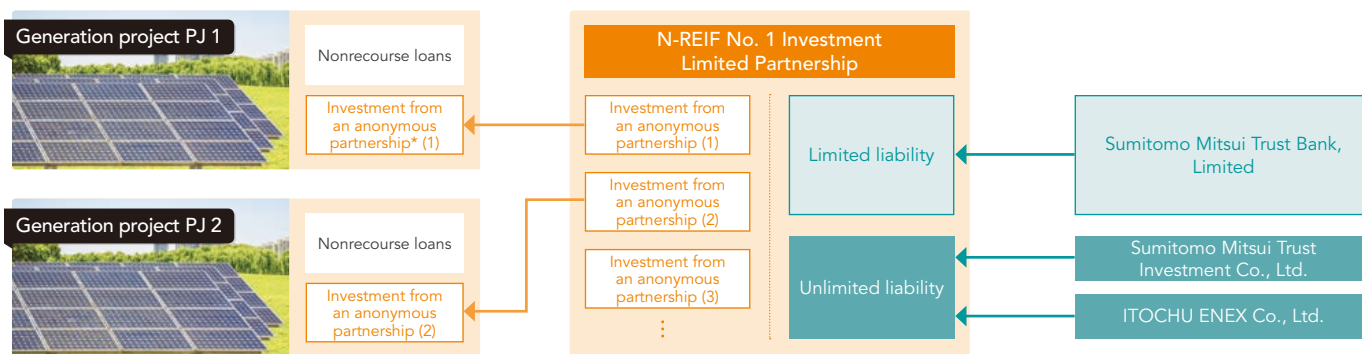
Renewable Energy Funds

SuMi TRUST Bank manages renewable energy funds it has set up for the purpose of investing exclusively in large-scale renewable energy projects.

As of September 2017, these funds have supplied equity funding for seven mega-solar power generation projects and two wind power generation projects with total potential generation capacity of 311MW. Of the ¥119.8 billion in aggregate equity investment directed into these projects, our funds supplied total equity investment of ¥9.5 billion. These projects generate annual power output of 362GWh, commensurate to CO₂ emission reduction of over 200,000 metric tons.

*For CO₂ emission reduction calculations, we use the emission coefficient of each electricity supplier in the electricity supply system of the region where each project is located.

Fund Schemes



*Anonymous partnerships are called “tokumeikumiai” in Japanese.

- We contribute by providing equity-like funding for the spread of renewable energy projects.
- We are expanding assets under management in our funds and building up an investment track record in solar and wind power, and plan to broaden the scope of our renewable energy investments to include biomass and other sources.
- We are working to develop new investment products for individual and institutional investors and pension funds that seek stable income gains.

Mega-Solar Projects Using Leases

Using leases to fund solar facility installations keeps the upfront investment costs for mega-solar project construction at zero, and projects can earn stable income by using the feed-in-tariff (FIT) system to wholesale at a fixed price the electricity it generates to the power supply grid. Leases are thus an effective method of financing for mega-solar projects that ensures business plan soundness.

Compared with other renewable energy sources, solar power generation has advantages such as 1) procedures for assessment etc. are straightforward and simple, 2) the construction phase is relatively short, and 3) low-cost, foreign-made PV panels with improved reliability have penetrated the space where domestically developed, well-established technologies once held sway, and its installation has been advanced.

In addition to new projects, we also provided lease-based financing options for fully operational projects that were put up for sale to investors (secondary transactions). Through improvements in technology and the establishment of new forms of funds provision, we will continue to work together with panel manufacturers, engineering, procurement, and construction (EPC) vendors, and others to provide total support to investors entering the solar power generation field.



Future pathways for solar power

- Pursue energy management linked to electric vehicles and storage batteries
- Realize net-zero energy buildings (ZEBs), net-zero energy houses (ZEHs), and virtual power plants (VPPs).
- Expand local production for local consumption models for natural energy and increase self-sufficient energy demand formats
- Reduce power generation costs further via technological development
- Tap into new funding supplies via the use of infrastructure investment funds



Micro-Power Generation in Water Supply Systems

Sumitomo Mitsui Trust Panasonic Finance proposes ideas for adopting micro-power generation systems in water supply systems across Japan, and promotes global warming mitigation measures and the use of natural energy in the regions.

In Japan's water supply systems, an increasing amount of energy is released without being harnessed such as untapped water flows from the vertical drop in gravity-flow supply pipes, surplus pressure in pumped supply pipes, and reduced pressure via pressure-reducing valves. The Group promotes ways to tap into these wasted sources of energy as a form of renewable energy that can generate electricity.

We offer business financing schemes that keep upfront investment cost at zero through lease-based installation of new power generation systems, which have realized 1) low cost, 2) high efficiency, and 3) compact size, to the water facilities leased from local authorities.

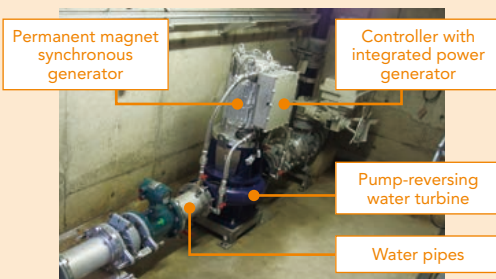
Specific properties of micro-power generation systems

- Achieved low costs by using off-the-shelf pumps, low-cost magnets, and standardized parts
- Developed water turbines that efficiently generate power via inverter controls
- Integrated power generator and water supply control system, installed on waterwheel in a vertical configuration to realize a much more compact footprint

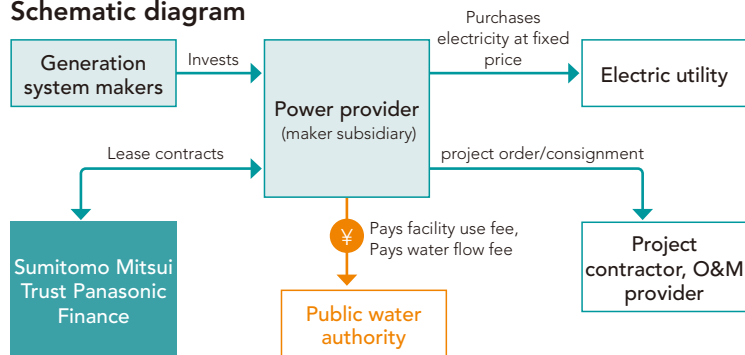
Specific properties of leases (merits for local authorities)

- Projects can be launched with no upfront investment costs
- Power provider is responsible for constructing the power generation system and its operation and maintenance (O&M)
- Lease can earn stable revenues

Newly developed micro-power generation system for water supply systems



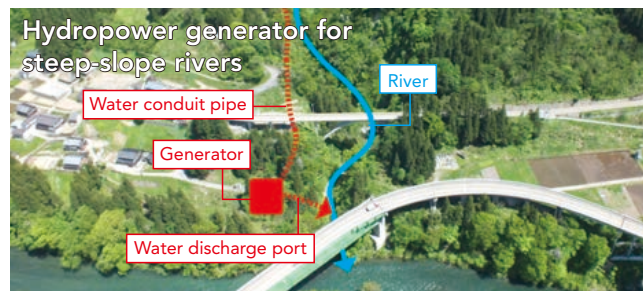
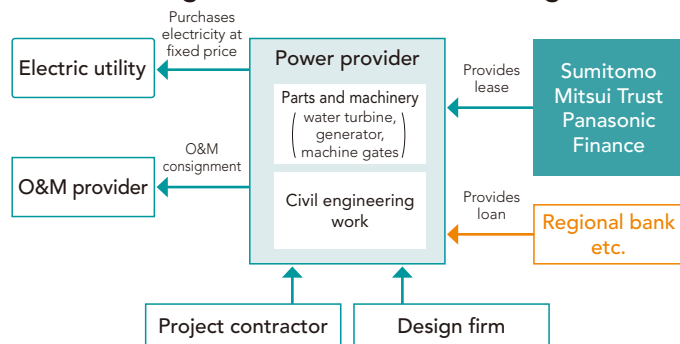
Schematic diagram



Small and Mid-sized Power Generation in Rivers

Japan's river systems have the potential to generate 14GW of electricity through the installation of small or mid-sized generators and its agricultural water supply channels 300MW, according to the results of a Ministry of the Environment survey. Sumitomo Mitsui Trust Panasonic Finance is helping to revitalize regional communities through joint initiatives with regional banks aiming to use each region's untapped hydropower potential.

Schematic diagram of collaboration with regional banks



Hydropower generation could be a source of renewable energy for Japan, which is blessed with many high-flow, steep-slope rivers. In cases where the feed-in-tariff (FIT) system is used, the maximum aggregate potential from installing small and mid-sized hydropower generators is estimated at 4.3GW.

Small and mid-sized power generators approved for installation since the FIT system's introduction have total output of 1,120MW, and of those, the ones in use have 240MW, indicating there is still scope for new installations.

It is possible to install hydropower generators that factor in the environment such as run-of-the-river small and mid-sized hydropower generators that use the shape of rivers or existing agricultural water supply channels and do not require building large dams.

Small and mid-sized hydropower potential, actual adoption capacity

	Potential aggregate output	Breakdown by category
Maximum aggregate potential in Japan*1	14.3GW	River systems 14GW Agricultural supply channels 300MW
Potential with FIT system*1	1.06~4.3GW	River systems 900M~4.06GW Agricultural supply channels 160~240MW
Approved for installation post-FIT adoption*2	1,120MW	
Installations post-FIT adoption*2	240MW	

*1 Ministry of the Environment's fiscal 2010 survey report on the adoption potential for renewable energy

*2 Agency for Natural Resources and Energy's website (accessed in June 2016)

Biomass Gas Generation

We support adoption of biomass gas generation facilities that convert food waste and other organic waste into bio-gas for electricity generation.

At a biomass gas power generator, organic waste—such as food waste, livestock urine and manure, and organic sludge from sewage and wastewater—is fermented and combustible gases, mainly methane, are extracted and used as fuel to generate electricity. Under the Food Recycling Law, the recovery of heat from food waste is recognized as a form of recycling provided certain conditions are met, and the power generated can be resold at a fixed price using the FIT scheme. The value of biomass gas systems is in improving overall energy efficiency through the effective use of both electricity and heat.

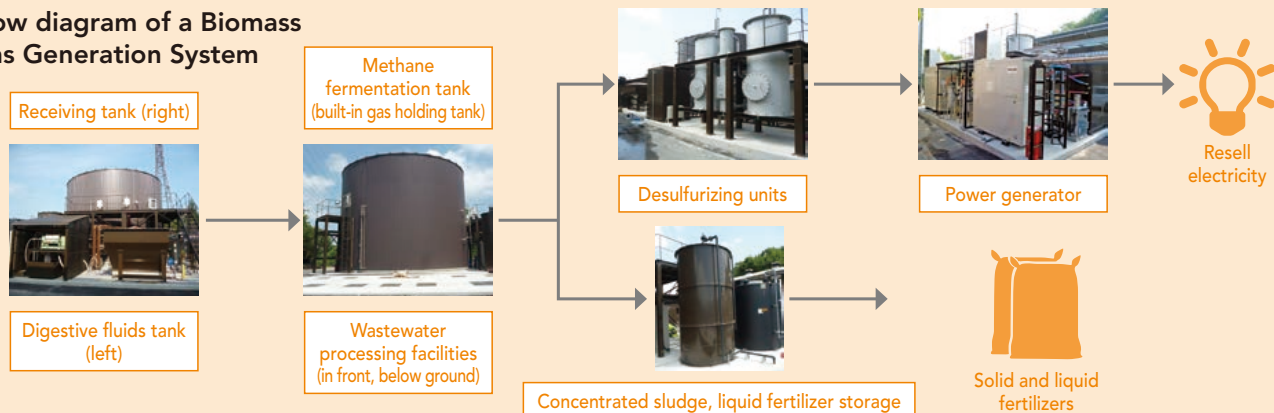
Merits

- Curtails volume of waste produced, reduces waste disposal costs
- Earns income from reselling electricity via the FIT system
- Curtails putrid odors due to fermentation, reduces release of bad smells to nearby areas
- Byproducts like post-fermentation, digested slurry can be recycled as a liquid fertilizer

Wastes eligible for usage

- Food waste, food residues
- Livestock urine and manure
- Organic sludge, etc. from sewage and wastewater

Flow diagram of a Biomass Gas Generation System



Response to Freon Regulation

In October 2016, an international coalition of nations agreed to regulate production volume of hydrofluorocarbons (HFCs), an alternative to ozone-destroying Freon*, in a series of steps, at the 28th meeting of the parties to the Montreal Protocol. Accordingly, Japan has revised domestic systems, facing an urgent need to take measures.

In the wake of the amended Montreal Protocol, in the major equipment categories such as air conditioners, refrigerators, and freezers, switching to equipment that uses non-freon or natural alternative refrigerants is now an urgent priority.

The expansion of government subsidy systems to support users for switching equipment is now being reviewed, while tightening of regulations is expected for installation, operation, maintenance and disposal of equipment.

Sumitomo Mitsui Trust Panasonic Finance focuses on leasing the equipment using non-freon alternatives as refrigerants, and it is contributing to the adoption and spread of such equipment.

Japan Machinery Leasing and Sales Co., Ltd., a Group member, works to safely retrieve and dispose of leased, Freon-using equipment after the lease is expired.

*Freon alternatives have been used in place of specified Freon, which has been identified as an ozone layer destroyer. HFCs do not deplete the ozone layer but they have a large greenhouse gas effect and so have high global warming potential.



A non-freon freezer unit and a non-freon freezer showcase

Kigali Amendment to Montreal Protocol to Regulate Freon Alternatives

	Developed nations	Group 1 developing nations* ¹	Group 2 developing nations* ²
Base year	2011—2013	2020—2022	2024—2026
Baseline value (CO ₂ equivalence)	Avg. HFC volume in each year + 15% of HCFC* ³ baseline value	Avg. HFC volume in each year + 65% of HCFC* ³ baseline value	Avg. HFC volume in each year + 65% of HCFC* ³ baseline value
Launch year for regulation	2019	2024	2028
Target year	2036	2045	2047
Target reduction	85%	80%	85%

*¹ Group 1 developing nations are still developing and do not belong to Group 2

*² Group 2 developing nations are India, Pakistan, Iran, Iraq, and Gulf nations

*³ HCFC: Hydrochlorofluorocarbons

Support for CO₂ Reduction of Buildings

Consulting to Support Applications for “CASBEE for Real Estate” Certification

CASBEE for Real Estate is an environmental performance evaluation system developed with the aim of increasing the stock of buildings with superior environmental performance in real estate market and promoting its use among investors for investment decision-making. There is extensive use of the system, especially among REITs and real estate companies, and SuMi TRUST Bank has consulting businesses that support property owners applying for the CASBEE for Real Estate certification.

Evaluation categories in CASBEE for Real Estate



Construction-Phase Support for Environmental Considerations

Improving energy efficiency is the most important theme in the environmental performance of buildings. SuMi TRUST Bank in its construction consulting business provides advisory services on how to improve in a comprehensive manner the environmental performance of buildings in ways such as installing energy-saving systems, taking into account landscapes and ecosystems, extending building life spans, and adopting recycling systems.

There are some projects we advised that have been recognized and awarded subsidies by the “leading projects” program for sustainable buildings (formerly known as “leading projects for promoting CO₂ reduction” program for housing and buildings), sponsored by the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), and the “net zero energy building” experimental pilot program, sponsored by the Ministry of Economy, Trade, and Industry (METI).

An example of a building where we provide construction-phase support for environmental considerations: Shimane Bank’s head office building
(Selected in 2014 for the 1st “leading projects for promoting CO₂ reduction” program for housing and buildings (currently known as “leading projects” program for sustainable buildings))



Home Renovation Loans for Smart Houses

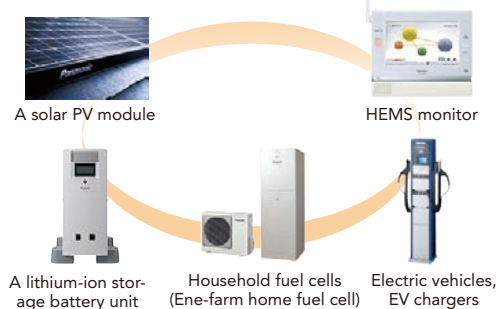
Homes have advanced so that they can wisely use electricity generated onsite; through our home renovation loans, we support remodeling homes into “smart houses.”

A smart house can efficiently generate and store its own power supplies by combining solar PV panels, storage battery units, and household fuel cells. Energy-saving functions that enable dwellers to control electricity consumption to match their lifestyles and weather conditions have improved. Since the system for purchasing surplus electricity from household solar panels will be phased out from 2019, converting the existing housing stock into “smart houses” will be an important theme to mitigate global warming.

With the liberalization of retail sales of electricity and gas to households in Japan, energy and telecommunication sector companies are increasingly partnering to provide bundled services such as combined sales of telecom or broadcast with electricity generated from various sources. There has also been progress in developing products that have multiple functions of housing, home appliances, and vehicles.

Since the system for purchasing surplus electricity from solar panels was established, Sumitomo Mitsui Trust Panasonic Finance has contributed to the adoption and spread of household solar panels with its solar loans. The cumulative sum of solar loans it has executed as of September 2017 is ¥69.1 billion. Through our partnerships with equipment vendors and installers, we support remodeling homes into “smart houses” with our renovation loans.

Equipment for Upgrading to a Smart House



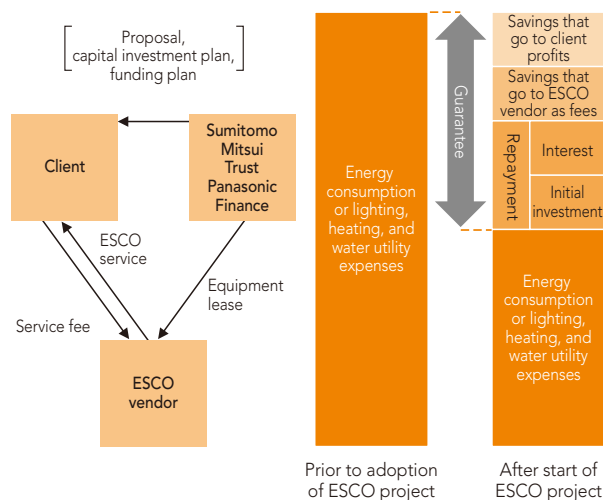
A smart house

Financing for ESCO Service Adoption

Sumitomo Mitsui Trust Panasonic Finance collaborates with energy service companies (ESCOs) to provide comprehensive energy conservation services from installation of energy-saving equipment to maintenance and management.

ESCOs provide comprehensive services for energy saving and guarantee a level of energy savings. Through the use of leases, aging facilities can be replaced at zero upfront cost and, in cases where certain conditions are met, subsidies can be utilized. ESCOs propose ideas that both help preserve the environment via energy conservation while reducing the costs of utilities such as water, lighting, and heating as well as operating and maintenance costs.

Outline of ESCO concept



Example: ESCO Proposal for a General Hospital

Energy conservation menu

Heat source: Construct hybrid heat source system, install high-efficiency steam boiler

Air conditioning: Improve air conditioning control system, install variable air volume controls, install inverters

Lighting: Install LED lighting

Monitoring: Add energy management functions

Energy conservation subsidy (initial) ¥176,591,000

Projected boost to earnings (annual)

Lower water, lighting, and heating costs ¥80,468,000

Fees paid for ESCO project ¥77,598,000

Annual boost to earnings ¥2,870,000

Reduction to environmental impacts (annual)

CO₂ reductions: 1,459t-CO₂ (down 19.0%)

Electricity use reductions: 172,473kWh (down 7.7%)

Gas use reductions: 598,102ℓ (down 44.7%)

Water use reductions: 9,892m³ (down 41.9%)



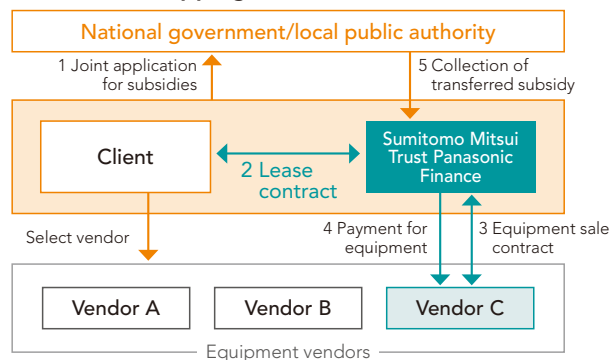
* Case where a client adopts a shared model, one form of an ESCO project

One-Stop Services for Energy-Saving Investment: Subsidy-Eligible Leases

We offer one-stop services that support all processes from planning for energy-saving investments to asset operation.

- Our one-stop service menu ranges from energy-saving assessments, examinations to identify energy-saving measures, equipment selection, subsidy applications, and securing financing to maintenance services.
- Using leases enables installation of energy-saving equipment without upfront investment cost.
- Securing subsidies lowers upfront investment costs, enabling recipients to benefit even more from energy savings and cost reductions.
- We offer tailored proposals through partnerships with manufacturers and installers.

Flow Chart Mapping Out the Use of Subsidies



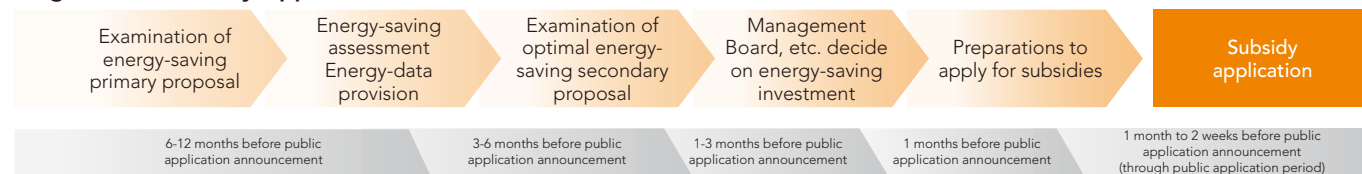
Main subsidy systems

- Subsidy support for rationalizing energy use at SMEs
- Net zero energy building (ZEB) project: Subsidies to promote adoption of innovative energy-saving technologies in housing and buildings
- Subsidies for facilities that sharply cut CO₂ emissions via efficient execution of advanced countermeasures (Advanced technologies promotion Subsidy Scheme with Emission reduction Targets (ASSET) project)
- Subsidies for promotion of renewable energy self-consumption measures using stored electricity and heat, etc.

*1 Certain conditions must be met to be eligible to apply for subsidies

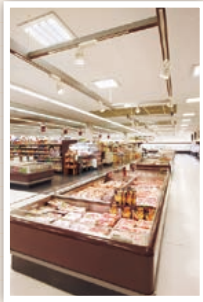
*2 Subsidy systems are subject to change

Stages in the Subsidy Application Process



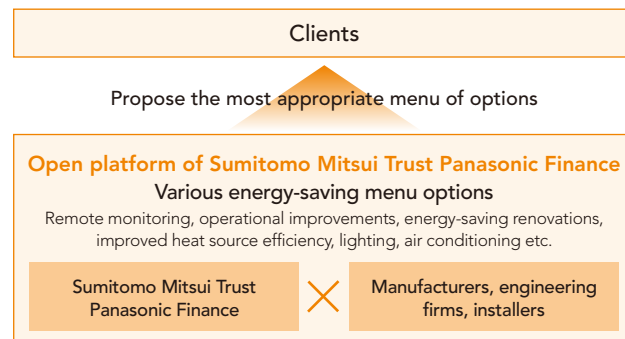
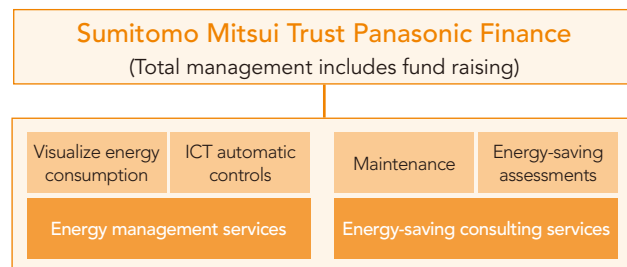
Energy Management Services Using Leases: Example

We offer comprehensive support from the planning and installation stages to energy management services.

Specific investment ideas	<ol style="list-style-type: none"> 1. Installation of high-efficiency freezers and showcases 2. Installation of non-freon equipment 3. Switch to LED lighting 4. Adoption of integrated control systems 	
Post-installation savings	<ol style="list-style-type: none"> 1. Electricity consumption lowered by about 2.5GWh per year (25% cut) 2. Electricity bill lowered by about 42 million yen per year 3. Maintenance cost lowered by about 5.4 million yen per year 	
Key points in our proposals	<ol style="list-style-type: none"> 1. A one-stop service menu from energy-saving consulting, equipment investment planning, and financing to post-installation energy management services 2. Use of subsidies lightens investment costs 3. Use of leases reshapes payment stream: zero upfront investment to purchase equipment with costs paid over time in the form of leveled-out payments 	

Example: A store that remodeled by installing high-efficiency freezers, showcases, and LED lighting

Energy-Saving Consulting: Energy Management Services



Initiatives to Reduce CO₂ Emissions from Business Activities

Energy Usage and CO₂ Emissions (Domestic Bases)

Energy usage		FY2012	FY2013	FY2014	FY2015	FY2016
Total volume of energy usage (heating value)	GJ	972,784	954,891	913,437	846,829	801,370
Total volume of energy usage (converted to crude oil)	kl	25,097	24,636	23,566	21,848	20,675
Energy usage intensity	kl/m ²	0.052	0.055	0.053	0.051	0.049
Electrical power	thousand kWh	82,807	79,932	76,768	71,206	66,742
City gas	thousand m ³	2,409	2,502	2,398	2,153	2,107
CO ₂ emissions		FY2012	FY2013	FY2014	FY2015	FY2016
Greenhouse gas emissions volume	t-CO ₂	46,563	50,605	48,918	43,816	40,833
Greenhouse gas emissions after adjustment	t-CO ₂	45,234	42,219	48,426	43,470	40,393
Emissions intensity	t-CO ₂ /m ²	0.097	0.114	0.111	0.103	0.098
Emissions intensity (after adjustment)	t-CO ₂ /m ²	0.094	0.095	0.110	0.102	0.097
Scope 1 emissions volume	t-CO ₂	5,592	5,806	5,577	5,002	4,907
Scope 2 emissions volume	t-CO ₂	40,971	44,798	43,340	38,813	35,925

Scope of calculations: SuMi Trust Bank facilities in Japan subject to the Act on the Rational Use of Energy; Group companies are tenants in some facilities.

Calculation method: Calculations conform to the method in the Act on the Rational Use of Energy; our disclosed figures have been revised following adjustments made to data for past fiscal years.

Some subtotals may not add up to totals due to rounding.

CO₂ Emissions at Bases Subject to the Tokyo Metropolitan Ordinance on Environmental Preservation

		No. 1 plan period						No. 2 plan period			
		Four bases						Four bases		Head Office	
		FY2010	FY2011	FY2012	FY2013	FY2014	Cum. total	FY2015	FY2016	FY2015	FY2016
Standard emissions	t-CO ₂	27,690	28,790	29,891	29,891	29,891	146,153	38,446	39,224	13,287	13,287
Mandatory reduction ratio	%	8	8	8	8	8	—	17	17	6	6
Maximum emissions limit	t-CO ₂	25,476	26,488	27,501	27,501	27,501	134,467	31,912	32,558	12,490	12,490
Mandatory reduction	t-CO ₂	2,214	2,302	2,390	2,390	2,390	11,686	6,534	6,666	797	797
CO ₂ emissions	t-CO ₂	20,810	18,186	18,860	18,993	18,501	95,350	21,024	19,638	10,711	10,912
Emissions reduction	t-CO ₂	6,880	10,604	11,031	10,898	11,390	50,803	17,422	19,586	2,576	2,375
Excess reduction	t-CO ₂	4,666	8,302	8,641	8,508	9,000	39,117	10,888	12,920	1,779	1,578
Emission permits awarded	t-CO ₂						39,117				

The emission figures in the table above show the reduction status at SuMi TRUST Bank's four bases with regard to the "mandatory reductions in total greenhouse gas emissions" and the "mandatory reductions in total greenhouse gas emissions via the emissions trading system" prescribed in the Tokyo Metropolitan Ordinance on Environmental Preservation (The four bases are the Fuchu Building, Shiba Building, Chofu Building, and Meguro Building). The head office building is a multi-tenant building with mandatory reductions that came into effect from fiscal year 2015 but SuMi TRUST Bank's mandatory reductions have not yet been finalized and so this data is shown in two columns in a separate table. Our emission reporting has been verified by a third-party assessment organization. The coefficients used to calculate emissions for the No. 1 plan period and the No. 2 plan period differ, so the performance over time of these periods cannot be compared.

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- Companies that do not adopt the proposals made by Sumitomo Mitsui Trust Bank, Limited in this document will not be subject to disadvantageous treatment with regard to other transactions with Sumitomo Mitsui Trust Bank, Limited, nor is adoption of the proposals made by Sumitomo Mitsui Trust Bank, Limited in this document a condition for other transactions with a company.

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