

 **SUMITOMO ELECTRIC**
<http://global-sei.com/smart/>**Smart Energy Innovator****Sumitomo Electric Industries, Ltd.**

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Smart Energy Innovator

Integrating Our Technical Capabilities to Create and Underpin Social Infrastructure

Osamu Inoue













President & COO
Sumitomo Electric Industries, Ltd.

The Sumitomo Electric Group operates globally in more than 40 countries and regions, all together with over 250,000 employees. For more than 120 years since our establishment, we have been taking on challenges to develop our own technologies and create new businesses, thereby expanding our business domain. Today, we operate in the five segments of automotive, infocommunications, electronics, environment & energy, and industrial materials. Of particular note is the environment & energy segment. Centering on electric wires and cables, which we have been manufacturing since our establishment, our business is expanding into various fields, including next-generation energy products such as redox flow batteries and superconductivity products. This expansion is backed by the Sumitomo Electric Group's high-level technologies and rich experience. Leveraging our wide variety of products, we present total solutions covering systems to services.

As a Smart Energy Innovator to create the future, we pledge that we will strive to accommodate needs from a wide variety of business operators, facilities, and communities, and provide high-performance, high-quality products and systems regarding environment & energy on a global basis, thereby continuing to play a role in creating and underpinning social infrastructure.



Total Lineup

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Our History

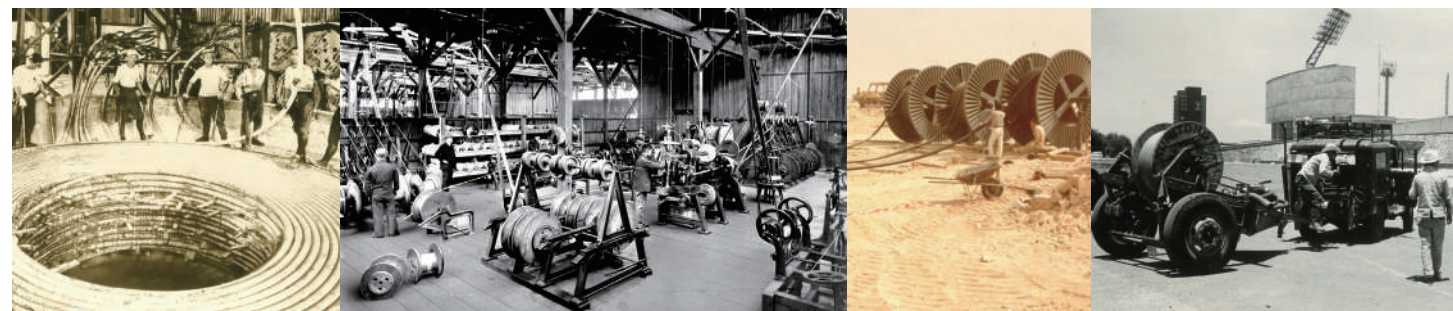
120 years of innovation

1922 : Succeeds in manufacturing and installing the world's longest submarine power cable

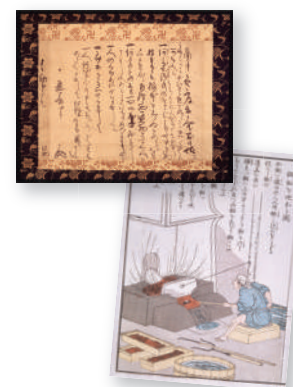
We worked on a big project of installing a submarine power cable between Niihama, Ehime Prefecture, and Shisakajima Island, located 21 km away from each other. The submarine power cable was the longest in the world in those days. Experiencing a spate of difficulties, such as severe storms and degradation of cable insulation resistance, we finally completed installing the submarine cable more than 20 days later.

The history of Sumitomo Electric dates back more than 120 years. Back then, Japan was still heavily dependent on imports for cables and almost all other expensive items. To solve the country's extremely severe situation, and contribute to realizing a rich, dream-inspiring future, we launched an electric wire business in 1897. Afterwards, we succeeded in the first domestic production of high-voltage underground cables and the production and installation of the world's longest submarine cables. We have thus played an important role in supporting the development of Japanese industries.

This long history has been underpinned by the Sumitomo Spirit, which has been passed down from generation to generation for more than 400 years. Sumitomo's history, the origin of Sumitomo Electric, began with copper refining business. Since then, for more than 400 years, we have always strived to conduct business in harmony with society. Placing our basis on the Sumitomo Spirit, we will contribute to the development of Japan and the rest of the world, with our belief in the great potential of innovation.



Sumitomo Spirit – Passed Down from Generation to Generation for More than 400 Years



The Sumitomo Spirit is based on the Monjuin Shiigaki (the Aphorisms of Monjuin), set down by Sumitomo founder Masatomo Sumitomo (1585-1652), and has been passed down unbroken from generation to generation throughout Sumitomo's 400 year history. The cardinal points of the Sumitomo Spirit are concentrated in the Sumitomo Business Principles.

Business Principles

- Article 1** Sumitomo shall achieve prosperity based on solid foundation by placing prime importance on integrity and sound management in the conduct of its business.
- Article 2** Sumitomo's business interest must always be in harmony with public interest; Sumitomo shall adapt to good times and bad times but will not pursue immoral business.

Banji-nissei

Banji-nissei means "do your sincere best, not only in business, but also in every aspect of your life." Originating from the preamble of Monjuin Shiigaki, it speaks of the importance of sincerity in all human endeavors. Banji-nissei is a pivotal teaching in the Sumitomo Spirit. Accordingly, Sumitomo personnel are expected to work not only to make money, but also to cultivate their character and grow into better human beings.

Shinyo-kakujitsu

The Business Principles Article 1 emphasizes the importance of integrity; that is, being worthy of the trust of others.

Fusu-furi

In its first part, Article 2 speaks of the importance of working proactively, pursuing profit by quickly and appropriately responding to changes in society and not being content with the status quo. At the same time, Article 2 emphasizes the importance of harmonizing business gains with the public interest and scorns reckless or careless actions in pursuit of easy gain. While furi means easy, temporary or short-term gain, the term also implies unfair profit obtained through dishonest means.



Research & Development

Power Systems R&D Center

We are promoting R&D on elemental technologies, products, equipment and systems that are essential for smart grids.

Energy and Electronics Materials Laboratory

We are supporting our widespread business fields through the development of metal / polymer material and fine circuit fabrication technologies that originate from cable technology.

Innovation Core SEI, Inc. (ICS)

By using Silicon Valley's resources and environment, we are working on research and study for next generation technologies and markets in the Automotive, Environment & Energy and Infocommunications fields, as well as new business development in the integrated fields. Besides promoting the R&D projects, we are also supporting the open innovation for R&D globalization and the Global Internship Program.



Consistently striving to develop proprietary technologies, considering how best to contribute to society

Kikaku Tokumaru

Deputy General Manager, R&D Unit, Executive Officer, Sumitomo Electric Industries, Ltd.



R&D, a driving force for sustainable development of the Sumitomo Electric Group

Based on its founding technology of copper wire manufacturing, the Sumitomo Electric Group has continued developing proprietary technologies and offering a wide variety of products and systems that benefit society. With consistent development of new business fields, the Group today operates in five major segments: environment & energy, infocommunications, electronics, automobiles, and industrial materials. A driving force behind our sustainable development is R&D. Based on the Sumitomo Spirit passed down through the generations for more than 400 years, we have continued R&D, while consistently considering how best to contribute to society.

Our creative R&D is dependent on the solid

foundation of human resources, finance, and monozukuri (manufacturing) prowess of the Sumitomo Electric Group. Professionals with passion continue exploring new fields under a corporate culture undaunted by failure. New technologies and products developed under this culture are steadily embodied by excellent production engineering and manufacturing techniques toward feasible businesses.

Our strength also lies in our R&D organization that extends over a wide range of business fields and fusional areas. We have "centers" that develop the products attractive to and selected by customers and "laboratories" that aim to develop innovative manufacturing processes in addition to core technologies in materials and systems. Under the general manager who supervises the entire R&D Unit, five deputy general managers focus on their assigned business fields, while cross-sectionally cooperating to produce synergy effects.

Solving global energy issues with our technologies to generate, connect, and utilize energy

As a deputy general manager in the R&D Unit, I am responsible for the Environment & Energy field. We focus on efficiently generating, stably connecting, and optimally utilizing energy in our R&D, looking toward the future. For instance, our Power Systems R&D Center aims to create innovation through new energy systems. The center researches and develops fundamental technology, products, and equipment that are indispensable in building smart grids, accelerating the development of energy management systems while conducting demonstrative experiments. In addition, the center has quickly initiated R&D for virtual power plants that efficiently optimize the supply-demand balance by coordinating users' various equipment, accumulating the associated technology and know-how.

On the other hand, to provide solutions to global environmental and energy issues and create new businesses, we have established R&D bases in Silicon Valley, California, U.S., and Willich, Germany. We also work hard for the concept of open innovation that accelerates global expansion of R&D units and promotion of projects. Sumitomo Electric will continue striving to develop and provide materials, products, systems, and solutions that contribute to the creation of a better society.





The Project

Redox Flow Batteries
Demonstrated in California
on the Largest Scale Ever in the U.S.



auspices of the Japanese government, and confronted many problems. "This demonstrational experiment of redox flow batteries here in the U.S. is the first such attempt for both the partner utility company and Sumitomo Electric," recalls Kazutoshi Nonami, who is in charge of sales. "We faced many challenges in the contract negotiation process, but the comprehensive strength of the Group, including sales companies here in the U.S., R&D Group, and administrative sectors such as accounting and legal departments, enabled Sumitomo Electric to overcome them." The Sumitomo Electric Group is a newcomer in the U.S. battery market, but has been involved in the power business in this country for more than 40 years. Sumitomo Electric is a supplier of various products, such as power cables, communication cables, optical fibers, and wire harnesses for automobiles, and is deeply trusted by the partner utility company. "To achieve our partner's ultimate goal, which is to realize a stable power supply, and to expand business in the future, our total corporate strength, which is not limited to cables, is attracting high expectations from our partner company, with focus on redox flow batteries," says Fumihiko Okuda with confidence.

What can be expected beyond this project? "We aim to position storage batteries in the major shift of power grid and to supply technologies that will satisfy customer needs," says engineer Yoshihiro Hirata. "We do business in all 3 fields: electricity, telecommunications, and automobiles. Such a company, which can offer advanced technologies in all 3 industries, is rare globally. While the 3 industries, namely, energy including batteries, automobiles including EVs, and the telecommunications that control them, are expected to be combined, Sumitomo Electric intends to offer solutions utilizing the synergy of technologies worldwide."

Providing solutions to the challenges of renewable energies

Helping to stabilize the power grid

The State of California in the U.S. is a world leader in environmental and energy policies. It aims to increase the proportion of renewable energies to 33% by 2020 and 50% by 2030, both excluding large-scale hydropower. However, when solar power is connected on a large scale, the output of solar power peaks and the power demand drastically decreases in the daytime, while the power demand steeply increases in the evening after solar generation stops. It is a challenge to eliminate such a big swing of power demand. The state government obliges power companies to equip energy storage, while public benefit organizations in the state are collaborating to build a system to gain a decent income from storage batteries. Under such circumstances, the Sumitomo Electric Group, which has been committed to developing redox flow batteries for more than 30 years, kicked off a demonstration project of a storage system in Bonita, California. Sumitomo Electric started the project in cooperation with the state government and

major local utility company having been commissioned by New Energy and Industrial Technology Development Organization (NEDO), Japan. Sumitomo Electric has built one of the largest facilities for redox flow batteries in the U.S. in a substation and is using them for multiple purposes including frequency regulation, voltage regulation and surplus-power handling, with the aim of using the batteries for both transmission and distribution.

As batteries connectable to the grid, redox flow batteries have a long life and are highly safe, suitable for quick charging and discharging and for long-time charging and discharging, characterized by strengths that lithium-ion batteries do not have. In the State of California, electric vehicles (EVs) are becoming increasingly common, posing a new challenge of the need to build more EV-charging stations. The high penetration of renewable energies and an increase in the number of EV-charging stations are expected to make the power grid unstable. Redox flow batteries are expected to contribute to its stabilization.

"In the future, renewable energies and EVs will become common around the world, and the conditions the State of California is facing now will occur globally," says Yoshiyuki Nagaoka, project manager of this project. "Redox flow batteries will have a significant role in coping with the changes."

Drawing on the Group's comprehensive strength

This project was set up in 2015. In California, where environmental regulations were strict, it was the first demonstration project under the



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Senior Vice President,
Sumitomo Electric USA, Inc.



Fumihiko Okuda
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Yoshiyuki Nagaoka
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Sumitomo Electric USA, Inc.



Riichi Kitano
Manager,
Innovation Core SEI, Inc.



Submarine Cable



The most reliable submarine cable technology
to support future energy infrastructures



FEATURES

An extensive product lineup from
offshore wind farm application to
interconnector projects

Submarine cable is a vital component of offshore renewable energy projects such as wind farms. We were among the first to produce and develop submarine cables in the world providing a wide range of solutions including XLPE, Mass Impregnated (MI), Fluid Filled, HVAC, HVDC, Medium Voltage to Extra High Voltage cables along with in-house developed cable accessories.



A pioneer in the submarine cable
industry with 120 years business history

Sumitomo Electric manufactured and supplied the first high voltage submarine cable in 1921 in Japan which was also the world's longest cable system at that time.

Our supply track record of delivering submarine cables since then exceeds 6,000 km.

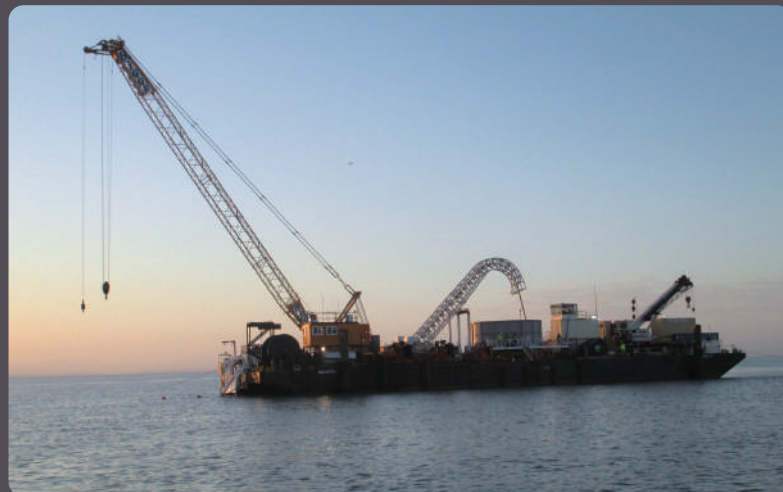
Submarine cables are sometimes installed in harsh environments that include high waves, currents, water pressure or unforeseeable obstacles on sea beds. Therefore, the installation of submarine cables requires much more sophisticated technologies than those needed for land cables. Sumitomo Electric's integrated design, production, installation and project management capabilities enable reliable and in-time completion of complex installation projects.



APPLICATION EXAMPLES

San Francisco Bay Crossing (in service since 2016)

The San Francisco Bay Crossing project includes 230 kV XLPE 1,400 mm² submarine cables with total cable length of approx. 14 km. We have manufactured specially designed submarine cables to meet customer's requirements on high tensile strength of the cable.



German North Sea (in service since 2017)

A project for 155 kV submarine cable connects an Offshore Wind Platform and a HVDC offshore platform in German North Sea. In order to meet growing demand of the submarine cable in the region backed by governments' policies to increase renewable generation capacity, Sumitomo Electric is committed to provide reliable and robust cable systems to the market.



Land Cable

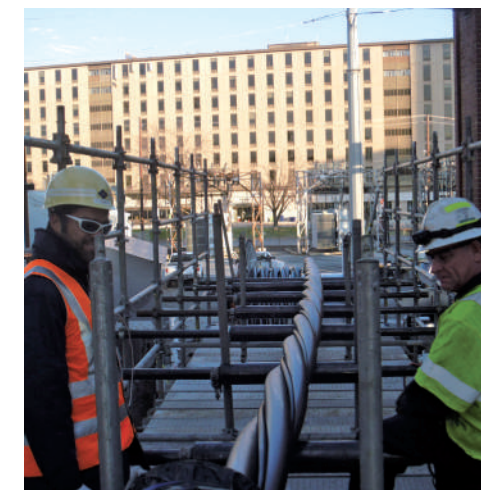


Proven track record over 120 years

FEATURES



High voltage Land cable systems are designed to transmit electricity in both urban and rural areas where constraints regarding right of way are growing despite the rising demand of electricity. The cable technology is also utilized for river or canal crossings, mines or crossing of environmentally sensitive areas. Along with the state-of-the-art cable manufacturing technologies, Sumitomo Electric has extensive experiences to deliver the projects with cable installation technologies in various site conditions such as direct burial, duct pipe installation, horizontal directional drilling (HDD), vertical shafts or utility tunnels.

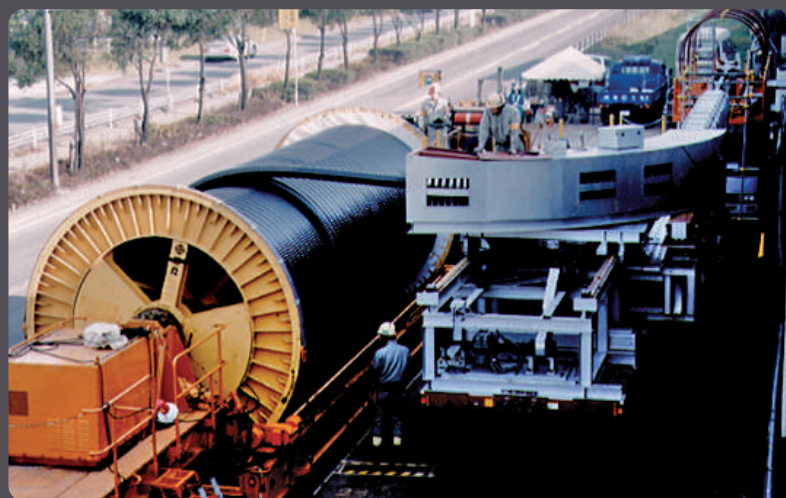


As a leading EHV manufacturer, we always provide solutions and benefits to the customers and ultimately to the societies around the world. As an example, we have completed 115 kV cable installation in approx. 1,850 m HDD pipe crossing a channel in the U.S., which is cost effective and technically robust solution compared to the conventional submarine cable installation.

APPLICATION EXAMPLES

500 kV AC-XLPE Project in Japan

Sumitomo Electric supplied a total 120 km of AC 500 kV XLPE cables to Shinkeiyo- Toyosu project in metropolitan Tokyo area. It was the world's first project to adopt 500 kV XLPE cable technology for long distance transmission line and has been in operation since 2000.



HVAC XLPE Triplex Cable Projects in the U.S.

In order to solve oil-leak problems with existing Pipe Type Fluid Filled cables, we have developed and propose to customers the use of our unique patented XLPE Triplex cable design. Such an innovative cable technology has been developed through a number of consultation process with the customers who seek such solutions.



HVDC (High Voltage Direct Current) Cable

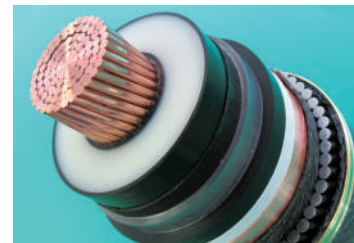


Sumitomo Electric's HVDC cable technologies enable interconnection of power grids between countries and across continents to secure reliable energy infrastructures.

FEATURES



Since the completion of the first HVDC cable system in Japan back in 1979, we have completed a large number of HVDC cable projects. Of particular note are the 500 kV HVDC submarine cables installed across the Kii Channel in Japan, which is one of the world's highest capacity HVDC cable system's with 2,800 MW transmission capacity. In addition to conventional Fluid Filled cables, we have developed and commercialized 500 kV MI (Mass Impregnated) and 400 kV XLPE cable system for HVDC applications.

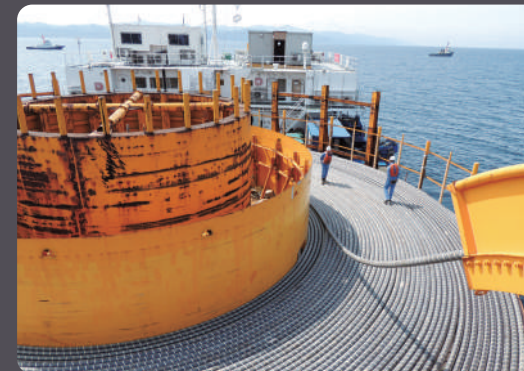


Sumitomo Electric's HVDC XLPE cable enables polarity reversal operations and also significantly higher operational conductor temperature (90°C) to that of MI cables. These features allow customers to achieve various benefits including reduced CAPEX, increased operational margins, polarity reversal operations with conventional LCC converter or combination of cable and overhead line in the same system. Our HVDC XLPE cable systems provide solutions to satisfy the customer's various requirements.

APPLICATION EXAMPLES

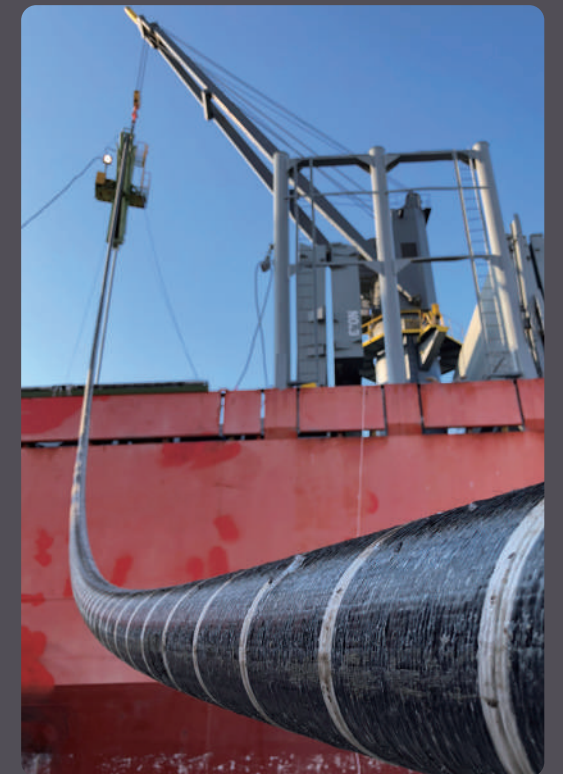
Hokkaido-Honshu 250 kV XLPE HVDC System (in service since 2012)

These HVDC XLPE submarine and land cables connects Hokkaido to Honshu and has a route length of 43 km. This is the world first project consisting of HVDC cables with LCC converter and overhead line under polarity reversal operation.



UK-Belgium 400 kV XLPE HVDC System (to be completed in 2019)

The project is 1 GW interconnector between UK and Belgium. Sumitomo Electric supplies and installs the world's first 400 kV HVDC XLPE cable system which is the highest voltage in HVDC XLPE cable system. The cable link consists of 130 km offshore route and 12 km onshore route.

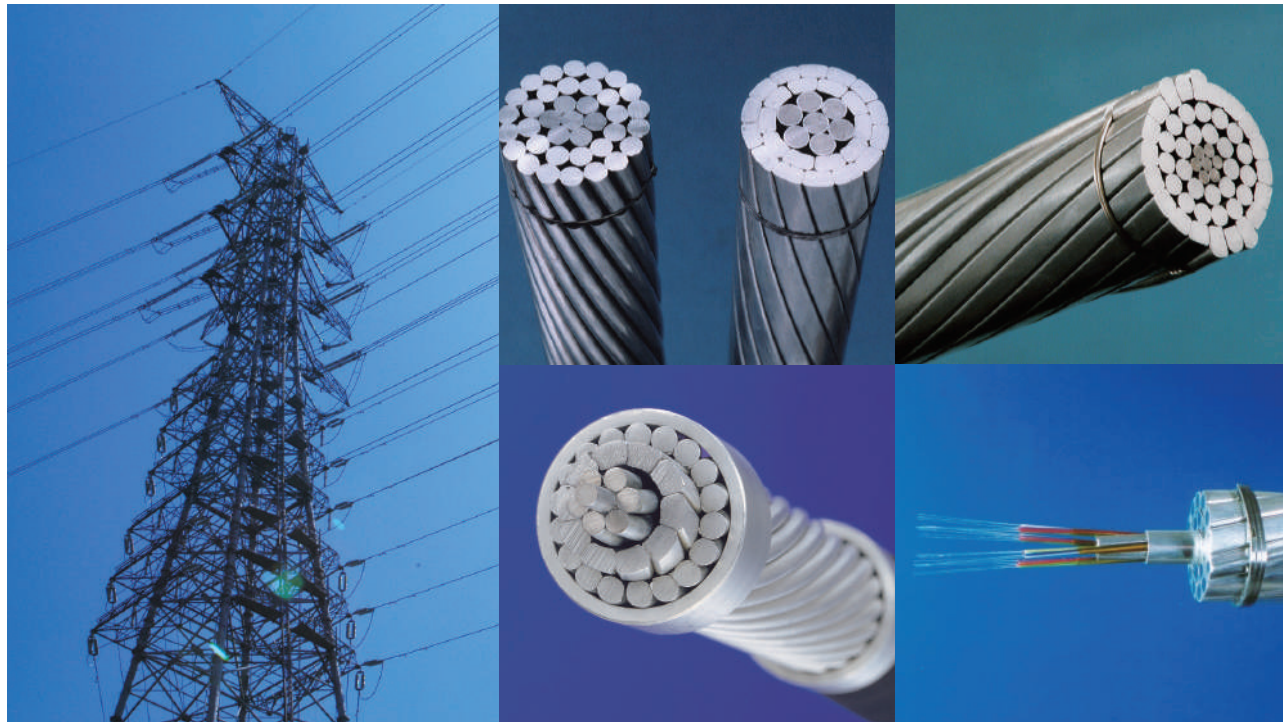


Southern India (Trichur-Pugalur) HVDC Project (To be completed in 2020)

The first HVDC XLPE cable and VSC project in India, with 2 x 1 GW of capacity. Our unique HVDC-XLPE cable technology, such as enabling polarity reversal and the ability to operate at 90°C conductor temperature, is the ideal HVDC-XLPE cable system solution for the project; among 200 km of route length in high temperature region, consist of 32 km of cable route and overhead line for remaining part which will be facing frequent lightning in rainy season.



Overhead Conductor



Sumitomo Electric's state-of-the-art overhead conductors play a significant role in development of the society and reliable energy networks.

FEATURES



Proven technology

Our experience is proven by our track record of nearly 100 years. As one of the world's leading manufactures, we will continue to provide reliable conductors to our customers all over the world.



Comprehensive and optimized solutions

Sumitomo provides customized and optimal solutions to each customer with a variety of overhead conductors suitable for various installation, operation and maintenance conditions including harsh environment such as heavy snow / wind / pollution or needs for uprating of existing lines.



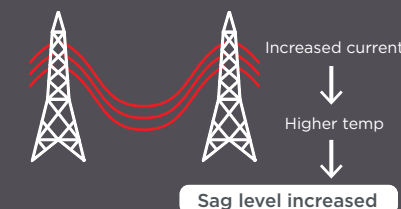
In-house evaluation facilities to develop new products

We have our own evaluation facilities such as corrosion test equipment, a large-scale wind tunnel facility and snow accumulation test equipment. We are also developing innovative aluminum alloys, to create new products that will satisfy a wide range of customer needs.

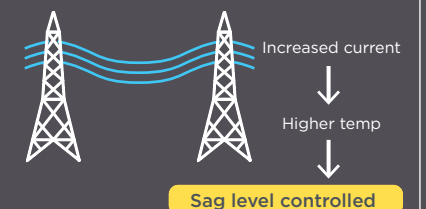
APPLICATION EXAMPLE

Sumitomo Electric's High Temperature Low Sag (HTLS) conductors enable increase of transmission capacity by 1.6 - 2.0 times without replacement or reinforcement of existing towers while maintaining the same sag level as conventional ACSR conductors. Among market players, we are recognized as the pioneer of GAP type conductor and Invar core conductor with supply record of more than 35 years.

Conventional Overhead Lines



High Temperature Low Sag Overhead Lines



PRODUCT APPLICATIONS

HTLS Conductors (GAP type)

"GAP construction" featuring a small gap between the steel core and thermal-resistant aluminum alloy layer enables to uprate the existing transmission capacity while maintaining the same ground clearance as conventional ACSR conductors.



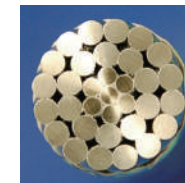
Low Loss Conductors

Low Loss conductors can reduce electrical transmission loss by up to 25% compared to conventional ACSR conductors. This conductor can also reduce CO2 emission and are environment-friendly.



HTLS Conductors (Invar Core Conductors)

With the combination of super thermal-resistant aluminum alloy and aluminum-clad Invar core, Invar core conductors offer excellent sag control and uprated current capacity.



Monitoring System

Monitoring and sensing system for transmission lines based on fiber optic and software technologies can improve reliability of customer's asset and modernize maintenance works.



Environment-friendly Conductors

These special conductors can reduce environmental impacts to communities around the transmission line by reducing wind noise and the reflection of sun light from conductors.



Prefabricated Overhead Line Conductors

With our technology for calculating the precise conductor length based on the actual distance between towers, we can produce conductor with the exact length and compress deadend clamps in factory. This can improve the efficiency of stringing works and minimize the installation period.



High Strength & Thermal Resistant Conductors for Long Span Application

High Strength & Thermal Resistant Conductors has been developed for long span projects such as sea or river crossing, combining extra high strength aluminum-clad steel and thermal-resistant aluminum alloy. This conductor is specialized in the reduction of sag to assure adequate clearance for these crossings whilst maintaining the high current capacity. Since the first installation in 1981, Sumitomo Electric has been delivering more than 1,000 km all over the world and the project including approximately 2,300 m crossing span in China is still one of the longest crossing project.



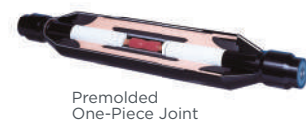
Cable Accessories



Reliable cable accessories satisfy a wide range of customer's demands

Cable accessories require sophisticated technologies and expertise in its design, manufacturing and installation. With in-house developments and capabilities backed by proven supply track record in those areas, our wide range of products offer ideal solutions to each customer in the area of XLPE, Fluid Filled and Mass Impregnated (MI) cables for both HVAC and HVDC.

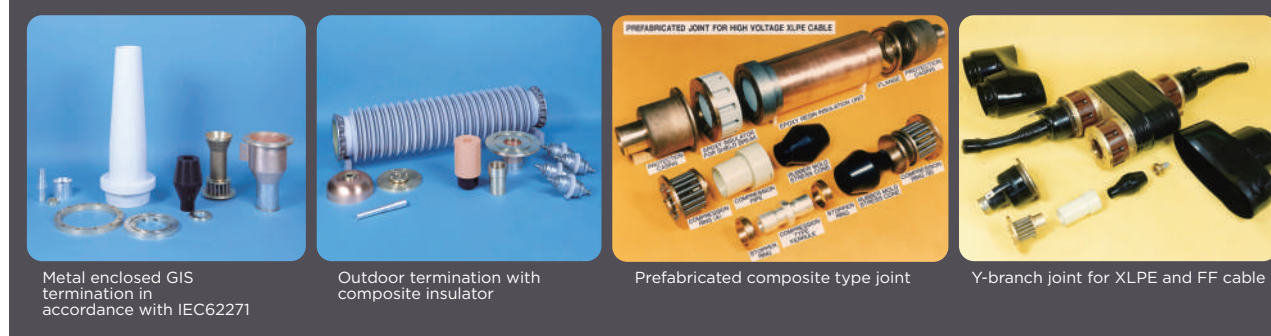
FEATURE



Premolded One-Piece Joint

Insulation parts are made of EP (Ethylene Propylene) Rubber which has strengths in electrical and mechanical characteristics such as tensile strengths and elongation. Also EP rubber has been developed by our own and manufactured over 50 years under the comprehensive quality management system. With these experiences and know-how, we have been delivering reliable cable accessories to our customers in conjunction with an extensive knowledge of cabling and assembling work.

APPLICATION EXAMPLES



Transition Joint between Fluid Filled and XLPE Cable

Transition Joints are designed to re-route or repair existing Fluid Filled cables with new XLPE cables. It is especially required at congested cities and sites to reduce civil work and enhance cost effectiveness.



Offshore Joint

Offshore joints are used for both initial installation and repair work when it's damaged during operation. It is an essential component for projects such as interconnector or offshore wind farms.

Power Cable Monitoring System

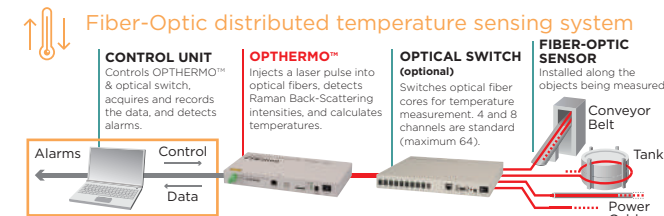


Forecasting power cable system's reliability in future by means of on-line monitoring and analysis

The power cable monitoring system provided by Sumitomo Electric, such as OPTHERMO™ and AOLCM system, contributes to robust asset management of power cable systems with real time monitoring of the system operation status. These monitoring devices can also be utilized for other applications such as downhole monitoring of oil / gas wells, LNG tanks, Tunnel fire detection. Our solutions include not only real time system monitoring but also prediction and simulation of future load status in order to maximize the use of transmission system.

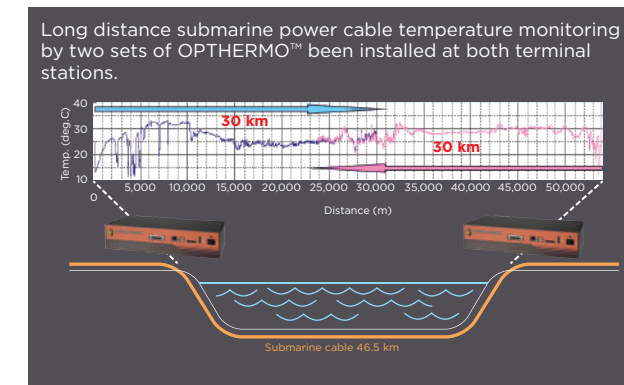
OPTHERMO™

FEATURES



OPTHERMO™ is a distributed temperature sensing system that uses optical fibers as sensors. Since the optical fiber, embedded inside or attached to the Power Cable, itself is used as the temperature sensor, this system is considered as the best solution for continuous measurement of cable temperatures over a long distance and wide area with significantly high temperature and special resolutions.

APPLICATION EXAMPLE



PRODUCT APPLICATIONS

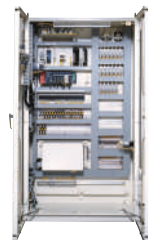
- Monitoring temperatures of power cables and dynamic cable rating system
- Monitoring temperatures of tunnel, culvert and cable duct
- Monitoring temperatures of belt conveyors carrying flammable materials
- Monitoring temperatures of steel plant and pipelines
- Managing temperature and air conditioning of data centers

AOLCM

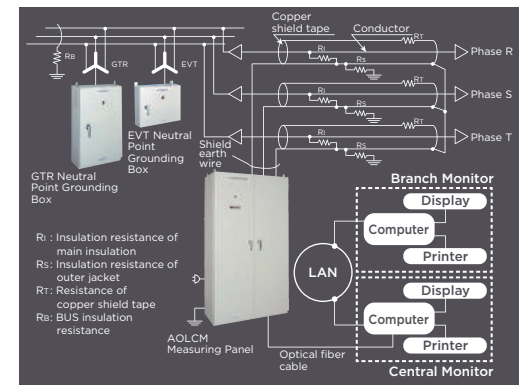
FEATURES

Medium Voltage cable on-line automatic insulation monitoring system

AOLCM (Automatic On-Line Cable Monitoring) is a system that monitors the conditions of insulation within medium voltage cables up to 6 kV without power outage. Multiple insulation resistances are measured and recorded automatically, and results of the analysis will be displayed with indication on deterioration level of cable insulations.



APPLICATION EXAMPLE



PRODUCT APPLICATIONS

- Large-scale plants (such as oil, chemical, automobile, semiconductor plants)
- Ultra-high voltage equipment such as used in intelligent buildings

Redox Flow Battery



Large-scale secondary battery system for supporting the evolutionary development of electric power systems

FEATURES



Safety

Composed of noncombustible and flame-retardant materials, the redox flow battery is highly safe with little possibility of a fire and can be operated at room temperature. Since the state of charge is monitored accurately, the battery secures maximum safety in system operation.



Long service life

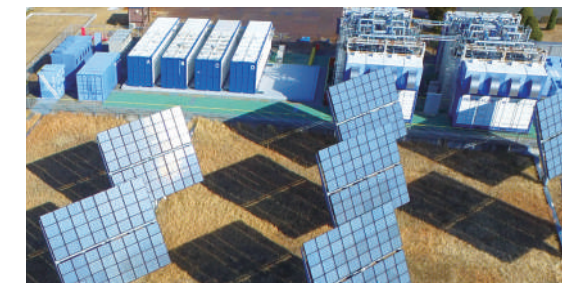
The redox flow battery has a 20-year design lifetime, with an unlimited number of charge-discharge cycles available. The electrolytes are free from degradation in principle and can be used semi-permanently.



Optimum use

The battery power output and capacity can be designed independently, allowing a single battery system for multiple uses with an economic application.

Redox flow batteries are rechargeable batteries that are charged and discharged by means of the oxidation-reduction reaction of ions of vanadium or the like. They have excellent characteristics: a long service life with almost no degradation of electrodes and electrolytes, high safety due to being free of combustible materials, and operability under room temperatures. These make the batteries suitable for use in power grid systems. Redox flow batteries are thus expected to serve as a necessary technology to stabilize the power grids that will expand the introduction of renewable energy including solar and wind power.



APPLICATION EXAMPLE

System implemented at Hokkaido Electric Power Company

[Battery system output and capacity]
15 MW and 60 MWh respectively
[Usage]
Frequency control and power supply / demand balancing
[Installation location]
Minami-Hayakita Substation (in Abira-cho, Hokkaido)
[Start of operation]
December 2015



Appearance of building for battery system



Battery cells and heat exchangers



Electrolytic solution tanks and direct-alternating current conversion devices

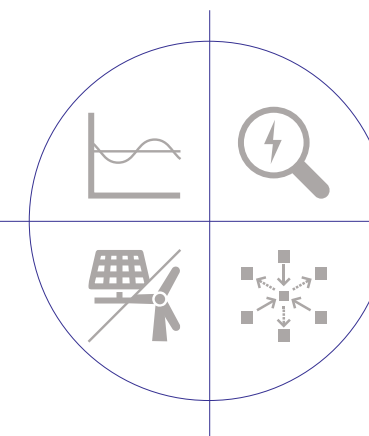
PRODUCT USE

Use in power grid operation

The system can provide ancillary services such as frequency controls to meet the needs of power grid operators.

Stabilization of renewable energy outputs

The system can ameliorate the impacts of steep power output fluctuations for wind or solar power generation on a power grid.



Power management by consumers

The system can realize power system operation that exactly matches a consumer's needs such as efficient and stable use of electric power.

Microgrid

The system can realize stable power supply within an independent and small-scale grid through coordination of distributed power sources such as renewable energy sources and power generators.

One of the world's largest redox flow battery systems

At the Minami-Hayakita Substation located in Abira-cho, Hokkaido, one of the world's largest redox flow battery systems is in operation. In the Hokkaido region, where renewable energy use is expanding rapidly, the feasibility of measures for stabilizing power grid operation is being tested and verified. We will continue playing a part in the expansion of the use of renewable energy as a pioneer among flow battery manufacturers.

Project members



Keiji Yano
Electrical Design Group,
in charge of designing and
launching electrical systems



Shohei Fukumoto
System Engineering Group,
in charge of local test and
adjustment

Power Cable with High Temperature Superconducting Wire



Bi-based HTS wire and power cable

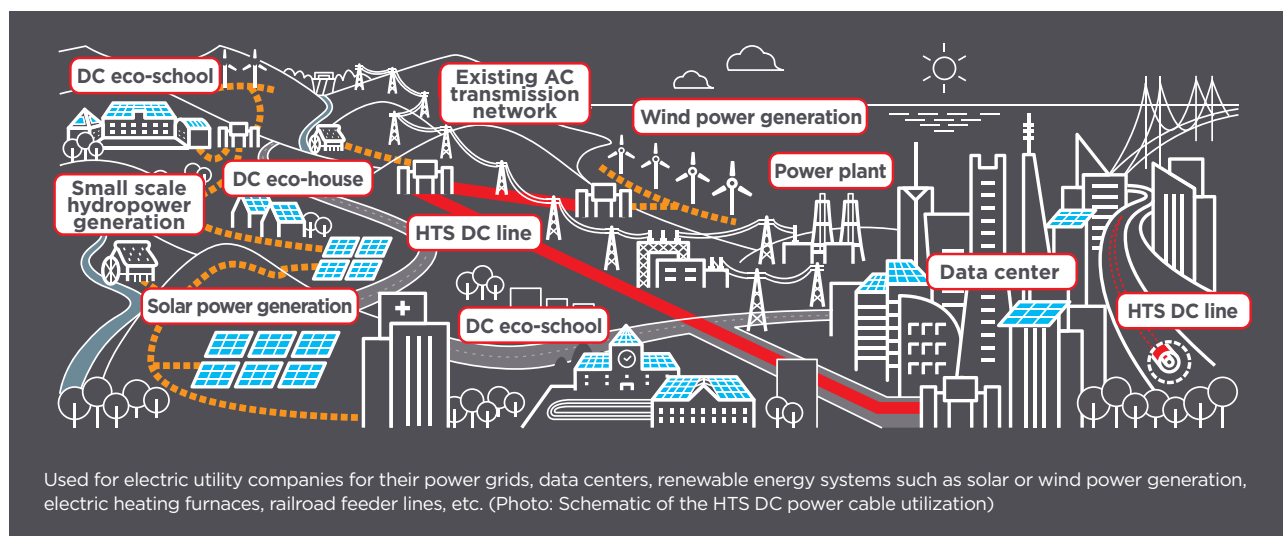
Low-loss, compact power cable

Sumitomo Electric began to research on high-temperature superconducting materials from 1986 and especially focusing on the development of the bismuth- based HTS wires (DI-BSCCO™) and its applications. Taking advantage of the superconductivity features – zero electrical resistance and high current density (approximately 200 times than that of copper), as one of their applications, we have been developing a low transmission loss and compact HTS power cable.

FEATURES

Our HTS cable with DI-BSCCO™ has low electrical loss and high current density, so it can carry a larger amount of electrical power with low transmission losses compared to same sized conventional cable. In addition, superconducting cable does not generate heat, allowing them to install in a compact space. From these advantages, HTS cable can realize reducing transmission loss and smaller size compared to a conventional cable. And also this cable has a characteristic of no electromagnetic emissions to outside of the cable (EMI free). This cable is particularly suitable for large-current DC power transmission lines, for example, data centers, electric heating furnaces, etc.

APPLICATION EXAMPLES



POTENTIAL CUSTOMERS AND USES



Electric utility companies



Power generation plants



Wind / solar power generation



Railroad feeder cables



Data centers



Electric heating furnaces

Company Profile

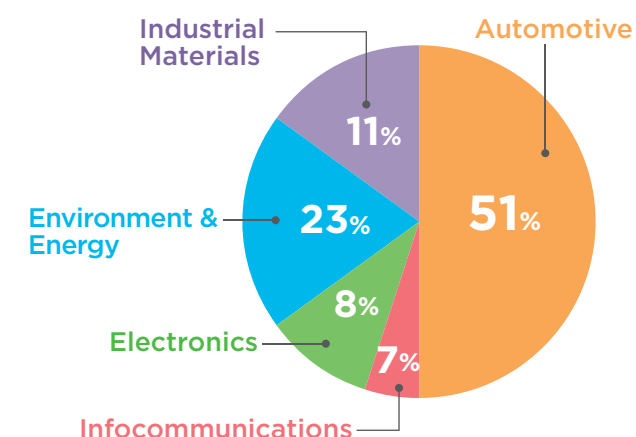


Connect with Innovation

Company Name	Sumitomo Electric Industries, Ltd.
Head Office	Osaka & Tokyo, Japan
Established	April 1897
Net Sales	USD 27,806 million
Employees	255,133
Number of Locations	395

(As of March 2018, Consolidated, Calculated by exchange rate 1USD=110.85JPY)

Net Sales Ratio by Business Segment



Automotive



Wiring Harnesses



Anti-vibration Rubber

Infocommunications



Optical Fiber Cable



Fusion Splicer

Electronics



Flexible Printed Circuit



Compound Semiconductors

Environment & Energy



Contact Wires



High-Voltage Cable

Industrial Materials



Nano-Polycrystalline Diamonds



Cutting Tools

Global Network

