**Power Generation and Sales Company**

**Mission Statement**

To offer our customers high-quality and affordable comprehensive energy services, with the utmost emphasis on safety.

**Vision**

Power generation and sales teams work as one unit to help enrich our customers’ lives and develop business.

"We work to maximize profits by taking on the challenge of achieving further growth and enhancing our cost competitiveness and offerings that put us at an advantage."  

We adopted the system that integrates power generation and sales into one unit so that our employees work more closely together to offer comprehensive services and make decisions smoothly, transcending the conventional boundary between the two different areas. All employees in Power Generation and Sales Company are committed to meeting our customers’ needs and promoting local projects unique to Tohoku Electric Power, in order to encourage people to choose us as their service provider. In this way, we can maximize our profits.

**Power Generation Business**

**Thermal Power Generation**

- **Efforts to Achieve Optimal Power Portfolio**
  On the other hand, considering future demand and our power source development plans along with projected maintenance expenses, we have decided to close down Akita Thermal Power Station Unit 5 and Ngata Thermal Power Station Unit 5, which served as emergency power sources to supply electricity after the Great East Japan Earthquake, and Ngata Thermal Power Station Unit 4, whose facilities are aging. We also plan to move the gas turbines at Akita Thermal Power Station Unit 4 and Ngata Thermal Power Station Unit 5 to Higashi Niigata Thermal Power Station Series 4-1, to effectively re-use equipment from closed facilities and improve thermal efficiency, resulting in lower fuel costs.

- **Efforts to Enhance Thermal Efficiency**
  Enhanced thermal efficiency for thermal power generation reduces the use of fossil fuels and contributes to the effective use of energy resources. Above all, it helps control CO2 emissions. Hence, we actively use thermal power technologies that enable high thermal efficiency.
  The Higashi Niigata Power Station Series 3, which went into operation in 1895, Japan’s first commercial-use, high-capacity gas combined-cycle power facility, and achieved thermal efficiency of about 48% – the highest efficiency possible at the time. Ngata Thermal Power Station Series 4 and Sendai Thermal Power Station Unit 4 later achieved even higher efficiency, and in July 2016, Shin-Sendai Thermal Power Station Series 3 went into full operation and accomplished thermal efficiency of over 60%, which was the world’s highest. Furthermore, we have steadily been working on the construction of the Nozawa Thermal Power Station Unit 3 and are planning to build the Joetsu Thermal Power Station Unit 1 in order not only to ensure a steady supply of electricity but also to achieve high economic efficiency and reduce environmental burdens.
  The Nozawa Thermal Power Station Unit 3 has adopted ultra-super critical pressure (USC) as a way to achieve higher thermal efficiency than those of existing Units 1 and 2. Joetsu Thermal Power Station Unit 1, which is a combined cycle power facility with thermal efficiency of 63% or higher (the highest we have ever achieved), aims to achieve high economic efficiency and reduce our impact on the environment.
  We will keep ourselves committed to further enhancing economic efficiency and conserving the environment, with safety as our top priority.

- **Efforts to Adopt IoT and Big Data**
  In September 2017, Tohoku Electric Power and Toshiba agreed to collaborate on exploring cutting-edge digital technologies, such as IoT and big data analytics, in order to further enhance the thermal efficiency of our thermal power stations.
  Using the results of this collaboration in FY2017, we will develop specific systems and conduct verification tests. We aim to apply the technologies to all our thermal power stations by the end of FY2019.
Power Generation and Sales Company

Efficient Procurement of Fuel
We have adopted new procurement schemes and diversified our product line to improve our cost competitiveness. We have also restructured our procurement portfolio by diversifying the sources from which we buy fuels and taking other relevant measures. This way, we procure fuels more efficiently and further optimize the procurement process, thereby ensuring steady supply, economic efficiency and flexibility.

Examples of Our Efforts Related to Coal

- Examples of Our Efforts Related to LNG

Hydroelectric Power Generation
Our Power Generation and Sales Company, with 205 hydroelectric power plants (about 2.44 million kW), is the largest number of this type of plant run by a company in Japan.*1

The electricity generated by our hydroelectric power plants in FY2017 was about 8.4885 billion kWh, which accounts for about 11% of our supply capacity.

In September 2017, the extensive renovation of the Kanose Hydroelectric Power Station (maximum output: 54,200 kW) was completed, bringing the station into operation again. The renovation was carried out due to aging of the facilities. We reconsidered the number of water wheel generators and introduced highly-efficient water wheels (water wheels with bulbs)*2 to increase output by up to 10% without changing the quantity of water used. We will continue to explore and develop new locations for hydroelectric power plants (e.g., Tohoku Sustainable & Renewable Energy Co., Inc., currently building the Yamagawa Dashi Hydroelectric Power Station with maximum output of 14,600 kW) and to renovate aging facilities at our existing hydroelectric power plants, thereby ensuring a steady supply of hydroelectric power.

Geothermal Power Generation
We have actively adopted geothermal power generation since the Kakkonda Geothermal Power Station in Kutsu went into operation in 1978. Our company group has six geothermal power plants in five locations. The total output is 212,300 kW, which comprises about 40% of the output of geothermal power generation facilities across the country. In FY2017, the electricity generated by our plants amounted to about 96 million kWh (equivalent to electricity used by 290,000 households per year).*3

Furthermore, as part of our efforts to leverage more thermal energy, Tohoku Sustainable & Renewable Energy, one of our group companies, has been searching the Kiyama and Shimoizaki areas in Akita for geothermal energy sources since 2010. They found a geothermal reservoir in 2015, and have been working to measure the quantity of the energy available by drilling a large-diameter hole as an exploration well since 2016.

Solar Power Generation
As part of our efforts to help develop a low-carbon society, we operate mega-solar power plants*1 in Hachinohe (Aomori), Sendai (Miyagi) and Haramachi (Fukushima) and a solar power station in Hanabi, Ishinomaki (Miyagi).

We project that operating these four solar power plants will lead to a cut of 2,860 tons of CO2 emissions per year equivalent to the amount of CO2 produced from electricity use by 1,650 households.*4

Examples of Our Efforts Related to Coal

- Coal carrier Noshiro Maru

Renewable Energy

- Hydroelectric Power Generation

Our Power Generation and Sales Company has 205 hydroelectric power plants (about 2.44 million kW), the largest number of this type of plant run by a company in Japan.*1

The electricity generated by our hydroelectric power plants in FY2017 was about 8.4885 billion kWh, which accounts for about 11% of our supply capacity.

In December 2017, we signed a basic agreement with Mozambique LNG One to buy LNG from the Mozambique LNG project. In accordance with this agreement, we will be purchasing up to about 261,000 tons of LNG annually for 15 years starting from the early 2020s when the project is anticipated to launch the production of LNG. This is the first long-term agreement we have ever signed to source LNG from Africa, and we believe it will help us further diversify the regions from which we source fuel.

Examples of Our Efforts Related to LNG

- Drilling a large-diameter hole as an exploration well

*1 Large-scale solar power plants with output of at least 1 megawatt (1,000 kW)

*2 Estimated assuming that one typical household uses Meter Rate Lighting B, a 31-A contract system, and also with 50% of meter rate billing.

*3 Estimated assuming that one typical household uses Meter Rate Lighting B, a 31-A contract system, and also with 50% of meter rate billing.

*4 Estimated assuming that one typical household uses Meter Rate Lighting B, a 31-A contract system, and also with 50% of meter rate billing.
Sales Business

Further Enhancement of Our Offerings and Competitive Edge

We are also continuing to move forward with our sales measures, which include offering new rate plans and developing and improving new services that will benefit our customers, thereby enhancing our competitive edge in terms of prices and other vital aspects of business.

Service for Business Users

We have dedicated teams that suggest how to save energy and reduce costs to our corporate customers ranging from plants, hospitals and welfare facilities to educational institutions and agricultural facilities. In April 2017, we acquired 100% ownership of Tohoku Energy Service Co., Inc. (“Tohoku ESCO”) to develop offerings that combine the energy we offer (i.e., electricity and gas) with Tohoku ESCO’s energy management systems and services for customers’ facilities, thereby further strengthening our comprehensive energy solutions.

Moreover, we currently offer a pilot service called “exEMS (experience Energy Management Systems).” This new product offers on-demand monitoring and visualized usage of electricity in order to help customers save energy and reduce costs.

Service for Family Users

We offer a wide range of rates and plans that suit customers’ increasingly diverse lifestyles.

Our new rate plans have been selected by numerous customers, thereby enhancing our competitive edge in terms of prices and other vital aspects of business.

We founded Tohoku EPCO Energy Trading in June 2017 to combine the energy we offer (i.e., electricity and gas) with the use of fuel futures.

It also acquires and accumulates trading skills and know-how to accurately manage business risks, and takes courses of action to continue boosting revenues, thereby ensuring future growth and development.

Sale of Electricity Beyond our Franchise Area

We have been taking a range of actions to increase the amount of electricity we sell outside the 6 prefectures in Tohoku and Niigata Prefecture. Synergia Power, a company we established jointly with Tokyo Gas, began to offer electricity for customers who use high- or extra-high voltage power in the Kanto region (mainly in the northern Kanto area) in April 2016. In March 2018, we invested in Tokyo Power Supply, which is Tohoku Corporation’s subsidiary and actively sells electricity and provides related services to customers living near the Tokyo Line (Tokyo Corporation has a 66.7% stake, Tokai Electric Power 33.3%).

We work with Tokyo Power Supply to sell electricity on the retail market in the Tokyo metropolitan area. Tokyo Power Supply has a wealth of sales channels, solid trading skills, and excellent marketing skills. Our collaboration aims to combine these strengths with ours, which are the know-how and experience we have built in the electricity business, in order to offer services appealing to our customers.

Furthermore, in January 2018, we updated the rate plan “Yorisou Denki” designed for customers in the Tokyo metropolitan area by offering new unit prices that give better value for money than ever in order to make our electricity more affordable to individual customers in the metropolitan area, thereby increasing our sales.

Efforts to Reach Our Full Potential for the Sales and Power Generation Business

Trading Business

We founded Tohoku EPCO Energy Trading in June 2017 to prepare for increased market transactions due to the deregulation of the retail electricity market. The new business started operating in April 2018.

The company actively explores new business areas with visions, such as integrated trading in the electricity market or the use of fuel futures.