Aggregation of Electricity Supply Plan
Fiscal Year 2016

June 2016

Organization for Cross-regional Coordination of Transmission Operators, JAPAN

CONTENTS

＜INTRODUCTION＞

The Organization has aggregated the Electricity Supply Plan of Fiscal Year 2016 according to the Article 28 of the Operational Rules of the Organization and the Article 29 of the Electricity Business Act which requires to submit the plan to METI by the EPCOs under the same article of the Act.

Electricity Supply Plan of F.Y.2016 is fallen on enactment of Revised Electricity Business Act, its submission schedule is equipped with transitional measures of preparation by supplementary clause of Oridnance of Ministry of Economy, Trade and Industry No.19. Accordingly, Electric Power Companies who have acquired their business licences except General Transmission and Distribution Companies shall submit their plans by Apr. 28, 2016 and General Transmission and Distribution Companies by May 31, 2016 to Minister of Economy, Trade and Industry(METI) through the Organization. The Organization shall aggregate and submit the plans to METI by June 30, 2016. Thus, Electricity Supply Plan of submission after Apr. 29, 2016 are excluded from this aggregation, submitted from Electric Power Companies who are satisfied requirement of Generation Companies except former Vertically-integrated Electric Power Companies or Wholesale Electric Power Companies.

Besides, for the evaluation of supply-demand balance, 69 Electric Supply Plans of Generation Companies reviewed by the Organization at the aggregation date(by June 10, 2016) are included to capture substantial supply capacity in Nationwide.

Number of Companies subject to the aggregation

Sector of Companies	Numbers of Companies who submit the Plan by Apr. 28	Numbers of Companies who submit the Plan by May 31	Numbers of Companies whose plans are reviewed from Apr. 29 to Jun. 10*
Retail Companies	276	-	-
Generation Companies	21	-	69
Registered Specific Transmission, Distribution and Retail Companies	16	-	-
Transmission Companies	1	-	-
General Transmission and Distribution Companies	-	10	-
Total Companies	314	10	69

*Evaluation of supply-demand balance only.

1. Electricity Demand Forecast

(1) Actual and preliminary data of F.Y.2015 and Forecast for F.Y.2016 (Short-term)

a. Peak Demand (average value of the three highest daily load[1]) in August

Table 1-1 shows actual data in F.Y.2015 and forecast[2] value for F.Y.2016 of the aggregated Peak Demand in each regional service area[3] which 10 General Transmission and Distribution Companies submitted.

Peak Demand (average value of the three highest daily load) in August2016 is forecasted for 157,660MW, 2.2% decrease over 161,200MW of that of August 2015. Besides, the actual data of F.Y.2015 is temperature adjusted[4] to 156,300MW, and forecasted value of F.Y.2016 is 0.9% increase over the temperature adjusted value of F.Y.2015.

Table 1-1 Peak Demand (average value of the three highest daily load) in August
(Nationwide, 10^4kW at the Sending-end)

F.Y.2015 Actual	F.Y.2016 Forecast
16,120 (15,630)	15,766 ▲2.2 % (+0.9%)*

Value in ( )is temperature adjusted.
* % changes over actual data of the previous year.

b. Forecast for F.Y.2016

Table 1-2 shows Monthly average value of the three highest daily load in F.Y.2016 of the aggregated Peak Demand of each regional service area which 10 General Transmission and Distribution Companies submitted. Monthly average value of the three highest daily load in Summer (August) is over that of Winter (January) by about 10GW, thus Peak Demand in Nationwide occurs in Summer.

Table 1-2 Monthly Peak Demand (average value of the three highest daily load) in F.Y.2016
(Nationwide, 10^4kW at the Sending-end)

	Apr.	May	Jun.	Jul.	Aug.	Sep.
Peak Demand	11,988	11,508	13,038	15,721	15,766	14,251
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Peak Demand	11,926	12,656	14,076	14,853	14,840	13,510

1 Peak Demand (average value of the three highest daily load) corresponds to the averaged value of the three highest daily load (hourly average) in each month.

2 Demand Forecast beyond F.Y.2016 is based on the normal weather. Thus, weather condition for assumption of the forecast may vary with actual data or estimated figure in F.Y.2015.

3 Peak Demand in regional service area means average value of the three highest daily load for the public demand supplied through the transmission and distribution network of the General Transmission and Distribution Companies by the Retail Companies and the General T/D Companies in regional service areas of General T/D Companies. The Organization shall publish them according to the provision of Paragraph 5, Article 23 of the Operational Rules.

4 Temperature adjustment is implemented to grasp current demand based on normal weather, which excludes fluctuation of the demand triggered by the operation of air-conditioners.

c. Annual Electric Energy Requirement

Table 1-3 shows preliminary data[5] in F.Y.2015 and forecast value for F.Y.2016 of the aggregated Electric Energy Requirement of each regional service area which 10 General Transmission and Distribution Companies submitted.

Electric Energy Requirement for F.Y.2016 is forecasted for 899.7 TWh, 1.3% increase over 888.2 TWh of that of F.Y.2015 in preliminary. Besides, the preliminary data of F.Y.2015 is temperature and leap year adjusted to 885.7 TWh, and forecasted value of F.Y.2016 is 1.6% increase over the forecasted value of F.Y.2015.

Table 1-3 Annual Electric Energy Requirement
(Nationwide, TWh at the Sending-end)

F.Y.2015 Preliminary	F.Y.2016 Forecast
888.2 (885.7)	899.7 +1.3% (+1.6%)*

Value in ( )is temperature and leap year adjusted.
* % changes over preliminary value of the previous year.

[5] Preliminary data of Annual Electric Energy Requirement is aggregated data of actual data from April to November, 2015 and preliminary data from December 2015 to March 2016.

(2) Demand Forecast for 10 years (Long-term)

Table 1-4 shows Major Economic Indicators developed and published in Nov.30, 2015 by the Organization. They are assumptions for General Transmission and Distribution Companies to forecast the demand in their regional service areas.

The real Gross Domestic Product (GDP) is estimated at ¥ 5,380 billion in F.Y.2016 and at ¥5,838 billion in F.Y.2025 with annual average growth rates of 1.0%. Index of Industrial Production (IIP)[6] is projected at 101.8 in F.Y.2016 and at 114.6 in F.Y.2025 with annual average growth rates of 1.4%.

Table 1-4 Major Economic Indicators assumed for Demand Forecast

	F.Y.2016	F.Y.2025
Gross Domestic Product(GDP)	¥ 538.0 trillion	¥ 583.8 trillion [1.0%]*
Index of Industrial Product(IIP)	101.8	114.6 [1.4%]*

* Average Annual Growth Rate for the forecasted value of F.Y.2016

a. Peak Demand (average value of the three highest daily load) in August

Table 1-5 shows the forecast of Peak Demand in F.Y.2016, F.Y.2020 and F.Y.2025 as the aggregation of each regional service area which 10 General Transmission and Distribution Companies submitted.

Peak Demand in Nationwide is forecasted at 160,950MW in F.Y.2020 and at 165,410MW in F.Y.2025, with the average annual growth rate of 0.5% from F.Y.2016 to FY.2025. Peak Demand Forecast for 10 years becomes continuously increasing trend. That is largely according to positive factors such as expansion of economic scale and greater dissemination of electric appliances in spite of negative factors such as endeavors at saving electricity use, wider utilization of energy-saving electric appliances, shrinking population and load leveling measure.

Table 1-5 Forecasted Peak Demand (average value of the three highest daily load) in August (Nationwide, 10^4kW at the Sending-end)

F.Y.2016 [aforementioned]	F.Y.2020	F.Y.2025
15,766	16,095 [0.5%]*	16,541 [0.5%]*

* Average Annual Growth Rate for the forecasted value of F.Y.2016

[6] Index as the value in F.Y.2010=100

b. Annual Electric Energy Requirement

Table 1-6 shows the forecast of Annual Electric Energy Requirement in F.Y.2016, F.Y.2020 and F.Y.2025 as the aggregation of each regional service area which 10 General Transmission and Distribution Companies submitted.

Annual Electric Energy Requirement in Nationwide is forecasted at 918.0TWh in F.Y.2020 and at 944.6TWh in F.Y.2025, with the average annual growth rate of 0.5% from F.Y.2016 to FY.2025. Annual Electric Energy Requirement Forecast for 10 years becomes continuously increasing trend. That is largely according to positive factors such as expansion of economic scale and greater dissemination of electric appliances in spite of negative factors such as endeavors at saving electricity use, wider utilization of energy-saving electric appliances, and shrinking population.

Table 1-6 Forecast of Annual Electric Energy Requirement
(Nationwide, TWh at the Sending-end)

F.Y.2016 [aforementioned]	F.Y.2020	F.Y.2025
899.7	918.0 [0.5%]*	944.6 [0.5%]*

* Average Annual Growth Rate for the forecasted value of F.Y.2016

2. Electricity Supply and Demand

(1) Supply-Demand Balance Evaluation Method

The Organization shall implement Supply-Demand Balance Evaluation of each regional service area as well as Nationwide with Supply Capacity[7] and Peak Demand in their regional service areas which General Transmission and Distribution Companies submitted. Besides, based on the discussion at the 2nd meeting of Study Committee on Regulating and Marginal Supply Capability and Long-Term Supply-Demand Balance Evaluation (May 30, 2015), the Evaluation is implemented by the criteria whether Reserve Margin (%)[8] in each regional service area is secured over 8% or not. (In Okinawa EPCO, the criteria is to secure the Supply Capacity over Peak Demand against the interruption of the largest generating unit in its regional service area.)

Further, Supply Capacity is comprised of generating capacity secured by Retail Companies and General Transmission and Distribution Companies for their regional service areas and generating surplus[9] of Generation Companies. Figure 2-1 shows summary of Supply-Demand Balance Evaluation method. At this point, Supply Capacity secured by Retail Company includes that of procured from other regional service area through Cross-regional Interconnection Lines. Thus, generating surplus of Generation Companies or reserve capacity of Retail Companies might be the Supply Capacity of other regional service area in future.

Under the circumstance in which operation of Nuclear Power Station has become unknown, Supply Capacity of corresponding unit or station is posted as zero where corresponding Supply Capacity is reported as “Unknown” according to Procedures for Electricity Supply Plans of F.Y.2016 (published in Mar. 2016, by the Agency for Natural Resources and Energy). In Electricity Supply Plans of F.Y.2016 all Nuclear Power Plant except resumed operation has reported its Supply Capacity as “Unknown”.

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7 Supply Capacity is the maximum power that can be steadily generated at the time of Peak Demand (average value of the three highest daily load).

8 Reserve Margin (%) is a difference between the Supply Capacity and the Peak Demand (average value of the three highest daily load) divided by the Peak Demand (average value of the three highest daily load).

9 Generating surplus is generating capacity of Generation Company in regional service area without sales destination.

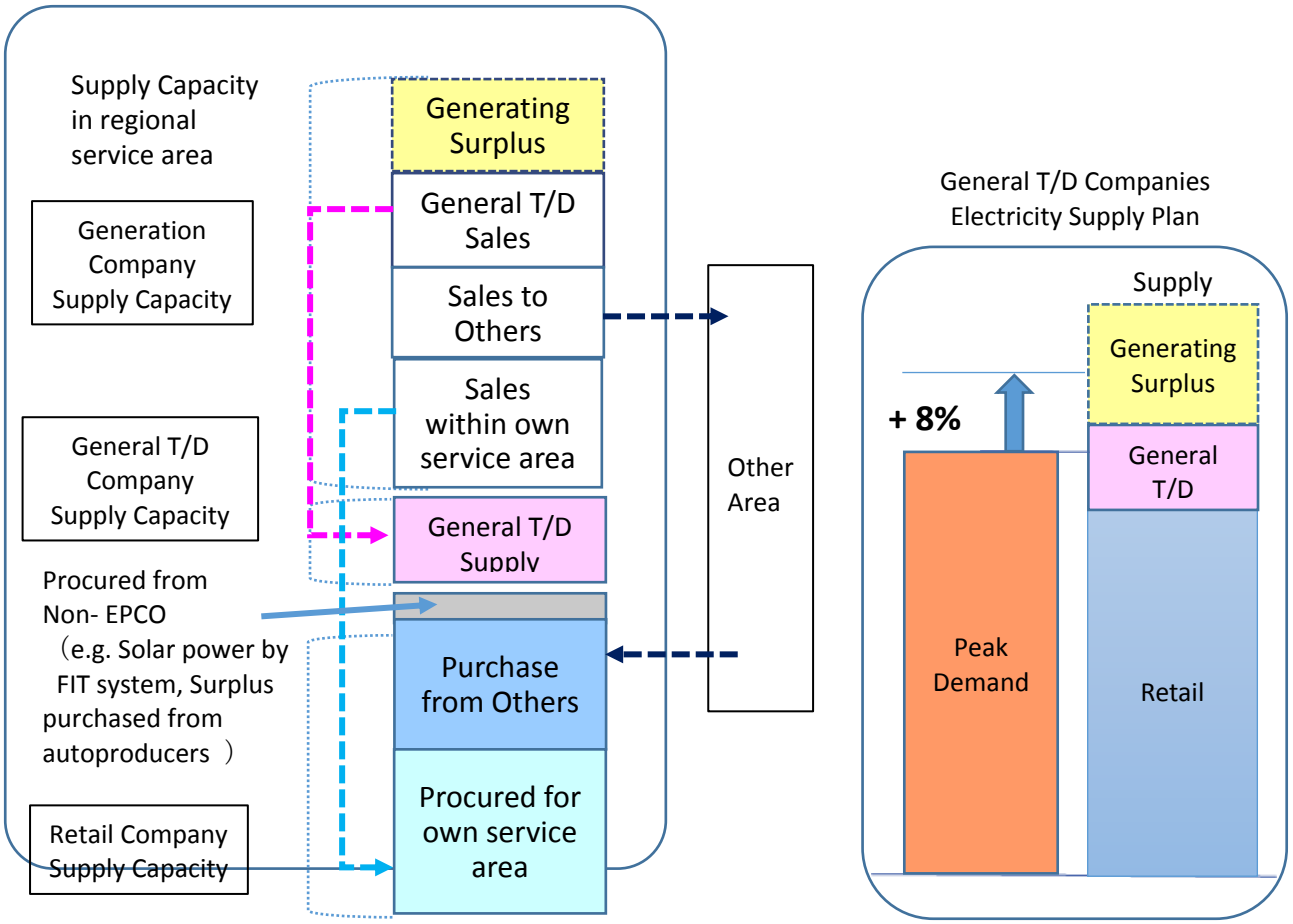

Figure 2-1　Summary of Supply-Demand Balance Evaluation Method

(2) Actual data of F.Y.2015 and Projection for F.Y.2016 (Short-term)

a. Actual data of F.Y.2015

Table 2-1 shows actual Supply-Demand Balance in August 2015 based on the Supply Capacity and Peak Demand in Nationwide.

Table 2-1 Actual Supply-Demand Balance in August 2015
(Nationwide, 10^4kW at the Sending-end)

Peak Demand (without temperature adjustment) [aforementioned]	Supply Capacity	Reserve Capacity	Reserve Margin
16,120	18,421	2,302	14.3%

Reserve Margin of 8%, Criteria for Stable Supply is secured in all regional service area of General Transmission and Distribution Company.

b. Projection of Supply-Demand Balance in F.Y.2016

Table 2-2 and Figure 2-2 shows projection of Monthly Supply-Demand Balance in F.Y.2016. In Nationwide, Reserve Margin of 8% is secured in each month.

Table 2-2 Monthly Supply-Demand Balance Projection in F.Y.2016
(Nationwide, 10^4kW at the Sending-end)

	Apr.	May	Jun.	Jul.	Aug.	Sep.
Peak Demand	11,988	11,508	13,038	15,721	15,766	14,251
Supply Capacity	13,974	13,852	15,139	17,676	17,867	16,909
Reserve Margin	16.6%	20.4%	16.1%	12.4%	13.3%	18.7%
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Peak Demand	11,926	12,656	14,076	14,853	14,840	13,510
Supply Capacity	14,594	14,960	16,495	16,935	16,837	16,062
Reserve Margin	22.4%	18.2%	17.2%	14.0%	13.5%	18.9%

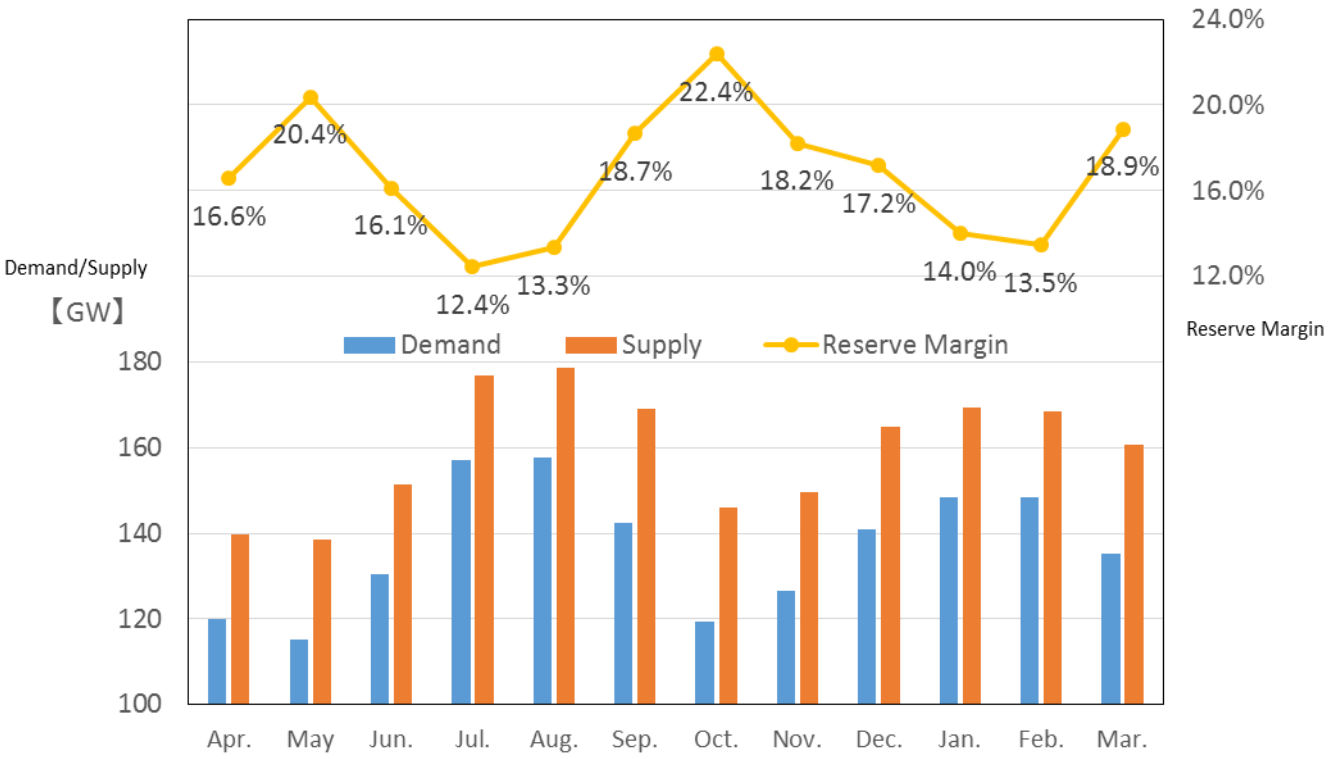

Figure 2-2 Monthly Supply-Demand Balance in F.Y.2016
(Nationwide, at the Sending-end)

Table 2-3 shows Monthly projection of Reserve Margin in each regional service area. Further, Table 2-4 shows Monthly projection of Reserve Margin in each regional service area recalculated with power exchange to the area of below 8% Reserve Margin from the areas of over 8% Reserve Margin based on Available Transfer Capability (ATC)[10].Reserve Margin in each regional service area almost secure the Criteria of Stable Supply, Reserve Margin of 8%, except some area and month. However, utilizing power exchange from other area with

[10] Based on the ATC as Feb. 19, 2016.

sufficient Supply Capacity through Cross-regional Interconnection Lines, the Criteria of Stable Supply, Reserve Margin of 8%, is secured through the Nationwide.

Table 2-3 Monthly projection of Reserve Margin in each regional service area
(Resource within own service area only, at the Sending-end)

	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Hokkaido	12.8%	10.3%	11.0%	17.4%	21.4%	22.1%	19.6%	12.6%	17.1%	17.2%	16.6%	26.9%
Tohoku	7.9%	15.4%	9.2%	12.0%	14.2%	17.3%	13.7%	10.8%	9.7%	10.6%	10.3%	13.4%
Tokyo	15.0%	21.3%	20.1%	7.7%	9.8%	19.7%	23.6%	16.7%	20.9%	15.1%	12.5%	16.9%
50Hz areas Total	13.4%	19.3%	17.4%	9.1%	11.3%	19.4%	21.2%	15.1%	18.3%	14.4%	12.4%	16.9%
Chubu	14.9%	14.5%	10.1%	10.3%	12.3%	13.5%	15.0%	11.3%	7.2%	7.7%	9.7%	11.1%
Hokuriku	14.3%	28.7%	13.3%	16.0%	16.8%	16.5%	24.4%	15.2%	15.6%	17.5%	15.2%	14.2%
Kansai	9.0%	15.0%	9.9%	11.9%	12.2%	15.6%	24.0%	19.5%	20.3%	15.0%	14.3%	25.2%
Chugoku	32.5%	32.4%	25.9%	20.0%	19.3%	29.5%	36.2%	37.9%	27.6%	22.3%	22.1%	31.1%
Shikoku	14.8%	18.2%	14.8%	14.5%	13.1%	22.4%	29.0%	24.7%	9.6%	9.0%	8.3%	14.0%
Kyushu	35.7%	30.0%	23.4%	22.0%	17.4%	18.8%	23.3%	23.4%	15.2%	11.9%	13.7%	20.8%
60Hz areas Total	18.5%	20.5%	14.6%	14.6%	14.3%	17.6%	22.9%	20.1%	15.6%	13.1%	13.6%	19.8%
Interconnected	16.2%	19.9%	15.8%	12.1%	13.0%	18.4%	22.1%	17.8%	16.8%	13.7%	13.0%	18.5%
Okinawa	60.8%	62.3%	47.2%	44.4%	50.5%	44.8%	44.4%	63.6%	65.7%	61.0%	73.3%	75.7%
Nationwide	16.6%	20.4%	16.1%	12.4%	13.3%	18.7%	22.4%	18.2%	17.2%	14.0%	13.5%	18.9%

Below Criteria 8%

Table 2-4 Monthly projection of Reserve Margin in each regional service area
(with power exchange through Cross-regional Interconnection Lines, at the Sending-end)

	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Hokkaido	12.8%	10.3%	11.0%	17.4%	21.4%	22.1%	19.6%	12.6%	17.1%	17.2%	16.6%	26.9%
Tohoku	8.0%	15.4%	9.2%	10.7%	14.2%	17.3%	13.7%	10.8%	9.7%	10.6%	10.3%	13.4%
Tokyo	14.9%	21.3%	20.1%	8.0%	9.8%	19.7%	23.6%	16.7%	20.9%	15.1%	12.5%	16.9%
50Hz areas Total	13.4%	19.3%	17.4%	9.1%	11.3%	19.4%	21.2%	15.1%	18.3%	14.4%	12.4%	16.9%
Chubu	14.9%	14.5%	10.1%	10.3%	12.3%	13.5%	15.0%	11.3%	8.0%	8.0%	9.7%	11.1%
Hokuriku	14.3%	28.7%	13.3%	16.0%	16.8%	16.5%	24.4%	15.2%	15.6%	17.5%	15.2%	14.2%
Kansai	9.0%	15.0%	9.9%	11.9%	12.2%	15.6%	24.0%	19.5%	19.5%	14.7%	14.3%	25.2%
Chugoku	32.5%	32.4%	25.9%	20.0%	19.3%	29.5%	36.2%	37.9%	27.6%	22.3%	22.1%	31.1%
Shikoku	14.8%	18.2%	14.8%	14.5%	13.1%	22.4%	29.0%	24.7%	9.6%	9.0%	8.3%	14.0%
Kyushu	35.7%	30.0%	23.4%	22.0%	17.4%	18.8%	23.3%	23.4%	15.2%	11.9%	13.7%	20.8%
60Hz areas Total	18.5%	20.5%	14.6%	14.6%	14.3%	17.6%	22.9%	20.1%	15.6%	13.1%	13.6%	19.8%
Interconnected	16.2%	19.9%	15.8%	12.1%	13.0%	18.4%	22.1%	17.8%	16.8%	13.7%	13.0%	18.5%
Okinawa	60.8%	62.3%	47.2%	44.4%	50.5%	44.8%	44.4%	63.6%	65.7%	61.0%	73.3%	75.7%
Nationwide	16.6%	20.4%	16.1%	12.4%	13.3%	18.7%	22.4%	18.2%	17.2%	14.0%	13.5%	18.9%

Improved above Criteria

Contributors to improvement

In Okinawa EPCO regional service area[11], as small and isolated island system, the Criteria of Stable Supply is to secure the Supply Capacity over Peak Demand against the interruption of the largest generating unit, as in conventional Evaluation, not applying the Criteria of other area. Table 2-5 shows Monthly Reserve Margin against the interruption of the largest generating unit (235MW), indicating stable supply secured in each month.

Table 2-5 Monthly Reserve Margin against the interruption of the largest generating unit
(235MW, at the Sending-end)

	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Okinawa	37.2%	42.0%	29.8%	28.0%	34.1%	27.7%	24.8%	40.6%	41.4%	37.2%	49.4%	50.9%

[11] In Okinawa EPCO regional service area, the Evaluation includes Reserve Margins of several isolated islands.

(3) Projection of Supply-Demand Balance for 10 years (Long-term)

a. Supply-Demand Balance

Table 2-6 and Figure 2-3 shows Annual Supply-Demand Balance Projection for 10 years.

In Nationwide, Reserve Margin of 8% is secured in each year.

Table 2-6 Annual Supply-Demand Balance Projection from F.Y.2016 to F.Y.2025
(Nationwide in August, 10^4kW at the Sending-end)

	F.Y.2016 [Aforementioned]	F.Y.2017	F.Y.2018	F.Y.2019	F.Y.2020
Peak Demand	15,766	15,817	15,910	16,008	16,095
Supply Capacity	17,868	17,647	17,878	17,755	18,005
Reserve Margin	13.3%	11.6%	12.4%	10.9%	11.9%
	F.Y.2021	F.Y.2022	F.Y.2023	F.Y.2024	F.Y.2025
Peak Demand	16,178	16,264	16,351	16,447	16,541
Supply Capacity	17,768	17,776	18,370	18,639	18,651
Reserve Margin	9.8%	9.3%	12.3%	13.3%	12.8%

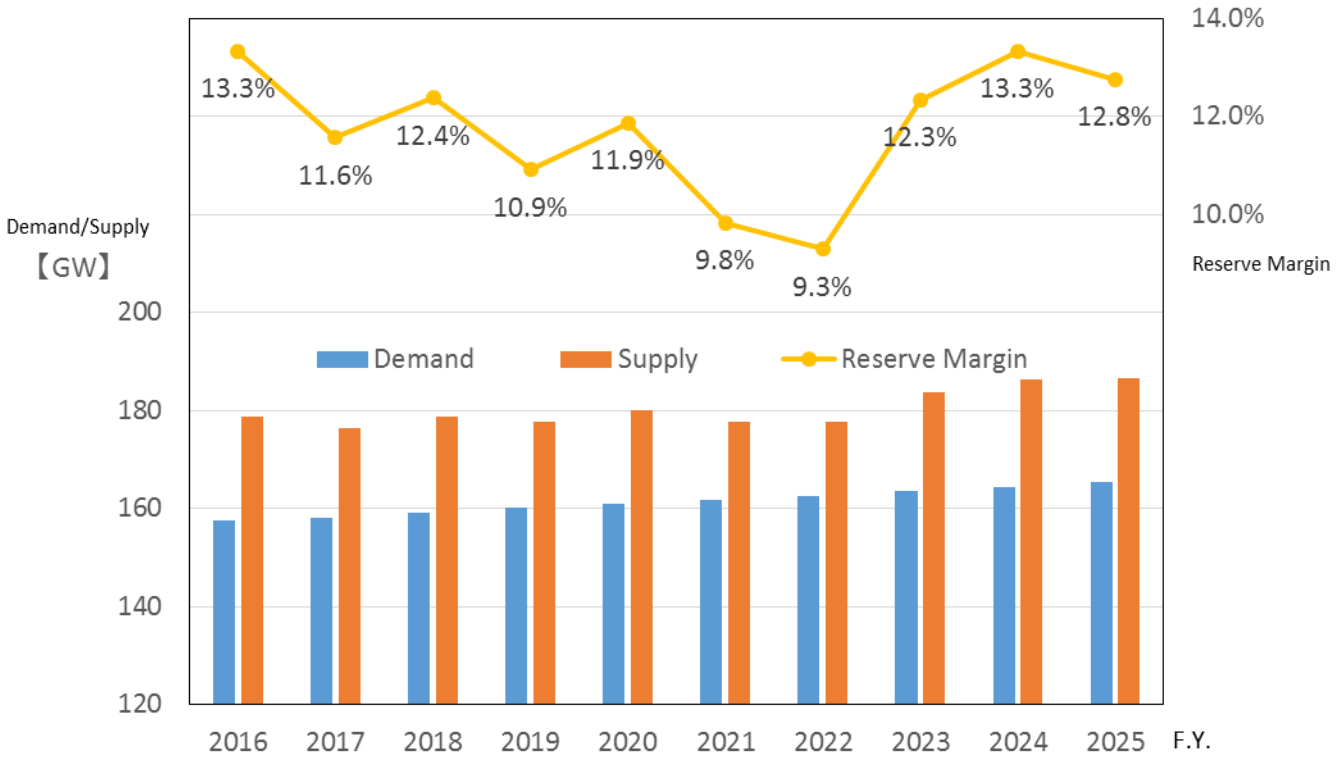

Figure 2-3 Annual Supply-Demand Balance Projection for mid- to long-term
(Nationwide in August, at the Sending-end)

Table 2-7 shows Annual Projection of Reserve Margin in each regional service area from F.Y.2016 to F.Y.2025. And Table 2-8 shows those recalculated with additional generating surplus (hereinafter, Additional Generating Surplus), captured at the Supply Plan by June 10, 2016, as the Supply Capacity not contributed[12] to calculate Reserve Margin for the year and area of under the Criteria. Further, Table 2-9 shows those recalculated with adding power exchange to the year and area of below 8% Reserve Margin even with Additional Generating Surplus from the areas of over 8% Reserve Margin based on Available Transfer Capability. After all the Evaluation implemented, Reserve Margin in Tokyo EPCO regional service area still shall fall below 8% in F.Y.2021 and F.Y.2022. Besides, all other areas shall clear the Reserve Margin of 8%.

At this aggregation of Electricity Supply Plans, the Organization has not captured newly developing facilities of Electric Power Companies without obligation to submit the Plans or of them with obligation of submission but not including the information. Even though those newly developing facilities are in various stage of development, there might be some facilities to be counted as future Supply Capacity.

In addition, capabilities of Interconnection Facilities between Hokkaido and Honshu (300MW) and between Tokyo and Chubu (900MW) to be enhanced hereafter, and counted as Transmission Margin for whole, the Organization shall review the management of them. Greater ATC in Cross-regional Interconnection Lines shall utilize Reserve Capacity over 8% level in other area to supply to Tokyo EPCO regional service area, the Organization shall search the possibility.

Thus stated above, in spite of some year and area shall experience the Reserve Margin below 8%, the stable supply of electricity shall not be immediately jeopardized. For there are reasons such as not capturing whole development plans of generation facilities, management of the capabilities of Cross-regional Interconnection Facilities to be enhanced hereafter is under review and further, Supply Capacities of Nuclear Power Plants are almost reported as "Unknown" (= zero). In consideration of above stated circumstances, the Organization shall continue to observe the Supply-Demand Balance closely.

[12] Aggregation of Supply-Demand Balance of regional service areas of General T/D Companies is based on the Electricity Supply Plans of Generation Companies or Retail Companies submitted by Apr. 28. Information from the Plans submitted after Apr. 29 shall not be included.

Table 2-7 Annual projection of Reserve Margin in each regional service area from F.Y.2016 to F.Y.2025
(Resource within own service area only, at the Sending-end)

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	21.4%	19.8%	35.2%	47.5%	45.6%	43.0%	41.3%	40.5%	49.8%	48.3%
Tohoku	14.1%	16.2%	14.8%	14.7%	16.2%	15.5%	15.3%	17.0%	16.9%	16.6%
Tokyo	9.8%	9.8%	11.2%	8.0%	8.4%	4.4%	2.2%	8.3%	10.6%	9.6%
50Hz areas Total	11.3%	11.6%	13.4%	11.7%	12.1%	8.9%	7.1%	11.9%	14.2%	13.3%
Chubu	12.3%	8.3%	8.2%	7.9%	8.5%	9.3%	7.2%	7.0%	6.7%	6.5%
Hokuriku	16.8%	13.0%	12.0%	12.7%	12.1%	11.5%	10.7%	10.1%	9.4%	8.7%
Kansai	12.1%	6.6%	9.6%	9.0%	7.1%	3.1%	7.7%	10.1%	10.3%	10.4%
Chugoku	19.2%	20.4%	21.4%	12.6%	17.8%	17.4%	17.2%	22.9%	22.6%	22.1%
Shikoku	13.1%	15.3%	14.4%	14.3%	14.8%	14.7%	12.1%	17.4%	17.5%	17.5%
Kyushu	17.5%	14.1%	8.7%	8.6%	16.5%	16.0%	15.7%	15.3%	14.9%	14.5%
60Hz areas Total	14.3%	11.0%	10.9%	9.6%	11.2%	10.0%	10.6%	12.2%	12.0%	11.8%
Interconnected	13.0%	11.2%	12.0%	10.5%	11.6%	9.5%	9.0%	12.1%	13.0%	12.5%
Okinawa	50.5%	47.1%	50.5%	53.8%	40.2%	43.9%	43.4%	43.3%	51.9%	41.3%
Nationwide	13.3%	11.6%	12.4%	10.9%	11.9%	9.8%	9.3%	12.3%	13.3%	12.8%

Below Criteria 8%

Note: Reserve Margin in Tokyo EPCO regional service area in F.Y.2019 is rounded up to 8.0%.

Table 2-8 Annual projection of Reserve Margin in each regional service area
(with Additional Generating Surplus, at the Sending-end)

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	21.4%	19.8%	35.2%	47.5%	45.8%	43.3%	41.6%	40.8%	50.0%	48.5%
Tohoku	14.1%	16.2%	15.2%	15.9%	17.3%	16.6%	16.5%	18.2%	18.0%	17.7%
Tokyo	9.8%	9.8%	12.1%	8.8%	9.2%	5.1%	2.8%	9.0%	11.2%	10.3%
50Hz areas Total	11.3%	11.6%	14.1%	12.5%	13.0%	9.6%	7.8%	12.7%	14.9%	14.0%
Chubu	12.3%	8.3%	8.2%	8.8%	10.2%	11.0%	8.8%	8.6%	8.4%	8.1%
Hokuriku	16.8%	13.0%	12.0%	12.7%	12.1%	11.5%	10.7%	10.1%	9.4%	9.6%
Kansai	13.3%	9.7%	12.7%	11.9%	9.6%	5.7%	10.3%	12.7%	12.8%	13.0%
Chugoku	19.2%	20.4%	21.4%	12.6%	17.8%	17.4%	17.2%	22.9%	22.6%	22.1%
Shikoku	13.1%	15.3%	14.4%	14.3%	14.8%	14.7%	12.1%	17.4%	17.5%	17.5%
Kyushu	17.5%	14.1%	8.7%	8.6%	16.5%	16.0%	15.7%	15.3%	14.9%	14.5%
60Hz areas Total	14.7%	11.9%	11.9%	10.7%	12.4%	11.3%	11.8%	13.4%	13.2%	13.1%
Interconnected	13.2%	11.8%	12.9%	11.5%	12.7%	10.5%	10.0%	13.1%	14.0%	13.5%
Okinawa	50.5%	47.1%	50.5%	53.8%	40.2%	43.9%	43.4%	43.3%	51.9%	41.3%
Nationwide	13.5%	12.1%	13.2%	11.9%	12.9%	10.8%	10.3%	13.3%	14.3%	13.8%

Below Criteria 8%

Improved above Criteria

Table 2-9 Annual projection of Reserve Margin in each regional service area
(with Additional Generating Surplus and power exchange through Cross-regional Interconnection Lines, at the Sending-end)

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	21.4%	19.8%	35.2%	47.5%	45.8%	41.0%	39.4%	40.8%	50.0%	48.5%
Tohoku	14.1%	16.2%	15.2%	15.9%	17.3%	8.0%	8.0%	18.2%	18.0%	17.7%
Tokyo	9.8%	9.8%	12.1%	8.8%	9.2%	7.4%	5.1%	9.0%	11.2%	10.3%
50Hz areas Total	11.3%	11.6%	14.1%	12.5%	13.0%	9.6%	7.8%	12.7%	14.9%	14.0%
Chubu	12.3%	8.3%	8.2%	8.8%	10.2%	11.0%	8.8%	8.6%	8.4%	8.1%
Hokuriku	16.8%	13.0%	12.0%	12.7%	12.1%	11.5%	10.7%	10.1%	9.4%	9.6%
Kansai	13.3%	9.7%	12.7%	11.9%	9.6%	8.0%	10.3%	12.7%	12.8%	13.0%
Chugoku	19.2%	20.4%	21.4%	12.6%	17.8%	11.7%	17.2%	22.9%	22.6%	22.1%
Shikoku	13.1%	15.3%	14.4%	14.3%	14.8%	14.7%	12.1%	17.4%	17.5%	17.5%
Kyushu	17.5%	14.1%	8.7%	8.6%	16.5%	16.0%	15.7%	15.3%	14.9%	14.5%
60Hz areas Total	14.7%	11.9%	11.9%	10.7%	12.4%	11.3%	11.8%	13.4%	13.2%	13.1%
Interconnected	13.2%	11.8%	12.9%	11.5%	12.7%	10.5%	10.0%	13.1%	14.0%	13.5%
Okinawa	50.5%	47.1%	50.5%	53.8%	40.2%	43.9%	43.4%	43.3%	51.9%	41.3%
Nationwide	13.5%	12.1%	13.2%	11.9%	12.9%	10.8%	10.3%	13.3%	14.3%	13.8%

Below Criteria 8%　Improved above Criteria　Contributors to improvement

Table 2-10 shows Annual projection of Reserve Margin against the interruption of the largest generating unit in Okinawa, indicating stable supply secured through the period.

Table 2-10 Annual projection of Reserve Margin against the interruption of the largest generating unit in Okinawa (at the Sending-end)

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Okinawa	34.1%	30.8%	34.3%	37.7%	24.2%	27.9%	27.6%	27.5%	36.2%	25.6%

Table 2-11 shows Annual projection of Reserve Margin in Winter peaking areas of Hokkaido and Tohoku. Table 2-12 shows those with Additional Generating Surplus, indicating stable supply secured through the period.

Table 2-11 Annual projection of Reserve Margin in Winter peaking areas of Hokkaido and Tohoku
(Resource within own service area only, January, at the Sending-end)

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	17.1%	14.2%	11.9%	23.0%	21.5%	19.0%	17.8%	26.2%	24.8%	23.6%
Tohoku	10.7%	9.5%	9.9%	9.0%	9.8%	8.5%	7.6%	9.0%	8.1%	7.2%

Below Criteria 8%

Table 2-12 Annual projection of Reserve Margin in Winter peaking areas of Hokkaido and Tohoku
(with Additional Generating Surplus, at the Sending-end)

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	17.1%	14.2%	11.9%	23.2%	21.8%	19.2%	18.0%	26.4%	25.1%	23.8%
Tohoku	10.7%	9.6%	10.2%	10.1%	10.9%	9.6%	8.7%	10.0%	9.1%	8.2%

Improved above Criteria

b. Supply Capacity secured by Retail Companies to their demand

Table 2-13 and Figure 2-4 shows Supply Capacity secured by Retail Companies to their demand for 10 years period from F.Y.2016 to F.Y.2025.

In mid- to long-terms especially, Retail Companies are planned their Supply Capacity as "Unspecified Procurement[13]" at this point.

Table 2-13 Supply Capacity secured by Retail Companies to their demand for 10 years period from F.Y.2016 to F.Y.2025(August, 10^4kW, at the Sending-end)

	F.Y.2016	F.Y.2017	F.Y.2018	F.Y.2019	F.Y.2020
Peak Demand Nationwide	15,766	15,817	15,910	16,008	16,095
Secured Supply Capacity	16,553	16,624	16,309	16,266	16,240
Ratio*	105.0%	105.1%	102.5%	101.6%	100.9%
	F.Y.2021	F.Y.2022	F.Y.2023	F.Y.2024	F.Y.2025
Peak Demand Nationwide	16,178	16,264	16,351	16,447	16,541
Secured Supply Capacity	16,058	16,134	16,072	15,961	15,970
Ratio*	99.37%	99.2%	98.3%	97.0%	96.6%

Note: * denotes the ratio of Peak Demand for Nationwide and secured Supply Capacity.

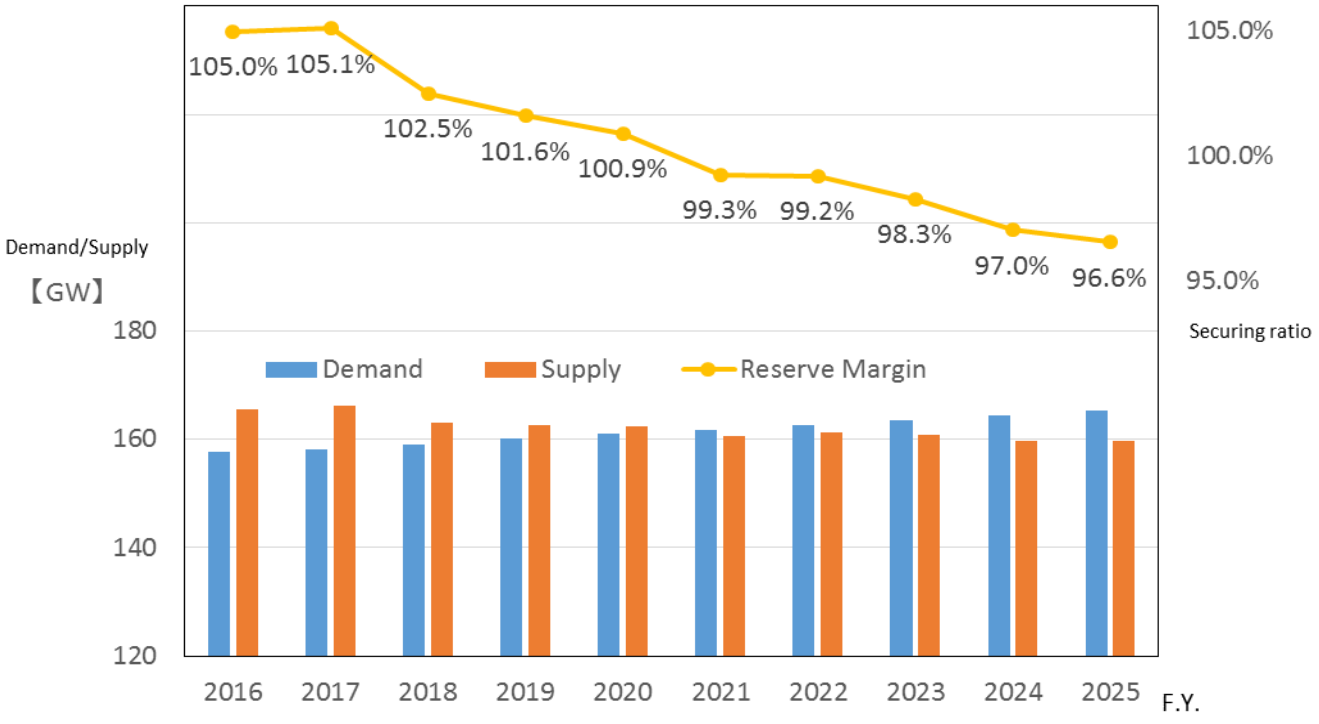

Figure 2-4 Supply Capacity secured by Retail Companies to their demand for 10 years period from F.Y.2016 to F.Y.2025(August, at the Sending-end)

[13] "Unspecified Procurement" means that Retail Companies plans to procure their future Supply Capacity by means of various procurement choice including procurement from the market, described in the Format of Electricity Supply Plan.

c. Supply Capacity secured by General Transmission and Distribution Companies

General Transmission and Distribution Companies secure their Supply Capacity for the demand of isolated islands respectively through the planning period, and also secure the Balancing Capacity equivalent to 6% over to their Peak Demand in their regional service areas for F.Y.2016. Balancing Capacity beyond F.Y.2017 shall be secured by the public solicitation.

3. Analysis on Transition of Generating Sources

(1) Transition of Generating Sources

In F.Y.2016, Electricity Supply Plan of whole Generation Companies could not be assembled, aggregation of Supply Plans for this year is comprised of identified generating sources those Retail Companies and General Transmission and Distribution Companies procured as well as Generating Surplus of Generation Companies which are reported in Supply Plans submitted by Apr. 28. Generating Surplus of Generation Companies reported in the Supply Plans submitted after Apr. 29 are not included in the aggregation.

The aggregation is based on categorization of identified generating sources procured by Retail Companies. Such as supply capacity with undefined procurement or unspecified generating sources is not shown on the table, thus this aggregation is not necessarily indicating the real composition of generating sources.

For Nuclear generation, even though its supply capacity reported as "Unknown", installed capacity is included to the aggregation which is equivalent to the procured capacity of Retail Company.

Table 3-1 and Figure 3-1 shows Transition of Installed Generating Capacities by generating sources. Figure 3-2 shows Transition of Installed Generating Capacities by its composition.

Table 3-1 Transition of Installed Generating Capacities by generating sources and its composition
(Nationwide, 10^4kW)

Generating Sources		F.Y.2016	F.Y.2020	F.Y.2025
Hydro		4,849 [16.4%]	4,836 [16.0%]	4,828 [15.1%]
	Conventional	2,110 [7.2%]	2,097 [6.9%]	2,088 [6.5%]
	Pumped Storage	2,739 [9.3%]	2,740 [9.1%]	2,740 [8.6%]
Thermal		15,624 [52.9%]	15,304 [50.5%]	16,017 [49.9%]
	Coal	4,178 [14.2%]	4,380 [14.5%]	5,060 [15.8%]
	LNG	7,812 [26.5%]	7,535 [24.9%]	7,709 [24.1%]
	Oil	3,350 [11.4%]	3,146 [10.4%]	3,005 [9.4%]
	Miscellaneous	285 [1.0%]	243 [0.8%]	243 [0.8%]
Nuclear		3,983 [13.5%]	3,555 [11.7%]	3,260 [10.2%]
Renewables		5,057 [17.1%]	6,629 [21.9%]	7,968 [24.9%]
	Wind	546 [1.9%]	486 [1.6%]	719 [2.2%]
	Solar	4,250 [14.4%]	5,945 [19.6%]	7,066 [22.1%]
	Miscellaneous	261 [0.9%]	197 [0.7%]	183 [0.6%]
Total		29,513 [100%]	30,325 [100%]	32,073 [100%]

For Thermal generation, Coal is projected to increase according to the development plan hereafter. LNG is in constant though some increase/decrease by replacement. Oil is projected to decrease by retirement. Solar shows large increase.

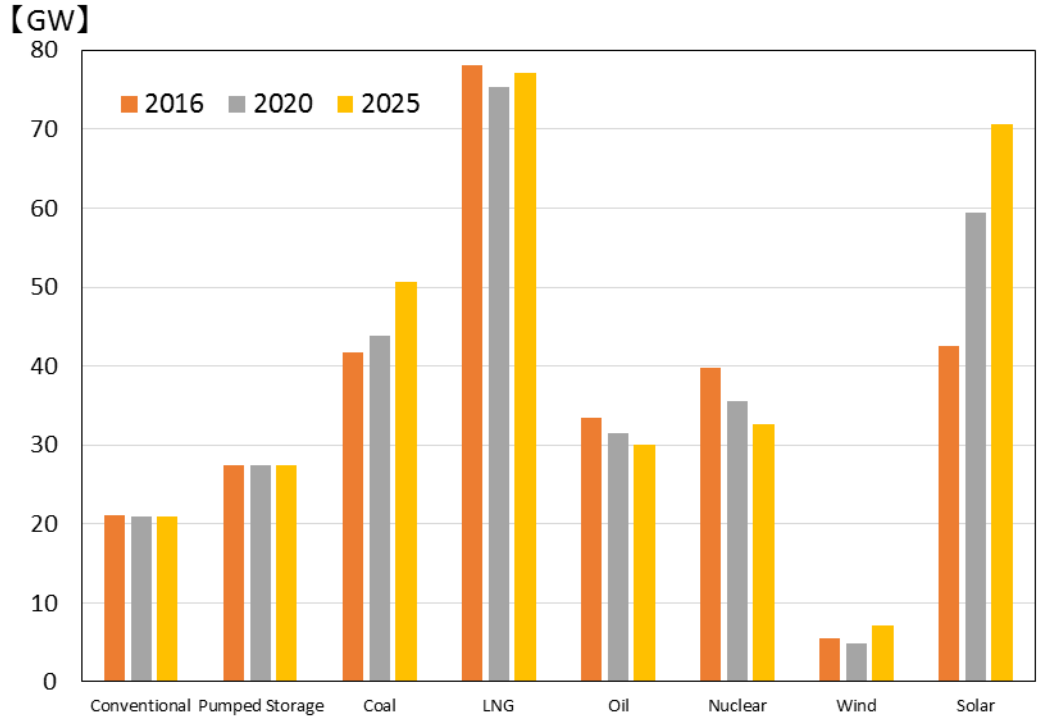

Figure 3-1 Transition of Installed Generating Capacities by generating sources

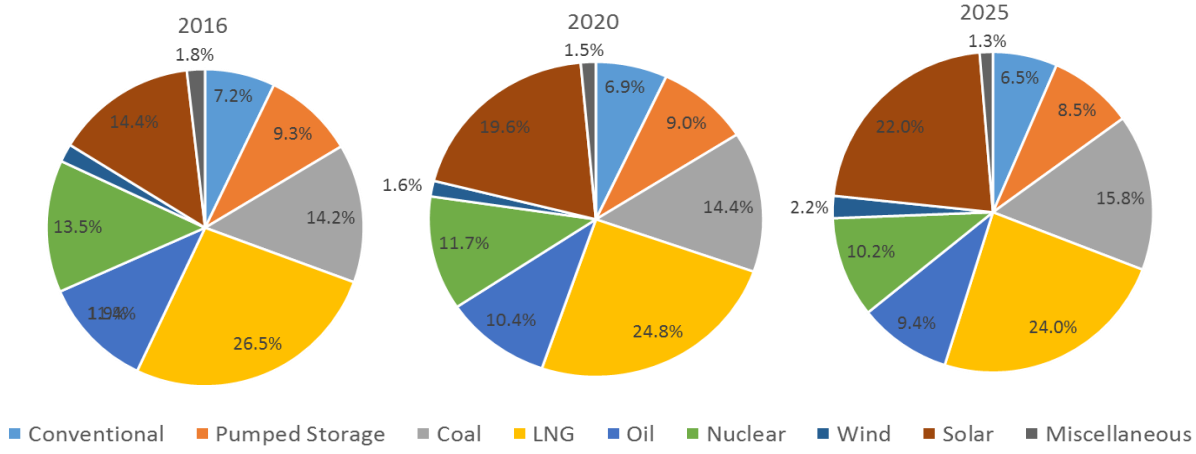

Figure 3-2 Transition of Installed Generating Capacities Composition by generating sources

(2) Transition of Gross Electric Energy Generation

Table 3-2 and Figure 3-3 shows Transition of Gross Electric Energy Generation by generating sources aggregating the reported values which Retail Companies submitted. Figure 3-4 shows Transition of Gross Electric Energy Generation by its composition. The aggregation is based on categorization of identified generating sources procured by Retail Companies. Such as electric energy generation from undefined procurement or unspecified generating sources are categorized to "Others". And for Nuclear generation, energy generation is calculated as zero for the capacity reported as "Unknown", however, change to the composition of Gross Electric Energy Generation may be expected according to operating condition of Nuclear Power Stations.

Table 3-2 Transition of Gross Electric Energy Generation by generating sources and its composition
(Nationwide, 10^8kWh at the Generating-end)

Generating Sources		F.Y.2016	F.Y.2020	F.Y.2025
Hydro		811 [8.7%]	839 [8.8%]	892 [9.1%]
	Conventional	757 [8.1%]	768 [8.1%]	763 [7.8%]
	Pumped Storage	54 [0.6%]	71 [0.7%]	129 [1.3%]
Thermal		7,522 [80.4%]	6,623 [69.4%]	6,344 [64.6%]
	Coal	2,805 [30.0%]	2,856 [29.9%]	3,135 [31.9%]
	LNG	4,013 [42.9%]	3,237 [33.9%]	2,809 [28.6%]
	Oil	561 [6.0%]	388 [4.1%]	266 [2.7%]
	Miscellaneous	142 [1.5%]	142 [1.5%]	134 [1.4%]
Nuclear		126 [1.4%]	129 [1.4%]	43 [0.4%]
Renewables		657 [7.0%]	934 [9.8%]	1,082 [11.0%]
	Wind	62 [0.7%]	91 [0.9%]	132 [1.3%]
	Solar	419 [4.5%]	658 [6.9%]	773 [7.9%]
	Miscellaneous	176 [1.9%]	185 [1.9%]	177 [1.8%]
Others[14]		238 [2.6%]	1,020 [10.7%]	1,461 [14.9%]
Total		9,355 [100%]	9,546 [100%]	9,822 [100%]

[14] Others include the balance between the equivalent Electric Energy Generation calculated from the Peak Demand(Nationwide, at the Sending-end) in regional service areas by the method instructed in the "Guidelines on Calculation of Demand and Supply for Supply-Demand Balance" (published by Agency for Natural Resources and Energy in March 2016) and Electric Energy Generation identified its generating sources of the Retail Companies.

For Thermal generation, Coal is projected to increase according to the development plan hereafter, “Others” is also projected to increase that includes supply capacity with undefined procurement in mid- to long-term by Retail Companies. Solar shows large increase due to greater integration for the projection period.

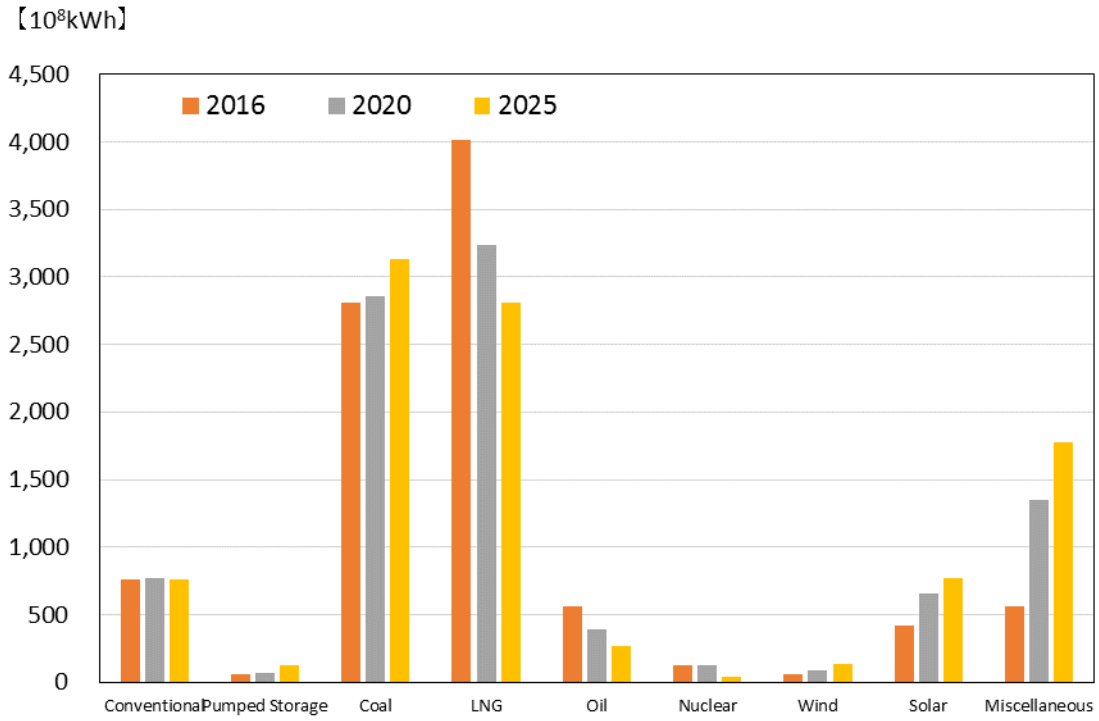

Figure 3-3 Transition of Electric Energy Generation by generating sources

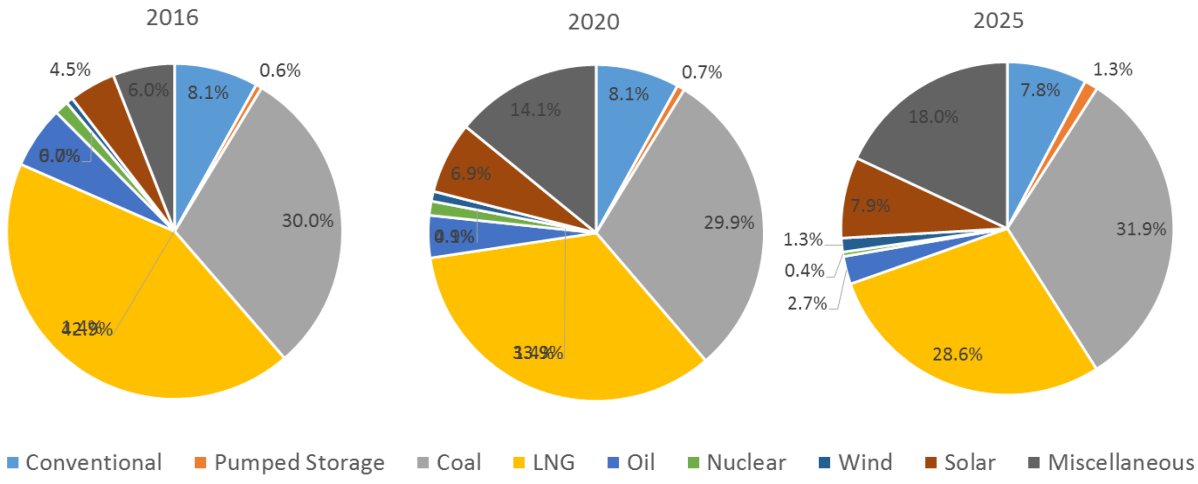

Figure 3-4 Transition of Electric Energy Generation Composition by generating sources

(3) Transition of Capacity Factor by generating sources

Table 3-3 and Figure 3-5 shows Capacity Factor by generating sources. The projection of Capacity Factor is calculated with aforementioned generating sources and gross electric energy generation by the Organization.

Besides, for Nuclear generation, Installed Generating Capacity is calculated with Supply Capacity reported “Unknown”, Capacity Factor is apparently lower, thus this projection is not necessarily indicate the real Capacity Factor of operating facilities.

Table 3-3 Capacity Factors by generating sources(Nationwide)

Generating Sources	F.Y.2016	F.Y.2020	F.Y.2025
Hydro	19.1%	19.8%	21.1%
Conventional	40.9%	41.8%	41.7%
Pumped Storage	2.3%	2.9%	5.4%
Thermal	55.0%	49.6%	45.4%
Coal	76.6%	74.4%	70.7%
LNG	58.6%	49.0%	41.6%
Oil	19.1%	14.1%	10.1%
Miscellaneous	-	-	-
Nuclear	3.6%	4.2%	1.5%
Renewables	14.8%	16.1%	15.5%
Wind	12.9%	21.3%	20.9%
Solar	11.3%	12.6%	12.5%
Miscellaneous	-	-	-
Others	-	-	-

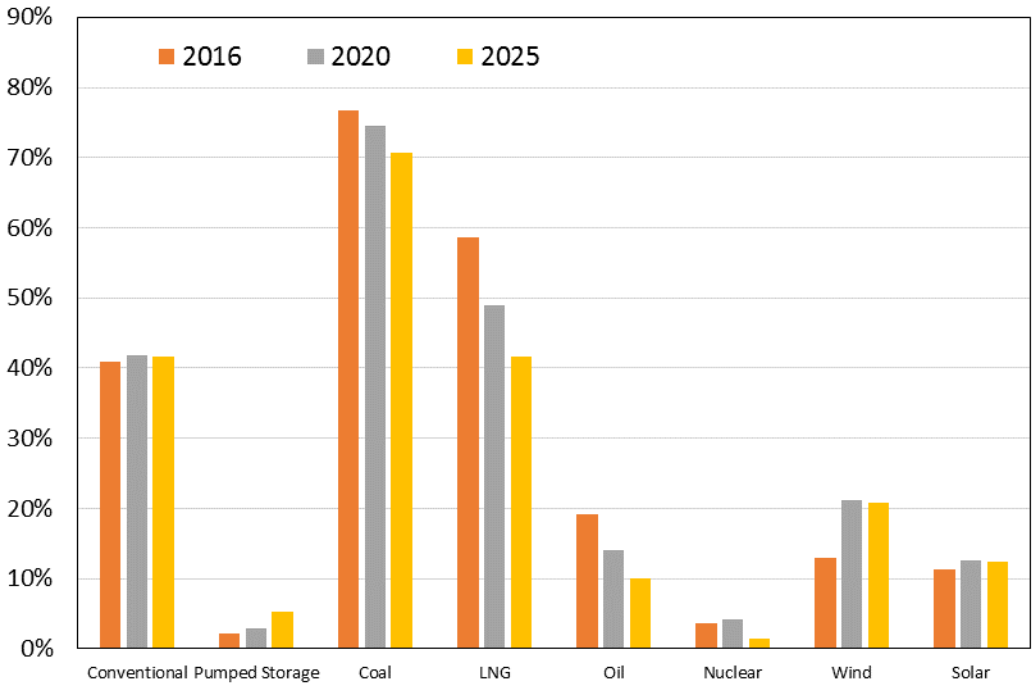

Figure 3-5 Capacity Factors by generating sources(Nationwide)

(4) Development plans by generating sources

Table 3-4, Table 3-5 and Table 3-6 shows the Development plans[15] up to F.Y.2025 submitted by Generation Companies, according to the new development, uprate/derate of installed facilities and retirement in the projected period, respectively.

Table 3-4 New Development Plan up to F.Y.2025 by stages(Nationwide, 10^4kW)

Generating Sources		Total		Under Construction		Planned	
		Capacity	Number	Capacity	Number	Capacity	Number
Hydro		**7.6**	**9**	**2.2**	**4**	**5.5**	**5**
	Conventional	7.6	9	2.2	4	5.5	5
	Pumped Storage	—	—	—	—	—	—
Thermal		**1,563.7**	**33**	**630.3**	**11**	**933.4**	**22**
	Coal	607.0	7	220.0	3	387.0	4
	LNG	952.5	11	410.3	7	542.2	4
	Oil, etc.	4.2	15	0.1	1	4.2	14
Nuclear		**1,018.0**	**7**	**414.1**	**3**	**603.9**	**4**
Renewables		**0.8**	**1**	**0.8**	**1**	**—**	**—**
	Wind	—	—	—	—	—	—
	Solar	0.8	1	0.8	1	—	—
	Miscellaneous	—	—	—	—	—	—
Total		**2,590.1**	**50**	**1,047.3**	**19**	**1,542.8**	**31**

Table 3-5 Uprate/Derate Plan of existing facilities up to F.Y.2025 by stages(Nationwide, 10^4kW)

Generating Sources		Total		Under Construction		Planned	
		Capacity	Number	Capacity	Number	Capacity	Number
Hydro		**3.5**	**22**	**3.0**	**16**	**0.5**	**6**
	Conventional	3.5	22	3.0	16	0.5	6
	Pumped Storage	—	—	—	—	—	—
Thermal		**39.4**	**6**	**39.4**	**6**	**—**	**—**
	Coal	3.8	1	3.8	1	—	—
	LNG	35.5	4	35.5	4	—	—
	Oil, etc.	0.0	1	0.0	1	—	—
Nuclear		**15.2**	**1**	**15.2**	**1**	**—**	**—**
Renewables		**△ 2.9**	**3**	**△ 3.5**	**1**	**0.6**	**2**
	Wind	—	—	—	—	—	—
	Solar	—	—	—	—	—	—
	Miscellaneous	△ 2.9	3	△ 3.5	1	0.6	2
Total		**55.2**	**32**	**54.0**	**24**	**1.1**	**8**

15 Aggregated with the facilities in which date of commercial operation is “Unknown”

Table 3-6 Retirement Plan of existing facilities up to F.Y.2025 (Nationwide, 10^4kW)

Generating Sources		Total	
		Capacity	Number
Hydro		**9.0**	**5**
	Conventional	9.0	5
	Pumped Storage	—	—
Thermal		**1,163.9**	**42**
	Coal	75.6	3
	LNG	702.5	4
	Oil, etc.	385.8	35
Nuclear		**56.6**	**1**
Renewables		**2.3**	**2**
	Wind	—	—
	Solar	0.8	1
	Miscellaneous	1.5	1
Total		**1,231.8**	**50**

4. Development Plans of Transmission and Distribution Facilities

The Organization has aggregated the Development Plans[16] of Cross-regional Transmission Lines and Substations(Transformers and AC/DC converters) up to F.Y.2025 submitted by General Transmission and Distribution Companies and Transmission Companies. Table 4 shows Development Plans of Cross-regional Transmission Lines and Substations. Figure 4 shows outlook of Electric Systems in Nationwide. Table 4-1, Table 4-2 and Table 4-3 shows the lists of Development Plans according to Cross-regional Transmission Lines, major Substations and their summarization, respectively.

Table 4 Development Plans of Cross-regional Transmission Lines and Substations

Increased length of Transmission Lines[17*18]		423km
	Overhead lines*	384km
	Underground lines	39km
Uprated capacities of Transformers		15,440MVA
Uprated capacities of AC/DC Converters[19]		1,200MW
Decreased length of Transmission Lines(retirement)		△ 72km
Derated capacities of Transformers(retirement)		△ 2,000MVA

16 Development Plans of transmission lines and substations are subject to submit for the voltage of 250kV over, or within 2 classes from the highest voltage in the regional service areas. (For Okinawa EPCO, only 132kV over is subjected.)
Total is not necessarily equal due to independent rounding.

17 Development Plans corresponding to change of line category or circuit numbers are not added up to increased length of transmission lines treated as no change for length.

18 Increased length doesn't include item with * due to undefined in-service date.

19 Installed capacity of converter station in one side is added up due to DC Transmission System.

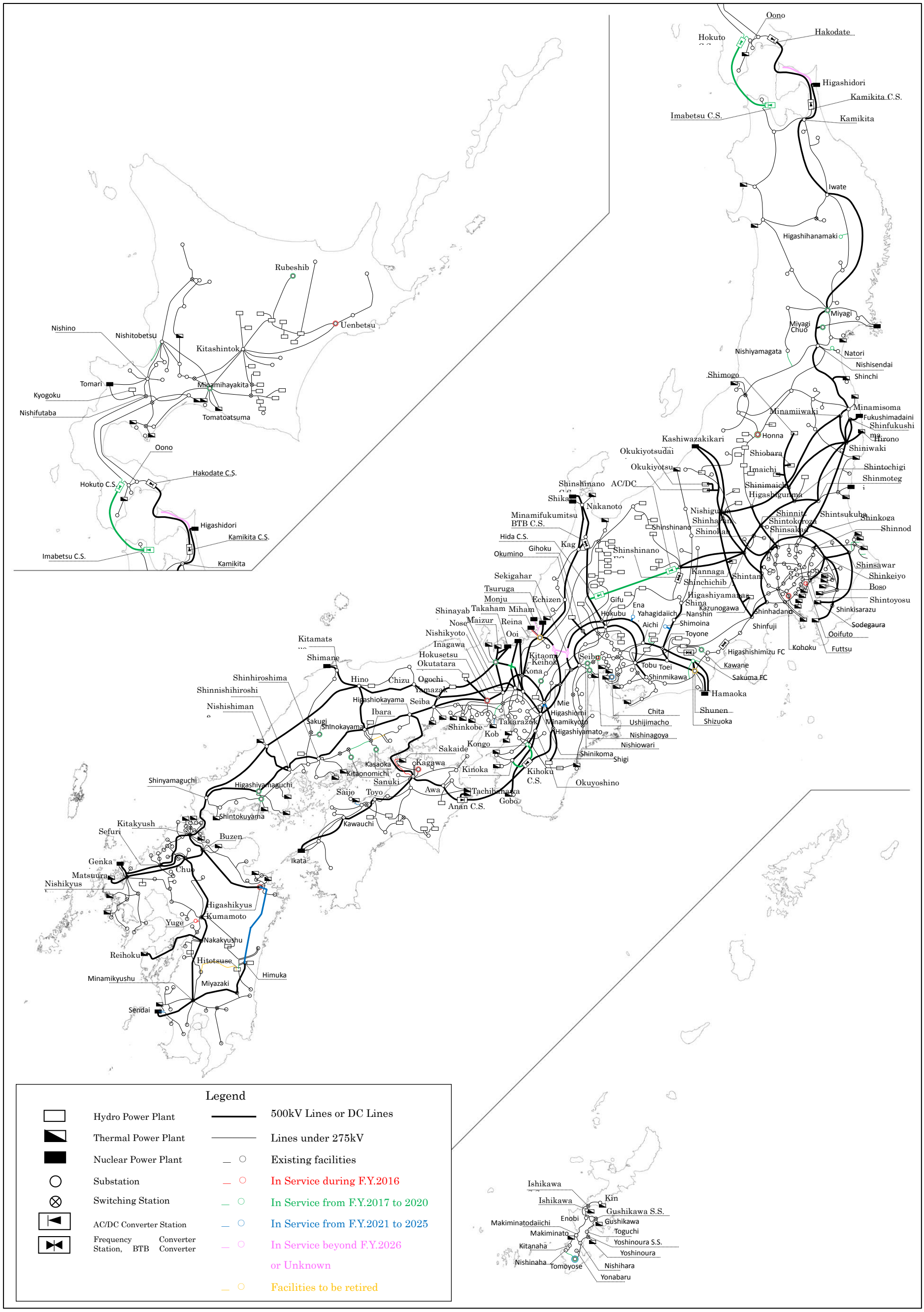

Figure 4 System Development Plan in Nationwide for the projection period

4-1 Development Plans of Major Transmissions

Table 4-1-1 List of Major Transmmission Lines Development under construction up to F.Y.2025

Company	Line	Voltage	Length[39,40]	Circuit	In-construction	In-service	Purpose[41]
Hokkaido EPCO	Ishikari Thermal Power Line	275kV	21km	2	Apr. 2015	Feb.2018	Generator connection
	Hokuto-Imabetsu DC Bulk Line	DC 250kV	97.5km 24.4km*1	SP1	Apr.2016	Mar.2019	Reliability upgrade*3
Tohoku EPCO	Higashi Hanamaki Branch Line	275kV	3.3km	2	Feb.2016	Oct.2017	Demand coverage
	Minami Yamagata Bulk Line	275kV	22.5km	2	Apr.2015	Jun.2018	Reliability upgrade
TEPCO Power Grid	Ooi Futo Line	275kV	0.1km*1	2	Nov.2014	Dec.2016	Generator connection
Chubu EPCO	Kaibe-Meijo Line (Ushijimacho Substation ıılead-in)	275kV	0.1km*1	2	Feb.2014	Jun.2016 Dec.2016	Demand coverage
	Shizuoka Higashi Branch Line	275kV	2km	2	Jul.2001	Oct.2019	Aging management Economic upgrade
	Shizuoka Nishi Branch Line	275kV	3km	2	Jul.2001	Oct.2019	Aging management Economic upgrade
Kansai EPCO	Mihama improvement	275kV	19.4km*2	2	Mar.2013	Jul.2016	Aging management
Chugoku EPCO	Hiroshima Higashi Bulk Line	220kV	33km*2	2	May 2015	Dec.2017	Demand coverage Generator connection
Kyushu EPCO	Yuge Branch Line	220kV	1km	2	Oct.2014	Jun.2016	Demand coverage Aging management
	Himuka-Hitotsuse Line	220kV	3km*2	1→2	Oct.2015	Feb.2018	Aging management Economic upgrade
	Hyuga Bulk Line	500kV	124km	2	Nov.2014	Jun.2022	Reliability upgrade Economic upgrade
Okinawa EPCO	Nishi Naha-Tomoyose Bulk Line	132kV	10km*1	2	Jun.2015	Oct.2017	Economic upgrade
EPDC	Ooma Bulk Line	500kV	61.2km	2	May 2006	Unknown	Generator connection

Table 4-1-2 List of Major Transmmission Lines Development planned up to F.Y.2025

Company	Line	Voltage	Length	Circuit	In-construction	In-service	Purpose
Hokkaido EPCO	Donan Bulk Line	275kV	0.3km	2	May 2016	Oct.2017	Reliability upgrade*3
	Hokuto Bulk Line	275kV	0.6km	2	May 2016	Oct.2017	Reliability upgrade*3
Tohoku EPCO	Customer line (AC/DC D ıılead-in)	275kV	2.2km	2	Aug.2016	Jun.2018	Reliability upgrade*3
	Customer line (Natori Substation D ıılead-in)	275kV	0.4km	2	Apr.2018	Jun.2019	Demand coverage
TEPCO Power Grid	G3060016 access line	275kV	0.6km	1	Jan.2017	Dec.2017	Generator connection
	G3060006 access line	275kV	5.6km	2	Jan.2017	Jan.2019	Generator connection
	Hida-Shinano DC Bulk Line	DC± 200kV	89km	BP1	Feb.2018	F.Y.2020	Reliability upgrade*3

Company	Line	Voltage	Length	Circuit	In-construction	In-service	Purpose
Chubu EPCO	Hida Branch Line	500kV	0.4km	2	F.Y.2019	F.Y.2020	Reliability upgrade*3
	Yahagi Daiichi Branch Line	275kV	4km	1	Apr.2019	Nov.2020	Aging management Economic upgrade
	Ena Branch Line	500kV	1km	2	Sep.2021	Oct.2024	Demand coverage
	Shimo Ina Branch Line	500kV	1km	2	Sep.2021	Oct.2024	Demand coverage
	Sekigahara-Kita Oomi Line	500kV	2km	2	Unknown	Unknown	Generator connection*3
	Sekigahara S.S.	500kV	—	6	Unknown	Unknown	Generator connection*3
	Miki Bulk Line/ Sekigahara Subs. ıılead-in	500kV	1km	2	Unknown	Unknown	Generator connection*3
Kansai EPCO	Izumi line/Kongo Sub. II lead in	500kV	0.1km	2	Oct.2016	Jun.2017	Economic upgrade Reliability upgrade
	Kongo Line uprated to 500kV	500kV	2.4km	2	Oct.2016	Dec.2017	Economic upgrade Reliability upgrade
	Ooi Bulk Line/ Shin Ayabe Line route change	500kV	1.9km	2	Feb.2019	Dec.2019	Economic upgrade
	Shin Kobe Line reinforcement	275kV	20.2km*2	2	Apr.2019	Mar.2020	Generator connection
	Kita Yamato Line/ Minami Kyoto Subs. Lead-in change	500kV	0.1km	2	Jun.2021	Dec.2021	Economic upgrade
	Kobe Ironworks/ Thermal Power Line	275kV	4.2km*1	2	Feb.2017	Feb.2022	Generator connection
	Tsuruga Line/North side improvement	275kV	9.3km*2	2	Beyond F.Y.2020	Beyond F.Y.2023	Aging management
	Kita Oomi S.S.	500kV	—	6	Unknown	Unknown	Generator connection*3
	Kita Oomi Line/ Kita Oomi S.S. ıılead-in	500kV	0.5km	2	Unknown	Unknown	Generator connection*3
Shikoku EPCO	Sanuki-Sakaide Line	187kV	4.6km*2	2	Aug.2016	Nov.2016	Aging management
	Saijo Thermal Power Line	187kV	6.5km*2	2	Feb.2020	May 2021	Generator connection
Kyushu EPCO	Shin Kagoshima Line/Sendai Nuclear II lead-in	220kV	5km*2	1→2	Aug.2020	Jul.2023	Economic upgrade

Table 4-1-3 Retirement Plans

Company	Line	Voltage	Length	Circuit	Retirement	Purpose
Chugoku EPCO	Okayama Bulk Line (in part)	220kV	▵11km	2	Dec.2016	Economic upgrade
Kyushu EPCO	Hitoyoshi Bulk Line	220kV	▵61km	1	Feb.2018	Aging management

[39] Length with *1 denotes “Underground”, otherwise, “Overhead”

[40] Length with *2 denotes change of line category or circuit numbers, not included in Table 4-1.

[41] Purpose is stated below, and with *3 indicates enforcement relating to Cross-regional Interconnection Lines.

Demand coverage	Relating to increase/decrease of demand
Generator connection	Relating to generator connection
Aging management	Relating to aging management of facilities (including proper update of facilities with evaluation of obsolence)
Reliability upgrade	Relating to improvement of reliability or security of stable supply
Economic upgrade	Relating to improvement of economies, such as reducing transmission loss, facility downsizing or upgrading stability of the system

4-2 Development Plans of Major Substations

Table 4-2-1 List of Major Substations Development under construction up to F.Y.2025

Company	Substation[42]	Voltage	Capacity	unit	In-construction	In-service	Purpose
Hokkaido EPCO	Uenbetsu	187/66kV	75MVA→ 100MVA	1→ 1	Apr.2016	Nov.2016	Aging management
	Hokuto Converter Station*4	—	300MW	—	Mar.2015	Mar.2019	Reliability upgrade*3
	Imabetsu Converter Stattion*4	—	300MW	—	Mar.2016	Mar.2019	Reliability upgrade*3
Tohoku EPCO	Honna	275/154kV	120MVA×2→ 150MVA	2→ 1	Aug.2015	Sep.2016	Aging management Economic upgrade
	Higashi Hanamaki*4	275/154kV	300MVA×2	2	Mar.2015	Oct.2017	Demand coverage
	Miyagi Chuo	500/275kV	1,000MVA	1	Feb.2016	Nov.2018	Economic upgrade
TEPCO Power Grid	Ooi Futo*4	275/154kV	300MVA×3	3	Nov.2014	Jan.2017	Generator connection
	Kohoku	275/154kV	450MVA	1	Oct.2015	Mar.2017	Generator connection
	Shin Shinano AC/DC Convrter Station*4	—	900MW	-	Feb.2016	F.Y.2020	Reliability upgrade*3
	Ushijimacho*4	275/77kV	300MVA×2	2	Dec.2015	Jan.2017	Demand coverage
Chubu EPCO	Kawane	275/154kV	200MVA×2 →300MVA×2	2→ 2	Aug.2015	Apr.2017	Aging management
	Ushijimacho	154/33kV→ 275/33kV	150MVA×2	2→ 2	Dec.2015	May 2017	Economic upgrade
	Nishi Nagoya	275/154kV	450MVA	1	Apr. 2011	Jun.2018	Economic upgrade
	Shizuoka*4	500/275kV	1000MVA	1	Aug.2001	Oct.2019	Aging management Economic upgrade
Kansai EPCO	Hokusetsu	500/275kV	1000MVA	1	Mar.2015	Oct.2016	Economic upgrade
	Kongo*4	500/275kV	1,000MVA×2	2	Jun.2014	Apr.2017	Economic upgrade Reliability upgrade
Shikoku EPCO	Kagawa	187/66kV	120MVA→ 150MVA	1→ 1	Sep.2015	Jun.2016	Aging management
Kyushu EPCO	Higashi Kyushu	500/220kV	1,500MVA	1	Sep.2014	Jun.2016	Generator connection
	Yuge*4	110/66kV→ 220/110/66 kV	90MVA +60MVA →300MVA	2→ 1	Sep.2011	Jun.2016	Demand coverage Aging management

Table 4-2-2 List of Major Substations Development planned up to F.Y.2025

Company	Substation	Voltage	Capacity[43]	unit	In-construction	In-service	Purpose
Hokkaido EPCO	Rubeshibe	187/66kV	60MVA→ 100MVA	1→ 1	Jun.2017	Jul.2018	Aging management
	Minami Hayakita	187/66kV	200MVA	1	Jan.2018	Sep.2018	Generator connection
	Uenbetsu	187/66kV	75MVA→ 100MVA	1→ 1	Jan.2018	Nov.2018	Aging management
	Rubeshibe	187/66kV	60MVA×2 →100MVA	2→ 1	Mar.2019	Oct.2019	Aging management
Tohoku EPCO	Honna	275/154kV	120MVA→ 150MVA	1→ 1	Aug.2017	Aug.2018	Aging management
	Miyagi (Phase Shifter)	—	850MVA×2 *5	2	Jul.2016	Dec.2018	Economic upgrade
	Natori*4	275/154kV	450MVA×2	2	Feb.2017	Jun.2019	Demand coverage
Chubu EPCO	Nishi Owari	275/154kV	450MVA×2 →500MVA×2	2→2	Jul.2016	Apr.2017	Aging management
	Hida Converter Station*4	—	900MW	—	F.Y.2017	F.Y.2020	Reliability upgrade*3
	Chita Thermal Power	275/154kV	300MVA×1 →450MVA×1	1→1	Nov.2018	Apr.2021	Aging management
	Chita Thermal Power	275/154kV	450MVA×2	2	Dec.2018	Aug.2021	Generator connection
	Ena*4	500/154kV	200MVA×2	2	Apr.2021	Oct.2024	Demand coverage
	Shimo Ina*4	500/154kV	300MVA×2	2	Apr.2021	Oct.2024	Demand coverage
Kansai EPCO	Shin Ayabe	275/77kV	200MVA→ 300MVA	1→1	Apr.2018	Dec.2018	Aging management
	Konan	275/77kV	300MVA→ 200MVA	1→1	Nov.2018	Jun.2019	Aging management
Chugoku EPCO	Kita Onomichi	220/110kV	300MVA	1	Sep.2016	Dec.2017	Demand coverage Generator connection
	Higashi Yamaguchi	500/220kV	1,000MVA	1	Dec.2016	Apr.2019	Demand coverage Generator connection
	Shin Tokuyama	220/110kV	150MVA→ 300MVA	1→1	Jun.2018	Apr.2019	Aging management Generator connection
	Kasaoka	220/110kV	250MVA→ 300MVA	1→1	Aug.2018	Jun.2019	Aging management
	Sakugi	220/110kV	200MVA	1	Jun.2019	Apr.2020	Generator connection
Okinawa EPCO	Tomoyose	132/66kV	125MVA×2 →200MVA×2	2→2	Oct.2017	Jun.2020 Oct.2023	Aging management

Table 4-2-3 Retirement Plans

Company	Substation	Voltage	Capacity	unit	Retirement	Purpose
Chubu EPCO	Shunen	500/275kV	▵1,000MVA	▵1	Oct.2019	Aging management
Kansai EPCO	Reinan	500/275kV	▵1,000MVA	▵1	Oct.2016	Aging management

[42] Substation with *4 denotes substation or converter station installed anew, including uprated electric facility.
[43] Capacity with *5 denotes installation of Phase Shifter, not included in Table 4-2 for its capacity.

4-3 Summarized Development Plans of Transmission Lines and Substations

Table 4-3-1, Table 4-3-2 and Table 4-3-3 shows summarized Development or Extension Plans of Major Transmission Lines and Substations (Transformers and Converter Stations) up to F.Y.2025 submitted by General Transmission and Distribution Companies and Transmission Companies.

Table 4-3-1 Development Plans of Major Transmission Lines

Segment	Voltage	Lines	Length[25]	Extended Length[26]	Total Lengh	Total Extended Length
Newly Installed or Extended	500kV	Overhead	131 km*[27]	262 km*	131 km*	262 km*
		Underground	0 km	0 km		
	275kV	Overhead	66 km	126 km	70 km	135 km
		Underground	4 km	9 km		
	220kV	Overhead	1 km	2 km	1 km	2 km
		Underground	0 km	0 km		
	187kV	Overhead	0 km	0 km	0 km	0 km
		Underground	0 km	0 km		
	132kV	Overhead	0 km	0 km	10 km	20 km
		Underground	10 km	20 km		
	DC	Overhead	187 km	187 km	211 km	211 km
		Underground	24 km	24 km		
	Total	Overhead	384 km	577 km	423 km	630 km
		Underground	39 km	53 km		
Retirement	220kV	Overhead	△ 72 km	△ 83 km	△ 72 km	△ 83 km
		Underground	0 km	0 km		

Table 4-3-2 Revised plans of line category and circuit numbers[28]

Voltage	Length Extended	Total Extended Length
500kV	0 km	0 km
275kV	49 km	98 km
220kV	41 km	82 km
187kV	11 km	22 km
132kV	0 km	0 km
DC	0 km	0 km
Total	101 km	202 km

[25] Length denotes both increased length for newly installed or extended plan, and decreased length for retirement. Development Plans corresponding to change of line category or circuit numbers are not added up to increased length of transmission lines in Table 4-3-1 treated as no change for length. Besides, Total is not necessarily equal due to independent rounding.

[26] Total Length denotes aggregation of Length multiplied by numbers of circuits. Development Plans corresponding to change of line category or circuit numbers are not added up to increased length of transmission lines in Table 4-3-1 treated as no change for length.

[27] Length with * includes undefined in-service date and are not added up to Length and Extended Length.

[28] Table 4-3-2 aggregates Length Extended and Total Extended Length of corresponding to revised plans of line category and circuit numbers.

Table 4-3-3 Development Plans of Major Substations

Segment[29]	Voltage[30]	Increased Numbers	Increased Capacity
Newly Installed or Extended	500kV	11 [7]	8,500 MVA [4,000MVA]
	275kV	14 [11]	5,490 MVA [3,300MVA]
	220kV	3 [1]	1,000 MVA [300MVA]
	187kV	0 [0]	300 MVA [0MVA]
	132kV	0 [0]	150 MVA [0MVA]
	Total	28 [19]	15,440 MVA [7,600MVA]
Retirement	500kV	△ 2	△ 2,000 MVA
	275kV	0	0 MVA
	220kV	0	0 MVA
	187kV	0	0 MVA
	132kV	0	0 MVA
	Total	△ 2	△ 2,000 MVA

[ ] : Aforementioning increased transformers according to new installation of Substation(which include revised voltage class of the highest in the existed Substations)

Table 4-3-4 Development Plans of AC/DC Converter Stations

Segment	Company and Number of Site	Capacity[31]
Newly Installed or Extended	Hokkaido EPCO 2	300MW each
	TEPCO Power Grid 1	900MW
	Chubu EPCO 1	900MW

[29] Retirement plans with transformer installations are included in Newly Installed or Extended and negative figures are added up in increased numbers or increased capacity.

[30] Voltage class by Upstream voltage

[31] Installed capacity of converter stations in both side of the DC lines are added up.

5. Cross-regional Operation

(1) Transition of Cross-regional transaction

Retail Companies shall procure supply capacity for their customers in their regional service areas. Scheduled procurement from external service areas at15:00 August 2016 is developed into 4 figures. Figure 5-1shows ratio of supply capacity and Figure 5-2 shows supply capacity, respectively. Also Figure 5-3 shows ratio of energy supply and Figure 5-4 shows energy supply, respectively.

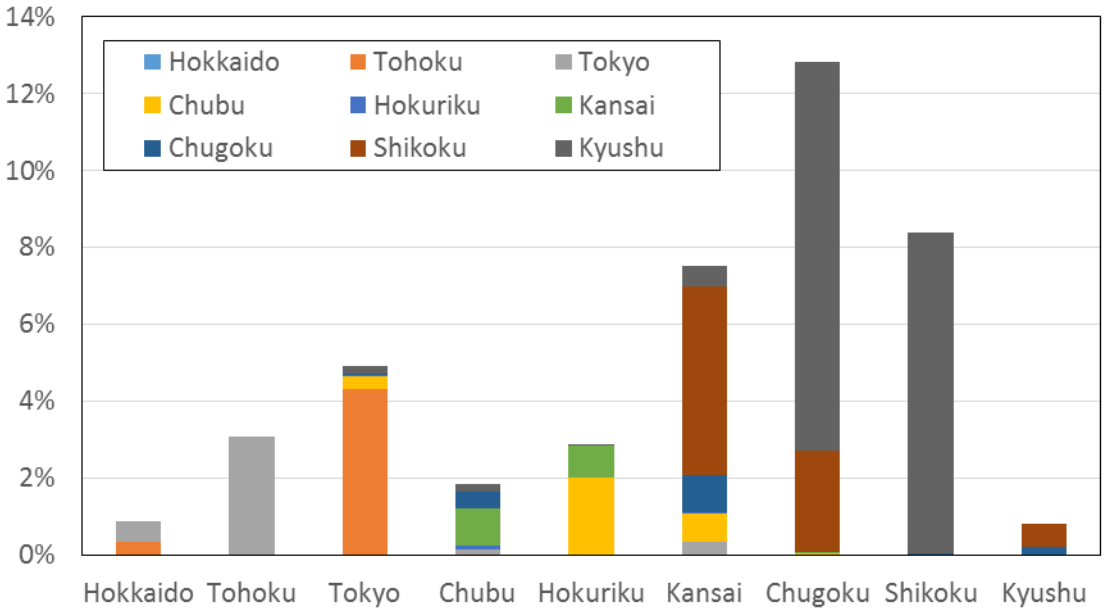

Figure 5-1 Ratio of Supply Capacity scheduled procuring from external regional service areas

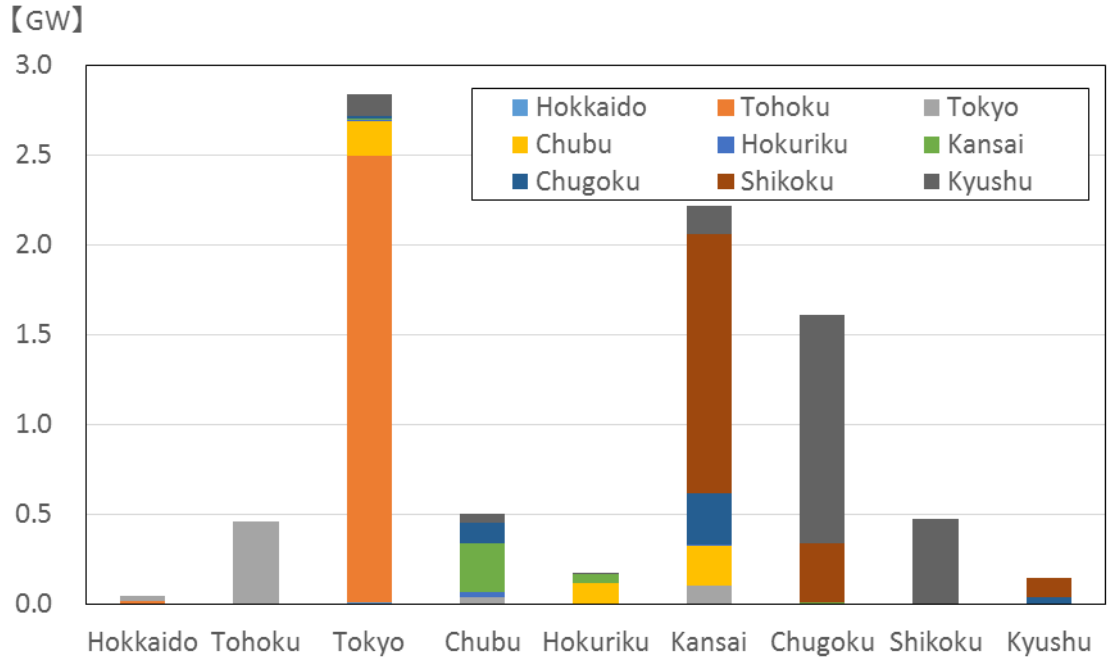

Figure 5-2 Supply Capacity scheduled procuring from external regional service areas

Figure 5-1 and 5-3 indicate that higher ratio for procurement from external regional service areas are observed in Chugoku, Shikoku and Kansai EPCO areas in both supply capacity and energy supply. And Figure 5-2 and 5-4 indicate that more capacity and energy are transmitted to other areas from Tohoku, Shikoku and Kyushu EPCO areas.

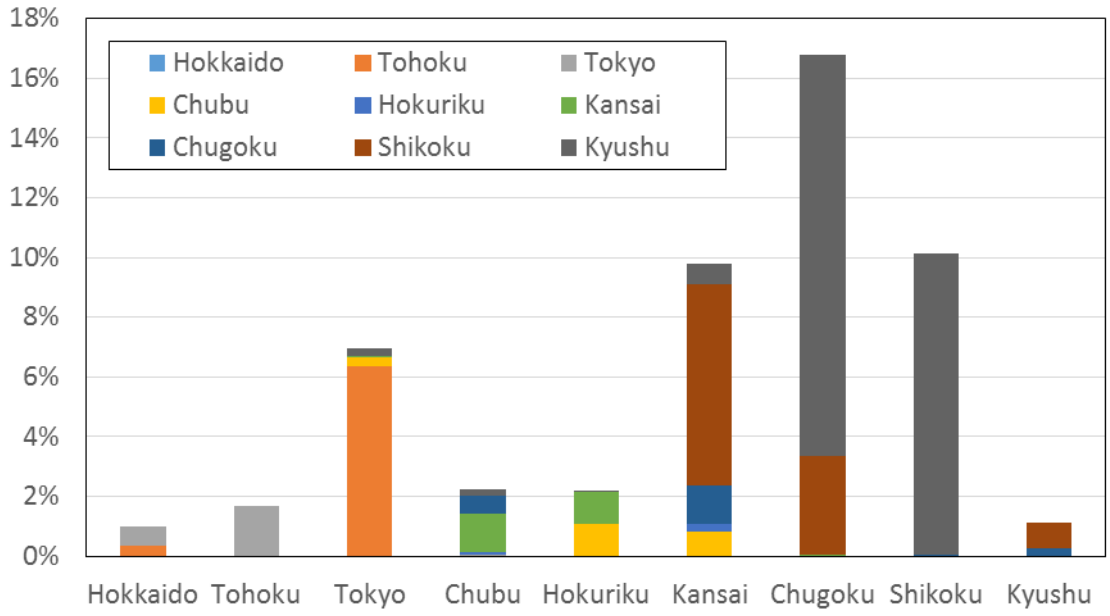

Figure 5-3 Ratio of Energy Supply scheduled procuring from external regional service areas

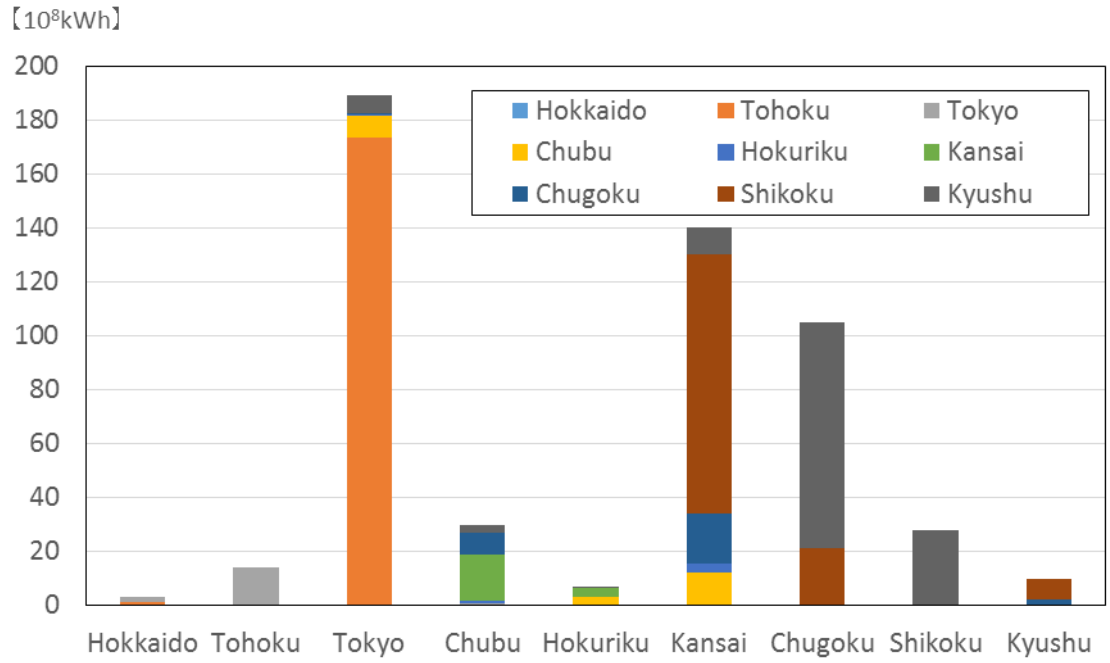

Figure 5-4 Energy Supply scheduled procuring from external regional service areas

(2) Scheduled Power Flow across the region

Figure 5-5 shows Scheduled Power Flow[32] (at 15:00, in August) across the region submitted by General Transmission and Distribution Companies.

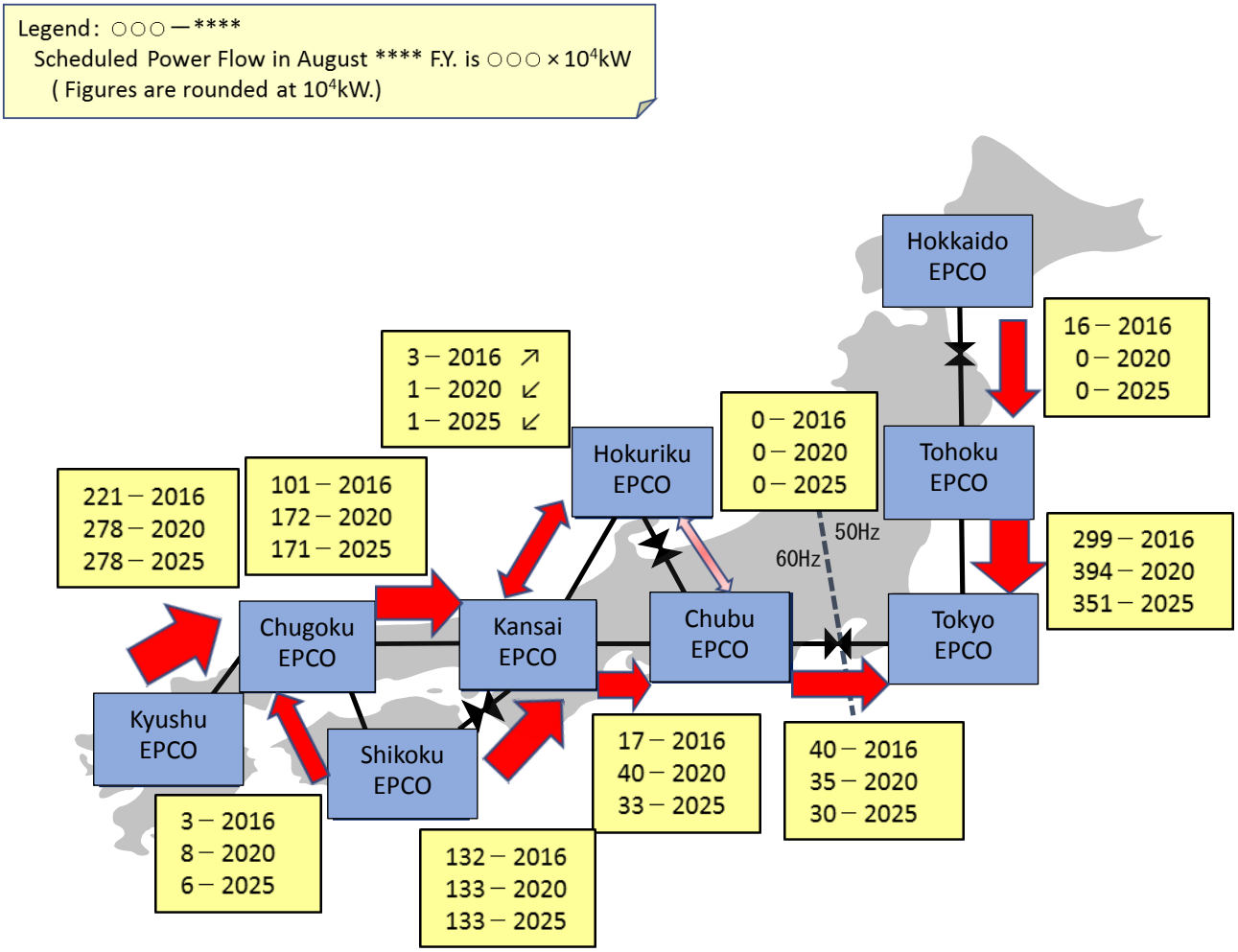

Figure 5-5 Scheduled Power Flow across the region for the projection period

[32] Scheduled Power Flows from the Nuclear Power with unknown supply capacity treated as zero are not included.

6. Characteristics Analysis of Retail Companies

(1) Distribution of Retail Companies by Business Scale (Retail Demand)

There are 276 Retail Companies which submitted Electricity Supply Plan, and they have been classified by business scale of retail demand that corresponding companies forecast. Figure 6-1 shows distribution by business scale and Figure 6-2 shows distribution by retail demand that corresponding companies forecast. Rather small Retail Companies forecast greater retail demand.

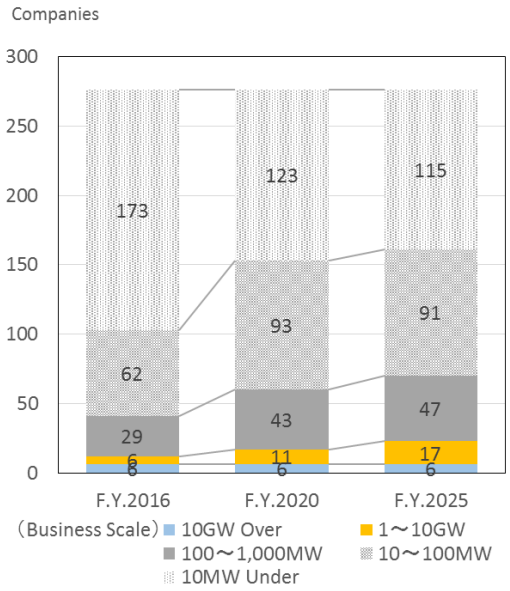

Figure 6-1 Distribution by business scale of retail demand

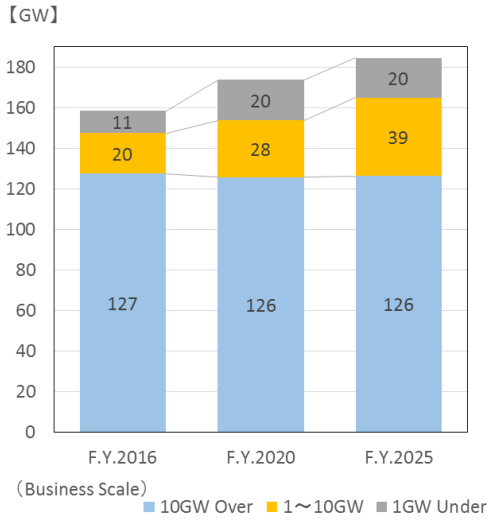

Figure 6-2 Distribution by accumulated retail demand

Similarly, Retail Companies are classified by business scale of retail energy sales that corresponding companies forecast. Figure 6-3 shows distribution by business scale of energy sales and Figure 6-4 shows those accumlated by retail energy sales that corresponding companies forecast.

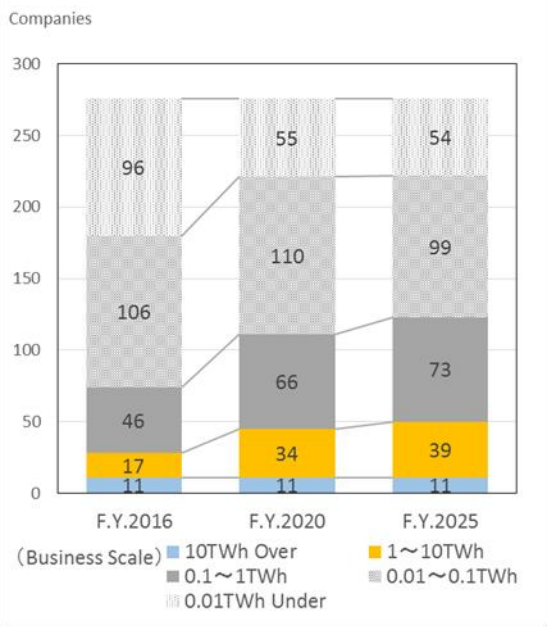

Figure 6-3 Distribution by business scale of energy sales

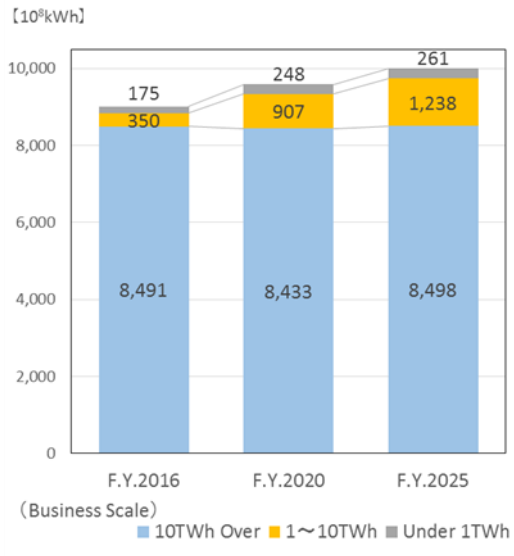

Figure 6-4 Distribution by accumulated energy sales

(2) Business Areas of Retail Companies

Figure 6-5 shows the ratio of Retail Companies by the numbers of areas planning their business and Figure 6-6 shows the numbers of Retail Companies by the business planning areas in F.Y.2016, respectively. Half of Retail Companies plan their business in single area.

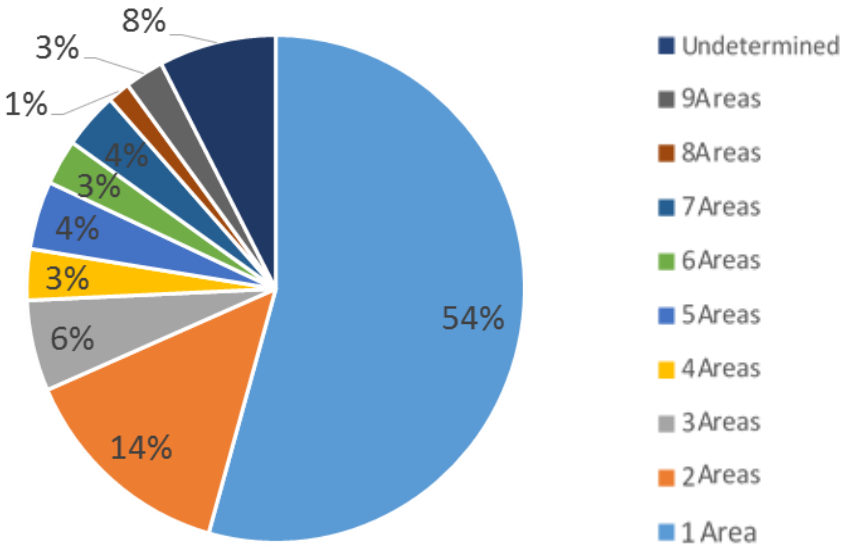

Figure 6-5 Ratio of Retail Companies by the numbers of areas planning their business in F.Y.2016

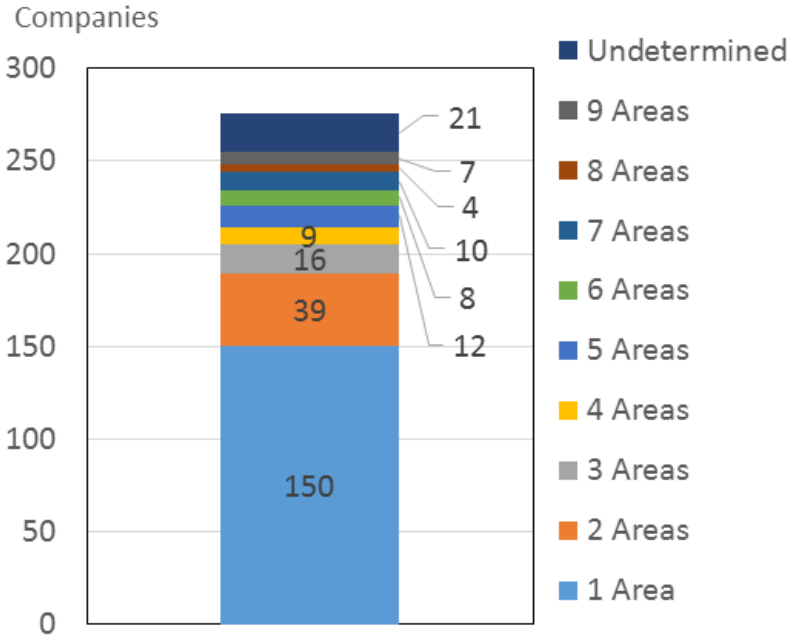

Figure 6-6 Numbers of Retail Companies by the business planning areas in F.Y.2016

Figure 6-7 shows the number and retail demand of Retail Companies in each regional service areas of General Transmission and Distribution Companies in F.Y.2016.

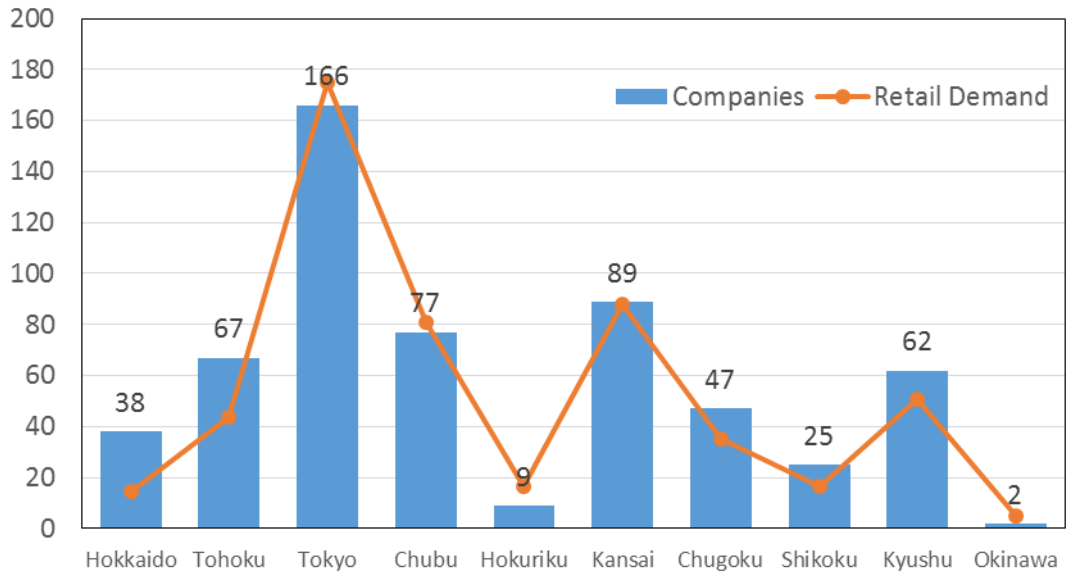

Figure 6-7 Number and retail demand of Retail Companies in each regional service areas

(3) Supply Capacity Procurement by Retail Companies

Figure 6-8 and Figure 6-9 show Supply Capacity contractually procured and the ratio to their forecasted retail demand by business scale of Retail Companies, respectively.

Both figures indicate that small and middle sized Retail Companies plan their mid- to long-term supply capacity as “undetermined”.

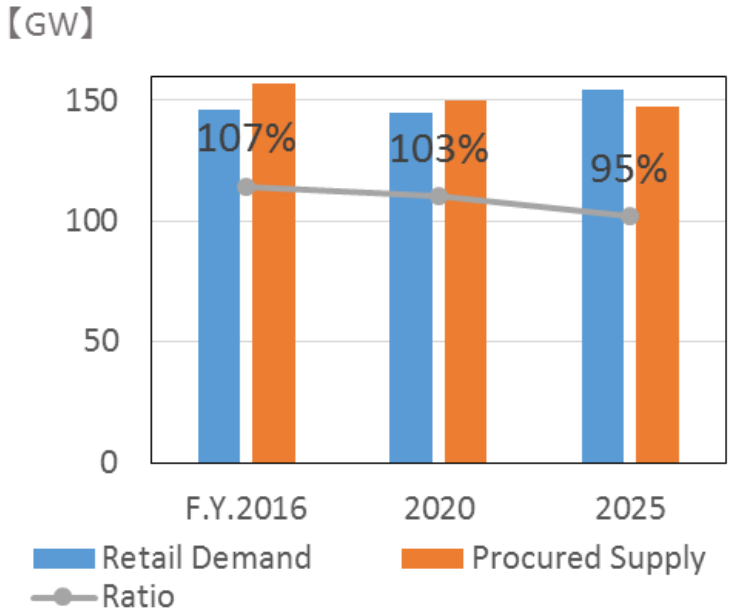

Figure 6-8 Supply Capacity contractually procured and the ratio to their forecasted retail demand
(Retail peak demand 2GW and Over aggregated)

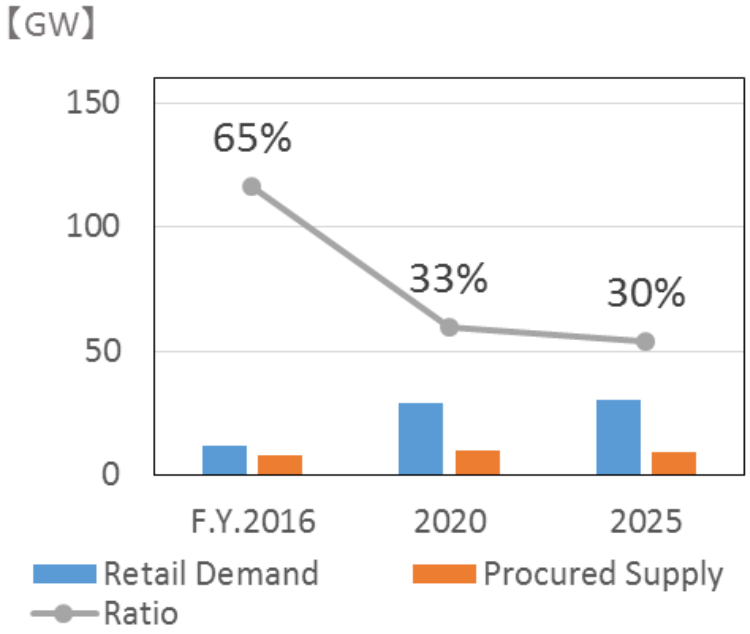

Figure 6-9 Supply Capacity contractually procured and the ratio to their forecasted retail demand
(Retail peak demand 2GW Under aggregated)

(4) Contracts of Interruptible Demand at the power shortage

Figure 6-10 shows the transition of Interruptible Demand Contract at the power shortage assured in Electricity Supply Plan of F.Y.2016.

There are about 3.5GW of contracted interruptible demand in Nationwide in F.Y.2016, however, beyond F.Y.2017, prospects of contracts are uncertain and most of them are not in aggregation at this point.

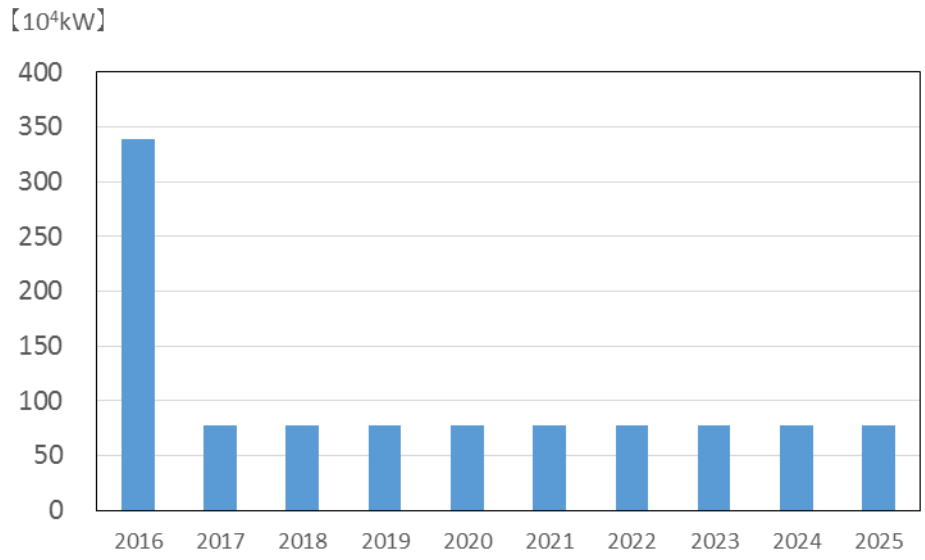

Figure 6-10 Transition of Interruptible Demand Contract at the power shortage

7. Uncertainties and Recent Challenges

Uncertainties and Recent Challenges in Aggregation of Electricity Supply Plan are as below.

(1) Uncertainties in Aggregation Method of Electricity Supply Plan

①Unreported Supply Capacity of Generation Companies with/without business license

Newly developed generators by Generation Companies without business licenses[33] who are not obliged to submit Electricity Supply Plan, or those by Generation Companies with business licenses not reported[34] in their Electricity Supply Plan are difficult to capture as supply capacity. According to media information, newly developed generators unreported in Electricity Supply Plan include those rated 100MW over in capacity numerously. These unreported generator must be included as supply capacity and evaluated as well as supply capacity reported in Electricity Supply Plan.

②Uncertainties in Power Development Plan

According to reporting rules of Electiricity Supply Plan, supply capacity is added up for reported figures in the Plan and unreported figures are not included. Rules of aggregating supply capacity shall be needed to evaluate the uncertainty of power development plan in scenario method under the circumstance in various parties concerned.

(2) Recent Challenges in Aggregation of Electricity Supply Plan

①Effectiveness in Procuring Supply Capacity of Retail Companies

Aggregation of Electricity Supply Plan in F.Y.2016 indicates that many Retail Companies plan their supply capacity of mid- to long-term “undetermined”. This “undetermined” supply capacity will be turned into “determined” as Retail Companies who do not have assured long-term supply capacity for bi-lateral contract at this time are likely to procure their supply capacity through the transaction at the JEPX or newly agreed bilateral contract in future.

It is forecasted that generation facilities will be switched from aged thermal power plant to reoperation of nuclear power plant or newly integrated generation facilities. However, Generation Companies can not have corroboration that their generation facility shall be operated as expected without long-term bilateral contract with Retail Companies. As a result, new development or switch of generation facilities are not likely to proceed as planned, and insufficient supply capacity procured in the market to the demand will be concerned.

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[33] Notification of Generation Company shall be required before commencement of the business, Electric Power Company who is preparing power development is not necessarily a Generation Company and has no obligation to submit Electricity Supply Plan.

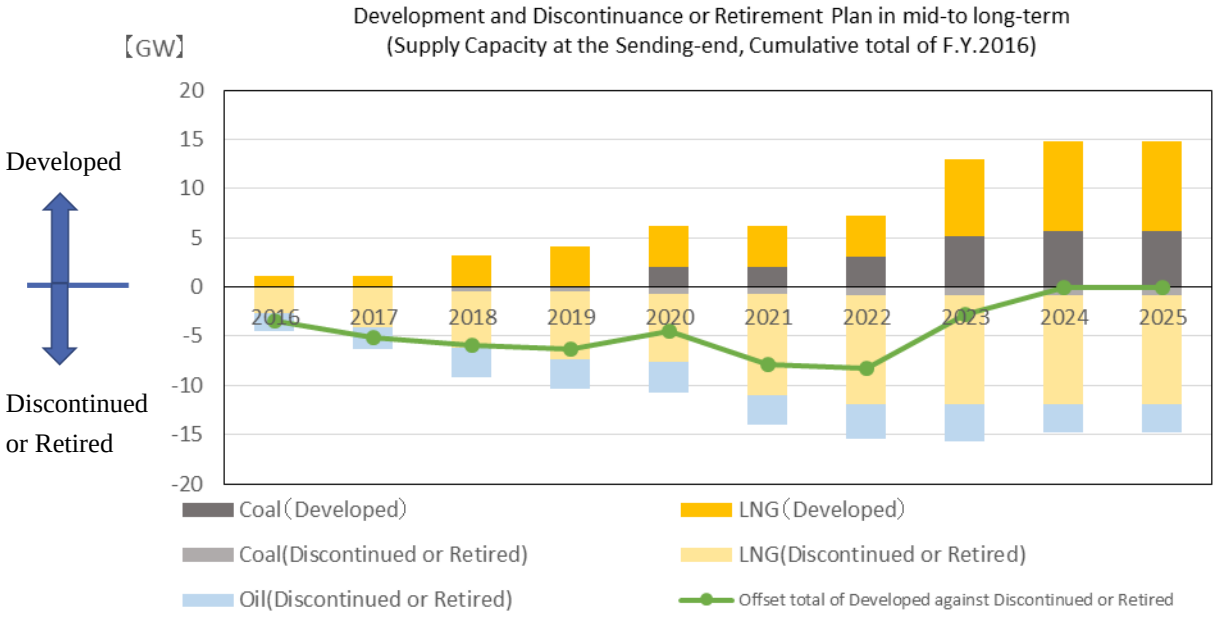
[34] Whether newly developed generation facility will be reported in Electricity Supply Plan or not is solely on the judgement of Electric Power Company.

＜Reference＞　～Hearing at the aggregation of Electricity Supply Plan

○ To evaluate adequacy of the supply capacity in the project period, development and discontinuance or retirement plans of thermal power plant in Nationwide by fuel sources are aggregated to the Figure below.

○ Supply capacity will project to gradually decrease during F.Y.2016 through 2022. However, it will turn to increase according to commercial operation of newly developed generation facilities beyond F.Y.2023.

○ In case power development will not proceed as planned, such as delay of in-service date or cancellation of the plan, adequacy of the supply capacity will be lower than the current projection and the Organization shall keep a close watch.



②Measures against Major Disturbance of rare occurence

Electric Power Companies express the concern stated below by the aggregation of Electricity Supply Plan and the Organization also recognizes them as major challenges regarding to risk management.

- ✓ According to re-operation of Nuclear Power Plant or integration of Renewable Energy, aged Thermal Power Plant with relatively weak competitiveness such as Oil-fired Thermal Power Plant will be gradually retired from service. In that circumstances, major disturbance with rare frequency, large scale and long period, such as the Great East Japan Earthquake might occur, insufficient supply capacity is projected to lead to electricity supply-demand in severe condition. Thus, ensurement of supply capacity such as Oil-fired Thermal Power Plant will be needed to consider based on the assumption that even in the rare frequency, major disturbance might occur.

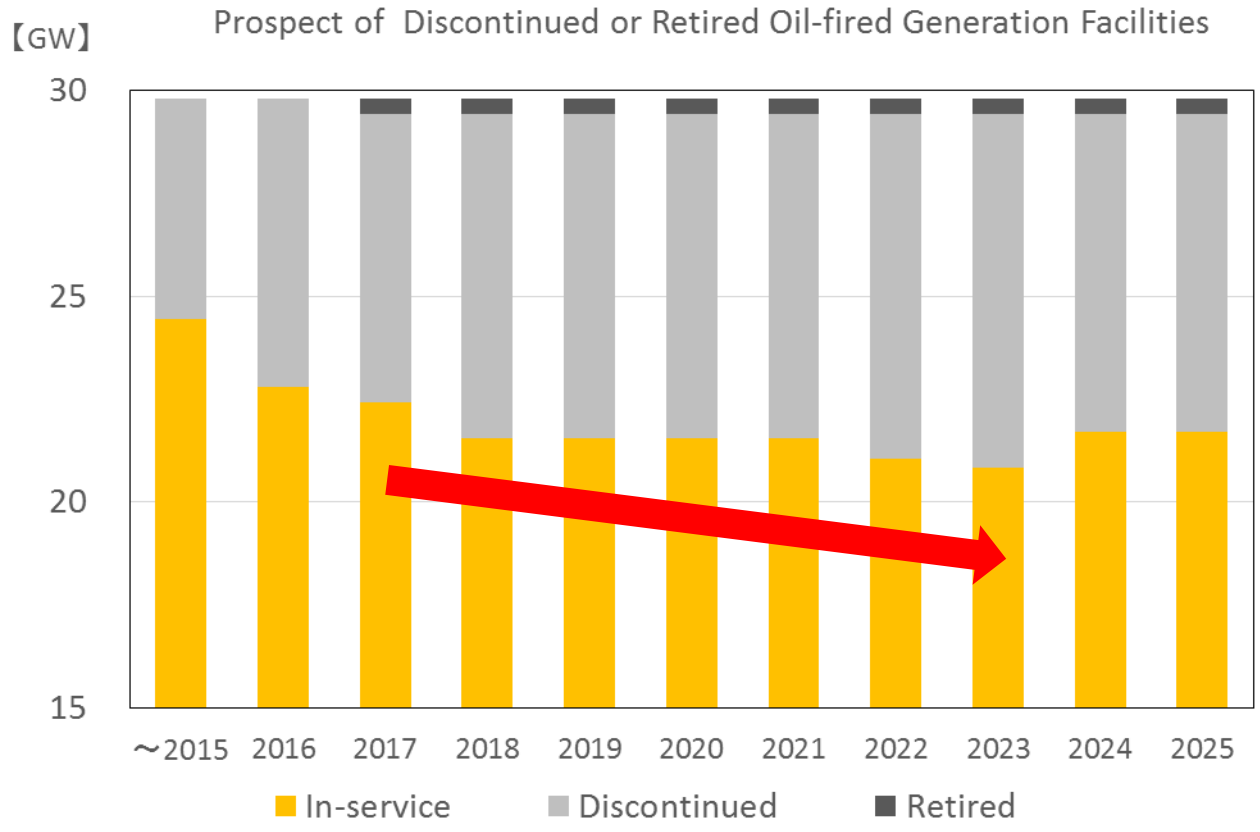
- ✓ For measures available as alternatives of supply capacity in emergency such as Interruptible Demand Contract, Former Vertically-integrated Electric Power Companies maintain those contracts in recent years level in light of the risk management for the emergency. However, they consider the contracts as difficult to keep in change of competitive environment and their cost. So treatment of those contracts are unknown beyond F.Y.2017. Thus, the treatment of those contracts must be considered anew hereafter.

<Reference> Condition of aged thermal power plant ～Hearing at the aggregation of Electricity Supply Plan

○After the Great East Japan Earthquake, Nuclear power plants are obliged to stop their operation, supply-demand balance has been kept by utmost utilization of Thermal Power Plants.

○Aggregation of Electric Supply Plan F.Y.2016 indicates that aged or less competitive generation facilities are quite probably to be discontinued or retired according to progress of the market liberalization with security of supply capacity, though thermal power plants are expected to be maintained for the risk management against emergency. Also, Electric Power Companies express their concerns about its probability and point it out.

○Especially for oil-fired generation facilities, are quite likely to be discontinued or retired due to their aged condition or less competitiveness in spite of various merit such as more flexibility for fuel procurement or operation, alternative of base-loaded generation facilities and the operation in emergency. (See below figure “Prospect of Discontinued or Retired Oil-fired Generation Facilities”). Further, as discontinuing or retiring of oil-fired generation facilities proceed, it is concerned that fuel supply chain is likely to inswept due to decrease of oil consumption for generation fuel.



Attached are the materials according to the aggregation of Electricity Supply Plan.

APPENDIX 1　Supply Demand Balance of F.Y.2016

Table A1-1 through A1-4 shows monthly peak demand, monthly supply capcity, monthly reserve capacity and reserve margin in each regional service area for F.Y.2016, respectively. Further, Table A1-5 and A1-6 shows monthly projection of power exchange and monthly projection of Reserve Margin in each regional service area recalculated with power exchange to the area of below 8% Reserve Margin from the areas of over 8% Reserve Margin respectively.

Table A1-1　Monthly Peak Demand Forecast in each regional service area

【10^4kW】

	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Hokkaido	421	385	378	416	432	432	427	460	510	510	510	471
Tohoku	1,091	1,000	1,089	1,280	1,309	1,193	1,084	1,191	1,310	1,353	1,346	1,253
Tokyo	3,912	3,648	4,128	5,247	5,247	4,580	3,786	4,124	4,524	4,811	4,811	4,427
50Hz areas Total	5,424	5,033	5,595	6,943	6,988	6,205	5,297	5,775	6,344	6,674	6,667	6,151
Chubu	1,876	1,872	2,157	2,428	2,428	2,278	1,959	1,945	2,183	2,257	2,257	2,100
Hokuriku	395	367	413	495	495	466	382	417	464	484	484	462
Kansai	1,998	1,929	2,245	2,634	2,634	2,435	1,930	2,040	2,255	2,477	2,477	2,166
Chugoku	770	761	860	1,056	1,056	929	764	833	948	997	997	896
Shikoku	358	347	401	504	504	440	351	375	466	466	466	407
Kyushu	1,064	1,080	1,230	1,518	1,518	1,360	1,120	1,165	1,316	1,396	1,390	1,230
60Hz areas Total	6,461	6,356	7,306	8,635	8,635	7,908	6,506	6,775	7,632	8,077	8,071	7,261
Interconnected	11,885	11,389	12,901	15,578	15,623	14,113	11,803	12,550	13,976	14,751	14,738	13,412
Okinawa	103	119	137	143	143	138	122	106	100	102	102	98
Nationwide	11,988	11,508	13,038	15,721	15,766	14,251	11,925	12,656	14,076	14,853	14,840	13,510

Table A1-2　Monthly projection of Supply Capacity in each regional service area

【10^4kW】

	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Hokkaido	475	425	419	488	524	527	511	518	597	598	595	598
Tohoku	1,177	1,154	1,189	1,434	1,495	1,400	1,232	1,320	1,437	1,497	1,485	1,421
Tokyo	4,498	4,425	4,958	5,650	5,762	5,483	4,678	4,811	5,470	5,538	5,414	5,173
50Hz areas Total	6,149	6,003	6,566	7,572	7,781	7,410	6,421	6,649	7,504	7,632	7,493	7,192
Chubu	2,156	2,144	2,376	2,679	2,727	2,585	2,254	2,165	2,340	2,432	2,476	2,333
Hokuriku	451	472	468	574	578	543	475	481	536	569	558	528
Kansai	2,177	2,218	2,466	2,948	2,954	2,814	2,393	2,438	2,712	2,848	2,831	2,712
Chugoku	1,020	1,007	1,083	1,268	1,260	1,203	1,041	1,149	1,210	1,220	1,218	1,175
Shikoku	411	410	460	577	570	538	453	468	511	508	505	464
Kyushu	1,444	1,404	1,518	1,852	1,782	1,615	1,381	1,438	1,515	1,562	1,580	1,486
60Hz areas Total	7,659	7,656	8,371	9,898	9,872	9,299	7,996	8,138	8,825	9,139	9,167	8,697
Interconnected	13,808	13,659	14,937	17,470	17,653	16,709	14,417	14,787	16,329	16,770	16,660	15,889
Okinawa	166	193	201	206	215	200	177	173	166	165	177	172
Nationwide	13,974	13,852	15,139	17,676	17,867	16,909	14,594	14,960	16,495	16,935	16,837	16,062

Table A1-3　Monthly projection of Reserve Capacity in each regional service area

【10^4kW】

	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Hokkaido	54	40	41	72	92	95	84	58	87	88	85	127
Tohoku	86	154	100	154	186	207	148	129	127	144	139	168
Tokyo	586	777	830	403	515	903	892	687	946	727	603	746
50Hz areas Total	725	970	971	629	793	1,205	1,124	874	1,160	958	826	1,041
Chubu	280	272	219	251	299	307	295	220	157	175	219	233
Hokuriku	56	105	55	79	83	77	93	64	72	85	74	66
Kansai	179	289	221	314	320	379	463	398	457	371	354	546
Chugoku	250	246	223	212	204	274	277	316	262	223	221	279
Shikoku	53	63	59	73	66	98	102	93	45	42	39	57
Kyushu	380	324	288	334	264	255	261	273	199	166	190	256
60Hz areas Total	1,198	1,300	1,065	1,263	1,237	1,391	1,490	1,363	1,193	1,062	1,096	1,436
Interconnected	1,923	2,270	2,036	1,892	2,030	2,596	2,614	2,237	2,353	2,019	1,922	2,477
Okinawa	63	74	65	63	72	62	54	67	66	62	75	74
Nationwide	1,986	2,344	2,101	1,955	2,102	2,658	2,668	2,304	2,419	2,082	1,997	2,552

Table A1-4 Monthly projection of Reserve Margin in each regional service area
(Resource within own service area only, at the Sending-end)【Aforementioned Table 2-3】

	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Hokkaido	12.8%	10.3%	11.0%	17.4%	21.4%	22.1%	19.6%	12.6%	17.1%	17.2%	16.6%	26.9%
Tohoku	7.9%	15.4%	9.2%	12.0%	14.2%	17.3%	13.7%	10.8%	9.7%	10.6%	10.3%	13.4%
Tokyo	15.0%	21.3%	20.1%	7.7%	9.8%	19.7%	23.6%	16.7%	20.9%	15.1%	12.5%	16.9%
50Hz areas Total	13.4%	19.3%	17.4%	9.1%	11.3%	19.4%	21.2%	15.1%	18.3%	14.4%	12.4%	16.9%
Chubu	14.9%	14.5%	10.1%	10.3%	12.3%	13.5%	15.0%	11.3%	7.2%	7.7%	9.7%	11.1%
Hokuriku	14.3%	28.7%	13.3%	16.0%	16.8%	16.5%	24.4%	15.2%	15.6%	17.5%	15.2%	14.2%
Kansai	9.0%	15.0%	9.9%	11.9%	12.2%	15.6%	24.0%	19.5%	20.3%	15.0%	14.3%	25.2%
Chugoku	32.5%	32.4%	25.9%	20.0%	19.3%	29.5%	36.2%	37.9%	27.6%	22.3%	22.1%	31.1%
Shikoku	14.8%	18.2%	14.8%	14.5%	13.1%	22.4%	29.0%	24.7%	9.6%	9.0%	8.3%	14.0%
Kyushu	35.7%	30.0%	23.4%	22.0%	17.4%	18.8%	23.3%	23.4%	15.2%	11.9%	13.7%	20.8%
60Hz areas Total	18.5%	20.5%	14.6%	14.6%	14.3%	17.6%	22.9%	20.1%	15.6%	13.1%	13.6%	19.8%
Interconnected	16.2%	19.9%	15.8%	12.1%	13.0%	18.4%	22.1%	17.8%	16.8%	13.7%	13.0%	18.5%
Okinawa	60.8%	62.3%	47.2%	44.4%	50.5%	44.8%	44.4%	63.6%	65.7%	61.0%	73.3%	75.7%
Nationwide	16.6%	20.4%	16.1%	12.4%	13.3%	18.7%	22.4%	18.2%	17.2%	14.0%	13.5%	18.9%

Below Criteria 8%

Table A1-5 Monthly projection of Power Exchange in each regional service area

【10^4kW】

	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Hokkaido	0	0	0	0	0	0	0	0	0	0	0	0
Tohoku	2	0	0	-17	0	0	0	0	0	0	0	0
Tokyo	-2	0	0	17	0	0	0	0	0	0	0	0
50Hz areas Total	0	0	0	0	0	0	0	0	0	0	0	0
Chubu	0	0	0	0	0	0	0	0	17	6	0	0
Hokuriku	0	0	0	0	0	0	0	0	0	0	0	0
Kansai	0	0	0	0	0	0	0	0	-17	-6	0	0
Chugoku	0	0	0	0	0	0	0	0	0	0	0	0
Shikoku	0	0	0	0	0	0	0	0	0	0	0	0
Kyushu	0	0	0	0	0	0	0	0	0	0	0	0
60Hz areas Total	0	0	0	0	0	0	0	0	0	0	0	0
Interconnected	0	0	0	0	0	0	0	0	0	0	0	0
Okinawa	0	0	0	0	0	0	0	0	0	0	0	0
Nationwide	0	0	0	0	0	0	0	0	0	0	0	0

Power Received for additional supply capacity Power Sent as additional supply capacity

Table A1-6 Monthly projection of Reserve Margin in each regional service area
(with power exchange through Cross-regional Interconnection Lines, at the Sending-end)【Aforementioned Table 2-4】

	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Hokkaido	12.8%	10.3%	11.0%	17.4%	21.4%	22.1%	19.6%	12.6%	17.1%	17.2%	16.6%	26.9%
Tohoku	8.0%	15.4%	9.2%	10.7%	14.2%	17.3%	13.7%	10.8%	9.7%	10.6%	10.3%	13.4%
Tokyo	14.9%	21.3%	20.1%	8.0%	9.8%	19.7%	23.6%	16.7%	20.9%	15.1%	12.5%	16.9%
50Hz areas Total	13.4%	19.3%	17.4%	9.1%	11.3%	19.4%	21.2%	15.1%	18.3%	14.4%	12.4%	16.9%
Chubu	14.9%	14.5%	10.1%	10.3%	12.3%	13.5%	15.0%	11.3%	8.0%	8.0%	9.7%	11.1%
Hokuriku	14.3%	28.7%	13.3%	16.0%	16.8%	16.5%	24.4%	15.2%	15.6%	17.5%	15.2%	14.2%
Kansai	9.0%	15.0%	9.9%	11.9%	12.2%	15.6%	24.0%	19.5%	19.5%	14.7%	14.3%	25.2%
Chugoku	32.5%	32.4%	25.9%	20.0%	19.3%	29.5%	36.2%	37.9%	27.6%	22.3%	22.1%	31.1%
Shikoku	14.8%	18.2%	14.8%	14.5%	13.1%	22.4%	29.0%	24.7%	9.6%	9.0%	8.3%	14.0%
Kyushu	35.7%	30.0%	23.4%	22.0%	17.4%	18.8%	23.3%	23.4%	15.2%	11.9%	13.7%	20.8%
60Hz areas Total	18.5%	20.5%	14.6%	14.6%	14.3%	17.6%	22.9%	20.1%	15.6%	13.1%	13.6%	19.8%
Interconnected	16.2%	19.9%	15.8%	12.1%	13.0%	18.4%	22.1%	17.8%	16.8%	13.7%	13.0%	18.5%
Okinawa	60.8%	62.3%	47.2%	44.4%	50.5%	44.8%	44.4%	63.6%	65.7%	61.0%	73.3%	75.7%
Nationwide	16.6%	20.4%	16.1%	12.4%	13.3%	18.7%	22.4%	18.2%	17.2%	14.0%	13.5%	18.9%

Improved above Criteria Contributors to improvement

APPENDIX 2　Supply Demand Balance for 10 years (long-term)

Table A2-1 through A2-4 shows 10 years projection of annual peak demand, annual supply capcity, annual reserve capacity and reserve margin in each regional service area from F.Y.2016 to F.Y.2025, respectively. And Table A2-5 and A2-6 shows additional generating surplus captured in the Plan by June 10, 2016 as the supply capacity not contributed to calculate reserve margin, and those recalculated with additional generating surplus. Further, Table A2-7 and A2-8 shows annual projection of power exchange and annual projection of Reserve Margin in each regional service area recalculated with power exchange to the area of below 8% Reserve Margin from the areas of over 8% Reserve Margin respectively.

Table A2-1 Annual Peak Demand Forecast in each regional service area (in August)

【10^4kW】

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	432	434	435	437	441	445	449	452	456	460
Tohoku	1,309	1,325	1,334	1,343	1,353	1,363	1,373	1,383	1,393	1,403
Tokyo	5,247	5,253	5,293	5,334	5,376	5,417	5,459	5,505	5,555	5,605
50Hz areas Total	6,988	7,012	7,062	7,114	7,170	7,225	7,281	7,340	7,404	7,468
Chubu	2,428	2,434	2,441	2,448	2,455	2,462	2,469	2,476	2,483	2,489
Hokuriku	495	497	499	501	505	508	511	514	518	521
Kansai	2,634	2,642	2,663	2,686	2,692	2,698	2,704	2,710	2,716	2,722
Chugoku	1,056	1,062	1,069	1,076	1,083	1,089	1,095	1,101	1,108	1,116
Shikoku	504	503	503	503	503	503	503	503	503	503
Kyushu	1,518	1,523	1,528	1,534	1,541	1,547	1,553	1,559	1,566	1,572
60Hz areas Total	8,635	8,661	8,703	8,748	8,779	8,807	8,835	8,863	8,894	8,923
Interconnected	15,623	15,673	15,765	15,862	15,949	16,032	16,116	16,203	16,298	16,391
Okinawa	143	144	145	146	146	147	148	148	149	150
Nationwide	15,766	15,817	15,910	16,008	16,095	16,178	16,264	16,351	16,447	16,541

Table A2-2 Annual projection of Supply Capacity in each regional service area (in August)

【10^4kW】

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	524	520	588	644	642	637	635	635	683	682
Tohoku	1,494	1,539	1,531	1,541	1,572	1,574	1,583	1,619	1,628	1,636
Tokyo	5,762	5,765	5,888	5,761	5,826	5,656	5,578	5,963	6,142	6,144
50Hz areas Total	7,781	7,824	8,007	7,945	8,040	7,867	7,796	8,217	8,453	8,462
Chubu	2,728	2,636	2,641	2,641	2,665	2,692	2,646	2,648	2,650	2,650
Hokuriku	578	562	559	565	566	566	566	566	566	566
Kansai	2,954	2,817	2,919	2,929	2,882	2,782	2,913	2,984	2,995	3,006
Chugoku	1,259	1,279	1,298	1,211	1,275	1,279	1,284	1,353	1,358	1,363
Shikoku	570	580	575	575	577	577	564	590	591	591
Kyushu	1,783	1,738	1,662	1,665	1,795	1,795	1,796	1,798	1,799	1,801
60Hz areas Total	9,872	9,611	9,654	9,586	9,760	9,690	9,768	9,940	9,960	9,977
Interconnected	17,653	17,436	17,661	17,531	17,800	17,557	17,564	18,157	18,413	18,440
Okinawa	215	211	218	224	205	211	212	212	226	211
Nationwide	17,868	17,647	17,878	17,755	18,005	17,768	17,776	18,370	18,639	18,651

Table A2-3 Annual projection of Reserve Capacity in each regional service area (in August)

【10^4kW】

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	92	86	153	207	201	192	186	183	227	222
Tohoku	185	214	197	198	219	211	210	236	235	233
Tokyo	515	512	595	427	450	239	119	458	587	539
50Hz areas Total	793	812	945	831	870	642	515	877	1,049	994
Chubu	300	202	200	193	210	230	177	172	167	161
Hokuriku	83	65	60	64	61	58	55	52	49	45
Kansai	320	175	256	243	190	84	209	274	279	284
Chugoku	203	217	229	135	192	190	189	252	250	247
Shikoku	66	77	72	72	74	74	61	87	88	88
Kyushu	265	215	134	131	254	248	243	239	233	229
60Hz areas Total	1,237	950	951	838	982	884	933	1,077	1,066	1,054
Interconnected	2,030	1,763	1,896	1,669	1,852	1,525	1,448	1,954	2,116	2,049
Okinawa	72	68	73	78	59	64	64	64	77	62
Nationwide	2,102	1,830	1,969	1,748	1,911	1,590	1,513	2,019	2,193	2,111

Table A2-4 Annual projection of Reserve Margin in each regional service area from F.Y.2016 to F.Y.2025
(Resource within own service area only, in August, at the Sending-end)【Aforementioned Table 2-7】

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	21.4%	19.8%	35.2%	47.5%	45.6%	43.0%	41.3%	40.5%	49.8%	48.3%
Tohoku	14.1%	16.2%	14.8%	14.7%	16.2%	15.5%	15.3%	17.0%	16.9%	16.6%
Tokyo	9.8%	9.8%	11.2%	8.0%	8.4%	4.4%	2.2%	8.3%	10.6%	9.6%
50Hz areas Total	11.3%	11.6%	13.4%	11.7%	12.1%	8.9%	7.1%	11.9%	14.2%	13.3%
Chubu	12.3%	8.3%	8.2%	7.9%	8.5%	9.3%	7.2%	7.0%	6.7%	6.5%
Hokuriku	16.8%	13.0%	12.0%	12.7%	12.1%	11.5%	10.7%	10.1%	9.4%	8.7%
Kansai	12.1%	6.6%	9.6%	9.0%	7.1%	3.1%	7.7%	10.1%	10.3%	10.4%
Chugoku	19.2%	20.4%	21.4%	12.6%	17.8%	17.4%	17.2%	22.9%	22.6%	22.1%
Shikoku	13.1%	15.3%	14.4%	14.3%	14.8%	14.7%	12.1%	17.4%	17.5%	17.5%
Kyushu	17.5%	14.1%	8.7%	8.6%	16.5%	16.0%	15.7%	15.3%	14.9%	14.5%
60Hz areas Total	14.3%	11.0%	10.9%	9.6%	11.2%	10.0%	10.6%	12.2%	12.0%	11.8%
Interconnected	13.0%	11.2%	12.0%	10.5%	11.6%	9.5%	9.0%	12.1%	13.0%	12.5%
Okinawa	50.5%	47.1%	50.5%	53.8%	40.2%	43.9%	43.4%	43.3%	51.9%	41.3%
Nationwide	13.3%	11.6%	12.4%	10.9%	11.9%	9.8%	9.3%	12.3%	13.3%	12.8%

Below Criteria 8%

Table A2-5 Additional Generating Surplus captured in the Plan by June 10, 2016(in August)

【10^4kW】

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	0	0	0	0	1	1	1	1	1	1
Tohoku	0	1	5	16	16	16	16	16	16	16
Tokyo	0	1	43	43	44	35	35	35	35	35
50Hz areas Total	0	2	49	59	60	52	52	52	52	52
Chubu	0	0	0	23	42	41	41	42	41	41
Hokuriku	0	0	0	0	0	0	0	0	0	5
Kansai	31	82	82	76	70	70	70	70	70	70
Chugoku	0	0	0	0	0	0	0	0	0	0
Shikoku	0	0	0	0	0	0	0	0	0	0
Kyushu	0	0	0	0	0	0	0	0	0	0
60Hz areas Total	31	82	82	99	111	111	111	111	110	115
Interconnected	31	83	131	158	172	163	162	163	162	167
Okinawa	0	0	0	0	0	0	0	0	0	0
Nationwide	31	83	131	158	172	163	162	163	162	167

Additional Generating Surplus

Table A2-6 Annual projection of Reserve Margin in each regional service area
(with Additional Generating Surplus, in August, at the Sending-end)【Aforementioned Table 2-8】

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	21.4%	19.8%	35.2%	47.5%	45.8%	43.3%	41.6%	40.8%	50.0%	48.5%
Tohoku	14.1%	16.2%	15.2%	15.9%	17.3%	16.6%	16.5%	18.2%	18.0%	17.7%
Tokyo	9.8%	9.8%	12.1%	8.8%	9.2%	5.1%	2.8%	9.0%	11.2%	10.3%
50Hz areas Total	11.3%	11.6%	14.1%	12.5%	13.0%	9.6%	7.8%	12.7%	14.9%	14.0%
Chubu	12.3%	8.3%	8.2%	8.8%	10.2%	11.0%	8.8%	8.6%	8.4%	8.1%
Hokuriku	16.8%	13.0%	12.0%	12.7%	12.1%	11.5%	10.7%	10.1%	9.4%	9.6%
Kansai	13.3%	9.7%	12.7%	11.9%	9.6%	5.7%	10.3%	12.7%	12.8%	13.0%
Chugoku	19.2%	20.4%	21.4%	12.6%	17.8%	17.4%	17.2%	22.9%	22.6%	22.1%
Shikoku	13.1%	15.3%	14.4%	14.3%	14.8%	14.7%	12.1%	17.4%	17.5%	17.5%
Kyushu	17.5%	14.1%	8.7%	8.6%	16.5%	16.0%	15.7%	15.3%	14.9%	14.5%
60Hz areas Total	14.7%	11.9%	11.9%	10.7%	12.4%	11.3%	11.8%	13.4%	13.2%	13.1%
Interconnected	13.2%	11.8%	12.9%	11.5%	12.7%	10.5%	10.0%	13.1%	14.0%	13.5%
Okinawa	50.5%	47.1%	50.5%	53.8%	40.2%	43.9%	43.4%	43.3%	51.9%	41.3%
Nationwide	13.5%	12.1%	13.2%	11.9%	12.9%	10.8%	10.3%	13.3%	14.3%	13.8%

Below Criteria 8%　　Improved above Criteria

Table A2-7 Annual projection of Power Exchange in each regional service area

【10^4kW】

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	0	0	0	0	0	-10	-10	0	0	0
Tohoku	0	0	0	0	0	-118	-116	0	0	0
Tokyo	0	0	0	0	0	128	126	0	0	0
50Hz areas Total	0	0	0	0	0	0	0	0	0	0
Chubu	0	0	0	0	0	0	0	0	0	0
Hokuriku	0	0	0	0	0	0	0	0	0	0
Kansai	0	0	0	0	0	62	0	0	0	0
Chugoku	0	0	0	0	0	-62	0	0	0	0
Shikoku	0	0	0	0	0	0	0	0	0	0
Kyushu	0	0	0	0	0	0	0	0	0	0
60Hz areas Total	0	0	0	0	0	0	0	0	0	0
Interconnected	0	0	0	0	0	0	0	0	0	0
Okinawa	0	0	0	0	0	0	0	0	0	0
Nationwide	0	0	0	0	0	0	0	0	0	0

Power Received for additional supply capacity　　Power Sent as additional supply capacity

Table A2-8 Annual projection of Reserve Margin in each regional service area
(with Additional Generating Surplus and power exchange through Cross-regional Interconnection Lines, in August, at the Sending-end)【Aforementioned Table 2-9】

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	21.4%	19.8%	35.2%	47.5%	45.8%	41.0%	39.4%	40.8%	50.0%	48.5%
Tohoku	14.1%	16.2%	15.2%	15.9%	17.3%	8.0%	8.0%	18.2%	18.0%	17.7%
Tokyo	9.8%	9.8%	12.1%	8.8%	9.2%	7.4%	5.1%	9.0%	11.2%	10.3%
50Hz areas Total	11.3%	11.6%	14.1%	12.5%	13.0%	9.6%	7.8%	12.7%	14.9%	14.0%
Chubu	12.3%	8.3%	8.2%	8.8%	10.2%	11.0%	8.8%	8.6%	8.4%	8.1%
Hokuriku	16.8%	13.0%	12.0%	12.7%	12.1%	11.5%	10.7%	10.1%	9.4%	9.6%
Kansai	13.3%	9.7%	12.7%	11.9%	9.6%	8.0%	10.3%	12.7%	12.8%	13.0%
Chugoku	19.2%	20.4%	21.4%	12.6%	17.8%	11.7%	17.2%	22.9%	22.6%	22.1%
Shikoku	13.1%	15.3%	14.4%	14.3%	14.8%	14.7%	12.1%	17.4%	17.5%	17.5%
Kyushu	17.5%	14.1%	8.7%	8.6%	16.5%	16.0%	15.7%	15.3%	14.9%	14.5%
60Hz areas Total	14.7%	11.9%	11.9%	10.7%	12.4%	11.3%	11.8%	13.4%	13.2%	13.1%
Interconnected	13.2%	11.8%	12.9%	11.5%	12.7%	10.5%	10.0%	13.1%	14.0%	13.5%
Okinawa	50.5%	47.1%	50.5%	53.8%	40.2%	43.9%	43.4%	43.3%	51.9%	41.3%
Nationwide	13.5%	12.1%	13.2%	11.9%	12.9%	10.8%	10.3%	13.3%	14.3%	13.8%

Below Criteria 8%　　Improved above Criteria　　Contributors to improvement

Table A2-9 through A2-12 shows 10 years projection of annual peak demand, annual supply capcity, annual reserve capacity and reserve margin in Winter peaking area of Hokkaido and Tohoku, respectively. And Table A2-13 and A2-14 shows additional generating surplus captured in the Plan by June 10, 2016 as the supply capacity not contributed to calculate reserve margin, and those recalculated with additional generating surplus.

Table A2-9 Annual Peak Demand Forecast in Winter peaking areas of Hokkaido and Tohoku (in January)

【10^4kW】

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	510	512	513	516	521	527	532	537	543	548
Tohoku	1,353	1,372	1,385	1,398	1,411	1,424	1,438	1,452	1,466	1,480

Table A2-10 Annual projection of Supply Capacity in Winter peaking areas of Hokkaido and Tohoku (in January)

【10^4kW】

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	597	585	574	634	633	627	627	678	678	677
Tohoku	1,498	1,502	1,522	1,524	1,550	1,546	1,548	1,582	1,584	1,587

Table A2-11 Annual projection of Reserve Capacity in Winter peaking areas of Hokkaido and Tohoku (in January)

【10^4kW】

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	87	73	61	118	112	100	95	141	135	129
Tohoku	145	130	137	126	139	122	110	130	118	107

Table A2-12 Annual projection of Reserve Margin in Winter peaking areas of Hokkaido and Tohoku (Resource within own service area only, in January, at the Sending-end)【Aforementioned Table 2-11】

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	17.1%	14.2%	11.9%	23.0%	21.5%	19.0%	17.8%	26.2%	24.8%	23.6%
Tohoku	10.7%	9.5%	9.9%	9.0%	9.8%	8.5%	7.6%	9.0%	8.1%	7.2%

Below Criteria 8%

Table A2-13 Additional Generating Surplus in Winter peaking areas of Hokkaido and Tohoku captured in the Plan by June 10, 2016(in January)

【10^4kW】

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	0	0	0	1	1	1	1	1	1	1
Tohoku	0	1	5	15	15	15	15	15	15	15

Additional Generating Surplus

Table 2-14 Annual projection of Reserve Margin in Winter peaking areas of Hokkaido and Tohoku (with Additional Generating Surplus, in January, at the Sending-end) 【Aforementioned Table 2-12】

	F.Y.2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hokkaido	17.1%	14.2%	11.9%	23.2%	21.8%	19.2%	18.0%	26.4%	25.1%	23.8%
Tohoku	10.7%	9.6%	10.2%	10.1%	10.9%	9.6%	8.7%	10.0%	9.1%	8.2%

Improved above Criteria

June 29, 2016

Organization for Cross-regional Coordination of Transmission Operators, Japan

Opinions to the Minister of Economy, Trade and Industry on the aggregation of the Electricity Supply Plan

On the aggregation of the Electricity Supply Plan, the Organizaition send the result with its opinions stated below to the Minister of Economy, Trade and Industry according to the paragraph 2 of Article 29 of the Electricity Business Act .

1. Effectiveness in Procuring Supply Capacity of Retail Companies

Aggregation of Electricity Supply Plan in F.Y.2016 indicates that many Retail Companies plan their supply capacity of mid- to long-term “undetermined”. This “undetermined” supply capacity will be turned into “determined” as Retail Companies who do not have assured long-term supply capacity for bi-lateral contract at this time are likely to procure their supply capacity through the transaction at the JEPX or newly agreed bilateral contract in future.

It is forecasted that generation facilities will be switched from aged thermal power plant to reoperation of nuclear power plant or newly integrated generation facilities. However, Generation Companies can not have corroboration that their generation facility shall be operated as expected without long-term bilateral contract with Retail Companies. As a result, new development or switch of generation facilities are not likely to proceed as planned, and insufficient supply capacity procured in the market to the demand will be concerned.

The Organization shall further reviews regarding to future prospects of electricity supply-demand balance and necessity of generation procurement in implementing the risk analysis of electricity supply-demand with careful watch on above stated condition. The Organization recommends to the Government to proceed the reviews regarding to effective supply capacity procurement including introduction of Capacity Mechanism scheme for the security of stable electricity supply in accordance with the balance of national bear.

2. Measures against Major Disturbance of rare occurence

Electric Power Companies express the concern stated below by the aggregation of Electricity Supply Plan.

①According to re-operation of Nuclear Power Plant or integration of Renewable Energy, aged Thermal Power Plant with relatively weak competitiveness such as Oil-fired Thermal Power Plant will be gradually retired from service. In that circumstances, major disturbance with rare frequency, large scale and long period, such as the Great East Japan Earthquake might occur, insufficient supply capacity is projected to lead to electricity supply-demand in severe condition. Thus, ensurement of supply capacity such as Oil-fired Thermal Power Plant will be needed to consider based on the assumption that even in the rare frequency, major disturbance might occur.

②For measures available as alternatives of supply capacity in emergency such as Interruptible Demand Contract, Former Vertically-integrated Electric Power Companies maintain those contracts in recent years level in light of the risk management for the emergency. However, they consider the contracts as difficult to keep in change of competitive environment and their cost. So treatment of those contracts are unknown beyond F.Y.2017. Thus, the treatment of those contracts must be considered anew hereafter.

The Organization also recognizes them as major challenges regarding to risk management. The Organization shall discuss risk management of major disturbance with rare occurrence and its meaures including generator procurement and others. The Organization recommends to the Government to proceed the reviews regarding to the measures for major disturbance with rare occurrence while organizing the concept of major disturbance with rare occurrence.