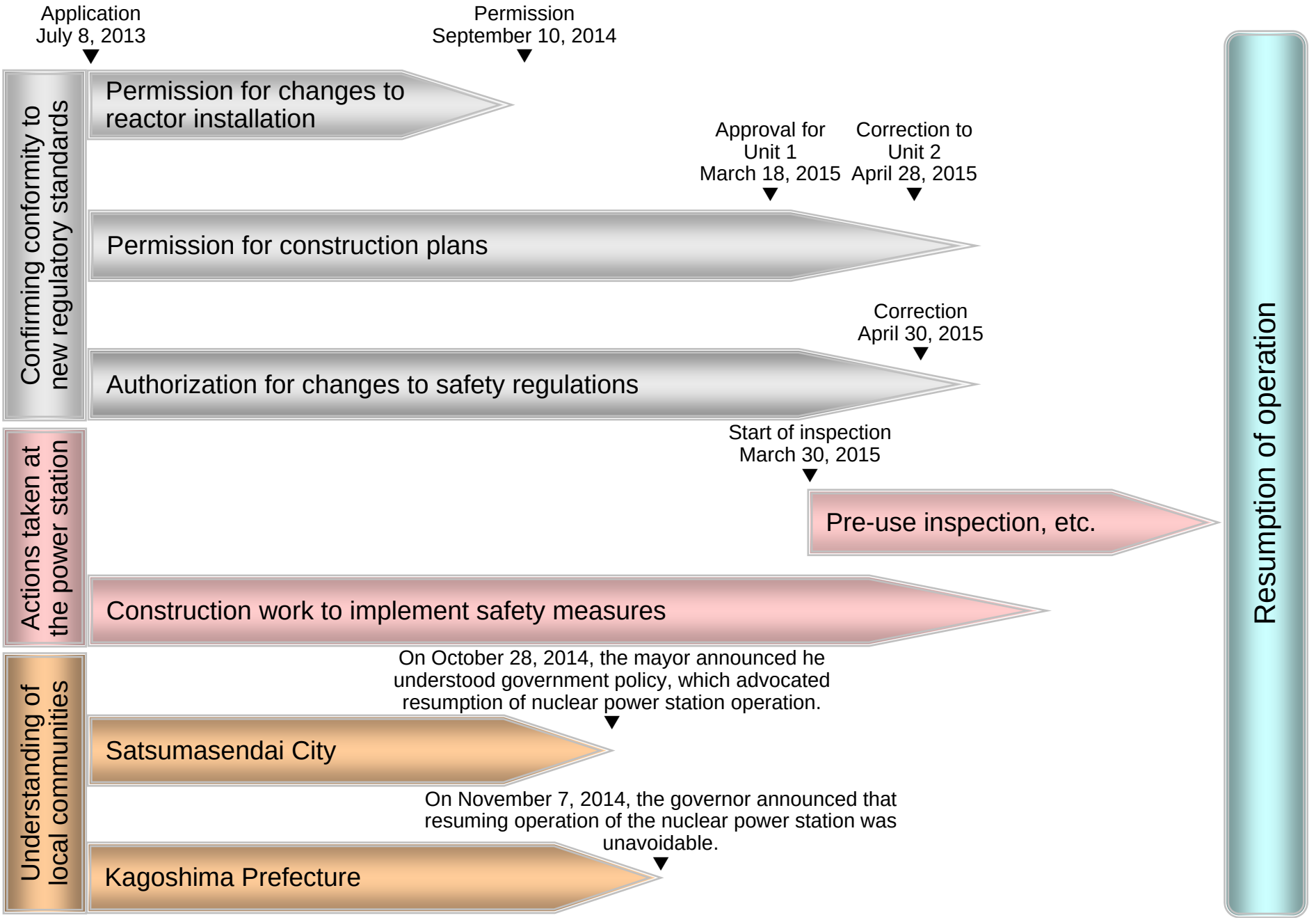
Section 2: Progress in Efforts to Resume Operation of the Sendai Nuclear Power Station and Other Issues

Table of Contents

◇ Materials

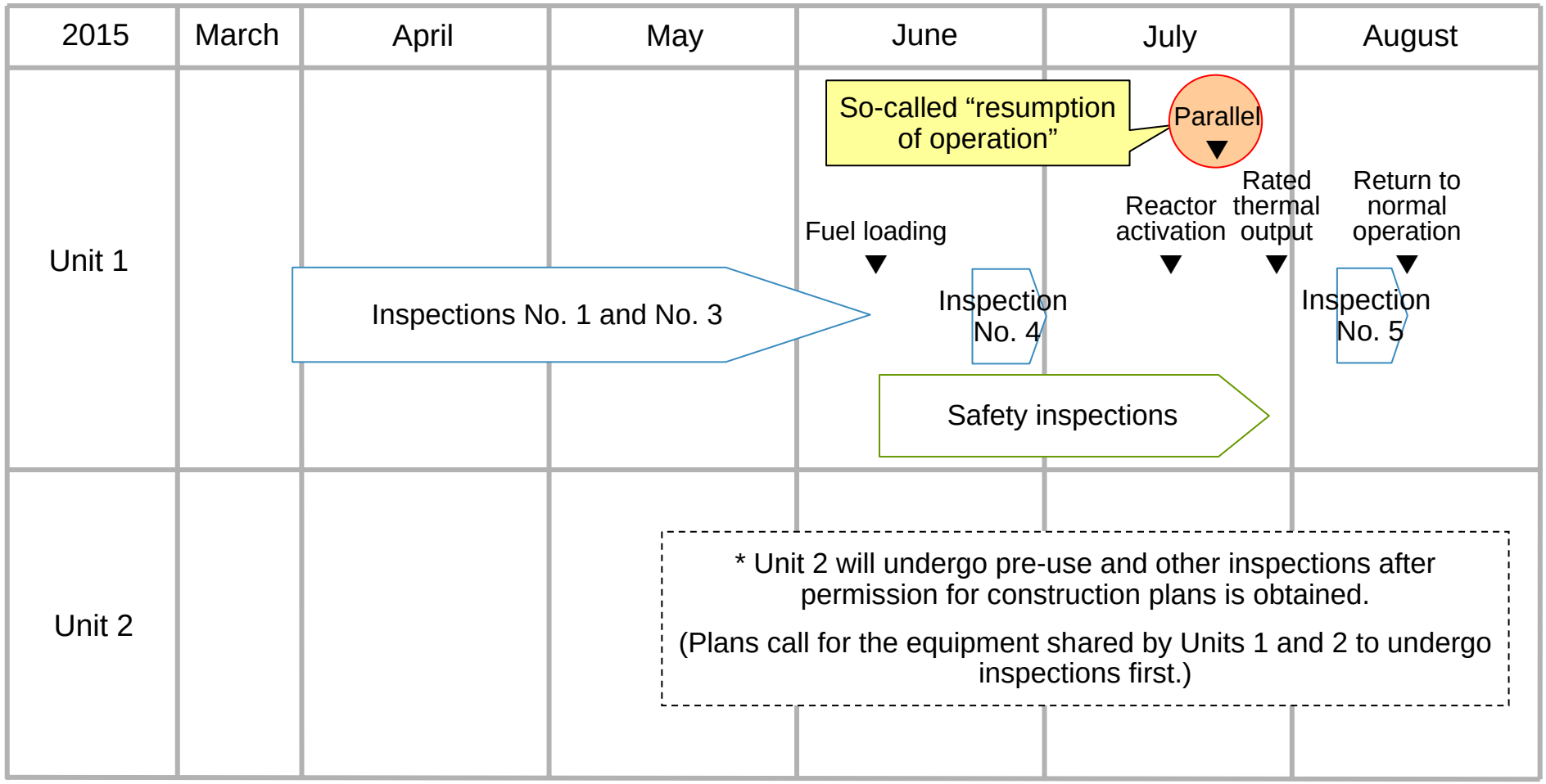
◇ Reference materials

Progress in efforts to resume operation of the Sendai Nuclear Power Station (process overview)



Progress in efforts to resume operation of the Sendai Nuclear Power Station (projected schedule)

* This is our projected schedule.



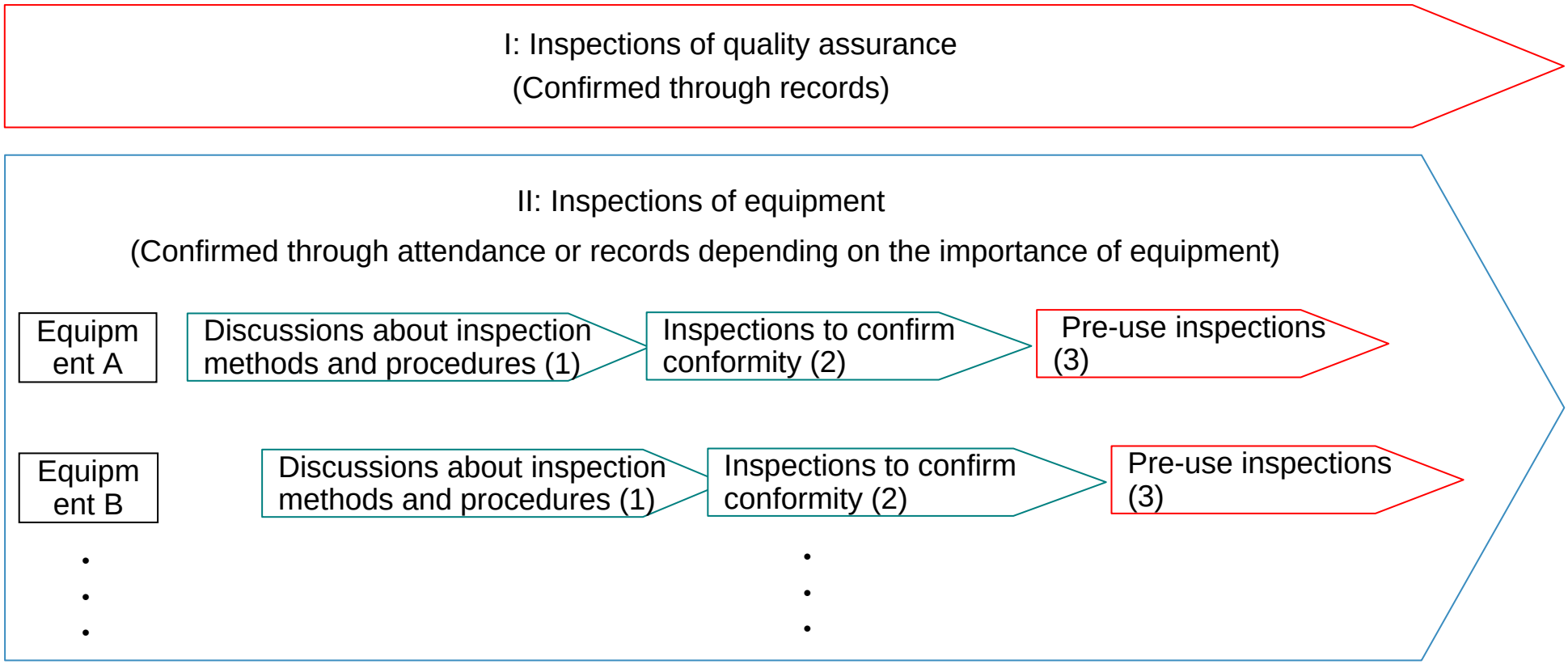
[Outline of pre-use inspections]
Inspection No. 1: Inspect materials, dimensions, external appearance, etc.
Inspection No. 3: Inspect performance (confirmed mainly through trial system operation)
Inspection No. 4: Inspect functions and performance at the time of reactor activation
Inspection No. 5: Inspect overall load performance at the time of rated output operation
[Outline of safety inspections]
Inspections to confirm compliance with safety regulations that stipulate operation and management of power stations

Progress in efforts to resume operation of the Sendai Nuclear Power Station (how to conduct pre-use inspections)

○ Pre-use inspections consist of two types of inspections: (I) inspections to confirm that operator quality control activities (inspections of quality assurance) are appropriate and (II) those to confirm conformity to technical standards for equipment (about 1,200 pieces of equipment and about 200 procedures)

○ Inspections of equipment (II) are conducted in three stages. The operator discusses with the Secretariat of the Nuclear Regulation Authority about inspection methods and procedures (1), and then conducts internal inspections of its equipment ((2): inspections to confirm conformity). These are followed by pre-use inspections through attendance by Secretariat personnel or confirmation of records depending on the importance of equipment (3).

<Conceptual diagram of pre-use inspections>



(Reference) Review of conformity of the Genkai Nuclear Power Station Units 3 and 4

[Convocation of meetings of the board of examiners]

○ Earthquakes and tsunami
- All explanations have been given and most items with respect to earthquakes and tsunamis have been confirmed.

○ Plants
- Examinations began again on September 17 last year.

(Main topics explained about at meetings of the board of examiners)
- November 18: Establishment of systems when large-scale destruction occurs
- November 27: Assessment of effectiveness of countermeasures against serious accidents, etc.
- December 25: Establishment of systems when large-scale destruction occurs (Explanations about large-scale destruction have generally been given.)

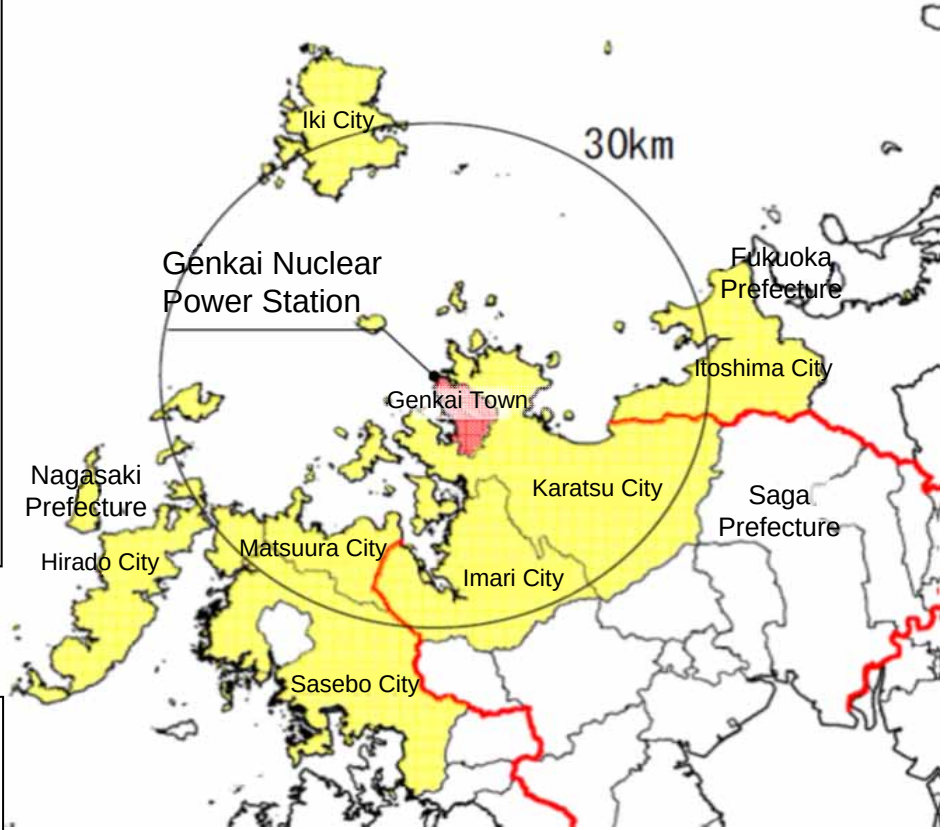
* In the future, we will explain about remaining issues such as technical abilities required mainly to prevent the spread of accidents.

[Conclusion of safety agreements and consultations with local governments]

○ We have concluded safety and other agreements not only with the local government of the area where the power station is located but also neighboring local governments and other parties concerned.

○ We are continuing discussions with Imari City of Saga Prefecture about entering into a safety agreement.

<Local governments around the Genkai Nuclear Power Station>



Reference materials: Outline of the FY2015 supply plan (1)

[Prospects for electrical power sales]

○ In FY2015, despite the effects from customers leaving Kyushu Electric Power, electrical power sales are expected to grow compared to the previous year because of effects such as increases in the number of households subscribing to electrical service, growth in industrial production due to economic expansion, and the leap year.

○ In the long run, mainly due to stable economic growth, electrical power sales are predicted to increase though they are affected by customers who leave Kyushu Electric Power and as electrical power saving takes root. We expect electricity sales to be 86.1 billion kWh in FY2024 and the maximum power supply to be 15.52 million kW.

FY / Item	2013 (Result)	2014 (Result)	2015	2023	2024	Average annual growth rate (%) This plan 24/13	Average annual growth rate (%) Previous plan 23/12
Segments other than the liberalized segment	<341> 351	<334> [▲4.8] 334	<336> [1.0] 337	335	336	<▲0.1> ▲0.4	<0.5> 0.3
Residential (included above)	<290> 298	<285> [▲4.3] 285	<288> [1.1] 288	292	293	<0.1> ▲0.2	<0.7> 0.6
Commercial	<189> 194	<184> [▲6.0] 183	<184> [0.9] 184	208	212	<1.0> 0.8	<1.2> 1.1
Industrial use and others	<299> 299	<296> [▲1.1] 296	<296> [0.3] 297	312	314	<0.4> 0.4	<0.6> 0.6
Liberalized segment	<488> 493	<480> [▲3.0] 479	<480> [0.5] 481	520	526	<0.7> 0.6	<0.8> 0.8
Electrical power sales (100 million kWh)	<829> 844	<814> [▲3.8] 813	<817> [0.7] 819	855	861	<0.4> 0.2	<0.7> 0.6
Maximum supply (10,000 kW)	<1,489> 1,583	<1,483> [▲7.1] 1,471	[0.5] 1,478	1,541	1,552	<0.4> ▲0.2	<0.7> 0.8

(Note 1) Figures in < > indicate temperature- and leap year-adjusted ones.
(Note 2) Figures in [ ] show year-on-year changes (%).
(Note 3) The total may not be the same as the sum of figures in all items because the latter is rounded off.
(Note 4) The maximum supply indicates the average of up to three-day supply at the end of transmission lines in summer.

[Economic prospects used as assumptions for this plan]

Item	2013 (Result)	2023	2024	Average annual growth rate (%) This plan 24/13	Average annual growth rate (%) Previous plan 23/12
Real GDP (¥1 trillion)	529.2	590.3	597.4	1.1	1.3
Industrial production index (2010 = 100)	98.9	114.9	116.6	1.5	1.8
Kyushu's population (10,000 people)	1,311	1,239	1,229	▲0.6	▲0.5

[Major assumptions for estimating electricity sales by user]

(Residential)

・The effects of population decrease and customers leaving Kyushu Electric Power after full market liberalization are already included. It is assumed that although also affected by the effects from electrical power conservation and other factors, electrical power sales are expected to fall at an annual rate of 0.2% (0.1% if temperature-adjusted) due to the spread of new home electric appliances, use of larger equipment, and growth in Ecocute users.

(Liberalized segment)

・Although an increasing number of customers leave Kyushu Electric Power and electricity conservation continues, the economy is expected to shift increasingly to services as exemplified by increase in the number of medical and welfare facilities due to the aging population and growth in service industries utilizing ICT. As a result, electrical power sales for business users are expected to rise at an annual rate of 0.8% (1.0% if temperature-adjusted).

・Although an increasing number of customers leave Kyushu Electric Power and electricity conservation continues, electricity sales for industrial users are predicted to grow at an annual rate of 0.4% (0.4% if temperature-adjusted) for reasons such as long-term stable growth of the world economy and expansion of production by Japanese manufacturers of more high-value-added products.

[Assumptions for effects from customers leaving Kyushu Electric Power]

・This plan includes two new factors: the recent increase in the number of customers leaving Kyushu Electric Power in the liberalized segment and low-voltage customers who are expected to leave Kyushu Electric Power due to full market liberalization. Demand from these former customers was estimated at about 1.5 billion kWh in FY2014 (about 2% of the total demand in Kyushu Electric Power's service area) and about 4.1 billion kWh in FY2024 (about 5%).

[Assumptions about effects from solar power generation (purchase of excess electricity)

・Equipment capacity is expected to grow based on the recent trends, and the amount of electricity consumed in-house is also expected to grow, a factor that causes electrical power demand to fall.

Reference materials: Outline of the FY2015 supply plan (2)

[Major plans to develop or abolish power sources]

Category	Equipment	Power station and unit name	Output	Construction period	
				Start of construction	Start of operation
Under construction	Thermal (LNG)	Shin-Oita Unit 3 (× 4)	480,000 kW	July 2013	July 2016
	Thermal (coal)	Matsuura Unit 2*1	1,000,000 kW	March 2001	June 2020
Under preparation for construction	Nuclear	Sendai Nuclear Unit 3	1,590,000 kW	Undecided yet	Undecided yet
	Geothermal	Otake*2	14,500 kW [+2,000 kW]	September 2017	December 2019
Abolished or to be abolished	Nuclear	Genkai Unit 1	559,000 kW	Abolished in April 2015	
	Thermal (petroleum)	Karatsu Units 2 and 3	375,000 kW, 500,000 kW	Abolished in June 2015	

*1 Successful bid on thermal power source in FY2014
*2 The Otake Power Station plans to have its power generation equipment updated (The figure in bracket shows the increase in output).

[Major power transmission equipment plan]

Category	Line name	Outline of construction work		Construction period	
		Voltage (10,000 volts)	Length (km)	Start of construction	Start of operation
Under construction	Hyuga main line	50	120	November 2014	June 2019

[Major transformer equipment plan]

Category	Line name	Outline of construction work		Construction period	
		Voltage (10,000 volts)	Capacity (10,000 kVA)	Start of construction	Start of operation
Under construction	Higashikyushu transformer substation	50/22	150	September 2014	June 2016

[FY2015 bidding-based thermal power source procurement plan]

	Item	Description
Distant islands (Okinoerabu Island)	Scale of invitation	We invited tenders for a power source that could start to supply a total of 4,500 kW of electricity to Okinoerabu Island, a distant island in Kagoshima Prefecture, by June 2020.
	Procurement period	In principle, 15 years

Reference materials: Outline of the FY2015 supply plan (3) [Power source development plan for the Matsuura Power Station Unit 2]

○ We invited tenders for thermal power sources, and in February 2015, Kyushu Electric Power became a successful bidder with its Matsuura Power Station Unit 2 (Matsuura City, Nagasaki Prefecture).

○ The Matsuura Power Station Unit 2 which is capable of generating 1,000,000 kW of electricity is scheduled to start operation in June 2020.

[Outline of invitation of tenders for thermal power sources]

Item	Description
Scale of invitation	1,000,000 kW in total
Start of supply	By June 2021
Procurement period	In principle 15 years (Can be selected from among the 10–30 years)
Type of power source (Annual operating rate)	70 to 80%

Kyushu Electric Power became a successful bidder

[Matsuura Power Station Unit 2]

Item	Outline
Generating power	1,000,000 kW
Start of operation	June 2020
Fuel	Coal
Power generation method	Pulverized coal-burning, ultra-super critical (USC) power generation*1

*1 This high-performance power generation method improves thermal efficiency and reduces environmental impacts by increasing the temperature and pressure level of steam used for ultra-super critical (USC) power generation.

○ We are considering increasing the thermal efficiency of the Matsuura Power Station Unit 2 so that it exceeds that of BAT*2 (45% for generating-end output and 42% for sending-end output*3).

○ We will install high-performance environmental equipment to reduce emissions of sulfur oxides, nitrogen oxides, and other environmental pollutants (annual CO_2 emissions: Around 4.7 million tons-CO_2)

○ Since environmental assessments have already been conducted in accordance with relevant laws, it is not necessary to carry out new environmental assessments unless there are major changes to the plan in the future.

*2: BAT stands for the best available technology.

*3: Based on low calorific value.

Reference materials: Outline of the FY2015 supply plan (4) [Decommissioning of the Genkai Nuclear Power Station Unit 1]

- ○ On March 18, 2015, we decided to terminate operation of the Genkai Nuclear Power Station Unit 1 and notified the Minister of Economy, Trade and Industry of changes to the electrical work. On April 27, we decided to decommission the unit.
- ○ The decommissioning process and schedule will be considered in the decommissioning plan we plan to submit in the future.
- ○ With the introduction of an “accounting-related system to smoothly proceed with decommissioning”, the decommissioning of the Genkai Nuclear Power Station Unit 1 will have little effect on the income/expenditure and finances of Kyushu Electric Power.

[Genkai Nuclear Power Station Unit 1]

Reactor: Pressurized-water reactor (PWR)	Date of discontinuation of operation: April 27, 2015
Output: 559,000 kW	Total power generation: 132.72 billion kWh*
Start of operation: October 15, 1975	Equipment usage rate: 74.3%*

* Cumulative amount for the period up to the end of FY2011

[Accounting-related system to smoothly proceed with decommissioning]

- The revision of the Ordinance on Accounting at Electric Utilities and related guidelines on March 13, 2015, made it possible that if an electric power company decommissions its reactor unexpectedly when for example safety regulations are changed, it can report that as depreciation in part of its assets over a certain period of time rather than simultaneously reporting all expenses incurred by its decommissioning, including its remaining book value.

  FY2014: We only report the unit as an asset (by creating a new account “nuclear decommissioning related temporary account”)

  From FY2015 to the next revision of rates: We will depreciate an amount equivalent to the portion of the asset amount that is included in the costs of the current rates.

  After the next revision of rates: We will include in the rate costs, the amount calculated on the assumption that the undepreciated balance will be depreciated equally over ten years and will depreciate it by the same amount.

Reference materials: Initiatives to achieve greater operational efficiency

- ○ In FY2014, we made steady efforts to constantly achieve greater operational efficiency, including reduction in material/equipment procurement costs, and exerted even further efforts in some areas to attain that goal. As part of our emergency measures to ease the effects from a deterioration in financial conditions caused by the suspended operation of all nuclear power stations, we also worked to reduce costs as much as possible in the short run chiefly by postponing certain construction projects through a close examination of their period and process and suspending certain operations temporarily while determining whether such measures directly affected safety, compliance, and stable supply.
- ○ As a result, we reduced costs by 314 billion yen, including the 179 billion yen cut-back through additional short-term efforts.
- ○ In FY2015, there are reasons for cost increases such as the repair expenses temporarily deferred from FY2013 and FY2014, but we will work to achieve the goal of reducing costs by 153 billion yen as included in the plan to achieve greater operational efficiency which was announced in April 2013, by reducing costs by an average of 140 billion yen annually over three years.

Item	FY2015 plan to achieve greater efficiency	FY2014 improved efficiency (actual) [A] + [B]	Value of improved efficiency if electricity rate costs are included (FY2014 alone) [A]	Additional efforts to improve efficiency (FY2014 alone) [B]	Value of improved efficiency if rate costs are included (average of 2013–2015)
Repair expenses	▲ 280	▲ 980	▲ 230	▲ 750	▲ 320
Miscellaneous expenses	▲ 220	▲ 710	▲ 210	▲ 500	▲ 220
Personnel expenses	▲ 510	▲ 370	▲ 440	70	▲ 480
Fuel expenses and purchased electrical power rates	▲220 ※1	▲740 ※2	▲ 250	▲ 490	▲ 180
Depreciation expenses (Capital investments)	▲ 300	▲ 340	▲ 220	▲ 120	▲ 230
Total [If fuel expenses and purchased electrical power rates are excluded]	▲ 1,530 [▲1,310]	▲ 3,140 [▲2,400]	▲ 1,350 [▲1,100]	▲ 1,790 [▲1,300]	▲140 billion yen level

*1: This is a reference value because it is based on a nuclear usage rate of 66%, which includes electrical power rate costs.
*2: The result was calculated on certain assumptions because no nuclear power stations operated in FY2014, making assumptions for supply-demand relations quite different from those used for electrical power rate costs.

Reference materials: Applications for renewable energy

○ Applications for renewable energy in Kyushu (excluding remote islands) at the end of March 2015 were worth 21,500,000 kW (including 17,930,000 kW for solar energy). Of this amount, 7,440,000 kW of renewable energy (including 4,660,000 kW for solar energy) have already been connected to Kyushu Electric Power.

- On December 22, 2014, we were appointed as a designated electric utility (electric operator)* for photovoltaic power generation because the amount for applications for connection exceeded the amount of renewable energy that can be connected (8,170,000 kW).
- In terms of solar energy, the total amount of renewable energy that has already been connected and the amount of energy whose connection has already been approved reached the amount of renewable energy that can be connected at the end of December 2014.

* Since we were appointed as a designated electric utility (electric operator) by the government, it has now become possible that after applications for connections exceeds the total amount of renewable energy that has already been connected and the amount for such energy whose connection has already been approved, we may impose on the applicants a set of conditions for system connection that assume 30-day-per-year or longer output restrictions without compensation.

Applications for renewable energy in mainland Kyushu (excluding remote islands and including Kyushu Electric Power)
(as of the end of March 2015) (10,000 kW)

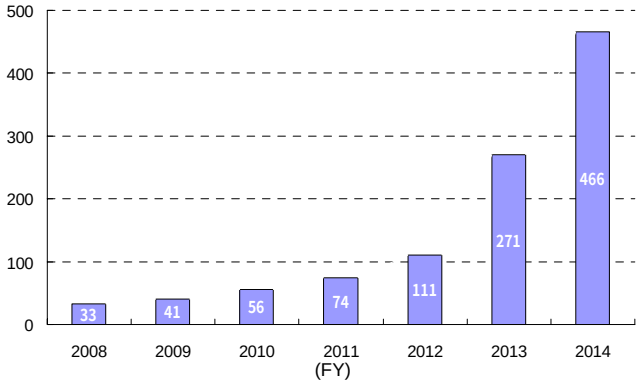
	Solar energy	Wind power	Biomass, etc.	Hydraulic power (excluding pumping up)	Geothermal	Total
Applications for consideration of connection	479	16	9	5	3	513
Applications for connection contracts	491	20	1	6	0.3	518
Connection already approved	357	12	4	1	1	377
Already connected	466	46	27	183	21	744
Total	1,793	95	41	195	26	2,150

* The total may not be the same as the sum of figures in all items because the latter is rounded off.
* All figures for biomass include those for cold energy.
* Amount of renewable energy that can be connected: 8,170,000 kW for solar energy and 1,000,000 kW for wind power.

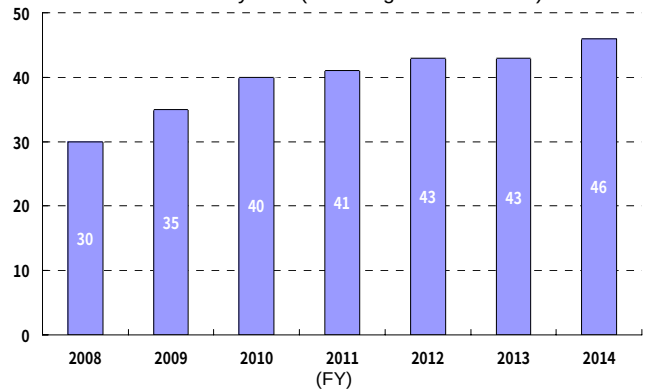
Connection of Kyushu Electric Power's renewable energy (excluding remote islands and including group companies)
(as of the end of March 2015) (10,000 kW)

	Solar energy	Wind power	Biomass, etc.	Hydraulic power (excluding pumping up)	Geothermal	Total
Already connected	4	7	4	128	21	164

Changes in the amount of solar energy connected in mainland Kyushu (excluding remote islands)



Changes in the amount of wind power connected in mainland Kyushu (excluding remote islands)



Reference materials: Prospects for supply and demand this summer (if operation of nuclear power stations is not resumed)

○ This summer's electricity demand is expected to be about 90% of last year's level as electricity conservation takes root (1,510,000 kW less). It is assumed that it will be 15,470,000 kW if the temperature is normal and that it will be 16,430,000 kW if Kyushu is hit by the same level of fierce heat as in 2013.

○ This summer, if operation of nuclear power stations is not resumed, we can supply a maximum of 16,930,000–16,980,000 kW of electricity.

○ Compared to the maximum electricity demand in 2013, when Kyushu was hit by fierce heat, it is expected that this summer we can secure a minimum reserve margin of 3% required for stable power supply by taking measures to maintain supply capability such as providing electrical power via support supply from other electric power companies (up to 740,000 kW).

(Generating end: 10,000 kW)

	July		August	
	(1) Same level of fierce heat as in 2013	(2) Average temperature	(1) Same level of fierce heat as in 2013	(2) Average temperature
Demand	1,643	1,547	1,643	1,547
Supply capabilities (total)	1,693	1,693	1,693	1,698
Nuclear	0	0	0	0
Thermal	1,227	1,227	1,227	1,227
Hydraulic	113	113	109	109
Pumping up	200	200	215	220
Solar energy and wind power	65	65	67	67
Geothermal	16	16	16	16
Provided by other companies	74	74	61	61
PPS, etc.	▲1	▲1	▲1	▲1
Reserve [Reserve margin]	50 [3.1%]	146 [9.4%]	50 [3.0%]	151 [9.8%]

* The total may not be the same as the sum of figures in all items because the latter is rounded off.

Reference materials: Prospects of supply and demand this summer if the operation of the Sendai Nuclear Power Station is resumed

○ If the Sendai Nuclear Power Station resumes its operation, prospects for this summer's supply and demand indicate that we can secure a reserve margin of around 4% (if one unit is operated) to 11% (if two units are operated) even if we are not provided with electrical power from other electric power companies.

(Generating end: 10,000 kW)

	If one unit of the Sendai Nuclear Power Station is operated		If two units of the Sendai Nuclear Power Station are operated	
	July (Same level of fierce heat as in 2013)	August (Same level of fierce heat as in 2013)	July (Same level of fierce heat as in 2013)	August (Same level of fierce heat as in 2013)
Demand	1,643	1,643	1,643	1,643
Supply capabilities (total)	1,708	1,727	1,797	1,822
Nuclear	89	89	178	178
Thermal	1,227	1,227	1,227	1,227
Hydraulic	113	109	113	109
Pumping up	200	221	200	227
Solar energy and wind power	65	67	65	67
Geothermal	16	16	16	16
Provided by other companies	0	0	0	0
PPS, etc.	▲1	▲1	▲1	▲1
Reserve [Reserve margin]	65 [4.0%]	84 [5.1%]	154 [9.4%]	179 [10.9%]

* The total may not be the same as the sum for all figures in all items because the latter is rounded off.