Support our Current Electricity and Focus on the Future of Electricity

OCCTO
Organization for Cross-regional Coordination of Transmission Operators, JAPAN

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The Organization for Cross-Regional Coordination of Transmission Operators (OCCTO) was established in April 2015 and has been performing its duties in accordance with the purposes for which it was established: namely, to maintain a stable supply of electricity and render power supply systems as efficient as possible from a neutral and impartial position.

I am cognizant of the weight of what my position entails as I take over as the president of this organization.

With the tightening of electricity supply and demand in last winter, we continue to be beset by circumstances that call on us to fulfill our roles as an organization to an even greater extent than ever before. We should revisit the purposes for which we were established and work even harder to fulfill them.

In addition, accommodating the growing adoption of renewable energy is also an urgent matter to be addressed. As well as dealing with balancing capacity matters and other issues, we have taken on new operations related to the Act on Renewable Energy Special Measures in accordance with the Act for Establishing Energy Supply Resilience, which was enacted in June 2020. We will focus on these operations while keeping the government's goals in mind.

All board and staff members of this organization will strive further to support Japan's electric power system today, fulfill our important roles for tomorrow, and live up to expectations.

I respectfully ask for your continued support and encouragement.

April 2021

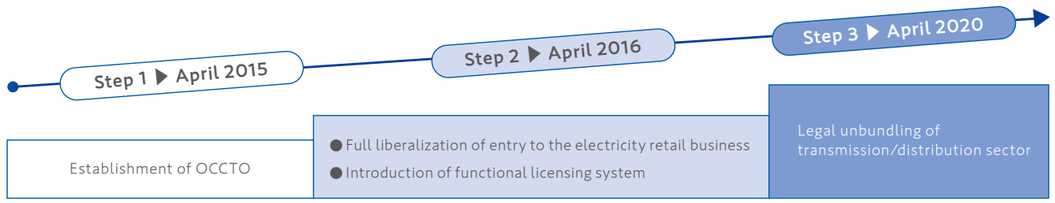
President
Tsutomu Oyama 大山 力

Process of Electricity System Reform

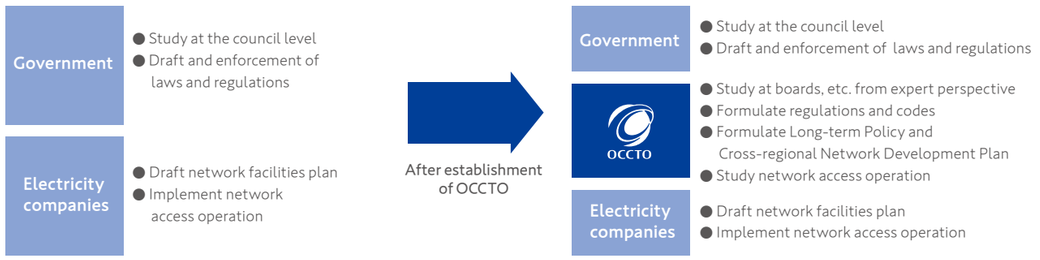
We have worked across three steps with a view to reforming the electricity supply system.

Three Goals

① Securing Stable Electricity Supply
② Suppressing Electricity Rates to the Maximum Extent Possible
③ Expanding Electricity Choices for Consumers and Business Opportunities



Role of OCCTO in the Electricity System Reform



Efforts so far and recent efforts of OCCTO

Secure short-term to mid- to long-term stable supply

In addition to aggregating electricity supply plans that are annually submitted from all electricity companies, OCCTO formulates Cross-regional Network Long-term Policy and Development Plans to secure not only short-term but also mid- to long-term stable supply on a nationwide scale.

Recent effort

Secure supply/ balancing capacity

- Studying, undertaking a detailed design of, and operating the capacity market
- Studying, undertaking a detailed design of the balancing market

Promote fair, equitable and efficient use of transmission/distribution facilities

Streamline the fair usage environment of electricity systems in Japan by formulating guidelines on transmission/distribution operations, accepting system impact studies, and managing use of interconnection lines.

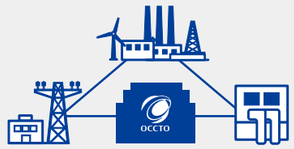
Recent effort

Efficient use of transmission/distribution facilities

- Review "Connect and Manage"

Monitor nationwide supply-demand conditions and network conditions of power systems

Monitor electricity supply-demand conditions as well as network conditions of power systems 24 hours a day, 365 days a year to grasp the whole centrally on a nationwide scale. We centrally monitor the state of the supply of and demand for electricity and the operations of the network twenty-four hours a day, 365 days a year on a nationwide scale. By instructing electric power companies to interchange power and increase the supply of thermal power plants whenever the supply-demand situation worsens, we ensure the stable supply of electricity.



New roles for OCCTO added through the enactment of the Act for Establishing Energy Supply Resilience

The following operations were added as roles to be fulfilled by OCCTO through the enactment of the Act of Partial Revision of the Electricity Business Act and Other Acts for Establishing Resilient and Sustainable Electricity Supply Systems (in June 2020) (Act for Establishing Energy Supply Resilience). OCCTO will ensure that these operations are carried out and will fulfill its new roles accordingly:

- Check the contents of disaster coordination plans formulated by general transmission and distribution companies
- Operate a mutual assistance system for disaster recovery costs
- Formulate cross-regional network development plans, submit them to the Government, and grant subsidies under the renewable energy levy system to partially cover the costs of developing inter-regional interconnection lines as set forth in these plans
- Grant subsidies related to the feed-in tariff (FIT) scheme for renewable energy
- Grant premiums related to the feed-in premium (FIP) scheme
- Manage the reserve fund for the disposition of solar panels and other hardware components

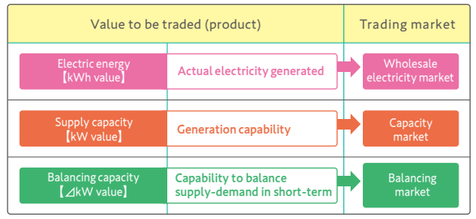
Secure Short -term to Mid -to Long - term Stable Supply

Electricity supply plans will be consolidated, and a stable supply of electricity will be secured for the short, medium, and long terms.

The electricity supply plans are plans in which the 10-year supply-demand forecast, development of power stations and development of transmission/distribution grids are aggregated. All electricity companies have an obligation to submit a supply plan to the Minister of Economy, Trade and Industry in accordance with the Electricity Business Act. OCCTO grasps and evaluates centrally the supply-demand balance nationwide and in supply areas for short-, mid-, and long-term by aggregating these plans. Furthermore, OCCTO secures a stable supply by generator procurement called “Generation Plant Bidding “ when necessary.

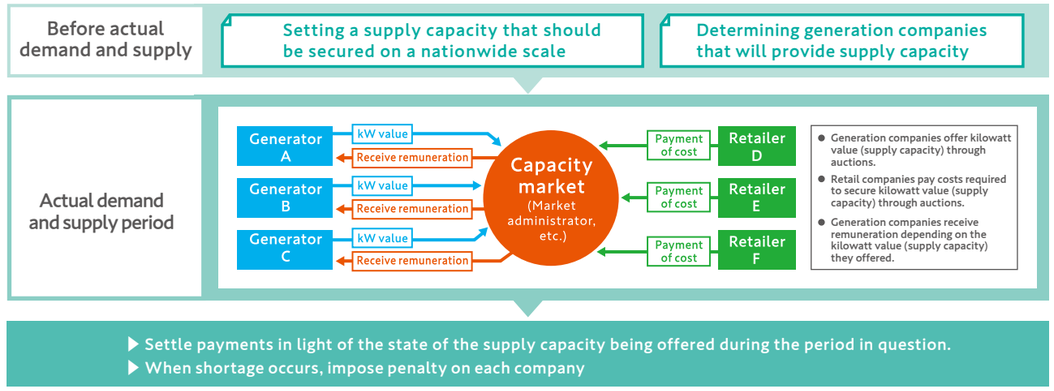
Contribute to efficiency improvement and activation of electricity market

As electrical power production became separated from power distribution and transmission in 2020 and as renewable energy is increasingly adopted, OCCTO has been investigating, undertaking a detailed design of, and operating new markets in which the value of electric power is traded in order to develop a framework for securing and harnessing the supply and balancing capacity required for the stable supply of electricity on a medium- to long-term basis at the lowest possible cost.



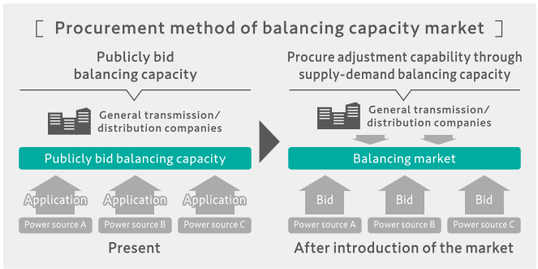
● Studying, undertaking a detailed design of, and operating the capacity market

The full liberalization of the electricity industry and large-scale adoption of renewable energy threatens to lower the predictability of returns on investments in power sources. The resulting shortfall in investments in power sources could lead to power shortages in the future. The capacity market will increase the predictability of returns on investments in power sources by paying some of the costs required for power sources in accordance with the value of the capability of power sources to generate electricity (supply capacity), which in turn will help secure supply capacity and adjustment capacity on a medium- to long-term basis. OCCTO is investigating, undertaking a detailed design of, and operating the capacity market as a market manager.



● Studying and undertaking a detailed design of a balancing market

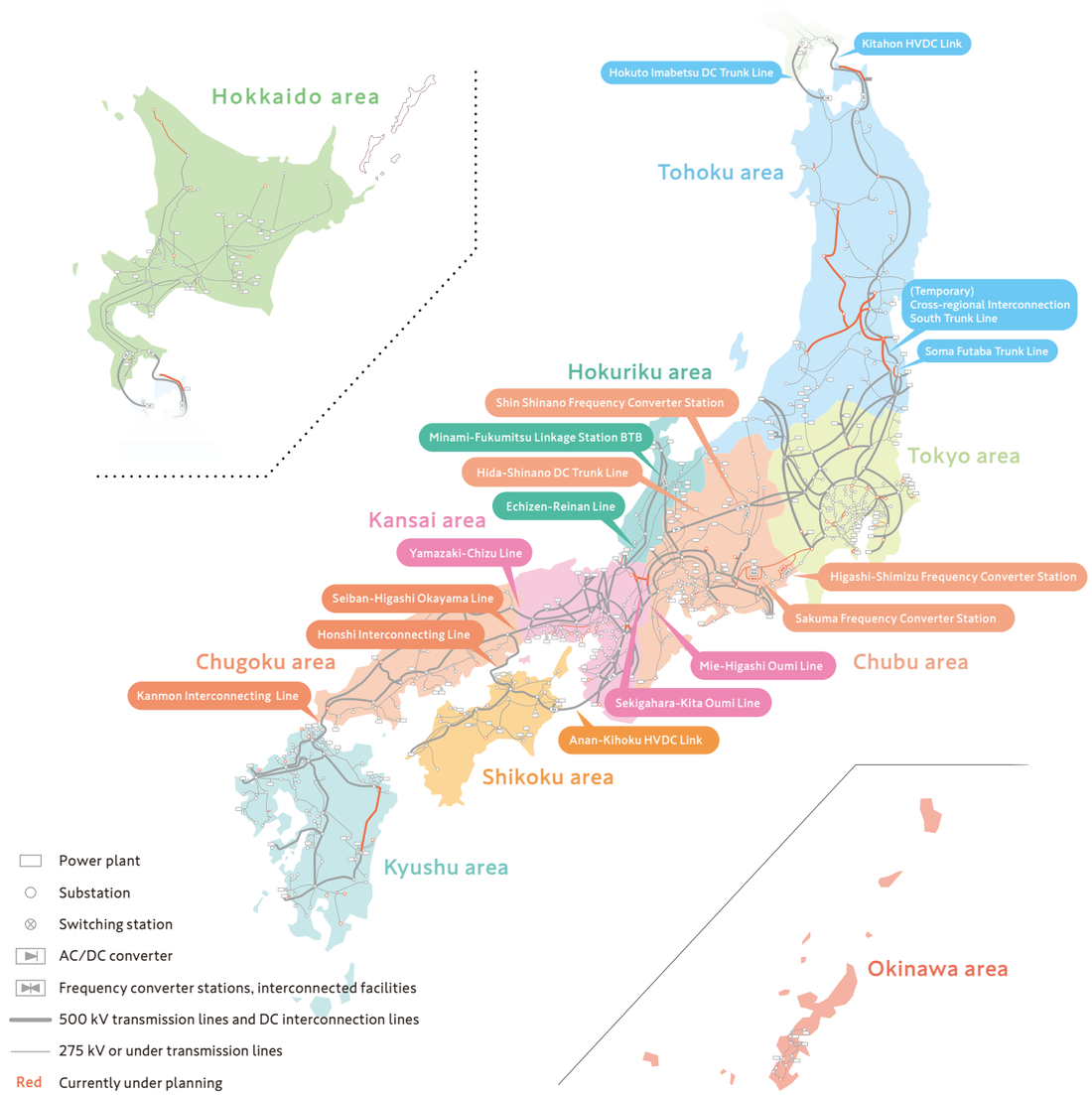
As renewable energy becomes the primary power source, it will be possible to more efficiently procure and operate the balancing capacity that is needed to allow general transmission and distribution operators to provide a stable supply of electricity by realizing cross-regional procurement cross-regional operations in a balancing market. OCCTO is studying and undertaking a detailed design of this market.



Formulate Long-term Policy and Development Plan for cross-regional network, and take initiative in reinforcing required facilities

OCCTO formulated a long-term policy (Long-Term Policy on Cross-regional Network), which put together a course of action related to the development and upgrading of cross-regional interconnection systems nationwide and announced this policy in March 2017. In addition, OCCTO formulated and announced a cross-regional network development plan pertaining to interconnection facilities linking Tokyo and Chubu in June 2016. In order to fulfill one of its new roles, which was added under the Act for Establishing Energy Supply Resilience and which entails formulating Cross-regional Network Development Plans and submitting them to the Government, OCCTO has been working on formulating a cross-regional network development plan pertaining to interconnection facilities linking Hokkaido and Honshu and a cross-regional network development plan pertaining to interconnection lines linking the Tohoku region and Tokyo.

●Cross-regional Interconnection Network
< Interconnection Lines and Bulk Transmission Lines in Each Area (Highest 2 Voltage Classes) >



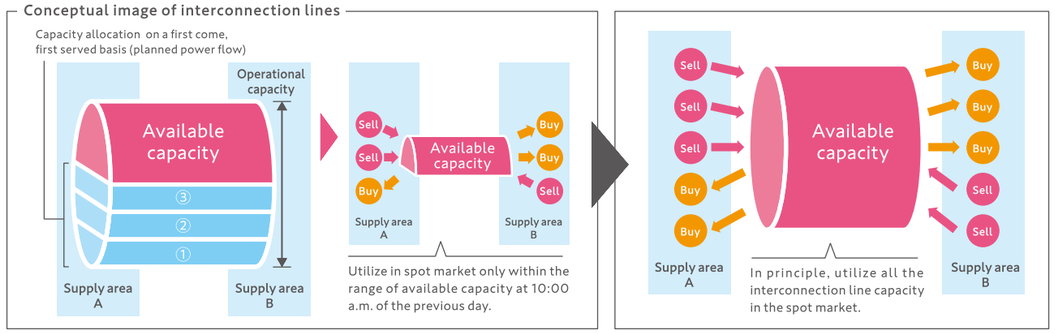
Promote Fair, Equitable and Efficient Use of Transmission/Distribution Facilities

Formulate rules for all electricity companies to comply

OCCTO formulated the Network Codes, a set of rules to be followed by transmission operators and users in accordance with the Electricity Business Act and revises these guidelines where necessary in an effort to ensure the proper and smooth operations of consigned supply operations and operations pertaining to the transmission and distribution of electricity.

Reviewing the method by which interconnection lines are used

Considering the deliberation results of the System Review Working Group on Electricity and Gas Basic Policy Subcommittee (3rd), as well as from the viewpoint of utilizing fair and equitable and efficient use of interconnection lines and developing a market environment, OCCTO changed the interconnection lines usage method to “implicit auction ” in October 2018.



● Mechanism before implicit auction

[Hybrid of first-come, first served basis and implicit auction]

After accumulating capacity allocation on a first-come, first served basis, capacity is allocated to the day ahead market by utilizing available capacity at 10:00 a.m. of the previous day.

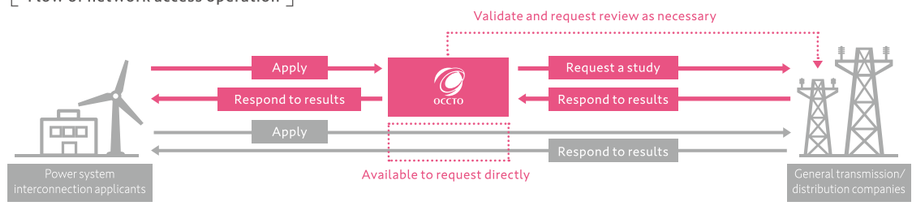
● Implicit auction

Terminate accepting interconnection line reservations on a first-come, first served basis and allocate all capacity on interconnection lines to the day ahead market in principle.

Accept system impact studies of generation facilities

OCCTO will accept applications for preliminary consultations and system impact studies from those who wish to connect power generation facilities to the network and verify the results of studies conducted by general transmission and distribution companies. A collective study process for generator connection led by general transmission and distribution companies was begun in October 2020 as a mechanism for systematically developing the network with a push-type approach that takes future power supply potential into account.

[Flow of network access operation]



Make efforts to maximize utilization of existing network

Against the background of progress in electricity liberalization and the Feed-in Tariff Scheme (FIT Scheme) of renewable energy, power stations with variable renewable energy such as photovoltaic as well as projects to build new thermal power stations are increasing and the needs of interconnection for new power sources are expanding.

In formulating a long-term policy on cross-regional network, OCCTO decided to aim to facilitate and render more affordable use of the electric power network by maximizing the use of the existing network in light of these environmental changes. To this end, OCCTO has been conducting“Probabilistic evaluation of power flow”*1 and engaged in connect and manage efforts (N-1 inter-tripping scheme and non-firm access connections). Further, we continue studying new network operation rules such as re-dispatching method*2.

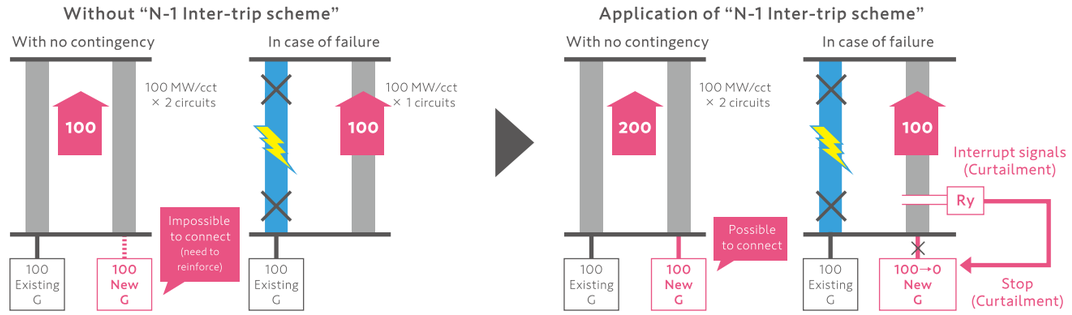
*1 Probabilistic evaluation of power flow is a methodology to increase available transmission capacity by assumed power flow given the actual situation and assessing network, such as by reviewing practical output based on historical data of variable renewable energy and by practical generator dispatches in accordance with demand (applied on April 2018)
*2 Re-dispatching method is a methodology to manage congestion which general transmission and distribution company implement utilizing balancing capacity when it judges that congestion of network occurs, or likely to occur, without specifying congested line.

[Japanese Connect and Manage]

● N-1 Inter-Trip scheme

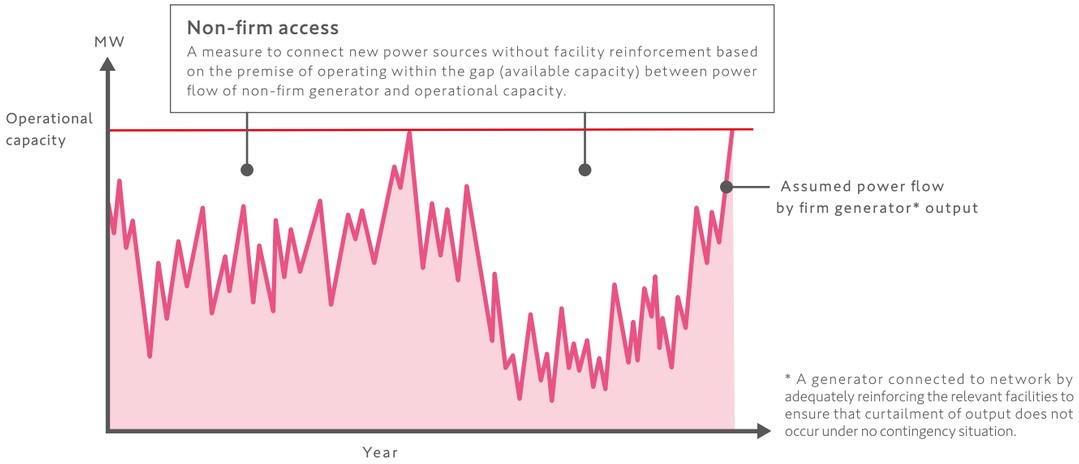
In Japan, from the viewpoint of network reliability, etc., power system development is conducted to secure stable and adequate transfer capacity even if an N-1 contingency (e.g. single line fault) occurs. N-1 Inter-trip scheme is a measure to utilize this capacity under no contingency situation by inter-tripping a generator when N-1 contingency occurs (curtailment of the generator output immediately with the relay system).

The N-1 inter-tripping scheme began to be applied to new power sources to be connected to a special high-voltage network in October 2018 (prior application). System design work is being carried out to enable the N-1 inter-tripping scheme to be applicable to new power sources to be connected to the high-voltage network sometime during fiscal year 2022.



● Non-firm access

A non-firm access connection is an initiative to enable new power sources to come online and be operated within the scope of available capacity without having to increase facilities on the assumption that output curtailment will be implemented if operational capacity is expected to be exceeded during normal times. In January 2021, it became possible to apply a non-firm access connection to a backbone grid network in any area lacking available capacity. We will also look into applying non-firm access connections to local grid networks.



Monitor Nationwide Conditions of Supply-Demand and Network System Operation

Monitor nationwide conditions of supply-demand and network system operation 24 hours a day, 365 days a year

OCCTO monitors and grasps, on a real-time basis, information such as supply-demand conditions monitored at the central load dispatching centers in each supply area by introducing the Cross-regional Operation System.

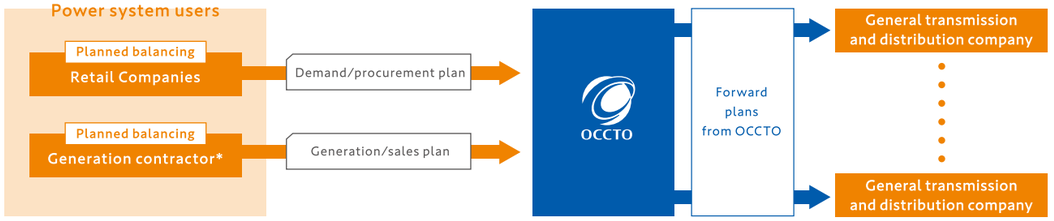
Furthermore, OCCTO manages the plans and actual performance of system users' supply-demand with monitoring supply-demand balance in each supply area provides immediate and precise judgments and instructions such as how much electricity supply, from/to electricity companies, etc.

Main content to be monitored

- Supply-demand conditions in each supply area and the main generator output condition
- Cross-regional network conditions including the usage status of interconnection lines between supply areas

Grasp situation of nationwide supply-demand balance by plan management through the Cross-regional Operation System

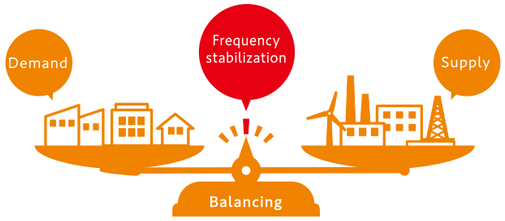
All system users have to submit annual, monthly, weekly and day-ahead plans for generation and supply-demand via the Cross-regional Operation System to OCCTO. OCCTO accepts these plans, confirms the integrity of them, and grasps the supply-demand balance condition on the basis of nationwide, supply area, and Electricity Company.



＊ Generation Companies and companies equipped with power generation facilities not corresponding to Generation Companies are included.

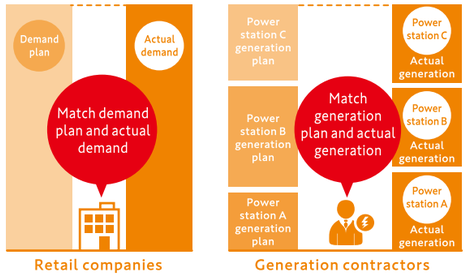
● Supply-demand balance

A large amount of electricity cannot be stored; thus, supply and demand need to be equalized constantly for stable supply. In the worst case, frequency fluctuation due to imbalance of supply and demand may cause a large-scale blackout.



● Planned balancing rule

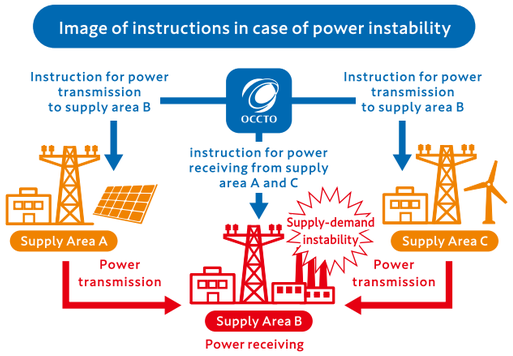
Rule for Retail Companies and Generation Contractors to make their plans and actual demands/generation balance for the 30-min unit.



Instructions for improvement of supply instability situation to electricity companies

■ Instructions by OCCTO

- OCCTO has strong authority under the Electricity Business Act to demonstrate effective control ability.
- All electricity companies are subject to instructions.
- OCCTO's instructions are applied not only in supply shortages, but also in insufficient suppression of output capacity due to excess supply.



■ Training for supply shortage

Training has been provided regularly in cooperation with members for supply shortages or power generation problems at the Cross-regional Operation Center. Training with specific conditions strengthens the response capability to secure a stable electricity supply.

We are prepared to deal with large-scale disasters.

In anticipation of large-scale natural disasters, which are becoming increasingly severe in recent years, we seek to work closely with the Government and will fortify links and ties of coordination with disaster-prevention operations at a national level within the context of an emergency communications system and disaster-response arrangements established in accordance with the Disaster-Prevention Operational Plan. During normal times, we will continue to conduct disaster-response drills and improve the effectiveness of our business-continuity plan (BCP).

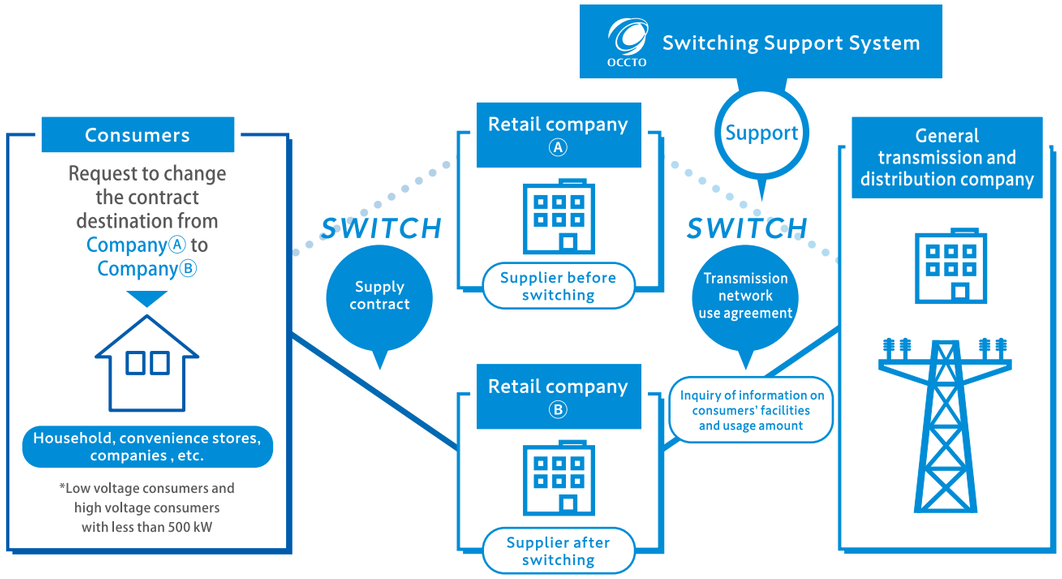
Furthermore, as an operation added by Act for Establishing Energy Supply Resilience, OCCTO will check the details of disaster cooperation plan prepared by general transmission and distribution company beginning in July 2020 and field applications and grant subsidies under a mutual assistance system to cover and recover the costs of disaster recovery on a nationwide scale beginning in April 2021.

Dispute resolution between electricity companies

OCCTO accepts consultations and complaints about transmission and distribution businesses from Electricity Suppliers and provides mediation/conciliation between Electricity Suppliers. OCCTO acquired a certification from the Minister of Justice as the certified dispute resolution business operator in accordance with the “Act on Promotion of Use of Alternative Dispute Resolution.”

OCCTO operates and maintains “Switching Support System.”

OCCTO contributes to information inquiries of consumers’ facilities and usage amounts, and to acceleration and facilitation of the switching of transmission network use agreements between Retail Companies and General Transmission and Distribution Companies.



Based on the Electricity Business Act, OCCTO Performs the Fair and Neutral Operation Management as an authorized organization

【Organization】

General meeting

Composed of all members.* Resolution of change of articles and operational rules, budgets and accounts, and assignment and dismissal of officers

Auditor

Audit / Advice

Board of directors
(President, Executive Vice-Presidents)
Daily management decisions

Assignment / Check, suggestion

Board of councilors
Deliberation of critical issues by neutral members except for utilities

Appointment of employees / Management, supervision

Secretariat

- **General Affairs Dept.** — Member liaison, formulation and review of rules for network use, operating Switching Support System, disaster prevention, information security measures
  - **Public and International Relations Office** — Reinforcing functions for collecting and transmitting information
- **General Planning Dept.** — Study of ideal reserve and balancing capacity , studying, undertaking a detailed design of, and operating the capacity market
- **Network Planning Dept.** — Demand forecast, aggregation of electricity supply plans, and formulation of long –term development plan of cross-regional network and cross-regional network development plan
  - **Network Access Office** — Acceptance of preliminary consultation and system impact study for power generation facility with over 10MW
- **Network Operation Dept.** — Respond to power shortage, management of cross-regional interconnection lines, coordination of maintenance work plans, and operation of Cross-regional Operation System
  - **Cross-regional Operation Center** — Monitoring and management of supply-demand and power system condition
- **Dispute Resolution Office** — Respond to complaints and consultations, conciliation/arbitration
- **Audit Office**

(Main operations are listed.)

※*All the Electricity Companies have an obligation to become members of OCCTO.
Responsibilities of OCCTO members
● Exercise their voting rights at general meeting. ● Observance of Rules for instructions and requests from OCCTO.
● Payment of membership fee. ● Submission of Electricity supply plan ● Emergency disaster preparedness

The positioning of OCCTO