参考資料1

Interim Summary of Review (Outline)

Energy Supply WG

Mid- and long-term initiatives to achieve a low-carbon society

2020

- The renewable energy promotion initiatives ill function effectively. Renewable energy accounts for more than 10% of the total primary energy supply.
- The proliferation of renewable energy will reinvigorate local communities and create new jobs.
- Renewable energy will proliferated through utilization of existing supply infrastructures, while the development of next-generation energy supply infrastructures will be accelerated.

2030

- Social programs will be reformed to deal with growing amounts of renewable energy. New programs compatible with renewable energy will be in place.
- Energy supply infrastructures will be in place to maximize the use of renewable energy.
- The introduction of renewable energy will be made obligatory as the energy is more cost competitive than fossil energy (assuming mainly the introduction of renewable energy heat to buildings).

2050

- Renewable energy will play a major part in energy supply together with nuclear power. Zero-carbon power supply programs will be in place.
- Japan's top level of environmental energy technologies will be proliferate widely over the world as low-carbon energy is predominantly in use globally.

Revision of the Energy Supply Road Map

The Energy Supply Road Map for the previous fiscal year

- Four pillars of the Road Map
  - Financial support for establishing infrastructures for promotion of renewable energy
  - Reform of social programs to cope with the proliferation phase of renewable energy
  - Accelerated development of next-generation energy supply infrastructures
  - Realization of low-carbon use of fossil energy. Extended use of security-assured nuclear power generation.

The trend of energy supply for this fiscal year

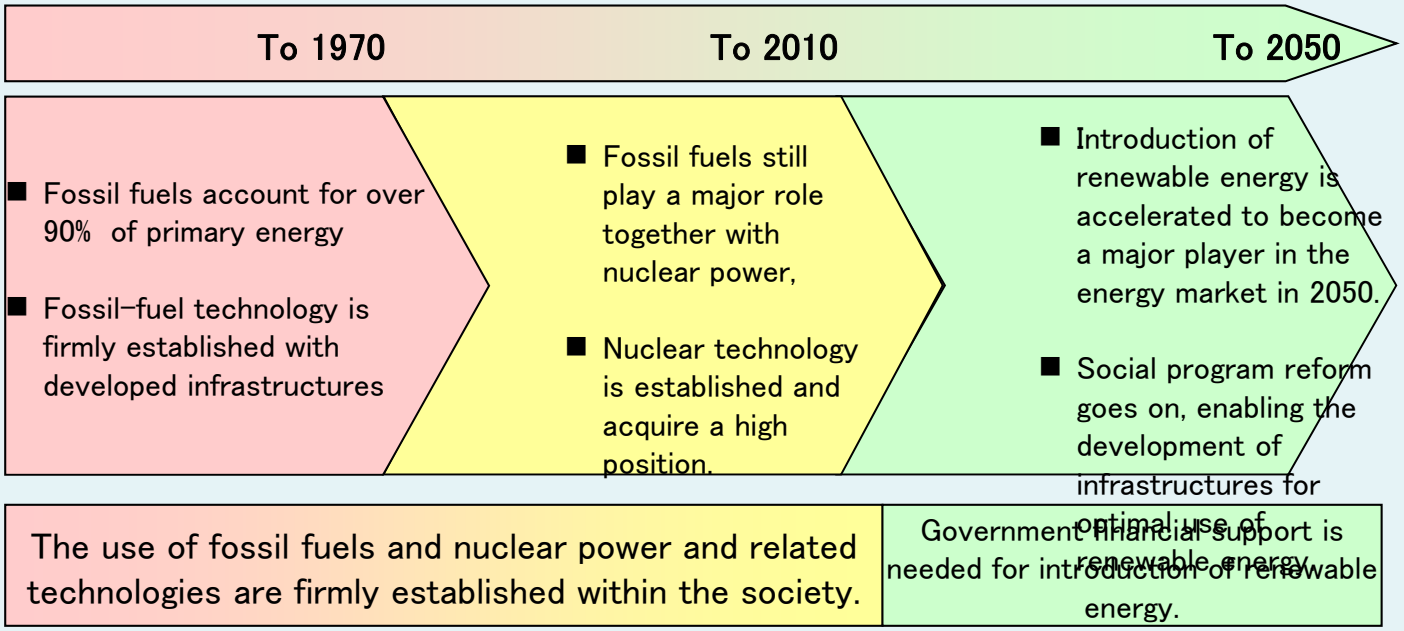
- A new growth strategy and an basic energy plan announced in June 2010
  - Heated discussion resumed concerning a total-amount fixed-price buyback program
  - Importance of constructing a next-generation energy and social program, including introduction of smart grids

Points of in revision of the Energy Supply Road Map

- Detailed design of a fixed-price buyback program (e.g. target sellers, buyback prices, purchase period, treatment of private consumption)
- Detailed analysis of estimated amounts of introduced renewable energy based on a buyback program design and other materials
- Review of renewable energy business promotion policy as a supplementary policy for the buyback program (intensive review at a workshop established under the WG)
- Development of an electricity program to promote the introduction of renewable energy

Prioritization in review by the Energy Supply WG

- The use of fossil fuels and nuclear power is technologically established throughout the society.
- To raise the position of renewable energy to the same level as that of fuels and nuclear power as a new social program, the government is required to proactively financial support activities at the private sector level.



- Compared with Europe, Japan is slow not only in establishing policies to promote renewable energy but in introducing renewable energy.
- Under these circumstances, the WG has reviewed a variety of policies, in response to growing expectation for introduction of renewable energy, concerning low-carbon energy supply needed for the promotion of renewable energy, specifically addressing many related issues to overcome.

Assumptions about renewable introduced output and buyback prices (1/2)

■ Estimated output and financial support levels for 2020 are assumed based on the following facts:

Renewable energy sources were analyzed for the potential for their introduction into Japan on the basis of the findings of the renewable energy feasibility study conducted by the Ministry of Environment during fiscal 2009.

Cost of introduction of renewable energy varies widely depending on geographical conditions of the location (e.g. wind speeds for wind power generation and heat density for geothermal generation). We attempted to clarify the relationship between the potential and cost for introducing renewable energy as a basic input to establishment of economic financial support policies to estimate unit prices by location for potential scenarios.

As the estimated output, we adopted the target output in the AIM Japanese technical model presented at the general review meeting on the 2009 Mid- and Long-term Roadmap for Global Warming Measures (the Ministry of Environment, 2009). The financial support policy assumed that IRR for 20 years at all locations will be 8% or more until the estimated output is reached (photovoltaic generation and solar heat were evaluated based on the investment recovery period).

■ The slides to follow will provide our views for each renewable energy source.

Assumptions about renewable introduced output and buyback prices (1/2)

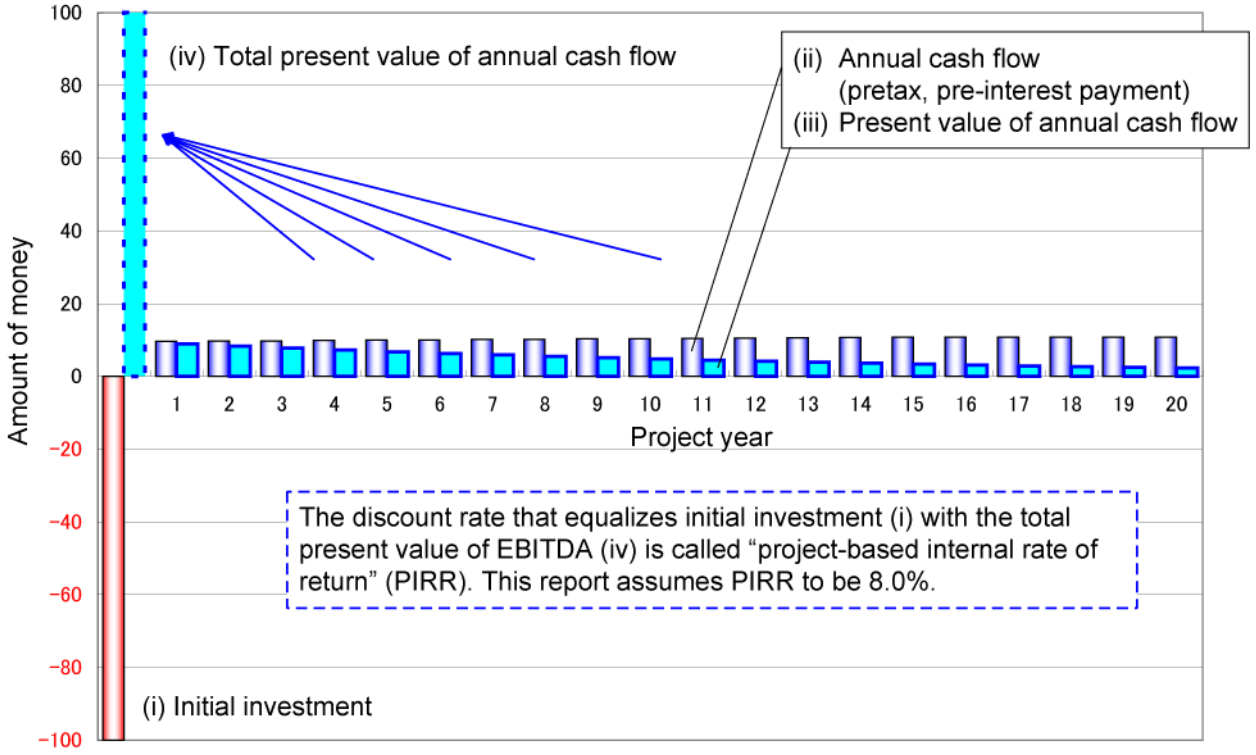
Photovoltaic generation	■ In the ▲15% scenario, the residential and non-residential segments in the private sector will adopt a fixed-price buyback program, under which the investment recovery period of 10 years is assumed. The public sector will introduce the same level of photovoltaic facilities as in the private sector. ■ In the ▲20% and ▲25% scenarios, buyback prices will be raised. The investment recovery period will be about 9 years and about 8 years, respectively. ■ Prices will basically continue declining with increasing output, and buyback prices will be revised annually.
Wind power generation (land/offshore)	■ Introduced output will be set for 11.31 million kW based on a scenario provided by the Japan Wind Power Association. ■ Buyback prices are calculated based on this output for the 20 years during which IRR of 8% is assured. For land wind power, buyback prices are assumed to be revised annually to reflect reducing windmills cost.
Small and medium hydraulic power generation	■ Energy will be purchased at fixed prices that ensure IRR of 8% until output target is achieved. ■ Three buyback prices are assumed depending on the target level.
Geothermal generation	■ Until the output target is achieved, buyback prices of the energy source at IRR of 8% or more (about 43 yen /kWh) would exceed those of other energy sources at all locations. For this reason, buyback prices will be maintained at 20 yen/kWh, while the government will shoulder part of research and development expenses for locations having and IRR less than 8% .
Use of solar heat	■ In the ▲15% scenario and the ▲20% scenario, financial support will be given to set the investment recovery period of 15 years (equivalent to the expected lifetime). In the ▲25% scenario, financial support will be given to set the investment recovery period of 10 years. Output is estimated based on the acceptable investment recovery period. ■ Other problems than economic issues will be solved.
Biomass generation	■ A FiT program will be introduced to ensure an IRR of 8% at locations until the output target is achieved.
Use of biomass heat	■ A green heat certificate program will be introduced at prices that ensure an IRR of 8% at locations until the output target is achieved.

※It should be noted that the cost of land wind power generation may increase under restriction on the part of the location.

Investments criteria used for buyback price determination

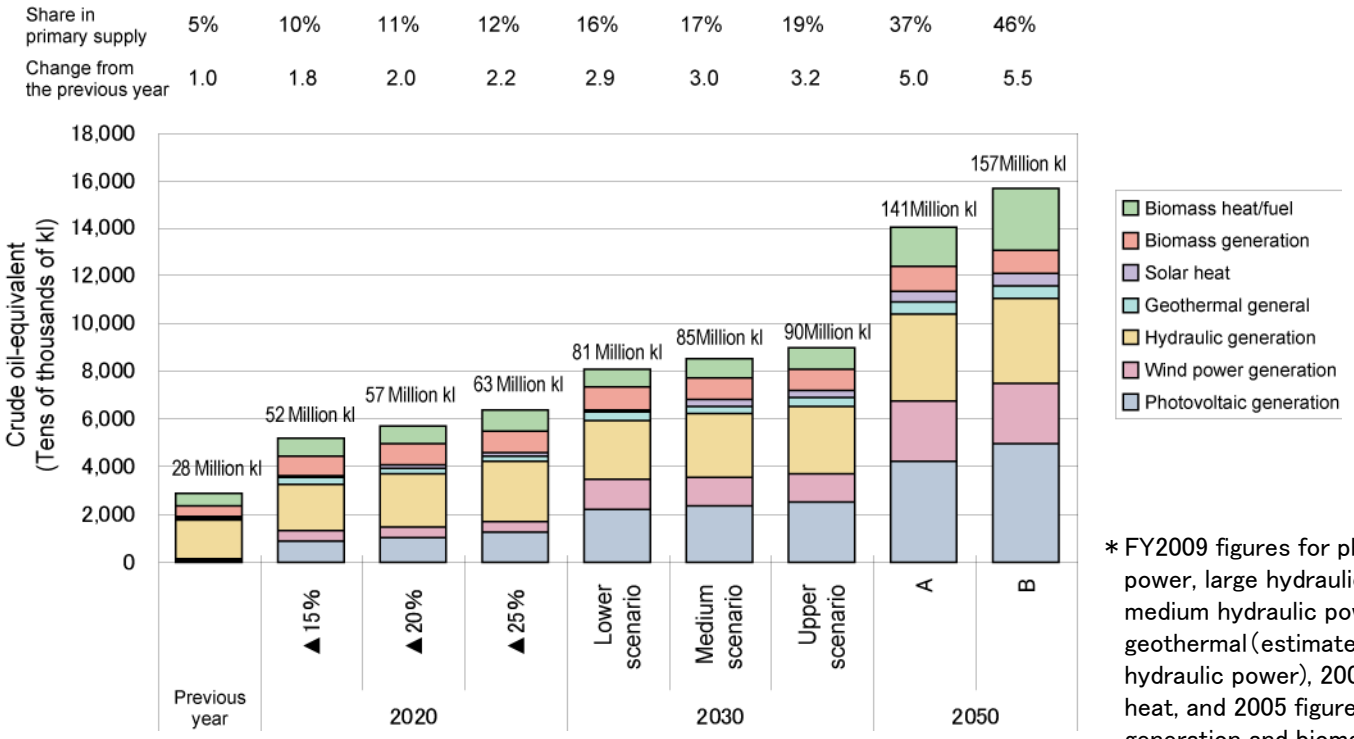
■ The IRR of 8% , used as investment criteria, has been adopted on the following basis. In photovoltaic generation, the assumed investment recovery period of 10 years is almost equivalent to an IRR of 8% :

- According to the Ministry of Land, Infrastructure, Transport and Tourism, projects under Japan's private finance initiative (PFI) assume an Equity IRR(EIRR) of about 10% to determine their profitability.
- For example, if project finance is provided for a wind power project assuming DSCR of1.3, interest rate of 4% , and a borrowing period of 15 years, then a Project IRR(PIRR) of 8.0% is needed to ensure an EIRR of 10% .
- Thus, the PIRR of 8.0% will be adopted to make an investment decision on a renewable energy project. The PIRR=8.0% is a prerequisite, while EIRR varies depending on how project finance is provided.



Renewable introduced output

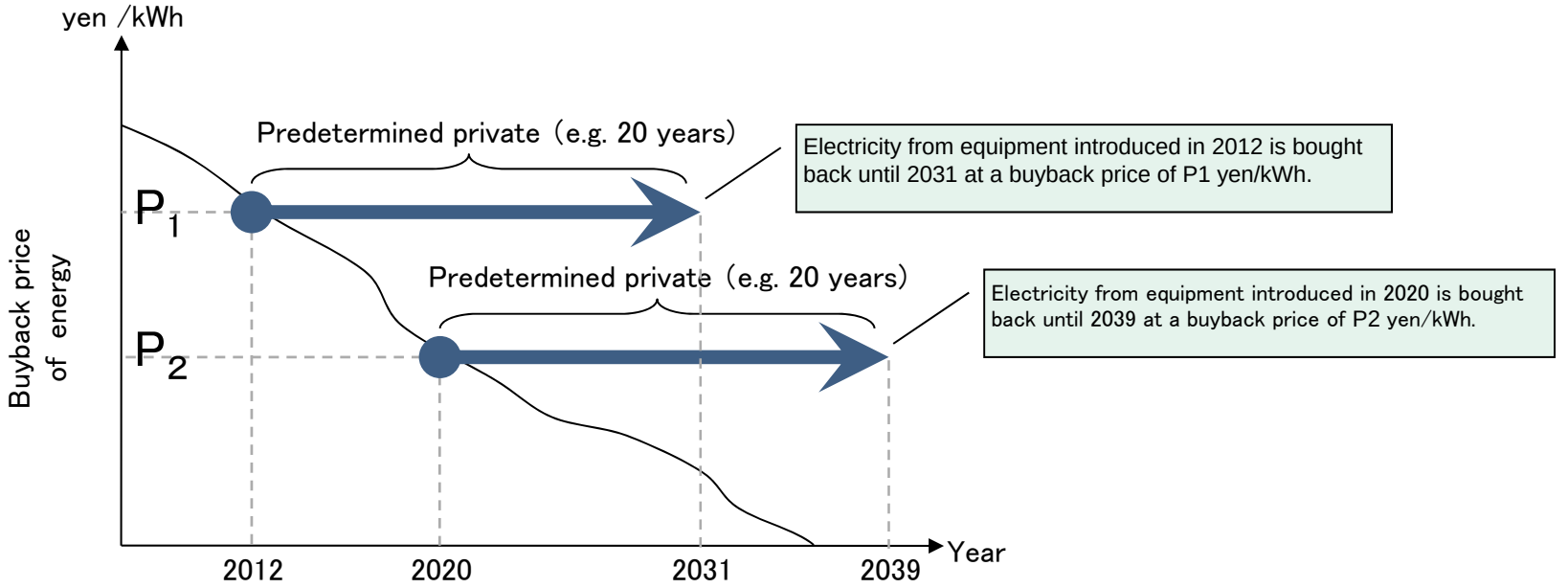
- The Energy Supply WG revised for this fiscal year the estimated renewable introduced output for FY2009 (released on http://www.env.go.jp/earth/report/h22-05/index.html) as follows.(Introduced output for 2020 was estimated in three scenarios: ▲15% , ▲20%, and ▲25% from the 1990 levels)
- The following points were taken into consideration in the revision:
  - The surplus electricity buyback program for photovoltaic generation, started in November 2009, was taken into account. At the same time, it was assumed that the full-amount buyback program will start in 2012.
  - The estimate of the utilization of solar heat was revised on the basis of a projection by the Solar Energy Utilization and Promotion Forum.
  - Based on a review by the Automobile WG, the estimated introduced output of biofuels was downgraded in the 15% and the 20% scenarios and all 2030 scenarios.
  - Based on information concerning existing hydraulic power generation by facility size, the classification of small, medium, and large hydraulic power facilities was revised.
- For 2020, it was confirmed that in all scenarios, the target of renewable energy achieving a 10% share of primary energy supply by 2020 will be realized as contemplated by the Law Concerning the Promotion of Measures to Cope with Global Warming.



＊FY2009 figures for photovoltaic, wind power, large hydraulic power, small and medium hydraulic power, and geothermal (estimated figure for large hydraulic power), 2007 figures for solar heat, and 2005 figures for biomass generation and biomass heat utilization

What is the FiT Program?

- A program that obligates power companies to buy back at fixed prices electricity generated from renewable energy sources. Buyback prices are usually by type of power supply.
- Buyback prices set in a certain year are fixed for a long period (e.g. 10 to 20 years) for power generation facilities introduced during the year. This ensures that installers of facilities can recover their initial cost incurred in the introduction, resulting in securer and proactive long-term investments in renewable energy.
- Buyback prices are expected to decline slowly in line with reduced production costs thanks to lowering cost of generation with technological progress.
- Buyback costs incurred by electric power companies in connection with renewable electricity are shouldered by all electricity users.
- After the new program is terminated, no additional FiT scheme is planned. Buybacks from existing applicable power supplies will be continued during the predetermined period.



Outline of the FiT program for renewable energy

■ To achieve the intended introduced output, it is desirable to introduce a FiT program that covers all amounts of renewable electricity. The program is outlined as follows.

- The program will cover energy sources in practical use, specifically, photovoltaic power, wind power, small and medium hydraulic power, geothermal energy (including hot-spring power generation), and biomass generation.
- Buyback prices of energy from other sources than photovoltaic generation will ensure the IRR of 8% for 20 years (different prices are set by type of power supply at around 20 yen). The buyback prices of electricity from photovoltaic generation will ensure the IRR of 8% for 20 years with a investment

	▲15%	▲20%	▲25%
Photovoltaic	44 yen/kWh(2012) →24 yen/kWh(2020)	48 yen/kWh(2012) →26 yen/kWh(2020)	53 yen/kWh(2012) →27 yen/kWh(2020)
Wind power	Land :22 yen/kWh(2012)→18 yen/kWh(2020), Off-shore(bottom-mounted) :30 yen/kWh Offshore(floating) :42 yen/kWh		
Small and medium hydraulic power	15 yen /kWh	20 yen /kWh	25 yen /kWh
Geothermal	20 yen /kWh(a supplementary program provided for locations with the IRR below 8%)		
Biomass	22 yen/kWh		

- All amounts of renewable electricity, including private consumption, will be bought back.(A full-amount buyback scheme is desirable to ensure fairness and enable estimation of investment recovery periods in line with an assumed increasing renewable electricity output.).
- For existing power supplies, the initially assumed profitability should assured.

Benefits of proliferation of renewable energy

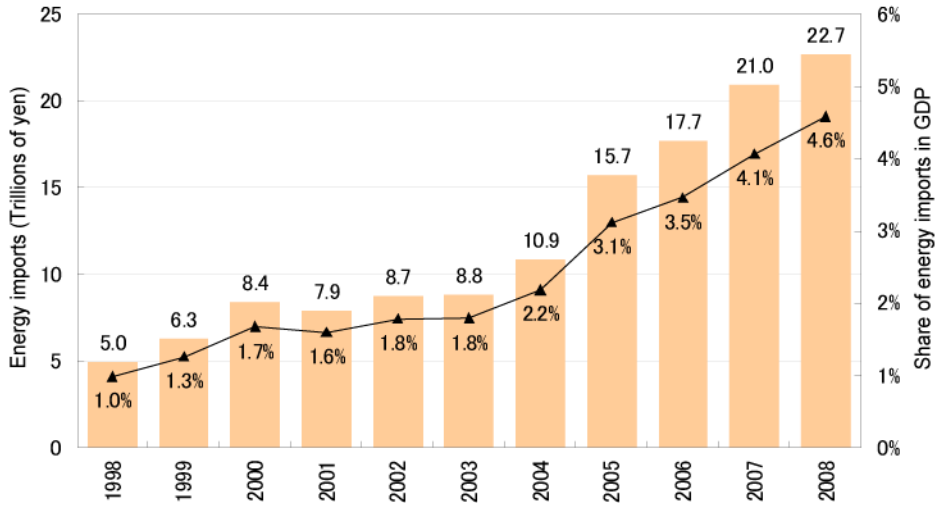
■ Benefits of proliferation of renewable energy

- The proliferation of renewable electricity will create new more jobs, enhance energy security, and promote business within communities, as a driving force behind Japan's economic growth.

CO_2 reduction	60 to 80 million t-CO_2 in 2020 (0.4 to 1.8 trillion yen when converted to the 2010 value at a discount rate of 4%)
Energy self-sufficiency	Improve to 10 to 12% by 2020
Reduction in cost incurred in procuring fossil fuels	0.8 to 1.2 trillion yen in 2020 (converted to the 2010 value at a discount rate of 4%) ※Fossil fuel imports recorded about 23 trillion yen in 2008, or 4.6% of GDP
Economic ripple effects	Average induced output of 9 to 12 trillion yen during the 2011-2020 period, with gross added value of 4 to 5 trillion yen (converted to the 2010 value at a discount rate of 4%)
Job creation	Annual average of 460,000 to 630,000 new jobs during the 2011-2020 period ※No equipment import is assumed (imports will reduce benefits). Includes equipment exports overseas.

Source: Ministry of Environment "Proposal for Low Carbonization toward Building a Low Carbon Society" (March 2010)

Energy imports and their share in GDP

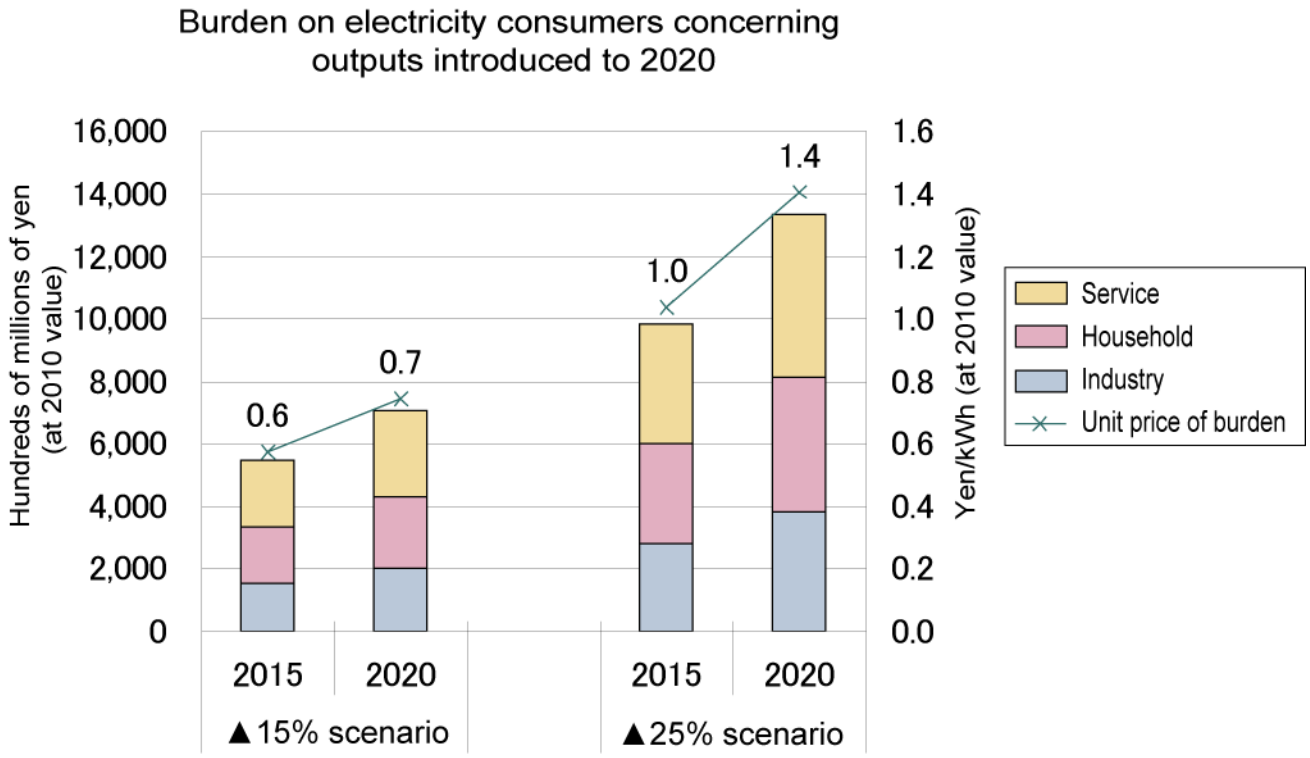


Source: complied from trade statistics and national economic accounting

Financial burden under the FiT program for renewable electricity

■ Financial burden under the FiT program for renewable electricity

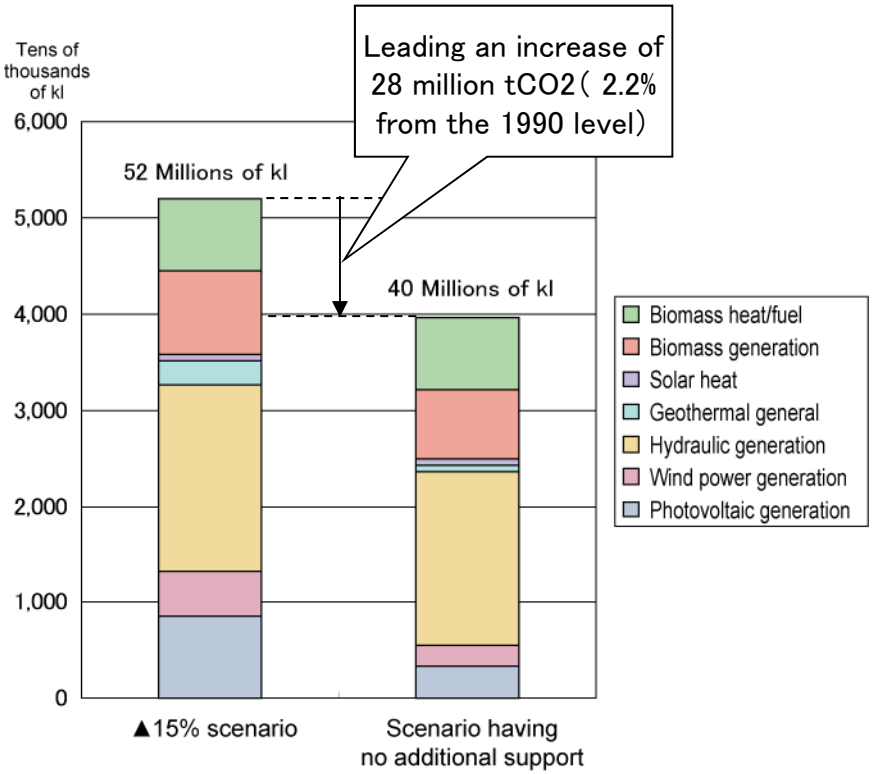
- Users will pay (buyback price − avoidable cost) × introduced output.
- For cumulative introduced output to 2020, electricity users will pay 0.72 to 1.33 trillion yen at 0.7 to 1.4 kWh.



※For other types than photovoltaic generation, it is assumed that the buyback covers only newly installed power supplies.
※Avoidable cost reflects increases in fossil fuel prices as projected by IEA.
※Annual electricity demand is assumed at 95 million kWh.
※The allocation among the industry, household, and service sectors is based on the 2008 results (burden on the heat supply and transportation segments is included in the industry sector).

Effects of the absence of additional financial support for the introduction of renewable energy

- If a FiT program is introduced and covers total amounts of renewable energy, then, it is confirmed, all scenarios would achieve the target of the basic anti-warming law of renewable energy representing 10% of the total primary energy supply by 2020.
- If no additional financial support is provided for the introduction of renewable energy,
- In 2020, renewable energy will be accounting for 7% of tit primary energy supply, representing a potential increase of 28 million tCO2 (2.2% from the 1990 level) compared with the 2020 ▲15% scenario .

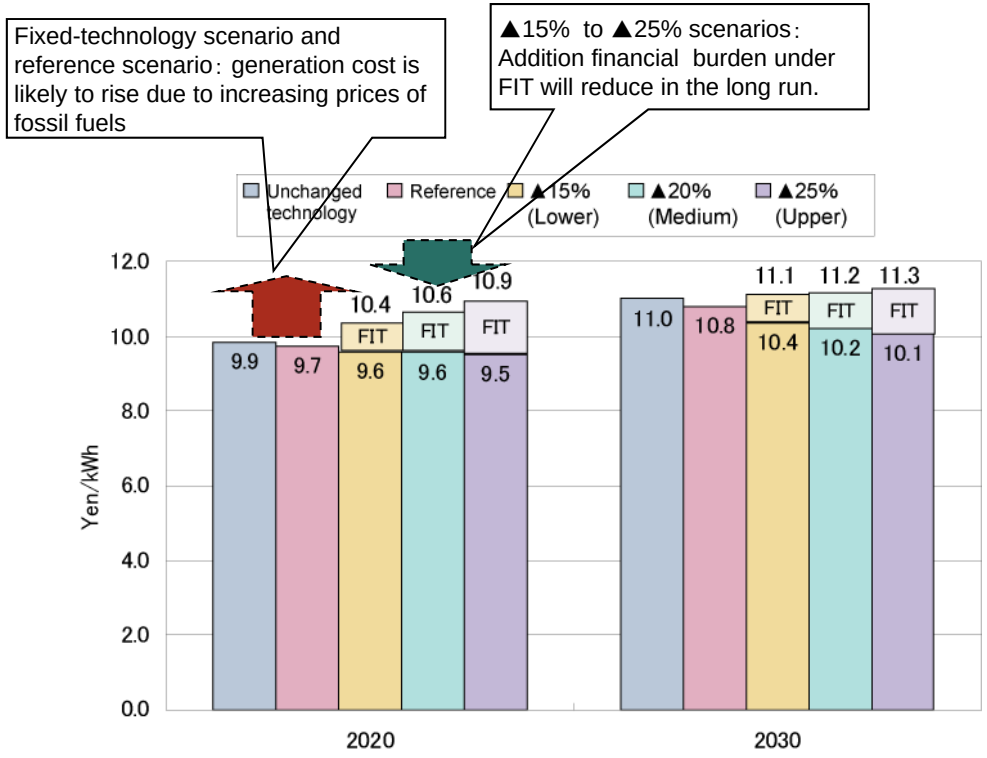


Assumptions for renewable energy by type

Photovoltaic	The same investment recovery period is assumed to continue as under the current FiT program, under world electricity is bought back at 48 yen /kWh for the residential sector and at 24 yen /kWh for the non-residential sector. The 70,000-yen/kW subsidy program will be continued for the residential sector.
Wind power	The annual average introduced output for the FY2005-2009 period is used.
Hydraulic power	The average increase for the FY2005-2009 period will be used for RPS-applicable projects.
Geothermal	Introduced output will stay flat.
Solar heat utilization	Introduced output will stay flat.
Biomass generation	Lower scenarios in the Kyoto Protocol Target Achievement Plan will be maintained.
Biomass heat /fuels	Reference scenarios estimated by the AIM Project Team will be adopted for biofuels.

Effects on generation costs of low-carbonization of power supplies

- In the ▲15% to the ▲25% scenarios for 2020, decreasing consumption of fossil fuels reduces generation cost by 0.1 to 0.2 yen/kWh from the reference scenario. Meanwhile, electricity users are projected to shoulder 0.7 to 1.4 yen/kWh under the FiT program introduced in 2020. As a result, in the ▲15% to ▲25% scenarios, they would have to shoulder 0.7 to 1.2 yen/kWh more than in the reference scenario due to increase outputs of renewable electricity.
- Thermal power outputs reduce with proliferation of renewable electricity, accelerating low carbonation of power supplies in the long run. During the course, renewable electricity becomes less expensive to reduce the burden on the FiT program. The charge gap shrinks if fossil fuel prices increase.
- In 2030, if the FiT program is not introduced, generation cost is projected to rise (about 1 yen/kWh according to an analysis) with increasing prices of fossil fuels. Meanwhile, the financial burden on the FiT program is estimated to reduce in the long run, and electricity charges would approach those in the assumed absence of the FiT program.
- In this discussion, costs of power line development are not analyzed.



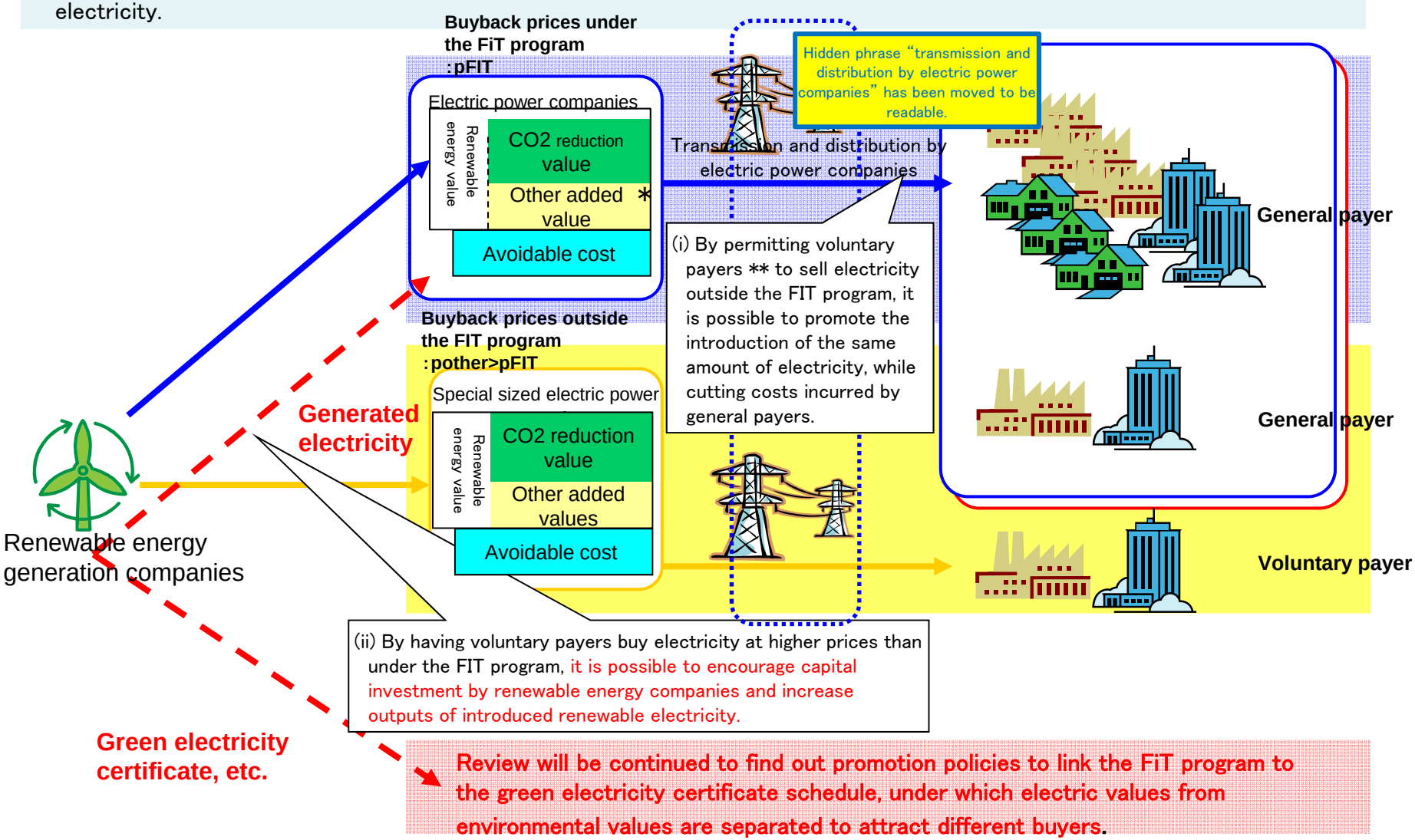
《Assumptions》
※Fixed-technology scenario and reference scenario: scenarios assuming that introduced outputs will stay flat
※Generation cost was determined by calculating the weight average output by type of power source.

Nuclear power	Based on the financial statements provided in *Political Economics of Renewable Energy* (Toyo Keizai, Inc.), the price of nuclear power and large hydraulic power is assumed to remain flat at 8.93 yen/kWh and 3.59 yen/kWh(2000s), respectively.
Large hydraulic power	
Thermal power	The values used in calculation of avoidable costs are adopted (Energy price projections by IEA World Energy Outlook were used. 11.2 yen /kWh for 2020 and 13.4 yen/kWh for 2030). These values are based on the financial statements and reflect future rise in fuel prices.
Renewable (excluding large hydraulic power)	It is assumed that, under a FiT program under which all electricity generated is bought back, the amount equivalent to avoidable costs to be borne by electric power companies will be included in costs (same as thermal power).

※Electricity from photovoltaic generation will be bought back until the buyback price reaches the current unit electricity charge for households (in the first half of the 2020s). It is assumed that electricity from other types of renewable electricity will continue to be bought back at the same prices as before 2020.

Treatment of CO2 reduction value of renewable electricity

■ By permitting electricity trading in and out of the FiT program and at the same time operating the green electricity certificate program, it will be possible to reduce financial burden anticipated under the program and enhance the introduction of renewable electricity.

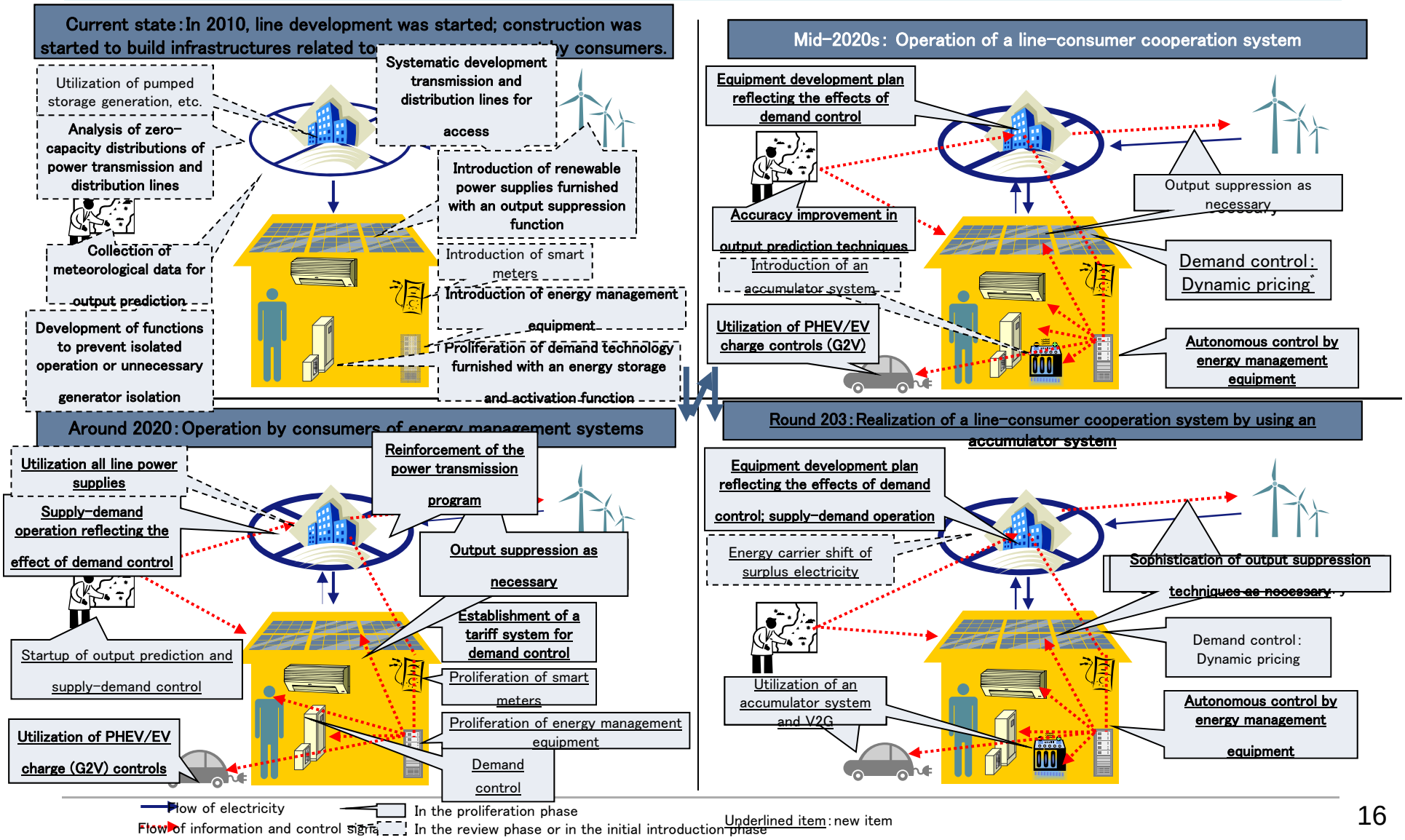


＊ "Other added values" include enhanced energy security, job creation, community revitalization, education effect concerning environment and energy, and reduced air contamination.

**"Voluntary payers" refers to users who are willing to pay more for renewable electricity.

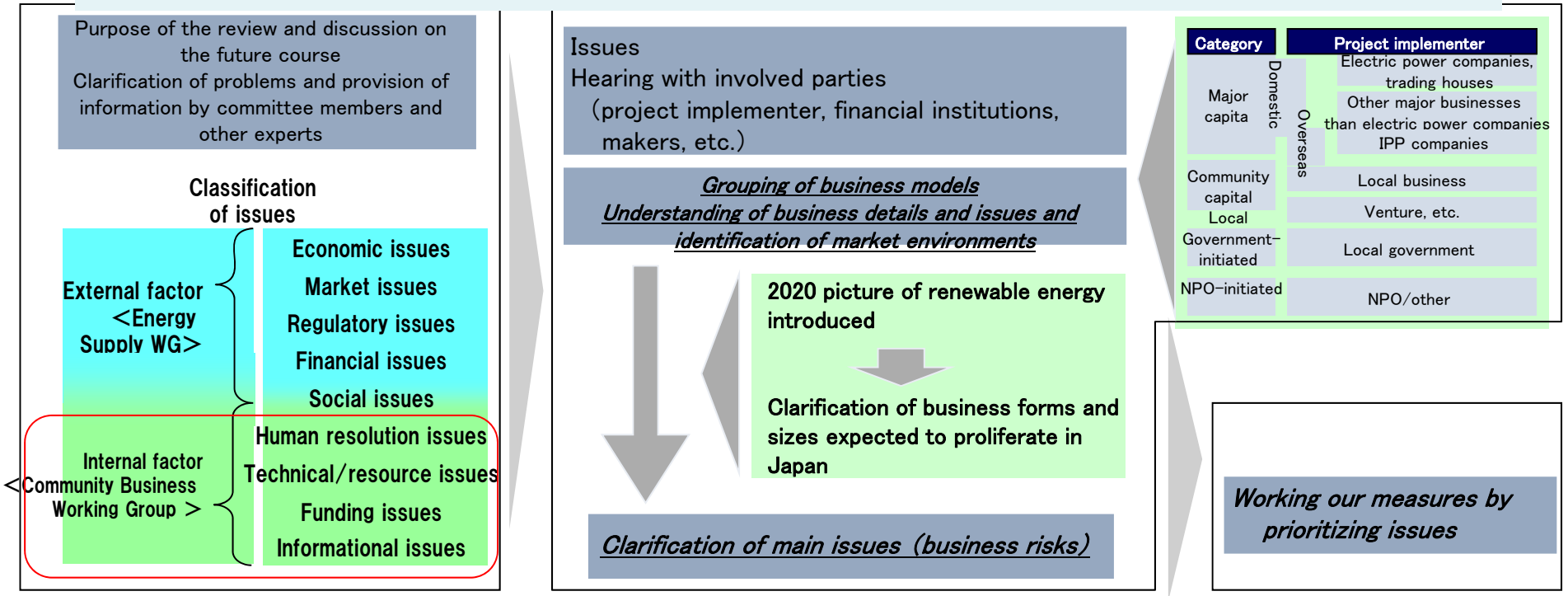
transmission and distribution network

■ There is some concern that mass proliferation of renewable electricity, which is subject to fluctuating outputs, might destabilize electricity supplies. This problem can be overcome by gradually rebuilding the existing electricity line infrastructure and related programs.



Review by the Working Group on Renewable Energy Business in Communities —Review Framework —

- Main domestic business projects were classified by type of project implementer. The details of such businesses and issues involved were analyzed to clarify market environment and other factors through interviews and literature investigations within the scope of this working group (review of community business models and evaluation of renewable energy type matching the geographical features of the region).
- Based on our analysis, we detailed business forms that potentially appear in Japan in line with the introduction of renewable energy introduction to 2020.
- This working group listed problems with internal factors (human resources, funds, and information) for project implementers, identified issues and possible solutions necessary to promote the business models, and reflected such considerations in the roadmap.



Review by the Community Business Working Group—Priority Issues for realizing the introduction scenarios—

■ To ensure dynamic development in the future of renewable energy business, businesses should take appropriate forms to deal with various issues, as follows.

	Photovoltaic generation	Wind power generation	Small and medium hydraulic power generation	Geothermal generation	Biomass generation
Business form expected to spread	Major capital + local government Community capital	Major capital＋major finance Community capital＋major＋community finance Community capital＋major＋community finance＋local government Community capital＋major＋community finance＋NPO	Major electric power company / public electricity operator Small hydraulic power electric power company	[Geothermal] Major capital, geothermal capital [Hot spring] Community capital, local government-initiated	Major capital＋major financial institutions Community＋major and community financial institutions
Issues of human resources	[Personnel shortage] ● Shortage of maintenance and control personnel; absence of a maintenance system	[Personnel shortage] ● Personnel shortage at project implementers and financial institutions	[Personnel shortage] ● Shortage of specialists in civil engineering, power generation technology, and other field of hydraulic power generation ● Especially, a shortage at project implementers of personnel having know-how concerning operation.	[Personnel shortage] ● Shortage of project leaders ● Shortage of personnel having expertise in excavation	[Personnel shortage] ● A shortage of personnel having management abilities at the project implementer and a shortage of personnel having expertise in wind power generation business at financial institutions
Issues of technology and resources	[Difficulty with acquiring land] ●Land acquisition costs /restricted use of land [Natural risk] ● Damage by typhoon, thunder, etc.; shortage of sunlight	[Appropriate setting of location and equipment] ● Consideration should given to noise, bird strikes, and scenic beauty ● Appropriate equipment shall be selected in accordance with the wind conditions of the site [Formation of community consent] ● Residents' consent should be formed subject to discussion on such issues as noise [Natural risk] ● risk involved in wind conditions; damage from typhoons, lightening strikes, etc.	[Acquisition of water rights for power generation] ● Even if you have the water right, you additionally need water rights for power generation [Technical consideration] ● Sufficient consideration should be given to the river environment	[Necessity for auxiliary wells] ● Auxiliary wells should be dug before operation starts [Technology shortage] ●Lack of an appropriate geothermal resource control method to prevent depletion of heat and water resources; incomplete anti-attenuation technology and anti-scaling measures; large variations in the digging success rate; shortage of digging techniques [Technological consideration] ● Full consideration should be given to the natural environment.	[Stable procurement of resources] ● Difficulty with securing biomass resources [Procurement of buyers] ● Procurement of buyers of electricity and heat
Issues of funding	[High cost] ● High initial costs; high equipment construction costs [Limited availability of funds] ● In service-type business,	[Difficulty acquiring funds] ● In Japan, project finance is not common, preventing project implementers in a low credit position from acquiring enough fund. [Burden of costs] ● Surrounding environments, such as	[High cost] ● Relatively high initial costs ● Much cost, work, and time in maintenance and control [Line linkage costs] ● An increase in line linkage costs in line with farther location	[High cost] ● High investigation expenses and high cost involved in initial investment in production wells [Long period] ● Excessively long lead time in development	[Low business profitability] ● The business profitability is low especially for individual energy projects that treats waste on their own

Review of community business WG —Large-boned policy—

■ Public financial support measures - as a large-boned policy - that the government should develop to address the “key issues” (summarized on the previous page) can be outlined as follows.

[Human resources]

○Develop human resources with both technological and financial knowledge who will be engaged in renewable energy business.
Specifically, establish personnel training programs.
In addition, while recruiting such human resources, promote the establishment of Renewable Energy Promotion Council in cooperation with local public entities and train coordinators involved in the project setup.
Organize and manage coaching staff for these purposes.

[Technologies (goods)/resources]

○ Establish a public operating rate guarantee program (to guarantee the quantity of electricity generated under normal wind conditions on the premise of appropriate performance of equipment) and move stepwise to a private sector-based insurance program once data are accumulated and it allows the stable operation of the guarantee program.

[Funds]

○ Provide credit support including public debt guarantee by the nation, etc., for small and medium enterprises to participate in renewable energy business (on the basis of the traditional credit support program related to renewable energy introduction or to financial support for small and medium enterprises).

○ Provide interest subsidies for interest rates on borrowings to introduce attract risk money to renewable energy business.

○ Provide incentives to low-carbon equipment leasing as eco leasing.

[Information]

○ Compile a database of information on the possible areas for development and business promotion, possible development quantity, and business plans concerning renewable energy and provide information to main project-related bodies (such as financial institutions) and community-level main bodies. In addition, establish special windows in each community to provide one-stop services to give personnel information, data on the amount, information on support programs for business promotion, information on application.

○ Provide support so that the supply and demand of local production for urban consumption can match up through the cooperation among communities.

Other important items to be reviewed

1 Mandated consideration and introduction of renewable energy heat

- In response to expanded introduction of equipment that uses renewable energy heat and an decrease in introduction costs, it is effective to shift the policy from financial support measures for introduction of renewable energy heat (e.g. subsidy program) to mandated consideration and introduction in a timely manner.
- If we expand renewable energy heat nationwide, using as a reference the mandated introduction of equipment using renewable energy by the Tokyo metropolitan government, it is necessary to consider in details target energy types, target buildings, attainment criteria, regional characteristics including climate conditions, exemptions, alternative energy, etc., and matching with heat demand, etc.

2 Low carbonization of fossil energy use

- In the medium run, low carbonization of energy supply is expected through the expansion of natural gas use.
- Considering the output fluctuation of renewable energy and constant output operation of nuclear power generation, thermal power generation equipment for natural gas thermal power and coal thermal power is essential for supply and demand adjustment.
- It is important to contribute to low carbonization in the whole world through proactive overseas development of Japan's top level generating technologies. And it is necessary to continuously develop technologies and develop human resources in Japan.

3 Expanding the use of nuclear power

- Toward the expansion of the use of nuclear power generation, firstly it is the most important to make efforts to increase the operating rate (the operating rate in FY 2009 was 66%).
- On the basic premise of security ensuring, it is necessary to consider revisions of regulations to increase the operating rate.
- While carrying out appropriate plant aging management, it is necessary to shift to facilities with larger output as needed.
- Meanwhile, if there is only a small increase in the operating rate and facilities, we may depend on the backup by thermal power generation and need to consider alternative measures.

Points to remember for realization of road map

- It is necessary to promote the introduction of renewable energy at a different speed from the past. The introduced output that is assumed this time cannot be achieved only by the fixed-price buyback program.
- The fixed-price buyback program is one of important policies toward a mid-term target. However, it is necessary to consider to shift to another policy when a certain level of cost reduction is achieved.
- It is necessary to review the burden of the development of electricity systems that support the mass introduction of renewable electricity, while considering competition with other energy.
- Concerning mandatory introduction of renewable energy, it is necessary to continue to review details of its target and timing.
- To achieve 10% share of renewable energy in primary energy supply by 2020, politically financial support is needed not only for renewable electricity but also for the proliferation of heat and fuels.
- In the future, it is necessary for many community-specific renewable energy projects to bear fruit. It is desirable that each community carries out projects spontaneously. For this purpose, the nation should promote support steadily for the time being including the development of human resources of various fields.
- In this WG, review was carried out only from the perspective of the supply side. Originally, however, it is necessary to overlook the entire supply and demand of energy. We should low carbonize truly necessary energy by reducing demand to a maximum extent by promoting energy conservation among consumers according to the supply capacity of energy.
- Towards low carbonization of energy supply, we have focused on the review of renewable energy to which high priority is given. However, both low carbonization of fossil fuels use including utilization of CCS and increased use of nuclear power are necessary policies. We need to take necessary policy measures after the review.
- It is necessary to review how to ensure stable supply of energy considering the risk when proliferation of renewable energy is not achieved as well as when there is only a small increase in the operating rate and facilities.
- Because the supply of fossil fuels can be secured or increased/decreased by storage or market procurement, it is necessary to consider power generation from a viewpoint that it is possible to maintain well-balanced fossil fuel equipment.
- Also for low-carbon energy technology, which is not in practical use (e.g. floating offshore wind power generation, ocean energy, hot dry rock power generation, clean coal technology which is in a research and development phase), we should take necessary support measures so that they can contribute to low carbonization inside and outside the country in the long term.

Summary of review results at this time

Detailed design of fixed-price buyback program

- To achieve the mid-term goal by 2020 and achieve 10% share or more of renewable energy in primary energy supply, it is important for energy to be purchased at fixed prices by type of power supply to ensure IRR of 8% for 20 years to the extent that the introduction target can be achieved.
- When it is assumed that introduction will expand, in order to effectively utilize generated electricity, the full-amount should be the target of buyback even in the case of photovoltaic generation for housing.
- For existing power supplies, it is necessary to ensure profitability at the time of business promotion.

Promoting renewable energy business promotion policy in communities

- From four perspectives - human resources, technologies (goods)/resources, funds, and information -, important issues should be organized and large-boned policies should be developed when we aim at dramatic expansion of renewable energy business in the future.
- For “human resources,” it is necessary to establish human resources development programs; for “technologies (goods)/resources,” a public operating rate guarantee program is required; for “funds,” incentives given to low-carbon equipment leasing are needed; and for “information,” it is necessary to provide information by compiling a database of communities that allow development and business promotion and by developing one-stop contact windows.

Close investigation of introduced output of renewable energy

- Considering other organizations’ review of the introduction timing of the fixed-price buyback program as well as solar heat use and biofuels, estimated introduced output should be closely investigated.
- Even after close investigation, about 10% or more renewable energy in primary energy supply should be secured in all scenarios by 2020.

Electricity system development

- Considering estimated changes in introduced output, necessary measures should be organized by setting four sections for the development of a next-generation transmission and distribution network.
- We should start to undertake infrastructure construction related to energy management on the consumers’ side including well-planed development of transmission and distribution wires for access and the introduction of smart meters.
- By around 2020, it is necessary that consumers’ energy management should be in an operation phase; by mid-2020s, the operation of a collaboration program between power systems and consumers should start; and by around 2030, collaboration programs between power systems and consumers should be achieved by utilizing battery systems.

Review of energy supply road map