II. Environmental Changes Related to Investments in Forests

1. Forests Receiving Attention as More ESG Investments Are Made

As more institutional investors worldwide gain a sense of crisis regarding the risk of climate change, they are increasingly putting value on the sustainability of corporate management and other non-financial information related to measures against climate change and biodiversity conservation as much as financial information, and make more ESG investments[7] (Figure 17).

Investors who make ESG investments also highly evaluate efforts to protect forests to mitigate climate change and conserve biodiversity. From the perspective of climate change, GHG emissions resulting from deforestation and forest degradation in developing countries account for approx. 10% of the world's total emissions. Therefore, efforts to stop reduction and degradation of tropical rainforests are of concern to the world, and the CDP Forest[8] publishes evaluation reports on corporate disclosed environmental information and efforts.

On the other hand, although forest reduction or degradation, which is a major problem in the world, is not seen in Japan, planted forests which account for approx. 40% of the forest area, are becoming old and growing less, so the annual CO_2 absorption by the entire forest is declining.

Establishing the cyclical use of "harvesting, utilizing, and replanting" planted forests will result in Japan's forests continuously demonstrating their functions for public interest and will mitigate climate change and conserve biodiversity. Traditional efforts by Japanese companies for social contribution, such as tree planting, are linked to ESG and SDGs, which are attracting global attention, if cyclical use is promoted. Under these circumstances, more Japanese financial institutions have been consulted by companies that want to start taking efforts related to ESG investments, so interest and inquiries regarding Forest Owners' Cooperatives and forestry stakeholders on things related to forests from financial institutions are increasing.

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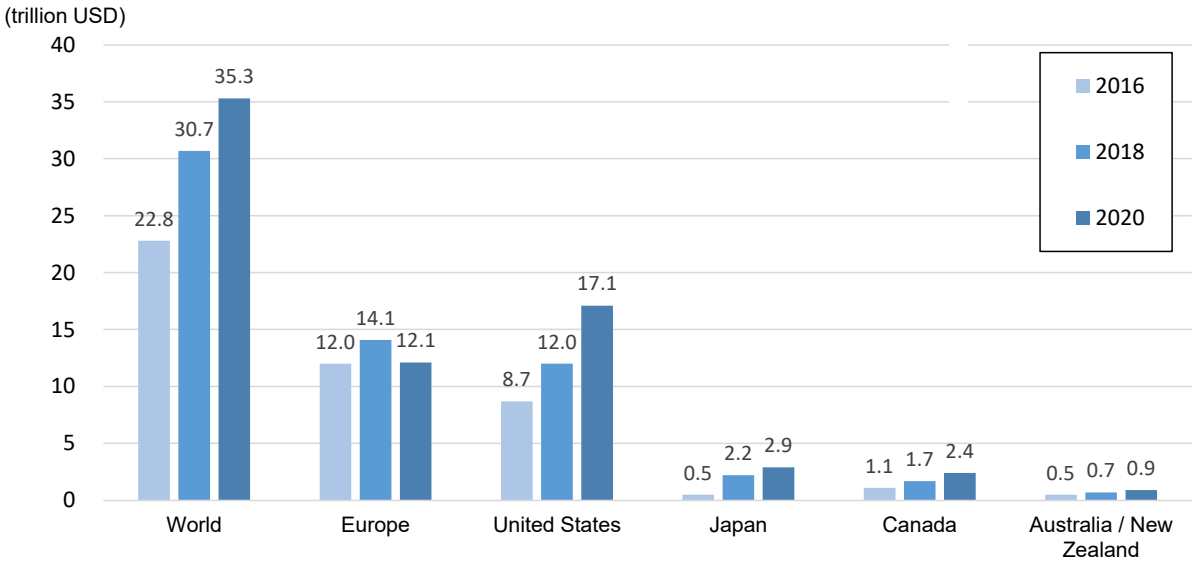
[7] An investment method that uses environmental, social, and governance aspects to decide on investments in addition to traditional financial information

[8] The Carbon Disclosure Project (CDP) is an initiative for institutional investors to ask companies to disclose their environmental strategies and measures against GHGs. The project added forests as survey targets in 2013, and evaluated companies involved in businesses related to wood, palm oil, cattle, and soybeans.

(Figure 17) Expanding global ESG markets



Created on the basis of GSIA (Global Sustainable Investment Alliance) "Global Sustainable Investment Review 2020".

2. Increasing the Chance of Producing Profits in Wood Production and Sales

A management decision model to evaluate economic efficiency based on the productivity of forest areas, which was developed in the study by Utsugi and others[9], has started being used. In this model, profits are calculated by multiplying wood volume that increases in a unit area per year (continuous growth volume) by stumpage prices and rotation periods, and expenditures include the costs of planting, tending, production of logs, and transporting.

Companies and governments can judge whether profits can be secured in forests through producing and selling wood by setting wood prices and expenditures, utilizing the calculation, and on the basis of continuous growth volume per unit area and zoning of planted forests.

The use of these research results is expected to improve the chances of producing profits in wood production/sales as matters now stand by reducing forestry practice costs to a certain extent, and to create forest and forestry projects that can be the target of investments.

3. Increasing Expectations for Forest Investment Incomes

It is difficult to extract investment projects consisting of profits only in the wood production/sales division in the management judgment model shown in 2. because stumpage prices are not expected to rise significantly. Therefore, there should be schemes and measures where the various values and possibilities of forests and forestry are additionally evaluated as the impact value of the investment.

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[9] Hajime Utsugi, Hirofumi Kuboyama (2021) Criteria for Forestry Based on Land Expectation Value (LEV) in Terms of Mean Annual Increment (MAI) of Plantation Forests. J Jpn For Soc 103: 200-206

In this regard, there have been movements in Japan against the background of efforts to achieve carbon neutrality, including:

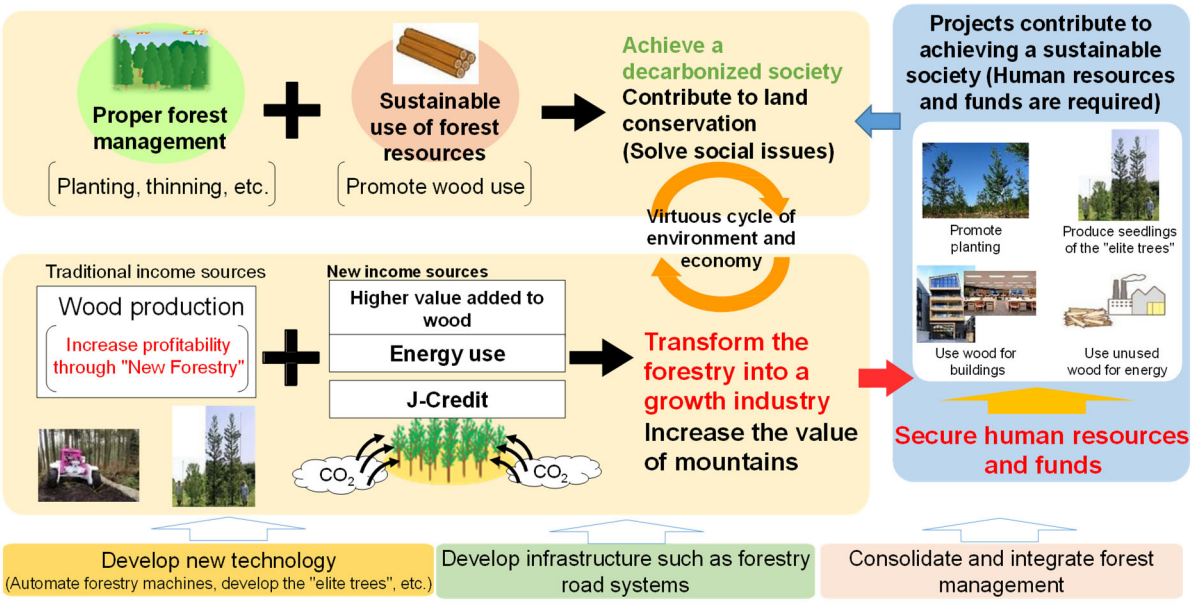
(1) Increase in the private sector's interest in wood use for buildings after the Act on the Promotion of Wood in Buildings to Contribute to the Realization of a Decarbonized Society was enforced;

(2) More use of woody biomass such as unused wood for energy use under the FIT scheme in Japan; and

(3) Progress in efforts to use the J-Credit scheme derived from forest management activities.

These actions have led to the improvement of the value of forests, and expectations are rising from the viewpoint of impact investing (Figure 18).

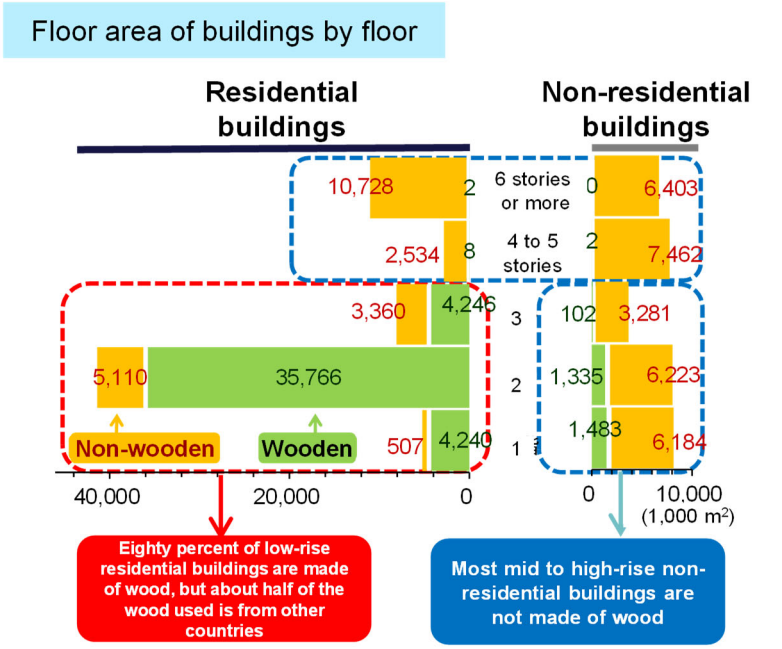
(Figure 18) Virtuous cycle of forest and forestry environment and economy by securing new sources of income



As for "(1) Increase in the private sector's interest in wood use for buildings after the Act on the Promotion of Wood in Buildings to Contribute to the Realization of a Decarbonized Society was enforced", looking at the current building floor areas in Japan in both residential buildings and non-residential ones and by number of floors, eighty percent of one-story to three-story residential buildings are wooden structures, but less than 10% of mid- to high-rise residential ones with 4 or more floors and non-residential buildings are wooden buildings (Figure 19). The Basic Plan for Forest and Forestry establishes a direction for aiming to acquire new demand for wood in mid- to high-rise buildings and non-residential buildings and for expanding the use of high-value-added wood products that use domestic wood. There has been progress on agreement systems based on the "Act on the Promotion of Wood in Buildings to Contribute to the Realization of a Decarbonized Society" (Act No. 36 of 2010) and public-private efforts on wood change. Efforts to increase wood value that lead to improved profitability of raw wood have been

implemented at an accelerated pace. Therefore, the growth of demand for high-value-added building wood materials is expected to increase the value of forests and forestry.

Figure 19: Use of wood for buildings



Source: Ministry of Land, Infrastructure, Transport and Tourism "the Survey of Building Construction Work Started" (2020)
Note: "Residential buildings" refers to the total number of residential buildings, semi-residential buildings, and residential-industry buildings, and "non-residential buildings" refers to the total number other buildings.

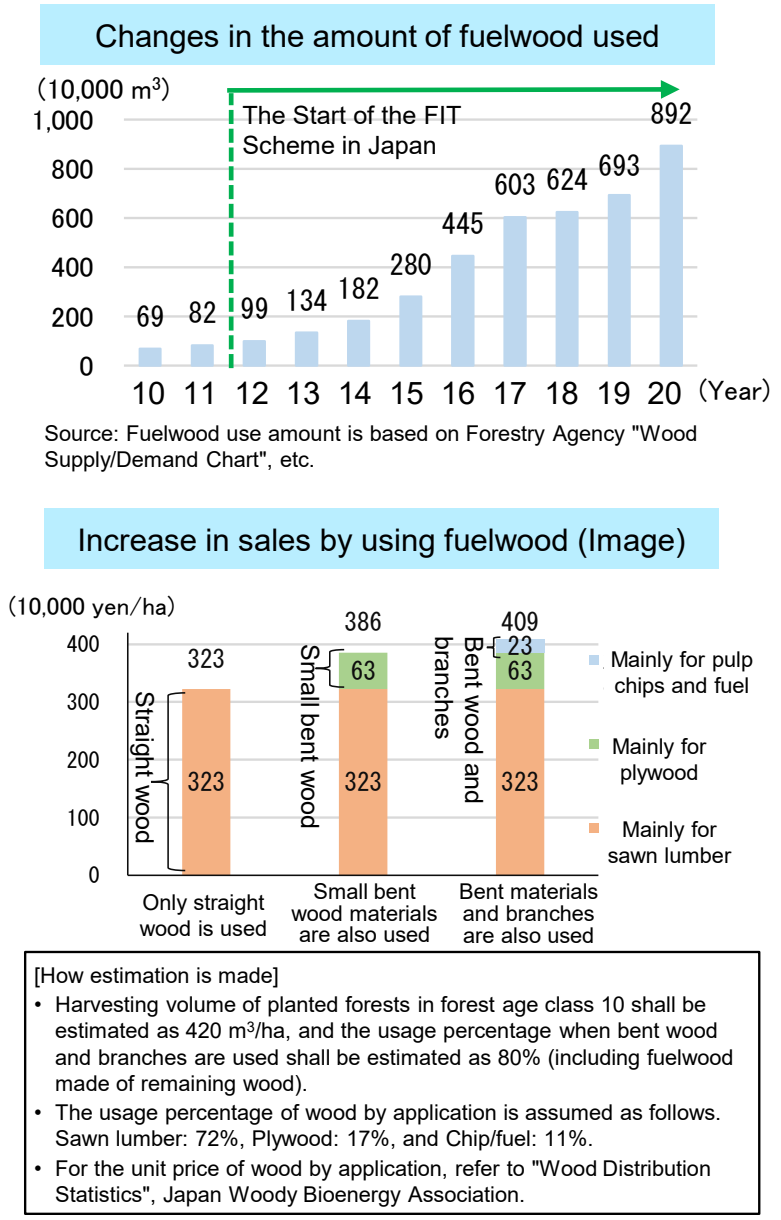
High-value-added wood products that use domestic wood

(Co-operative Fukuoka/Okawa Furniture Industry)

(Nishiawakura Mori No Gakko)

As for "(2) More use of woody biomass such as unused wood for energy under the FIT scheme in Japan", the increasing amount of woody biomass is used for energy sources, as woody biomass generation plants have increased as a result of the Feed-in Tariff (FIT) Scheme for Renewable Energy Use in 2012. New income sources are available for wood, the value of which was limited to sawn lumber and plywood, by broadening wood utilization, including using it as fuel. This leads to the utilization of bent wood, branches, and other wood waste that was previously unused. (On the other hand, it is important to keep in mind from the management viewpoint that it is crucial to increase the ratio of high-value applications such as sawn lumber). Therefore, it is believed that this will contribute to an increase in the sales of wood, and improvement in the value of forests and forestry (Figure 20).

Figure 20: Using unused wood as woody biomass



Finally, as for "(3) Progress in efforts to use the J-credit scheme derived from forest management activities" the forest sector accounts for 42% of the global carbon credits as mentioned above. However, looking at Japan's certification status of the J-credit scheme by methodology, solar power generation accounts for the majority of the issuance, and forest management activities are only 128,000 t-CO_2 (Figure 21).

The value of forests has been generated by wood sales revenue as a result of logging. With the J-credit scheme, however, additional income can be generated from standing trees without logging them, so it is possible to create new revenue sources by expanding and promoting credit issuance.

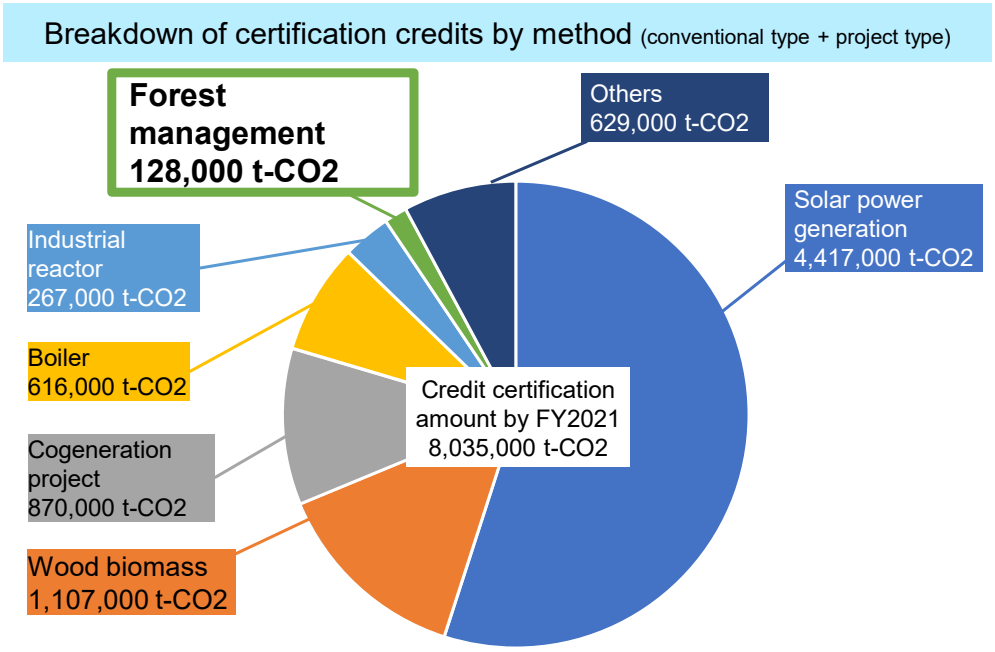
The Plan for Global Warming Countermeasures promotes the creation of carbon-neutral credits for carbon removal/absorption credits, which are becoming increasingly important to achieve carbon neutrality by applying the scheme to forest owners and management

entities and simplifying monitoring processes in order to increase the generation of forest-derived credits through forest management activities.

Specifically, the Forest Subcommittee was established under the J-Credit Scheme Steering Committee, and has started to review the scheme for forest management activities since April 2022 (requirements for project registration (additional requirement), handling of reforestation, recording the fixed amount of CO_2 in wood use, and the absorption amount of natural forests).

The acquisition of credits has made it possible to increase the value of forests and forestry by adding revenue that had not existed before.

Figure 21: Using J-Credit Scheme



* Data from J-credit Secretariat
* Includes transferred amount from J-VER scheme

Selling price of J-credit

	Price	Remarks
Renewable energy (Solar, biomass, etc.)	2,995 yen/t-CO2	Auction results in January 2022
Energy savings (Introducing boilers, lighting equipment, etc.)	1,574 yen/t-CO2	Same as above
Forest management	From thousands to ten and thousands yen/t-CO2	Information from interviews (Negotiated transaction price)

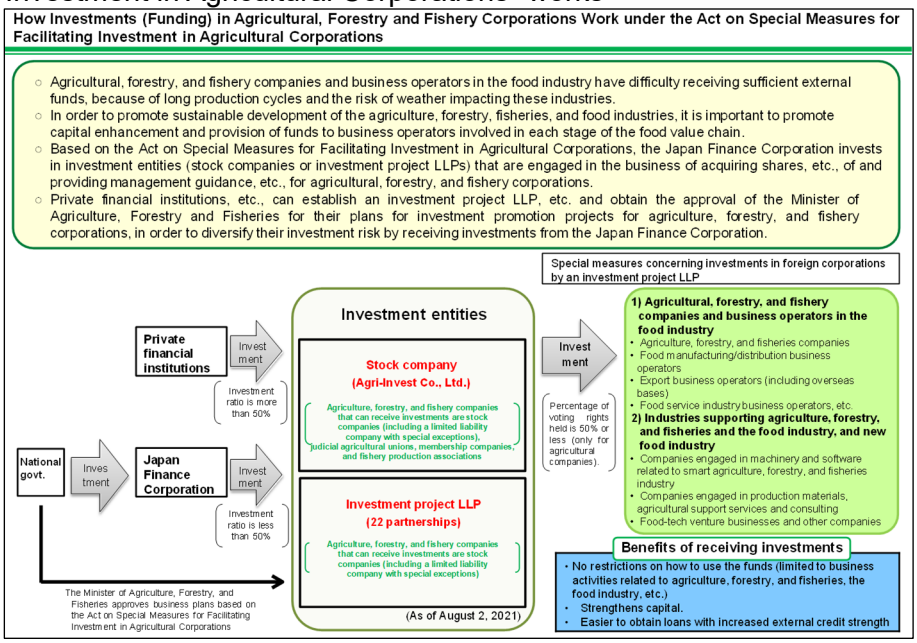
* J-credits are generally sold through negotiated transactions, and individual transaction prices are unknown. Only government-owned credits for renewable energy and energy savings are sold through bidding.

Source: J-Credit Scheme website https://japancredit.go.jp/, Forestry Agency

4. New Movements of Public-private Funds

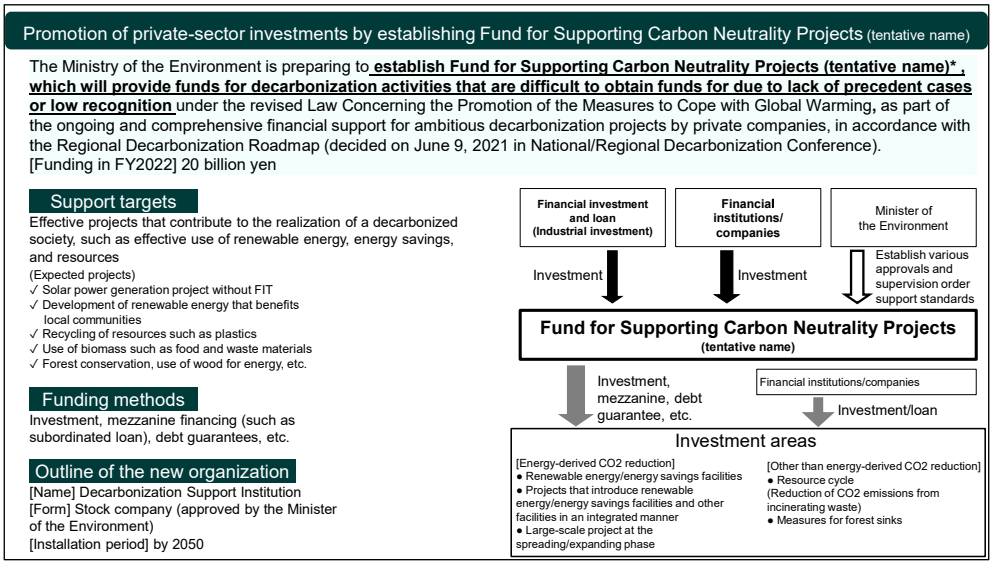
An environment for promoting new investments in the forest/forestry/wood industry is being developed, as the Act on Special Measures for Facilitating Investment in Agricultural Corporations (Act No. 52 of 2002) was revised in April 2021 to expand investment targets, which were only agricultural corporations, to include forestry and other fields (Figure 22), and the Act Partially Amending the Act on Promotion of Global Warming Countermeasures (Act No, 60 of 2022) was established in May 2022 to specify the creation of new decarbonization investment systems and include forest conservation and timber/energy use as investment targets (Figure 23).

Figure 22: How investments based on the "Act on Special Measures for Facilitating Investment in Agricultural Corporations" works



Created based on the website of the Ministry of Agriculture, Forestry and Fisheries "Investment Promotion System for Agriculture, Forestry and Fisheries Corporations"

Figure 23: Outline of a new decarbonization investment system (Ministry of the Environment)



Created based on the MoE website "Decarbonization Portal"

III. How Investment in Forests, etc. Should be Promoted from the Viewpoint of Promoting Carbon Neutrality

1. Basic Concept of Investing in Forests, etc.

In order to transform Japan's forestry into a growth industry and further promote green growth in accordance with the Basic Plan for Forest and Forestry, as groundwork for investment in forests, etc., it would be effective to have a system where even people without much expertise can easily understand how multiple functions such as measures against climate change and biodiversity conservation can be estimated as investment effects.

Financial institutions have said that it is difficult to decide whether or not to invest in the forest and forestry sector because there are not many precedents for investments. In addition to determining profitability, whether individual investment projects for the forest/forestry/wood industry are desirable for promoting the policies listed in the Basic Plan for Forest and Forestry and are not greenwashing[10] projects must be explained externally in this age where business activities are evaluated from an ESG perspective. On the other hand, it cannot be said that financial and investment institutions have developed persons who have deep knowledge on forests, and it is difficult to make decisions without expert knowledge. Under these circumstances, if the impact of new investment projects on carbon neutrality and biodiversity conservation can be seen in a simple way, it is expected to be a call for investment in forests.

The basic idea is to quantitatively evaluate the increase and decrease in forest absorption after investment projects, and to objectively confirm the impact and effect on biodiversity conservation and other matters, in order to induce investment in forests.

This approach is designed to help 1) secure confidence in the contribution of green investments to green growth, 2) reduce issuance costs and administrative burdens by investors, and 3) prove the greenness of their own investment projects, and is intended to be a key factor in achieving green growth involving private funds.

2. Necessity of Consideration based on the Unique Nature of Japanese Forests

As mentioned before, while forests worldwide require measures against reduction and degradation of them, in Japan, the amount of forest absorption is gradually decreasing with the aging of planted forests. The promotion of cyclical use of forest resources with the cycle of "Harvesting, Utilizing, and Replanting" trees is important to secure and increase forest absorption over the medium to long term. As such, there is a gap between Japan and other nations in themes for responses to forests through investment.

For this reason, it is necessary to consider measures on the basis of Japan's unique challenges in forest management. The aim is to induce investment in forests by showing evaluation methods based on the effects of future forest absorption and storage for the forestry industry that harvests/replants trees.

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[10] The term "greenwashing" refers to something that is apparently environmentally-friendly, but actually is not or is pretending to be so.

Because harvesting itself causes CO_2 emissions, it is necessary to contrive evaluation methods, such as to measure the degree of cyclical use by confirming changes in CO_2 absorption depending on how forest areas are used after harvesting and how logged trees are used.

3. Using Public-Private Funds, etc.

The basic concept described in 1. and 2. shall be taken into account as evaluation methods for investment projects using public-private funds, etc.

In order to ensure that investment in forests through public-private funds, etc. can be used effectively as a call for investments by private investment institutions, and that investment projects are appropriately and smoothly selected, promotion should be made by formulating this Guideline and making its concept and method of use known to people.

4. Study with a View to Use in Private Investment Institutions

Private investment institutions expect investment opportunities to expand through investments by public-private funds, but at present, few people consider forests as new investment opportunities. Under these circumstances, it is difficult to see the expansion of investments just by introducing guidelines that contribute to the promotion of carbon neutrality per investment project.

In order to expand the potential for investment, it is necessary in general to expand the possibility of project formation. Therefore, further consideration is necessary to make necessary support measures and rules regarding promoting innovation in forestry road system development and forestry technology, establishing boundaries and arranging information on forest owners to contribute to the creation of investment projects in large forests, creating stable revenue opportunities through consolidation, obtaining forest resource information with laser measurements, etc., forest accounting systems, and disclosing corporate information on forest/forestry/wood industry.

Therefore, as the next step, we consider formulating an "explanatory version for general use" which not only explains the concept of investments comparing Japanese and overseas forests, the Basic Plan for Forest and Forestry, and a wide range of other matters, but also illustrates possible investments by using case studies including the use of decision tools for investment project models as well as commentaries on guidelines in an easy-to-understand way.

The guidelines that will be newly examined will clarify the means and objectives by showing outcomes on the impact of biodiversity and other factors.

The guideline can be used not only for investments by private investment institutions, but also for explaining forest and forestry projects by companies to stakeholders and for using loans for forest and forestry projects.

As the world of ESG investments is moving rapidly, this guideline should be revised as appropriate to accommodate changes in situations.

IV. How to Evaluate Investment Projects

1. Application and Significance of Evaluation

Forest and forestry projects should be built by investment project managers with business purposes and profitability in mind, and some of the forests included in the scope of investment projects are at the stage of tending/thinning, or are in an old forest age class and scheduled to be harvested. When the contribution to carbon neutrality is measured by CO_2 absorption, forests that receive carbon credits, such as forest absorption, where thinning is mainly carried out, will always receive a positive evaluation.

On the other hand, as mentioned before, in order to promote the cycle of "harvesting, utilizing, and replanting" trees, harvesting and planting is important, but the amount of CO_2 absorbed by the forest does not recover immediately after planting, and the amount of emissions increases at that time. Therefore, when the concept of the J-credit scheme is applied to determine the CO_2 absorption/emissions of forests in relation to harvesting, the contribution to carbon neutrality will be negatively evaluated.

This evaluation method aims to measure contribution of investment projects in the forest/forestry/wood industry to carbon neutrality and other factors. Therefore, the evaluation should not be performed for changes in CO_2 absorption in an entire forest owned by a company that conducts investment projects or an entire mountain that includes investment project forests, but should be performed for changes in CO_2 absorption in each forest stand that is the target of an investment project.

As described later, for CO_2 absorption effects after harvesting/planting, this evaluation method will focus on future CO_2 absorption effects accompanied by post-harvesting actions, and include future resource recovery related to CO_2 emissions associated with harvesting. In other words, the entire CO_2 absorption effect gained by tending/thinning until harvesting at the same cutting age as the current harvest for the area replanted afterwards is counted in advanced at the time of the current harvest in this evaluation method. This evaluation method focuses on CO_2 absorption that changes as a result of post-harvesting actions, such as planting, natural regeneration, and diversion.

As described above, because thinning areas included in the scope of investment projects will always be positively evaluated when contribution to carbon neutrality is measured in terms of CO_2 absorption, this evaluation method does not include these thinning areas in light of the purpose of formulating this guideline. However, it is possible to evaluate the CO_2 absorption effect in accordance with forest growth by focusing on the silviculture processes such as thinning during the period of growth (up to harvesting) by using conventional methods such as the J-credit scheme, and to make investment decisions in conjunction with this evaluation method.

On the other hand, for CO_2 storage and emission reduction by using logged trees, there is no difference in the counting method between harvested wood and thinned wood. Therefore, when an investment project area contains thinning areas, CO_2 storage / emission reduction amounts by the use of logged trees, including timber transportation from the area, shall be evaluated. By doing so, it would be possible to properly evaluate

the major CO_2 absorption/emission events of an entire investment project and to easily determine the contribution of an entire investment project to carbon neutrality.

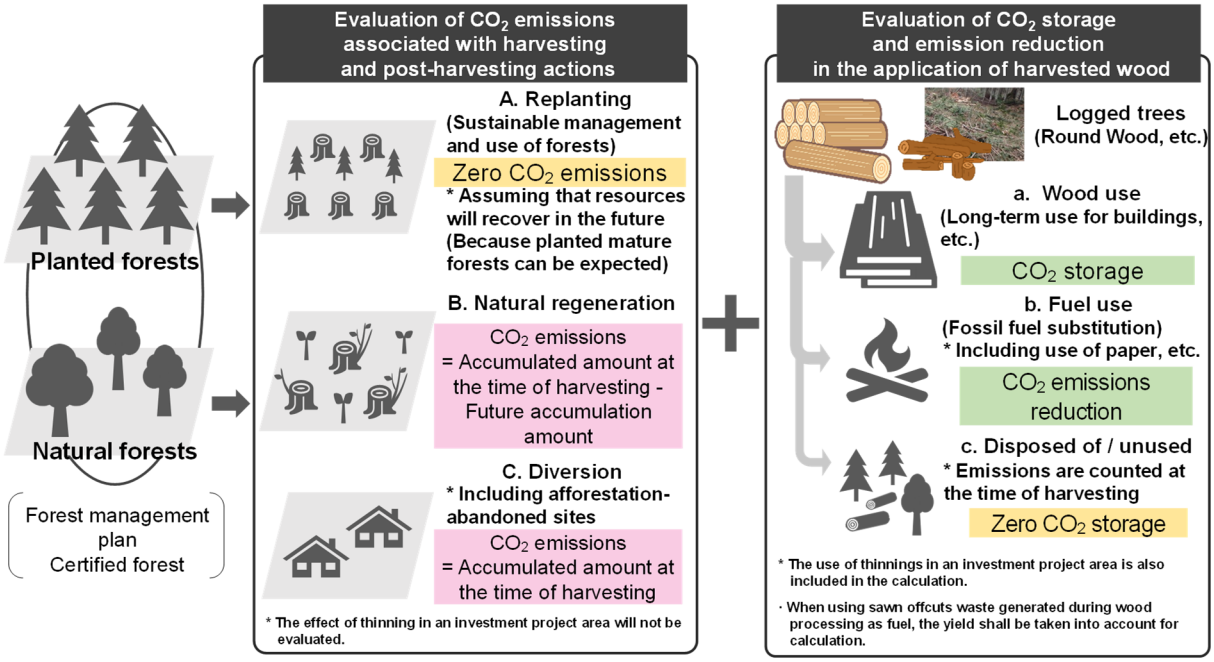
This evaluation method allows investment project managers to organize investment projects that promote contribution to carbon neutrality in relatively small areas by making use of logged trees, without having to organize investment projects in large areas of an entire mountain. Investment funds can have visibility into harvested areas after development and use of harvested trees, which reduces concerns of greenwashing and provides visibility into an entire supply chain, so revenue predictability will increase. It also makes it possible to quantitatively evaluate and objectively confirm increases and decreases in forest absorption in investment projects.

Therefore, the formulation and dissemination of this evaluation method will be significant in encouraging the cyclical use of forest resources by "harvesting, utilizing, and replanting" trees, which is promoted in the Basic Plan for Forest and Forestry.

2. System for Evaluating the Contribution of Investment Projects to Carbon Neutrality

As shown in Figure 24, it is appropriate to comprehensively evaluate the contribution of each investment project to carbon neutrality by using 1) calculated values pertaining to the evaluation of CO_2 emissions from harvesting and post-harvesting actions, and/or 2) calculated values for the evaluation of CO_2 storage and emission reduction accompanied with the use of harvested wood including thinnings.

Figure 24: Scope of targets where CO_2 absorption and emissions are estimated in accordance with the guideline



(1) Evaluation of CO_2 emissions associated with harvesting and post-harvesting actions

CO_2 absorption and emissions of forests associated with harvesting and post-harvesting actions can be estimated by estimating the current and future trunk volume of planted or natural trees, and by multiplying the timber volume by the forest area, wood density, biomass expansion factor, root-to-shoot ratio, carbon fraction, and CO_2 conversion factor, in accordance with the yield table from the prefecture. This calculation is based on the method used for calculating forest absorption in the J-credit scheme.

① Equation for estimating CO_2 emissions

Absorbed amount (Emissions) (t- CO_2) = Trunk volume (m^3/ha) × Area (ha) × Wood density (t/m^3) × Biomass expansion factor × (1 + Root/shoot ratio) × Carbon fraction × CO_2 conversion factor

- Trunk volume: Volume of the trunk part of a tree (material volume)
- Wood density: Factor that converts wood volume into weight
- Biomass expansion factor: Factor for adding branch volume
- Root/shoot ratio: The ratio of root volume to the tree volume above ground (trunk + branches)
- Carbon fraction: Percentage of the carbon fraction in wood per ton
- CO_2 conversion factor: A factor for converting carbon fraction to carbon dioxide (CO_2) amount (44/12)

② Concept of forest absorption at the stage of harvesting and replanting

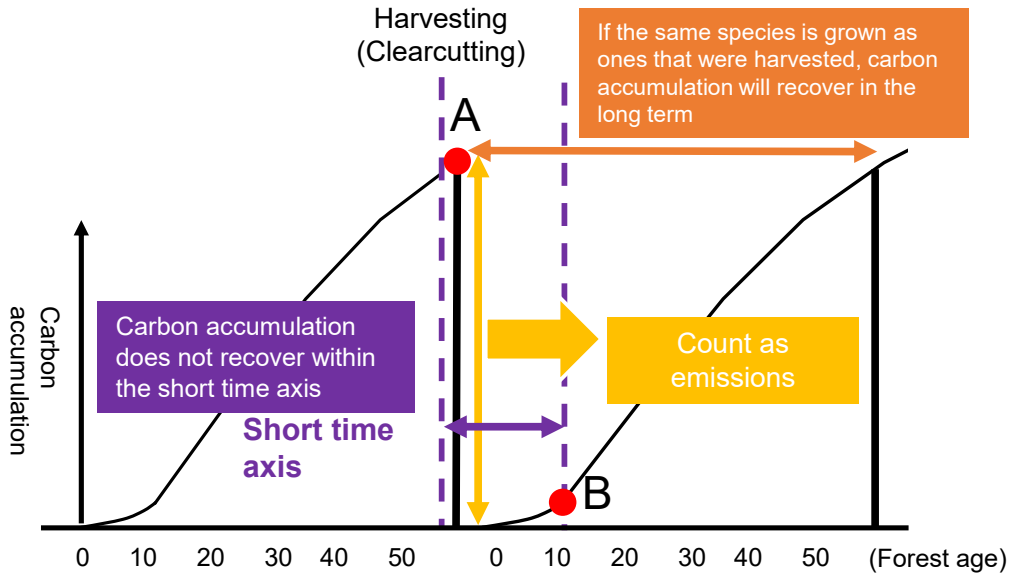
From the viewpoint of inducing investments in forests in a way that contributes to the realization of carbon neutrality on the basis of the land conditions and land use status in Japan, if there are plans or contracts to guarantee the cyclical use of the forests, there is some validity to the idea that emissions count of the CO_2 absorption accompanied with the harvesting event of the forests should be treated as zero taking into account the fact that forest absorption will certainly recover in the future after planting, and that changes in CO_2 absorption after harvesting are not evaluated.

If the same tree species is planted in a site of the same quality and grows in the same way without suffering from damages by disasters or other risks, the trees are expected to absorb the same amount of CO_2 at the same age, according to the characteristics of Japanese forests. Furthermore, in light of the actual situation at the investment scene, which is the investment period of approx. 10 years, this evaluation method assumes that the entire amount of carbon accumulation at the time of the current harvest will be restored in future, and the emissions at the time of the current harvest will be evaluated as zero, if plans and schedules ensure that adequate forest management will be carried out after planting (Figure 25).

Even when natural regeneration is selected as a post-harvesting action, the above-mentioned replanting concept is used for evaluation. With the forest age at the time of

harvest being an evaluation period, estimation shall be carried out using the yield table of the tree species expected after natural regeneration.

Figure 25: Changes in carbon accumulation as Sugi (Japanese cedar) grows



1. The carbon emissions when 50-y/o trees are harvested represented as A.
2. Even after planting, the carbon accumulation in the short term, such as 10 years, is represented as B and has not recovered.

   Carbon absorption rate (the slope of the line) grows small in the initial stage and does not recover until the forest age class reaches 15.
3. On the other hand, assuming that the same species as ones that were harvested are planted and the trees are appropriately managed and grown for the same period as before without suffering disasters, carbon accumulation will basically recover 50 years after the replanting, according to the carbon accumulation curve for planted trees in Japan.

For this reason, when assessing carbon absorption in a general 10-year period for a development project involving harvesting events, "planting with the same species as one that was harvested" shall be assessed as "zero CO2 emissions", because expected recovery of carbon absorption by the growth of planted trees are taken into account in advance.

(*) Notes

· If there is a large discrepancy between the values in the yield table and the trunk volume data or actual measured values in the forest register, the values should be corrected as necessary.

· Forest soil is an important element that affects global warming because of its large accumulation of carbon, but the changes in the amount of carbon are considered to be smaller and slower than changes in the amount of carbon accompanying harvesting and replanting above ground. Therefore, this evaluation method does not take into account forest soil.

(2) Evaluation of CO_2 storage and emission reduction in the application of harvested wood

In evaluating CO_2 storage amounts accompanying applications of harvested wood, it is appropriate to estimate 1) the amount of CO_2 stored by wood use and 2) the reduction of CO_2 emissions by fuel use (fossil fuel substitution).

① Amount of CO_2 stored by wood use

The amount of carbon stored in wood products (converted to CO_2) is estimated by first obtaining the product volume by multiplying the planned supply volume of logs brought in to a sawmill or other plant by a yield, and then multiplying the obtained product volume by the wood density, carbon fraction percentage, and CO_2 conversion factor. The equation used for the calculation is shown below.

Planned supply volume (m^3) × Yield × Wood density (t/m^3) × Carbon fraction × CO_2 conversion factor

· Planned supply volume: Quantity planned to be supplied to sawmills, plywood plants, chip plants, wood markets, etc.
· Yield: Yield based on logs equivalent percentage in Wood Supply and Demand Chart (conifer: 60%, broadleaf: 50%)
· Wood density: Factor that converts wood volume into weight
· Carbon fraction: Percentage of the carbon fraction in wood per ton
· CO_2 conversion factor: A factor for converting carbon fraction to carbon dioxide (CO_2) (44/12)

② Reduction of CO_2 emissions by fuel use (fossil fuel substitution)

Reduction of CO_2 emissions by fuel use (fossil fuel substitution) is calculated by first multiplying the planned supply volume of logs used for chips and other items by wood density to convert it into weight, then converting it to the carbon amount generated when A-type heavy oil — mainly used for boilers in plants, buildings, and plastic hothouses — are burnt, and finally converting it to CO_2. The equation used for the calculation is shown below.

Depending on the type of fossil fuel used, it is possible to replace type-A heavy oil with diesel oil, coal, or natural gas.

Planned supply volume (m^3) × Wood density (t/m^3) × Fossil fuel (type-A heavy oil) substitution effect per one ton of wood (tC/t) × CO_2 conversion factor

· Fossil fuel (type-A heavy oil) substitution effect per one ton of wood (tC): The amount of heat and carbon generated by combustion are calculated by comparing wood with fossil fuel (type-A heavy oil) (= 0.272).

Calorific value for burning 1 ton of wood: 14.4 GJ/t.
* The value varies depending on the water content.
Carbon fraction generated when burning type-A heavy oil: 0.0189 tC/GJ
(Based on the List of Calculation Methods and Emission Factors in the Calculation/Reporting/Publication System for GHG Emissions, Ministry of the Environment)

(*) Notes

· When using wood offcuts generated during wood processing as fuel, the yield shall be taken into account and added to the calculation of fuel use.

· While paper products as HWP are usually counted as wood use, it is difficult to separate chips for paper making and ones for fuel at the planning phase of an investment project. Therefore, for convenience, paper-making chips are also included in CO_2 emissions reduction by fuel use (fossil fuel substitution).

· It is difficult to estimate CO_2 emissions in harvesting, transportation, distribution, machining, and other processes at the planning stage, and general emissions calculation values may not be specified. Therefore, for convenience, this calculation does not take into account the CO_2 emissions in these processes, and the Life Cycle Assessment (LCA) will be discussed in the future.

(Table) Factors for estimating CO_2 absorption/emissions of forests and wood

Tree species	Biomass expansion factor		Root/shoot ratio	Wood density	Carbon fraction	Remarks
	Forest age ≦ 20*	Forest age > 20**				
Conifer						
Sugi	1.57	1.23	0.25	0.314		
Hinoki	1.55	1.24	0.26	0.407		
Sawara	1.55	1.24	0.26	0.287		
Akamatsu	1.63	1.23	0.26	0.451		
Kuromatsu	1.39	1.36	0.34	0.464		
Hiba	2.38	1.41	0.20	0.412		
Karamatsu	1.50	1.15	0.29	0.404		
Momi	1.40	1.40	0.40	0.423		
Todomatsu	1.88	1.38	0.21	0.318		
Tsuga	1.40	1.40	0.40	0.464		
Ezomatsu	2.18	1.48	0.23	0.357		
Aka ezomatsu	2.17	1.67	0.21	0.362	0.51	
Maki	1.39	1.23	0.20	0.455		
Ichii	1.39	1.23	0.20	0.454		
Ginkgo	1.50	1.15	0.20	0.450		
Foreign conifer	1.41	1.41	0.17	0.320		
Other conifer	2.55	1.32	0.34	0.352		Applicable to Hokkaido, Aomori, Iwate, Miyagi, Akita, Yamagata, Fukushima, Tochigi, Gunma, Saitama, Niigata, Toyama, Yamanashi, Nagano, Gifu, and Shizuoka
Same as above	1.39	1.36	0.34	0.464		Applicable to Okinawa
Same as above	1.40	1.40	0.40	0.423		Applicable to all other prefectures
Broadleaved trees						
Buna	1.58	1.32	0.26	0.573		
Kashi	1.52	1.33	0.26	0.646		
Chestnut	1.33	1.18	0.26	0.419		
Kunugi	1.36	1.32	0.26	0.668		
Nara	1.40	1.26	0.26	0.624		
Doronoki	1.33	1.18	0.26	0.291		
Hannoki	1.33	1.25	0.26	0.454		
Nire	1.33	1.18	0.26	0.494		
Keyaki	1.58	1.28	0.26	0.611		
Katsura	1.33	1.18	0.26	0.454		
Hoonoki	1.33	1.18	0.26	0.386		
Maple	1.33	1.18	0.26	0.519		
Amur cork	1.33	1.18	0.26	0.344	0.48	
Shinanoki	1.33	1.18	0.26	0.369		
Castor aralia	1.33	1.18	0.26	0.398		
Paulownia	1.33	1.18	0.26	0.234		
Foreign broadleaved trees	1.41	1.41	0.16	0.660		
Birch	1.31	1.20	0.26	0.468		
Other broadleaved trees	1.37	1.37	0.26	0.469		Applicable to Chiba, Tokyo, Kochi, Fukuoka, Nagasaki, Kagoshima and Okinawa
Same as above	1.52	1.33	0.26	0.646		Applicable to Mie, Wakayama, Oita, Kumamoto, Miyazaki, and Saga
Same as above	1.40	1.26	0.26	0.624		Applicable to all other prefectures

Japan GHG Inventory Report * forest age class 1 to 4 ** forest age class 5 or older

3. System for Evaluating the Contribution of Investment Projects to Biodiversity Conservation

While climate change has a negative impact on ecosystems, efforts to conserve and restore them contribute to climate change mitigation, and measures against climate change and biodiversity conservation are inseparable. Deforestation would lead to the loss of forest ecosystems as well as reducing the sources of CO_2 absorption, thus accelerating global warming.

From this perspective, appropriate conservation and management of forests is required in any context. With regard to climate change, although it is possible to quantify the rise in temperature and CO_2 absorption and it is easy to consider target setting and direction of efforts, it is relatively difficult to quantify biodiversity. Therefore, setting goals and managing efforts are considered relatively difficult.

The main focus of this guideline is to determine how individual investment projects contribute to the realization of carbon neutrality. However, considering the discussions at COP26, it seems that climate change and biodiversity should be addressed at the same time.

In this regard, in the area of ESG (environment, society, and corporate governance) investments, there is a growing trend to incorporate ESG perspectives, including biodiversity conservation, into investment analysis and decision-making processes based on the United Nations Principle of Responsible Investment (PRI), and the rating of corporate value by ESG evaluation organizations is being promoted.

The Basic Plan for Forest and Forestry presents basic policies for achieving the basic principles of "the demonstration of public functions of forests" and "sustainable and sound forestry development."

Therefore, when evaluating investment projects under this guideline, it is decided that a qualitative confirmation of how the projects fit in the direction of the policies stipulated in the Basic Plan for Forest and Forestry will enable certain measurement of the contribution to ensuring biodiversity. In addition, measurement will be made for matters that directly lead to biodiversity through the maintenance and demonstration of public functions of forests. Furthermore, by checking the matters, auxiliary measurements will be made for matters that lead to stably securing businesses based on the characteristics of projects related to the forest/forestry/wood industry.

Because some matters to check can be judged quantitatively, those that can be evaluated numerically should be indicated by numerical values as much as possible, and examples of such numerical values are shown in parentheses in the following examples of matters to check.

① Matters that directly lead to the maintenance and demonstration of forests' public functions

- ○ Appropriate forest practices in an entire investment project, including areas that are not harvesting areas
  - · Carrying out appropriate forest management, such as tending and thinning, in harvesting areas and other forest areas

· Carrying out measures to prevent damage by wildlife, such as installing anti-deer fences at planting areas

(Thinning areas, areas of creation of a collective Forest Management Plan, areas with anti-deer fences, etc.)

○ Status of efforts on forest certification systems

· Acquisition of forest certification (FSC, PEFC, SGEC), conservation of natural forests in investment projects, shift to mixed forests of conifers and broadleaf trees

(Areas with forest certification, forest conservation areas, etc.)

○ Risk factor analysis and response to natural disaster risks

· Whether risk factor analysis on natural disasters, including damage by disease and harmful insects, meteorological damage, and forest fires, is carried out for reforestation areas and other forest conservation areas in order to grow and preserve sound forests, and whether appropriate controls are conducted in order to avoid damage

· Possession of forest insurance

(Extension distance of firebreak, etc.)

○ Legally-harvested wood and wood products (Act on Promotion of Use and Distribution of Legally-Harvested Wood and Wood Products)

· Whether registration has been made as a type-1 wood-related business entity or type-2 wood-related business entity under the Act on Promotion of Use and Distribution of Legally-Harvested Wood and Wood Products (Act No. 48 of 2016), if an investment project includes sawmills, chip plants, and woody biomass power plants

(The amount of wood and wood products that has been confirmed to be legitimate, etc., in the case of a registered wood-related business entity.)

② Matters that contribute to the confirmation of the stability of businesses based on the characteristics of investment projects for the forest, forestry, and wood industry

○ Creation of a Collective Forest Management Plan

Creation of a Collective Forest Management Plan to fully demonstrate forests' multiple functions through efficient forest practices and adequate forest protection based on the plan

(Area of creation of a Collective Forest Management Plan, etc.)

○ Introduction of advanced technology

· Introduction of smart forestry technology to achieve light labor, such as improving the efficiency of forest resource research and boundary clarification by using laser

measurement, and improving the efficiency of wood production/distribution management by using ICT such as log measuring applications.

· Introduction of advanced machinery for securing labor safety, such as the remote operation and automation of forestry machinery, and the introduction of advanced forestry machinery

(Area to obtain forest information by laser measurement, quantity of advanced forestry machines introduced, etc.)

○ Regional contribution

· Creation of employment as forestry workers through investment projects as well as creation of new jobs through sawmills, biomass energy use facilities, and the forest-related service industry, and the increase in involvement of urban residents

(Number of jobs created, involved population, sales of related business, etc.)

○ Improve occupational health/safety and the working environment

· Safety education, introduction of safety equipment adopting new technology, the occurrence of industrial accidents, training and education for improving workers' skills, etc.

(Number of accident-free days, implementation of safety education, number of trainees, number of qualified workers, etc.)

○ Reduction of labor and costs for planting

· Use of seedlings of the "elite trees" or other trees with excellent growth, use of drones and forestry machinery to transport seedlings, integrated harvesting and replanting, low density planting, simplification of weeding practices, etc.

(Planted area and percentage of “elite trees”, number of weeding practices, etc.)

○ Corporate governance and disclosure of corporate information

· Avoiding fraud and other risks through sound corporate management

· Disclosure of information through corporate annual reports, CSR reports, environmental reports, integrated reports, and websites

· Compliance with the "Guidelines for Harvesting, Transporting, and Replanting" or other guidelines specified by the prefecture and organizations, registration of certification, or preparation of voluntary rules by forestry contractors

(Number of discovered wrongdoings, presence of ethical behavior rules, information disclosure status, etc.)

○ Cooperation with local businesses, municipalities, etc.

· Cooperation with local businesses and support systems for investment projects, subsidies issued by the GOJ and municipal governments, etc.

(References)

About "Study Group on Proper Investments in Forest/Forestry/Wood Industry"

1 Purpose

The Basic Plan for Forest and Forestry, which was revised in June 2021 (decided by the Cabinet on June 15, 2021), calls for the realization of "green growth" in the forest/forestry/wood industry.

In Japan, forests have been integrated and shifted to efficiency through forest trusts, and corporate forests have been used to contribute to the environment and society. Under these circumstances, the Act on Special Measures for Facilitating Investment in Agricultural Corporations (Act No.52 of 2002) was revised to include the forestry sector into investment targets, and the Ministry of the Environment considered establishing a new decarbonization investment system in FY2022. The possibility of investment under the theme of forest management and use is expanding toward "green growth."

We hereby establish this study group as a private advisory body for the director-general of the Forestry Agency, in order to obtain a wide range of opinions from experts on how investments will be made for the forest/forestry/wood industry and how investments should be made to promote the Basic Plan for Forest and Forestry, and to search for appropriate methods for promoting policies.

2 Committee members (titles abbreviated, ○: Chairperson)

	Norichika Ando	Senior Manager of Norinchukin Research Institute Co.,Ltd.
	Hajime Utsugi	Research Director of Forest Research and Management Organization / Forestry and Forest Products Research Institute (Responsible for research on forestry production technology)
	Hidehiko Oshima	Special Advisor of Japan Finance Corporation
	Taro Sasaki	Advisor of National Federation of Forest Owners' Co-operative Association
○	Satoshi Tatsuhara	Associate Professor at the Graduate School of Agricultural and Life Sciences / Faculty of Agriculture, The University of Tokyo
	Koji Hongo	Vice Chairperson of the Japan Federation of Wood-industry Associations
	Akira Matsumoto	Secretary of the Regional Research Department of the Development Bank of Japan
	Michiyo Morisawa	Director of CDP Worldwide-Japan

3 Meetings held so far

Meeting	Date and time	Agenda
1	January 31, 2022 13:00 – 15:30	(1) Situation surrounding decarbonization in forests (2) Interviewing stakeholders
2	February 7, 2022 15:00 - 17:30	(1) Review on the first meeting (2) Interviewing stakeholders
3	February 28, 2022 15:00 - 17:30	(1) Summary of issues based on the discussion so far (2) Direction of consideration
4	March 30, 2022 10:00 - 12:00	(1) Summary proposal
5	May 18, 2022 13:15 - 15:15	(1) Interim summary draft