Summary

Entrusted Work to Examine Measures to Use and Provide Information Concerning the Introduction Potential of Renewable Energies in FY 2021

The introduction of renewable energies is important not only as a countermeasure for global warming but also from such viewpoints as establishing energy security, developing autonomous and scattered energy systems and creating new industries and jobs. For this reason, in an effort to develop basic data to examine measures to introduce and spread the use of renewable energies in the coming years, the Ministry of the Environment (MoE) has since FY 2009 been conducting the "Study on the Potential for the Introduction of Renewable Energies", etc., proceeding with the development of basic information on the potential of all types of renewable energies, including PV power, wind power, small and medium-scale hydropower, geothermal heat, solar heat and underground heat. At the same time, the MoE disclosed in June, 2020 the Renewable Energy Potential System (REPOS) which overlays various types of information for easy understanding as information on the potential of renewable energies is made into cartographic information.

In the light of the Declaration of Carbon Neutrality by the Government of Japan in October, 2020 and the enactment of the Act to Partially Revise the Act on the Promotion of Global Warming Countermeasures (May, 2021) and other moves designed to further drive renewable energies as the principal energy sources, this work involved improvement of the REPOS, consolidation and elaboration of information on the potential of renewable energies and examination of the next generation REPOS, all of which aimed at facilitating the process of local decarbonization with due consideration of the revision of the Act on the Promotion of Global Warming Countermeasures.

1. Improvement, etc. of the REPOS Towards the Facilitation of Local Decarbonization

(1) Consolidation of Information to Assist the Setting Up of Subject Areas for the Promoted Use of Renewable Energies and Introduction Targets for Renewable Energies

The basic design of three tools was completed to support the examination of areas subject to the promotion of renewable energies and the setting of targets for renewable energies by local public bodies based on information on the potential of renewable energies in the geographical areas of their jurisdiction, taking the progress situation of the examination of operating policies of the draft act to revise the Act on the Promotion of Global Warming Countermeasures into consideration. Having checked the types of information to be included in these tools and ways to develop the tools, the relevant information was

collected and arranged. The functions and screens of the existing REPOS were improved to enable the loading of various tools to the REPOS.

Fig.-1 Top Page of REPOS after Improvement

(2) Consolidation of Information to Promote Efforts to Facilitate Local Carbonization

Three support tools were developed and loaded to the REPOS to promote the planning and implementation of active renewable energy promotion policies by local public bodies. These tools effectively combine not only the examination results of (1) above but also information on the potential of renewable energies by prefecture and also by municipality, data on actually introduced renewable energies, targets for renewable energies, etc. and other information contributing to the promotion of local decarbonization for their easy understanding and handling by the relevant officials of local public bodies while bringing links to other sites into perspective.

Reference materials explaining how to utilize these tools and data to their users were prepared and loaded to the REPOS for public access. Assistance was also provided for the preparation of reference materials to be used by those MoE officials in charge at explanatory meetings organized by the MoE for local public bodies.

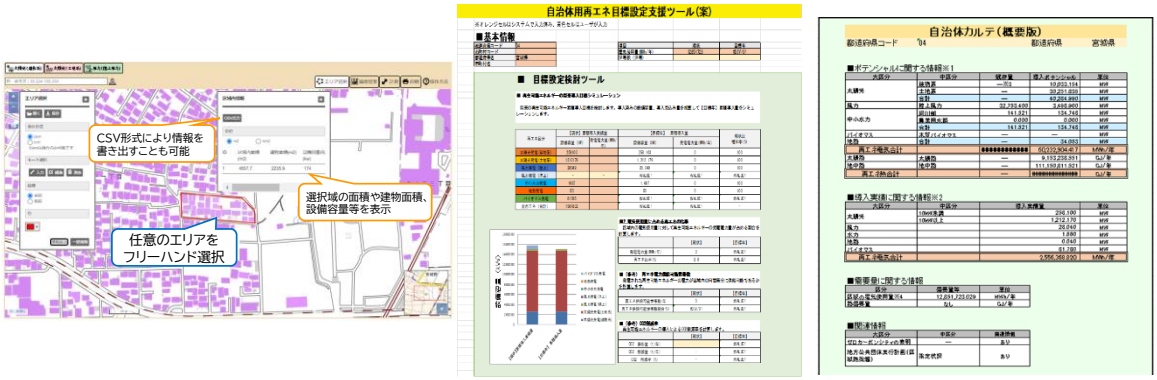


Fig.-2 Screen Images of Three Tools to Support Local Decarbonization
(Left: Suppport Tool to Examine Areas Subject for Promotion; Centre: Support Tool to Set up Targets for Renewable Energies; Right: Local Public Body Diagnosis Chart)

2. Consolidation and Elaboration of the Potential of Renewable Energies

(1) Review of the Definition of Introduction Potential

Various technical terms, including the introduction potential by scenario which was estimated in the MoE's Study on the Potential for the Introduction of Renewable Energies in the past, were reviewed and re-examined so that the contents of these terms could be instinctively understood.

(2) Elaboration of Information on the Introduction Potential

With PV power and ground wind power, information on the introduction potential was elaborated along with other relevant work using a new estimation method based on integration or withdrawal as well as the latest trends concerning various categories. For the review of the estimation category for PV power, the examination priority was given to the utilization of GIS information and a way of utilizing the type of GIS information with a high coverage rate of local public bodies. Moreover, a new estimation method was examined regarding information on the woody biomass introduction potential and the relevant abundance was estimated.

Most of the results of these estimation exercises were loaded to the REPOS for use with "1. Improvement, etc. of the REPOS Towards th Facilitation of Local Decarbonization" in mind.

(3) Estimation of New Information on Potential Using Past Actual Data on Renewable Energy Resources

A potential map was prepared for PV power and wind power from the viewpoint of time and geography unlike the conventional estimation method. For this purpose, past actual long-term data based on the time unit for renewable energy resources (based on solar radiation data and wind condition data) was used. This map was made publicly available in the form of a video for easy visual understanding by users.

(4) Examination of an Estimation Method for Introduction Potential by Scenario, Taking Revision of the FIT System into Consideration

In anticipation of the start of the FIP (feed-in-premium) scheme where a certain premium amount is added to wholesale market prices in April, 2022 following revision of the FIT (feed-in-tariff) system, a possible way of changing the estimation method for the introduction potential of renewable energies by scenario which presumes the use of information on the conventional FIT system was examined. In regard to PV power in particular, the examination took an increase of cases not dependent on the FIT system into consideration.

Moreover, the latest trends related to or which could impact the environment for the introduction of renewable resources as well as the business environment in Japan were learned. The relationship between such trends and this Entrusted Work and any possible impacts of such trends on the Entrusted Work were then sorted and examined.

(5) Examination of the Schedule to Renew Information on the Introduction Potential of Renewable Energies in the Intermediate Future

The policies and concrete schedules for the renewal and refinement of information in the immediate future were prepared for all introduction potentials of renewable energies based on efforts up to the present, various trends concerning the move to make renewable energies the principal energy sources and the results of the examinations referred to in 1. through 2.-(4) of this Summary.

(6) Examination of the Development of Data Contributing to the Stable Spread of Small and Medium-Scale Hydropower

The relationship between the river discharge data surveyed and analyzed in the Entrusted Work on the Introduction Potential of Renewable Energies in FY 2020 and the market prices of electricity was continually investigated and the relevant data was prepared and analyzed. The results of this analysis were uploaded to the REPOS in a way which could be easily understood by users.

(7) Preparation and Uploading of a Heat Demand Map

A heat demand map was prepared based on cartographic map data purchased for the Work and was then uploaded to the REPOS.

3. Examination of a Next Generation REPOS

(1) Examination to Automate Various Estimates and Automatic Linkage of Data

As the REPOS is destined to handle a far greater amount of information in the coming years, it is essential to make the renewal of information more efficient and to minimize human mistakes by means of automating various estimation exercises and data linkage. For this reason, an automated data linkage method using the API links, etc. with various sites was examined. In addition, the effectiveness of automation featuring potential information on ground wind power was checked by means of comparing the existing estimation method and the automation method.

(2) Examination of Facilitation of the Use of Renewable Energies Through Analysis of Smart Meter Data and Aerial Images

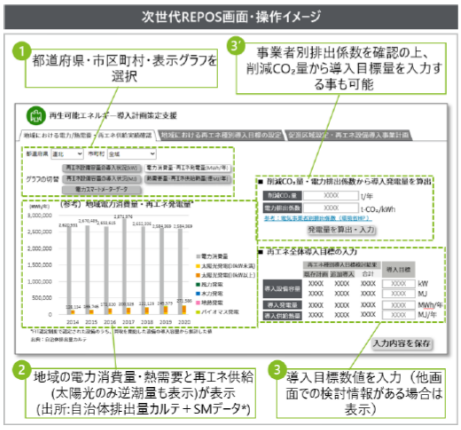
With such advanced data as smart meter data and AI analysis data of aerial images, methods to consolidate and use such data were examined to facilitate local decarbonization. One of the methods examined was visualization of the difference between the potential of renewable energies and actual introduction performance based on establishment of the details of the actual performance of introducing renewable energies. Further examination work involved the search for a model for data sharing between data holders, such as local public bodies, business operators, etc. and data users.

(3) Examination of a Roadmap for a Next Generation REPOS and Definitions of Requirements

The requirements for a next generation REPOS were examined and sorted to prepare a roadmap for system development and the draft definitions of the requirements for an initial system were compiled.

For this examination, the contents of the examinations in 1. through 3.(2) of this Report were taken into consideration and the examination committee members and local public bodies as users were interviewed to establish concrete issues and requests from the viewpoint of user experience (UX). This was followed by the determination of the priority ranking of items to be uploaded to the REPOS. Further examination was conducted

concerning an operating system for a next generation REPOS and methods to continually update and expand data and to arrange data links with external sites.



ユーザー	ユースケース		使い方
自治体	環境政策策定	電力使用量/熱利用の把握	・地域の電力消費量・熱需要量・再エネ供給量の過去実績を確認し、再エネ導入量の検討等のインプットとする
		再エネ全体導入目標数値検討	・地域の電力消費量・熱需要量・再エネ供給量の過去実績を確認し、それらを考慮した再エネ導入目標を立てる
	参考・ベンチマーク情報取得	他地域における導入状況の把握	・近隣や先行している地域の電力消費量・熱需要量・再エネ供給量を確認し、自地域の検討の参照数値とする
	実施状況確認	電力の地産地消情報取得	・地域の太陽光発電量・逆潮量・太陽光発電の地産地消量を取得、地産地消率の向上等に役立てる
		既存設備の発電状況確認	・太陽光発電の逆潮流分や非FIT設備の発電量も含めた地域の再エネ発電量を取得し、再エネ導入計画等に役立てる
発電事業者	実施状況確認	既存設備の発電状況確認	・太陽光発電の逆潮流分や非FIT設備の発電量も含めた地域の再エネ発電量を取得し、設備増設の計画等に役立てる
研究者	エネルギーシステム最適化	電力の地産地消情報取得	・地域の電力消費量・熱需要量・再エネ供給量、太陽光逆潮量の過去実績を確認し、再エネをフル活用した最適電源構成の検討等に役立てる

Fig.-3 Examination Results of Next Generation REPOS Screens and Operation by Type of Use
(Purpose of Use: Establishment of Local Power Demand and Current Power Generation by Renewable Energies)

4. Others

The following meetings/groups were established and operated to conduct the Work and the advice as well as guidance of experts was obtained.

・Meeting to Examine the Investigation and Utilization of the Introduction Potential of Renewable Energies (held three times)
・PV Power Working Group (met three times)
・Ground Wind Power Working Group (met twice)
・Biomass Working Group (met three times)
・Next Generation REPOS Examination Group (met three times)

Various arrangements were made regarding such matters as the operation of the REPOS and handling of information on the potential of renewable energies. These included the setting up of an exclusive mail address to centrally receive any enquiries made to the MoE on the REPOS, support for the preparation of reference materials, handling of new needs, improvement of the UI/UX of the REPOS and uploading of data to as well as adjustment of data of the REPOS.