



*We support rapid assessment
about on-land wind power generation
from installation to replacement.*



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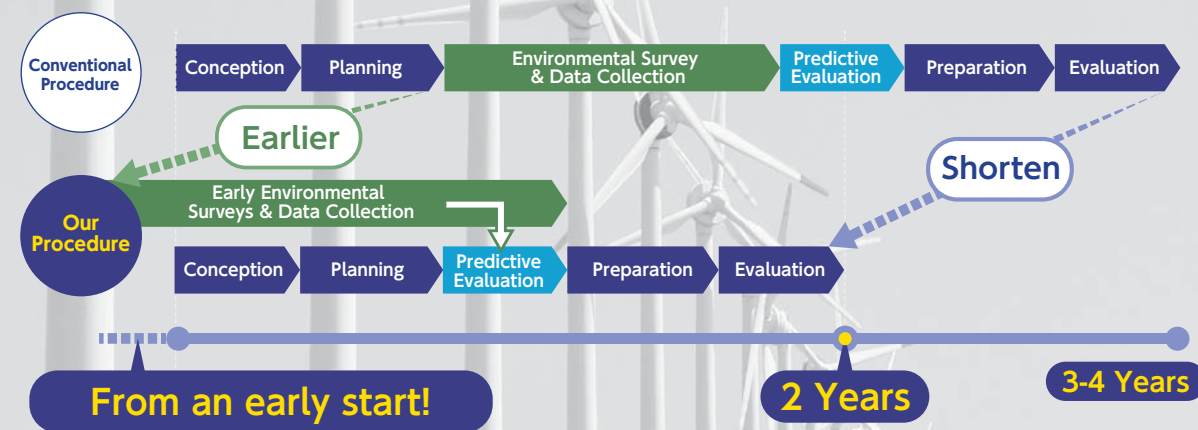
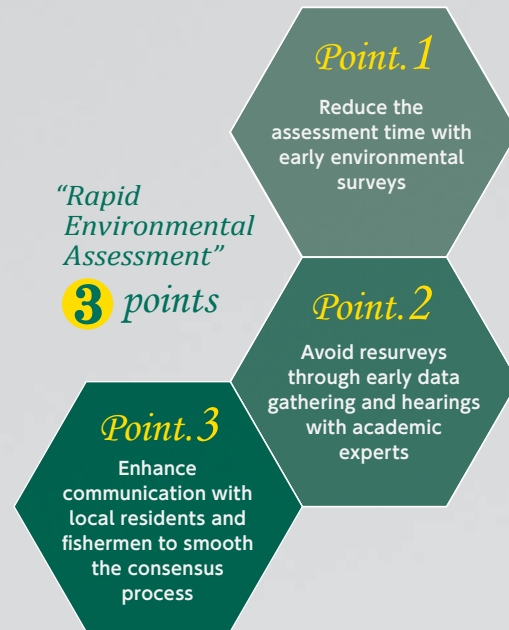
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Accelerate environmental assessment

At the Civil Engineering & Eco-technology Consultants Co., as a commissioned project from NEDO, we conducted a verification of the demonstration project on shortening the procedure period for environmental assessment. The results are published on the website of NEDO as "guide for speeding up environmental assessment". Utilizing the enormous knowledge gained from the case analysis of this project, we will support the implementation of prompt and appropriate environmental assessment.

We also support to prevent rework of FIT applications. Currently, FIT application can be started at the same time as the method of environmental assessment procedure. However, it is required that the business plan at that time sufficiently reflect environmental considerations. However, it is required that the business plan at that time sufficiently reflect environmental considerations. Therefore, it is increasingly necessary to implement current status surveys (noise, birds of prey, vegetation, etc.) at the schedule from the point of making a decision on commercialization and incorporate them in the business plan. We propose the necessary investigation / consideration contents at an accurate timing according to business characteristics and regional characteristics of each business.



Proper suggestion of post-survey, smooth support

We also propose survey items and survey contents suitable for each wind power site even in the post-survey that is required continuously after the construction of the windmill. Because there are uncertainties in the forecasts in the environmental assessment related to wind power generation, there are many cases that you are asked to conduct noise investigation, change of flight behavior of birds and check survey of bird strike. We propose suitable survey items and survey contents without waste based on the survey experience of existing windmill and support smooth post-survey.

Efforts for efficient assessment in replacements

Regarding the replacement of wind turbine generators with few implementation examples, we also catch the latest trends from abundant examples and experiences and support the facilitation of environmental assessment.

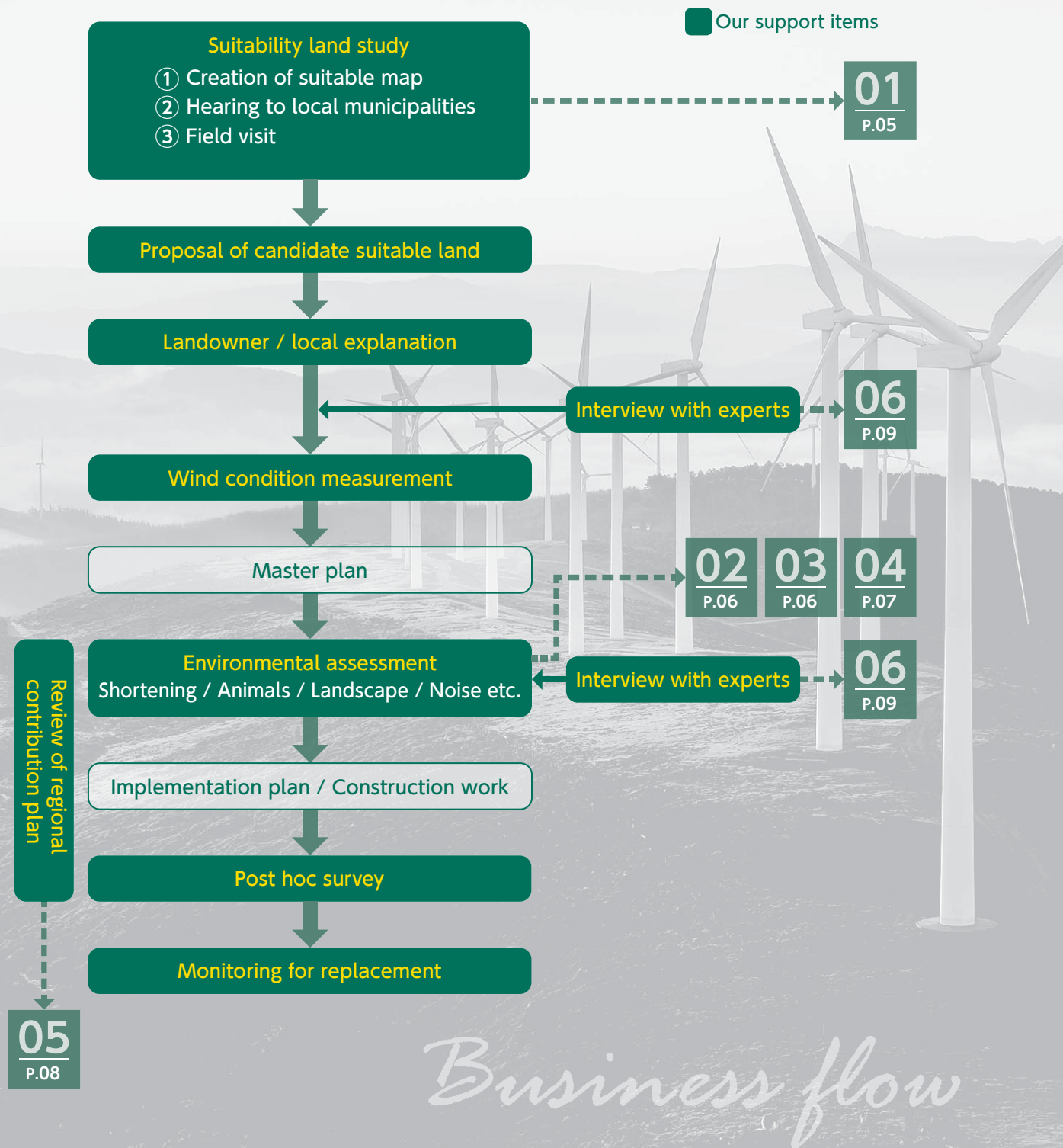
It is said that the service life of wind power generators is generally twenty years. When conducting a power generation project of a scale exceeding a certain output in the replacement, it is necessary to carry out the environmental assessment again, but the methodology of replacement environmental assessment is still in the process of establishment.

Based on our experiences of collecting and organizing many cases of environmental assessment related to wind power generation, including NEDO's demonstration projects, we have also selected appropriate assessment items according to each business site even at replacement, smooth procedure We propose to become.

Assessment that can contribute both in newly constructed business and in replacement business

Utilizing high technology and abundant know-how, we support consistently from suitable site selection to rapid assessment and replacement.

Our role in wind power generation business

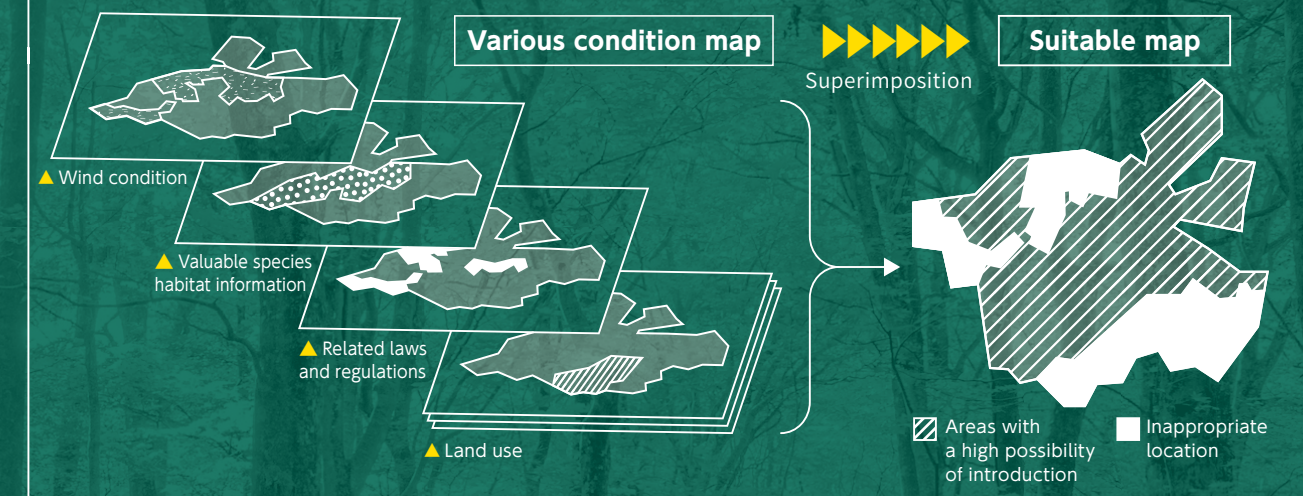


01

Environment survey experts comprehensively sort areas suitable for wind power generation introduction

1 Creation of suitable map

In addition to nationwide wind condition data and topographical conditions, we utilize our original database covering valuable species information to create a condition map, as well as information on law enforcement areas such as the Natural Park Law, the location of power grid and main roads. Using the suitable map with these overlapped, we select the area most suitable for wind turbine installation.



2 Hearing to relevant local governments

We will interview related local governments concerning the characteristics and problems of the area selected according to the suitable map, measures concerning the wind power generation of local governments, the extent of living of local residents, awareness of the environment, and so on. By keeping communication with the local stakeholders from the early stage, we can prevent the rework in the later environmental assessment.

3 Field visit

Confirm whether there is a problem with the windmill transportation route or the transmission line, and visit the site with local consent for examination of the location of the windmill placement. By using aerial photographs by UAV certified holders, we can also grasp the current status of places where people cannot enter and provide topographical information.



1 Aerial photograph by UAV 2 Field visit using UAV 3 Photographing by UAV

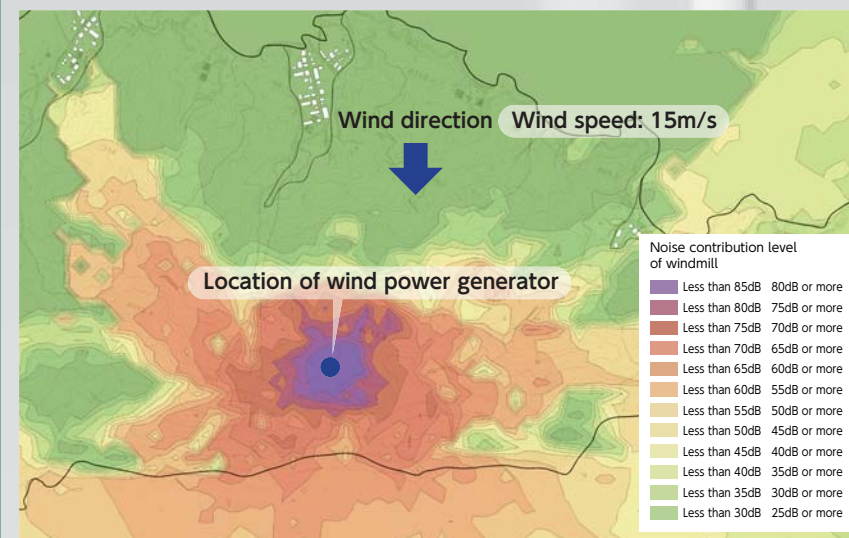
Total support for wind power generation business

From many experiences of wind power generation environmental assessment, we will introduce the main issues and corresponding technologies.

02 Expressing the noise influence predicted from weather conditions and topography in 2-D and 3-D in an easy to understand manner

In the noise problem which is one of the limiting factors of the arrangement decision of the windmill, from the concern that the wind noise from the blades of the windmill, the mechanical sounds generated from the generator, etc. affect the health, from surrounding residents It may be over reflected. In order to avoid such situation, prepare materials with scientific basis corresponding to elaborate preliminary survey and predictive evaluation, and promote dialogue with the residents smoothly.

As for the noise survey, it is required to comply with "Guidelines Concerning Noise Generated from Wind Power Generation Facilities" published by the Ministry of the Environment in May, 2017 and "Manual for Measuring Noise etc. Generated from Wind Power Generation Facilities". In addition to the conventional environmental noise, various analyzes such as measurement of residual noise when the wind speed of the hub height is in the effective wind speed range (below cut-in wind speed and less than the rated wind speed) and frequency analysis by survey of very low frequency sound to hold.



Noise prediction map by wind turbine installation

In noise prediction, by analyzing the noise from multiple sound sources in a complex manner, considering not only the distance attenuation but also the topography and weather conditions, the influence of the ground surface, etc., the noise influence range around the wind turbine installation area can be accurately predicted. Furthermore, we put these data on a map, visualize the range affected by noise with 2-D / 3-D, accurately grasp, and consider environmental conservation measures.

04 Investigate the habitat status of rare birds and bats with the latest equipment

The impact on ecosystems such as bird strikes and bat strikes caused by wind turbines after installation and operation inhibiting the flight path of birds and bats is a major problem in the wind power generation business, It is an indispensable element for smooth progress of environmental assessment.

By introducing the latest ship radar and ultrasonic recording equipment, we will investigate even night behavior that it is difficult to confirm by visual inspection and there are many technical issues. We will organize data such as acquired flight position, altitude, direction, etc. to grasp flight conditions of birds and habitat status of bats with high precision, and based on this, we will conduct a forecast survey without coming back at each examination stage of environmental assessment.



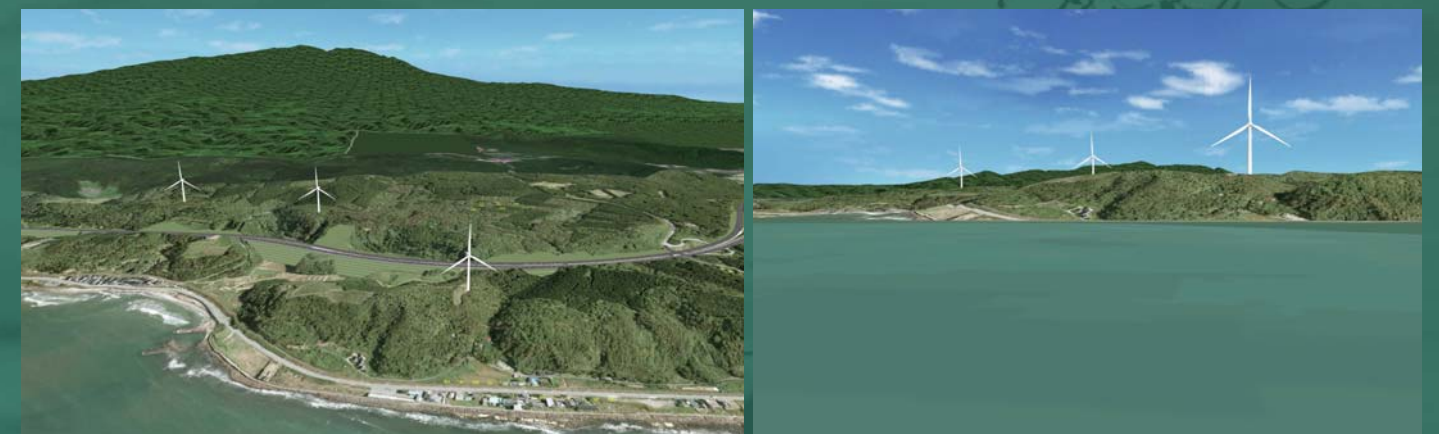
① Ship radar survey ② Bird flying route grasped by ship radar ③ Installation of ultrasonic recording equipment
Offered (①②) / FRS Corporation

03 Simple image of "Scenery with Windmill" Draw realistically in 3-D

Vista by installation of windmill introducing visualization using 3-D which makes the change of landscape easier than conventional 2-D, makes it easy to consider landscape in response to guidelines.

When setting wind turbines, the guidelines set by the Ministry of the Environment and prefectures require consideration not to harmonize with the natural and cultural landscape of the area. Furthermore, in recent years, we may be asked to consider landscapes from a new viewpoint, such as a sequence landscape, such as a continuous view from a passing vehicle.

In the conventional 2-D landscape examination, we had only to make image materials with representative viewpoints and we could not consider from a free angle, but in the case of 3-D it is possible to freely set the viewpoint, it is also possible to create easy-to-understand explanatory materials that are easier for many people to understand.



Offered (both photos) / Landscape design laboratory

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05 Aiming for wind power model coexisting with local people

Renewable energy such as wind power and geothermal power is a power generation resource that can be used for a long period of time utilizing the natural environment peculiar to the area. Understanding the local people such as local residents, local governments, and agriculture, forestry and fisheries industries is essential when constructing these power plants. Therefore, it is the key to clearly show what kind of merit is benefited to the local power plant. In addition, it is also necessary to maintain good relationships so that smooth negotiations can be made during equipment renewal. For these reasons, proposals for regional promotion measures for renewable energy power generation projects are becoming increasingly important.

At our company, we have been engaged in regional revitalization of the inter-mountainous region through dam projects such as hydroelectric power generation, etc., and have implemented a wide range of approaches such as promotion of regional industries such as tourism and special products and disaster prevention activities including prevention of wildlife damage. The results of the efforts have been highly appreciated by the Ministry of Land, Infrastructure and Transport, and received six awards in 15 operations. Based on these achievements, we propose regional contribution plans where wind power generation business is easy to accept, and support construction of relations with local people.



06 Experts network of various genres

In order to properly carry out environmental assessment, it is important to receive advice from experts and specialists in the area, conduct surveys, forecasts and evaluations.

Until now, we have formed a network with universities, academic societies, organizations, environmental academics and researchers nationwide as we handle a lot of national projects such as development of dams and roads and census of riparian waterside. In the field of renewable energy such as wind power generation and geothermal power generation, we have also formed networks in various fields through environmental assessment, business of the Ministry of Economy, Trade and Industry, Ministry of the Environment. In Hokkaido we are serving as the secretary of the "Raptors Research Group" and there are also connections with many birds of prey experts such as universities in Hokkaido, research institutes, individual researchers gathering at our association. Utilizing these networks, you can gather advice from experts who are appropriate for each business.

07 Achievements of land-based wind power generation environmental assessment and technical staff covering the whole country

We have engineers located in seven locations nationwide from Hokkaido to Kyushu. Each is familiar with the natural and social environments of land and sea in each region, and we are constantly collecting real information and data. We understand the ordinances of each municipality and the way of thinking of the Environment Council more closely, so we can advance the assessment based on the environmental characteristics of the area.

Achievements of land-based wind power generation assessment

Hokkaido	9
Aomori Prefecture	1
Akita Prefecture	2
Miyagi Prefecture	1
Fukushima Prefecture	3
Aichi Prefecture	1
Ehime Prefecture	1
Kochi Prefecture	2
Oita Prefecture	1

Center for Environmental Science and Technology: 19 people

Osaka Branch: 25 people

Sapporo Branch: 8 people

Tohoku Branch: 26 people

Head Office: 198 people

Chubu Branch: 23 people

Kyushu Branch: 17 people

Total support for wind power generation business

Company Profile

Establishment	January 1984(Founded in April 1941)
Capital	¥250 million
Number of Employees	405 people
Business contents	Construction consultant (Proposal, survey, planning, designing and construction supervision etc. on environment and construction business)
Major trading partners	Ministry of Land, Infrastructure, Transport and Tourism and related foundations / private enterprise / NEXCO / local governments / others
Registration qualification	<ul style="list-style-type: none"> •Construction consultant registration; Building 29 No. 3460 •Geological Surveyor Registration; Quality No. 27 No. 1547 •Surveyor registration; (7) 14861 •First class architect office registration; (Tokyo) No. 37113 •Measurement certification business registration; (concentration) No. 573 •Measurement certification business registration; (sound pressure level) No.15 •Measurement certification business registration; (vibration acceleration level) No. 17 •Designated Investigation Organization based on Soil Contamination Countermeasures Act; 2003-3-1127 •Work environment measurement institution registration; (Saitama) 11-47 •ISO certification; ISO 9001 [ASR-Q 3589]
Patent	<p>【 Patent number 】</p> <ul style="list-style-type: none"> •Deposit flow distribution and purification method in sewage pipe;No.1898704 •Supporting device of telescopic device in bridge;No. 3907021 •River flow rate observation system;No. 4520878 •Flow measurement device;No. 4539842 •River electromagnetic flow velocity sensor, river flow velocity measurement device, river flow velocity measurement system;No. 4902263 •Water flow measurement system and water flow measurement method;No. 5047886 •Noise level meter and program for noise measurement;No. 5235120 •Method for measuring perspective distortion;No. 5594697 •Sluice gate / sluice pipe inspection support system and sluice gate / sluice pipe inspection support method;No. 5925230 •Noise meter and program for noise measurement;No. 6025148

Major membership group	<ul style="list-style-type: none"> Japan Wind Power Association Natural Energy Council Japan Geothermal Association Japan Association of Environment Assessment The Japan Civil engineering Consultants Association Japan Society of Civil Engineers Planning Consultants Association of Japan Japan Society of Erosion Control Engineering Japan Road Association Japan River Association The Ecological Society of Japan Nature Environment Coexistence Technology Association Ecology and Civil Engineering Society River Ecology Research Group of Japan The Ornithological Society of Japan Society for Research of Golden Eagle Japan Wild Bird Society of Japan Yamashina Institute for Ornithology Japan Society on Water Environment The Japanese Society of LIMNOLOGY The Japanese Society of Environmental Entomology and Zoology The Japanese Society of Revegetation Technology The Acoustical Society of Japan The Institute of Noise Control Engineering of Japan Japan Society for Atmospheric Environment Japan Environmental Measurement and Chemical Analysis Association The Remote Sensing Society of Japan General Incorporated Association Japan UAS Industrial Development Association
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Technical staff qualified person list

■Registered Professional Engineers	236 people	■Registered Environment Measuring Engineer	18 people
Engineering Management	57 people	■Soil Contamination Surveys Technical Manager	5 people
Civil Engineering	151 people	■Registered Environmental Counselor	15 people
Water Supply & Sewerage	1 person	■Environmental Assessor	30 people
Environment	14 people	■Registered Weather Forecaster	5 people
Applied Science	6 people	■Biotope Planners and Builders	67 people
Information Engineering	2 people	■Registered Taxonomic Proficiency	31 people
Environmental Engineering	3 people	■Certified Harbor Survey Engineer	1 person
Agriculture	2 people	■Tree Doctors	1 person
■Registered Civil Engineering Consulting Manager	94 people	■Japan Fisheries Research and Education Agency;Fellow	1 person
■PhD (Engineering/Agriculture/Science/ Fisheries Science)	41 people		

(Created in February 2018)

