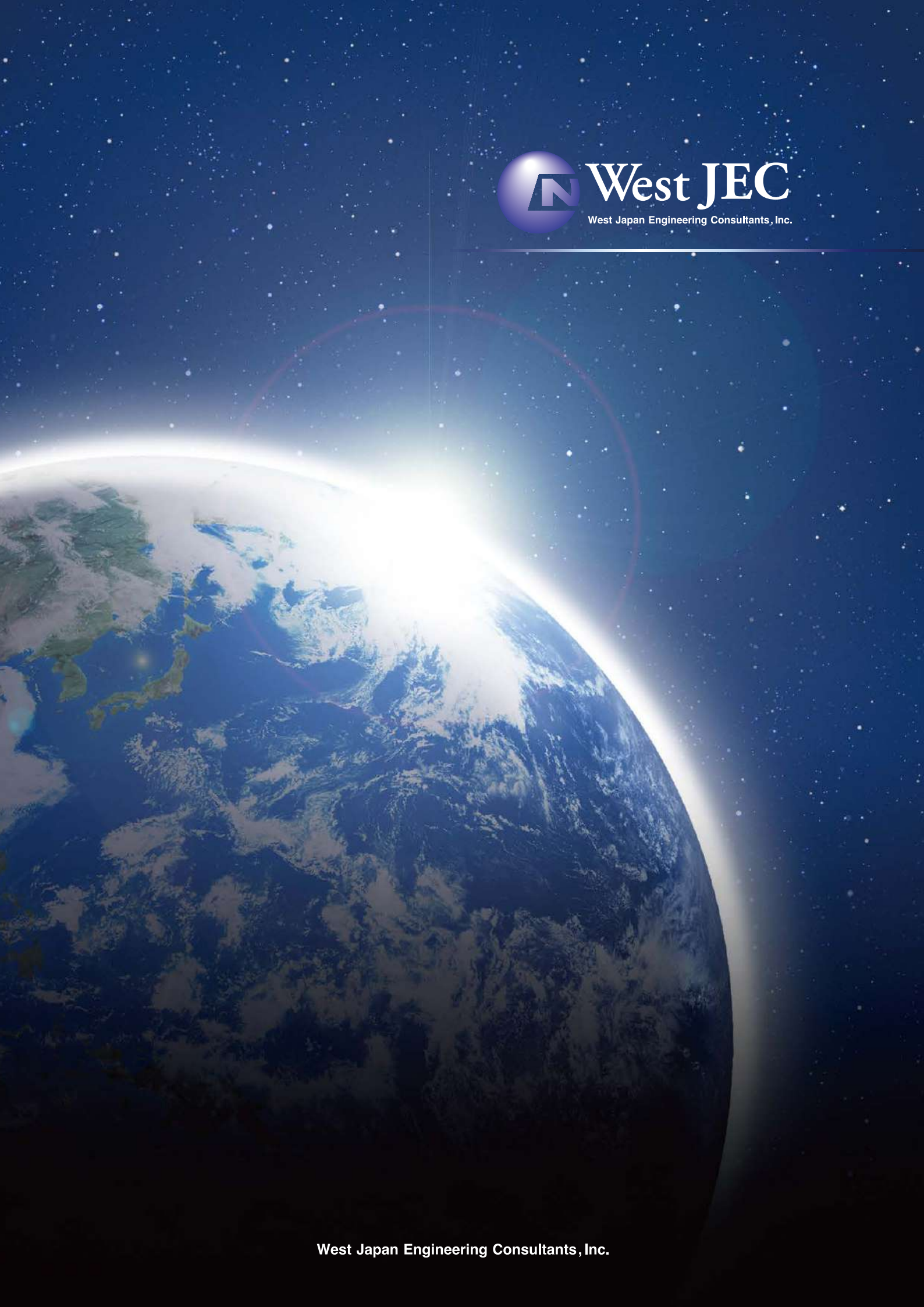
West JEC
West Japan Engineering Consultants, Inc.
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CORPORATE PHILOSOPHY

We aim to create solutions for a prosperous society while harmonizing the needs of humanity with the needs of the natural world.

- We provide the engineering solutions which our clients expect and upon which they can rely.
- We make optimal use of leading-edge technologies.
- We contribute to improving the environment of the world.







MESSAGE FROM PRESIDENT YASUJI AKIYAMA

President
稲山　泰治
Yasuji Akiyama

West Japan Engineering Consultants, Inc. (West JEC) was founded in 1967 as a subsidiary of the Kyushu Electric Power Company and is now a key member of the Kyushu Electric Power Group. Over the years, West JEC has accumulated broad experience in providing engineering services and solutions to numerous clients in Japan and abroad. Each project challenges and motivates us to develop new technologies and methodologies to satisfy our clients with the best engineering. West JEC is known for its innovative technologies and methodologies.

West JEC specializes in integrated engineering of power generation and infrastructure development projects. In addressing client needs, West JEC professionals utilize an interdisciplinary approach to provide solutions which are congruent with the economics of the project, the return expected by the project owners, and the expectations of institutions providing finances. West JEC strives to find solutions which coexist harmoniously with the project surroundings and the natural world.

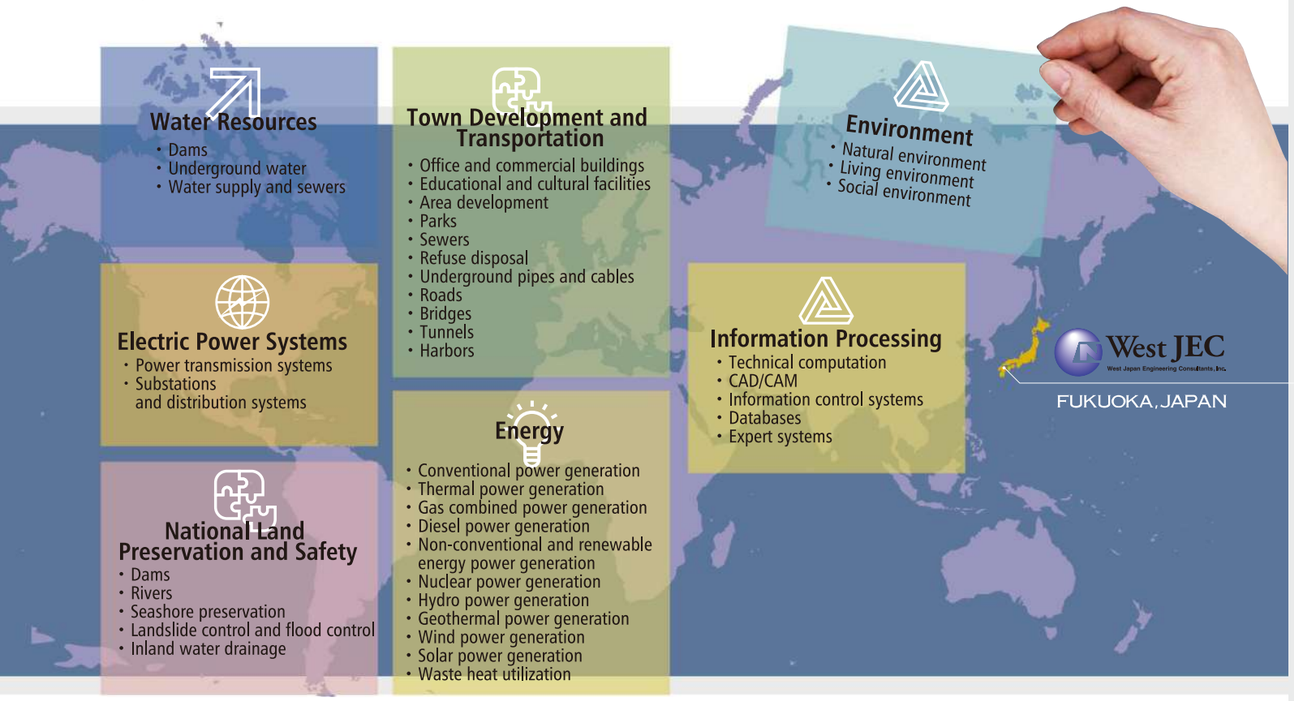
West JEC has particular expertise in engineering power generation and electric systems, and the transmission and distribution of power (including rehabilitation and renovation of existing power plants) for private and public utilities. In the field of conventional thermal power generation, West JEC has developed special expertise in diesel, oil, gas, gas combined cycles and coal (fluidized bed combustion) systems. In non-conventional power generation, we have a strong department concerning nuclear power technology. Also, we believe in preserving the environment for present and future generations and for the sake of other living things. To preserve the environment, West JEC utilizes world class engineering to harness renewable energy resources such as hydro, wind, solar, biomass (refuse and wastes) and geothermal energy resources.

To improve living standards without damaging the environment, West JEC has developed capabilities in the fields of civil, architectural and environmental engineering. We survey, plan, design, and supervise construction of 1) River and ocean facilities such as dams and seashore protection structures; 2) Transportation facilities such as tunnels, roads, bridges, and railways ; 3) Waterworks, sewage, and other urban development structures and agricultural facilities. We also conduct oceanographic engineering projects and surveys and analyses of underground water. We design energy-efficient buildings and facilities which use waste heat efficiently.

West JEC is a technological innovator. We have developed advanced techniques for processing information and cutting edge methods for evaluation and integration of project elements, in order to shorten construction time, lower costs and improve the rate of return for owners. In addition, we have cooperated with Japanese governmental aid organizations to bring advanced technology to nations seeking to improve the living standards of their citizens. Finally, our engineering protects the local and global environment and at the same time preserves harmony with the culture and ethos of the project site locale and country.

Integrated Services From Upstream to Downstream

West JEC contributes to the development and accumulation of social capital both in Japan and overseas by offering integrated services in civil, architectural, electrical, mechanical, geoscientific, and environmental engineering. Depending on the maturity of particular projects, West JEC can provide services from the stage of conceptualization and general planning through defining their economy and assessing their impact upon the society. When needed, West JEC can assist clients in determining and procuring financial resources needed to execute projects. Services can be rendered at any stage of the development process: detailed planning, detailed design, assistance in the preparation of bidding documents for materials procurement and equipment supply, assistance in contracting suppliers and contractors, construction supervision, witnessing testing and the training of personnel for the operation and maintenance of facilities. The areas in which West JEC renders these services are described below.



SEQUENCE OF SERVICES PROVIDED FOR POWER GENERATION PROJECTS

Consulting services for the construction of new facilities or the expansion, renovation and / or the rehabilitation of existing facilities usually are provided in the sequence below:

Services before construction
- Project finding
- Development master plans
- Preliminary study for selection of plant sites and access routes
- Survey and investigation for basic planning, pre-feasibility studies
- Feasibility study (technical, economic and environmental)
- Preparation of the plan for financial procurement
- Assistance in the execution and due diligence for financial procurement
- Detailed design and costing plans
- Preparation of bidding documents
- Assistance in the bidding process and contracting

During Construction
- Check and review of manufacturer's drawings
- Layout of mechanical and electrical facilities
- Detailed design of civil and architectural facilities
- Witnessing of factory tests
- Construction supervision
- Preparation of test programs
- Witnessing and assistance in overall trial operation and acceptance tests

After Commissioning
- Preparation of completion report
- Preparation of operation and maintenance manuals
- Training in project planning, design, operation and maintenance
- O&M construction and supervision

Integrated Services from Upstream to Downstream

CSR Corporate Social Responsibility

At West JEC, our corporate philosophy is to dedicate ourselves to achieving true harmony between humanity and the environment while contributing to the creation of a prosperous society. We accomplish this by carefully considering he natural and living environment in the course of providing our engineering consulting services, from the survey, planning, and design stages through the construction stage of electric power and civil facilities.

Environmental Policy

1. To set objectives, implement solutions and continuously improve our environmental management systems.
2. To observe statutory and regulatory requirements
3. To promote environmentally-friendly business activities
4. To promote resource and energy savings
5. To provide environmental training for all West JEC employees and for employees of the group of companies comprising the Kyushu Electric Power Co.

Corporate Citizenship

1. Participation in street cleaning volunteering
2. Community education
3. Improving natural environment

1.Volunteering in cleaning around our head and branch office buildings

2. Lectures on environment to primary school kids.

3. Participation in tree planting activities.

Energy Development and Power Generation

Energy development, particularly power generation, is one of West JEC's specialties. Over the years, we have accumulated experience and developed know-how in every type of energy conversion system for generating electricity. Our expertise extends from conventional thermal power such as diesel, gas simple cycle, and gas combined-cycle to environmentally friendly systems, including non-conventional generation systems such as nuclear energy and fuel-cells and renewable energy such as geothermal, wind, and solar power generation.

Geothermal Power Generation

Hatchobaru geothermal power plant, Japan

West JEC has accumulated expertise in geothermal power generation since 1949, when our engineers first collaborated with the Research Laboratory of Kyushu Electric Power Company. Over the years, West JEC engineers have acquired and developed geological, geochemical, geophysical and several other geoscientific technologies for the exploration and evaluation of heat sources, water supplies and reservoir structures. In addition, West JEC uses proprietary software and mathematical models for the evaluation of the geothermal potential and longevity of particular resources at differing levels of exploitation. West JEC's integrated services include evaluation of geothermal resources, engineering of geothermal power generation facilities, assessment of the environmental impact and the economics of resource exploitation, multi-utilization of resources, and personnel training for the operation and maintenance of geothermal reservoirs and power facilities.

Wind Power, Solar Power, and Clean-Coal Power Generation

Cape Noma wind park, Japan

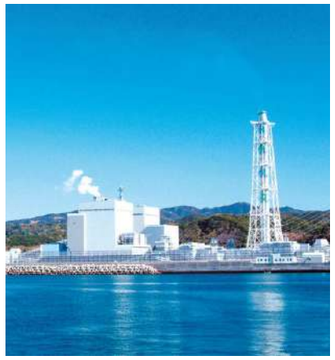
Use of clean, natural energy resources is the future of electric power generation. West JEC has developed capabilities for harnessing wind, fuel cell, and solar (photovoltaic). In addition, West JEC is conducting research and development of combined cycle power generation using pressurized and fluidized bed coal-fired boilers. This system utilizes the energy of pressurized combustion of coal gas to drive a gas-turbine which generates electricity. Combustion of coal gas is a highly efficient energy system.

Hydro Power Generation

Hitotsuse hydro power station, Japan

Water is another renewable source of energy for electric power generation. West JEC has participated in numerous hydro-power projects, from large scale power plants to so-called mini-hydro power plants. West JEC can provide total engineering services, from survey and investigation to planning, design, construction supervision, and training in the operation and maintenance of power facilities. West JEC has developed specialized software which utilizes space imagery for evaluation of riverine potential and project planning. For the small and mini-hydro power projects, West JEC has developed advanced methods to yield shorter construction periods in order to minimize costs while using standardized designs.

Thermal and Gas Turbine/Diesel Power Generation



Reihoku coal-fired thermal power station, Japan

Tatsugo diesel power station, Japan

West JEC has experience in power generation from thermal means using a variety of fuels such as diesel, oil, coal, LNG and LPG. West JEC renders consulting services in a wide range of plant capacities. West JEC has civil, architectural and environmental engineers as well as electrical and mechanical engineers, all skilled in rendering integrated services for conventional and non-conventional power plants. West JEC also has expertise in the rehabilitation, renovation and modernization of existing power facilities.

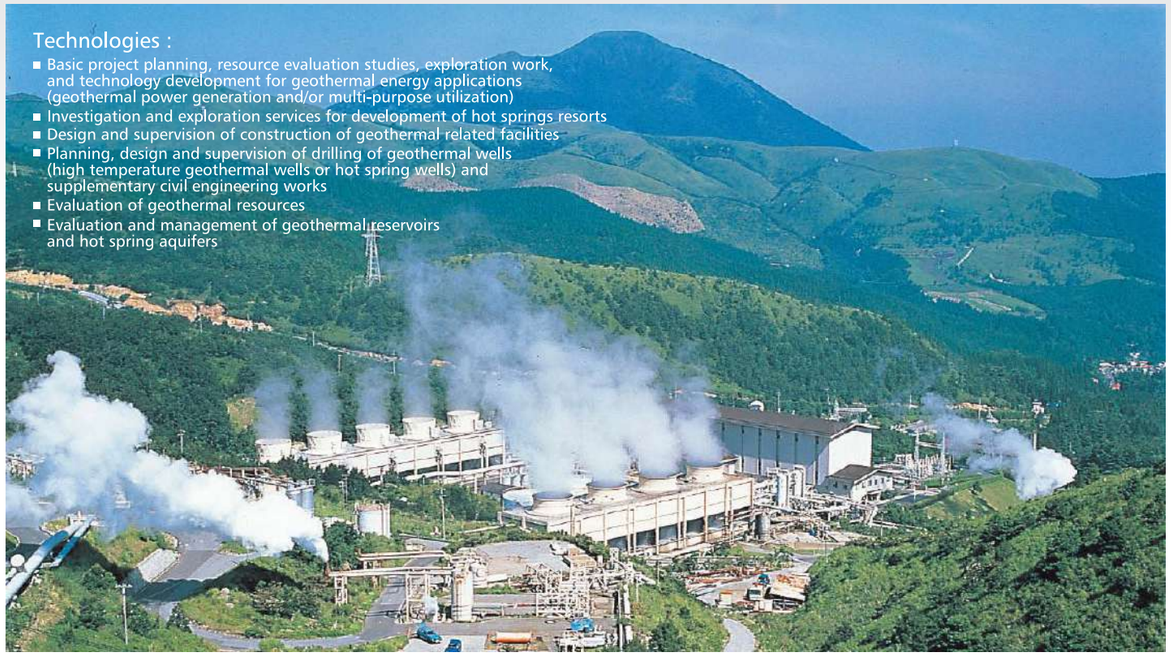
Nuclear Power Generation

Genkai nuclear power plant, Japan

West JEC is experienced in providing geological and anti-seismic design and, performing environmental surveillance for structures of nuclear power facilities. The engineers of West JEC can design new plants and also can upgrade computer systems for the existing nuclear power plants, to enhance their reliability. On the basis of experience gained in the operation of nuclear facilities of the parent company, West JEC can provide support to clients during power plant outages as well as services to improve safety and performance. West JEC can carry out analyses and diagnostics of nuclear power plants in operation and also can provide personnel training.

Geothermal

Among renewable energy sources, geothermal energy offers the most stable energy supply.
This is because geothermal energy is the energy source least affected by climatological, seasonal, or diurnal variations.



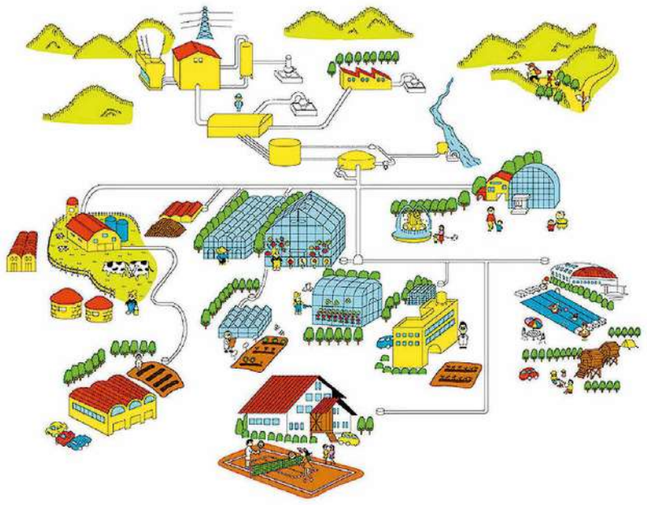
Conceptual diagram of a geothermal reservoir

Image of fractures developed within formations

A good geothermal system combines three elements

1. A heat source, such as a magma chamber or a hot geological environment
2. A water supply
3. A reservoir: a geological structure permeable enough for deep fluid circulation, with an impermeable cap rock to preserve fluid pressure

West JEC applies a variety of geological, geophysical and geochemical methods to determine the location and quality of these three elements the basic element of geothermal energy.

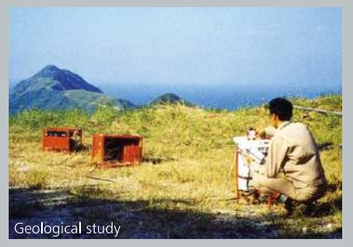


West JEC can provide technical support for the effective use of geothermal fluids in applications other than power generation.

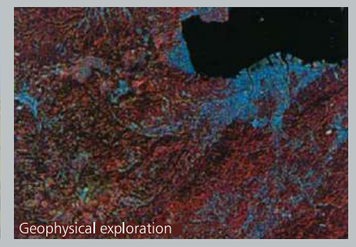
Total consulting services from up-steam to down-stream.

Providing consulting services both in Japan and abroad, West JEC has acquired technology and experience in problem solving throughout the world.

Geo-scientific study



Geological study



Geophysical exploration

In the process of finding prospective exploitation sites, we use geoscientific techniques to conduct reconnaissance of relatively large areas and delineate their geothermal features. After that, we survey progressively smaller areas, in order to define the size and position of conspicuous geothermal indicators where targets for deep exploration drilling may be situated.

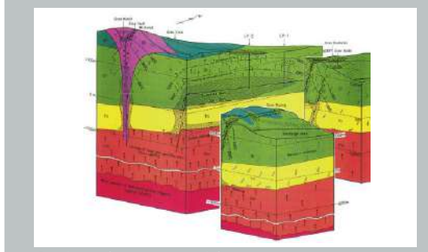
Borehole surveys

Supervision of well drilling and well testing

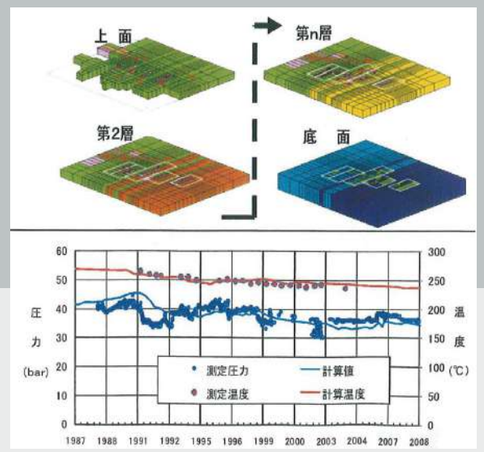
West JEC provides drilling supervision services and conducts borehole pressure and temperature surveys and well completion and production testing. These processes identify the thermal and hydrological setting of the reservoir and elucidate the chemical and thermodynamic properties of the fluids.

Reservoir simulation and resource evaluation

From the integration of all information gathered from geoscientific and drilling works, West JEC creates a conceptual model of the geothermal structure and then creates a numerical model that is used, after a calibration process, to assess the geothermal resource capacity and to test the response of the geothermal reservoir to different levels of exploitation. West JEC's piping, plant and electrical engineers collaborate with planners and economists to formulate a plan for single or multiple stage development.



Geothermal structure model



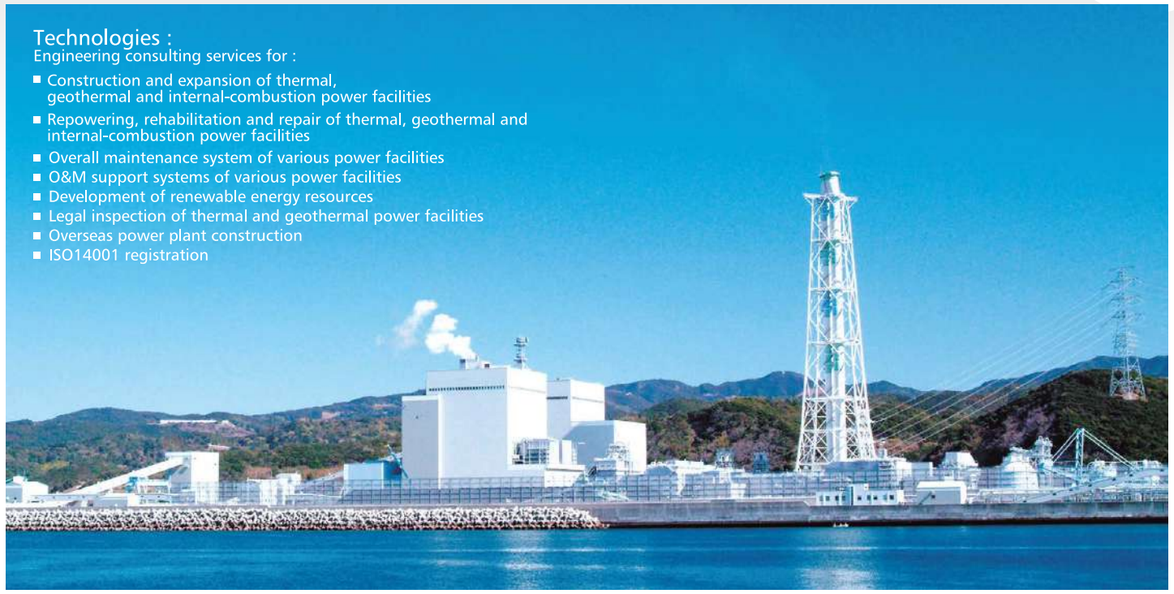
The numerical model is comprised of several thousand elements, each encompassing the thermo-hydraulic properties of rocks that are determined by calibration of the model. The model must be capable of reproducing actual, measured parameters before it can be used to forecast the response of the reservoir to exploitation.

Thermal Power & New Energy Engineering

West JEC provides know-how for survey, planning, design and construction supervision for new facilities and for expansion, rehabilitation and repair of existing facilities. West JEC also provides IT systems to modernize existing facilities. These systems minimize maintenance costs without impairing facility reliability.

Technologies :
Engineering consulting services for :

- Construction and expansion of thermal, geothermal and internal-combustion power facilities
- Repowering, rehabilitation and repair of thermal, geothermal and internal-combustion power facilities
- Overall maintenance system of various power facilities
- O&M support systems of various power facilities
- Development of renewable energy resources
- Legal inspection of thermal and geothermal power facilities
- Overseas power plant construction
- ISO14001 registration



Reihoku Power Station (Coal), Kyushu Electric Power Inc., Japan

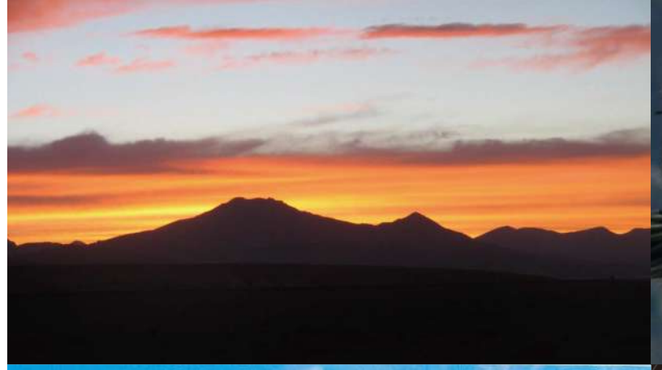
Ulubelu Geothermal Power Plant (under construction), Sumatra, Indonesia

West JEC has ample experience in planning the construction of new or the rehabilitation of older power projects, including conducting feasibility studies, basic and detailed designs and assisting clients in the bidding and contracting of contractors. With the know-how and experiences gained in the domestic power utility market, West JEC has contributed to the reliable supply of power and to environmental preservation in Southeast Asia, North and Central America, Africa and Eastern European countries.

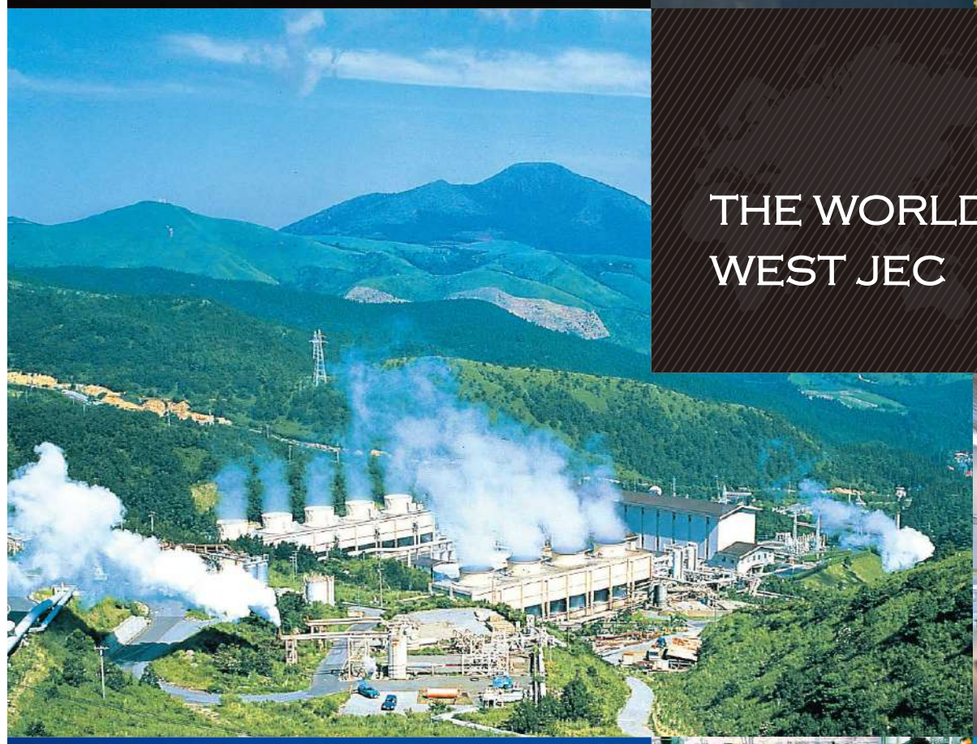
Lahendong Geothermal Power Plant
Sulawesi, Indonesia

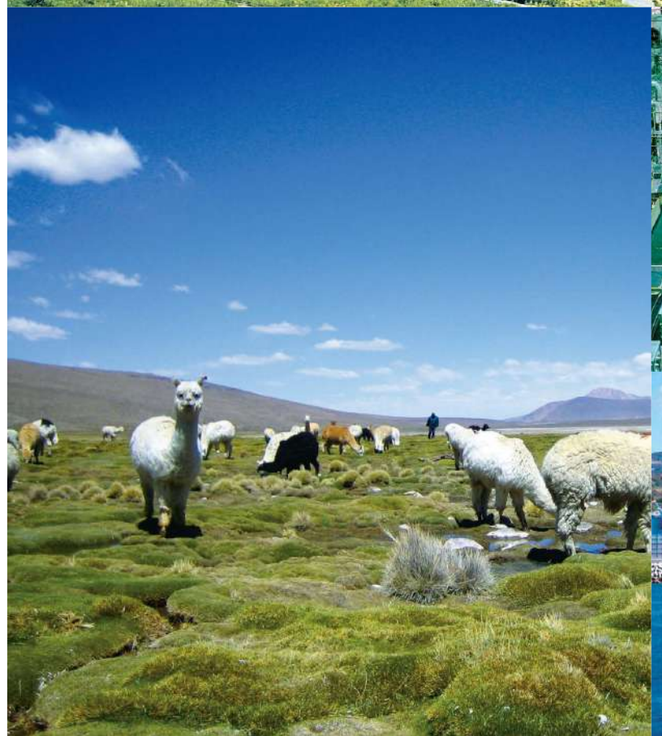
Hatchobaru Geothermal Power Station
Kyushu Electric Power Inc., Japan

Control room after replacement works of major control system in Shin-Oita Power Station (Combined), Kyushu Electric Power Inc., Japan

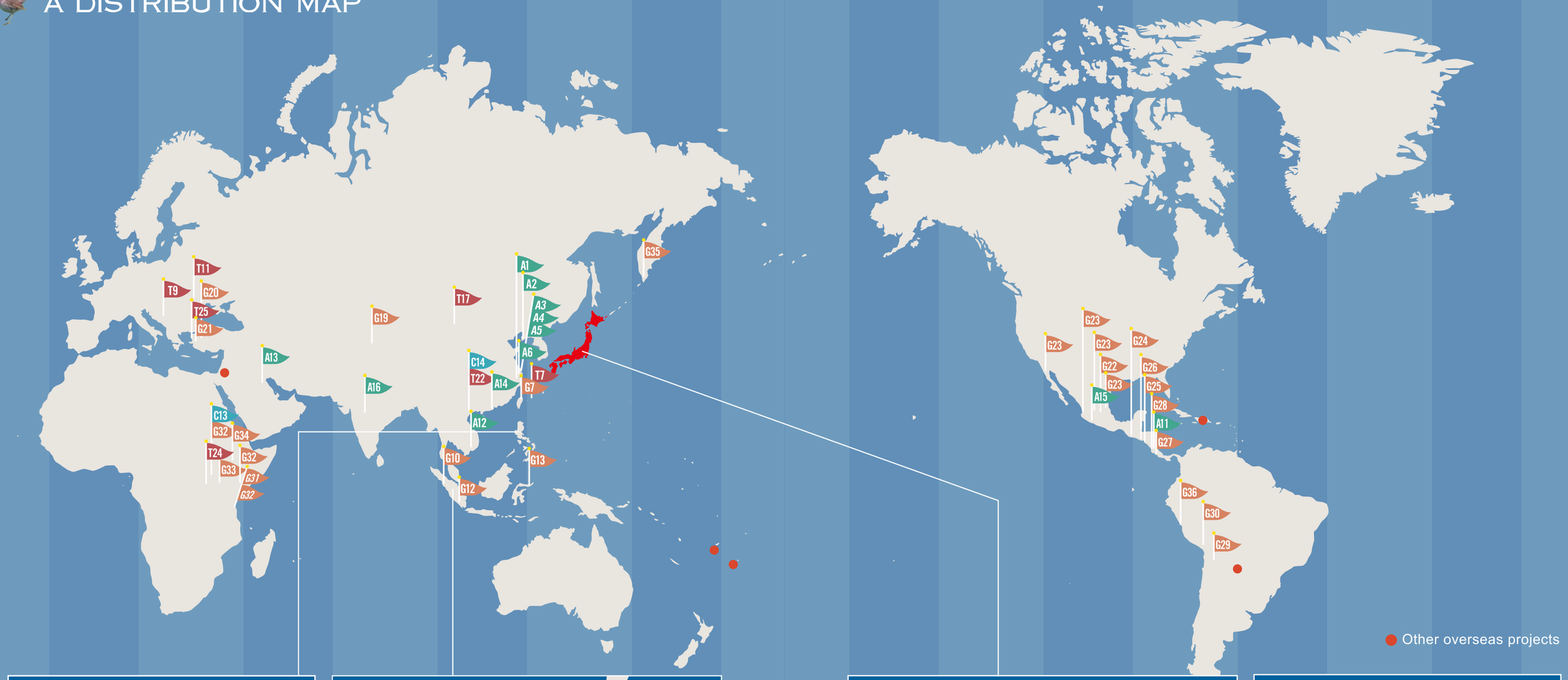


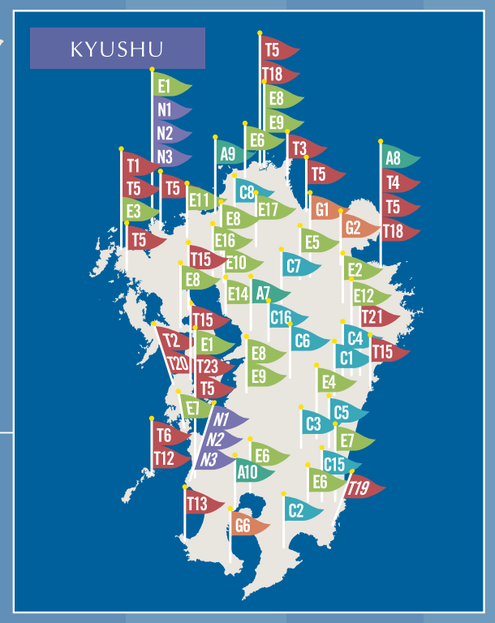
THE WORLD OF
WEST JEC





A DISTRIBUTION MAP





MAJOR EXPERIENCE

	No	Project Name	Brief Description of the Project	Country	Type of Project	Type of Services						Type of Finance													
												Japanese								Non-Japanese					
						PFS	F/S	C	D	De	M	O	LG	JB	JE	JI	JS	EC	NE	Pr	LG	WB	UN	IA	AD	KF	Pr
Geothermal	G1	Otake and Hatchobaru geothermal development projects	Consulting services for exploration, drilling supervision, well testing, reservoir evaluation, conceptual design, FCRS design, environmental services, construction supervision, testing, commissioning, reservoir monitoring, Kyushu EPC. [Service Period: 1968 to date]	Japan	G C A E		●	●	●	●	●	●								●							
	G2	Yamagawa, Ogiri and Takigami geothermal power plant projects	Consulting services for the project implementation, well evaluation, basic design, detailed design, bidding documents, drawing review: 30MW unit for Yamagawa, 30MW Ogiri and 25 MW Takigami, Kyushu EPC. [Services Period: Nov. 1992 to Nov. 1996]	Japan	G C A E			●	●	●	●	●								●							
	G3	Production well development for the Mori geothermal power plant	Re-evaluation of the geothermal resource, selection of drilling targets: The project succeeded in the production drilling and in the recovering of power output from less than 20 MW to more than 30MW, Hokkaido EPC. [Service Period: Oct. 1990 to Feb. 1992]	Japan	G				●		●	●								●							
	G4	Re-evaluation of resourcepotential of the Kakkonda and Matsukawa geothermal fields in Tohoku area	Re-evaluation of resource potential by forecasting simulations and selection of drilling targets for sustainable operation of the Kakkonda and Matsukawa geothermal powerplants. [Service Period: Apr. 2007 to Feb. 2009]	Japan	G		●				●	●								●							
	G5	Geothermal promotion survey at the Onsen-cho geothermal field, Hyogo Prefecture in Japan	Geological, geophysical (MT), geochemical survey, exploration well drillings, environmental assessment and comprehensive evaluation for small-scale geothermal power project at the Onsen-cho geothermal field, Hyogo Prefecture as a promotion survey in Japan. [Service Period: Jun. 2005 to Mar. 2007]	Japan	G	●													●								
	G6	Geothermal promotion survey at the Ikedako-tobu geothermal field, Kagoshima Prefecture in Japan	Geological, geophysical (MT), geochemical survey, exploration well drillings, production tests, environmental assessment and comprehensive evaluation including reservoir simulation study for small-scale geothermal power project (1500 kW) at the Ikedako-tobu geothermal field, Kagoshima Prefecture as a promotion survey in Japan. [Service Period: Jun. 2007 to Mar. 2010]	Japan	G	●													●								
	G7	Resource assessment of the Chingshui Geothermal Power Generation Project	Resource potential evaluation by means of the Stored Heat Method with a statistical analysis, Monte Carlo Analysis, and recommendation of appropriate power plant output and basic development plan for the Chingshui geothermal field in Taiwan. [Service Period: Jan. 2008 to Jun. 2008]	Taiwan	G		●																				●
	G8	Master plan for geothermal power development	Formulation of the master plan rank and assignment of priorities to fields for the development of geothermal resources. [Service Period: Mar. 2006 to Sep. 2007]	Regional: Indonesia	G	●						●				●											
	G9	Feasibility study for units 4, 5, and 6 of the Dieng geothermal power development	Feasibility studies including geoscientific data review, resource assessment by numerical reservoir simulation, viability studies for the power facilities gathering-reinjection system and economic-financial evaluation. [Service Period: Mar. 2006 to Sep. 2006]	Indonesia	G		●					●								●							●
	G10	Due diligence to assess participation in the Sarulla geothermal development and owner's engineering services for the consortium MEDCO-Itochu-Ormat	Due diligence and owner's engineer geoscientific review, conceptual and numerical modeling 100MW Namora I Langit and 200MW Silangkitang. Create reservoir exploitation plan and production-reinjection well drilling programs, check & review of contractor's work. [Service Period: from 2007]	Indonesia	G C A E				●	●	●	●															
	G11	Research cooperation for small scale geothermal exploitation in the eastern part of Indonesia	Feasibility studies of off-grid electric developments using geothermal resources for rural electrification addressed to establish a platform for a regional independent economy of low CO2 and other green house gases emission. [Service Period: Nov. 1997 to Mar. 2002]	Indonesia	G		●													●							
	G12	Ulubelu geothermal power plant project	Integrated consulting services to construct 55 MW x 2 geothermal power plant including, review of resource feasibility study, basic design, assistance in bidding, drawing review and consulting for construction and O&M of the power plant and switchyard and cross-country transmission lines, PLN. [Service Period: Mar. 2007 to Jan. 2013]	Indonesia	G			●						●													
	G13	Lahendong geothermal power plant project (unit-3)	Integrated consulting services to construct 20 MW geothermal power plant including, review of resource feasibility study, basic design, assistance in bidding, drawing review, and consulting for construction of the power plant, switchyard PLN. [Service Period: Aug. 2005 to Feb. 2010]	Indonesia	G			●						●													
	G14	Resource assessment for the Kamojang and Hululais geothermal fields	Reservoir simulation to evaluate sustainability of 230 MW powerplant operation for the Kamojang geothermal field in West Java and preliminary resource assessment for the Hululais geothermal field in Sumatra. [Service Period: Feb. 2012 to Mar. 2013]	Indonesia	G			●							●												
	G15	Capacity building of geothermal power development technology in Indonesia	Technical transfer of geothermal power exploration and evaluation technologies to staffs of the Governmental Institute, Center for Geological Resources (CGR) in Indonesia. [Service Period: Oct. 2011 to Mar. 2013]	Indonesia	G							●				●											
	G16	Feasibility study of the Cabalian geothermal power project, Southern Leyte	Feasibility study including geoscientific data review, resource assessment, conceptual design of power and transmission lines, and economic evaluation of the project. [Service Period: Sep. 2001 to Jan. 2002]	Philippines	G C A E		●					●			●											
	G17	Northern Negros geothermal power plant project	Consulting services to PNOC-EDC for the project implementation including market study, review of resource feasibility study, and FCRS design, construction and O&M of the power plant, associated switchyard and transmission lines of 49 MW Northern Negros geothermal power plant. [Service Period: Jan. 2001 to Jun. 2008, JBIC]	Philippines	G		●	●				●		●	●											
	G18	Rehabilitation of the Tiwi and Mak-Ban geothermal power plants	Consulting services for the formulation of a rehabilitation program and the preparation of bidding documents, drawing review and construction supervision of 55MW x 6 at Tiwi and 55MW x 6 at Mak-Ban. [Service Period: Apr.1997 to May. 2003]	Philippines	G		●		●	●	●	●															●
	G19	Study for a geothermal power development project at Uttarakhand State in India	Preliminary feasibility study consisting of geological, geophysical, geochemical surveys, resource potential evaluation, discussion on implementation plan, social and environmental aspects, and economical analysis. [Service Period: Aug. 2009 to Feb. 2010]	India	G	●									●											
	G20	Feasibility study of the Kizildere rehabilitation and expansion geothermal project	Feasibility study for rehabilitation and expansion of the Kizildere geothermal power plant taking into consideration the severe scaling and the insufficient return of hot water into the reservoir. [Service Period: Aug. 2001 to Jan. 2002]	Turkey	G		●									●											
	G21	Feasibility study of the Izmir district heating system	Feasibility study for utilization of geothermal and fresh water resources to provide the Izmir district with a heating system as well as to study the district heating systems of several municipalities of Turkey. [Service Period: Sep. 1999 to Mar. 2000]	Turkey	G		●				●	●				●											
	G22	Pilot study for infrastructure to protect the environment and to promote economic growth: The utilization of geothermal energy in the Puebla-Panama Plan region	Preparation of a master plan to enhance the utilization of geothermal energy in the countries under the Puebla-Panama Plan, in order to sustain the promotion of geothermal energy utilization projects included the execution of two feasibility studies and the study to standardize geothermal technologies of the region. [Service Period: Mar. 2003 to Nov. 2004]	Regional: Plan Puebla Panama	G		●					●		●													
	G23	Feasibility studies, 75MW Los Humeros, 50MW Cerritos Colorados, 100MW Cerro Prieto and 100MW Los Azufres geothermal complex	Geoscientific data review, conceptual and numerical models, reservoir assessment, reservoir exploitation plan and programming of plant retirement and new additions, production-reinjection drilling programs, hot reinjection, pipeline network system, scale deposition prevention-mitigation recommendations, selection energy conversion scheme, economic-financial evaluation. [Service Period: 2004 to 2007]	Mexico	G		●		●			●		●													
	G24	Engineering for the Zunil-I and Zunil II geothermal power developments and engineering services for the Amatitlan geothermal development	Geological, geophysical, geochemical exploration of the Zunil-I and II areas and of the Amatitlan geothermal area (20MW private project), conceptual model, well targets, drilling supervision, numerical modeling to testing, scale deposition, economic-financial evaluation. [Service Period: Several periods from 1989 to 1998 Zunil and from 1989 to 2007 Amatitlan]	Guatemala	G		●		●			●				●							●	●				
	G25	Engineering for the Berlin geothermal project	CSAMT (Controlled Source Audio-Magneto Telluric) and MT (Magnetotelluric) studies to assess the extent of the exploitable reservoir of the Berlin geothermal field, conceptual modeling and selection of production and reinjection targets. [Service Period: Jun. to Sep. 2004]	El Salvador	G		●					●															●
	G26	Due diligence to assess strategic partnership of Kyushu Electric-Sumitomo with LAGEO	Evaluation of the geothermal concessions of LAGEO, its development plan and assistance in the economic-financial evaluation of the proposed partnership. [Service Period: Nov. to Dec. 2001]	El Salvador	G														●							
	G27	Engineering services for the Miravalles geothermal project	Consulting services as ICE's Owner's Engineer for the project implementation including basic design, detailed design, bidding documents, drawing review and construction supervision of 55MW Miravalles geothermal power plant. [Service Period: Feb. 1988 to Aug. 1994]	Costa Rica	G		●																				●
	G28	Feasibility study for the 30 MW Las Pailas geothermal development	Geoscientific data review to create conceptual/numerical models to assess reservoir capacity of 30MW of power generation. Recommendations on exploitation plan, well drilling programs, hot reinjection and pipeline network system, studies on scale deposition, selection and design of the energy conversion scheme, economic-financial evaluation of the whole project. [Service Period: Mar. 2003 to Nov. 2004]	Costa Rica	G		●		●			●				●											
	G29	Feasibility study of the Laguna Colorada geothermal development	Geoscientific data review to create conceptual/numerical models to assess reservoir capacity of 100 MW of power generation. Recommendations on exploitation plan, well drilling programs, hot reinjection and pipeline network system, studies on scale deposition, selection and design of the energy conversion scheme, economic-financial evaluation of the whole project. [Service Period: Oct. 2007 to Jan. 2008]	Bolivia	G		●					●			●												
	G30	Assessment of the feasibility of geothermal utilization in Peru and pre-feasibility studies for the Borateras and Calientes geothermal developments	Assistance to JBIC in the assessment of geothermal utilization in Peru. Pre-feasibility studies of the Borateras and Calientes geothermal fields; Geological, geophysical (MT), geochemical exploration, construction of the conceptual model, exploratory well targets, estimation of potential and economic-financial evaluation. [Service Period: Oct. 2007 to Jan. 2008 Borateras] and from Oct. 2007 to Mar. 2008 Calientes]	Peru	G	●					●			●	●												
	G31	Geothermal power development in Eastern Africa: Exchange of Know-How on "Public Private Partnership" Models	Case studies of successful stories in East Asia and Central America regarding which types of public-private partnerships could effectively and efficiently bring geothermal power generation to the geothermal East African countries. [Service Period: Feb. to Dec. 2004]	Regional: East Africa	G							●										●					
	G32	Preliminary geothermal master plan for the utilization of geothermal energy in Kenya, Uganda and Tanzania	Under the Sub-Saharan program for the utilization of renewable resources, preliminary master plan study utilizing GIS technology in combination with the study of the availability and potential of geothermal resources in the three countries, in order to give priorities to prospective sites of geothermal potential and to contribute to the local development. [Service Period: Nov. 2007 to Jun. 2008]	Regional: East Africa	G		●																				●
	G33	Engineering services for the Olkaria geothermal development	I: Olkaria I, II, II and IV, conceptual / numerical models, 60MW Olkaria-II expansion study. II: Olkaria IV supervision, well testing. III: conceptual / numerical model of the three connected reservoirs, optimize exploitation study, evaluation of the rehabilitation, repowering or substitution of Olkaria-I, IV, Feasibility study of the optimized exploitation scheme. [Service Period: May. 2005 to Dec. 2008]	Kenya	G		●		●	●		●										●				●	●
	G34	Aluto Langano Geothermal Field Appraisal Project	For the purpose of contributing to the implementation of the TICAD-IV (the 4th Tokyo International Conference for African Development) Program, feasibility study including 4 deep directional well drillings, evaluation of geothermal resource, planning of optimum geothermal development, cost estimation, financial and economic evaluation. [Service Period: Nov. 2010 to May. 2014 (scheduled)]	Ethiopia	G		●		●	●					●					●	●						
	G35	Kamchatka geothermal power plant development project	Feasibility study including site survey, evaluation of geothermal resource, planning of optimum geothermal development (20MW x 2), cost estimation, financial and economic evaluation for the Mutnovsky geothermal field. [Service Period: Jul. 1996 to Jun. 1997]	Russia	G		●														●						
	G36	Master Plan for Development of Geothermal Energy in Peru	The objective of this study project was to create a nationwide geothermal power development plan for Peru in order to promote and accelerate the geothermal energy development and exploitation program in Peru. [Service Period: Nov. 2010 to Jun. 2012]	Peru	G		●										●										
	G37	Data Collection Survey for Geothermal Power Plant project	The purpose of this survey was to study geothermal power development plans in West Nusa Tenggara Province, Indonesia. [Service Period: Mar. 2011 to Nov. 2011]	Indonesia	G	●										●										
	G38	Feasibility study for the Tulehu Geothermal Power Plant project	The purpose of the Preparatory Survey was to prepare feasibility study documents for the Tulehu geothermal power development project. [Service Period: Jul. 2010 to Oct. 2011]	Indonesia	G		●										●										
Thermal	T1	New construction project of the Matsuura coal-fired thermal power station	Consulting services to Kyushu EPC for the project implementation including basic design, detailed design, bidding documents, drawing review and construction supervision for 700MW Matsuura coal-fired power project. [Service Period: Nov. 1979 to Jul. 1989]	Japan	T			●		●										●							
	T2	New construction project of the Reihoku coal-fired thermal power station	Consulting services to Kyushu EPC for the project implementation including basic design, detailed design, bidding documents, drawing review and construction supervision for 700MW x 2 Reihoku coal-fired thermal power project. [Service Period: Nov. 1991 to Jul. 2003]	Japan	T			●		●										●							
	T3	New construction project of the Karita coal-fired pressurized fluidized bed combustion (PFBC) combined cycle thermal power station	Consulting services to Kyushu EPC for the project implementation including basic design, detailed design, bidding documents, drawing review and construction supervision for 360 MW Karita coal-fired pressurized fluidized bed combustion (PFBC) combined cycle thermal power project. [Service Period: Apr. 1992 to Jul. 2001]	Japan	T			●		●										●							
	T4	New construction project of the Shin-Oita combined cycle thermal power station	Consulting services for the project implementation including basic design, detailed design, bidding documents, drawing review and construction supervision for Shin-Oita combined cycle thermal power project. Plant Capacity: 1st system: 115 MW x 6, 2nd system: 217.5 MW x 4, 3rd system: 245 MW x 3. [Service Period: Nov. 1988 to Aug. 1998]	Japan	T			●		●										●							
	T5	Replacement projects of major control systems for thermal power stations in Kyushu EPC	Consulting services to Kyushu EPC for the project implementation including basic design, detailed design, bidding documents, drawing review and construction supervision for the replacement project of major control systems for the following thermal power stations. [Service Period: 1994 to date]; Karatsu oil-thermal No.3 unit, Sendai oil-thermal No.1 unit, Ainoura oil-thermal No.1 & 2 units, Shin-Kokura LNG gas-thermal No.3, 4 & 5 units, Buzen oil-thermal No.1 & 2 units, Matsuura coal-thermal No.1 unit, Shin-Oita combined cycle No.1 system No.2, 4, 5 & 6 units.	Japan	T			●		●										●							
	T6	Extension projects of diesel power stations by Kyushu EPC for Isolated islands	Consulting services to Kyushu EPC for the project implementation including basic design, detailed design, bidding documents, drawing review and construction supervision for the following diesel power plant projects for Isolated islands. [Service Period: 1998 to 2006]; Tatsugo No.5 & 6 units, Shin-Iki No.4 unit, Shin-Tanegashima No.4 unit, Shin-Kikai No.5 & 6 units, Shin-China No.6 unit, Toyotama No.5 unit, Shin-Arikawa No.6 unit, Shin-Tokunoshima No.6 unit, Koshikijima Daiichi No.3 unit and many other extension projects for Isolated islands.	Japan	T			●		●										●							
	T7	Extension project of diesel power plants by Okinawa EPC for Ishigaki islands	Consulting services to Okinawa EPC for the project implementation including basic design, detailed design, bidding documents, drawing review and construction supervision for Ishigaki daini diesel power plant for Ishigaki island. [Service Period: Mar. 1994 to Jun. 1995]	Japan	T			●												●							
	T8	New construction project of the Ishikawa gas-turbine power plant	Consulting services to Okinawa EPC for the project implementation including drawing review and construction supervision for Ishikawa gas-turbine power plant. [Service Period: Jun. 1991 to Jun. 1992]	Japan	T			●												●							
	T9	Rehabilitation project of the Kakanj coal-fired thermal power plant	Consulting services to Elektroprivreda (EPBiH) for the project implementation including survey and planning of rehabilitation, study regarding environmental improvement, bidding documents, bidding assistance, bid evaluation, drawing review, and construction supervision for the 110MW (Unit 5) and 230MW (Unit 7) rehabilitation project. [Service Period: Aug. 2001 to Dec. 2006]	Bosnia Herzegovina	T			●							●						●							
	T10	Rehabilitation project of the Sucat thermal power plant	Assistance in finance procurement and consulting services for diagnostics, study and planning of rehabilitating items, design, bidding documents, drawing review for O&M for the 150 MW (No.1) and 300 MW (No.4) in stage 1 and for 200 MW (No.2) and 200 MW (No.3) of Sucat thermal power plant. [Service Period: Feb. 1988 to Dec. 1990 for 1st stage and Jan. 1990 to Jun. 1995 for 2nd stage]	Philippines	T			●		●	●	●			●													
	T11	Rehabilitation and improvement project of co-generation system for thermal power plants	Study of basic project conditions, project implementation plan, project effects, economy, replication to similar projects and project influence to other industrial and social fields. Study for the district heating and heat supply authority of Botosani City. [Service Period: Sep. 2000 to Mar. 2001]	Romania	T		●													●							
	T12	New construction project of the Koshikijima wind power plant	Consulting services to Kyushu EPC for the project implementation including scrutiny of wind conditions, basic design, detailed design, bidding documents, drawing review and construction supervision for 250 kW Koshikijima wind power project. [Service Period: Dec. 1986 to Mar. 1990]	Japan	W			●		●										●							
	T13	New construction project of the Noma wind power plant	Consulting services to Kyushu EPC for the project implementation including scrutiny of wind conditions, basic design, detailed design, bidding documents, drawing review and construction supervision for 10 units x 750 kW Noma wind power project. [Service Period: Oct. 1992 to Mar. 2002]	Japan	W			●		●										●							
	T14	Wind power development projects for IPPs	Consulting services as owner's engineer to Independent Power Producers (IPPs) for the project implementation including drawing review and construction supervision for the following wind power development. [Service Period: 2000 to 2001]; 750 kW x 6 unit wind turbines for Shimamaki wind farm in Hokkaido prefecture (2000) and 1,500 kW x 9 unit wind turbines for Sarakitomanai wind farm in Hokkaido prefecture. (2001).	Japan	W			●													●							
	T15	Wind power development projects for local governments	Consulting services to local governments for the project implementation including basic design, detailed design, bidding documents, drawing review and construction supervision for the following wind power development. [Service Period: 1999 to 2006]; 750 kW wind turbine for ETO Land Hayahino-Mine of Kitakata-town in Miyazaki prefecture (1999), 300 kW x 1 unit and 600 kW x 2 unit wind turbines for Sazanka-kogen at Konagai-cho in Nagasaki prefecture (2003) and 300 kW x 2 unit wind turbine for Futae-fishing port of Itsuwa-cho in Kumamoto prefecture (2006).	Japan	W			●		●										●							
	T16	Wind power development project in Northern Luzon	Consulting services to PNOC-EDC for feasibility study of 42 MW Northern Luzon wind power development. [Service Period: Jul. 2001 to Mar. 2002]	Philippines	W		●									●										●	
	T17	Wind power development project in Inner Mongolia	Consulting services for optimum arrangement of wind turbines using RIAM-COMPACT® application and generation energy forecast for wind power generation in Inner Mongolia. [Service Period: 2005 to 2006]	Japan	W			●		●										●							
	T18	Wave prediction system for LNG ships	Wave prediction system (real-time) for LNG ships for Kitakyushu LNG Co. ltd. And Oita LNG Co. ltd. [Service Period: 2010 & 2012]	Japan	W					●										●							
	T19	Wood chips fuel boiler project	Consulting services as owner's engineer for the project implementation including basic design, detailed design, bidding documents, drawing review and construction supervision for wood chips fuel boiler project. [Service Period: Apr. 2002 to Mar. 2004]	Japan	T			●		●										●							

Type of Projects

N Nuclear Power　T Thermal Power　H Hydro Power　G Geothermal Power
W Wind Power　C Civil Projects　A Architectural Projects　E Electrical Projects

Services

PFS: Pre-Feasibility Study　C : Plant Construction, Testing, Commissioning Supervision　D : Drilling Supervision　M : Maintenance Supervision
FS : Feasibility Study　De: Conceptual/Detailed Design　O : Others Type of Services

Type of Finance

LG: Local Government　JS: JICS　EC: ECFA　Pr : Private　WB: World Bank Group　IA: Inter American Development Bank
JB: JBIC　JE: JETRO　JI : JICA　NE: NEDO　UN: United Nations　AD: Asia Development Bank　KF: Kreditanstalt f_r Wiederaufbau

MAJOR EXPERIENCE

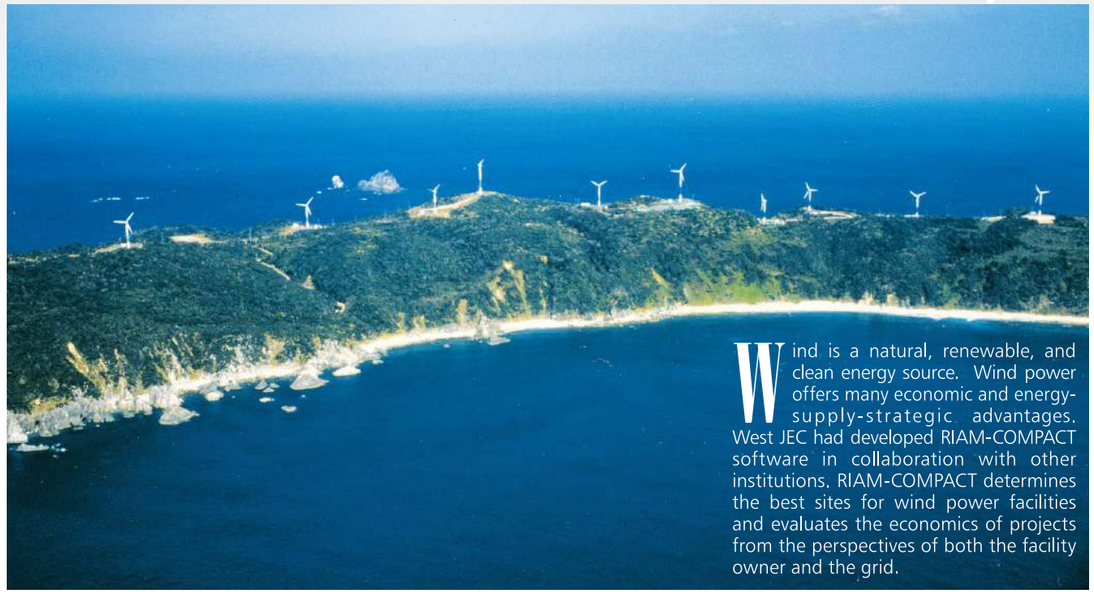
	No	Project Name	Brief Description of the Project	Country	Type of Project	Type of Services						Type of Finance														
												Japanese								Non-Japanese						
						PFS	F/S	C	D	De	M	O	LG	JB	JE	JI	JS	EC	NE	Pr	LG	WB	UN	IA	AD	KF	Pr
Thermal	T20	Receiving system for woody biomass fuel	Consulting services to Kyushu EPC for the project implementation including bidding documents, drawing review and construction supervision for receiving system for woody biomass fuel of the Reihoku thermal power station. [Service Period: Jan. 2010 to Mar. 2011]	Japan	T			●		●										●							
	T21	Animal waste power generation project	Consulting services to Kitakata town office, Miyazaki Prefecture for the feasibility study of a 10 MW x 2 animal waste power generation project. [Service Period: Oct. 1995 to Mar. 1998]	Japan	T		●						●														
	T22	Electric power technical regulations and standards for thermal power plants in the Socialist Republic of Vietnam	Consulting services for establishment of electric power technical regulations and standards for thermal power plants in the Socialist Republic of Vietnam. [Service Period: Mar. 2009 to Jan. 2013]	Vietnam	T					●						●											
	T23	Replacement project of 220 kV GIS at Sendai thermal power station	Consulting services to Kyushu EPC for the project implementation including basic design, detailed design, bidding documents, drawing review and construction supervision for replacement project of 220 kV Gas insulated switchgear (GIS) at Sendai thermal power plant. [Service Period: May. 2007 to Aug. 2013]	Japan	T E			●		●										●							
	T24	Transmission network system for future geothermal development	Feasibility study of optimum transmission network system for future geothermal development in the Republic of Rwanda. [Service Period: Jul. 2011 to Feb. 2012]	Rwanda	G E		●												●								
	T25	Pre-feasibility study for Geothermal Power Development in Canakkale-Tuzla Field, TURKEY	Consulting services for a proper development procedure and generation capacity, based on the delineation, evaluation and development strategy of the geothermal resources in this field.	Turkey	G E	●																				●
	T26	Expansion project of Las Pailas II geothermal power plant and Borinquen geothermal power plant	Feasibility study including site survey, evaluation of geothermal resource, conceptual design of gathering system / power plant / transmission line / planning of optimum geothermal development, cost estimation and financial and economic evaluation. [Service Period: Jul. 2011 to date]	Costa Rica	G		●									●											
Civil	C1	Engineering services for the Omaru pumped storage power project	Engineering services to Kyushu EPC for site survey, planning and detailed design: Type: Upper: Rock-fill Lower: Gravity, Height: Upper 69 m, Lower 52 m, Head: 652 m, Capacity 1,200MW Omaru pumped storage power project under construction to be completed in 2008. [Service Period: Jan.1994 to Dec.2007]	Japan	H	●	●		●	●	●									●							
	C2	Engineering services for the Uchinoura hydropower project	Engineering services to Kyushu EPC for site Survey, planning and design including model test of spillway: Type: Run-of-river, Discharge: 3.2 m3/s, Head: 128.1 m, Watershed Area: 17.8 km2, Capacity: 3.3 MW Uchinoura hydropower project, Location: Kagoshima Pref. Commissioned in Jun. 1989. [Service Period: Apr.1986 to Jun.1989]	Japan	H	●	●			●	●									●							
	C3	Engineering services for the Oyodogawa No.2 hydropower project	Engineering services to Kyushu EPC for the site survey, planning, detailed design and construction supervision for additional 38.6MW plant: Type: Reservoir dam and canal, Discharge: 149.5 m3/s, Head: 56.3 m, Watershed area: 1,373.6 km2, Capacity: from 30.6MW to 69.2MW Oyodogawa No. 2 hydropower project, Location: Miyazaki Pref. Commissioned in May 1985. [Service Period: Apr.1982 to May.1985]	Japan	H	●	●			●	●									●							
	C4	Engineering services for the Saigo hydropower project	Engineering services to Kyushu EPC for site survey, planning, detailed design and construction supervision for additional 18.6 MW plant, Type: Reservoir dam and canal discharge: 120.0 m3/s, Head: 27.3 m, Watershed area: 647.8 km2, Capacity: from 8 MW to 26.6 MW Saigo hydropower project, Location: Miyazaki Pref. Commissioned in Aug. 1983. [Service Period: Apr. 1980 to Aug. 1983]	Japan	H		●			●	●									●							
	C5	Engineering services for the Shin-Kawabaru hydropower project	Engineering services to Kyushu EPC for site survey, planning and design including model test of spillway: Type: Canal and dam, Discharge: 45.0 m3/s, Head: 55.5 m, Water-shed Area: 362 km2, Capacity: 21 MW, Location: Miyazaki Pref. Completion: 1993. [Service Period: Apr.1990 to Jan.1993]	Japan	H		●			●	●									●							
	C6	Engineering services for the Shin-Itsukigawa hydropower project	Engineering services to Kyushu EPC for site survey, planning and detailed design for addition of 7MW generator including design of waterway bridge, temporary facilities, etc. Type: Run-of-river, Discharge: 20.0 m3/s, Head: 90.7 m, Watershed Area: 205 km2, Location: Kumamoto Pref. Capacity: From 8.3 MW to 15.3 MW. [Service Period: Apr.1993 to Jul.1996]	Japan	H		●			●	●									●							
	C7	Engineering services for the Ryumon Dam	Engineering services to the Ministry of Construction for planning and design: Type: Gravity/rock-fill, Height 99.5/30.9 m, Length: 375/252 m, Catchment Area: 26.5 km2, Storage Capacity: 42,500 x 103 ton, Location: Kumamoto Pref. [Service Period: Apr.1996 to Jan.2001]	Japan	C		●		●	●	●									●							
	C8	Engineering services for the Narubuchi Dam	Engineering services to the Fukuoka Prefecture Government for field survey, investigation, planning and detailed design: Purpose: Flood Control and water supply, Type: Gravity, Height: 67.4 m, Length: 308 m, Catchments Area: 6.8 km2, Storage capacity: 4,400 x 103 ton, Location: Fukuoka Pref. [Service Period: Apr.1997 to Mar.2002]	Japan	C		●		●	●	●									●							
	C9	Engineering services for the Indonesia Rural electrification project (Technical Assistance Component for Mini-Hydro)	Engineering services to PLN (PERSERO) for the review of the system and methodology of potentiality study and project preparation for mini-hydro power plant. Identify problems and provide recommendations on the system and methodology. Review the existing Pre-F/S and F/S and D/D for PLN to enable to preparation of finance. [Service Period: Oct.1995 to Sep.1996]	Indonesia	H		●													●							
	C10	Engineering services to investigate the situation of existing hydropower plants	Engineering services to NPC for the purpose of estimating an accepted method in Japan of reducing construction costs of hydro power plants. Completion: Feb. 2001 by JEPOC finance. [Service Period: Aug. 2001 to Jan. 2002]	Philippines	H	●														●							
	C11	Feasibility study of the Catuiran hydropower development project	Engineering services to NPC for site survey, aerial photographic mapping, discharge measurement, planning and design: Type: Run off river, Discharge: 15m3/s, Head: 135.40m, Watershed area: 155km2, Capacity: 17.8MW, Location: Mindoro, Completion: Jan. 2003 by JETRO finance. [Service Period: Aug. 2002 to Jan. 2003]	Philippines	H		●								●													
	C12	Feasibility study of the Timbaban hydropower development project	Engineering services to NPC for site survey, aerial photographic mapping, discharge measurement, planning and design: Type: Run off river, Discharge: 16m3/s, Head: 173m, Watershed area: 84km2, Capacity: 23.5MW, Location: Aklan, Completion: Jan. 2004 by JETRO finance. [Service Period: Aug. 2003 to Jan. 2004]	Philippines	H		●								●													
	C13	Engineering services for the rural electrification program through hydropower resources	Engineering services to the Uganda government for the site survey, power demand and supply plan, electric situation of rural area, possibility of small-hydro for rural electrification: Type: Run off river, Discharge: 4.0m3/s, Head: 15~45m, Capacity: 2.0MW in total, Completion: Feb. 2006 by ECFA finance. [Service Period: Nov. 2005 to Feb. 2006]	Uganda	H	●												●										
	C14	Feasibility study of IPP through hydropower projects	Site survey, hydrological study, geological evaluation, optimization study of development scale, review of pre-feasibility study, Type: Pondage type, Discharge: 32m3/s, Head: 170m (approx.), Capacity: 32MW, Completion: May. 2007. [Service Period: Aug. 2006 to May. 2007]	North Vietnam	H		●													●							
	C15	Engineering service for the Osuzu hydropower plant project	Engineering service to Kyushu EPC for detailed design of the hydropower plant: Type: Pondage type, Discharge: 1.33m3/s, Net head: 31.80m, Capacity: 330kW, Location: Miyazaki pref., Completion: Mar. 2009. [Service Period: Dec. 2006 to Mar. 2007]	Japan	H					●										●							
	C16	Engineering service for the Hikawa dam renovation project	Engineering service to Kumamoto Pref. for pre-feasibility study, feasibility study and detailed design of the renovation project: Dam height: 58.5m (56.5m), Length of the dam: 202.0m, Volume of the concrete: 118,000m3, Total storage capacity: 7,100,000m3, Effective storage capacity: 5,900,000m3, Completion: Jun. 2010. [Service Period: 1980 to 2010], Spec before the renovation.	Japan	C		●	●			●				●													
Environment	E1	Environmental impact assessment in relation to construction of nuclear power plant	Survey of present environmental conditions (atmosphere, odor, water quality, soil noise, vibration, meteorology, topography and geology, fauna and flora, ecosystem, natural scene, and other social environment and simulation analysis, 1,590 MW Nuclear Power Plant. [Service Period: Apr. 2003 to Mar. 2010]	Japan	N							●															●
	E2	Environmental impact assessment in relation to construction of geothermal power plant	Survey of present environmental conditions (atmosphere, odor, water quality, soil, noise, vibration, meteorology, topography and geology, fauna and flora, natural scene, hot spring and other social environment and simulation analysis, 55 MW Geothermal Power Plant. [Service Period: Apr. 1981 to Mar. 1995]	Japan	N							●															●
	E3	Environmental impact assessment in relation to construction of coal-fired thermal power plant	Survey of present environmental conditions (atmosphere, odor, water quality, soil noise, vibration, meteorology, topography and geology, fauna and flora, ecosystem, natural scene, and other social environment and simulation analysis, 1,000 MW Coal-fired Thermal Power Plant. [Service Period: Apr. 1999 to Mar. 2001]	Japan	T							●															●
	E4	Environmental impact assessment in relation to construction of pumped storage power plant	Survey of present environmental conditions (water quality, soil noise, vibration, meteorology, topography and geology, fauna and flora, natural scene, and other social environment and simulation analysis) for 1,200 MW Pumped Storage Power Plant. [Service Period: Apr. 1993 to Mar. 1999]	Japan	H							●															●
	E5	Environmental impact assessment in relation to construction of dam	Survey of present environmental conditions (water quality, soil noise, vibration, meteorology, topography and geology, fauna and flora, natural scene, and other social environment and simulation analysis). [Service Period: Apr. 1996 to Mar. 2005]	Japan	C							●															●
	E6	Environmental impact assessment in relation to the construction of power transmission system	Survey of present environmental conditions (fauna and flora, natural scene, and other social environment and simulation analysis) for 500kV transmission lines. [Service Period: Apr. 1999 to Mar. 2008]	Japan	E							●															●
	E7	Environmental impact assessment in relation to construction of wind power system	20 windmills location study, examining bird migration courses to prevent bird collisions, investigating the distribution of precious plants and examining conservation measures. [Service Period: Apr. 2003 to Mar. 2007]	Japan	W							●															●
	E8	National environmental census on several rivers in Kyushu	Survey of present environmental conditions (fauna and flora), for the Onga River system, Chikugo River system, Kumagawa River system, and Honmyou River system. [Service Period: Apr. 1992 to Mar. 2008]	Japan	C							●	●														
	E9	Monitoring survey for nature-oriented river works	Survey fauna and flora before and after nature-oriented river works, for the Onga River system and Kumagawa River system. [Service Period: Apr. 2001 to Mar. 2005]	Japan	C							●	●														
	E10	Improvement works in fish migratory river	Improvement method for existing fishways, Yabe River. [Service Period: Apr. 2006 to Mar. 2008]	Japan	C							●	●														●
	E11	Restoring ecological network in wetland of back-water in dam reservoirs	Biotope design for investigation of the animals and plants and the hydrological situation in order to recover the ecological network of Kasegawa Dam in Otonashi district. [Service Period: Apr. 2002 to Mar. 2003]	Japan	A							●	●														
	E12	Development of a ship equipped with a UV irradiation system to control red tide	Development of the first technology in the world using a ship with an installed UV lamp to control fresh-water red tide, Completion of an experimental culture of the red tide, local research, the effectiveness of computer simulation and pilot plant, and a monitoring investigation concerning the extinction of the red tide at the reservoir dam. [Service Period: from Apr. 1990 to Mar. 1993]	Japan	T							●	●														
	E13	Development of a new technique for controlling algal blooms in reservoirs using vertical curtains	Development of the first technology / preventing method in the world for eutrophication of lake water membrane layer (epilimnion), by installing a film (curtain) which controls the river water inflow. This method is one of the Japanese standard techniques to control algal bloom in reservoirs. [Service Period: Apr. 1997 to Mar. 1999]	Japan	H							●	●														
	E14	Construction of tidal flats as an environmental restoration and mitigation	Planning and basic design of restoration and mitigation for coastal reclamation and tideland reclamation. [Service Period: Apr. 2006 to Mar. 2007]	Japan	T							●															●
	E15	Development of a new technique for controlling blooms of blue green algae using water jet system.	Development of the first blue-green algal bloom control device by water jet injection in the world. This system has been the most effective system in Japan with the processing range of 20,000 m2/h. [Service Period: from Apr. 2000 to Mar. 2006]	Japan	H							●	●														
	E16	Development of a water demineralizer with a magnetic separator using a superior conduction magnet	Development of a magnetic separation system to mitigate water pollution by using a super conducting magnet. This system has the potential to be used to quickly remove suspended solids and pollutants from water and may be effective to utilize in sewage systems. [Service Period: from Apr. 2003 to Mar. 2007]	Japan	E							●															●
	E17	Development of a simulation model for lake eutrophication	Development of water quality simulation models to prevent murky water in lake dams, performing eutrophication cause analysis and the valuation method of the effect of these various measures. Implementation of the basic design using the model of the lake dam eutrophication measures. [Service Period: from Apr. 1999 to Mar. 2004]	Japan	E							●															●
Architectural	A1	Experimental Verification of Innovative Energy Conservation Using a New System in a Dyeing Factory in China	Energy management systems to support awareness of energy-saving and the introduction of a new dyeing system in factory to promote the rationalization of energy consumption in Hangzhou. [Service Period: Jan. 2011 to Mar. 2012]	China	A							●								●							●
	A2	Energy Conservation Analysis and Consumption Measurement of Shopping Mall Complexes in China	Energy conservation analysis, consumption measurement and energy management systems to support awareness of energy-saving in shopping mall complex designs in Dalian. [Service Period: Dec. 2009 to Feb. 2010]	China	A							●								●							●
	A3	Energy Conservation Analysis and Consumption Measurement of Hotels in China	Energy conservation analysis, consumption measurement and energy management systems to support awareness of energy-saving in Hotel Building Designs in Shanghai. [Service Period: Jul. 2009 to Nov. 2009]	China	A							●								●							●
	A4	Experimental Verification of Innovative Energy Conservation Systems in Factories in China	Feasibility study, energy management systems to support awareness of energy-saving and the introduction of ESCO services to promote the rationalization of energy consumption in Shanghai. [Service Period: Jul. 2006 to Feb. 2007 by JETRO finance]	China	A	●								●													
	A5	Experimental Verification of Innovative Energy Conservation Systems in Buildings in China	Feasibility study, systems that promote the rationalization of energy consumption in facilities for the general public by introducing ESCO services and ice storage systems in Shanghai. [Service Period: Aug. 2005 to Feb. 2006 by JETRO finance]	China	A	●								●													
	A6	Energy Conservation Analysis and Consumption Measurement of the ESCO business Evaluation in China	Evaluation the profitability of the ESCO business, energy conservation analysis and consumption measurement and market surveys of energy prices, products and common building designs in China. [Service Period: Jul. 2004 to Mar. 2005 by NEDO finance]	China	A	●													●								
	A7	Kumamoto City General Health and Welfare Center Building, Kumamoto Pref., Japan	Architectural design / Structural Engineering, basic design and planning, site survey, detailed design and construction supervision of building, "Central Public Health Service and Healthcare Facilities". [Service Period: Jul. 2006 to Mar. 2008]	Japan	A			●	●			●															
	A8	Oita Tsurusaki Regional City Hall and Administration Center Building, Oita Pref., Japan	Architectural design / Structural Engineering, basic design and planning, site survey, detailed design and construction supervision of building "Local Government Official and Residence Service Institution". [Service Period: Apr. 2002 to Oct. 2005]	Japan	A			●	●			●															
	A9	Hakata-eki Minami-R Office Building, Fukuoka Pref., Japan	Architectural design / Energy conservation analysis / Structural Engineering, basic design and planning and construction supervision, "Office for Promoting the Rationalization of Energy Consumption". [Service Period: Jun. 2001 to May. 2003]	Japan	A			●	●											●							
	A10	Gran Garden Kagoshima, Private Residence Care Service Center Building, Kagoshima Pref., Japan	Architectural design / Structural Engineering, basic design and planning, detailed design and construction supervision of building, "Private Residence for the Aged Including Lifelong Care Service". [Service Period: Nov. 2003 to Sep. 2006]	Japan	A			●	●											●							
	A11	Miravalles-III Geothermal Power Plant Project, Oxbow Power Services Inc.(IPP), ICE	Structural Engineering / Architectural design and construction supervision of powerhouse and auxiliary buildings, detailed design, auxiliary buildings. [Service Period: Feb. 1999 to Jan. 2000: 12 months]	Costa Rica	A			●	●																		●
	A12	Phu My-I Gas Combined Cycle Power Plant Project (1 x 1000 MW), Electricity of Vietnam(EVN)	Structural Engineering / Architectural design of powerhouse and auxiliary buildings, detailed design including Seismic Design of powerhouse, auxiliary buildings. [Service Period: Aug. 1998 to Jan. 1999: 6 months]	Vietnam	A				●														●				
	A13	Az-zur Distillation / Power Plant Project(4 x 100MW, 4 x 6 MG/D), MEW, Kuwait	Structural Engineering / Architectural design and construction supervision of control building and auxiliary buildings, detailed design including Seismic Design of buildings. [Service Period: Jan. 1997 to Sept. 1997: 9 months]	Kuwait	A			●	●																		●
	A14	Guangdong Zhuhai Coal-fired Thermal Power Plant Project, Guangdong Zhuhai Power Station Co., China	Structural Engineering / Architectural design of powerhouse and auxiliary buildings, detailed design including Seismic Design of powerhouse, auxiliary buildings (2 x 600 MW). [Service Period: Aug. 1996 to Dec. 1996: 5 months]	China	A			●	●											●							●
	A15	Petacalco Coal-fired Thermal Power Plant Project, CFE, Mexico	Structural Engineering / Architectural design and construction supervision of powerhouse and auxiliary buildings, detailed design including Seismic Design of powerhouse, auxiliary buildings. [Service Period: Mar. 1990 to Nov. 1991: 21 months]	Mexico	A			●	●														●				
	A16	Auraiya Combined Cycle Power Plant Project, NTPC, India	Structural Engineering / Architectural design and construction supervision of powerhouse and auxiliary buildings, detailed design including seismic design of powerhouse, auxiliary buildings. [Service Period: Jun. 1987 to Nov. 1989: 30 months]	India	A			●	●														●				
Nuclear	N1	Support nuclear power plant construction of Kyushu EPC	Review documents for the application to construct, modify or repair a nuclear plant, prepared by plant vender, such as construction plan, structural design, seismic design, etc. [since 2003, Sendai 1, Turbine Replacement]	Japan	E						●									●							
	N2	Plant Life Management for Nuclear Power Plants of Kyushu EPC	Evaluation of nuclear power plant safety from the viewpoint of the aging management system during 30 years of operation. ·[Evaluate Genkai1 since 2000] [2003, Report to NISA] [2004, Checked by NISA] ·[Evaluate Genkai2 since 2008] [2010, Report to NISA] [2010, Approved by NISA]	Japan	E						●									●							
	N3	Preventive Maintenance Optimization for Nuclear Power Plants of Kyushu EPC	Reorganization of maintenance plan and system based on the new inspection system which was introduced in 2008.	Japan	E						●									●							

Geothermal Training

Entrusted with capacity building in the planning and development of the geothermal resources, West JEC annually hosts training courses designed to build skills in the exploration, development and evaluation of geothermal resources while considering the environment and economics. The training courses also address aspects related to the construction and O&M of exploitation facilities including multi-purpose applications for the use of geothermal heat. Visits to geothermal power plants and facilities for tourism, balneo therapeutics, horticulture, etc. are also part of the training course. In addition, West JEC provides on-the-job training (OJT) during the execution of projects.

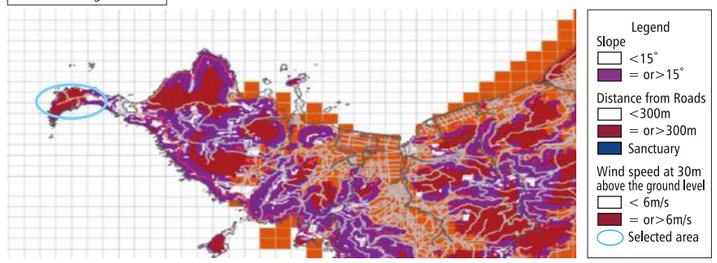
Development of Renewable Energy Technologies

The challenge for the twenty-first century is New Energy: Finding energy substitutes for fossil fuels. With this in mind, West JEC endeavors to fuse non-fossil energy resources with science and technology, in order to develop engineering for the survey, planning, and design of New Energy facilities.



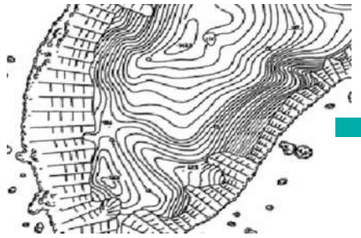
Wind is a natural, renewable, and clean energy source. Wind power offers many economic and energy-supply-strategic advantages. West JEC had developed RIAM-COMPACT software in collaboration with other institutions. RIAM-COMPACT determines the best sites for wind power facilities and evaluates the economics of projects from the perspectives of both the facility owner and the grid.

Macro-siting services

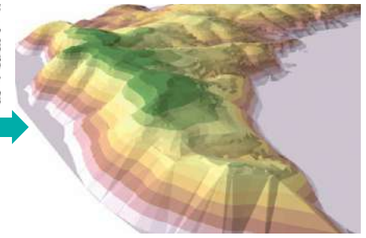


Selection of a wind power site begins with evaluation of the parameters of wind conditions, road accessibility, legal conditions, and transmission / distribution line networks. The GIS (geographic information system) is the tool used in this step to manipulate the primary parameters for selection of wind power plant sites. The analysis of these initial results produces multiple prospective sites. We call this stage of the selection process "macro-siting."

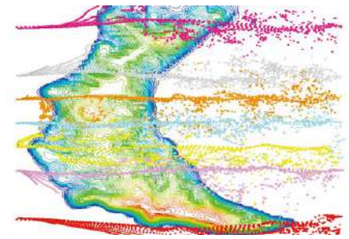
Micro-siting services



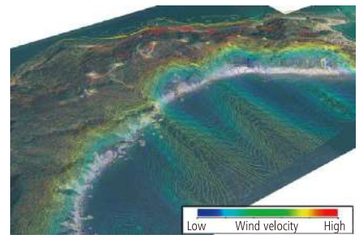
2D map with contour lines



Conversion to 3D display



Wind prediction in particle display



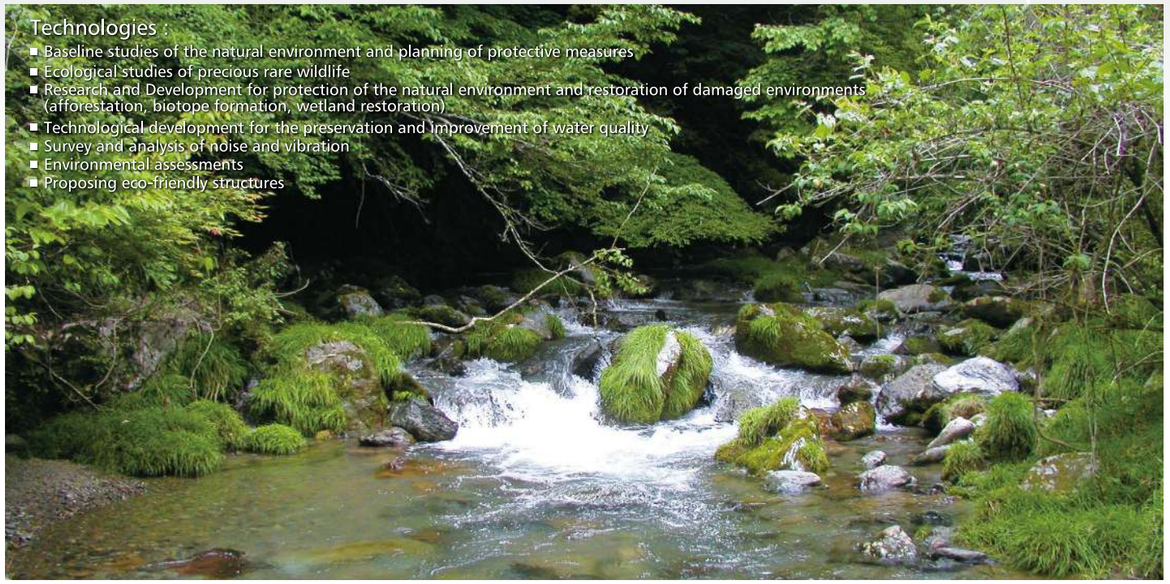
3D display of contour of the prediction of wind speed

Next, using the results obtained from the macro-siting process, "RIAM-COMPACT" (※1) software quantitatively analyzes more detailed wind conditions at each of the multiple prospective sites. The software predicts electric power output or turbulent flow conditions. These predictions are reintegrated into the GIS model as additional parameters and used to determine the optimal site. This reintegration process is called "micro-siting."

(※1)RIAM-COMPACT had been developed jointly by Environment Geographic Information System Research Laboratories Co., Ltd., West Japan Engineering Consultants Co., Ltd., and FS consulting Co., Ltd. It is marketed by Riam Compact Co., Ltd. RIAM-COMPACT is based upon a core technology which was developed by Dr. Ken Uchida of the Research Institute for Applied Mechanics of Kyushu University. The Kyushu University Technology Licensing Organization, Ltd licenses the core technology to RIAM-COMPACT.

Environmental Impact Assessments and Protection of Project Environment

West JEC has developed high level technology and gained broad experience in solving environmental concerns. Our technology and experience enable us to excel in engineering to establish environmental baselines prior to the construction of infrastructure and in determining and assessing the impact of projects on the environment. We also excel in devising measures to protect animal and plant habitats, measures to prevent eutrophication in lakes and ponds, and in designing general environmental management programs.

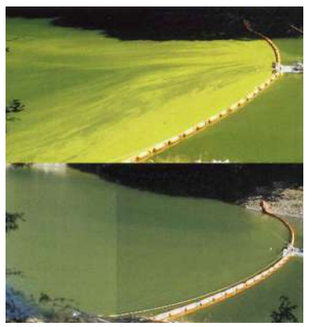


Technologies :

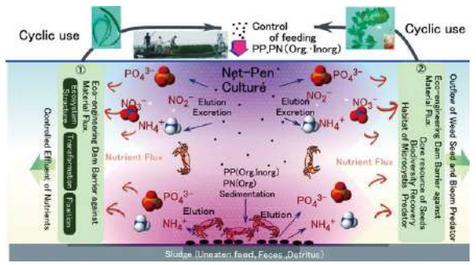
- Baseline studies of the natural environment and planning of protective measures
- Ecological studies of precious rare wildlife
- Research and Development for protection of the natural environment and restoration of damaged environments (afforestation, biotope formation, wetland restoration)
- Technological development for the preservation and improvement of water quality
- Survey and analysis of noise and vibration
- Environmental assessments
- Proposing eco-friendly structures

Based upon a broad base of knowledge accumulated through years of experience and through detailed studies of the atmosphere and terrestrial features such as mountains, rivers and oceans, and other animal and plant habitats, West JEC can propose methods to protect animals and plants which would otherwise be affected by infrastructure development.

West JEC has conducted studies of air and water quality, noise and vibration, and odors under various environmental conditions. We use the data from these studies to investigate and predict the impact of infrastructure development projects on the project surroundings and to propose mitigation measures.



West JEC has technology and experience to prevent eutrophication and to improve the water quality of surface water reservoirs such as lakes or ponds. This technology suppresses the proliferation of algae and prevents algal bloom (algae, freshwater red tide).



West JEC renders consulting services in the construction of systems for the re-cycling of ecological materials using a mechanism which we call an “ecological dam.” This mechanism recycles industrial water pollutants into materials useful for human life. This recycling system facilitates sustainable regional development while improving aquatic environments.

Architecture

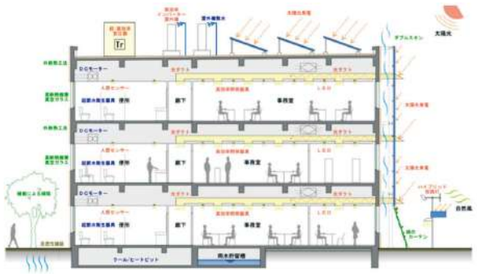
One of West JEC's goals is to contribute to the creation of rich social assets and a prosperous society. West JEC architects strive to provide world-class architectural services. Our expertise includes buildings for public utilities, medical and welfare institutions, intelligent office buildings, and energy-efficient housing, as well as design of power facilities such as plant buildings.

Technologies :

- Design and construction supervision of commercial office buildings, welfare institutions, lodging facilities, and any other type of buildings
- Project planning, design and construction supervision for urban development
- Design and construction supervision of hydroelectric, thermal, and geothermal power facilities and electricity substations.
- Design and construction supervision of overseas power and architectural projects
- Inspection of buildings and diagnosis of earthquake-resistant designs
- Construction management

West JEC can carry out inspections, surveys, and analyses of existing buildings in order to diagnose their structural condition and ascertain any need for structural repairs to assure safety. Based upon its experience in earthquake-resistant design and retrofit design, West JEC can recommend and implement maintenance and management programs for buildings.

The design, structural and installation engineers of West JEC can respond to any client need, by providing services ranging from conceptual planning to complete architectural designs. Where earthquake-resistant designs and special structural analysis for seismic isolation are necessary, we can provide inspection, analysis, proposal, design, construction supervision, as well as implementation of these features.

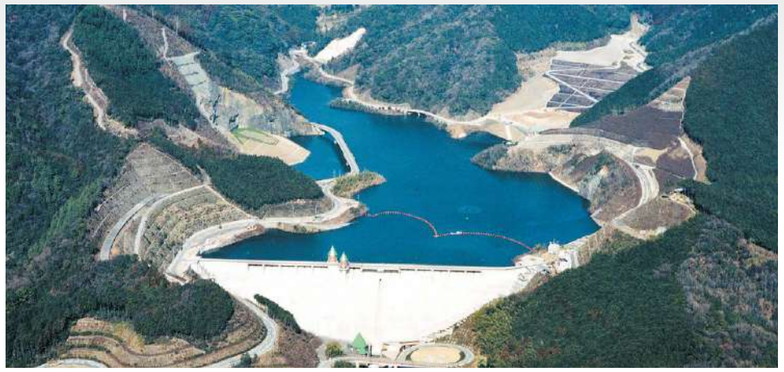


Planning and designing of energy-efficient and eco-friendly architecture.

West JEC aims to contribute to the transition to a low-carbon society. Based upon the knowledge and experience which we developed for all-electric homes and renewable energies, we can plan and design architectural systems which are high performance, highly reliable, and economical. West JEC also participates in industry-academia partnerships, in order to strengthen our capability to respond to the needs of our clients.

Riverine Systems: Hydraulics & River

West JEC has expertise in a wide range of technical services related to management of river systems. Areas of our expertise include planning of flood control and water utilization facilities, planning, design, management and operation of dams, survey and design of river facilities and hydro-power facilities, and river management using optical fiber IT systems.



Technologies :

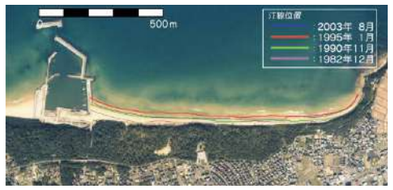
- Making river improvements and planning river maintenance policies
- Planning operation and maintenance of dams for flood control, water usage, and other purposes
- Planning environmental management of rivers and restoration of rivers to their natural states
- Planning for environmental water preservation and landslide control
- Planning and design of embankments and retaining walls
- Planning and design of sluice gates, pipes, flood gates, and so forth
- Planning and design of artificial rivers, biotopes, and fishways
- Planning and design of IT facilities related to river management
- Planning, design and implementation of dams and landslide control facilities
- Planning of dam intake and discharge facilities and dam management facilities
- Redevelopment of dams, embankments, and dam facilities and overall dam inspection
- Design implementation and planning of hydropower facilities and aqueduct tunnel
- Planning of power generation for dam control

River Basins and Coastal Zones

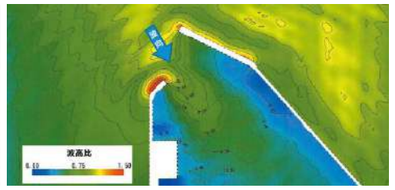
Coastal zones are sensitive to impacts from both land and sea. These zones are also predisposed to disasters such as earthquakes and tsunamis. Consequently, earthquake- and tsunami-resistant structures are needed for coastal zones. Measures to compensate for subsidence are also necessary. West JEC is located in Japan, a country surrounded by coastal and reclaimed areas and stricken frequently by natural catastrophes. West JEC has acquired extensive experience and technology for dealing with these issues. Long term expertise and high level technology permits West JEC to provide a wide range of services for the development and utilization of coastal zones. Doing this contributes to making Japan a place resilient to disasters and a place where society can be in symbiosis with nature.

Technologies :

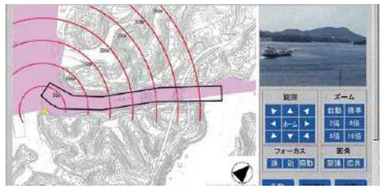
- Planning and design of harbor facilities
- Planning and design of fisheries infrastructures
- Implementation of countermeasures for weakly-structured terrain
- Planning and design of marine wind power generation systems
- Design of disaster management telecommunication systems
- Diagnosis of structural strength and seismic integrity and design of structural repairs
- Analysis of ocean waves and currents and of wind flows
- Coast deformation analysis
- Coastal protection planning
- Investigation and design of estuaries processes
- Comprehensive management of sediments
- Design of storm fences and other countermeasures for drifting sand



Studies of coastal deformation using aerial photography and GIS technology



Evaluation of bay tranquility



Design of surveillance camera control systems

Road, Bridge and Community Cable Box Design

To create a more harmonious environment for humanity, our road and bridge engineers design and supervise construction of roads, bridges, and community cable boxes (CC Boxes). They also supervise installation of power transmission cable in underground conduits and on bridges, using technologies which are friendly to people and the natural world.

Technologies :

- Planning and design of road structures
- Planning and design of roads, bridges, road-appurtenant facilities, and roadside slopes
- Road disaster prevention inspections
- Planning and design of tunnels
- Planning and design of CC Boxes
- Computerization of CC Box control registers
- Planning and design of installations of underground distribution power lines
- Planning and design of installations of distribution power lines on bridges

Planning and design of installations of underground cables with CC Boxes

Planning and design of roads and bridges

Regional and Urban Infrastructure

West JEC's urban, water, and sewerage engineers have developed proven technologies and acquired broad experience in regional and urban planning for river systems, from headwater forests to marine estuaries. We assist governments in creating bright, active communities. These communities manifest their unique history, culture, and landscape. To do this, we utilize model landscape dioramas and state-of-the-art GIS technologies, to propose regional development plans, countermeasures for industrial waste and construction byproducts, measures for utilization of unused energy resources, and so forth.

Technologies :

- Regional planning, urban planning, landscape design and park design
- Survey, planning and design of water and sewerage systems and industrial water systems
- Survey, planning and design of environmental preservation facilities and renovation of river, road and harbor facilities
- Planning and design for utilization of information technology
- Survey, planning and design of recycling of construction byproducts and industrial waste

Natural environment revitalization image scenery using CG

Sewerage conveying pipe

Image drawing of an exhibit facility

Power Transmission and Transformation Facilities

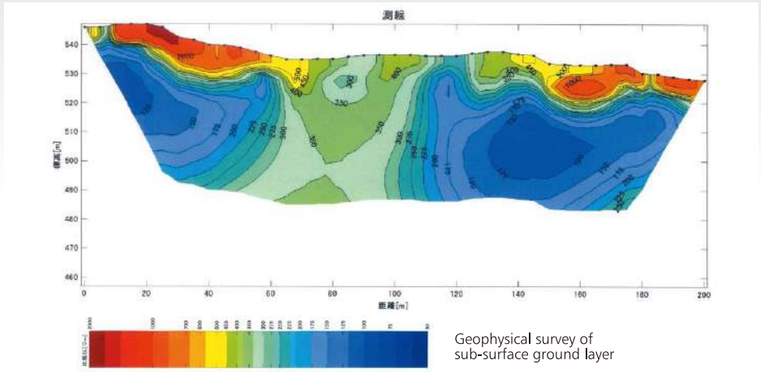
We carry out survey, planning, design, and maintenance management of power transmission facilities. We also support construction of mobile phone relay stations, in order to cope with the ever-increasing number of phone subscribers and to enhance transmission quality.

Technologies :

- Planning, survey, design and construction supervision of the foundations for power transmission lines.
- Survey, design and construction supervision of substation sites.
- Environmental information study for transmission line routes and substation sites.
- Survey, design and construction supervision of relay stations for mobile phone networks.

Investigation and Research

Our engineers survey, test, and analyze subsurface ground layers and ground water for structures under construction on an integrated service basis. They also make various measurements and conduct soundness diagnoses. When implementing these studies and tests, we aggressively develop and utilize new technologies in order to minimize total cost.



Geophysical survey of sub-surface ground layer

Technologies :

- Surface reconnaissance and analysis on wide-area geology and underground water distributions
- Implementation and analysis of boring, various in-situ measurements and laboratory tests for civil structure foundations
- Emergency surveys of ground conditions and preparation of applications for disaster support in the event of natural disasters caused by earthquakes and landslides
- Soil contamination surveys and analyses
- Concrete testing, analysis of concrete structural soundness, and remaining-life assessments
- Asphalt testing
- Measurement, analysis and assessment of ground deformation
- Geophysical surveys of subsurface ground layer

Slope disaster surveys

Laboratory testing

Surveys of the concrete structural soundness

Information and Disaster Management

West JEC's information disaster management engineers utilize geographic information systems (GIS), remote sensing technologies, and numerical simulation technologies in order to evaluate the potential impacts of disasters such as earthquakes, landslides, deluges, and tsunamis, and to construct resilient systems for dealing with such disasters. In addition, we carry out environment assessments on subjects such as groundwater recharge, water quality preservation, and flow distribution of thermal waste water.

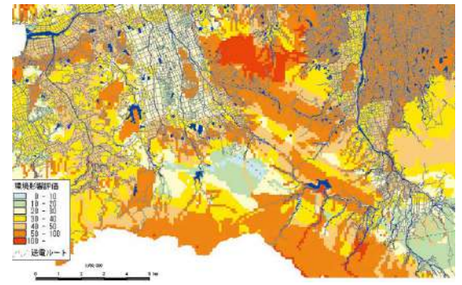
Technologies :

- GIS (Geographic Information System)
  Optimal site locating programs, optimal route selections, and environmental impact assessment for construction of structures
- Feasibility studies
  Studies to assess the priorities of remedial work for facilities hit by landslide disasters, based on Data Envelopment Analysis (DEA)
- Disaster Management system
  Construction of support systems for dealing with disasters
  Construction of landslide warning systems
  Assistance in implementation of disaster chart exercises (DIG)
- Simulation Technologies
  Flooding estimates and assessments of potential structural integrity impairments by using methods of tsunami analysis
  Evaluations of earthquake resistance by utilizing methods of seismic response analysis
  Environmental impact assessments using methods of underground water flow analysis
- Remote Sensing Analysis
  Data acquisition regarding the extent of disaster damage
  Support of environmental studies and land use surveys

Seismic Response and Earthquake Resistant Design

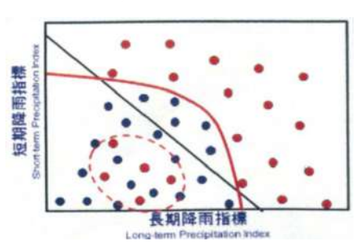
We implement highly sophisticated seismic assessments of electric power facilities such as dams, LNG tanks, and underground power plants and other underground structures, utilizing seismic response analyses and liquefaction analyses for earth dams and reclaimed land.

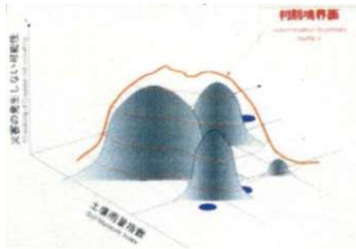
Applying GIS and remote sensing technologies, we implement the most appropriate assessments for various needs including disaster management measures, environmental preservation measures, development plans for large scale structures and so on.

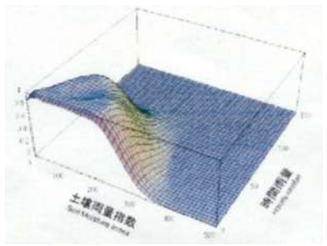


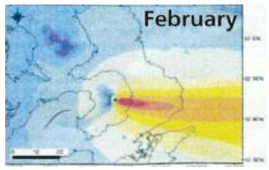
Construction of Landslide Warning System

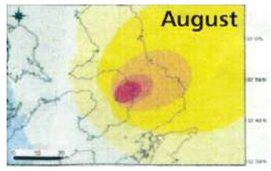
In order to predict sediment-related disasters such as mud debris flow or landslide from rainfall conditions accurately, we construct landslide warning systems. The critical rainfall level for warning and evacuation under these systems is based on RBF (Radial Basis Function) Networks.









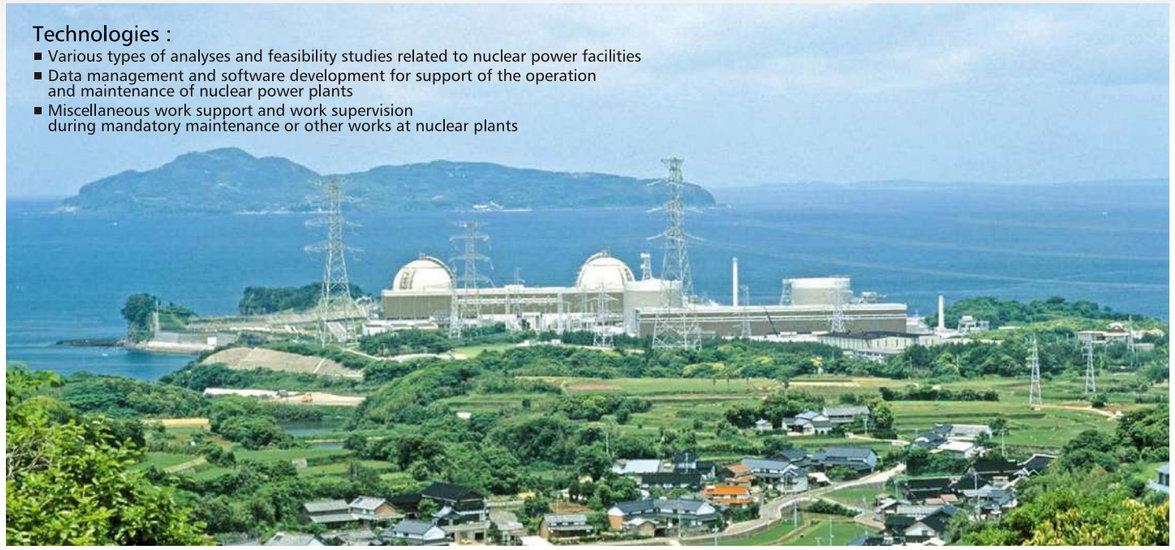


Ash Fall Simulation based on TEPHRA2

We have a technology cooperation arrangement with Professor Chuck Conner of South Florida University. You may download information related to TEPHRA2 from his website.

Nuclear Engineering

Nuclear power has been recognized as an important source of electric power because of its superb characteristics, particularly the ability to generate large amounts of power in a stable manner, economically, and with minimum harm to the environment. Continuing efforts have been made to improve the operation and maintenance of nuclear power plants, while placing safe and sound operation as the top priority. In pursuit of safer and more reliable nuclear energy, we offer engineering consulting services, primarily in the areas of studies and analysis, data management, and miscellaneous supporting functions based on our wealth of experience.



Technologies :

- Various types of analyses and feasibility studies related to nuclear power facilities
- Data management and software development for support of the operation and maintenance of nuclear power plants
- Miscellaneous work support and work supervision during mandatory maintenance or other works at nuclear plants

Systems development and various types of studies and research projects

Maintenance management to assure the soundness of plant equipment

We offer consulting services to support planning and design of maintenance management systems, operational management systems, and isolation support systems, in order to minimize human error and promote more efficient work implementation. We also conduct feasibility studies concerning facility improvements and other studies.

Nuclear power stations in Japan undergo mandatory annual maintenance, during which the reactor is shut down, after which very elaborate, extensive inspections and examinations are carried out. West JEC carries out periodical inspection work as a consultant, in order to improve the reliability and efficiency of the mandatory annual maintenance.

West JEC

West Japan Engineering Consultants, Inc.

EARTH'S ENVIRONMENT AND THE HARNESSING OF CLEAN ENERGY

Water Resources, National Land Preservation and Safety, Energy, Electric Power Systems, Environment, Town Development and Transportation, Information Processing

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