

Programs for Global Environmental Protection

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Our company, Tomen, has developed so many domestic and overseas projects through the activity of commercial trading until now, and has been contributing to protection of global environment. This essay introduces outlines and features of representative projects as follows.

- 1) Wind mill power generation projects as development and usage of natural energy
- 2) High efficiency gas turbine power generation projects of low environmental load
- 3) Planting projects at the remaining land of coal open-air mining in Australia

These projects have been continuously promoted and have been creating good results. Now, I write outlines of the projects hereunder.

Outlines of Tomen's environmental / energy projects

- 1) Wind mill power generation projects

5,000kW power generation project in the year 1987 at Mojave desert in California U.S.A was the start of Tomen's wind mill power generation projects. Tomen accumulated much know how of wind power mill project in this relatively small project, and after this project, Tomen developed two more large projects in the same district of 85,000kW in 1989 and of 75,000kW in 1990. After that, 69,000kW were constructed in California, Wyoming and other states. Tomen is also planning to construct a 51,000kW project in Illinois in October this year. This project is the first windmill power generation project in Illinois and the biggest project in the area of east Mississippi river.

Wind mill power generation projects have been developed not only in U.S.A. but also in England, Italy and Spain where wind mill power generation projects are positively supported by the nations as clean energy projects. Projects in England started with Wales 31,000kW power

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generation project, and Tomen made another 28,000kW projects in England and Scotland. In Italy, Tomen made 59,000kW project in 1996, and now has 169,000kW in total with 3 projects. Spain has many suitable lands for wind mill power generation, therefore larger scale projects have developed. The first project of 40,000kW started in Galicia state in 1998, and until now Tomen has 250,000kW projects in 4 sites. Tomen was also granted the project development right of total 525,000kW for 10years ahead from the State Government, and now a couple of new projects are designed and under construction. For these new projects, project finance is furnished from a West German Bank and it will be the biggest fund in the world as for a wind mill power generation project. Now in Japan, Tomen is challenging to develop projects with plenty of experience through overseas projects. Projects began with 20,000kW in Hokkaido, and now total 58,000kW are in commercial operation in Aomori and other areas. Tomen has other development projects of 126,000kW in Tohoku, Kyusyu and other areas in near future. Through these overseas and domestic projects, Tomen is recognized as a top enterprise in the world as for a wind mill power generation company.

2) Gas turbine power generation projects

Tomen's gas turbine power generation projects are either co-generation or combined cycle system both of which have feature of low environmental load and high heat recovery efficiency. Tomen has constructed a 165,000kW gas turbine combined cycle plant in Lockport, N.Y., U.S.A. and started commercial operation in 1992. Also 80,000kW was started in the same time in P.A. In 1994, there were openings of 742,000kW projects at 3 sites in N.Y. and N.J. Also there were opening of 240,000kW in C.A. in 1996, and 490,000kW at 2 sites in M.N. and W.S. in 1997.

IN Europe, 28,000kW co-generation in Spain and 262,000kW in Hungary in1996, 1,2690,000kW in England in 1997/99, 190,000kW in Romania in 2000 started commercial operation. The power station in Romania supplies warm water produced from heat in the power station to the city residences as well as electricity, and it is popular to the city people. In Japan, 149,000kW in Osaka, and 67,000kW in Kanagawa (kerosene fuel) gas turbine power stations completed and started commercial operation.

These projects were designed in accompany with the program of de-regulation of electricity supply systems, so projects are in the form of IPP (Independent Power Producer) which supplies power to the traditional electricity companies. Tomen's work

on those projects are designing the project, consideration to the environmental protection, choosing partners, forming project finance, selection of E.P.C. contractor, completion of contracts, etc. and over all arrangement which are necessary until opening the commercial operation.

3) Planting projects at the remaining lands of coal open-air mining in Australia

Tomen, as joint project with a Japanese Electricity Company, started plantings at the remaining land of coal open-air mining in Hunter Valley district in NSW state, Australia in order to recover natural view and to make absorption source of CO₂. The project is programmed to plant 3kinds of faster growing speed eucalypts in 12 ha area with density of 833plants per hectare. Planting started in November 1999 and will finish in autumn 2003. During the period, many kinds of research data such as difference of growing speed by kind of plant, rating of CO₂ absorption volume, etc. are given for judgment of capability for CO₂ absorption. This project is thought to be very much useful project for global environment protection by performing two objectives of practical usage of lands as well as CO₂ reduction.

Tomen is also promoting another project in the remaining lands of coal open-air mining in the same area, which is to grow up grass and to use mowed grass as biomass fuel in substitute of coal for a coal burning power station. This project started in September,2001, and two kinds of rice, two kind of peas are sowed in 2ha area. Grown up grasses are planned to be used at a near power station. Actual burning test will be performed in near future and it is supposed that these grasses will be actually used as fuel for power generation. Grasses grow up fast and have high density per area, also absorb CO₂ efficiently, therefore, it is expected as an energy source of no-incremental CO₂ by biomass circulation.

Furthermore, Tomen is promoting a research project also in Australia. It is to collect methane gas generated from coal beds and to use it as fuel. Methane gas has very high glass house effect. This project is aiming to prevent methane gas discharging to atmosphere and to use it as energy , so we think it will be very effective project for environmental protection.

Features of Tomen's environmental/energy project

In the process to complete these projects, there are shown very specific features which are likely to trading company's projects. Those features are as follows. As the first, they appear in a global scale. The wind mill power generation project started at a desert in California, and soon after recognition of its feasibility, thousands of wind mills were installed in California. After that, it came to England, Spain and finally to Japan in 1999. Gas turbine power generation project was also expanded from the start at New Jersey to wide area of the U.S.A. and to Spain, England, Hungary, Romania and Japan.

Next feature is to organize a project getting other partners for dispersion of project risks. Almost all project of the above are not only one owner's project by Tomen, but are joint projects with a couple of project owners. Each owner has adequate capability and know how to absorb risks, therefore, a counter compensation system works to reduce over all project risks, and as a result, better feasible project is realized.

The third, project finances were furnished to those many projects. Project finance means the funding provided to the project with a security of the future project value itself. Project owners have a merit that they can establish a project with lesser initial investment. Because of future project value it self is given to the financiers as a security, there is very strict investigation of project feasibility, risk analysis etc., in financiers side. As a result, only superior project such as of high feasibility, of clearly established risk control management, comes to authorization for finance, and this process helps to make a highly secured project for the project owners. Projects related to energy usually need big amount investment and decades of long term refundable period, then it is necessary to establish a way to avoid big and long risks by a method such as project finance.

Finally, regarding over all organization of the project, Tomen, through its business in the past, has accumulated knowledge for regulation, law, commercial customs, contracts, accountings, taxation, etc. So, Tomen is able to control smooth negotiations for the important contracts such as power supply contracts, material purchase contracts, as well as compliance of environmental protection law. Those factors tie-up to make higher value of the projects.

Tomen's policy for environmental/energy projects in the future

All the above are projects up to now. For the future, Tomen is planning to develop large scale projects of various natural energy and new energy which are OTEC as principal and ocean wave power generation, bio-energy, H2 energy, etc. OTEC creates large electric power with very less environmental load, big volume of desalinated water with small energy consumption, effective Lithium extraction, production of great scale marine farm, etc. Therefore, OTEC is thought to be an especially wonderful project as it gives simultaneous solution on problems of energy, water and food which are most important matters to human beings.

Tomen has exported ocean water desalination plants to a middle east country in the past, and maintains deals for food globally. Utilizing these experience and know how, Tomen desires to establish OTEC in a global scale as a new project to represent the 21st century.