



## Chiyoda Corporation

• Strategic Development of Energy Conservation Technology Project (FY2000-2006), etc.

# Achieving Energy Saving on the Level of Industrial Complexes through the Sharing of Heat between Factories

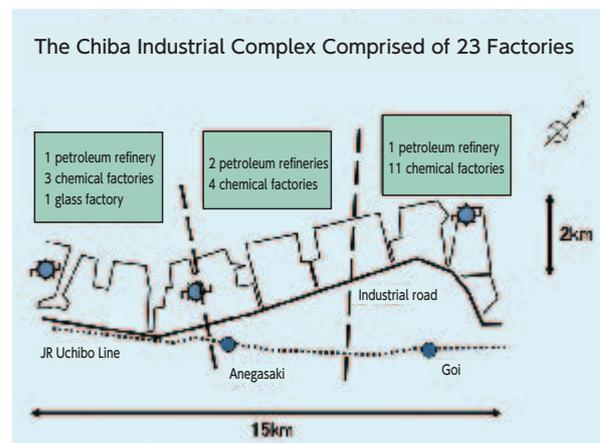


Japan is a country that is advanced in energy-saving, and Japan's development of element technologies for energy saving is also on the highest level in the world. Energy-saving measures in the industrial domain are especially advanced. In particular, petroleum refineries and chemical factories in industrial complexes have taken internal energy-saving measures for many years. For this reason, Japan's industrial complexes have reached the stage where no further energy saving is possible with the existing technologies alone.

Chiyoda Corporation, a plant design and construction company, recognized the fact that, although energy saving at individual factories had reached its limit, further energy saving on the level of industrial complexes, in which factories belonging to different industries are located close to each other, can be achieved if heat interchange between factories belonging to different industries is made, because the temperature range of the heat used differs depending on what industry the factory belongs to.

Accordingly, Chiyoda Corporation participated in NEDO's "Strategic Development of Technologies for Achieving More Efficient Utilization of Energy" project and other projects and endeavored to develop the company's original "area-wide pinch technology," which is a technology for expanding the "pinch technology," an analysis tool for analyzing the material and heat flows in a single factory, plant, etc. and optimizing the flows, so that the pinch technology can be applied to analyses of the sharing of materials and heat energy between factories located in the same industrial complex, and successfully conducted a demonstration test in an actual industrial complex, in which the company achieved dramatic energy efficiency improvement. The "area-wide pinch technology" developed by Chiyoda Corporation has been adopted by four industrial complexes in Japan

(the Chiba, Kashima, Mizushima and Oita Industrial Complexes). In addition, the area-wide pinch technology is attracting strong attention as an effective energy-saving solution technology for industrial complexes not only in Japan but also in other countries, as exemplified by the fact that it has been used since FY2011 as a technology for demonstration projects conducted overseas (in such places as the Map Ta Phut Industrial Complex in Thailand) as part of the "Project for International Demonstration of Technologies and Systems for Improving Energy Consumption Efficiency and Other Technologies and Systems" of NEDO.



The Chiba Industrial Complex, which is One of the Main Industrial Complexes in Japan (as of FY2000)



Photo of the Joint Announcement by NEDO and the Ministry of the Industry of Thailand

**Q. Why did this project start?**

Japan had vigorously promoted energy saving since the first oil crisis, and had achieved energy utilization efficiency on the highest level in the world. However, the total amount of carbon dioxide emitted in Japan in FY2005 as a result of the use of energy (which is said to represent the majority of the total amount of greenhouse gases emitted in Japan) had been 113.6% of the corresponding amount in FY1990. Because the voice for measures to combat global warming had been strengthening at the time, promoting research and development on new energy-saving technologies had been an urgent task. In addition, the “Energy Saving Front Runner Plan” of the “New National Energy Strategy” established in May 2006 had required that efforts be made to improve the energy consumption efficiency by at least 30% (per GDP) by the year 2030 by establishing a virtuous cycle of technological innovations and social system reforms.

To address these challenges, the Ministry of Economy, Trade and Industry drew up the “Strategy for Energy-Saving Technologies” in April 2007 as the strategy for promoting mid- and long-term technological development in the area of energy-saving technologies by promoting coordinated collaborative efforts between the industry, academia, government organizations and various entities in other fields of business so that large breakthroughs can be achieved in the area of energy-saving technologies. NEDO started this project as a means to overcome the demand side challenges relating to energy saving in the manufacturing sector, (household and business use) consumer products production sector and transportation sector identified in the “New National Energy Strategy” mentioned above and the Strategy for Energy-Saving Technologies established based on it.

**Q. What was the aim of the project?**

The project aimed at improving the energy consumption efficiency by at least 30% (per GDP) by the year 2030 by establishing a virtuous cycle of technological innovations and social system reforms. The report of the post-project evaluation (conducted in FY2011) of this project estimates that the amount of energy that will have been saved by the year 2030 by the technologies that have already been commercialized and the technologies that may be commercialized in the future will be approximately 30 million kl.

**Q. What is the role of NEDO?**

NEDO designed the system for implementing the project. The implementation system was so designed that the likelihood of the introduction into the market would be increased by establishing the project into the pilot study phase, commercialization development phase and demonstration study phase and adding a preliminary research phase. For studies with a research and development period of three years, NEDO exercised appropriate research and development management by receiving an interim evaluation by external learned people at the end of the second year, reviewing the resource allocation and project plan, “reviewing the target values and plans,” “discontinuing studies or taking drastic improvement measures” and taking other appropriate measures.