

EXECUTIVE SUMMARY

Solid waste disposal has long been a headache for many developed countries as well as developing countries of the world and is no exception in mainland China. With the fast industrialization along the southern coastal area and its huge amount of population, mainland China natural environment is badly polluted and destroyed. Two megacities of mainland China, Beijing and Shanghai, together with the notorious cities such as Tokyo and Bangkok, were found to exceed WHO guideline for particulate matter by a factor of at least three (WHO and UNEP 1992).

On the other hand, while global energy consumption fell by 1% per year between 1990 and 1993, Asia's energy consumption grew by 6.2% a year (ADB1997). Demand for primary energy in Asia is substantial. However, high carbon content fuels, main contributors to air pollution, are likely to continue to dominate the region's energy market. Coal will remain the fuel of choice throughout much of the region, because of its abundance and easy availability, especially in mainland China, India and Mongolia, and the demand is projected to increase by 6.5% a year (world bank 1997c). It can be expected that pollution problem will be exacerbated in mainland China in the coming years if it continues to industrialize in the past way : at the expense of the environment.

Recently, this pollution issue has attracted the attention of the central government of mainland China. The government has committed to spending 1.5% of GDP on the

nation's pressing environmental concerns in 2000, amounting to about \$16.8 billion. Among the most pressing environmental concerns, appropriate solid waste management received much attention. Solid waste pollution in mainland China is growing increasingly severe but has been dealt with more slowly than water and air pollution, as in other developing countries. Approximately 110 million tons of municipal solid waste is produced every year - leaving nearly 1/3 of mainland China's major cities "besieged" by garbage, according to China's EPA. Industrial solid waste is produced at the staggering rate of 650 million tons per year. Hazardous solid waste is a particularly acute threat to the environment and public health because of the dearth of adequate treatment and disposal facilities.

Facing these problems, mainland China government has to take immediate actions, with the help from well-proven expertise of the developed countries. The government has begun encouraging the development of a solid waste management industry within the territory. Solid waste management companies will find many business opportunities in mainland China.

A technology, which can handle the solid waste disposal problem on one hand and can recover energy on the other, would best fit mainland China's present conditions and requirements. The technology of waste-to-energy facilities, which is widely employed in Europe and Japan, is sure to meet these requirements. In simple term, a waste-to-energy

facility recovers the heat from burning the solid waste and then generate steam to produce electricity or for heating network. For instant, Japan incinerates 80% of its municipal solid waste, while Sweden and Denmark incinerate 55% and 65% of their municipal solid waste respectively, France and Germany incinerate 35% and 38% of its solid wastes in Year 2000 respectively.

ASIA - MAINLAND CHINA - THE EMERGING MARKET

In the recent two decades, people in Asian area started to get affluent as a result of rapid economic growth. At the same time, authorities start to aware of the serious pollution problems, looking for various solutions. In the Asian region, Japan, South Korea, Singapore and Taiwan pursue the development of incineration aggressively in tackling the solid waste. Thailand possesses three (3) incineration plants of over 200 tons daily capacity. The Bangkok authority is now investigating the feasibility of new incineration projects in Bangkok. Singapore also has several incineration plants in operation. However, at the time being, mainland China has only very few modern incineration plants under operation, which is far from enough.

In view of this good business opportunity for private investors in mainland China, this project intends to study the prospects of waste-to-energy facilities and the financial evaluation of different operation modes, namely BOT, BOO and Operator, in the market

of mainland China. In simple terms, BOT / BOO is a project financing method which investors make investment in developing an infrastructure and have the right of operating this infrastructure for a concession period. Operator is such a mode that a company with the necessary expertise is selected by the local authority to run an infrastructure that is fully funded by the local authority itself.

Since there are several types of solid wastes, which require different kinds of incineration technologies to deal with, this study will bound itself to facilities incinerating urban / municipal domestic solid waste and commercial waste only. The treatment of hazardous waste and industrial waste are out of the scope of this study.

This study could be useful for both local mainland China investors as well as mainland China-based investors who are looking for business opportunities in the sector of waste management in the mainland China. This study could also be a valuable reference to local authorities of mainland China who are considering to pursue incineration as the means of handling the ever-growing solid wastes problem.

This study consists of five chapters. The first chapter is a general introduction to the solid waste management of the world and the role of waste-to-energy facilities in the waste management chain. Chapters 2 and 3 give more insight into the current situation of waste management and forms of investment in mainland China, particularly the innovative BOT / BOO methods. Chapters 4 and 5 are the core parts of this study, which

present pragmatic financial analyses on building and operating a waste-to-energy facility

in mainland China, based on the best of the current knowledge.