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THE ROLE OF HONG KONG IN THE DEVELOPMENT OF RENEWABLE ENERGY IN CHINA

SAM C. M. HUI and K. P. CHEUNG

Department of Architecture, University of Hong Kong, Pokfulam Road, Hong Kong, China
Email: cmhui@hku.hk and kpcheuna@hku.hk

ABSTRACT

China's energy development is important to the world's energy market. To meet the growing energy demand and protect the environment, it is necessary to expand China's renewable energy market and accelerate technology uptake. As a Special Administrative Region of China, Hong Kong could play an active role in promoting renewable energy by serving as a financial intermediary and an information and technology gateway. Both Hong Kong and the mainland China will benefit from promoting international collaborations on renewable energy. To overcome the obstacles and constraints to greater diffusion of renewable energy, sustained efforts, proven policies and government support are important.

KEYWORDS

Renewable energy development; Hong Kong; China.

INTRODUCTION

China has the world's largest population at over 1.2 billion people, and it has experienced significant economic growth during the last decade as a result of the transition from a centrally planned to a market oriented economy. Energy demand in China is expected to grow at a fast rate in the coming century (see Figure 1) and this will bring about severe pressure to the energy industry and the world's environment (Yan and Li, 1997).

The existing energy structure of China relies heavily on coal (over 70% in the energy mix) and the energy efficiency level throughout the energy system is rather low. To meet its energy need and protect the environment, it is very

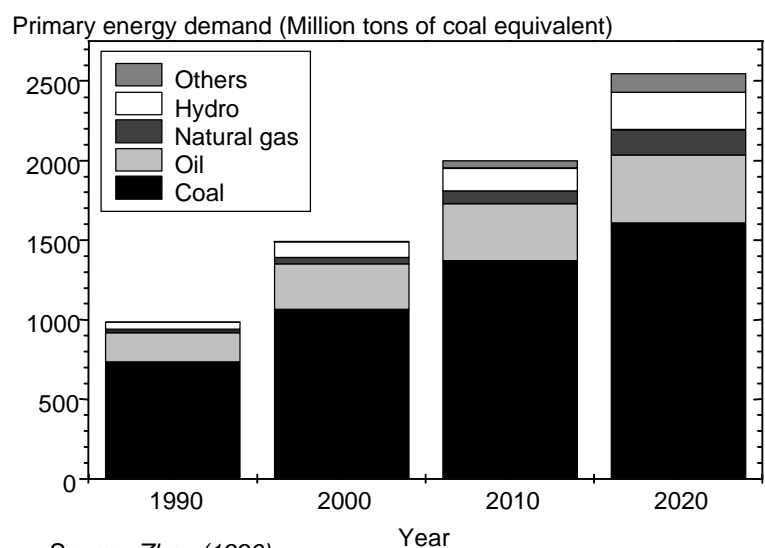


Figure 1 Forecast of primary energy demand in China

important for China to improve energy efficiency and promote renewable energy (Zhang and Gu, 1994; Li, 1996). However, because of institutional, financial and technological constraints, development of renewable energy in China is still limited. Efforts are needed locally and internationally to accelerate the development and expand the renewable energy market.

Since 1 July 1997, Hong Kong has become a Special Administrative Region of China. Under the “one country, two systems” principle, Hong Kong continues its capital free market and maintains links with the global economies. As a financial, trade and information centre in the world, Hong Kong has the potential to contribute to the renewable energy development in mainland China and to create a sustainable energy market for itself. This will present both challenges and opportunities to Hong Kong (Hui, 1997).

CURRENT STATUS

China has abundant sources of renewable energy including biomass, solar, wind, hydro, geothermal and ocean energy (Hui, Cheung and Will, 1997; Yan and Li, 1997; Chinese Solar Energy Society, 1991). At present biomass is a major source of energy in the rural areas and it is usually utilised through traditional methods and inefficient technologies. Solar energy is mainly used for water heating, passive solar houses, cooking and drying; whereas solar photovoltaics (PV) is being investigated for electricity generation. Wind energy has been used for water pumping in China since ancient time and wind turbines for electricity generation at remote locations are developing rapidly in the last decade. Many small hydropower installations are being used in hilly regions and they are usually run-of-the-river types with a water head of as low as three metres. Geothermal energy is another important heat and energy resources in China and the geothermal resources are located in the southeast coast and southwest plateau. The coastal line of China also provides opportunities for exploiting ocean energy such as wave, tidal and thermal energy conversion.

As for Hong Kong, no data is available to show how much renewable energy is being utilised at present (Hui, 1997). Large hydropower, traditional biomass and geothermal energy are not feasible in Hong Kong because of the limited local conditions. It is believed that only a few projects in Hong Kong have adopted some forms of renewable energy, such as solar water heating. Land and space restriction is a major constraint since Hong Kong has a very high population and building density. The lack of government support and incentives is a key limiting factor affecting renewable energy development.

POLICIES AND APPROACH

Renewable energy development is given increasing attention to by the Chinese Government (Li, 1996; Cheung and Yiu, 1995). It is an important aspect stressed in the *China's Agenda 21 Plan* for sustainable development. In 1995, the State Planning Commission, the State Science and Technology Commission and the State Economic and Trade Commission have jointly formulated a *Program on New and Renewable Energy Development in China (1996-2010)*, and an implementation plan for the Ninth Five-Year Plan (1996-2000), based on the program. The three commissions have also formed a joint committee to develop a renewable energy strategy to the year 2010, called China Sunlight Program.

The issue has also attracted the attention of multi-lateral development institutes such as the World Bank and the Asian Development Bank. A study organised by the World Bank and the Chinese Government in 1996 has identified priorities for power related renewable energy development in China and has assessed their economic viability (World Bank, 1996). A general approach was recommended for developing renewable energy: (a) identify technologies that are most promising in the near-to-mid term; (b) develop the market-based policies and institutional arrangements required to attract large-scale investment in the long term; (c) develop properly targeted financial incentives to accelerate market development of key technologies in the short term and to obtain environmental benefits of renewables over the long term; and (d) provide impetus for key technologies through targeted assistance for investment and technical support.

To implement this approach, cooperation between project developers, funding agencies and central and local governments is very important. It is believed that foreign investment and technologies are crucial for the growth of the renewable energy market in China (Chen, 1997; Wu, 1997). However, at present, difficulties and barriers to foreign participation do exist and they usually relate to cultural differences, legacies of planning and limitations of infrastructure. An intermediary that can facilitate understanding and cooperation between different parties will be useful and Hong Kong may play such a role to speed up the diffusion of renewable energy in the mainland China.

Economic links between Hong Kong and the mainland China have grown from strength to strength since economic reform and open-door policy were adopted in China in 1978. Hong Kong has been playing an important role as the major funding centre for China. Besides a direct source of funds, Hong Kong often serves as a window through which foreign funds are channelled efficiently into China for financing various projects. The partnership between Hong Kong and mainland China is an advantage to renewable energy projects since it can leverage multi- and bi-lateral funding support with debt and equity contributions as well as contributions from the down payments for asset-based financing. The efficient communication network and sound social and financial infrastructure in Hong Kong are also important criteria for attracting overseas investment and promoting foreign companies to market their products, technologies, and services.

BENEFITS OF RENEWABLE ENERGY

Development of renewable energy resources can reduce China's growing dependence on imported oil and the need for additional thermal power plants. Renewable energy can also provide least-cost electricity to remote areas not currently served by existing energy supply systems and has competitive advantage over conventional electrification approaches. As the bulk of the Chinese population lives in the rural areas (over 900 million people) and many are still without electricity supply, there is a large potential for rural electrification using renewables such as wind, solar and small hydro. For urban and coastal areas of China whose economy and energy demand are growing very fast, renewable energy can be an effective means to lessen acute energy shortage, diversify energy sources and curb growth in pollution from coal-fired generation. To maximise the renewable energy potential in China, its relationship with social and agricultural development should be considered carefully (Mao, 1994).

The benefits for Hong Kong to develop a renewable energy market is clear. Hong Kong may profit by creating industrial activities, involving in financing, research, technology transfer and human resource training. By promoting international collaborations on renewable energy, Hong Kong could serve as a gateway for the information and technologies, and this will help strengthen its competitiveness. On the other hand, the renewable energy industry can satisfy the local demand for green energy since Hong Kong has some potentials for solar PV, solar water heating, wind, waste-to-energy and small hydro (Hui, Cheung and Will, 1997). As the electricity transmission system of Hong Kong is interconnected with the Guangdong Province in the mainland China, it is possible for Hong Kong to make use of the mainland's renewable energy resources to meet its energy need.

PROSPECTS AND CONSTRAINTS

A number of key renewable energy technologies have been identified in China as the development priorities, including the improvement of biomass energy utilisation (forestry and agriculture), development of wind farms and generators, and expansion of solar energy (thermal and PV), small hydro and geothermal applications. An interesting example of international cooperation for promoting these technologies is wind energy which is being emphasized in China and supported by the other industrialised countries. The wind resources in China, with an exploitable capacity of about 250 GW, is suited for both remote village power development and for large-scale, grid-connected electricity production. With the experience gained from some demonstration sites set up with the US and European manufacturers, China is about to develop wind turbines of size over 200 kW. Wind energy development grows steadily with the support and subsidies from

international agencies, and the price of wind power generation at some locations is expected to reduce to a level competitive with conventional fossil-based generation.

Although the potential of renewable energy is large, it is important to understand in context the constraints that are limiting its extensive penetration (World Energy Council, 1994). Institutional, economic and financial constraints are the major limitations in China at present. To overcome these barriers, government commitment, regulatory reform and policy initiative are essential. Central and local governments may have to review their policy and regulatory environment to make it attractive to private investment in both the manufacture and deployment of renewables. Opening of energy market to decentralised power producers is often needed. Loans, stockholding schemes, joint ventures, and other approaches may be used to accommodate investment from international development banks, foreign governments, exports credits and commercial credits. For renewable energy utilisation to grow, policies will be needed to require the development of a highlighted awareness of the benefits of renewables; training of policy makers, managers and technical staff; and incentives and efforts by government to be supportive of these energy resources.

CONCLUSION

China's emerging and significant role in renewable energy is clear. To cope with its increasing energy demand and protect the environment, China should expand its renewable energy market and accelerate technology improvements. As a Special Administrative Region of China, Hong Kong could play an active role in promoting renewable energy by serving as a financial intermediary and an information and technology gateway. It is believed that both Hong Kong and the mainland China will benefit from promoting international collaborations on renewable energy. However, sustained efforts, proven policies and government support are needed to overcome the obstacles and constraints to greater diffusion of renewable energy. This task will present both challenges and opportunities to Hong Kong and to all those parties involved. The result will have long-term implications to the world's energy development.

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