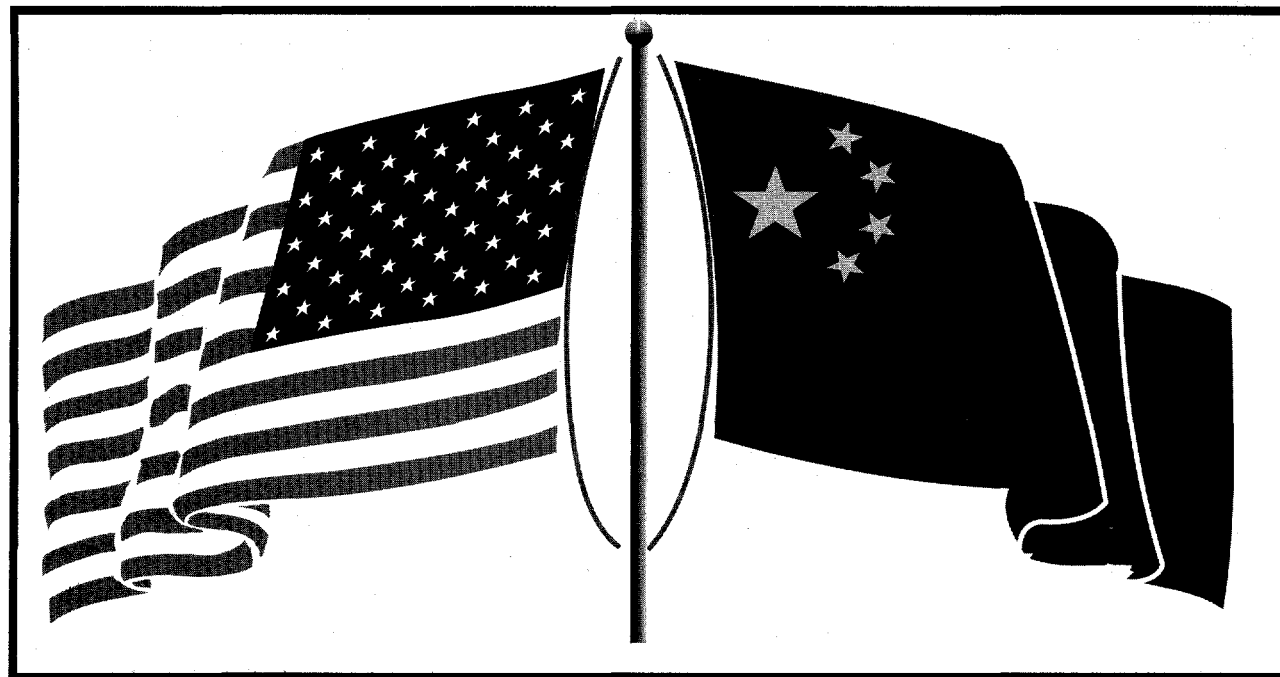


The United States of America
and the
People's Republic of China
Experts Report on
**Integrated Gasification
Combined - Cycle Technology
(IGCC)**
December 1996



Commissioned by
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Note of Appreciation

Those responsible for the final preparation and printing of this report wish to express their appreciation, and that of the entire team, to those whose vision initiated this effort and the many people in China, the United States and elsewhere who contributed to the process. Thanks to all who did the background work, who participated in the expert meetings, who contributed papers, and to those who wrote, arranged, drafted, edited and printed the report. Thanks for your efforts, the sharing of your knowledge and, most of all, for your belief in the benefits to China and to the world that will be derived through China's adoption of many of the ideas presented herein.

PREFACE

- **Opening Remarks From Professor Zhou Guangzhao, Member and President of CAS**
- **Opening Remarks From The Honorable J. Bennett Johnston, United States Senate**

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It is widely known that, with the implementation of the policy of reform and opening to the outside, China's national economy has achieved rapid development. As a basic industry in the national economy, electric power is a significant criterion in evaluating the nation's progress. With its annual growth rate of 15 GW/a, China's electric power industry has now leaped to second place in the world in terms of installed capacity.

China is a nation with coal as its main energy source. Therefore, coal-fired power plants will remain dominant in the long run. Thus, enhancing plant thermal efficiency and reducing polluting emissions will be crucial measures, contributing not only to the sustained development of the national economy but also to improvement of the world environment. Ever since the 1992 UN Conference on Environment and Development in Brazil, the Chinese government, sticking staunchly to its commitment, has stipulated with ratification, by the State Council, of China's Agenda 21, in which strategies for efficient control over air pollution and for the development of clean coal technology have been formally put forward.

Integrated Gasification Combined Cycle (IGCC), a new technology developed since the 1970's, has drawn world-wide attention for its high efficiency, lower pollution and low water requirement characteristics.

In May 1994, the Chinese government established an IGCC demonstration leading group, consisting of six government agencies: State Science and Technology Commission, State Planning Commission, State Economic and Trade Commission, the Ministry of Electric Power, the Ministry of Machinery Industry, and the Ministry of Coal Industry, which soon developed a collaboration with the Department of Energy of the United States. In order to carry out the IGCC technology as early as possible, the Chinese Academy of Sciences, together with Tulane University, USA, made a suggestion to organize concerned specialists from both countries to give an objective evaluation of the IGCC technology, thus pushing forward the development of the technology in China. The suggestion received support from PRC SSTC and the US DOE, and has been listed as a project in the Annex IX of the Sino-US fossil Energy Cooperative Agreement.

Assessing the IGCC technology by the Chinese and American specialists from different perspectives, this report points out that China is a developing country with limited economic strength but a very wide market. As a result, more attention should be paid to assimilating the imported technology, so as to reduce construction cost of the new IGCC power station by making efficient use of the existing domestic technology and construction capacity, and at the same time, providing market information for overseas enterprises who wish to extend the IGCC technology in China.

We sincerely hope that the publication of this report will provide a pragmatic analytical basis for the Chinese and American governments, related enterprises, and all those concerned with developing the IGCC technology in China.

A handwritten signature in black ink, appearing to read 'G. Zhou', written in a cursive style.

Professor Zhou Guangzhao

Member and President of the Chinese Academy of Sciences

United States Senate

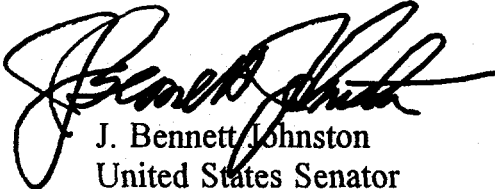
WASHINGTON, DC 20510-1802

November 20, 1996

The United States and the People's Republic of China share the need for more efficient and environmentally friendly power production technologies to help meet increasing energy demands. The Integrated Gasification Combined Cycle (IGCC) technology is a promising example--it is the cleanest and most efficient means of producing power and other products from coal. China's Agenda 21 plan identified IGCC technology as a top priority for sustainable development. The U.S. has been developing IGCC technology for the past twenty years and has become the world leader in advancing and commercializing the technology. This joint effort between the United States and China to analyze the advantages and potential for IGCC should serve as a model for future cooperative efforts to find solutions to our common environmental and energy production problems.

It gives me great pleasure, therefore, to introduce the attached report. Because of the high degree of technical and financial risk associated with the use of new technologies for production of energy, the research, development and demonstration path to commercial acceptance of new power production technology is long and arduous. The demonstrated performance of IGCC in the U.S., and its potential for helping to meet the future energy needs of China, is exciting and merits the attention and resources reflected in this joint effort. This report will be critically valuable in the assessment of IGCC's potential role in mitigating climate change resulting from CO2 emissions and will also provide insight into options for the best utilization of China's vast coal reserves. Such options might include the production, using IGCC, of chemicals, automotive, residential and industrial fuels, as well as many other coal-derived products.

The joint effort that produced this report is the result of the growing recognition that the U.S. and China have common interests and purposes in the broad area of energy and environmental technology. I trust that the project will provide a useful framework for future cooperative efforts.



J. Bennett Johnston
United States Senator

ABSTRACT

A report written by the leading U.S. and Chinese experts in Integrated Gasification Combined Cycle (IGCC) power plants, intended for high level decision makers, may greatly accelerate the development of an IGCC demonstration project in the People's Republic of China (PRC). The potential market for IGCC systems in China and the competitiveness of IGCC technology with other clean coal options for China have been analyzed in the report. Such information will be useful not only to the Chinese Government but also to U.S. vendors and companies. The goal of this report is to analyze the energy supply structure of China, China's energy and environmental protection demand, and the potential market in China in order to make a justified and reasonable assessment on feasibility of the transfer of U.S. Clean Coal Technologies to China. The Expert Report was developed and written by the joint US/PRC IGCC experts and will be presented to the State Planning Commission (SPC) by the President of the CAS to ensure consideration of the importance of IGCC for future PRC power production.

US-PRC IGCC EXPERT REPORT

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