Book Reviews

Books Reviewed in this issue:

Damming the Three Gorges — What Dam-Builders Don't Want You To Know
Grainne Ryder (ed.)
review by Vaclav Smil

Coal in Canada
K. Morgan MacRae & Shaun Hatch
review by George K. Lee

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Damming the Three Gorges — What Dam-Builders Don't Want You To Know.

by GRAINNE RYDER (ed.)
Toronto: Probe International, 1991
135pp.

Building the world's largest dam (up to 17 GW) in the deepest gorges of China's longest river is an idea nearly as old as the Chinese republic. Long before the Communist takeover in 1949 engineers and economists of China's Nationalist (Guomintang) government, helped by American experts, were promoting the project as one of the key future ingredients of China's quest for modernity. More systematic work on designing the dam started during the 1950s with the establishment of the Yangzi Valley Planning Office, but the obviously enormous cost of construction and recurrent economic crises of Maoist China (the Great Leap Forward followed by the greatest famine in human history between 1959 and 1961; the Cultural Revolution between 1966 and 1976) kept on pushing anticipated construction further into the future.

The outlook changed fundamentally with Deng Xiaoping's economic reforms during the early 1980s. The long-term goal of quadrupling China's GDP by the year 2000, chronic electricity supply shortages idling up to 20% of the country's industrial capacity, and rapidly increasing demand from new export-oriented industries as well as from urban households (during the decade China became the world's largest producer of refrigerators!) revived the plans for the Three Gorges Dam — and China's new openness brought both Western technical cooperation and the promise of future financing.

In 1985, a powerful US consortium, including the US Army Corps of Engineers, Bechtel, Stone and Webster, and Merrill Lynch submitted a review of technical aspects of the project and recommended commissioning a detailed cost-benefit analysis leading to financing of the dam's construction. In 1986, the Canadian International Development Agency arranged the financing of a detailed feasibility appraisal to be conducted by a Canadian consortium of Acres International, SNC, Lavalin, Hydro Quebec and BC Hydro. CIDA, spending Canadian taxpayers' money but obligingly kow-towing to the Chinese government, refused to release the terms of reference for this assessment — Probe International had to get them by using the Canadian Access to Information Law.

A one-volume summary of the study was re-

leased in February 1989, concluding that a 185m high dam is feasible on technical, environmental and economic grounds and recommending the construction "at an early date." By that time, a surprisingly powerful resistance against the project developed in China. Relaxation of the Party's tight control of public affairs led to an open criticism of many economic policies, and growing concerns about rapid degradation of China's environment found one of its most prominent targets in the gargantuan project.

Consequently, it is hard to avoid the impression that the Canadian project feasibility study was used by the proponents of the dam to silence growing domestic opposition to such environmental and economic excess by way of a judgement of foreign experts. But these experts were not unbiased, and *Damming the Three Gorges* is a brief, but fairly systematic, rebuttal of virtually all the key conclusions of the slanted appraisal. Eight topical chapters — written by a variety of professionals (their disciplinary backgrounds include biology, economics, geography, hydrology, and energy analysis) — deal with resettlement, environmental impacts, flood control implications, dam safety, its electricity-generating contribution to China's economy, and the financial aspects of the project. (This reviewer contributed the chapter on "Missing Energy Perspectives.")

Conclusions of these assessments reinforce a large number of Chinese, and a smaller number of Western, critiques of the Three Gorges project published during the 1980s. Three Gorges would displace up to 1.2 million people, cause a number of serious environmental problems (some of the potentially most costly ones by changing water and sediment flow in downstream areas), provide only uncertain flood-protection benefits, carry major risks of dam-induced earthquakes, contribute less of more expensive electricity than a series of smaller dams, and cost much more than estimated by faulty projections (using artificial exchange rates).

The project would be more defensible if there were no alternatives — and no experience with past failures. But China, with the world's largest hydrogeneration potential, has a very large number of suitable sites in the 1-6 GW range, and does not have to build a single 13-17 GW plant. Moreover, the country should first lower its extraordinarily high energy use/GDP unit: electricity conservation could generate the equivalent of the dam's output in much cheaper ways. The enormous environmental costs of giant dam building — amply illustrated by the consequences of the Aswan High Dam — can be ignored only by the most biased observers.

Damming the Three Gorges is a bad idea whose time should never come. Canadian taxpayers' money has been used to push this bad precept — but this little Canadian study is a sensible counterweight to that uncritical endorsement: it is not a flight of blind environmentalism, rather a matter of common sense.

Vaclav Smil
Department of Geography
University of Manitoba

Coal in Canada

by K. MORGAN MACRAE & SHAUN HATCH
Calgary: Canadian Energy Research Institute, 1991
pp.xxii,72

This book provides a concise, readable overview of the important but largely unrecognized and often misunderstood role that the coal industry plays in the Canadian economy. The information is well presented with statistical data liberally complemented with easily understood graphical illustrations.

In the first section of the book, the history and growth of coal mining in Canada and the rapid shift in primary coal use from heating and transportation applications during the 1950s to its current focus on coke making and electricity generation are reviewed. Canadian coal reserves, which total 6.5 billion tonnes, are estimated to last nearly 100 years at present rates of consumption. By comparison, Canadian oil and gas reserves are substantially less, with life indices of 13 and 27 years respectively. A detailed breakdown of domestic coal production, consumption, exports and revenues by region is

then given. Metallurgical coal is produced mainly for export, with 1989 shipments of about 28 Mt accounting for 14% of the world's seaborne trade in this commodity. In contrast, essentially all of the thermal coal produced, about 40 Mt in 1989, was consumed domestically for electricity generation. The prospects for the export of quality bituminous coals are promising, given the dramatic growth in capacity predicted for coal-fired heat and electricity in the Asia/Pacific and Common Market countries.

The next section succinctly describes the strong dependence of coal sales on the cost effectiveness of rail and ship transport to distant markets. Large coal tonnages, corresponding to about 20% of all goods transported by rail and about 20% of the total imported and export products moved by ship, have prompted large-scale expansions and improvements to the transportation infrastructure. Consequently, other bulk commodities have benefited greatly from escalations in coal shipments over the past 25 years.

The final section of the book analyzes the direct, indirect and induced effects of coal production on employment and income using established economic models. In 1989 the coal industry employed over 11,000 people and generated more than 23,000 additional jobs in the transportation, service and retail sectors. The total value added produced by Canadian coal activities in 1989 was $3.2 billion, of which $1.2 billion was directly attributed to the coal industry. These figures, which yield total employment and total value-added income multipliers of about 2.0 and 2.7 respectively, reflect the high degree of automation and the high level of productivity in both the recovery and movement of coal.

Two minor errors are obvious in Figure 4.7, where Canso Strait and Quebec city are misplaced. In addition, a clarification of the statement "the export for thermal coal appears to have strong growth potential... should subsidies for production of coal be reduced or eliminated" would be of interest. It would have been helpful to include a map showing the locale and annual production of the major coal producing areas in Chapter 3 and to show the main rail lines connecting these areas to the ports shown in Figure 4.7.

As noted in three chapters, the retention and expansion of future coal markets will be largely dictated by both fiscal policies, to modify supply and demand, and environmental constraints, to progressively reduce emission and waste. Thus, one critical deficiency is a commentary on the potential impact of these policies on the Canadian coal industry. Hopefully, the authors' views on the anticipated economic benefits and penalties due to the implementation of traditional and emerging regulatory strategies for pollution control (particulary with respect to the deployment of new clean coal technologies, the availability of coal with tight quality specifications and the achievement of societal targets for environmental improvement) will be the subject of another publication.

In conclusion, *Coal in Canada* is an excellent guide to readers wishing to become acquainted with the substantial contribution made by the industry to Canada's economy and energy security, and to regional development and employment.

George K. Lee
Scientist Emeritus, CANMET
EMR Canada
Ottawa

Erratum

In the review of *Synthetic Fuels* by Ronald F. Probstein and R. Edwin Hicks in the last issue of *ESR* (3:3:305-06), the publisher was incorrectly cited. This book was published by pH Press, MIT Branch, P.O. Box 195, Cambridge, Mass., USA 02139.