

## Human Rights

Human rights violations are particularly severe in countries which AECL has made its highest priorities in the past for CANDU sales, such as China, Indonesia, Turkey and South Korea. The Canadian government has argued that a policy of 'constructive engagement' (establishing even stronger commercial relations) will encourage improvements in human rights. Such a policy of appeasement is self-serving and hypocritical. In countries with serious human rights and/or proliferation violations, Canada should embargo nuclear trade and consider broader trade sanctions. In countries where citizens have limited democratic and civil rights, public review of nuclear safety is limited or non-existent.

## Corruption

AECL paid over \$22 million in bribes, disguised as agent fees, to secure CANDU sales to Argentina and South Korea in the 1970s. In 1994, AECL's agent in South Korea was arrested and jailed for paying bribes to the head of South Korea's nuclear utility. Following the AECL bribery scandals in the 1970s, AECL was required to report its aggregate agent fees each year in its annual report. However, the government allowed AECL to stop reporting agent fees in 1998, by which time \$68.7 million had been paid out over the previous 22 years. Although a 1999 Canadian law forbade bribery of foreign officials, this law is largely meaningless without adequate public disclosure.

## Transparency & Environmental Assessment

AECL has a tradition of secrecy because of its origins in nuclear weapons research. The Export Development Corporation, which finances most reactor exports, also discloses virtually no information about its dealings and has never conducted adequate environmental assessments. EDC should not finance nuclear power exports. As a minimum, both of these crown corporations should be subject to the Access to Information Act, and EDC projects should be subject to the Canadian Environmental Assessment Act.

**It is important for people from across the country to insist that nuclear power be phased out and that no public money be used to finance any expansion of this industry in Canada or abroad.**

## Endnotes

1. David H. Martin, *Financial Meltdown: Federal Nuclear Subsidies to AECL*, Campaign for Nuclear Phaseout, November 2001. <http://www.cnp.ca/issues/nuclear-subsidies-2000.pdf>
2. *2000 Report of the Commission of the Environment and Sustainable Development*, May 30 2000, Chapter 3, paragraph 3.34, p. 3-12.
3. Nuclear Engineering international, *World Nuclear Industry Handbook 2000*, pp. 20-21.
4. See: *Nuclear Engineering International*, May 1996; May 1997; May 1998; May 1999; and May 2000. In 1996 and 1999, CANDUs had slightly better performance than British MAGNOX reactors, which are not marketed internationally
5. "Nuclear Electricity Generation for December 1999", *Nucleonics Week*, February 10, 2000.



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# EXPORTING DISASTER: PULL THE PLUG ON CANDU REACTOR EXPORTS

*The export of Canadian CANDU reactors has had very high economic and human costs.*



- Since 1952, the Canadian government has given \$16.6 billion in subsidies to Atomic Energy of Canada Ltd. (AECL), a federal crown corporation that designs and markets the CANDU reactor. However, Canadian construction and export sales of

CANDUs have dried up, and the massive taxpayer subsidies cannot possibly be recouped.

- Nuclear power is very expensive for developing countries – it displaces cheaper, cleaner alternatives, and worsens indebtedness and balance of payment problems.
- The dark underside of nuclear power has always been its potential contribution to nuclear weapons proliferation, through plutonium production – an inevitable byproduct of reactor operation. The CANDU reactor is more proliferation-prone than other reactor designs.
- The ethical cost of CANDU exports has also been high, since AECL has repeatedly used bribery to sell reactors, and human rights violations in recipient countries have been ignored.
- Nuclear exports remain shrouded in secrecy and are not subjected to environmental assessments under the Canadian Environmental Assessment Act.

## Economics

Despite glowing promises of economic benefits, AECL has never made any net profit, and has remained dependent on government subsidies throughout its 50-year history. From 1953 to 2000 AECL subsidies totaled \$16.6 billion (\$2000).<sup>[1]</sup> In its March 1996 budget announcement, the Chrétien government promised to reduce AECL subsidies to \$174 million in 1997; \$132 million by 1998; and \$100 million per year thereafter. The govern-

ment has seriously backtracked on this commitment. Its budget promise was exceeded by 14% in 1997; 27% in 1998; 27% in 1999; and 57% in 2000. The average annual subsidy to AECL in those four years was \$162 million.

While the federal government has implemented draconian cutbacks to social programs such as health care, it has continued to throw billions of dollars at nuclear power, a sunset technology. By comparison, AECL's \$156 million subsidy

in 2000 could have bought 50 MRI (Magnetic Resonance Imaging) machines and operated them for a year. Instead Canadians are forced to pay for private clinics and travel to the United States. AECL's subsidy in 2000 could alternately have paid for about 2,200 nurses for one year, or for 12,500 heart operations.

The federal government spent 13 times more on subsidies to AECL in 2000 than on its total funding for renewable energy – \$156.5 million to AECL in

## CANADIAN REACTOR EXPORTS

Country	Reactor	MW(e) net	Cons. Start	Comm. Oper'n
Argentina	Embalse	600	Apr 1974	Jan 1984
China	Qinshan-1	678	Feb 1997	UC
	Qinshan-2	678	Feb 1997	UC
India	CIRUS	40 (t)	Dec 1955	Jul 1960
	RAPS-1	207	Aug 1965	Dec 1973
	RAPS-2	207	Apr 1968	Apr 1981
Pakistan	KANUPP	125	Aug 1966	Oct 1972
Romania	Cernavoda	633	Jan 1980	Dec 1996
South Korea	Wolsong-1	629	Oct 1977	Apr 1983
	Wolsong-2	665	Oct 1991	Jul 1997
	Wolsong-3	665	Nov 1993	Jul 1998
	Wolsong-4	665	May 1994	Sep 1999
Taiwan	TRR	40(t)	Sep 1969	Jan 1973

CIRUS = Canada India Reactor-United States • RAPS = Rajasthan Atomic Power Station  
 KANUPP = Karachi Nuclear Power Plant • TRR = Taiwan Research Reactor • UC = Under Construction (as at April 2001)  
 Source: IAEA

1999-2000, \$12 million/year for renewables.<sup>[2]</sup> The impact on the federal budget would be 'revenue neutral' if the government eliminated subsidies to AECL and instead funded renewable energy and efficiency programs. Efficiency and renewable energy technologies are two of the most important solutions to the climate change crisis. Nuclear power is not a viable solution to climate change because of its high cost and its own serious environmental problems.

Canadian utilities are not interested in building more reactors – there have been no new reactors orders since 1974. AECL has maintained that prospects for reactor exports justify ongoing subsidies from Canadian taxpayers. However, Canada got a late start in the reactor export business, and by 1999, CANDU-type reactors accounted for only 28 of 431 operable reactors in the world, or 6.5%.<sup>[3]</sup> In 1996, AECL announced that it would sell "ten reactors in ten years", but since that time

only two reactors have been sold (to China in 1996). In 2001, AECL also admitted that it has little chance of reactor sales in the foreseeable future, following the loss of sales bids to Turkey and South Korea. It is expected that the world's nuclear generating capacity will peak in 2002, and then begin a period of sustained and permanent decline as old reactors are shut down.

The chance of success for CANDU reactors is further reduced by its abysmal performance. Contrary to the myth of CANDU superiority, in the five years 1995-1999, CANDU reactors had the worst performance in the world of all internationally marketed reactor designs.<sup>[4]</sup> The average capacity factor for all Canadian reactors in 1999 was 49.25%.<sup>[5]</sup> Capacity factor is actual electricity production divided by perfect output, so it provides a percentage figure that indicates the number of outages and/or reduced power levels at the reactors, higher being

better. 49% is a disastrously low level, indicating dramatically higher costs.

Most CANDU sales have had government financial aid, involving some combination of low prices, outright grants, low or no interest, and long repayment periods. Occasionally bribes or trade concessions were made:

- Romania was given a barter arrangement – trading goods such as strawberries and nails to pay for their CANDU reactor.
- A trade agreement was signed with Mexico to import \$1 million worth of oil per day, as an enticement to sign a CANDU deal – the sale was never made but Canada bought the oil anyway.
- South Korea obtained an increasing amount of technology transfer and domestic manufacture for each of the four CANDU reactors that it bought.
- A concessionary loan was made to China for \$75 million, made the day that the deal was signed for sale of two CANDU reactors in November 1996.

On November 26, 1996, a deal was signed to sell two CANDU reactors to China. The government guaranteed a \$1.5 billion loan for the reactors (the largest in Canadian history), which went through the government export credit agency, another crown corporation known as the Export Development Corporation (EDC). The loan was on the EDC's "Canada Account", which is carried on the books of the Department of Foreign Affairs and International Trade. The Canada Account loans for nuclear plants are supposedly made according to the Nuclear Consensus Agreement of the Organization for Economic Cooperation and Development (OECD), intended to prevent vendors from price-cutting too severely. However, nuclear loans are too big and too risky for the EDC or for private sector financial institutions to handle without direct government support. Government backing allows EDC typically to provide nuclear loans, and at lower-than-commercial interest rates.

There are also serious questions about: the absence of third party liability insurance in the event of a serious accident; the absence of political risk insurance on the loans; the degree to which AECL has 'given away the store' through technology

transfer; the consequences of cost overruns; and the cost of possible performance guarantees or equipment warranties.

## CANDU and the Bomb

The explosion of an atomic bomb by India in 1974, using plutonium from a Canadian-supplied reactor, demonstrated the very real contribution that Canadian reactors can make to nuclear weapons proliferation. Canada discontinued nuclear cooperation with both India and Pakistan because of their clandestine nuclear weapons program. However, beginning in 1989, without any public discussion or parliamentary debate, Canada began allowing technical information exchange and nuclear aid to both India and Pakistan through the CANDU Owners Group (COG). Even after both India and Pakistan conducted nuclear weapons tests in May 1998, Canada continued to provide technical aid, ostensibly in the name of reactor safety.

The CANDU reactor is more proliferation-prone than other reactor designs for several reasons. It produces more plutonium than most other reactor designs, and plutonium is a primary explosive for nuclear weapons. CANDU reactors also possess on power refuelling capability, meaning that the small and numerous CANDU fuel bundles are removed and inserted constantly, making monitoring and verification of fuel inventories much more difficult. It would be possible to use dummy fuel bundles, and divert others for plutonium extraction. AECL also markets CANDU reactors on the basis that the fuel does not need enrichment like that of American-style Light Water Reactors. For a country that wants to evade proliferation restrictions placed on foreign-purchased uranium by starting its own fuel cycle operation, this simplifies their task – an expensive and complex uranium enrichment plant is not needed.

Agreements cannot prevent proliferation. Signatories of the Non-Proliferation Treaty (NPT), such as North Korea, Iran and Iraq have simply ignored their treaty commitments. The legal exit provision from the NPT also has no penalties, and requires only three months notice. All of Canada's past reactor customers (India, Pakistan, Taiwan, Romania, Argentina, and South Korea) have in the past pursued a nuclear weapons program.