



VALUATION SERIES

No. 22 / MAY 2019

PUBLIC CHOICE ALTERNATIVES

Radioactive in So Many Ways

A VALUATION OF
ATOMIC ENERGY OF CANADA LIMITED

BY IAN MADSEN



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Valuation Series No. 22 • Date of First Issue: May 2019.

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ISSN 1491-78

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EXECUTIVE SUMMARY

Atomic Energy of Canada Limited, 'AECL', is the federal Crown corporation which develops nuclear technology, mainly now in Canadian Nuclear Laboratories, which sells nuclear isotopes for medical and other purposes. Using an **intrinsic value method**, and discounting to the present AECL's projected future free cash flows, as the company is today, assuming that it will remain non taxable indefinitely (owing to its legacy of huge losses), the range of estimates is negative \$55B to negative \$7.9B, with a tighter range of a median (midpoint of the array of values) of negative \$13.8B to a mean (simple average) of minus \$17.7B.

Under the **market-based valuation system**, i.e., evaluating AECL's financial metrics against those of companies deemed to be comparable, the 'as is' current value of the company ranges from negative \$7.1B to positive \$940M, with a median (midpoint of the array of values) of \$160M and a mean (simple average) of negative \$1.99B. These estimates are based on a narrow foundation. Only three of eight possible valuation metrics (Price to Sales, 'P/S'; Enterprise Value to Revenue, 'EV/Rev'; and Enterprise Value to Earnings Before Interest, Taxes and Depreciation and Amortization, 'EV/EBITDA') were usable.

INTRODUCTION

Atomic Energy of Canada Limited, A History

AECL is a federally owned Crown corporation. It owns the Whiteshell Nuclear Laboratories facility in Manitoba and the Nuclear Power Demonstration Reactor in Ontario, which are to be decommissioned. It contracts with Canadian Nuclear Laboratories “for the day-to-day operations of the sites”. AECL remains responsible for safety, site decommissioning and nuclear waste remediation.¹

Atomic Energy of Canada Limited, AECL, which develops nuclear technology, mainly now in Canadian Nuclear Laboratories, which sells nuclear isotopes for medical and other purposes, has a long and distinguished scientific history, but a much more troubled financial one.

One of the world’s first nuclear reactors was built at the National Research Council in Ottawa in 1941. The NRC built a nuclear research facility at Chalk River, nearby, in 1944. Controlled fission was achieved in 1945, the second country in the world to do so. AECL was created in 1952 to peacefully exploit nuclear power.

The CANDU (Canadian Nuclear Deuterium-Uranium) development was begun in 1954 and completed to a commercial point and connected to Ontario’s grid in 1962. The first actual generating station was brought online in 1968. Pickering, east of Toronto, came online in 1971, and Bruce,

north of the city, in 1977. In 1983, Gentilly-2 in Montreal, and Point Lepreau in New Brunswick went online, as did a facility built in South Korea. Another in Argentina went online the next year. Four more reactor units went online at Bruce in 1984-87, and another four at Darlington in 1990-93. At this point, Canada had twenty-two CANDU reactors. Two were sold to China in 1996. Another in Romania began operations in that year.² More recently, AECL has identified Small Modular Reactors, ‘SMR’s’, as being an opportunity that could bring in revenue as potential clients seek to avoid greenhouse gas emissions and also go ‘off-grid’. AECL is developing SMR’s, but as this is very early in the development process, it has not factored into this study’s valuation.³

During all this time, research and development costs and construction cost overruns of AECL were never recouped, and remain on the company’s balance sheet, but are submerged in and dwarfed by the later-recognized nuclear site decontamination and decommissioning liabilities. It is unclear what the apportionment to each actually is. It is beyond the scope of this study to determine whether the amounts involved are correct or ‘whom to blame’. It is sufficient for the purpose of this study to accept that the federal government of Canada has taken responsibility for these figures, and that they cannot be evaded or erased, although the ultimate costs could be higher, but are unlikely to be lower than stated, unless there is more aggressive remediation activity.

1. See <https://www.aecl.ca/about-aecl/goco-model/>.

2. See <http://www.snclavalin.com/en/nuclear-candu-history>.

3. See <https://www.aecl.ca/science-technology/small-modular-reactors/>.

INTRINSIC VALUE: VALUATION OF AECL AS A BUSINESS, USING DISCOUNTED FREE CASH FLOW

The intrinsic value model uses a perpetuity with a constant growth rate and constant cost of capital. This is crudely but generally appropriate for a stable company in a slow-growth, mature sector. For the intrinsic value of AECL, projecting future cash flow growth, and bringing it to a net present value, a relatively conservative approach was taken which could undervalue the company (see Table 1).

Each constituent (eg., revenue, cost of goods sold, interest expense, depreciation and amortization, administrative and sales expense) determining the final free cash flow was projected independently. The company's free cash flow growth rate range was held to a restrained 2 to 4 percent, and the required rate of return or cost of capital range was from 5 to 9 percent. AECL's cost of capital, given low expectations and high current valuations in

the stock market, could well be lower than the range used (and thus raise its estimated value), although there is also a chance that interest rates and the rate of return investors demand on equity (share) investment could increase. The statutory tax rate used in calculations may be lower in the future, as there is continued global pressure to lower corporate tax rates, exemplified by the 2017 drop in US corporation income tax rates.

Using an intrinsic value method, and discounting to the present AECL's projected future free cash flows, as the company is today, taxed as it presently is at statutory rates, the range of estimates is negative \$55B to negative \$7.9B, with a tighter range of a median (midpoint of the array of values) of negative \$13.8B to a mean (simple average) of minus \$17.7B.

Table 1								
Intrinsic Value, Using Present Value of Discounted Future Cash Flows								
Present Value of Discounted Free Cash Flow = Estimated Next Year Free Cash Flow (Required Rate of Return ['r'] = Growth Rate ['g'])								
Projected Fully Taxed Free Cash Flow Estimate for FY2018 (\$B): -\$ 0.55								
Matrix Values (\$B) g=v; r=>	4.00%	5.00%	6.00%	7.00%	8.00%	9.00%	10.00%	
0.00%	-\$ 14	-\$ 11	-\$ 9	-\$ 8	-\$ 7	-\$ 6	-\$ 6	-\$ 6
1.00%	-\$ 18	-\$ 14	-\$ 11	-\$ 9	-\$ 8	-\$ 7	-\$ 6	-\$ 6
2.00%	-\$ 28	-\$ 18	-\$ 14	-\$ 11	-\$ 9	-\$ 8	-\$ 7	-\$ 7
3.00%	-\$ 55	-\$ 28	-\$ 18	-\$ 14	-\$ 11	-\$ 9	-\$ 8	-\$ 8
4.00%	--	-\$ 55	-\$ 28	-\$ 18	-\$ 14	-\$ 11	-\$ 9	-\$ 9
5.00%	\$ 55	--	-\$ 55	-\$ 28	-\$ 18	-\$ 14	-\$ 11	-\$ 11
6.00%	\$ 28	\$ 55	\$ --	-\$ 55	-\$ 28	-\$ 18	-\$ 14	-\$ 14
7.00%	\$ 18	\$ 28	\$ 55	\$ --	-\$ 55	-\$ 28	-\$ 18	-\$ 18
		Minimum	Maximum	Median	Mean (Average)			
Total Market Value (\$B)		-\$ 55.04	-\$ 7.86	-\$ 13.76	-\$ 17.71			

Source: Author's calculations based on valuation model formulae using summary versions in annual reports from the company.

MARKET-BASED VALUE: VALUATION OF AECL USING STOCK MARKET AND FINANCIAL METRICS

The nature of AECL means that mainly engineering and construction companies, plus two Canadian-listed technical consulting companies were used for financial comparison purposes, although none of that fits what AECL is. The company, surprisingly, has some non-trivial value, but it becomes negative after re-attributing its legacy losses and recognized liabilities. Unused tax losses are included, but they may not be, in practice, usable, or even recognized.

As noted in the Executive Summary, the 'as is' current value of the company ranges from negative \$7.1B to positive \$940M, with a median (midpoint of the array of values) of \$160M and a mean (simple average) of negative \$1.99B. Three of eight possible valuation metrics (Price to Sales, 'P/S'; Enterprise Value to Revenue, 'EV/Rev'; and Enterprise Value to Earnings Before Interest, Taxes and Depreciation and Amortization, 'EV/EBITDA') were usable.

Table 2				
Market Value, Using Financial Metrics from Comparable Companies				
Valuation Metrics Applied to AECL; i.e., Market Value of Common Equity (Figures \$B)	Price to Sales	Enterprise Value/Revenue (Subtracting Net Debt)	Enterprise Value/EBITDA (Subtracting Net Debt)	
Average Six Canadian Engineering or Construction Cos.	\$ 0.05	\$ 8.06	\$ 7.17	
Average Two Canadian-Listed Business Consulting Cos.	\$ 0.04	\$ 8.13	\$ 7.22	
Average Eleven US-Listed Engineering or Construction Cos.	\$ 0.04	\$ 8.05	\$ 7.38	
Average of All the Above, Evenly Weighted by Company	\$ 0.05	\$ 8.06	\$ 7.29	
Market Value Using Comparable Companies, and Three Viable Valuation Ratios				
	Minimum	Maximum	Median	Mean (Average)
Total Market Value (\$B)	\$ 0.05	\$ 8.06	\$ 7.29	\$ 5.13
Value of Liabilities (\$B)	-\$ 7.97	-\$ 7.97	-\$ 7.97	-\$ 7.97
Value of Accumulated Tax Losses (\$B)	\$ 0.84	\$ 0.84	\$ 0.84	\$ 0.84
Net Value (\$B)	-\$ 7.08	\$ 0.94	\$ 0.16	-\$ 1.99

Source: Capital IQ via Yahoo!Finance; company annual reports; calculations from consultant.

CONCLUSION

This study used detailed historical financial statements, but the trends in net income, costs and capital expenditures may not be fully and reliably extrapolated. It is highly unlikely that there could be a floating of AECL shares on a stock market or that the company could be sold to private investors. AECL would likely have to have all liabilities removed and absorbed by Ottawa.

Keeping them inside AECL is a rather dubious way to keep them 'off the books' of the federal government. As far as is known, the proceeds of any such sale, however AECL is restructured or refinanced, would go to the federal government of Canada, unless Ottawa decides otherwise.

APPENDIX I:

RATIONALE FOR DIVESTITURE OR PRIVATIZATION

While it is up to the people through their elected representatives to decide if a Crown corporation or other government agency or entity should be sold or otherwise privatized and the proceeds used for the benefit of all citizens and taxpayers, there are some established reasons to embark on such a path, some or all of which are cited for divestiture of such enterprises but may not be applicable in any single case.

1. The government has no mandate to own or run a commercial enterprise. Libertarians, 'Classical Liberals' and free-market conservatives believe that the provision of citizens' safety, security and justice is the government's primary role, and its involvement in the economy should generally not extend beyond this.
2. Regulation can usually accomplish any public policy reason for direct involvement in an industry. If regulation is not easily feasible, then a direct contract or subsidy to any affected individuals, entity or entities may be more efficient or effective and less economically disruptive or costly.
3. If a government-controlled or sponsored enterprise has a monopoly position, near-monopoly, or effective monopoly in a line or lines of business or businesses, then opportunities are lost in one or more commercial or potentially commercial sectors for entrepreneurs and investors to try to create and grow businesses to enrich and sustain themselves, employees, suppliers, and others.
4. A monopoly, near-monopoly, or effective monopoly market position by a government-owned or sponsored entity could result in far higher prices for customers, the general public, or a section of the public, than would be the case in a fully competitive marketplace for the industry involved.
5. A government-owned or -sponsored enterprise may compete directly against private sector firms, which are owned by or employ citizens, or against individual citizens, all of whom the government is supposed to serve, not disadvantage.
6. The government-owned or -sponsored enterprise may compete unfairly against its private sector rivals in that it had or has access to lower-cost government-sourced and -guaranteed capital (debt). It may have a much larger debt component in its capital versus that which would be tolerated in the private sector. Thus, it may not have to meet high standards for profit and cost control, allowing it to offer lower than true free market-based competitive pricing.
7. Government-owned firms may not need to pay provincial or federal income taxes. This can allow such firms to supply goods or services more cheaply than the private sector companies they are competing with.
8. Government-owned or -sponsored enterprises may not have any kind of profit orientation or target, may be used as public policy vehicles and may be given preference in their activities or even in their transgressions, such as labour or environmental abuses.
9. Government-owned or -sponsored enterprises, by virtue of being public sector vehicles overseen by bureaucrats and politicians, may be places where favoured individuals find employment, particularly at management levels.

10. Since profit is a secondary goal of a government-owned or -sponsored enterprise, it is difficult to evaluate the effectiveness, efficiency or productivity of the enterprise or its employees. Consequently, these employees and assets may not be very productive or effective.
 11. In some cases, government-owned entities are monopolies or effective monopolies, and use their market-dominating power to charge higher prices than would be the case in a fully competitive sector with several viable companies in intense rivalry to offer customers the best product or service at the best price.
 12. Government-owned or -sponsored enterprises are often creations of certain time-fixed circumstances and outlive whatever use or public policy role their creators may have conceived. Often, advances in technology; the modernization of transport, telecommunication or information technology; the evolution of the economy and available products and services and the increasing standard of living make these enterprises potentially obsolete. In the private sector, firms and individuals must adapt and evolve, or decline.
 13. Government-owned or -sponsored enterprises perpetuate their possibly obsolete existences by virtue of the constituencies that build up around them: employees, managers, directors and bureaucrats, customers, suppliers and associated advocates or consultants. They can lobby to keep the enterprise going, despite dysfunction or losses. They are far more motivated to do so than are the taxpayers, whose average cost is much less per person and may be indirect, hidden or difficult to calculate.
 14. Because they are not profit-oriented, government-owned or -sponsored enterprises are usually less efficient, and thus they lower the overall efficiency of the entire economy. This can make a whole nation less competitive than its global rivals are, whether nations or individual companies.
- The effects are worse the greater the government involvement in the economy. When taken to its most extreme, as happened in 20th-century communist nations, the countries were unable to compete against capitalist companies, despite their immense direct and indirect subsidies, government support and the lack of profit requirement.
15. Funds tied up in the capital of government-owned or -sponsored enterprises could be used to reduce government debt or lower taxes on individuals or corporations, which they could then spend or invest as they freely choose, and thus they could inject money back into the economy in more-lucrative ways.
 16. The greater the number and size of government owned or government sponsored enterprises in an economy, the greater the size and power of the government, which is usually the largest single entity in society, increasing the dangers of abuse of power, including injuring individual citizens, companies, or groups. Effective capacity of opposition or recourse against this power diminishes as the proportion of the economy the government occupies increases.

