

Macroeconomic Impacts of an International Repository – 14048

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ABSTRACT

A comprehensive macroeconomic study has been performed to measure the economic and employment impacts that could accrue to a country that hosts an international repository. The study comprehensively examines the entire project, including construction and operation of the repository and the supporting packaging and transportation infrastructure. The study basis includes a specified annual receipt rate of spent fuel, HLW and ILW. In addition, it assumes an entirely stand-alone, dedicated transportation infrastructure. The study projects direct and indirect employment deriving from the venture as well as the national tax and royalty income that accrues to the host country.

INTRODUCTION

The purpose of this study was to estimate the broad economic benefits of an international repository that could accrue to the host country. The study was undertaken as part of a commercial effort.

A dominant assumption in this study is that an international repository is undertaken as a “commercial” venture. By commercial, the study authors are not commenting on the ownership. Indeed, it is likely that the host government would be a dominant, if not sole owner. By commercial, the authors mean that the international repository is developed and run as a business, that fees are paid to the repository company to provide transportation and disposal services, taxes are paid and that the venture makes a profit.

Basic Input Parameters

The parameters modeled were as follows:

1. A repository is sited in Pangea geology. For purposes of this study, Argentina or Australia are considered as regions exist in both countries with the desired geological conditions.
2. Development is done over a 14-year period, and operations are conducted for a 40-year period.
3. The repository’s annual receipt is 700 canisters of HLW^a, 2,000 metric tonne of uranium (MTU) of spent fuel and 20,000 m³ of ILW.
4. All facilities required to receive, transport, overpack and dispose of the wastes are greenfield construction. This includes, for the model, 100 km of new rail as well as a new, dedicated port facility.
5. Over the 40-year life of the project, the host country manufactures 70 – 5,000 tonnes dedicated transport ships and 3,000 shipping casks.
6. The initial capital cost, including shipbuilding, is \$8.3 billion.^b
7. Subsequent expenditures on ship and cask replacement are \$6.8 billion.
8. The annual revenue for receiving the subject wastes is \$7.4 billion.

^a Each HLW canister contains waste from between 1.5 and 10 MTU of fuel depending on burnup and fuel type.

^b All monetary figures are in 2013 US dollars.

9. Annual operations cost \$1.1 billion, including direct employment of 2,000.

Annual Operations

To model the project, it is assumed that all expenditures are financed by customer prepayments. Hence there is no debt. Royalty payments have been modeled to be 16% of total revenues less international shipping charges. Thus, in a typical year, the financial performance for the project would be:

Category	Amount (billions of US\$)
Revenue	\$7.4
Royalty	\$0.9
Direct Operating Expense	\$1.1
Long-Term Care Fund	\$0.1
Depreciation ^c	\$0.3
Taxable Income	\$5.0
Tax (35%)	\$1.8
Net Income	\$3.2

The payment to the long-term care fund has been provided at \$100 million per year. However, such contributions will clearly be developed through negotiations with the host government.

Direct Tax Revenues

Excluding the long-term care fund payments, the annual direct tax and royalty payments to the host government during operations are estimated as follows:

- Payroll tax: \$0.08 billion^d
- Royalty: \$0.9 billion
- Corporate tax: \$1.8 billion
- Income tax of direct employees: \$0.13 billion
- Total: \$2.91 billion

These tax revenues exclude contributions to Goods and Services Tax (GST) or Value Added Tax (VAT) through direct spending as well as increased consumer spending.

As will be discussed below, this project results in a significant amount of “multiplied” employment. No estimate of the direct tax benefit of this employment has been made.

Employment Impacts

During the 14-year investment period, the project would fund 56,000 person-years of direct employment. There are two subsequent multiplier effects on this. The first is the effect of supplier jobs to the direct investment. This is estimated to be 10,000 jobs during the development. The second multiplier is on employment derived from consumption by all

^c For simplicity, depreciation is considered to be 1/30th of the initial capital development costs. This is not accurate in that certain capital items (e.g., ships) will depreciate over a shorter period of time. The depreciation rules in each country are different. To make a more precise estimate, a country’s tax regime would have to be modeled.

^d For the purposes of this study, it has been assumed that the direct payroll is one third of the total annual operating expense and that payroll taxes are 24% of direct payroll.

workers, estimated to be 50% of the total payroll. Hence, the total employment impact during the development period is 294,000 person-years of employment.

During operations, the direct employment of 2,000 is supported by supplier employment of 6,000. Using the 50% consumer-based employment multiplier, the annual impact is 12,000 person-years of employment. Over the 40-year operation period, the project creates 480,000 person-years of employment.

Macroeconomic Impacts

There are many different macroeconomic impacts that could derive from a project of this magnitude. Several are briefly discussed below:

- **Balance of Trade:** As noted, annual revenues are estimated to be \$7.4 billion. These are considered to be exports. While the study assumes that all goods and services needed by the project are domestically supplied, many components will be imported. These might include specialized components manufactured elsewhere. No study of this has yet been done. More significantly, it is possible that some portion of the spending might be directed to customer countries. For example, it is conceivable that Japan and Korea, each with considerable, relevant manufacturing capabilities, might negotiate the disposal of their wastes in trade for domestic manufacturing of certain items like ships and casks. This would reduce the net export value of the \$7.4 billion noted above. In addition, as discussed below, there is an increase in private consumption as a result of the project. This private consumption would clearly cause imports to increase that, in turn, would reduce the net export value derived from this project.
- **Exchange Rate:** This project has the potential to increase the value of the local currency. As the money supply in a country increases, the global market values that currency higher based on the increased financial security driven by the increased money supply. This was very evident in the increased value of the Australian dollar during the boom in resource exports over the last few years. There are, however, other factors that influence the exchange rate, including interest rates.
- **Interest Rates and Inflation:** It is likely that this project would influence the interest inflation rates in countries of the size of Australia and Argentina. The employment numbers cited previously will put demand on the workforce and this demand will likely drive wages higher. The multiplied consumer impact will have an even larger drive on wages and prices.
- **Private Consumption:** As noted, the primary spending model projects a total direct and indirect employment, excluding private consumption, of 196,000 person years during development and 320,000 person-years during operations. The personal consumption by this group is estimated to result in 258,000 person-years of employment. The model projects that personal consumption over the 56-year period (development and operation) averages \$7.5 billion per year.

Country Comparisons^e

- **Gross Domestic Product (GDP):** The international repository project would generate \$7.4 billion in new annual import income to the host economy. The Australian and Argentine GDPs are \$1,500 and \$450 billion, respectively. Thus, the international

^e Information cited in this section comes from www.tradingeconomics.com. The figures have been developed in late 2013 and do not reflect recent changes in the exchange rates in the currencies of Australia and Argentina.

repository project would represent an increase of 0.5% and 1.6% in GDP in Australia and Argentina, respectively.

- **Tax:** The international repository project is estimated to produce direct tax payments of \$2.9 billion annually. The Australian and Argentine annual tax collections are \$500 and \$110 billion respectively. Hence, the international repository project would represent an increase of 0.6% and 2.6% in Australia and Argentina respectively.
- **Exports:** The international repository project is estimated to produce \$7.4 billion in new annual export income. This represents an increase of 2.6% in Australia and 7.8% in Argentina, compared to their annual export income of \$290 billion and \$95 billion, respectively.
- **Labor Impact During Development:** As noted earlier, the international repository project is estimated to result in an increase of 21,000 full time jobs during the 14-year development period. In Australia, the total employed workforce is 12 million and in Argentina, it is 16 million. Hence, the international repository would lead to an employment increase of 0.2% in Australia and 0.13% in Argentina.
- **Labor Impact During Operation:** Over the 40-year operational period, the international repository project would produce 12,000 new person-years of employment. Compared to current employment, this represents an increase of approximately 0.1% in both Argentina and Australia.

CONCLUSIONS

This paper reports on the potential economic impacts of the development and operation of an international repository in both Australia and Argentina. The study projects the benefits of such a project in terms of GDP, tax revenue, export income and employment. The study is a conservative estimate of the benefits of such a project but is subject to the validity of many key assumptions. The study results show that such a project would have a material positive impact on the economies of both Australia and Argentina.