

Nuclear Subsidies and Proliferation: Clarifying the Link

by Henry David Sokolski

Last March, the South Australian Government established a royal commission to investigate the benefits and risks of Australia expanding its mining of uranium; enriching, reprocessing and fabricating nuclear fuels for both domestic use and export; producing nuclear power; and storing radiological waste, including foreign spent reactor fuel.¹ A key driver behind the commission's creation was the decline of traditional domestic industries, such as automobile manufacturing and shipbuilding, in South Australia. Given the state's enormous uranium reserves and current mining activities, some Australians have argued that Australia could benefit financially by expanding the mining sector and by adding value to its uranium exports by enriching the material and fabricating it into reactor fuel assemblies. Others have maintained that Australia can realize significant economic benefits by recycling and storing foreign spent fuel and producing carbon-free nuclear power.

The royal commission's remit is to consider all these claims and to weigh the financial, social, technical, diplomatic, and nonproliferation risks with the benefits of each of these possible activities. On November 25, 2015, the commission asked that I give testimony on the nuclear weapons proliferation implications of each of these activities. Below is what I submitted with additional reference citations. The testimony's thesis is that if Australia wants to avoid the temptation of selling nuclear goods to states that might use these goods to make bombs, it should only consider new nuclear activities that can be entirely financed by the private sector and turn a profit without having to resort to foreign sales. This is especially so, given that the current paucity of emerging nuclear markets and the high cost of nuclear power plants will encourage, first, demands for state subsidies and second nuclear exports to questionable foreign customers. Rather than run this risk, I argue, Australia should consider setting an international nonproliferation example by limiting any new nuclear developments it might engage in to activities that be financed entirely by the private sector and turn profits based entirely on domestic demand.

Many Australians want additional civilian nuclear activities to be conducted in Australia. But if they want to avoid contributing to nuclear weapons proliferation, they would do well not subsidize any new nuclear activities. This includes all "value adding" activities, such as nuclear enrichment or reprocessing as well as nuclear power production. None of these should be pursued unless there is an absolute economic imperative to do so—one that is so clear that

1. See The Royal Commission on the Nuclear Fuel Cycle, "About the Commission, available at <http://nuclearrc.sa.gov.au/about-the-commission/>.

these activities can be entirely financed with private monies based on projected cash flows from domestic consumption alone.

Australia already mines and exports uranium in a highly competitive global market. To improve upon its current position, Australia is now committed to export uranium to India even though this will enable India to use safeguarded Australian uranium imports to free up more of its own unsafeguarded domestic uranium ore for military purposes. Strictly speaking, such uranium exports can be seen as a violation of the Nuclear Nonproliferation Treaty (NPT), which, under Article III (paragraphs 1 and 2), forbids any member from providing source or special fissionable materials to any non-nuclear-weapon state that lacks safeguards over all of its nuclear materials and activities.² This should tell us something about what the future holds. If Australia encourages additional nuclear activities where it is difficult to make a profit domestically or to secure an adequate share of the international market.

Certainly, if Australia gets into the business of exporting enriched uranium, it will discover that this market is at least as tight (i.e., over supplied) as the global market is for yellow cake. To recoup one's investments, one will be tempted to support sales to countries with questionable nonproliferation credentials. This temptation is only likely to increase as the nuclear activities and products in question become more expensive to produce and difficult to sell.

If Australia goes into the additional fields of nuclear power production, uranium enrichment, plutonium recycling, each of these activities would require substantial governmental subsidies to break even financially in Australia. The reason why is simple: The capital investment and operating costs of these activities are certain to exceed what Australians would likely be willing to pay. In order to defray these costs (and to help justify government subsidies and supports for such investments) there would be an interest for the government to support exporting portions or all of the "value added" nuclear technology or its production to interested, paying parties overseas.

To whom might Australia export? Demand for more nuclear power in the largest markets—the US and Western Europe—is in decline. Also, these markets already have all the nuclear fuel production or fuel contracts they need. China—the fastest growing nuclear power nation—is making itself self-sufficient in enrichment, recycling, and power reactor production and operation. Russia is already more than self-sufficient. Japan, meanwhile, is bringing some of its reactors back on line but nuclear power is unlikely to resume there to levels anything like what it was before Fukushima. It may import yellowcake but it had contracted enrichment and other fuel services overseas and has substantial fuel services in place domestically. This, then, leaves the immediate nuclear power markets of Pakistan, India, South Korea, Argentina, Turkey, Brazil, South Africa, Egypt, Algeria, Iran, Saudi Arabia. Unfortunately, each of these states has, has had, has been suspected of having or expressed a desire to acquire a nuclear weapons

2. See The Treaty on the Nonproliferation of Nuclear Weapons available at <http://www.un.org/en/conf/npt/2005/npttreaty.html>.

program.³ More distant and unlikely markets include Bangladesh, Vietnam, Indonesia, Jordan, and various developing states in Africa. None of these distant markets are all that attractive as they, and most of the more immediate prospects for nuclear exports, will require billions of dollars in financing that must be supplied by the exporter. In tight nuclear markets, though, one has to make do with the prospects one has. As such, if Australia expanded its nuclear activities to ones that could only survive through exports, Australia would be drawn to do business with entities with questionable financial or nonproliferation credentials.

In this regard, Australia would be no different than other nuclear supplier states that have over invested in nuclear technology. The French government, which owns AREVA and EDF, not only considered selling Libya a reactor while Gaddafi was in office, but a reactor for Syria even after the Israelis bombed a suspect production reactor site there. The French sale of a large research reactor and massive amounts of highly enriched uranium to Iraq (which Saddam planned to make his first nuclear weapon from) is well known as well as is the reprocessing offers France made to Pakistan and South Korea in the 1970s. France's tie with the Israeli program is now well known. It included, a production reactor, reprocessing, and even nuclear design and nuclear testing cooperation.

States that trumpet the imperative of nonproliferation, including the US, are no less immune. Washington launched Iran's nuclear program in the 1960s and 1970s. The US trained hundreds of Iranians in nuclear technology in US universities and even countenanced offering the Shah plutonium recycling technology. A key rationale here was that Iran was an important nuclear market. How Iran will ultimately use the nuclear technology it now has and what additional nuclear technology and goods it might yet import, of course, are still open questions.

Then there is India. Its first nuclear explosive in 1974 exploited "peaceful" US reprocessing technology and heavy water to make the weapon's plutonium in direct violation of its peaceful end use pledges both to the US and to Canada, which supplied India with the CIRUS reactor.

3. On Turkey's, Egypt's and Algeria's nuclear programs, see Hans Rühle, "Is Turkey Secretly Working on Nuclear Weapons?" *The National Interest*, September 22, 2015, available at <http://nationalinterest.org/feature/turkey-secretly-working-nuclear-weapons-13898> and U.S. Department of Energy, Office of Nonproliferation and International Security, "International Safeguards: Challenges and Opportunities for the 21st Century," NNSA report NA-24, National Nuclear Security Administration, Washington, DC, October 2007, pp. 93-94; *DefenseTalk*, "Egypt's Secret Nuclear Weapons Program," March 13, 2011, available at <http://www.defencetalk.com/forums/missiles-wmds/egypts-secret-nuclear-weapons-program-11038/>; Rafael Ofek, "Egypt's Nuclear Dreams," *IsraelDefense*, February 11, 2013, available at <http://www.israeldefense.co.il/en/content/egypts-nuclear-dreams>; and Bruno Tertrais, "Alternative Proliferation Futures for North Africa," in *The Next Arms Race*, pp. 205-38, available at http://npolicy.org/books/Next_Arms_Race/Ch7_Tertrais.pdf.

India also enrolled more Indian students in US Atomic Energy Commission-sponsored nuclear instruction under the Atoms for Peace Program than any other country other than the UK. The US sold India two light water reactors that were completed in the late 1960s in hopes that this would secure an important emerging nuclear power market and shape Indian attitudes toward nonproliferation. As subsequent events and the 1974 test demonstrated, these hopes were misguided.

As for the 2008 US-Indian civilian nuclear cooperative agreement, this too was driven in large part by promises of US nuclear jobs and exports. A darker, unspoken official rationale was that the deal would be useful to bring India into America's strategic orbit and enable it to restrain a rising nuclear-armed China. There even was talk that the deal would help promote nonproliferation. None of this has yet worked out. In fact, the current Republican chairman of the Senate Foreign Relations Committee recently said that his vote in favor of the deal was a "mistake;" that although the deal was driven by commercial considerations, it had produced little for the US and had only served to undermine international nuclear restraint.⁴

As for Russian and Chinese civilian nuclear exports, we need only consider how they have benefited the nuclear weapons related efforts of Pakistan, North Korea, and Iran and may yet do so in the case of prospective exports to Saudi Arabia, Turkey, Egypt and Algeria.

None of this is to argue that commercial nuclear activities dictate risky nuclear exports. They do not. But with tight nuclear markets for expensive nuclear activities, they are more likely: Governments engage in such commerce not only to make up for commercial losses at home, but to achieve temporary diplomatic advantages (e.g., improving relations with some other state) that frequently undermine international security. Not infrequently (as with the US-India deal) such diplomatic arguments are offered to help justify one or another nuclear sale.

The band aid most frequently employed to mask this risks associated with such sales, of course, is international nuclear safeguards. Properly understood and employed against certain nuclear facilities and materials, these nuclear inspection procedures can and do afford timely warning and detection of possible military nuclear diversions (i.e., detection early enough to allow outside authorities to act in time to prevent the diversion from ever producing nuclear warheads).

The problem is that these inspection procedures cannot afford timely warning in every case. With large power reactors, which can produce reactor-grade plutonium, weapons-grade plutonium, and tritium, one must be certain that there is no way that fresh or spent reactor fuel can be recycled or enriched to produce nuclear explosive uranium or plutonium and that

4. See Hearing of the Senate Foreign Relations Committee, "Reviewing the Civil Nuclear Agreement with South Korea," October 1, 2015, available at <http://www.foreign.senate.gov/hearings/reviewing-the-civil-nuclear-agreement-with-the-republic-of-korea-09302015>.

tritium is not being extracted.⁵ If there is any chance that an overt or covert facility could process such materials, timely detection and warning of a possible military diversion may not be possible. As for nuclear plants that process tons of enriched uranium or separated plutonium in liquid, gaseous, power or even solid forms, international inspections most often can only confirm significant diversions well *after* they occur—i.e., past the time needed to make a bomb. As for the ability of current inspection procedures to detect covert nuclear facilities, recent experience in Syria, Iran, and Iraq are cautionary tales.

Rather than encourage candor and prudence regarding these unpleasant realities, there is a tendency to be gloss over them. We should be encouraging international nuclear inspectors to distinguish between those nuclear activities and materials that they can adequately safeguard against possible military diversions with timely detection and warning, and those for which they cannot (i.e., for which they can only monitor to possibly detect possible military diversions after they occur). Instead, in the name of nuclear promotion (to assure a prospective nuclear export to a dubious end user), there is an all too strong temptation to deny their salience.⁶

This brings us to the second proliferation risk Australia must consider if it gets into nuclear activities that clearly require government subsidies and that is the example it will set. If, for whatever reason, Australia decides to lend government support for uneconomical nuclear activities such as spent fuel recycling or nuclear power production, presumably other countries, including those that have no sound economic rationale to pursue nuclear energy development

5. There has long been a debate about the military utility of reactor-grade plutonium. The latest brief by a weapons designer at Lawrence Livermore suggests the utility is all too high. Also, with the spread of fission boosting technology, the distinction between reactor and weapons grade plutonium all but vanishes. See Bruce Goodwin, "Reactor Plutonium Utility in Nuclear Explosives," brief given before a meeting at the New Diplomacy Initiative, Tokyo, Japan, November 6, 2015, available at http://www.npolicy.org/article_file/Goodwin_Reactor-Plutonium-Utility.pdf and Victor Gilinsky and Henry Sokolski, "The Other Dangers from That North Korean Nuclear Test," *The Wall Street Journal*, January 19, 2016, available at <http://npolicy.org/article.php?aid=1304&rid=2>.

6. See Victor Gilinsky and Henry Sokolski, "Is the IAEA's Safeguards Strategic Plan Sufficient?" Paper presented at the IAEA Symposium on International Safeguards, "Linking Strategy, Implementation and People," held in Vienna, Austria, October 22, 2014, available at http://npolicy.org/article_file/IAEA_Safeguard_Strategic_Plan.pdf; "Nuclear Safeguards: In Pursuit of the Undoable: Troubling Flaws in the World's Nuclear Safeguards," *The Economist*, August 23, 2007, available at <http://www.economist.com/node/968786>; and Henry Sokolski, "Assessing the IAEA's Ability to Verify the NPT," in Henry Sokolski, editor, *Falling Behind: International Scrutiny of the Peaceful Atom* (Carlisle, PA: Strategic Studies Institute, 2008), pp. 3-59, available at http://npolicy.org/books/Falling_Behind/Ch1_Sokolski.pdf.

but might harbor an interest in exploiting it later to develop a bomb option, could justify their pursuit of such uneconomic, “peaceful” nuclear activities by pointing to Australia's example. Rebuttable arguments that Australia might make to justify its own subsidies—e.g., that nuclear is the very latest cutting edge technology, that it will produce more jobs than other kinds of energy investments dollar for dollar, that it's absolutely indispensable for energy security even in energy-rich regions and is critical to quickly and cheaply reduce carbon emissions—are likely to be repeated by other states including nuclear weapons proliferators. In this case, Australian officials may find themselves in the awkward position of having to confirm these dubious claims even though this will undermine international security.

All of these points seem soft and of little economic import. They are not. Although nuclear power technology is quite mature, its safety record is mixed. If there were to be another accident like that of Chernobyl or Fukushima or even another Three Mile Island, the value of investments in the nuclear power industry everywhere would take a major hit. Those who invested heavily in nuclear power plants and related services and goods and whose business plans depended on exporting more of these goods and facilities would be in serious trouble. This highlights why it makes sense to invest in nuclear power if it is clear one can make money without exporting or subsidizing it domestically. In this case, even if there was a nuclear accident and one's past investment was reduced or wiped out, one would still likely have had made some money and could close the industry down, if necessary, in an orderly fashion. More important, there would be no additional international security knock-on regrets as a consequence of sales made to others or any imperatives to “save” one's industry by pushing ever more exports to even more marginal customers.

Again, if Australians want to avoid contributing to nuclear weapons proliferation, they would do well not subsidize any additional nuclear activities in any fashion. This includes all “value adding” nuclear activities, such as nuclear enrichment or reprocessing as well as nuclear power production. None of these activities should be pursued unless there is an absolute economic imperative to do so—one that is so clear that these activities can be entirely financed with private monies based on projected cash flows derived exclusively from domestic Australian consumption alone.

I doubt that this standard could be met by most of the additional nuclear activities this commission is currently considering. On the other hand, by promoting this standard and explaining why it is needed to promote nonproliferation, Australia would establish a standard that the whole world would do well to follow. Certainly, more than a few countries, including the US, have historically launched domestic nuclear programs with “limited” subsidies meant only to last for a short while only to find that these subsidies grow in size and duration and ultimately prove to be inadequate. This is where the trouble begins. Where it ends is explosive.