

The People's Republic of China's Short-Term Security in the  
Energy Sector Concerning Foreign Investment in Uranium

James Avery King

Political Science 4213: Chinese Politics

May 5, 2016

There are many variables to factor into the equation of the People's Republic of China's ability to maintain its new stance as a global superpower during the twenty first century. The most critical variable, as is evident through General Secretary Xi Jinping's push toward less pollution in a relatively recent joint agreement with President Barack Obama concerning global climate change, will ultimately be the PRC's ability to successfully import large amounts of uranium sustainably over time. This uranium will go towards fueling the PRC's twelve operational nuclear fission reactors as well as the additional twenty-four fission reactors being built (Sternfield 2010). With the pivot towards nuclear power as an alternative to fossil fuels for powering domestic electrical grids, the PRC is making a gamble that its government and private sector will be able to secure enough contracts to sustain the large investment it has made into this type of infrastructure. This paper will give evidence to the fact that the PRC's investment in foreign depositories of land-based uranium will ultimately result in maintaining its growth in the nuclear power sector for a liberal estimate of 60 years based off of estimates of uranium land deposits. The maintenance of growth can be attributed to the type of nuclear reactor that the PRC has chosen to implement in the near future, the large amount of the resource available in the general vicinity of mainland China, and the relationships that the PRC has cultivated with the governments and companies controlling the export of uranium in the aforementioned geographic locations.

According to world-nuclear, “there are about 440 commercial nuclear power reactors operable in 31 countries, with over 380,000 MW of total capacity” (2016). The website also states that, “about 65 more reactors are under construction” worldwide (2016). With the People’s Republic of China beginning the construction of 24 nuclear reactors in 2009 that means that at least thirty-seven percent, or in fractional representation roughly over one-third, of nuclear reactors being constructed are in mainland China. Eva Sternfield from the EU-China Civil Society Forum states in her article “China Going Nuclear” that in 2009 the PRC “adjusted its energy development plans and aims for a tenfold increase of nuclear capacity by 2020” (2010). Her article also expounded upon the numbers concerning long-term growth in the nuclear sector of the PRC. It stated that mainland China will “aim for a tenfold increase of nuclear capacity from a present 10 GW up to 80 GW by 2020, up to 200 GW by 2030 and up to 400 GW by 2050” (2010). To put this in perspective with the statistics given from the world-nuclear website, the PRC’s 10GW or 10,000 MW output from the nuclear sector accounted for roughly three percent of the total nuclear output when comparing the current total output of nuclear power to that of the mainland China’s output in 2009. There is a very small possibility that the Chinese were able to build even one reactor and have it completely functional in the seven years after this statistic from 2009, so the three percent of total electrical output and the PRC’s proportion of reactors to be built in the near future is a relatively accurate calculation of China’s contribution to the global nuclear energy sector.

It is truly amazing that the PRC plans to more than double the total output of nuclear power for the entire planet by 2050 considering that mainland China currently accounts for the previously mentioned three percent of the current total output of nuclear power. In 2050 the PRC

is setting the goal of having 400GW, or 400,000MW of its electricity generated from its nuclear sector (Sternfield 2010). As of January 2016 there was only roughly 380,000 MW of nuclear output worldwide (2016). It is remarkable that a country can be the victim of two colonial wars, one war and one major genocide of a then totalitarian neighbor, a civil war, several domestic political cleansings, and still be able to now have the liquid capital, resources, and technology to support a doubling of the world's electricity generated from nuclear fission reactors in less than half of a century.

As of March 2016 the PRC has proposed a total of 136 nuclear fission reactors to be built within 15 years and required 6072 tons of uranium to keep the country's current number of reactors online (2016) compared to the 18,214 tons of uranium needed for the United States to maintain its current number of reactors (2016). This means that the PRC only currently needs thirty-three percent, exactly one third, of the amount of uranium that is needed by the United States to maintain the number of reactors that are now on the Chinese power grid. It is more than evident that as the PRC expands its nuclear capacity, and therefore the amount of tons of uranium consumption, it will begin to compete directly and fiercely with the United States of America's private sector for natural depositories of the resource worldwide.

According to Westinghouse's nuclear portion of its website the AP1000 light-water fission reactor produced by the company has "a nominal net electrical output of 1,110 megawatts electric." With a liberal estimate of 24, the amount of reactors currently under construction of the 136 proposed nuclear reactors of the PRC being the AP1000, there will result in a total output of 26,640 MW from these types of reactors alone, roughly over six percent of mainland China's goal for nuclear energy by 2050. If every newly constructed reactor in mainland China was

modeled after Westinghouse's AP1000, Beijing would have to build around 360 of them by 2050 to reach their goal of 400,000 MW of an electrical payload from the nuclear sector. That is equivalent to building ten to eleven reactors every single year for 34 years. The PRC will have to diversify the types of reactors that it will construct in order to meet its goal but this will not be a problem. Due to concepts paralleling Moore's Law in the nuclear technology sector, it is inevitable that both the private manufacturers in the United States and the government-controlled manufacturers of the PRC will optimize a new version of this reactor that has a much larger payload of electricity while using much less uranium.

Foreign markets and investment are necessary for Beijing's demand of uranium ore to fuel its current reactors along with its AP1000 reactors that are under construction (2010). As mentioned in China's forecast scenario for the mining industry from 2007 to 2014, the amount of uranium produced domestically would increase from 750 to only 878 tons (2010). From the estimates of the world nuclear website updated in January of 2016, the PRC needed 6072 tons to keep producing electricity in the nuclear sector. Even if mainland China somehow increased its output to 1,000 tons by 2016, there would still be a dire need for the other 5072 tons from the global market.

As stated in a previous paragraph the PRC wants to double the output of the world's electricity that comes from the nuclear sector by 2050. Currently there is a need for approximately 68,000 tons of uranium to sustain nuclear power worldwide. If Beijing doubles the output worldwide, there will be a need for 136,000 tons of uranium ore by 2050 which could

decrease marginally depending on how many reactors are kept online that are currently running, and increase exponentially if other countries try to keep up with the PRC in the nuclear sector.

There are many countries that are relatively close to the PRC that have an ample supply of natural uranium depositories to keep Beijing's nuclear sector online and fueled. According to the website [world-nuclear.org](http://world-nuclear.org), the PRC is included in countries that house the top 16 largest natural deposits of uranium worldwide (2015). Beijing is also close to two countries in Central Asia, Mongolia, the Russian Federation, and the largest natural deposit of uranium worldwide, Australia. Although it has the most uranium, Australia's deposits are not as pure and therefore do not have as high of a yield in electricity as Canada's. Canada has the fourth largest natural deposit of the ore and is the direct neighbor of the United States (2016). The PRC, with itself and five other neighbors on the twelve largest deposits lists, will be competing with the United States' ten of the sixteen largest natural depositories, plus or minus Australia. In terms of the total percentage of worldwide deposits, it is approximately 43.5 percent leaning towards Beijing and around 55.5 percent leaning towards Washington if Australia's deposits are divided in half, Beijing works out deals for all or its regional neighbor's ore, and the rest of the world works out deals with the USA. This means that the PRC is going to have to give out some serious aid packages, sweeten loan interest rates, and pull out all stops diplomatically to compete in the long game with the United States.

The most immediate necessity for Beijing is to court the Australian government and lobby for the availability of the lands of the Maori people, aboriginal Australians, to be mined by foreign companies. This is a very controversial issue in Australia at the moment and will take a very delicate touch to make the situation favorable for the Chinese, but it is also a double-edged

sword. By opening the Maori lands for foreign mining companies Beijing would have to deal with the new threat of being outbid by American companies for the 1,706,100 tons of uranium available in Australia (2015).

Second to the issue of courting Australia would be cultivating a lasting friendship with the government of Kazakhstan. Kazakhstan houses the second-largest deposit of uranium with 679,300 natural tons of its ore. General Secretary Xi has begun to lay the groundwork for this lasting friendship by visiting Kazakhstan's capital and announcing the concept of the new "one belt, one road" policy while on this visit. Kazakhstan will be an integral part of the new Silk Road initiative not only through its geographic location but also through its abundant deposits of natural resources.

The final priority of Beijing should be to ease tensions with the Russian Federation in order to gain access of the 505,900 tons of naturally deposited uranium ore in the country. This amount is roughly nine percent of the total deposits worldwide, and would greatly help the PRC to sustain its growth in the nuclear sector. Russia not only has natural deposits, but a large stockpile of nuclear weapons from the cold war that could be refined into fuel for reactors. This would be a considerable trade victory for mainland China and would help to make sure that the country is able to obtain its objective of 400,000 MW by 2050.

In total, there are 5,902,500 tons of natural uranium ore present on the land of planet Earth. If consumption remained at 68,000 tons a year for 34 years until 2050, this would consume a little over 2.3 million of the 5.9 million tons, leaving approximately 3,590,500 tons available. If the rate of consumption doubles, as the PRC has said it would, during this year and

does not increase, there would be enough uranium ore to power the world's reactors for around 26 years. So, using liberal estimates of consumption, the power source of nuclear fission reactors will be able to produce electricity for another 60 years.

The arbiter of all uranium ore deals for the People's Republic of China is the China National Nuclear Corporation. This corporation has been working on securing deals with the different mining companies of Australia in recent years. An example of this would be the 2007 deal that the CNNC made with PepinNini Mineral Ltd. for stakes in the Mount Victoria and Crocker Well deposits in South Australia (February 2007). The PRC's CNNC has also been courting companies and government agencies in Kazakhstan. This is evident in the 2007 press release from China Energy Newswire concerning Kazatamoprom, Kazakhstan's main source of uranium ore trade deals (2007). In the press release, the author Terry Wang states, "The president of Kazakhstan's state-run nuclear power company Kazatomprom has revealed that the company intends to swap some of its shares in a uranium mine in exchange for stakes in Chinese nuclear power projects" (November 2007). These press releases give credit to the fact that the Chinese National Nuclear Corporation has been strategically aligning itself with the companies and governments that control uranium ore in some of the largest deposits worldwide.

Like all natural resources, uranium ore only exists until the governments and corporations of the world mine all of it from the earth and use it for fuel. It is finite and will only be around for a finite duration of time with regard to the current consumption and growth of consumption in the future. The People's Republic of China is undertaking a noble cause to transition its energy sector from being dependent on fossil fuels to embracing the concept of clean energy through nuclear power. However, the PRC will only be able to sustain its growth in the nuclear



sector based on naturally occurring land deposits for a liberal estimate of 60 years. Although it has made an effort to implement the latest nuclear technology in the form of the Westinghouse's AP1000 light-water reactor, embraced regional neighbors whose geographic locations have been favorable geologically for the natural conception of uranium ore, and cultivated trade deals with these neighbors to ensure that there is an abundance of the ore domestically, the PRC will ultimately have to face the facts. There is only 60 years' worth of uranium deposited organically on the land of planet Earth with regard to current rates of consumption and predictions for the consumption's growth. If a country with enough liquid capital readily available as the People's Republic of China were to divert its current investment in the finite resource of uranium to more advanced methods of procuring electricity, such as the gravitational device made by Nikola Tesla or the concept of nuclear fusion that is being researched currently by people like Dr. Weston Stacey at the Georgia Institute of Technology, then there would be a possibly infinite amount of time that the country could sustain itself. Until this is realized, money will continue to be exchanged for finite resources to continue a finite system of governance for a finite amount of time. Without this realization all countries, not just the PRC, will be subject on a long enough time scale to extinction due to the lack of resources needed for power grids. As a species, we are racing towards another Dark Age by pursuing resources that pollute our home, accelerate the process of global warming, and will eventually cease to exist on our planet. There must be a major breakthrough in the energy sector if any government, including the People's Republic of China, wishes to continue its sovereignty, economic growth, and support a productive populace that will ensure the evolution and livelihood of generations to come.

Works Cited

2007. "CNNC and Sinosteel Sign Australian Uranium Deal" *China Energy Newswire* (February): 1. Academic Search Interfax News Agency (May 5, 2016).
2007. "Kazakhstan to Exchange Uranium Mine Shares for Stakes in Chinese Nuclear Power Projects" *China Energy Newswire* (November): 1-2. Academic Search Interfax News Agency (May 5, 2016).

2010. "China's Forecast Scenario" *China Mining Report* (Quarter 4): 51-53. Academic Search Business Monitor International Ltd (May 5, 2016).

2015. "Supply of Uranium" *World Nuclear Association*.

<http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/uranium-resources/supply-of-uranium.aspx> (May 5, 2016).

2016. "Nuclear Power in the World Today" *World Nuclear Association*.

<http://www.world-nuclear.org/information-library/current-and-future-generation/nuclear-power-in-the-world-today.aspx> (May 5, 2016).

2016. "Overview" *Westinghouse Electric Company LLC*.

<http://www.westinghousenuclear.com/New-Plants/AP1000-PWR/Overview> (May 5, 2016).

Burtless, Gary. 2004. "The Labor Force Status of Mothers Who Are Most Likely to Receive Welfare: Changes Following Reform." *The Brookings Institution*.

<http://www.brookings.edu/views/oped/burtless/20040330.htm> (April 10, 2005).

Sternfield, Eva. 2010 "China Going Nuclear" *EU-China Civil Society Forum* 14 (November): 1-12. Academic Search Hintergrundinformationen (May 5, 2016).