THE LWR PROVISION AND THE NORTH KOREAN NUCLEAR CRISIS: A CHINESE PERSPECTIVE

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ABSTRACT

The provision of the light-water reactor (LWR) has been an outstanding issue during the six-party talks aimed at resolving the North Korean nuclear crisis. While the other parties expressed their respect for North Korea regaining its sovereign right to acquire LWR technology in the September 2005 Joint Statement of Principles to denuclearize North Korea, the subject of the LWR provision will be "discussed" at "an appropriate time"—which is subject to different interpretations. Just after the Joint Statement was issued, Washington implied it would "discuss" the LWR subject only after Pyongyang denuclearization which could mean never reaching a provision on the LWR. Pyongyang, however, demands that the LWR provision should be undertaken before any disarmament. This LWR issue would continue to be a big obstacle in the coming six-party talks. In this paper I will first examine what Pyongyang's motivations are for demanding an LWR provision, taking into account security concerns, political imperatives, and energy security. I will then explore how the six-party talks should resolve the issue of LWR provision and thus negotiate a way out of this nuclear crisis.

INTRODUCTION

Once again the six-party talks aimed at resolving the North Korean nuclear crisis have hit a snag. Although a breakthrough statement of principles was produced last September, Pyongyang has walked away from negotiations in response to Washington's recent financial crackdown on counterfeiting and money laundering issues, which Pyongyang perceives as an effort to topple its regime. Meanwhile, North Korea continues unhindered in its pursuit of a nuclear deterrent. The longer negotiations are stalled, the greater North Korea's nuclear capability and the higher the stakes for giving it up. Therefore, it is imperative that negotiations resume immediately on denuclearization. It can be expected that to negotiate a way out of the current nuclear crisis, the six- party talks will have to resolve in the coming talks the outstanding issues including the LWR provision, HEU program, verification, and timing and sequence of North Korean denuclearization for implementing the agreement of Joint Statement.

The LWR provision has been an outstanding issue during the six-party talks. While the other parties expressed in the Joint Statement their respect for North Korea regaining its sovereign right to acquire LWR technology, the subject of the LWR provision will be "discussed" at "an appropriate time"—which is subject to different interpretations. Just after the

Joint Statement was issued, Washington implied it would "discuss" the LWR subject only after Pyongyang denuclearization, which could mean never reaching a provision on the LWR. As Secretary of State Condoleeza Rice stated, "When the North Koreans have dismantled their nuclear weapons and other nuclear programs verifiably and are indeed nuclear-free, I suppose we can discuss anything." However, Pyongyang responded that the U.S. should not even dream of the issue of DPRK's dismantlement of its nuclear deterrent before providing LWRs – a physical guarantee for confidence-building. Thus, Pyongyang demands that the LWR provision should be undertaken before any disarmament. In practice, recently the U.S. and its partners have formally terminated the KEDO project to build two LWRs for North Korea as part of the 1994 Agreed Framework. It is expected that the LWR provision would continue to be a big issue in the coming talks.

NORTH KOREAN MOTIVATIONS FOR THE LWR PROVISION

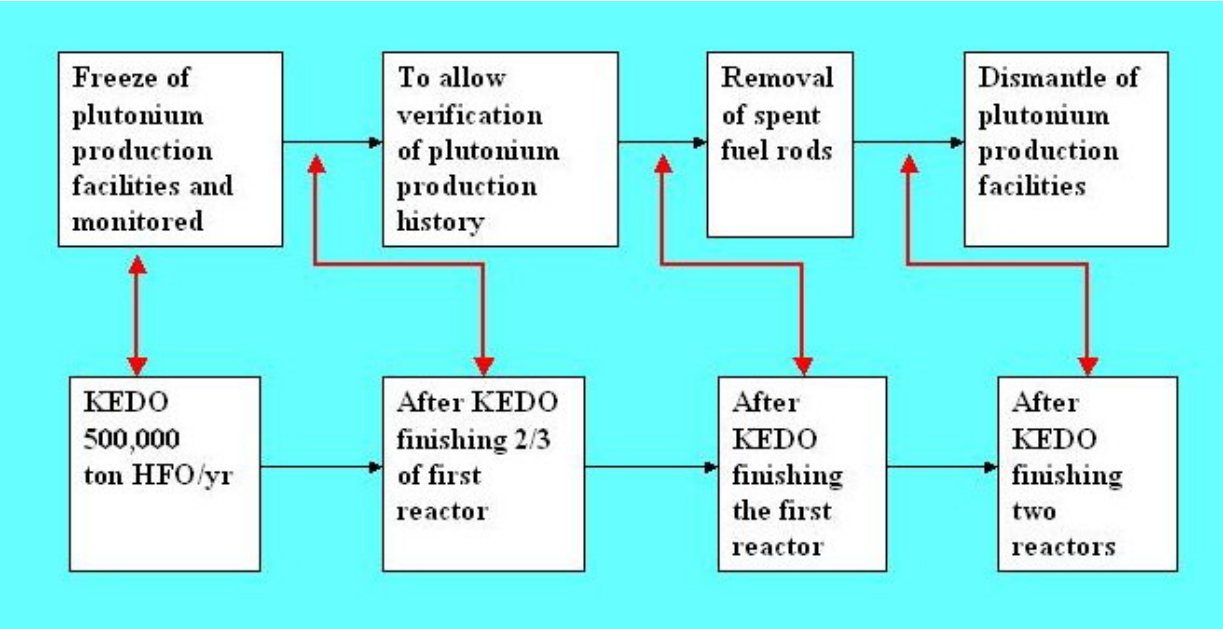
What motivates Pyongyang to demand a LWR provision? I will examine what Pyongyang's motivations are for demanding the LWR provision, taking into account security concerns, political imperatives, and energy security.

Building trust through deeds. Given the long history of deep mistrust and animosity between Washington and Pyongyang, Pyongyang is concerned that the U.S. will not live up to its pledge of security assurance once it gives up its nuclear deterrence. Pyongyang wants to use the LWR as a tangible measure to build mutual trust with Washington. As its Foreign Affairs Ministry emphasized, "In order to recover relations of trust between DPRK and U.S., the U.S. should show its intent to turn words into actions. The physical foundation of consolidating trust between our nations is a light water reactor."

Moreover, Pyongyang hopes to have a special interaction with Washington during its disarmament procedure through a linkage between the LWR provision and nuclear dismantlement as it did in the 1994 Agreed Framework, which used the LWR to schedule the timing several matters including IAEA inspection at two suspect waste sites, the removal of spent fuels and the dismantlement of nuclear facilities (see fig.1).

Political imperatives. Pyongyang argues that the LWR provision was already agreed upon in the 1994 Agreed Framework, so why not this time? North Korea is not a defeated country, and both South Korea and Japan have large civilian nuclear programs, why does North Korea not have the right for nuclear energy? The Joint Statement stated, "The DPRK and the United States undertook to respect each other's sovereignty." From the Pyongyang perspective, a sovereign nation has a right to peaceful nuclear energy. Thus, Pyongyang wants to use the LWR provision to force the U.S. to show its serious commitment to recognizing North Korea's sovereignty. Also, Pyongyang wants to use the LWR provision to test whether Washington has the political will to give up its hostile policy.

Fig.1: 1994 Agreed Framework: Using the LWRs to control North Korean nuclear dismantlement



Energy security. Pyongyang is also concerned about its energy security. North Korean fossil fuel resource, as in the South, is very limited-- " no oil, no gas, very limited coal." However, North Korea has plenty of natural uranium which could supply its nuclear power for hundreds of years. Pyongyang wants to develop nuclear power in its energy mix to increase its energy security (see a detailed discussion in the next section). In addition, North Korea has trained over 7000 nuclear technicians over several decades. Pyongyang hopes to rearrange their jobs in the new nuclear power system.

NUCLEAR POWER AND ENERGY SECURITY

North Korea has been facing a huge energy and electricity shortage for over a decade and this has constrained its economic development. In particular, the electricity shortage contributed to worsened food shortages which in turn caused the massive famines of the mid-1990s. North Korea relies mainly on two domestic energy resources: coal and hydropower. For example, coal accounted for about 86% of the country's primary energy consumption in 2001.[1] North Korea had a total installed generating capacity of 8-10 gigawatts in 1990 (coal-fired thermal plants and hydroelectric plants accounted for nearly half respectively). However, the coal-fired generation has decreased due to a reduction in coal production caused by flood damage and a lack of electricity. Also hydropower is damaged by flooding, the low water level of reservoirs, and the aged power system. Moreover, many of its transmission and distribution (T&D) systems are also beyond their life times and outdated. It is estimated that the current total operable generation capacity is only about 1-3 gigawatts [2](coal-fired thermal plants account for about one third and hydroelectric plants account for about two third).

North Korean energy experts have explicitly stated that the main path to ensure the long term energy security in the DPRK is to realize the diversification of the energy resource use, while gradually decreasing the coal share in the total primary energy. As they mentioned, "to ensure the long-term security of energy in the future, our country will promote the exploration and development of crude oil and build nuclear power plants based on the abundant uranium resource to gradually raise the share of nuclear power generation in the production of electricity. And our country will develop, introduce and extend new and renewable energy technologies including wind, solar and biomass energy, co-generation and fuel cells. In addition, we will further our efforts to bring natural gas to our country under the regional and international support." [3]

North Korean energy experts hope to take a similar course as South Korea and Japan. North Korea, as the South and Japan, has a very limited domestic fossil fuel resource (see table1). For example, North Korea has "no oil and no gas." Its recoverable reserved coal could only supply a coal-fired power generation system with a capacity of 4 GWe for about 10 years. However, North Korea has plenty of natural uranium. North Korea is reported to have approximately known natural uranium 300,000 Mt.[4] And its speculative uranium was reported about 4 million Mt.[5] If we assume North Korea has a nuclear capacity of 6 GWe (about 20% of assumed total electricity generation by 2020), then its known uranium would supply such a nuclear power system for around 250 years, and the speculative uranium could supply for several thousand years. It is very different from Iranian case. Iran has plenty of reserved oil and gas (with current production rate, its reserved oil and gas could supply about 88 years and 220 years respectively). But Iran has very limited natural uranium. It is estimated its known uranium could only supply a nuclear power system with capacity of 6 GWe for about 1 year. Even including the speculative uranium, it could only supply for around 12 years.[6] Finally, it should be noted that if North Korea is to have LWRs, it should observe and implement the 1992 joint declaration of the Denuclearization of the Korean Peninsula which requires "no enrichment and reprocessing" on the peninsula. Thus, it needs an outside LEU supply. But, its own natural uranium would be used as a source for the feeds or used to trade for LEU.

Some experts argue that nuclear power is more expensive for North Korea than other forms of generating electricity from coal or other resources. North Korea has no such financial resource to develop such a power system. However, from the Pyongyang perspective, if it gets the LWR for free---as the 1994 Agreed Framework promised, then the cost of nuclear power generation is cheaper than that of coal-fired power. Because the capital costs, which are greater than those for coal, oil or gas-fired plants, contribute much of the nuclear generation cost; the total fuel costs of a nuclear power plant, which are typically cheaper than those of a coal, oil or gas-fired plant, are a minor proportion of total generating costs.

Moreover, South Korea reaffirmed in the Beijing Joint Statement its proposal of 12 July 2005, concerning the provision of 2 million kilowatts of electric power to the DPRK. While the South Korean supply of 2 GWe of electricity is a good move, North Korea does not want this offer to replace the LWR project, which has a greater role. Given its policy of "Juche," or self-reliance, the North does not want its economy depending on electricity from the South.

Table 1: North Korea, South Korea and Japan's Fossil Fuel Resources

		North Korea	South Korea	Japan
COAL	Recoverable Reserves	661Mmst (1999)	86 Mmst (2002)	852 Mmst(2002)
	Production Consumption	105.3 Mmst(2001) 105.2	3.7 Mmst(2002) 79.7 Mmst(2002)	3.3 Mmst 179.1 Mmst
	Reserve/Consumption	~6 yr	~1 yr	~5yr
OIL	Proven	None	None	59 million barrels
	Production Consumption	None 86,000 bbl/d (imported)	None 2.1 million bbl/d (import)	0.12 million bbl/d 5.57 million bbl/d
	Reserve/Consumption	None	None	~10 yr
GAS	Proven	None	None	1.4 Tcf
	Production Consumption	None None	None 816 bcf	0.10 Tcf 2.67 Tcf
	Reserve/Consumption	None	None	~0.5 yr

Source: http://www.eia.doe.gov/emeu/cabs/nkorea2.html

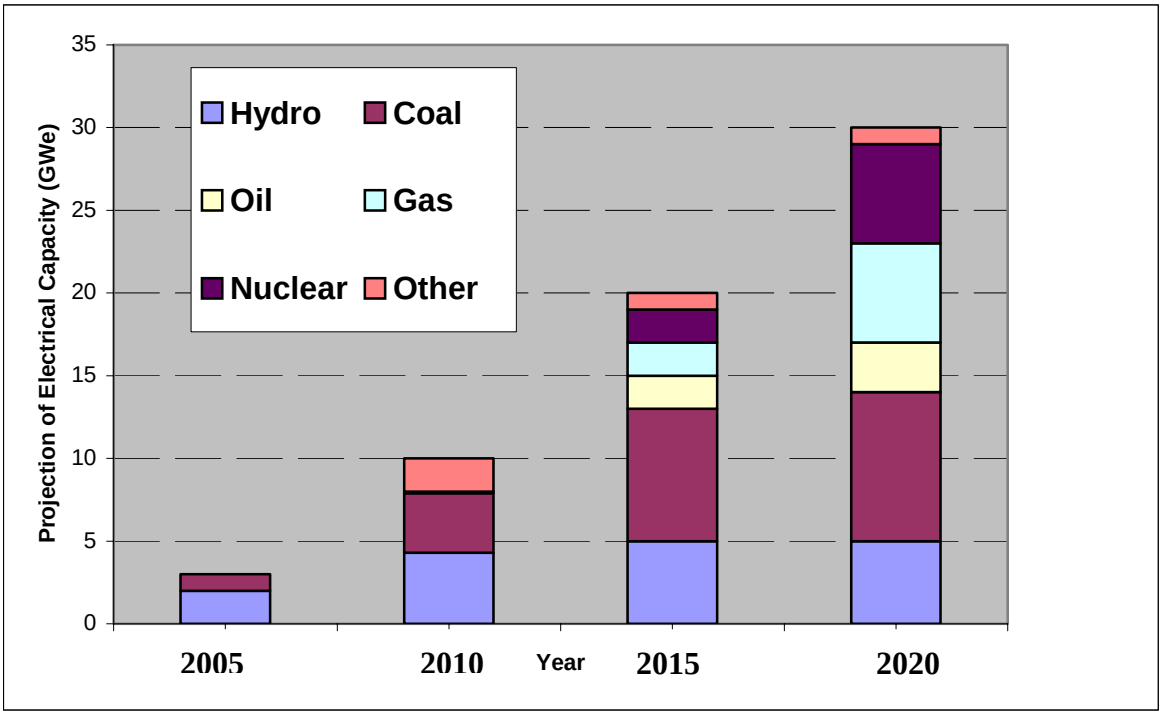
Finally, if North Korea, as its energy experts desire, wants to develop and diversify its electrical generating capacity in the future as South Korea and Japan currently do, how much nuclear power could it develop? As a reference scenario, here I will discuss a projection of electricity generation based on the following assumptions: 1) North Korea currently has a very low electricity consumption per capita –about 570 kwh/capita (for a comparison, South Korean: 5,900 kwh/capita; Japan: 8,200 kwh/capita; U.S.: >14,000 kwh/capita). It is assumed North Korea will arrive at the target of 5,900 kwh/capita (the South's current level) and will have a total installed capacity 30 GWe by 2020 (South Korean current generating capacity is about 60 GWe); 2) North Korea's generating capacity has a mix of resources as shown in table 2, which is similar to the South Korean and Japanese current situations. It is assumed North Korea has a nuclear capacity of 6 GWe (about 20% of its total electricity generation) by 2020. North Korean energy experts proposed that its nuclear power would account for about 17% and 32% of its total installed capacity by 2010 and 2020 respectively;[7] 3) In the near term (say 2007-2010), North Korea will focus on rehabilitating its current energy systems (power stations and T&D systems) into 1990 level. 4) The U.S. would resume shipments of 500,000 tons of heavy fuel oil (HFO) per year, until South Korea begins to supply 2GW of electricity; 5) South Korea would start to

Table 2: Comparison of Electricity Generation: North Korea, South Korea, and Japan

	North Korea (2020)	South Korea (2004)	Japan (2002)
Hydro	17%	6.4%	9 %
Coal	30%	29.1 %	22.2 %
Oil	10%	10.3 %	10.2 %
Gas	20%	26.3 %	26.6 %
Nuclear	20%	27.9 %	31 %

Source: http://www.eia.doe.gov/emeu/cabs/nkorea2.html; Korea Electric Power Corporation, KEPCO in Brief, Dec.31,2004, see website: www.kepco.org.

Fig.2 North Korean Electrical Generation: A Future Scenario



supply its 2 GWe of electricity around 2009 and would end its electricity supply when the LWRs begin operation; 6) After North Korean dismantles its plutonium program (say 3 years), the two LWRs will start construction (around 2009).[8] One could need about 5 years, and another one could take 7 years. Thus, North Korea would have a nuclear capacity of 2 GWe around 2015; 7) North Korea would have gas-fired power stations with a capacity of 2 GWe around 2015, which could be linked to the Russian gas pipeline.[9] Meanwhile, it would have oil-fired power stations of 2 GWe. In addition, it will keep the same level of hydropower from 2015 to 2020. Also its renewable energy (mainly from wind power) would have an installed capacity of 1GWe by 2015. Consequently, we could have a future scenario of North Korean electrical generation by 2020 (as shown in fig.2).

CONCLUSIONS AND SUGGESTIONS

Considering Pyongyang's concerns as discussed above, it is not irrational for North Korean to demand the LWR provision. The U.S. denial of the LWR provision would make North Korean denuclearization too difficult. It is suggested that the U.S. and others should commit to the LWR provision during North Korean denuclearization.

However, the North Korean proposal of demanding "LWR provision before any disarms," as the 1994 Agreed Framework promised, would be not feasible, either. Construction time for a reactor is around seven years, and as shown in the KEDO LWR project, is often delayed. The other countries cannot wait for another ten years. Moreover, there is an urgent need for Pyongyang to rehabilitate its current power stations and transmission and distribution systems. Pyongyang should be flexible about the timing of LWR provision. However, such a flexibility should be traded for U.S. concessions on other benefits, in particular the normalization of relations between Washington and Pyongyang.

What North Korea wants most is for the U.S. to give up its " hostile policy" and provide reliable security assurances, including Pyongyang's highest priority of regime survival. The most tangible and vital security assurance the U.S. can provide is to normalize relations with North Korea as a first step toward integrating it into the international community. Thus, "normalization" is one major step to remove Pyongyang's deep security concerns. Pyongyang will not dismantle its nuclear program without receiving a tangible security assurance and specifically the promise of normalized relations with Washington.

While the Joint Statement stated that both Washington and Pyongyang undertook to " take steps to normalize their relations subject to their respective bilateral policies," the normalization of relations "subject to their respective bilateral policies" is open to interpretation. According to Washington, there will be a long road to normalizing relations with Pyongyang, which will include denuclearization, but also discussions on human rights, biological and chemical weapons, ballistic missile programs, conventional weapons proliferation, and terrorism and other illicit activities. Yet, Pyongyang wants normalization at a much earlier stage—before dismantling its nuclear program and after a freeze.

It can be expected once Pyongyang gets what it has most wanted --“ normalization” and building more trust, the timing of LWR provision would be much more flexible. Thus, the six-party talks should take a strategy of “normalization at an early stage” in exchange for the “LWR provision at a later stage.” For example, it could take three steps to denuclearize North Korea: the first step would focus on a freeze of plutonium production; the second step would dismantle plutonium production facilities, plutonium weapons and associated facilities; and the third step would dismantle the HEU program.[10] In such a roadmap of North Korean denuclearization, Washington should establish normalized relations with Pyongyang when it dismantles its plutonium program at the second step. After North Korea dismantles verifiably its plutonium program, the US and others would start construction of the LWR. Pyongyang would put its nuclear power system under IAEA safeguards and accept the Additional Protocol.

NOTES AND REFERENCES

1 http://www.eia.doe.gov/emeu/cabs/nkorea2.html.
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3 See, e.g. DPRK Delegation, “Options for Rehabilitation of Energy System and Energy Security and Energy Planning in the DPR of Korea,” Asian Energy Security Workshop 2004, Beijing, China, May 12-14, 2004. Available at: http://www.nautilus.org/archives/energy/AES2004Workshop/DPRK.html. Regarding North Korean energy plans, also see: e.g., North Korean Delegation, “Energy Sector Activities and Plans in the DPRK,” Asian Energy Security Workshop 2005, Beijing, China, May 13-16, 2005. Available at: http://www.nautilus.org/aesnet/2005/JUN0805/DPRK.ppt
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8 Here it is suggest to take “plutonium first” approach to denuclearize North Korean. See details in Hui Zhang, “North Korea Denuclearisation: A Chinese View of the Way Forward,” *Disarmament Diplomacy* no. 82 (Spring 2006).
9 One projected pipeline of special interest is the “Sakhalin I” pipeline which would cross directly from Russia through North Korea en rout to South Korea. It is expected such a pipeline would be built within three to four years and cost around $3-3.5 billion. It is estimated that building eight 250MWe gas-fired power stations (i.e. total 2 GWe generation capacity) combined with the small local grids would cost about$ 1.2-1.36 billion. See details in Selig Harrison, “Gas Pipelines and the North Korean Nuclear Crisis,” *Foreign Service Journal*, December 2003.
10 Zhang,“ North Korea Denuclearisation: A Chinese View of the Way Forward,” op.cit.