Nuclear Codependency

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Abstract

The likelihood that North Korea possesses nuclear weapons is a clear and present danger to sustained stability on the Korean peninsula. Unfortunately, the traditional notion of "Atoms for Peace" has been a failure in the engagement of the North. In this brief we outline our proposal for a novel approach to mutual cooperation in energy provision on the Korean peninsula, which is premised on having North Korea, which currently has no existing capabilities for nuclear energy generation, host reactors that deliver energy to South Korea. This arrangement is stable and sustainable, in the sense that it allows for a scenario where the North never finds it in its interest to disrupt energy supplies to the South, and where the South is willing to pay the fixed costs of nuclear plant construction, in exchange for a discounted stream of energy supply from the North. Policy implications of this proposal are then considered.

The notion of using economic incentives to forward the goal of nonproliferation probably dates back to the "Atoms for Peace" speech by Dwight D. Eisenhower in 1953 (Eisenhower 1953). The plan envisioned peaceful uses for nuclear technology, involving the transfer of technical know-how concerning nuclear energy production from existing nuclear states to nonnuclear states, in exchange for a commitment to relinquish indigenous efforts to develop such technology. The underlying motivation of the proposal, of course, was to discourage the possibility of nuclear weapons proliferation.

Unfortunately, insofar as North Korea has been concerned, the program has not lived up to expectations: Indeed, North Korea arguably exploited the technology transfer inherent in the program to develop their own nuclear capabilities in the first place. The October 2006 test was a signal of how the development

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of usable nuclear weapons is well within the realm of possibility for North Korea. Coupled with existing military intelligence about North Korean weapons delivery capabilities, the need to reenvision the traditional notion of Atoms for Peace becomes more important than ever.

Recent developments in the six-party talks, unfortunately, have failed to emphasize the centrality of resolving the economic incentive problem. Among the major stumbling blocks was the important issue of energy provision to the North; in particular, this involved the sequencing of denuclearization vis-à-vis energy aid (Yardley & Sanger 2007). Pyongyang had insisted on energy delivery before denuclearization, regarding nuclear capability as the only bargaining chip that brought the rest of the world to the dealing table; other parties, however, were understandably reluctant to reprise the 1994 agreement, when backloaded weapons shipments allowed the North to convert much of its spent nuclear fuel into weaponizable material. Ultimately, the agreement settled on the promise of the delivery of a "modest" amount of heavy fuel oil, with the issue of the abandonment of the Yongbyon nuclear facility left largely untouched (Cooper & Yardley 2007). Even with the closing of the Yongbyon facility, the failure to carefully address the economic incentive issues, however, is an open invitation for yet another failed round, and any concluded nuclear deals (Bowley & Cooper 2007) continue to run the risk of reneging down the road.

Our suggestion here is that an alternative approach exists to ensure mutual cooperation in energy provision between interdependent states. In particular, our proposal turns Atoms for Peace on its head by suggesting an arrangement where North Korea—which currently has no existing capabilities for nuclear energy generation—host reactors that deliver energy to South Korea. This has the potential to address two concomitant problems: The fear experienced by the North that the South would threaten its energy independence were the reactors be located in the South, and the need by the South to be assured that the North will not engage in weapons production, while also satisfying its growing energy needs at the minimum cost.

Contrary to the more conventional proposal of locating reactors in the South for transmission of energy to the North, this approach is more stable in the long run, since it is compatible with both the incentives of both the North and South.

Why is this the case? Consider the following setup, which is a fair representation of reality. Both North and South Korea have energy needs, but the South's needs exceeds its current capacity for new plant construction. Moreover, while energy generation is possible in either country, the higher price of inputs in the South means that it is more economical to generate energy in the North. At the same time, the impoverished North, despite of its cost advantages, does not possess sufficient capital to build additional nuclear power plants on its own. In effect, each country faces a distinct set of choices: The South has to make its optimal decision on whether to make new investments in power plants located in the North, or to ramp up energy production in its existing plants (which may itself be subject to capacity constraints); while the North decides on whether to devote its resources toward energy production or weapons development. The amount of energy ultimately generated, of course, must be sufficient to meet its

own needs, as well as have enough left over for transfer to the South.

Given this simple framework, it is possible to find scenarios where the North never finds it in its interest to disrupt energy supplies to the South, and where the South is willing to pay the fixed costs of nuclear plant construction, in exchange for a discounted stream of energy supply from the North. The arrangement is one of energy codependency, and this codependency is the guarantee of cooperation.

What kinds of conditions must be satisfied for such scenarios to arise? While a full accounting of the actual conditions are technical and of interest only to specialists, it is possible to provide an intuitive description of the main moving parts.

First, we require the share of energy produced by the North that is earmarked for delivery to the South not be unreasonably large. This makes sense: After all, if the North receives only a small share of the energy pie, it may view the deal as unfair, and hence prefer not to partake altogether. Moreover, a small benefit received in each period raises the possibility that it will be tempted to renege, since its perceived benefits from cooperation are so small.

Second, the preferences of the North for weapons production must not be too overwhelming. If the desire for nuclear weapons—whether it be for international prestige, psychological fulfillment, or personal fetish—is driving, then no amount of economic incentive can be sufficient to deter its construction. On this point, we remain guardedly optimistic that nuclear weapons are for Kim Jong Il ultimately a means to an end, with the end being that of regime preservation. Hence, whether this goal is ultimately met by the actual acquisition of nuclear weapons, or by enhancing the economic conditions of the country, is irrelevant.

Of course, we are aware that not everyone will agree with this particular view of Kim's rationality. There is an alternative way, however, to meet this second condition. If the cost of weapons relative to energy production can be made prohibitively high, the condition will also be satisfied. This is where advances in nuclear power plant design can make a difference. Recent work in compact liquid metal reactor technology offers promise of largely tamper-proof reactors (Kim, Fahlen & Lyles 2007). Even if the design fails to be completely foolproof, the ability to sufficiently raise the cost of acquiring nuclear raw material for the purposes of enrichment may be enough to deter such action in the first place.

Another way to think of this solution is that we need to *lower* the cost of energy relative to weapons production. This suggests an almost paradoxical possibility: If South Korea—or any other interested party such as the United States or Japan—can somehow subsidize energy production in the North, the codependent relationship can be sustained indefinitely. Of course, if South Korea is the source of the subsidy, then this must be set against the consideration of whether this subsidy alters the cost-benefit ratio of investment in the North to begin with. Nonetheless, the scheme does place the more recent calls for increased energy aid to the North in clearer context: The goal of aid, then, is not so much to offer Pyongyang a free ride, but to instead generate conditions that ensure that the system continues to operate as planned.

What prevents the North from exploiting the setup and diverting the South's

investment toward weapons production? While this is certainly a possibility, we can safely rule out this action in the stable system. Why? For the North to choose weapons production, it would mean that, at some point in the future, it must effectively choose nondelivery. This would then cause the entire arrangement to unwind, with no agreement to begin with. However, if the initial conditions for the agreement are to be fulfilled, this means that the South must already have taken this possibility into consideration. We can therefore safely rule out any deviations from this outcome.

One important objection to our setup thus far is that it essentially ignores the presence of interested third parties—international or regional players such as the United States or Japan. Thankfully, the framework outlined above can be easily extended to include the presence of such an external party. To do so, we postulate a third party with an interest in successful cooperation between the North and South. We can construe such benefits as arising from either pecuniary sources—such as increased trade flows with the region—or nonpecuniary sources, such as an enhanced sense of peace and security. Since this third party can potentially realize greater welfare when there is successful cooperation, it will take steps to actively ensure that this is the case. Specifically, it can make a small transfer to the North that burnishes its willingness to stick to the agreement.

What form will such a transfer take? Of course, outright income transfers to a vilified North Korea are likely to face significant political opposition at home. However, indirect transfer mechanisms may exist. For example, we can view the decision of the United States to release $25 million North Korean funds from a bank in Macao (Choe 2007) as a form of indirect transfer. The fact that the North subsequently agreed to shut down its main nuclear plant is an indication that such transfers can and do make a difference to bringing about mutually beneficial North-South cooperation.

A major advantage of our approach here is that it sidesteps the tricky issue of sequencing and energy aid. Since our proposal sets up nuclear energy production as a rational substitute for weapons production, there is no immediate need for delivery of alternative energy, since the plan would endow North Korea with the ability to choose energy production to satisfy its needs. In addition, the plan only requires that centrifuge facilities, instead of all nuclear facilities, be shut down.

While longer-term denuclearization in the context of the NPT regime is desirable for both North Korea and the world at large, we regard this goal as an extended diplomatic effort that is distinct from energy codependency. Indeed, the greater normalization of relations between the DPRK and the ROK through energy codependence may serve as a stepping stone that enhances the prospects of such longer run goals.

Can such a scheme possibly succeed in practice? As is the case so often in the politics of the Korean peninsula, the issues are complex and multifacted, success is dependent on, among other things, enhanced diplomacy (which we address below). We would like to point out, however, that the building blocks for our proposed arrangement are also in place. The South currently has almost $1

billion invested in the construction of two light-water reactors located on North Korea's eastern coast. While this project has been in limbo since late 2003—in part due to the opposition of the United States—there is clearly a precedence for Southern-sponsored civilian nuclear facilities hosted in the North.

The security dilemma on the Korean peninsula is stronger than perhaps anywhere else on the globe—years of mistrust, failed peace initiatives, and the potential for devastating attacks from either side have worked their toll. While sustainable cooperation will be difficult, we consider this arrangement as one that is well within the interests of both sides, and success in this area could potentially open the door to additional future cooperation in others.

References

Bowley, Graham & Helene Cooper (2007). "Nuclear Deal Reached With North Korea". *The New York Times* October 4: A1

Choe, Sang-Hun (2007). "North Korea Receives Funds and Says It Will Shut Down Its Main Nuclear Reactor". *The New York Times* June 26: A10

Cooper, Helene & Jim Yardley (2007). "Pact With North Korea Draws Fire From a Wide Range of Critics in U.S." *The New York Times* February 14: A10

Eisenhower, Dwight D. (1953). "Atoms for Peace". *Address to 470th Plenary Meeting of the United Nations General Assembly* December 8

Kim, Lance, Jay Fahlen & Bethany Lyles (2007). "A Return to Atoms for Peace: Provision of an Experimental Compact Liquid Metal Fast Reactor to North Korea". *Journal of Nuclear Materials Management* 36(1) (Fall): 39–51

Yardley, Jim & David E. Sanger (2007). "Nuclear Talks on North Korea Hit Roadblock". *The New York Times* February 12: A1, A11