


ARTICLE

The Peaceful Origins of North Korea's Nuclear Programme in the Cold War Period, 1945–1965

Donghyun Woo 

Department of Asian Languages and Cultures, University of California, Los Angeles, USA
Email: dhwoo1234@gmail.com

Abstract

Was Kim Il-sung's desire to have nuclear weapons the sole reason for North Korea's quest for nuclear power? The answer, I argue, is highly unlikely given that extensive economic considerations played the most fundamental role in North Korea's pursuit of atomic energy from 1945 to 1965. With original, creative research on previously unexamined North Korean publications and Soviet archival materials, I demonstrate how the 'peaceful' impetus steered North Korea's early nuclear enterprises in the Cold War period. While previous studies draw *only* upon circumstantial evidence to argue that North Korea's going nuclear was predestined due to its security concerns, this article revises this teleological assumption by reconstructing historical contexts wherein the two driving factors that formed early North Korea's nuclear programme were mostly emulating how the Soviets harnessed nuclear power for economic gain, and aversion to the Americans' use of nuclear power for atomic weapons to a lesser degree. That is, North Korea, like other countries in what later would be termed the Global South, sought to master nuclear technology for industrial ends in the first place, which turned out to be economically burdensome to continue, long before September 1965 when its first research reactor went online.

On 9 September 1958, an exhibition about the Peaceful Use of Atomic Energy in the Soviet Union opened in Pyongyang. Over 120,000 citizens of the Democratic People's Republic of Korea (DPRK, North Korea) saw the Soviet Peaceful Atoms display in the capital city. Physicist To Sang-rok, later considered the 'father of North Korean nuclear physics', stated in the country's most influential newspaper *Rodong Shinmun* that the exhibition enabled North Koreans to apply nuclear technology to the management of a planned economy.¹ In 1959, the Soviet Union promised to offer technical assistance for the peaceful application of nuclear energy to North Korea, which led to the creation of the

¹ *Rodong Shinmun*, 24 Oct. 1958.

infamous Yongbyon Nuclear Scientific Research Centre with an IRT-2000 research reactor operational in 1965.² In the first North Korean nuclear ‘crisis’ in the early 1990s, this centre became one of the most well-known nuclear facilities in the world, briefly becoming a target of the United States (US) consideration for air strikes.³ All the while, North Korea in the post-war 1950s and 1960s suffered from a general lack of consumer goods, houses, medicines, and foreign currency. How did a poverty-stricken country with very few specialists and even fewer physicists become a nuclear state from 1945 to 1965? What was the main reason that initially drove North Korea to join in the global proliferation of peaceful nuclear technology in the 1950s and 1960s?

Compared with scholarly attention paid to the ‘peaceful’ nuclear programme of the Republic of Korea (South Korea),⁴ North Korea’s similar quest has been studied only partially with a sole emphasis on its military aspect. Academic works that trace the history of North Korea’s nuclear programme focus exclusively on security issues.⁵ While this approach is valid to a degree,⁶ it attributes North Korea’s nuclear activities only to its leadership’s perceived insecurity, fuelling the conventional wisdom that Kim Il-sung was *always* eager to build its own bombs. Drawing *only* upon circumstantial evidence, moreover, previous studies assume that North Korea’s future proliferation actions were predestined, without examining how North Koreans understood nuclear power. Korean and Russian scholars pen similar security-centred, teleological accounts.⁷ This prevailing viewpoint is one of the best examples, as Itty Abraham criticizes, of how a dominant ‘discourse of control’ that seeks ‘to predict which countries are likely to build nuclear weapons’ narrows our comprehension of multifaceted nuclear histories.⁸

This article offers an original narrative that extensive economic considerations steered North Korea’s quest for nuclear power from the beginning, while

² Georgiy Kurov, ‘A technical history of Soviet–North Korean nuclear relations’, in James Moltz and Alexandre Mansourov, eds., *The North Korean nuclear program: security, strategy and new perspectives from Russia* (New York, NY, 2000), pp. 15–20.

³ Leon V. Sigal, *Disarming strangers: nuclear diplomacy with North Korea* (Princeton, NJ, 1997).

⁴ Dong-Won Kim, ‘Imaginary savior: the image of the nuclear bomb in Korea’, *Historia Scientiarum*, 19 (2009), pp. 105–18; Sheila Jasanoff and Sang-Hyun Kim, ‘Containing the atom: socio-technical imaginaries and nuclear power in the United States and South Korea’, *Minerva*, 47 (2009), pp. 119–46; John DiMoia, ‘Atoms for sale?: Cold War institution-building and the South Korean atomic energy project, 1945–1965’, *Technology and Culture*, 51 (2010), pp. 589–618.

⁵ Balázs Szalontai and Sergey Radchenko, ‘North Korea’s efforts to acquire nuclear technology and nuclear weapons: evidence from Russian and Hungarian archives’, *Cold War International History Project Working Paper*, 53 (2006); Walter C. Clemens Jr, ‘North Korea’s quest for nuclear weapons: new historical evidence’, *Journal of East Asian Studies*, 10 (2010), pp. 127–54; Vipin Narang, *Seeking the bomb: strategies of nuclear proliferation* (Princeton, NJ, 2022), pp. 224–6.

⁶ Scott D. Sagan, ‘Why do states build nuclear weapons?: three models in search of a bomb’, *International Security*, 21 (1996–7), pp. 54–86.

⁷ Moltz and Mansourov, eds., *The North Korean nuclear program*; Koo Kab-woo, ‘Puk’an ‘haek tamnon’ ūi wŏnhyŏng kwa maŭmch’egye, 1947–1964nyŏn’, *Hyŏndae Pukhan Yŏn’gu*, 17 (2014), pp. 197–250. For a North Korean perspective, see Yi Chŏng-sŏk and Kim Sŏng-su, *21segi ūi haek enerŭgi* (Pyongyang, 2010), pp. 154–67.

⁸ Itty Abraham, ‘The ambivalence of nuclear histories’, *OSIRIS*, 21 (2006), pp. 49–65.

the history of North Korea's weapon programme would remain in a veil for the time being due to the lack of reliable data. Although North Korea had good reasons to pursue nuclear weapons due to insecurity from early on, I argue, security alone cannot adequately explain the country's initial fascination with peaceful atoms, or attempts to apply nuclear technology to industry in the 1940s and 1950s, and its immediate frustration in the early 1960s, the topics of which have never been previously studied. That is, Kim Il-sung's nuclear dream focused on how to make the atom serve for North Korea's industrial economy, not its arsenal, throughout much of the Cold War, which turned out to be financially unpromising by the time the country's first research reactor went online. As for definition of the peaceful nuclear programme, I follow the widely used notion in international nuclear history studies that encompasses industrial applications of isotopes and radiation technologies, nuclear power generation, and detonation of bombs for geoengineering projects, or peaceful nuclear explosion, all of which were originated from, but *not* directly linked to, the weapon programme.⁹

Contributing to a growing body of scholarship that charts the nuclear trajectories of countries in what later would be termed the Global South,¹⁰ I explore how North Korean understanding and expectations of nuclear power were formed from 1945 to 1965,¹¹ arguing that the two driving factors that shaped North Korea's peaceful nuclear programme in the Cold War period were mostly emulating how the Soviets harnessed nuclear power for economic gain, and aversion to the Americans' use of nuclear power for atomic weapons to a lesser degree. In addition, historical particularities existed, which made North Korea's nuclear journey more distinctively peaceful than that of other non-First World nuclear aspirants. First, North Korea was not a competitive supplier of fissionable materials, unlike countries such as India, South Africa, Brazil, and Argentina, all of which used their strategic resources as a bargaining chip to pursue their own weapon programme. Though North Korea sold thorium-contained monazite to Soviet buyers in the 1950s, Moscow tried to reduce the volume of its purchase of North Korean monazite. Second, North Korea by the mid-1960s had neither solid techno-scientific infrastructure

⁹ David Holloway, *Stalin and the bomb: the Soviet Union and atomic energy, 1939–1956* (New Haven, CT, 1994); Jacob D. Hamblin, *The wretched atom: America's global gamble with peaceful nuclear technology* (New York, NY, 2021); Kate Brown, *Plutopia: nuclear families, atomic cities, and the great Soviet and American plutonium disasters* (New York, NY, 2013); Sonja D. Schmid, *Producing power: the pre-Chernobyl history of the Soviet nuclear industry* (Cambridge, MA, 2015).

¹⁰ For Israel's case, see Avner Cohen, *Israel and the bomb* (New York, NY, 1998). For India's case, see George Perkovich, *India's nuclear bomb: the impact on global proliferation* (Berkeley and Los Angeles, CA, 1999). For Pakistan's case, see Feroz Hassan Khan, *Eating grass: the making of the Pakistani bomb* (Stanford, CA, 2012). For Ghana's case, see Abena Dove Osseo-Asare, *Atomic junction: nuclear power in Africa after independence* (Cambridge, 2019). For Brazil's case, see Carlo Patti, *Brazil in the global nuclear order, 1945–2018* (Baltimore, MD, 2021). See also Hamblin, *The wretched atom*.

¹¹ For cultural analyses of nuclear power, see Paul Josephson, 'Atomic-powered communism: nuclear culture in the postwar USSR', *Slavic Review*, 55 (1996), pp. 297–324; Sonja D. Schmid, 'Shaping the Soviet experience of the atomic age: nuclear topics in *Ogonyok*, 1945–1965', in Dick van Lente, ed., *The nuclear age in popular media: a transnational history, 1945–1964* (New York, NY, 2012), pp. 19–51.

nor qualified experts,¹² which were essential in furthering nuclear physics research. Unlike India or Pakistan, whose research capabilities were represented by famed, pro-weapon physicists such as Homi Bhabha or Munir Khan, North Korea focused on translating relevant publications and journals from abroad. Third, North Korea's nuclear enterprises focused on industrial applications of nuclear power such as using radiation and radioactive isotopes until the late 1970s, due to their high cost and political disinterest in innovating such technologies. Given the country's financial and technological inability, North Korean techno-scientific communities did not begin to discuss nuclear power generation until after 1980, when Kim Il-sung pointed out the importance of developing nuclear power generation capabilities. It was also closely related to the country's energy portfolio where hydropower always came at the top, followed by thermal power, a trend that lasts to the present; for example, 96 per cent of domestic electricity was generated from dams and rivers by 1964.¹³ That is, North Korea had many incentives to choose cheaper alternatives to nuclear power in order to address its chronic energy shortage. Fourth, despite its direct confrontation with the US in the Korean War, and ensuing, long-lasting exposure to US bomb threats, both to a degree that no country went through during the Cold War period, no publicly available evidence exists that Kim Il-sung actively pursued nuclear power for deterrence or destruction, making it difficult to determine if he had desire for, or at least awe of, bombs, like pro-nuclear leaders such as Kwame Nkrumah, Sukarno, and Saddam Hussein. Fifth, North Korea did not have access to Euro-American nuclear providers such as the US to Iran, Britain to Ghana, Canada to India and Pakistan, and France and Italy to Israel and Iraq,¹⁴ except for the Soviet Union that was committed to guarding the global non-proliferation regime.¹⁵ In the 1960s and 1970s, Moscow cast a dubious eye over Pyongyang's possible nuclear proliferation activities, rejecting North Korea's requests of transfer of nuclear power plants. As a prerequisite to receive a nuclear power plant from the Soviet Union, North Korea joined in the Non-Proliferation Treaty in 1985, which formed a stark contrast with nuclear-weapon states such as India, Israel, and Pakistan that never signed the treaty while keeping silent about their destructive nuclear capabilities. Unless more evidence is found, these aforementioned points make North Korea's early embrace of atomic power as one of the most peaceful nuclear histories. Ironically, North Korea with such a past began to display its aggressive nuclear identity to the world starting in the early 1990s.

Based on previously unexamined North Korean publications and Soviet archival materials, I analyse North Korean efforts to possess nuclear power in 1945–65 by tracing how North Korean media portrayed Soviet supremacy

¹² Byun Hak-moon, 'Pukhan ūi kisul hyōngmyōngnon: 1960–70nyōndae sasang hyōngmyōng kwa kisul hyōngmyōng ūi pyōnghaeng' (Ph.D. diss., Seoul National University, 2015).

¹³ N. Shiryaev, 'Spravka (11 June 1964)', Russian State Archive of Contemporary History (RGANI), f. 5, op. 49, d. 904, l. 62.

¹⁴ Osseo-Asare, *Atomic junction*; Hamblin, *The wretched atom*.

¹⁵ Leopoldo Nuti, 'The making of the nuclear order and the historiography on the 1970s', *International History Review*, 40 (2018), pp. 965–74.

in nuclear science and policy, North Korean physicists' activities, its leadership's view on US bomb threats during and after the Korean War, support for international peace initiatives and organization of exhibits, requests for nuclear assistance from the Soviets, and an emerging attitude of *Juche* (meaning self-reliance, *chuch'e*) in nuclear matters. My analysis of North Korea–Soviet nuclear interactions offers a new understanding, as North Korean techno-scientific accounts and Soviet archival materials that contain crucial information of North Korea's entry into its own atomic age by 1965 have not been examined previously. In order to study North Korea, whose archives remain closed, scholars make a detour by examining diplomatic documents that were produced by officials, both North Korean and foreign. However, such records, as other types of written information, do not always tell the truth in its entirety. Considering that such information tends to be regarded as state propaganda, I make critical use of Soviet reports, especially in the later part of this article, which contain techno-scientific facts that were never stated in any North Korean publications that are currently available. Despite the limitations of this approach, I suggest that it is currently the most reliable way to reconstruct nuclear realities of North Korea in the 1960s. In addition to North Korea–Soviet nuclear exchanges, I also explore the previously overlooked North Korean economy and its techno-scientific discourses with nuclear power as the main thread, critically building on previous studies that characterize the country as ideology-driven.¹⁶ It should then be appropriate to adopt the established periodization in North Korean history studies.¹⁷

This article is structured as follows: in the first section, I examine how North Koreans understood nuclear power through a Soviet lens and criticized the US martial atoms in 1945–50. In the second section, I trace how North Korean experts expanded their nuclear knowledge during and after the Korean War and condemned US atomic testing in 1950–5. In the third section, I analyse how North Korean leaders, both political and scientific, strove to join in the Soviet-led Peaceful Atoms project with intensive propaganda campaigns against US nuclear testing and explore opportunities to receive basic nuclear facilities from the Soviet Union in 1956–9. In the last section, I reconstruct how a combination of the country's economic and technological inability and an emerging ideology of *Juche* not only delayed the construction of the Yongbyon Centre, but also confined nuclear research to isotopes and radiation technologies in 1960–5. Throughout the article, I show how South Korea's participation in the US-led Atoms for Peace programme that involved similar exchanges influenced North Korea's pursuit of peaceful nuclear technology. In conclusion, I discuss how emphasis on the peaceful origins of North

¹⁶ Andrei Lankov, *Crisis in North Korea: the failure of de-Stalinization, 1956* (Honolulu, HI, 2005); Balázs Szalontai, *Kim Il Sung in the Khrushchev era: Soviet-DPRK relations and the roots of North Korean despotism, 1953–1964* (Stanford, CA, 2005); James F. Person, 'Solidarity and self-reliance: the antinomies of North Korean foreign policy and *Juche* thought, 1953–1967' (Ph.D. diss., The George Washington University, 2013).

¹⁷ Byun, 'Pukhan ūi kisu hyŏngmyŏngnon'; Cho Su-ryong, 'Chŏnhu Pukhan ūi sahoējuūi ihaeng kwa "charyŏkkaengsaeng" kyŏngje ūi hyŏngsŏng' (Ph.D. diss., Kyung Hee University, 2018).

Korea's nuclear programme offers a revised understanding of the historical entanglement of North Korea and nuclear power.

I

Analysis of Korean media, in particular newspapers, indicates that North and South Korean media adopted different views in describing atomic bombs after the end of the war in 1945. Unlike their South Korean counterparts, North Korean media never linked atomic bombs to the fall of Japan.¹⁸ Whereas nuclear weapons were eulogized below the 38th parallel as a 'saviour' of the nation, 'tremendously benevolent to compatriots', or the 'victory of science',¹⁹ North Koreans perceived nuclear weapons as objects monopolized by Americans and obstacles to the realization of a nuclear-free world. Although the notion of an American monopoly shifted in the late 1940s, the latter view of American bombs as a global threat lay at the core of North Korean nuclear discourse thereafter.

From the mid-1940s, North Korean media paid particular attention to contemporary nuclear-related issues, formulating a long-lasting dialogue about the US's responsibility. For example, one *Rodong Shinmun* article relayed a 'debate on atomic bombs in America' to its North Korean readership in April 1946. Painting a stark contrast between military leaders and scientists over who would control atomic energy, the article talked about a heated dispute in American society between late 1945 and early 1946.²⁰ Furthermore, North Korean newspapers contrasted Soviet initiatives and American refusals within the United Nations Atomic Energy Commission, whose purpose was to ban the use of atomic weapons.²¹

Following the Soviet-led peace offensive, North Korea advocated the complete ban of atomic weapons and the development of Soviet bombs. The speech of V. M. Molotov, the Soviet minister of foreign affairs, in November 1947 gave the first signal that the American monopoly on atomic weapons could be broken soon.²² His speech was reprinted in *Rodong Shinmun* in Korean,²³ leading to wide support inside and outside North Korea. From then on, promoting peace embraced the Soviet bomb because it would deter the US from brandishing its nuclear might. In the North Korean mind, backing Soviet atomic weapons, not having its own ones, as a 'nuclear shield' was seen as a righteous act to protect the socialist homeland and to assure world peace, for the Soviet Union was the 'only country' that used atomic energy for peaceful purposes.²⁴ This clear divide between destructive American science and constructive, defensive Soviet science continued in sync with Soviet propaganda throughout the 1940s and 1950s.

¹⁸ Munhwahullyŏn'guk sŏnjŏnbu, *Wŏnjaryŏk e taehayŏ* (n.p., 1950), p. 18.

¹⁹ Kim, 'Imaginary savior'; Wŏlch'u Sanin, *Chosŏn tongp'o ege koham* (Seoul, 1945), pp. 39–43; An Tong-hyŏk, *Kwahak shinhwa* (Seoul, 1947), pp. 175–6.

²⁰ *Chŏngno*, 17 Apr. 1946. The newspaper was renamed *Rodong Shinmun* as of 1 Sept. 1946.

²¹ *Chosŏn Shinmun*, 29 May 1948.

²² *Pravda*, 7 Nov. 1947.

²³ *Rodong Shinmun*, 11 Nov. 1947.

²⁴ To Sang-rok, *Chayŏn Kwahak*, 6 (1949), pp. 2–9.

After liberation in 1945, policy-makers in both North and South Korea strove to train specialists in science and engineering, as their expertise was deemed crucial for the path to progress. North Korean leadership built Kim Il-sung University as the cradle for furthering research in the natural sciences, including physics. When it opened in September 1946, it was the only university in North Korea, with 80 students majoring in physics and maths out of a total of 1,290. Within four years, the number of students in the physics and mathematics department had tripled. As the leadership prioritized teaching basic sciences and, above all, physics, all nineteen students who graduated came from the physics and mathematics department when the first class graduated in December 1949.²⁵ In addition, Soviet scholars began to work as advisers in this university starting in July 1948.²⁶

To Sang-rok trained the first generation of North Korean physicists. Born in Korea in 1903, he obtained a bachelor's degree in physics from Tokyo Imperial University in 1930. As a scientist hailing from a colony, however, he was not able to secure a tenured position in Japan. A few years later, he got a teaching position in Korea and then Hsinking (Changchun) before returning to Seoul after August 1945.²⁷ In Seoul, he played a leading role in directing the physics department at *Kyōngsōng* University (renamed Seoul National University in 1946). However, the American Military Government in Korea removed him from his position as dean under the pretext of alleged embezzlement. This drove him to move to North Korea in late June 1946. In Pyongyang, he built the physics and mathematics department from scratch, contributing to North Korean physics through teaching, research, and public lectures.²⁸

One of the imminent tasks faced by North Korean scientists, including To Sang-rok, was to educate the populace through a popularization campaign similar to efforts in the Soviet Union to involve the masses in modern science. Along with other physicists, To Sang-rok played a critical role in transforming the 'entire nation into scientists'. Moving beyond the ivory tower, scientists shared expertise in various publications. In their writings, anti-scientism was the archenemy to be defeated, because it prevented the 'use of atomic energy as power or fuel' which 'would bring an unprecedented gain in human culture'.²⁹

Why did ordinary North Koreans need to be concerned with physics and nuclear power? To Sang-rok expounded, 'Conducting research on physics lays the groundwork for socialist industries, agricultural economy, and national defence...[O]ur lives would be clearly improved if this energy is

²⁵ To Sang-rok, *Ŭnhyeroun sarang sok esō* (n.p., 1981), pp. 321–2.

²⁶ *Kim Il-sung chonghap taehak 10nyōnsa* (Pyongyang, 1956), pp. 62–3.

²⁷ Im Jong-hyok, 'Mullihakcha To Sang Rok ūi saengae wa yōn'gu hwaldong e taehayō', in Kuksa P'yōnch'an Wiwōnhoe, ed., *Han'gukсарon* (45 vols., Gwacheon, 1978–2007), XLII. http://db.history.go.kr/download.do?levelId=hn_042_0050&fileName=hn_042_0050.pdf, accessed 18 June 2022.

²⁸ *Sun'gan T'ongshin* (1947), in Kuksa P'yōnch'an Wiwōnhoe, ed., *Puk'an kwan'gye saryojip* (88 vols., Gwacheon, 1982–2020), XXVII, pp. 192–4; To Sang-rok, *Yangja yōk'ak* (Pyongyang, 1950); *Kim Il-sung chonghap taehak 10nyōnsa*, p. 56.

²⁹ To Sang-rok, *Taejung Kwahak*, 1 (1946), p. 6.

used for peaceful industries. Hence, it is not a coincidence that physics research attracts special attention in advanced countries.³⁰ Expectedly, in their quest to become an advanced country where nuclear energy was exploited in the domestic economy, North Korean planners and scientists viewed Soviet science as a model.³¹

One noticeable aspect of early North Korean nuclear understanding was associating atomic energy with economic efficiency, a view that was globally shared.³² To Sang-rok stated that if one kilogramme of uranium underwent fission, it would produce 16.7×10^{12} calories, which amounted to 2,100 tons of burning coal.³³ Actualizing this theoretical formulation hinged on isotope separation, or enrichment; but the size required for a factory capable of this process would be so huge that it might 'cause the downfall of a country'.³⁴ Although only in principle, North Korean physicists by 1949 understood a way to produce plutonium.³⁵ However, as the physicists admitted,³⁶ initiating a nuclear energy programme in the 1940s was costly and would require a tremendous amount of resources that North Korea lacked.

II

The widespread horror of US bombings throughout the Korean War engendered an enduring legacy that largely shaped not only the defensive nuclear policies, but also the *modus vivendi* of the nascent North Korean state. In this vein, the official North Korean account of the 'victorious' war could be better understood if one reads it as survival from 'indiscriminate' US bombings that obliterated nearly everything in North Korea.³⁷ Living in fear of American atomic bombs served as one of the biggest incentives for North Koreans to flee to South Korea.³⁸ Later, in the 1960s, Kim Il-sung occasionally recalled this experience and explained the link between the threat of American atomic attacks and the South-bound refugees, who seemed to have come from all regions.³⁹ One Soviet report from early in the Korean War also reflected a general opinion of the communist leaders that US forces would employ atomic weapons to halt the Korean People's Army's continuous advance.⁴⁰ Far from

³⁰ To Sang-rok, *Yök'ak* (Pyongyang, 1949), p. 3.

³¹ To Sang-rok, *Chayön Kwahak*, 1 (1949), pp. 9–13, 18.

³² Hamblin, *The wretched atom*.

³³ To Sang-rok, *Chayön Kwahak*, 2 (1949), p. 100.

³⁴ To Sang-rok, *Chayön Kwahak*, 3 (1949), p. 92.

³⁵ *Ibid.*, pp. 95–7.

³⁶ Ri Ch'ae-bok, *Kongöpp Chishik*, 10 (1949), pp. 62–74.

³⁷ Kim Taewoo, 'Limited war, unlimited targets: U.S. air force bombing of North Korea during the Korean War, 1950–1953', *Critical Asian Studies*, 44 (2012), pp. 467–92.

³⁸ Kim Kwi-ok, *Wöllammin üi saenghwal kyöngghöm kwa chöngch'esöng* (Seoul, 1999), pp. 247–9.

³⁹ Kuksa P'yöngch'an Wiwönhoe, ed., *Puk'an kwan'gye saryojip*, VII, p. 543.

⁴⁰ 'Political situation on the Korean Peninsula, Shtykov to Gromyko (18 July 1950)', The Archive of Foreign Affairs of the Russian Federation (AVPRF), f. 0102, op. 6, p. 21, d. 47, ll. 29–40, translated in Chinese in Shen Zhihua, ed., *Chaoxian zhan zheng: Eguo dang an guan de jie mi wen jian* (3 vols., Taibei, 2003), II, p. 461.

the battlefield, however, Soviet and Chinese leaders seemed to discount the threat in general.⁴¹

As a tug-of-war became fixed on the 38th parallel from mid-1951, North Korean leadership decided to reopen schools and academic institutions to continue to prepare for an indigenous nuclear programme. With this decision, Kim Il-sung University resumed in November 1951 in a wartime shelter. Before moving to another shelter in South Pyongan province in February 1952, this 'university in the mountains' had 69 students (44 per cent of them women) studying mathematics and physics out of a total of 846 enrolled.⁴² Although the country was at war in 1952–3, a few research trips to Peking University were made by educators and students from the physics and mathematics department. The threat of US bombings did not prevent physicists from writing academic articles. A small number of Soviet physicists came to wartime Korea as advisers.⁴³

In 1952, North Korea celebrated its achievements in the scientific arena through a series of national events. The National Scientists Convention was held in April, the agreement to receive North Korean students in the Soviet Union was reached in May, and the Academy of Sciences (AS) of the DPRK opened in December. Drawing upon the consensus at the April convention that creating a state-directed scientific institution was urgent, Kim Il-sung demanded that North Korean scientists strengthen research works and learn 'advanced' science from other countries including the Soviet Union.⁴⁴ Reflecting his wishes, one of the priorities of the new academy was to 'absorb advanced Soviet science'.⁴⁵ The reality was dire; North Korean scientists conducted research in dugouts (*ttanggul*) because of the threat of US bombings.⁴⁶

After the Korean War ended in 1953, Kim Il-sung prioritized solving the practical issues of the war-torn country, while demanding that experts join the effort under the party's guidance. As a part of the reconstruction work, the main campus of Kim Il-sung University returned to Pyongyang by the summer of 1954, offering physics classes and opening seventeen labs. To Sang-rok led the effort by publishing a major Korean-language physics text,⁴⁷ while other physicists published academic articles.⁴⁸ In February 1955, the first agreement for techno-scientific co-operation between North Korea and the Soviet Union was reached, which enabled North Korean experts to participate in the Soviet Peaceful Atoms programme, including the Joint Institute for

⁴¹ 'A meeting minute between Stalin and Zhou Enlai (20 Aug. 1952)', The Presidential Archive of the Russian Federation, f. 45, op. 1, d. 329, ll. 54–72, translated in Chinese in Shen, ed., *Chaoxian zhan zheng*, III, p. 1202.

⁴² *Pravda*, 11 Mar. 1952; *Kim Il-sung chonghap taehak 10nyŏnsa*, pp. 90–1.

⁴³ *Kim Il-sung chonghap taehak 10nyŏnsa*, pp. 97, 100, 104.

⁴⁴ *Ibid.*, pp. 102–3.

⁴⁵ *Chosŏn Minjujuŭi Inmin Konghwaguk Kwahagwŏn Hakpo*, 7 (1954), p. 12. This bulletin was renamed *Chosŏn Minjujuŭi Inmin Konghwaguk Kwahagwŏn T'ongbo* in 1957. This journal is hereafter cited as *Bulletin*.

⁴⁶ *Bulletin*, 5 (1954), p. 169.

⁴⁷ To Sang-rok, *Mullihak ūi kich'o* (Pyongyang, 1954).

⁴⁸ *Kim Il-sung chonghap taehak 10nyŏnsa*, p. 143.

Nuclear Research (JINR) at Dubna in 1956. In general, natural science training including physics in the country expanded.⁴⁹

In the international arena, the North Koreans criticized American nuclear tests.⁵⁰ Reproaching Operation Castle, a series of seven hydrogen bomb tests conducted at Bikini Atoll, a North Korean commentator characterized it as a 'scheme to distract from the 1954 Geneva Conference', in which the fate of both the Korean Peninsula and Indochina was being discussed. Referring to US's responsibility for the proliferation of nuclear weapons, the commentator stated that the atomic weapons of 'imperialists' imposed a threat to humanity because they were intended to hit the rear areas to 'annihilate innocent non-combatants'.⁵¹ This evaluation resonated with North Korean physicist Chŏng Kŭn, who characterized atomic bombs as 'political' and claimed that from a military point of view they were a 'failure'.⁵²

Thus, by the mid-1950s, North Korean propaganda about American nuclear weapons resembled that of the Soviet Union, which underscored a dichotomy between American and Soviet nuclear sciences. The narrative had it that while the peaceful socialists had mastered nuclear technology in the name of the people, the warlike capitalists put a heavy burden on their citizens.⁵³ Understandably, atomic energy 'only served imperialism' in America, where 'science was militarized'; Americans dumped Hanford fissile materials into the Columbia River 'uselessly'.⁵⁴ However, it was not known to the Soviet or North Korean publics that the Soviet Union also dumped radioactive waste into rivers.⁵⁵

With the strong desire to absorb 'advanced' Soviet science in the 1950s, North Korean physicists continued to eulogize the use of atomic energy in the Soviet Union, just as their southern counterparts praised American atoms. As a North Korean document suggests, Chŏng Kŭn, the theoretical physics course rector at Kim Il-sung University, was the first Korean to visit the world's first peaceful nuclear power plant at Obninsk, which provided electricity for the civilian grid.⁵⁶ At Obninsk, he felt that 'humanity had entered the threshold of the atomic age'.⁵⁷ The world's first nuclear power plant captured Chŏng's heart; the powerful devices, including betatron and synchrotron, represented the 'might of Soviet science'. Leading North Korean physicist Kim Hyŏn-pong suggested that the prospects for harnessing atomic energy for peaceful purposes were huge; cheap electricity would open up new possibilities for improving the quality of peoples' lives.⁵⁸ However, North Korea was

⁴⁹ Kuksa P'yŏnch'an Wiwŏnhoe, ed., *Puk'an kwan'gye saryojip*, XXX, pp. 741–2.

⁵⁰ Sŏ Ch'ang-hwan, trans., *Kwahak esŏ ūi tu segye* (Pyongyang, 1953), p. 99.

⁵¹ *Kukche Saenghwal*, 9 (1954), pp. 20–3. This journal is hereafter cited as *International Life*.

⁵² *Ibid.*, 8 (1955), pp. 36–40.

⁵³ *Ibid.*, 19 (1954), pp. 13–15; *ibid.*, 14 (1954), pp. 22–6; Chang Ik-hwan, *Kŭlloja*, 1 (1952), pp. 70–83.

This North Korean journal *Kŭlloja* is hereafter cited as *Worker*.

⁵⁴ Sŏ, *Kwahak esŏ ūi tu segye*, p. 95.

⁵⁵ Brown, *Plutopia*, p. 191.

⁵⁶ *Kim Il-sung chonghap taehak 10nyŏnsa*, p. 153.

⁵⁷ *International Life*, 16 (1955), pp. 21–6; *Kwahak kwa Kŭsul*, 10 (1955), pp. 56–9.

⁵⁸ *Worker*, 1 (1955), pp. 78–90.

not on the Soviet list of nuclear recipients of nuclear research reactors in 1955, which included Poland, Czechoslovakia, Romania, Hungary, Bulgaria, East Germany, and the People's Republic of China.⁵⁹

Consolidating knowledge from Soviet nuclear science and propaganda nourished North Korea's economic expectations for atomic power. By the mid-1950s, uranium and thorium were seen as promising substitutes for oil and coal.⁶⁰ Simultaneously, uranium ores were found in Ŭn'gok Mine, North Pyongan province.⁶¹ The use of radioactive isotopes was expected to have a wide range of applications, from disinfection and conservation to transforming the climate.⁶² Chŏng Kŭn linked nuclear power with 'profitability' (*ch'aesan*); 0.5 tons of nuclear fuel – uranium or thorium – was sufficient to run a plant equal to the Sup'ung hydropower plant, then the tallest dam and largest hydropower plant in Asia. To his joy, North Korea had abundant resources that could be used as nuclear fuel.⁶³ Translated Soviet publications gave what seemed surreal images of irrigating Saharan deserts and installing electric railroads that would connect London, Moscow, and Beijing.⁶⁴ As the knowledge of nuclear power engineering deepened,⁶⁵ pundits estimated that atomic energy would produce a good deal of power in the late twentieth century.⁶⁶

III

Previous studies view the year of 1956 as a political watershed in North Korean history,⁶⁷ where Kim Il-sung rose as the leader with unchecked power. In North Korean nuclear history, the same year was the onset of expanding possibilities to acquire peaceful nuclear technologies. Starting in 1956, North Korean leaders began to realize the unlimited potential of nuclear power for peaceful purposes. Early that year, Kim Il-sung relayed to the Soviet ambassador North Korean scientists' desire to get help from the Soviet Union in the field of nuclear science.⁶⁸ During a visit to the USSR in the summer, Kim Il-sung toured the world's first nuclear power plant (Figure 1) and was said to have breakfasted there.⁶⁹ North Korean political leaders such as Kim Tu-pong, the chairman of the Supreme People's Assembly, also visited the same plant at Obninsk. Kim Tu-pong was impressed with the plant's

⁵⁹ *International Life*, 22 (1955), pp. 27–9.

⁶⁰ *Kwahak kwa Kisul*, 4 (1955), pp. 35–41; *ibid.*, 11 (1955), pp. 46–50.

⁶¹ Kim Chae-myŏng, *Chosŏn ūi kwangmul* (Pyongyang, 1955), p. 159.

⁶² *International Life*, 24 (1954), pp. 19–22; *Kwahak kwa Kisul*, 4 (1955), pp. 42–58; *ibid.*, 7 (1955), pp. 42–51.

⁶³ *International Life*, 8 (1955), pp. 36–40.

⁶⁴ *Ssobet'ŭ kwahak ūi widaehan him* (Pyongyang, 1955).

⁶⁵ *Kwahak kwa Kisul*, 3 (1955), pp. 42–50.

⁶⁶ Mun Kyŏng-ok, *Chayŏn kwa kisul* (Pyongyang, 1955), pp. 11–14, 20.

⁶⁷ Lankov, *Crisis in North Korea*; Szalontai, *Kim Il Sung in the Khrushchev era*.

⁶⁸ 'The diary of V. I. Ivanov, the Soviet ambassador in the DPRK (20 Jan. 1956)', AVPRF, f. 0102, op. 12, p. 68, d. 5, l. 27.

⁶⁹ 'Program of stay for the DPRK governmental delegation in the Soviet Union (July 1956)', AVPRF, f. 0102, op. 12, p. 69, d. 10, ll. 4–6.



Figure 1. The North Korean delegation led by Kim Il-sung at the world's first nuclear power plant in July 1956. Source: A. A. Goverdovski et al., eds., *The world's first nuclear power plant: documents, articles, memoirs, photographs* (Obninsk: FSUE 'SSC RF-IPPE', 2014), p. 191.

'awe-inspiring force' which for him confirmed Soviet supremacy over 'aggressors' who were threatening the world with bombs.⁷⁰ Likewise, in the North Korean leadership's eyes, the 1956 agreement for nuclear co-operation between the US and South Korea presaged the transformation of East Asia into a nuclear base.

North Korean experts endeavoured to learn how to apply nuclear technology to the country's economy through their participation in relevant international organizations. One of the few channels to do so opened with the creation of the intergovernmental JINR in 1956, which played a critical role in facilitating the country's knowledge of nuclear physics until 2015. North Korean media closely followed the organization and the North Korean physicists' participation in it. Still, North Korean specialists' role within the JINR was more that of a novice than a designer.⁷¹ It was only in 1960 that a JINR group led by Chinese physicist Wang Ganchang discovered a rare particle,⁷² and for this North Korean physicist Kim Hi-in was awarded a JINR annual scientific prize in 1961.⁷³

⁷⁰ 'The diary of V. I. Ivanov, the Soviet ambassador in the DPRK (8 Feb. 1956)', AVPRF, f. 0102, op. 12, p. 68, d. 5, l. 39. See also *Bulletin*, 2 (1957), p. 83.

⁷¹ *Rodong Shinmun*, 3 Oct. 1956.

⁷² *Ibid.*, 29 Mar. 1960.

⁷³ *Ibid.*, 7 July 1961.

In the catastrophic aftermath of the Korean War and especially in the 1950s, North Korean academia suffered an absolute dearth of tools, materials, and staff to conduct research work. A talk in June 1956 between the Soviet ambassador and North Korean scientific leaders shows the bleak situation faced by North Korean physicists. Upon the ambassador's cogent reminder that the Soviet AS wanted to help its North Korean counterpart, the president and the vice-president of the North Korean AS revealed that the most serious obstacle plaguing North Korean academia was the absence of qualified cadres. And while the North Korean AS planned to start a study of nuclear physics, they continued, 'literature, theoretical works, trained cadres, and fissionable elements' were completely lacking. Hence, the two leaders hoped for Soviet assistance in nuclear physics.⁷⁴ In December, although the nuclear physics department had been newly created at Kim Il-sung University, it was not adequately staffed.⁷⁵ A North Korean mathematician stated that North Korean science lagged behind that of advanced countries 'not by several decades but by several centuries'.⁷⁶

Against all odds, North Korean physicists strove to learn nuclear physics from the Soviet Union and other countries, with a view to using radioactive isotopes in the economy.⁷⁷ Recent trends in nuclear physics and relevant fields in other countries such as India and Canada were regularly circulated through the *Bulletin* of the North Korean AS. Soviet physicists continued to visit North Korea.⁷⁸ The 1957 agreement between the North Korean and Soviet Academies of Sciences served as a shot in the arm for North Korea. Though interest was paid to using radiation technology,⁷⁹ some of the isotopes were 'hard to import [to North Korea] because of their short half-lives'.⁸⁰ Meanwhile, North Korean physicists knew that even a tiny amount of radioactive isotopes could cause lethal damage that would require protective measurements and strict regulations.⁸¹ By early 1959, the long-term plan for nuclear physics was set, with the focus on the application of isotopes, the expansion of the number of qualified scientists, and preparation to introduce nuclear reactors. Once the production of isotopes became possible, the plan predicted, research works would make a 'greater profit' (*kōdaehan suiksōng*).⁸²

The US scheme to deploy nuclear weapons in South Korea in violation of the truce agreement began in May 1957, which virtually all security-centred

⁷⁴ 'The diary of V. I. Ivanov, the Soviet ambassador in the DPRK (11 June 1956)', AVPRF, f. 0102, op. 12, p. 68, d. 5, ll. 121-4.

⁷⁵ 'A meeting between E. L. Titorenko, the second secretary of the Soviet embassy in the DPRK, with Kim Hyōn-pong (4 Dec. 1956)', AVPRF, f. 0102, op. 17, p. 26, d. 5, l. 2.

⁷⁶ *Bulletin*, 1 (1957), p. 4.

⁷⁷ To Sang-rok, *Wōnja enerūgi wa kū ūi p'yōnghwajōk riyong* (Pyongyang, 1956); 'Politicheskii otchet za 1959 god', RGANI, f. 5, op. 49, d. 257, l. 62.

⁷⁸ *Bulletin*, 4 (1957), pp. 109-10.

⁷⁹ *Bulletin*, 1 (1959), pp. 53-4; *ibid.*, 2 (1959), pp. 21-2.

⁸⁰ *Ibid.*, 5 (1958), pp. 29-32.

⁸¹ To Sang-rok, *Tongwi wōnso ran muōshin'ga* (Pyongyang, 1959), pp. 124-32.

⁸² *Bulletin*, 1 (1959), p. 15.

works use to simply assume that this event was the turning point that drove North Korean leaders to go nuclear without examining how they understood the issue.⁸³ My examination of North Korea–Soviet conversations during this period strongly indicates that North Korean planners were mostly concerned to exploit higher propaganda values from the US’s offensive actions. North Korea also made robust efforts to back Soviet proposals to create a non-nuclear zone and to ban nuclear weapons testing in 1958 and 1959.⁸⁴ Indirectly criticizing US atomic testing, a joint study conducted in early 1959 by Kim Il-sung University and the North Korean AS reported that rainwater near Pyongyang, far from the Pacific Testing Grounds, was radioactive.⁸⁵ In the late 1950s, North Koreans perceived the introduction of US nuclear weapons to South Korea simply as the continuation of raising tension on the Korean Peninsula and of proliferating atomic weapons in the region.⁸⁶

Celebrating the tenth anniversary of the country’s founding, the Peaceful Use of Atomic Energy exhibition in Pyongyang in 1958 offered a great opportunity to popularize the Soviet Peaceful Atoms programme among North Koreans. The Soviet Union took the initiative of staging this type of exhibition in several countries between 1957 and 1959.⁸⁷ The Pyongyang exhibition had a grand opening with fifty different cutting-edge devices, ten types of models, and thirty kinds of blueprints, displayed in eight sections.⁸⁸ It was a ‘success’.⁸⁹ On 17 September, Kim Il-sung visited the exhibition (Figure 2) and left with the following remarks: ‘I saw the essence of great Soviet science...Atomic energy that resulted from mankind’s labour must contribute to humanity...This exhibition...would be greatly helpful for the development of our country’s economy.’⁹⁰ Pyongyang requested a fifteen-day extension just before the scheduled end of the month-long exhibition and Moscow granted approval.⁹¹ In addition, Soviet exhibition crews made presentations and gave lectures in

⁸³ Hans Kristensen and Robert Norris, ‘A history of US nuclear weapons in South Korea’, *Bulletin of the Atomic Scientists*, 73 (2017), pp. 349–57; Sigal, *Disarming strangers*; Michael Mazarr, *North Korea and the bomb: a case study in nonproliferation* (New York, NY, 1995), pp. 15–17.

⁸⁴ For discussion of creating non-nuclear zones, see ‘Reception of Lee Sin-p’al, the North Korean ambassador in the USSR, by N. T. Fedorenko, the Soviet deputy minister of foreign affairs (25 Feb. 1958)’, AVPRF, f. 0102, op. 14, p. 75, d. 4, ll. 1–2; ‘The diary of A. M. Puzanov, the Soviet ambassador in the DPRK (16 Mar. 1959)’, AVPRF, f. 0102, op. 15, p. 81, d. 7, l. 57. For discussion of supporting a nuclear test ban, see ‘A meeting between V. I. Pelishenko, the Soviet chargé d’affaires of the Soviet Union in the DPRK, and Kim Il-sung (27 Mar. 1958)’, AVPRF, f. 0102, op. 14, p. 75, d. 8, l. 190; ‘The diary of A. M. Puzanov, the Soviet ambassador in the DPRK (7 Apr. 1958)’, AVPRF, f. 0102, op. 14, p. 75, d. 6, ll. 95–6.

⁸⁵ To, *Tongwi wŏnso ran muŏshin’ga*, pp. 133–4.

⁸⁶ *International Life*, 7 (1959), pp. 1–2.

⁸⁷ ‘The diary of A. M. Puzanov, the Soviet ambassador in the DPRK (21 Oct. 1957)’, AVPRF, f. 0102, op. 13, p. 72, d. 5, l. 286.

⁸⁸ *Bulletin*, 5 (1958), pp. 58–9.

⁸⁹ *Rodong Shinmun*, 17 Sept. 1958.

⁹⁰ *Ibid.*, 18 Sept. 1958.

⁹¹ ‘The diary of A. M. Puzanov, the Soviet ambassador in the DPRK (6 Oct. 1958)’, AVPRF, f. 0102, op. 14, p. 75, d. 7, l. 427.



Figure 2. Kim Il-sung's visit to the Peaceful Use of Atomic Energy exhibition on 17 September 1958. Source: *Rodong Shinmun*, 18 Sept. 1958.

more than nine North Korean cities, which were attended by some 24,000 people. In Pyongyang, over 28,000 citizens watched Soviet movies such as *The first in the world* and *Tagging atoms*.⁹²

Although by the late 1950s North Korean experts used radiological apparatuses for industrial purposes, such as roentgenoscopes or liquid-level metres,⁹³ devices to examine the inside of machines or pipes, there was no command centre to direct a nuclear programme until 1965. Meanwhile, below the 38th parallel, the Board of Atomic Energy, the realization of the Atoms for Peace programme in South Korea, was created in 1959 with American assistance to purchase the first research reactor. The fact that North Korea was lagging behind its southern and socialist brothers in introducing atomic energy pushed North Korean planners to seek to get on the Soviet list of nuclear recipients. Soviet documents suggest that negotiations between North Korea and the Soviet Union over the transfer of nuclear facilities to North Korea, by the initiative of Pyongyang, began around April 1958. The North Korean ambassador to the USSR Ri Sin-p'al asked the Soviet minister of foreign affairs about the prospect of receiving help to draw plans to introduce nuclear power in North Korea. Ri made the appeal that his country had neither the experience nor the specialists.⁹⁴ The Soviet Union agreed to receive a North Korean

⁹² 'The diary of A. M. Puzanov, the Soviet ambassador in the DPRK (28 Oct. 1958)', AVPRF, f. 0102, op. 14, p. 75, d. 7, ll. 459–60; *Rodong Shinmun*, 30 Oct. 1958.

⁹³ *Kwahak kwa Kisul*, 5 (1956), pp. 65–73; *Bulletin*, 5 (1959), pp. 45–6.

⁹⁴ 'A meeting between A. A. Gromyko and Lee Sin-p'al, the DPRK ambassador in the USSR (28 Apr. 1958)', AVPRF, f. 0102, op. 14, p. 75, d. 4, ll. 3, 5.

delegation for familiarizing itself with nuclear activities.⁹⁵ The delegation was mostly concerned with how to ‘rationally use atomic energy in the conditions of the DPRK’. The delegation leader intended to find out if such a nuclear power plant construction project in North Korea would be deemed adequate by Soviet experts. Also, the delegation wanted Soviet advice on the issue of applying atomic energy in the thermal power plants that were planned to be constructed in Pyongyang, Hŭngnam, and Chŏngjin, and of learning how to mine and process fissionable materials such as thorium and beryl, which North Korea possessed.⁹⁶ However, it took an additional year for North Korea to reach an agreement to get Soviet help in nuclear physics and using atomic energy for economic development.⁹⁷

While much about these initial North Korea–Soviet negotiations over the transfer of nuclear facilities to North Korea seems to be locked up in classified archives, an agreement providing Soviet technical assistance to North Korea for the peaceful use of atomic energy was reached on 7 September 1959, three years after a similar nuclear agreement was signed between the US and South Korea. A *Rodong Shinmun* article stated that North Korea welcomed the decision with ‘boundless pleasures’. Through the agreement, North Koreans could start introducing atomic energy – a ‘masterpiece of the mankind’s science’ – in the domestic economy. Like South Koreans welcoming the shipment of research reactors and relevant equipment from the US in 1959, North Koreans would soon receive nuclear devices such as a research reactor, radiochemical laboratory, and a betatron.⁹⁸ Study opportunities in the Soviet Union were expanded for North Korean specialists, as their southern countrymen were already studying in the US. By this time, the Soviet Union had already been assisting North Korea for many years in carrying out geological prospecting and exploration works,⁹⁹ informing Kim Il-sung of uranium ore deposits in North Korea.¹⁰⁰ A North Korean physicist suggested that North Korea would soon pioneer ways to harness atomic energy as electric power, repaying the Soviets’ noble assistance in the future.¹⁰¹

After repeated requests by North Korean planners in the late 1950s, Soviet assistance finally granted a chance for North Korea to produce radioactive isotopes. However, it took several years before operators switched on North Korea’s first research reactor in the Yongbyon Centre in 1965, three years after South Korea’s first research reactor went online in Seoul. Partly, it was because North Korea lacked an appropriate technological base; throughout

⁹⁵ ‘The diary of A. M. Puzanov, the Soviet ambassador in the DPRK (17 May 1958)’, AVPRF, f. 0102, op. 14, p. 75, d. 6, l. 144.

⁹⁶ ‘A meeting between N. M. Shesterikov, the counsellor in the Soviet embassy in the DPRK, and Chŏng Chun-t’aek (14 June 1958)’, AVPRF, f. 0102, op. 14, p. 75, d. 8, ll. 224–5.

⁹⁷ ‘A meeting between G. M. Pushkin, the Soviet deputy minister of foreign affairs, and Lee Sin-p’al, the DPRK ambassador in the USSR (14 May 1959)’, AVPRF, f. 0102, op. 15, p. 81, d. 5, l. 4.

⁹⁸ *Rodong Shinmun*, 8 Sept. 1959; *Pravda*, 8 Sept. 1959.

⁹⁹ N. Shiryaev, ‘Spravka (11 June 1964)’, RGANI, f. 5, op. 49, d. 904, l. 62.

¹⁰⁰ ‘The diary of A. M. Puzanov, the Soviet ambassador in the DPRK (17 May 1959)’, AVPRF, f. 0102, op. 15, p. 81, d. 7, ll. 105–7.

¹⁰¹ *Bulletin*, 5 (1959), pp. 8–11.

the 1950s and 1960s, North Korea was only able to sell ‘useful ores’, containing fissionable materials, for more foreign currency.¹⁰² To Kim Il-sung’s discomfort, South Korea was not only racing ahead with the Atoms for Peace programme, but also benefiting from American industrial goods and surplus agricultural produce. His pet project, the First Five-Year Plan (1957–61) of North Korea, did not produce enough clothing materials, food, and houses by the time it was completed in 1959. Therefore, as the next section shows, North Korean planners chose to prioritize uplifting the living standard of the nation, which led to the reduction of their political and economic interests in nuclear power.

IV

In this section, I explore how North Korea’s relations with nuclear power unfolded from 1960 to 1965, showing that its leadership’s interest in materializing nuclear power inside the DPRK was at best lukewarm; Kim Il-sung in this period seemed to have treated a nuclear reactor more as a white elephant than a chance to generate electricity or to accumulate fissile materials for future weapons. There still exist enormous difficulties in reconstructing North Korean realities in the 1960s due to the limited availability of reliable data. Currently available Soviet documents contained less detailed information starting in late 1959, compared to the previous years. Unfortunately, relevant North Korean publications are very reticent to talk about their own nuclear history.¹⁰³ Bypassing these hardships, I analyse the previously untapped materials that are housed in the Russian State Archive of Economy, which were mostly produced by Soviet engineers who managed North Korea–Soviet nuclear exchanges in this period.

Soviet documents indicate that in the early 1960s North Korea was *never* eager to receive the basic materials and equipment for their first nuclear facility, which overturns the dominant, security-centred narrative that Kim Il-sung persistently wanted to have his own bombs. In order to understand this tepid interest, we need to take into account the primary objectives of North Korean leadership at that time. The main goal of North Korean planners was to establish a self-reliant economy while fortifying the country. However, due to a tight state budget, they prioritized other building projects such as the Pyongyang Thermal Power Plant and textile factories that were supported by Soviet components. In this context, Kim Il-sung’s disinterest in nuclear power can be clearly seen in the 1961 list of important goals to be achieved in the country’s first Seven-Year Plan (1961–7). In this list, the 2-MW atomic reactor appeared only after a long list of thermal and hydropower stations, and factories for metallurgical, chemical, machine-building, and light industries.¹⁰⁴ After allocating a large sum of funds to defence, North Korean planners

¹⁰² A similar trend in the Soviet Union can be seen in Oscar Sanchez-Sibony, *Red globalization: the political economy of the Soviet Cold War from Stalin to Khrushchev* (New York, NY, 2014), p. 109.

¹⁰³ Yi and Kim, *2lsegi ūi haek enerūgi*; Wŏn Myōng-uk, *Mije ūi tae Chosŏn haek apsal ch’aektong kwa kŭ p’asan ūi pulgap’isōng* (Pyongyang, 2013).

¹⁰⁴ ‘The list’, Russian State Archive of Economy (RGAE), f. 365, op. 2, d. 1716, ll. 341–3.

chose to enhance the country's industrial capabilities and to satisfy peoples' imminent needs over time-consuming, resource-intensive nuclear physics research. In April 1962, when Soviet officials asked about the shipment of equipment for a reactor, their North Korean interlocutors told them that the shipment should be 'partially postponed due to their currency difficulties'.¹⁰⁵ In May, a North Korean official expressed his wish to delay the shipment of nuclear devices from the projected deadline of 1963 to 1965;¹⁰⁶ the reactor took up less than 5 per cent of the whole amount of supplies planned to be sent to the DPRK in 1963 on Soviet credit and trades.¹⁰⁷

North Korea's economic and technological inability delayed the construction process of the Yongbyon 'Furniture Factory', a code name for its first nuclear research centre. Though the reactor fittings (*armatura*) were delivered to North Korea before August 1962,¹⁰⁸ the country's officials were debating whether they would send those fittings back to Moscow.¹⁰⁹ As recorded in the Soviet reports, at the construction site of the centre, ninety-two kilometres from Pyongyang near the Kuryong River, the pace of the building works was slow despite the presence of 1,000 North Korean workers; communication among Soviet and North Korean experts on site was never smooth; pits were occasionally flooded; and the deadlines of individual components of the whole project were usually delayed. By 30 April 1963, laying foundations of the main reactor building had not yet begun; the visiting Soviet engineers pointed out that most of the planning for a physical laboratory building would have to be modified and that the projected ventilation system and an isotope laboratory building were unsatisfactory due to the lack of technical documents and 'indecision of Korean comrades'.¹¹⁰ In May, there was a further delay in the laying of the foundations caused by a lack of timber; and owing to a lack of drilling rigs, a team of geologists manually dug a well more than eight metres deep next to the foundations of the main building.¹¹¹ Meanwhile, North Korean leaders wanted to have the centre operational in celebration of a national holiday of 15 August 1964,¹¹² but this could not be achieved due to the underperformance that was widespread throughout the construction site.¹¹³ Most of the necessary equipment for the centre seems to have been

¹⁰⁵ 'A meeting between comrade M. I. Siryakov, the acting economic counsellor in the Soviet embassy in the DPRK, and Son Chu-bok, the acting chairman of the Korean Association of Foreign Trade "Sölbi" (21 Apr. 1962)', RGAE, f. 365, op. 2, d. 1768, l. 147.

¹⁰⁶ 'A summary', RGAE, f. 365, op. 2, d. 1803, l. 35.

¹⁰⁷ 'The list', RGAE, f. 365, op. 2, d. 1803, l. 38. See also 'Appendix', RGAE, f. 365, op. 2, d. 1768, l. 184.

¹⁰⁸ 'A meeting with comrade Kye Ŭng-t'ae, the vice-minister of foreign trade of the DPRK, held as of 25 Aug. 1962, by his initiative', RGAE, f. 365, op. 2, d. 1768, l. 204.

¹⁰⁹ 'A meeting between I. F. Larionov, the economic counsellor in the Soviet embassy in the DPRK, and Son Chu-bok (27 Nov. 1962)', RGAE, f. 365, op. 2, d. 1768, l. 236.

¹¹⁰ 'A summary', RGAE, f. 365, op. 2, d. 1803, ll. 88–92.

¹¹¹ *Ibid.*, ll. 101–2.

¹¹² *Ibid.*, ll. 166–9.

¹¹³ *Ibid.*, ll. 2–6.

delivered by the end of 1964.¹¹⁴ However, North Korea's first peaceful nuclear facility began only partially in September 1965.¹¹⁵ Currently, no records indicate that Kim Il-sung visited, or publicly showed his interest in, the Yongbyon Centre.

In the first half of the 1960s, an emerging ideology of *Juche* began to be discussed by North Korean nuclear experts. At a meeting with P. D. Prokudin, the chief Soviet engineer for North Korea's first nuclear reactor, Kim Hyŏn-pong, the then vice-chairman of the State Committee of Atomic Energy and leading nuclear physicist of the country, explained the slogan of self-reliance in August 1962. Refuting the argument that *Juche* in the economy implied a closed economy, Kim stated that the slogan's core was to recognize the utmost importance of 'considering historical and contemporary conditions of our country [in economy and diplomacy]'. Given that Korea suffered Japanese colonial rule and that 'currently southern Korea is occupied by American imperialists', Kim stated his belief North Korea should build a strong economic base, with a view to 'healing rapidly the wounds of southern economy'. By producing a sufficient amount of grain in North Korea, Kim continued, socialist countries that were in dire need of food resources would not have to send grain to North Korea.¹¹⁶ This attitude of advancing science and technology 'based on its own strength' dominated in the discursive space of North Korea's scientific communities. In September 1964, To Sang-rok summarized how basic science progressed along with the construction of the DPRK. He argued that the foremost task for North Korean scientists was to establish *Juche*, or to embody a 'revolutionary spirit of self-reliance'. He proudly listed the scientific achievements that North Korea had made in this spirit, which included Kim Bong-han's medical research of the meridian system (*kyŏngnak*) and Ri Sŭng-gi's chemical research of Vinalon. However, he only stated in passing that the first nuclear power plant was built in a 'socialist country'.¹¹⁷ Considering that To Sang-rok served as an authoritative figure in legitimizing Soviet science in the previous decades,¹¹⁸ *Juche* in nuclear matters severely narrowed the scope of the North Korean reception of Soviet nuclear science.

Still, available documents indicate that the establishment of *Juche* in nuclear science did not necessarily imply stockpiling plutonium for nuclear warheads. Kim Il-sung for the first time argued for the exploitation of nuclear energy (*wŏnjaryŏk*) at the Fourth Party Congress in 1961; however, the country's main focus until the early 1980s was on the industrial application of radioactive isotopes, up until the Sixth Party Conference in 1980, when Kim publicly declared the importance of developing nuclear power plants for the first time. In their endeavours to create a socialist regime with an affluent, self-reliant

¹¹⁴ 'A meeting with comrade Li Tae-baek, a trade attaché of the embassy of the DPRK in the USSR, held as of 7 Mar. 1964', RGAE, f. 365, op. 2, d. 1831, ll. 18–20.

¹¹⁵ 'The list', RGANI, f. 5, op. 49, d. 891, l. 124.

¹¹⁶ 'A meeting with comrade Kim Hyŏn-pong, the vice-chairman of the Committee of Atomic Energy under the cabinet of ministers of the DPRK, held as of 29 Aug. 1962', RGAE, f. 365, op. 2, d. 1768, ll. 208–10.

¹¹⁷ *Worker*, 18 (1964), pp. 23–31.

¹¹⁸ *Ibid.*, 1 (1958), pp. 47–53.

economy, North Korean scientists concentrated their research capabilities on how to apply isotopes and radiation technologies to industry in order to boost production.¹¹⁹ While examining North Korean nuclear history after 1965 lies beyond the scope of this article, it is safe to assume that this North Korean focus on peaceful nuclear technologies lasted for a while after its first research reactor went online.

V

What can we learn from North Korea's peaceful embrace of nuclear power? First, the prevailing discourse that North Korea's going nuclear was predestined should be revised, given the historical evidence. While previous studies point to a set of comments made by North Korean experts and officials,¹²⁰ these opinions do not represent Kim Il-sung's wish to make nuclear bombs. Attempting to find clearer evidence for Kim's decision to build bombs is necessary and should be encouraged. However, a lack of data should not serve as a scholarly pretext that justifies assumptions that North Korea's ambition for nuclear weapons can be traced back to the Korean War and even earlier, as virtually all security-centred accounts do based *only* on circumstantial data. On the contrary, a mandate to develop its industrial economy with the peaceful application of nuclear technology, which was largely shared by leaders in the Global South, is more convincing in understanding North Korea's initial pursuit of atomic power. Later in the 1960s and 1970s, North Korea made frequent entreaties to the Soviets for help building a nuclear power plant,¹²¹ but this was only approved by Moscow in the mid-1980s. However, the North Korean nuclear energy programme crashed for the same economic reasons that made its leadership in the early 1960s reluctant to invest more in nuclear physics research.

A case-study of North Korea's peaceful nuclear enterprises provides a meaningful reminder that its nuclear weapon programme, though we do not fully know how it started and unfolded, might have been a byproduct of South-South nuclear co-operation in the much later period. By the mid-1960s, North Korea had almost no economic incentives to build nuclear bombs that were costly. Given that it took time, resources, and costly exchanges with First World countries in the 1960s and 1970s for the Global South to further its own nuclear technologies inside the global nuclear order that historian Jacob Hamblin characterizes as 'wretched'¹²² or neocolonial, and that Moscow served as the only nuclear provider to Pyongyang throughout much of the Cold War period, North Korea's pursuit of nuclear weapon capabilities needs to be analysed in the context of the Cold War as North-South confrontation, with more reliable data that would be available in the future. Also, it might not be implausible that South Korea's undeclared nuclear activities

¹¹⁹ *Bulletin*, 3 (1962), pp. 22–8.

¹²⁰ Szalontai and Radchenko, 'North Korea's efforts', pp. 27–8.

¹²¹ *Ibid.*, pp. 42, 56.

¹²² Hamblin, *The wretched atom*.

taking place from 1979 to 2000, which were admitted to by the South Korean government in 2004, partly motivated North Korea to pursue its own weapon programme.¹²³

Finally, it is easy to observe that in the eyes of North Koreans not much has changed between the past and the present in terms of nuclear aggression and economic sanctions practised by American ‘imperialists’. Unfortunately, there are no signs of concession from the US that it wants the de-nuclearization of North Korea *first*, and from the DPRK that it wants economic sanctions lifted *first*. As long as both parties want peace and the de-nuclearization of the Korean Peninsula on their own terms, the nuclear status quo will linger in the years to come.

Acknowledgements. The author thanks Kate Brown, Paul Josephson, David Holloway, Kim Dong-hyuk, Chae Jun-hyung, Kim Tae-woo, Chong Young-hwan, Theodore Porter, David Fedman, Rachel Leow, and two anonymous reviewers for offering their helpful comments and suggestions on earlier versions of this article, and Chông Ch’ang-hyŏn, Park Ch’ang-hŭi, Byun Hak-moon, Cho Su-ryong, Lee Ju-ho, Lee Jun-hee, and Kim Geun-bae for providing valuable source materials. The author is grateful to Kim Minchul for his friendship and advice. This article would not have been possible without the love and support of my wife Tanusha Woo.

Competing interests. The author declares none.

¹²³ Jungmin Kang et al., ‘South Korea’s nuclear surprise’, *Bulletin of the Atomic Scientists*, 61 (2005), pp. 40–9.

Cite this article: Woo D (2023). The Peaceful Origins of North Korea’s Nuclear Programme in the Cold War Period, 1945–1965. *The Historical Journal* 66, 459–479. <https://doi.org/10.1017/S0018246X22000140>