

Executive Summary



Hiroshima Report 2023

Evaluation of Achievement in Nuclear Disarmament,
Non-Proliferation and Nuclear Security in 2022

March 2023

About the Hiroshima Report The *Hiroshima Report* attempts to help the movement toward a world without nuclear weapons—firstly, by clarifying the current status of the issues and efforts surrounding nuclear disarmament, non-proliferation and nuclear security. In doing so, it aims to encourage increased debate on these issues by policy-makers, experts in and outside governments, and civil society. Furthermore, by issuing this report from Hiroshima, where a nuclear weapon was once used, it aims to help focus attention and promote further actions across various fields toward the realization of a world without nuclear weapons.

The *Hiroshima Report 2023: Evaluation of Achievement of Nuclear Disarmament, Non-Proliferation and Nuclear Security in 2022* is an outcome of the “Hiroshima Report Publication Project,” commissioned by Hiroshima Organization for Global Peace (HOPE) to the Center for Disarmament, Science and Technology (CDAST), the Japan Institute of International Affairs (JIIA). As with previous reports issued annually since 2013, the *Hiroshima Report 2022* is published in both English and Japanese. This project has been conducted as a part of the “Hiroshima for Global Peace” Plan launched by Hiroshima Prefecture in 2011.

Published by:

Hiroshima Organization for Global Peace (HOPE)
Peace Promotion Project Team, Regional Policy
Bureau, Hiroshima Prefectural Government
10-52 Motomachi, Naka-ku, Hiroshima
730-8511 Japan
<https://hiroshimaforpeace.com/en/>
hope@hiroshimaforpeace.com

Edited by:

Center for Disarmament, Science and Technology (CDAST),
The Japan Institute of International Affairs (JIIA)
3rd Floor Toranomon Mitsui Building
3-8-1 Kasumigaseki, Chiyoda-ku, Tokyo
100-0013 Japan
<https://www.jiia.or.jp/en/>
info_cdast@jiia.or.jp

The Russian invasion of Ukraine that began on February 24, 2022, and its subsequent behavior had tremendous impacts and influences, both directly and indirectly, on various issues regarding nuclear disarmament, nuclear nonproliferation, and nuclear security. At the 10th Review Conference (RevCon) of the Nuclear Non-Proliferation Treaty (NPT) held in August, the states parties sought to adopt a final document to reaffirm the significance of the NPT, particularly in light of the current difficult situation concerning nuclear issues. However, due to opposition by Russia, it could not be adopted following the previous 2015 RevCon. The rift over the nuclear issue also deepened not only between nuclear-weapon states (NWS) and non-nuclear-weapon states (NNWS), but even more so among the NWS, making it more difficult to reach an agreement on the nuclear issue.

The major trends in nuclear disarmament, non-proliferation and nuclear security observed in 2022 are as follows. The situation became increasingly serious.

Items and Countries Surveyed in the Hiroshima Report 2022

<p>Items (78)</p>	<p>Nuclear Disarmament: 41 Nuclear Non-Proliferation: 19 Nuclear Security: 18</p>
<p>Countries Surveyed (34)</p>	<p>NWS: China, France, Russia, the U.K. and the U.S. Non-NPT parties: India, Israel and Pakistan Non-nuclear-weapon states: Nuclear disarmament and non-proliferation: Australia, Austria, Brazil, Canada, Egypt, Germany, Indonesia, Iran, Japan, Kazakhstan, South Korea, Mexico, the Netherlands, New Zealand, Norway, Poland, Saudi Arabia, South Africa, Sweden, Switzerland, Syria and Turkey Nuclear security: Australia, Belgium, Brazil, Canada, Finland, Germany, Iran, Japan, Kazakhstan, South Korea, Mexico, the Netherlands, Norway, South Africa, Sweden, Switzerland, Turkey and the UAE Other: North Korea*</p>

* North Korea declared its suspension from the NPT in 1993 and its withdrawal in 2003, and has conducted in total six nuclear tests in 2006, 2009, 2013, 2016 (twice) and 2017. However, there is no agreement among the states parties on North Korea's official status.

1. Nuclear Disarmament

Russia's invasion of Ukraine in February 2022 and subsequent campaign of aggression accompanied by nuclear intimidations brought a strong sense of urgency to the international community that nuclear weapons would be used for the first time since the atomic bombings of Hiroshima and Nagasaki.

The rift over the nuclear disarmament also deepened not only between nuclear-weapon states (NWS) and non-nuclear-weapon states (NNWS), but even more so among NWS. Nuclear-armed states continue to consider that nuclear weapons play an important role in their national security, and have been taking measures to maintain and strengthen their nuclear deterrence over the medium-to-long term, including efforts to modernize their nuclear forces. NNWS allied with NWS also appear to have stepped up their reliance on the extended nuclear deterrence.

Meanwhile, both NWS and NNWS made various proposals regarding the continued non-use of nuclear weapons and nuclear risk reduction as an urgent issue. However, there was little progress in terms of agreeing on or implementing further nuclear disarmament by NWS.

The number of countries signing or ratifying the Treaty on the Prohibition of Nuclear Weapons (TPNW)—which, inter alia, legally bans states from possessing and using nuclear weapons—has steadily increased. Despite this, nuclear-armed states and their allies have stated their intention not to sign the treaty.

The Status of Nuclear Forces (estimates)

- Approximately 12,705 nuclear weapons (estimated) still exist on the Earth, and the pace of their reduction has slowed. Furthermore, it is pointed out that global

reductions of operational warheads have stalled, and their numbers may be rising again.

- China, India, Pakistan and North Korea have been gradually increasing their stockpiles of nuclear warheads for more than a decade.

Commitment to Achieving a World without Nuclear Weapons

- No country openly opposes the goals of “the total elimination of nuclear weapons” and “a world without nuclear weapons.” In addition, a number of countries, including five NWS, reaffirmed that “a nuclear war cannot be won and must never be fought.” However, steady and concrete implementation and promotion of nuclear disarmament toward the realization of this goal was not seen in 2022. Many NNWS intensified their criticism of this situation.
- At the 10th NPT Review Conference held in August, a final document could not be adopted due to Russia's opposition. Japan's Prime Minister Fumio Kishida attended the RevCon and proposed the “Hiroshima Action Plan” in his statement.
- On the Japan-led UN General Assembly (UNGA) Resolution titled “Joint courses of action and future-oriented dialogue towards a world without nuclear weapons,” 147 countries, including France, the United Kingdom and the United States, voted in favor. However, China and Russia voted against it.

Humanitarian consequences of nuclear weapons

- The Fourth Conference on the Humanitarian Impact of Nuclear Weapons was held in June, attended by more than 800

participants from 80 countries, international organizations, civil society organizations, and academia.

- Victim assistance and environmental remediation were discussed or implemented under TPNW or as individual initiatives.

TPNW

- By the end of 2022, 68 countries have become states parties to the TPNW.
- The First Meeting of the States Parties (1MSP) was held in June. Participating countries adopted by consensus the Declaration, the Vienna Action Plan and the Decision. In the Declaration, they reaffirmed the complementarity of the TPNW and the NPT. The Vienna Action Plan lists 50 actions to be taken by states parties with regard to the universalization, elimination of nuclear weapons, victim assistance and environmental remediation, institutionalizing scientific and technical advice, the relationship of the TPNW with nuclear disarmament, and other matters essential for achieving the Treaty's aims.
- Nuclear-armed states and their allies remain opposed to the TPNW. Meanwhile, a small number of U.S. allies attended the 1MSP as observers.

Reduction of Nuclear Weapons

- The United States and Russia have complied with the provisions regarding the numerical limits on their strategic nuclear weapons as stipulated in the New Strategic Arms Reduction Treaty (New START). On the other hand, Russia announced that it would temporarily suspend its acceptance of on-site inspections (OSI) due to sanctions against Russia. The Bilateral Consultative Com-

mittee scheduled for the end of November for the resumption of OSI could not be held after Russia announced the postponement of the meeting.

- The United States has expressed that it is prepared to negotiate a new arms control framework to succeed New START, which expires in 2026. However, since Russia's invasion of Ukraine, the bilateral Strategic Stability Dialogues have not been convened.
- China reiterated that it would not join such negotiations unless the two countries possessing the largest nuclear arsenals make drastic and substantive reductions.
- All nuclear-armed states continue to modernize their nuclear forces. In particular, China and Russia have been aggressively pursuing the development and deployment of various new delivery vehicles for carrying nuclear warheads. The United States estimates that China could be capable of deploying about 1,500 nuclear warheads by 2035.

Diminishing the Roles and Significance of Nuclear Weapons in the National Security Strategies and Policies

- Russia's invasion of Ukraine raised strong concerns in the international community about the possibility of nuclear weapon use. In addition, Russia's actions were strongly criticized, particularly by Western countries, as being in violation of both negative security assurances and the Budapest Memorandum of Understanding.
- The United States released its Nuclear Posture Review (NPR), which presented a nuclear posture that was generally based on its existing nuclear policies,

with some modifications.

- In September, North Korea adopted the Law on Policy on Nuclear Forces, which stipulates, inter alia, the possibility of first use of nuclear weapons and enhancement of both strategic and tactical nuclear arsenals.
- There have been few significant changes in nuclear policies regarding the following: the role and significance of nuclear weapons; a “sole purpose” or no first use policy; negative security assurances; and extended nuclear deterrence. In its NPR, the United States stated that it would not adopt such policies, but retained the goal of moving toward a sole purpose declaration. Reportedly, U.S. allies also did not express support for a U.S. adoption of such policies.
- In response to the indication that China’s policies of minimum deterrence and no first use of nuclear weapons is changing, China emphasized that its nuclear policy and posture remain unchanged.
- Sweden and Finland applied to join the North Atlantic Treaty Organization (NATO). U.S. allies also reaffirmed the importance of extended (nuclear) deterrence.
- Five NWS, as well as some NNWS participating in the Stockholm Initiative and others groups, have made various proposals on measures to reduce nuclear risks at the NPT RevCon and other forums.

De-Alerting or Measures for Maximizing Decision Time to Authorize the Use of Nuclear Weapons

- There have been few significant changes in NWS policies concerning alert status. Russian and U.S. strategic nuclear forces

are considered to remain on high alert status.

- China denied an allegation that it has been putting some of its nuclear forces on higher alert.

CTBT

- Among the 44 states listed in Annex 2 of the CTBT, whose ratification is a prerequisite for the treaty’s entry into force, five states (China, Egypt, Iran, Israel and the United States) have signed but not ratified, and three (India, Pakistan and North Korea) have not even signed.
- With the exception of North Korea, all countries which have declared possession of nuclear weapons maintain moratorium on nuclear test explosions. Since 2018, no country has conducted a nuclear explosion test. The United States claimed that China and Russia may have conducted non-“zero yield” nuclear tests, but China and Russia denied the allegations.
- North Korea was reportedly complete its preparedness to conduct a nuclear test explosion. However, it did not conduct such a test in 2022.
- Some nuclear-armed states are considered to have conducted nuclear tests without explosions, such as subcritical experiments and computer simulations.

FMCT

- At the 2022 session of the Conference on Disarmament (CD), negotiation of an FMCT yet again failed to be commenced. Pakistan continued to oppose even negotiating a treaty prohibiting just the production of fissile material for nuclear weapons. China, Iran and Pakistan also voted against the UN General Assembly resolution on FMCT.

- China, India, Israel, Pakistan and North Korea have yet to declare a moratorium on the production of fissile material for nuclear weapons.

Transparency in Nuclear Forces, Fissile Material for Nuclear Weapons, and Nuclear Strategy/Doctrine

- There has been no significant change in nuclear-armed states' policies regarding transparency.
- While China insists that transparency of intentions and policies is important, it has not disclosed any information about the type or quantity of nuclear arsenals it possesses.

Verifications of Nuclear Weapons Reductions

- Countries participating in the International Partnership for Nuclear Disarmament Verification (IPNDV), which was launched by the United States, continue further discussions and deliberations on verification measures—including virtual exercises.

Irreversibility

- Russia and the United States continue to dismantle or convert, to some extent, their strategic delivery vehicles, nuclear warheads, and fissile material declared excess for military purposes.

Disarmament and Non-Proliferation Education and Cooperation with Civil Society

- The importance of disarmament and non-proliferation education, diversity and inclusion including gender, and participations of civil society was emphasized at the NPT RevCon and the

TPNW 1MSP.

- Japan announced the establishment of the “Youth Leader Fund for a world without nuclear weapons,” by which future leaders of the younger generation are invited to Japan for learning first-hand the realities of nuclear weapon use.
- Some countries have started to legislate “divestment” against, or prohibitions on lending to, organizations and companies which are involved in producing and developing nuclear weapons. The number of companies which have individually established such policies is also increasing.

Hiroshima and Nagasaki Peace Memorial Ceremonies

- Representatives from 99 countries attended the peace memorial ceremony in Hiroshima, and 83 countries were represented at the ceremony in Nagasaki.

2. Nuclear Non-Proliferation

As of December 2022, 191 countries have acceded to the Nuclear Non-Proliferation Treaty (NPT). However, three nuclear-armed states—India and Pakistan which possess nuclear weapons, and Israel which has not denied possessing them—remain outside and are seen as unlikely to join the treaty in the near future. North Korea has not made a strategic decision on renouncing its nuclear weapons, and there are concerns that the nation is continuing to engage in illicit trafficking and procurement activities for its nuclear and missile programs. Regarding the Joint Comprehensive Plan of Action (JCPOA), as a countermeasure against the U.S. withdrawal in 2018, Iran has continued to steadily expand its suspension of adherence to the nuclear limits of the deal.

The number of countries that have accepted the International Atomic Energy Agency (IAEA) safeguards under the Additional Protocols has increased steadily. Still, more than 40 countries have yet to sign them. The Russian invasion of Ukraine has also affected the implementation of IAEA safeguards in Ukraine.

Acceptance and Compliance with the Nuclear Non-Proliferation Obligations

- No progress has been made to resolve the North Korean nuclear issue. Pyongyang insisted that it has no intention to renounce its nuclear arsenals, and has continued to bolster its nuclear and missile capabilities.
- Iran has expanded its stockpile of enriched uranium, including 20% and 60% highly enriched uranium (HEU), and the number and performance of centrifuges well beyond the provisions of the JCPOA. Indirect negotiations were held intermittently by the countries involved

to restore the JCPOA, but no agreement was reached during 2022.

IAEA Safeguards

- As of 2022, 132 NPT NNWS have concluded the IAEA Additional Protocols. Some countries such as Brazil argue that the conclusion of an Additional Protocol should be voluntary, not obligatory under the NPT.
- The IAEA applied integrated safeguards to 69 NNWS by the end of 2021. In addition, as of June 2022, the Agency developed and approved state-level safeguards approaches (SLAs) for 135 countries.
- Iran continued to suspend verification and monitoring measures under the JCPOA, including the application of the Additional Protocol to the IAEA Safeguards Agreement. The IAEA was also unable to access data from surveillance cameras, online enrichment monitors and electronic seals installed at Iran's nuclear facilities.
- The IAEA reported that it could not resolve the issues regarding the accuracy and completeness of declarations for four sites related to Iran's alleged past clandestine nuclear program. The IAEA has demanded that Iran provide further clarifications and information.
- Saudi Arabia is nearing completion of its first research reactor, but has not yet concluded an Additional Protocol with the IAEA nor accepted a modification to its Small Quantities Protocol (SQP).
- Australia, the United Kingdom, and the United States (AUKUS) and the IAEA started technical discussions regarding the implementation of IAEA safeguards for nuclear fuel for Australia's nuclear-powered submarines. Some countries,

including China, expressed criticism and concerns regarding these three countries' decision.

- Russia's attack and occupation of nuclear facilities in Ukraine has impeded the IAEA from fully and safely conducting safeguard verification activities in Ukraine.

Implementing Appropriate Export Controls on Nuclear-Related Items and Technologies

- Most members of the Nuclear Suppliers Group (NSG) have solid export controls in place, including establishment of legislative measures and other relevant national implementation systems. On the other hand, many countries, in particular developing countries, have been requested to strengthen their systems and their implementation of export controls.
- North Korea continues to engage in illicit trafficking and procurement through, inter alia, ship-to-ship transfers and cyber activities.
- China has been criticized for its export of nuclear power reactors to Pakistan, which may constitute a violation of the NSG guidelines.

Transparency in the Peaceful Use of Nuclear Energy

- Since 2018, China has not submitted their reports based on the Guidelines for the Management of Plutonium.

3. Nuclear Security

Russia's attacks and occupation of an operating nuclear facility in Ukraine have created a situation that could seriously threaten the safety and nuclear security of the facility. This has highlighted a new challenge in dealing with threats to nuclear facilities posed by states during conflict.

The threat of cyber-attacks against nuclear facilities as well as sabotage involving drones continues to require close attention. On the other hand, with regard to international nuclear security efforts, the first Review Conference of the Amendment to the Convention on the Physical Protection of Nuclear Material (A/CPPNM) was held in March, and the Conference determined that the A/CPPNM is adequate in light of the prevailing situation. With regard to the global inventory of weapon-usable nuclear materials, Japan and Kazakhstan have made significant progress in their efforts to minimize HEU (Highly Enriched Uranium), and global stocks of civilian HEU have decreased. On the other hand, civilian stocks of separated plutonium have increased and continue to grow. Regarding the International Physical Protection Advisory Service (IPPAS), four countries in this survey announced their future acceptance or plans to accept the IPPAS mission.

Physical Protection of Nuclear Material and Facilities

- Regarding the global inventory of weapons-usable nuclear material, as for HEU, military stocks continue to decline, the stocks combined both for military and non-military also declined, and downward trends continued. As for separated plutonium, civilian stocks of France and the United Kingdom have increased, and trends for increase continued. On the other hand, Japan's stocks of separated plutonium decreased.

- Twenty out of the 27 countries surveyed still possess weapons-usable nuclear material that could be attractive to terrorists.

Accession to Nuclear Security and Safety-Related Conventions and Their Application to Domestic Systems

- Brazil has ratified the A/CPPNM. In addition, Turkey announced that it has ratified the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. For most of the nuclear security related conventions, the number of parties increased progressively.
- Regarding the implementation of “Nuclear Security Recommendations on the Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5),” new dissemination of information by each country of their progress in reflecting the recommended measures in their domestic system continues to decrease. With regard to cyber security, the United Kingdom has outlined a new policy for managing and mitigating cyber risks for civilian nuclear facilities, and the United States announced that it has completed inspections of domestic nuclear power plants for the implementation of relevant regulations in 2021.

Efforts to Maintain and Improve the Highest Level of Nuclear Security

- Regarding civilian HEU minimization, progress has been made in Japan and Kazakhstan in removing HEU and converting HEU-fueled reactors to low-enriched uranium fueled reactors. Norway is also continuing its efforts along these lines.
- Finland accepted their third IPPAS mission, including a follow-up mission.

Switzerland announced that it will accept a follow-up mission in 2023, while the United Kingdom plans to request a mission, and the United States has requested a mission to the IAEA. Furthermore, Japan has decided to request the IAEA to accept IPPAS for the third time—including a follow-up mission—in 2025.

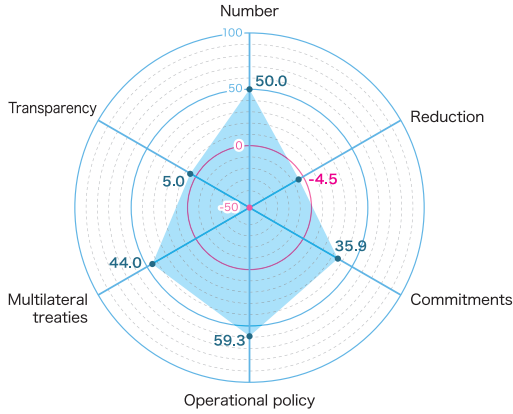
- As for multilateral efforts, the G7 has frequently issued joint statements condemning Russia and expressing concern about the precarious situation regarding facility safety and nuclear security brought about by Russia’s attack on Ukraine’s nuclear facilities. They also expressed support for the efforts of the IAEA and its Director General to address the situation. On the other hand, the Global Initiative to Combat Nuclear Terrorism (GICNT), co-chaired by the United States and Russia, temporarily suspended all activities in 2022. In addition, there was no activities observed in 2022 on the INFCIRC Initiative, which promotes efforts on key nuclear security themes derived from the Nuclear Security Summit Process.

6-Point Nuclear Disarmament Radar Charts (NWS)

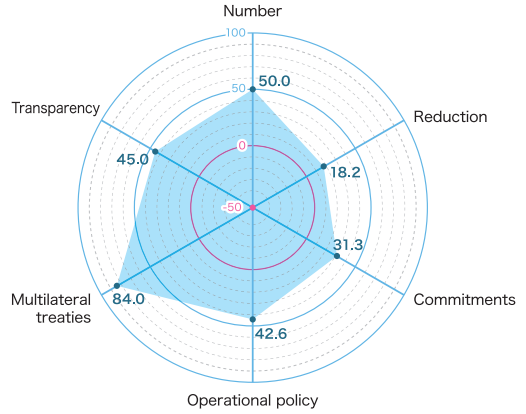
The following radar charts aim to illustrate where NWS stand in different aspects of nuclear disarmament. For this purpose, the 14 issues used for nuclear disarmament evaluation were grouped into six aspects. According to the radar charts, China is required to improve its efforts for nuclear weapons reduction and transparency. Russia and the United States are urged to undertake further reductions of their nuclear arsenals. The performances of France the United Kingdom are relatively well-balanced, compared to the other NWS. Still, those two countries need to improve their efforts regarding reductions, commitments and operational policies.

Aspects	Issues
Number	<ul style="list-style-type: none"> • Number of nuclear weapons
Reduction	<ul style="list-style-type: none"> • Reduction of nuclear weapons
Commitments	<ul style="list-style-type: none"> • Treaty on the Prohibition of Nuclear Weapons (TPNW) • Commitments to achieving a world without nuclear weapons • Humanitarian consequence of nuclear weapons • Disarmament and non-proliferation education and cooperation with the civil society • Hiroshima and Nagasaki Peace Memorial Ceremonies
Operational policy	<ul style="list-style-type: none"> • Diminishing roles and significance of nuclear weapons in the national security strategies and policies • De-alerting, or measures for maximizing decision time to authorize the use of nuclear weapons
Multilateral treaties	<ul style="list-style-type: none"> • Comprehensive Nuclear-Test-Ban Treaty (CTBT) • Fissile Material Cut-Off Treaty (FMCT)
Transparency	<ul style="list-style-type: none"> • Transparency regarding nuclear forces, fissile material for nuclear weapons, and nuclear strategy/doctrine • Verifications • Irreversibility

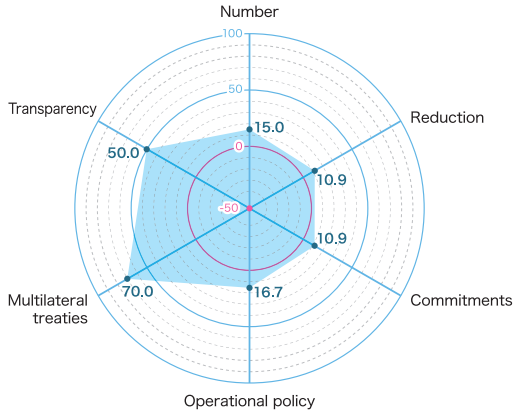
 **China**



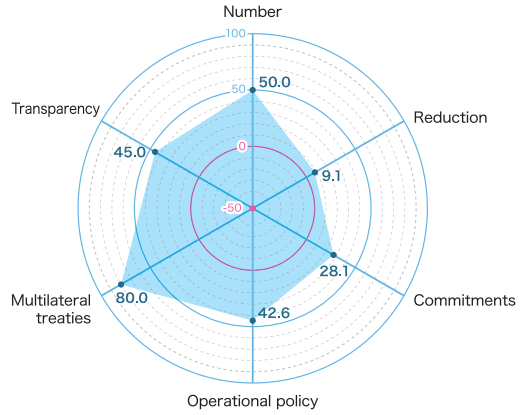
 **France**



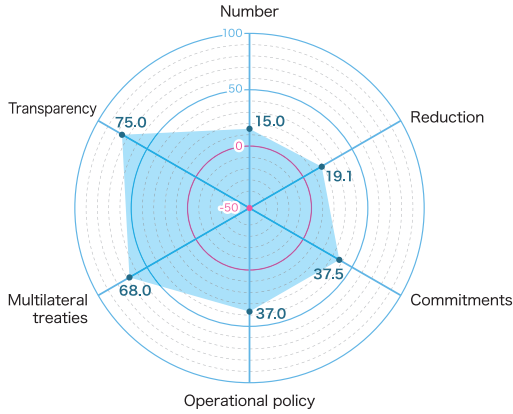
 **Russia**



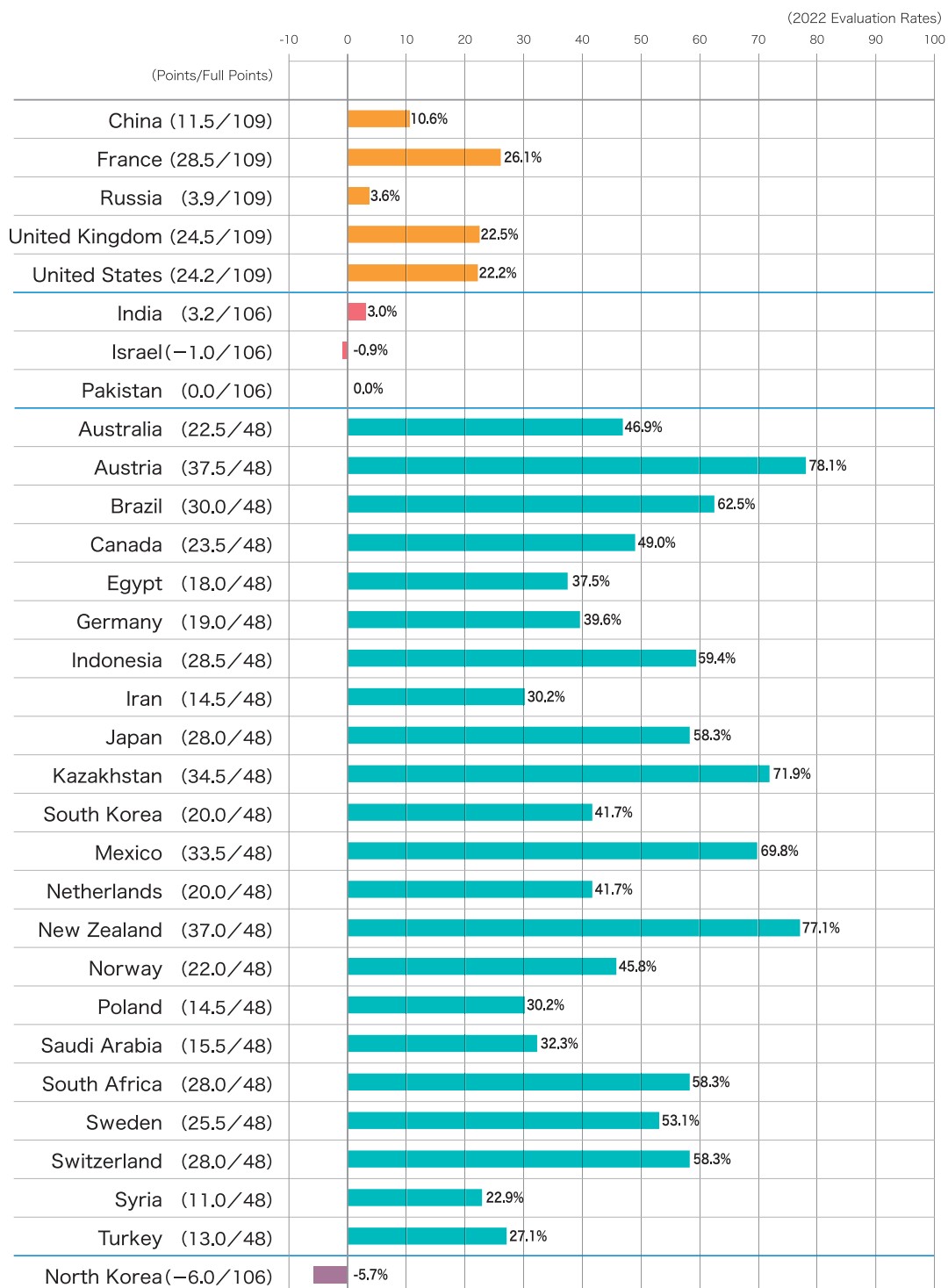
 **United Kingdom**



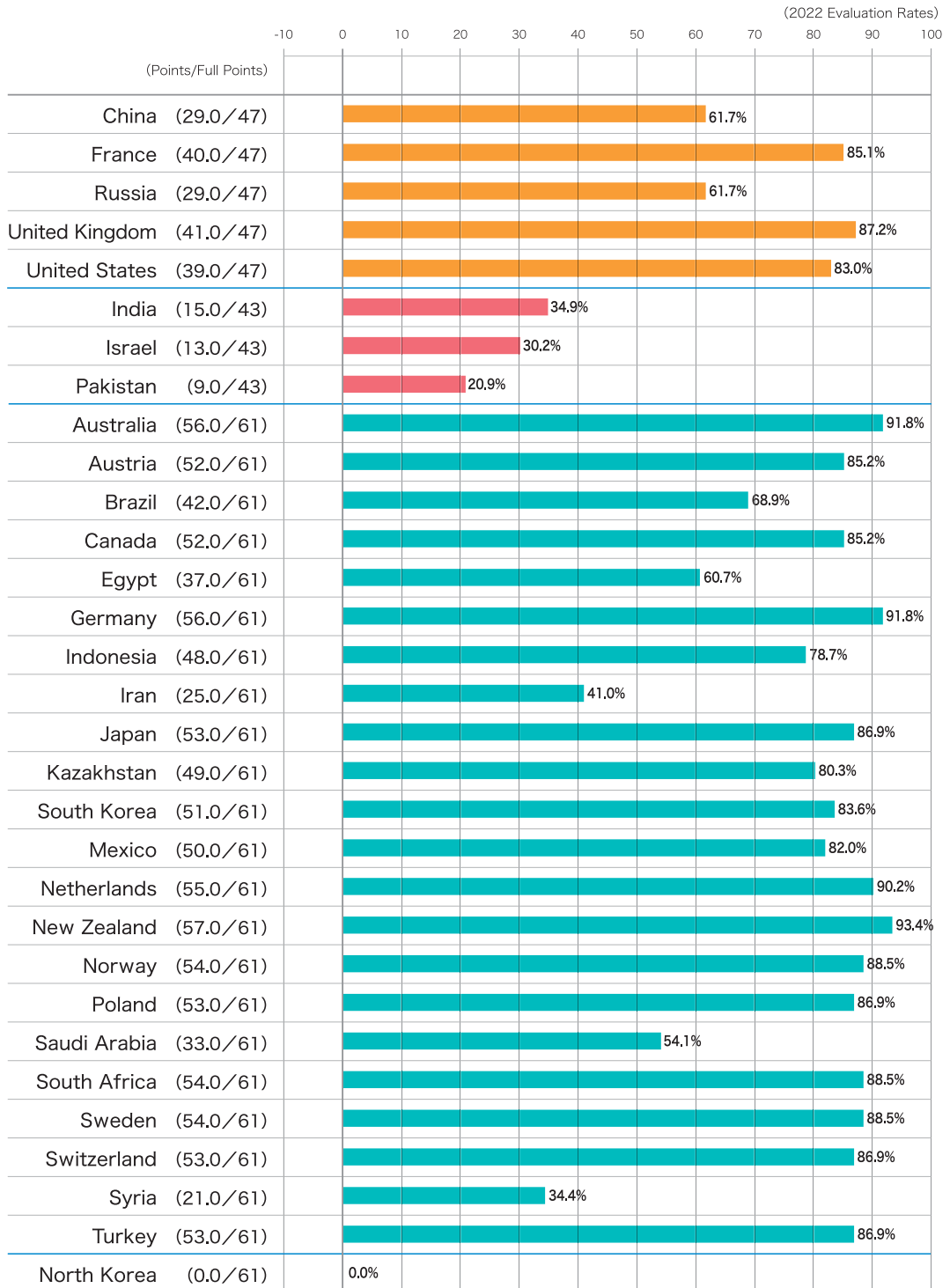
 **United States**



Nuclear Disarmament



Nuclear Non-Proliferation



Nuclear Security

