



NTI NUCLEAR SECURITY INDEX

Theft / Sabotage / Radiological

Economist Impact Methodology Theft and Sabotage

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Summary

To gain a better understanding of current global nuclear security conditions, the Nuclear Threat Initiative (NTI) commissioned Economist Impact (formerly the Economist Intelligence Unit) to construct the latest edition of the NTI Nuclear Security Index (the 2023 NTI Index). The 2023 NTI Index provides a country- or area-level assessment of nuclear security conditions in 175 countries and Taiwan. It follows the release of five iterations of the NTI Index, in January 2012, January 2014, January 2016, September 2018, and July 2020.

The 2023 NTI Index divides countries and areas into three groups, each with independent rankings and assessments. The first group assessed in the Index is the 22 countries with 1 kilogram or more of weapons-usable nuclear materials (this assessment results in the Theft: Secure Materials ranking for countries with weapons-usable nuclear materials). This ranking assesses actions related to securing materials against theft. The second group is the 153 countries and Taiwan that have less than 1 kilogram of or no weapons-usable nuclear materials but could be used as safe havens, staging grounds, or transit points for illicit nuclear activities (the Theft: Support Global Efforts ranking for countries and areas without nuclear materials). This ranking assesses actions related to supporting global nuclear security efforts. These first two groups assess nuclear materials security conditions since 2012. The third group includes the 46 countries and Taiwan with certain types of nuclear facilities, the sabotage of which could result in a significant radiological release with serious off-site health consequences (the Sabotage: Protect Facilities ranking). This ranking assesses actions related to protecting nuclear facilities against sabotage. The first edition to include the sabotage ranking was released in 2016.

Nuclear security is particularly difficult to observe because of both the legacy of secrecy associated with the subject and the absence of internationally agreed upon quantitative performance indicators. To address the need for an objective country- or area-level assessment of nuclear security, Economist Impact developed a multidimensional analytical framework, commonly known as a benchmarking index. A multidimensional framework is a useful way of measuring performance that cannot be directly observed—for example, a country or area's economic competitiveness or, in this case, a country or area's nuclear security conditions. Indices, in such cases, are effective in several ways: (a) they can aggregate a wide range of related data and evaluate it in a consistent manner; (b) they can track outcomes over time; and (c) they can spur countries and areas to improve performance, especially relative to others in the Index. Indices can therefore be a useful tool for stimulating public policy reforms. The goal of the NTI Index is not only to prompt improvements in nuclear security policies and programs but also to encourage international debate on the risks and other factors that affect the likelihood of a country or area losing control of its weapons-usable nuclear materials or its nuclear facilities being subject to an act of sabotage.

The 2023 NTI Index is again the result of collaboration between NTI and Economist Impact. Economist Impact researched the metrics captured in the NTI Index, paying particular attention to any changes to regulations or licensing conditions in a country or area. As a result of updates and revisions to the NTI Index framework since 2012, direct year-on-year comparisons would not have been possible. To allow for such comparisons, Economist Impact rescored countries and areas in the previous editions of the NTI Index using the updated 2023 framework and the data that would have been available when research for those editions was conducted.

In addition, the results from previous editions of the NTI Index were thoroughly reviewed and researched again to ensure accuracy. In a limited number of cases, research indicated that more information had become available, a relevant law or regulation had not been captured, or researchers disagreed on a score. In those instances, Economist Impact revised the previous scores to reflect the most accurate data. Rescoring those select data points was necessary for the 2023 NTI Index to capture accurate year-on-year comparisons. Most of the research was conducted between June 2022 and February 2023, although data was updated as new information became available until April 1, 2023.

NTI and Economist Impact once again drew on the expertise of highly respected nuclear security experts (the International Panel of Experts) from nuclear- and non-nuclear-weapon states, from countries and areas with and without nuclear materials, and from developed and developing nations, to provide input on options for strengthening the 2023 NTI Index.

The categories in the Theft: Secure Materials as well as the Sabotage: Protect Facilities rankings are as follows:

1. **Quantities and Sites**,¹ which captures the quantity of nuclear materials, the number of sites, the frequency of transport in a particular country or area, and whether quantities are increasing or decreasing
2. **Security and Control Measures**, which encompasses the core activities related to the physical protection and accounting of weapons-usable nuclear materials, personnel and security infrastructure, cybersecurity, and security culture
3. **Global Norms**, which includes actions that contribute to a strengthened global nuclear security architecture
4. **Domestic Commitments and Capacity**, which indicates how well a country or area has implemented its international commitments as well as its capacity to do so
5. **Risk Environment**,² which examines issues that can undermine nuclear security at the national level, such as political instability, absence of effective governance, corruption, or the illicit activities of non-state actors

The Theft: Support Global Efforts ranking consists of categories three, four, and five from the Theft: Secure Materials ranking.

The research for both the Theft: Secure Materials and the Sabotage: Protect Facilities rankings primarily considered regulatory requirements for security. Taking a bottom-up approach and reviewing security at the facility or site-level within each country or area was impossible, not least because of national security concerns. Researching domestic regulations also posed a challenge: some countries or areas do not publish the majority of their nuclear security regulations; and two, Israel and North Korea, do not make any regulations public. Owing to these research challenges, Economist Impact used a variety of techniques to score certain countries or areas (see the section Research behind Selected Indicators).

To limit the degree of subjectivity in these indicators, Economist Impact created subindicators that, whenever possible, were framed as a binary choice (yes or no; or 1 or 0). For example, Economist Impact asked if a country or area has domestic regulations or licensing conditions that require nuclear facilities to have protection from a cyber attack. If it does, it is awarded one point; if it does not, it scores a zero. A binary approach limits the risk of subjectivity and increases the likelihood that the same scores would be obtained by another set of researchers, a key measure of objectivity and analytical rigor. If a binary approach was not appropriate, the research team used a qualitative scoring approach.

Despite the care taken in designing these measures, no index of this kind can be perfect. Some countries or areas are particularly non-transparent in matters of nuclear security. In those cases, Economist Impact scored indicators using expert judgment or relied on proxy measures; for example, the sophistication of a country or area's military operations was used to assess how well weapons-usable nuclear materials and nuclear facilities are protected in countries or areas where the military is primarily responsible for that protection.

¹ Category 1 in the Sabotage: Protect Facilities ranking does not include Quantities; it is called Number of Sites.

² This category was named Societal Factors in the 2012 NTI Index.

The indicators in the 2023 NTI Index are embedded in an interactive data model (available as an Excel workbook at www.ntiindex.org) that offers a wide range of analytical tools, allowing a deeper investigation of measures of nuclear security globally. For example, users can filter countries or areas by region or by membership in international organizations or multilateral initiatives. A user can directly compare two or more countries or areas and examine correlations between indicators. Individual country and area profiles are also included in the 2023 NTI Index model, permitting a deeper dive into the nuclear security conditions in each country or area. The weights assigned to each indicator can be changed to reflect different assumptions about the importance of categories and indicators. Finally, the model allows scores to be benchmarked against external factors that could influence nuclear security. For example, the results of the Theft: Secure Materials ranking correlate well with regulatory quality (as measured by the World Bank's Worldwide Governance Indicators) and with those countries and areas that are most at peace (as measured by the 2022 Global Peace Index).

Methodology

General

The 2023 NTI Index includes three separate rankings. The first ranking assesses the nuclear materials security conditions in 22 countries that have 1 kilogram or more of weapons-usable nuclear materials (Theft: Secure Materials). This ranking assesses actions related to securing materials against theft. The ranking has 74 subindicators used to construct 21 indicators across five categories. The scope of the Theft: Secure Materials ranking includes highly enriched uranium (HEU), including spent fuel; separated plutonium; and plutonium in unirradiated mixed oxide fuel (MOX). A second, separate ranking assesses the nuclear materials security conditions in 153 countries and Taiwan that have less than 1 kilogram of or no weapons-usable nuclear materials but could be used as safe havens, staging grounds, or transit routes (Theft: Support Global Efforts).³ This ranking assesses actions related to supporting global nuclear security efforts. The number of countries and areas in the Theft: Support Global Efforts ranking was initially determined by the scope of the Risk Briefing service of the Economist Intelligence Unit (EIU).⁴ The Theft: Support Global Efforts ranking has 29 subindicators across nine indicators and three categories; the three categories are a subset of the five categories in the Theft: Secure Materials ranking. Finally, the third ranking assesses nuclear security conditions in 46 countries and Taiwan⁵ with certain types of nuclear facilities, the sabotage of which could lead to a significant radiological release with serious off-site health consequences (Sabotage: Protect Facilities).⁶ This ranking assesses actions related to protecting nuclear facilities against sabotage. The Sabotage: Protect Facilities ranking has 67 subindicators, 18 indicators, and five categories.

The overall score (0–100) for each country and area in each ranking is a weighted sum of the categories included in that ranking. Each category is scored on a scale of 0–100, where 100 represents the most favorable nuclear security conditions and 0 represents the least favorable conditions. A score of 100 in the ranking does not indicate that a country or area has perfect nuclear security conditions and likewise a score of 0 does not mean that a country or area has no security; instead, the scores of 100 and 0 represent the highest or lowest

³ NTI recognizes that some states may have gram quantities of weapons-usable nuclear materials in multiple locations which, added together, may bring totals to more than 1 kilogram. For the purposes of the NTI Index, because of the need to rely on publicly available information, those states are grouped with states that have no weapons-usable nuclear materials.

⁴ The EIU's Risk Briefing service provides forecasts, alerts, background studies, and data covering a wide range of risk factors across 180 countries and areas. The service is updated regularly in response to events that affect the assessment of operating risk in a particular country or area.

⁵ Taiwan is included in the Theft: Support Global Efforts ranking and the Sabotage: Protect Facilities ranking. Given Taiwan's status, this methodology describes the number of countries and areas in the NTI Index as "153 countries and Taiwan" and "46 countries and Taiwan" in the Theft: Support Global Efforts ranking and the Sabotage: Protect Facilities ranking, respectively.

⁶ These nuclear facilities are operating nuclear power reactors or nuclear power reactors that have been shut down within the past five years; research reactors with a capacity of 2 megawatts or more; reprocessing facilities; and spent fuel pools, only if the fuel has been discharged in the past five years and is not associated with an operating reactor.

possible score, respectively, as measured by the NTI Index criteria. Each category score is normalized based on the sums of underlying indicators and subindicators and a weight is then applied. Weights are based on input from the International Panel of Experts and reflect the relative importance and relevance of each indicator and category. These weights differ among the three rankings to reflect that security priorities may be different in countries or areas with or without weapons-usable nuclear materials and in countries or areas with nuclear facilities. Although each model displays the weights selected by the International Panel of Experts by default, a user can manually change the weights to see how different priorities might affect the scores and rankings.

The number of countries or areas and indicators in each of the three rankings has changed repeatedly since the framework's inception in 2012. For example, the NTI Index Theft: Secure Materials ranking assessed the following:

- › 2012: 32 countries with weapons-usable nuclear materials across 18 indicators
- › 2014: 25 countries with weapons-usable nuclear materials across 19 indicators
- › 2016: 24 countries with weapons-usable nuclear materials across 20 indicators
- › 2018: 22 countries with weapons-usable nuclear materials across 20 indicators
- › 2020: 22 countries with weapons-usable nuclear materials across 21 indicators
- › 2023: 22 countries with weapons-usable nuclear materials across 21 indicators

The steady decline in the number of countries within the Theft: Secure Materials ranking between 2012 and 2018 reflects the removal of all or most of such materials from the territories of 10 countries.⁷ The NTI Index Sabotage: Protect Facilities ranking assessed 46 countries and Taiwan against 18 indicators in 2020. The number of countries and areas in the Sabotage: Protect Facilities ranking increased by two from 2018 to 2020 as a result of the construction of nuclear facilities in Jordan and the United Arab Emirates. There has been no change in the number of countries and areas included in any of the rankings between 2020 and 2023.

Index Constraints and Other Important Factors

In producing the NTI Index, Economist Impact relied on publicly available sources, such as laws and regulations, to reach initial scoring conclusions. The research team gathered data from the following types of sources:

- › Primary legal texts and legal reports
- › Government publications and reports
- › Academic publications and reports
- › Websites of government authorities, international organizations, and non-governmental organizations
- › EIU country rankings and reports (specifically "Risk Briefing")
- › Local and international news media reports

See the Selected Bibliography for more information on central sources.

⁷ Austria, the Czech Republic, Hungary, Mexico, Sweden, Ukraine, and Vietnam removed all or most of their materials between the release of the 2012 NTI Index and the release of the 2014 NTI Index. Uzbekistan eliminated its stock of weapons-usable nuclear materials between the release of the 2014 NTI Index and the release of the 2016 Index. Argentina and Poland removed all or most of their materials following the release of the 2016 Index.

The emphasis on publicly available sources has the benefit of creating a transparent and repeatable methodology, but it also presents some challenges. For example, regulations and other requirements for nuclear security are sometimes classified. In cases where no public information was available, the countries or areas were queried about the status of their regulations or licensing conditions as part of the data confirmation process. Those countries or areas could then choose whether to provide additional insight into their regulatory requirements, which could then be considered in making a final scoring decision.

In cases where countries or areas are particularly non-transparent and chose not to respond to data confirmation queries, scores were assigned based on a proxy indicator or the country or area was given a score of 0. The absence of information on nuclear security reduces public and international confidence in the security measures countries and areas are taking; thus, it is appropriate for the countries or areas that do not make their regulations publicly available to receive low scores.

Although facility-level assessments would provide important “ground-truth” information, this level of granularity is not currently possible because of the sensitive nature of specific security arrangements. The NTI Index relies instead on the assumption that a country or area with the appropriate laws and regulations in place is more likely to have sound security procedures at each nuclear facility than a country or area without appropriate laws and regulations.

Additionally, the NTI Index includes “indicators” of security conditions and not the complete set of good security practices that nuclear facilities should employ to protect against theft of weapons-usable nuclear materials or sabotage of nuclear facilities. For example, information regarding the types of locking mechanisms, surveillance systems, thickness of walls, and so forth, is not publicly available for security reasons. The exclusion of specific security practices from the NTI Index does not reflect their lack of importance, but instead reflects the research constraints of the NTI Index.

Finally, please note that the NTI Nuclear Security Index does not directly address proliferation risks, smuggling or illicit trafficking, disarmament, or nuclear safety.

International Panel of Experts

As in previous years, NTI and Economist Impact drew on the expertise of highly respected nuclear security experts (the International Panel of Experts) from nuclear- and non-nuclear-weapon states, from countries and areas with and without nuclear materials, and from developed and developing nations, to provide input on options for strengthening the 2023 NTI Index. This input included discussions on the potential addition and removal of several subindicators, the revision of the international assurances indicator, and potential approaches to rewarding outcomes-based approaches in the cybersecurity category. Economist Impact also received expert guidance from technical advisors on the panel throughout the research process. These technical advisors helped Economist Impact modify and refine indicators to capture key elements of nuclear security and provided insights into the more technical parts of the research.

Country and Area Scope

By reviewing recent reports pertaining to quantities of nuclear materials and taking into account recent developments, Economist Impact identified 22 countries (listed in alphabetical order) as having 1 kilogram or more of HEU (including spent fuel), separated plutonium, or plutonium content in unirradiated MOX:

Australia	Germany	Kazakhstan	South Africa
Belarus	India	Netherlands	Switzerland
Belgium	Iran	North Korea	United Kingdom
Canada	Israel	Norway	United States
China	Italy	Pakistan	
France	Japan	Russia	

The 2023 NTI Index also assesses the 153 countries and Taiwan (listed in alphabetical order) that have less than 1 kilogram of weapons-usable nuclear materials or no weapons-usable nuclear materials:

Afghanistan	Colombia	Guinea	Mauritania
Albania	Comoros	Guinea-Bissau	Mauritius
Algeria	Congo (Dem. Rep. of)	Guyana	Mexico
Angola	Congo, Rep.	Haiti	Moldova
Argentina	Costa Rica	Honduras	Mongolia
Armenia	Côte d'Ivoire	Hungary	Montenegro
Austria	Croatia	Iceland	Morocco
Azerbaijan	Cuba	Indonesia	Mozambique
Bahamas	Cyprus	Iraq	Myanmar
Bahrain	Czech Republic	Ireland	Namibia
Bangladesh	Denmark	Jamaica	Nepal
Barbados	Djibouti	Jordan	New Zealand
Belize	Dominican Republic	Kenya	Nicaragua
Benin	Ecuador	Kuwait	Niger
Bhutan	Egypt	Kyrgyz Republic	Nigeria
Bolivia	El Salvador	Lao PDR	Oman
Bosnia and Herzegovina	Equatorial Guinea	Latvia	Panama
Botswana	Eritrea	Lebanon	Papua New Guinea
Brazil	Estonia	Lesotho	Paraguay
Brunei Darussalam	Eswatini	Liberia	Peru
Bulgaria	Ethiopia	Libya	Philippines
Burkina Faso	Fiji	Lithuania	Poland
Burundi	Finland	Luxembourg	Portugal
Cambodia	Gabon	North Macedonia	Qatar
Cameroon	Gambia, The	Madagascar	Romania
Cabo Verde	Georgia	Malawi	Rwanda
Central African Republic	Ghana	Malaysia	Samoa
Chad	Greece	Mali	São Tomé and Príncipe
Chile	Guatemala	Malta	Saudi Arabia

Senegal	Spain	Timor-Leste	Uruguay
Serbia	Sri Lanka	Togo	Uzbekistan
Seychelles	Sudan	Tonga	Vanuatu
Sierra Leone	Suriname	Trinidad and Tobago	Venezuela
Singapore	Sweden	Tunisia	Vietnam
Slovak Republic	Syrian Arab Republic	Turkey	Yemen
Slovenia	Taiwan	Turkmenistan	Zambia
Solomon Islands	Tajikistan	Uganda	Zimbabwe
Somalia	Tanzania	Ukraine	
South Korea	Thailand	United Arab Emirates	

The 2023 NTI Index also assesses the following 47 countries and areas (listed in alphabetical order) with nuclear facilities, the sabotage of which could result in a significant release of radiation with serious off-site health consequences. Note that this list includes 20 of the countries in the Theft: Secure Materials and 26 countries and Taiwan that are in the Theft: Support Global Efforts ranking.

Algeria	Egypt	Mexico	South Africa
Argentina	Finland	Morocco	South Korea
Armenia	France	Netherlands	Spain
Australia	Germany	North Korea	Sweden
Bangladesh	Hungary	Norway	Switzerland
Belgium	India	Pakistan	Taiwan
Brazil	Indonesia	Peru	Ukraine
Bulgaria	Iran	Poland	United Arab Emirates
Canada	Israel	Romania	United Kingdom
Chile	Japan	Russia	United States
China	Jordan	Slovak Republic	Uzbekistan
Czech Republic	Kazakhstan	Slovenia	

Data Review and Confirmation Process

After researching the indicators for each model, NTI and Economist Impact gave all 49 countries and areas included in the Theft: Secure Materials ranking and/or the Sabotage: Protect Facilities ranking an opportunity to review and comment on Economist Impact's preliminary results. The purpose of the data review and confirmation process was to ensure the accuracy of the 2023 NTI Index data. The research team also recognized that some countries or areas might be willing, upon request, to provide Economist Impact with more detailed information than is readily available to the public.

To make this process as simple as possible, Economist Impact developed documents that presented the preliminary scores for the 2023 NTI Index indicators. These forms allowed reviewers to either agree or disagree with the score selected for their country or area and, if the reviewer disagreed, to offer an alternative answer and justification. Economist Impact used the submitted responses to reevaluate and potentially change a country or area's scores. When responses were unclear, Economist Impact contacted individuals for clarification. Country and area representatives had three and a half months—from early December 2022 to mid March 2023—to respond to the data review and confirmation request.

Of the 49 countries and areas contacted, 26 provided official responses to the data review and confirmation request. They were Argentina, Australia, Belgium, Brazil, Bulgaria, Canada, Chile, the Czech Republic, Finland, Germany, Hungary, Italy, Japan, Jordan, Mexico, the Netherlands, Norway, Romania, Slovenia, South Korea, Spain, Sweden, Switzerland, Taiwan, the United Arab Emirates, and the United Kingdom.⁸

Scoring

Subindicator scoring options range from binary observations (0,1) to subindicators with eight possible scores. For each subindicator, a higher value is associated with more favorable nuclear security conditions. For example, for the subindicator number of sites in the Theft: Secure Materials ranking, a country with 100 or more sites with nuclear materials is assigned a value of 0, whereas a country with one site is assigned a value of 3. The sum of the subindicator values is divided by the total possible subindicator values, then converted to a 0–100 scale to determine the indicator score. The sole exception to this scoring scheme is indicator 3.2 Voluntary Commitments. This indicator has nine subindicators, each with a possible score of 1. However, the total indicator score is capped at 6.

Theft: Secure Materials Ranking

The five categories of the Theft: Secure Materials ranking are as follows:

1. **Quantities and Sites.** This category comprises three indicators: Quantities of Nuclear Materials, Sites and Transportation, and Materials Production and Elimination Trends.
2. **Security and Control Measures.** This category comprises seven indicators: On-site Physical Protection, Control and Accounting Procedures, Insider Threat Prevention, Physical Security during Transport, Response Capabilities, Cybersecurity, and Security Culture.
3. **Global Norms.** This category comprises four indicators: International Legal Commitments, Voluntary Commitments, International Assurances, and the International Atomic Energy Agency (IAEA) Nuclear Security Information Circulars (INFCIRCs).
4. **Domestic Commitments and Capacity.** This category comprises three indicators: United Nations Security Council Resolution (UNSCR) 1540 Implementation, Domestic Nuclear Materials Security Legislation, and Independent Regulatory Agency.
5. **Risk Environment.** This category comprises four indicators: Political Stability, Effective Governance, Pervasiveness of Corruption, and Illicit Activities by Non-State Actors.

⁸ Of the 25 countries and Taiwan that responded, 9 are included in both the Theft: Secure Materials ranking and the Sabotage: Protect Facilities ranking: Australia, Belgium, Canada, Germany, Japan, the Netherlands, Norway, Switzerland, and the United Kingdom. One is included only in the Theft: Secure Materials ranking: Italy. The remaining 16 are included only in the Sabotage: Protect Facilities ranking: Argentina, Brazil, Bulgaria, Chile, the Czech Republic, Finland, Hungary, Jordan, Mexico, Romania, Slovenia, South Korea, Spain, Sweden, Taiwan, and the United Arab Emirates.

Each indicator within the five categories contains up to nine underlying subindicators. The categories, indicators, and subindicators are as follows:

1	QUANTITIES AND SITES	Scored 0–100 where 100 = most favorable nuclear materials security conditions
1.1	Quantities of Nuclear Materials	
1.1.1	Quantities of nuclear materials	Scored 0–8 where 8 = most favorable nuclear materials security conditions
1.2	Sites and Transportation	
1.2.1	Number of sites	Scored 0–3 where 3 = most favorable nuclear materials security conditions
1.2.2	Bulk processing facilities	Scored 0–3 where 3 = most favorable nuclear materials security conditions
1.2.3	Frequency of materials transport	Scored 0–2 where 2 = most favorable nuclear materials security conditions
1.3	Material Production and Elimination Trends	
1.3.1	Material production and elimination trends	Scored 0–4 where 4 = most favorable nuclear materials security conditions
2	SECURITY AND CONTROL MEASURES	Scored 0–100 where 100 = most favorable nuclear materials security conditions
2.1	On-site Physical Protection	
2.1.1	Mandatory physical protection	Scored 0–1 where 1 = most favorable nuclear materials security conditions
2.1.2	On-site reviews of security	Scored 0–1 where 1 = most favorable nuclear materials security conditions
2.1.3	Design basis threat (DBT)	Scored 0–1 where 1 = most favorable nuclear materials security conditions
2.1.4	Tests and assessments	Scored 0–2 where 2 = most favorable nuclear materials security conditions
2.2	Control and Accounting Procedures	
2.2.1	Legal and regulatory basis for materials control and accounting (MC&A)	Scored 0–3 where 3 = most favorable nuclear materials security conditions
2.2.2	Measurement methods	Scored 0–2 where 2 = most favorable nuclear materials security conditions
2.2.3	Inventory record	Scored 0–1 where 1 = most favorable nuclear materials security conditions
2.2.4	Material balance area(s)	Scored 0–2 where 2 = most favorable nuclear materials security conditions
2.2.5	Control measures	Scored 0–2 where 2 = most favorable nuclear materials security conditions

2.3 Insider Threat Prevention		
2.3.1	Personnel vetting	Scored 0–3 where 3 = most favorable nuclear materials security conditions
2.3.2	Frequency of personnel vetting	Scored 0–3 where 3 = most favorable nuclear materials security conditions
2.3.3	Reporting	Scored 0–1 where 1 = most favorable nuclear materials security conditions
2.3.4	Surveillance	Scored 0–2 where 2 = most favorable nuclear materials security conditions
2.3.5	Insider threat awareness program	Scored 0–2 where 2 = most favorable nuclear materials security conditions
2.4 Physical Security during Transport		
2.4.1	Physical security during transport	Scored 0–2 where 2 = most favorable nuclear materials security conditions
2.5 Response Capabilities		
2.5.1	Emergency response capabilities	Scored 0–3 where 3 = most favorable nuclear materials security conditions
2.5.2	Armed response capabilities	Scored 0–1 where 1 = most favorable nuclear materials security conditions
2.5.3	Law enforcement response training	Scored 0–1 where 1 = most favorable nuclear materials security conditions
2.5.4	Nuclear infrastructure protection plan	Scored 0–1 where 1 = most favorable nuclear materials security conditions
2.5.5	Response coordination capabilities	Scored 0–2 where 2 = most favorable nuclear materials security conditions
2.6 Cybersecurity		
2.6.1	Mandatory cybersecurity	Scored 0–1 where 1 = most favorable nuclear materials security conditions
2.6.2	Sensitive digital asset management	Scored 0–2 where 2 = most favorable nuclear materials security conditions
2.6.3	Cybersecurity DBT	Scored 0–1 where 1 = most favorable nuclear materials security conditions
2.6.4	Cybersecurity assessments	Scored 0–2 where 2 = most favorable nuclear materials security conditions
2.6.5	Cyber incident response plan	Scored 0–1 where 1 = most favorable nuclear materials security conditions
2.6.6	Mandatory cybersecurity awareness program	Scored 0–1 where 1 = most favorable nuclear materials security conditions

2.7	Security Culture	
2.7.1	Security culture	Scored 0–1 where 1 = most favorable nuclear materials security conditions
2.7.2	Security culture assessments	Scored 0–1 where 1 = most favorable nuclear materials security conditions
2.7.3	Security responsibilities and accountabilities	Scored 0–2 where 2 = most favorable nuclear materials security conditions
3	GLOBAL NORMS	Scored 0–100 where 100 = most favorable nuclear materials security conditions
3.1	International Legal Commitments	
3.1.1	Convention on the Physical Protection of Nuclear Material (CPPNM)	Scored 0–2 where 2 = most favorable nuclear materials security conditions
3.1.2	2005 CPPNM Amendment	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.1.3	International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT)	Scored 0–2 where 2 = most favorable nuclear materials security conditions
3.1.4	IAEA safeguards agreement	Scored 0–2 where 2 = most favorable nuclear materials security conditions
3.2	Voluntary Commitments	
3.2.1	Global Initiative to Combat Nuclear Terrorism (GICNT) membership	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.2.2	Group of Eight (G-8) Global Partnership membership	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.2.3	World Institute for Nuclear Security (WINS) contributions	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.2.4	IAEA Nuclear Security Fund contributions	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.2.5	Bilateral/multilateral assistance	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.2.6	Centers of Excellence	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.2.7	Ministerial participation in International Conference on Nuclear Security (ICONS)	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.2.8	IAEA Incident and Trafficking Database	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.2.9	IAEA Nuclear Security Guidance Committee	Scored 0–1 where 1 = most favorable nuclear materials security conditions

3.3 International Assurances		
3.3.1	Published regulations	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.3.2*	Published nuclear security annual reports	Scored 0–2 where 2 = most favorable nuclear materials security conditions
3.3.3	Published nuclear security progress reports	Scored 0–2 where 2 = most favorable nuclear materials security conditions
3.3.4*	Public declarations/reports about civilian nuclear materials	Scored 0–4 where 4 = most favorable nuclear materials security conditions
3.3.5	Public declarations/reports about military nuclear materials	Scored 0–2 where 2 = most favorable nuclear materials security conditions
3.3.6	Review of security arrangements	Scored 0–2 where 2 = most favorable nuclear materials security conditions
3.3.7*	International Physical Protection Advisory Service (IPPAS) mission	Scored 0–5 where 5 = most favorable nuclear materials security conditions
3.4 Nuclear Security INFCIRCs		
3.4.1	INFCIRC/869	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.4.2*	INFCIRC/908	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.4.3	Other nuclear security INFCIRCs	Scored 0–3 where 3 = most favorable nuclear materials security conditions
4	DOMESTIC COMMITMENTS AND CAPACITY	Scored 0–100 where 100 = most favorable nuclear materials security conditions
4.1 UNSCR 1540 Implementation		
4.1.1	UNSCR 1540 reporting	Scored 0–1 where 1 = most favorable nuclear materials security conditions
4.1.2	Extent of UNSCR 1540 implementation	Scored 0–4 where 4 = most favorable nuclear materials security conditions
4.2 Domestic Nuclear Materials Security Legislation		
4.2.1	CPPNM implementation authority	Scored 0–1 where 1 = most favorable nuclear materials security conditions
4.2.2	National legal framework for CPPNM Amendment	Scored 0–2 where 2 = most favorable nuclear materials security conditions
4.3 Independent Regulatory Agency		
4.3.1	Independent regulatory agency	Scored 0–1 where 1 = most favorable nuclear materials security conditions

* Indicates new or revised indicator/subindicator. For more detail on new and revised indicators/subindicators, see the section Comparability between 2020 and 2023 Indices.

5	RISK ENVIRONMENT	Scored 0–100 where 100 = most favorable nuclear materials security conditions
5.1	Political Stability	
5.1.1	Social unrest	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.1.2	Orderly transfers of power	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.1.3	International disputes/tensions	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.1.4	Armed conflict	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.1.5	Violent demonstrations or violent civil/labor unrest	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.2	Effective Governance	
5.2.1	Effectiveness of the political system	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.2.2	Quality of the bureaucracy	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.3	Pervasiveness of Corruption	
5.3.1	Pervasiveness of corruption	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.4	Illicit Activities by Non-State Actors	
5.4.1	Likelihood of terrorist attacks	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.4.2	Firearms seized during interdiction of illicit weapons trafficking	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.4.3	Domestic terrorism threat	Scored 0–8 where 8 = most favorable nuclear materials security conditions
5.4.4	Neighboring terror threat	Scored 0–4 where 4 = most favorable nuclear materials security conditions

* Indicates new or revised indicator/subindicator. For more detail on new and revised indicators/subindicators, see the section Comparability between 2020 and 2023 Indices.

Theft: Support Global Efforts Ranking

The three categories of the Theft: Support Global Efforts ranking are a subset of the Theft: Secure Materials ranking. They comprise categories three through five as follows:

- 3. Global Norms.** This category comprises three indicators: International Legal Commitments, Voluntary Commitments, and IAEA Nuclear Security INFCIRCs.
- 4. Domestic Commitments and Capacity.** This category comprises two indicators: UNSCR 1540 Implementation and Domestic Nuclear Materials Security Legislation.
- 5. Risk Environment.** This category comprises four indicators: Political Stability, Effective Governance, Pervasiveness of Corruption, and Illicit Activities by Non-State Actors.

Each indicator within the three categories contains one to nine underlying subindicators. The categories, indicators, and subindicators are as follows:

3	GLOBAL NORMS	Scored 0–100 where 100 = most favorable nuclear materials security conditions
3.1 International Legal Commitments		
3.1.1	CPPNM	Scored 0–2 where 2 = most favorable nuclear materials security conditions
3.1.2	2005 CPPNM Amendment	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.1.3	ICSANT	Scored 0–2 where 2 = most favorable nuclear materials security conditions
3.1.4	IAEA safeguards agreement	Scored 0–2 where 2 = most favorable nuclear materials security conditions
3.2 Voluntary Commitments		
3.2.1	GICNT membership	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.2.2	G-8 Global Partnership membership	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.2.3	WINS contributions	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.2.4	IAEA Nuclear Security Fund contributions	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.2.5	Bilateral/multilateral assistance	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.2.6	Centers of Excellence	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.2.7	Ministerial participation in ICONS	Scored 0–1 where 1 = most favorable nuclear materials security conditions

3.2.8	IAEA Incident and Trafficking Database	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.2.9	IAEA Nuclear Security Guidance Committee	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.3	International Assurances	
3.3.1	Published regulations	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.3.2*	Published nuclear security annual reports	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.3.3	Published nuclear security progress reports	Scored 0–3 where 3 = most favorable nuclear materials security conditions
3.3.4*	Public declarations/reports about civilian nuclear materials	Scored 0–4 where 4 = most favorable nuclear materials security conditions
3.3.5	Public declarations/reports about military nuclear materials	Scored 0–2 where 2 = most favorable nuclear materials security conditions
3.3.6	Review of security arrangements	Scored 0–2 where 2 = most favorable nuclear materials security conditions
3.3.7*	International Physical Protection Advisory Service (IPPAS) mission	Scored 0–5 where 5 = most favorable nuclear materials security conditions
3.4	Nuclear Security INFCIRCs	
3.4.1	INFCIRC/869	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.4.2*	INFCIRC/908	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.4.3	Other nuclear security INFCIRCs	Scored 0–3 where 3 = most favorable nuclear materials security conditions
4	DOMESTIC COMMITMENTS AND CAPACITY	Scored 0-100 where 100=most favorable nuclear materials security conditions
4.1	UNSCR 1540 Implementation	
4.1.1	UNSCR 1540 reporting	Scored 0–1 where 1 = most favorable nuclear materials security conditions
4.1.2	Extent of UNSCR 1540 implementation	Scored 0–4 where 4 = most favorable nuclear materials security conditions
4.2	Domestic Nuclear Materials Security Legislation	
4.2.1	CPPNM implementation authority	Scored 0–1 where 1 = most favorable nuclear materials security conditions
4.2.2	National legal framework for CPPNM Amendment	Scored 0–2 where 2 = most favorable nuclear materials security conditions

* Indicates new or revised indicator/subindicator. For more detail on new and revised indicators/subindicators, see the section Comparability between 2020 and 2023 Indices.

5	RISK ENVIRONMENT	Scored 0–100 where 100 = most favorable nuclear materials security conditions
5.1	Political Stability	
5.1.1	Social unrest	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.1.2	Orderly transfers of power	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.1.3	International disputes/tensions	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.1.4	Armed conflict	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.1.5	Violent demonstrations or violent civil/labor unrest	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.2	Effective Governance	
5.2.1	Effectiveness of the political system	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.2.2	Quality of the bureaucracy	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.3	Pervasiveness of Corruption	
5.3.1	Pervasiveness of corruption	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.4	Illicit Activities by Non-State Actors	
5.4.1	Likelihood of terrorist attacks	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.4.2	Firearms seized during interdiction of illicit weapons trafficking	Scored 0–4 where 4 = most favorable nuclear materials security conditions
5.4.3	Pervasiveness of organized crime	Scored 0–4 where 4 = most favorable nuclear materials security conditions

* Indicates new or revised indicator/subindicator. For more detail on new and revised indicators/subindicators, see the section Comparability between 2020 and 2023 Indices.

Sabotage: Protect Facilities Ranking

The five categories of the Sabotage: Protect Facilities ranking are as follows:

1. **Number of Sites.** This category comprises one indicator: Number of Sites.
2. **Security and Control Measures.** This category comprises six indicators: On-site Physical Protection, Control and Accounting Procedures, Insider Threat Prevention, Response Capabilities, Cybersecurity, and Security Culture.
3. **Global Norms.** This category comprises four indicators: International Legal Commitments, Voluntary Commitments, International Assurances, and IAEA Nuclear Security INFCIRCs.
4. **Domestic Commitments and Capacity.** This category comprises three indicators: UNSCR 1540 Implementation, Domestic Nuclear Materials Security Legislation, and Independent Regulatory Agency.
5. **Risk Environment.** This category comprises four indicators: Political Stability, Effective Governance, Pervasiveness of Corruption, and Illicit Activities by Non-State Actors.

Each indicator within the five categories contains up to nine underlying subindicators. The categories, indicators, and subindicators are as follows:⁹

1	NUMBER OF SITES	Scored 0-100 where 100=most favorable nuclear security conditions
1.1 [†]	Number of Sites	
1.1.1 [†]	Number of sites	Scored 0–5 where 5 = most favorable nuclear security conditions
2	SECURITY AND CONTROL MEASURES	Scored 0–100 where 100 = most favorable nuclear security conditions
2.1	On-site Physical Protection	
2.1.1	Mandatory physical protection	Scored 0–1 where 1 = most favorable nuclear security conditions
2.1.2	On-site reviews of security	Scored 0–1 where 1 = most favorable nuclear security conditions
2.1.3	DBT	Scored 0–1 where 1 = most favorable nuclear security conditions
2.1.4	Tests and assessments	Scored 0–2 where 2 = most favorable nuclear security conditions

[†] Denotes indicators and subindicators that are also in the Theft: Secure Materials ranking but have been adjusted to be specific to the sabotage of nuclear facilities.

⁹ There are differences between the Theft: Secure Materials ranking framework and the Sabotage: Protect Facilities ranking framework. In some cases, although indicators in both models have the same names, different aspects of nuclear security are being measured (e.g., the number of sites subindicator defines sites differently in the Theft: Secure Materials and Sabotage: Protect Facilities rankings). Additionally, some indicators and subindicators have the same indicator question and the same scoring criteria, but owing to differences in the Theft: Secure Materials ranking framework and the Sabotage: Protect Facilities ranking framework, they have different indicator and subindicator numbers. For a more extensive discussion of the differences between the Theft: Secure Materials ranking and the Sabotage: Protect Facilities ranking, see the section Comparison between the Theft: Secure Materials Ranking and Sabotage: Protect Facilities Ranking as well as the indicator frameworks at the end of this Economist Impact methodology.

2.2 Control and Accounting Procedures		
2.2.1	Legal and regulatory basis for MC&A	Scored 0–3 where 3 = most favorable nuclear security conditions
2.2.2 [#]	Radiological consequences (materials)	Scored 0–1 where 1 = most favorable nuclear security conditions
2.2.3 [#]	Radiological consequences (equipment, systems, and devices)	Scored 0–1 where 1 = most favorable nuclear security conditions
2.2.4 [†]	Control measures	Scored 0–2 where 2 = most favorable nuclear security conditions
2.2.5 [#]	Access control	Scored 0–1 where 1 = most favorable nuclear security conditions
2.3 Insider Threat Prevention		
2.3.1	Personnel vetting	Scored 0–3 where 3 = most favorable nuclear security conditions
2.3.2	Frequency of personnel vetting	Scored 0–3 where 3 = most favorable nuclear security conditions
2.3.3	Reporting	Scored 0–1 where 1 = most favorable nuclear security conditions
2.3.4 [†]	Surveillance	Scored 0–2 where 2 = most favorable nuclear security conditions
2.3.5	Insider threat awareness program	Scored 0–2 where 2 = most favorable nuclear security conditions
2.4 Response Capabilities		
2.4.1	Emergency response capabilities	Scored 0–3 where 3 = most favorable nuclear security conditions
2.4.2 [†]	Armed response capabilities	Scored 0–1 where 1 = most favorable nuclear security conditions
2.4.3 [†]	Law enforcement response training	Scored 0–1 where 1 = most favorable nuclear security conditions
2.4.4	Nuclear infrastructure protection plan	Scored 0–1 where 1 = most favorable nuclear security conditions
2.4.5	Response coordination capabilities	Scored 0–2 where 2 = most favorable nuclear security conditions
2.5 Cybersecurity		
2.5.1	Mandatory cybersecurity	Scored 0–1 where 1 = most favorable nuclear security conditions
2.5.2	Sensitive digital asset management	Scored 0–2 where 2 = most favorable nuclear security conditions
2.5.3	Cybersecurity DBT	Scored 0–1 where 1 = most favorable nuclear security conditions

[†] Denotes indicators and subindicators that are also in the Theft: Secure Materials ranking but have been adjusted to be specific to the sabotage of nuclear facilities.

[#] Denotes indicators and subindicators that are unique to the Sabotage: Protect Facilities ranking.

2.5.4	Cybersecurity assessments	Scored 0–2 where 2 = most favorable nuclear security conditions
2.5.5	Cyber incident response plan	Scored 0–1 where 1 = most favorable nuclear security conditions
2.5.6	Mandatory cybersecurity awareness program	Scored 0–1 where 1 = most favorable nuclear security conditions
2.6	Security Culture	
2.6.1	Security culture	Scored 0–1 where 1 = most favorable nuclear security conditions
2.6.2	Security culture assessments	Scored 0–1 where 1 = most favorable nuclear security conditions
2.6.3	Security responsibilities and accountabilities	Scored 0–2 where 2 = most favorable nuclear security conditions
3	GLOBAL NORMS	Scored 0-100 where 100=most favorable nuclear security conditions
3.1	International Legal Commitments	
3.1.1	CPPNM	Scored 0–2 where 2 = most favorable nuclear security conditions
3.1.2	2005 CCPNM Amendment	Scored 0–1 where 1 = most favorable nuclear security conditions
3.1.3	ICSANT	Scored 0–2 where 2 = most favorable nuclear security conditions
3.1.4 [#]	Convention on Nuclear Safety	Scored 0–2 where 2 = most favorable nuclear security conditions
3.2	Voluntary Commitments	
3.2.1	GICNT membership	Scored 0–1 where 1 = most favorable nuclear security conditions
3.2.2	G-8 Global Partnership membership	Scored 0–1 where 1 = most favorable nuclear security conditions
3.2.3	WINS contributions	Scored 0–1 where 1 = most favorable nuclear security conditions
3.2.4	IAEA Nuclear Security Fund contributions	Scored 0–1 where 1 = most favorable nuclear security conditions
3.2.5	Bilateral/multilateral assistance	Scored 0–1 where 1 = most favorable nuclear security conditions
3.2.6	Centers of Excellence	Scored 0–1 where 1 = most favorable nuclear security conditions
3.2.7	Ministerial participation in ICONS	Scored 0–1 where 1 = most favorable nuclear security conditions
3.2.8	IAEA Incident and Trafficking Database	Scored 0–1 where 1 = most favorable nuclear security conditions
3.2.9	IAEA Nuclear Security Guidance Committee	Scored 0–1 where 1 = most favorable nuclear security conditions

[#] Denotes indicators and subindicators that are unique to the Sabotage: Protect Facilities ranking.

3.3	International Assurances	
3.3.1	Published regulations	Scored 0–1 where 1 = most favorable nuclear security conditions
3.3.2*	Published nuclear security annual reports	Scored 0–2 where 2 = most favorable nuclear materials security conditions
3.3.3	Published nuclear security progress reports	Scored 0–2 where 2 = most favorable nuclear security conditions
3.3.4	Review of security arrangements	Scored 0–2 where 2 = most favorable nuclear security conditions
3.3.5*	IPPAS mission	Scored 0–5 where 5 = most favorable nuclear materials security conditions
3.4	Nuclear Security INFCIRCs	
3.4.1	INFCIRC 869	Scored 0–1 where 1 = most favorable nuclear security conditions
3.4.2*	INFCIRC/908	Scored 0–1 where 1 = most favorable nuclear materials security conditions
3.4.3	Other nuclear security INFCIRCs	Scored 0–3 where 3 = most favorable nuclear security conditions
4	DOMESTIC COMMITMENTS AND CAPACITY	Scored 0–100 where 100 = most favorable nuclear security conditions
4.1	UNSCR 1540 Implementation	
4.1.1	UNSCR 1540 reporting	Scored 0–1 where 1 = most favorable nuclear security conditions
4.1.2†	Extent of UNSCR 1540 implementation	Scored 0–4 where 4 = most favorable nuclear security conditions
4.2	Domestic Nuclear Security Legislation	
4.2.1	CPPNM implementation authority	Scored 0–1 where 1 = most favorable nuclear security conditions
4.2.2	National legal framework for CPPNM Amendment	Scored 0–2 where 2 = most favorable nuclear security conditions
4.3	Independent Regulatory Agency	
4.3.1	Independent regulatory agency	Scored 0–1 where 1 = most favorable nuclear security conditions
5	RISK ENVIRONMENT	Scored 0–100 where 100 = most favorable nuclear security conditions
5.1	Political Stability	
5.1.1	Social unrest	Scored 0–4 where 4 = most favorable nuclear security conditions
5.1.2	Orderly transfers of power	Scored 0–4 where 4 = most favorable nuclear security conditions

† Denotes indicators and subindicators that are also in the Theft: Secure Materials ranking but have been adjusted to be specific to the sabotage of nuclear facilities.

* Indicates new or revised indicator/subindicator. For more detail on new and revised indicators/subindicators, see the section Comparability between 2020 and 2023 Indices.

5.1.3	International disputes/tensions	Scored 0–4 where 4 = most favorable nuclear security conditions
5.1.4	Armed conflict	Scored 0–4 where 4 = most favorable nuclear security conditions
5.1.5	Violent demonstrations or violent civil/labor unrest	Scored 0–4 where 4 = most favorable nuclear security conditions
5.2	Effective Governance	
5.2.1	Effectiveness of the political system	Scored 0–4 where 4 = most favorable nuclear security conditions
5.2.2	Quality of the bureaucracy	Scored 0–4 where 4 = most favorable nuclear security conditions
5.3	Pervasiveness of Corruption	
5.3.1	Pervasiveness of corruption	Scored 0–4 where 4 = most favorable nuclear security conditions
5.4	Illicit Activities by Non-State Actors	
5.4.1	Likelihood of terrorist attacks	Scored 0–4 where 4 = most favorable nuclear security conditions
5.4.2	Firearms seized during interdiction of illicit weapons trafficking	Scored 0–4 where 4 = most favorable nuclear security conditions
5.4.3	Domestic terrorism threat	Scored 0–8 where 8 = most favorable nuclear security conditions
5.4.4	Neighboring terror threat	Scored 0–4 where 4 = most favorable nuclear security conditions

[†] Denotes indicators and subindicators that are also in the Theft: Secure Materials ranking but have been adjusted to be specific to the sabotage of nuclear facilities.

[#] Denotes indicators and subindicators that are unique to the Sabotage: Protect Facilities ranking.

^{*} Indicates new or revised indicator/subindicator. For more detail on new and revised indicators/subindicators, see the section Comparability between 2020 and 2023 Indices.

Outcomes-based Regulations

Security at nuclear facilities should not be static and must undergo continuous improvement. The most common approach to nuclear security historically has been for countries and areas to put in place prescriptive regulations with which nuclear operators must comply. However, regulations are not updated frequently, and they often lag behind developments in security practice or the types of threats against which nuclear operators need to protect.

Some countries and areas are moving away from prescriptive regulations for nuclear security toward more outcomes/results-based approaches, which might require a more flexible approach to scoring in the Index. Rather than using national-level regulations that are then implemented by operators at facilities, an outcomes-based regulatory approach sets parameters against which facilities must be protected (e.g., cyber attacks or armed attacks). The onus is on the licensee/operator to design specific procedures tailored to the facility to meet the overall security objectives. An outcomes-based approach gives licensees greater responsibility for shaping and implementing nuclear security at their nuclear facilities. This shift is designed to promote a more cooperative working relationship between the licensee and the regulator.

Advocates of outcomes-based regulation make several arguments to support this approach. First, in the absence of regulator-prescribed standards, licensees must take more responsibility for the design and

implementation of their security arrangements. Second, the regulator can foster an environment of innovation and continuous improvement, in which licensees are encouraged to adopt novel security solutions that work in harmony with their business processes. Third, licensees have the flexibility to quickly review and optimize their arrangements in response to dynamic threat environments, which is not possible under a system of prescriptive regulations.

Throughout the research process, Economist Impact encountered several countries or areas that are shifting toward an outcomes-based approach, particularly in the area of personnel vetting. For example, some countries or areas are employing “continuous” vetting of personnel. Rather than requiring alcohol or drug tests at fixed intervals, all personnel at facilities are trained to monitor the behavior of their colleagues on a continuous basis and report any anomalies that are observed. These anomalies then result in a more formalized vetting procedure to identify the cause of aberrant behavior and to determine if the behavior presents risks to the facility.

When countries or areas indicated they had outcome-based regulations, scores were adjudicated by Economist Impact on a case-by-case basis. As an increasing number of countries or areas have adopted outcomes-based regulations since the NTI Index was first launched in 2012, Economist Impact expects this field to have a growing impact on both the methodology and the ranking of the Index in the future.

Calculating the 2023 NTI Nuclear Security Index

The subindicators listed are classified into indicators, and their values are summed and then set on a 0–100 scale to determine the value of the indicator:

$$\text{indicator score} = (\sum \text{individual subindicators} / \sum \text{maximum subindicator scores}) * 100$$

The category values are a weighted total of the indicators in the category:

$$\text{category score} = \sum \text{weighted individual indicators}$$

The category values have been normalized on the basis of the following equation:

$$x = (x - \text{Min}(x)) / (\text{Max}(x) - \text{Min}(x)),$$

where $\text{Min}(x)$ and $\text{Max}(x)$ are, respectively, the lowest and highest values in the NTI Index (i.e., out of the 22 countries with weapons-usable nuclear materials; out of the 153 countries and Taiwan without weapons-usable nuclear materials; or out of the 46 countries and Taiwan with nuclear facilities at risk of sabotage) for any given indicator. The normalized value (i.e., a score of 0–100) is directly comparable with other normalized indicator scores.

The following is an example of calculating the Category 1 score for Australia:

	Indicator name	Raw score (0–100)	Weight (%)	Weighted score	Normalized score (0–100)
1	Quantities and Sites	–	–	94	94
1.1	Quantities of Nuclear Materials	100	37.6	37.6	–
1.2	Sites and Transportation	100	37.6	37.6	–
1.3	Material Production/Elimination Trends	75	24.8	18.75	–

In this example, the normalized Category 1 score was calculated using a Max(x) value of 100 and Min(x) value of 0, as reflected in the data.

The overall score for each country or area is the weighted sum of the category scores, as determined by the weighting profile:

$$\text{Overall score} = \sum \text{weighted category scores}$$

The following is an example of calculating the overall score for Australia:

	Category name	Normalized score (0–100)	Weight (%)	Weighted score
	Overall	–	–	93
1	Quantities and Sites	94	19	17.9
2	Security and Control Measures	89	27	24
3	Global Norms	96	19	18.2
4	Domestic Commitments and Capacity	100	19	19
5	Risk Environment	89	16	14.2

The countries with weapons-usable nuclear materials, countries and areas without weapons-usable nuclear materials, and countries and areas with nuclear facilities at risk of sabotage can then be ranked according to these parameters.

Model Weights

The weights assigned to each category and indicator can be changed in the NTI Index data models to reflect different assumptions about their relative importance. Three sets of weights are provided in all the data models. The weights defined by NTI and Economist Impact are the default setting. They are based on extensive discussions between NTI, Economist Impact, and the International Panel of Experts on the relative value of each category and indicator. The second weighting option, called neutral weights, assumes all categories are equally important and evenly distributes weights on that basis. The third option, equal weights, assigns an identical weight to each indicator, rather than to each category.

A fourth weighting option called principal components analysis (PCA) is included in the Theft: Secure Materials and Sabotage ranking data models. PCA is detailed further below.

The default setting uses expert judgment to assign weights to indicators, bringing a real-world perspective to the Index. This perspective is important if the Index is to guide policy actions. The second and third options—in which all categories or indicators, respectively, are weighted equally—have the advantage of simplicity and do not involve subjective judgment. One disadvantage of these options is the assumption that all indicators or categories, respectively, are equally significant.

Weight Profile Defined by NTI and Economist Impact for the Theft: Secure Materials Ranking

CATEGORY	WEIGHT (%)
Quantities and Sites	19
Security and Control Measures	27
Global Norms	19
Domestic Commitments and Capacity	19
Risk Environment	16

INDICATOR	WEIGHT (%)
1 Quantities and Sites	
1.1 Quantities of Materials	38
1.2 Sites and Transportation	38
1.3 Material Production/Elimination Trends	25
2 Security and Control Measures	
2.1 On-site Physical Protection	20
2.2 Control and Accounting Procedures	12
2.3 Insider Threat Prevention	18
2.4 Physical Security during Transport	12
2.5 Response Capabilities	12
2.6 Cybersecurity	16
2.7 Security Culture	10
3 Global Norms	
3.1 International Legal Commitments	33
3.2 Voluntary Commitments	22
3.3 International Assurances	27
3.4 Nuclear Security INFCIRCS	18
4 Domestic Commitments and Capacity	
4.1 UNSCR 1540 Implementation	25
4.2 Domestic Nuclear Security Legislation	33
4.3 Independent Regulatory Agency	41

	INDICATOR	WEIGHT (%)
5	Risk Environment	
5.1	Political Stability	25
5.2	Effective Governance	25
5.3	Pervasiveness of Corruption	25
5.4	Illicit Activities by Non-State Actors	25

Weight Profile Defined by NTI and Economist Impact for the Theft: Support Global Efforts Ranking

CATEGORY	WEIGHT (%)
Global Norms	45
Domestic Commitments and Capacity	30
Risk Environment	25

	INDICATOR	WEIGHT (%)
3	Global Norms	
3.1	International Legal Commitments	40
3.2	Voluntary Commitments	34
3.3	Nuclear Security INFCIRCS	26
4	Domestic Commitments and Capacity	
4.1	UNSCR 1540 Implementation	43
4.2	Domestic Nuclear Materials Security Legislation	57
5	Risk Environment	
5.1	Political Stability	25
5.2	Effective Governance	25
5.3	Pervasiveness of Corruption	25
5.4	Illicit Activities by Non-State Actors	25

Weight Profile Defined by NTI and Economist Impact for the Sabotage: Protect Facilities Ranking

CATEGORY	WEIGHT (%)
Number of Sites	5
Security and Control Measures	30
Global Norms	23
Domestic Commitments and Capacity	23
Risk Environment	19

INDICATOR	WEIGHT (%)
1 Number of Sites	
1.1 Number of Sites	100
2 Security and Control Measures	
2.1 On-site Physical Protection	22
2.2 Control and Accounting Procedures	14
2.3 Insider Threat Prevention	20
2.4 Response Capabilities	14
2.5 Cybersecurity	18
2.6 Security Culture	12
3 Global Norms	
3.1 International Legal Commitments	33
3.2 Voluntary Commitments	22
3.3 International Assurances	27
3.4 Nuclear Security INFCIRCs	18
4 Domestic Commitments and Capacity	
4.1 UNSCR 1540 Implementation	25
4.2 Domestic Nuclear Security Legislation	33
4.3 Independent Regulatory Agency	42
5 Risk Environment	
5.1 Political Stability	25
5.2 Effective Governance	25
5.3 Pervasiveness of Corruption	25
5.4 Illicit Activities by Non-State Actors	25

Principal components analysis

The goal of PCA is to define quantitatively a weighting scheme for the indicators that are used to create a composite index or ranking of overall nuclear security. PCA is a method for removing redundant information shared across indicators by specifying a weighting that explains the most variance in the data.

PCA assigns each element in an index a weight that considers the covariance between indicators and the importance of a particular element in maximizing the variation in the index outcome (nuclear security conditions); in other words, it aims to minimize redundancy between variables and to maximize the variance with respect to the outcome. The weight is calculated by taking the principal component (*eigenvector*) associated with the highest explained variance (*eigenvalue*). Important assumptions for valid PCA are that (a) variance is meaningful and not the result of data with large measurement error, and (b) the dynamics of interest (nuclear security conditions) are along the direction with the largest variance.

Variation within indicator weights is a sign of redundancy in the elements or that some elements are not as relevant in explaining the variation in the overall index once all the other variables are considered. Finding equal weights across indicators is a sign of very little redundancy across subgroups and similar relevance in explaining variation in the index, which suggests that the index was appropriately divided into subgroups.

The PCA-weights feature within the NTI Index models has been provided for those experts who may wish to explore the behavior of the model in more depth. They should not be considered (a) as an alternative to the NTI/Economist Impact weights, or (b) as a means of understanding country and area rankings and scores, because they do not consider the intrinsic significance of an indicator in the context of the NTI Index.

Weight Profile Defined by PCA for the Theft: Secure Materials Ranking

CATEGORY	WEIGHT (%)
Quantities and Sites	3
Security and Control Measures	40
Global Norms	23
Domestic Commitments and Capacity	15
Risk Environment	19

INDICATOR	WEIGHT (%)
1 Quantities and Sites	
1.1 Quantities of Materials	0
1.2 Sites and Transportation	14
1.3 Material Production/Elimination Trends	86
2 Security and Control Measures	
2.1 On-site Physical Protection	21
2.2 Control and Accounting Procedures	13
2.3 Insider Threat Prevention	15

	INDICATOR	WEIGHT (%)
2.4	Physical Security during Transport	9
2.5	Response Capabilities	17
2.6	Cybersecurity	14
2.7	Security Culture	11
3	Global Norms	
3.1	International Legal Commitments	29
3.2	Voluntary Commitments	28
3.3	International Assurances	27
3.4	Nuclear Security INFCIRCS	16
4	Domestic Commitments and Capacity	
4.1	UNSCR 1540 Implementation	39
4.2	Domestic Nuclear Security Legislation	32
4.3	Safeguards Adherence and Compliance	29
5	Risk Environment	
5.1	Political Stability	38
5.2	Effective Governance	28
5.3	Pervasiveness of Corruption	23
5.4	Illicit Activities by Non-State Actors	11

Weight Profile Defined by PCA for the Sabotage: Protect Facilities Ranking

CATEGORY	WEIGHT (%)
Number of Sites	0
Security and Control Measures	37
Global Norms	24
Domestic Commitments and Capacity	17
Risk Environment	23

INDICATOR	WEIGHT (%)	
1	Number of Sites	
1.1	Number of Sites	100
2	Security and Control Measures	
2.1	On-site Physical Protection	22
2.2	Control and Accounting Procedures	16

	INDICATOR	WEIGHT (%)
2.3	Insider Threat Prevention	17
2.4	Response Capabilities	17
2.5	Cybersecurity	13
2.6	Security Culture	14
3	Global Norms	
3.1	International Legal Commitments	27
3.2	Voluntary Commitments	30
3.3	International Assurances	29
3.4	Nuclear Security INFCIRCS	14
4	Domestic Commitments and Capacity	
4.1	UNSCR 1540 Implementation	50
4.2	Domestic Nuclear Security Legislation	32
4.3	Independent Regulatory Agency	19
5	Risk Environment	
5.1	Political Stability	36
5.2	Effective Governance	28
5.3	Pervasiveness of Corruption	22
5.4	Illicit Activities by Non-State Actors	14

Model Correlations

Correlating the 2023 theft scores for countries with weapons-usable nuclear materials to other data sets reveals some potentially interesting associations. Correlations measure the strength of a relationship between two variables. Scatter plots, which can be found on the Correlation-Scatter Plot worksheet in the Excel data models for all three rankings, show the correlations between the 2023 results and several variables. Correlation analysis for three of these variables follows:

- 1. Global Peace Index.** The 2022 Global Peace Index (GPI) gauges ongoing domestic and international conflict, safety and security in society, and levels of militarization. The GPI is scored from 1 to 5, where countries and areas that are most at peace receive a score of 1 and those with lower levels of peace receive a higher value. In the 2023 Theft: Secure Materials ranking, the GPI scale is inverted so that countries that are most at peace receive a score of 5 and those that are less peaceful receive lower scores. The results indicate a high positive correlation (0.87) between a country's GPI score and its score in the 2023 Theft: Secure Materials ranking. The correlation is positive because as the GPI score decreases (meaning a country is less at peace), the score in the 2023 Theft: Secure Materials ranking decreases (meaning nuclear materials security conditions are less favorable).

2. **Regulatory quality.** The regulatory quality indicator, a qualitative assessment to capture perceptions of the ability of the government to formulate and implement sound policies and regulations, is taken from the World Bank's Worldwide Governance Indicators (WGI). Countries and areas are ranked from -2.50 to 2.50, where -2.50 is "very low" and 2.50 is "very high." There is a strong positive correlation of 0.89 between the regulatory quality variable and the 2023 Theft: Secure Materials ranking. The correlation shows that countries with higher regulatory quality tend to have better nuclear materials security conditions.
3. **Gross domestic product (GDP) per head.** This quantitative indicator is a measure of GDP per head in nominal U.S. dollar terms and allows for a basic comparison of countries and areas in terms of standard of living. For countries with weapons-usable nuclear materials, the correlation between GDP per capita and the 2023 Theft: Secure Materials ranking score is 0.76. The correlation shows that as GDP per capita increases, a country's overall NTI Index score is likely to increase as well.

Changes to the 2023 Nuclear Security Index Framework

NTI and Economist Impact made several small changes to the NTI Index framework between 2020 and 2023 to raise the bar for nuclear security while maintaining the integrity of the 2020 framework for comparability. These changes are summarized in the following table:

	Added	Modified
Theft with weapons-usable nuclear materials	1 indicator	3 indicators
Theft without nuclear materials	1 indicator	0 indicators
Sabotage	1 indicator	2 indicators

This section provides greater detail on these changes, as well as how countries and areas were compared and the methodology used to facilitate the comparison between the 2020 and 2023 rankings.

New indicators

The 2023 edition of the Nuclear Security Index has one new subindicator. Subindicator 3.4.2 INFCIRC/908 was added to indicator Nuclear Security INFCIRCs in the Global Norms category in all three rankings.

3.4 Nuclear Security INFCIRCs

The Nuclear Security INFCIRCs indicator comprises three subindicators, one of which is new in 2023.¹⁰

3.4.2 INFCIRC/908

This subindicator assesses whether a country or area has subscribed to INFCIRC/908. Subscribing countries and areas commit to establishing and implementing national-level measures to mitigate insider threat. The new indicator follows the scoring system established by subindicator 3.4.1 INFCIRC/869, an existing metric that assesses whether a country or area subscribed to INFCIRC/869. Subindicator 3.4.2 is included in both the Theft: Secure Materials and Sabotage: Protect Facilities rankings. This subindicator appears in the Theft: Support Global Efforts framework as 3.3.2, under Indicator 3.3 Nuclear Security INFCIRCs.

¹⁰ Subindicator 3.4.3 Other nuclear security INFCIRCs assesses whether the country or area has subscribed to three or more of the IAEA Information Circulars (INFCIRCs) 899, 901, 904, 905, 909, 912, 917, and 918. Subscribing is interpreted as a commitment to strengthening national nuclear security regimes and supporting global norms. In the 2020 indicator frameworks, subscriptions to INFCIRC/908 were captured as part of this indicator. In 2023, subscriptions to INFCIRC/908 have been separated into the new indicator. In cases where countries or areas had subscribed only to INFCIRC/908, their historical scores for subindicator 3.4.3 have been revised to reflect this fact.

Modified indicators

3.3 International Assurances

The International Assurances indicator comprises seven subindicators, three of which were modified between 2020 and 2023.

3.3.2 Published nuclear security reports

In 2020, this subindicator assessed whether a country or area publishes annual reports on nuclear security issues using binary scoring. In 2023, Economist Impact revised the scoring system for this indicator to distinguish between the publication of a one-off report on nuclear security and the publication of regular annual reports on nuclear security. Annual reporting on issues related to nuclear security is good practice to show transparency and progress on nuclear security issues, and, therefore, receives the highest score. Any reporting on nuclear security, however, can also help build confidence and increase transparency. Therefore, countries and areas that have released one-off reports or reports at irregular intervals receive partial credit. The new scoring system is as follows:

0 = No

1 = Yes, the country/area has published at least one report on nuclear security.

2 = Yes, the country/area has published two or more consecutive annual reports on nuclear security.

This subindicator is included in both the Theft: Secure Materials and Sabotage: Protect Facilities rankings.

3.3.4 Public declarations about civilian nuclear materials (Theft: Secure Materials ranking only)

In 2020, subindicator 3.3.4 assessed whether the country makes any public declarations or reports about quantities of nuclear materials used for civilian purposes, using a three-tiered scoring system: No; Yes; and Yes, and the most recent report has been released in the past year. At the recommendation of the International Panel of Experts, Economist Impact and NTI revised subindicator 3.3.4 Public declarations/reports about civilian nuclear materials to award increasing levels of credit for annual declarations of separated plutonium or HEU, or both. The new scoring system uses a five-tiered approach to award the highest credit for regular declarations at defined intervals:

0 = No, the country has not made any public declarations or reports about quantities of nuclear materials used for civilian purposes.

1 = Yes, the country has made at least one public declaration or report about quantities of HEU *or* separated plutonium for civilian purposes.

2 = Yes, the country has made at least one public declaration or report about quantities of HEU *and* separated plutonium for civilian purposes.

3 = Yes, the country makes public declarations or reports about quantities of HEU *or* separated plutonium for civilian purposes at defined intervals (i.e., on an annual basis).

4 = Yes, the country makes public declarations or reports about quantities of HEU *and* separated plutonium for civilian purposes at defined intervals (i.e., on an annual basis).

This subindicator is included only in the Theft: Secure Materials ranking.

3.3.7/3.3.5 IPPAS mission (Theft: Secure Materials and Sabotage: Protect Facilities rankings, respectively)

In 2020, subindicator 3.3.7 assessed whether the country or area had hosted an IAEA IPPAS mission and included four scoring options: No; Yes; Yes, within the past five years; and Yes, within the past five years and the country or area has publicly released at least a summary of the results. At the recommendation of the International Panel of Experts, Economist Impact and NTI revised subindicator 3.3.7 IPPAS missions to

award credit for both pre-mission and post-mission actions, in recognition of the realities that (a) not every country or area is able to receive an IPPAS mission, and (b) some best practices related to missions lie beyond simply hosting a mission. The new scoring system is as follows:

0 = No, the country/area has never hosted an IPPAS mission *and* has not demonstrated a desire/intent to host a mission.

1 = No, the country/area has not hosted a mission but has demonstrated its desire or intent to host a mission by

- (a) Making a public request for an IPPAS mission,
- (b) Holding a workshop in anticipation of an IPPAS mission, or
- (c) Scheduling an IPPAS mission.

2 = Yes, the country/area has hosted an IPPAS mission.

3 = Yes, the country/area has hosted an IPPAS mission within the past five years.

4 = Yes, the country/area has hosted an IPPAS mission within the past five years *and* has publicly released a summary of the results.

5 = Yes, the country/area has hosted an IPPAS mission within the past five years *or* has hosted an IPPAS mission and publicly released a full report of the results.

This subindicator is included in both the Theft: Secure Materials and Sabotage: Protect Facilities rankings.

Comparability between 2020 and 2023 Indices

To ensure an accurate year-on-year comparison, Economist Impact required identical data sets for each model for all years of the Index.¹¹ Modifying the Index framework prevents a direct comparison between the 2023 and previous indices. To allow for comparisons, Economist Impact undertook research to rescore the previous indices using the revised 2023 NTI Index framework. To do this, Economist Impact considered the information that would have been available during the period when the initial research was conducted (e.g., July 2019 to March 2020 for the 2020 Index). In some cases, the scores that would have been assigned for previous indices were obvious based on the date of the relevant regulatory document. For example, if a country or area subscribed to INFCIRC/908 in 2017, Economist Impact would assign scores of 1 for that indicator for the 2018 and 2020 indices. When Economist Impact could not confirm whether a requirement had been in place during the previous research period, it either queried the governments during data confirmation or, when that was not possible, made reasonable assumptions based on whether regulatory changes relevant to cybersecurity at nuclear facilities had been instituted in recent years.

In addition to rescoring data for the new indicators, in a limited number of cases, Economist Impact adjusted previous scores because of new evidence. In all cases, if a previous score was deemed to be inaccurate, Economist Impact corrected the score to reflect the most up-to-date information available. Those adjustments help ensure that no artificial improvements or declines in scores are captured in the 2023 NTI Index.

In a few instances, a country or area's response to Economist Impact's 2023 data review and confirmation request contradicted their own responses from previous years. In those cases, Economist Impact first queried the government about the discrepancy; if Economist Impact did not receive a response to the query, additional research was undertaken and, in some cases, reasonable assumptions were made based on available sources.

Once Economist Impact had comparable data sets across the six NTI Index iterations, a year-on-year comparison could highlight where scores had improved, remained the same, or declined based on actions

¹¹ The Nuclear Security Index was published in 2012, 2014, 2016, 2018, and 2020.

taken by countries or areas. The scores and rankings for the rescored indices were calculated using the same framework, methodology, and weights as described in the section Calculating the 2023 NTI Nuclear Security Index. Owing to the methodological change and updated scores, the normalized scores and ranks in the originally published 2012, 2014, 2016, 2018, and 2020 NTI Index models and reports are not comparable to the normalized scores and ranks in the newly rescored data for those years or to the score and ranks in the 2023 model and report. To understand changes in scores between previous indices and 2023 resulting from actions taken by countries or areas, users should use the 2023 models and their comparison tools, rather than previous models.

Comparison between the Theft: Secure Materials Ranking and the Sabotage: Protect Facilities Ranking

Given the widespread danger of the threat of sabotage and the serious consequences that could result from a large radiological release, NTI and Economist Impact developed the sabotage assessment in the 2016 NTI Index. Countries and areas are included in the Sabotage: Protect Facilities ranking if they have (a) operating nuclear power reactors or nuclear power reactors that were shut down within the past five years; (b) research reactors with a capacity of 2 megawatts or greater; (c) reprocessing facilities; and/or (d) spent fuel pools, only if the fuel has been discharged in the past five years and is not associated with an operating reactor. In 2023, NTI and Economist Impact identified 46 countries and Taiwan with such facilities. Twenty of these countries are in the Theft: Secure Materials ranking and 26 of the countries and Taiwan are in the Theft: Support Global Efforts ranking.

Although many of the indicators in the Theft: Secure Materials ranking framework and the Sabotage: Protect Facilities ranking framework are the same, the Sabotage: Protect Facilities ranking framework is designed to specifically address protection of nuclear facilities against sabotage. Several of the subindicators in the Sabotage: Protect Facilities ranking are slightly different from their equivalent in the Theft: Secure Materials ranking to reflect differences in how nuclear facilities are protected against theft versus sabotage. In such cases, this will mean a country or area's score for the same subindicator in the Theft: Secure Materials ranking and Sabotage: Protect Facilities ranking may differ. Additionally, 8 sabotage-specific subindicators are included in the Sabotage: Protect Facilities ranking framework, and 15 subindicators that are included in the Theft: Secure Materials ranking framework are not included in the Sabotage: Protect Facilities ranking framework.¹²

¹² It is important to note that indicator and subindicator numbers differ in the two models. Despite different indicator and subindicator numbers, the questions asked and the scoring criteria often remain consistent between the Theft: Secure Materials ranking model and the Sabotage: Protect Facilities ranking model. Any inconsistencies are explained in the indicator frameworks laid out in the Scoring section of this methodology.

The chart below shows the differences between the Theft: Secure Materials and Sabotage: Protect Facilities rankings. Those indicators that are marked as “n/a” have not been included in their respective ranking framework; indicators and subindicators with asterisks have been altered in the Sabotage: Protect Facilities ranking framework.

THEFT: SECURE MATERIALS RANKING		SABOTAGE: PROTECT FACILITIES RANKING	
1	QUANTITIES AND SITES	1	NUMBER OF SITES
1.1	Quantities of Nuclear Materials	n/a	n/a
1.1.1	Quantities of nuclear materials	n/a	n/a
1.2	Sites and Transportation	1.1*	Number of Sites*
1.2.1	Number of sites	1.1.1*	Number of sites*
1.2.2	Bulk processing facilities	n/a	n/a
1.2.3	Frequency of materials transport	n/a	n/a
1.3	Material Production and Elimination Trends	n/a	n/a
1.3.1	Material production and elimination trends	n/a	n/a
2	SECURITY AND CONTROL MEASURES	2	SECURITY AND CONTROL MEASURES
2.1	On-site Physical Protection	2.1	On-site Physical Protection
2.1.1	Mandatory physical protection	2.1.1	Mandatory physical protection
2.1.2	On-site reviews of security	2.1.2	On-site reviews of security
2.1.3	Design basis threat (DBT)	2.1.3	Design basis threat (DBT)
2.1.4	Tests and assessments	2.1.4	Tests and assessments
2.2	Control and Accounting Procedures	2.2	Control and Accounting Procedures
2.2.1	Legal and regulatory basis for MC&A	2.2.1	Legal and regulatory basis for MC&A
2.2.2	Measurement methods	n/a	n/a
2.2.3	Inventory record	n/a	n/a
2.2.4	Material balance area(s)	n/a	n/a
n/a	n/a	2.2.2	Radiological consequences (materials)
n/a	n/a	2.2.3	Radiological consequences (equipment, systems, and devices)
2.2.5	Control measures	2.2.4*	Control measures*
n/a	n/a	2.2.5	Access control
2.3	Insider Threat Prevention	2.3	Insider Threat Prevention
2.3.1	Personnel vetting	2.3.1	Personnel vetting
2.3.2	Frequency of personnel vetting	2.3.2	Frequency of personnel vetting
2.3.3	Reporting	2.3.3	Reporting

Notes: n/a = not applicable. *Indicates the indicator/subindicator has been revised.

THEFT: SECURE MATERIALS RANKING		SABOTAGE: PROTECT FACILITIES RANKING	
2.3.4	Surveillance	2.3.4*	Surveillance*
2.3.5	Insider threat awareness program	2.3.5	Insider threat awareness program
2.4	Physical Security during Transport	n/a	n/a
2.4.1	Physical security during transport	n/a	n/a
2.5	Response Capabilities	2.4	Response Capabilities
2.5.1	Emergency response capabilities	2.4.1	Emergency response capabilities
2.5.2	Armed response capabilities	2.4.2*	Armed response capabilities*
2.5.3	Law enforcement response training	2.4.3*	Law enforcement response training*
2.5.4	Nuclear infrastructure protection plan	2.4.4	Nuclear infrastructure protection plan
2.5.5	Response coordination capabilities	2.4.5	Response coordination capabilities
2.6	Cybersecurity	2.5	Cybersecurity
2.6.1	Mandatory cybersecurity	2.5.1	Mandatory cybersecurity
2.6.2	Sensitive digital asset management	2.5.2	Sensitive digital asset management
2.6.3	Cybersecurity DBT	2.5.3	Cybersecurity DBT
2.6.4	Cybersecurity assessments	2.5.4	Cybersecurity assessments
2.6.5	Cyber incident response plan	2.5.5	Cyber incident response plan
2.6.6	Mandatory cybersecurity awareness program	2.5.6	Mandatory cybersecurity awareness program
2.7	Security Culture	2.6	Security Culture
2.7.1	Security culture	2.6.1	Security culture
2.7.2	Security culture assessments	2.6.2	Security culture assessments
2.7.3	Security responsibilities and accountabilities	2.6.3	Security responsibilities and accountabilities
3	GLOBAL NORMS	3	GLOBAL NORMS
3.1	International Legal Commitments	3.1	International Legal Commitments
3.1.1	CPPNM	3.1.1	CPPNM
3.1.2	2005 CPPNM Amendment	3.1.2	2005 CPPNM Amendment
3.1.3	ICSANT	3.1.3	ICSANT
3.1.4	IAEA safeguards agreement	n/a	n/a
n/a	n/a	3.1.4	Convention on Nuclear Safety
3.2	Voluntary Commitments	3.2	Voluntary Commitments
3.2.1	GICNT membership	3.2.1	GICNT membership
3.2.2	G-8 Global Partnership membership	3.2.2	G-8 Global Partnership membership
3.2.3	WINS contributions	3.2.3	WINS contributions

Notes: n/a = not applicable. *Indicates the indicator/subindicator has been revised.

THEFT: SECURE MATERIALS RANKING		SABOTAGE: PROTECT FACILITIES RANKING	
3.2.4	IAEA Nuclear Security Fund contributions	3.2.4	IAEA Nuclear Security Fund contributions
3.2.5	Bilateral/multilateral assistance	3.2.5	Bilateral/multilateral assistance
3.2.6	Centers of Excellence	3.2.6	Centers of Excellence
3.2.7	Ministerial participation in ICONS	3.2.7	Ministerial participation in ICONS
3.2.8	IAEA Incident and Trafficking Database	3.2.8	IAEA Incident and Trafficking Database
3.2.9	IAEA Nuclear Security Guidance Committee	3.2.9	IAEA Nuclear Security Guidance Committee
3.3	International Assurances	3.3	International Assurances
3.3.1	Published regulations	3.3.1	Published regulations
3.3.2	Published nuclear security annual reports	3.3.2	Published nuclear security annual reports
3.3.3	Published nuclear security progress reports	3.3.3	Published nuclear security progress reports
3.3.4	Public declarations/reports about civilian nuclear materials	n/a	n/a
3.3.5	Public declarations/reports about military nuclear materials	n/a	n/a
3.3.6	Review of security arrangements	3.3.4	Review of security arrangements
3.3.7	IPPAS mission	3.3.5	IPPAS mission
3.4	Nuclear Security INFCIRCs	3.4	Nuclear Security INFCIRCs
3.4.1	INFCIRC/869	3.4.1	INFCIRC/869
3.4.2	INFCIRC/908	3.4.2	INFCIRC/908
3.4.3	Other nuclear security INFCIRCs	3.4.3	Other nuclear security INFCIRCs
4	DOMESTIC COMMITMENTS AND CAPACITY	4	DOMESTIC COMMITMENTS AND CAPACITY
4.1	United Nations Security Council Resolution (UNSCR) 1540 Implementation	4.1	United Nations Security Council Resolution (UNSCR) 1540 Implementation
4.1.1	UNSCR 1540 reporting	4.1.1	UNSCR 1540 reporting
4.1.2	Extent of UNSCR 1540 implementation	4.1.2	Extent of UNSCR 1540 implementation
4.2	Domestic Nuclear Security Legislation	4.2	Domestic Nuclear Security Legislation
4.2.1	CPPNM implementation authority	4.2.1	CPPNM implementation authority
4.2.2	National legal framework for CPPNM Amendment	4.2.2	National legal framework for CPPNM Amendment
4.3	Independent Regulatory Agency	4.3	Independent Regulatory Agency
4.3.1	Independent regulatory agency	4.3.1	Independent regulatory agency
5	RISK ENVIRONMENT	5	RISK ENVIRONMENT
5.1	Political Stability	5.1	Political Stability
5.1.1	Social unrest	5.1.1	Social unrest

Notes: n/a = not applicable. *Indicates the indicator/subindicator has been revised.

THEFT: SECURE MATERIALS RANKING		SABOTAGE: PROTECT FACILITIES RANKING	
5.1.2	Orderly transfers of power	5.1.2	Orderly transfers of power
5.1.3	International disputes/tensions	5.1.3	International disputes/tensions
5.1.4	Armed conflict	5.1.4	Armed conflict
5.1.5	Violent demonstrations or violent civil/labor unrest	5.1.5	Violent demonstrations or violent civil/labor unrest
5.2	Effective Governance	5.2	Effective Governance
5.2.1	Effectiveness of the political system	5.2.1	Effectiveness of the political system
5.2.2	Quality of the bureaucracy	5.2.2	Quality of the bureaucracy
5.3	Pervasiveness of Corruption	5.3	Pervasiveness of Corruption
5.3.1	Pervasiveness of corruption	5.3.1	Pervasiveness of corruption
5.4	Illicit Activities by Non-State Actors	5.4	Illicit Activities by Non-State Actors
5.4.1	Likelihood of terrorist attacks	5.4.1	Likelihood of terrorist attacks
5.4.2	Firearms seized during interdiction of illicit weapons trafficking	5.4.2	Firearms seized during interdiction of illicit weapons trafficking
5.4.3	Domestic terrorism threat	5.4.3	Domestic terrorism threat
5.4.4	Neighboring terror threat	5.4.4	Neighboring terror threat

Notes: n/a = not applicable. *Indicates the indicator/subindicator has been revised.

Research behind Selected Indicators

This section focuses on the research behind selected indicators and includes an explanation for the scoring framework behind several of the more complex variables created by Economist Impact. Scoring criteria for all indicators are included in the section Scoring.

Approach

Economist Impact used its network of more than 900 country and area experts and regional specialists, many with local language skills, to undertake the research. However, given the reliance of the Index on publicly available sources, researchers faced constraints in some areas because of the opaque nature of certain aspects of nuclear security. To address the lack of publicly available information and reduce the subjectivity of the researchers, Economist Impact implemented specific scoring schemes and instituted strict scoring guidelines. These steps to address the lack of information and reduce subjectivity are detailed in the following sections.

Challenging Indicators

1.1 Quantities of Nuclear Materials (Theft: Secure Materials ranking)

This indicator seeks to capture each country's combined total quantity of HEU, including spent fuel; separated plutonium; and plutonium content in unirradiated MOX. Materials that are owned by one country but are present in another are accounted for under the latter's total. Plutonium content in MOX is either reported as such by a country or calculated as 5–8 percent of total MOX quantities. Quantities include materials in weapons components.

The key challenge in researching quantities of weapons-usable nuclear materials is the general lack of publicly available information in this area, particularly for nuclear-weapon states. Most countries do not declare all their nuclear materials (including materials in weapon components). Economist Impact primarily relied on three sources for data (in addition to consulting national sources, where available): the Institute for Science and International Security; the IAEA and its INFCIRC/549 declarations (civilian plutonium, civilian MOX, civilian HEU); and the International Panel on Fissile Materials (IPFM) and its *Global Fissile Material Report 2022* (military HEU and plutonium). In many cases, these sources use estimates or ranges of quantities that are based on the latest available information. When quantities were provided in a range, Economist Impact used the midpoint (e.g., a range of 5–10 kilograms is reported by Economist Impact as 7.5 kilograms). Owing to the uncertainties associated with quantities,¹³ Economist Impact banded the data into eight groups. This banding allows for slight variances in accounting for quantities without impacting scoring outcomes.

1.2 Number of Sites (Theft: Secure Materials ranking)

This indicator seeks to capture how many sites (both military and civilian) with 1 kilogram or more of HEU, including spent fuel; separated plutonium; or unirradiated MOX fuel are present in a country. Significant challenges arose in researching this indicator. Unsurprisingly, many countries do not publish the number or location of facilities with weapons-usable nuclear materials. There are sound national security reasons for not publicizing specific information on quantities and sites. Nevertheless, the lack of transparency in this area meant that Economist Impact had to use the limited information that was publicly available to estimate the number of sites. Owing to the uncertainty associated with these estimates, Economist Impact again banded the number of sites.

¹³ The uncertainties associated with quantities of nuclear materials also impact indicator 1.3 Material Production and Elimination Trends. Scores for 1.3 are based on the actions of a country within the past four years. When considering whether a country's total stock of nuclear materials is decreasing, the following points were evaluated:

- Is the country reducing its stock of nuclear weapons?
- Is reprocessing being discontinued?
- Are HEU-fueled research reactors being converted to low-enriched uranium (LEU) and unneeded research reactors being decommissioned?
- Are military vessels fueled by HEU being converted to LEU?
- Is the country returning or giving nuclear materials to another country?
- Is a change the result of normal fluctuations due to the use of MOX fuel in power reactors?

In cases where changes in quantities of materials could potentially be explained by natural fluctuations in the fuel cycle, Economist Impact conducted an analysis of quantities in that country to determine if the fluctuations were cyclical or if long-term trends show a clear increase or decrease in quantities. Economist Impact considered HEU and separated plutonium cycles separately. In cases where fluctuations were cyclical, the country received a score of "no change."

2.2.2 and 2.2.3 Radiological consequences (Sabotage: Protect Facilities ranking)

These two subindicators assess whether countries and areas require the use of a graded approach to security for nuclear materials and equipment, systems, and devices, the sabotage of which could result in high radiological consequences. Economist Impact encountered many challenges when scoring these subindicators. The challenges primarily centered on the distinction between safety and security. The subindicators in the NTI Index are designed to address security measures at nuclear facilities. Radiological consequences, however, are relevant to both safety and security concerns. The intersection between safety and security made the research challenging, particularly with regard to the protection of nuclear materials. In many cases, regulations reference protection against theft based on common categories of nuclear materials that are used by the IAEA (e.g., Category 1, Category 2). The IAEA does not apply these categories in the context of sabotage, but some countries or areas appear to do so. Ultimately, Economist Impact gave credit for these two subindicators only when the regulations specifically mentioned a graded approach to physical protection or increased levels of security for nuclear materials and/or equipment, systems, and devices taking into account the radiological consequences.

2.6 and 2.5 Cybersecurity (Theft: Secure Materials ranking and Sabotage: Protect Facilities ranking, respectively)

The Cybersecurity indicator includes six subindicators on mandatory cyber protection, protection of sensitive digital assets against cyber attacks, cybersecurity DBT, tests and assessments, cyber incident response plans, and mandatory cybersecurity awareness programs. Cybersecurity's relatively recent inclusion in national nuclear regulations means that very little information is publicly available. Some countries and areas address cybersecurity comprehensively in their national regulations and others are working to update their legislation to include cybersecurity; yet many countries and areas with weapons-usable nuclear materials or nuclear facilities at risk of sabotage do not have regulations that require cybersecurity at nuclear facilities. To receive credit for these subindicators, countries and areas must specifically include nuclear facilities in their cybersecurity plans. Credit is not given for laws and policies related to cybersecurity of general critical infrastructure.

3.3.3 Published nuclear security progress reports (Theft: Secure Materials ranking and Sabotage: Protect Facilities ranking)

This subindicator seeks to assess whether countries and areas have made public declarations about nuclear security progress. To apply consistent scoring criteria to this indicator, Economist Impact and NTI worked together to develop a strict scoring rubric. To be considered a public declaration on nuclear security progress, the declaration, statement, or report must include a substantial description of nuclear security practices. A declaration, statement, or report meets the criteria if it (a) is delivered in conjunction with an international, multilateral, or regional conference on nuclear security (e.g., one of the four Nuclear Security Summits, ICONS, the IAEA General Conference, GICNT meetings, Global Partnership meetings, or a nuclear security treaty conference such as the CPPNM Amendment or ICSANT); and (b) provides information about specific actions the country or area has taken to strengthen its own nuclear security (e.g., passing new legislation or imposing new regulations; reducing, eliminating, or consolidating nuclear materials; converting HEU to LEU; or hosting a peer review) or to strengthen the global nuclear security architecture (e.g., providing funds to the IAEA's Nuclear Security Fund, supporting the IAEA's nuclear security work, or providing assistance to another country or area). Reporting only on treaty ratification would not be considered a progress report. Furthermore, steps toward improving nuclear security must have been taken within two years of the report to qualify.

5.1–5.3 Risk Environment: Political Stability, Effective Governance, and Pervasiveness of Corruption (Theft: Secure Materials ranking, Theft: Support Global Efforts ranking, Sabotage: Protect Facilities ranking)

The Risk Environment category comprises four indicators, three of which are described in this section. (Indicator 5.4 Illicit Activities by Non-State Actors is described separately below.) The scoring of Political Stability, Effective Governance, and Pervasiveness of Corruption indicators is based on proprietary information contained in the EIU's Risk Briefing Rankings.

TITLE	SOURCE
5 RISK ENVIRONMENT	
5.1 Political Stability	
5.1.1 Social unrest	Economist Intelligence Unit, Risk Briefing
5.1.2 Orderly transfers of power	Economist Intelligence Unit, Risk Briefing
5.1.3 International disputes/tensions	Economist Intelligence Unit, Risk Briefing
5.1.4 Armed conflict	Economist Intelligence Unit, Risk Briefing
5.1.5 Violent demonstrations or violent civil/labor unrest	Economist Intelligence Unit, Risk Briefing
5.2 Effective Governance	
5.2.1 Effectiveness of the political system	Economist Intelligence Unit, Risk Briefing
5.2.2 Quality of the bureaucracy	Economist Intelligence Unit, Risk Briefing
5.3 Pervasiveness of Corruption	
5.3.1 Pervasiveness of corruption	Economist Intelligence Unit, Risk Briefing

The EIU Risk Briefing assessment, which is updated once per quarter, considers present conditions and the EIU's expectations for the future. The EIU forecasts future risk conditions rather than simply extrapolating present trends into the future. The comparability of the qualitative assessments is made more rigorous by the extensive guidance provided by the EIU's team of 900 country and area analysts who undertake the research for each indicator. Analysts can constantly view the scoring for other countries and areas, which enables consistency across geographies. Additional oversight is provided by the editorial team, which includes risk heads for every region. The EIU also conducts an annual global audit of all the scores. Ultimately, the ratings and scores rely on the expert opinion of the EIU's analysts working in regional teams that have extensive knowledge of events and conditions in both individual countries and areas and the region.

The EIU's 900-plus analysts have a wide range of open and closed sources at their disposal. They are based in virtually every country and area throughout the world and are able to analyze recent market developments and forecast political, economic, and business trends. In addition, they provide detailed, regular information on conditions within a country or area. The analysts also draw on the existing analytic work already developed at the EIU, as well as open sources. International open sources include publications from the United Nations, Central Intelligence Agency, International Monetary Fund, World Bank, International Institute for Management Development, International Labor Organization, and Interpol.

5.4 Illicit Activities by Non-State Actors (Theft: Secure Materials ranking, Theft: Support Global Efforts ranking, Sabotage: Protect Facilities ranking)

As detailed in the section Modified indicators, this indicator seeks to understand whether any terrorist or criminal groups that may be interested in illicitly acquiring weapons-usable nuclear materials or in committing acts of nuclear terrorism more generally are present in a country or area and capable of carrying out their goals. Details as to the extent of a group's presence in a given country or area could not be easily ascertained. Owing to the nature of this topic, which has serious national security implications, publicly available information is limited. Nonetheless, Economist Impact and NTI worked with a group of technical advisors to craft four subindicators to approximate the general level of the terrorism threat in each country or area, considering the capabilities of groups, their cross-border nature, and the impact of non-terrorist illicit activities.

Due to the indicator-level weighting scheme of the Index, scores for individual subindicators are not adjusted by weight but still carry an implicit weighting of their own. For instance, if a country or area received the maximum score on a binary 0/1 subindicator and the minimum score on a 0–4 banded subindicator, it would receive an indicator score of 1 out of a possible 5 points. However, if the country or area scored the converse, earning a minimum score on a binary 0/1 subindicator and the maximum score on a 0–4 banded subindicator, it would receive a total indicator score of 4 out of a possible 5 points. The use of a broad range of scoring options within a single subindicator can therefore unintentionally under- or over-value subindicators solely as a result of the scoring options selected.

Subindicators 5.4.1 Likelihood of terrorist attacks, 5.4.2 Firearms seized during interdiction of illicit weapons trafficking, and 5.4.4 Neighboring terror threat are all scored from 0–4; subindicator 5.4.3 Domestic terrorism threat has a binary score. The NTI and Economist Impact decided to adjust the scoring option for subindicator 5.4.3 to ensure that its impact on the overall indicator score was not disproportionate to the other three subindicators within indicator 5.4. To counteract this possible effect, the numeric value attached to subindicator 5.4.3's binary score is 0/8 instead of 0/1. By increasing the numeric value of 5.4.3's positive binary scoring option, the NTI and Economist Impact teams can provide additional weight to the subindicator commensurate with its importance.

Challenging Countries

Although each country and area posed unique research challenges, China, Iran, Israel, and North Korea were particularly complicated. China and Iran make regulations publicly available, but several regulatory areas in these countries remain confidential. Israel does not publicly acknowledge its nuclear program and, therefore, does not publish any regulations on nuclear security. As for North Korea, while there is some historical insight into the internal workings of its nuclear facilities/sites, it is minimal at best. In the interest of ensuring the NTI Index is as accurate as possible, Economist Impact scored several indicators across these four countries using proxy scoring and expert input.

The following scoring methods were applied to these four countries to score the Theft: Secure Materials ranking and the Sabotage: Protect Facilities ranking (where the indicator numbers differ for the two rankings, both are listed: first Theft, then Sabotage).

Use of military proxy

Iran, Israel, and North Korea were particularly difficult to score for indicator 2.1, On-site Physical Protection. These countries are distinct among those countries or areas for which Economist Impact could not find publicly available information in that they rely primarily on military (or, in the case of Israel, civil defense force) protection

for nuclear sites. For indicator 2.1, therefore, Economist Impact used a proxy indicator—military capability or sophistication—to score these countries. The military capability or sophistication indicator is scored as follows:

- › A score of 0 means “very low”: no investment in military research and development (R&D). Principal equipment is very old or obsolete.
- › A score of 1 means “low”: minimal investment in military R&D. A high percentage of equipment is old and unsophisticated.
- › A score of 2 means “moderate”: investment of a small part of military expenditure in R&D. Principal equipment is a mixture of new and old and is moderately sophisticated.
- › A score of 3 means “high”: substantial investment in military R&D and in maintenance. Principal equipment is relatively modern and sophisticated and is well maintained.
- › A score of 4 means “very high”: huge investment in military R&D and armament production projects. Principal equipment is new and highly sophisticated.

Although the maximum score for indicator 2.1 is 5, the maximum score these three countries could receive was 4, where 4 represented the most favorable nuclear security conditions. The absence of information on nuclear security reduces public and international understanding of the security measures countries are taking. Therefore, receiving the highest possible score of 5 for indicator 2.1 was not appropriate for states that were scored using a proxy. Because a proxy indicator was used for these countries, they did not receive separate scores for each of the subindicators in 2.1. Instead, these countries received an overall score for the indicator.

Assumptions based on military control of materials

For the following subindicators, the scores for Iran, Israel, and North Korea assume that the military imposes a strict regime under direct control of the state:

- › 2.3.1 Personnel vetting (Israel and North Korea only)
- › 2.4.1 Physical security during transport (Theft: Secure Materials ranking only)
- › 2.5.1/2.4.1 Emergency response capabilities
- › 2.5.2/2.4.2 Armed response capabilities
- › 2.5.3/2.4.3 Law enforcement response training
- › 2.6.1/2.5.1 Mandatory cybersecurity (Israel only)

The unique approaches used for each country reflect the relative level of regulations available. For example, while Iran makes publicly available its regulations around personnel vetting, it does not publish regulations around response capabilities. However, because Iran’s state security and intelligence forces are responsible for security at the country’s nuclear sites, it can be inferred that internal, non-public regulations mandate the existence of such response capabilities. Similar assumptions are made across these other countries where regulations are not publicly available, and the military imposes a strict regime around nuclear security conditions.

Use of expert input

Expert input or secondary sources were used to assign scores for the following indicators and subindicators:

- › 2.1.4 Tests and assessments (China only)
- › 2.2 Control and Accounting Procedures (North Korea only)
- › 2.2.5/2.2.4 Control measures (China only)
- › 2.3.1 Personnel vetting (China, North Korea, Russia)
- › 2.3.3 Reporting (China only)
- › 2.3.5 Insider threat awareness program (Russia only)
- › 2.4.1 Physical security during transport (North Korea only) (Theft: Secure Materials ranking only)
- › 2.7.1/2.6.1 Security culture (China only)
- › 4.3.1 Independent regulatory agency (China and Russia only)

China makes most of its nuclear security regulations publicly available and, beginning in 2020, participated in the data confirmation process, though some areas are ambiguous or remain confidential altogether. In these instances, Economist Impact relied on expert input or secondary evidence to provide appropriate scores. For example, while China's regulations around personnel vetting do not clearly specify the required screening mechanisms (e.g., drug tests, background checks, mental fitness checks) for personnel, experts on Chinese nuclear policy have confirmed that personnel vetting mechanisms are applied across nuclear facilities.

Israel

Israel maintains a policy of opacity regarding its nuclear program. Israel does not publish any nuclear security-related laws or regulations that could be used in this research. Moreover, Economist Impact was unable to elicit expert opinion on Israel's nuclear security conditions, which it was able to do for the other challenging countries. As already noted, owing to the lack of publicly available information, Economist Impact used proxies as a scoring technique for some indicators.

Economist Impact did not use a proxy (military sophistication) or an assumption based on military (or similar body) protection of nuclear sites to score indicator 2.2 Control and Accounting Procedures. Materials control and accounting (MC&A) is typically not in the purview of security personnel responsible for protecting nuclear materials. Economist Impact and its experts acknowledge that, more than likely, Israel has regulations regarding MC&A. However, Israel maintains an unusual lack of transparency regarding nuclear materials; thus, Economist Impact erred on the conservative side in its scoring. The burden of proof is on Israel to demonstrate it has systems in place.

In cases where security-related concerns are typically the responsibility of military or other trained personnel, Economist Impact did use proxies based on Israel's military sophistication. For example, while Israel's cybersecurity regulations are not publicly available, it has a military cyber unit within the Israel Defense Forces that defends the country's critical cyber infrastructure. Economist Impact was able to make a confident assumption that Israel's nuclear facilities are protected against cyber attacks. Economist Impact therefore provided partial credit to Israel on the cybersecurity indicator.

Treatment of Taiwan in the NTI Index

Taiwan is included in the Theft: Support Global Efforts ranking and the Sabotage: Protect Facilities ranking. Taiwan posed a unique research challenge, as it is not currently a member of the IAEA or a party to most international conventions owing to its status in the international community. However, it has well-established and publicly available regulations. Therefore, for the Security and Control Measures category, Economist Impact reviewed Taiwan's publicly available nuclear regulations and Atomic Energy Council legislation. Economist Impact also determined that for select indicators it was appropriate to score Taiwan based on relevant domestic regulations and other considerations, as follows:

3.1.1 Convention on the Physical Protection of Nuclear Material (CPPNM)

Taiwan is not a party to the CPPNM. Economist Impact assigned credit to Taiwan based on provisions in its domestic regulations.

3.1.2 2005 CPPNM Amendment

Taiwan is not a party to the 2005 CPPNM Amendment. Economist Impact has given Taiwan credit on this subindicator based on its domestic regulations and the U.S.–Taiwan 123 Agreement for Peaceful Cooperation, which legally binds Taiwan to follow the CPPNM and the 2005 Amendment. The U.S.–Taiwan 123 Agreement came into force on June 22, 2014. Therefore, Taiwan receives credit for the 2005 CPPNM Amendment in the 2016, 2018, 2020, and 2023 editions of the NTI Index but not the 2012 or 2014 editions, as there is no evidence that the provisions of the 2005 CPPNM Amendment were legally binding before the 123 Agreement.

4.1.1 UNSCR 1540 reporting and 4.1.2 Extent of UNSCR 1540 implementation

Because Taiwan is not a member of the United Nations, it is not obliged to—and in fact cannot—provide a UNSCR 1540 Report to the 1540 Committee. Despite this, Economist Impact assigned credit to Taiwan for a report and matrix it has drafted, modeled on 1540 reports, which is publicly available on Taiwan's Atomic Energy Council's website. Economist Impact also reviewed and scored this matrix against the same criteria used to assess other 1540 reports. Treating Taiwan's matrix like those of other countries and areas, Economist Impact has assigned credit based on the number of elements of UNSCR 1540 that have been implemented as reflected in the matrix.

4.2.1 CPPNM implementation authority

Economist Impact assigned credit to Taiwan on the basis of having a national authority for the implementation of nuclear security regulations.

4.2.2 National legal framework for CPPNM Amendment (Sabotage: Protect Facilities ranking only)

Economist Impact assigned credit to Taiwan on the basis of provisions in its domestic regulations.

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Note: Economist Impact qualitative assessments are based on official national sources, which vary by country and area.

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NTI NUCLEAR SECURITY INDEX

Theft / Sabotage / Radiological

Economist Impact Methodology Radioactive Source Security Assessment

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Summary

To better understand global trends in radioactive source security, the Nuclear Threat Initiative (NTI) commissioned Economist Impact (formerly the Economist Intelligence Unit) to construct the second edition of the Radioactive Source Security Assessment. The Radioactive Source Security Assessment measures national policies, commitments, and actions governing radioactive sources, as well as the risks associated with radioactive sources, across 175 countries and Taiwan.

The Radioactive Source Security Assessment groups policies, commitments, actions, and factors that affect the overall risk environment into a four-part framework:

- › **National Measures:** The national measures in place to manage and secure radioactive sources
- › **Global Norms:** The country or area's international commitments and support for global norms on radioactive source security
- › **Alternative Technologies:** The country or area's capacity for introducing alternative technologies to replace high-activity radioactive source applications
- › **Risk Environment:** The risk environment and its potential effect on the security of radioactive sources

Given that radioactive sources are present around the world, indicators within each of these four categories were selected for their application on a global scale. They represent data points that are relevant and important to radioactive sources and their security, are readily available for all or most countries or areas, and do not require in-depth research into laws and regulations. As a result, indicators may not independently paint a complete picture of the radiological security environment.

Additionally, the framework does not produce scores or rankings of countries or areas, unlike the rankings in the Nuclear Security Index. Together, however, these data points provide insight into priorities for improving the governance and security of radioactive sources, serve to reinforce global norms, and provide a foundation for future in-depth analysis.

A panel of radiological security experts informed the development of this framework and its associated indicators. The experts helped identify priorities for radioactive source security and available data sources.

The indicators in the Radioactive Source Security Assessment are embedded in a model (available as an Excel workbook at www.ntiindex.org) that offers a wide range of analytical tools, allowing for a deeper investigation of measures of radiological security globally. For example, users can filter countries and areas individually, by region, or by membership in international organizations or multilateral initiatives. This model shares many of the features of the Nuclear Security Index models, providing easy access for users who are familiar with the Nuclear Security Index.

Assessment Criteria and Categories

The 2023 Radioactive Source Security Assessment has a four-part framework. Each of the four categories includes between three and six indicators. Details of these indicators are outlined below.

Category A: National Measures

This category assesses a country or area's domestic policies, commitments, and actions for managing and securing radioactive sources through five indicators. The first two indicators ask whether a country or area has an independent regulatory body to provide oversight over radioactive sources and whether its domestic laws and regulations explicitly require security (not just safety) measures to be in place to protect radioactive sources. The third indicator assesses whether the country or area maintains a national registry of radioactive sources, a key step in tracking and accounting for sources at the national level. The fourth indicator assesses whether the country or area has the authority to inspect facilities with radioactive sources. The fifth indicator asks whether the country or area has licensing requirements for the export of International Atomic Energy Agency (IAEA) Category 1¹ radioactive sources.

Category B: Global Norms

This category assesses a country or area's international commitments and support for global norms on radioactive sources through three indicators. The first indicator examines the extent of each country or area's commitments within the context of the IAEA Code of Conduct on the Safety and Security of Radioactive Sources. In particular, it addresses political commitment to the Code of Conduct, to the Supplemental Guidance on the Import and Export of Radioactive Sources and the related actions to nominate a Point of Contact and submit answers to the Import and Export Questionnaire, and to the Supplemental Guidance on the Management of Disused Radioactive Sources.

The second indicator assesses whether a country or area participates in international organizations or conferences related to the security of radioactive sources, including the Global Initiative to Combat Nuclear Terrorism (GICNT). It also captures whether a country or area sent an official delegation to the IAEA's International Conference on the Safety and Security of Radioactive Sources, held in 2022.² (The 2020 assessment captured countries' and areas' participation at the 2018 International Conference on the Security of Radioactive Material.)

The third indicator measures whether the country or area is a party to three international legal agreements related to radiological security: the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT), the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, and the Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency.

¹ Category 1 sources are radioactive materials that, according to the IAEA, "would be likely to cause permanent injury to a person who handled it, or were otherwise in contact with it, for more than a few minutes." IAEA Category 1 sources include radioisotope thermoelectric generators; irradiators; teletherapy sources; and fixed, multibeam teletherapy (Gamma Knife) sources. See www-pub.iaea.org/MTCD/publications/PDF/Pub1227_web.pdf.

² International Conference on Safety and Security of Radioactive Sources: Accomplishments and Future Endeavours, Vienna, Austria, June 20–24, 2022. See www.iaea.org/events/safety-security-radioactive-sources-2022.

Category C: Alternative Technologies

The third category assesses a country or area's commitment to supporting the development and implementation of alternative technology to high-activity radioactive sources. This category captures commitment through three proxy indicators: intent, implementation, and capacity.

The first indicator assesses intent by asking whether a country or area has subscribed to IAEA Information Circular (INFCIRC) 910, which was derived from the 2016 Nuclear Security Summit Joint Statement on Strengthening the Security of High Activity Sealed Radioactive Sources (HASS). Among other commitments, INFCIRC/910 calls on countries and areas to support the development of non-HASS technologies (whether isotopic or not) through research and development and to promote them as far as technically and economically feasible.

The second indicator assesses implementation, by asking whether a country or area has publicly declared a regulatory requirement, policy, or commitment to implementing alternative technology to high-activity radioactive sources. The primary sources for this indicator were national progress reports from the 2016 Nuclear Security Summit and national statements from the 2020 IAEA International Conference on Nuclear Security.³

The third indicator comprises two subindicators that assess each country or area's capacity to sustainably implement alternative technologies to high-activity radioactive sources. The first of these subindicators measures the number of blackouts per month that local businesses face, based on the assumption that a stable power supply is a precondition for adopting alternative technologies such as linear accelerators or x-ray-based technologies. The second subindicator measures the percentage of the country or area's population over age 25 with a tertiary degree or higher. This is a proxy for having a population with skilled workers, as a skilled workforce is required to implement new technologies. For example, replacing Cobalt-60 teletherapy devices with linear accelerators requires highly qualified personnel (radiation therapists and medical physicists).

Category D: Risk Environment

The final category assesses a country or area's risk environment through four indicators: political stability, effective governance, pervasiveness of corruption, and illicit activities by non-state actors. The first three of these indicators (political stability, effective governance, and pervasiveness of corruption) come directly from the Nuclear Security Index and consist of several subindicators. These subindicators include, among other things, the presence of armed conflict, the effectiveness of a country or area's political system, and the extent of corruption in its public and private sectors.

The fourth indicator assesses illicit activities by non-state actors, including terrorist groups and criminal networks through three subindicators: the likelihood of terrorist attacks, the risk of organized crime, and the number of firearms seized as part of the interdiction of illicit arms trafficking.

³ NTI and Economist Impact conducted the research for this indicator in advance of the release of the 2020 Radioactive Source Security Assessment. The underlying data for this indicator have not been updated since then. Therefore, the 2023 and 2020 data for this indicator are the same.

The categories, indicators, and subindicators are spelled out in the following table.

TITLE	SCORING	SOURCE
A NATIONAL MEASURES		
A.1 Regulatory Oversight		
A.1.1 Does the country or area maintain a radioactive source regulatory oversight body?	Binary (Yes/No or no data available)	IAEA
A.2 Security Measures		
A.2.1 Does the country or area have regulations that require security measures to be in place to protect radioactive sources?	Binary (Yes/No or no data available)	Stimson Center Radiological Sources Security Database
A.3 State Registry		
A.3.1 Does the country or area maintain a national registry of radioactive sources?	Binary (Yes/No or no data available)	Stimson Center Radiological Sources Security Database
A.4 Inspection Authority		
A.4.1 Does the country or area have authority to inspect facilities with radioactive sources?	Binary (Yes/No or no data available)	Stimson Center Radiological Sources Security Database
A.5 Export Licenses		
A.5.1 Does the country or area have licensing requirements for exporting IAEA Category 1 sources?	Binary (Yes/No or no data available)	Stimson Center Radiological Sources Security Database
B GLOBAL NORMS		
B.1 IAEA Code of Conduct Status		
B.1.1 Has the country or area made a political commitment and notified the IAEA of its intent to abide by the Code of Conduct on the Safety and Security of Radioactive Sources?	Binary (Yes/No or no data available)	IAEA
B.1.2 Has the country or area notified the IAEA of its intent to abide by the Guidance on the Import and Export of Radioactive Sources?	Binary (Yes/No or no data available)	IAEA
B.1.3 Has the country or area nominated a Point of Contact to facilitate imports and exports of radioactive source material?	Binary (Yes/No or no data available)	IAEA
B.1.4 Has the country or area made available its responses to the IAEA Importing and Exporting states questionnaire?	Binary (Yes/No or no data available)	IAEA
B.1.5 Has the country or area notified IAEA of its commitment to implement the Guidance on the Management of Disused Radioactive Sources?	Binary (Yes/No or no data available)	IAEA

TITLE	SCORING	SOURCE	
B.2 International Participation			
B.2.1	Does the country or area participate in the Global Initiative to Combat Nuclear Terrorism (GICNT)?	Binary (Yes/No or no data available)	GICNT
B.2.2	Did the country or area send an official delegation to the 2022 International Conference on the Safety and Security of Radioactive Sources?	Binary (Yes/No or no data available)	IAEA
B.3 International Conventions			
B.3.1	Is the country or area party to the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT)?	Binary (Yes/No or no data available)	IAEA
B.3.2	Is the country or area party to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management?	Binary (Yes/No or no data available)	IAEA
B.3.3	Is the country or area party to the Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency?	Binary (Yes/No or no data available)	IAEA
C COMMITMENT AND CAPACITY TO ADOPT ALTERNATIVE TECHNOLOGIES			
C.1 Intent			
C.1.1	Has the country or area subscribed to IAEA INFCIRC/910?	Binary (Yes/No or no data available)	IAEA
C.2 Implementation			
C.2.1	Has the country or area publicly declared a regulatory requirement, policy, or commitment to implementing alternative technology to high-activity radioactive sources? ⁴	Yes/No/No data available	NTI research
C.3 Capacity			
C.3.1	Average percentage of businesses experiencing power outages each month	Quantitative (%) X = No data available	World Bank
C.3.2	Percentage of population over age 25 with a tertiary degree or higher	Quantitative (%) X = No data available	United Nations (UN)

⁴ NTI and Economist Impact conducted the research for this indicator in advance of the release of the 2020 Radioactive Source Security Assessment. The underlying data for this indicator have not been updated since then. Therefore, the 2023 and 2020 data for this indicator are the same.

TITLE	SCORING	SOURCE
D	RISK ENVIRONMENT	
D.1	Political Stability*	
D.1.1	Social unrest: What is the risk of significant social unrest during the next two years? X = No data available E = Very high D = High C = Moderate B = Low A = Very low	Economist Intelligence Unit (EIU) Risk Briefing
D.1.2	Orderly transfers of power: How clear, established, and accepted are constitutional mechanisms for the orderly transfer of power from one government to another? X = No data available E = Not clear, established, or accepted D = Two of the three criteria are absent C = One of the three criteria is absent B = Clear, established, and accepted A = Very clear, established, and accepted	EIU Risk Briefing
D.1.3	International disputes/tensions: Is there a risk that international disputes/tensions will negatively affect the polity during the next two years? X = No data available E = Very high D = High C = Moderate B = Low A = No threat	EIU Risk Briefing
D.1.4	Armed conflict: Is this country or area presently subject to armed conflict, or is there at least a moderate risk of such conflict during the next two years? X = No data available E = Territorial conflict; opposition has effective control over a region or regions D = Sporadic and incursive conflict C = Incursive conflict; government remains in control, but opposition engages in frequent armed incursions B = Sporadic conflict; government control is firm, but opposition engages in isolated incidents of violence A = No armed conflict exists	EIU Risk Briefing
D.1.5	Violent demonstrations or violent civil/labor unrest: Are violent demonstrations or violent civil/labor unrest likely to occur during the next two years? X = No data available E = Very high D = High C = Moderate B = Low A = Very low	EIU Risk Briefing

* Denotes indicators that were directly incorporated from the Nuclear Security Index.

TITLE	SCORING	SOURCE
D.2 Effective Governance*		
D.2.1 Effectiveness of the political system: How effective is the country or area's political system in formulating and executing policy?	X = No data available E = Very low D = Low C = Moderate B = High A = Very high	EIU Risk Briefing ⁵
D.2.2 Quality of the bureaucracy: What is the quality of the country or area's bureaucracy and its ability to carry out government policy?	X = No data available E = Very low D = Low C = Moderate B = High A = Very high	EIU Risk Briefing
D.3 Pervasiveness of Corruption*		
D.3.1 Pervasiveness of corruption: How pervasive is corruption among public officials?	X = No data available E = Very high D = High C = Moderate B = Low A = Very low	EIU Risk Briefing
D.4 Illicit Activities by Non-State Actors		
D.4.1 Likelihood of terrorist attacks: How likely is it that domestic or foreign terrorists will attack with a frequency or severity that causes substantial disruption to business operations?	X = No data available E = Very high D = High C = Moderate B = Low A = Very low	EIU Risk Briefing
D.4.2 Risk of organized crime: How likely is organized crime to be a problem for government and/or business?	X = No data available E = Very high D = High C = Moderate B = Low A = Very low	EIU Risk Briefing
D.4.3 Firearms seized during interdiction of illicit weapons trafficking	Banded quintiles X = No data available E = Very high D = High C = Moderate B = Low A = Very low	UN Office of Drugs and Crime

* Denotes indicators that were directly incorporated from the Nuclear Security Index.

⁵ In 2023, Economist Impact used EIU Risk Briefing as the data source for subindicator D.2.1, as it provides a more comprehensive country and area coverage than the source previously used (the EIU Business Environment Ranking).

Assessment Constraints and Other Important Factors

The Radioactive Source Security Assessment is the first worldwide assessment of radiological security. As such, it not only provides interesting insights into the status of radiological security but also serves as a feasibility study to determine the availability of information needed to assess radiological security around the world. The Radioactive Source Security Assessment relies on publicly available information, which means the methodology is transparent and repeatable. Unlike the research conducted for the Nuclear Security Index, Economist Impact did not conduct in-depth country and area research into laws and regulations and instead relied on publicly available information that is easily accessible from existing databases or other consolidated resources. As a result of these research constraints, certain factors relevant to radiological security—such as the number of IAEA Category 1–2 radioactive sources in each country or area (information that is not publicly available) or other regulatory requirements that might exist in some countries or areas (requiring in-depth research)—were not included in the assessment.

For a limited set of indicators, a result of “No” can mean either a negative response to the question or that no data are available. This option has been applied to indicators where publicly accessible data are clearly lacking. The assessment’s limited scope precluded in-depth research for each country or area to determine the availability of data. However, when trusted secondary sources, such as the Stimson Center, have conducted country-by-country or area-by-area research (see the Stimson Center’s Radiological Sources Security Database), the assessment relies on the determination of those sources regarding the availability of public information for select indicators.

It should also be noted that the Radioactive Source Security Assessment represents a selection of indicators of security conditions and not a comprehensive set of actions that countries and areas and their respective facilities should adopt to protect against the theft or sabotage of radioactive sources. For example, information regarding the types of physical protection measures, such as locking mechanisms or surveillance systems mandated at facilities with radioactive sources, is not publicly available for security reasons. The exclusion of specific security practices from the Radioactive Source Security Assessment does not reflect their lack of importance. Rather, it reflects the assessment’s goal of setting a baseline understanding of the status of radiological security worldwide, as well as the research constraints.

Methodology

The Radioactive Source Security Assessment comprises categories related to the radiological security conditions for each country and area. To collect data for the 2023 Radioactive Source Security Assessment, the Economist Impact research team gathered data from the following sources:

- › IAEA and international organization publications and reports
- › National statements at multilateral events, such as the 2016 Nuclear Security Summit and the 2020 IAEA International Conference on Nuclear Security
- › Academic publications
- › Data collected by government authorities, international organizations, and non-governmental organizations such as the Stimson Center
- › EIU proprietary country and area rankings and reports (specifically, its Risk Briefing)

See the Select Bibliography for more information on central sources.

Given the widespread use of radioactive sources in sectors as diverse as healthcare, agriculture, and industry, the 2023 Radioactive Source Security Assessment assumes that radioactive sources are present in or transported through each of the 175 countries and Taiwan included in the assessment. These countries and Taiwan are listed below in alphabetical order.

Afghanistan	Congo (Democratic Republic of)	Indonesia	Nepal
Albania	Costa Rica	Iran	Netherlands
Algeria	Côte d'Ivoire	Iraq	New Zealand
Angola	Croatia	Ireland	Nicaragua
Argentina	Cuba	Israel	Niger
Armenia	Cyprus	Italy	Nigeria
Australia	Czech Republic	Jamaica	North Korea
Austria	Denmark	Japan	Norway
Azerbaijan	Djibouti	Jordan	Oman
Bahamas	Dominican Republic	Kazakhstan	Pakistan
Bahrain	Ecuador	Kenya	Panama
Bangladesh	Egypt	Kuwait	Papua New Guinea
Barbados	El Salvador	Kyrgyz Republic	Paraguay
Belarus	Equatorial Guinea	Lao PDR	Peru
Belgium	Eritrea	Latvia	Philippines
Belize	Estonia	Lebanon	Poland
Benin	Eswatini	Lesotho	Portugal
Bhutan	Ethiopia	Liberia	Qatar
Bolivia	Fiji	Libya	Romania
Bosnia and Herzegovina	Finland	Lithuania	Russian
Botswana	France	Luxembourg	Rwanda
Brazil	Gabon	North Macedonia	Samoa
Brunei Darussalam	Gambia, The	Madagascar	São Tomé and Príncipe
Bulgaria	Georgia	Malawi	Saudi Arabia
Burkina Faso	Germany	Malaysia	Senegal
Burundi	Ghana	Mali	Serbia
Cambodia	Greece	Malta	Seychelles
Cameroon	Guatemala	Mauritania	Sierra Leone
Canada	Guinea	Mauritius	Singapore
Cabo Verde	Guinea-Bissau	Mexico	Slovak Republic
Central African Republic	Guyana	Moldova	Slovenia
Chad	Haiti	Mongolia	Solomon Islands
Chile	Honduras	Montenegro	Somalia
China	Hungary	Morocco	South Africa
Colombia	Iceland	Mozambique	South Korea
Comoros	India	Myanmar	Spain
Congo, Rep.		Namibia	Sri Lanka

Sudan	Thailand	Uganda	Venezuela
Suriname	Timor-Leste	Ukraine	Vietnam
Sweden	Togo	United Arab Emirates	Yemen
Switzerland	Tonga	United Kingdom	Zambia
Syrian Arab Republic	Trinidad and Tobago	United States	Zimbabwe
Taiwan	Tunisia	Uruguay	
Tajikistan	Turkey	Uzbekistan	
Tanzania	Turkmenistan	Vanuatu	

Research behind Selected Indicators

This section focuses on the research behind selected indicators and includes an explanation for the answer choices behind several of the more complex variables created by Economist Impact. Scoring criteria for all the indicators are included in the section Assessment Criteria and Categories.

A.1 Regulatory Oversight

Indicator A.1 assesses whether the country or area maintains a regulatory body with oversight of radioactive sources. These data are available through the IAEA Directory of National Regulatory Bodies for the Control of Radiation Sources, as well as the Stimson Center’s Radiological Sources Security Measure Level and State Level Databases. In reviewing these sources, NTI and Economist Impact decided to use the IAEA’s Directory of National Regulatory Bodies for the Control of Radiation Sources because it aligned most closely with the methodological direction of this assessment. The Stimson Center only captured the existence of oversight bodies in countries or areas where “security” was referenced in regulations, potentially excluding oversight bodies that deal only with safety. By using the IAEA directory, the assessment identifies countries or areas that have a regulatory body with oversight of any aspect of radioactive sources. Indicator A.2 then assesses whether a country or area’s regulatory body has oversight over the security of radioactive sources, specifically.

C.1–C.2 Alternative Technology: Intent and Implementation

In evaluating a country or area’s commitment and capacity to adopt alternative technologies, Economist Impact relied on publicly available information to evaluate intent, implementation, and capacity.

To measure intent (indicator C.1), Economist Impact used country and area support for IAEA INFCIRC/910, the Joint Statement on Strengthening the Security of High Activity Sealed Radioactive Sources (HASS), as a proxy. One of the commitments in INFCIRC/910 is to support the development of non-HASS technologies (whether isotopic or not) through research and development and to promote them as far as technically and economically feasible.

To measure implementation (indicator C.2), Economist Impact used the presence of legal or regulatory requirements, policies, or commitments to implementing alternative technology to high-activity radioactive sources. Information to satisfy this requirement was gathered from publicly available sources.

D.1–D.4 Risk Environment: Political Stability, Effective Governance, Pervasiveness of Corruption, and Illicit Activities by Non-State Actors

The Risk Environment category comprises four indicators. The scores for Political Stability, Effective Governance, and Pervasiveness of Corruption indicators, along with two of the three subindicators in the Illicit Activities by Non-State Actors, are based on proprietary information contained in the Risk Briefing Tracker produced by the Economist Intelligence Unit (EIU).

D	RISK ENVIRONMENT
D.1	Political Stability
D.1.1	Social unrest
D.1.2	Orderly transfers of power
D.1.3	International disputes/tensions
D.1.4	Armed conflict
D.1.5	Violent demonstrations or violent civil/labor unrest
D.2	Effective Governance
D.2.1	Effectiveness of the political system
D.2.2	Quality of the bureaucracy
D.3	Pervasiveness of Corruption
D.3.1	Pervasiveness of corruption
D.4	Illicit Activities by Non-State Actors
D.4.1	Likelihood of terrorist attacks
D.4.2	Risk of organized crime

The EIU Risk Briefing assessment, which is updated once per quarter, considers present conditions and the EIU's expectations for the future. The EIU forecasts future risk conditions rather than simply extrapolating present trends into the future. The comparability of the qualitative assessments is made more rigorous by the extensive guidance provided by the EIU's team of 900 country analysts who undertake the research for each indicator. Analysts can constantly view the scoring for other countries and areas, which enables consistency across geographies. Additional oversight is provided by the editorial team, which includes risk heads for every region.

The EIU also conducts an annual global audit of all the scores. Ultimately, the ratings and scores rely on the expert opinions of the EIU's analysts, who work in regional teams and have extensive knowledge of events and conditions in both the countries and areas and the region.

The EIU's 900-plus analysts have a wide range of open and closed sources at their disposal. They are based in virtually every country and area throughout the world and are able to analyze recent market developments and forecast political, economic, and business trends. In addition, they provide detailed, regular information on conditions within a country or area. The analysts also draw on the existing analytic work already developed at the EIU, as well as open sources. International open sources include publications from the United Nations, Central Intelligence Agency, International Monetary Fund, World Bank, International Institute for Management Development, International Labor Organization, and Interpol.

D.4.3 Firearms seized during interdiction of illicit weapons trafficking

Unlike the rest of the Risk Environment category, subindicator D.4.3 does not rely on EIU data. Instead, it measures the number of weapons seized during interdiction of illicit weapons trafficking over the past five years. This subindicator was included to approximate the prevalence of smuggling routes, which increase the chances that stolen or lost radioactive material will end up in the hands of non-state or terrorist networks. The data on gun seizures are collected and published by the UN Office on Drugs and Crime. Economist Impact collated the data and banded each country or area into quintiles (A = Very low, B = Low, C = Moderate, D = High, E = Very high) based on the number of weapons seized. The countries or areas with the highest number of seizures receive a rating of “E = Very high,” while countries or areas with few seizures receive a rating of “A = Very low.” Data on weapons seizures were limited to approximately half of the 175 countries and Taiwan included in this assessment. Countries or areas for which data on weapons seizures were unavailable were given a rating of “X = No data.”

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