The 2016 Nuclear Security Index: Implications and Reactions

Ramesh Thakur
This year’s index reveals that concerns are the greatest regarding the Asia–Pacific when it comes to nuclear security vulnerabilities.

Pervez Hoodbhoy
The index is a helpful tool in assessing some aspects of nuclear security but it cannot capture the unique threats that Pakistan faces.

R. Rajaraman
Indian officials have been dismayed by their poor index ranking, but India is well advised to reflect on its position and make improvements.

Shen Dingli
Despite making progress, China is likely performing even better than it is being given credit for by those producing the index.
In Focus: Thakur

The 2016 Nuclear Security Index: An Introduction
By Ramesh Thakur

Published every two years since 2012, the Nuclear Security Index provides valuable insight into efforts by various countries to secure nuclear materials by ranking and scoring them across a broad range of criteria. The latest index, published on Jan. 14 this year, reveals that of all the regions in the world, the concerns are the greatest regarding Asia-Pacific when it comes to nuclear security vulnerabilities, writes Ramesh Thakur.

THERE IS NO world government, yet most international transactions are peaceful, orderly, stable and predictable. This is the result of a dense and binding network of norms, rules and codes of behavior that together make up global governance. The actors in global governance include national governments, intergovernmental organizations such as the United Nations (UN), multinational corporations, international financial institutions and regulators, and civil society.

NON-GOVERNMENTAL ORGANIZATIONS
Non-governmental organizations (NGOs) play various roles including research, advocacy, norm promotion, agenda setting, lobbying public authorities, implementing programs and delivering services and humanitarian assistance, monitoring implementation of international commitments, and direct action. Without their decades-long efforts on human and labor rights, environmental and consumer protection and other social, economic and political activism, the world would be a far harsher place today.

NGOs have also long been active on nuclear issues, in relation both to nuclear power and weapons. While several Nobel peace prizes have been controversial, one that received general acclaim was to the International Physicians for the Prevention of Nuclear War (IPPNW) in 1985. One of the group’s key messages was the shared interests of US and Soviet scientists in averting a nuclear war. They were preceded by the Pugwash Conferences on Science and International Affairs, founded in 1957 and also a Nobel Laureate (1995), and have been joined by other NGOs like Global Zero and Reaching Critical Will, also animated by grave concerns about the acute risks posed by nuclear weapons.

NUCLEAR SECURITY
With the collapse of the Soviet Union, the world faced the threat of the so-called “loose nukes,” nuclear weapons and materials that were stored in anything but secure locations and conditions across the vast country, as well as a large number of unemployed and badly paid but highly skilled nuclear scientists. Visionary Americans worked with Russian colleagues to try and gradually reduce, contain and eliminate the risks. But after the terrorist attacks of Sept. 11, 2001, the world awoke to the new danger of nuclear terrorism. The very notion of deterrence was utterly irrelevant to groups who prided themselves on suicide attacks and held no territory or fixed assets that could be threatened in retaliatory attacks.

A nuclear security incident anywhere could have far-reaching consequences worldwide and is therefore a global concern. Several worrying incidents are known to have taken place in recent years, pointing to gaps in the existing national and multilateral machinery. Referring to a July 2012 breach of security by anti-nuclear activists at a US military complex that houses sensitive nuclear materials in Oak Ridge, Tennessee, Senators Sam Nunn and Richard Lugar noted: “If an unarmed [82-year-old] nun is capable of breaking into America’s nuclear Fort Knox, we must entertain the possibility that terrorists could do the same, with much more serious consequences.” (On May 8, 2015, the nun’s conviction for sabotage was overturned by the Sixth US Circuit Court of Appeals.)

NATIONAL SECURITY SUMMITS
US President Barack Obama took office with a vision for a world freed from the threat of nuclear weapons. Curiously, in his final State of the Union address on Jan. 13 this year, with the exception of the Iran deal, he failed to mention nuclear issues. Yet, while he may not have succeeded in realizing the vision of a nuclear weapons-free world, he did initiate and will preside over the final Nuclear Security Summit (NSS), in which all the world’s leaders with relevant nuclear programs signed on to the agenda to secure all civilian nuclear materials and facilities. The first summit was held in Washington in April 2010, and the final one will be held there this March.

Russia’s decision not to attend the 2016 NSS and uncertainties over the future of US–Russia nuclear security co-operation are potentially serious setbacks. Russia continues to have the world’s largest stockpiles of nuclear weapons, separated plutonium and highly enriched uranium (HEU), stored in the world’s largest number of buildings and bunkers, and a variety of vulnerabilities remain. States have implemented many NSS commitments; additional states have ratified the Convention on the Physical Protection of Nuclear Materials (CPPNM) and its 2005 Amendment; more are taking advantage of tools and services provided by the Vienna-based International Atomic Energy Agency (IAEA); and countries have co-operated with one another. However, the convention is not yet universal, and the requisite number of ratifications of the amendment is not in sight to bring it into force. Just over half the number of countries have joined the International Convention for the Suppression of Acts of Nuclear Terrorism.

BILATERAL & TRILATERAL CO-OPERATION
In the nuclear security endeavor, NGOs too have been active, with the most prominent, but by no means the only one, being the Washington-based Nuclear Threat Initiative (NTI). Much of the substantial progress in securing nuclear materials...
The 1993 US-Russia HEU Purchase (megatonnes-to-megawatts) Agreement was successfully completed in November 2013: a historic achievement that over 20 years eliminated more than a quarter of the planet’s nuclear materials for non-civilian use. Under the program, 500 tonnes of weapon-grade HEU — equivalent to 20,000 bombs — was down-blended, delivered to the US, fabricated into nuclear fuel, and used in nuclear plants. Nuclear fuel accounts for around 10 percent of US commercial energy. Remarkably, nearly half of this comes from eliminated Russian nuclear weapons.

Trilateral US-Russia-Kazakhstan co-operation to secure residual, unguarded plutonium at Semipalatinsk in Kazakhstan, initiated without a formal negotiated agreement and driven by direct engagement among US, Russian and Kazakh scientists, was also groundbreaking. The former Soviet Union conducted 456 nuclear tests in Semipalatinsk (116 atmospheric and 340 underground). When Russian scientists and military personnel withdrew after the collapse of the Soviet Union, they left behind abandoned equipment, tunnels and boreholes filled with plutonium residue that, if recovered, could be used to make dozens of nuclear bombs. Indeed, scavengers looking for abandoned Soviet-era valuable metal and equipment came within meters of the unguarded fissile material between 1991 and 2012. Over 17 years from 1996 to 2012, scientists from Kazakhstan, Russia and the US worked together in a US $150 million operation to secure the material in the tunnels of Degelen Mountain and surrounding boreholes by filling them with special concrete, “greatly reducing one of the largest nuclear security threats since the collapse of the Soviet Union,” according to a study by Harvard University’s Belfer Center for Science and International Affairs. In October 2012 they unveiled a three-sided stone monument with the simple sentence in all three languages etched on it: “The world has become safer.”

The Co-operative Threat Reduction (CTR or Nunn–Lugar, 1991–2014) programs have facilitated the elimination of significant quantities of nuclear materials, promoted habits of international co-operation and reinforced nuclear disarmament and non-proliferation norms. When the former Soviet Union fell apart, it had more than 27,000 nuclear weapons and enough separated plutonium and HEU to triple this number. Under the CTR program, more than 7,500 warheads were deactivated in the countries of the former Soviet Union, over 2,500 delivery vehicles were destroyed and an estimated 4,000 tonnes of chemical weapons were eliminated. The number of countries with weapons-useable nuclear materials has halved from the 1992 total of 50.

The three initiatives provide models for international co-operation on threat reduction, demonstrating that collaborative work involving military-relevant nuclear materials can be undertaken without threatening national security or requiring countries to disclose sensitive information. The Nunn–Lugar program is also a good example of how during the Cold War, the US Congress sometimes prodded and supplemented the efforts of various administrations to address the nuclear threat. Today, in contrast, politics in Washington is so dysfunctional that Congress acts as a brake on the executive branch’s nuclear diplomacy.

NUCLEAR THREAT INITIATIVE

Founded in 2001 by philanthropist businessman Ted Turner and former Senator Sam Nunn, NTI is actively engaged in shaping, developing and implementing nuclear security programs. In 2008, in partnership with others and in collaboration with the IAEA, NTI helped to set up the World Institute for Nuclear Security in Vienna. With over 3,000 members from 115 countries,
the institute brings together those responsible for looking after nuclear security to swap ideas, share best practices and exchange lessons learned. Last year, NTI also helped set up the IAEA-administered, low-enriched uranium international nuclear fuel bank in Kazakhstan, to facilitate the peaceful use of nuclear energy with minimal proliferation threats.

The flagship NTI publication is the biennial Nuclear Security Index, the third edition of which was published on Jan. 14, 2016, in Washington. Prepared jointly by NTI and the Economist Intelligence Unit with the mission of developing global standards and best practices for securing all nuclear materials, the release of all three indexes (2012, 2014 and 2016) has been widely covered by the global media.

The 2016 index tells us a lot that is interesting. Australia maintains its overall top ranking among the world’s 24 states with weapons-useable nuclear materials, with a score of 93 out of 100. Of the 24, four became parties to key international agreements related to nuclear materials security during the biennium, six made new voluntary commitments (such as contributing to the IAEA Nuclear Security Fund), and eight passed or updated laws and regulations on cyber-security.

Japan is assessed as the most improved state, bettering its score by 12 from four years ago to 78. Among nuclear-armed states, France (81), the US (80) and the UK (78) score the highest, while the most improved since 2012 are India (+4), the US (+2), Russia (+2) and the UK (+1). Of the remaining nuclear-armed states, Pakistan is 22nd with a score of 42 and North Korea is last with 24.

Rankings aside, on the upside, 12 countries decreased their quantities of weapons-useable nuclear materials over the four-year period measured by the index, and Uzbekistan removed all of its weapons-useable nuclear material. On the downside, no improvements have been made in the core protection and control measures assessed by the index. More worryingly, the current global system for securing nuclear materials has major gaps that prevent it from being comprehensive and effective: no common set of international standards and best practices exists, there is no mechanism for holding states with lax security accountable, and the legal foundation for securing materials is neither complete nor universally observed.

Most worryingly, 83 percent of all fissile stocks are military-controlled materials and thus remain outside existing international security mechanisms. Moreover, participation in international peer review—a very effective tool for improving performance and building confidence in other states about the integrity of a state’s security remains—is limited: only 16 of the 24 states with weapons-useable nuclear materials have had a nuclear security peer review in the past five years, and seven have never had one.

An act of sabotage against a nuclear facility could result in a significant radiological release, similar in scale to the release when a tsunami hit Japan’s Fukushima nuclear power plant in 2011. The 2016 index for the first time assesses nuclear security conditions related to the protection of nuclear facilities against acts of sabotage for 45 countries with nuclear power plants or research reactors. On this scale, Finland (with a score of 95) displaces Australia (92) at the top. The index finds troubling shortfalls in how well countries are protecting nuclear facilities against sabotage and the emerging threat of cyber attacks. Twenty states lack even basic requirements to protect nuclear facilities from cyber attacks and score zero. Too many countries remain unprepared to deal with cyber attacks that might lead to sabotage.

Among the Asia-Pacific countries on the overall theft ranking, following Australia in the top spot are Japan, China, India, Pakistan and North Korea (see Table 1 opposite). In the composite sabotage ranking, Australia is followed at number 2 by Japan, South Korea, Indonesia, Taiwan, China, India, Pakistan, Bangladesh and North Korea (see Table 2 opposite). In the theft rankings, four or five of the six Asia-Pacific countries are in the bottom half on all measures; on sabotage risks, on all measures six or seven of the countries plus Taiwan are in the bottom half. Whichever way we look at it, therefore, of all the regions in the world, the concerns are the greatest regarding Asia-Pacific when it comes to nuclear security vulnerabilities. While this is especially true of all four Asian countries that possess nuclear weapons, the non-nuclear weapon states cannot be sanguine about the threats and risks for the whole continent.

Overly sensitive governments will attack the messenger with full Yes, Minister-style efforts to belittle and discredit the index and NTI, casting aspersions on methodology, motives, bias, data reliability and so on. But global rankings can actually provide a very useful and convenient good governance policy tool. Sensible states will

### TABLE 1: THEFT RANKING AND SCORES FOR ASIA-PACIFIC COUNTRIES AMONG THE 24 COUNTRIES WITH NUCLEAR POWER PLANTS OR RESEARCH REACTORS

<table>
<thead>
<tr>
<th>Country</th>
<th>Overall Rank (R)</th>
<th>Overall Score (S)</th>
<th>Number of Sites</th>
<th>Security &amp; Control Measures</th>
<th>Global Norms</th>
<th>Domestic Commitments, Capacity</th>
<th>Risk Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>2</td>
<td>92</td>
<td>-1 100</td>
<td>9 89</td>
<td>-1 100</td>
<td>-1 100</td>
<td>11 76</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>36</td>
<td>49</td>
<td>-1 100</td>
<td>-42 21</td>
<td>-36 62</td>
<td>-27 84</td>
<td>-39 29</td>
</tr>
<tr>
<td>China</td>
<td>34</td>
<td>59</td>
<td>-39 40</td>
<td>28 59</td>
<td>34 71</td>
<td>35 71</td>
<td>-32 40</td>
</tr>
<tr>
<td>North Korea</td>
<td>14</td>
<td>23</td>
<td>-15 80</td>
<td>-42 21</td>
<td>45 0</td>
<td>44 13</td>
<td>-36 34</td>
</tr>
<tr>
<td>India</td>
<td>36</td>
<td>54</td>
<td>-30 60</td>
<td>-26 60</td>
<td>-27 79</td>
<td>-42 47</td>
<td>-39 29</td>
</tr>
<tr>
<td>Indonesia</td>
<td>37</td>
<td>63</td>
<td>-15 80</td>
<td>30 54</td>
<td>32 76</td>
<td>27 84</td>
<td>-32 40</td>
</tr>
<tr>
<td>Japan</td>
<td>5</td>
<td>89</td>
<td>-62 20</td>
<td>-30 80</td>
<td>-10 88</td>
<td>-1 100</td>
<td>-6 83</td>
</tr>
<tr>
<td>Pakistan</td>
<td>36</td>
<td>54</td>
<td>-15 80</td>
<td>-10 10</td>
<td>-34 47</td>
<td>-25 87</td>
<td>-44 16</td>
</tr>
<tr>
<td>South Korea</td>
<td>20</td>
<td>81</td>
<td>-30 60</td>
<td>20 72</td>
<td>-1 100</td>
<td>-13 95</td>
<td>21 68</td>
</tr>
<tr>
<td>Taiwan</td>
<td>33</td>
<td>60</td>
<td>-30 60</td>
<td>-18 73</td>
<td>42 33</td>
<td>42 47</td>
<td>10 77</td>
</tr>
</tbody>
</table>
choose to make full use of the NTI Nuclear Security Index as a global benchmark against which to track and improve their own record.

In the following three articles in this package, three scientific experts, all of them members of the Asia-Pacific Leadership Network for Nuclear Non-Proliferation and Disarmament (APLN), tell the story of China, India and Pakistan in relation to the three Nuclear Security Index reports published so far. They describe each of their respective country’s policy measures on nuclear security and its rankings in the 2012, 2014 and 2016 NTI index. They then provide explanations for any upward or downward movement and how China, India and Pakistan, on one side, and the NTI, on the other, have interacted to improve each other’s score and methodology. Finally, they conclude with where each country stands today and is heading towards in the near future on nuclear security.

Professors Pervez Hoodbhoy and R. Rajaraman alert us to incomplete data and methodological flaws that ensure that the NTI index is less than perfect. Both also make the point that commitments on paper, weighted equally in the index, do not always lead to national implementation of international obligations: governments are not equal in their fidelity to global norms. Beyond these shared concerns, however, while Hoodbhoy warns us that Pakistan’s nuclear security position might be more precarious than judged by the NTI index, Rajaraman suggests India’s might not be as fragile as indicated. Professor Shen Dingli similarly cautions readers against evaluating China’s true security preparedness through the prism of Western political culture. While the low scores for China may be understandable, the index is likely to be mistaken and misleading with regard to the true picture there. For all three countries, moreover, the modest size of nuclear programs means that enhanced performance on the security of nuclear materials in the NTI index through greater transparency could come at the risk of diminished national security that puts higher premium on opacity than is the case with Russia, the US and allied nuclear weapons states. Regardless, all three are in agreement that the pioneering and innovative attempt at cross-national comparisons by the NTI is intrinsically valuable and has been a learning exercise for the countries as much as for NTI.

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