

Nuclear Liability: A Key Component of the Public Policy Decision to Deploy Nuclear Energy in Southeast Asia



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AMERICAN ACADEMY OF ARTS & SCIENCES

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Suggested citation: Mohit Abraham, *Nuclear Liability: A Key Component of the Public Policy Decision to Deploy Nuclear Energy in Southeast Asia* (Cambridge, Mass.: American Academy of Arts and Sciences, 2014).

Cover image: People gathering near a nuclear power project in Kudankulam, in the southern Indian state of Tamil Nadu, September 9, 2012.

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ISBN: 0-87724-099-X

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Contents

v	Acknowledgments
1	Prologue
4	Introduction
8	Brief Historical Context
10	International Law and Nuclear Liability
23	Domestic Approaches
24	Supplier Community Approach
25	Challenges to the Liability Framework & Possible Solutions
29	India's Nuclear Liability Act
36	Conclusion
39	Appendix A: Summary of Provisions of International Nuclear Liability Conventions
46	Appendix B: Summary of Liability Limits by Country
47	Appendix C: Analysis of the Provisions Relating to Supplier Liability under India's Civil Liability for Nuclear Damages Act (CLNDA)
49	Contributors

Acknowledgments

There is growing interest worldwide in civilian nuclear power to meet increased energy demands. But the spread of nuclear technology, in the absence of rigorous independent regulatory regimes and international inspection programs, can present serious security risks, the proliferation of weapons capabilities, and safety dangers that can lead to accidents.

The Academy's Global Nuclear Future (GNF) Initiative is working to prevent such dangerous outcomes by identifying and promoting measures that will limit the security, safety, and proliferation risks created by the apparent growing global appetite for nuclear energy. The GNF Initiative has created an interdisciplinary and international network of experts that is working together to devise and implement nuclear policy for the twenty-first century.

To help reduce the risks that could result from the global expansion of nuclear energy, the GNF Initiative addresses a number of key policy areas, including the international nonproliferation regime, the entirety of the fuel cycle, the physical protection of nuclear facilities and materials, and the interaction of the nuclear industry with the nonproliferation community. Each of these areas has specific challenges and opportunities, but informed and thoughtful policies for all of them are required for a comprehensive approach to reduce the risks inherent in the spread of nuclear technology.

We would like to thank the foundations that have allowed us to work on nuclear related issues throughout the course of the Academy's Global Nuclear Future Initiative. We are deeply grateful to Carnegie Corporation of New York, The William and Flora Hewlett Foundation, The John D. and Catherine T. MacArthur Foundation, The Alfred P. Sloan Foundation, The Flora Family Foundation, and The Kavli Foundation for their support.

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Prologue

This paper provides an analysis of nuclear liability, with a focus on the countries of Southeast Asia. The unfortunate events at Fukushima Daiichi in 2011 have raised serious issues for the world community and, in particular, nuclear energy aspirants with regard to the scope and adequacy of nuclear liability coverage in the event of a nuclear accident. For the public in countries that are still discussing the efficacy of deploying nuclear power, we believe that the nuclear liability regime needs to be robust enough to fairly compensate all parties if and when a nuclear accident occurs. This paper tackles this complex issue by focusing on the most significant issues, including:

1. The tension among nuclear suppliers, nuclear operators, and the host and neighboring states in sharing the cost of liability.
2. The continual debate regarding the sufficiency and availability of funds to meet potential compensation demands in case of an accident. This uncertainty, we believe, constitutes a hurdle for public acceptance of nuclear energy, especially in developing countries; we believe that the insurance caps need to be raised significantly.
3. Altering the balance in this area of nuclear liability law jurisprudence by identifying the nuclear supplier as the responsible party in case of an accident. If liability laws comparable to the Indian Civil Liability for Nuclear Damages Act are adopted in the future by additional countries, particularly those in Southeast Asia, this could be a game changer in assessing the economic viability of nuclear energy. (The principle of excluding supplier liability in favor of channeling all liability to the operator of a nuclear power plant has been the operative standard in existing statutes and conventions.)
4. Reliance by a growing number of nuclear aspirants on foreign technology and expertise, including safety oversight. We believe that this will create new challenges regarding legal jurisdiction as to who is responsible for compensation and the extent of liability that could be imposed on these foreign entities and individuals.
5. Unavailability of a universal framework regarding the liability conventions across all states. The principles laid down by the Paris and Vienna Conventions form the bedrock of current international nuclear liability law. However, there is a lack of harmonization between these two agreements. (Many states, including legal officials from the United States, have asserted that the Convention on Supplementary Compensation

for Nuclear Damage [creating a viable risk pool based on proportional assessments imposed on nuclear plant operators in states that have ratified the CSC] could serve as an umbrella agreement. According to the IAEA, “The OECD-sponsored Paris Convention and Brussels Convention are popular in Western Europe while the IAEA-sponsored Vienna Convention is popular in Eastern Europe and elsewhere around the world. Some countries have signed a Joint Protocol to link those two treaties. The Convention on Supplementary Compensation for Nuclear Damage (CSC) was designed to become a global regime and is open to countries without nuclear power plants.”¹

This paper addresses the following key questions:

1. What impact have the unfortunate events at Fukushima had on the views of regional policy-makers and stakeholders regarding changes to nuclear liability and nuclear compensatory standards?
2. What is the standard that policy-makers and scholars, planning the deployment of new nuclear energy, should use as a guidepost as they consider nuclear liability legislation in their respective states? Obvious questions that arise include whether the principles laid down by the Paris and Vienna Conventions should be used to establish regional or country-specific standards, and whether regional agreement on standards should be preferred over country-specific standards. The current U.S. policy is clear on these questions: The United States prefers adoption by new countries of the CSC rather than implementation of region-based standards.
3. Will the vendors in Russia, Japan, China, and the Republic of Korea, as substantive future nuclear suppliers, be influential in setting the trend(s) in the nuclear liability regime?
4. What can countries considering deployment of nuclear energy learn from the recent experiences in India? Statements made by Russian officials seem to indicate that if the Russian government were to accept India’s new liability law, there would be an increase in tender price for its new VVER plants in India, increasing the burden on Indian consumers. Does this set a precedent, or are alternatives, based on variants of India’s nuclear liability law, preferable?
5. Should specific incentives to encourage passively safe designs be considered when the technical aspects of establishing a robust and sustainable liability regime are considered?

1. “Initiative for Global Liability,” *World Nuclear News*, August 30, 2013, http://www.world-nuclear-news.org/NP_Initiative_for_global_liability_3008131.html.

6. What roles should international bodies such as the International Atomic Energy Agency, the World Nuclear Association, and others play in encouraging a uniform and strict liability regime?
7. Can other substantive non-nuclear models (such as the International Oil Pollution Compensation Fund) that contain provisions for risk-sharing among private and public entities be useful in assessing the size of the financial risk pool to pay for compensation in the event of an accident?

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Introduction

Many years ago, the nuclear industry accepted the practice of channeling all the liability for a nuclear accident to the operator, which has the duty to ensure that the products and services being supplied are free from defect.² Consequently, no international or domestic law placed any significant liability on the supplier. The only two internationally acceptable situations in which a right of recourse could be claimed by an operator against a supplier were (1) if a nuclear incident arose from an act of omission or commission by the supplier *with intent to cause damage*; and (2) a contractual right of recourse (e.g., a private contract to apportion liability freely entered into by operator and supplier).

This principle of nuclear liability went unchallenged for many years and was codified in the Convention on Third Party Liability in the Field of Nuclear Energy (1960), the Vienna Convention on Civil Liability for Nuclear Damage (1997, as amended), and the Convention on Supplementary Compensation for Nuclear Damages (1997). The principle of excluding supplier liability in favor of channeling all liability to the operator of a nuclear power plant has for years been taken as a given, an undisputed principle of international nuclear liability law jurisprudence. Nations pursuing nuclear energy have almost always complied with this principle, and over time the principle has found its way into domestic nuclear liability laws of the countries that sought to promulgate such legislation.

The main justification for this approach is the belief that unlimited liability placed on many players would render the business of nuclear power unviable. Consequently, two primary factors have motivated the approach of channeling all liability to the operator. First, this approach avoids difficult and complicated questions of legal cross-actions to establish liability in every individual case. Second, it obviates the necessity for all those that might be associated with construction or operation of a nuclear installation, other than the operator itself, to take out insurance, and thus allows concentration of the insurance capacity available.³

2. Many thanks to Sunil Felix, Francesca Giovannini, James Glasgow, Stephen Goldberg, Neha Kalkotwar, Michael May, Steven Miller, M. P. Ram Mohan, Sanjay Mullick, Thomas Phillippe, John Randell, Arvind Ray, Els Reynaers, Robert Rosner, Deepto Roy, Scott Sagan, Rakesh Sood, Bhanudey Kanwar Singh, Shobha Singh, and all the participants at the meetings organized by the American Academy of Arts and Sciences in Hanoi, Hiroshima, and Bali for their valuable support, comments, and suggestions. I would also like to acknowledge the invaluable support of the American Academy of Arts and Sciences and the Nuclear Law Association of India. All errors remain mine.

3. Revised text of the Expose des Motifs of the Paris Convention, approved by the Organisation for Economic Co-operation and Development (OECD) Council on November 16, 1982, available at http://www.oecd-nea.org/law/nlparis_motif.html.

The present system is therefore viewed as cost-effective because nuclear operators can channel the cost of insurance against future nuclear accidents to the consumers that use the nuclear power. If liability were more widely dispersed, the price of nuclear equipment would increase to reflect the cost of insurance borne by the products' suppliers, which may be many for even a single nuclear power project.⁴

The nuclear industry also argues that restricting liability to operators acts as an incentive for operators to strictly adhere to safety standards and to introduce the latest technology to maintain the highest standards of safety.⁵

With the increasing influence of developing countries such as India and China, the nuclear industry now faces the attractive prospect of lucrative new markets in which nuclear energy will be a significant source of power. What was not expected, however, was that one of these developing countries, India, would attempt to change one of the basic principles of international nuclear liability law by altering the limits of supplier liability.

The principle of supplier liability was introduced when the Indian parliament passed the Civil Liability for Nuclear Damages Act, 2010 (CLNDA). Under the CLNDA, liability for a nuclear incident would principally lie with the operator, which would be required to pay compensation. However, the act also introduces the novel concept (novel at least in the area of nuclear liability law) of supplier liability over and above the accepted principles of operator liability. Whether prominent supplier countries such as the United States, Japan, France, and Russia will accept this new principle remains to be seen. However, supplying India with nuclear material confers significant economic benefits on France and Russia, and preliminary evidence suggests that both countries may accede in the case of deploying reactors in India. In fact, recent reports indicate that Russia has already arrived at a preliminary agreement with the Indian authorities and has accepted the Indian nuclear liability law. While the exact modalities of the agreement are in the process of being worked out, the structure adopted appears to be one in which the increased cost of the supplier purchasing insurance for the supplied component will lead to an escalation in the cost of the concerned component.⁶ If this agreement were to be finally signed, it would be a watershed moment in the history of international nuclear liability law.

Whether countries that are now planning or are in the commission stage of nuclear power plants, including those in the Association of Southeast Asian Nations (ASEAN) or other South Asian countries, will consider the CLNDA

4. Arya Hariharan, "India's Nuclear Civil Liability Bill and Supplier's Liability: One Step towards Modernizing the Outdated International Nuclear Liability Regime," *William & Mary Environmental Law and Policy Review* 36 (1) (2011): 223-255.

5. Kathy J.S. Fritz, "Civil and State Liability for Nuclear Accidents: A Proposal for Eastern Europe," *International Legal Perspectives* 6 (1994): 37, 60-61.

6. Charu Sudan Kasturi, "India Cracks N-liability Barrier With Russia," *The Telegraph*, April 1, 2014, http://www.telegraphindia.com/1140402/jsp/nation/story_18145683.jsp#.U0QmXq2SzvI.

to be a feasible model, or whether India, because of its unique standing in the world economy, will stand alone in enforcing this principle remains to be seen.

If major supplier countries such as France and Russia agree to the supplier liability model that is “modish” in India, then France and Russia and the other suppliers may have difficulty arguing that the same model should not be accepted elsewhere. Some academic and environmental organizations are even arguing that Japan should consider adopting supplier liability, especially in light of the fact that much of the compensation paid out for the Fukushima disaster was taxpayer funded.⁷ Very recently, about 1,400 plaintiffs have filed a lawsuit against the three companies that supplied the reactors at the Fukushima nuclear power plant, namely, Toshiba, General Electric, and Hitachi. This lawsuit, filed at the Tokyo District Court, challenges current regulations that provide immunity to suppliers from liability in nuclear accidents and that place the liability solely on the operator, in this case, the Tokyo Electric Power Company (TEPCO). The plaintiffs have argued that the three suppliers failed to implement safety improvements to the four-decade-old boiling water reactors at the nuclear power plant, and they are seeking a token compensation of 100 yen (approximately US \$1) each. The goal of the plaintiffs is not economic compensation, but to raise awareness in relation to the issue of supplier immunity from nuclear liability.⁸

Another pressing issue, which is being raised in the aftermath of the Fukushima accident, is the extent of nuclear liability provided for in the various international conventions and domestic laws as well as the sufficiency of funds to meet compensation demands. A consistent criticism being expressed is that none of the legal frameworks pertaining to nuclear liability provide for adequate compensation structures from the operator, and most of the compensation in the event of a nuclear incident would actually be funded by taxpayers. This criticism also constitutes a hurdle against public acceptance of nuclear energy, especially in developing countries. In fact, in India, the operator companies will also be wholly government-owned, which could explain in part why the Indian government chose to introduce an expanded concept of supplier liability. In a recent development on this issue, the Canadian government is seriously contemplating introducing legislation to significantly increase the liability thresholds for nuclear accidents from the present level of about \$73 million to \$1 billion.⁹

7. Hariharan, “India’s Nuclear Civil Liability Bill,” 1. See also Sandeep Dikshit, “Japan May Amend Its Nuclear Damage Compensation Act,” *The Hindu*, March 5, 2013, <http://www.thehindu.com/sci-tech/energy-and-environment/japan-may-amend-its-nuclear-damage-compensation-act/article4476106.ece>.

8. “Hundreds Sue Toshiba, GE, Hitachi over Fukushima Nuclear Disaster,” *Voice of Russia*, January 31, 2014, http://voiceofrussia.com/news/2014_01_31/Hundreds-sue-Toshiba-GE-Hitachi-as-responsible-for-Fukushima-nuclear-disaster-3397/.

9. “Canadian Government Introduces Nuclear Liability Legislation,” *Nuclear Engineering International*, February 4, 2014, <http://www.neimagazine.com/news/newscanadian-government-introduces-nuclear-liability-legislation-4171533>.

The Indian law introducing supplier liability, the lawsuit against the suppliers of the Fukushima nuclear power plant, and the proposed increase of liability thresholds by the Canadian government to \$1 billion are all part of increasing measures and voices that are seeking reform to the extant nuclear liability regime. This is the ideal time for the nuclear industry itself to suggest reforms that are acceptable to the public at large while not discouraging investment and innovation in the nuclear industry.

This paper briefly examines the evolution of the principles of international nuclear liability, as well as the liability mechanisms presently embodied in international conventions and domestic laws. The paper also discusses some of the problems within the international legal framework on international nuclear liability and explores the possibility of regional cooperation as a way to address transboundary nuclear incidents. It will also discuss methods of compensation that can be structured to ensure availability of higher compensation in the event of a nuclear incident. The paper concludes with a discussion of the supplier liability mechanism introduced by India and the consequent commercial impact on international trade in nuclear energy.

Brief Historical Context

The idea of channeling liability solely to the operator can be traced to principles that evolved in the United States.¹⁰ Until 1954, the U.S. government was liable for any nuclear incident because all nuclear facilities were run by the government or the military. In 1954, the U.S. government decided that private industry would also be permitted to own, operate, and license reactors. Per then-prevalent principles of tort and environmental law, liability could fall on any of the stakeholders: that is, suppliers, designers, contractors, and manufacturers.¹¹ With the memory of the devastating power of nuclear technology still fresh, stakeholders saw that the corresponding risks and liabilities were substantively different from other conventional industrial applications. Exposure to such substantial risks was unacceptable and proved to be a hurdle in attracting meaningful investment to the sector. At the same time, American nuclear suppliers wanted to expand into Western Europe but were not willing to expose themselves to liability claims for nuclear incidents occurring outside the territory of the United States. This factor, along with the difficulty of calculating insurance premiums because of the low-probability but high-risk nature of nuclear incidents, issues pertaining to determination of compensation, proving damage, and so on, led to the enactment of the Price-Anderson Nuclear Industries Indemnity Act, which came into effect in 1957.¹²

ECONOMIC CHANNELING OF LIABILITY

The Price-Anderson Act embodies the concept of economic channeling of liability. In accordance with the act, nuclear operators agree to bear the burden of strict liability in return for a limitation of liability over time, guaranteed insurance coverage with manageable premiums, and capped damages.¹³ Under this concept of economic channeling, while a supplier may in principle be liable, the operator would cover the eventual economic burden by paying any compensa-

10. Tom Vanden Borre, “Channeling of Liability: A Few Juridical and Economic Views on an Inadequate Legal Construction,” in *Contemporary Developments in Nuclear Energy Law: Harmonizing Legislation in CEEC/NIS*, ed. Nathalie L.J.T. Hogback (London: Kluwer Law International, 1999), 13, 17–18.

11. Hariharan, “India’s Nuclear Civil Liability Bill,” 226.

12. See Evelyne Ameye, “Channeling of Nuclear Third Party Liability towards the Operator: Is It Sustainable in a Developing Nuclear World or Is There a Need for Liability of Nuclear Architects and Engineers,” *European Energy and Environmental Law Review* 19 (1) (2010): 33, 35. See also Hariharan, “India’s Nuclear Civil Liability Bill,” 226. For the text of the Price-Anderson Act, see 42 U.S.C. sec. 2210.

13. Hariharan, “India’s Nuclear Civil Liability Bill,” 226.

tion. Therefore, operators would be required to obtain the maximum amount of insurance against nuclear incidents that they can avail from the insurance industry. Any liability over and above that covered under such insurance would be paid through the fund created under the Price-Anderson Act, the main contributors of which are members of the American nuclear industry. This is in contrast with legal channeling, under which victims cannot bring claims against any entity other than the operator, even if such other entity were to be at fault, because all liability has been shifted to the operator. The legal principle insulating the supplier from all liability was developed based on this concept of economic channeling and provided suppliers with further protection from liability.

LEGAL CHANNELING OF LIABILITY

The economic channeling principle was transformed to a legal principle by a report issued in 1959 by Harvard Law School and the Atomic Industrial Forum, *International Problems of Financial Protection against Nuclear Risk*.¹⁴ The Harvard report took the view that once a supplier had delivered goods/components to an operator, the supplier no longer had control over those goods/components, and hence the liability for the goods/components was completely transferred as well.¹⁵ At the time, this principle was a significant departure from accepted principles of tort law. No other industry had excluded suppliers from the chain of liability in this manner.

The Harvard report articulates a variety of reasons for this new approach to liability, including the importance of keeping costs low, avoidance of litigation, and encouraging investment and innovation in the nuclear industry.¹⁶ The report also notes that potential plaintiffs might target the suppliers rather than operators because of the deeper pockets of suppliers.¹⁷ This observation has proved prescient. India recently modified its own nuclear liability law to make suppliers liable to preserve the ability to sue suppliers in the event of proven negligence on part of the suppliers—whose resources are likely to be far greater than those of the Indian nuclear operators, which presently are all state-controlled companies.

The Harvard report also partially endorses the approach of channeling liability to the operator by arguing that it would improve the victim's ability to recover compensation (especially in transboundary incidents). In response to the criticism that such a principle would result in suppliers providing poor service, the report argues that operators will choose only those suppliers that have a reputation for being the best and the safest.¹⁸ Further, the operator would be forced to maintain the highest standards of safety.

14. *Ibid.*, 227.

15. Vanden Borre, "Channeling of Liability," 20.

16. Ameye, "Channeling of Nuclear Third Party Liability," 35.

17. Vanden Borre, "Channeling of Liability," 20.

18. Ameye, "Channeling of Nuclear Third Party Liability," 35.

International Law and Nuclear Liability

INTERNATIONAL CONVENTIONS

The Organisation for Economic Co-operation and Development (OECD) took the initiative to prepare the Convention on Third Party Liability in the Field of Nuclear Energy (Paris Convention, 1960), which established the nuclear liability regime for most of Western Europe. This was one of the first nuclear conventions to deal with liability issues.

Supplementing the Paris Convention, the 1963 Convention Supplementary to the Paris Convention of July 29, 1960 (Brussels Supplementary Convention) was established to provide for greater compensation than is guaranteed under the original Paris Convention.

Thereafter, the International Atomic Energy Agency (IAEA) sought to replicate the principles of the Paris Convention within an international framework, and the Vienna Convention on Civil Liability for Nuclear Damage (Vienna Convention, 1963) was born. The broad principles in these conventions can be summarized as follows:

1. The no-fault liability principle (strict liability);
2. Liability is channeled exclusively to the operator of the nuclear installation (legal channeling);
3. Only courts of the state in which the nuclear accident occurs would have jurisdiction (exclusive jurisdiction);
4. Limitation of the amount of liability and the time frame for claiming damages (limited liability); and
5. The operator is required to have adequate insurance or financial guarantees to the extent of its liability amount (liability must be financially secured).

Today, the principles laid down by the Paris and Vienna Conventions form the bedrock of international nuclear liability law. Contracting states have the option either to transform the principles of the conventions into domestic laws or to directly implement the convention as self-executing. Many of these principles have also been replicated in the domestic laws of countries with civilian nuclear energy programs that are not party to any of the conventions. For instance, although Japan is not a party to any of the international conventions

on nuclear liability, its nuclear liability law and implementing regulations largely capture the principles in the international agreements. Indonesia and Malaysia have also largely followed those principles and are the only countries in South-east Asia to have passed such laws.

The effectiveness of the Paris and Vienna Conventions with respect to provision of prompt and adequate compensation payment to places affected by an accident has consistently been doubted. Many large nuclear energy-producing countries remain outside the two conventions, and many national laws differ from their provisions, thus impeding harmonization efforts. Further, some countries have limited liability requirements, and others have unlimited liability regimes, which also complicates the goal of achieving harmonization. Within the ASEAN region, Vietnam is considering whether to become a party to the Vienna Convention and has not yet framed its position on nuclear liability. Malaysia (with its Atomic Energy Licensing Act of 1984) and Indonesia (with its Act No. 10 of 1997) have enacted domestic laws that follow internationally accepted principles of exclusive operator liability and that place limitations on liability. However, these laws do not discuss the possibility of transboundary incidents, and the liability thresholds (\$16 million for Malaysia and \$93 million for Indonesia) are relatively low compared to other nuclear energy-producing countries. India, in addition to introducing the concept of supplier liability, has also placed limits on liability thresholds.

With the adoption of the Vienna Convention, two parallel conventions existed, neither of which applied to nuclear damage suffered in the territory of a party to the other convention. The accident at Chernobyl and the adoption of nuclear energy by many countries over the last few decades tested the two conventions and revealed them to be largely inefficient. The accident at Fukushima Daiichi has raised further questions about international nuclear liability. However, unlike the Chernobyl incident, which triggered a series of changes to the international nuclear liability regime, the incident at Fukushima has yet to result in further changes. This might be because of the minimal transboundary impact of Fukushima; however, the issue is evolving in light of the recent developments of radioactivity leaking into the water near Fukushima and the potential effect of radiation spreading into the Pacific Ocean. This incident has raised questions about the amount of liability and the exclusion of suppliers from any liability. The international community and regional players must now consider new models of nuclear liability for their respective regions.

THE IMPACT OF CHERNOBYL ON THE LIABILITY CONVENTIONS

The Chernobyl accident in 1986 caused serious social and economic disruption for large portions of the populations of Belarus, the USSR, and Ukraine. The radioactive plume that resulted from the accident covered much of Europe, even reaching the United Kingdom in the first few days of May 1986.¹⁹ At the time of the incident, the USSR was not party to either the Paris Convention or the Vienna Convention and failed to notify its neighbors at the time the accident occurred.

Many years before the Chernobyl accident, the International Court of Justice (ICJ) had settled the principles of international environmental law in the Trail Smelter Arbitration (1939) and the Corfu Channel Case (1949), finding that states have a duty to prevent transboundary environmental harm and have an obligation to pay compensation for harms caused. Despite the clarity of this legal position, no country could bring a valid claim seeking compensation against the USSR for Chernobyl for primarily three reasons: (1) the ICJ's jurisdiction is consent-based, and the USSR would not subject itself to the jurisdiction of the ICJ in this matter; (2) the USSR had veto power in the United Nations; and (3) the USSR was not party to either the Paris or the Vienna Convention.²⁰

The ramifications of Chernobyl exposed the weakness of the extant liability framework. The nuclear accident had affected thousands over a large geographic area; yet no legal remedy was available to the affected individuals or states, and liability thresholds were low at that time.²¹ Thus, the international community started the process of revisiting the existing nuclear liability laws.

With both the Paris and Vienna Conventions being independent of each other, it was open to states to adopt either of the conventions. This raised the issue of coordination and harmonization because, in general, no country could be a party to both conventions, because the exact details were not consistent and could lead to potential conflict in their simultaneous application.²² Thus, at the initiative of the IAEA and the OECD, in 1988 the two main conventions were linked by the Joint Protocol relating to the Application of the Vienna Convention and the Paris Convention (1988 Joint Protocol), which came into

19. A. V. Lowe, Colin Warbrick, and John Woodliffe, "Chernobyl: Four Years On," *International and Comparative Law Quarterly* 39 (2) (1990): 461–471. See also L. A. Malone, "The Chernobyl Accident: A Case Study in International Law Regulating State Responsibility for Transboundary Nuclear Pollution" (1987), Faculty Publications, Paper 590, <http://scholarship.law.wm.edu/facpubs/590>.

20. Malone, "The Chernobyl Accident."

21. For an indication of the costs of the Chernobyl accident, see Belarus Foreign Ministry, "Chernobyl Disaster: Why are the Consequences Still Observed and Why is the International Assistance Still Critical?" available at http://chernobyl.undp.org/english/docs/belarus_23_anniversary.pdf.

22. World Nuclear Association, <http://www.world-nuclear.org/info/Safety-and-Security/Safety-of-Plants/Liability-for-Nuclear-Damage/#.UbgEHfY318>.

force in 1992. Parties to the 1988 Joint Protocol are treated as if they are parties to both conventions. Therefore, if an incident in a country bound by the Paris Convention causes damage in a country bound by the Vienna Convention, the victims in the Vienna Convention country could claim compensation under the laws of the Paris Convention country.²³

Many states have not ratified the 1988 Joint Protocol, including the United Kingdom and France. The problem of nonharmonization is illustrated by Russia's present position. In 2005, Russia ratified the Vienna Convention. But, not being a member of the OECD, it did not adopt the Paris Convention. Nor did it adopt the 1988 Joint Protocol. Thus, if a situation similar to Chernobyl were to arise, Russia may have a legitimate argument that it is not a party to the Paris Convention and the Joint Protocol, and thereby could avoid compensating neighboring Paris Convention states.²⁴

The Vienna Convention has also undergone significant changes. In 1997, delegates from more than eighty states adopted the Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage (1997 Protocol), which entered into force in 2003. The 1997 Protocol extends the geographic scope of the Vienna Convention, sets the possible limit of an operator's liability at not less than 300 million special drawing rights²⁵ (a significant increase from the previous limit of \$5 million), and broadens the definition of nuclear damage to include environmental damage. To date, the Vienna Convention, which aimed at universal adherence, has attracted the membership of only forty states.

Subsequent to the Chernobyl accident, the European Union undertook a complete revision of the Paris and Brussels Supplementary Conventions. The 2004 Protocol to Amend the Paris Convention on Third Party Liability in the Field of Nuclear Energy²⁶ of 29 July 1960 (2004 Protocol) is the most important of these revisions. The 2004 Protocol extends the geographic scope of accidents, raises the amount of compensation available to the victims, and enlarges the definition of nuclear damage. The new limits of liability were fixed for operators (insured) at €700 million, for the installation state (public funds) at €500 million, and for collective state contribution under the Brussels Convention at €300 million, or a total of €1.5 billion. The 2004 amendments removed the requirement for a state to restrict the maximum liability of a nuclear operator, thus allowing states preferring an unlimited liability policy to join the convention. However, the 2004 Protocol has not yet entered into force, because a majority of EU states, including Germany, France, and the United Kingdom,

23. *Ibid.*

24. Mulavana Parameswaran Ram Mohan, "Transboundary Nuclear Liability Regime: A Case for South Asian Nuclear Energy Risk Community," Ph.D. dissertation, Indian Institute of Technology at Kharagpur, 2012. See also 1997 Vienna Convention, Article 1A (2) & (3).

25. Approximately US \$455 million.

26. The 2004 Protocol to Amend the Paris Convention on Third Party Liability in the Field of Nuclear Energy.

have not ratified it. Thus, the old liability limits, enacted in 1960 (i.e., €360 million), continue to apply.

In addition to the Paris and Vienna Conventions, in 1997 at the insistence of the United States, the IAEA sponsored another international nuclear liability regime, the Convention on Supplementary Compensation (CSC). The CSC was put in place primarily to align the U.S. Price-Anderson Act with international law. The CSC provides for two tiers of compensation. In the first tier, it fixes the amount of compensation at 300 million special drawing rights. To the extent that the funds from the operators are insufficient to cover this amount, the installation state has to make public funds available to capture the difference. In the second tier, if claims for compensation for nuclear damage exceed 300 million special drawing rights, additional amounts would have to be offered through contributions by member states based on their installed nuclear capacity. These additional amounts are to be provided through contributions by member states collectively on the basis of a formula that factors in the installed nuclear capacity of a state and a UN rate of assessment.²⁷ The amount is therefore not fixed, but depends on the number of nuclear power plants in member countries and will increase as the nuclear capacity of a state increases.²⁸ It is estimated that if most states that use nuclear power adhered to the CSC, the amount of the second tier would be more than 300 million special drawing rights²⁹—an amount in addition to the first tier compensation of 300 million special drawing rights.

Another special feature of the CSC is that 50 percent of the international funds are to be used to compensate damage suffered both inside and outside the installation state, while the remaining 50 percent is to be used exclusively to compensate transboundary damage.³⁰ Nevertheless, the allocation of international funds may vary depending on the national compensation made available by the installation state. Therefore, if the installation state prescribes a national compensation lower than 300 million special drawing rights, then the percentage of international funds exclusively available for compensating transboundary damage is to be increased accordingly.³¹ However, if the installation state makes available a national compensation amount of 600 million special drawing rights or higher, then the whole amount of supplementary compensation is to be used to compensate damage suffered both inside and outside the installation state.³²

27. See IAEA, Convention on Supplementary Compensation for Nuclear Damage, Articles III and IV, <http://www.iaea.org/Publications/Documents/Conventions/supcomp.html>.

28. See Ben McRae, “The Convention on Supplementary Compensation for Nuclear Damage: Catalyst for a Global Nuclear Liability Regime,” available at <http://www.oecd-nea.org/law/nlb/nlb-79/017-035%20-%20Article%20Ben%20McRae.pdf>.

29. *Ibid.*

30. See IAEA, Convention on Supplementary Compensation for Nuclear Damage, Article XI (1) (a) and (b).

31. *Ibid.*, Article XI (1) (c).

32. *Ibid.*, Article XI (2).

For transboundary damage to be compensated using international funds, the CSC requires that such damage should have occurred within the geographical scope of the CSC, that is, within the territory of a contracting party.³³ In other words, the international funds are not available to non-contracting parties. However, with respect to the national compensation amount, the CSC leaves it to the discretion of the installation state to include or exclude damage suffered in another state that is not a party to the CSC. This discretion is, however, subject to other obligations of a contracting state that may arise under other international conventions on nuclear liability.

The advantage that the CSC offers is that it is an instrument to which all states may adhere regardless of whether they are parties to an existing nuclear liability convention and regardless of whether they have nuclear installations on their territory. The CSC can be adhered to even if contracting parties enter into regional arrangements or agreements for liability. However, an important requirement is that countries should enact national liability laws that are consistent with model law described in the annex to the CSC (or amend laws that are inconsistent) or the Vienna or Paris Convention. The CSC can therefore work as a “supplemental” convention: that is, over and above an existing convention. The CSC has not yet come into force, because it requires the ratification of five parties with a minimum of 400,000 MW of installed nuclear capacity.³⁴ Fourteen countries, including India, have signed the CSC, but most have yet to ratify it. However, India has drafted a liability law that some argue is not in compliance with the CSC model law owing to the expanded concept of supplier liability that has been introduced in the law. (This is discussed in detail in Appendix C.) Therefore, India’s ratification of the CSC is in doubt.

Table 1, prepared by the World Nuclear Association, shows the nuclear power states and the liability conventions to which they are party.

33. *Ibid.*, Article V.

34. *Ibid.*, Article XX.

Table 1. Nuclear Power States and Liability Conventions to Which They are Party³⁵

Countries	Conventions	Countries	Conventions
Argentina	VC; RVC; CSC	Lithuania	VC; JP
Armenia	VC	Mexico	VC
Belgium	PC; BSC; RPC; RBSC	Netherlands	PC; BSC; JP; RPC; RBSC
Brazil	VC	Pakistan	
Bulgaria	VC; JP	Romania	VC; JP; RVC; CSC
Canada		Russia	VC
China		Slovak Republic	VC; JP
Czech Republic	VC; JP	Slovenia	PC; BSC; JP; RPC; RBSC
Finland	PC; BSC; JP; RPC; RBSC	South Africa	
France	PC; BSC; RPC; RBSC	Spain	PC; BSC; RPC; RBSC
Germany	PC; BSC; JP; RPC; RBSC	Sweden	PC; BSC; JP; RPC; RBSC
Hungary	VC; JP	Switzerland	PC; RPC; BSC; RBSC
India	CSC*	Taiwan	
Iran		Ukraine	VC; JP
Japan		United Arab Emirates	RVC
Kazakhstan	RVC	United Kingdom	PC; BSC; RPC; RBSC
Korea		United States	CSC

*India has signed the CSC but has not yet ratified it. Whether India's domestic liability law conforms to the requirements of the convention is not yet clear.

Key to abbreviations: PC = Paris Convention; RPC = 2004 Revised Paris Protocol (not yet in force); BSC = Brussels Supplementary Convention; RBSC = 2004 Revised Brussels Supplementary Convention (not yet in force); VC = Vienna Convention; RVC = Revised Vienna Convention 1997; JP = 1988 Joint Protocol; CSC = Convention on Supplementary Compensation for Nuclear Damage (not yet in force)

Several key players, such as India, China, and Japan, are not yet party to any of the key conventions. Among the ASEAN countries, the Philippines and Indonesia have signed the Vienna Convention and the 1997 Protocol.³⁶ It therefore is clear that a large portion of the world's nuclear reactors continue to remain outside the framework of any of these conventions.

35. World Nuclear Association, <http://www.world-nuclear.org/info/Safety-and-Security/Safety-of-Plants/Liability-for-Nuclear-Damage/#.UbgEHfYY3I8>.

36. Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage.

A comparative table highlighting key features of the three conventions has been included as Appendix A. While many of the principles in the three conventions are similar, there are differences in some of the provisions, including those in relation to the amount of liability, the time period within which a claim can be made, the geographical scope of application of these conventions, the definition of “nuclear damage,” and the approach to how compensation must be dispersed, among other issues. These differences in themselves highlight the need for a uniform framework.

Some believe that the lack of progress in attaining harmonization and consensus is owing to the different approaches subscribed to by two of the most important players: the United States and France. Whereas France supports the Paris Convention and the Joint Protocols, the United States is pushing for the CSC framework. However, in a joint French-U.S. statement from August 28, 2013, France indicated its support of the CSC framework and its desire to bring the CSC into force.³⁷ Japan has recently indicated that it is proposing to introduce legislation to ratify the CSC. This ratification would be a major step toward bringing the international convention into force.³⁸

The CSC framework would require more nuclear power countries, like China, India, France, and Japan, and possibly more European nuclear energy countries that are party to one of the liability conventions. The reason for this is because the installed capacity required for the CSC to come into effect requires the inclusion of major countries with high installed nuclear capacity. Furthermore, the participation of these countries is also imperative in making the CSC an effective framework, as it would increase access to the amount of funds that may be available in the case of a nuclear accident.

The robustness of all the existing conventions was considered in great detail in 1999 at an International Symposium in Budapest, organized by the OECD and the IAEA, on the issue of reform of civil nuclear liability.³⁹ It was noted that the traditional opinion was that the special regime for nuclear liability developed in the 1960s, and it represented a fair compromise between the obligation to ensure the protection of the public and the economic and legal interests of the nuclear industry. It also noted that this traditional view was now beginning to be questioned to a certain extent, and that the issue of reform of nuclear liability was an evolving one.⁴⁰

In the aftermath of Fukushima, the questions challenging this traditional view are increasing, and the issue of reform needs to be revisited, keeping in mind new and evolving challenges facing the nuclear industry and the public good.

37. Joint Statement on Liability for Nuclear Damage amongst France and the United States, available at http://energy.gov/sites/prod/files/2013/08/f2/Joint%20Statement%20Signed_0.pdf.

38. “Japan Looks to Ratify Liability Accord,” *World Nuclear News*, December 13, 2013, <http://www.world-nuclear-news.org/NP-Japan-looks-to-ratify-liability-accord-1312134.html>.

39. Reform of Civil Nuclear Liability, International Symposium, Budapest, Hungary, May 31–June 3, 1999, available at <https://www.oecd-nea.org/law/legislation/nea2188-liability.pdf>.

40. See *ibid.*, foreword by Patrick Reynders, 5–7.

THE IMPACT OF FUKUSHIMA ON THE INTERNATIONAL LIABILITY FRAMEWORK

The incident at Fukushima has underlined the lack of a reliable universal liability framework, reflecting the inability of the international community to achieve a universal harmonized regime.⁴¹

Major Japanese industries such as agriculture, fishing, and tourism were heavily affected by the incident at Fukushima.⁴² However, because the accident occurred on the eastern side of Japan, bordering the Pacific Ocean, the transboundary impact on other countries has been insubstantial. Nevertheless, the UN Scientific Committee on the Effects of Atomic Radiation suggests that the full impact may not be known for years.⁴³ At this stage, though, liability and compensation issues have been limited within the jurisdiction of Japan.⁴⁴ Japan has not acceded to any of the international nuclear liability conventions but has its own domestic legislation, which, again, does not provide recourse to people affected outside the territory of Japan. Had the accident occurred in the western region of Japan, it might have caused considerable damage in South Korea. The Fukushima nuclear accident emphasizes the need to undertake reforms that are acceptable to more countries. With total costs estimated at well over \$100 billion,⁴⁵ the Fukushima accident is also a reminder of the low caps on liability in extant liability laws and the corresponding obligation of the government to pay compensation, as well as the potential impact such an incident could have on neighboring countries.

Many experts now conclude “that the need to revisit and revise regulations regarding financial responsibility for nuclear accidents has been clear and compelling for at least a quarter of a century (since Chernobyl) and has been made overwhelmingly obvious by Fukushima.”⁴⁶ And many now hope that the Fukushima accident will serve as a catalyst for real progress in the nuclear liability regime.⁴⁷

41. Ram Mohan, “Transboundary Nuclear Liability Regime.”

42. Eri Osaka, “Corporate Liability, Government Liability, and the Fukushima Nuclear Disaster,” *Pacific Rim Law and Policy Journal* 21 (3) (June 2012): 433–459.

43. UNSCEAR 2012, *Interim Findings of Fukushima-Daiichi Assessment presented at the Annual Meeting of UNSCEAR*, available at <http://www.unis.unvienna.org/unis/pressrels/2012/unisous144.htm>.

44. OECD, Nuclear Energy Agency, “Fukushima Press Kit” (2012), <http://www.oecd-nea.org/press/press-kits/fukushima.html>.

45. Kyoko Hasegawa, “Fukushima Operator Warns Clean Up May Cost 125 billion,” available at <http://www.google.com/hostednews/afp/article/ALcqM5jbDwBCdfyO8lz4LNAYPgqVNPO0RQ?docId=CNG.9394a22b87c85b55c6e1f77e575fb76d.5e1>. See also Tsuyoshi Inajima and Yasumasa Song, “Fukushima \$137 Billion Cost has TEPCO Seeking More Aid,” *Bloomberg*, <http://www.bloomberg.com/news/2012-11-07/fukushima-137-billion-cost-has-tepcos-seeking-more-aid.html>.

46. Mark Cooper, “Nuclear Liability: The Market-Based, Post-Fukushima Case for Ending Price-Anderson,” *Bulletin of the Atomic Scientists*, October 5, 2011, <http://thebulletin.org/web-edition/features/nuclear-liability-the-market-based-post-fukushima-case-ending-price-anderson>.

47. Patrick Reyners, “A New World Governance for Nuclear Safety after Fukushima?” *International Journal of Nuclear Law* 4 (1) (2013): 63–77.

The IAEA has responded to the accident by emphasizing the need to achieve a “global” nuclear liability regime. In June 2011, the IAEA adopted a “Draft Action Plan on Nuclear Safety.” On the matter of the nuclear liability regime, the action plan states:

Member States to work towards establishing a global nuclear liability regime that addresses the concerns of all States that might be affected by a nuclear accident with a view to providing appropriate compensation for nuclear damage. The IAEA International Expert Group on Nuclear Liability (INLEX) to recommend actions to facilitate achievement of such a global regime. Member States to give due consideration to the possibility of joining the international nuclear liability instruments as a step toward achieving such a global regime.⁴⁸

Responding to the action plan, INLEX recommended actions to achieve such a global regime.⁴⁹ Overall, the recommendations advise states to participate in the existing international regimes in order to take advantage of the higher level of flexibility offered by these conventions. Repeated requests to states to adhere to the international conventions have, however, not yielded concrete results.

Perhaps the approach needs to shift from looking for international consensus on issues of nuclear liability to focusing on how various regions decide to approach nuclear liability. For example, the EU has called for greater harmonization through involvement of the EU. A communication from the European Commission to the European Council and the European Parliament—Nuclear Illustrative Program (NIP), presented under Article 40 of the Euratom Treaty, makes clear that because a majority of new EU states follow the Vienna Convention, the Commission is seeking to harmonize nuclear liability rules within the Community; and that in order to finalize and improve the proposals already made, the discussion should focus on developing a harmonized liability scheme and mechanisms to ensure the availability of funds in the event of damage caused by a nuclear accident.⁵⁰ Further, in its July 12, 2007, opinion to NIP, the European Economic and Social Committee states that for greater acceptability of nuclear power, the current system (liability insurance of €700 million) is inad-

48. IAEA 2011, *Draft IAEA Action Plan on Nuclear Safety*, <http://www.iaea.org/About/Policy/GC/GC55/Documents/gc55-14.pdf>.

49. IAEA, *IAEA Action Plan on Nuclear Safety—Nuclear Liability* (Vienna: IAEA, 2012), <http://ola.iaea.org/OLA/documents/ActionPlan.pdf>.

50. Commission of the European Communities 2007, *Nuclear Illustrative Programme: Presented under Article 40 of the Euratom Treaty for the Opinion of the European Economic and Social Committee*, discussed in “Legal Study for the Accession of Euratom to the Paris Convention on Third Party Liability in the Field of Nuclear Energy,” available at http://www.docstoc.com/docs/132800046/2009_12_accession_euratom.

equate.⁵¹ Arguments calling upon further EU involvement through a European Nuclear Liability Directive are also being advanced.⁵²

Regional cooperative structures similar to those advocated by the EU may also prove useful for South Asian countries and countries within the ASEAN region.

THE IMPACT OF THE INTERNATIONAL CONVENTIONS ON ASIA

Transboundary Issues

The IAEA estimates that Asia may well be the engine of the world's nuclear energy growth. The energy requirements of Asian countries are already significant and continue to grow. Despite the Fukushima incident, the IAEA estimates that the majority of global expansion of nuclear power will be in Asia.⁵³

Because of the potential transboundary impact of nuclear incidents, countries within the region must have a clear mechanism for how to react in the event of a Fukushima- or Chernobyl-type incident. Apart from Saudi Arabia, the United Arab Emirates, the Philippines, and Indonesia, none of the Asian or Asia-Pacific countries that have a significant stake in nuclear energy or are committed to a nuclear energy program are parties to any of the international liability conventions that are in force. This position seriously compromises the efficient operation of nuclear power plants in this region. In the event of a cross-border incident (such as Chernobyl), avoiding liability would not be difficult.

Unlike Bangladesh, India, Indonesia, and Malaysia, most Asian countries do not have a domestic nuclear liability law, and the few such laws that do exist do not address transboundary issues. However, concerns have been voiced within the South Asia region about nuclear power plants that are sited close to international borders. Considering the scale of nuclear power expansion and new plans, such issues will only escalate in the future.

Sri Lanka in 2012 raised serious concerns about India's Kudankulam Nuclear Power Plant (KNPP). Located on the Tamil Nadu coast, the plant is 250 kilometers from the island nation, which has continually raised safety concerns throughout the construction process. Further, Bangladesh's proposed nuclear power project, which is 50 kilometers aurally from the Indian border, may result in India raising concerns about the siting of this project. Similarly, future nuclear power plants within the ASEAN region could also pose serious

51. Ibid.

52. Jakub Handrlica, "Euratom Powers in the Field of Nuclear Liability Revisited," *International Journal of Nuclear Law* 3 (1) (2010): 1-18.

53. IAEA, *Energy, Electricity and Nuclear Power Estimates for the Period up to 2050*, IAEA Reference Data Series no. 1 (Vienna: IAEA, 2011), http://www-pub.iaea.org/MTCD/publications/PDF/RDS1_31.pdf.

concerns for all neighboring countries within the region, irrespective of whether such countries are pursuing a nuclear energy program.

International momentum on framing a universal nuclear liability regime has been slow. The reforms following Chernobyl have largely been ineffective. For example, the 1997 Vienna Protocol has only ten ratifications, and the 2004 Paris Protocol has only two (Norway and Switzerland). Europe, which bore the brunt of the Chernobyl disaster, still does not have a harmonized liability regime; and many countries in Europe continue to adhere only to the original Paris or Vienna Convention.

The slow progress on transboundary principles of international nuclear liability law should be kept in mind by countries in the ASEAN and South Asia region. Early engagement on the issue of international nuclear liability is necessary so that effective regional frameworks can be put in place before more nuclear power plants become operational in these regions. The difficulty of a truly international framework such as the CSC or the Vienna Convention is the sheer number of countries and interests involved. Regions such as the EU, South Asia, and Southeast Asia might find that focusing on achieving regional agreements is a more effective way of building a robust liability regime.⁵⁴

Challenges Faced by Countries in Which the Operator Will Be from a Different Country

The situation of liability on a foreign operator is likely to be seen more and more, as countries like the United Arab Emirates (UAE) and Vietnam—new entrants to nuclear power—come to rely extensively on foreign technology, material, and expertise. None of the international conventions or domestic laws of countries address the possible challenges that such a scenario may raise.

This evolving issue can already be seen in the UAE. On the recommendation of the IAEA, the UAE established a Nuclear Energy Program Implementation Organization, which in turn established the Emirates Nuclear Energy Corporation (ENEC) as an Abu Dhabi public entity, initially funded with \$100 million to evaluate and implement nuclear power plants within the UAE. Consequently, bids were invited from foreign companies including AREVA, GDF Suez, and a Korean consortium.⁵⁵ The Korean consortium was led by Korea Electric Power Co. (KEPCO), and included Samsung, Hyundai, Doosan, and Westinghouse. In December 2009, ENEC announced that the KEPCO-led consortium had been selected.

Importantly, one of the KEPCO subsidiaries, Korea Hydro and Nuclear Power Co. Ltd., will play the key role of engineering, procurement, and construction contractor as well as be the operator of the proposed nuclear power plant.⁵⁶ Further,

54. For a detailed analysis on the merits of regional agreements, see Mohan, “Transboundary Nuclear Liability Regime.”

55. World Nuclear Association, Nuclear Power in the United Arab Emirates, <http://www.world-nuclear.org/info/Country-Profiles/Countries-T-Z/United-Arab-Emirates/#.UiV2fmQY3cw>.

56. Ibid.

Korea Power Engineering Co. Inc. will provide the nuclear power plant design and engineering service, while Korea Nuclear Fuel Co. Ltd will provide the fuel. Korea Plant Service and Engineering Co. Ltd will be involved in plant maintenance.⁵⁷

Therefore, the UAE has now embarked on a nuclear power program that depends on almost all the material, technology, and expertise being imported from South Korean entities. While the UAE has drafted a law on nuclear liability that is completely in sync with the provisions of the Vienna Convention, and accordingly provides for exclusive channeling of liability to the operator,⁵⁸ it is important to note that the operator in this instance will be a foreign entity. The liability limit is set at roughly 450 million special drawing rights (approximately \$694 million), higher than that prescribed under the Vienna Convention.

While the provisions of the UAE law in themselves are sufficient to channel the liability to the operator, this situation does raise a few challenges. For instance, the nuclear regulator in the UAE is the Federal Authority for Nuclear Regulation, whose board must consist of citizens of the UAE.⁵⁹ However, the senior management, including the director general and other senior scientists, are experts from other countries. Further, as already noted, the operator and key suppliers will also all be from other countries. In the event of a nuclear incident, the host country would have to determine compensation claims and the extent of liability. In the absence of a dedicated domestic team of experts in the field of nuclear energy, this would presumably raise significant challenges in the exercise of such jurisdiction and the determination of liability issues that may arise.

Another issue is in relation to the possibility of disputes arising out of enforcement of court awards against a foreign entity. While the UAE liability law does provide that the operator would be under an obligation to obtain and maintain insurance and guarantees as available in the financial markets,⁶⁰ the practical considerations of enforcing these obligations against an entity that is not based in the home country need to be factored into any discussions on changes to new international or regional liability arrangements. Further, from the perspective of a foreign operator, it may consider incorporating a local subsidiary company within the jurisdiction of the country in which it will operate and seek to insulate its parent company from the impact of any liability that may arise.

These are only a sampling of some of the possible conflicts that can arise in cases involving a large portion of a country's nuclear industry being operated by foreign entities, with the enforcement and monitoring mechanisms being handled by domestic entities. The IAEA and countries newly entering the field of nuclear energy need to consider these issues as well in framing a new liability regime.

57. *Ibid.*

58. Articles 3 and 4 of UAE Federal Law by Decree No. 4 of 2012, available at <http://www.fanr.gov.ae/En/AboutFANR/OurWork/Documents/Federal-Law-by-Decree-No-4-of-2012-Concerning-Civil-Liability-for-Nuclear-Damage-English.pdf>.

59. <http://fanr.gov.ae/En/AboutFANR/Pages/Board-of-Management.aspx>.

60. Article 8.

Domestic Approaches

Beyond the international and regional conventions, several countries with commercial nuclear programs have their own legislative regimes for nuclear liability. These countries can be grouped into three categories: (1) those that are party to one or both of the international conventions and have their own legislation (notably the United Kingdom, Germany, Sweden, and Russia); (2) those that are not party to any international convention that is in force but have their own legislation or related measures (the United States, Canada, Japan, South Korea, India, and China); and (3) those that are not party to a convention and are without their own legislation. The limits of liability vary considerably among jurisdictions with their own legislation. (For a summary of liability limits provided for by legislation in various countries, see Appendix B.)

Apart from India, no country grants operators a right to recourse against a supplier unless such a right is contractually agreed to or the nuclear incident is the result of a supplier's act or omission intended to cause such damage.

India was not the first country to introduce the principle of supplier liability. In 1998, Austria passed the Act on Civil Liability for Damages caused by Radioactivity. The focus of this act is to protect Austrian citizens; consequently, it provides for unlimited strict liability. Under this law, a plaintiff can file a claim against a supplier, but the claim can be dismissed if the supplier can prove that the operator is capable of paying compensation. If the operator proves unable to pay compensation, the courts may reopen the suit against the supplier.⁶¹

The motivation for the Austrian legislature's decision was its view that the legal channeling of supplier's liability was not an appropriate standard to use.⁶² However, because Austria has only three small research reactors, not much attention has been paid to this law.

61. Hariharan, "India's Nuclear Civil Liability Bill," 239.

62. *Ibid.*

Supplier Community Approach

The Nuclear Power Plant Exporters' Principles of Conduct is an industry code of conduct and the result of a three-year initiative to develop norms of corporate self-management in the exportation of nuclear power plants. Articulated and consolidated by the world's leading nuclear power plant vendors, including AREVA, CANDU, Mitsubishi, GE Hitachi, ROSATOM, Westinghouse, and KEPCO, the principles also address civil liability.

The principles require that before entering into a contract to supply a nuclear power plant to any customer, a vendor needs to make an independent judgment that the consumer state has a legal regime providing adequate and prompt compensation in the unlikely event of an accident. Further, the principles urge that the legal regime should have the following components:

- a. Contains adequate liability limits and financial protection consistent with current international standards;
- b. Is backed by customer-state guarantees;
- c. Ensures that claims for compensation by possible victims will be channeled to the operator of the nuclear power plant(s) that would be strictly and exclusively liable and channeled to a single competent court;
- d. Includes compensation for personal injury, property damage, environmental damage, loss of income, economic loss, and preventive measures;
- e. Does not allow compensation amounts to be set aside or reduced by unilateral strict reciprocity requirements; and/or
- f. Includes a treaty relationship with the vendor state under the IAEA's Vienna Convention, the Paris Convention, and/or the CSC.⁶³

The principles envisage that such action would enable global treaty relations to ensure worldwide compensation and liability protection during plant operation and transnational transport. The principles affirmed by the suppliers also stress the importance of channeling liability exclusively to the operator.

63. *Nuclear Power Plant Exporters' Principles of Conduct*, 7.

Challenges to the Liability Framework & Possible Solutions

REGIONAL FRAMEWORKS

The absence of a clearly delineated regional or international framework to govern issues of liability and compensation is a serious concern. Since the complications inherent in international negotiations will continue, countries that wish to pursue a civilian nuclear power program must not focus only on their own nuclear plans, but must also consider the interests of the region.

Presently, no legal or treaty obligation on ASEAN or South Asian countries relates to transboundary liability and compensation. The situation is akin to the pre-Chernobyl liability framework in Europe, and because of the proximity of these countries, is not advisable or desirable. Particular focus needs to be given to liability thresholds as well as to transboundary impacts.

Another option for ASEAN and South Asian countries is to consider legislation on the basis of reciprocity. An example of such reciprocity is the U.S. Price-Anderson Act and its Canadian counterpart, the Nuclear Liability Act.⁶⁴ Each provides for reciprocity of legal remedies for liability and compensation in accident cases involving transboundary radiation.⁶⁵ However, such a mechanism is not even under consideration by any of the South Asian or ASEAN countries. To the contrary, the existing laws in India, Bangladesh, Indonesia, and Malaysia are silent on the transboundary impact of nuclear accidents.

South Asia and the ASEAN region are thus ideally placed to adopt a liability framework similar to the Paris Convention. Any talk of nuclear expansion in this region ought to be accompanied by meaningful debate on adopting such a framework. This framework need not be confined to issues of liability alone but can also include other critical aspects: for instance, siting and regional mapping of risk zones and possible risk scenarios. Further, the unique circumstance of having foreign operators operating almost all aspects of nuclear power plants within another country can also be factored into these arrangements.

The Fukushima incident has offered the world another chance to strengthen the legal regimes governing nuclear liability, and countries in South Asia and the ASEAN region, where nuclear energy is in its early stages, have an opportunity

64. R.S.C., 1985, c. N-28.

65. Mohan, "Transboundary Nuclear Liability Regime."

to learn from previous experiences and to work on a harmonized regional liability regime. A stable and certain liability framework is imperative if all stakeholders are to accept nuclear energy as a sustainable method of power generation.

AVAILABILITY OF COMPENSATION AND LIABILITY LIMITS

Under extant international and domestic laws, the best available limit of compensation can be found in the U.S. Price-Anderson Act—an accessible fund of approximately \$12 billion. While methods of determining the total economic costs of a nuclear accident may be debated and questioned, what remains clear is that nuclear liability limits and available funds are unlikely to meet the actual economic costs that a nuclear accident brings about. It must however be pointed out that typically in cases where the financial security is inadequate to pay for the claims, public funds in the installation state are commonly used as the next source of funding. As seen in the cases of Chernobyl and now Fukushima, a large portion of the cost of an accident is more often than not borne by the affected countries and their taxpayers. This poses a serious challenge to the acceptability of nuclear power as a viable option, especially for developing countries (e.g., in the South Asia region or ASEAN), as the compensation mechanisms may be inadequate and could result in a lack of support among local communities for nuclear energy in these countries. This argument in fact gained significant momentum in India and resulted in the Indian law evolving a concept of supplier liability that is discussed elsewhere in this paper. This argument has also been raised in the context of Fukushima.

However, any such argument also needs to be examined from a realistic perspective. Presently, no insurance pool would be in a position to provide insurance in the range of hundreds of billions of dollars. Consequently, no commercial entity can be expected to open itself to the possibility of being completely bankrupted in the event of a nuclear accident. Such an approach would effectively discourage nuclear energy activities. This is clearly a challenging paradox. How can the nuclear industry meaningfully contribute to the economic costs of a nuclear accident while at the same time continue to be economically viable?

In considering the possible ways of addressing this paradox, it is important to keep in mind the evolution of international principles of liability. Rather than discarding these principles as unworkable or impractical, the approach for reforms in this regard should be to build on the existing platforms provided by the international conventions, particularly the CSC.

At the moment, the structure of creating a fund, as in the case of the Price-Anderson Act or the CSC, appears to provide a starting point to address this challenge. However, rather than confining contributions to such a fund within a jurisdiction (as with the Price-Anderson Act), the nuclear industry can consider creation of such a fund at an international or a regional level. Contrib-

utors to the fund should include not only nuclear operators, but also suppliers. Additionally, states can also contribute to such a fund. Considering the relative rarity of nuclear accidents yet the large-scale consequences of such an event, it would be in the interest of all stakeholders, particularly of the nuclear industry, to create such a fund. Rather than being solely operator-driven (as in the case of Price-Anderson) or solely state-driven (as in the case of the CSC), a combined operator- and state-driven approach along with contributions from the supplier community would result in a much more robust fund, which could provide meaningful compensation in the event of a nuclear accident.

The concept of the nuclear supplier community contributing in the event of a nuclear accident is not new. Section 934 of the U.S. Energy Independence and Security Act, 2007⁶⁶ deals with how the United States will meet its obligations under the CSC, and in particular its obligation to contribute to the international supplementary fund in the event of certain nuclear incidents. The section authorizes the secretary of energy to issue regulations establishing a retrospective risk-pooling program by which nuclear suppliers will reimburse the U.S. government for its contribution to the international supplementary fund in accordance with a predetermined formula. A similar concept can also be evolved at an international level, involving contributions into a fund by states, nuclear operators, and major suppliers. The working of such a provision can be in a manner that would make the contribution by nuclear suppliers reasonable without making the business itself economically unviable.

Another example of the implementation of a fund that involves active participation between states and industry is the International Oil Pollution Compensation Funds (IOPC Funds).⁶⁷ The IOPC Funds provide financial compensation for oil pollution damage that occurs in member states resulting from persistent spills of oil from tankers.⁶⁸ Notably, the funds are financed by contributions paid by entities that receive certain types of oil by sea transport. These contributions are based on the amount of oil received in the relevant calendar year, and they cover expected claims together with the costs of administering the funds. These contributions are payable by the individual contributors to the fund. A state is not responsible for the payment of contributions levied on contributors in that state unless it has voluntarily agreed to do so.⁶⁹ Thus, the IOPC Funds are

66. Available at <http://www.gpo.gov/fdsys/pkg/PLAW-110publ140/pdf/PLAW-110publ140.pdf>.

67. The framework for the regime was the 1969 International Convention on Civil Liability for Oil Pollution Damage and the 1971 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution (1971 Fund Convention). To increase the scope and compensation under these conventions, the 1992 Civil Liability Convention and the 1992 Fund Convention were adopted. Following the Erika and Prestige incidents, a third instrument, the Protocol to the 1992 Fund Convention (Supplementary Fund Protocol), was adopted in 2003, providing additional compensation over and above that available under the 1992 Fund Convention.

68. See Funds Overview, <http://www.iopcfunds.org/about-us/>.

69. See The International Regime for Compensation for Oil Pollution Damage (August 2013), http://www.iopcfunds.org/fileadmin/IOPC_Upload/Downloads/English/explanatorynote_e.pdf.

administered by states under the framework of international agreements, but whose main contributories are members of the oil industry.

Addressing the gap between the actual losses incurred by a nuclear accident and the limits of liability provided under different legal instruments will require a fundamental relook at international and regional frameworks for nuclear liability laws. A model that involves the creation and administration of a fund with both states and the nuclear industry (including the supplier community) being contributories is one worth considering, as it would increase the pool of accessible funds and create a meaningful compensation structure. It also addresses the argument against the present model, which completely insulates the supplier in the event of a nuclear incident. The structures adopted by the oil industry, as well as those contemplated in the CSC and the Energy Independence and Security Act, 2007, can be a good starting point in providing an effective amount of funds for compensation claims in the event of nuclear incidents, and they provide an existing structure that can be further built on. It will also go a long way in addressing the concern that nuclear suppliers are not playing a role in contributing to funds for compensation of nuclear accidents.

India's Nuclear Liability Act

As a nuclear weapons country and not being one of the five countries identified as a nuclear weapons state, India is excluded from the Nuclear Non-Proliferation Treaty (NPT). India can join the NPT only if it disarms and joins as a non-nuclear weapons state, something that the geopolitical situation in the South Asia region makes politically impossible.

States that are not party to the NPT are also excluded from nuclear trade by the Nuclear Suppliers Group (NSG). However, because of India's impeccable record of nonproliferation, the pressing need to reduce the fossil fuel being burned by the world's second most populous country, and the tremendous market potential for Western countries, the NSG in 2008 decided to grant India a waiver, opening its international vendor market to India. This unique exemption was a consequence of years of negotiations and strong support from many influential countries, particularly the United States.

Subsequent to receiving the NSG exemption, the Indian government has entered into agreements with France (September 2008), Russia (December 2008), and the United States (October 2008) for the supply of nuclear technology and material. India and the IAEA signed a nuclear safeguards agreement in February 2009. Other agreements have been signed with Canada, Kazakhstan, the United Kingdom, South Korea, Mongolia, Australia, and Argentina. Negotiations are ongoing with the EU and Japan.

As a condition of its entry into the international nuclear energy market, India was required to enact a domestic nuclear liability law. In 2010, the Indian parliament approved the CLNDA.

LIABILITY THRESHOLDS

Many have criticized the act's liability threshold of approximately \$330 million as inadequate. Comparisons are made to the Bhopal gas tragedy in which a toxic gas leak from a chemical plant owned by Union Carbide led to the deaths of thousands and damages paid in the region of \$1 billion, an amount still considered to be inadequate and the subject of severe criticism.

CONTROVERSIAL INCLUSION

The most controversial provision introduced by the CLNDA is the principle of supplier liability. When India's ruling party presented the act to the Indian parliament, its provisions were similar to those found in international conventions such as the CSC and the Paris or Vienna Convention. Liability was channeled exclusively to the operator of the nuclear power plant, and the supplier could be held liable only in limited circumstances. However, trade union and civil society representatives argued that foreign suppliers would not bother with safety compliance if a system permitted them to escape the consequences of liability. (Fifty years earlier, in *International Problems of Financial Protection against Nuclear Risk*, the same argument was put forward to *reject* the concept of supplier liability.) Advocates of supplier liability also pointed out that defects in the supplier's technology or services might not be noticed by the operator until after the operator has commenced operation of the nuclear power plant.⁷⁰

Indian legislators concluded that the act should reflect Indian interests and well-being, and thus suggested that "there should be a clear cut liability on the supplier of nuclear equipment/material in case they are found to be defective."⁷¹ The intention was to ensure that compensation would not be inadequate for victims of a nuclear accident.

The act as finally promulgated contains a right of recourse that the operator can claim against the supplier in cases where "the nuclear incident has resulted as a consequence of an act of supplier or his employee, which includes supply of equipment or material with patent or latent defects or sub-standard services." (The act also contains other controversial provisions, all of which are presented in a brief analysis in Appendix C.)

IS THE NEW PRINCIPLE OF SUPPLIER LIABILITY ACCEPTABLE TO SUPPLIER COUNTRIES?

The United States, France, and Russia have consistently opposed the provisions of the CLNDA. Nevertheless, Russia already has an operational nuclear power plant at Kudankulam, and France is in the initial stages of work on the Jaitapur Nuclear Power Project in western India. Whether these countries accept the law will play a significant factor in determining the broader acceptability of the concept of supplier liability.

70. See State of India, Department-Related Parliamentary Standing Committee on Science and Technology, Environment and Forests, "Two Hundred Twelfth Report on 'The Civil Liability for Nuclear Damage Bill, 2010,'" August 18, 2010, <http://www.prsindia.org/uploads/media/Nuclear/SCR%20Nuclear%20Liability%20Bill%202010.pdf>.

71. *Ibid.*, 19.

Russia

Recent reports indicate that the Indian government has determined that the next two reactors to be built in Kudankulam (i.e., Kudankulam 3 and 4) should be covered by the CLNDA. The Russian government has steadfastly opposed this position, arguing that the agreement between Russia and India for setting up the Kudankulam Nuclear Power Plant predates the act's promulgation.

The Indian government has agreed that the supplier-liability provisions under the CLNDA do not apply to Kudankulam 1 and 2 (reactors that are already operational), an interpretation that is being challenged before the Indian Supreme Court. There is a strong likelihood that the court will decide that even Kudankulam 1 and 2 fall within the ambit of the CLNDA.⁷²

If India's highest court determines that the CLNDA applies to all aspects of Kudankulam, the only way in which the intergovernmental agreement between Russia and India could supersede the act would be for the Indian parliament to pass a new law or amend the existing law. Until such action, all nuclear reactors in India, including Kudankulam 1 and 2, would be covered under the CLNDA, irrespective of any agreement with any foreign government. Amending the act appears to be a political impossibility at present. Russia may therefore be forced to accept that the act applies to all of its reactors in Kudankulam. In turn, this has led to various reports that the Russian government will renegotiate the price of the underlying contracts.⁷³ These reports now appear to be correct as Russia already seems to have arrived at a preliminary agreement with the Indian authorities in what is being considered an acceptance of the principle of supplier liability under the CLNDA.⁷⁴ At this stage, the agreement is still being finalized, but the principles agreed upon by both India and Russia appear to be modeled on a commercial understanding that Russia would purchase insurance for each component that it supplies to the Indian operator and the cost of this insurance would be included in the price of the product supplied. This would result in an escalation of costs for each component and consequently an escalation in the price of nuclear power. Nevertheless, this would amount to an acceptance of the principle of supplier liability and if such an agreement were to be finally signed between India and Russia, it would mark a watershed moment in international nuclear liability jurisprudence.

72. Mohit Abraham, "Defective Law on Nuclear Liability: India Walks Alone on Nuclear Jurisprudence," *The Economic Times*, http://articles.economictimes.indiatimes.com/2012-12-20/news/35933839_1_nuclear-liability-kudankulam-nuclear-damages-act.

73. See, for example, "Reactors to Cost Double," *Indian Express*, December 20, 2012, <http://www.indianexpress.com/news/reactors-to-cost-double-russia/1047796/>; and "More Liabilities Will Push Up Kudankulam Costs: Russia," *Indian Express*, October 15, 2012, <http://www.indianexpress.com/news/more-liabilities-will-push-up-kudankulam-cost-russia/1016840/>.

74. Kasturi, "India Cracks N-liability Barrier with Russia." See also "Russia Concedes India's Nuke Liability Law Terms," *The Free Press Journal*, <http://freepressjournal.in/russia-concedes-indias-nuke-liability-law-terms/>.

France

Although France has also consistently opposed the provisions of the CLNDA, in a recent interview French President François Hollande stated, “Regarding civil nuclear liability, we obviously respect Indian law. It is the sovereign decision of a country that has witnessed catastrophes like the Bhopal gas tragedy.”⁷⁵

While Hollande’s statement does not constitute definitive acceptance of or willingness to be subject to the CLNDA, many Indian reports have interpreted it as a positive indication. Further, French conglomerate AREVA has already made substantial investments in India and seems unlikely to abandon its potential investments there simply because of the CLNDA. While there has been no statement from the French authorities that they would not go ahead with investments in India in the nuclear energy sector because of the CLNDA, if Russia and India arrive at an agreement, there is a strong possibility that France would follow the same model in relation to supplier liability.

United States

The United States has consistently maintained the position that until India synchronizes the CLNDA with the CSC and ratifies the CSC, U.S. companies such as GE and Westinghouse will not take part in nuclear power projects in India.

Recently, the principal deputy assistant secretary of state for South and Central Asian affairs, Geoffrey Pyatt, urged the Indian government to consult with the IAEA to ensure that the Indian liability law accomplishes the objective—shared by the United States and India—of moving India into the international mainstream of civil nuclear commerce, stating, “India’s nuclear liability is not in line with international nuclear liability principles reflected in the CSC.”⁷⁶ Pyatt also clarified that the current liability law imposes a risk of heavy financial burden on equipment suppliers seeking to enter the Indian market and exposes them to significant financial penalties in the event of a nuclear accident.

Recent reports indicate that the Indian government is proposing some sort of waiver by which certain provisions of the Indian liability law would not apply to U.S. nuclear suppliers.⁷⁷ This view, however, has been criticized, and it would

75. Indrani Bagchi, “We Are Building Same Reactors for Ourselves That We Are Selling to India: Hollande,” *Times of India*, February 14, 2013, <http://timesofindia.indiatimes.com/india/We-are-building-same-reactors-for-ourselves-that-we-are-selling-to-India-Hollande/articleshow/18504284.cms>.

76. “US Advises India to Consult IAEA on Nuclear Liability Law,” *Samay English*, December 1, 2012, <http://english.samaylive.com/world-news/676519035/us-india-iaea-geoffrey-pyatt-international-atomic-energy-agency-.html>.

77. Sandeep Dikshit and J. Venkatesan, “Manmohan May Carry Nuclear Liability Dilution as Gift for US Companies,” *The Hindu*, September 19, 2013, <http://www.thehindu.com/news/national/manmohan-may-carry-nuclear-liability-dilution-as-gift-for-us-companies/article5142882.ece>.

be extremely difficult for the Indian government to exempt only American companies from certain parts of the Indian liability law.⁷⁸

On June 13, 2013, Westinghouse and the Nuclear Power Corporation of India Limited (NPCIL) signed a memorandum of understanding (MoU) for an early works agreement in relation to the Westinghouse AP 1000.⁷⁹ While the MoU is silent on issues of liability, this does indicate a willingness on the part of both India and the United States to work together to address the issue of supplier liability. Thus, the situation with regard to the United States is evolving, but it does suggest that the United States will continue lobbying with India until the CLNDA has been changed to bring it in line with prevailing international nuclear liability principles, or at least until the CLNDA is diluted in relation to its application to U.S. nuclear supplier companies.

Japan

In the aftermath of Fukushima, will Japan consider a supplier liability model similar to the one introduced by India? This is an uncomfortable question for suppliers. Critics have pointed out that the nuclear industry and its suppliers made billions building and operating the reactors at Fukushima, yet the Japanese government and its citizens are bearing a substantial portion of the liability arising from the disaster. Greenpeace Japan is leading efforts to ensure that Japanese law is amended to introduce the concept of supplier liability in line with the CLNDA.⁸⁰ Although the likelihood of such an amendment being passed may not be high, discussions about supplier liability, which prior to the Fukushima incident were practically unheard of, are now an increasing part of the public discourse.

As noted in the introduction to this paper, 1,400 plaintiffs have filed a lawsuit against the supplier companies that manufactured the reactors at the Fukushima nuclear power plant. The goal of the plaintiffs in this lawsuit is not economic compensation, but rather to raise awareness with respect to the issue of supplier immunity from nuclear liability. Clearly, this indicates a strong movement in Japan to introduce an element of supplier liability in the operation of nuclear power plants.

78. Mohit Abraham and M. P. Ram Mohan, "Don't Waver Now on Nuclear Liability," *The Hindu*, September 20, 2013, <http://www.thehindu.com/opinion/lead/dont-waver-now-on-nuclear-liability/article5147177.ece>.

79. "Westinghouse and Nuclear Power Company of India Limited Sign Memorandum of Understanding for Early Works Agreement," Westinghouse Press Release, as reported by *Reuters*, June 13, 2013, <http://in.reuters.com/article/2012/06/13/idUS133717+13-Jun-2012+PRN20120613>.

80. Kumi Naidoo, "Fukushima Disaster: Holding the Nuclear Industry Liable," *The Guardian*, March 11, 2013, <http://www.guardian.co.uk/sustainable-business/fukushima-nuclear-industry-disaster-liable>.

THE WAY FORWARD: ALTERNATIVES

Politically, the Indian government probably cannot at this point limit the already expanded concept of supplier liability. The question that therefore arises is whether foreign countries and suppliers will accept India's nuclear liability law.

Instead of opposing the CLNDA and insisting on its amendment (as the United States is doing), an alternative model for France and Russia (one that is reportedly being contemplated by both countries) would be to renegotiate their contracts/agreements with the Indian government. For instance, the following points could be renegotiated:

1. Price escalation: The present system of excluding supplier liability is primarily driven by a desire to make nuclear energy cost-effective; it allows nuclear operators to channel the costs of insurance so that suppliers do not also have to budget for such insurance. If every supplier were to take out its own insurance, the cost of such insurance (which in the nuclear sector is significantly high) would be passed on to the operator and ultimately to the consumer. Therefore, if supplier liability is accepted as a principle, nuclear supplier countries will insist that the extra cost of such insurance be factored into the costs to be borne by the operator. That is, supplier countries would balance the additional liability being imposed on them by increasing the cost of their product. Russia ostensibly is adopting this line of negotiation in relation to the reactors at Kudankulam for which construction has not yet begun.
2. At the time of delivery of any product related to a nuclear power plant, suppliers could insist on receiving a certificate of satisfaction from the operator noting that the product meets all specifications and is of the highest quality. The Indian operator could provide the certificate after appropriate testing or even after a period of time of using the product. The supplier would then insist on the operator's assurance that, having tested and deemed itself fully satisfied with the product, the operator agrees contractually that the product of the supplier does not suffer from any "patent or latent" defects as envisaged under section 17(b) of the CLNDA.
3. Compliance of the supplier with quality assurance programs or manuals prescribed by the Indian operator could also be documented to serve as future proof that the product supplied did not suffer from any defects.
4. The supplier could then also insist that the Indian operator indemnify the supplier against any action or claim that might be brought against the supplier by any third party.

In order to benefit from the massive commercial potential of India's civilian nuclear energy sector, France and Russia may want to focus their resources on contractual negotiations rather than on changing the law.

If they do pursue this approach, it would mark a watershed moment in international nuclear liability law. Even tacit acceptance of the concept of supplier liability by countries such as France and Russia would have the effect of inviting a broader examination of the principles of legal channeling that have underpinned international nuclear liability law for the last five decades. Countries that are on the threshold of accepting civilian nuclear energy—particularly those within the South Asia and ASEAN regions—might also explore the possibility of adopting laws similar to India's CLNDA. And if major suppliers accept the principle of supplier liability in India, they would have difficulty denying a similar right to other nations. The possibilities and challenges thrown up by the CLNDA, though still in the realm of speculation, are exciting and have the potential to alter in fundamental ways the present discourse on international nuclear liability.

Conclusion

Against the backdrop of the Fukushima accident and the entry of new players in the international nuclear energy space, such as India, the UAE, and Vietnam, existing nuclear liability principles are going to be revisited; this raises more issues and challenges. It is evident that a robust nuclear liability regime is essential for the growth of nuclear power as well as its public acceptance. This requires a great deal of cooperation among countries, regulators, international institutions, and the nuclear industry. Many questions are being raised against the extant nuclear liability regime, both on the issue of adequacy of compensation and on the issue of supplier liability.

Considering the difficulties that the world has already seen in developing a global nuclear liability regime, the focus on regional cooperation and arrangements in the area of international nuclear liability should consider the EU's initiative for a European nuclear liability law. Regional initiatives would facilitate a global liability regime through regional efforts. Developing nations in South Asia and the ASEAN region have an intrinsic mutual interest in formulating and strengthening a regional framework, and it may be easier to achieve such a framework with a more modest goal of attaining uniformity and certainty in a region as opposed to the entire world.

At the same time, any viable nuclear liability regime would also have to provide sufficiently high levels of compensation and accessible funds. This should not be the responsibility of states alone; and the nuclear industry, including the supplier community, has to step forward in making reasonable contributions to such a regime within acceptable economic parameters that do not discourage the private sector from continuing its important role within the nuclear industry. The model of the CSC, whereby states contribute to an international pool of funds, can be further strengthened with contributions from the nuclear industry, including the supplier community. Any model that provides for maximum compensation must be welcomed, and to this end, the CSC appears to be a step in the right direction. The CSC also intends to supplement other liability frameworks, including the Paris and Vienna Conventions. In fact, Article XII (3) (a) and (b) of the CSC envisages that regional arrangements or agreements can be entered into by contracting parties to the CSC. Thus, while future regional frameworks could provide for principles of liability, transboundary incidents, and other critical aspects like siting as well as regional mapping of risk zones and possible risk scenarios within a region, the CSC model along with an additional contribution from the industry would provide a significant boost to these regional frameworks by providing accessible funds. Recent support from France and Japan for the CSC also brings it closer to coming into force. The

CSC would therefore be a meaningful base on which a reformed nuclear liability regime could be built.

Any discussions on reconsidering international nuclear liability law should also factor in the unique challenges of countries that are new entrants in nuclear energy, in particular those that plan to rely exclusively on foreign operators and suppliers. Since none of the international or domestic laws deal with this scenario, it is important that some thought is provided on this aspect as well.

Another major issue, which is likely to be increasingly raised in the Asia region, is the new model of international nuclear liability law introduced by the CLNDA. If France and Russia agree to function under this law, it could set a precedent for the acceptability of supplier liability that would fundamentally alter commercial practices in the area of nuclear commerce. Wider acceptance of this liability regime would also have a significant impact on countries (such as Vietnam) that are in the process of formulating their own liability laws. Other countries in the ASEAN region, such as Malaysia and Indonesia, may also consider adopting the CLNDA model—particularly in light of the incident at Fukushima, where a large portion of the liability fell to the government and ultimately the Japanese taxpayer. Civil society played a strong role in highlighting the approach taken by India in formulating its liability law, and it is not inconceivable that this aspect of supplier liability would enter the public discourse of countries that are considering liability laws, and would put pressure on governments to strongly consider this aspect.

While the supplier community along with other major countries would continue to resist such a liability, it is imperative to recognize that for such liability to be excluded in the manner it presently is, the entire nuclear industry must play a stronger role in contributing to compensation for nuclear accidents. Thus, a system in which funds for nuclear accidents are contributed by all players—states, operators, and suppliers—would make available more funds than any of the present liability regimes and would be a strong step toward building an effective and fair nuclear liability regime. The recent joint declaration by the United States and France is also a positive step toward the realization of the CSC framework and can serve as a very good starting point to provide a future model in which states, operators, and suppliers play a part in contributing funds toward compensating nuclear accidents.

The IAEA ought to consider providing INLEX with terms of reference on a reexamination of the existing principles of international nuclear liability, including those in relation to regional arrangements and an expansion of sources of funds that are available in the case of a nuclear incident. The models adopted by CSC and the oil industry, as well as the U.S. approach of seeking retrospective pooling of funds from nuclear suppliers, could provide an existing structure on the basis of which a future nuclear liability model could be built.

Across the world, public acceptance of nuclear energy is already facing a critical challenge. Any weakness in liability frameworks, such as inadequate compensation or the inability to claim relief for a transboundary incident, will

likely lead to stronger resistance to nuclear energy. All stakeholders need to work toward addressing this key issue. The traditional view of liability frameworks must shift to one that seeks a balance between encouraging the nuclear industry and ensuring adequate compensation in the event of an incident. The existing international conventions and domestic approaches, particularly the CSC, already provide a platform from which improved and effective liability regimes can evolve. The acceptability of nuclear energy would be significantly boosted by having an effective and practical liability framework in place.

Appendix A

Summary of Provisions of International Nuclear Liability Conventions

S No.	Particulars	Paris Convention (PC) (as Amended by 1964 Additional Protocol and 1982 Protocol)*	Vienna Convention (VC) (as Amended by 1997 Protocol “RVC”)	Convention on Supplementary Compensation for Nuclear Damage (CSC)**
1.	Geographical Scope	PC not applicable to incidents or damage occurring in territory of non-contracting state unless legislation of contracting state (where nuclear installation is located) provides for it	No Provision under VC RVC Amendment: <ul style="list-style-type: none"> • Convention shall apply to nuclear damage wherever suffered • Legislation of Installation State may exclude application of convention if damage suffered in the territory or maritime zone of a non-contracting state 	CSC applicable to damage in contracting party or beyond territory of contracting party on ship or aircraft registered or artificial installation/ island under the jurisdiction or in exclusive economic zone or continental shelf of contracting party
2.	Nondiscrimination	Convention and national law applied without discrimination on nationality, domicile, or residence	<ul style="list-style-type: none"> • Same as under PC RVC Amendment: <ul style="list-style-type: none"> • Installation state may derogate from the convention if compensation for nuclear damage is in excess of 150 million special drawing rights 	<ul style="list-style-type: none"> • Same as under PC • Additionally, installation state may exclude damage suffered by non-contracting state if it is obligated under any other convention

S No.	Particulars	PC*	VC	CSC**
3.	Nuclear Damage	Liability of operator under PC for: <ul style="list-style-type: none"> • Damage/loss of life • Damage/loss of property other than (a) nuclear installation itself or (b) any property on same site 	Nuclear damage means: <ul style="list-style-type: none"> • Loss of life/personal injury/damage to property arising from radioactive properties or combination of radioactive property and toxic, explosive, or other hazardous properties • If law of competent court provides, loss/damage to life or damage to property resulting from ionizing radiation RVC Amendment: Nuclear damage means: <ul style="list-style-type: none"> • Loss of life/personal injury • Damage to property Subject to extent determined by competent court: <ul style="list-style-type: none"> • Economic loss arising from loss of life/personal injury/damage to property • Cost for reinstatement of impaired environment • Loss of income due to impairment of environment • Costs of preventive measures • Any other economic loss caused by impairment of environment if permitted by law on civil liability • To extent that loss/damage arises from ionizing radiation or combination of radioactive property and toxic, explosive, or other hazardous properties 	Same as under RVC Amendment

S No.	Particulars	PC*	VC	CSC**
Operators Liability				
4.	Exclusive Liability	<ul style="list-style-type: none"> • Same as under CSC • Additionally, except under convention, no other person is liable if nuclear incident occurs during transportation 	<ul style="list-style-type: none"> • Only operator liable for nuclear damage • Insurer may be liable to pay compensation subject to laws of competent court • No liability of operator for non-nuclear damage 	<ul style="list-style-type: none"> • Right to compensation exercised only against operator. Subject to national law, direct right of action may lie against insurer or financial guarantor furnishing security
5.	Exclusion of Liability of Operator	No liability of operator for damage due to armed conflict, hostilities, civil war or insurrection, or due to grave natural disaster of exceptional character	<ul style="list-style-type: none"> • Same as under PC • Additionally, if operator proves nuclear damage resulted wholly/partly from gross negligence or act/omission with intent to cause damage by any person, operator may be relieved to pay damages to such person 	Same as under VC
6.	Right of Recourse	Operator shall have right to recourse only if (a) such right is provided in a written contract or (b) the incident occurs from an act or omission done with intent to cause damage	Same as under PC	<ul style="list-style-type: none"> • Same as under PC • Additionally, contracting parties to enact legislation to enable other contracting parties who paid contribution to benefit from right of recourse of operator

S No.	Particulars	PC*	VC	CSC**
Compensation Amounts				
7.	Liability Limits of Operator	<ul style="list-style-type: none"> • Maximum liability of operator is 15 million special drawing rights • Contracting party may, if provision for insurance provided in accordance with convention, increase or decrease amount of liability. However, a decreased amount of liability of operator shall not be less than 5 million special drawing rights 	<ul style="list-style-type: none"> • Minimum liability of operator is US \$5 million, excluding interests and costs <p>RVC Amendment:</p> <ul style="list-style-type: none"> • Minimum liability of operator not less than 300 million special drawing rights • Liability of operator not less than 150 million special drawing rights, and if public funds made available, up to 300 million special drawing rights • For transitional period of fifteen years, liability of operator to be not less than 100 million special drawing rights, and if minimum is fixed below 100 million special drawing rights, public funds to be made available for compensation • Installation state may in its discretion set lower limit of operator's liability to not less than 5 million special drawing rights, and make public funds available up to such amount specified for compensation 	<ul style="list-style-type: none"> • Liability of operator not less than 300 million special drawing rights or not less than 150 million special drawing rights, if public funds made available up to 300 million special drawing rights • Installation state may in its discretion set lower limit of liability of operator not less than 5 million special drawing rights and make public funds available up to such amount specified for compensation • Contracting party may limit liability of operator for ten years to an amount not less than 150 million special drawing rights • Maximum amount of operator's liability payable for nuclear incident during carriage is governed by national law

S No.	Particulars	PC*	VC	CSC**
8.	Insurance Cover	Type and terms of insurance or financial security specified by competent public authority	<ul style="list-style-type: none"> Operator to maintain insurance as specified by installation state. If yield of insurance is inadequate, installation state to provide public funds <p>RVC Amendment:</p> <ul style="list-style-type: none"> Where liability of operator is unlimited insurance of at least 300 million special drawing rights Installation state may in its discretion set lower limit of insurance to not less than 5 million special drawing rights 	Same as under VC and RVC Amendment
9.	Public Funds	Contracting party to take necessary measures to provide public funds if there is an increase in the amount of compensation	Public funds used under convention as discussed in liability limit and insurance cover above	<ul style="list-style-type: none"> Public funds used under convention as discussed in liability limit and insurance cover above For liability of operator beyond the amount of 300 million special drawing rights or beyond such greater amount as specified or beyond 150 million special drawing rights for first ten years, compensation for damage to be settled through public funds

S No.	Particulars	PC*	VC	CSC**
10.	Enforcement of Rights of Compensation	Except in measures of execution of right, no invocation of any jurisdictional immunities before competent court	Same as under PC RVC Amendment: <ul style="list-style-type: none"> • Persons suffering damage may enforce their right without bringing separate proceeding according to origin of source of fund provided • Contracting parties to ensure any State may bring action for damages on behalf of its nationals, domiciles, and residents 	Persons suffering damage may enforce their right without bringing separate proceeding according to origin of source of fund provided
11.	Nature Form and Extent of Compensation	Governed by national law	Governed by law of competent court subject to provisions of convention RVC Amendment: <ul style="list-style-type: none"> • If compensation likely to exceed maximum prescribed, priority in distribution shall be given to claims in respect of loss of life or personal injury 	Governed by law of competent court
12.	Time Limits	<ul style="list-style-type: none"> • Right to compensation extinguishes after ten years from date of incident • Under national legislation, if measures provided to cover liability of operator, such period of ten years may be extended by contracting party 	<ul style="list-style-type: none"> • Right to compensation extinguishes after ten years from date of incident • Under insurance system of national law, period more than ten years may also be provided RVC Amendment: <ul style="list-style-type: none"> • Right to compensation extinguishes in thirty years from date of incident for loss of life/personal property and ten years from date of incident for other damage 	Same as under VC

S No.	Particulars	PC*	VC	CSC**
13.	Jurisdiction	<ul style="list-style-type: none"> Courts in whose territory the incident occurred shall have jurisdiction If incident occurs beyond territory of contracting party or place of incident not determinable, then courts of contracting party where installation is situated will have jurisdiction If incident occurs partly outside any contracting party and partly within single contracting party, jurisdiction lies with the court of contracting party. In any other case, courts of contracting party determined at request of contracting party concerned 	<ul style="list-style-type: none"> Courts in whose territory the incident occurred shall have jurisdiction If incident occurs beyond territory of contracting party or place of incident not determinable, then courts of installation state of operator will have jurisdiction <p>RVC Amendment:</p> <ul style="list-style-type: none"> If installation located in exclusive economic zone of contracting party, courts of that party shall have jurisdiction If jurisdiction lies within more than one contracting party it may be fixed by agreement Incident partly outside any contracting party and partly within single contracting party jurisdiction lies with the court of contracting party 	<p>Same as under VC</p> <p>Additionally:</p> <ul style="list-style-type: none"> If installation located in exclusive economic zone of contracting party, courts of that party shall have jurisdiction If jurisdiction lies within more than one contracting party it may be fixed by agreement
14.	Applicable Law	National law or the national legislation (substantive and procedural) of the court having jurisdiction	Law of court having jurisdiction under convention	Either VC, PC, or annex to CSC shall apply to exclusion of other subject to the provisions PC/VC/CSC; the applicable law shall be the law of the competent court

*2004 Protocol to amend the Paris Convention on Nuclear Third Party Liability is not yet in force, <http://www.oecd-nea.org/law/paris-convention-ratification.html>.

**Convention on Supplementary Compensation for Nuclear Damage is not yet in force, http://www.iaea.org/Publications/Documents/Conventions/Supcomp_status.pdf.

Appendix B

Summary of Liability Limits by Country

Country	Operator Liability (Millions)	Government Liability (Millions)	Law
United States	\$11,900	Unlimited	Price-Anderson Act (1957)
France	\$861	\$300	Atomic Energy Act (1960)
Japan	Unlimited	Unlimited	Law on Compensation for Nuclear Damage and Law on Contract for Liability Insurance for Nuclear Damage (1961, amended 2009)
Russia	Not specified	Unlimited	Federal Law on the Use of Atomic Energy (1995, amended 2010)
Canada	\$73	No limit specified	Nuclear Liability Act (1985)
United Kingdom	\$224 (approx.)	\$481 (approx.)	Nuclear Installations Act (1965)
Germany	Unlimited	\$2,500	Act on the Peaceful Utilization of Atomic Energy and the Protection against Its Hazards (1959, amended 2010)
India	\$330	\$462 (can be increased by a government notification)	The Civil Liability for Nuclear Damages Act (2010)
United Arab Emirates	\$694	No limit specified	Federal Law by Decree No. 4 of 2012
Malaysia	\$16 (approx.)	No limit specified	Atomic Energy Licensing Act (1984)
Indonesia	\$91 (approx.)	No limit specified	Act No. 10 (1997)

Appendix C

Analysis of the Provisions Relating to Supplier Liability under India's Civil Liability for Nuclear Damages Act (CLNDA)

The CLNDA as finally promulgated contains the following clause on supplier liability:

Section 17: The operator of the nuclear installation, after paying the compensation for nuclear damage in accordance with section 6, shall have a right of recourse where—

- (a) Such right is expressly provided for in a contract in writing;
- (b) the nuclear incident has resulted as a consequence of an act of supplier or his employee, which includes supply of equipment or material with patent or latent defects or sub-standard services;
- (c) the nuclear incident has resulted from the act of commission or omission of an individual done with the intent to cause nuclear damage.

Sections 17(a) and (c) are in sync with the model law provided for in the CSC and other international conventions. Sub-clause (b) is the controversial portion. Under the terms of section 17(b), an operator that has paid out compensation may subsequently seek reimbursement from a supplier, whose products or services may have patent or latent defects or are substandard. The “patent or latent defects or substandard services” test is subjective. No precedent exists in the nuclear industry to guide how these standards might be applied in an Indian court. Furthermore, any given nuclear power project will have multiple suppliers. Pinning fault for a specific incident on a given component will be extremely difficult and will almost certainly result in protracted litigation.

The international nuclear community has, not surprisingly, reacted negatively to the inclusion of supplier liability in the CLNDA. However, the act contains another controversial provision:

Section 46: The provisions of this Act shall be in addition to, and not in derogation of, any other law for the time being in force, and nothing contained herein shall exempt the operator from any proceeding, which might, apart from this Act, be instituted against such operator.

According to section 46 of the act, other Indian laws that would normally apply to an industrial accident will also apply to nuclear accidents, along with the provisions of the CLNDA. This has the effect of making the supplier subject to any Indian law that applies to an industrial accident (e.g., laws covering criminal liability or damage claims under tort law).

Both these aspects of the CLNDA have caused foreign governments and suppliers significant anxiety. The concepts broached by these two sections of the act were previously unheard of in international nuclear liability jurisprudence, and countries that expended significant diplomatic capital in supporting India's NSG exemption, such as the United States, France, and Russia, felt betrayed by their inclusion in India's domestic law.

In order to mollify the fears of the international community (and no doubt in response to intense lobbying by supplier countries hoping to see some of the critical provisions of the CLNDA diluted), the Indian government enacted the Civil Liability for Nuclear Damage Rules, 2011. Two features of one of these rules, rule 24, are particularly salient:

1. Limitation of the Amount of Liability

Rule 24 sub-rule 1 provides that an operator's liability will be restricted to the extent of the operator's liability (that is, the liability cannot exceed that which the operator itself incurs) or the value of the contract with the supplier, whichever is *less*.

2. Limitation of the Time Period for Liability

Rule 24 sub-rule 2 provides that a right of recourse, as provided for in section 17 of the CLNDA, will be available to an operator only for the duration of the initial license issued under India's Atomic Energy (Radiation Protection) Rules, 2004 (about five years), or the product liability period negotiated between the supplier and operator, whichever is longer.

At first glance the Civil Liability for Nuclear Damage Rules, 2011, appears to have provided some relief to suppliers in limiting both the amount of liability to which they may be subject and the time period during which a supplied product is under CLNDA scrutiny. However, several ambiguities remain. The rules, for example, make no reference to the scenario envisaged under section 17(b) (which introduced supplier liability), and they do nothing to ameliorate the controversial section 46.

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