



Centre For Legal Policy

BETTER LAWS. BETTER GOVERNANCE

# OPERATIONALISING INDIA'S NUCLEAR AGREEMENTS

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## ISSUES AND SOLUTIONS ON NUCLEAR LIABILITY

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## EXECUTIVE SUMMARY

In the wake of its growing energy requirements, India has entered into agreements for the peaceful use of nuclear energy with several countries. The operationalisation of several of these agreements required India to adopt a legislation on the civil liability for nuclear damage, to bring it in line with prevailing international standards on nuclear liability. In this context, the Civil Liability for Nuclear Damage Act, 2010 ('CLND Act') was brought into force in order to provide for civil liability for nuclear damage that is legally channelled to the operator of the nuclear industry through a no-fault liability regime. However despite the adoption of the CLND Act and the Civil Liability for Nuclear Damage Rules, 2011 ('CLND Rules') thereunder, India's nuclear energy agreements with several countries have yet to be operationalised. The main reason for this standstill pertains to certain provisions of the CLND Act that are at variance with internationally prevalent standards in this regard.

In this Report, we seek to analyse these provisions that have delayed the execution of India's nuclear agreements. Through this analysis, we recommend specific reforms to the legislative framework and administrative arrangements under the CLND Act and Rules to put an end to such delays.

The five parameters that form the basis of our recommendations are:

- *Constitutionality* in ensuring that legislation is not in conflict with the Constitution of India and relevant Supreme Court precedent.
- *Compliance* of the text of the legislation with India's international legal obligations.
- *Coherence* with other laws and rules that govern similar subjects.
- *Clarity* in form and substance through appropriate textual changes.
- *Contemporaneity* through the incorporation of international best practices suitably adapted to the Indian context.

Keeping in mind the above parameters, in Section I of the Report, we examine India's compliance with its international law obligations under the 1997 Convention for Supplementary Compensation for Nuclear Damage ('CSC'), a treaty it signed in 2010. The primary focus is on Section 17(b) of the CLND Act that provides for a right of recourse against suppliers in certain situations when the supply is 'sub-standard' or suffers from 'patent or latent defects'. Though the inclusion of this section means that India is technically in breach of its CSC obligations [once India ratifies the treaty], we argue that there is a legitimate justificatory basis for this section. Thus our recommendations in this section seek to ensure India's compliance with its international legal obligations while at the same time allowing Section 17(b) in the CLND Act to remain on the statute book. This is achieved by identifying available avenues in international law, specifically under the Vienna Convention on the Law of Treaties ('VCLT') and the CSC.

In Section II of the Report, we examine Rule 24 of the CLND Rules. The Rule establishes limitations on the right of recourse being exercised against suppliers, both in terms of amount as well as the time during which such right is available. We argue that the Rule, though motivated by a laudatory intention of incentivising suppliers to participate in India's nuclear energy programme, is *ultra vires* the CLND Act. This is because it imposes several restrictions on the right of recourse that are not envisaged or provided for under the CLND Act. To resolve this conflict, we make several recommendations in this section to achieve some of the justifiable objectives under Rule 24 of the CLND Rules, albeit in a legally tenable manner. The changes however will not involve any tinkering with the fundamental premise of Section 17(b) of the CLND Act which continues to be justifiable and consequently ought to remain immune from amendment.

In Section III of the Report, we analyse the issue of concurrent liability of operators and suppliers under other legislations and the common law of tortious liability. The current framework of the CLND Act, seemingly innocuously allows for the simultaneous imposition of liabilities on suppliers and operators under other legislations for the same incident of nuclear damage. Such liability, which is not limited, causes a significant impediment to the signing of supply contracts, necessary for India's nuclear agreements to be operationalised. In light of this, we propose certain statutory amendments which are a *sine qua non* to preserving the sanctity of the said Act as a special mechanism for the enforcement of nuclear damage claims.

In the last Section of the Report, we analyse the issue of cost of nuclear power vis-à-vis other sources of energy and potential pathways for differing liability provisions to feed through to cost. We also discuss the issue of 'appraisal optimism' that is prevalent globally in the nuclear energy industry, and the difficulty of accurate estimation of costs. While we find that nuclear energy is competitive on grounds of climate change mitigation rather than solely on energy security, liability provisions in the CLND Act have the potential to result in pyramiding insurance costs, adding further uncertainty to a source of energy that is already very difficult to cost. We thus recommend both *ex ante* mandatory insurance and discuss some of the contours of insurance pools that could be set up to operationalise nuclear energy in India.

Our reform recommendations in this Report are motivated by the vision for an equitable and progressive regime for addressing liability issues arising out of a nuclear incident. It is our firm view that through the incorporation of these recommendations into the legislative framework under the CLND Act, the prevailing issues obstructing the operationalisation of India's nuclear agreements will come closer to resolution.

## I. SECTION 17(b) OF THE CIVIL LIABILITY FOR NUCLEAR DAMAGE ACT, 2010 AND INDIA'S INTERNATIONAL OBLIGATIONS UNDER THE CONVENTION ON SUPPLEMENTARY COMPENSATION FOR NUCLEAR DAMAGE

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The Civil Liability for Nuclear Damage Bill ('CLND Bill') was introduced in the Lok Sabha on May 7, 2010.<sup>1</sup> As per its Statement of Objects and Reasons, it aimed to facilitate India's entry into the international nuclear liability regime.<sup>2</sup> The Parliamentary Standing Committee ('Standing Committee'), examined the provisions of the Bill and suggested several amendments, most of which were accepted.<sup>3</sup> The Bill was then passed by the Parliament on August 30, 2010 as the CLND Act.<sup>4</sup>

The Act seeks to establish a civil nuclear liability regime with the aim of providing prompt compensation to the victims of a nuclear incident through a no-fault liability regime. This liability is legally channelled to the operator of the nuclear plant under Section 4 of the CLND Act, which is in line with international best practices including the CSC 1997, a treaty India has signed but not ratified. However, under Section 17(b) of the CLND Act, a liable operator has the right to recover compensation from the supplier of nuclear material for sub-standard services or patent or latent defects in the nuclear equipment, material or service. This right under Section 17(b) is believed to be contrary to the generally accepted practice of recourse as envisaged in most civil nuclear liability conventions all over the world.<sup>5</sup>

In the first part of this section, we examine the text of Section 17(b). In the second part, we look at Section 17(b) in the context of Article 10 of the Annex to the CSC. In the third part, we analyse the rationale behind the inclusion of Section 17(b) under the Act and provide examples of similar provisions in the laws of other States. In the last part, we suggest ways through which Section 17(b) could be harmonised with India's obligations under international law.

<sup>1</sup> Rajeswari Pillai Rajagopalan and Uma Purushothaman, 'Role of the Indian Political System in Shaping India's Nuclear Policy' (2012) 3 Int'l. J. Nuclear L., 253-256.

<sup>2</sup> The CLND Bill, Statement of Objects and Reasons.

<sup>3</sup> See Parliamentary Standing Committee on Science & Technology, Environment and Forests, *Report on Civil Liability for Nuclear Damage Bill, 2010* (August 2010) <<http://www.prsindia.org/uploads/media/Nuclear%20Nuclear%20Liability%20Bill%202010.pdf>> accessed 17<sup>th</sup> August 2014 ('Standing Committee Report on the CLND Bill'); M R Madhavan, 'The House always wins' (*Indian Express*, 3 September 2010) <<http://archive.indianexpress.com/news/the-house-always-wins/676542/>> accessed 26 August, 2014; Political Bureau, 'With 18 changes, fate of nuke liability bill hangs in balance' (*Times of India*, 22 August 2010) <[http://epaper.timesofindia.com/Repository/getFiles.asp?Style=OliveXLib:LowLevelEntityToPrint\\_ET&Type=txt/html&Locale=english-skin-custom&Path=ETM/2010/08/22&ID=Ar00301](http://epaper.timesofindia.com/Repository/getFiles.asp?Style=OliveXLib:LowLevelEntityToPrint_ET&Type=txt/html&Locale=english-skin-custom&Path=ETM/2010/08/22&ID=Ar00301)> accessed 26 August, 2014.

<sup>4</sup> PRS Legislative Research, 'Civil Liability for Nuclear Damage Bill, 2010', <<http://www.prsindia.org/billtrack/the-civil-liability-for-nuclear-damage-bill-2010-1042/>> accessed 26 September 2014 ('PRS Bill Track').

<sup>5</sup> Standing Committee Report on the CLND Bill (n 3); Lok Sabha, 'Discussion on the motion for consideration of the Civil Liability for Nuclear Damage Bill' (25 August 2010) <<http://164.100.47.132/LssNew/psearch/DebateAdvSearch15.aspx>> accessed 24 September 2014 ('Lok Sabha Discussion on the CLND Bill'); Lok Sabha, 'Introduction of the Civil Liability for Nuclear Damage Bill' (7 May 2010) <<http://164.100.47.132/LssNew/psearch/Result15.aspx?dbsl=2324>> accessed 24 September 2014 ('Lok Sabha Debate on the CLND Bill'); Rajya Sabha Debate on Civil Liability for Nuclear Damage Bill, 2010 (30 August 2010) <<http://164.100.47.5/newdebate/220/30082010/Fullday.pdf>> accessed 26 September 2010 ('Rajya Sabha Debate on the CLND Bill').

## A. INTERPRETATION OF TERMS UNDER SECTION 17(b)

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Section 17(b) of the Act states that:

“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:-

(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.”

The interpretation of the terms under Section 17(b) are relevant for understanding the exact nature and purpose of Section 17(b). An examination of the terms will provide the necessary assistance in proceeding further with the discussion.

### 1. MEANING OF ‘PATENT AND LATENT DEFECTS’

‘Latent defect’ as provided for under Section 17(b), has been interpreted to imply an intrinsic defect that exists at the time of acceptance but is not discoverable by reasonable inspection.<sup>6</sup> In this regard, there is also an implied condition on the seller’s part to ensure that goods are free from such latent defects.<sup>7</sup> Latent defects have also been defined to mean defects which are not obvious to the eye and are not apparently noticeable through customary or reasonable inspection.<sup>8</sup>

‘Patent defects’ have been interpreted to mean extrinsic defects that exist at the time of inspection and are discoverable through examination by a person of ordinary prudence with the exercise of due care and attention.<sup>9</sup>

### 2. MEANING OF ‘SUBSTANDARD SERVICES’

The term ‘substandard’ as used in Section 17(b), has been interpreted to mean below standard quality or below specified quality.<sup>10</sup> In most judicial pronouncements, it has been specifically used

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<sup>6</sup> See *Rajkot Municipal Corporation v. Manjulben Jayantilal Nakum and Ors.*, (1997) 9 SCC 552, paras 17, 56 and 59; *Pradeep Kumar v. Mahaveer Pershad & Ors.*, AIR 2003 AP 107, paras 13-14; John Cibinic, Ralph C. Nash, James F. Nagle (eds), *Administration of Government Contracts* (CCH Incorporated, 2006) 850.

<sup>7</sup> *Sorabji Hormusha Joshi And Co. v. V.M. Ismail & Anr*, AIR 1960 Mad 520, paras 28-29.

<sup>8</sup> P Ramanatha Aiyar, *Advanced Law Lexicon* (4th edn, LexisNexis Butterworths Wadhwa 2013) 2711.

<sup>9</sup> *Pradeep Kumar v. Mahaveer Pershad & Ors.*, AIR 2003 AP 107, paras 13; John Cibinic and others (n 6) 850; Aiyar (n 8) 3536; See also *Sanderson v. National Coal Board*, 1961 2 QB 244.

<sup>10</sup> Aiyar (n 8) 4653; *J. Kamala & Ors v. Drug Inspector & Anr.*, 2003CriLJ3672, paras 1-2; *Greater Hyderabad Petroleum Products Dealers' Association v. Union of India & Ors.*, AIR2006AP349, paras 5-7, 16; *Bichitrana Swain v. State of Orissa*, 63 (1987) CLT266, paras 5, 13.

as a negative adjective.<sup>11</sup> In these pronouncements, it has been employed to describe the nature and condition of the good that does not conform to the requisite standards as provided for in the relevant legislations in question or in the context of a relevant industry.<sup>12</sup>

### 3. GENERAL OBSERVATIONS

It is pertinent to point out that the Atomic Energy Regulatory Board ('AERB'), a regulatory body set-up under Atomic Energy Act, 1962, publishes codes and guides on the design, material and site safety standards for nuclear facilities.<sup>13</sup> These Safety Codes are intended to establish objectives and to set minimum requirements that have to be fulfilled to provide adequate assurance for safety in nuclear and radiation facilities.<sup>14</sup> The AERB publishes Safety Guides that provide guidelines and make available methods for implementing specific requirements as prescribed in line with the relevant Safety Code(s).<sup>15</sup> Safety codes and guides can provide necessary assistance to suppliers in determining the characteristics that constitute 'latent or patent defects' or 'substandard services'.

Further, the notion of 'substandard equipment/services' in the field of nuclear energy has also been under international scrutiny on account of the Fukushima Disaster and the defects detected in a few South Korean nuclear plants.<sup>16</sup> In both these incidents, and others that include the Three Mile Island Disaster and Chernobyl, the contributing factor of the nuclear disaster was either faulty equipment/material or substandard services as provided by suppliers.<sup>17</sup> In the South Korean example specifically, fake certificates had been obtained to misrepresent compliance of requisite standards, which were then detected in time before any nuclear occurrence.<sup>18</sup> Some of the defects that have been detected in nuclear incidents so far include the use of faulty fuses, cooling fans,

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<sup>11</sup> Ibid.

<sup>12</sup> Ibid.

<sup>13</sup> Atomic Energy Regulatory Board ('AERB') Publications Page  
<http://www.aerb.gov.in/AERBPortal/pages/commonTemplate/index3.jsp> accessed 18 August 2014.

<sup>14</sup> Ibid.

<sup>15</sup> Ibid.

<sup>16</sup> National Diet of Japan, 'The official report of The Fukushima Nuclear Accident Independent Investigation Commission' (2012) <[https://www.nirs.org/fukushima/naiic\\_report.pdf](https://www.nirs.org/fukushima/naiic_report.pdf)> accessed 26 September 2014 ('Fukushima Report'); 'Korea probes forged quality certificates' (*World Nuclear News*, 2012), <[http://www.world-nuclear-news.org/RS-Korea\\_probes\\_forged\\_quality\\_certificates-0711124.html](http://www.world-nuclear-news.org/RS-Korea_probes_forged_quality_certificates-0711124.html)> accessed 26 August, 2014; See also '277 fake test results found at reactors', (*Korea Herald*, 2013), <<http://www.koreaherald.com/view.php?ud=20131010000797>> accessed 26 August, 2014.

<sup>17</sup> Ibid; Staff Report to the President's Commission, 'The Accident at Three Mile Island: Role of the Managing Utility and the Suppliers' (October, 1979) ('Staff Report on the Accident at Three Mile Island'); See also Antonia Layard, 'Nuclear Liability Damage Reform After Chernobyl' (1996) 5 Rev. Eur. Community & Int'l. Envtl. L. 218-224.

<sup>18</sup> 'Korea probes forged quality certificates' (*World Nuclear News*, 2012), <[http://www.world-nuclear-news.org/RS-Korea\\_probes\\_forged\\_quality\\_certificates-0711124.html](http://www.world-nuclear-news.org/RS-Korea_probes_forged_quality_certificates-0711124.html)> accessed 26 August, 2014; See also '277 fake test results found at reactors', (*Korea Herald*, 2013), <<http://www.koreaherald.com/view.php?ud=20131010000797>> accessed 26 August, 2014.

power switches and cooling rods or involved incidents of insufficient training.<sup>19</sup> The investigators in many of these incidents therefore discussed implications of the use of substandard equipment or services, and the need for sufficient precautionary measures to prevent incidents on account of such use.

In light of the above, both domestic as well as international guidelines and legislations can be resorted to for interpreting the terms mentioned in Section 17(b) in order to give effect to its purpose.

## B. SECTION 17(b) IS CONTRARY TO ARTICLE 10 OF THE ANNEX TO THE CSC

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India entered into a nuclear agreement with the United States of America ('US') in 2005 for the peaceful use of nuclear energy.<sup>20</sup> One of the outcomes of the agreement was the expectation on the part of the US of the implementation of a nuclear liability legislation in India that contained international standards on civil liability for nuclear damage.<sup>21</sup> In this regard, the US Government pressed India to sign the CSC and adopt a domestic legislation conforming to the standards laid down under it.<sup>22</sup> Presumably on account of this, India expressed its intention to take all the steps necessary to adhere to the CSC in 2008.<sup>23</sup> The CSC has been attractive to India on account of provisions such as Articles III(1)(b) and VII(1) which contemplate international contributory funding in the event of an accident that causes damages beyond 300 million Special Drawing Rights ('SDR').<sup>24</sup>

The CSC specifies in its Annex, a draft law that countries seeking to accede must model their domestic nuclear liability legislation on, in order to ensure compliance.<sup>25</sup> The Act broadly follows the entire structure of the Annex, with two exceptions as mentioned under Section 17(b) (right of recourse against suppliers) and under Section 46 (liability of the operator under other laws). These two provisions *prima facie* run contrary to the rights and obligations as provided for under the

<sup>19</sup> Ibid; Fukushima Report; Layard (n 17); Staff Report on the Accident at Three Mile Island (n 17).

<sup>20</sup> William J. Burns, Under Secretary of State for Political Affairs, 'Hearing before the Committee on Foreign Relations on The U.S.-India Civil Nuclear Cooperation Initiative' (United States Senate, 110th Cong., 2nd Session, 2008) ('Statement of William Burns in US Senate'); See also S. Menon, 'Letter addressed to Mr. William Burns' (Ministry of External Affairs, Government of India, 2010).

<sup>21</sup> Ibid.

<sup>22</sup> Suvrat Raju and M V Ramana, 'The Other Side of Nuclear Liability' (2010) 16 Economic & Political Weekly, Vol. XLV, 48-54 ; Siddharth Vardarajan, 'A New Paradigm for Nuclear Liability'(2011) Seminar; Arya Hariharan, 'India's Nuclear Civil Liability Bill and Suppliers Liability: One Step Towards Modernizing the International Nuclear Liability Regime' (2011) 36 Wm. & Mary Envtl. L. & Pol'y Rev. 223, 243-244.

<sup>23</sup> Raju and Ramana (n 22) 53; Vardarajan (n 22).

<sup>24</sup> Vardarajan (n 22).

<sup>25</sup> International Atomic Energy Agency (IAEA) International Law Series No. 3, 1997 Vienna Convention on Civil Liability for Nuclear Damage and the 1997 Convention on Supplementary Compensation for Nuclear Damage - Explanatory Texts (IAEA Vienna, 2007) ('IAEA Explanatory Texts').

Annex and therefore do not allow India to fully comply with the CSC. This part examines Section 17(b) of the CLND Act.

## 1. ARTICLE 10 OF THE ANNEX TO THE CSC IS A MANDATORY PROVISION THAT DOES NOT ALLOW FOR ANY DEVIATION

Article 10 of the Annex to the CSC states that:

“National law may provide that the operator shall have a right of recourse only:

- (a) if this is expressly provided for by a contract in writing; or
- (b) if the nuclear incident results from an act or omission done with intent to cause damage, against the individual who has acted or omitted to act with such intent.”

Under law, the term ‘may’ has been interpreted to have a mandatory as well as non-mandatory effect, in light of the given context. On the other hand, the term ‘only’ has been interpreted to narrow down the scope of a provision and make it inapplicable to anything falling outside its purview.<sup>26</sup>

Under Article 10 of the Annex a combined interpretation of the term ‘may’ with the term ‘only’ implies that in instances where a State party chooses to provide operators with a right of recourse under its national law, such a right can only be provided under either of the two listed situations and no other.<sup>27</sup> Section 17(b) presents an additional situation wherein the operator has recourse to the supplier for compensation. It is thus clearly contrary to Article 10 of the Annex.

This position is further strengthened by the other provisions of the CSC that stress on the ‘absolute’ liability of the operator, allowing for minimal leeway for a different interpretation.<sup>28</sup> The principle of absolute liability has been understood to be applicable to hazardous or inherently dangerous industries due to their very nature.<sup>29</sup> It has been evolved to ensure prompt compensation to victims who suffer on account of such industries.<sup>30</sup>

Hence, based on a literal interpretation of the various provisions under the CSC, it is evident that Section 17(b) is not in compliance with the rights and obligations as provided for under the CSC.

<sup>26</sup> Aiyar (n 8) 3384.

<sup>27</sup> IAEA Explanatory Texts (n 25).

<sup>28</sup> Convention on Supplementary Compensation for Nuclear Damage, IAEA Doc. INFCIRC/567 (Sept. 12, 1997) ('CSC'), Article 3(3) of the Annex.

<sup>29</sup> See *MC Mehta v. Union of India*, AIR 1987 SC 1086, para 31; See also *Charan Lal Sahu v. Union of India*, AIR 1990 SC 1480, paras 74, 90-91; *Deepak Nitrate Ltd. v. State of Gujarat*, (2004)6 SCC 402, para 4.

<sup>30</sup> Ibid; See also IAEA Explanatory Texts (n 25).

However, since India has only signed the CSC and not ratified it, as per the basic rules of treaty interpretation, it does not have to strictly adhere to all the rights and obligations as envisaged under CSC, but has to merely make an effort to not violate its object and purpose.<sup>31</sup>

### C. THE INCLUSION OF SECTION 17(b) INTO THE ACT IS NOT WITHOUT BASIS

Section 17(b) was heavily debated during the drafting stage of the CLND Bill, as it provided nuclear operators with the right of recourse against suppliers of nuclear material and equipment, a concept that was not widely envisaged in the international nuclear liability regime.

Prior to the existing language used in Section 17(b), the right of recourse against suppliers was provided for only in instances involving ‘wilful acts or gross negligence’. However, on the recommendation of the Standing Committee the language was amended to reflect a provision similar to (though not the same as) the product liability laws that hold the supplier liable for product liability, faulty design, faulty manufacture, and/or negligence. This amendment was made on account of the fact that instances involving ‘wilful acts or gross negligence’ required proof of intent, a characteristic of criminal liability that differed from the civil liability regime envisaged by the CLND Act.<sup>32</sup> Further, the rationale for the inclusion of supplier liability was discussed by the Standing Committee, wherein it observed that there were several instances where the latent and patent defects in the nuclear equipment or material were not disclosed by the suppliers, a practice that had to be curbed.<sup>33</sup>

It had been recognised during the drafting history of the CLND Bill, that the right of recourse against suppliers was not in consonance with the international conventions of civil nuclear liability, including the CSC.<sup>34</sup> However, irrespective of its applicability internationally, the right of recourse against suppliers was retained in the CLND Act on account of a variety of reasons.

One of the reasons for the inclusion of Section 17(b) under the CLND Act was the verdict in the Bhopal Gas Tragedy.<sup>35</sup> The decision of the Supreme Court of India in the Bhopal Gas Tragedy, one of the world’s worst industrial accidents, was hugely unsatisfactory.<sup>36</sup> The Supreme Court gave a paltry compensation to the victims and reduced the charges against Union Carbide officials from

<sup>31</sup> Vienna Convention on the Law of Treaties (27 January 1980) 1155 U.N.T.S. 331, Article 18.

<sup>32</sup> Standing Committee Report on the CLND Bill (n 3).

<sup>33</sup> Standing Committee Report on the CLND Bill (n 3).

<sup>34</sup> Standing Committee Report on the CLND Bill(n 3); Lok Sabha Debate on the CLND Bill, Rajya Sabha Debate on the CLND Bill, Lok Sabha Discussion on the CLND Bill (n 5); See also Rajagopalan and Purushothaman (n 1).

<sup>35</sup> Vardarajan (n 22).

<sup>36</sup> See *Union Carbide Corporation v. Union of India*, No. 8460/1996 (June 7, 2010); See also *Union Carbide Corporation v. Union of India*, AIR 1990 SC 273.

murder, or culpable homicide not amounting to murder to ‘death due to criminal negligence’.<sup>37</sup> The verdict in the Bhopal Gas Tragedy had an enormous impact on the discussions surrounding the CLND Bill, on account of the widely perceived analogousness.<sup>38</sup> It caused a great uproar in civil society and in the government, which led to a bolstered approach towards the accountability and responsibility of all stakeholders in the nuclear energy sector under the CLND Bill.<sup>39</sup> These incidents led the opposition parties and civil society groups to push for Section 17(b) to be included into the CLND Act.<sup>40</sup>

Another significant development around the drafting stages of the Bill was the Deep Water Horizon oil leak in the Gulf of Mexico.<sup>41</sup> The facts and circumstances of this incident highlighted the lack of accountability on the part of companies in taking requisite precautions and safeguards in preventing damage to the environment and the people.<sup>42</sup> This incident also highlighted the inequitable approach adopted by the US government. On the one hand, the US government imposed an exorbitant sum in the form of compensation on BP Oil for not taking enough precautions in curbing the oil spill, while on the other hand they insisted on avoidance of liability for the American nuclear vendors in case of a nuclear accident caused by their products in India.<sup>43</sup>

Section 17(b) under the CLND Act takes an evolutionary approach towards the notion of civil liability for nuclear damage. The legal channelling of liability to the operator was formulated in an era where developments in the nuclear energy sector were in their initial phase.<sup>44</sup> On account of this, channelling was introduced in order to reduce the insurance costs incurred and encourage more investment in the sector.<sup>45</sup>

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<sup>37</sup> See *Union Carbide Corporation v. Union of India* (1989) 1 SCC 674; *Keshub Mahindra v. State of Madhya Pradesh* (1996) 6 SCC 129.

<sup>38</sup> Lok Sabha Discussion on the CLND Bill, Lok Sabha Debate on the CLND Bill (n 5).

<sup>39</sup> Vardarajan (n 22).

<sup>40</sup> Rajagopalan and Purushothaman (n 1) 253-256; Vardarajan (n 22).

<sup>41</sup> Vardarajan (n 22); See also Centre for Legislative Research and Advocacy (CLRA), ‘Policy Brief for Parliamentarians: Civil Liability for Nuclear Damage Bill 2010: How Civil and How Liable?’(2010) <<http://www.clraindia.org/include/CLRA%20Nuke%20Bill%20policy%20brief.pdf>> accessed 26 September 2014 (‘CLRA Policy Brief’).

<sup>42</sup> Ibid.

<sup>43</sup> Ibid.

<sup>44</sup> Evelyne Ameye, ‘Channelling 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?’ (2010) 19 Eur. Energy & Envtl. L. Rev. 33 - 58.

<sup>45</sup> Ibid.

However, as of today after the passage of half a century, on account of growth and development in the nuclear energy sector, the justification for such channelling needs to be relooked at.<sup>46</sup> With the rapid growth in technology and expertise in the field of nuclear energy, the suppliers have now become equal stakeholders in the nuclear energy sector.<sup>47</sup> The suppliers therefore play a much more important role with regard to the precautions and safety measures that need to be undertaken to ensure nuclear safety by providing training and expertise with the regard to the use of nuclear equipment.<sup>48</sup> Further, grave nuclear incidents such as the Three Mile Island and Chernobyl disasters have occurred, in part, on account of lapses on the part of suppliers.<sup>49</sup> Therefore, in the light of these observations, Section 17(b) provides a small but evolutionary solution to the issue of accountability on the part of suppliers in the nuclear sector.<sup>50</sup>

One of the biggest rationales for the exclusion of supplier liability has been the rise in insurance costs that allegedly discourages investment in the sector especially through foreign suppliers.<sup>51</sup> However, an aspect which seems to have been ignored while analysing these costs is the willingness of the operator to compensate the victims, in cases where he has the awareness that he can recover the said amount from the supplier in instances involving suppliers' fault.<sup>52</sup> Furthermore, it has been observed that the insurance costs may not be adequately affected on the inclusion of supplier liability, through the implementation of a variety of measures that include pooling of funds and efficient functioning of the nuclear market.<sup>53</sup> The question of nuclear costs and the impact of liability legislation on such costs is discussed in detail in section V of this Report.<sup>54</sup>

Therefore, in the light of the above stated factors, it can be inferred that the rationale for the inclusion of Section 17(b) in the nuclear liability regime in India is not without basis. It is believed that Section 17(b) in fact takes a 'human-friendly' and safe approach towards the use of nuclear energy in India by aiming to increase the answerability of all stakeholders in the nuclear industry.<sup>55</sup>

<sup>46</sup> Ameye (n 44); See also Michael G. Faure, Tom Vanden Borre, 'Compensating Nuclear Damage: A Comparative Economic Analysis of the U.S. and International Liability Schemes' (2008) 33 Wm. & Mary Envtl. L. & Pol'y Rev. 219, 283-284.

<sup>47</sup> Ameye (n 44).

<sup>48</sup> Ameye (n 44) 44-54.

<sup>49</sup> Ameye (n 44); See also Staff Report on the Accident at Three Mile Island (n 17); Ashwin Kumar and M. V. Ramana, 'Compromising Safety: Design Choices and Severe Accident Possibilities in India's Prototype Fast Breeder Reactor' (2008) 3 Science & Global Security, Vol. 16.

<sup>50</sup> Hariharan (n 22) 250-251; Ameye (n 44).

<sup>51</sup> Ibid.

<sup>52</sup> Ibid.

<sup>53</sup> Ibid.

<sup>54</sup> See Section IV of this Report: Liability and Issues of Cost, 43-69.

<sup>55</sup> Vardarajan (n 22); Hariharan (n 22).

## 1. THE NOTION OF HOLDING SUPPLIERS ACCOUNTABLE IS NOT A NEW CONCEPT

Several States had suggested the need for transparency and accountability of the nuclear suppliers and manufacturers, at the negotiation stage of the Vienna Convention on Civil Liability for Nuclear Damage, 1963 ('Vienna Convention'). However, on account of insufficient support this suggestion was never incorporated into the Vienna Convention.<sup>56</sup>

Further, several member States of the Paris Convention on Third Party Liability in the Field of Nuclear Energy, 1960 ('Paris Convention') such as Austria, Germany and Greece articulated reservations to the Paris Convention that allowed for their national law to continue to hold persons other than the operator liable for damage caused by a nuclear incident on the condition that those persons were fully covered in respect of their liability, including being defended against unjustified actions by the operator or the State.<sup>57</sup>

Currently, there are several States around the world that do not adhere to the notion of absolute liability and accountability of operators without any answerability of suppliers. The national laws of these States provide for a similar right of recourse as provided for under Section 17(b) in India. These States include:-

1) **Austria:** Section 16 of the **Austrian Atomic Liability Act 1999** imposes concurrent liability for nuclear damage on the operator, carrier and the supplier. This implies that in addition to holding the operator liable on a no-fault basis, the Austrian law also holds supplier and carriers concurrently liable on the principles of ordinary tort law and product liability law. Hence, the Austrian Law effectively does away with the concept of legal channelling altogether.<sup>58</sup>

2) **Hungary:** Under Section 55(2)(b) of the **Hungarian Act on Atomic Energy 1996** right of recourse can be exercised by the operator in cases where 'the nuclear damage is the result of a wilful destructive action or negligence, against a natural person acting or omitting to act with such intention.'<sup>59</sup> This provision therefore allows for recourse against suppliers, similar to Section 17(b) in the CLND Act.

3) **South Korea:** Article 4(1) of the **South Korean Act on Compensation for Nuclear Damage 1969** (as amended in 2001) states that in instances where nuclear damage is caused by wilful act or gross negligence of a third party, a nuclear operator has the right of recourse

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<sup>56</sup> IAEA Explanatory Texts (n 25).

<sup>57</sup> Ameye (n 44).

<sup>58</sup> Pre-Legislative Briefing Service (PLBS), 'Addendum to A Briefing Document on the Civil Liability for Nuclear Damage Bill, 2010: Questions of Constitutionality and Legislative Options Open to Parliament' <[http://www.vidhilegalpolicy.in/Docs/PLBS\\_Addendum%20on%20Civil%20Nuclear%20Liability%20Bill.pdf](http://www.vidhilegalpolicy.in/Docs/PLBS_Addendum%20on%20Civil%20Nuclear%20Liability%20Bill.pdf)> accessed 17 August 2014 ('Addendum to the PLBS Briefing Document'); CLRA Policy Brief (n 41).

<sup>59</sup> Ibid.

against such third party, provided that where the nuclear damage occurs due to the supply of material or services (including labour) for the operation of a nuclear reactor, the nuclear operator shall have a right of recourse only insofar as there has been a wilful act or gross negligence by the supplier of the materials concerned or by his employees.<sup>60</sup> This provision is also sufficiently similar to Section 17(b) in the CLND Act.

**4) Chile:** The Law for Nuclear Safety (which was promulgated in 1984) in Chile provides for a novel alternative with regard to the liability of nuclear operators for transport of nuclear materials by third-party carriers. The Chilean Law, instead of outrightly defying the principle of legal channelling, broadens the definition of ‘nuclear operator’ to include a transporter of nuclear substances and/or radioactive material in Chile’s territorial sea, surrounding sea, and the Exclusive Economic Zone. The consequence of such a definition is that transporters of nuclear material are included within the purview of the liability regime and can be proceeded against for compensation.<sup>61</sup>

Therefore, it can be gauged from the examples above that the notion of supplier liability has been recognised in several jurisdictions and is not an alien concept. This implies that Section 17(b) as it exists under the CLND Act does not blatantly discount the international understanding of the right of recourse against suppliers, given that this understanding is fairly quite varied.

## D. RECOMMENDATIONS TO ENSURE INDIA’S COMPLIANCE WITH ITS INTERNATIONAL LEGAL OBLIGATIONS.

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### 1. INDIA CAN JUSTIFY THE INCLUSION OF SECTION 17(b) UNDER THE ACT, BY MAKING A RESERVATION TO THE CSC

Article 19 of the VCLT provides States with the option of making reservations, while signing, ratifying, accepting, approving or acceding to treaties unless: (a) the reservation is prohibited by the treaty; (b) the treaty provides that only specified reservations, which do not include the reservation in question, may be made; or (c) in cases not failing under subparagraphs (a) and (b), the reservation is incompatible with the object and purpose of the treaty. India is not a signatory to the VCLT; however, several provisions of the VCLT including Article 19 have been regarded to reflect customary international law.<sup>62</sup>

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<sup>60</sup> Ibid.

<sup>61</sup> Hariharan (n 22) 241; G. Balachandran, ‘The Civil Nuclear Liability Bill’, IDSA Brief No. 26 (July 2010) <[http://idsa.in/system/files/ib\\_CivilNuclearLiabilityBill.pdf](http://idsa.in/system/files/ib_CivilNuclearLiabilityBill.pdf)> accessed 18 August 2014.

<sup>62</sup> Mr. Alain Pellet, Special Rapporteur, ‘Second Report on Reservations to Treaties: Law and Practice Relating to Reservations to Treaties’, International Law Commission, A/CN.4/477 & Corr.1 & 2 and Add.1 & Corr.1-4, Vol. II (1996) 74.

India has the option to make a reservation to Article 10 of the Annex to the CSC since it satisfies the requisite criteria for making a valid reservation as provided for under Article 19 of the VCLT.

As per the definition of a valid reservation, India can make a reservation even after having *signed* but not having *ratified* the CSC. Further, the CSC does not contain specific provisions regarding reservations or prohibitions regarding reservations. This implies that the conditions stipulated under subparagraphs (a) and (b) of Article 19 of the VCLT are not applicable to India.

Further, subparagraph (c) of Article 19 is also not fulfilled in the instant facts and circumstances, as the object and purpose of the CSC, the Paris Convention and the Vienna Convention do not include the principle of legal channelling or right of recourse. There is no objective test for determining the object and purpose of a treaty.<sup>63</sup> In most instances therefore, recourse is taken to the *travaux préparatoire* and explanatory texts along with the relevant practice of contracting states to determine the object and purpose of any treaty.<sup>64</sup>

In the present instance, it can be inferred from the Preamble of all three conventions, that the principle of legal channelling and the right of recourse are not part of their object and purpose.

The Preamble of the Vienna Convention recognises the desirability of establishing some minimum standards for financial protection against damage resulting from peaceful use of nuclear energy. It also aims to contribute to the development of friendly relations among nations irrespective of their differing constitutional and social systems.

Further, the Preamble of the Paris Convention strives to encourage elaboration and harmonization of legislation relating to nuclear energy, particularly with regard to third party liability and insurance against atomic risks. It also strives to provide for a minimum set of unifying rules for adequate and equitable compensation for victims of nuclear damage, with the aim to also ensure that growth in production and uses of nuclear energy for peaceful purposes are not thereby hindered. Lastly, the Paris Convention allows for its State parties to take, on national basis, any additional measures which they deem appropriate.

The Preamble of the CSC recognises the relevant measures as provided for under the Vienna Convention, Paris Convention and national legislation, and aims to supplement and enhance those measures by increasing the compensation amount payable to victims. It also aims to strengthen the worldwide liability regime by striving to promote regional and global cooperation in ensuring nuclear safety. Therefore, it can be inferred from the text of their Preambles that legal channelling of liability and right of recourse are not an inherent part of the object and purpose of any the three conventions.

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<sup>63</sup> International Law Commission, ‘Draft Articles on the Law of Treaties with commentaries, 1966’, Vol. II (2005) 204.

<sup>64</sup> VCLT Articles 31 & 32.

Additionally, it is pertinent to point out that the US, a State party to the CSC provides for economic channelling of liability under its regime, which in certain instances could include the supplier. Further, under its Energy Independence and Security Act of 2007, the US allows for pooling of funds by its nuclear suppliers for the payment of the excess amount of compensation over and above the amount due from the operator in nuclear incidents falling outside the purview of its nuclear liability legislation implementing the CSC (the Price-Anderson Nuclear Industries Indemnity Act of 1957).<sup>65</sup> These provisions as provided for under the legislations of the US have not been objected to by any State or by the International Atomic Energy Agency ('IAEA'), and therefore reflect the relevant State practice for the purpose of interpreting the object and purpose of the CSC.

In light of the above discussion, it can be inferred that the conditions stipulated under subparagraph (c) of Article 19 of the VCLT are also not satisfied. Therefore, India can make a valid reservation to the CSC with respect to Section 17(b) and assure compliance with its international legal obligations.

## 2. ALTERNATIVELY, INDIA CAN GET AN EXEMPTION UNDER ARTICLE XV OF THE CSC ON THE BASIS OF THE 'POLLUTER PAYS PRINCIPLE'

Article XV of the CSC states that:

"This Convention shall not affect the rights and obligations of a Contracting Party under the general rules of public international law."

According to the IAEA Explanatory Texts to the Vienna Convention and the CSC ('IAEA Explanatory Texts'), additional rights and obligations of Installation States under general rules of public international law are left entirely open by both the Vienna Convention and CSC. This implies that any of the rights and obligations that are provided to States under general rules of public international law are exempt from the application of the relevant conventions and do not constitute a violation of that State's international legal obligations.

The phrase 'general rules of public international law' as provided under Article XV of the CSC, has been interpreted through a variety of sources, to include general principles of international law.<sup>66</sup> Hence, in light of this interpretation, any general principle of international law that is relevant to the nuclear liability regime will be exempt from the application of the CSC and will be a valid defence for State parties that intend on incorporating such a principle in their national legislations.

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<sup>65</sup> Faure and Borre (n 46) 273-275.

<sup>66</sup> See interpretation of Article 25, Basic Law for the Federal Republic of Germany in *BVerfGE* 15, 25 2 BvM 1/60 *Yugoslav Military Mission*, 30 October 1962; *The Paquete Habana*, 175 U.S. 677 (1900); *Interpretation of the Agreement of 25 March 1951 between the WHO and Egypt* (Advisory Opinion) [1980] I.C.J. Rep. 73; *Jorgic v. Germany*, App. no. 74613/01 (ECHR, 12 July 2007).

The ‘polluter pays principle’, as confirmed through a variety of sources, is a general principle of international law that is applicable not only to States but also to private entities.<sup>67</sup> As interpreted by the Supreme Court of India, this principle means that absolute liability for harm to the environment extends not only to compensating the affected persons or entities against the harm in question but also to the costs involved in restoring the environmental degradation.<sup>68</sup> The polluter pays principle, therefore, promotes the process of ‘sustainable development’.<sup>69</sup> Polluter pays has been incorporated in several national and international nuclear liability regimes, wherein it is applied to promote accountability and to quantify liability.<sup>70</sup> The principle comes into operation as the mechanism through which compensation can be recovered from a polluting entity either directly or indirectly for the environmental harm it causes.<sup>71</sup> The CSC does not expressly deal with this principle, but given that it is a general principle of international law, allows for its operation under Article XV.<sup>72</sup>

In several developing economies that are characterised by widespread poverty, high interest rates, judicial delays and uncertainty, the polluter pays principle has been applied as a secondary mechanism of recovery.<sup>73</sup> Policy-makers in these economies primarily aim to provide for systems that provide prompt compensation to the victims of environmental harm, and secondarily endeavour to impose liability on the responsible parties.<sup>74</sup> Within this context, several legislations

<sup>67</sup> This position has been envisaged by the Organisation for Economic Co-Operation and Development ('OECD') in 'The Polluter Pays Principle: OECD Analysis and Recommendations', OCDE/GD(92)81 (1992) ('OECD Analysis and Recommendations') <[http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=OCDE/GD\(92\)81&docLanguage=En](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=OCDE/GD(92)81&docLanguage=En)> accessed 25 September 2014; See for Polluter Pays Principle for a general principle of international law in *Trial Smelter Arbitration (United States of America v. Canada)* (1941) 3 U.N. Rep. Int'l Arb. Awards 1905; Lavanya Rajamani (Rapporteur), 'Legal Principles Relating to Climate Change', International Law Association The Hague Conference (2010) 74 INT'L L. ASS'N REP. CONF. 346, 384-386.

<sup>68</sup> *Vellore Citizens Welfare Forum v. Union of India*, (1996) 5 SCC 647, paras 11-15; *Indian Council for Enviro-Legal Action v. Union of India*, (1996) 3 SCC 212, para 67.

<sup>69</sup> Sustainable Development means development that meets the needs of the present without compromising the ability of the future generations to meet their own needs. It has been considered to be a concept that attempts to create a balance between ecology and development and has been accepted to be a part of the Customary International Law; See Brundtland Report and various other international instruments as cited in Vellore Citizens Case.

<sup>70</sup> United Nations General Assembly, Report of the International Law Commission, G.A. Official Records, 61st Sess., Supplement No. 10 (A/61/10) (2006) 145 ('Report of the ILC').

<sup>71</sup> Ibid.

<sup>72</sup> IAEA Explanatory Texts (n 25).

<sup>73</sup> Barbara Luppi, Francesco Parisi and Shruti Rajagopalan, 'Environmental Protection for Developing Countries: The Polluter-Does-Not-Pay Principle' (2009) Legal Studies Research Paper No. 09-08, University of Minnesota Law School.

<sup>74</sup> OECD Analysis does not bar such a manifestation of the polluter pays principle and allows for sufficient discretion in its application as mentioned in OECD Analysis and Recommendations; Article on Globalizing Environmental Liability.

now impose a primary obligation on governments to provide such prompt relief to victims and secondarily provide for mechanisms for recovery of such relief from the actual polluting entity.<sup>75</sup>

For the application of Article XV to the right of recourse as envisaged under Section 17(b), it needs to be shown that the Indian State has the right or an obligation under the general rules of public international law to provide for such recourse to the nuclear operators. In this context, the discussion surrounding the polluter pays principle assumes importance because this principle gives a right to the State to demand payment from entities that pollute the environment for compensating the persons affected and for restoring the environment to its original state. In India, all the operators in the nuclear industry are government-owned entities that fall within the definition of 'State' under Article 12 of the Constitution, as interpreted by the Supreme Court.<sup>76</sup> This implies that the Indian government performs the dual function of acting as an operator and the State in the disbursement of compensation for nuclear damage. The Indian Government acting as itself and as an operator also has an obligation under the Act, to immediately compensate the affected persons in the instance of a nuclear disaster. However, through recourse to Section 17(b), the government can recover the compensation amount from a nuclear supplier in instances where the nuclear damage occurs on account of latent or patent defects in the nuclear equipment or substandard services, with no fault of the government as the operator.

Section 17(b) therefore serves twin purposes. First, it ensures the answerability of the nuclear supplier as a stakeholder in the nuclear industry. Second, through the manifestation of the polluter pays principle, it ensures, after establishing causation, that the supplier pays as a polluter to the Indian Government to make up for the compensation amount disbursed to victims and for environmental restoration. In addition to the fulfilment of these purposes, Section 17(b) also ensures the government and the tax payers are indemnified of the compensation amount that was paid to the victims to serve the purpose of speedy compensation for nuclear damage in the event of a nuclear disaster, even in instances where the nuclear damage was a result of the fault on the part of the supplier.

From the above discussion it can be inferred that Section 17(b) is a recognised manifestation of the polluter pays principle and qualifies for an exemption of India's obligations under Article XV of the CSC.

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<sup>75</sup> Report of the ILC (n 70).

<sup>76</sup> See the test laid down in *Pradeep Kumar Biswas vs Indian Institute of Chemical Biology and Ors*, (2002) 5 SCC 111; See also PRS Legislative Research, 'Legislative Brief: The Civil Liability for Nuclear Damage Bill, 2010' (2010)

<<http://www.prssindia.org/uploads/media/Nuclear/Final%20Brief%20%20civil%20liability%20for%20nuclear%20damage%20bill.pdf>> accessed 25 September 2014.

## E. SUMMARY OF FINDINGS

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The observations contained in this Section are summarised hereunder:

- 1) Domestic as well as international guidelines and legislations can be resorted to, in interpreting the terms ‘latent or patent defects’ and ‘substandard services’ in order to give effect to its purpose.
- 2) Based on a perusal of Article 10 of the Annex to the CSC along with the IAEA Explanatory material that are relevant in interpreting the right of recourse of operators in the nuclear industry, Section 17(b) is not in compliance with the CSC.
- 3) The inclusion of Section 17(b) in the CLND Act is not entirely without basis, given the policy considerations that were of relevance at the drafting stages of the CLND Bill.
- 4) Additionally, the notion of right of recourse against suppliers is not an alien concept and has been recognised in various jurisdictions.

## F. RECOMMENDATIONS

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To ensure India’s compliance with the CSC notwithstanding the retention of Section 17(b) of the CLND Act, this Report makes the following recommendations:

- 1) In the light of the rules of treaty interpretation under Article 19 of the VCLT, India can make a reservation to the CSC to allow for right of recourse against suppliers as provided for under Section 17(b); or
- 2) India can get an exemption for the applicability of Section 17(b) as a general rule of public international law under Article XV of the CSC, on account of the polluter pays principle that universally recognises the right of States to recover compensation from the polluters of the environment, whoever that may be.

## II. VALIDITY OF RULE 24 OF THE CLND RULES VIS-A-VIS THE CLND ACT

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Rule 24 of the Civil Liability for Nuclear Damage Rules, 2011 ('CLND Rules') has the probable effect of diluting the right of recourse conferred by Section 17. The power to make rules for carrying out the purposes of the Act can be traced to Section 48<sup>77</sup> of the CLND Act, 2010. Since provisions in relation to 'right of recourse' do not find mention in Section 48(2), it would be safe to assume that the power to frame rules in this regard is derived from Section 48(1). Rule 24 of the CLND Rules has been mired in controversy ever since it came into force. The controversy surrounding the said Rule can be appreciated only after perusing what the Rule provides for:

- "24. Right of recourse - (1)** A contract referred to in clause (a) of section 17 of the (CLND) Act shall include a provision for right of recourse for not less than the extent of the operator's liability under sub-section 2 of section 6 of the Act or the value of the contract itself, whichever is less.
- (2) The provision for right of recourse referred to in sub-rule (1) shall be for the duration of initial license issued under the Atomic Energy (Radiation Protection) Rules, 2004 or the product liability period, whichever is longer."

Section 17 of the CLND Act provides for the right of recourse under three circumstances, viz., where such a right is expressly provided for in a contract in writing under Section 17(a); where the nuclear incident is the consequence of an act of the supplier or his employee, which includes supply of equipment with patent or latent defects or sub-standard services under Section 17(b); and when the nuclear incident has resulted from the act of commission or omission of an individual done with the intent of causing nuclear damage under Section 17(c). Evidently, Section 17 neither lays down a cap on the amount that an operator can recover from a supplier nor a limitation period during which such right of recourse subsists. *Prima facie*, Rule 24(1) would have the effect of limiting the liability of the suppliers in the event that the contract between a supplier and an operator is of a significantly low value. Rule 24(2) limits the time during which the right of recourse is available to the operators. While the duration of initial license, under Rule 9 of the Atomic Energy (Radiation Protection) Rules, 2004 is a maximum of five years, the product liability period<sup>78</sup> makes the duration of the right of recourse contingent on a contractual provision.

The first part of this section will analyse the legal position regarding the validity of Rule 24 of the CLND Rules vis-à-vis the provisions of the CLND Act. Thereafter, the second part will examine whether a contract under Section 17(a), read in conjunction with Rule 24, will fall foul of the established principles concerning waiver of the benefit conferred by Sections 17(b) and 17(c) of the CLND Act. The third part of this section will examine whether the waiver of the statutory benefit conferred by Section 17 would be opposed to public policy.

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<sup>77</sup> Section 48 of the Act confers rule-making power on the Central Government. While sub-section (1) confers a general power to make rules for carrying out the purposes of the Act, sub-section (2) allows rule-making with respect to the matters specified in clauses (a) to (n) of that sub-section.

<sup>78</sup> In the Explanation to Rule 24(2), 'product liability period' has been defined as the period for which the supplier has undertaken liability for patent or latent defects or sub-standard services under a contract.

## A. VALIDITY OF RULE 24

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The Parliamentary Committee on Subordinate Legislation in its Twenty Seventh Report, on the CLND Rules, 2011 held that ‘delegated legislation should be consistent with the substantial provisions of the Act and should not contain limitations or excesses which are not contemplated under the Act.’<sup>79</sup> The Committee spoke in context of the limitations imposed by Rule 24 in terms of the amount which can be claimed by exercising the right of recourse under Section 17(a) and also the duration for which a supplier can be held liable.

Delegated legislation may be declared invalid particularly on two grounds, viz., (i) violation of the Constitution, and (ii) violation of the enabling/parent Act.<sup>80</sup> Since the power to make delegated legislation is derived from the enabling Act, it is fundamental that the delegate on whom such power is conferred acts within the limits of authority conferred by the Act.<sup>81</sup>

Delegated legislation which suffers from the vice of being repugnant to the parent Act has formed the subject of challenge before various courts. Courts, while pronouncing on the impugned provisions of delegated legislation have been mindful of, *inter alia*, the nature and language of the power-conferring provision in the enabling Act, the purpose sought to be fulfilled by the statute, and the phraseology of the delegated legislation. Rule 24 prescribes such limitations on a contract under Section 17(a) which do not find mention under the CLND Act. The terminology employed in Rule 24 exposes it to an *ultra vires* challenge on the following grounds. While Grounds 1 and 2 deal with the limitations imposed by Rule 24 on the time during and amount up to which recourse can be claimed, Ground 3 pertains only to the amount.

### 1. RULE 24 IMPOSES SUCH RESTRICTIONS ON THE RIGHT OF RE COURSE WHICH ARE NOT CONTEMPLATED BY THE ENABLING ACT

An instance where delegated legislation attempted to impose restrictions not envisaged by the enabling Act was *Kunj Behari Butail and Ors. v. State of Himachal Pradesh and Ors.*,<sup>82</sup> where the validity of the Himachal Pradesh Ceiling on Land Rules, 1973 was challenged. The rules, framed by virtue of the power conferred on the Central Government by Section 26(1) of the Himachal Pradesh Ceiling on Land Holdings Act, 1972, were meant to carry out the ‘purposes of the Act’. Rule 3 of the said rules brought ‘tea estates’ within the applicability of the Act when the same had been

<sup>79</sup> Parliamentary Committee on Subordinate Legislation, *Twenty Seventh Report: The Civil Liability for Nuclear Damage Rules, 2011*, (2012) para 3.15 <<http://www.dianuke.org/wp-content/uploads/2012/08/SC-report-on-Rules-for-CLND.pdf>> accessed 20 August 2014.

<sup>80</sup> Justice GP Singh, *Principles of Statutory Interpretation*, (13<sup>th</sup> edn, Lexis Nexis Butterworths Wadhwa 2012) 1012.

<sup>81</sup> The rules by virtue of the power-conferring provisions cannot be framed to supplant the provisions of the enabling Act but to supplement it. See, *Additional District Magistrate (Rev) Delhi Administration v. Shri Siri Ram* (2000) 5 SCC 451; *St. Johns Teachers Training Institute v. Regional Director* (2003) 3 SCC 321.

<sup>82</sup> (2000) 3 SCC 40.

expressly exempted by virtue of Section 5 of the parent Act.<sup>83</sup> Notwithstanding Section 5, Rule 3 laid down that areas treated as subservient to tea plantation shall not be transferred by the landowner without the permission of the State Government.

The Court pertinently observed that a general delegation of legislative power (to carry out the purposes of the Act)

“cannot be so exercised as to bring into existence substantive rights or obligations or disabilities not contemplated by the provisions of the Act itself.”<sup>84</sup>

Consequently, the Court struck down the Rules as *ultra vires* the 1972 Act.

Limits not envisaged by the parent Act but imposed by means of delegated legislation were also challenged in *State of Karnataka and Anr. v. H. Ganesh Kamath and Ors.*<sup>85</sup> The Supreme Court was called upon to pronounce upon the validity of Rule 5(2) of the Karnataka Motor Vehicles (Amendment) Rules, 1976. Rule 5(2), framed under the power conferred by Section 21(2)(aa) of the Motor Vehicles Act, 1939, mandated that an applicant would not be granted a licence to drive a medium transport vehicle unless the licensing authority is satisfied that the applicant has had at least one year’s experience in driving any motor vehicle. The validity of Rule 5(2) was challenged before the Karnataka High Court for being repugnant to Sections 4 and 7(8) of the 1939 Act, which lay down the qualifications necessary for procuring a driving licence. The parent Act required the applicant to qualify a test of driving competence which would entitle him/her to obtain a driving licence. However, the additional qualification mandated by Rule 5(2) of the 1963 Rules requiring one year’s driving experience was viewed as being ‘contrary’ to the provisions of the Act. In this context, the Court held that by means of the said Rule 5(2), ‘*the right of an applicant to drive a motor vehicle is whittled down*’. Most importantly, while Rule 5(2) was struck down for being *ultra vires* the parent Act, the Court held that

“it is a well-recognised principle of interpretation of a statute that conferment of rule-making power by an Act does not enable the rule-making authority to make a rule which travels beyond the scope of an enabling Act or which is inconsistent therewith or repugnant thereto.”<sup>86</sup>

Also, in *Sant Saranlal and Anr. v. Parsuram Sahu and Ors.*,<sup>87</sup> Rules 1(c) and 3 of the Bihar Money-Lenders Rules, 1938 were challenged. Rule 1(3) defined the term ‘maximum amount of loans’,

<sup>83</sup> Section 5 of the Himachal Pradesh Ceiling on Land Holdings Act, 1972 deals with exemptions from application of this Act. Section 5(g), specifically, exempts ‘tea estates’.

<sup>84</sup> *Kunj Behari Butail* (n 82) para 14.

<sup>85</sup> (1983) 2 SCC 402.

<sup>86</sup> *Ganesh Kamath* (n 85) para 7. See also *Additional District Magistrate* (n 80) para 16.

<sup>87</sup> AIR 1966 SC 1852.

while Rule 3 required the money-lender to mention in his application the maximum amount of loan which may remain outstanding. The said rules were framed by the State Government pursuant to the power granted by Section 27 of the Bihar Money-Lenders Act, 1938 which empowered the State Government to make rules prescribing the form of registration certificate and the particulars to be contained in an application made by a money-lender. These rules were challenged before the Court on the ground that the 1938 Act nowhere provides for an over-all limit to the loan advanced by a registered money-lender and hence, the same cannot be fixed by the State Government. The appellants contended that '*when the Act does not provide so, the Government cannot, by rule, fix such a limit.*'<sup>88</sup> Taking note of the nature of power conferred on the State Government, the Court held that '*the State Government is not competent to make a rule fixing a maximum amount of outstanding loan*' and that the rules framed do not provide that '*a money-lender properly registered as such under the Act will cease to be one if he advances a loan in excess of the limit mentioned in the registration certificate.*'<sup>89</sup> The rule-making power in this instance was limited to what was stated in clauses (a) to (e) of Section 27 and none of these clauses empower the State Government to prescribe the limit up to which the loans advanced by a money lender are to remain outstanding.<sup>90</sup>

In view of the aforementioned judgments, Rule 24 can be said to have imposed substantive limitations on the right of recourse which do not find mention in the CLND Act. Neither Section 48(1), the provision conferring the rule-making power nor Section 17 contemplate any limitations on the operator's right to claim damages from the supplier. In fact, Section 17(b) envisages a no-fault liability rule on recourse and has no fetters on the time during and the extent to which such right of recourse can be exercised.

Furthermore, in *Bharat Barrel and Drum Manufacturing Company Private Limited and Anr. v. The Employees' State Insurance Corporation*,<sup>91</sup> the vires of Rule 17 of the Employees' State Insurance Rules, 1948 were challenged. The Rules were framed in pursuance of the power conferred by Section 96(1)(b) of the Employees' State Insurance Act, 1948 which empowers the State Government to make rules in regard to 'the procedure to be followed in proceedings before such Courts'<sup>92</sup> and the execution of orders made by such Courts.'

The issue was whether the power to prescribe periods of limitation for initiating proceedings before the Court was a part of and included in the power to prescribe the 'procedure to be followed in proceedings before such Courts.' The Supreme Court held that the rule-making authority under the

<sup>88</sup>*Sant Saranlal* (n 87) para 12.

<sup>89</sup>*Sant Saranlal* (n 87) para 24.

<sup>90</sup>*Sant Saranlal* (n 87) para 20.

<sup>91</sup> (1971) 2 SCC 860.

<sup>92</sup> Courts here refer to Employees' Insurance Courts constituted by the State Government by means of a notification under Section 74 of the Employees' State Insurance Act, 1948.

power so conferred cannot impose a period of limitation which has not been so envisaged by the parent Act. Since the legislature remained silent with regard to the period of limitation in respect of claims under Section 75(2)(b),<sup>93</sup>

“It cannot be considered to have left such matters in respect of claims under some similar provisions to be provided for by the rules to be made by the Government under its delegated powers to prescribe the procedure to be followed in proceedings before such Court.”<sup>94</sup>

While drawing parallels between Rule 24 of the CLND Rules and the impugned Rule 17 in *Bharat Barrel*, what can be concluded is that Rule 24 attempts to impose a limitation on the period during which the right of recourse can be exercised, something which is not contemplated by the CLND Act. Limitation is imposed by the CLND Act on the period within which claims can be made by the victims of a nuclear disaster,<sup>95</sup> but nothing of such nature is envisaged with respect to the operator’s right of recourse. *Prima facie*, this indicates that the legislature did not intend to limit the right of recourse of the operator and, most certainly, did not attempt to delegate the function of imposing a period of limitation to the Government. The same principle will apply to limitation on the amount for which suppliers can be held liable.

## 2. RULE 24 GOES BEYOND THE OBJECT/PURPOSE OF THE CLND ACT

While there are no straitjacketed guidelines for determining the object of a statute and the legislative policy of the government, these can be gathered from the Preamble, the Statement of Objects and Reasons and the core provisions of the concerned Act.<sup>96</sup> Where the legislature provides for a general rule-making power to carry out the purposes of the Act, it may be permissible to find out the object of the enactment and then see if the rules framed satisfy the act of having been so framed as to fall within the scope of such general power conferred.<sup>97</sup>

In *Vasu Dev Singh and Ors. v. Union of India and Ors.*, a notification issued under Section 3 of the East Punjab Urban Rent Restriction Act, 1949 was challenged. The Administrator of Chandigarh, under Section 3, was empowered to issue a notification whereby an exemption from the application

<sup>93</sup> Section 75 of the Employees’ State Insurance Act, 1948 enumerates the matters which are to be decided by the Employees’ Insurance Court. Section 75(2)(b), in particular, pertains to a dispute as to the rate of wages or average daily wages of an employee.

<sup>94</sup> *Bharat Barrel* (n 91) para 11.

<sup>95</sup> In this context, Section 18 of the CLND Act mandates that the right to claim compensation for nuclear damage shall extinguish, if such claim is not made within a period of - (a) 10 years, in case of damage to property; (b) 20 years in case of personal injury to a person.

<sup>96</sup> *Vasu Dev Singh and Ors. v. Union of India and Ors.* (2006) 12 SCC 753. See also *Vasantlal Maganbhai Sanjanwala v. State of Bombay* AIR 1961 SC 4; *Union of India v. Azadi Bachao Andolan* (2004) 10 SCC 1; *Bangalore Development Authority v. Air Craft Employees Cooperative Society Ltd. and Ors.* 2012 (1) SCALE 646.

<sup>97</sup> *Kunj Behari Lal Butail* (n 82).

of the Act could be granted to a particular building or rented land. Consequently, the Administrator issued a notification exempting all residential and non-residential premises carrying a rental value of more than Rs. 1500 per month from the application of this Act. The said notification was challenged as unconstitutional for having contravened the underlying legal philosophy of a beneficent legislation. While duly noting that the legislative objective and policy must be considered having regard to the Preamble<sup>98</sup> and the core provisions<sup>99</sup> of the Act, the Court held that the notification issued by the Administrator is *ultra vires* the 1949 Act. While arriving at this conclusion, the Court also observed that the Rent Act is a ‘beneficent legislation which sought to protect a category of the tenants from occupying rented buildings.....not only from enhancement of rent, but also from unreasonable eviction.’

In *Subhash Chand Aggarwal v. Union of India and Ors.*,<sup>100</sup> Rule 6(j)(v) of the Delhi Holding (Consolidation and Prevention of Fragmentation) Rules, 1959 was challenged for going beyond the purpose of the East Punjab Holding (Consolidation and Prevention of Fragmentation) Act, 1948. The rule-making power under the said Act was couched in Section 46. The impugned Rule 6(j)(v) mandated that the allottee of an industrial plot shall neither transfer or sell the same in any manner nor amalgamate it with another land. The Court took aid of the Preamble to ascertain the purpose of the Act, which was to provide for the compulsory consolidation of agricultural holdings and for prevention of fragmentation of agricultural holdings. Upon a perusal of the Act and the Rules, the Court concluded that the main enactment does not envisage a complete bar or prohibition on transfer of any type of land but Rule 6(j)(v) has introduced a fresh restriction in the post consolidation holding, which is beyond the scope, sphere and concern of the main enactment.<sup>101</sup> Rule 6(j)(v) was struck down by the Court for being ‘contrary and repugnant to the provisions of the principal enactment as well as beyond its nature, object and scheme.’

The CLND Act seeks to create a mechanism for compensating victims of nuclear damage arising from a nuclear incident.<sup>102</sup> The Department of Atomic Energy ('DAE') in its Report submitted to the Department-Related Parliamentary Standing Committee on Science and Technology, Environment and Forests mentioned that the ‘principal objective of the CLND Bill, 2010 is to provide for prompt compensation to the victims of a nuclear incident.’<sup>103</sup> Such a purpose is also discernible from the Preamble and key provisions of the Act. Even though recourse may not be *per se* incidental to victim compensation, Rule 24 does impose substantive fetters on the right of recourse which is

<sup>98</sup> The Preamble to the Act mentions that the Act is meant to restrict the increase of rent of certain premises situated within the limits of urban areas, and the eviction of tenants therefrom.

<sup>99</sup> In *Vasu Dev Singh* (n 96), the Supreme Court held that the legislative policy is to be deciphered from the core provisions of the Act.

<sup>100</sup> 2011 VIII AD (Delhi) 338.

<sup>101</sup> *Subhash Chand* (n 100) para 35.

<sup>102</sup> PRS Bill Track (n 4).

<sup>103</sup> Standing Committee Report on the CLND Bill (n 3).

beyond the competence of delegated legislation. Moreover, to provide for ‘civil liability for nuclear damage’ is an object of the CLND Act.<sup>104</sup> When read in conjunction with the polluter pays principle, the entity whose products cause the nuclear incident should actually be held liable for the nuclear incident caused.<sup>105</sup> In this regard, delegated legislation which imposes limitations on claiming damages from the polluting entity would fall foul of the purpose of the CLND Act.

### 3. RULE 24 MAKES THE AMOUNT RECOVERABLE BY WAY OF RECOURSE CONTINGENT ON THE VALUE OF THE CONTRACT

Rule 24 also stands exposed to a challenge under Article 14 of the Constitution for invoking such conditions which bear no reasonable nexus with the purpose sought to be achieved by the CLND Act. In *Subhash Chand Aggarwal*, Rule 6(j)(v) restricting the allottee from transferring, selling or amalgamating land, was challenged also for being violative of Article 14 and for not having a rational nexus with the object and purpose of the 1948 Act. In this regard, the Court opined that the said Rule could not be sustained for it had no nexus with the object, purpose and scope of the enactment itself and hence, was violative of Article 14.<sup>106</sup>

The value of the contract may be more or less than the damage actually incurred, and the imposition of such a parameter would be against the interests of both the operator and the supplier. In November 2007, the Ministry of Petroleum and Natural Gas requested the Comptroller and Auditor General ('CAG') to conduct a special audit of Production Sharing Contracts ('PSCs') between the Government of India and private contractors in the oil and gas sector, due to perceived irregularities in the procurement procedure.<sup>107</sup> The fact that the PSCs for certain oil blocks were awarded on the basis of a single financial bid by a particular vendor and after rejection of bids by various other vendors warranted an audit by the CAG. The value of the bid (and subsequently, the contract) being too low merited the need for reopening and revisiting the procurement procedures. Apprehensions of this kind may also arise in the nuclear industry where prospective parties (suppliers) to an agreement may underestimate prices to procure a bid/contract. In a scenario where, ideally, supplier liability should depend upon the potential impact that an accident is capable of causing, it would become contingent on the financial and business interests of the contracting parties. The supplier can be held liable for not less than the extent of the operator's liability. The ‘value of the contract’ bears no rational nexus with the purpose of the Act,

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<sup>104</sup> The Preamble to the CLND Act specifies that the Act is to provide for, *inter alia*, prompt compensation to the victims of a nuclear accident through a no-fault liability regime.

<sup>105</sup> Indian Council for Enviro-Legal Action (n 68).

<sup>106</sup> See also *PJ Irani v. State of Madras* AIR 1961 SC 1731; *Bangalore Development Authority v. Air Craft Employees Cooperative Society Ltd. and Ors.* 2012 (1) SCALE 646.

<sup>107</sup> Ministry of Petroleum and Natural Gas, Report on Performance Audit of Hydrocarbon Production Sharing Contracts, No. 19 (2011-12) <[http://saiindia.gov.in/english/home/our\\_products/audit\\_report/government\\_wise/union\\_audit/recent\\_reports/union\\_performance/2011\\_2012/Civil\\_%20Performance\\_Audits/Report\\_19/exe-sum.pdf](http://saiindia.gov.in/english/home/our_products/audit_report/government_wise/union_audit/recent_reports/union_performance/2011_2012/Civil_%20Performance_Audits/Report_19/exe-sum.pdf)> accessed 25 September 2014.

exposing its constitutional validity to a challenge under Article 14. This issue is further explored in Section V of this Report.<sup>108</sup>

Keeping in view the aforementioned grounds 1, 2 and 3, it is our view that Rule 24 is *ultra vires* the CLND Act. Also, it is violative of Article 14 inasmuch it provides for the value of the contract as a factor limiting supplier liability.

## B. WAIVER BY CONTRACT OF A STATUTORY BENEFIT CONFERRED BY SECTION 17

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What further intensifies the case against Rule 24 is former Attorney General Late Mr. Goolam E. Vahanvati's opinion on Section 17 of the CLND Act. Mr. Vahanvati opined that

“Section 17 of the CLND Act, 2010 is a kind of enabling provision; it gives a specific right to the operator but does not place any mandatory obligation or requirement to exercise the right of recourse against the supplier. In the absence of a mandatory obligation, the operator could choose not to exercise that right. It is a statutory right and not a fundamental right under the Constitution.”<sup>109</sup>

While the legal intent behind the Act was to provide three stand-alone sub-clauses (a), (b) and (c) under Section 17, Rules 24(1) and (2) have the probable effect of waiving the statutory right of the operator under Sections 17(b) and 17(c) to have recourse against the supplier if a contract under Section 17(a) has been entered into. In such an event, the question that needs consideration is the legality of such waiver of a right conferred by a statute.

Mr. Vahanvati's legal opinion with regard to the right of recourse confirms that the operator can either incorporate a clause in the contract to enforce the right of recourse against the supplier or can waive such a right altogether. However, what needs to be answered is whether it would be permissible for operators to waive their statutory rights to claim compensation from suppliers in the event of a nuclear incident where either the product supplied had a patent or latent defect, or substandard service was provided, both of which are circumstances mentioned under Sections 17(b) and 17(c) respectively.

The general principle that everyone has a right to waive and to agree to waive the advantage of a law made solely for the benefit of an individual in his private capacity<sup>110</sup> has been well-accepted.

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<sup>108</sup> See Section IV of this Report: Liability and Issues of Cost, 43-69.

<sup>109</sup> J. Venkatesan, ‘Opinion on liability waiver based on legality, says AG’, *The Hindu* (New Delhi, 22 September 2013) <<http://www.thehindu.com/news/national/opinion-on-liability-waiver-based-on-legality-says-ag/article5154648.ece>> accessed 19 August 2014.

<sup>110</sup> Maxwell, *The Interpretation of Statutes* (P. St. J. Langan ed, 12<sup>th</sup>edn, Lexis Nexis Butterworths Wadhwa 2011) 328.

However, a waiver would be inoperative if it is against public morals.<sup>111</sup>In *Shri Lachoo Mal v. Shri Radhey Shyam*,<sup>112</sup> the Supreme Court observed that if there is any express prohibition against contracting out of a statute in it then no question can arise of anyone entering into a contract which is so prohibited. However, when there is no such prohibition it will have to be seen whether an Act is intended to have a more extensive operation as a matter of public policy.<sup>113</sup>The Court categorically held that

“If any person enters into a binding contract to waive the benefits conferred upon him by an Act of Parliament he can contract himself out of the Act unless it can be shown that such agreement was contrary to public policy.”<sup>114</sup>

In the event that the CLND Act does not expressly prohibit an agreement to waive the operator's right of recourse, the legality of such an agreement needs to be tested against the anvil of public policy. There can be no waiver of a statutory requirement which is imposed in public interest.<sup>115</sup>For instance, in *Krishna Bahadur v. Purna Theatre*,<sup>116</sup> the Court held that the right of a worker to receive retrenchment compensation could not be waived, since it would be opposed to public interest. In *Firestone Tyre and Rubber Co. v. Synthetics and Chemicals Ltd. and Ors.*<sup>117</sup>the Court held that a person cannot waive a right or benefit conferred by a statute unless it is of a personal or private nature. The High Court categorically held that '*there is a clear distinction between a contractual or a statutory right created in favour of a person for his own benefit and a right which is created on the ground of public interest and policy.*'<sup>118</sup>A right can be waived by the party for whose benefit certain requirements or conditions had been provided for by a statute subject to the condition that no public interest is involved therein.<sup>119</sup>Thus, the implications of a contract, which has the effect of limiting the amount that can be claimed by the operator under the right of recourse as well as the duration for which such right subsists, on public interest will have to be assessed.

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<sup>111</sup> *Waman Shriniwas Kini* AIR 1959 SC 689.

<sup>112</sup> (1971) 1 SCC 619.

<sup>113</sup> *Lachoo Mal* (n 112) para 6.

<sup>114</sup> *Lachoo Mal* (n 112) para 24. The ratio in *Lachoo Mal* has been taken cognizance of in later judgments as well, such as *Bank of India and Ors. v. OP Swaranakar* 2002 (9) SCALE 519; *Sita Ram Gupta v. Punjab National Bank and Ors.* (2008) 5 SCC 711; *Union of India v. LSN Murthy* (2012) 1 SCC 718.

<sup>115</sup> Maxwell (n 110) 330.

<sup>116</sup> (2004) 8 SCC 229.

<sup>117</sup> [1971] 41 Comp Cas 377 (Bom).

<sup>118</sup> *Firestone Tyre* (n 117) para 51.

<sup>119</sup> *Krishna Bahadur* (n 116) para 9.

## C. PUBLIC POLICY AND THE CLND ACT

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In the previous part, we examined the legal position of Rule 24 vis-à-vis the CLND Act. Since Rule 24 is *ultra vires* the CLND Act, enforcing a contract by means of this Rule would amount to an illegality which cannot be condoned by any conduct or agreement of parties.<sup>120</sup> Even if Rule 24 survives an *ultra vires* challenge, a contract under Section 17(a) would inevitably fall foul of Section 23 of the Indian Contract Act, 1872 ('Contract Act'). Section 23 mandates that the consideration of an agreement is unlawful if the Court regards it as immoral, or opposed to public policy.

The law stipulates that a waiver will be inoperative and void if it would be against public policy. While pronouncing upon the contours of public policy, courts have attempted to consider situations independently and conclude what would constitute 'opposed to public policy' in particular cases. In *Central Inland Transport Corporation Limited and Anr. v. Brojo Nath Ganguly and Anr.*,<sup>121</sup> the Supreme Court noted that the term 'opposed to public policy' is incapable of a precise definition for the concept of what is good for or would be injurious to the public or public interest has varied from time to time.<sup>122</sup> Moreover, in *Gherulal Parakh v. Mahadeodas Maiya and Ors.*,<sup>123</sup> the Court held that the doctrine of public policy should only be invoked in 'clear and incontestable cases of harm to the public.'<sup>124</sup>

A pertinent observation made by the Supreme Court in *State of Rajasthan and Ors. v. Basant Nahata*<sup>125</sup> was that what is 'opposed to public policy' would be a matter depending upon the nature of the transaction. The Court was quick to observe in *Basant Nahata*<sup>126</sup> that the doctrine of public policy is contained in a branch of common law, and is governed by precedents.<sup>127</sup> The doctrine of public policy is somewhat 'open-textured' and 'flexible' and hence,

"The pleadings of the parties and the materials brought on record would be relevant so as to enable the Court to judge the concept as to what is for public good or in the public interest or what would be injurious or harmful to

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<sup>120</sup> *Waman Kini* (n 111) para 16.

<sup>121</sup> (1986) I LLJ 171 SC.

<sup>122</sup> *Central Inland* (n 121) para 95.

<sup>123</sup> AIR 1959 SC 781.

<sup>124</sup> *Gherulal Parakh* (n 122) para 58.

<sup>125</sup> (2005) 12 SCC 77.

<sup>126</sup> For our purposes, the judgment in *Basant Nahata* assumes importance as it gives an insight into the public policy aspect as well as a critique on when delegated legislation can be declared invalid. Taking a cue from this judgment, Rule 24 can be held invalid for laying down unwarranted limitations on the right of recourse even though there are no statutory guidelines to that effect in the CLND Act, 2010.

<sup>127</sup> *Basant Nahata* (n 125) para 13.

the public good or in the public interest at the relevant point of time as contra-distinguished from the policy of a particular government.”<sup>128</sup>

It would be against public interest if the operators waive their right to claim compensation from a supplier who has provided substandard service or a product with latent or patent defects. In an event where the operator has entered into a contract of an inappropriately low value with the supplier, and if the operator has exhausted his own means, the government would then be expected to compensate the victims of the nuclear accident. The inevitable consequence of this would be that compensation is ultimately being paid out of the taxpayers’ money even though the law enables the operator to seek compensation from a negligent supplier.<sup>129</sup> This is clearly opposed to public policy.

Further, curtailing the liability of the supplier of nuclear material and equipment also runs contrary to the polluter pays principle. The judgment in *Indian Council for Enviro-Legal Action v. Union of India*<sup>130</sup> lends credence to this view,

“The polluter pays principle demands that the financial costs of preventing or remedying damage caused by pollution should lie with the undertakings which cause the pollution, or produce the goods which cause the pollution.”<sup>131</sup>

The government is not obligated to meet the costs involved in either preventing damage or carrying out any remedial action in cases where damage has been caused owing to a defect in supply or services, because that would have the effect of shifting the financial burden of the pollution incident to the taxpayer.<sup>132</sup> In fact, in a petition challenging its constitutional validity, the petitioners argued that the CLND Act, by making suppliers not liable, violates the polluter pays principle which has come to be recognized as part of the law of the land under Article 21 of the Constitution.<sup>133</sup> The Supreme Court has interpreted the polluter pays principle to mean that the absolute liability for harm to the environment extends to restoring the environmental degradation as well as to ‘compensating the victims of pollution.’<sup>134</sup> Essentially, ‘the polluter is liable to pay

<sup>128</sup> Ibid.

<sup>129</sup> Mohit Abraham and MP Ram Mohan, ‘Don’t waiver on nuclear liability’ *The Hindu* (New Delhi, 20 September 2013) <<http://www.thehindu.com/opinion/lead/dont-waver-now-on-nuclear-liability/article5147177.ece>> accessed 14 August 2014.

<sup>130</sup>(1996) 3 SCC 212.

<sup>131</sup> *Indian Council for Enviro-Legal Action* (n 68) para 52.

<sup>132</sup> Ibid.

<sup>133</sup> The judgment in this matter was delivered on 6 May 2013 in *G. Sundarajan v. Union of India and Ors.* (2013) 6 SCC 620. The text of the petition is available at ‘Writ Petition Challenging the Constitutional Validity of the Civil Liability for Nuclear Damage Act, 2010’ (*Common Cause*, October 2011) <[http://www.commoncause.in/Recent\\_PILs/9a10a/nuclear\\_Petition.pdf](http://www.commoncause.in/Recent_PILs/9a10a/nuclear_Petition.pdf)> accessed 25 August 2014.

<sup>134</sup> *Vellore Citizens Welfare Forum* (n 68) para 12.

*the cost to the individual sufferers.*<sup>135</sup> In such circumstances, the right of recourse also bears a connection, albeit an indirect one, to victim compensation. Thus, the right of recourse is opposed to public policy in two ways - First, unwarranted limitations on supplier liability would have the effect of unfairly burdening the taxpayers. If a contract under Section 17(a) has the effect of limiting the supplier liability and imposing burdens on the taxpayer that would inevitably be opposed to public policy. State liability is gradually becoming an exception with liability and obligation to compensate being first placed at the doorstep of the person most in control of the activity at the time the accident occurred.<sup>136</sup> The aim of the polluter pays principle is to transfer the cost of environmental protection from the governments to actual polluters who contaminate the environment by their activities.<sup>137</sup> The polluter pays principle does not run contrary to the accepted principle of sovereign guarantees for risky investments. The principle only ensures that instead of the taxpayers' money (through the government), the polluting entity is compelled to compensate the harm caused to the environment as a means of first resort. The government is always a last resort source for compensation.

Secondly, the polluter pays principle mandates that the polluting entity (who may be the supplier) is obliged to contribute towards the compensation payable to the victims of a nuclear accident. Of late, arguments in favour of liability of the suppliers for accidents caused by their products have gained momentum. The nuclear industry has matured and become more sophisticated, thereby employing more complex technological equipment. Operators may not, on all occasions, be aware of the risks that particular equipment may be capable of giving rise to. An operator can rationally adopt only such levels of prevention of a nuclear accident which correspond to the risks he generates.<sup>138</sup> As the knowledge of equipment becomes more specific, it will be hard to sustain operators' liability for risks that they are not aware of and cannot perceive.<sup>139</sup> Consequently, if suppliers' liability is limited by imposition of such stipulations wholly unconnected with the actual damage caused, victim compensation would inevitably bear the brunt and consequently public policy would be affected.

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<sup>135</sup> Ibid.

<sup>136</sup> International Law Commission, 'International Liability for Injurious Consequences Arising out of Acts not Prohibited by International Law' UN Doc A/CN.4.531 (21 March 2003), 102.

<sup>137</sup> Ondrej Vicha, 'The Polluter Pays Principle in OECD Recommendations and its Application in International and EC/EU Law', (2011) 2 Czech Y.B. Int'l. L. 57, 60.

<sup>138</sup> Michael G. Faure and Karine Fiore, 'An Economic Analysis of the Nuclear Liability Subsidy', (2009) 26 Pace Envtl. L. Rev. 23 419, 423.

<sup>139</sup> Ameye (n 44) 45.

## D. SUMMARY OF FINDINGS

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The findings that emerge from this section have been summarised hereunder:

- 1) Rule 24 of the CLND Rules is *ultra vires* the CLND Act as it imposes such limitations on the operator's right of recourse which have not been contemplated by the CLND Act. Limitations on supplier liability with regard to the amount and time period find no mention in the CLND Act and hence, delegated legislation cannot impose such limitations.
- 2) Also, by inserting a stipulation such as the value of the contract between the operator and the supplier, Rule 24 is violative of Article 14 and hence, unconstitutional inasmuch as it introduces the value of the contract as a standard to determine supplier liability.
- 3) A contract under Section 17(a) between the operator and the supplier would have the probable effect of waiving the statutory right of the operator to claim recourse under Sections 17(b) and 17(c). This would amount to contractual waiver of a benefit conferred by a statute.
- 4) Such a waiver would be inoperative as it is opposed to public policy and against public interest. In cases where the operators' means are exhausted but they have waived their right to claim compensation from the supplier, the Government would have to compensate the victim. The inevitable consequence of this would be that compensation would have to be paid by the taxpayer. Also, the polluter pays principle mandates that a polluting entity is obliged to make good the environmental damage as well as compensate the victims of the harm caused. Hence, waiver of the statutory right of recourse is against public policy and would be inoperative.

## E. RECOMMENDATIONS

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The Report makes the following recommendations with regard to Section 17 of the CLND Act and Rule 24 of the CLND Rules:

- 1) The limitation on the time during which a supplier can be held liable should be inserted by means of a proviso to a relevant section in the CLND Act.
- 2) Rule 24 of the CLND Rules should be deleted.

### III. CONCURRENT LIABILITY FOR OPERATORS AND SUPPLIERS UNDER OTHER LAWS

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A significant impediment to the operationalisation of agreements for nuclear supply in India has been the lack of clarity surrounding liability of suppliers in the context of Section 46 of the CLND Act.

Section 46 states that,

**“Act to be in addition to any other law –**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.”

From the first part of the sentence, the CLND Act can be understood to supplement, rather than trump other legislations in force. This understanding has been interpreted to allow for tort liability claims against nuclear suppliers in India.<sup>140</sup> This interpretation is further reinforced by Section 35 which ousts the jurisdiction of civil courts in respect of matters that can be adjudicated under this Act. At the same time, Section 9 which underlines the special nature of the adjudicative mechanism under the Act does not expressly make this mechanism exclusive. On account of a combination of these factors, significant doubts persist as to whether and to what extent tort liability claims against suppliers are excluded by the operation of the CLND Act.<sup>141</sup>

A resolution of this issue is imperative if the CLND Act as a special mechanism enforcing the legal channelling of liability is to have any significance.<sup>142</sup> This section of the paper addresses this issue of concurrent liability. The first part analyses the complex legislative architecture in order to make sense of the implications on suppliers and operators as a result of the interplay of the provisions of the CLND Act. The next part specifically analyses Section 46, the key provision that is ambiguous in allowing for claims to be filed under other Acts. The last part makes recommendations that strive to ensure that the sanctity of the Act as a special mechanism is preserved. Such recommendations, it is believed, will go a long way in assuaging justified reservations amongst suppliers without compromising on India's public policy. This will thereby remove a key hurdle to the operationalisation of India's nuclear agreements.

<sup>140</sup> Vardarajan (n 22).

<sup>141</sup> Mohit Abraham, ‘Nuclear Liability: A Key Component of the Public Policy Decision to Deploy Nuclear Energy in Southeast Asia’, <<https://www.amacad.org/multimedia/pdfs/publications/researchpapersmonographs/nuclearLiability.pdf>> accessed 26 September 2014; Ashley J. Tellis, ‘India's Nuclear Liability Dilemma’, <<http://www.cfr.org/world/indias-nuclear-liability-dilemma/p23305>> accessed 26 September 2014, as cited in Hariharan (n 22).

<sup>142</sup> CLND Act, Preamble; Lok Sabha Debate on the CLND Bill, Rajya Sabha Debate on the CLND Bill, Lok Sabha Discussion on the CLND Bill (n 5).

## A. THE LEGISLATIVE FRAMEWORK

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There are six provisions of the CLND Act which are relevant to this issue. Section 4 of the Act imposes liability for nuclear damage on the operator of the nuclear installation in the event of a nuclear incident. Section 4(6) in this regard, specifically enshrines the principle of no-fault liability underlining the principle of legal channelling.<sup>143</sup> This ensures that irrespective of who is at fault for the damage caused, the operator shall be liable.<sup>144</sup>

The damage for which such an operator can be held liable is ‘nuclear damage’ defined in Section 2(g) of the Act.<sup>145</sup> The definition covers both loss of life and personal injury as well as loss to property. This Section also contains a non-exhaustive list of specific types of losses and damage which are covered under the said definition.<sup>146</sup> This list includes any economic loss, loss of income, cost of preventive measures and costs of measures to reinstate the impaired environment owing to

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<sup>143</sup> Standing Committee Report on the CLND Bill (n 3); Lok Sabha Debate on the CLND Bill, Rajya Sabha Debate on the CLND Bill (n 5).

<sup>144</sup> IAEA Explanatory Texts (n 25); Hariharan (n 22); Ameye (n 44).

<sup>145</sup> CLND Act, s 2(g) states that:

*“nuclear damage” means- (i) loss of life or personal injury (including immediate and long term health impact) to a person; or*

*(ii) loss of, or damage to, property, caused by or arising out of a nuclear incident, and includes each of the following to the extent notified by the Central Government;*

*(iii) any economic loss, arising from the loss or damage referred to in sub-clauses (i) or (ii) and not included in the claims made under those sub-clauses, if incurred by a person entitled to claim such loss or damage;*

*(iv) costs of measures of reinstatement of impaired environment caused by a nuclear incident, unless such impairment is insignificant, if such measures are actually taken or to be taken and not included in the claims made under sub-clause (ii);*

*(v) loss of income derived from an economic interest in any use or enjoyment of the environment, incurred as a result of a significant impairment of that environment caused by a nuclear incident, and not included in the claims under sub-clause (ii);*

*(vi) the costs of preventive measures, and further loss or damage caused by such measures;*

*(vii) any other economic loss, other than the one caused by impairment of the environment referred to in sub-clauses (iv) and (v), in so far as it is permitted by the general law on civil liability in force in India and not claimed under any such law, in the case of sub-clauses (i) to (v) and (vii) above, to the extent the loss or damage arises out of, or results from, ionizing radiation emitted by any source of radiation inside a nuclear installation, or emitted from nuclear fuel or radioactive products or waste in, or of, nuclear material coming from, originating in, or sent to, a nuclear installation, whether so arising from the radioactive properties of such matter, or from a combination of radioactive properties with toxic, explosive or other hazardous properties of such matter.*

<sup>146</sup> Ibid.

a nuclear incident.<sup>147</sup> However, for these enumerated types of losses, the extent to which they could constitute ‘nuclear damage’ and hence pave the way for compensation under the CLND Act has to be ‘notified by the Central Government’.<sup>148</sup> Thus, while loss of life, personal injury or property is directly compensable after a determination under the CLND Act, the remaining types of losses can be determined only pursuant to and in accordance with a notification by the Central Government specifying the extent to which such losses are compensable.

Payment of compensation for such nuclear damage does not however reduce the amount of an operator’s liability under any claim made under any other law, according to the proviso to Section 5(2). The provision assumes that there are other laws under which liability can be imposed on operators and that any payment or compensation for nuclear damage is not exclusive to this Act.<sup>149</sup>

Such other laws will be discussed in the latter part of this section. However, *prima facie*, two aspects of the above-mentioned provision are curious. First, it derogates from the rationale of this legislation, which was to set up a special mechanism for prompt compensation to be paid by specifically envisaging the possibility of liability under other Acts.<sup>150</sup> Second, it is a proviso in a section that otherwise deals with exemptions to the principle of legal channelling of liability to the operator.<sup>151</sup> Such other exemptions include *force majeure* situations and other enumerated instances, where the operator cannot be held liable under this Act.<sup>152</sup> These exemptions thus allow for non-payment of compensation by the operator in certain specific instances.<sup>153</sup> Keeping in mind the main text of Section 5 under the Act, the above-mentioned proviso therefore does not chart out

<sup>147</sup> Ibid.

<sup>148</sup> Ibid.

<sup>149</sup> CLND Act, s 5(2) states that:

*An operator shall not be liable for any nuclear damage caused to-(i) the nuclear installation itself and any other nuclear installation including a nuclear installation under construction, on the site where such installation is located; and*

*(ii) to any property on the same site which is used or to be used in connection with any such installation; or*

*(iii) to the means of transport upon which the nuclear material involved was carried at the time of nuclear incident:*

*Provided that any compensation liable to be paid by an operator for a nuclear damage shall not have the effect of reducing the amount of his liability in respect of any other claim for damage under any other law for the time being in force.*

<sup>150</sup> Hariharan (n 22); Addendum to the PLBS Briefing Document (n 58).

<sup>151</sup> CLND Act, proviso to s 5(2).

<sup>152</sup> List of exemption include grave natural disaster, armed conflict, hostility, civil war, insurrection or terrorism as provided for under Section 5(1), CLND Act.

<sup>153</sup> CLND Act, s 5(1).

an exception to the principle of legal channelling. It instead talks of an entirely different situation where the operator's liability is open to claims for compensation under the CLND Act and under other Acts. The placement of this proviso is thus odd. Further, such a proviso also finds no place in the Annex to the CSC from whose provisions (Articles 5 and 7) the rest of Section 5 is largely derived.<sup>154</sup>

The above mentioned proviso is also *prima facie* contrary to Section 35 of the CLND Act, which ousts the jurisdiction of civil courts for liability claims under the Act. Section 35 contains a familiar ouster clause which excludes jurisdiction of ordinary civil courts for claims that can be brought under the Act.<sup>155</sup> This clause is an established feature of all special legislations that set up dedicated mechanisms of dispute resolution in targeted areas.<sup>156</sup> However, it is pertinent to note that Section 35 begins with the words, 'Save as otherwise provided in Section 46', a prefatory clause, that was absent in the original draft bill but was brought in by the Cabinet Amendments on 20 August 2010.<sup>157</sup> This clause appears to specifically save the jurisdiction of the civil court for cases under Section 46. The language of this clause flows from a Standing Committee recommendation that suggested that all 'legal remedies available to the victims should be dealt together.'<sup>158</sup> This inference is also discernible from the fact that the other change that was made in the section was to specifically save the jurisdiction of the Supreme Court and High Courts as recommended by the Committee.<sup>159</sup>

It should be pointed out that the basis for the Committee's recommendation for the inclusion of the said clause in the CLND Act is perplexing. According to the Standing Committee, both Clauses 35 and 46 were included into the CLND Act to deal with remedies for victims but 'deal with them separately'.<sup>160</sup> It is unclear what this means since Section 35 provides the legal framework for

<sup>154</sup> CSC, Articles V & VII of the Annex; See IAEA Explanatory Texts (n 25).

<sup>155</sup> CLND Act, s 35 states that:

*Save as otherwise provided in section 46, no civil court (except the Supreme Court and a High Court exercising jurisdiction under articles 226 and 227 of the Constitution) shall have jurisdiction to entertain any suit or proceedings in respect of any matter which the Claims Commissioner or the Commission, as the case may be, is empowered to adjudicate under this Act and no injunction shall be granted by any court or other authority in respect of any action taken or to be taken in pursuance of any power conferred by or under this Act.*

<sup>156</sup> *The Premier Automobiles Ltd. V. Kamlekar Shantaram Wadke of Bombay and Ors.*, AIR 1975 SC 2238, paras 20-21, 26; *K.S. Venkataraman & Co. v. State of Madras*, AIR1966SC1089, paras 7, 16, 43.

<sup>157</sup> Standing Committee Report on the CLND Bill (n 3); Lok Sabha Debate on the CLND Bill, Rajya Sabha Debate on the CLND Bill (n 5).

<sup>158</sup> Standing Committee Report on the CLND Bill (n 3).

<sup>159</sup> Ibid.

<sup>160</sup> Ibid.

adjudicating disputes under the CLND Act, whereas Section 46 deals (ostensibly) with claims which can be made under other Acts. Therefore, since the two provisions pertain to distinct issues, their conflation leads to considerable confusion. This is because the effect of these words is to specifically allow for claims, as may be allowed by Section 46, to be filed before the civil court.<sup>161</sup>

## B. THE CORE ISSUE: SECTION 46

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Section 46 contains two parts. The first part is a standard provision, often seen in statutes, that underlines the fact that the provisions of the statute are in addition to other laws in force.<sup>162</sup> This does not however imply that the CLND Act cannot override other Acts in cases of inconsistency. That would be contingent on standard principles of statutory interpretation (for other central statutes) and determination of legislative competence (for any potentially conflicting state statutes).<sup>163</sup> Further, the statutory principle which contemplates special statutes to override general statutes, is also of relevance in the context of the CLND Act.<sup>164</sup> The CLND Act would arguably prevail over general statutes or general provisions of law, as it is a special statute designed specifically for providing civil liability in case of nuclear damage. The second part of Section 46 is more complex and requires detailed scrutiny.

### 1. CONCURRENT PROCEEDINGS AGAINST OPERATORS UNDER OTHER LEGISLATIONS EXCLUDED

The second part of Section 46 specifically provides that nothing in the section would prevent proceedings other than those which can be brought under the Act, to be brought against the operator. This serves two clear purposes— first it provides by abundant caution, that any criminal proceedings against the operator would not be excluded by the operation of the Act. This is an unarguable proposition - a statute setting up a special mechanism for civil damages cannot by implication exclude criminal liability against any person who may be found so liable.<sup>165</sup> Second, it

<sup>161</sup> The expression ‘save as otherwise provided by or under the Act’ has been interpreted to mean, ‘save as otherwise expressly barred by or under the Act’. See *State of Rajasthan & Ors. v. Shri Noor Mohammad*, AIR1973SC2729, para 8; See also *Lalu Prasad Yadav v. State of Bihar and Ors.*, AIR 2010 SC 1561, paras 25-30, 35-37.

<sup>162</sup> *State of Karnataka v. Vishwabarathi House Building Coop. Society &Ors.*, (2003) 2 SCC 412, para 57-60; *P.C. Joshi &Anr. v. The State of Uttar Pradesh*, AIR 1961 SC 387, para 7.

<sup>163</sup> *Sri. B.S. Yeddyurappa v. Sri. Sirajin Basha*, 2014CriLJ1469, paras 54, 114; *Life Insurance Corporation of India v. D.J. Bahadur and Ors*, AIR1980 SC 2181, paras 9-10, 57, 71, 153; *Prof. S.N. Hegde v. The Lokayukta and Ors.*, ILR 2004 KARNATAKA 3892, paras 24, 26, 54, 58.

<sup>164</sup> Singh (n 80) 147.

<sup>165</sup> All the other environmental legislations such as the Atomic Energy Act, 1962, Water (Prevention and Control of Pollution) Act, 1974, Air (Prevention and Control of Pollution) Act, 1981, Environment (Protection) Act, 1986 and others provide for criminal sanctions against persons who pollute the environment or not observe strict standards of pollution control as set out by the rules and guidelines under these legislations.

also implies that any proceedings which can be brought against the operator under this Act must be brought under the special mechanism set up under it. This proposition therefore bars the possibility of filing compensation claims in a civil court as those claims are incorporated within the purview of the special mechanism under the Act itself. From a combined reading of the two parts to Section 46 and Section 35, it is thus clear that though theoretically, other provisions of law relevant to liability in case of a nuclear accident continue to govern a nuclear incident and allow for claims to be brought before a civil court, such claims in practice will be excluded, since they can also be brought under the CLND Act.

## 2. CLAIMS AGAINST SUPPLIERS BY VICTIMS NOT EXPRESSLY EXCLUDED

Crucially however, this statutory position fails to exclude claims that can be directly brought by victims against suppliers for nuclear damage. Currently the CLND Act under Section 4 read with Sections 9 and 14 allows those seeking compensation having suffered nuclear damage to make a claim against the operators. However, these provisions are silent on claims made by victims against suppliers who may be at fault for the particular nuclear damage caused. At the same time, Section 46 does not expressly, or otherwise, prohibit the institution of such claims either. This interpretation thus exposes the nuclear suppliers to potentially unlimited amounts of liability under ordinary principles of tort law.<sup>166</sup>

Even if it is argued that the scheme of the Act, if not in its letter, makes it clear that the principle of legal channelling along with claims for nuclear damage can only be directed against the operator and not the supplier, it will be important to understand the substance of claims which can be filed under this Act. This is determined by the definition of ‘nuclear damage’ in Section 2(g). As discussed above, though the types of loss covered by the definition and consequently capable of being brought under this Act are wide, several types of losses are contingent on the Central Government making a notification of the extent to which they are so covered.<sup>167</sup> Thus, if the Central Government fails to notify any particular type of loss, it will not be possible to bring claims pertaining to that type of loss under this Act. In such instances, both operators as well as suppliers would be liable for the same under ordinary principles of tort law.<sup>168</sup> While addressing this issue for

These legislations also provide for fines which may be incurred by the responsible persons to assist the government in environmental restoration. These fines are not excluded by the application of the impugned provision; See for principle on simultaneous civil and criminal proceedings, *P. Swaroopa Rani v. M. Hari Narayana*, AIR 2008 SC 1884, paras 11-12; *Pattabhirama China Govinda Charyulu v. P. Seshagiri Rao*, AIR 1941 Mad 860; *Asoke Kumar Sarkar & Anr. v. Radha Kanto Pandey*, AIR 1967 Cal 178, paras 22-23.

<sup>166</sup> Addendum to the PLBS Briefing Document (n 58); Norbert Pelzer, Göttingen, ‘The Indian Civil Liability for Nuclear Damage Act, 2010 – Legislation with Flaws?’, [http://www.kernenergie.de/kernenergiewAssets/docs/fachzeitschriftatw/2011/atw2011\\_01\\_pelzer\\_indian\\_civil\\_liability.pdf](http://www.kernenergie.de/kernenergiewAssets/docs/fachzeitschriftatw/2011/atw2011_01_pelzer_indian_civil_liability.pdf) accessed 26 September 2014.

<sup>167</sup> CLND Act, s 2.

<sup>168</sup> Hariharan (n 22); Addendum to the PLBS Briefing Document (n 58); Pelzer (n 166).

operators would require a vigilant government that notifies certain types of loss proactively as constituting nuclear damage, suppliers cannot benefit from such notification.

### 3. PRINCIPLE OF LEGAL CHANNELLING NOT CLEARLY ENSHRINED

Foisting suppliers with such liability is problematic in principle and practice. In principle it militates against the principle of legal channelling of liability that the CLND Act is designed to set up.<sup>169</sup> If suppliers are to be held liable under ordinary principles of tort law, the rationale of legal channelling of liability to the operator for expeditious compensation is irreparably harmed.<sup>170</sup> Even if it is seen as supplementary to proceedings under the CLND Act, there are no merits to having such a supplementary provision. This is because the Act ensures that no person is left uncompensated.<sup>171</sup> Section 6 provides a liability cap on the operator, beyond which the government will be liable to take measures to ensure compensation is provided. Thus, such supplementary proceedings are not necessary from the point of view of compensating victims.

The only redeeming feature of the provision, it might be argued, is that it upholds public policy of holding those at fault liable (in case the incident occurs on account of the fault of the supplier).<sup>172</sup> While this is true in principle, the Act accommodates such an interest by allowing operators to have recourse against suppliers in such situations under Section 17(b).<sup>173</sup> There is, therefore little merit in extending this rationale to allow direct claims against suppliers.

On the contrary, there is a clear demerit to such an extension. The possibility of such liability on suppliers under ordinary principles of tort law keeps them open to potentially unlimited amounts of liability. Such a possibility would lead to difficulties in the suppliers taking out insurance to cover any future liability costs that they might incur on account of claims by victims. This is discussed briefly in section V of the Report. These developments would therefore discourage foreign investors from supplying to the Indian nuclear industry, an eventuality that will cost the economy and the Indian nuclear industry itself.<sup>174</sup> At the same time, it will make it prohibitive for Indian suppliers to remain engaged in this business. The economics of this point are self-evident and require no further

<sup>169</sup> Preamble, CLND Act; Lok Sabha Debate on the CLND Bill, Lok Sabha Discussion on the CLND Bill, Rajya Sabha Debate on the CLND Bill (n 5).

<sup>170</sup> Ameye (n 44) 44-45.

<sup>171</sup> CLND Act, s 9(1).

<sup>172</sup> Vardarajan, Hariharan (n 22).

<sup>173</sup> CLND Act, s 17(b).

<sup>174</sup> Hariharan (n 22) 252; Ameye (n 44).

explanation.<sup>175</sup> Hence, if nuclear energy in India is to be operationalised, it is imperative that the CLND Act is amended to specifically exclude such claims against suppliers.

### C. SUMMARY OF FINDINGS:

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There are two clear inferences from the analysis in this section of the Report:

1. The interplay of provisions pertaining to liability under this Act and other Acts is unnecessarily complex and unwieldy. This requires simplification.
2. The possibility of direct tortious claims by victims against suppliers is not excluded by the provisions of this Act. To make nuclear energy viable in India, this requires amendment.

### D. RECOMMENDATIONS

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The Report makes the following recommendations with regard to the concurrent and tortious liability of operators and suppliers:

1. The proviso to Section 5(2) should be deleted as it serves no purpose and finds no mention in the relevant articles of CSC on which it is supposed to be based.
2. Section 9 should insert the word ‘only’ after the word ‘compensation’ in order to clarify that the victims who suffer on account of nuclear damage can institute claims for compensation under the provisions of the CLND Act only and not by having recourse to other legislations or Courts.
3. Section 46 should be limited to criminal liability provisions only since the CLND Act is a special legislation, specifically enacted to entertain civil liability claims for nuclear damage. Hence, the CLND Act should bar recourse to civil claims outside its purview.
4. The phrase ‘Save as otherwise provided in Section 46’ should be deleted from the language of Section 35, as it creates confusion and does not add to the meaning of the said provision.
5. Relevant notifications regarding ‘extent of nuclear damage’ under Section 2(g) ought to be issued to provide clarity on the scope of the application of the CLND Act, which would then in turn also provide the necessary assistance in interpreting the other provisions of the Act.

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<sup>175</sup> See ‘International Problems of Financial Protection against Nuclear Risk’, A study under the auspices of Harvard Law School and Atomic Industrial Forum Inc. (Cambridge, 1959).

## IV. LIABILITY AND ISSUES OF COST

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Section 17(b) of the CLND Act and the issue of liability in general has generated much debate over its relation to costs - both in terms of its impact on the costs of nuclear power projects, as well as the extent to which these costs may be passed through to electricity tariffs, potentially affecting the competitiveness of nuclear power. However, given the heterogeneity of cost structures in the nuclear power sector across countries, the evidence on the precise impacts of liability legislation on costs is mixed.

This section analyses the issue of liability and costs, and is organised in three parts. The first part looks at the structure of costs for civilian nuclear power projects and trends in these costs, drawing from international experience. It then places India's experience within this context.<sup>176</sup> It also looks at the cost of nuclear power in relation to other fuel technologies, and again places India's energy sector within this context.<sup>177</sup> The second part looks at pathways through which the costs of liability could affect the development of nuclear power, and considers mechanisms set up by other countries to deal with these costs. The third part looks at the issue of liability and costs within the framework of the CLND Act, specifically relating to Sections 7 and 8.

## A. ISSUES IN THE ESTIMATION OF NUCLEAR COSTS

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### 1. NUCLEAR COSTS ARE HETEROGENOUS & DIFFICULT TO ESTIMATE WITH ACCURACY

Of all existing commercial fuel generation technologies, nuclear power is arguably one of the most difficult to evaluate on costs. This is because of two factors: first, the heterogeneity of market structures within which nuclear power generation has evolved, and second, the predictive rather than historical nature of cost estimation.

To illustrate the first factor, one can consider the cases of the two countries where nuclear power was adopted in different institutional frameworks: France and the US. In France, where roughly 80% of electricity is generated from nuclear energy, a highly centralised, state-controlled institutional structure of the sector/industry has led to different cost structures from that of the US (roughly 20% nuclear), where nuclear power developed within competitive or semi-competitive markets for power generation. Investment risks were therefore primarily borne by the state in France, whereas in the US, they were borne by investors who built and operated nuclear power generation plants. This meant that cost information disclosures were different in the two countries: despite starting its civilian nuclear energy programme in the early 1970s, France published its first comprehensive

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<sup>176</sup> It considers the broad economics and does not go into detailed discussion on differences in reactor technology. For a discussion of the latter, refer to MV Ramana, 'Why India's electricity is likely to remain in short supply: The Economics of Nuclear Power' (2013) 69 Bulletin of the Atomic Scientists, 67-78.

<sup>177</sup> Experience to date in civilian nuclear energy comprises 15,000 reactor years of commercial operation in 33 countries. See World Nuclear Association, *Nuclear Power in India*, (2014) <http://www.world-nuclear.org/info/Country-Profiles/Countries-G-N/India/> accessed 3 September 2014.

document on nuclear energy costs in 2000 in the Charpin-Dessus-Pellat Report<sup>178</sup> specially commissioned by then Prime Minister Lionel Jospin.<sup>179</sup> In comparison, periodic data on US nuclear energy costs has been published by the US Energy Information Administration.

This is not meant to imply that either institutional framework (centralised or market oriented) can give rise to more accurate data reporting, as there are problems inherent in the method of costing *per se* - this leads to the second factor. Given the rapidly changing structure of the electricity sector, and the adoption of climate change mitigation measures, historical data cannot be extrapolated beyond a certain degree without making assumptions regarding the future (for instance on carbon prices or binding emissions reduction targets). In fact, data are rarely informed by the concrete, historical record of nuclear costs in the real world; they are always forecasts of future performance.<sup>180</sup> Most studies estimating the potential costs of nuclear power rely on non-transparent engineering cost calculations from industry sources rather than parameters based on actual experience. Additionally, much of this data is provided by vendors, who might have incentives to misrepresent their costs so as to maximise their chances of commercial success<sup>181</sup>. This *moral hazard* problem is especially relevant as developing countries seek to transition their electricity sectors from centrally planned to market-oriented systems, shifting investment risks from the state (or public sector) to investors.

Although much work has been done over the last four decades to attempt to standardise nuclear plant costing, there is still no internationally agreed definition of capital costs for nuclear power stations, and most analyses of nuclear power lack a basis in microeconomics.<sup>182</sup> The one conclusion that may be drawn on costs is that they are *uncertain*; this is reflected in a range of cost estimates in the literature, driven by variation in construction and financing costs.<sup>183</sup> The notion of *levelized cost* - defined as annuitized capital cost (including decommissioning) plus operating costs, is frequently used to compare fuel generation technologies. It is useful to discuss the components of cost and the drivers of cost to arrive at a meaningful interpretation of nuclear costs.

### (a) COMPONENTS OF COST

There are four major components of the cost of nuclear power<sup>184</sup>:

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<sup>178</sup> Refer to the authors commissioned to write the report: Jean-Michel Charpin, Benjamin Dessus and René Pellat, *Report to the Prime Minister: Economic Forecast Study of the Nuclear Power Option*, July 2000, <[http://fire.ppl.gov/eu\\_fr\\_fission\\_plan.pdf](http://fire.ppl.gov/eu_fr_fission_plan.pdf)> accessed 30 September 2014.

<sup>179</sup> A. Grubler, 'The costs of the French nuclear scale-up: A case of negative learning by doing', (2010) 38 Energy Pol'y, 5174-5188.

<sup>180</sup> G. MacKerron, 'Nuclear costs - why do they keep rising' (1992) 20 Energy Pol'y, 641-652.

<sup>181</sup> I. Kessides, 'Nuclear power: Understanding the economic risks and uncertainties,' (2010) 38 Energy Pol'y, 3849-3864.

<sup>182</sup> Kessides (n 181).

<sup>183</sup> D. Kennedy, 'New nuclear power generation in the UK: Cost benefit analyses, (2007) 35 Energy Pol'y, 3701-3716.

<sup>184</sup> Kessides (n 181).

- *Capital or construction costs* - incurred during the planning, preparation and construction of a new nuclear power station
- *Operations and maintenance (O&M) costs* - related to administration, management, support and upkeep of a power station (labour, material and supplies, capital upgrades and additions, spares, insurance, security, planned maintenance and contractor services, licensing and regulatory fees, and corporate overhead costs)
- *Fuel costs* - reflecting the cost of fuel for the power station
- *Back end costs* - related to the decommissioning and dismantling of nuclear facilities at the end of their operating life, and the long term management and disposal of radioactive waste.<sup>185</sup>

In addition, given the current focus on climate change mitigation, some estimations of power generation costs take into account a further component:

- *Carbon costs* - related to a carbon price on emissions. However, this is negligible for nuclear power; further, most developing countries have not adopted a carbon price.

The calculation of projected generation costs for a nuclear power plant includes the above components. Additionally, an appropriate discount rate is applied to obtain the present value of costs. The levelized cost of power generation is therefore equal to the present value of the sum of discounted costs divided by the total production adjusted for its economic time value.

In 2010, the International Energy Agency ('IEA') published a survey of comparative cost projections for power generation from different fuels covering 190 power plants in 21 countries (OECD and non-OECD)<sup>186</sup>, based on the methodology above, and using two different discount rates - a 'high' case (10%) and a 'low' case (5%). The median results for nuclear power generation plants, including the median levelized cost of electricity ('LCOE'), as well as the overnight costs of construction<sup>187</sup>, are in Table 1.<sup>188</sup> The overnight cost of construction in the 2010 IEA study,<sup>189</sup> at \$4,101/KWh, are roughly equivalent to those published in a seminal MIT study from 2007, which places overnight costs at \$4,000/Kwh.<sup>190</sup>

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<sup>185</sup> Techniques for the disposal of waste have not been perfected.

<sup>186</sup> The study did not include India.

<sup>187</sup> The overnight cost is the present value cost that would have to be paid as a lump sum up front to finance a construction project - it is useful in estimating the 'lumpiness' of capital investments.

<sup>188</sup> The descriptive statistics to the Table are in Appendix 1

<sup>189</sup> International Energy Agency, *Projected Costs of Generating Electricity*, 2010 <[http://www.iea.org/publications/freepublications/publication/projected\\_costs.pdf](http://www.iea.org/publications/freepublications/publication/projected_costs.pdf)> accessed 30 September 2014.

<sup>190</sup> MIT (2007) Update of the MIT 2003 Future of Nuclear Power - An Interdisciplinary MIT Study. The 2003 study estimated overnight costs at \$2,000/KWh.

**Table 1: Median Cost of Nuclear Power Generation, 2010**

Median Case Specifications	Nuclear Power
<b>Capacity (MW)</b>	1,400
<b>Owner's and construction</b>	3,681.07
<b>Overnight cost (\$/kW)</b>	4,101.51
<b>O&amp;M (\$/MWh)</b>	14.74
<b>Fuel cost (\$/MWh)</b>	9.33
<b>Carbon cost (\$/MWh)</b>	0.00
<b>Efficiency (net, LHV)</b>	33%
<b>Load factor</b>	85%
<b>Lead time (years)</b>	7
<b>Expected lifetime (years)</b>	60
<b>LCOE at 5% discount rate (\$/MWh)</b>	<b>58.53</b>
<b>LCOE at 10% discount rate (\$/MWh)</b>	<b>98.75</b>

Source: IEA (2010, 103)

Capital or construction costs, also known as investment costs, typically represent 60% of the total cost of nuclear power, while O&M and fuel costs account for 20% each<sup>191</sup>.

### (b) DRIVERS OF COST

Generally, the economics of a nuclear plant are determined by three main drivers:

- The discount rate
- The capital costs of construction
- The operating performance

Of these, some studies suggest that the discount rate is the most important influencing factor<sup>192</sup>- this is evident in Table 1 in terms of the increase in the levelized cost of energy at a higher discount rate. Typically, governments have lower discount rates than private investors - this is because governments evaluate investment opportunities using the social rate of return, which takes into consideration socio-economic and welfare objectives from investments which recognizably take longer to achieve, whereas private (or corporate) investors would primarily be looking for an appropriate risk-adjusted return on their investments.

There is an additional dimension to the concept of ‘risk’ in relation to nuclear energy as compared with fossil fuel or renewable technologies - a distinction can be drawn against ‘risk’ and ‘uncertainty’, where ‘risk’ involves randomness with known probabilities, and ‘uncertainty’

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<sup>191</sup> Kessides (n 181).

<sup>192</sup> MacKerron (n 180).

involves randomness with unknown probabilities.<sup>193</sup> Nuclear accidents are more likely to fall under ‘uncertainty’ - which we could also term ‘non-market risk’. The fact that there is no generally accepted definition of what constitutes a ‘severe accident’ makes this non-market risk harder to quantify<sup>194</sup>. Nevertheless, some of the literature makes an attempt to do so.<sup>195</sup><sup>196</sup>

Further, discount rates may be affected by factors outside the direct control of investors or governments,<sup>197</sup> such as conditions in world financial markets - indeed in some cases the long term rate of interest is used to discount investments.

Capital costs and operating performance are stated in the literature to be of roughly equal importance in determining nuclear costs.<sup>198</sup> Construction times have been seen to be in direct correlation with capital costs, and hence the longer the construction times, the higher the expected costs.<sup>199</sup> Operating cost is taken to include the costs of regulatory stringency.<sup>200</sup>

### (c) TRENDS IN COSTS

Although there are no benchmark international standards for the determination or evaluation of nuclear costs, there have been numerous published academic assessments of trends in capital costs in various countries. These are qualified by the type of data that is available, and it should be noted that detailed disaggregated data on nuclear costs is very difficult to obtain.

The main observation underpinning these assessments is that actual costs have almost always exceeded estimated or projected costs of the construction and operation of nuclear power plants. Further this has been by a much larger amount in some countries (such as the US) than in others (such as France). This has been a trend throughout the period during which large scale nuclear power generation has been in existence (from around the 1970s onwards). This is contrary to the commonly-held view that the scaling up of a technology will ultimately lead to falling costs due to economies of scale.

<sup>193</sup> Kessides (n 181).

<sup>194</sup> Ibid.

<sup>195</sup> Hirschberg et al (1998) consider an accident to be severe if it entails one or more of the following: (i) at least 5 fatalities (ii) at least 10 injured (iii) at least 200 evacuees (iv) extensive ban on food consumption (v) release of hydrocarbons in excess of 10,000 tons (vi) forced clean-up of an area of land or water in excess of 25 km<sup>2</sup> and (vii) economic loss of at least 5 million (Kessides (n 181)). The International Nuclear and Radiological Event scale (INES) was developed in 1990 by the IAEA and the OECD. It has seven levels: levels 4-7 are termed ‘accidents’ and levels 1-3 are termed ‘incidents’. There are further sub-classifications within these levels (Balachandran (n 61)).

<sup>196</sup> Studies on the causes of the Chernobyl accident have concluded that it was the result of faulty design (of control rods and coolant channels), lack of a containment structure and lack of a stringent ‘safety culture. See International Nuclear Safety Group (INSAG), *INSAG 7: The Chernobyl Accident - Update of INSAG 1*, (1992) International Atomic Energy Agency, Vienna <[http://www-pub.iaea.org/MTCD/publications/PDF/Pub913e\\_web.pdf](http://www-pub.iaea.org/MTCD/publications/PDF/Pub913e_web.pdf)> accessed 30 September 2014.

<sup>197</sup> MacKerron (n 180).

<sup>198</sup> Ibid.

<sup>199</sup> MacKerron (n 180); Kessides (n 181).

<sup>200</sup> MacKerron (n 180).

A cost escalation of 5% per annum for the French Pressurised Water Reactor (PWR) programme was found between 1974 and 1984, and an escalation of 6% between 1984 and 1990.<sup>201</sup> The same study finds high cost escalations even for the indigenous French ‘N4’ reactor designs between 1974 and the post 1990 period. The operating costs for the French programme remained essentially flat between 1985 and 2000, which is remarkable given the increasing need for load modulation in a system in which base load technology such as nuclear supplied 80% of electricity.<sup>202</sup>

Boccard finds instead that the capital costs of power in France grew at a lower yearly rate of 2.1%, which is nevertheless in contrast with the US where capital cost escalation was 19% for the same period.<sup>203</sup> The same study also finds a correlation between the cost per unit of power at the plant level and construction duration for the whole plant of 80% for France, and 76% for the US. Both studies imply that the projections for France, although higher than actual costs, were nonetheless more accurate than cost projections for the US.

MacKerron finds that capital cost escalations for the US<sup>204</sup> can be attributed to regulatory uncertainty in the period between 1970 and 1990. In the UK, in real terms the per kW capital cost of the Torness power station (1988) was 124% higher than that of Hunterston B completed a decade earlier.

In the UK, the Sizewell B nuclear power station (which began generating in 1995) experienced cost escalations which took the leveled cost to £60/MWh (~\$100/MWh)<sup>205</sup> - these have been attributed mainly to costly design changes imposed by the regulatory authorities during the construction process.<sup>206</sup> However, the authorities nevertheless stated that future costs would be considerably lower (£22-38/ MWh) going forward due to improvements in regulation and project management techniques, plus the involvement of the private sector which has better incentives to control costs.<sup>207</sup> This has not yet occurred.

To reiterate, the main observations from the literature assessing trends in nuclear costs is that actual costs have tended to be higher than projected costs - but despite this, ‘appraisal optimism’ continues to prevail in cost projections for the future. The evidence on the role of institutional structures in influencing cost trends is mixed. For instance, cost escalations in France where nuclear power was developed in the public sector were lower than those in the US. However, the

<sup>201</sup> Grubler (n 179).

<sup>202</sup> Ibid.

<sup>203</sup> N. Boccard, ‘The cost of nuclear electricity - France after Fukushima’, (2014) 66 *Energy Policy*, 450-461.

<sup>204</sup> On a per kW and constant price basis, reactors started in the 1974-77 period were almost 3.6 times as expensive as those started in 1966-67 (MacKerron (n 180)).

<sup>205</sup> At current exchange rates.

<sup>206</sup> Kennedy (n 183).

<sup>207</sup> Ibid.

Sizewell B project in the UK, which was a public sector project, nevertheless experienced cost escalations. Finally, the literature appears to show that regulation influences costs.

## 2. NUCLEAR COSTS IN INDIA REFLECT THESE GENERAL TRENDS

The costs of civilian nuclear power projects in India can be analysed against the context set out above. The current installed generation capacity of nuclear power in India is 5,780 MW, comprising roughly 2% of India's total installed capacity of 237,743 MW (this includes Kudankulam).<sup>208</sup> Out of total nuclear installed capacity, 1,840 MW runs on imported uranium.<sup>209</sup> A further 3,000 MW of capacity is scheduled to begin commercial operations over the next 2 years through bilateral trade agreements.<sup>210</sup>

Appendix 2 shows some total cost estimates for nuclear power - it should be noted that due to the general unavailability of official disaggregated data, these should be considered approximations. Adjusting for inflation, the cost per kW for three projects for which commercial operations began in the last decade is expressed in 2013 prices in Table 2.

**Table 2: An Illustration of Costs of Nuclear Power Projects in India<sup>211</sup>**

Name	Capacity (MW)	Date of Commercial Operation	Real Cost in 2013 prices (\$ Mn)	Real Cost in 2013 prices (\$ / KW)
Tarapur Atomic Power Station Units 3 & 4	1,080	2006	590	546
Rajasthan Atomic Power Station Units 5& 6	440	2010	314	714
Kaiga Generating System 3 & 4	440	2011	419	953

Source: NPCIL; Author's calculations; Note: Numbers are meant to be strictly representative only, due to the lack of publicly available official/accurate data

<sup>208</sup> Central Electricity Authority, *Power Sector Executive Summary for the Month of February 2014*, (2014) Government of India <[http://www.cea.nic.in/reports/monthly/executive\\_rep/feb14.pdf](http://www.cea.nic.in/reports/monthly/executive_rep/feb14.pdf)> accessed 3 September 2014.

<sup>209</sup> Department of Atomic Energy, *Nuclear Power Generation*, (2014) Lok Sabha Unstarred Question No. 2906, Government of India <[http://dae.nic.in/writereaddata/parl/budget2014\\_2/lsus2906.pdf](http://dae.nic.in/writereaddata/parl/budget2014_2/lsus2906.pdf)> accessed 3 September 2014.

<sup>210</sup> Appendix 2 contains further details of nuclear power plants, including total capacity and total costs (based on available data). To our knowledge and as per our efforts thus far, there is no publicly available official data on the disaggregated costs of nuclear power. Data cannot therefore be used to compute differences with and without supplier liability, based on the three pathways outlined in Section B.1.

<sup>211</sup> A price index was obtained from the Office of the Economic Adviser, available at [http://www.eaindustry.nic.in/download\\_data\\_0405.asp](http://www.eaindustry.nic.in/download_data_0405.asp). The price series was rebased to 2013 as the base year. We use the date of the start of commercial operations as the indicative year for applying the price index. We use current market exchange rates where \$1= Rs. 60.

The figures in Table 2 give a range of estimates from \$546-\$953 per kW for the costs of nuclear power. The Nuclear Power Corporation of India Limited's ('NPCIL') estimate is \$1,500 per kW.<sup>212</sup> Cost estimates reported by the Atomic Energy Commission are \$1,200 per kW for Tarapur 3 & 4 and \$1,300 per kW for Kaiga 3 & 4. Additionally, it reports a higher cost estimate of \$1,700 per kW for reactors in Gujarat and Rajasthan, which are due to begin commercial operations in 2015/16.<sup>213</sup>

Cost overruns have been reported for forthcoming nuclear power plants, for example the cost for Kudankulam Units 1 & 2 rose from Rs. 13,171 crore to Rs. 17, 270 crore (an increase of \$680 Mn at current exchange rates). Cost overruns have also been reported on past nuclear power projects<sup>214</sup> indicating that India could be susceptible to the same 'appraisal optimism' and upward trend in costs that has characterised international experience thus far.

In contrast, the 2010 IEA estimate for the average international cost of nuclear power is \$4,000 per KW, implying a very large cost differential with India. This broad comparison implies two things: first, that given decades of trade isolation have required the use of indigenous technology and materials to develop nuclear power in India, the costs of imported technology are likely to be higher. And second, the components of legislation which relate to the operator's right of recourse to the supplier for liability for nuclear damages - namely, Section 17(b), Rule 24 and Section 46 of the CLND Act, which have been analysed previously in this Report<sup>215</sup> - add to the general uncertainty over the costs of nuclear power.

### 3. THE COMPETITIVENESS OF NUCLEAR POWER VIS-À-VIS OTHER FUELS

Despite the cost differentials described above, the relevance and effectiveness of nuclear energy in a country is contingent upon its competitiveness with other fuel sources, which is in turn influenced by broader energy policy objectives of the government.

#### (a) COMPARATIVE COSTS AND PRICE VOLATILITY

Whilst construction costs form the largest proportion (roughly 60%) of nuclear costs, operating costs are relatively lower than the three major fossil fuel based technologies - oil, gas and coal. In contrast, fuel costs form a very high proportion of costs of oil and gas based power, whereas renewables once again have a high capital cost but relatively low operating cost. The 2010 IEA study on comparative projected costs of power generation from different fuels<sup>216</sup> for the year 2015 includes a median case for six different categories/technologies. These costs, shown in Table 3, support this observation on comparative costs - for instance, the cost of fuel for gas based power is \$61/MWh compared with \$9/MWh for nuclear power.

<sup>212</sup> World Nuclear Association (n 177).

<sup>213</sup> Ibid.

<sup>214</sup> Ibid.

<sup>215</sup> See Sections II and III of this Report.

<sup>216</sup> The study assumes a carbon price of \$30 per tonne of carbon, applicable to coal and gas.

**Table 3: Comparative Median Costs of Power Generation Estimated by the IEA, 2010**

Table 6.1: Median case						
Median case specifications	Nuclear	CCGT	US/USC coal	Coal w/90%CC(S)	Onshore wind	Solar PV
Capacity (MW)	1 400.0	480.0	750.0	474.4	45.0	1.0
Owner's and construction	3 681.07	1 018.07	1 915.65	3 336.96	2 236.80	5 759.35
Overnight cost (\$/kW)*	4 101.51	1 068.97	2 133.49	3 837.51	2 348.64	6 005.79
O&M (\$/MWh)	14.74	4.48	6.02	13.61	21.92	29.95
Fuel cost (\$/MWh)	9.33	61.12	18.21	13.04	0.00	0.00
CO <sub>2</sub> cost (\$/MWh)	0.00	10.54	23.96	3.22	0.00	0.00
Efficiency (net, LHV)	33%	57%	41.1%	34.8%	-	-
Load factor (%)	85%	85%	85%	85%	26%	13%
Lead time (years)	7	2	4	4	1	1
Expected lifetime (years)	60	30	40	40	25	25
LCOE (\$/MWh)	5%	58.53	85.77	65.18	62.07	96.74
	10%	98.75	92.11	80.05	89.95	410.81
					137.16	616.55

\*Overnight costs include owner's, construction and contingency costs but exclude IDC.

Source: IEA (2010, 103); Note: LCOE - *levelized cost of electricity*

Further, Table 3 shows that the load factor for nuclear power, which is the percentage of plant capacity that is continuously utilised at any point in time, is 85% compared with 26% for onshore wind and 13% for solar PV. This is because most forms of renewable energy are intermittent<sup>217</sup> and therefore backup generation must exist to provide a continuous supply of power.<sup>218</sup> However, the lead time to completion for nuclear power projects - which is 7 years - is much longer than any of the other technologies.

Table 4 shows a qualitative comparison of different fuel generation technologies on seven key parameters.

**Table 4: Qualitative Comparison of Generation Technologies**

Technology	Unit size	Lead time	Capital cost (kW)	Operating cost	Fuel prices	CO <sub>2</sub> emissions	Regulatory risk
CCGT	Medium	Short	Low	Low	High	Medium	Low
Coal	Large	Long	High	Medium	Medium	High	High
Nuclear	Very large	Long	High	Medium	Low	Nil	High
Hydro	Large	Long	Very high	Very low	Nil	Nil	High
Wind	Small	Short	High	Very low	Nil	Nil	Medium
Recip. engine	Small	Very short	Low	Low	High	Medium	Medium
Fuel cells	Small	Very short	Very high	Medium	High	Medium	Low
Photovoltaics	Very small	Very short	Very high	Very low	Nil	Nil	Low

Source: Kessides (n 181).

A key determinant of the competitiveness of different fuels is *price volatility*. For fossil fuel generation, the fuel cost comprises roughly 70% of the cost of electricity to the consumer. Oil

<sup>217</sup> For instance, the wind only blows at certain times during the day or night.

<sup>218</sup> Most countries taken into account in the IEA study have low levels of irradiation - so the load factor for 'sunny' countries like India would potentially be much higher.

prices are famously volatile, responding to political and economic developments fairly flexibly and quickly, and as a result, are hard to predict. Gas prices are similarly volatile, as they are pegged to oil prices in contractual agreements around the world. There is however a transition in progress from oil-linked to hub-based gas pricing in gas contracts, with the development of the US Henry Hub (and potentially the Marcellus Hub in the future) and the UK National Balancing Point as pricing benchmarks. This transition, and the dynamics of hub-based gas pricing, are likely to develop further over time.

Coal currently has the biggest price advantage over all other fuel sources in many developing countries with indigenous reserves, although the cost of uranium is about one-tenth that of coal for equivalent energy.<sup>219</sup> However, the biggest challenge to price stability in coal is the adoption of measures towards binding climate change mitigation targets and the possibility of a mandatory carbon price being imposed either directly by national governments or through multilateral trade mechanisms which put indigenous coal reserves at a disadvantage.<sup>220</sup> A carbon price could therefore render coal uncompetitive.

Renewable energy ranks similar to nuclear in terms of required capital investments, although this is likely to fall as the prices of manufactured components drop and technology advances. But at present, it does not have the ‘scale’ advantages of nuclear power.

Kennedy<sup>221</sup> evaluates the cost-benefit of nuclear power for the UK, and concludes that the welfare balance is positive in a high gas price, low nuclear cost, non-zero carbon price world, and negative in a low gas price, high nuclear cost world - this finding is likely to apply to many other countries.<sup>222</sup>

In line with the general arguments above, data released by the Government of India in Table 5 below shows that nuclear energy in India’s power generation sector (at the costs estimated in Table 2 earlier) is competitive with several other technologies.<sup>223</sup>

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<sup>219</sup>A. Adamantiades and I. Kessides, ‘Nuclear power for sustainable development: Current status and future prospects,’ (2009) 37 Energy Pol’y, 5149-5166.

<sup>220</sup>For instance, the World Bank recently announced that it would stop financing coal fired power projects due to environmental concerns.

<sup>221</sup>Kennedy (n 183)

<sup>222</sup>Ibid.

<sup>223</sup>IEA 2010 (n 189).

**Table 5: Comparative Costs of Power Generation from Different Fuels for India (per Unit of Power)**

	Maximum Tariff (per unit) <sup>224</sup>	Minimum Tariff (per unit)
<i>Pithead coal station</i>	3.19	0.87
<i>Non pithead coal station</i>	5.29	3.32
<i>Lignite station</i>	4.01	2.79
<i>Natural Gas (at administered prices)</i>	3.99	2.66
<i>Natural Gas (at non-administered prices)</i>	4.52	4.23
<i>LNG based station</i>	10.67	8.41
<i>Naphtha/Diesel station</i>	13.01	7.67
<i>Hydro station</i>	5.77	0.86
<i>Wind power</i>	6.00	3.74
<i>Solar Photovoltaic</i>	7.72	-
<i>Concentrated Solar Power</i>	11.88	-
<i>Nuclear power</i>	3.41	0.95

Source: DAE, 2014b

However, the main competing fuel to nuclear is coal, and according to Table 5, nuclear energy is just about able to compete with indigenous coal (the differential is roughly Rs. 0.05 per kW).

It should be noted that the relatively low (in comparison to the international average) estimate of \$1,500 per KW for nuclear power plants provided by the NPCIL has been disputed in some of the literature.<sup>225</sup>on the grounds that it contains implicit subsidies to nuclear power, reflected in the accounting methodology used in official computations of the cost of nuclear power.<sup>226</sup> However, the use of explicit and implicit subsidies in promoting specific technologies, including nuclear, coal and renewables, is not an uncommon practice in India.<sup>227</sup>

<sup>224</sup> We interpret a unit as Rs./Kwh.

<sup>225</sup> See SR Raju and MV Ramana 'Cost of Electricity from the Jaitapur Nuclear Plant', (2013) 48 Econ. & Pol. Weekly 28; A Srinivas and A. Gambhir, 'Nuclear Energy - A Story of Unkept Promises', (2013) 48 Econ. & Pol. Weekly 24.

<sup>226</sup> The primary disagreements range around the cost of 'heavy water' used as inputs, and the methodology used to account for these inputs. For example, Ramana (n 176) argues that the true price of heavy water is 24,880/kg whilst Thakur (2005) maintains that the official government price is half that amount. Similarly, whilst the NPCIL methodology views heavy water as being leased to it by the government at no cost, Ramana (n 176) argues that heavy water should be included as an initial capital expenditure which can then be credited back at the end of the project life. See Sudhinder Thakur, 'Economics of Nuclear Power in India: The Real Picture', (2005) 40 Economic and Political Weekly, 5209-5219.

<sup>227</sup> Although in principle, subsidies in economics are considered to be regressive as they generally end up benefitting the rich, unless they are targeted directly at eligible poorer consumers/ See Paul Segal and Anupama Sen, 'Oil Revenues and Economic Development: The Case of Rajasthan' (2011) Oxford Institute for Energy Studies Working Paper <<http://www.oxfordenergy.org/wpcms/wp-content/uploads/2011/08/WPM-43.pdf>> accessed 1<sup>st</sup> October 2014.

Given the lack of data, a detailed analysis of comparative fuel subsidies is outside the scope of this Report. Given the chronic deficit of electricity in India, however, it is still likely that nuclear power at a higher price could find a market, particularly among industrial and commercial users.

### (b) NUCLEAR ENERGY IN RELATION TO BROADER ENERGY POLICY OBJECTIVES

The adoption of nuclear energy (regardless of the cost issue) is typically underpinned by two broader energy policy objectives of government - the first is energy security, and the second is climate change mitigation via decarbonisation of the electricity sector.

The energy security objective relates to the risk and subsequent economic impacts of fuel supply disruptions. Political events such as the oil embargo of 1973, physical events such as severe weather phenomena, and commercial events such as contractual disputes with exporters can require a country that is a net energy importer to fall back upon its reserves of fuel.<sup>228</sup> Due to the high energy density of nuclear fuel, it is possible for countries to stockpile sufficient imported uranium to operate their nuclear supply systems for many years on the once-through fuel cycle and thus weather any realistic supply disruptions.<sup>229</sup> For instance, the governments of France and Japan (prior to Fukushima) have tenaciously pursued nuclear power on the basis of this argument.<sup>230</sup> Further, uranium is easier to store than other indigenous reserves that may be plentiful - primarily coal. It is four orders of magnitude less mass than the mass of coal for equivalent energy, and unlike coal, it does not degrade (in terms of the quality of combustion) in storage.<sup>231</sup>

The environmental objective relates to climate change mitigation via the reduction of carbon emissions. Nuclear energy is relatively free of carbon emissions. According to the IAEA, the complete nuclear power chain, from uranium mining to waste disposal and including reactor and facility construction costs, emits 30g of carbon dioxide per kWh, compared with over 950g per kWh on average by coal burning plants and just under 450g per kWh by gas fired power plants.<sup>232</sup> This environmental advantage also feed into general economic security. Stern (2007) estimates that the economic impacts of global warming could reduce global GDP by as much as 25%, while greenhouse gas mitigation would cost about 1% of global GDP.<sup>233</sup>

The success of governments in pursuing the nuclear energy option on the basis of both these objectives is either aided or impeded by public perceptions of the risks of nuclear energy. Although there is a general public perception that energy policy must address the three objectives of secure

<sup>228</sup> Organisations such as the IEA were originally founded with a view towards resolving these security of supply risks - its members must mandatorily hold 90 days of fuel stocks in reserve at any time.

<sup>229</sup> Adamantiades and Kessides (n 219).

<sup>230</sup> Ibid.

<sup>231</sup> Ibid.

<sup>232</sup> Ibid.

<sup>233</sup> Ibid.

supply, economic efficiency and environmental protection, the public is often reluctant to accept necessary trade-offs between them.<sup>234</sup>

Although nuclear energy evokes stronger public responses, on record, the number of deaths directly caused by fossil fuel accidents have been relatively higher than those caused directly by nuclear accidents. About 7,500 deaths relating to coal mining occur around the world every year, with 80% of them in China - although this number has been falling.<sup>235</sup> Every year, about \$600 Mn is paid to US miners suffering from pneumoconiosis (black lung disease).<sup>236</sup> It could however also be argued that it is difficult to directly trace the negative health effects of radiation from nuclear accidents and subsequent fatalities - which constitute indirect impacts.

Most studies show that public acceptability of a given level of risk in society is governed by three factors: control of risk, potential for disaster and familiarity.<sup>237</sup> Public attitudes towards nuclear power have diverged and shifted through time all over the world. Whilst these shifts are more consistent over time in some countries (for instance - US public opinion has steadily moved increasingly in favour of nuclear energy since 1993), they are less so in others. The Fukushima accident prompted Germany to shut down its nuclear power capability, whilst France continued to generate 85% of its electricity from nuclear power - some of which may even be imported by Germany to make up for the deficit in supply. The use of legislation to address public concerns about risk is an important and arguably effective factor in encouraging greater acceptability towards civilian nuclear power.

### (c) NUCLEAR ENERGY IN INDIA'S POLICY OBJECTIVES - STRONGER ON ENVIRONMENTAL THAN ENERGY SECURITY GROUNDS

Where does nuclear energy sit in relation to India's broader energy policy goals? India is a net energy importer. It is also an economy with a chronic shortage of electricity, with a peak deficit ranging from 9-12%. With a rising population, roughly half of which lacks access to any form of modern commercial energy, it is clear that India's primary energy demand will continue to rise. The numbers around this are highly uncertain, and range from 'extremely optimistic' - generally in official government forecasts - to 'cautious but confused' - reflected in independent and international agency forecasts. This divergence is due to the changing structure of India's energy sector mirroring a wider shift in the economy - from central planning to greater marketisation, where some parts of the energy sector have prices and quantities set by the Government, and others have them set by demand and supply on the basis of nascent but expanding markets. Due to this shift and the lack of clear price signals, it is very difficult to accurately measure or predict the demand for energy.

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<sup>234</sup> Ibid.

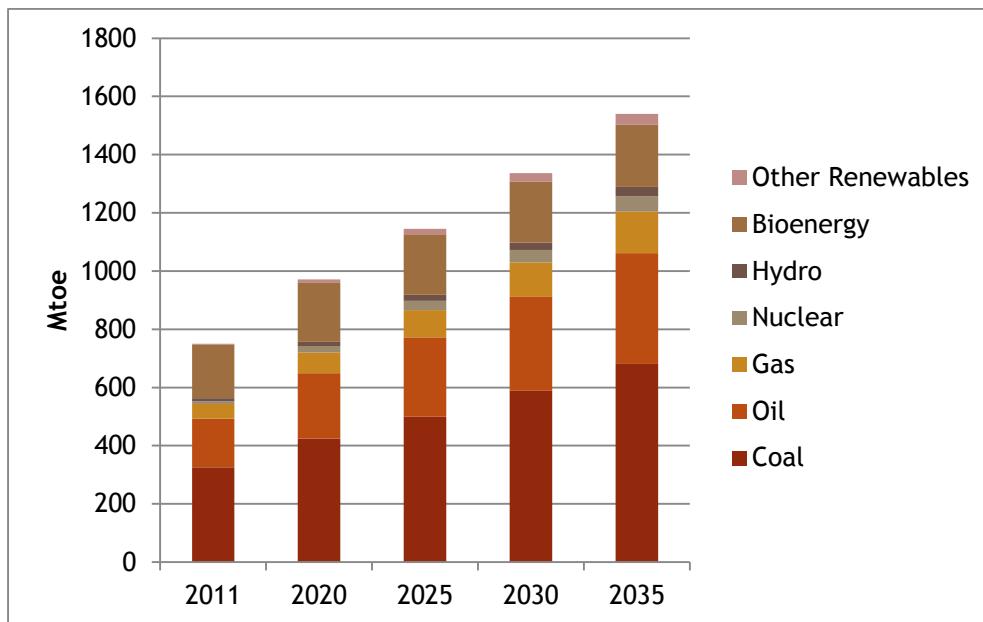
<sup>235</sup> Ibid.

<sup>236</sup> Ibid.

<sup>237</sup> Ibid.

Nuclear energy can be placed within India's energy policy objectives in terms of two main issues - its contribution to total energy supply, and its relevance to climate change mitigation and environmental goals.

**Figure 1: Composition of Primary Energy Demand in India to 2035**



Source: IEA 2013 (n 231)

The IEA forecasts that India's primary energy demand will grow at a compounded average annual rate ('CAAGR') of 3% to the year 2035, nearly tripling to roughly 1500 million tonnes of oil equivalent (mtoe)<sup>238</sup>. Despite government efforts to diversify the primary energy basket, which is dominated by coal, it will continue to form the majority -just over 40% - of primary energy consumption.

Interestingly, within this rise in energy demand, nuclear energy is forecast to exhibit the second-fastest CAAGR, at 7.9%, followed jointly by gas and hydro (at 4.4% each), oil (3.5%), coal (3.1%) and bioenergy (0.6%). The fastest CAAGR is forecast to occur in renewables other than hydro (including solar and wind, at 12.2%). Nevertheless, the total proportion of nuclear energy within total primary energy demand will be small, at 3.4%.

However, within total electricity generation (in Terawatt-hours), which is similarly projected to grow at 5% to 2035, nuclear power will constitute a slightly higher share - 6% of total generation in 2035. In terms of electrical generation capacity (in Gigawatts), whilst total capacity will grow at a

<sup>238</sup> This is according to the IEA's 'New Policies Scenario' 2013, which takes into account broad policy commitments and plans that have already been implemented to address energy-related challenges, as well as those that have been announced, even when the specific measures to implement these commitments have yet to be introduced. It assumes only cautious implementation of current commitments and plans; See International Energy Agency, *World Energy Outlook* (2013) <<http://www.iea.org/Textbase/npsum/WEO2013SUM.pdf>> accessed on 3 September 2014.

CAAGR of 6.1%, from just over 200 GW at present to 887 GW by 2035, nuclear capacity will increase from 5 GW to ~30 GW by 2035 (a figure equivalent to adding roughly 15% of current generation capacity). The share of nuclear generation capacity (in GW) will still be lower than coal (45%), gas (14%), hydro (14%), wind (11%) and solar PV (10%), but higher than oil (1%) and bioenergy (2%).

In contrast with the IEA forecast, India's 12<sup>th</sup> Five Year Plan document envisages nuclear generation capacity increasing from 2% in 2012 to 9% by 2030, and total generation, from 3% to 12%.<sup>239</sup> However, Five Year Plan targets have rarely been achieved - for example, nuclear capacity added during the 11<sup>th</sup> Five Year Plan was 880 MW as against a target of 3,380 MW, and it is unlikely that capacity addition of a further 5,300 MW of nuclear power will be achieved as targeted for the end of the 12<sup>th</sup> Five Year Plan (in 2017).<sup>240</sup> Perhaps in recognition of this, an earlier Government target of achieving 63 GW of nuclear power generation capacity by 2032 was revised down to roughly 30 GW.

Therefore, looking at the 'big picture' forecast and the energy security objective, nuclear is likely to continue to form a small proportion of India's total energy mix by the year 2035, implying that its contribution to meeting primary energy demand is likely to remain similar to current proportions. Nevertheless, nuclear power could displace some coal as a source of 'base load' power, given the intermittent nature of renewable technologies.<sup>241</sup>

Nuclear energy has a relatively stronger case when measured on the environmental objective. In 2009, India pledged to reduce its carbon intensity by 25% relative to 2005 levels, by 2020. Carbon intensity is a measure of the amount of carbon emitted to produce a unit of Gross Domestic Product ('GDP').

As noted earlier, nuclear power emits just 3% of the amount of carbon dioxide from a kWh of coal, and can provide an alternative to coal-fired base load power.<sup>242</sup> The 2010 IEA forecast for nuclear power generation based on the New Policies Scenario is 81 TWh, which equates to carbon emissions of 2.43 million tonnes.<sup>243</sup> This is negligible compared with the equivalent amount of emissions were this power to be generated instead by coal - 77 million tonnes. If coal-fired power plants were to be entirely replaced with nuclear energy in 2020, equivalent carbon dioxide emissions would be 30 million tonnes compared with over 1 billion tonnes from coal-fired power. Admittedly, although India's current emissions reduction targets are relative and not absolute (i.e. they relate to the

<sup>239</sup> Planning Commission 12<sup>th</sup> Five Year Plan, (2013) Government of India Government of India, Sage Publications Pvt India Ltd.

<sup>240</sup> Ibid.

<sup>241</sup> Base load power refers to power sources that are required to run continuously i.e. even during valleys in demand. Renewable technologies like wind are intermittent i.e. the wind blows at intervals- affecting the amount of energy that can be generated from wind at any point in time and necessitating backup generation.

<sup>242</sup> Alternative base load sources with similarly *nil* emissions are hydro (but with potentially similar issues around public opposition relating to land resettlement of citizens displaced by hydro projects), and potentially, geothermal energy.

<sup>243</sup> IEA 2010 (n 189).

carbon intensity of GDP and not to absolute emissions), it is clear that nuclear power could have a significant impact on emissions reduction and environmental targets.

This impact would be particularly pertinent in the event of adoption of a carbon price or carbon tax on coal, whether mandated by international or national protocol. Manufacturing costs would in this case increase for economic sectors which depend largely on coal. This could affect the competitiveness of manufacturing, and consequently have an adverse impact on GDP.

Given sustained global efforts towards climate change mitigation, it is likely that some sort of regime to this effect may not be very far off into the future. The long gestation periods for both nuclear and coal-fired power projects make current policy decisions in this context all the more relevant.

From the above analysis, it can be argued that there is a stronger environmental case for nuclear power than there is a case for its contribution to significantly mitigating energy shortages, and policy implementation will be contingent upon the priority accorded to environmental targets vis-à-vis targets aimed at increasing overall energy supply, given the large amount of effort that is needed to operationalise nuclear energy in order to bring about a disproportionately smaller outcome in terms of contribution to total energy supply.

## B. LIABILITY AND COSTS

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### 1. WHERE DOES LIABILITY SIT WITHIN THE COST STRUCTURE? POTENTIAL PATHWAYS

Returning to the issue of nuclear liability, there are three potential pathways for the costs of liability to feed through into nuclear energy costs:

- O&M costs
- The discount rate
- Construction costs

Prior to outlining these pathways for the effects of liability on costs, it is important to note that liability in the Indian context and in the context of current debates can be split into operator liability and supplier liability. Operator liability is the more conventional component of nuclear costing, whereas supplier liability runs outside of existing international legal convention.

#### (a) O&M COSTS

Operations and maintenance are typically the area within which costs related to operator liability would sit. For instance in 2012, France's Court of Audit as well as its Senate recommended adding a

yearly Euro 4 Bn insurance premium to cover damages of up to Euro 100 Bn in case of a major accident.<sup>244</sup> The proposed insured amount was almost equivalent to the financial damage incurred following Hurricane Katrina, the second costliest natural disaster ever after Fukushima. The damage from Katrina has been estimated at Euro 160 Bn (~\$200 Bn)<sup>245</sup> by the Munich Re Group.<sup>246</sup> In contrast, estimates made in 2013 for cleaning up after Fukushima were \$20 Bn for the site and about as much for the surrounding areas.<sup>247</sup> Boccard estimates that the yearly insurance premium in France stands at Euro 69 Mn (~\$90 Mn) per reactor - this is a major sum compared to most European countries, where nuclear operators only need to cover Euro 700 Mn (~\$890 Mn) of damages while their government covers an additional equivalent amount through international convention.

In comparison, the Price-Anderson Act covers up to \$13 Bn for a single accident (but the country also hosts more reactors, implying a greater risk).<sup>248</sup> Nevertheless, the premium paid by US nuclear operators is estimated at a hundred times less than what the market would ask to cover the economic damages of a major accident.<sup>249</sup> It has been reported that the consortia of American Nuclear Insurers quoted yearly premiums in 2011 of \$0.9 Mn, \$1.3 Mn and \$1.8 Mn per year for plants with one, two or three reactors.<sup>250</sup> The average over the entire fleet of active US reactors is \$0.7 Mn per reactor or one-hundredth of the cost of covering a Katrina type disaster.<sup>251</sup>

The more difficult issue of supplier liability could also sit within O&M costs, but this would require a consensus on an accurate estimation of this cost, on the time period for which it is valid, and on how it is financed. Supplier liability could have impacts on cost through other pathways.

### (b) THE DISCOUNT RATE

One of the potential pathways through which supplier liability could have an impact on nuclear costs is the discount rate used by investors - in other words, the company supplying the reactor might place a very high present value on future revenues, requiring a much earlier return on its investment. This effect could be influenced by the length of the period for which liability can be brought against suppliers. Consequently, reactors become more expensive to purchase, and the additional costs may be borne either by the state (and eventually the taxpayer) or by the consumer through higher tariffs. Again, the extent of the impact on tariff would depend on the structure of the electricity market and whether it is relatively competitive or primarily centralised.<sup>252</sup>

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<sup>244</sup> Boccard (n 203).

<sup>245</sup> At current exchange rates.

<sup>246</sup> Boccard (n 203)

<sup>247</sup> Ibid. Another estimate puts the total economic cost of Fukushima at over \$60 Bn (Aoki and Rothwell, 2013)

<sup>248</sup> Boccard (n 203).

<sup>249</sup> Ibid.

<sup>250</sup> Ibid.

<sup>251</sup> Ibid.

<sup>252</sup> This is because pricing in competitive markets is different from that in centralised markets.

### (c) CONSTRUCTION COSTS

Another potential pathway for the effects of liability on costs is the impact on construction times, particularly if no internationally agreed consensus on supplier liability is achieved. For instance, it could be that investments then become a matter of bilateral negotiation between host countries and investors (company/country). This is likely to lengthen the lead times for construction and there is evidence in the literature (discussed earlier in this section) which suggests that construction times and construction costs are very strongly correlated.

While the three pathways outlined above constitute the most likely effects of liability legislation on cost, one cannot rule out the possibility of cascading effects - for instance, investors may choose higher discount rates for new constructions despite liability costs being factored into O&M costs.

## 2. THE IMPACT OF LIABILITY ON COSTS

The main controversy over nuclear legislation in India emanates from the provisions for liability of nuclear operators, and their right of recourse to suppliers as described earlier in this Report. Under the legislation, operator liability is subject to a cap of Rs.1,500 crores (\$250 Mn at current exchange rates), with the Central Government liable for any amount over this limit up to 300 Mn SDR<sup>253</sup> taking the total cap on liability to roughly \$700 Mn. The liability period is also limited (to either 10 or 20 years for personal injury or damage/loss of property).

As noted earlier in this section, this total amount is lower than the amounts set in countries with established nuclear fleets - nuclear operators in France are liable for up to US \$890 Mn plus an additional amount determined and covered by the French government, and in the US, operators can be liable for up to US \$13 Bn for a single accident - although the US market and legislative arrangements are such that spread over a large fleet, individual operators are liable for much smaller amounts.

The concept of *unlimited operator liability* is not uncommon, as typically liability is channelled to the operator. For instance, a 2000 OECD-Nuclear Energy Agency ('NEA') study states that Germany (prior to the nuclear shutdown), Japan and Switzerland adopted unlimited liability for operators. However, for Germany and Switzerland the total compensation amounts available including public funds in millions of SDR were limited.<sup>254</sup> It is unclear whether these governments would have paid any additional amounts beyond these stated limits. In Japan, there were no pre-specified limits and the amounts were decided by the *Diet*.<sup>255</sup>

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<sup>253</sup> At 2014 exchange rates, 1 SDR = \$ 1.5. SDR 300 Mn would therefore be equivalent to \$450 Mn.

<sup>254</sup> The study by OECD-NEA sets these at SDR 450 and SDR 560 for Germany and Switzerland. See OECD-Nuclear Energy Association (NEA), *Methodologies for Assessing the Economic Consequences of Nuclear Reactor Accidents*, (2000) OECD Paris<<https://www.oecd-nea.org/rp/pubs/2000/2228-methodologies-assessing.pdf>> accessed 3 September 2014. As per 2014 exchange rates, 1 SDR = \$1.5, thus the amounts are equivalent to \$675 and \$840.

<sup>255</sup> Japan's bicameral legislature.

As has been discussed earlier in this Report, the concept of *supplier liability* as opposed to operator liability is also not uncommon in national legislation, and examples include Austria, Hungary, South Korea and Chile. Notably, this list includes countries where nuclear power has *not* been rendered economically unviable. This supports the argument made earlier in this Report that Section 17(b) is not without basis, especially if one considers that the total amounts available for operator liability appear to be low, relative to international experience.

However, examples of *unlimited supplier liability* within internationally accepted conventions or national legislation are scarce, if any.<sup>256</sup> In the absence of limits based on either the amount of compensation or on time periods beyond which the right of recourse expires, questions arise over the economic viability of nuclear power as the computation of insurance amounts (particularly in the absence of third party inspections of nuclear facilities) becomes uncertain.

Based on the discussion of cost drivers/pathways through which the impact of supplier liability could manifest on costs, some observations can be made. If supplier liability is limited by time or amount, the resulting ‘risk’ can be factored into the costs of construction/capital costs or into operating costs (based on annual insurance premiums required to cover liability). If supplier liability is unlimited by either time or amount, the resulting ‘uncertainty’ could manifest in investment decisions through higher discount rates, where investors may require a high rate of return to justify their investment - which means that investments from parties other than governments/the public sector may not be forthcoming. A combination of these impacts cannot be ruled out - however, the principle of legal or economic channelling (as in the case of the Price-Anderson Act) is predicated precisely on the avoidance of cascading impacts and the prevention of ‘pyramiding’ of insurance.

Against this context, there are two issues with respect to supplier liability in the CLND Act - First, that it could be set too low which goes against its very purpose- potentially resulting in the government (and therefore the taxpayer) picking up the bill. And second and conversely, that it could expose suppliers to potentially unlimited amounts of liability - thereby stifling investments in nuclear power and negating the purpose and objective of nuclear power policy *per se*.

As noted earlier, the cap of Rs. 1,500 crores (US \$250 Mn) appears atypically lower in comparison to liability amounts in other countries which can run into billions of dollars for a single accident. Similarly, a cap based on the ‘value of the contract’ risks being lower than even this amount.

It may therefore be more prudent to limit liability by time rather than by amount. There is some controversy over this. As mentioned in Section III of this Report, the time periods currently under discussion include the license period (5 years - which has been questioned as too little) and the

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<sup>256</sup> The research carried out for this Report did not establish concrete examples of unlimited supplier liability.

product liability period (which is contingent on a contractual provision). However, a third potential solution is to bring supplier liability in alignment with the time limits on operator liability (10 or 20 years), as the victims' right to compensation for personal injury or property lapses after these periods. A further argument for time-limited supplier liability is that it is broadly in alignment with the principle of depreciation of assets (or 'wear and tear') over time.

Separate from the question of liability *per se* is that of the impact or manner in which it is dealt with. One potential impact is that of increased electricity tariffs (reflecting increases in operating costs). For instance, the cost of electricity from the Jaitapur power plant which was initially estimated at Rs. 3-4/kWh, was in 2013 estimated to have risen to Rs. 6.50/kWh<sup>257</sup>; India was reported to have successfully negotiated it down to Rs.6/kWh in March 2014.<sup>258</sup> This tariff is uncompetitive with coal, but as already noted, in the absence of a carbon price, very few other 'scaled up' technologies are likely to be competitive with coal-fired power, and the chronic shortage of electricity in India could mean that nuclear power at a higher price will find a market.

However, a potential drawback of this method is that it could lead to differential tariff increases varying by project. More specifically, in the absence of standardised mechanisms to deal with the impact of liability - such as insurance pools, different operators or suppliers could contract differently with insurers to obtain requisite liability coverage. It would also lead to a pyramiding of insurance costs, making nuclear power prohibitively expensive. This problem is discussed further in the context of international experience, below.

### 3. MECHANISMS DEALING WITH THE IMPACT OF CIVILIAN NUCLEAR LIABILITY

Nuclear energy is characterised by an extremely low risk probability of accidents, but potentially catastrophic consequences should an accident occur. This risk is quantified through Probabilistic Risk (or Safety) Assessments which are used to estimate the probability of nuclear accidents.<sup>259</sup> A number of solutions have been proposed in the literature on mechanisms to deal with the impact of civilian nuclear liability on the costs of nuclear power.<sup>260</sup> It is unlikely that one mechanism could provide a universal solution to the problems encountered in operationalising civilian nuclear

<sup>257</sup> At the time, Areva, the French company contracted to build the reactors, was reported to have agreed upon a tariff of Rs. 9.20/KWh for the Hinkley nuclear power plant in the UK which was based on identical technology.

<sup>258</sup> 'India, France agree on cost of power generated by Jaitapur Nuclear Power Plant', *The Economic Times*, (New Delhi, 9 March 2014) <[http://articles.economictimes.indiatimes.com/2014-03-09/news/48051208\\_1\\_india-and-france-european-pressurised-reactors-major-hurdle](http://articles.economictimes.indiatimes.com/2014-03-09/news/48051208_1_india-and-france-european-pressurised-reactors-major-hurdle)> accessed 3 September 2014.

<sup>259</sup> For an example from India, see Solanki, R.B. & Prasad. M (2007)Probabilistic Safety Assessment of Nuclear Power Plants - A Monograph, Atomic Energy Regulatory Board, Government of India. For an example with a specific estimation see the German government's 'Risk Study of Nuclear Power Plants' (GRS 1980: Deutsche Risikostudie Kernkraftwerke. Fachband 5. Untersuchung von Kernschmelzunfällen) which estimated the total risk of a nuclear reactor meltdown at  $2.9 * 10^{-5}$  or 1 nuclear meltdown in 30,000 service years.

<sup>260</sup> Pascal Herzog, 'Civil Liability - Mechanisms to Allocate the Costs of a Civil Nuclear Accident' (Master thesis, University of St. Gallen 2012).

liability legislation, and a combination is usually used in practice. Within these mechanisms, insurance provides the most variety from which to choose an appropriate framework.

*Self-insurance* or *mutual insurance* is considered when the administrative costs of an external insurer are high, and involves the accumulation of capital reserves to cover future potential payouts.<sup>261</sup> It is used when there is a lack of capacity in the national insurance market, but the main problem with this mechanism is the potential inadequacy of the operator's assets. Coverage can also be obtained from the *private insurance market* - but again, the capacity is very limited, and one estimate suggests that the risk market has the capacity to reach \$1-2 Bn per risk when the cost of accidents can potentially be much higher, as discussed earlier in this section.<sup>262</sup> New regulations requiring stricter solvency requirements in this market also constrain its potential to cover nuclear risks.<sup>263</sup>

*Public insurance* where the state is an insurance partner for nuclear power plants is yet another option - and can be either contractual or based on law.<sup>264</sup> Switzerland and Holland have state coverage - Swiss mandatory insurance is based on law and is applicable to all nuclear power plant operators. Notably, the Fund is capitalised by annual fees calculated on the basis of the insurance premiums paid by operators on the commercial market.<sup>265</sup> However, to avoid market distortions the state has to offer its insurance schemes under similar conditions as those by commercial insurance companies - this is presumably also to avoid a situation where the taxpayer subsidises insurance.<sup>266</sup>

*Insurance pools* are the standard method for managing nuclear risks. They have existed since the 1950s to support the fledgling civilian nuclear power industry, and again, can be the result of a contractual agreement or a legal obligation.<sup>267</sup> Through 'horizontal' risk pools, insurers, nuclear power operators and states share the risk of an accident, thereby providing access to a wide pool of compensation. However, participants in the pool have to be fully transparent in regard to the ceded risks as well as their solvency in order to create a truly homogenous portfolio structure.<sup>268</sup>

The US nuclear insurance pool (created through the Price-Anderson Act) is an example of a horizontal pool and provides a two-tier structure of coverage to its participants (described earlier in this section). The first tier requires pool participants to take out private insurance, and the second tier requires participants to contribute to the pool in annual instalments with adjustments for inflation. To enable 'economic channelling', the US nuclear insurance pools do not only cover

<sup>261</sup> Ibid.

<sup>262</sup> Ibid.

<sup>263</sup> Ibid.

<sup>264</sup> Ibid.

<sup>265</sup> Ibid.

<sup>266</sup> Ibid.

<sup>267</sup> Ibid.

<sup>268</sup> Ibid.

the operator's liability but also the designers' and constructors' liabilities.<sup>269</sup> Therefore the victims of the Three Mile Island accident of 1979 did not only sue the operator (Metropolitan Edison General Public Utilities) but also its designers (Babcock & Wilcox) and constructor (United Engineers and Construction Catalytic) - Metropolitan Edison in turn used its right of recourse and sued Babcock & Wilcox (they settled out of court).<sup>270</sup>

There are 26 risk pools in existence globally, which also in turn provide reinsurance to each other - thus risk covered by one pool generates revenues for other pools. Risk pools are therefore typically formed at a national level and tend to not compete with each other for business. The US nuclear risk pool, for instance, insures roughly a third of its risks and outsources the remainder to various international pools. Pools can also be set up through multilateral platforms - the CSC, for example, is essentially a multi-country risk pool.

Pool participants may make contributions according to some predetermined criteria, such as their contribution to system capacity. Risk pools can therefore allow for smaller companies to participate, who would otherwise be unwilling to invest in nuclear power.<sup>271</sup> Risk pools typically stipulate two conditions for membership; first, participants should be signatory to an international convention, and second, participants should allow inspections of their nuclear installation. The latter is because the calculation of insurance premiums needs to be carried out through Probabilistic Risk Assessments.

Another potential mechanism to operationalise liability is to introduce *minimum asset requirements* for operators, similar to regulations in the banking and insurance industry. This could extend the financial strength of the operator in case of a nuclear disaster.<sup>272</sup> However, asset requirements would have to be very large to compensate all victims of a potential nuclear accident, making the capital costs too high for the operator.<sup>273</sup> Instead, it has been suggested that minimum asset requirements be combined with other mechanisms such as mandatory insurance, in order to make capital costs bearable for operators.<sup>274</sup>

Other suggested mechanisms include *ex ante* and *ex post* risk funds. *Ex ante* risk funds are evident in the operation of compulsory state insurance introduced by countries such as Switzerland and Holland, and essentially collapse to public insurance.<sup>275</sup> Market solutions such as *nuclear bonds* and *tradable nuclear risk papers* have also been proposed, which could potentially increase the capacity available to fully compensate victims using global capital markets. Japan for instance used

<sup>269</sup> Ameye (n 44).

<sup>270</sup> Ibid.

<sup>271</sup> Ibid.

<sup>272</sup> Ibid.

<sup>273</sup> Ibid.

<sup>274</sup> Ibid.

<sup>275</sup> Ibid. In Switzerland, the premiums of Swiss compulsory insurance are calculated by the University of St Gallen, seen as an 'independent partner' minimising the risk of conflicts of interest.

bonds to raise funding after the Fukushima accident. However, these options come with fairly well-known financial market risks.<sup>276</sup>

Finally, *ex post* risk funds are another mechanism used to enable compensation for nuclear accidents - for instance, Japan allowed its 'Nuclear Damage Facilitation Fund' to issue roughly \$60 Bn of compensation bonds after the Fukushima accident.<sup>277</sup> Alternatively, the state could partner with other stakeholders to build an *ex post* fund, becoming an insurer of last resort.<sup>278</sup> The disadvantage to this solution is that if such state reactions are foreseeable to operators of nuclear power plants, a problem of moral hazard develops *ex ante*.<sup>279</sup> More generally, Herzog (2012) provides two 'guiding principles' of liability mechanisms - that *ex ante* solutions are better than *ex post* solutions, and that risk-ownership should be specified before an 'incident'.<sup>280</sup>

### C. OPERATIONALISING NUCLEAR INSURANCE - SECTIONS 7 & 8 OF THE CLND ACT

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It is evident from the discussion above that nuclear insurance pools provide an effective mechanism for sourcing the large amounts of funding required to cover liability as stipulated within legislation. The previous section has described the functioning of insurance pools and particularly highlighted the fact that pools rarely exist in isolation, but need to interact with other international nuclear risk pools to obtain reinsurance.

Sections 7 and 8 of the CLND Act make some provisions for ensuring that liability is met, but does not detail the mechanisms:

**"7(1)** - The Central Government shall be liable for nuclear damage in respect of a nuclear incident, - (a) where the liability exceeds the amount of liability of an operator specified under sub-section (2) of section 6, to the extent such liability exceeds liability of the operator; (b) occurring in a nuclear installation owned by it(c) occurring on account of causes specified in clauses (i) and (ii) of sub-section (1) of section 5.<sup>281</sup>

**7(2)** - For the purpose of meeting part of its liability under clause (a) or clause (c) of sub-section (1), the Central Government may establish a fund to

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<sup>276</sup> Herzog (n 260).

<sup>277</sup> Ibid.

<sup>278</sup> Ibid.

<sup>279</sup> Ibid.

<sup>280</sup> Ibid.

<sup>281</sup> Section 5(1) of the CLND Act mandates that an operator shall not be liable for any nuclear damage where such damage is caused by, a nuclear incident directly due to (i) a grave natural disaster of an exceptional character; or, (ii) an act or armed conflict, hostility, civil war, insurrection or terrorism.

be called the Nuclear Liability Fund by charging such amount of levy from the operators, in such manner as may be prescribed.

**8(1)** - The operator shall, before he begins operation of his nuclear installation, take out insurance policy or such other financial security or combination of both, covering his liability under sub-section (2) of section 6, in such manner as may be prescribed.

**8(2)** - The operator shall from time to time renew the insurance policy or other financial security referred to in sub-section (1), before the expiry of the period of validity thereof.

**8(3)**-The provisions of sub-sections (1) and (2) shall not apply to a nuclear installation owned by the Central Government.”

Whilst the provisions in Sections 7 and 8 provide for liability *per se*, the operator is exempted from taking out insurance in the case of nuclear installations that are owned by the Central Government. Additionally, the Central Government is liable for nuclear damage in situations where the liability exceeds the amount of liability set out under Section 6(2). The exemption of nuclear installations owned by the Central Government from taking out insurance also implies that its liability may be met through an *ex post* mechanism, which contradicts the general principle that *ex ante* solutions are better.

Rule 3 of the CLND Rules corroborates with Sections 7 and 8 (including the exemption of Central Government owned nuclear installations), but contains a specific stipulation for the operator to take out insurance or financial security or a combination of both. Additionally, Rule 3 allows for the pooling of resources to meet liability requirements:

**“Rule 3(4)** - Nothing in this rule shall prevent a group of operators to enter into a joint arrangement of financial security providing for contribution to such security in proportion to their individual installed capacity in thermal megawatts.”

The mechanism for the creation of an insurance pool therefore exists in the Act and the Rules. There are however two potential hurdles to its creation, relating to Sections 7 and 8 of the CLND Act and Section 3 of the CLND Rules. The first involves a lack of harmonisation between the insurance requirements for private (domestic or foreign operators) and operators of installations owned by the Central Government. Ideally, a harmonised single insurance pool could prevent the pyramiding of insurance premiums, cut down transaction costs, and enable better leverage of international pools for reinsurance.

The second hurdle relates to the fact that these provisions entirely overlook the potential for including suppliers within insurance pool arrangements.<sup>282</sup> This is specifically of relevance to India's domestic supply industry to the civilian nuclear power sector, where concerns over the onerous capital requirements for each supplier to obtain private insurance could exclude the participation of domestic suppliers. As stated earlier, insurance pools are advantageous in the development of a fledgling nuclear power sector as they allow for smaller companies to participate and make contributions according to a predetermined proportion. India has over 200 domestic suppliers to its nuclear power industry (many of which operate solely in India) which risk being crowded out given the resources of overseas suppliers, unless a mechanism is introduced which enables them to meet liability requirements.<sup>283</sup> For instance, if each supplier were to take out private insurance policies covering the maximum liability limit (Rs. 1500 crores) suppliers would be seeking a total coverage of Rs. 3 lakh crores per operator. This demonstrates the pyramiding of insurance costs.

A more effective solution towards the harmonisation of liability provisions would therefore be to include private and state-owned operators and suppliers in a national insurance pool, with the total contribution based on a comprehensive and regularly updated Probabilistic Risk Assessment (the probability of a nuclear accident occurring in India in a set amount of reactor-years) with individual contributions to the pool based on factors such as size, contribution to total capacity, minimal asset requirements, or other criteria relating to the criticality of supplies. As an example of the use of Probabilistic Risk Assessment with nuclear insurance pools, the 1980 German study (referenced in footnote 261) estimated the total risk of a nuclear reactor meltdown at  $2.9 * 10^{-5}$  or 1 nuclear meltdown in 30,000 service years, which translates into a probability that a nuclear reactor would experience a meltdown of 0.01%.<sup>284</sup> Insurance premiums could then be based on the probability of nuclear accidents occurring.

Following the establishment of a pool, its operationalization and the building up of a corpus of funds is also subject to constraints. One suggestion to fund the pool is through a 'surcharge' of Rs. 0.05/KWh on tariffs from nuclear power.<sup>285</sup> Based on a 1000 MW unit operating for 300 days a year and generating 720 crore units of electricity in that period, the surcharge would result in revenues of Rs. 36 crore per annum.<sup>286</sup> For a site with two units - the revenues would amount to Rs. 72 crore per annum.<sup>287</sup> Assuming a total generation capacity of 10,000 MW the surcharge could yield Rs. 360 crore in revenues per annum - it would therefore take just over 4 years to build up a corpus of Rs. 1500 crore using this option.<sup>288</sup>

<sup>282</sup> As stated earlier the US nuclear insurance pool included parties other than the operators.

<sup>283</sup> RJ Gruendel and ER Kini, 'Through the looking glass: Placing India's new civil liability regime for nuclear damage in context' (2012) 3 Nuclear Law Bulletin 45-66.

<sup>284</sup> The probability is calculated through the formula Specific Risk =  $1 - (1 - \text{Total Risk})^{\text{years of service}}$ , where the reactor life is assumed to be 40 years.

<sup>285</sup> Balachandran (n 61).

<sup>286</sup> Ibid.

<sup>287</sup> Ibid.

<sup>288</sup> Ibid.

At current levels of nuclear capacity, it would take roughly double that time. However, this solution would be likely to render nuclear power uncompetitive with coal, and could result in cross-subsidies (where industrial users that pay a higher tariff subsidise agriculture users for whom tariffs are kept consistently low and are rarely adjusted upwards).

A more effective solution may be to fund the pool partly through contributions and partly through reinsurance with international nuclear risk pools. The General Insurance Corporation ('GIC'), tasked with setting up India's nuclear insurance pool, recently reported that it had managed to arrange coverage equivalent to \$78 Mn out of the total liability limits for each operator (based on coverage from 8 domestic insurers) but was attempting to obtain the remainder through international insurance pools. Here again, there are two potential constraints to the operationalization of the nuclear insurance pool. The conditions for obtaining cover from international nuclear risk insurance pools, as stated earlier, include the requirement for participants to be signatories to an international convention, and for inspections to be permitted of nuclear power installations in participating countries.

With regard to the first constraint, India is a signatory to the CSC, and following on from the recommendations in section II-D of this Report to make India's legislation on civilian nuclear liability comply with the provisions of the CSC, this should allow India access to coverage from international nuclear insurance pools.

The second constraint relates to the unwillingness of international reinsurance firms to provide reinsurance on the basis that most of India's civilian nuclear power industry was developed within the confines of the Indian public sector, without (until recently) a history of exposure to third-party inspections. GIC has in fact identified as an impediment the refusal of the NPCIL to allow nuclear insurance inspectors to visit any of the existing nuclear power plants as a precondition for membership and access to international insurance pools.<sup>289</sup>

To resolve this issue, the Central Government could utilise the provisions in Sections 43 and 44 of the CLND Act to establish an inspections regime or a flow of information that complies with international inspections requirements.

**"44. Power to call for information -** The Central Government may, in exercise of its powers and performance of its functions under this Act, issue such directions, as it may deem fit, for the purposes of this Act, to any operator, person, officer, authority or body and such operator, person, officer, authority or body shall be bound to comply with such directions.

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<sup>289</sup> Gruendel and Kini (n 283).

**45. Exemption from application of this Act -** The Central Government may call for such information from an operator as it may deem necessary.”

This could enable the removal of the second constraint and help towards operationalising a nuclear insurance pool for civilian nuclear energy in India.

## D. SUMMARY OF FINDINGS

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The findings from this section can be summarised as follows:

- 1) Nuclear costs are heterogeneous and subject to ‘appraisal optimism’. Indian experience appears to follow this general trend.
- 2) The provisions in the CLND Act and CLND Rules relating to mechanisms for meeting nuclear liability are sketchy and disharmonious, and could potentially result in the pyramiding of insurance costs.
- 3) A solution towards the harmonisation of liability provisions would be to include private and state-owned operators and suppliers in a national insurance pool, with the total contribution based on a comprehensive Probabilistic Risk Assessment with individual contributions to the pool based on predetermined criteria.
- 4) India will need to comply with international requirements regarding the establishment of an inspections regime in order to access reinsurance on international nuclear risk pools.

## E. RECOMMENDATIONS

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The Report makes the following recommendations on liability and costs and the operationalisation of nuclear insurance pools in India:

1. Sections 7 and 8 of the CLND Act should be harmonised - the requirement for mandatory insurance should be made applicable to all operators (including Central Government-owned installations) in order to ensure that an *ex ante* mechanism for speedy compensation is in place.
2. An insurance pool should be incorporated into these two provisions of the Act as the primary mechanism for meeting liability, with the details of contributions to be worked out.
3. Section 7(2) of the CLND Act should be amended to include suppliers.
4. Sections 43 and 44 of the CLND Act should be utilised to facilitate the setting up of an inspections regime or flow of information which adheres to international requirements for reinsurance via international nuclear risk pools.

## V. SUMMARY OF RECOMMENDATIONS

On the basis of the analysis in the Report, the following are our recommendations for reform of the legislative framework pertaining to nuclear liability in India in order to operationalise India's nuclear agreements:

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### A. RECOMMENDATIONS TO ENSURE INDIA'S COMPLIANCE WITH THE CSC NOTWITHSTANDING THE RETENTION OF SECTION 17(b) UNDER THE CLND ACT

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1. In the light of the rules of treaty interpretation under Article 19 of the VCLT, India can make a reservation to the CSC to allow for right of recourse against suppliers as provided for under Section 17(b); or
2. India can get an exemption for the applicability of Section 17(b) as a general rule of public international law under Article XV of the CSC, on account of the polluter pays principle that universally recognises the right of States to recover compensation from the polluters of the environment, whoever that may be.

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### B. RECOMMENDATIONS ON SECTION 17 OF THE CLND ACT and RULE 24 OF THE CLND RULES

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1. The limitation on the time during which a supplier can be held liable should be inserted by means of a proviso to a relevant section in the CLND Act.
2. Rule 24 of the CLND Rules should be deleted.

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### C. RECOMMENDATIONS ON CONCURRENT AND TORTIOUS LIABILITY OF OPERATORS AND SUPPLIERS

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1. The proviso to Section 5(2) should be deleted as it serves no purpose and finds no mention in the relevant articles of CSC on which it is supposed to be based.
2. Section 9 should insert the word 'only' after the word 'compensation' in order to clarify that the victims who suffer on account of nuclear damage can institute claims for compensation under the provisions of the CLND Act only and not by having recourse to other legislations or Courts.
3. Section 46 should be limited to criminal liability provisions only since the CLND Act is a special legislation, specifically enacted to entertain civil liability claims for nuclear damage. Hence, the CLND Act should bar recourse to civil claims outside its purview.

4. The phrase ‘Save as otherwise provided in Section 46’ should be deleted from the language of Section 35, as it creates confusion and does not add to the meaning of the said provision.
5. Relevant notifications regarding ‘extent of nuclear damage’ under Section 2(g) ought to be issued to provide clarity on the scope of the application of the CLND Act, which would then in turn also provide the necessary assistance in interpreting the other provisions of the Act.

#### D. RECOMMENDATIONS ON LIABILITY AND COSTS AND THE OPERATIONALISATION OF A NUCLEAR INSURANCE POOL IN INDIA

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1. Sections 7 and 8 of the CLND Act should be harmonised - the requirement for mandatory insurance should be made applicable to all operators (including Central Government-owned installations) in order to ensure that an *ex ante* mechanism for speedy compensation is in place.
2. An insurance pool should be incorporated into these two provisions of the Act as the primary mechanism for meeting liability, with the details of contributions to be worked out.
3. Section 7(2) of the CLND Act should be amended to include suppliers.
4. Sections 43 and 44 of the CLND Act should be utilised to facilitate the setting up of an inspections regime or flow of information which adheres to international requirements for reinsurance via international nuclear risk pools.

## VI. APPENDICES

### A. Appendix 1: Descriptive Statistics for Median Case

OECD MEDIAN CASE NUCLEAR	Net Capacity	Owner's and Construction	Oversight cost	Fuel cost	CO <sub>2</sub> cost	O&M cost
number of countries	13	13	13	13	13	13
count	15	15	15	15	15	15
max	1 650	5 862.86	5 862.86	9.33	0.00	29.81
min	954	1 505.92	1 556.40	7.90	0.00	7.20
<b>mean</b>	<b>1 387</b>	<b>3 723.63</b>	<b>4 079.33</b>	<b>9.10</b>	<b>0.00</b>	<b>14.66</b>
<b>median</b>	<b>1 400</b>	<b>3 681.07</b>	<b>4 101.51</b>	<b>9.33</b>	<b>0.00</b>	<b>14.74</b>
delta	696	4 356.94	4 306.46	1.43	0.00	22.61
std.dev	245	1 226.70	1 334.33	0.51	0.00	5.53

Source: IEA (n 189)

## B. Appendix 2: Details of Nuclear Power Plants in India

Name	Type	Capacity (MW)	Cost (₹) in crore	Date of Commercial Operation
Tarapur Atomic Power Station (TAPS) Unit 1 - Maharashtra	BWR	160	92.99	28th October 1969
Tarapur Atomic Power Station (TAPS) Unit 2 - Maharashtra	BWR	160		28th October 1969
Tarapur Atomic Power Station (TAPS) Unit 3 - Maharashtra	PHWR	540	5667.84	18th August 2006
Tarapur Atomic Power Station (TAPS) Unit 4 - Maharashtra	PHWR	540		12th September 2005
Rajasthan Atomic Power Station (RAPS) Unit 1 - Rajasthan	PHWR	100	175.81	16th December 1973
Rajasthan Atomic Power Station (RAPS) Unit 2- Rajasthan	PHWR	200		1st April 1981
Rajasthan Atomic Power Station (RAPS) Unit 3- Rajasthan	PHWR	220	2511	1st June 2000
Rajasthan Atomic Power Station (RAPS) Unit 4- Rajasthan	PHWR	220		23rd December 2000
Rajasthan Atomic Power Station (RAPS) Unit 5- Rajasthan	PHWR	220	2362	4th February 2010
Rajasthan Atomic Power Station (RAPS) Unit 6- Rajasthan	PHWR	700		31st March 2010
Rajasthan Atomic Power Station (RAPS) Unit 7- Rajasthan	PHWR	700	NA	June 2016 (estimated)
Rajasthan Atomic Power Station (RAPS) Unit 8 - Rajasthan	PHWR	220	NA	December 2016 (estimated)
Madras Atomic Power Station (MAPS) Unit 1 - Tamil Nadu	PHWR	220	245.87	27th January 1984

Madras Atomic Power Station (MAPS) Unit 2 - Tamil Nadu	PHWR	220			21st March 1986
Kaiga Generating System (KGS) Unit 1- Karnataka	PHWR	220	2896	16th November 2000	
Kaiga Generating System (KGS) Unit 2- Karnataka	PHWR	220		16th March 2000	
Kaiga Generating System (KGS) Unit 3- Karnataka	PHWR	220	2877	6th March 2007	
Kaiga Generating System (KGS) Unit 4- Karnataka	PHWR	220		20th January 2011	
Narora Atomic Power Station (NAPS) Unit 1- Uttar Pradesh	PHWR	220	723.62	1st January 1991	
Narora Atomic Power Station (NAPS) Unit 2- Uttar Pradesh	PHWR	220		1st July 1992	
Kakrapar Atomic Power Station ( KAPS) Unit 1- Gujarat	PHWR	220	1366.68	6th May 1993	
Kakrapar Atomic Power Station ( KAPS) Unit 2- Gujarat	PHWR	220		1st September 1995	
Kakrapar Atomic Power Station (KAPS) Unit 3 - Gujarat	PHWR	700	NA	June 2015 (estimated)	
Kakrapar Atomic Power Station (KAPS) Unit 4 - Gujarat	PHWR	700	NA	December 2015 (estimated)	
Kudankulam Atomic Power Station Unit 1 - Tamil Nadu	PWR	1000	17270	August 2014 (estimated)	
Kudankulam Atomic Power Station Unit 2 - Tamil Nadu	PWR	1000		May 2015 (estimated)	

Source: NPCIL



# Vidhi

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