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**Nuclear Power Plant Financing
Post-Fukushima, and International
Investment Law**

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(Forthcoming in the **JOURNAL OF WORLD ENERGY LAW & BUSINESS**)

Abstract

The essential thesis of this article is that, as corporate and project finance trends continue in nuclear power plant financing, resulting in diversified and much broader and more complex structures of foreign investment, international investment law will become increasingly relevant to and influential upon these transactions. This in turn will spawn a new wave of disputes based in international investment law claims, before international arbitral tribunals including the ICSID. After discussing the 2011 Fukushima nuclear disaster, and the first international investment law case directly related to an investment in a nuclear power plant, the article begins in Part I by describing recent trends in the financing of nuclear power plants. These trends include a shift from almost exclusively sovereign-assumed financing cost and risk, to other financing models which increasingly access global capital markets, and spread risk among a larger and more diverse set of investors. It then proceeds in Part II to review and consider the international legal sources addressing nuclear energy development and related international trade and investment transactions, focusing on the sources of international investment law. It considers both the primary ways in which the current trends in nuclear power plant financing are making international investment law increasingly relevant to nuclear power plant related investments, as well as the secondary effect this increasing relevance will likely have upon future structuring of financing arrangements for new nuclear power plants. In Part III it provides detailed consideration of the application of international investment law to foreign investments in nuclear power plants, including areas in which host states of such investments are most likely to experience increased exposure to liability due to current financing trends. It concludes with a further consideration of the secondary effects caused by this increased host state exposure to liability, including effects on future structuring of financing arrangements for new nuclear power plants, and effects on (re)negotiations of international investment law instruments between actual or potential host states, and states that are actual or potential home states of nuclear vendors and investors.

In the early afternoon of March 11, 2011, the most powerful earthquake ever to hit Japan struck the ocean floor approximately 70 kilometers off Japan's northeast coast. The earthquake measured 9.03 on the moment magnitude scale, and was one of the five

¹ Professor of Law, University of Alabama School of Law. The author would like to thank Sahib Singh, George Borovas, Jim Glasgow, Nadira Barkatullah, Paul Murphy, and Marco Roscini for invaluable assistance in writing this article.

most powerful earthquakes ever recorded since recordkeeping began in 1900.² Approximately an hour after the earthquake struck, massive tidal waves – some reaching a colossal 133 feet in height - generated by the earthquake, began to make landfall along the northeast coast of the Japanese islands of Honshu and Hokkaido. The hardest hit area of coastline was in the Tohoku area of Honshu, and extended from Ibaraki prefecture in the south, to Iwate prefecture in the North; a distance of some 250 miles.

In September 2012, a year and a half after the earthquake and tsunami disaster, a Japanese National Police Agency report confirmed that the event had caused 15,878 deaths; 6,126 injuries; and 2,713 people to yet be missing across twenty prefectures.³ It caused 129,225 buildings to totally collapse, with an additional 254,204 buildings “half collapsed,” and a further 691,766 buildings partially damaged.⁴ The World Bank has estimated that the overall economic cost of the disaster was \$235 billion, making it the most costly natural disaster in world history.⁵

In the weeks following the tsunami, international attention became focused on the Fukushima Daichi nuclear power plant, located on the east coast of Fukushima prefecture. The tsunami had caused both a primary and secondary power failure at the plant, resulting in three of the six nuclear reactors at the Fukushima Daichi complex experiencing full core meltdowns. The meltdowns caused significant amounts of radioactive materials to be released from the nuclear cores of the reactors into the surrounding environment, including nearby ground and ocean waters. This radioactive contamination required massive forced evacuations of nearby towns and villages, and a continuing exclusion zone around the crippled reactor site.⁶

The severity of the Fukushima Daichi nuclear meltdown incident has been provisionally rated at the highest possible level of 7 on the International Nuclear Event Scale – a rating which it now shares only with the 1986 Chernobyl disaster in Ukraine.⁷

As the Chernobyl incident, and the previous 1978 Three-Mile Island incident in the United States had done before it, the Fukushima Daichi nuclear incident prompted a renewal of popular and official concern around the world regarding the safety of nuclear energy facilities. Although nuclear technical specialists and industry officials have stressed the fact of the older designs of the affected reactors at Fukushima Daichi – all three reactors went into operation between 1971 and 1976 - and have argued that more modern designs, equipped with passive safety systems, would shut down safely in similar circumstances, the effect of the Fukushima Daichi incident on the future of nuclear energy has been vigorously debated, from both descriptive and normative perspectives.

It is of course too soon to tell what the full, long term effects of the Fukushima Daichi incident will be on the role nuclear energy plays in the future mix of energy

² A full range of information and sources, both official and media, regarding the Tohoku earthquake and resulting tsunami can be found at the website of the MCEER Center at the University of Buffalo (<http://mceer.buffalo.edu/infoservice/disasters/Honshu-Japan-Earthquake-Tsunami-2011.asp>)

³ http://www.npa.go.jp/archive/keibi/biki/higaijokyo_e.pdf

⁴ See id.

⁵ See Victoria Kim, “Japan damage could reach \$235 billion, World Bank estimates,” Los Angeles Times, March 21, 2011. <http://www.latimes.com/business/la-fgw-japan-quake-world-bank-20110322,0,3799976.story>

⁶ An excellent review of the Fukushima Daichi disaster can be found at http://www.world-nuclear.org/info/fukushima_accident_inf129.html

⁷ See id.

sources relied upon by countries around the world.⁸ There were, however, a few fairly immediate responses by governments to the nuclear incident in Japan.⁹ None more dramatic than the German government's decision, taken only four months after the incident, to completely abandon the use of nuclear energy in Germany by the year 2022.

This decision by the German government was the thirteenth in a series of amendments to the German Atomic Energy Act, and was the culmination of a longstanding and controversial public debate in Germany over the future of nuclear energy, and energy policy generally.¹⁰ The final decision by the government in fact represented an about face for Chancellor Angela Merkel, who as recently as September 2010 had been strongly supportive of an extension of reactor lifespans in Germany through 2036. Under the final government decision, however, the eight oldest of Germany's 17 nuclear power plants – those at Biblis A, Neckarwestheim 1, Biblis B, Brunsbüttel, Isar 1, Unterweser, Philippsburg 1, and Krummel – were forced to shut down permanently as of August 6, 2011, when the new law came into effect. The remaining plants were to be shut down gradually before 2022.¹¹

The decision by the German government to shorten dramatically the operating lifespan of these 17 nuclear power plants, and in particular the eight older plants named above, has predictably produced a number of legal challenges by the owners and operators of the plants. Several of these challenges are proceeding within the German national court system.¹²

However a separate legal challenge has been initiated by the Swedish utility company, Vattenfall, pursuant to the procedures of the International Center for the Settlement of Investment Disputes (ICSID), headquartered in Washington D.C. In joint partnership with the German utility company E.ON, Vattenfall owns and operates both the Krummel and Brunsbüttel nuclear power plants – two of the eight plants forced to shut down immediately following the adoption of the German government's new amendment to the Atomic Energy Act.¹³

⁸ Note, however, the most recent International Energy Agency and International Atomic Energy Agency reports on this subject: <http://safetyfirst.nei.org/industry-actions/iaea-nuclear-expansion-to-continue-despite-fukushima/>; http://www.world-nuclear-news.org/EE-IEA_cuts_nuclear_power_growth_forecast-1211124.html

⁹ Venezuela and Italy both cancelled their nuclear programs, at different stages of development. On Venezuela, see <http://www.bbc.co.uk/news/world-latin-america-12768148>; on Italy, see <http://www.time.com/time/world/article/0,8599,2077622,00.html>; for a full review of states' policy responses to the Fukushima nuclear disaster, see http://www.world-nuclear.org/briefings/policy_responses_fukushima_accident.html

¹⁰ See generally Nathalie Bernasconi-Osterwalder & Rhea Tamara Hoffman, *The German Nuclear Phase-Out Put to the Test in International Investment Arbitration? Background to the New Dispute Vattenfall v. Germany (II)*, International Institute for Sustainable Development Briefing Note, June 2012 (http://www.iisd.org/pdf/2012/german_nuclear_phase_out.pdf); Alexander Rossnagel & Anja Hentschel, *The Legalties of a Nuclear Shutdown*, Bulletin of the Atomic Scientists, 68: 55 (2012) (<http://bos.sagepub.com/content/68/6/55.full>)

¹¹ See id.

¹² See id.

¹³ See id. Each company holds 50% ownership in Krummel. Vattenfall holds 66.6% ownership and E.ON holds 33.3% ownership in Brunsbüttel.

The ICSID is an international arbitral institution, specialized in facilitating arbitration of disputes based in international investment law.¹⁴ Vattenfall has brought its claim directly against the German government on the basis of the Energy Charter Treaty (ECT), an international investment law treaty to which both Germany and Sweden (Vattenfall's home state) are parties, along with 45 other states.¹⁵ The ECT provides in Article 26 that disputes arising under the treaty, typically between private foreign investors and investment host states, may be submitted to international arbitration under the auspices of the ICSID, among other fora.

At the time of this writing, the claim by Vattenfall has been filed with the ICSID, and two of the three arbitrators who will eventually sit on the arbitral panel have been selected.¹⁶ Submissions by the parties in the case have not yet commenced, so nothing is known for certain regarding the exact legal bases for or arguments supporting Vattenfall's claim, nor the amount that Vattenfall will be arguing it is due in compensation from the German government. However, in the Spring of 2012, Vattenfall itself estimated in its financial report for 2011, that the financial damage suffered by the company as a result of the nuclear phase-out by the German government totaled 1.18 billion euros (\$2.4 billion).¹⁷ More recent media reports put the amount that Vattenfall will claim in compensation from Germany in its ICSID action at around 3.5 billion euros (\$4.6 billion).¹⁸

Again, it is not known on what precise legal grounds Vattenfall will make its case for compensation, but since the claim is being brought under the ECT, Vattenfall will necessarily be arguing, in essence, either that Germany breached the international legal obligations which the treaty places on host governments with regard to their regulatory treatment of foreign investments, resulting in a claim for compensation; or that the German government's actions amount to an expropriation of Vattenfall's investment, for which compensation is due under international law.

The Vattenfall case is significant, among other reasons, in that it is the first case in which international investment law has been used as the basis for a claim by a private foreign investor, that the regulatory treatment of its investment in a nuclear power plant by the government of the state in which the nuclear power plant is sited, gives rise to an international legal obligation of financial compensation by the host state.¹⁹ However, it is unlikely to be the last. As I will discuss in this article, recent trends in the financing of nuclear power plant development projects are likely to lead to increased applicability of

¹⁴ See generally Schreuer, Malintoppi, Reinisch & Sinclair, *THE ICSID CONVENTION: A COMMENTARY* (2nd ed., 2009).

¹⁵ See Nathalie Bernasconi-Osterwalder & Rhea Tamara Hoffman, *The German Nuclear Phase-Out Put to the Test in International Investment Arbitration? Background to the New Dispute Vattenfall v. Germany (II)*, International Institute for Sustainable Development Briefing Note, June 2012 (http://www.iisd.org/pdf/2012/german_nuclear_phase_out.pdf)

¹⁶ Vattenfall AB and others v. Federal Republic of Germany (ICSID Case No. ARB/12/12) (<https://icsid.worldbank.org/ICSID/FrontServlet>)

¹⁷ www.vattenfall.com/en/file/Q4-2011-Report_19971864.pdf

¹⁸ <http://www.dw.de/vattenfall-seeks-recompense-for-german-nuclear-phaseout/a-16473507>

¹⁹ There have been a number of previous international investment arbitrations involving nuclear power plants in one way or another (e.g. *Hrvatska Elektroprivreda d.d. v. Republic of Slovenia*, ICSID Case No. ARB/05/24; *Limited Liability Company Amto v. Ukraine*, AISCC Arbitration No. 080/2005). However, the Vattenfall case appears to be the first case in which the investment in dispute is an investment in the nuclear power plant itself, i.e. in the entity which owns the nuclear power plant.

international investment law to investments in nuclear power plants, and therefore to more frequent recourse by foreign investors to international arbitration in venues such as the ICSID, in attempt to seek compensation from host states for alleged unfair regulatory treatment of their investments.

My essential thesis in this article is that, as corporate and project finance trends continue in nuclear power plant financing, resulting in diversified and much broader and more complex structures of foreign investment, international investment law will become increasingly relevant to and influential upon these transactions. This in turn will spawn a new wave of disputes based in international investment law claims, before international arbitral tribunals including the ICSID.

I will begin in Part I by describing recent trends in the financing of nuclear power plants. These trends include a shift from almost exclusively sovereign-assumed financing cost and risk, to other financing models which increasingly access global capital markets, and spread risk among a larger and more diverse set of investors. Corporate and project finance models and case studies will be reviewed.

I will then proceed in Part II to review and consider the international legal sources specifically addressing nuclear energy development and related international trade and investment transactions. I will focus on the sources of international investment law, primarily including both bilateral and multilateral treaties, as well as customary international law. I will discuss both the primary, or direct ways in which the current trends in nuclear power plant financing are making international investment law increasingly relevant to nuclear power plant related investments, as well as the secondary effect this increasing relevance will likely have upon future structuring of financing arrangements for new nuclear power plants.

In Part III I will provide detailed consideration of the application of international investment law to foreign investments in nuclear power plants, including areas in which host states of such investments are most likely to experience increased exposure to liability due to current financing trends. I will conclude with a further consideration of the secondary effects caused by this increased host state exposure to liability, including effects on future structuring of financing arrangements for new nuclear power plants, and effects on (re)negotiations of international investment law instruments between actual or potential host states, and states that are actual or potential home states of nuclear vendors and investors.

I. Current Trends in Nuclear Power Plant Financing

A nuclear power plant (NPP) is an extremely capital intensive addition to a country's energy infrastructure. The up-front cost of constructing a NPP prior to its entry into operation is dependent on many factors, including the size and power output of the plant. The World Nuclear Association has provided the following information on a number of recently completed NPPs and their engineering, procurement and construction costs, including a calculation of the cost per kilowatt of energy to be produced by the plant:²⁰

²⁰ <http://www.world-nuclear.org/info/inf02.html>

EdF Flamanville EPR: **\$5.6 billion** (\$3400/kW)
 Bruce Power Alberta, 2 x 1100 MWe ACR: **\$6.2 billion** (\$2800/kW)
 CGNPC Hongyanhe, 4 x 1080 MWe CPR-1000: **\$6.6 billion** (\$1530/kW)
 AEO Novovroznezh 6&7, 2136 MWe net: **\$5 billion** (\$2340/kW)
 AEP Volgodonsk 3 & 4, 2 x 1200 MWe VVER: **\$4.8 billion** (\$2000/kW)
 KHNP Shin Kori 3&4, 1350 MWe APR-1400: **\$5 billion** (\$1850/kW)
 NRG South Texas, 2 x 1350 MWe ABWR: **\$8 billion** (\$2900/kW)
 ENEC for UAE from Kepco, 4 x 1400 MWe APR-1400: **\$20.4 billion** (\$3643/kW)

It is this massive up-front cost that has always proved the greatest challenge to financing the construction of a new NPP. Other costs specially associated with constructing and operating a NPP include the sourcing and pricing of nuclear fuel, licensing and other regulatory compliance costs, security of the facility, supply chain complexities and inefficiencies, liability insurance, and the exceptional length of time typically required to construct a NPP and bring it to operational status, including often encountered construction delays and budget overruns. From design to operation, a NPP can typically take up to a decade to construct. During this time, and before the plant becomes operational and any revenue is realized, the up-front costs remain on investors' books, and can generate significant additional financing costs.²¹

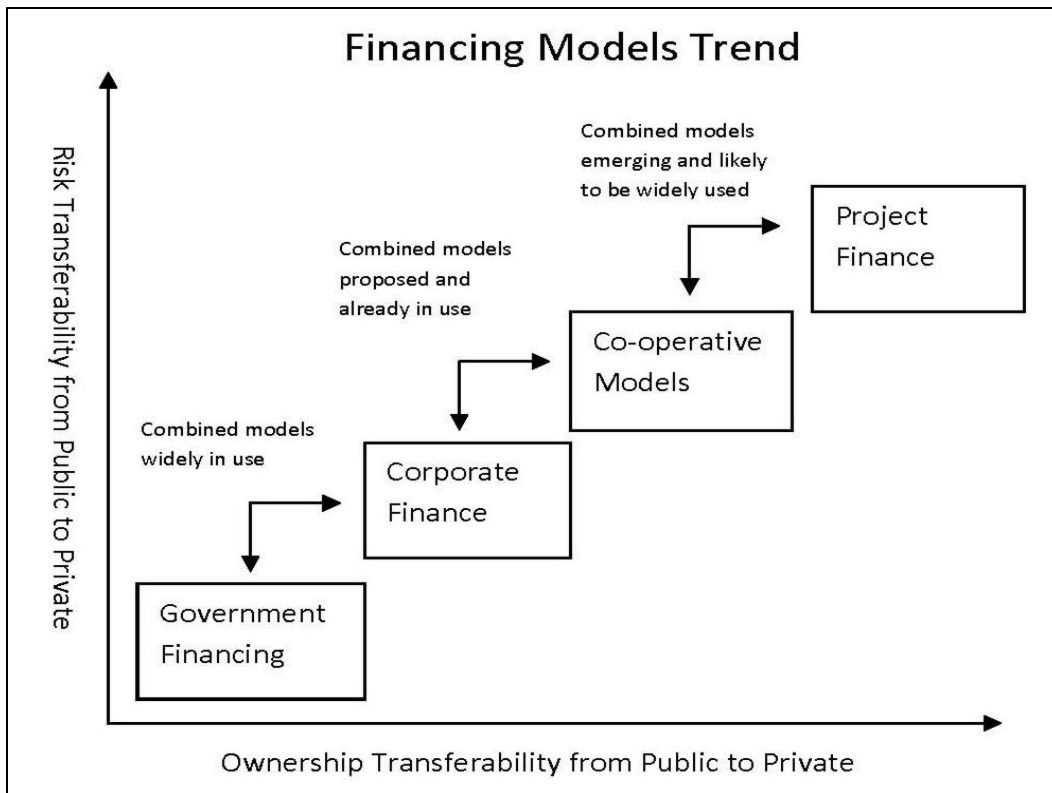
Once operational, the business model for recouping costs and realizing profit for investors relies on long term operation and a steady revenue stream. With such a business model of high capital outlay and long term revenue generation dependence, there are sizeable risks attached to investment in new NPP construction. These include the risk of regulatory noncompliance in a heavily regulated industry, temporary or permanent shutdown due to malfunction or safety concern, potential liability from nuclear accidents, plant operating performance, the unpredictable dynamics of the energy market, and management of spent fuel and waste.

Traditionally, the combination of all of these factors of cost and risk meant that the only entities both able and willing to undertake the construction of a new NPP were state-owned or regulated, sovereign backed utilities. In essence, under this financing

²¹ For this Part, see generally *The Financing of Nuclear Power Plants*, Nuclear Energy Agency, Organisation for Economic Cooperation and Development (2009) (<http://www.oecd-neo.org/ndd/reports/2009/financing-plants.pdf>); *The Economics of Long-Term Operation of Nuclear Power Plants*, Nuclear Energy Agency, Organisation for Economic Cooperation and Development (2012) (<http://www.oecd-neo.org/ndd/reports/2012/7054-long-term-operation-npps.pdf>); *Financing of New Nuclear Power Plants*, IAEA Nuclear Energy Series No. NG-T-4.2 (2008) (http://www-pub.iaea.org/MTCD/Publications/PDF/Pub1345_web.pdf); *Issues to Improve the Prospects of Financing Nuclear Power Plants*, IAEA Nuclear Energy Series No. NG-T-4.1 (2009) (http://www-pub.iaea.org/MTCD/publications/PDF/Pub1408_web.pdf); Ioannis N. Kessides, *The Future of the Nuclear Industry Reconsidered: Risks, Uncertainties, and Continued Potential*, Policy Research Working Paper 6112, The World Bank Development Research Group (June 2012) (<http://elibrary.worldbank.org/docserver/download/6112.pdf?expires=1361854624&id=id&accname=guest&checksum=E9921A281AD3E778DC01269D17B7E4DD>).

model, partially or wholly state-owned utilities, backed by sovereign guarantee, would completely finance the construction of the nuclear power plant, and assume the costs and risks associated with construction and operation of the NPP. Due to the sovereign-backed character of this investment, however, these costs and risks were all essentially passed on to the eventual consumers of the power produced by the plant, who were also typically the taxpayers funding the state owned and regulated utility. At present, all completed and operating nuclear power plants around the world were financed essentially on this basis.

However, as has been the case with other capital intensive energy infrastructure projects, and infrastructure development in other sectors as well, the financing of NPPs has undergone significant change over the past decade, and new models for financing the construction of NPPs have begun to be utilized, which take advantage of global capital markets in order to diversify the sources of finance, and spread financial cost and risk among multiple investors. The following graph summarizes these models and their relationship along multiple axes:²²



²² Graph directly based upon and only slightly modified from a table created by Nadira Barkatullah in her presentation: *Financing of Nuclear Power Projects*, IAEA/ICTP School of Nuclear Energy Management, Trieste, Italy, August 9, 2011 (IAEA).
http://www.iaea.org/nuclearenergy/nuclearknowledge/schools/NEM-school/archive/2011/topics/topic1/FinanceNPP-ICTP-9_Barkatullah.pdf

A. Corporate Finance

Although there are many ways in which to structure the financing of any capital intensive infrastructure project, there are of course only two basic methods for raising capital for that purpose: debt and equity. Most infrastructure projects will involve a combination of both types of financing, in different proportions, depending on the project and the financing model chosen. One way to distinguish between financing models at their most basic level is as between those in which the method of financing is backed by the existing assets of the project's promoters (corporate finance), and those in which financing is backed only by the project itself (project finance or limited recourse finance).

A NPP construction project will typically be led by a large utility, often experienced in operating NPPs, potentially together with other partners. These can include other utilities which, in return for their capital investment, contract for the rights to sell a proportion of the electricity to be produced by the NPP to their customers. They can also include non-utility investors, and even consumers from electricity-intensive industries.²³ The involvement of sovereigns as whole or partial owners of the utilities involved and/or as financial contributors or guarantors of at least a portion of the financing, is a near certainty in any NPP financing model. However, unlike in the traditional model in which a sovereign backer of a utility typically assumed 100% of the cost and risk of a NPP construction project, corporate finance models have recently been used in some cases to bring additional sovereign and private investors into the financing structure, and spread much of the cost, and some of the risk, around to the members of the consortium.

One example is the case of the construction of the number 3 and number 4 VVER nuclear reactors at the Mochovce NPP in Slovakia.²⁴ In 2006 Italian energy utility ENEL purchased a 66% equity interest in the Slovak energy utility Slovenske elektrarne (SE), during its privatization. ENEL is itself partially privatized under Italian government control, with the largest shareholders consisting of Italian Ministry of Economy & Finance and the state-run bank Cassa Depositi e Prestiti. In 2008, SE announced that it would complete Mochovce units 3 & 4, originally due to be finished by 2012 and 2013 respectively (though currently still under construction). The Mochovce case exemplifies corporate finance through a diversity of equity, and therefore risk, holders in the lead utility at multiple levels, as well as debt financing through bond issuance by ENEL.

Another example, with even further diversity of investors and spread of both cost and risk, is the case of the construction of four South Korean-designed pressurized water nuclear reactors (PWRs) at the Barakah NPP in the United Arab Emirates.²⁵ Although initially planned as a project finance structure, the final financing package for the

²³ See *The Financing of Nuclear Power Plants*, Nuclear Energy Agency, Organisation for Economic Cooperation and Development (2009), Pg. 41 (<http://www.oecd-neo.org/ndd/reports/2009/financing-plants.pdf>)

²⁴ See (<http://www.reuters.com/article/2012/12/19/slovakia-mochovce-idUSL5E8NJ8X020121219>) & (http://www.banktrack.org/manage/ajax/ems_dodgydeals/createPDF/mochovce_nuclear_power_plant_unit_s_3_4)

²⁵ See UAE: Abu Dhabi Absorbs Barakah Risk, Nuclear Intelligence Weekly, August 3, 2012; (<http://gulfnnews.com/business/features/full-steam-ahead-for-nuclear-plans-1.733832>) ; (http://www.world-nuclear-news.org/C-US_bank_finances_UAE_project-1009127.html).

Barakah NPP consists of equity investment both by the Emirates Nuclear Energy Corporation (ENEC) – the project’s primary developer – and by the vendor of the reactors, Korea Electric power Company (KEPCO). Added to this equity investment is a \$2 billion line of credit extended to the project by the Export-Import Bank of the United States (U.S. Company Westinghouse is a member of the KEPCO-led consortium selected to construct the NPP). The government of the UAE has additionally agreed to guarantee all external loans provided to the project.

Again, the benefits of the corporate finance model for financing a new NPP over the traditional model, include an increase in the number and in the diversity in identity of investors, and a sharing of both cost and risk among them. However, importantly, the corporate finance model does still typically place the assets of the utilities and their financing partners directly at risk in the event of the occurrence of any one of the significant risks associated with construction and operation of a NPP.²⁶

B. Hybrid Model

Partly in consideration of this concern regarding exposure of investor assets to risks associated with long-term NPP development projects, some recent NPP financing models have been structured using elements of both corporate finance and limited recourse project finance, through the intermediary use of a project specific joint venture company (JVC), often referred to in this context as a Special Purpose Vehicle (SPV). Examples of such a hybrid structure include a number of NPP projects currently being developed in Finland. In fact, these projects have become so associated with the hybrid corporate/project finance model that this model is often referred as the “Finnish Model.”

The Olkiluoto unit 3 project is owned by the SPV Teollisuuden Voima Oyj (TVO).²⁷ TVO is itself owned through share purchase by Finnish utilities and by large electricity consumers. These electricity consumers have entered into power purchase agreements with TVO, under which the price of electricity to be sold to them in the future is set in advance, thus guaranteeing them predictable power supply cost. TVO has financed the construction of the Olkiluoto 3 reactor on its own balance sheet, which includes both equity purchase and loans provided to TVO by its shareholders. TVO has also secured export credit guarantees by the French, Finnish and Swedish governments.

Another Finnish NPP project, the Pyhajoki site, employs a similar structure for its financing.²⁸ In this case, the SPV Fennovoima is owned by German utility E.ON (34%)

²⁶ See *The Financing of Nuclear Power Plants*, Nuclear Energy Agency, Organisation for Economic Cooperation and Development (2009), Pg. 43 (<http://www.oecd-neo.org/ndd/reports/2009/financing-plants.pdf>).

²⁷ See (http://www.world-nuclear-news.org/-Arbitration_court_rules_on_Olkiluoto_3-0607124.html); (<http://www.globalarbitrationreview.com/news/article/30671/areva-siemens-win-latest-round-nuclear-dispute/>); (<http://www.world-nuclear.org/info/inf76.html>) ; (http://crgp.stanford.edu/events/presentations/CRGP_Alto_2010/Case_1/Olkiluoto_3_case_workshop_1.pdf)

²⁸ See (<http://www.world-nuclear.org/info/inf76.html>); (<http://www.neimagazine.com/news/newsfinnish-government-says-yes-to-tvo-and-fennovoima>); (http://www.world-nuclear-news.org/NN_Plans_and_partners_develop_for_Fennovoima_1912101.html)

and a consortium of Finnish power and industrial companies collectively acting through the Finnish company Voimasakeyhtio SF (66%). The fact that Fennovoima is one-third owned by a foreign utility, makes the Pyhajoki project particularly progressive in its financing structure.

The use of a project-specific, stand-alone SPV to finance and to ultimately own and operate a NPP under this model, has the advantage for shareholder investors that their assets not directly committed to the project SPV are not at risk. However, due to this limited recourse, it is often more difficult and expensive for project-specific SPV's to obtain loans from banks or other sources.

C. Project Finance

The furthest progression away from the traditional single-public-utility model of NPP financing, is for the financing structure to employ a project-specific SPV to finance and to own and operate the NPP, and for this JVC to be essentially the sole nexus for the investors in the project. Shares in the JVC will be purchased by participants through the provision of either debt or equity financing, and the JVC itself will secure additional funding from investors or banks in its own name. Such a project finance model can involve a large and diverse set of public and private investors. The connection of the various investors to the project can range from immediately connected, e.g. the utility or set of utilities located in the country where the NPP is sited, to pure portfolio investment by entities not at all connected to the project, other than through their investment. As is also true with corporate finance models, project finance models typically involve complex corporate structures, spanning multiple jurisdictions, through which financing funds are channeled into the ultimate project SPV.

For example, a recent trend is for partnerships of large electric utilities, such as ENEL/EDF (Sviluppo Nucleare Italia), Constellation Energy/EDF (Unistar Nuclear Energy), and Eon/RWE (Horizon Nuclear Power), to team up with nuclear technology vendors (e.g. Westinghouse, General Electric, Hitachi) and other nuclear industry investment companies, to form a SPV in a country often not directly connected to any of the lead utilities. This SPV will take the lead role in shepherding a NPP project from start to finish, and will ultimately own and operate the NPP. The lead utilities will draw upon their experience and expertise in constructing and operating NPPs in other countries, and will manage the various construction and operation contractors, both conventional and nuclear, and oversee the project. The purchase of shares in the SPV by these lead investors serves to provide anchor capital to attract other equity investors, including portfolio investors, to make relatively small share purchases in the SPV, and fill out the financing package. Plans to finance the construction of two new reactors at the Temelin NPP in the Czech Republic are proceeding according to this model, with several different consortia of utilities and vendors competing for the project with bids to Czech Power Company (CEZ), the primary Czech power utility - itself a joint stock company.²⁹

Often involved in the most recent project finance deals for construction of new NPPs, is the participation as an investor of the primary vendor of the NPP technology for

²⁹ See (http://www.world-nuclear-news.org/NN-Application_in_for_new_Temelin_units-3011124.html);

the project – i.e. the company that will actually be building the nuclear island containing the reactor core. This is quite a recent phenomenon in NPP financing, though it is consistent with trends in other areas of capital intensive infrastructure development as well. There are of course relatively few companies in the world that are in the business of constructing and selling the core technologies of NPPs. Westinghouse, Areva, General Electric, Hitachi, Mitsubishi, and Toshiba are among the most prominent of these companies. Traditionally, the NPP vendor company would undertake the construction of a NPP on a turnkey contract basis, meaning that it would work with subcontractors and take responsibility for the entire construction effort of the nuclear island, but once the NPP was finished, the vendor's role would essentially be over, and they would move on to the next project. In recent years, however, NPP owners/operators have been more insistent that vendors join the consortium of investors themselves – the idea being that vendors should maintain some of their own “skin in the game,” and have their financial fortunes tied to the ultimate success or failure of the NPP as a business venture.

For their part, vendors have not at all welcomed this new trend in which they are expected to commit significant amounts of their own capital as investments in NPP projects, often for many years at a time. Tying up their own business capital in NPP investments, of course, leaves less to commit to future construction projects, which is their primary business and source of profit. Vendors have therefore only reluctantly agreed to go along with this new trend. However, the insistence of developers that vendors be involved in the financing consortium has become so widespread that, in order to remain competitive in their bidding for new projects, vendors have typically had little choice but to include such an ongoing investment in their bids. One example of this trend is the Visaginas NPP project in Lithuania, in which Hitachi, the vendor of the nuclear island technology for the project, will provide investment capital in exchange for a 20% equity stake in the \$6.5 billion project.³⁰

Again, in all of these models of project finance structuring, one of the chief attractions to some, particularly large utility investors, is the limited recourse nature of the SPV which serves as the direct owner and operator of the project. However, this is also the very aspect of such models that makes it difficult to raise enough capital from other investors to cover the massive initial outlays necessary to construct a NPP and bring it into operation. For many investors, not having a sovereign guarantor of the project, who will be able, for example, to step in and absorb unanticipated cost overruns and keep the project on track to completion, simply presents too great a risk compared to other investment opportunities. This is precisely why, though initially conceived on a project finance basis, the construction of the four new reactors at the Barakah NPP in the United Arab Emirates has only been made practical through a credit facility from the U.S. ExIm Bank, and, most importantly, through the Abu Dhabi government's decision to guarantee all external loans provided to the project. While many project finance based NPP development projects are currently proceeding, none has yet resulted in a completed and successfully operating NPP.

³⁰ See (<http://www.bloomberg.com/news/2012-02-23/lithuania-s-planned-visaginas-nuclear-plant-to-cost-6-5-billion.html>).

D. Summary of Financing Trends and the Legacy of Fukushima

In summary of this Part, with few exceptions (e.g. Rosatom's build-own-operate approach in Turkey and Belarus)³¹ the modern trend in NPP financing involves highly complex financing structures, involving an increasing number of investors, and a broad diversity in the identity and origin of those investors – from local public utilities, to foreign public/private utility consortia, to private foreign vendors, to domestic or foreign public export import banks, to an array of portfolio equity investors of both public and private character drawn from global capital markets. This increase in diversity among investors includes a significant increase in the number of foreign investors involved in the financing of NPP development projects, as compared to the classic local-utility-based model.

As mentioned above, the impact of the 2011 Fukushima nuclear incident on the future of existing nuclear facilities, and on the development of new nuclear facilities around the world, has been the subject of intense public debate, and of concern within the nuclear industry. While there have been some dramatic developments, such as the decision of the German government to move away from nuclear energy entirely, in most cases the impact of Fukushima on planned NPP developments has been a delay and not a cancellation of construction. This is primarily because, for the countries that are most seriously engaged in expansion of their nuclear power programs, the underlying realities of energy need, and the alternatives available for supplying that energy, have not fundamentally changed. And while concern about safety of nuclear facilities is always paramount, modern NPP designs, combined with safety lessons learned *inter alia* through the experience of the Fukushima disaster, offer confidence to most nuclear developers that the risks presented by their new nuclear facilities will be manageable. As a result, the most recent forecasts by both the International Atomic Energy Agency, and the International Energy Agency, are that the recent expansion in nuclear energy capacity worldwide, and particularly in China, India, the Middle East and Eastern Europe (sometimes referred to as the “nuclear renaissance”), will continue despite the setback of the Fukushima disaster.³²

The most significant influence of the Fukushima disaster on the nuclear industry is likely to be an increase in consciousness about, and emphasis on, existing facility safety upgrades, and thorough safety planning for new facilities. It is also likely that, due to the heightening of perceived risk associated with NPP development within global capital markets, NPP developers and investors will increasingly look to diversify capital sources in order to spread financial cost and risk. They will also likely look for the involvement of sovereign guarantors of NPP development projects as indispensable elements of the overall financing structure. Thus, the trend in expansion of the number of investors involved in NPP development projects, as well as the diversification in identity

³¹ See (http://www.world-nuclear-news.org/C-Rosatom_gears_up_to_serve_global_market-1408124.html).

³² (<http://safetyfirst.nei.org/industry-actions/iaea-nuclear-expansion-to-continue-despite-fukushima/>) ; (http://www.world-nuclear-news.org/EE-IEA_cuts_nuclear_power_growth_forecast-1211124.html). On the nuclear renaissance, see (<http://www.world-nuclear.org/info/inf104.html>); (<http://www.economist.com/node/21549936>).

and nationality of those investors, is likely to proceed undeterred, and if anything catalyzed, by the Fukushima disaster.

II. International Investment Law and its Relevance

There is a significant and growing body of international law regulating nuclear energy in both its civilian and military applications. The cornerstone of this legal regime is the 1968 Nuclear Nonproliferation Treaty (NPT), which codified an agreed framework of basic rights and responsibilities of states with regard to nuclear energy.³³ Any civilian use of nuclear energy falls within this basic framework established by the NPT, with its recognition in Article IV of an inalienable right of states to pursue peaceful uses of nuclear energy, including development of the full nuclear fuel cycle, as limited by non-nuclear weapon states' necessary compliance with Articles I, II, and III of the treaty, which impose obligations aimed at preventing the proliferation of nuclear weapons.

Article III of the NPT requires non-nuclear weapon states to conclude a separate bilateral treaty with the International Atomic Energy Agency (IAEA), under which all fissile materials and all civilian nuclear facilities within the territory of the state will be placed under safeguards administered by the IAEA, to confirm that no fissile material is diverted from peaceful uses to military uses. Article III also provides an international legal mandate for states to individually maintain national export control systems, designed to prevent the spread of materials and technologies that could be used in a military nuclear program, to states and non-state actors of concern. Many national export control systems are coordinated and harmonized through the Nuclear Suppliers Group, a nonbinding multilateral arrangement among supplier states.³⁴

In order to facilitate international trade in peaceful nuclear energy technologies and materials, states frequently enter into bilateral nuclear technology transfer agreements, which provide the legal basis upon which international nuclear trade involving both public and private actors between their territories must proceed. Such agreements entered into by the United States are typically referred to as "123 Agreements," after the section of the 1954 Atomic Energy Act which requires that such an agreement be in force with a foreign state before technology trade with U.S. nuclear vendors can occur.³⁵

When considering the construction of a nuclear power plant in particular, both the state upon whose territory the NPP will be sited, as well as the vendor companies supplying nuclear technologies to the site, should be aware of the sources of international law directly applying to civilian nuclear facilities. These include treaties and customary international law placing obligations on states regarding the safety of nuclear materials, the security of nuclear facilities, liability for nuclear accidents, and the treatment and disposition of radioactive waste. All of these sources of public international law addressing nuclear energy, taken together, comprise the international regulatory

³³ See Daniel H. Joyner, *INTERPRETING THE NUCLEAR NONPROLIFERATION TREATY* (2011).

³⁴ See Daniel H. Joyner, *The Nuclear Suppliers Group: History and Functioning*, *INTERNATIONAL TRADE LAW & REGULATION* 11(2), 33-42 (2005).

³⁵ See (<http://www.fas.org/sgp/crs/nuke/RS22937.pdf>)

framework within which civilian nuclear power plant development, and related international transactions, must occur.³⁶

However, there is another body of international law which is not *per se* specific to nuclear energy, and which could not be said to have played a particularly influential role in relation to international transactions in nuclear technologies, until the filing of the Vattenfall dispute discussed previously. As noted in that discussion, the Vattenfall case is based in international investment law, the primary sources of which are bilateral, and in some cases regional multilateral, treaties imposing obligations upon states parties with regard to their regulatory treatment of foreign investments within their territories.³⁷ While the past decade has seen a remarkable rise to prominence of international investment law within the practice of international law, resulting in something of a cottage industry of practitioners litigating an ever increasing number of disputes before international arbitral tribunals, such as those established under the ICSID framework, international investment law claims directly involving investments in nuclear energy facilities had not been seen until the filing of the Vattenfall case in 2011. As explained above, under the traditional model of NPP financing and ownership, one or a small number of typically state-owned utilities would finance the building of a NPP on their balance sheets, usually backed by sovereign guarantee of outside, private loans or other investments. Under this framework of investment, while a NPP project might or might not be successful from a profitability perspective, few investors in NPP projects ever lost money on those investments, due to the underlying sovereign guarantees.

However, as the Vattenfall case demonstrates, newer trends in NPP financing that involve limited recourse for investors, and increased project related cost and risk, shared by an increasing number of investors of diverse nationalities, are producing a greater likelihood of international investment law's relevance to and influence upon such investments. This relevance and influence will be both direct and indirect.

Firstly, in terms of direct legal liability, broader-based and more complex and diverse foreign investment in NPPs increases the likelihood that a foreign investor in a NPP development project will suffer financial loss on their investment, with no direct recourse against the project or the other investors, and will seek to bring a claim under international investment law against the host state government. This is likely to lead to an increased incidence of claims brought before international investment tribunals like those of the ICSID.

Secondly, this increase in likelihood of the exposure of host states to significant liability under international investment law, will likely have its own secondary effect upon future structuring of financing arrangements for new NPPs. Host states of NPP projects will need to factor in this increased likelihood of legal claims against them when considering both potential participation in NPP development projects, as well as the pricing of such projects. Similarly, potential investors will be able to factor in the

³⁶ See (<http://www.oecd-neo.org/law/isnl/10th/isnl-10th-anniversary.pdf>)

³⁷ On international investment law see generally Dolzer & Schreuer, *PRINCIPLES OF INTERNATIONAL INVESTMENT LAW* (2nd ed., 2012); Dugan, Wallace, Rubins & Sabani, *INVESTOR-STATE ARBITRATION* (2008); Muchlinski, Ortino & Schreuer, *THE OXFORD HANDBOOK OF INTERNATIONAL INVESTMENT LAW* (2008); Zachary Douglas, *THE INTERNATIONAL LAW OF INVESTMENT CLAIMS* (2009); McLachlan, Shore & Weiniger, *INTERNATIONAL INVESTMENT ARBITRATION: SUBSTANTIVE PRINCIPLES* (2007); Schreuer, Malintoppi, Reinisch & Sinclair, *THE ICSID CONVENTION: A COMMENTARY* (2nd ed., 2009).

investor protection function of international investment law, when they are considering both participation in and financing and structuring of NPP development projects.

In addition, the increase in likelihood of exposure of host states to liability may have the further secondary effect of influencing actual or potential host states of nuclear investments, in their (re)negotiations of bilateral investment treaties with states that are home states of nuclear vendors or investors, in order to secure terms designed to limit this liability.

I will proceed to a more detailed consideration of potential direct legal liability for host states of NPP investments under international investment law.

III. Application of International Investment Law to NPP Investments

Before beginning a review of the application of international investment law to NPP investments, it is important to note that most of the direct applications of bilateral investment treaty (BIT) law to NPP investments that I will review herein will not be particularly novel as a matter of law. The doctrines and jurisprudence of international investment law have been well developed on the full range of its application to the sorts of financial transactions typically involved in NPP investments.

However, there has been very little awareness among legal practitioners, and current and future investors and host states, regarding how the sources of international investment law apply to investments specifically in the NPP finance area. Due to the significant increase in the overall number of NPPs constructed or under construction around the world over the past twenty years – often referred to as the “nuclear renaissance” – along with the trends of complexity and diversification in NPP financing models reviewed above, international investment law will likely have increased relevance and application to NPP investments in the future. Thus, a review of the scope and particulars of this particular application of international investment law is both novel and important for practitioners, investors, and host states alike.

Again, because of the wealth of jurisprudence and scholarly explication and commentary on all aspects of international investment law, I will not attempt herein to undertake an exhaustive examination of international investment law principles as they apply to NPP investments. Rather, in order to be most useful to practitioners, investors and host states, I will particularly identify and analyze principles of international investment law of most relevance for understanding how exposure to liability is likely to increase for host states, as diversified financing trendlines continue to result in more, and more complicated and diverse, foreign investment in NPPs. These include areas in which public policy considerations of host states are most likely to come into tension with their BIT obligations to foreign nuclear power plant investors.

The implications of having foreign investment in nuclear power plants by an increasingly diverse and complex set of foreign investors, under circumstances of limited recourse, is of course that any BIT liability for the host state is likely to affect a greater number of foreign investors, and more seriously, and therefore create a higher potential level of financial exposure for the host state.

It is also important to reiterate before proceeding that there is at present no universal harmonizing multilateral treaty on international investment law. Efforts to establish such a multilateral agreement on investment have unfortunately failed. Thus, international investment law is currently still comprised of a web of bilateral treaties between states, and a few regional multilateral treaties. Because of this reality, analysis of the law and its applicability to facts can only be done with certainty on a case by case basis, in light of the particular provisions of the applicable bilateral or regional treaty and related customary international law.

That being said, it is possible generally to discern provisions and principles of international investment law which are common in many, if not most, BITs on a number of fundamental issues. It is also possible, notwithstanding the notoriously decentralized nature of international investment arbitration, to outline a number of trends in the jurisprudence of international investment arbitral tribunals regarding these principles, chiefly including ICSID tribunals. These principles and trends in jurisprudence can provide a general overview of some of the most important applications of international investment law, of which practitioners, investors and host states should be aware.

A. Investment/Investor

The first issue to be considered in any analysis of the application of international investment law, is whether the financial transaction under consideration meets the qualifying definitions for both “investor” and “investment” as spelled out in the relevant BIT. Under the predominant “asset-based” definition of a qualifying investment, assets meeting the test for investments typically include all assets owned or controlled either directly or indirectly by nationals or companies of the other party to the treaty.³⁸ Specifically included are, typically, both tangible and intangible property, rights such as mortgages and liens, shares of stock or other equity interests in a company or its assets, claims to money or performance having economic value, intellectual property including licenses, and any other right conferred by law or contract. Some BITs will include portfolio investment within this list of qualifying assets, while others explicitly exclude it.

In addition to the criteria within the applicable BIT itself, ICSID tribunals have typically looked for several specific criteria in order to determine whether a transaction amounts to a covered investment. With some variation, these criteria are: “the existence of a substantial contribution; the project should have a certain duration; participation in the risks of the transaction for both parties; and the operation should be significant for the host state’s development.”³⁹

BITs that include such a broad, asset-based definition, and that specify that assets controlled both directly and indirectly by investors qualify as investments, will likely cover all of the typical investments made by investors in NPPs pursuant to the financing models discussed above. In most such cases, investments by foreign investors will be

³⁸ See generally Engela C. Schlemmer, “Investment, Investor, Nationality, and Shareholders,” in Muchlinski, Ortino, and Schreuer, eds., *THE OXFORD HANDBOOK OF INTERNATIONAL INVESTMENT LAW* (Oxford University Press, 2008).

³⁹ *id.* at pg. 65.

framed as relatively straightforward debt or equity investments, and as such will fit squarely within the scope of covered investments.

As in the context of many other types of international finance transactions, investments by foreign companies in a NPP construction project will frequently be structured through the intermediary involvement of a number of related companies, frequently across a number of different jurisdictions, through which funds will pass before ultimately being invested in the project company. The presence of such intermediary companies will not typically be problematic in finding the foreign investment to be covered by the applicable BIT between the host state of the investment, and the home state of the original investor. When faced with a transactional structure in which the investment at issue is owned by a number of juridical entities incorporated in various jurisdictions and/or an entity that is itself owned by other entities, or even a chain of entities, international arbitral tribunals will generally pierce any corporate facades and “go up the chain of ownership until they find an entity with standing to bring a treaty claim and stop at that point. Once a juridical entity with standing is identified, tribunals accept that the formal requirements for jurisdiction have been satisfied.”⁴⁰

Majority shareholding is also not necessary to qualify as an investment. “The size of an investment is, as a general rule, not relevant when one deals with investor protection. There is also no requirement that an investor (shareholder) must be a majority shareholder. The percentage of shareholding is never an issue; the mere fact that an investment was made, suffices.”⁴¹

Thus, in cases in which a foreign investor has made either a debt or equity investment in a NPP construction project, regardless of the size of the investment, and likely regardless of any corporate intermediaries between the original foreign investor and the investment itself, as long as the BIT between the host state and the home state of the original foreign investor contains a typical comprehensive, asset-based definition of investment, the investment is almost certain to be covered by the protections of the treaty.

One other kind of investment that is frequently made, particularly by foreign vendor companies in a NPP construction project, is the licensing of the use of technology related to the NPP to the builders and operators of the NPP. Such licenses are integral to the project, and form a major part of the costing of the project. Understandably, the right to control this intellectual property and its use, and protect it from being used outside of the terms of the license by the licensee or by any other party, is jealously guarded by the original rights holder (typically the vendor company). Under comprehensive asset-based definitions of investment, as that described above, such licenses are themselves protected investments under a BIT.

With regard to the definition of a qualified investor – a separate criterion which must be met in order for the transaction to be covered as an investment under an applicable BIT - BITs frequently provide separate definitions for corporate and individual investors, respectively. In the more common context of corporate investors, arbitral

⁴⁰ Christopher Dugan, et al., *INVESTOR-STATE ARBITRATION* (Oxford University Press, 2008), pg. 319

⁴¹ Engela C. Schlemmer, “Investment, Investor, Nationality, and Shareholders,” in Muchlinski, Ortino, and Schreuer, eds., *THE OXFORD HANDBOOK OF INTERNATIONAL INVESTMENT LAW* (Oxford University Press, 2008) pg. 83; See also generally Christoph Schreuer, *Shareholder Protection in International Investment Law*, 2 TDM (2005) (Available at http://www.univie.ac.at/intlaw/pdf/csunpublpaper_2.pdf); Campbell McLachlan, Laurence Shore and Matthew Weiniger, *INTERNATIONAL INVESTMENT ARBITRATION: SUBSTANTIVE PRINCIPLES* (Oxford University Press, 2007)(Pgs. 184-193).

tribunals tend to follow the reasoning of the International Court of Justice's 1970 *Barcelona Traction* case, in determining corporate nationality according to the principal seat or legal place of incorporation of the company, as opposed to an approach that looks through the corporate entity to determine the nationality of those persons or entities controlling the company in fact.⁴² Examples can be seen in the *Tokios Tokeles v. Ukraine* case, and the *Sedelmayer v. Russia* case.⁴³ In the *Tokios Tokeles* case, the tribunal granted jurisdiction for a Lithuanian company to bring a claim against Ukraine pursuant to the terms of the BIT between Lithuania and Ukraine, even though the Lithuanian company was owned and predominantly controlled by Ukrainian nationals. In this case, the tribunal was concerned only with the nationality of the claimant company, and refused to look further through the corporate veil to the original investors. Tribunals have typically maintained this position on corporate nationality, even when doing so will allow for multiple alternative fora in which investors may ultimately bring a BIT claim. In the *Lauder v. Czech Republic* case, a U.S. citizen controlled a Dutch company (CME), which in turn owned a company in the Czech Republic (CNTS). The U.S. citizen brought a claim against the Czech Republic as an indirect shareholder in the Czech company, under the Czech/U.S. BIT. This claim was found by the arbitral tribunal to be admissible.⁴⁴ In parallel proceedings before a different arbitral tribunal, the Dutch company controlled by the U.S. citizen brought a claim against the Czech Republic under the BIT between the Czech Republic and the Netherlands. This claim was also held to be admissible.⁴⁵

B. Entry and Establishment

Another issue that may be relevant to investors in NPPs and to host states is the issue of BIT treatment of entry and establishment of foreign investments.⁴⁶ The energy sector is of course a very sensitive area of public policy consideration for all states, involving economic as well as security concerns. Investments in NPPs by foreign investors could potentially provide a source of tension between the economics of infrastructure financing on the one hand, and such public policy concerns on the other. States may in some cases, therefore, feel it necessary to disallow certain foreign investments in NPPs. This in turn could become an issue to which international investment law applies.

⁴² *Barcelona Traction Light and Power Company Limited (Belgium V. Spain)*(1970) ICJ Reports 3. See Engela C. Schlemmer, "Investment, Investor, Nationality, and Shareholders," in Muchlinski, Ortino, and Schreuer, eds., *THE OXFORD HANDBOOK OF INTERNATIONAL INVESTMENT LAW* (Oxford University Press, 2008) pg. 75.

⁴³ *Tokios Tokeles v. Ukraine*, Decision on Jurisdiction, 29 April 2004, http://ita.law.uvic.ca/documents/Tokios-Jurisdiction_000.pdf ; *Franz Sedelmayer v. The Russian Federation*, Award, 7 July 1998.

⁴⁴ *Ronald S. Lauder v. The Czech Republic*. Award, 3 September 2001, <http://ita.law.uvic.ca/documents/LauderAward.pdf>

⁴⁵ *CME Czech Republic B.V. (The Netherlands) v. The Czech Republic*, Partial Award, 13 September 2001, <http://ita.law.uvic.ca/documents/CME-2001PartialAward.pdf>

⁴⁶ See generally Ignacio Gomez-Palacio & Peter Muchlinski, "Admission and Establishment," in Muchlinski, Ortino, and Schreuer, eds., *THE OXFORD HANDBOOK OF INTERNATIONAL INVESTMENT LAW* (Oxford University Press, 2008).

There is no general principle of international law requiring states to admit foreign investment into their territory, and in general states may have a number of public policy or economic reasons for excluding certain types of foreign investments, or certain foreign investors, from establishing an investment in their territory. BITs tend to cover this issue under one of two alternative frameworks. The preponderance of BITs incorporate what is referred to as the controlled entry model for entry and establishment of foreign investment. Essentially, this means that the BIT will provide in its terms that entry and establishment of foreign investment will be subject to the requirements of the national law of the host state, and no particular international legal limitations or disciplines of nondiscrimination will be stipulated. The controlled entry model has historically been favored by developing states in their negotiated BITs.

However, an increasing minority of BITs incorporate what is referred to as a fully liberalized model for entry and establishment of foreign investment. This model is typically favored in BITs negotiated by developed states. Essentially, the fully liberalized model provides for an extension of non-discrimination rules, including both most favored nation and national treatment rules, to the pre-entry stage of investment. For example, the BIT between the U.S. and the Czech Republic of 1992 provides in Article II(1) that:

Each Party shall permit and treat investment, and activities associated therewith, on a basis no less favorable than that accorded in like situations to investment or associated activities of its own nationals or companies, or of nationals or companies of any third country, whichever is the most favorable, subject to the right of each Party to make or maintain exceptions falling within one of the sectors or matters listed in the Annex to this Treaty.⁴⁷

As is illustrated in this excerpt, in BITs that incorporate a fully liberalized model for entry and establishment of foreign investment, it is common to provide that the general pre-entry nondiscrimination rules do *not* apply to certain specified industry sectors considered sensitive by the host state. In the above referenced U.S.-Czech Republic BIT, the sectors or matters subject to a negative exception by the U.S., and thus not subject to the BIT's nondiscrimination rules, include *inter alia* air transportation, banking, insurance, energy and power production, and ownership of real property.

Thus, in the context of investments in NPPs, host states and investors will need to look to the particular provisions of the relevant BITs to determine whether most favored nation and national treatment rules apply not only to the post-entry stage of the investment, but potentially to the pre-entry stage as well, thus potentially restricting host states' abilities to discriminate between potential investments on the basis of nationality.

⁴⁷ See (http://unctad.org/sections/dite/ia/docs/bits/czech_us.pdf)

C. Standards of Treatment

BITs differ quite widely in the substance and structure of their provisions incorporating the core obligations of host states with regard to established, covered foreign investments.⁴⁸ These provisions are the central *raison d'être* for BITs, and are frequently the subject of close negotiation between the states parties. Notwithstanding the wide array of difference in detailed content and structuring of these provisions, some elements common to most BITs can be discerned. It is these core obligations of treatment of foreign investment that are most often the subject of disputes between investors and host states before international arbitral tribunals. Again, because of trends in the financing of BITs producing a more complex and diverse array of foreign investors in many NPPs, host states will likely find themselves owing these substantive legal obligations to a far greater number of foreign investors than has previously been the case in the context of NPP development projects.

The most fundamental of such obligations, included in almost all BITs, are the nondiscrimination obligations of most favored nation treatment and national treatment with regard to covered foreign investments. The above quoted article from the U.S.-Czech Republic BIT is illustrative of a fairly concise provision incorporating both principles in one sentence. Quoting from the BIT again and adding explanatory notation in underline and bracketed bold:

Each Party shall permit and treat investment, and activities associated therewith, on a basis no less favorable [**Nondiscrimination Language**] than that accorded in like situations [**Comparator Term**] to investment or associated activities of its own nationals or companies [**National Treatment Language**], or of nationals or companies of any third country [**Most Favored Nation Language**], whichever is the most favorable, subject to the right of each Party to make or maintain exceptions falling within one of the sectors or matters listed in the Annex to this Treaty.⁴⁹

BITs will also typically include provisions obligating host states not to adopt regulatory measures that are arbitrary, or discriminatory, or violative of due process, and that impair the value of foreign investments. Another very common clause in BITs is a provision requiring host states at all times to accord fair and equitable treatment to foreign investments.

⁴⁸ See generally Todd Grierson-Weiler & Ian Laird, “Standards of Treatment,” in Muchlinski, Ortino, and Schreuer, eds., *THE OXFORD HANDBOOK OF INTERNATIONAL INVESTMENT LAW* (Oxford University Press, 2008); Anthea Roberts, *Power and Persuasion in Investment Treaty Interpretation: The Dual Role of States*, *AMERICAN JOURNAL OF INTERNATIONAL LAW*, Volume 104, pg. 179 (2010); Stephan Schill, *Deference in Investment Treaty Arbitration: Re-Conceptualizing the Standard of Review Through Comparative Public Law*, *JOURNAL OF INTERNATIONAL DISPUTE SETTLEMENT*, Volume 3(3) (November 2012).

⁴⁹ (http://unctad.org/sections/dite/ia/docs/bits/czech_us.pdf)

These provisions are often expressed fairly briefly in the text of a BIT, without significant explication. However, a wealth of jurisprudence from international arbitral tribunals has grown up around each of these elements of common BIT standards of treatment. Insightful and parsimonious in this regard, is the analysis of Todd Grierson-Weiler and Ian Laird, who have concluded from an extensive review of international arbitral decisions that there has in recent years been:

an apparent convergence in the interpretation of the minimum (or ‘fair and equitable’) and ‘non-discrimination’ standards of treatment found in most investment protection treaties . . . The convergence appears to have been based upon a tribunal’s analysis of the legitimacy of the expectations enjoyed by an investor with respect to investments covered under an investment protection treaty. The investor expects to receive treatment in accordance with an underlying conception of regulatory fairness, regardless of whether that concept is grounded in one or more differently formulated treaty provisions.⁵⁰

Essentially, Grierson-Weiler and Laird argue that international arbitral tribunals have increasingly viewed the “fair and equitable treatment” standard in common BIT provisions to provide a “parent” or “umbrella” standard, circumscribing and subsuming within its broader meaning the other, various concepts typically also included in BIT standards provisions. These concepts include both the most favored nation and national treatment nondiscrimination principles; prohibitions on “arbitrary” and “discriminatory” regulation; and the obligation for investments to be regulated only according to “due process.” As the ICSID arbitral tribunal in the 2004 *Waste Management* case explained:

Taken together, the *S.D. Myers*, *Modnev*, *ADF* and *Loewen* cases suggest that the minimum standard of treatment of fair and equitable treatment is infringed by conduct attributable to the State and harmful to the claimant if the conduct is arbitrary, grossly unfair, unjust or idiosyncratic, is discriminatory and exposes the claimant to sectional or racial prejudice, or involves a lack of due process leading to an outcome which offends judicial propriety – as might be the case with a manifest failure of natural justice in judicial proceedings or a complete lack of transparency and candor in an administrative process. In applying this standard it is relevant that the treatment is in breach of representations made by the host State which were reasonably relied on by the claimant.⁵¹

This unified, minimum standard of treatment, they argue, is essentially underpinned by the customary international law principle of good faith. As they explain:

⁵⁰ “Standards of Treatment,” Pg. 260, in Muchlinski, Ortino, and Schreuer, eds., *THE OXFORD HANDBOOK OF INTERNATIONAL INVESTMENT LAW* (Oxford University Press, 2008)

⁵¹ *Waste Management, Inc v. Mexico (No. 2)*, Award, 30 April 2004 (ICSID Case No. ARB (AF)/00/3), at para 98.

The principle of good faith thus operates to mandate regulatory fairness and transparency in a manner not dissimilar from the way in which it mandates responsibility for detrimental reliance. Rather than involving responsibility for a specific promise to a specific investment, the obligation to provide a transparent and predictable regulatory environment is a general promise made to international investors at large.⁵²

The failure by a host state to meet this minimum standard of treatment required by the provisions of most BITs, and underpinned by the principle of good faith in customary international law, will expose the host state to financial liability for the damage caused to a covered investment as a result of this failure.

D. Expropriation

As important as the general obligations relating to standards of treatment in a BIT, are the provisions concerning expropriation of a covered foreign investment by the host state.⁵³ The fear of expropriation of foreign investments was historically the prime *raison d'être* for international investment treaties, and continues to be a concern today. However, instead of direct expropriations, in which title to property is taken outright by the host state government - which do still occur, though rarely - most BIT jurisprudence today is focused on indirect expropriation, which occurs when regulatory measures short of a direct expropriation nevertheless “result in the effective loss of management, use or control, or a significant depreciation of the value of the assets of a foreign investor.”⁵⁴ As August Reinisch has explained:

Though there have been various attempts at clarifying and differentiating between different types of indirect expropriations, it appears that the term is frequently used interchangeably with expressions such as *de facto*, disguised, constructive, regulatory, consequential, or creeping expropriation. Attempts to define indirect expropriations focus on the ‘unreasonable interference’, with the ‘prevention of enjoyment’ or the ‘deprivation’ of property rights.⁵⁵

⁵² Todd Grierson-Weiler & Ian Laird, “Standards of Treatment,” Pg. 277, in Muchlinski, Ortino, and Schreuer, eds., THE OXFORD HANDBOOK OF INTERNATIONAL INVESTMENT LAW (Oxford University Press, 2008).

⁵³ See generally August Reinisch, “Expropriation,” in Muchlinski, Ortino, and Schreuer, eds., THE OXFORD HANDBOOK OF INTERNATIONAL INVESTMENT LAW (Oxford University Press, 2008).

⁵⁴ UNCTAD, Taking of Property, Series on Issues in International Investment Agreements (2000) at Pg. 2 (<http://unctad.org/en/docs/psiteiitd15.en.pdf>)

⁵⁵ “Expropriation,” Pg. 422, in Muchlinski, Ortino, and Schreuer, eds., THE OXFORD HANDBOOK OF INTERNATIONAL INVESTMENT LAW (Oxford University Press, 2008).

And as the arbitral tribunal held in the *Metalclad* case:

Thus, expropriation . . . includes not only open, deliberate and acknowledged takings of property, such as outright seizure or formal or obligatory transfer of title in favor of the host State, but also covert or incidental interference with the use of property which has the effect of depriving the owner, in whole or in significant part, of the use or reasonably-to-be-expected economic benefit of property even if not necessarily to the obvious benefit of the host State.⁵⁶

It is important to bear in mind that BITs do not prohibit expropriation. Neither does such a prohibition exist in customary international law. Rather, BIT rules and customary international law on expropriation, both direct and indirect, typically focus on the criteria to be met for a lawful expropriation, and the standard for compensation due to a foreign investor in the event of expropriation of its property. Thus, in the BIT between the U.S. and the Czech Republic, the primary expropriation provision states:

Investments shall not be expropriated or nationalized either directly or indirectly through measures tantamount to expropriation or nationalization (“expropriation”) except: for public purpose; in a nondiscriminatory manner; upon payment of prompt, adequate and effective compensation; and in accordance with due process of law and the general principles of treatment provided for in Article II(2).⁵⁷

One of the most contentious, evolving questions of BIT law relevant to indirect expropriation, is how to distinguish between compensable indirect expropriation on the one hand, and legitimate non-expropriatory regulation on the other. For example, the 2004 Canadian Model BIT provides that:

Except in rare circumstances, such as when a measure or series of measures are so severe in the light of their purpose that they cannot be reasonably viewed as having been adopted and applied in good faith, non-discriminatory measures of a Party that are designed and applied to protect legitimate public welfare objectives, such as health, safety and the environment, do not constitute indirect expropriation.⁵⁸

⁵⁶ *Metalclad Corp v. United Mexican States*, ARB(AF)/97/1, Award, 20 August 2000, 16 ICSID Rev-FIL J 168, 195 (2001) paragraph 103.

⁵⁷ (http://unctad.org/sections/dite/ia/docs/bits/czech_us.pdf)

⁵⁸ (<http://italaw.com/documents/Canadian2004-FIPA-model-en.pdf>) Annex B 13(1) on the clarification of indirect expropriation.

Of particular relevance to investments in nuclear power plants is this observation by August Reinisch:

At present environmental regulation poses some of the most difficult questions with regard to the proper delimitation between compensable expropriatory and legitimate regulatory measures. . . The broad implication of the *Methanex* and *Saluka* approach, more or less removing any non-discriminatory regulatory action for a public purpose from the scope of compensable regulatory takings, has given rise to an intense debate. It is too early to say whether legitimate regulatory purposes will in the future serve as an easily available escape from a potential finding of a regulatory expropriation.⁵⁹

Thus, the question of whether regulations adopted by the host state, which have the effect of diminishing the value of covered foreign investment in a NPP, constitute compensable indirect expropriation under a BIT, will be a complex inquiry which is highly specific to the facts and to the provisions of the applicable BIT. But in light of the public policy sensitivities surrounding NPPs with regard to *inter alia* safety, environmental and public health concerns, particularly in the post-Fukushima context, host states should be aware of the potential implications under international investment law of regulations that seek to address these concerns.

IV. Implications

As noted previously, I have attempted in Section III only to identify and analyze a few of the principles of international investment law that are of most relevance to investors, host states and practitioners, for understanding the scope of potential liability of host states for their regulatory treatment of foreign investment in NPPs.

Drawing on the analysis of trends in the financing of NPPs discussed in Section I, I have argued that, due to the significant increase in the overall number of NPPs constructed or under construction around the world over the past twenty years – often referred to as the “nuclear renaissance” – along with the trends of complexity and diversification in NPP financing models discussed, it is likely that there will be an increased incidence of applicability of international investment law to foreign investments in NPPs. Thus, investors, host states, and practitioners should be aware of this increasing applicability of international investment law, and of the substantive rules of international investment law defining host state obligations and potential legal liability.

As observed previously, however, the implications of this increasing applicability of international investment law extend beyond this primary level of potential direct legal liability. The increase in the frequency and seriousness of exposure of host states to liability under international investment law, will itself likely have secondary effects, both

⁵⁹ “Expropriation,” Pgs. 436-437, in Muchlinski, Ortino, and Schreuer, eds., *THE OXFORD HANDBOOK OF INTERNATIONAL INVESTMENT LAW* (Oxford University Press, 2008).

upon future structuring of financing arrangements for new nuclear power plants, and upon actual or potential host states of nuclear investments in their (re)negotiations of BIT's with states that are actual or potential home states of nuclear investors.

Both investors and host states will need to take this new legal variable into account when structuring and pricing future nuclear projects. For investors, the applicability of international investment law potentially means significantly improved protection for their nuclear investments, through an additional layer of inter-governmental public law, supplementing the private law contracts they will already have in place outlining the investment. For host states, the applicability of international investment law means yet another level of potential liability arising from the foreign investment in NPPs. The precise effect of these varied implications upon the pricing of a NPP development project will need to be the subject of project-specific negotiation.

Over time, the increased incidence of liability of host states under BITs relative to investments in NPPs, may cause some host states to seek through (re)negotiation of BITs with the home states of actual or potential nuclear investors, terms that restrict this liability. This too will need to be the subject of negotiation.