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ARTICLE

AN INTERNATIONAL LEGAL FRAMEWORK FOR SE4ALL: HUMAN RIGHTS AND SUSTAINABLE DEVELOPMENT LAW IMPERATIVES

Thoko Kaime & Robert L. Glicksman***

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ABSTRACT

Energy is critical to all aspects of human development. Modern life is possible only because of the opportunities afforded by modern energy systems. From cooking, to lighting and heating, to transport, access to energy is critical. Governments around the world recognize the link between human development and access to safe, secure, and affordable sources of energy. However, many people around the

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world have access to only rudimentary and inadequate energy sources, depriving them of opportunities for economic development and creating serious health risks. Even in countries where access to energy services is adequate, the provision of those services has both health and environmental effects. In particular, the production of energy using fossil fuels generates greenhouse gases that contribute significantly to climate disruption, which is likely to create disproportionate risks to the same undeveloped nations already suffering from a lack of access to adequate energy supplies.

To address these twin challenges, the United Nations Secretary-General launched the Sustainable Energy for All initiative (“SE4All”) to achieve universal access to energy for all, while at the same time increasing stocks of renewable energy and improving the efficiency of energy systems to mitigate climate disruption risks. This Article examines the genesis and context of SE4All, placing the effort within both its historical and international policy contexts. It highlights the voluntary nature of the initiative and argues that its effective implementation and the achievement of its goals require the articulation of an applicable international legal framework that aids the transformation of SE4All’s policy actions into binding international legal commitments. The article contends that such a transformation does not depend on the creation of entirely new legal rules or institutions. Instead, an effective framework for successful implementation of SE4All can be derived from existing rules of international human rights law and sustainable development law. Reliance on these twin bodies of international law will increase the prospects for SE4All to achieve energy access and related goals that its predecessor initiatives have failed to accomplish.

INTRODUCTION

The facts about energy access make for very distressing reading. A significant proportion of the global population lacks access to suitable energy sources. According to the International Energy Agency, 1.4 billion people in the poorest regions of the world have no access to electricity.¹ According to some estimates, the poorest three-

1. See *IEA, UNDP & UNIDO Release Energy Poverty Report*, INT’L INST. FOR SUSTAINABLE DEV., available at <http://climate-l.iisd.org/news/iea-undp-and-unido-release-energy-poverty-report/> (last visited Jan. 27, 2014); *Energy Poverty: How to Make Modern Energy Access Universal?*, INT’L ENERGY AGENCY, UNITED NATIONS DEV. PROGRAMME &

quarters of the global population use only ten percent of global energy.² The majority of forecasting scenarios indicate that 1.2 billion people—mostly in rural areas—will still lack access to electricity in 2030 if the current patterns of investment are maintained.³ Worldwide, 2.7 billion people—that is, roughly a third of the global population—rely on biomass-sourced fires for cooking and heating.⁴ These fires are made by burning animal dung, waste, crop residue, rotted wood, and other forms of biomass.⁵ Although between 1970 and 1990, rural electrification programs in developing countries connected nearly 800 million people to the electricity grid and provided another half billion with improved cooking facilities, the number of people without access to modern energy services has remained unchanged because of population growth.⁶ The great proportion of these people have no access to electricity or the benefits that it brings, such as lighting, space heating, cooking, or mechanical power. While biomass is good for making fires, it does not have the exogenous qualities needed to allow people to escape poverty. Fires from biomass cannot power hospitals, operate water pumps, enable agricultural equipment, or provide modern and reliable transportation systems. In order to achieve the Millennium Development Goals (“MDGs”), and specifically the goal to halve extreme poverty by

UNITED NATIONS INDUSTRIAL DEV. ORG., 7 (2010) [hereinafter *Energy Poverty*], available at http://www.SE4All.org/wp-content/uploads/2013/09/Special_Excerpt_of_WEO_2010.pdf.

2. See Mark Williams & Sharmila Murthy, *Reconciling the Carbon Market and the Human Right to Water: The Role of Suppressed Demand Under Clean Development Mechanism and the Gold Standard*, 43 ENVTL. L. 517, 541 (2013) (citations omitted).

3. See *Energy Poverty*, supra note 1, at 7.

4. See *id.*; see also Nina Robertson, Bruce Rich & Lynsey Gaudio, *As the World Burns: A Critique of the World Bank Group’s Energy Strategy*, 43 ENVTL. L. REP. NEWS & ANALYSIS 10760, 10762 (2013); Arno Behrens et al., *Escaping the Vicious Cycle of Poverty: Towards Universal Access to Energy in Developing Countries 3* (CEPS, Working Document No. 363, 2012), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2028909 (last visited Mar. 31, 2015).

5. See Nigel Bruce, Rogelio Perez-Padilla & Rachel Albalak, *Indoor Air Pollution in Developing Countries: A Major Environmental and Public Health Challenge*, 78(9) WORLD HEALTH ORG. 1078, 1078 (2000); Makoto Kanagawa & Toshihiko Nakata, *Assessment of Access to Electricity and the Socio-economic Impacts in Rural Areas of Developing Countries*, 36 ENERGY POL’Y 2016, 2017 (2008); Paul Wilkinson et al., *A Global Perspective on Energy: Health Effects and Injustice*, 370 THE LANCET 965, 966 (2007); Kamil Kaygusuz, *Energy Services and Energy Poverty for Sustainable Rural Development*, 15 RENEWABLE & SUSTAINABLE ENERGY REV. 936, 937 (2011).

6. *World Energy Assessment: Energy and the Challenges of Sustainability*, UNITED NATIONS DEV. PROGRAMME, UNITED NATIONS DEP’T OF ECON. & SOC. AFF. & WORLD ENERGY COUNCIL, 21, 3 (2000).

2015,⁷ new policies specifically designed to address energy poverty must be put in place so that many more enjoy the benefits of safe, reliable, and secure energy sources.

In contrast, the challenge is different in communities in which modern energy services are adequate or plentiful. Emissions of greenhouse gases (“GHGs”), principally from the combustion of fossil fuels, are changing the Earth’s climate to the detriment of those who depend on our planet’s natural systems for survival.⁸ Climate change poses threats to ecosystems, weakening food security and restricting access to water for hundreds of millions of people around the world.⁹ Extreme weather events, a side effect of our warming planet, are getting more frequent and severe, in rich and poor countries alike, decimating lives and livelihoods, infrastructure, and budgets.¹⁰ With this background, the challenge of bringing energy to those without is compounded by the need to reduce the world’s

7. The first Millennium Development Goal is to eradicate extreme hunger and poverty. See *A New Sustainable Development Agenda: The Millennium Development Goals*, UNITED NATIONS DEV. PROGRAMME, available at <http://www.undp.org/content/undp/en/home/mdgoverview/> (last visited Mar. 31, 2015); see also *We Can End Poverty: Millennium Development Goals and Beyond 2015*, UNITED NATIONS, available at <http://www.un.org/millenniumgoals/bkgd.shtml> (last visited Mar. 31, 2015) (identifying halving extreme poverty by 2015 as a goal).

8. See Christopher B. Field et al., *Climate Change 2014: Impacts, Adaptation, and Vulnerability: Summary for Policymakers*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, 3 (2014) (“Human interference with the climate system is occurring, and climate change poses risks for human and natural systems.”), available at http://ipcc-wg2.gov/AR5/images/uploads/IPCC_WG2AR5_SPM_Approved.pdf (last visited Mar. 31, 2015). See generally Victor B. Flatt, *Adapting Energy and Environmental Policy for Climate Change*, 11 VT. J. ENVTL. L. 655 (2010); Uma Outka, *Environmental Law and Fossil Fuels: Barriers to Renewable Energy*, 65 VANDERBILT L. REV. 1679 (2012).

9. See generally HUGH TURRAL, JACOB J. BURKE & JEAN-MARC FAURÈS, FAO WATER REPORTS: CLIMATE CHANGE, WATER AND FOOD SECURITY 36 (2011); Alejandro E. Camacho, *Adapting Governance to Climate Change: Managing Uncertainty Through a Learning Infrastructure*, 59 EMORY L.J. 1 (2009).

10. See Sofya Matteotti & Olga Nartova, *Climate Change: Implications for the (Re)Insurance Industry*, 10 N.Z. J. OF PUB. & INT’L L. 107, 107-22 (2012); Michael K. Lee, *The Day after Tomorrow Scenario: What If Global Warming Causes Rapid Climate Change*, 7(2) SUSTAINABLE DEV. L. & POL’Y 39, 39-40 (2007); see also Cynthia Rosenzweig et al., *Climate Change and Extreme Weather Events: Implications for Food Production, Plant Diseases, and Pests*, 2(2) GLOBAL CHANGE & HUM. HEALTH 90, 90-102 (2001); Alan Ramo & Deborah Behles, *Transitioning a Community Away from Fossil-Fuel Generation to a Green Economy: An Approach Using State Utility Commission Authority*, 15 MINN. J.L. SCI. & TECH. 505, 506 (2014) (asserting that “studies continue to link climate change to extreme weather events”).

carbon footprint and mitigate climate change.¹¹ While bringing energy to those that lack access is imperative, it is critical that this does not result in the worsening of the global carbon footprint.

To address these twin challenges, in November 2011 the UN Secretary-General (“UNSG”) outlined a vision statement on SE4All.¹² The initiative sought to mobilize international cooperation in tackling the issues of energy access, energy efficiency, and renewable energy. While it is clear that SE4All is an ambitious and necessary initiative, the legal framework on which it is based and its ability to drive the societal changes needed to accomplish its goals are less clear. This article argues that the success of the initiative depends on not only a strong institutional framework, but also a firm legal basis situated in international law. It examines the international policy imperatives for SE4All and identifies principles drawn from international human rights law and sustainable development law as the legal underpinning of bringing the SE4All’s ambitious goals to fruition. Part II describes the SE4All initiative and places its development in historical context. Part III explores the significance of SE4All for the protection of human rights and achievement of sustainable development. Part IV argues that an international legal framework capable of supporting binding state obligations is essential for the success of SE4All. It also roots that framework in existing principles of human rights and sustainable development law.

I. *SE4ALL’S DEVELOPMENT AND CONTEXT*

SE4All does not exist in a vacuum. This Part puts the development of SE4All in context, exploring precursor initiatives with a view to outlining the reasons for their failure or limited success and providing a basis for evaluating what is needed to make SE4All a more powerful tool for achieving its energy access, energy efficiency, and clean energy goals.

A. *The Context of SE4All*

The widely acknowledged link between energy and development has not always been recognized in international law and policy. To

11. See Kamil Kaygusuz, *Energy for Sustainable Development: A Case of Developing Countries*, 16 *RENEWABLE & SUSTAINABLE ENERGY REV.* 1116 (2012).

12. See *About Us: Setting a Vision in Motion*, *SUSTAINABLE ENERGY FOR ALL*, available at <http://www.se4all.org/about-us/> (last visited June 28, 2015).

fully appreciate the significance of the UNSG's initiative, it is useful to assess the shortcomings of the initiative's antecedents. The first significant move towards the international recognition of the link between renewable energy and development may be traced to the United Nations Conference of New and Renewable Sources of Energy, held in Nairobi, Kenya in August 1981.¹³ Among other things, the Conference highlighted the "importance of developing new and renewable sources of energy in order to contribute to meeting requirements for continued economic and social development," and called for a "transition from the present international economy based primarily on hydrocarbons to one based increasingly on new and renewable sources of energy."¹⁴ Although stressing that the responsibility for changing various states' energy mixes was ultimately a matter of sovereign choice, the Conference recommended that an intergovernmental body be established to implement and monitor the Nairobi Programme of Action on new and renewable sources of energy. In response, the United Nations General Assembly ("UNGA") established the Committee on the Development and Utilization of New and Renewable Sources of Energy.¹⁵ However, the ambitious tasks set out in the Nairobi Programme of Action, including energy assessment and planning, research and development, transfer, adaptation and application of mature technologies, and information exchange, education, and training did not come to fruition. At its sixth session, the Committee itself noted that the ten years following its establishment were "essentially lost" because there was no political resolve to develop new and renewable technologies as an alternative to the hydrocarbon-based fuels powering all the major economies at that time.¹⁶ Decrying the path dependence that characterized many states' energy policies and inhibited major shifts towards new and renewable energy sources, the Committee called for a "strong international institutional arrangement

13. See United Nations Conference on New and Renewable Sources of Energy, G.A. Res. 36/193, U.N. Doc. A/RES/36/193 (Dec. 17, 1981).

14. *Id.* at 1.

15. See Immediate Implementation of the Nairobi Programme of Action for the Development and Utilization of New and Renewable Sources of Energy, G.A. Res. 38/169, U.N. Doc. A/RES/38/169 (Dec. 19, 1983).

16. See Committee on the Development and Utilization of New and Renewable Sources of Energy, Implementation of the Nairobi Programme of Action for the Development and Utilization of New and Renewable Sources of Energy: Contribution of the United Nations Conference on Environment and Development, ¶ 8, U.N. Doc. A/AC.218/1992/5/Rev.1, (Feb. 13, 1992).

. . . [to] give renewable energy necessary visibility and weight” and recommended the establishment of an international renewable energy agency.¹⁷

The Committee’s forthright observation of its faltering mandate did not mask its assessment of the importance of renewable energy within the global economic system, a view echoed by the pronouncements of the Brundtland Commission in 1986. In its landmark report, *Our Common Future*,¹⁸ the Commission recommended that States place energy at the forefront of national policies in favor of sustainable development.¹⁹ Acknowledging the essential role played by traditional sources of energy in development, the Commission called on States to put in place policies that would ensure a transition from an era in which energy has been used in an unsustainable manner. In particular, the Commission made recommendations addressing the importance of transitioning to renewable energy sources as well as improving energy efficiency. The Commission emphasized that States should accord a much higher priority in national energy programmes to renewable energy sources and called for the deployment of funding that would realize the necessary research, development, and demonstration projects. It also called for large-scale funding and technical assistance to enable development of the necessary institutional and technical capacity in renewable energy.²⁰ The Commission also recommended that States take proactive measures to encourage energy efficiency gains across all sectors, from household to industry, and to do so using devices that would ensure the long-term sustainability of such measures, including conservation taxation or other incentives.²¹ The report, however, did not address the issue of universal access to energy as a driver for sustainable development.²²

The report of Brundtland Commission formed an important backdrop to the United Nations Conference on Environment and

17. *See id.* ¶ 35.

18. *See* World Commission on Environment and Development, *Energy: Choices for Environment and Development*, in *OUR COMMON FUTURE*, U.N. Doc. A/42/427/ Ch. 7 (Aug. 4, 1987), available at <http://www.un-documents.net/ocf-07.htm>.

19. *Id.* at Ch. 1, ¶¶ 13-15.

20. *See id.* at Ch. 7, ¶¶ 73-88.

21. *Id.* at Ch. 6, ¶¶ 89-106.

22. *See* Adrian J. Bradbrook & Judith G. Gardam, *Placing Access to Energy Services within a Human Rights Framework*, 28 *HUM. RTS. Q.* 389, 399 (2006) (noting that “the importance of providing energy services to entire population of developing countries” was not addressed).

Development (“UNCED”) held in Rio de Janeiro, Brazil in 1993. Indeed the preparatory meetings for the summit placed the energy issue at the center of discussions.²³ However, calls by States such as Canada, Sweden, Norway, and others²⁴ for prescriptions for energy efficiency and increased investments in renewable energy were met with significant resistance.²⁵ In particular, many oil-producing States regarded the envisaged changes in energy patterns as threats to their own economic prospects. As a result, the proposed chapter on energy was deleted from the summit’s final document, Agenda 21. Thus, despite the momentum created by the Brundtland Commission, an opportunity was lost to create definitive international laws and policies on renewable energy, energy access, and energy efficiency. Instead, Agenda 21 makes limited references to energy in the chapters on human settlement,²⁶ protection of the atmosphere,²⁷ and promotion of agriculture and rural development.²⁸ Indeed, the rest of the 1990s may be characterized as another lost decade, as international law and policy concerning sustainable energy failed to make headway in acknowledging the role played by renewable energy and energy efficiency.²⁹

The next significant contribution towards international energy law was marked by the negotiations leading towards the conclusion of the Energy Charter Treaty (“ECT”)³⁰ and its Protocol on Energy Efficiency and Related Environmental Aspects.³¹ The ECT has the distinction of being the first and only multilateral treaty focusing solely on energy matters. Although both these instruments contain detailed provisions on energy efficiency and renewable energy, the

23. See Shanna L. Halpern, *United Nations Conference on Environment and Development: Process and Documentation*, ACADEMIC COUNCIL FOR THE UNITED NATIONS SYSTEM, 2 (1992).

24. See, e.g., Stephanie Meakin, *The Rio Earth Summit: Summary of the United Nations Conference on Environment and Development*, GOV’T OF CAN. (1992), available at <http://publications.gc.ca/Collection-R/LoPBdP/BP/bp317-e.htm> (last visited Feb. 18, 2015).

25. See Bradbrook & Gardam, *supra* note 22, at 399.

26. See *United Nations Conference on Environment and Development: Agenda 21*, UNITED NATIONS SUSTAINABLE DEV., ¶¶ 7.1-7.80 (1992) [hereinafter *Agenda 21*], available at <https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf>.

27. See *id.* ¶¶ 9.1-9.35.

28. *Id.* ¶¶ 14.1-14.104.

29. See Stuart Bruce, *International Law and Renewable Energy: Facilitating Sustainable Energy for All?*, 14 MELBOURNE J. OF INT’L L. 1, 17-25 (2013).

30. See Energy Charter Treaty, Apr. 24, 1998, 2080 U.N.T.S. 95 [hereinafter ECT].

31. Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects, Apr. 16, 1998, 2081 U.N.T.S. 3.

couching of the provisions is not mandatory but merely suggestive of good state policy choice. As Thomas Waelde puts it, the ECT “tries to be as ‘politically correct’” as possible,” but “very carefully avoids any legally binding environmental obligation.”³²

The biggest failure in international diplomacy relating to energy policy is perhaps exemplified by the absence of any commitment to promote renewable energy within the global legal architecture to combat climate change. In 1988, the UNGA expressed its “concern that the emerging evidence indicates that continued growth in atmospheric concentrations of ‘greenhouse’ gases could produce global warming”.³³ Despite the potential of renewable energy to promote both adaptation and mitigation options,³⁴ the United Nations Framework Convention on Climate Change (“UNFCCC”),³⁵ the UN’s key convention to combat climate change, lacks the strong prescriptive role that the problem it seeks to resolve requires. As a framework convention, it lacks detail. It outlines the primary obligation of state parties to develop and maintain inventories of GHG emissions, as well as a general obligation to develop national and regional measure to mitigate climate change.³⁶ There is no specific reference to renewable energy in the UNFCCC,³⁷ although it may be inferred that there is an obligation to include renewable energy sources in adaptation plans through an expansive reading of article 4(1)(c). That article commits States Parties to “promote and cooperate in the development, application and diffusion” of

32. See Thomas W. Waelde, *Sustainable Development and the 1994 Energy Charter Treaty: Between Pseudo-Action and the Management of Environmental Investment Risk*, in *INTERNATIONAL ECONOMIC LAW WITH A HUMAN FACE* 223, 236 (Friedl Weiss, Erik Denters, & Paul de Waart eds., 1998).

33. *Protection of the Global Climate for Present and Future Generations of Mankind*, G.A. Res. 43/53, U.N. Doc. A/RES/43/53, at 1 (Dec. 6, 1988).

34. See Ralph E.H. Sims, *Renewable Energy: A Response to Climate Change*, 76 *SOLAR ENERGY* 9, 9 (2004); Ralph E.H. Sims, Hans-Holger Rogner & Ken Gregory, *Carbon Emission and Mitigation Cost Comparisons Between Fossil Fuel, Nuclear and Renewable Energy Resources for Electricity Generation*, 31 *ENERGY POLICY* 1315, 1315-16 (2003); see also Jeffrey Thaler, *Fiddling as the World Floods and Burns: How Climate Change Urgently Requires a Paradigm Shift in Permitting of Renewable Energy Projects*, 42 *ENVTL. L.* 1101 (2012); Xiaodong Wang, *Legal and Policy Frameworks for Renewable Energy to Mitigate Climate Change*, 7 *SUSTAINABLE DEV. L. & POL’Y* 17 (2007).

35. United Nations Framework Convention on Climate Change, Mar. 21, 1994, 1771 U.N.T.S. 107 [hereinafter UNFCCC].

36. See *id.* arts. 4(1)(a)-(b).

37. There is also no reference to energy efficiency in the substantive sections of the Convention.

technologies that “control, prevent or reduce” emissions in sectors that include the energy sector. According to Professor Dan Bodansky, States could only agree on this weak provision because “[o]il producing states such as Saudi Arabia and Kuwait objected to the regulation of sources” of emissions.³⁸

The Kyoto Protocol to the UNFCCC (“Kyoto Protocol”),³⁹ which was designed to provide more specific and binding obligations to implement the framework established by the UNFCCC, does not fare much better in relation to its provisions on renewable energy and energy efficiency. The Kyoto Protocol prescribes binding quantified emission limitation reduction targets for states listed in its Annex B. However, it does not prescribe policy choices that states should undertake to ensure the attainment of the prescribed emissions limits or reductions. In relation to renewable energy, article 2(1)(a) provides a non-exhaustive list of eight policy suggestions, which encourage States to research, develop, promote, and increase the use of new and renewable forms of energy. As Professor Bodansky observes, a general binding commitment to the development of renewable energy was proposed at the beginning of negotiations for the UNFCCC. However, by the conclusion of the treaty, such an obligation had been ruled out entirely.⁴⁰ Thus a very credible tool for shifting the world’s energy mix away from fossil fuels was almost written out of the seminal processes for combating climate change in international law.

Although the new millennium began with further disappointment with the omission of sustainable energy and access to energy from the MDGs,⁴¹ developments at the international level quickly ushered in a new recognition of the critical role played by renewable energy and access to energy. A key document was a lengthy report prepared by the United Nations Development Program, the United Nations Department of Economic and Social Affairs, and the World Energy Council. The report, *World Energy Assessment: Energy and the*

38. Daniel Bodansky, *The United Nations Framework Convention on Climate Change: A Commentary*, 18 *YALE J. INT’L L.* 451, 509 (1993). *See also* Intergovernmental Negotiating Committee for a Framework Convention on Climate Change, *Preparation of a Framework Convention on Climate Change: Set of Informal Papers Provided by Delegations, Related to the Preparation of a Framework Convention on Climate Change*, U.N. Doc. A/AC.237/Misc.1/Add.1 (May 22, 1991).

39. Kyoto Protocol to the United Nations Framework Convention on Climate Change, U.N. Doc. FCCC/CP/1997/7/Add.1 (Dec. 11, 1997).

40. Bodansky, *supra* note 38, at 508-09, 541-43.

41. *See* Bradbrook & Gardam, *supra* note 22, at 399.

Challenge of Sustainability (“WEA”),⁴² brought to the fore the strong relationship between energy and poverty and called for international action to provide universal access to energy for all. The report was produced pursuant to a decision of the UNGA in 1997 that the Ninth Session of the Commission on Sustainable Development (“CSD-9”) would focus on energy, the atmosphere, and the transport sector.⁴³ The report of CSD-9 recognized that lack of access to modern energy was particularly severe in rural areas and noted its impact in the underdevelopment of such regions. In particular, it highlighted how lack of energy access was responsible for increased migration towards urban centers and the increasing problems of slum development. A 2004 update to WEA⁴⁴ also emphasized the relationship between access to energy and poverty by highlighting the linkage between energy and the MDGs. Particularly instructive is Annex 1 to the 2004 Update, in which the authors detailed a matrix of energy and MDGs that demonstrate the role that energy plays in the achievement of each of the goals.⁴⁵

The seminal work in the WEA that linked energy, poverty, and sustainable development was picked up by one of the five working groups tasked to make preparations for the World Summit on Sustainable Development (“WSSD”), which took place in Johannesburg in 2002.⁴⁶ The United Nations Secretary-General, Kofi Annan, proposed five themes as focus issues for the WSSD. These included water, energy, health, agriculture, and biodiversity. Each one of these focus areas was designated a working group and a report was

42. See *World Energy Assessment*, *supra* note 6.

43. See Economic and Social Council, *Commission on Sustainable Development: Report on the Ninth Session*, Supp No 9, U.N. Doc. E/2001/29 & E/CN.17/2001/19 (Apr. 27, 2001).

44. See WORLD ENERGY ASSESSMENT: OVERVIEW: 2004 UPDATE (José Goldemberg & Thomas B. Johansson eds., 2004), available at <http://www.undp.org/content/dam/aplaws/publication/en/publications/environment-energy/www-ee-library/sustainable-energy/world-energy-assessment-overview-2004-update/World%20Energy%20Assessment%20Overview-2004%20Update.pdf>.

45. *Id.* at 80.

46. See Report of the World Summit on Sustainable Development, U.N. Doc. A/CONF.199/20 (Sept. 4, 2002) [hereinafter WSSD Report], available at http://www.un.org/jsummit/html/documents/summit_docs.html (last visited Mar. 31, 2015); see also Randall Spalding-Fecher, Harald Winkler & Stanford Mwakasonda, *Energy and the World Summit on Sustainable Development: What Next?*, 33 ENERGY POL’Y 99, 99 (2005), available at <http://www.erc.uct.ac.za/Research/publications/05Spalding-Fecher%20etal%20Energy%20and%20WSSD.pdf>; Adil Najam & Cutler J. Cleveland, *Energy and Sustainable Development at Global Environmental Summits: An Evolving Agenda*, 5 ENV’T, DEV. & SUSTAINABILITY 117, 119 (2003).

prepared for each theme. The report of the working group on energy proposed three action areas in its proposed action framework, which included reducing poverty by providing access to modern energy services in rural and peri-urban areas; improving health and reducing environmental impacts of traditional fuels and cooking devices; and improving access to affordable and diversified energy services in Africa.⁴⁷ The WSSD Plan of Implementation⁴⁸ adopted these recommendations and called upon the international community to develop and promote renewable energy resources as well as improve access to reliable, socially acceptable, and environmentally sound energy resources while recognizing the specific factors for providing access to the poor.⁴⁹

These initiatives gained further impetus with the establishment of the International Renewable Energy Agency (“IRENA”).⁵⁰ Founded in 2009 to promote widespread and increased adoption and sustainable use of all forms of renewable energy, IRENA’s statute entered into force on July 8, 2010.⁵¹ The mandate of the organization is to become the main driving force in promoting a transition towards the use of renewable energy on a global scale. In this regard, it is required to act as the as the global voice for renewable energy through the provision of practical advice and support for both industrialized and developing countries to help them improve their regulatory frameworks and build capacity.⁵² The agency will facilitate access to all relevant information, including reliable data on the potential of renewable energy, best practices, effective financial mechanisms, and state-of-the-art technological expertise. Although the organization is not currently part of the United Nations family, it is envisaged that it

47. See WEHAB Working Group, *A Framework of Action on Energy*, 17 (2002), available at http://portal.unesco.org/en/ev.php-URL_ID=17750&URL_DO=DO_TOPIC&URL_SECTION=201.html (last visited Mar. 31, 2015).

48. See WSSD Report, *supra* note 46.

49. *Id.* at ¶ 9.

50. See *About IRENA*, INT’L RENEWABLE ENERGY AGENCY, available at <http://www.irena.org/Menu/index.aspx?PriMenuID=13&mnu=Pri> (last visited June 27, 2015).

51. Statute of the International Renewable Energy Agency, U.N. Doc. IRENA/FC/Statute (July 8, 2010), available at http://www.irena.org/documents/uploadDocuments/Statute/IRENA_FC_Statute_signed_in_Bonn_26_01_2009_incl_declaration_on_further_authentic_versions.pdf.

52. See *Overview of IRENA Mandate: Annex 1*, INT’L RENEWABLE ENERGY AGENCY, available at <http://www.irena.org/DocumentDownloads/Procurement/Annex%20I,%20About%20IRENA.pdf> (last visited June 27, 2015).

will be incorporated in the future.⁵³ As of July 2015, IRENA had 142 States and the European Union as members, while thirty States are IRENA signatories or applicants for membership. Signatories include almost all European and African governments, and also major economies such as the United States, India, Japan, and Australia. China also has announced it will join IRENA, a milestone in international efforts to double the share of renewable energy worldwide by 2030.

Finally, the momentum generated by these developments crystallized at Rio+20 and the conference's outcome document, *The Future We Want*,⁵⁴ put SE4All at center stage. In that document, States reaffirmed their support for the implementation of national and subnational policies and strategies, based on individual national circumstances and development aspirations, using an appropriate energy mix to meet developmental needs.⁵⁵ States also agreed to increase the use of renewable energy sources and other low-emission technologies, coupled with more efficient use of energy, greater reliance on advanced energy technologies (including cleaner fossil fuel technologies), and the sustainable use of traditional energy resources.⁵⁶ In particular, the document acknowledges the need for increasing access to modern energy sources and encourages states to cooperate to realize this important goal.⁵⁷ More important, however, is the explicit acknowledgment of the UNSG's SE4All initiative and the targets that it puts in place:

125. We recognize the critical role that energy plays in the development process, as access to sustainable modern energy services contributes to poverty eradication, saves lives, improves health and helps provide for basic human needs. We stress that these services are essential to social inclusion and gender equality, and that energy is also a key input to production. We commit to facilitate support for access to these services by 1.4 billion people worldwide who are currently without them. We recognize that access to these services is critical for achieving sustainable development.

53. Abbas Al Lawati, *Irena Keen to Join the United Nations Family*, GULFNEWS, (July 9, 2009), available at <http://m.gulfnews.com/news/uae/environment/irena-keen-to-join-the-united-nations-family-1.491658> (last visited July, 14 2015).

54. *The Future We Want*, G.A. Res. 66/288, U.N. Doc. A/RES/66/288, (July 27, 2012).

55. *Id.* at ¶ 127.

56. *Id.*

57. *Id.*

126. We emphasize the need to address the challenge of access to sustainable modern energy services for all, in particular for the poor, who are unable to afford these services even when they are available. We emphasize the need to take further action to improve this situation, including by mobilizing adequate financial resources, so as to provide these services in a reliable, affordable, economically viable and socially and environmentally acceptable manner in developing countries...

129. We note the launching of the initiative by the Secretary-General on Sustainable Energy for All, which focuses on access to energy, energy efficiency and renewable energies. We are all determined to act to make sustainable energy for all a reality and, through this, help to eradicate poverty and lead to sustainable development and global prosperity. We recognize that the activities of countries in broader energy related matters are of great importance and are prioritized according to their specific challenges, capacities and circumstances, including their energy mix.⁵⁸

Thus, it is clear that the SE4All initiative stands on the shoulders of other efforts that have gradually brought the issue of sustainable energy to the forefront of international policy making. Whereas some of the earlier efforts met with modest success, SE4All is more likely to succeed as a result of its inclusion of targets absent from previous initiatives. Additionally, the explicit linkages between human development, climate change, and energy development make a compelling case for immediate action by a host of stakeholders, including national governments, international organizations, and private actors.⁵⁹ More importantly, these linkages create legal obligations for the achievement of SE4All because the United Nations member States have undertaken binding obligations under previously adopted various human rights and sustainable development treaty frameworks. These obligations form a starting point for conceptualizing SE4All commitments as binding legal duties as opposed to mere policy suggestions. The next three sections outline these linkages and explain how a human rights and sustainable

58. *Id.* at ¶¶ 125, 126, 129.

59. See Jenny Sin-hang Ngai, *Energy as a Human Right in Armed Conflict: A Question of Universal Need, Survival, and Human Dignity*, 37 *BROOKLYN J. INT'L L.* 579, 611 (2012) (“The growing international recognition of the link between access to energy and human development, as evidenced in the practice of states and the international community, makes the case for formal recognition of the right to energy even more compelling.”).

development legal framework may contribute to effective implementation of SE4All.

B. *The UNSG's Vision for SE4All*

The UNSG's vision statement built on a number of international initiatives that have added growing impetus on energy issues since 2010. In April 2010, the Secretary-General's Advisory Group on Energy and Climate Change issued a report entitled *Energy for a Sustainable Future*.⁶⁰ Among its keys recommendations was the call for the transformation of national energy systems to promote two central goals: first, to ensure sustainable energy for all; and second, to improve the efficiency of existing energy systems by at least forty percent.⁶¹ In September 2010, energy issues also took center stage at the MDG Summit.⁶² Recognizing the central role played by energy in the achievement of the MDGs, the MDG Summit Outcome Document emphasized the importance of addressing energy issues, including access to affordable energy, energy efficiency, and sustainability of energy sources and use, as part of global efforts for the achievement of the MDGs and the promotion of sustainable development.⁶³ In December 2010, the UNGA designated 2012 as the International Year for Sustainable Energy for All ("IYSEFA").⁶⁴ The General Assembly resolution encompassing that designation sought to increase awareness and promote action at the local, national, regional, and international levels. The designation of IYSEFA was meant to provide a platform for the mobilization of support and commitments of three interlinking goals: the achievement of universal access to energy, the realization of improved efficiency for existing and new energy systems, and the expansion of the share of renewable energy

60. See Secretary-General's Advisory Group on Energy and Climate Change, *Energy for a Sustainable Future: Report and Recommendations* (2010) [hereinafter AGECC], available at <http://www.un.org/millenniumgoals/pdf/AGECCsummaryreport%5B1%5D.pdf>.

61. *Id.* at 8-9.

62. See Millennium Development Goals: 2010 UN Summit, UNITED NATIONS, available at <http://www.un.org/en/mdg/summit2010/> (describing the MDG Summit) (last visited Mar. 31, 2015).

63. See Keeping the Promise: United to Achieve the Millennium Development Goals, G.A. Res. 65/1, ¶ 46, U.N. GAOR, 65th sess., U.N. Doc. A/RES/65/1 (Oct. 19, 2010), available at http://www.un.org/en/mdg/summit2010/pdf/outcome_documentN1051260.pdf.

64. See International Year of Sustainable Energy for All, G.A. Res 65/151, U.N. GAOR, 65th Sess., Supp. No. 49, U.N. Doc. A/RES/65/151, ¶ 1 (Feb. 16, 2011).

across all energy platforms.⁶⁵ IYSEFA was launched in January 2012 at World Future Energy Summit, held in Abu Dhabi⁶⁶ and followed by series of regional launch events.

November 2011 marked the formal launch of SE4All, including announcement of the membership of the initiative's steering committee, known as the UNSG's High Level Action Group on SE4All. The High-Level Group is composed of forty-six global leaders from business, finance, government and civil society. At the launch, the UNSG Ban Ki-moon announced that the Group had been tasked specifically "to catalyze partnerships, commitments and action – in corporate board rooms, in government ministries, and on the ground in thousands of local communities."⁶⁷ The High-Level Group was co-chaired by Kandeh Yumkella, Chair of UN-Energy and Director-General of the United Nations Industrial Development Organization, and Charles Holliday, Chairman of Bank of America. A twelve-member Technical Group was established to advise the High-Level Group.

Another crucial driver for the momentum towards energy issues was the preparation for the Rio+20 world summit. As part of the summit process, the preparatory committee proposed that there would be a thematic session of energy, including a number of energy days.⁶⁸ Rio+20's two themes included the development of a green economy in the context of poverty eradication and sustainable development and the re-energizing of the institutional framework for sustainable development.⁶⁹ The thematic session on energy would focus principally on recommendations for an action agenda for the public

65. Declaring the IYSEFA, the UNGA called on its Member States, the United Nations system and all other actors to "increase the awareness of the importance of addressing energy issues, including modern energy services for all, access to affordable energy, energy efficiency and the sustainability of energy sources and use . . . and to promote action at the local, national, regional and international levels." *Id.* ¶ 4.

66. See *Exhibit & Summit 2012*, WORLD FUTURE ENERGY SUMMIT, available at <http://www.worldfutureenergysummit.com/portal/about-wfes/overview/2011-summit-and-exhibition.aspx> (last visited Mar. 31, 2015).

67. See *Ban Launches High-Level Group to Mobilize Action on Sustainable Energy for All*, UN NEWS CENTRE (Nov. 1, 2011), available at <http://www.un.org/apps/news/story.asp?NewsID=40281&Cr=sustainable+energy&Cr1=#.UuQNQrTFK70> (last visited Mar. 31, 2015).

68. See *Energy*, RIO+20: UNITED NATIONS CONF. ON SUSTAINABLE DEV., available at <http://www.uncsd2012.org/index.php?menu=123#energy> (last visited Mar. 31, 2015).

69. See *Objectives & Themes*, RIO+20: UNITED NATIONS CONF. ON SUSTAINABLE DEV., available at <http://www.uncsd2012.org/objectiveandthemes.html> (last visited Apr. 19, 2014).

and private sectors.⁷⁰ The Rio Energy Days would provide a broader platform for energy-related debate and events within the framework of the Rio+20 Conference.⁷¹ Mirroring the collaborative approach demanded by the thematic focus, these activities were organized by UN-Energy in collaboration with the Brazilian Government, private-sector partners, and other civil society stakeholders.⁷²

Thus, the UNSG's SE4All initiative was accompanied by a significant range of supporting activities by other United Nations institutions and processes. The importance of the momentum created by such a flurry of activity cannot be underestimated. Previous attempts to drive international policy on sustainable energy have not met with great success because of limitations in the constituencies involved.⁷³ In contrast, the SE4ALL effort seeks to ride on a wave of increasing acknowledgement of the central role played by energy not only in development, but also in efforts to mitigate climate change.

The UNSG's initiative aims to deliver sustainable energy for all by 2030 through three mutually reinforcing objectives.⁷⁴ First, the initiative seeks to *ensure universal access to modern energy services*—access to electricity and to modern fuels and technologies for cooking, heating, and productive uses.⁷⁵ Second, it targets a *doubling of the rate of improvement in energy efficiency*—increasing the current rate of improvement to 2.5 percent per year, achieving a forty percent reduction by 2030 (measured in terms of global energy intensity).⁷⁶ Third, it strives to *double the share of renewable energy in the global energy mix*—increasing the current renewable energy share of global energy consumption to 30 percent.⁷⁷

70. See *Energy Day*, RIO+20: UNITED NATIONS CONF. ON SUSTAINABLE DEV., available at <http://www.uncsd2012.org/index.php?page=view&type=1000&nr=602&menu=126> [hereinafter *Energy Day*] (last visited Mar. 31, 2015); see also *A Special Report on Energy Day: Energy DBAN-KIay at Rio+20*, INT'L INST. FOR SUSTAINABLE DEV., available at http://www.iisd.ca/uncsd/rio20/enbots/energy_day.html (last visited Mar. 31, 2015).

71. See *Energy Day*, *supra* note 70.

72. See *id.*

73. Cf. Adrian J. Bradbrook, *Sustainable Energy Law: The Past and the Future*, 30 J. ENERGY & NAT. RESOURCES L. 511, 514 (2012) ("Energy efficiency is sometimes referred to as a 'cinderella issue' as it has attracted only limited government subsidies and comparatively little discussion in legal circles.").

74. See SUSTAINABLE ENERGY FOR ALL, *supra* note 12, at 4.

75. See AGECC, *supra* note 60, at 9.

76. See *id.*

77. See Secretary-General's High-Level Group on Sustainable Energy for All, *Report of the Co-Chairs*, 21 (Sept. 2012) [hereinafter *Sec. Gen. SE4ALL Report*], available at

SE4All's goals therefore include ensuring that the benefits of modern energy are available to all and that energy is provided as cleanly and efficiently as possible. This result is a matter of equity, first and foremost, but it is also an issue of urgent practical importance because it addresses two of the most pressing challenges of our time—reducing poverty and minimizing the risks of climate change. The objectives of SE4All are ambitious but achievable, and they are becoming increasingly affordable with the rapid advance of technology.⁷⁸ Cost-effective solutions can be developed and successes at the national level have followed from a combination of political will, investment, and capacity building.⁷⁹ However, for this initiative to work there must be strong institutional mechanisms backed by a robust legal framework.

By announcing the vision, the UNSG sought to raise the issue of sustainable development to the top of the international agenda and establish the initiative as a priority for the United Nations, national governments, non-governmental organizations, and the private sector. The UNSG's initiative will work closely with Member States, UN-Energy, the United Nations Foundation, and other partners to drive a comprehensive approach that builds on lessons learned, replicates successful models, and leverages the collective strengths of the United Nations system.⁸⁰ Thus, to give impetus to the initiative, the UNSG sought commitments, both prior to and during Rio+20, to action from national governments and stakeholders at all levels to advance the three objectives of SE4All.⁸¹ Additionally, the UNSG called on United Nations institutions and states to develop implementation mechanisms through national coordinating committees and new public-private partnerships, as well as develop innovative financial mechanisms to support current financing gaps.⁸²

<http://www.un.org/wcm/webdav/site/sustainableenergyforall/shared/Documents/09.2012%20-%20SE4ALL%20-%20Report%20of%20the%20Co-Chairs.pdf> (last visited Mar. 31, 2015).

78. Cf. James E. Parker-Flynn, *A Race to the Middle in Energy Policy*, 15 *SUSTAINABLE DEV. L. & POL'Y* 4, 9 (2015) (noting that “the cost of solar photovoltaic installation, which has dropped significantly in recent years, is now less of a restraint on the expansion of solar power than it was previously. The drop stems from reductions in the cost of both the solar modules and non-module components of installation. . . . In a few years, solar energy may actually be as cheap as, or cheaper than, energy from fossil fuels.”).

79. See Luis Gomez-Echeverri, *Foreign Aid and Sustainable Energy* 20-21 (World Inst. For Dev. Economics Research, Working Paper No. 2013/093, 2013).

80. See AGECC, *supra* note 60, at 12.

81. See Sec. Gen. SE4ALL Report, *supra* note 77, at 3-8.

82. See AGECC, *supra* note 60, at 10-11.

Crucially, SE4All addresses a gap in previous interventions in favor of sustainable energy—the provision of accountability and performance measurement, including success metrics and a mechanism for tracking results and stakeholder commitments.⁸³

SE4All has three key elements: the High Level Group on Sustainable Energy for All, a Global Action Agenda, and a global monitoring and reporting platform. The key task of the High Level Group was to set out concrete priority areas for action—securing commitments by a wide range of stakeholders and tracking progress.⁸⁴ Another key task of the Group was to develop the second key element, an Action Agenda on sustainable energy for all to be presented at Rio+20.⁸⁵ The Agenda sets out pathways for concerted action toward sustainable energy for all. It recommends eleven action areas to help focus efforts and mobilize commitments towards the three SE4All objectives. Its stated aim is to accelerate global momentum toward SE4All by linking results of individual State actions with its ambitious global objectives.⁸⁶ The final element for SE4All is the setting up of a global tracking and reporting platform.⁸⁷ Designed to provide transparency to the commitment process and contribute to the sharing of best practices, this element will help highlight the need for policy and institutional reforms as well as resource commitments. The platform envisages an online searchable commitment database, with a tracking function ranged against key indicators including area, country, technology, and value.⁸⁸

II. *THE IMPACT OF ENERGY SOURCES ON HUMAN RIGHTS AND THE ENVIRONMENT*

Access to modern energy services is strongly linked to poverty reduction.⁸⁹ Human wellbeing, poverty reduction, social inclusion, and economic improvement are not achievable without access to

83. See Sec. Gen. SE4ALL Report, *supra* note 77, at 13.

84. See The Secretary-General's High Level Group on Sustainable Energy, *A Global Action Agenda: Pathways for Concerted Action toward Sustainable Energy for All*, 5 (2012) [hereinafter *Global Action Agenda*], available at <http://www.un.org/wcm/webdav/site/sustainableenergyforall/shared/Documents/SEFA-Action%20Agenda-Final.pdf> (last visited Mar. 31, 2015).

85. *Id.* at 3-4.

86. *Id.* at 7-12.

87. See Sec. Gen. SE4ALL Report, *supra* note 77, at 13-14.

88. See *id.*

89. WORLD ENERGY ASSESSMENT, *supra* note 44, at 6, 12, 33-44.

reliable electricity, clean fuels, and the range of services that they provide.⁹⁰ This connection is most apparent in Africa and South Asia, where the number of people who depend on biomass for cooking and heating and who lack access to electricity is the greatest.⁹¹ In particular, expanding access to end-use services based on modern energy sources emanates from the United Nations Millennium Declaration of 2000's MDGs. The MDGs include the eradication of extreme poverty and hunger; the achievement of universal primary education; the promotion of gender equality and the empowerment of women; the reduction of child mortality; the improvement of maternal health; combating HIV/AIDS, malaria and other diseases; the entrenchment of environmental sustainability; and the development of a global partnership for development.⁹² Although access to energy was not included in the list of MDGs, it is clear that access to secure, safe, clean and affordable sources of energy is critical for the achievement of the stated goals.⁹³

For example, affordable and reliable access to electricity contributes to the eradication of poverty and hunger due to increased productivity in agriculture. Electricity can be used for irrigation as well as to improve the manner in which farm produce is stored and transported to markets.⁹⁴ Increased agricultural productivity also provides ecosystem benefits for cultivable land by allowing reduced planting so that ecosystems and biodiversity may recover and flourish.⁹⁵

90. See Kaygusuz, *supra* note 5; see also Ngai, *supra* note 59, at 579 (“energy is at the center of human survival and development”).

91. See *Global Health Risks: Mortality and Burden of Disease Attributable to Selected Major Risks*, WORLD HEALTH ORGANIZATION, (2009), at 23, available at http://www.who.int/healthinfo/global_burden_disease/global_health_risks/en/ (last visited July 16, 2015); see also Reza Kowsari & Hisham Zerriffi, *Three Dimensional Energy Profile: A Conceptual Framework for Assessing Household Energy Use*, 39 ENERGY POLICY 7505, 7505-06 (2011); Raffaella Centurelli, *Energy Poverty: Can We Make Modern Energy Access Universal? Focus on Financing Appropriate Sustainable Energy Technologies*, 22 COLO. J. INT'L ENVTL. L. & POL'Y 219, 238 (2011) (describing financial commitments that would be necessary to replace wood-burning with gas-burning cooking facilities in Africa and Asia).

92. United Nations Millennium Declaration, G.A. Res. 55/2, U.N. GAOR, 55th Sess., Supp. No. 49, ¶¶ 18-20, U.N. Doc. A/55/49 (2000).

93. See Bradbrook & Gardam, *supra* note 22, at 396.

94. P. Balachandra, *Universal and Sustainable Access to Modern Energy Services in Rural India: An Overview of Policy-Programmatic Interventions and Implications for Sustainable Development*, 92 J. OF THE INDIAN INST. OF SCI. 163, 165-67 (2012).

95. Marshall Wise et al., *Implications of Limiting CO₂ Concentrations for Land Use and Energy*, 324 SCIENCE 1183, 1185 (2009); Virginia H. Dale & Stephen Polasky, *Measures of the*

There is also a strong nexus between access to energy and the educational attainment of children.⁹⁶ Although basic educational services and literacy can be achieved without access to modern energy sources, access to improved energy services can improve the availability and quality of educational services. Safe, accessible, and affordable energy services help increase children's educational attainment by reducing dropout rates from school, as more child-friendly environments encourage school attendance.⁹⁷ Children can spend more time on their studies as the amount of time they need to spend collecting fuel falls.⁹⁸ Electricity also facilitates access to educational media and communications in both schools and homes. It allows children to study when it becomes dark outside and provides the opportunity to use sophisticated teaching equipment such as projectors, computers, and laboratory equipment. More importantly, modern energy services enable access to media and communications that expand the classroom beyond the village, truly connecting children to the world.⁹⁹ Finally, there is growing evidence that specialized teachers in subjects such as mathematics and science are more likely to be retained in rural schools if the electricity grid is extended to rural schools. The improvements in quality of life that accompany electricity access encourage teachers to relocate to rural areas, thereby improving the quality of educational services available there.

Gender equality and women's empowerment can also be greatly improved through better-quality access to energy services. Because women and girls are traditionally responsible for food preparation,

Effects of Agricultural Practices on Ecosystem Services, 64 *ECOLOGICAL ECON.* 286, 290-94 (2007).

96. Makoto Kanagawa & Toshihiko Nakata, *Assessment of Access to Electricity and the Socio-economic Impacts in Rural Areas of Developing Countries*, 36 *ENERGY POLICY* 2016 (2008); Shahidur R. Khandker, Douglas F. Barnes & Hussain A. Samad, *Welfare Impacts of Rural Electrification: A Case Study from Bangladesh*, World Bank Policy Research Working Paper Series 4859, 2, 7-9, 29-31 (2009), available at <https://openknowledge.worldbank.org/bitstream/handle/10986/4055/WPS4859.pdf?sequence=1>.

97. United Nations Department of Economic and Social Affairs (UNDESA) *Electricity and Education: The Benefits, Barriers, and Recommendations for Achieving the Electrification of Primary and Secondary Schools* 2014 at 8-15 available at <http://www.un-energy.org/publications/13000-electricity-and-education-the-benefits-barriers-and-recommendations-for-achieving> (last visited July 7, 2015).

98. International Energy Agency (IEA), *Energy Poverty – How to Make Modern Energy Access Universal? World Energy Outlook 2010*, at 15 (2010), available at http://www.se4all.org/wp-content/uploads/2013/09/Special_Excerpt_of_WEO_2010.pdf.

99. See Balachandra, *supra* note 94, at 166.

they are also often responsible for collection of firewood or other biomass for cooking.¹⁰⁰ Consequently, modern energy services save women and girls time due to avoided wood collection and reduced cooking time. Such time savings can be deployed to productive activities such as income generation or schooling. Eliminating dependency on fuel collection also reduces the risks of assaults and injury, especially where fuel has to be collected far from home. Professor Bradbrook quotes a study commissioned by the United Nations Development Fund for Women (UNIFEM), which reported on how Sierra Leonean women spend days in the forest, breaking off firewood with their bare hands and carrying it on their backs.¹⁰¹ Some of those who failed to find firewood or did not bring back adequate amounts were beaten by their husbands.¹⁰² Access to modern energy services would reduce the need for this kind of work by women, and might reduce associated physical abuse as well.

Access to electricity also benefits public health by providing modern health services that depend on access to modern energy services. For example, diagnostic clinical equipment, safe storage of medicines, and appropriate handling of laboratory specimens all require modern power sources. Local manufacture of medicines and associated delivery systems is only possible with the availability of reliable and safe energy sources. Additionally, health systems are more likely to retain staff, particularly in rural service centers, if they have access to modern energy sources and the services that such sources avail.¹⁰³ Thus, countries that do not have access to safe and secure energy systems are unlikely to have health systems that are capable of effectively managing the public disease burden or retaining quality individuals to service such health systems.

The nature of the energy source also bears on progress toward achieving the MDGs. Conventional biomass-based fuels, for example, produce smoke and indoor air pollution, which adversely affects

100. See Bradbrook & Gardam, *supra* note 22, at 394.

101. See Elizabeth Rehn & Ellen Johnson Sirleaf, *Women, War and Peace: The Independent Experts' Assessment on the Impact of Armed Conflict on Women and Women's Role in Peace-Building*, United Nations Development Fund for Women (UNIFEM), 129-30 (2002).

102. See Bradbrook & Gardam, *supra* note 22, at 395.

103. World Health Organization, World Bank, *Access to modern energy services for health facilities in resource-constrained settings: A review of status, significance, challenges and measurement* (2014) at 16, 18-19 available at http://www.who.int/hia/green_economy/modern-energy-services/en/ (last visited July 16, 2015).

people's health, especially women and children.¹⁰⁴ Reliance on biomass often results in regular exposure to harmful emissions of carbon monoxide, hydrocarbons, and other particulates, particularly among women and children most frequently engaged in biomass-based cooking.¹⁰⁵ Exposure to these emissions is a key cause of disease and mortality in developing countries. According to the World Health Organization, nearly two million people a year die prematurely from illness attributable to indoor air pollution due to solid fuel use.¹⁰⁶ Among these deaths, 21% are due to lower respiratory infection, 35% to chronic obstructive pulmonary disease (COPD), and 3% to lung cancer.¹⁰⁷ Fifteen percent of all deaths among children under five years old can be attributed to particulate matter inhaled from indoor air pollution from household solid fuels.¹⁰⁸ Women exposed to heavy indoor smoke are three times as likely to suffer from chronic obstructive pulmonary disease (e.g., chronic bronchitis) than women who use cleaner fuels. Among men (who already have a heightened risk of chronic respiratory disease due to their higher rates of smoking), exposure to indoor smoke nearly doubles that risk. Approximately 1.5% of annual lung cancer deaths are attributable to exposure to carcinogens from indoor air pollution. As with bronchitis, the risk for women is higher, due to their role in food preparation as well as their comparatively lower rates of smoking. Women exposed to indoor smoke thus have a higher risk of lung cancer in comparison with those not exposed.¹⁰⁹ Thus, access to clean fuels has a clear impact on the health of women and children.

More generally, fossil fuel-based energy systems emit substantial quantities of pollutants that contaminate the air, sea, and

104. See, e.g., Lakshman Guruswamy, *Drafting Model Laws for Indoor Air Pollution for Developing and Developed Nations Workshop: Introduction*, 24 COLO. NAT. RESOURCES, ENERGY & ENVTL. L. REV. 319, 324-25 (2013); Amelia Reiver Schlusser, Comment, *Seeing the Forest for the Trees: Regulating Carbon Dioxide Emissions from Bioenergy Production under the Clean Air Act*, 43 ENVTL. L. 989, 991 (2013).

105. See Guruswamy, *supra* note 104, at 325.

106. See World Health Organization, *Health in a Green Economy* 1 (2011), available at http://www.who.int/hia/hgebrief_henergy.pdf?ua=1; see also Andy Haines & Carlos Dora, *How the Low Carbon Economy Can Improve Health*, BRIT. MED. J. 344 (2012), available at http://www.researchgate.net/publication/221724255_How_the_low_carbon_economy_can_improve_health.

107. World Health Organization, *Global health risks: mortality and burden of disease attributable to selected major risks* 23 (2009), available at http://www.who.int/healthinfo/global_burden_disease/global_health_risks/en/ (last visited July 16, 2015).

108. *Id.* at 28.

109. *Id.* at 46, 50.

land, resulting in serious adverse health impacts. The residential energy sector is responsible for substantial quantities of air pollution. In 2008, electricity generation for the residential sector accounted for nearly one fifth of global CO₂ emissions.¹¹⁰ The net contribution to climate change is considerably greater when other GHGs, such as methane and black carbon, are included. These impacts are problematic, as developing nations will bear a disproportionate burden from adverse climate change impacts.¹¹¹ The non-CO₂ pollutants from the incomplete combustion of household fuels have the most immediate effects on climate and damaging effects on health.¹¹² It has been estimated that the global warming effect of black carbon is equal to twenty to fifty percent of the effect of CO₂.¹¹³

Energy systems also have significant impacts on land use. The establishment of any energy system will have a significant geological footprint that is hard to reverse with attendant impacts on the adjoining ecosystems. For example, the establishment of a coal-based power system will require a significant period before land degraded by coal mining can be reclaimed.¹¹⁴ In the case of nuclear energy

110. See, e.g., International Energy Agency, *CO₂ Emissions from Fuel Combustion: Highlights* (2010), at 65, available at <http://www.iea.org/media/training/presentations/statisticsmarch/co2highlights.pdf>. Cf. John C. Dernbach, *Harnessing Individual Behavior to Address Climate Change: Options for Congress*, 26 VA. ENVTL. L.J. 107, 129 (2008) (“Residential and commercial buildings account for nearly forty percent of [U.S.] carbon dioxide emissions.”); John R. Nolon, *The Land Use Stabilization Wedge Strategy: Shifting Ground to Mitigate Climate Change*, 34 WM. & MARY ENVTL. L. & POL’Y REV. 1, 7-8 (2009) (“The residential and commercial sectors account for approximately one-third of the total U.S. CO₂ emissions”); Earl L. Hagström & Jonathan T. Rodriguez, *Managing the Challenges of Climate Change Regulation for the Built Environment*, 2010 WL 1616856, at *1 (2010) (“Energy use by the built environment (residential and commercial) contributes to more CO₂ and GHG emissions [in the United States] than the transportation and industry sectors.”).

111. See Marissa S. Knodel, *Wet Feet Marching: Climate Justice and Sustainable Development for Climate Displaced Nations in the South Pacific*, 14 VT. J. ENVTL. L. 127, 143 (2012) (referring to “the asymmetrical impacts of climate change, where the poor and those living in developing countries will experience far worse consequences than the wealthy and those living in developed countries”); see also Mary Jane Angelo & Joanna Reilly-Brown, *Whole-System Agricultural Certification: Using Lessons Learned from Leed to Build A Resilient Agricultural System to Adapt to Climate Change*, 85 U. COLO. L. REV. 689, 705 (2014); Teresa Thorp, *In Search of Coherency in Negotiating Post-2015 International Climate, Development, and Disaster Risk Reduction Agreements*, 25 FORDHAM ENVTL. L. REV. 706, 715 (2014).

112. See *supra* note 109 and accompanying text.

113. See, e.g., Jessica Seddon Wallack & Veerabhadran Ramanathan, *The Other Climate Changers: Why Black Carbon and Ozone Also Matter*, 88 FOREIGN AFFAIRS 105, 105 (2009).

114. See, e.g., Vasilis Fthenakis & Hyung Chul Kim, *Land Use and Electricity Generation: A Life-cycle Analysis*, 13 RENEWABLE & SUSTAINABLE ENERGY REV. 1465

systems, the toxic effects of any accident will likely last hundreds of years before land can be used.¹¹⁵ But even so-called clean energy systems are not costless. Renewable energy systems may even leave a larger immediate footprint on landscapes and ecosystems than traditional energy generating facilities.¹¹⁶

Water systems do not escape the impact of energy production. The production of feedstock for bioenergy, the abstraction of water for thermal power cooling systems, and the diversion and harnessing of water for hydroelectric systems all have impacts on water usage, as well as the supporting geological and geographical structures. Production of biomass for energy locks up water resources into the feedstock and may lead to the degradation of water resources in the areas that the crops are grown either through overuse or discharge of fertilizers into the ecosystem. The use of water for cooling systems for nuclear or fossil fired power stations may also have impacts on aquatic ecosystems. While in these cases, the use of water may not deplete the resource and the used water may be made available for other uses downstream, the returned water is often at a higher temperature than the natural temperature ranges. This aspect may sometimes alter the character of ecosystems and the life forms that it supports.¹¹⁷ Dam construction alters the character of river basins, affecting downstream habitats and species as well as irreversibly altering the lifestyles and opportunities of downstream communities. A study commissioned by the World Commission on Dams in 2000 estimated that forty to eighty million people were directly affected by dam construction and the associated displacements around the world.¹¹⁸ However, further analysis of systemic impacts showed that

(2009); Carl E. Zipper et al., *Restoring Forests and Associated Ecosystem Services on Appalachian Coal Surface Mines* 47(5) *Envtl. Mgmt.* 751-65 (2011).

115. Cf. National Cancer Inst., *Accidents at Nuclear Power Plants and Cancer Risk*, available at <http://www.cancer.gov/cancertopics/factsheet/Risk/nuclear-power-accidents> (last visited Mar. 31, 2015) (discussing long-term health risks of exposure to radiation after a nuclear accident).

116. See, e.g., Robert L. Glicksman, *Solar Energy Development on the Federal Public Lands: Environmental Trade-Offs on the Road to a Lower Carbon Future*, 3 *SAN DIEGO J. ENERGY & CLIMATE L.* 107, 114-17 (2011-2012).

117. See, e.g., E. H. Poornima et al., *Impact of Thermal Discharge from a Tropical Coastal Power Plant on Phytoplankton*, 30 *J. OF THERMAL BIOLOGY* 307, 307-08 (2005); Yi-Li Chuang, Hsiao-Hui Yang, & Hsing-Juh Lin, *Effects of a Thermal Discharge from a Nuclear Power Plant on Phytoplankton and Periphyton in Subtropical Coastal Waters*, 261 *J. OF SEA RESEARCH* 197, 197 (2009).

118. See Brian D. Richter et al., *Lost in Development's Shadow: The Downstream Human Consequences of Dams*, 3 *WATER ALTERNATIVES* 14, 16-17 (2010).

the numbers of people impacted downstream due to dam construction and river basin alteration were in the magnitude of 500 million.¹¹⁹

Access to modern energy is a critical prerequisite to improved living conditions in the developing world. Enhanced energy comes at a cost, however. The description in this Part of the adverse health and environmental effects linked to all forms of energy development makes it clear that adequately addressing these effects, especially in the developing world, will require more than just a shift away from traditional energy sources that generate both greenhouse gases that contribute to climate change and conventional pollutants such as particulate matter. Increases in the efficiency of energy use are also critical.

III. *THE PLACE OF SE4ALL WITHIN EXISTING INTERNATIONAL LEGAL FRAMEWORKS*

It is clear from the foregoing analysis that although energy systems play a critical role in human development, they inevitably will have serious impacts on global sustainability and human wellbeing in both the short and long terms. On the one hand, usage of unimproved energy sources such as biomass will continue to impose a not insignificant disease burden on many around the world, especially in poor, undeveloped communities. On the other hand, increased energy production and access will likely take a major toll on the environment, imposing significant costs on ecosystems and communities. In this regard, energy efficiency is a crucial path forward because efficiency reduces the footprint of energy systems, no matter which energy path is chosen.

The SE4All initiative attempts to balance these potentially conflicting pressures by ensuring that increased access is matched by investments in renewable energy and efficiency. The system of commitments envisaged by the initiative is deliberately voluntary to encourage stakeholder buy-in. It is our view, however, that the lack of binding obligations risks driving SE4All along the same trajectory that produced the failed initiatives of the past. As a result, we argue that the realization of the ambitious vision set out by the UNSG depends critically on articulation of the applicable international legal framework for SE4All. In particular, the aim should be to harness the mechanisms that are already available in international law to foster

119. *Id.*

SE4All objectives and policy development. In the following two sections, we outline the key justifications for the necessity of a clear legal framework in favor of SE4All. Section A explains why international human rights and sustainability frameworks hold the greatest promise for effective implementation of SE4All. Section B addresses how existing international law commitments in these two realms already provide a strong foundation for the imposition of binding state duties consistent with SE4All's goals.

A. *The Need for an International Legal Framework to Promote SE4All's Goals*

Despite the obvious linkage between energy and poverty, there has been a dearth of legal responses to address the challenges posed by lack of access to modern sources of energy.¹²⁰ Although well-intentioned, SE4All continues this trend by failing to articulate any legal basis for interventions in favor of promoting activities needed to achieve the initiative's energy-related goals. It is important to articulate a well-developed legal regime that could support the recognition of enforceable state duties under SE4All. In view of the social, economic, and environmental impacts created by access (or lack thereof) to different forms of energy, the regimes of international human rights law and international sustainable development law represent a logical source of legal duty and a powerful tool for realizing SE4ALL's ambitions.

Compelling reasons support insistence on a clearly articulated legal framework for SE4All, and in particular for a framework derived from human rights and sustainability law. First, both these frameworks are capable of encouraging states to undertake focused efforts at implementing their SE4All obligations as well as measuring the progress of such efforts. For example, an explicit link between SE4All and a human rights framework enables the articulation of a series of binding obligations on states to undertake measures aimed at ensuring the realization of universal access to energy services, one of SE4All's three fundamental precepts. The establishment of a norm of universal access would be a useful basis for bringing pressure to bear

120. See Adrian J. Bradbrook, Judith G. Gardam & Monique Cormier, *Human Dimension to the Energy Debate: Access to Modern Energy Services*, 26 J. ENERGY NAT. RESOURCES L. 526, 528 (2008); see also Ngai, *supra* note 59, at 605 (arguing that the protection currently provided by international law to a right of individual access to energy is "vastly inadequate and ineffective").

on states to fulfill their responsibilities to their citizens.¹²¹ At a minimum, such a norm would require States to demonstrate that they are undertaking the necessary steps to realize at least the essential elements of such a right.¹²²

Similarly, an explicit incorporation into SE4All standards by States of the rules of sustainable development law would lay the ground for matching the quest for an increase in the stock of renewable energy and increases in energy efficiency with states' obligations within various environmental treaties such as the UNFCCC¹²³ or the Convention on Biological Diversity.¹²⁴ For example, the development of dams for power production would have to pass strict environmental impact assessments to ensure that the impacts on ecosystems were minimized.¹²⁵ Such an approach would alter the voluntary nature of SE4All commitments by creating enforceable state duties, as envisaged in the initiative's Action Plan. Although a clear link between SE4All and a states' obligations under human rights or sustainable development law does not impose new or additional obligations, such a link makes clear the imperative nature of the SE4All effort to satisfy important state duties already recognized under existing principles of international law. The SE4All initiative's obligation to put in place an accountability framework for implementation, including the "tracking of progress" through a "transparent and accessible platform ... for self-reporting,"¹²⁶ fits well with state obligations on human rights reporting.

Second, the articulation of a clear legal framework offers a strong platform for advocacy initiatives by non-governmental stakeholders aimed at ensuring state compliance with SE4All commitments. As the UNSG correctly noted, realization of SE4All's goals requires the active collaboration of all stakeholders, including

121. See Bradbrook & Gardam, *supra* note 22, at 413.

122. Committee on Economic, Social and Cultural Rights, General Comment 3, The Nature of States Parties' Obligations (Fifth session, 1990), ¶ 10, U.N. Doc. E/1991/23, Annex III at 86 (1991), *reprinted in* Compilation of General Comments and General Recommendations Adopted by Human Rights Treaty Bodies, U.N. Doc. HRI/GEN/1/Rev.6, at 14 (2003).

123. See United Nations Committee on Sustainable Development, New York, U.S., Apr. 30 – May 9, 1992, Intergovernmental Negotiating Committee for a Framework Convention on Climate Change, U.N. Doc. A/AC.237/18 (Part II)/Add.1 (May 15, 1992).

124. See *generally* Convention on Biological Diversity, 1760 U.N.T.S. 79 (1992).

125. See Matthew McCartney, *Living With Dams: Managing the Environmental Impacts*, 11 WATER POL'Y 121, 135-36 (2009).

126. See Global Action Agenda, *supra* note 84, at 14.

citizens and non-governmental entities, within and across states.¹²⁷ Such participation not only improves the quality of information available to states seeking to implement SE4All, but also enhances the legitimacy of resulting policy choices.¹²⁸ The framing of SE4All commitments as human rights obligations or sustainable development imperatives increases the likelihood of such participation by increasing citizen awareness of the duty of their governments to ensure at least minimal access to modern energy supplies, and heightens stakeholder opportunities to discover inadequacies in state responses and to use public disclosure to pressure states to improve their track records.

Third, an international legal framework such as the one proposed here would lead to better coordination between United Nations human rights institutions and the body's specialized agencies that focus on the environment. Whereas such a scenario is vaguely envisaged in the Global Action Plan,¹²⁹ the articulation of a right of access to energy, for example, would allow the various human rights bodies and environmental agencies to participate in the global tracking and reporting platform¹³⁰ through the examination of commitment and progress reports submitted to the SE4All secretariat as part of those bodies' own human rights mandate. This linkage would not only aid the work of the human rights bodies, but also enable states to build better-integrated plans for their SE4All actions, which link policy to human rights and environmental obligations.

Finally, the legal framework availed by international human rights and sustainable development affords a certain structure to the discourse on SE4All and the interventions that it stipulates. The institutional structure proposed by SE4All is intended to focus State action towards the achievement of the initiative's goals. The wide ranging interrelationships between SE4All's goals (universal access to energy, renewable energy, and energy efficiency) and the impacts of striving towards those goals on economics, human development, and the environment amplify the risk that these "issues are considered in a wide range of disparate bodies" in which the quest for focused

127. U.N. News Centre, *supra* note 65.

128. See Thoko Kaime, *Cultural Legitimacy and Regulatory Transitions for Climate Change: A Discursive Framework*, 3 CARBON & CLIMATE L. REV. 321, 322 (2011).

129. See Global Action Agenda, *supra* note 84.

130. See Sec. Gen. SE4ALL Report, *supra* note 77, at 13; see also Global Action Agenda, *supra* note 84, at 14.

action is ultimately lost.¹³¹ In its 2002 report, the WEHAB noted that “access to energy and modern energy services” was a key issue to be addressed by the international community, but observed that “[c]urrently there is no international or intergovernmental process to host or facilitate dialogue on priority energy issues.”¹³² Although SE4All has gone a long way to address this gap, the articulation of a legal framework for implementing it would move the discourse on SE4All from one that addresses a random range of interventions into a focused debate on how best to deliver SE4All in a manner that is measurable against established benchmarks available under human rights and sustainable development mechanisms.

Application of an international legal framework to SE4All therefore holds out the prospect of important practical benefits. In the following section, we outline the basic contours of this framework by highlighting existing international human rights and sustainable development norms and institutional processes that have general applicability to the SE4All effort.

B. *SE4All in International Human Rights Law and Sustainable Development Law*

The prospects for achieving SE4All’s goals would be enhanced if one could link state duties to pursue them to existing international human rights and sustainability legal frameworks. Fortunately, those goals and the actions needed to achieve them fit comfortably within both those frameworks. The three elements of SE4All—realizing universal access to modern energy services, increasing the stock of renewable energy capacity, and improving energy efficiency—are already implicit within existing state human rights and sustainable development obligations. In this section, we focus on several international legal instruments relating to human rights and sustainability that are relevant to SE4All and that support the recognition of enforceable state duties to promote SE4All’s three principal objectives.¹³³

131. See Bradbrook & Gardam, *supra* note 22, at 414; WEHAB Working Group Report, *supra* note 47, at 15-16.

132. WEHAB Working Group Report, *supra* note 47, at 16.

133. See Ngai, *supra* note 59, at 606 (arguing that “access to energy is an implied human right . . .”).

Perhaps the most iconic instrument in this regard is the United Nations Charter,¹³⁴ which was adopted in 1945 and is binding on all member States of the organization. Article 55 of the Charter calls upon all stated to promote:

- a. higher standards of living, full employment, and conditions of economic and social progress and development;
- b. solutions of international economic, social, health, and related problems; and international cultural and educational co-operation; and
- c. universal respect for, and observance of, human rights and fundamental freedoms for all without distinction as to race, sex, language, or religion.

Although there is no reference to energy in the Charter, given the impacts of access to and sources of energy described in Part III above, the achievement of the goals set out in Article 55 requires universal access to modern energy services as well as the mitigation of the adverse health and climate impacts of those systems. Additionally, Article 56 calls upon “[a]ll Members ... to take joint and separate action in co-operation with the Organization for the achievement of the purposes set forth in Article 55,” thereby providing support for the collective effort to achieve SE4All’s goals.

A second important source of legal obligations in favor of SE4All is the Universal Declaration of Human Rights (“UDHR”), adopted by the United Nations in 1948.¹³⁵ Although initially intended as a non-binding aspirational statement on human rights, some contend that the instrument has now become binding customary law.¹³⁶ Article 25 of the Declaration provides that “[e]veryone has the right to a standard of living adequate for the health and well-being of

134. U.N. Charter, June 26, 1945, 1 U.N.T.S. xvi, 59 Stat. 1031, T.S. 993, entered into force Oct. 24, 1945.

135. Universal Declaration of Human Rights, G.A. Res. 217 (III) A, U.N. Doc A/RES/217(III) (Dec. 10, 1948) [hereinafter UDHR].

136. See Jochen von Bernstorff, *The Changing Fortunes of the Universal Declaration of Human Rights: Genesis and Symbolic Dimensions of the Turn to Rights in International Law*, 19 EUROPEAN J. OF INT’L L. 903 (2008); Katherine G. Young, *Freedom, Want, and Economic and Social Rights: Frame and Law*, 24 MD. J. OF INT’L L. 182 (2009); Catherine Jean Archibald, *What Kind of Life: Why the Canadian Charter’s Guarantee of Life and Security of the Person Should Include the Right to a Healthy Environment*, 22 TUL. J. INT’L & COMP. L. 1, 28 (2013). Cf. John G. Sprankling, *The Global Right to Property*, 52 COLUM. J. TRANSNAT’L L. 464, 496 (2014) (asserting that view that the entirety of the UDHR “has evolved over time to become customary international law through its periodic reaffirmation by the General Assembly and other international bodies . . . remains a minority view”).

himself and of his family, including food, clothing, housing and medical care and necessary social services. . . .”¹³⁷ Although access to energy is not included on this list, its availability is an important attribute of “a standard of living adequate for health and well-being,” for reasons described in Part III above. Similarly, interventions in favor of renewable energy and energy efficiency have a considerable impact on raising living standards and the ability to protect human rights because such interventions not only increase access, but also mitigate the negative impacts of expanding energy systems.¹³⁸

Third, in order to give legal expression to the ideals espoused in the UDHR, the UN General Assembly promulgated in December 1966 the International Covenant on Civil and Political Rights (“ICCPR”)¹³⁹ and the International Covenant on Economic Social and Cultural Rights (“ICESCR”).¹⁴⁰ Article 6 of the ICCPR protects the right to life. In its General Comment No. 6 on the right to life,¹⁴¹ the Human Rights Committee favored an expansive interpretation of the right to life, advising that the expression “inherent right to life” should not “be understood in a restrictive manner.” Instead, it called on States Parties to take positive steps to protect the right to life, including “measures to reduce infant mortality and to increase life expectancy, especially in adopting measures to eliminate malnutrition and epidemics.”¹⁴² The examples identified by the Committee fit very well with the SE4All agenda, as measures to secure access to food and improve the delivery of health services all depend on access to safe, secure, and reliable energy services.

The ICESCR is perhaps the most relevant international instrument in assessing whether SE4All’s goals are backed by extant,

137. See UDHR, *supra* note 135, art. 25.

138. Cf. Ngai, *supra* note 59, at 616 (“The energy sources involved [in meeting basic individual energy needs] should not be harmful to human health or the environment and, ideally, [should be] clean and environmentally friendly.”).

139. International Covenant on Civil and Political Rights, G.A. Res. 2200A (XXI), 21 U.N. GAOR Supp. No. 16, at 52, U.N. Doc. A/6316 (1966), 999 U.N.T.S. 171 (Mar. 23, 1976).

140. International Covenant on Economic, Social and Cultural Rights, G.A. Res. 2200A (XXI), 21 U.N. GAOR Supp. No. 16, at 49, U.N. Doc. A/6316 (1966), 993 U.N.T.S. 3 (Jan. 3, 1976).

141. Human Rights Committee, General Comment 6, Article 6 (16th Sess.), Compilation of General Comments and General Recommendations Adopted by Human Rights Treaty Bodies, U.N. Doc. HRI/GEN/1/Rev.1 at 6 (1994).

142. *Id.* at ¶ 5.

binding principles of international human rights law.¹⁴³ Although energy is not expressly mentioned in the document, the Covenant's social, economic, and cultural goals cannot be achieved without universal access to energy or mitigation of the health-related impacts of energy systems through, for example, improvements in efficiency as well as increases in the renewable stock of energy sources.¹⁴⁴ For example, Articles 6 and 7 entrench the right to work, including prescriptions on conditions of work. Without access to modern energy services, states cannot effectively implement this right, as employment opportunities are necessarily limited when energy infrastructure is underdeveloped.¹⁴⁵ Similarly, creating safe and healthy working conditions also requires improved energy infrastructure, as most safety equipment and aids, including medical support, require modern energy sources. Article 11 sets out a catalogue of rights that are key to the realization of the right to an adequate standard of living. It provides:

1. The States Parties to the present Covenant recognize the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing, and to the continuous improvement of living conditions...
2. The States Parties to the present Covenant, recognizing the fundamental right of everyone to be free from hunger, shall take, individually and through international co-operation, the measures, including specific programmes, which are needed:
 - (a) To improve methods of production, conservation and distribution of food by making full use of technical and scientific knowledge, by disseminating knowledge of the principles of nutrition and by developing or reforming

143. See Ngai, *supra* note 59, at 607 (arguing that “as access to modern energy services is an essential component in the effective realization of many human rights under the ICESCR, the existence of this right is necessarily inferred”).

144. Cf. Stephen R. Tully, *The Contribution of Human Rights to Universal Energy Access*, 4 NW. J. INT'L HUM. RTS. 518 (2006) (urging recognition of a human right to energy access); Bradbrook, Gardam & Cormier, *supra* note 120 (making the case for incorporation of access to modern energy services into the human rights framework).

145. See United Nations Development Programme, *Integrating Energy Access and Employment Creation to Accelerate Progress on the Millennium Development Goals in Sub-Saharan Africa* (2012), available at http://www.undp.org/content/dam/undp/library/Environment%20and%20Energy/Sustainable%20Energy/EnergyAccessAfrica_Web.pdf (last visited Mar. 31, 2015); see also Ngai, *supra* note 59, at 611 n. 219 (noting that “it has also been argued that the right to energy is essential to the realization of multiple rights under the ICESCR including: the right to work (Art. 6), the right to safe and healthy working conditions (Art. 7) and the right to education (Art. 13)”).

agrarian systems in such a way as to achieve the most efficient development and utilization of natural resources;

(b) Taking into account the problems of both food-importing and food-exporting countries, to ensure an equitable distribution of world food supplies in relation to need.

As explained above, achieving food security and enhancing living standards is closely linked to improved access to modern energy services, while environmental sustainability is fostered both by increased availability of renewable energy and improvements in energy efficiency. All of these are goals of SE4All.

Similarly, Article 12 of the ICESCR guarantees the right to the highest attainable standard of physical and mental health. As demonstrated in Part III, effective health systems depend on the availability of modern energy systems, without which communities cannot make use of the latest developments in health technology. Additionally, access to energy and incorporation of clean energy technologies improve the underlying conditions for public and environmental health. Finally, Article 13 guarantees the right to education, which can only be effectively delivered if schools have access to modern energy services. Without such access, public education systems will likely struggle to deliver an advanced education necessary for sustainable development, let alone procure and retain highly-skilled teachers within the system.

Aside from these two major instruments on human rights, other binding international treaties are also relevant to SE4All. These include the Convention on the Elimination of All Forms of Discrimination against Women (“CEDAW”)¹⁴⁶ and the Convention on the Rights of the Child (“CRC”).¹⁴⁷ CEDAW is the only international law document to expressly recognize an individual entitlement to access to energy. Article 14 calls upon states parties to “take all appropriate measures to eliminate discrimination against women in rural areas ... and, in particular, ... ensure to such women the right ... to enjoy adequate living conditions, particularly in

146. Convention on the Elimination of All Forms of Discrimination against Women, G.A. Res. 34/180, 34 U.N. GAOR Supp. No. 46, at 193, U.N. Doc. A/34/46, 1249 U.N.T.S. 13 (Sept. 3, 1981) [hereinafter CEDAW].

147. Convention on the Rights of the Child, G.A. Res. 44/25/Annex. 44, U.N. GAOR Supp. No. 49, at 167, U.N. Doc. A/44/49 (1989), 1577 U.N.T.S. 3 (Sept. 2 1990) [hereinafter CRC].

relation to housing, sanitation, electricity and water supply, transport and communications.”¹⁴⁸ The Committee on the Elimination of Discrimination against Women, which is responsible for overseeing implementation of the Convention, “is anxious that States Parties implement this important provision.”¹⁴⁹

The CRC catalogues a series of civil and political as well as socio-economic rights applicable to children. For example, Article 28 recognizes the child’s right to education, including “facilitating access to scientific and technical knowledge and modern teaching methods.”¹⁵⁰ Article 27 guarantees “the right of every child to a standard of living adequate for the child’s physical, mental, spiritual, moral and social development.”¹⁵¹ Article 24 protects the child’s right “to the enjoyment of the highest attainable standard of health and to facilities for the treatment of illness and rehabilitation of health.”¹⁵² None of these protections is achievable without access to safe, secure, and reliable energy services.

Similarly, moves towards increased reliance on renewable energy sources and improvements in energy efficiency carry a dividend for children’s health, consistent with sustainable development principles. Sustainable development law directly influences the manner in which SE4All is implemented.¹⁵³ The core principles of this branch of international law¹⁵⁴ require that actions to implement SE4All be undertaken within strict environmental

148. See CEDAW, *supra* note 146.

149. See CEDAW, *Progress achieved in the implementation of the convention on the elimination of all forms of discrimination against women*; Beijing, 21 June 1995, Fourth World Conference on Women, U.N. Doc. A/CONF.177/7 para 45(1) available at <http://www.un.org/esa/gopher-data/conf/fwcw/off/a--7.en> (last visited July 16, 2015).

150. See CRC, *supra* note 147, art. 28(3), 29(1)(e) (agreeing that children’s education shall be directed at “development of respect for the natural environment”).

151. *Id.* art. 27(1).

152. *Id.* art. 24(1).

153. See Ngai, *supra* note 59, at 616 (arguing that “the manner of realizing the right to energy must also be sustainable, ensuring that the right can be realized for present and future generations”).

154. Although there has been much discourse regarding the uncertain nature of sustainable development as a legal principle, certain legal rules have emerged to describe what the principle requires in international law. See Nico Schrijver, *Grounding of Sustainable Development in International Law*, in THE EVOLUTION OF SUSTAINABLE DEVELOPMENT IN INTERNATIONAL LAW: INCEPTION, MEANING AND STATUS. COLLECTED COURSES OF THE HAGUE ACADEMY OF INTERNATIONAL LAW 329 (Nico Schrijver ed., The Hague, Martinus Nijhoff Publishers, 2008); see also Virginie Barral, *Sustainable Development in International Law: Nature and Operation of an Evolutive Legal Norm*, 23 EUROPEAN J. OF INT’L L. 377 (2012).

limits.¹⁵⁵ Based on the seminal work of the United Nations Commission on Sustainable Development¹⁵⁶ and the International Law Association Committee on the Legal Aspects of Sustainable Development,¹⁵⁷ it is possible to distill six fundamental principles of international sustainable development law.

The first principle is that although States have sovereignty over their natural resources, they must utilize such resources in a manner that does not cause undue damage to the environment.¹⁵⁸ This obligation is affirmed in the Revised African Convention on the Conservation of Nature and Natural Resources,¹⁵⁹ the UNFCCC¹⁶⁰ and the Convention on Biological Diversity (“CBD”).¹⁶¹ In relation to SE4All, this principle requires, for example, that plans to achieve universal access must not cause undue environmental degradation. Second, States must adhere to the principle of equity and the

155. See generally ROY HAINES-YOUNG, MARION POTSCHIN & DUNCAN CHESHIRE, *DEFINING AND IDENTIFYING ENVIRONMENTAL LIMITS FOR SUSTAINABLE DEVELOPMENT. A SCOPING STUDY* (2006), available at http://www.nottingham.ac.uk/cem/pdf/NR0102_FTR_Final.pdf.

156. See U.N. C.S.D., Report of the Expert Group Meeting on Identification of Principles of International Law for Sustainable Development, Geneva, Switzerland, 26-28 Sept. 1995, available at <http://www.un.org/documents/ecosoc/en17/1996/background/ecn171996-bp3.htm> (last visited Mar. 31, 2015).

157. See ILA New Delhi Declaration of Principles of International Law Relating to Sustainable Development New Delhi, India, Apr. 2-6, 2002, U.N. Doc. A/CONF.199/8 (2002).

158. See 1992 Rio Declaration on Environment and Development, Principle 2, U.N. Doc. A/CONF.151/26 (vol. I) (1992) [hereinafter Rio Declaration].

159. Revised African Convention on the Conservation of Nature and Natural Resources, art. 3(3), adopted July 11, 2003 at the Assembly of the African Union, available at http://www.au.int/en/sites/default/files/AFRICAN_CONVENTION_CONSERVATION_NATURE_NATURAL_RESOURCES.pdf.

160. See UNFCCC, *supra* note 35, art. 3(4).

161. Convention on Biological Diversity, *supra* note 124 (incorporating the principles of state sovereignty in article 3 and sustainable use in article 10); see also UNFCCC, *supra* note 35, where the principle is in the Preamble (sovereignty & responsibility); United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, 1954 U.N.T.S. 3 (June 17, 1994), art. 9, 33, I.L.M. 1328, available at <http://www.unccd.int/en/Pages/default.aspx>, at art. 3(c), Principles (work toward sustainable use of scarce water & land) and Art 10.4 (national action plans), art. 1.1 (regional and sub-regional actions), Art 17.1(a) (research and development), Art 19.1(c) & (e) (capacity-building); Agreement Establishing the World Trade Organization, 1867 U.N.T.S. 154, 33 I.L.M. 1144 at Preamble (1994), available at https://www.wto.org/english/docs_e/legal_e/04-wto_e.htm [hereinafter WTO Agreement]; International Treaty on Plant Genetic Resources for Food and Agriculture, at art 1.1, Nov. 3, 2001, available at <http://www.austlii.edu.au/au/other/dfat/treaties/2006/10.html> [hereinafter FAO Seed Treaty] (conservation and sustainable use of PGRFA) then operational in Art 6 (measures for sustainable use of plant genetic resources).

eradication of poverty. This principle arguably requires states to ensure that SE4All initiatives focus on meeting the needs of the poor, as they have the greatest priority.¹⁶² Additionally, actions prompting SE4All must not deny the ability of future generations to benefit from critical environmental resources.¹⁶³ Consequently, the path to achieving universal access must be carefully structured in such a way that it does not limit the options for future generations. There is therefore a duty to develop an appropriate mix of energy sources, including clean sources, and with efficient technologies. This principle of equity is duly recognized in both the CBD¹⁶⁴ and the UNFCCC.¹⁶⁵

Third, states have a common responsibility to protect the environment at the national, regional, and global levels, although that responsibility is qualified by the need to take into account different circumstances, particularly in relation to each state's historical contribution to the creation of a particular problem and its ability to prevent, reduce and control the threat.¹⁶⁶ As a result, SE4All developing states who have contributed little to climate change may be allowed to achieve SE4All's universal access to energy goal through higher polluting energy sources than developed countries, which will have a more onerous task in meeting the initiative's renewable energy and efficiency targets. However, recognition of this

162. See Agenda 21, *supra* note 26, 3.8(o) (enabling the poor to achieve sustainable livelihoods).

163. See Rio Declaration, *supra* note 158, Principle 3.

164. See Convention on Biological Diversity, *supra* note 124, art. 15.7 (access and equitable benefit sharing).

165. See UNFCCC, *supra* note 35, Preamble, art. 3 (noting the priorities of present and future generations and equity); see also Convention to Combat Desertification, *supra* note 161, arts. 16(g), 17.1(c), 18.2(b) (incorporating the principle of traditional knowledge sharing, traditional knowledge research & development, and technology transfer); FAO Seed Treaty, *supra* note 161, Preamble, arts. 1.1, 10-13 (noting responsibility and benefit-sharing, objectives, and a multilateral system of access and benefit-sharing for plant genetic resources).

166. Rio Declaration, *supra* note 158, Principle 7. This principle is reflected in various provisions of the UNFCCC, including the Preamble, art. 3 (Principles) and art. 4 (Commitments) (Annex 1 and non-Annex 1). It is also reflected in other international treaties, including the Kyoto Protocol, *supra* note 39, arts. 10, 12 (inventories, programmes, and CDM); UN Convention to Combat Desertification, *supra* note 161, arts. 3-7 (stating principles and establishing obligations for affected and developed country parties prioritizing African countries); WTO Agreement, *supra* note 161, at Preamble; the FAO Seed Treaty, *supra* note 161, arts. 7.2(a), 8, 15.1(b)(iii), 18.4(d) (noting developing country capabilities, technical assistance, benefits to least developed and centers of diversity, and financing). See generally Christopher D. Stone, *Common but Differentiated Responsibilities in International Law*, 98 AM. J. OF INT'L L. 276, 276-301 (2004).

allowance must be balanced by the necessity for developing countries to choose clean energy now to avoid energy system lock-in and further harm to populations that are already poor, sick, and subject to much pollution. This calls for a careful balancing act in determining the energy mix for universal access.

Fourth, international sustainable development law requires that states observe the precautionary principle. Where there is scientific uncertainty, the principle shifts the burden of proof to those proposing activities that might cause serious harm and favors prevention over remediation.¹⁶⁷ The 1994 Agreement on Sanitary and Phytosanitary Measures, for example, reflects this fundamental principle.¹⁶⁸ The precautionary principles requires that SE4All implementing activities undergo robust risk assessment to ensure that innovation in favor of SE4All goals does not exacerbate environmental damage, such as by land degradation or damage to river systems caused by large dams.

Another important cross-cutting principle is that of public participation and access to information and justice, which requires that citizens be allowed to participate meaningfully in government decisions that affect them.¹⁶⁹ A good example of an international environmental treaty encapsulating the principle is the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters.¹⁷⁰ This treaty would appear to obligate states to put in place mechanisms

167. See Rio Declaration, *supra* note 158, Principle 15.

168. Agreement on Sanitary and Phytosanitary Measures, art. 5.7, 1867 U.N.T.S. 493, 33 I.L.M. 1153 (1994), available at https://www.wto.org/english/docs_e/legal_e/15sps_01_e.htm (highlighting provisional measures); see also Convention on Biological Diversity, *supra* note 124, at Preamble, arts. 8(g), 14.1(b) (noting LMOs and likely adverse impacts); Cartagena Protocol on Biosafety, Preamble, arts. 1, 7, 10.6, 11.8, 15, Annex III.4, 2226 U.N.T.S. 208 (Jan. 29, 2000) (emphasizing precautions, advance informed agreement procedure, decision-making, and risk assessment); UNFCCC, *supra* note 35, art. 3(3) (stating precaution); North American Free Trade Agreement, U.S.-Can.-Mex., Dec. 17, 1992, arts. 905, 907.3, 32 I.L.M. 289 (1993) (noting use of international standards and assessment of risk/provisional regulations, respectively) [hereinafter NAFTA].

169. See Rio Declaration, *supra* note 158, Principle 10.

170. See Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, 2161 U.N.T.S. 447, 38 I.L.M. 517 (1999). See also U.N. Convention on Biological Diversity, *supra* note 124, arts. 13, 14.1(a) (public education and awareness and participation in impact assessment); U.N. Convention to Combat Desertification, *supra* note 161, arts. 3 (a), 10.2(f) (addressing principles and national action plans); WTO Agreement, *supra* note 161, V.2 (consultation with NGOs); FAO Seed Treaty, *supra* note 161, art 9.2(e) (noting farmers' rights to participate).

for citizen input into the formulation of SE4All action plans, including avenues of appeal if citizen concerns are not addressed.

A final and reinforcing principle is that of integration and interrelationship.¹⁷¹ For SE4All, the principle requires that action plans strive to resolve the likely conflicts between economic and financial, social, and environmental considerations. Thus, states must take positive steps to ensure that there is a proper balance between the three related goals of the initiative as well as between the human rights and environmental objectives of all planned interventions.

The legal principles described above, taken together, provide considerable guidance for ensuring that SE4All actions not only change the profile of energy systems towards universal access, improvements in the proportion of renewables, and higher rates of energy efficiency, but also that such interventions contribute in a coherent manner towards the protection of human rights and adherence to sustainable development.

CONCLUSION

SE4All is a flagship policy initiative for the United Nations. Supported by a Charter mandate, it seeks to make a fundamental and lasting difference in the lives of many across the globe by unlocking the opportunities that access to energy promises as well as deal with the negative consequences of energy systems that depend on the use of fossil fuels. However, the failure to couple SE4All with a clear legal framework risks reducing the activities envisaged under the initiative to mere political gestures with no reasonable way of ensuring that states adhere to the commitments they have undertaken. Consequently, the articulation of an applicable legal framework, drawn from existing legal obligations of participating states, would bring clarity and force to the initiative. The framework proposed here would allow states to set goals which can be tracked with the aid of existing human rights and sustainable development implementation

171. See Rio Declaration, *supra* note 158, Principle 4. This principle is also reflected in the UN Convention on Biological Diversity, *supra* note 124, at art. 6 (integration of conservation and use into policies and plans); the Cartagena Protocol on Biosafety, *supra* note 168, Preamble, arts. 2.4-5 (noting that agreements should be mutually supportive between countries and aligned with other international instruments); FAO Seed Treaty, *supra* note 161, Preamble, art 5.1 (promoting synergies and an integrated approach); General Agreement on Tariffs and Trade, 55 U.N.T.S. 187, art .XX (stating exceptions); NAFTA, *supra* note 168, at art. 103, 104, 104.1, 1114, 2101 (explaining relationships with other accords, environmental standards and investment, and exceptions).

mechanisms, ensuring not only that SE4All remains a priority, but also that states construct their plans within structures that are already well-understood. Reliance on human rights and sustainable development frameworks to achieve SE4All's three principal goals holds considerable promise that SE4All's implementation will alleviate past deficiencies in efforts under precursor international legal regimes to facilitate energy access, enhanced energy efficiency, and clean energy goals, particularly among the world's most disadvantaged populations.