IUCN Academy of Environmental Law
Climate Law in Developing Countries post-2012: North and South Perspectives

Climate Policy Energy Solutions for Developing Countries – Be Careful What You Wish For[1]

Key Words: EIA Imperatives; Renewables; Biofuels; Nuclear Energy; "Clean" Coal; Carbon Capture & Sequestration

In the rush to find energy solutions for greenhouse gas emissions and to relieve the economic burdens and energy security problems of dependence on imported oil, alternative technologies are being advocated and even implemented on large scale without adequate technological or environmental assessments. Some of the alternatives actually can result in far greater greenhouse gas emissions than burning traditional fossil fuels. These problems occur pronouncedly, for example, with the contemplated conversion of coal into liquid transportation fuels and use of oil from shale or tar sands, among the most polluting and carbon-intensive fossil fuels.

Perhaps most concerning, there has been a rush to develop and use carbon capture and storage technologies to make possible the burning of coal without contributing to greenhouse gas emissions. The coal industry has seized upon this still unproven technology to justify expansion of the use of coal, by far the most polluting of energy resources. Ignored has been inadequate research on the technical feasibility of secure and long-term sequestration of carbon dioxide, which like underground injection as a means of disposing of toxic wastes in several Southern

damages from unscrubbed coal combustion exceed the costs of operation of coal-burning power plants.[6]

CCS Background[7]

What is CCS: Geologic sequestration involves separating and capturing CO_2 from an industrial or energy-related source, transporting it to a storage location, and injecting it underground. It is based on the theory that the liquid will remain isolated in the subsurface. The technology to separate carbon dioxide from plant emissions and store it underground has not yet been proven on a commercial scale, and potential leakage of CO_2 into underground sources of drinking water could pose significant threats to human and environmental health.

Promoting CCS: The U.S. and other countries, however, are touting CCS as an essential mechanism for reducing CO_2 emissions. Since 2005, the U.S. Department of Energy (DOE) has earmarked $145 million to support seven regional partnerships that are testing the feasibility of sequestration. Preliminary pilot testing to determine the viability and safety of carbon sequestration will not be completed until 2009; further, large scale testing has not yet begun. Congress is also putting pressure on the DOE to expedite the use of CCS before technological and environmental challenges have been addressed and sufficient regulatory programs established. For example, Representatives Henry Waxman (D-Calif.) and Ed Markey (D-Mass.) have recently introduced legislation that would prevent the permitting of new coal-fired power plants that cannot capture and store most greenhouse-gas emissions. The European Union (E.U.) expects that all coal-fired power plants in Europe will be built with CCS capabilities by 2020.[8] In addition, the E.U. recently revised the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR), a 15-year old treaty, to allow CO_2 to be stored on the ocean floor. Further, the recently-issued Synthesis Report from the UN Intergovernmental Panel on Climate Change included CCS as one of its major proposed climate change solutions. Finally, private philanthropy is seeking to expedite the implementation of CCS through public policy and financial channels. For example, several foundations have indicated an interest in fast-tracking CCS in the US.

Challenges Posed by CCS and the Current Approach: While it is recognized that CCS may provide important benefits for climate change response, many uncertainties remain that pose significant risks to natural resources and human health. A predominant risk of CCS is to underground sources of drinking water (USDW).[9] CCS is based on the expressed, but unsubstantiated theory, that CO_2 will be isolated in perpetuity by impermeable formations in the

---

[6] *Environmental Costs of Electricity,*

subsurface. Yet, decades of bad US state experience with underground injection of toxic wastes clearly reveals numerous pathways of contamination from both anthropogenic and natural causes. Violations of confinement integrity that could endanger USDW include:

-

foreign government or other person…"[12] The NRC even refused to follow a 9th Circuit decision requiring it to consider terrorist attacks in licensing proceedings under the National Environmental Policy Act.[13]

Nuclear plants have an additional safety disadvantage because they must instantly shut down in a power failure but they can not be quickly restarted. During the August 2003 Northeast blackout, nine U.S. nuclear plants had to be shut down. Twelve days later, their average capacity loss had exceeded 50 percent. For the first three days, when they were most needed, their output was below three percent of normal.[14]

Nor is the nuclear fuel cycle entirely without its own contribution to greenhouse gas emissions since fossil fuel energy is used in the mining, transportation and highly energy intensive enrichment of nuclear power fuel.[15]

Cost

Nuclear energy also is the costliest option by far among all main energy competitors, indeed so costly that even with huge federal loan guarantees of up to $18.5 billion per plant, Wall Street has been unwilling to finance them.[16] Just the capital costs of new plant construction now have reached $6–9 billion per plant according to Florida Power & Light (FPL) projections for a two-unit project, translating into 11-17 cents/kWh over the life of the plants. First year costs are nearly twice these values.[17] And FPL reported that the 200 mile transmission lines required for the installation would cost $3 billion more, raising the total cost estimate to $7,700 per kW and said that even this figure was "nonbinding" and "subject to change."[18]

Lew Hay, chairman and CEO of FPL, was quoted as saying of the cost of the above 2-plant project: "That's bigger than the total market capitalization of many companies in the U.S. utility industry and 50 percent or more of the market capitalization of all companies in our industry with the exception of Exelon…This is a huge bet for any CEO to take to his or her board." [19]

And in January 2008, MidAmerican Nuclear Energy Co., owned by famed investor Warren Buffett, said that nuclear plant construction prices were so high it was ending its pursuit of a nuclear power plant project in Fayette County, Idaho after it had spent $13 million researching the plan's feasibility. Company President Bill Fehrman stated, "Consumers expect reasonably

---

[12] 10 C.F.R. Sec. 50.13 (2008).
[13] *Amergen Energy Co., LLC*, 65 N.R.C. 124 (2007).
[14] Lovins, Amory B, I. Sheikh & a. Markevich, *Forget Nuclear,* Rocky Mountain Institute, Volume xxiv #1, Spring 1008. at pp. 24,25.
[15] Copan, *supra* note 7, at p. 9.
[16] Lovins *et al, supra* note 10 at pp. 1 & 25. This cost was confirmed as of 2007 by the Keystone Center's mid-2007 update, industry estimates and an MIT low 2003 cost assessment. *Id at p. 1.*
[17] Harding, J., *Myths of the Nuclear Renaissance*, Environmental Law Quarterly, Vol 15, #T/TT/ April 2008 http://www/boalt.org/elq/C35.01_08_Hardibng_2006.04.10.php at p. 3. Moody's Global Credit Research estimate new power plant construction costs at $ 5,000-6,000/kW in an October 2007 study and report, *New Nuclear Generation in the United States.*
[18] *Nuclear Power, Part 2: The price is not right* at http://climateprogress.org/s008/06/13/nuclear-power-part-2-the-price-is-not-right/ at pp. 1, 2, stating the FP&L plants would cost $12-18 billion, from $5,500 to
MC /P ‹MCID 23 ›BDC B30/TT0 1 Tf0 Tc 0 Tw 6.48 0 0 6.48 90 159.3 Tm(17)Tj/TT2 119 0 10.02 96.48 108.8401 Tm748

priced energy, and the company's due diligence process has led to the conclusion that it does not make economic sense to pursue the project at this time."[20]

Fuel Supply

Uranium fuel supplies are limited and fast depleting. Existing plants are fueled by extraction from abandoned Russian weapons, cancelled nuclear plants and government inventories, driving prices down and resulting in the closing down of mines and enrichment plants since the 1980s. Thus, as supplies from existing sources are drying up, there no longer exists the capacity to obtain and enrich new plant fuel supplies. As a result, the spot market prices for uranium are seven times higher today than five years ago.[21]

Reprocessing of spent nuclear fuel is the answer advanced by nuclear advocates, including the Bush Administration, to the supply problem. But the dangers of the plutonium by-product are unacceptable, with just nine pounds of plutonium required to produce a basic nuclear bomb, and the costs are prohibitive since current reactors can not use the reprocess fuel without substantial physical modification. The costs of using reprocessed fuel to run reactors are higher by 2.5-3 times (3.5 -4.5 cents/kWh).[22]

France's nuclear reprocessing is often used as a success example, but it has not found a means of recycling either the reprocessed uranium or the separated plutonium. As a result, France has an inventory of thousands of tons of reprocessed uranium and 50 tons of separated plutonium for which there is no commercial use.[23]

Thus, uranium supplies are a distinct limitation on a resort to nuclear power to address climate change, especially when you consider that simply keeping pace with planned retirements would require eight new plants per year in this decade and twenty-one new plants per year in the following decade.[24]

Nuclear Waste Disposal

The "spent" fuel remaining after use in nuclear power plants is highly toxic, consisting 97% of uranium and 3% of highly toxic isotopes such as Cesium 137, Iodine 120 and plutonium 239, some of which have half lives running tints millions of years. Currently there are 55,000 metric tons of spent nuclear fuel in the United States alone. The majority is stored in "pools" at reactor sites that, if breached, could result in melt-downs resulting in highly dangerous releases. Several plants now experience leaks from these spent fuel pools, resulting in dangerous tritium, cesium and strontium isotopes. As the pools, almost all well above their designed capacity, become full, utilities are resorting to "dry cask" storage in concrete and steel containers the required life of which is only 20 years.[25]

While the nuclear power industry touts the concrete containment vessels designed to protect the power plants from accidents or attack as security for this spent fuel, it never mentions that the

---

[20] *Id*. at pp. 1,2.
[21] Harding, *suprs* note 12 at p. 5.
[22] *Id*. at p. 4.
[23] Coplan, supra note 7, at p. 5.
[24] Harding, *supra* note 12. at p. 4.
[25] Coplan, *supra* note 7, at pp. 2 & 3.

Brazil has been the pioneer in the use of biofuels, allowing it to eliminate its oil imports, becoming completely energy independent, and demonstrating to the world the potential benefits of substitution of biofuels for fossil fuels. Indeed, inspired by Brazil's example, the United States in recent years has developed a strong biofuels industry, albeit from the disadvantageous feedstock of corn. The United States has just created an alliance with Brazil to make major purchases of its biofuels. The European Union and countries around the world are rapidly developing their own biofuels programs.

But Brazil and its replicators have to exercise great care in designing and implementing biofuels programs. The environmental and social risks of biofuel development, also demonstrated in Brazil, are great and could well undermine all the potential advantages if not done right.

These concerns are particularly pertinent to Brazil if its biofuel program meets current projections of biofuels exports to the United States and other countries. Brazil ethanol-industry estimates that the extent of land devoted to sugarcane cultivation, 13.6 million acres in 2006-2007, will reach 20.5 million acres by the 2012-13 harvest, an area bigger than the very large U.S. State of Maine. Brazil produced 65% of world ethanol exports last year, shipping 898 million gallons, or 31% more than in 2005. Processors estimate the country's annual ethanol exports will more than double to reach 1.85 billion gallons by 2013. This vast and rapid expansion will put tremendous pressure on Brazil's pasture land, presently the primary source of its biofuel production, and on its invaluable forest lands and Amazon basin treasure chest of biodiversity.

Even if forest land and protected areas are declared legally to be off limits to biofuel production as has been legislated in Brazil, these vulnerable areas still may be affected by migration to them harmful in areas where water is scarce. Experts cite the increased danger of spills of ethanol and

concentrated in the 25 sugar mills and distilleries that remain…This has provoked a generalized ‘slumming’ of the workers, which has aggravated hunger.”

Roundtable for Sustainable Biofuels sponsored by the Ecole Polytechnique Federale de Lausanne, the Dutch Government and its Cramer Commission, the UK, and FAO, UN-Energy, UNEP, UNIDO, UNCTAD and the WTO, among others.[51] Importers should require that imported biofuels meet these standards.

Biofuel production should not be permitted that jeopardizes the price and supply of food and crops essential for animal feed and local construction materials for the people of developing countries..[52]

Exporters and Importers of biof

It is essential that forests, protected conservation areas, and other habitats essential for biodiversity be protected.

Measures should be adopted to protect the land rights and way of life of existing farmers and ranchers.

Regulations must be adopted to protect water supplies and protect against water and air pollution from the growing and processing of biofuel
feedstocks. Feedstocks such as jatropha and sweet sorghum that require minimum water, fertilizers and pesticides should be promoted.

Electric utilities should be required to remove barriers to use of biofuels and oil companies should be prohibited from banning sale of biofuels at their company-owned and leased service stations.

(GBEP), The Biofuels initiative of UNCTAD, and The Global Village Energy Partnership (GVEP) that also provides financial support, capacity building and technical assistance to small bioenergy projects.

Biofuels Conclusion

The potential is great for the use of biofuels to relieve world dependence on scarce and uncertain supplies of oil[58] and to reduce emissions of greenhouse gasses. Particularly in developing countries where national and individual resources are too low for the introduction of modern energy resources essential for their development, biofuels have potential for providing energy from local crops, creating jobs and alleviating poverty.[59]

None of these potentials will be realized, however, if standards are not adopted to provide against substitution of fuel for food crops, endangerment of clean water supplies, deterioration of the land and inequitable distribution of the profits from biofuel production. Introduction of biofuels is proceeding so rapidly, however, that the environmental and social risks of biofuel production are too often being ignored. Without careful and thorough assessment and regulation, the promise of biofuels may well be lost.

CONCLUSION

Rather than massive promotion of high risk and high cost CCS and nuclear energy to reduce greenhouse gas emissions and provide energy security, a massive international effort should be devoted to the commercialization of safe, environmentally sound measures such as energy efficiency, cogeneration and renewable energy resources -- solar photovoltaics, solar thermal, wind, geothermal, small hydro, wave, tidal and bioenergy resources -- all with appropriate

New nuclear power plants are so horrendously expensive that their costs, mining threats to workers and the environment, threats to proliferation of weapons and security threats from terrorists simply are not worth the costs. Efficiency and renewable resource alternatives at today's costs are far more advantageous from every standpoint.

Biofuels, particularly second generation biofuels that do not compete with food supplies, seem the best, maybe the only, immediate alternative for energy to fuel economic development in poor countries and rural areas of countries in transition not served by modern energy resources.

Respectfully submitted:

Richard L. Ottinger
Dean Emeritus
Pace Law School
78 North Broadway
White Plains, New York 10603 USA
Phone: 914-422-4121
Fax: 914-422-4180
E-Mail: rottinger@law.pace.edu
Also Co-Chair, IUCN CEL Energy Law and Climate Change Specialist Group