

## Annexure A

### Business Risks and Costs of New Nuclear Power

Craig A. Severance

<http://climateprogress.org/wp-content/uploads/2009/01/nuclear-costs-2009.pdf>

Several U.S. utilities are now advancing proposals for a new generation of nuclear power plants. Though massive cost overruns and construction delays in the 1970's and 1980's caused U.S. utilities to cancel over 130 nuclear plant orders, the nuclear industry is now hoping to ride a wave of concern over global warming. Can new nuclear power help the U.S. electric power industry cut greenhouse gas emissions, at a reasonable cost?

#### **EXECUTIVE SUMMARY**

It has been an entire generation since nuclear power was seriously considered as an energy option in the U.S. It seems to have been forgotten that the reason U.S. utilities stopped ordering nuclear power plants was their conclusion that nuclear power's business risks and costs proved excessive.

With global warming concerns now taking traditional coal plants off the table, U.S. utilities are risk averse to rely solely on natural gas for new generation. Many U.S. utilities are diversifying through a combination of aggressive load reduction incentives to customers, better grid management, and a mixture of renewable energy sources supplying zero-fuel-cost kWh, backed by the KW capacity of natural gas turbines where needed. Some U.S. utilities, primarily in the South, often have less aggressive load reduction programs, and view their region as deficient in renewable energy resources. These utilities are now exploring new nuclear power.

Estimates for new nuclear power place these facilities among the costliest private projects ever undertaken. Utilities promoting new nuclear power assert it is their least costly option. However, independent studies have concluded new nuclear power is not economically competitive. Given this discrepancy, nuclear's history of cost overruns, and the fact new generation designs have never been constructed anywhere, there is a major business risk nuclear power will be more costly than projected. Recent construction cost estimates imply capital costs/kWh (not counting operation or fuel costs) from 17-22 cents/kWh when the nuclear facilities come on-line. Another major business risk is nuclear's history of construction delays. Delays would run costs higher, risking funding shortfalls. The strain on cash flow is expected to degrade credit ratings.

Generation costs/kWh for new nuclear (including fuel & O&M but not distribution to customers) are likely to be from 25 - 30 cents/kWh. This high cost may destroy the very demand the plant was built to serve. High electric rates may seriously impact utility customers and make nuclear utilities' service areas non competitive with other regions of the U.S. which are developing lower-cost electricity.

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*The Economics of Nuclear and Coal Power* (Praeger 1976)+

<http://www.greenpeace.org/international/en/news/features/AREVAS-dirty-little-secrets060510/>

<http://climateprogress.org/2009/03/08/ponzi-scheme-madoff-friedman-natural-capital-renewable-resources/>

<http://timeforchange.org/nuclear-power-station-causing-cancer-leukemia>

<http://www.globalresearch.ca/index.php?context=va&aid=13825>

<http://www.countercurrents.org/cc-green110405.htm>

<http://www.scientificamerican.com/article.cfm?id=nuclear-cannot-solve-climate-change>

<http://www.greenpeace.org/international/en/news/features/activists-raid-south-african-p/>

<http://www.fin24.com/Economy/Eskom-fingered-in-Koeberg-report-20060813>

<http://www.energyscience.org.au/BP16%20BaseLoad.pdf>

<http://www.aph.gov.au/library/pubs/rp/2008-09/09rp09.htm>

<http://repairyourworld.blogspot.com/2008/12/nuclear-vs-renewables-debate-in-south.html>

<http://timeforchange.org/nuclear-power-station-causing-cancer-leukemia>

## Moody's Nuclear sector investment analysis

<http://www.greens-efa.org/cms/topics/dokbin/206/206749.pdf>

"October 2007 Special Comment+the capital market service company Moody's delivers a stunning U.S. nuclear sector analysis:

Moody's does not believe the sector will bring more than one or two new nuclear plants on line by 2015, a date cited by a majority of the companies currently highlighting their nuclear ambitions. The complexity associated with the permitting process as well as the execution risks associated with construction projects of this nature should not be underestimated. (5) Moody's believes that many of the current expectations regarding new nuclear generation are overly ambitious. In fact, the timing associated with commencing construction and making the next nuclear unit commercially available could be well beyond 2015 and the costs associated with the next generation of nuclear build could be significantly higher than the approximately \$3,500/kW estimates cited by many industry participants.26 nuclear competence alliance+ between the four major research centres with links to academic institutions, utilities and the industry has been established in 2000 but, so far, has not been able to stop the erosion of well educated young people able to replace the rapidly aging current workforce. As Lothar Hahn, managing director of the German company GRS (Society for Reactor Safety), points out, the consequences could be extremely serious:

First studies indicate that deficiencies in maintaining knowledge at state-of-the-art levels and a subsequent degradation in education and training of operating personnel may endanger the safe operation of nuclear installations. Furthermore, knowledge deficits at authorities and expert organisations due to a lack of qualified successors to retired experts have been depicted as an imminent threat to the qualified supervision of reactor plants and thereby to safe plant operation.41

Former NRC Commissioner Peter Bradford, who was involved in the licensing of some 25 nuclear reactors, comes to a severe judgement on the prospects of nuclear power: "Those who tell you things like "It could save the earth"54 or "Clean, green atomic energy can stop global warming"55 or "Nuclear energy just may be the energy source that can save our planet from catastrophic climate change"56 are inviting you into a dangerous la-la land in which nuclear power will be over subsidised and under-scrutinized while other more promising and more rapid responses to climate change are neglected and the greenhouse gases that they could have averted continue to pollute the skies at dangerous rates.57

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Those suffering from nuclear amnesia have forgotten why nuclear power faded from the energy scene in the first place, how many times it has failed to deliver, how often it has disappointed its most determined advocates, how extravagantly it has squandered unparalleled, unstinting support from taxpayers around the world, leaving them with burdens that may last for millennia.58 In June 2005, the trade journal Nuclear Engineering International published the analysis of the 2004 Edition of the World Nuclear Industry Status Report under *their* headline. "On the way out - In sharp contrast to multiple reporting of a potential nuclear revival the atomic age is in the dusk rather than in the dawn". At the end of 2007, we have nothing to add+

Sen. McCain keeps saying, "If France can produce 80 percent of its electricity with nuclear power, why can't we?" Wrong question, Senator. The right question is: Why would we? Energy efficiency and renewables are the key to affordable, carbon-free electricity. They should be a focus of national energy and climate policy. Not nukes.