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## Packing the Nuclear Pork Barrel is the Wrong Approach to Low-Carbon Energy



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The “American Power Act,” the long-awaited Kerry-Lieberman-[Graham?] “discussion draft” of a Senate climate bill released last week on Capitol Hill, is stuffed with taxpayer giveaways and new regulatory loopholes for the nuclear power industry. These financial subsidies and licensing shortcuts are supposed to deliver some of the missing votes needed to reach 60 and invoke “cloture” (i.e. cut-off general debate) on a climate bill. While this kind of horse-trading is the way Capitol Hill is accustomed to doing business, most of these nuclear provisions represent dumb economics and bad public policy.

One wonders whether any of those involved on either side of this vote-getting strategy realize that force-feeding nuclear power to American energy consumers at this early stage in the effort to decarbonize the electricity sector would raise the cost of meeting the bill’s near- and medium-term carbon reduction targets by tens of billions of dollars. The Generation III + nuclear plants proposed for support under the bill are not expected to become economically competitive (i.e. without federal incentives) until the CO<sub>2</sub>-equivalent price of GHG emissions exceeds about \$50 per ton for regulated utilities, and even higher for “merchant” power companies that face head-to-head competition with other sources of low carbon electricity, and have a larger proportion of higher-return equity in their capital structures for these projects. Economic modeling of the generous allowances and offsets available under the K-L and previous bills suggests that these elevated carbon price levels will not be reached for several decades, if ever.

A May 2010 analysis by the nation’s largest operator of nuclear plants, Exelon Corp., pegs the “projected long-run CO<sub>2</sub> price at \$40 per ton,” and its own corporate cost of carbon abatement using new nuclear power plants at \$100 per ton without tax incentives and loan guarantees, and \$75 per ton with them – in *both cases, well above the long-term projected carbon price*. According to Exelon, “Clean Coal with CCS” is literally off-the-chart at \$300/ton with incentives and \$500/ton without them. This is much higher than other assessments, but most of these other studies still project “all-in” long-term coal CCS abatement costs, including transportation and storage costs, to be above \$40 per ton, while near-term CCS abatement costs are within or above Exelon’s cited range for new nuclear power plants. [<http://www.ekopolitan.com/climate/five-reports-upcoming-costs-electricity-clean-coal>]

Deploying utility-scale solar plants in Exelon’s service area would supposedly cost \$175/ton with incentives, and \$450 per ton without them. However, buying Renewable Energy Credits, representing the generation of renewable electricity with existing incentives in optimum locations, would cost Exelon only about \$30 per ton, less than the projected long-term carbon price, and thus appears economic, but there is currently only a limited supply of such credits. Co-generation (waste heat recycling and combined heat and power) is clearly competitive now, as are energy efficiency, power uprates of existing nuclear plants, and retirement of the oldest dirtiest coal generating assets, all of which have a *negative* carbon abatement cost. [See “Fixing the Carbon Problem Without Breaking the Economy,” Resources for the Future Policy Leadership Forum Lunch, John W. Rowe, Chairman and CEO, Exelon Corporation, May 12, 2010, <http://www.rff.org/Events/Pages/The-Road-to-a-Low-Carbon-Energy-Future.aspx>] I cite Exelon’s analysis not because I think it’s necessarily the most reliable source of information on comparative future energy costs, but rather because it illustrates that a fairly broad informed consensus exists on where the major investment opportunities lie for achieving significant near-term GHG reductions under a climate bill. The main problem appears that a minority of members of the Senate do not yet apprehend that this widespread agreement exists.

### Picking the Right Low-Carbon Investment Strategy

So what would all the nuclear largesse mean in practice if the K-L bill as written becomes law, and perhaps 12-24 new nuclear power plants are constructed over the next fifteen years in response to the incentives the bill creates? American taxpayers and consumers will have to pay through the nose for the electricity from these plants, which is likely to cost – depending on the project ownership and finance structure—anywhere from 17-34 cents per kilowatt hour (kWh) (California Energy Commission, December 2009) when it enters

the grid around 2018, instead of buying end-use efficiency “negawatts” *today* at less than 5 cents per kilowatt hour, industrial waste heat cogeneration *today* at less than 9 cents per kWh, wind at less than 11.5 cents per kWh, and a wide variety of other renewable sources at less than 17 cents per kilowatt hour, with the expectation of further price declines. In a recent analysis from DOE’s National Renewable Energy Laboratory (NREL), for example, big box commercial rooftop PV solar is expected to decline from about 11 - 15 cents/kWh (Phoenix versus Kansas City) today to 4.5 - 6 cents per kWh in 2015. Not only will new-nuclear cost more than these other cleaner sources, but the effective carbon displacement arrives 5-7 years *later* than the other technologies, further raising the overall cost of meeting the GHG reduction targets.

The harder, farther, and *earlier* we push on energy efficiency in a climate bill, the fewer costly nuclear, coal CCS or other “low-carbon” generating plants we’ll have to build later on to meet the GHG reduction targets. So there is actually a triple-barreled economic benefit from deferring widespread deployment of the most costly decarbonization pathways (nuclear, coal CCS, renewables in less-favorable locations) until we absolutely need them to stay on track with meeting our reduction targets: (1) lower electricity costs; (2) earlier GHG reductions; and (3) less required future investment in low-carbon central station power plants that have other serious environmental drawbacks.

This strategy not only frees up funding for massive early investments in more cost-effective energy efficiency, but it also allows more time for technology innovation to reduce future nuclear (and coal CCS) costs and environmental impacts. The same holds true for currently costly, land-intensive combinations of remotely located large-scale renewables and new high-voltage transmission lines. Rapidly evolving technology and plummeting manufacturing costs may enable a higher proportion of clean energy to come from equally or more cost-effective distributed-generation mounted along highway embankments and atop buildings and parking lots, lessening the burden imposed by some large-scale renewable deployments on the natural environment.

So much for the Nuclear Subtitle’s dumb economics. As for bad public policy, the current draft contains quite a lot that needs to come out. The draft mistakenly conflates the respective promotional versus regulatory roles of the DOE and NRC, eliminates important environmental and procedural safeguards in the licensing process, and improperly involves Congress in efforts to pressure an independent nuclear safety agency, the NRC, into “expediting” new reactor licenses and curtailing inspection requirements. Most members of Congress, even some pro-nuclear ones, should not and I predict will not sit still for this backhanded attempt to amend the Atomic Energy Act and further weaken the NRC’s reactor licensing requirements.

A reasoned compromise on nuclear power is necessary in order to move ahead with meaningful emissions constraints, but the current K-L Nuclear Subtitle fails to strike the right balance. *Bottom Line:* A more measured, less hyperbolic approach to the APA nuclear energy provisions, geared to ascertaining the economic, environmental, and safety performance of a few new “standardized” reactor units, and fully respecting the independence of the NRC, the integrity of the NEPA process, and the role of states and the public in the federal nuclear licensing process, is the right path forward. The current subtitle is tailor-made for inducing more public distrust of the NRC and yet another economic train wreck for nuclear power, like the one in the 1970’s and ‘80’s that produced some \$250 billion in losses and cost overruns. Let’s not go there.

No sensible view of politics should encompass the notion that it is necessary or acceptable to jeopardize public health and safety in order to obtain a Senate supermajority favoring GHG emissions reductions. Hopefully the Administration and perhaps even the climate bill opposition have re-learned a thing or two in the last few weeks from the ongoing oil disaster in the Gulf—turning a blind eye to safety and environmental concerns to jury-rig political compromises is not the right way to pass a climate bill, or anything else.

What follows is an in-depth look at the most problematic provisions of the K-L nuclear subtitle. Readers are encouraged to respond with their own comments and corrections, especially if they feel I have misconstrued the effects of a provision. The legislation is brand new, and I make no claim to infallibility of interpretation in such matters.

### **The Nuclear Fuel Cycle is “Low-Carbon,” but it’s not “Clean”**

Title I of the APA bears the title “Domestic Clean Energy Development.” In the “Statement of Policy” that begins the “Nuclear Subtitle”, one can certainly agree with the importance it attaches to “transitioning to a clean energy, low-carbon economy,” but the assertion that nuclear power is a “safe and *clean*” energy industry does not comport with reality. The Chernobyl, Three-Mile Island, and lesser-known nuclear accidents aside, nuclear power remains a high-cost, subsidy-dependent, radioactive-waste-generating, thermally-polluting, fresh water-wasting, and non-renewable energy resource, with a cradle-to-grave fuel cycle that is linked to both serious environmental harms (from radioactive and heavy metals pollution) and to weapons proliferation, and that still carries with it a low probability of a high-consequence accident. Simply calling nuclear energy “safe and clean” in a climate bill does not make it so. Nor can I agree that after 50 years of federally subsidized development and public investment totaling in excess of \$100 billion—much more if indirect costs and

complete fuel cycle environmental harms are considered—that the nuclear energy industry should remain a major target of federal incentives to encourage deployment of low-carbon energy technologies.

### **The Cost of Nuclear Reactors Shows No Consistent Downward Trend Despite Decades of Government Support**

The “financial and technical barriers to construction and operation” of nuclear plants that the bill seeks to reduce have changed little despite *five decades of federal support*. In fact, the financial barriers to nuclear only seem to have increased in recent years, a product of continuing to seek “economies of scale”—i.e. the effort to make nuclear electricity economically competitive by deploying ever larger generating units, thereby distributing the huge upfront capital costs that have to be recovered from electricity sales across a larger number of kilowatt hours, reducing the cost per kWh to a manageable level. This has led to gargantuan nuclear reactor units of 1500-1700 megawatts—or “twin units” of 2200 MW that must be built in a tight sequence to realize forecast construction cost savings—which are virtually non-financeable by private capital markets, and threaten to torpedo the balance sheets of their corporate sponsors.

One has only to look around the globe today – at China, Russia, India, France, South Korea, and Japan -- to realize that nuclear power remains the quintessential “state-socialist” – or if you prefer – “state- capitalist” technology. It is prospering only in those countries where the state plays a dominant role in the economy, and takes on the bulk of the financial risk from constructing new reactors. Taxpayers and ratepayers in these countries are on the hook to pay for these costly projects, whether they want them or not. And soon, it seems, US and American taxpayers will be forced to join them. Why Senate economic conservatives—who sometimes sound as though they would like to undo the New Deal—are enthralled with nuclear state socialism as practiced in France, Japan, or China remains something of a mystery.

### **Further “Expediting” an Already Streamlined Nuclear Licensing Procedure That Hasn’t Even Been Tested Yet is Bizarre Public Policy**

Not only does the draft K-L bill invert the economics of low-carbon energy, but it also manages to insert itself in a ham-fisted way into the NRC’s supposedly independent process and procedures for certifying the safety of new reactor designs, their environmental acceptability for construction and operation at a particular site, the integrity of their construction, and their readiness to begin operation. Under the heading “Encouraging Domestic Nuclear Power Generation,” Section 1101 of the bill would direct the NRC to “establish and implement an expedited procedure” for issuing new Combined Construction and Operating Licenses (COL), and demands that NRC submit reports to Congress about how it would design the new expedited procedure and develop “technology-neutral guidelines for nuclear plant licensing in the future.”

It would also direct each Department of Energy (DOE) National Laboratory “with expertise in the field of nuclear energy” to “dedicate personnel for the support of the expedited licensing procedures.” These requirements overlook the fact that the NRC is an *independent regulatory agency* whose primary responsibility is protecting the health and safety of the public, while DOE is an agency of the Executive Branch with a mission of advancing the development of nuclear energy. These are two very different missions, and mixing or merging the functions and activities of the two agencies as this provision seeks to do is highly improper and bad public policy. Indeed, achieving a clear separation of the nuclear regulatory from the promotional function was the primary reason the old Atomic Energy Commission was split up in the first place!

This entire section of the bill is preemptively shopping for a remedy to a problem that has not been posed or shown to exist. According to a recent press report, NRC Chairman Gregory Jaczko has expressed no desire to see new nuclear regulation measures in climate legislation. “Right now, we’re in a pretty good place. We have very strong statutory provisions. We have a very good ... implementation of those statutory provisions through our regulations. ... There’s not a lot right now that I think the commission would be asking for specifically.” <http://www.eenews.net/climatewire/2010/05/11/5/>.

### **“If it Ain’t Broke, Don’t Fix It.”**

In an April 6, 2010 letter to Chairman Jaczko on behalf of the Bipartisan Policy Center, two prominent nuclear power supporters, former Republican Senator Pete Domenici and former NRC Chairman Richard Meserve, wrote that their recent review of the NRC licensing process for new reactors “did not find any evidence that either the NRC or industry had needlessly delayed or extended the licensing process.” They reported that “there has on occasion been some miscommunication between NRC staff and applicants,” and that industry representatives “accept some responsibility for past miscommunications.” Some industry representatives also acknowledged that “they have not been able to respond to NRC staff’s Requests for Additional information in as timely a manner as they would like.”

The new design certification process has proven “cumbersome,” they noted, because the licensing system embodied in current NRC regulations “had envisioned that applications for COLs *would reference [standardized] designs that had been certified* and sites that had

the benefit of early site permits...As it happened, numerous COL applications were filed in parallel with applications for certified designs," [this was due mainly to the sudden availability of nuclear loan guarantee authority created by the 2005 Energy Policy Act.] The NRC staff thus has had "the challenge of dealing simultaneously with a large number of overlapping applications that were filed *pursuant to an entirely new and largely untested licensing regime* (emphasis added)." They conclude, "Once the process has run its course a few times, we expect that many of these issues will resolve themselves." So what is going on here -- the ink is barely dry on this new licensing regime, and some new-nuclear boosters in the Senate are already hell bent on "expediting" it?

In sum, it is wildly premature for nuclear enthusiasts in Congress to be dictating that further changes should be made now in the NRC's licensing process. This process has *already* been extensively streamlined -- largely to the nuclear industry's own specifications -- over the twenty years since the last big nuclear build-out, in preparation for the very resumption of nuclear reactor construction that now appears in the offing. This significantly revised process, which *already excludes or severely curtails opportunities to challenge nuclear licensing decisions that were originally guaranteed to states and public interveners under the Atomic Energy Act*, has yet to see even one new reactor receive final design certification, much less a combined Construction and Operating License. The slow pace has really nothing to do with the revised NRC rules, or environmental impact assessment procedures, and everything to do with the nuclear vendors underinvestment in preparing—and the soaring costs of building—the new reactor designs, all of which has made the "nuclear renaissance" a tentative "stop-and-go" affair for US utilities and merchant power generators.

### Shifting the Risks of the Nuclear Build-Out to Taxpayers

Section 1102 of the bill would expand the "Title 17" [of the 2005 Energy Policy Act) nuclear loan guarantee program, from its current level of \$18.5 billion for nuclear reactors, by tracking the President's budget request for an additional \$36 billion in nuclear loan guarantee authority, providing a total guaranteed loan volume of \$54 billion for ostensibly "innovative" nuclear plants. This section would also establish a modest "loan guarantee retention fee" for recipients of the loan guarantee as an incentive to get off the government dole, but only beginning 5 years after the date on which construction is completed, and gradually increasing thereafter. In reality, most of the new nuclear plant projects seeking federal loan guarantee support do not plausibly represent "innovative technology," and should not even be considered *eligible* for federal loan guarantees.

The current crop of loan guarantees is all about funding the same old uneconomic nuclear power technology that private capital markets have long refused to fund because they perceive the investments carry excessive project execution and market risks. The amount of loan guarantee funding in this provision is excessive, driven by politics and not sound policy. Existing federal policy already provides \$18.5 billion in subsidies that were intended to support a few "standardized" nuclear units of new design in order to confirm their advertised potential for safe, cost-effective, environmentally benign nuclear power generation. Any follow-on units should have to compete on a level playing field with other low-carbon energy sources to meet the bill's emission limits. As noted above, most analyses show that when forced to compete in this manner, new-build nuclear power plants are not economically competitive in most U.S. power markets today, even when advantaged by mild-to-moderate carbon pricing scenarios.

In short, nuclear low-carbon kilowatts will be costly kilowatts, more costly than needed to meet the near and medium term emissions reduction targets in the bill, which can be satisfied with less costly, and in most instances cleaner low-carbon technologies. It is in the period from 2030 to 2050, when most of the easy low-hanging abatement opportunities may already have been "picked," as it were, that nuclear power technology could potentially play a more significant role, provided that more cost-effective and environmentally benign technology variants have been identified, and a stronger global non-proliferation regime has been put in place than exists today.

This period also corresponds to the interval in which the bulk of existing US nuclear power plants are slated to be retired, and decisions will need to be made whether or not to replace this capacity with more evolved and efficient nuclear technology, or with something else. Nuclear power's renewable energy competitors in 2030 will be what they are today, only much better, so subsidizing a big rollout of uneconomic nuclear plants today will not guarantee future success, and could in fact inhibit it, by stifling innovation and "locking-in" a U.S. commitment to very large, inflexible, uneconomic, and very costly reactors.

Indeed, with five different types of large reactors seeking subsidized entry into the US marketplace, and a sixth – South Korea's APR 1400, also poised to enter the market—it appears that Congress, the industry, and the NRC have all but abandoned the goal of "standardizing" on just one or two home-grown nuclear plant designs, further diminishing the likelihood of re-growing a significant US nuclear-industrial base. In line with this new "imported nuclear power" strategy, the K-L bill seeks a 10 –year suspension of import duties on the major components of nuclear power plants.

### Another Bad Idea—More "Regulatory Risk" Insurance

Section 1103 of the bill would more than double the "regulatory risk insurance" originally extended in 2005 to the first six reactors to

receive a COL and break ground on construction. This misguided provision, which would create a potential taxpayer liability of \$6 billion to financially compensate new nuclear projects that get in trouble with regulators (\$500 million in insurance is to be made available for each unit in a rolling roster of up to 12 reactors, “consisting of not less than two nor more than 4 different reactor designs,” with unused coverage rolling over to the next reactor in line to be constructed). This provision essentially pits the financial interests of taxpayers and a federal executive agency (DOE) against the responsible and necessarily independent exercise of NRC and state regulatory authority. The program seems ripe for abuse as a possible fund for nuclear reactor projects that get into trouble as a result of their own flawed project management or contractor malfeasance, but then seek to place the blame on federal or state regulators, triggering up to \$500 million in “get well” payments per unit. The last thing anyone should want is a nuclear regulator that is hesitant to raise issues for fear of triggering a requirement for massive payouts by the Secretary of Energy.

The section raises a significant moral hazard. By removing some of the cost and schedule risk of failing to strictly adhere to the NRC’s safety standards, or other federal, state, and local requirements, this provision would actually encourage licensees to resist or evade these requirements knowing that their regulatory financial risk in doing so would be “covered” by the DOE. If the owners of new-build nuclear projects desire to insure themselves against this kind of risk, they can purchase insurance in the commercial marketplace and pay premiums just like any other business, based on a broad statistical risk analysis of past reactor construction project performance.

### **Pressuring the NRC to Expedite Power Plant Licenses**

Section 1103 also includes an obnoxious and unrelated provision that would require the NRC to file numerous quarterly and biannual reports with the Congress describing, *inter alia*, “the steps that will be taken by the Commission to ensure the expeditious review and processing of submitted, complete licensing applications” and providing “an explanation for why licensing milestones have not been met,” and “recommendations for amendments to existing laws (including regulations) that should be made to help remove barriers to the expeditious review of complete licensing actions.”

These and other reporting provisions represent an unwarranted imposition by members of Congress into the affairs of an independent regulatory body tasked with protecting public health and safety, and explicitly *not* tasked with “expediting” new nuclear power plant deployments. The NRC has established petition procedures for seeking amendments or additions to its rules governing the nuclear licensing process. Absent any showing that the current licensing process is not adequately protecting the public health and safety, Congress institutionally should refrain from intervening in the deliberations of the Commission, and let it go about accomplishing its statutory responsibility to protect nuclear industry workers and the public. A desire on the part of a few members of Congress to see an even faster passage of new nuclear plants through an already streamlined licensing process is grossly insufficient grounds for Congress as a whole to meddle in and micromanage the affairs of the Commission, as this provision improperly seeks to do. If these members want to see a faster licensing process, let them file a petition for a public rulemaking before the Commission, like any other concerned citizen, laying out their case for revising the current rules and showing how public safety would not be diminished thereby.

### **Attempts to Micromanage DOE’s Nuclear Fuel Cycle Research Do Not Belong on a Climate Bill**

Section 1104 would establish a spent fuel recycling R&D “center of excellence” within one year of enactment. This provision is largely redundant to what already exists and is clearly out of place on this bill. The Secretary of Energy during the Bush Administration already designated Idaho National Laboratory (INL) near Idaho Falls as the nation’s “lead laboratory” for advanced nuclear fuel cycle research and development, and the Obama Administration has not withdrawn or altered that designation. Moreover, the mandated “research initiative” to reduce the “*quantity* of waste requiring disposal or storage” is predicated on the wrong metric, as the environmental hazard (radio-toxicity and half-life) and heat-loading of nuclear waste – not its “quantity”-- are the characteristics that dominate requirements for long-term geologic disposal, and spent fuel reprocessing creates its own set of personnel hazards, environmental threats, and large “quantities” of liquid radioactive waste requiring further processing and disposal.

Moreover, INL or any other civil laboratory focusing on the nuclear fuel cycle would in all likelihood *not be* the primary locus for future research “to ensure adequate protection against the proliferation of nuclear materials that could be used in the manufacture of nuclear weapons.” The National Nuclear Security Administration (NNSA) has multi-billion dollar, multi-program nuclear weapons laboratories that focus on this issue. These are matters that are in any case appropriately left to the discretion of the Secretary of Energy, the Director of NNSA, and the relevant oversight and legislative committees of the Congress. An attempt to enlarge the federal pork barrel infrastructure that supports spent fuel reprocessing – which by itself adds nothing to nuclear power’s potential contribution to decarbonization -- does not belong in a bill whose primary purpose is to achieve near- and medium-term GHG reductions.

### **Doing Away with Mandatory Hearings does not Serve the Public Interest in Safety and Accountability**

Section 1105 would amend the Atomic Energy Act to remove the requirement for an administrative hearing on “non-contested” issues.

This sounds relatively anodyne, but it would actually be a harmful statutory change, done without public hearing in the committees of jurisdiction, which would diminish an important safeguard in the licensing of new reactors. Not all license applications (or relicensing applications) for reactors are of uniformly high quality. The NRC's own Inspector General has, for example, criticized the NRC staff for simply copying industry applications verbatim into a significant portion of its own conclusions in relicensing cases.

In the current licensing process, the NRC must hold a hearing on all issues relevant to the issuance of a construction permit, regardless of whether a member of the public requests a hearing. This is, in fact, a good thing. Licensing hearings on non-contested issues are independent reviews of the application by a panel of NRC administrative judges consisting of two nuclear safety experts and one attorney. Such hearings compel the NRC staff to state on the record, and the Atomic Safety and Licensing Board panel to agree, that all the statutory requirements for a license have been met. If NRC staff or licensing board members have any unresolved concerns regarding the pending license, this hearing is an opportunity to state them.

The scope of this mandatory hearing covers all issues that were not raised and formally admitted as "contentions" by persons granted standing to intervene in the licensing process – standing which has become increasingly difficult to gain for members of the public under NRC's already "streamlined" licensing process. Importantly, the occurrence of this hearing does not depend on whether a member of the public happens to have the money and the expertise to mount an effective challenge on their own. Thus, for a single reactor license application, the NRC may hold one mandatory hearing, or it may hold two hearings: one on contested issues and one on uncontested issues. Thus "non-contested" is not synonymous with either "unimportant" or "already adequately reviewed." The proposed change would reduce the rigor of the licensing process and further undermine the public's tenuous confidence in the NRC. The disaster in the Gulf this past month demonstrates once again the terrible price to be paid when industry and government collude to whittle away at safety regulations.

Section 1106 would extend the time a member can serve on the NRC in the event of delayed confirmation proceedings for a successor. It appears harmless enough, although readers are encouraged to comment if they perceive a problem with this provision that I don't.

#### **More DOE "Cost-Sharing" for Nuclear Energy Research and Licensing**

Section 1107 would require the Secretary of Energy within 180 days of enactment to "develop and publish on the website of the Department of Energy a schedule that contains an outline of a 5-year strategy to lower effectively the costs of nuclear reactors," including "modular and small-scale reactors, balance-of-plant issues, cost-efficient manufacturing and construction, licensing issues, and enhanced proliferation controls." It would also authorize \$50 million per year for 5 years to support the effort, to which the "cost-sharing" requirements in Section 988 of the Energy Policy Act (EPA) of 2005, (Public Law 109-58) would apply. These cost sharing arrangements generally require a 20 percent cost share with industry for "research and development," with an exemption for basic or fundamental research and development, and a 50 percent cost share for "demonstration and commercial application activities," – which sounds like the category at issue here -- but the Secretary of Energy has been granted the authority, since delegated to the Under Secretary, to reduce cost sharing requirements for demonstration and commercial application activities "as necessary and appropriate, taking into consideration any technological risk relating to the activity" (See [http://management.energy.gov/policy\\_guidance/1427.htm](http://management.energy.gov/policy_guidance/1427.htm))

Given that DOE has just finished underwriting the nuclear industry's cost of compliance with NRC's "reformed" licensing process, to the tune of \$727 million from 2003-2011, it hardly seems necessary for taxpayers to provide additional support in this area. After 50 years of involuntary taxpayer and ratepayer financial support, isn't it finally time for the major nuclear vendors to raise and invest their own funds in the forever "maturing" promise of developing "cost-effective" and "proliferation-resistant" nuclear power. When, if ever, will this government sponsored gravy train finally end? The government, for example, has sponsored research and development on modular gas-cooled reactors for decades.

The one sensible component of this cost-sharing proposal that might plausibly benefit the environment is the suggestion that further cost-shared research be done on long-neglected "balance of plant" issues, specifically, developing more efficient means of air-cooling nuclear power plants, which would reduce their environmentally damaging thermal discharges and excessive consumptive use of fresh water, as well as the "parasitic load" of such cooling systems on the plant output.

But the idea that \$500 million of cost-shared R&D – if indeed DOE *does* require industry to match the government's \$250 million contribution – can decisively alter the economics of nuclear power in five years is, frankly, not credible. Only a sharp ramp in the carbon price, far above the incrementally advancing price collars in the draft bill, can do that, and the politics of continued coal production and use seem destined to prevent such an increase. While this provision will not deliver on the expectations of its sponsors, and like much past nuclear energy research may wind up wasting the public's money, it is less harmful than some of the other highly objectionable provisions discussed in this post.

### Ditching the Immediate Pre-Startup Inspection and Assessment of Operational Readiness

Section 1108 of the bill would, without any public hearing and “markup” of the proposal in the relevant committees of jurisdiction, make a small but substantial change to the NRC’s current responsibilities just prior to allowing a new nuclear reactor to operate. The Atomic Energy Act of 1954 would be amended to read:

“Following issuance of the combined license, the Commission shall ensure that the prescribed inspections, tests, and analyses have been met.”

Without understanding the context, such an alteration of the statute sounds harmless enough. Who can be opposed to language that requires the NRC to ensure that prescribed inspections and other requirements have been met, right? But here (in bold) is the text that was deleted from the law without hearing in the relevant committees of jurisdiction:

“Following issuance of the combined license, the Commission shall ensure that the prescribed inspections, tests, and analyses are performed and, **prior to operation of the facility, shall find that the prescribed acceptance criteria are met.** (Emphasis added). “

This section drops from NRC licensing the final quality assurance/quality control assessment conducted immediately prior to allowing a new reactor to commence operation that is intended to certify that all of the NRC’s prescribed acceptance criteria have been met. This requirement is especially important for reactors that may have endured a protracted construction process, in which the NRC’s initial acceptance of a key plant subsystem or component may have been performed years earlier. Once again, dropping reasonable, statutorily mandated safety requirements, especially without the due process of public hearings in the relevant committees of jurisdiction, on behalf of an industry that for reasons unrelated to safety regulation is moving at a snail’s pace, is just irresponsible, boosterish behavior. This section must be eliminated from bill.

### Gutting the NEPA Analysis of Power Generation Alternatives Having Lesser Environmental Impacts and Costs

Section 1109, “Environmental Reviews for Nuclear Energy Projects,” would amend the AEA (again, without a public hearing and markup by the relevant committees of jurisdiction) to allow the NRC to “supplement” the Environmental Impact Statement (EIS) previously done to support a reactor project’s “Early Site Permit,” rather than prepare a full EIS to support the Combined Construction and Operating License (COL) application for the specific size and type of reactor to be built at that site. There is a lot wrong with this idea.

First, under NRC’s revised rules, years, even decades may pass between the granting of an Early Site Permit and the construction of a reactor. In the interim, a host of conditions warranting review may have changed, including the density of the contiguous populated area, local fresh water resource needs and availability, the regional need for additional generating capacity, and the alternative means available to satisfy that need that might entail lesser environmental burdens and public health risks.

Second, the ESP is limited to a broad parametric analysis of environmental impacts based on a general “envelope” of operating characteristics that is supposed to encompass the range of generic designs that might be constructed in the future at the “preferred site.” particular site. The ESP does not assess all the environmental impacts of, and “all reasonable alternatives” to constructing a specific reactor design at that site.

Third, the public’s ability to participate in and challenge the outcome of a Supplemental EIS is less than under a full-scale EIS process.

Unfortunately, Section 1109 appears specifically designed to allow the industry and the NRC to avoid having to assess, at any point (either in the EIS for the Early Site Permit or in the later supplement) the economic, technical, or other benefits and costs of the proposed action when compared to range of reasonable alternative means for obtaining the electricity services to be supplied by the reactor project. This alteration of existing law would consign to the dustbin the serious, searching review of alternatives and the “purpose and need” for additional generating capacity – two items at the heart of NEPA reviews for any federally permitted generating facility.

Ironically, by further insulating nuclear power from searching comparisons with its market competitors, this section would actually *undermine the principle thrust of the utility sector carbon cap and trade mechanism the bill seeks to create*—i.e. fostering the competitive market conditions that are the most favorable to sorting-out and swiftly deploying clean low-carbon energy solutions in order of their cost-effectiveness in displacing carbon. In any investment comparison of nuclear power with either end-use electrical efficiency measures or on-site industrial/commercial co-generation, for example, nuclear power today emerges the clear loser, yet if Section 1109 becomes law, analysis of this comparison will be smothered to the detriment of pursuing the most economically efficient and environmentally sound path to future carbon reductions.

At the very least, if the down-and –dirty politics of achieving carbon reductions dictate that the high-cost nuclear pathway is to be pursued

at the expense of more cost-effective de-carbonization options, then the deployment of the higher-cost, heavily-incentivized nuclear capacity should be linked megawatt-for-megawatt to early retirement of existing dirty base load coal capacity that has many years left to run, so that the public gets some tangible decarbonization benefit from the added billions it is being forced to invest in high-cost nuclear power.

### **The Big Nuclear Tax Giveaway – Hold on to Your Wallet!**

Part III of the Nuclear Subtitle, “Tax Provisions,” contains a host of tax incentive provisions, the total net cost of which I am unable to assess for lack of the requisite expertise. Experts from NRDC’s Center for Market Innovation (CMI) are looking into the total cost of these nuclear tax incentive provisions, and may post a ballpark estimate in the next few days. In a few weeks time, the Congressional Budget Office (CBO) is obligated to come up with estimates of the federal revenue outflows and inflows generated by all the various provisions of the bill, and provide a net assessment of its impact on federal revenues.

Here’s what I am able to glean from a first read of this section.

New nuclear power plants get a 10% investment tax credit on the final capital cost of the plant for units placed in service before January 1, 2025. This looks to be worth on the order of \$800 million to \$1 billion per unit (in FY 10 dollars), obviously more when paid in out-year dollars.

If you’re a public power provider or a cooperative electric company, you can convert the tax credit into a cash payment within sixty days of the new nuke being placed in service. This effectively would seem to allow these entities almost a cost and risk free way to buy into new nukes at taxpayer expense. They can go out and borrow short term, using the convertible federal tax credit as collateral on what would otherwise be a risky high-interest loan, or else possibly pledge to transfer the cash grant, as payment to the investor-owned utilities or merchant generators with majority interests in the new plant, in return for a 10% interest. In return, the majority owners manage to reduce their long-term financing cost by about \$1 billion and gain a customer for 10% of the output of the new plant.

All the equipment in new nuclear power plants, other than a building or its structural components, would also be granted an accelerated depreciation period of five years. This provision too is worth billions of dollars to the owners of the new plants

The production tax credit created in the 2005 Energy Policy Act (1.8 cents per kWh) for electrical output from the first 6000 MW of new nuclear capacity would be extended to the first 8000 MW, and the credits could be transferred from the public power shareholders in a new nuke to their privately-owned partners. State and local governments would also be given the option of using tax-exempt bonds to help finance new nuclear plants. There are additional giveaways that I don’t understand yet, but these seem to be the main ones.

The potential amount of nuclear tax incentives involved here is mind boggling – surely in the tens of billions. These are public funds that will not be invested in efficiency and other cheaper, faster, and cleaner ways of displacing global warming emissions. It’s depressing to think that this costly payoff to a special interest is the best the Senate and the Obama Administration can do to put this country on a clean energy path. We can help them do better.

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