Union of Concerned Scientists

ISSUE BRIEF

# Billions of Dollars in Subsidies for the Nuclear Power Industry Will Shift Financial Risks to Taxpayers

**Nuclear Subsidies in the American Power Act (APA) and the American Clean Energy Leadership Act (ACELA)**

The nuclear power industry is seeking tens of billions in new subsidies and other incentives in federal climate and energy legislation that would shift massive construction, financing, operating and regulatory costs and risks from the industry and its financial backers to U.S. taxpayers. Congress should reject these overly generous subsidies to this mature industry whose history of skyrocketing costs and construction overruns already has resulted in two costly bailouts by taxpayers and captive ratepayers—once in the 1970s and 1980s when utilities cancelled or abandoned more than 100 plants, and again in the 1990s when plant owners offloaded their "stranded costs." Massive new subsidies will only further mask nuclear power's considerable costs and risks while disadvantaging more cost-effective and less risky carbon reduction measures that can be implemented much more quickly, such as energy efficiency and many renewable energy technologies.

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The nuclear industry already will benefit from considerable subsidies provided by the Energy Policy Act of 2005 and from a price on carbon emissions (See Table 2). These subsidies should be more than adequate to allow the industry to demonstrate whether it can build a limited number of "first mover" units, on time, on budget, and operate them safely (as recommended by numerous experts[1]), and which the initial loan guarantees and other subsidies included in the 2005 Act were designed to support. However, proposals in pending legislation go way beyond what is needed to accomplish that goal. To illustrate this point, this analysis quantifies key nuclear subsidies in two Senate bills: The American Power Act (APA) and the American Clean Energy Leadership Act (ACELA).

## The Nuclear Power Industry Should Not Receive Tens of Billions of Dollars in New Subsidies.

Using conservative capital cost estimates ($7,085/kW including financing)[2] and assuming eight new reactors are built over the next 15 years,[3] we estimate that the nuclear industry could obtain new subsidies worth in excess of $40 billion, or $5 billion per reactor, if a broad range of industry handouts are included in pending climate and energy legislation. If all 31 reactors for which the Nuclear Regulatory Commission (NRC) has received or expects to receive applications are built,[4] total proposed subsidies to the industry could be worth between $65 billion and $147 billion (see Table 1 for more details). While not all subsidies will be available to every project, the collective impact of these handouts will be large because companies will be able to pick and choose among a wide range of subsidies best suited to a variety of partnership and financial structures. Given the industry's poor financial track record and history of cost overruns, cancellations and bailouts, Congress should not create a host of new federal subsidies and other incentives that will shield the industry from the considerable costs and risks of investing in this highly risky technology by shifting those costs and risks to taxpayers.

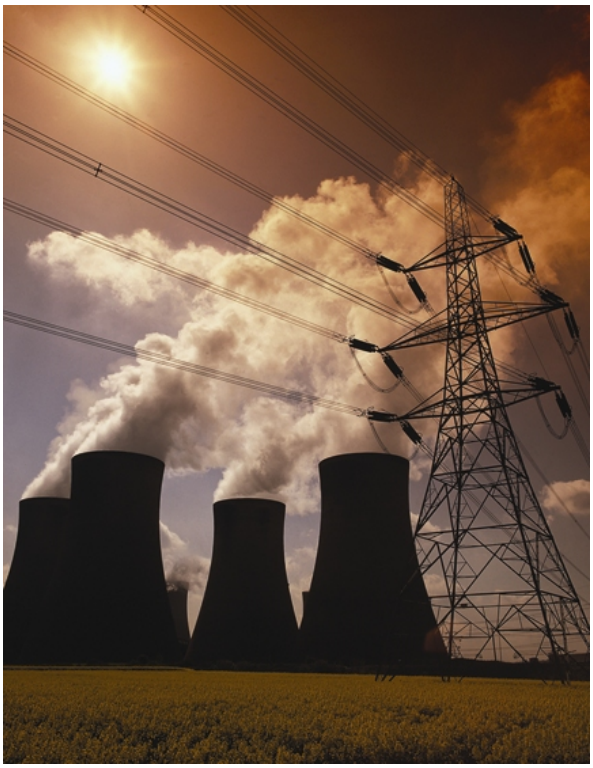
## The Clean Energy Bank Must Have Clear and Effective Limits.

If Congress creates a new federal financing entity called the Clean Energy Deployment Administration (CEDA) to promote the domestic development and deployment of clean energy technologies, then it must include adequate taxpayer protections that would limit the overall size of the fund as well as the amount of credit support that could go to any one technology. Congress should not exempt CEDA from the Federal Credit Reform Act (FCRA), which would allow the fund to provide potentially unlimited loan guarantees to large, well-capitalized entities that are able to pay their estimated subsidy costs up front. Congress should also require CEDA to prioritize financial support for technologies that will reduce the most global warming emissions per dollar invested. These provisions modifications are necessary to reduce the overall risk of default to taxpayers and mitigate negative impacts on the competitiveness of more economic and environmentally acceptable

alternatives. Finally, new loan guarantees should be limited to helping emerging technologies cross the "valley of death" to be deployed on a large scale and become commercially viable. With 104 operating reactors in the United States and new reactor designs that are largely unchanged from those in commercial operation, reactors based on designs currently pending before the NRC should not be classified as emerging technologies. **As proposed, CEDA could provide virtually unlimited loan guarantees; the potential value could be worth more than $3 billion per reactor and between $24 billion to $94 billion to the industry.**[5]

## The Title XVII DOE Loan Guarantee Program For New Reactors Should Not Expanded.

Proposals to triple the authority for nuclear loan guarantees through the existing Loan Guarantee Program from $18.5 billion to $54 billion should be rejected. The proposed new loan guarantees would result in allocating more than half of the fund to nuclear energy and shift the risks of financing the construction of risky, capital-intensive nuclear power plants from private industry to taxpayers. This would substantially lower the cost of capital for new plant construction and could significantly advantage high cost nuclear power plants over cleaner and more cost-effective alternatives such as energy efficiency and renewable energy. **The proposed expansion in DOE loan guarantees could be worth more than $3 billion per reactor and between $24 billion to $26 billion to the industry**.[6]



## The Accelerated Depreciation Period for New Reactors Should Not Be Further Reduced.

Reducing the period from 15 years to five years would allow the nuclear industry to claim substantially larger tax deductions and much lower tax payments for assets with a life expectancy exceeding 40 years. This would significantly reduce the industry's tax burden and increase its after-tax profit. The nuclear industry claims that such a provision would put nuclear power on par with renewable energy technologies under the federal tax code; however, the dollar value of the subsidy would be much greater for nuclear than for renewables because of the large disparity between the actual asset life and the depreciate life of these projects. **This subsidy could be worth as much as $700 million per reactor and between $6 billion to 23 billion to the industry.**

## New Reactors Should Not Receive a 10 Percent Investment Tax Credit (ITC).

This provision would significantly reduce the industry's tax liability while tilting emerging energy markets towards large, capital intensive projects and away from less risky, more cost-effective clean energy alternatives. An ITC is more appropriate than a production tax credit (PTC) for smaller projects to lower transaction costs and as a temporary measure when financing is hard to obtain. This provision would allow companies to claim "progress expenditures" in advance of the plant actually being completed, regardless of how long it takes to build them or whether they ever generate power. **Similarly, Congress should not provide federal payments for new reactors in lieu of tax credits** to municipal and cooperative utilities. This would require taxpayers to make payments to cover 10 percent of the investment of publicly owned and cooperative utilities that decide to build new reactors, constituting a massive handout to these entities due to the large disparity in size and cost vs. other existing and emerging low-carbon technologies. **Together, these subsidies could be worth as much as $800 million per reactor and between $6 billion to $24 billion to the industry.**

## The Production Tax Credit for New Reactors Should Not be Expanded.

The Energy Policy Act of 2005 already provides a 1.8 cent per kilowatt tax credit for the first 6,000 MW of nuclear power to come on line. Proposals to increase the limit to 8,000 MW or to allow tax exempt entities to allocate their available credits to private partners would greatly expand the value of this subsidy to the industry. **An expanded subsidy could be worth as much as $1.4 billion per reactor and $10 billion to the industry.**[7]

## Table 1. Subsidies for New Nuclear Reactors in Proposed Senate Climate and Energy Legislation

| | Levelized cost impact under new subsidies (cents/kWh) | Value per reactor of new subsidies (Billion $) [1],[2] | Value to industry assuming 8 plants (Billion $) [2] | Value to industry assuming 31 plants (Billion $) |
|---|---|---|---|---|
| **Financial Incentives Under APA not including loan guarantees** | | | | |
| Reduces accelerated depreciation period to 5 years. [3] | 2.7 | 0.7 | 6 | 23 |
| Increases the production tax credit from 6,000 MW to 8,000 MW; allows tax exempt entities to allocate available credits to private partners. [4] | 2.1 | 1.4 | 10 | 10 |
| Provides a 10% tax credit for construction of new reactors; provides federal payments to municipal and cooperative utilities of up to 10% in lieu of tax credits. | 1.9 | 0.8 | 6 | 24 |
| Increases regulatory risk insurance from $2 billion to $6 billion up to $500 million per reactor. | NA | 0.5 | 4 | 6 |
| **Total Financial Incentives Under APA not including loan guarantees** [5],[6] | **4.6 to 4.8** | **2.0 to 2.6** | **16 to 20** | **39 to 53** |
| **Loan guarantees under APA and ACELA** | | | | |
| Increase loan guarantees from $18.5 billion to $54 billion (APA) [7] | 3.7 | 3.0 | 24 | 26 |
| Clean Energy Deployment Administration (ACELA) | 3.7 | 3.0 | 24 | 94 |
| **Loan guarantees under APA and ACELA** | **3.7** | **3.0** | **24** | **94** |
| ***Total Value to Nuclear Industry of APA and ACELA [8]*** | **8.3 to 8.5** | ***5.0 to 5.6*** | ***40 to 44*** | ***65 to 147*** |

Notes:

1. Per reactor values are based on an a 1,100 MW reactor with an all-in cost including financing costs of $7,085/kw.
2. The discount rate for the present value of loan guarantees is 6.4% and is based on the weighted average cost of capital of a sample project with 80% debt and 20% equity. All other values are discounted using a 9.6% discount rate based on the weighted average cost of capital of a sample project with 50% debt and 50% equity.
3. Industry totals for accelerated depreciation represents value per reactor times the number of plants built.
4. The PTC is limited to 8,000 MW of capacity or about eight 1,100 MW reactors. The total amount of funds for the PTC is limited to $8.6 billion face value for the industry, the maximum after tax value for the industry is $10 billion.
5. Because plants cannot take both the ITC and PTC the ranges shown represent the total if the ITC is used or the PTC is used, but not both.
6. Does not include the $5 billion in additional Advanced Energy Manufacturing tax credits due to the uncertainty of the fraction that would go to nuclear.
7. Total value to industry is limited to the value per reactor times 8 plants, which is the total at which the total loan guarantee fund under APA is exhausted given our cost assumptions.
8. The ranges shown represent low and high ranges of using either the ITC or PTC in combination with having either the loan guarantees available under APA or ACELA.

## Tax Exempt Bonds Should Not Be Used for Public-Private Partnerships for New Reactors.

This provision would enable publicly owned utilities to issue tax free, low-cost bonds for nuclear plants developed jointly with private interests. Depending upon ownership structure, plants could be eligible for a broad combination of subsidies. Because it is not possible to project what percentage of plants would be financed using this mechanism, we did not estimate a total value to the industry. **However, the estimated value of the proposed Build America Bonds Act and other tax-exempt bond financing for the Vogtle reactor project in Georgia is $4.1 billion.**[8]

## Federal Regulatory Risk Insurance for Nuclear Plants Should Not Be Expanded.

The Energy Policy Act of 2005 already provides $2 billion in total coverage for up to six reactors to shield them against costs associated with regulatory and legal delays, a protection that is not available to other low carbon technologies. Congress should not expand the coverage to $6 billion and 12 reactors or expand the circumstances and time frame under which this coverage will be provided**.** Providing for direct payments from the federal government to reactor developers for delays in NRC construction and licensing proceedings would shield reactor developers from the costs associated with certain regulatory and legal proceedings that could lead to delays in new reactor construction, certification and operation by shifting these costs to taxpayers. **This subsidy is worth as much as $500 million per reactor and $4 billion to $6 billion to the industry.**

## New Nuclear Reactors Already Benefit From Generous Taxpayer Subsidies.

An earlier case study by Earth Track of the proposed new reactor at Calvert Cliffs in Maryland, which will be co-owned by Constellation Energy and Electricity de France, provides a window into the subsidies already available to new nuclear power plants through loan guarantees and production tax credits provided by the Energy Policy Act of 2005, as well as other more established subsidies including federal liability insurance already available to the nuclear industry.[9] The analysis shows the range of financial incentives that directly benefit new nuclear power plants and demonstrates that taxpayers will be the largest de facto investor in new nuclear projects under current law. Based on this analysis, the financial benefits currently available to Calvert Cliffs are estimated at between $631 million and more than $1 billion per year.[10] Table 2 shows that subsidies to Calvert Cliffs approach private investment in the plant and exceed the market value of the power the plant will produce. Comparable federal subsidies are available to other proposed reactors, while additional subsidies may be available to some reactor developers where individual state policies further subsidize nuclear investments through construction work in progress (CWIP) and property tax abatements.

### Table 2. Subsidies Available to the Calvert Cliffs Nuclear Reactor

| | Low | High | Notes |
|---|---|---|---|
| | *Cents per kWh* | | |
| **I. Private investment in Calvert Cliffs III** | | | |
| Base case of Calvert Cliffs | 5.7 | 5.7 | Constellation estimate, Oct. 2008 |
| **II. Public investment in Calvert Cliffs III** | | | |
| ***A. Selected EPACT subsidies*** | | | |
| Production tax credits | 0.5 | 0.5 | Constellation estimate assuming 50% access to PTCs |
| Loan Guarantees, 100% of debt | 3.7 | 3.7 | Constellation estimate, Oct. 2008 |
| *Industry total estimated cost* | 9.9 | 9.9 | |
| ***B. Additional subsidies ignored in Constellation models*** | | | |
| Accelerated depreciation | 0.3 | 0.6 | 15 yr 150% DB vs. service life. |
| Price-Anderson cap on reactors | 0.5 | 2.5 | Based on Heyes (2002); values uncertain. |
| Waste fund short-fall | - | 0.2 | Based on Rothwell (2005). |
| Calvert Co. property tax abatement | 0.0 | 0.0 | $20m/year, but not visible on a per kWh basis. |
| Reduced cost of capital from delay insurance, first two reactors | - | 0.8 | High estimate based on Bradford (2007). |
| *Add-in missing subsidies* | 0.8 | 4.1 | |
| **III. Total cost of nuclear power** | | | |
| **Public subsidy** | **5.0** | **8.3** | |
| **Public/private share** | **87%** | **145%** | |
| **Subsidy/average wholesale rates, 2002–2006** | **113%** | **189%** | |
| **Full cost of power** | **10.7** | **14.0** | |

Source: Koplow. *Nuclear Power as Taxpayer Patronage: A Case Study of Subsidies to Calvert Cliffs Unit 3*. 2009.

## References


[1] See for example: Massachusetts Institute of Technology. The Future of Nuclear Power. 2003, 2009. UCS. Nuclear Power: A Resurgence We Can't Afford, 2009. National Academy of Sciences. America's Energy Future: Technology and Transformation. 2009.

[2] This is a mid-range estimate based on data from actual projects and several studies. The Energy Information Administration overnight cost assumptions for the 2010 Annual Energy Outlook (*http://www.eia.doe.gov/oiaf/aeo/assumption/electricity.html*) were $3,820/kw before financing costs, or all in costs of $5,431/kW with our financing cost assumptions. Other estimates include Koplow (*http://www.foe.org/more-kerry-lieberman-nuclear-subsidies*) with all in costs of $7,452/kW to $9,375/kW based on information from Bell Bend Nuclear (*http://BellBend.com*) and DiSavino (*http://www.reuters.com/article/idUSN0611303620100506*).

[3] The Energy Information Administration estimated that $18.5 billion in loan guarantees would be sufficient for four reactors, which suggests that a tripling of the current Department of Energy loan guarantee program alone would be sufficient to fund 12 new reactors. However, based on our higher capital costs of $7,085/kW, including financing and an 80 percent debt structure, the $54 billion fund would be sufficient to fund eight new reactors.

[4] Nuclear Regulatory Commission. Expected New Nuclear Power Plant Applications. Updated May 6, 2009. *http://www.nrc.gov/reactors/new-reactors/new-licensing-files/expected-new-rx-applications.pdf.*

[5] The Congressional Budget Office estimated that the industry could receive $100 billion in loan guarantees based on current loan guarantee applications. CBO S. 1462 American Clean Energy Leadership Act of 2009. As reported by the Senate Committee on Energy and Natural Resources on July 16, 2009. September 30, 2009.

[6] The per-reactor subsidy estimates in this section are based on a single 1,100 MW reactor comparable to the Westinghouse AP1000; industry total values are based on 12 new 1,100 MW reactors being built with access to a combination of subsidies that in practice will vary by project structure and ownership type.

[7] As proposed under APA and current tax code, eligible entities may take either the PTC or ITC but not both.

[8] Assumes 80 percent debt financing for private partners in the Vogtle reactor, and 100 percent debt financing for public partners.

[9] Constellation and EDF are planning to build a 1,600+ MW Areva Evolutionary Power Reactor.

[10] 8,769 hrs/yr x 1,600 MW x 0.90 (avg. capacity factor) x 1,000 kW/MW x $0.05/kWh (low) and $0.083/kWh (high).


This fact sheet is also available online at *www.ucsusa.org/nuclear_power.*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