Senator McCain's Nuclear Plan: An Economic and Environmental Disaster

Summary

Sen. John McCain has repeatedly called for building 45 new nuclear reactors by 2030, with the ultimate goal of 100 new plants. The plan would be extremely costly to taxpayers, presents significant risk for the economy and the public, and does little to solve America's energy problems.

McCain's radical expansion of nuclear power would have major consequences for America that his campaign has either not disclosed or not considered, even though nuclear power is constantly referenced as one of the centerpieces of the McCain energy policy.

- **A $280 billion cost to taxpayers:** Nuclear plants are enormously expensive. The cost of 45 reactors is likely to be at least $315 billion, while 100 reactors would cost at least $700 billion. Under Sen. McCain's plan, taxpayers are estimated to be on the hook for $126 billion to $280 billion in failed nuclear loans.

- **A job creation fantasy:** New nuclear power plants would create, at best, one-fourth as many jobs as Sen. McCain claimed during the second presidential debate, costing taxpayers as much as $19 million for each job created.

- **Fails to take advantage of cleaner, cheaper alternatives:** Clean energy technologies such as energy-efficient products and wind and solar power can deliver more energy much sooner than building new nuclear power plants, and create more jobs at a lower cost to taxpayers—without the risks. John McCain has consistently failed to support those lower cost alternatives, and his costly nuclear plan would continue to keep better alternatives underfunded and at the back of the line.

It's clear that Sen. McCain's nuclear proposal would be an economic disaster. It would also risk environmental disaster by creating enough waste to fill a second Yucca Mountain-sized dump and dramatically increasing the amount of nuclear waste transported on our roads and rails. Finally, Sen. McCain's plan would do nothing to deal with our current energy crisis because no new power would be generated until at least 2019.

America's energy future is at stake

America is facing an energy crisis. Energy costs are rising. Pollution from fossil fuel use threatens our health and contributes to global warming. And America's dependence on imported energy puts our economy and national security at risk.

Americans have a clear choice this November in the presidential election. Sen. **Barack Obama** has been a leader in embracing a new energy future for America—one in which we use energy wisely and get more of our energy from clean, homegrown renewable sources. His opponent, Sen. John McCain, on the other hand, has pushed Big Oil's agenda in Congress, has worked to block clean energy solutions for America, and has consistently voted against policies to encourage renewable energy.

Possibly even worse, Sen. McCain has embraced a risky and reckless scheme to build as many as 100 new nuclear power plants across the country—a scheme that could cost taxpayers hundreds of billions of dollars and do too little to solve America's energy problems.

Sen. McCain's nuclear plan: An economic and environmental disaster

Cost: The mother of all subprime loans

Nuclear power plants are exceedingly expensive. The most recent estimates of the cost of new nuclear power plants range from $6 billion to $12 billion per plant. Bloomberg News used industry figures to arrive at a conservative $7 billion per reactor, and estimated that Sen. McCain's initial 45 new power plants could cost at least $315 billion to build.[1] Moreover, the cost of building nuclear reactors has risen dramatically in recent years—increasing 185 percent between 2000 and 2007.[2]

Much of the money for those reactors is likely to come out of the pockets of taxpayers. The private sector has been reluctant to invest in nuclear power, meaning that taxpayers will need to take on the risk of default to get the plants built. The Congressional Budget Office assumes that 50 percent of all nuclear loan guarantees are likely to default.[3] The construction of 45 plants would leave taxpayers on the hook for more than $126 billion in nuclear loans. If the full 100 plants in Sen. McCain's plan are built using government-backed loan guarantees, taxpayers could be on the hook for more than $280 billion in failed nuclear loans.[4]

This plan means that every household in America could ultimately end up paying $1,100 to more than $2,400 for failed nuclear loans.[5]

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[1] Eliot Blair Smith, "McCain Nuclear Energy Revival May Cost $315 Billion," *Bloomberg*, 11 September 2008.
[2] Braden Reddall, "RPT – U.S. Power Plant Costs Up 130 Pct Since 2000 – CERA," *Reuters*, 14 February 2008.
[3] See Congressional Budget Office, *Cost Estimate: S. 14 Energy Policy Act of 2003*, 7 May 2003.
[4] Cost estimate assumes that loan guarantees cover up to 80 percent of the plant's cost at a 50 percent rate of default.
[5] Based on projected 115 million American households in 2010 per U.S. Census Bureau, *Projections of the Number of Households and Families in the United States: 1995 to 2010*, April 1996.

Timing: No new electricity until 2019

America needs to start solving its energy problems right away. But nuclear power plants are extremely complex and require long lead times to build. According to the Nuclear Energy Institute (the nuclear industry's trade association), the total time to bring a new nuclear power plant online (from applying for a construction permit until the first electricity is generated) is at least 10 years.[6] Even if the first of McCain's nuclear power plants is started on Inauguration Day, the first electricity from that plant won't be generated until 2019. By contrast, clean energy alternatives such as energy efficiency, wind and solar power can begin delivering energy quickly. Efficient products can start saving energy in the time it takes to screw in an energy-saving light bulb, while solar panels and wind turbines can be manufactured and installed on timelines ranging from a few months to a couple of years.

Jobs: Not nearly enough

Sen. McCain claims that building 45 new nuclear power plants will create 700,000 jobs.[7] This estimate is wildly different from any real-world estimate of job creation from nuclear plants. By his estimate, each plant will create nearly 16,000 jobs.[8] By contrast, the largest currently planned new nuclear plant, Calvert Cliffs Unit 3 in Maryland, would, by the company's own testimony, generate 4,000 temporary construction jobs and only 360 permanent jobs.[9] I Sen. McCain is talking about only temporary construction jobs, his estimate is off by at least a factor of four. If he is talking about permanent jobs he is off by a factor of 43. Using the real-world example of the proposed Calvert Cliffs reactor, these are enormously expensive jobs. At our previous estimate of $7 billion per reactor, the temporary construction jobs come at a cost of $1.75 million per job,[10] whereas the permanent jobs are created at a cost of $19 million per job.[11]

Water consumption: Way too much

Many areas of the United States—particularly the West—have too little water to go around. Nuclear power plants use more water than most other types of electricity generation.[12] The operation of 45 nuclear power plants would use 200 billion to 350

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[6] Nuclear Energy Institute, Key Steps in Building a New Reactor, February 2008.
[7] CNN, *Transcript of Presidential Debate*, downloaded from www.cnn.com/2008/POLITICS/09/26/debate.mississippi.transcript/, 13 October 2008.
[8] Dividing 700,000 total jobs by 45 plants = 15,555 jobs per plant.
[9] Before the Public Service Commission of Maryland, *Testimony of Michael J Wallace in the Matter of Application of Unistar Nuclear Energy, LLC and Unistar Nuclear Operating Services, LLC for a Certificate of Public Convenience and Necessity to Construct a Nuclear Power Plant at Calvert Cliffs in Calvert County Maryland*, Case No. 9127, 26 February 2008.

[10] $7 billion per reactor divided by 4,000 jobs =$1.75 million per job.
[11] $7 billion per reactor divided by 360 jobs = $19.4 million per job.
[12] Electric Power Research Institute, *Water & Sustainability (Volume 3): U.S. Water Consumption for Power Production: The Next Half Century*, March 2002.

billion gallons of water per year.[13] Sen. McCain's plan ignores the practical impact on local water supplies; it's one more reason why private investors are unwilling to put their own money behind these projects.

Nuclear waste: Another Yucca Mountain-sized dump, increased shipments through our communities

Nuclear reactors produce dangerous highly radioactive waste in the form of spent fuel. Nuclear waste is one of the most dangerous substances ever created by humans, remaining hazardous for at least a quarter of a million years.[14] No country in the world has developed an effective, safe and permanent way to dispose of this waste.

Sen. McCain's nuclear power plan would create vast amounts of nuclear waste—enough to fill a second nuclear waste repository the size of the controversial Yucca Mountain dumpsite.

Using recent industry estimates for waste generation from new reactors, we estimate that 45 new reactors would produce 900 to 1,350[15] metric tons of additional waste per year. The licensed operation of 45 reactors for 60 years would mean 54,000 to 81,000[16] metric tons of additional spent fuel that would need to be permanently stored in a geologic repository. If 100 new reactors were constructed, then a total of 120,000 to 180,000 metric tons of spent fuel would be created.

The only proposed site under consideration for the geologic storage of spent fuel in the United States is at Yucca Mountain in Nevada, which has numerous technical problems and is not suitable for highly radioactive waste.[17] But even if Yucca Mountain were to open in 2017, all of its storage capacity is already spoken for. The site will hold waste that already exists and waste that will be created by existing plants before the dump is opened.

Under Sen. McCain's plan, 54,000 to 180,000 metric tons of additional spent fuel would be generated, meaning that the United States would either need to increase the capacity of Yucca Mountain by 85 to 280 percent, or need to build one to three more

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[13] Nuclear power plants with ponds or cooling towers use 400-720 gallons/MWh, per Note 13. Based on average size of a proposed new reactor reported by the Department of Energy's loan guarantee program, new nuclear plants are assumed to have 1400 MW capacity and operate at a 90 percent capacity factor. The 45 nuclear plants would thereby produce 496,692,000 MWh of electricity per year. At 400 gallons/MWh, that level of energy production would require 200 billion gallons/year. At 720 gallons/MWh, that level of energy production would require 350 billion gallons/year.

[14] Based on the half-life of plutonium-239.

[15] Nuclear reactors produce approximately 20-30 metric tons per year of spent fuel, depending on the size and how much time the reactor is shut down for refueling or for safety problems.. According to Unistar's application to build the EPR (Evolutionary Pressurized-water Reactor) in Calvert County, Maryland, this 1,600 MW reactor would generate an additional 30 metric tons, on average, of spent fuel per year. The EPR is one of the largest proposed reactors.

[16] Calculation: 900-1300 tons of spent fuel per year x 60 years =54,000-81,000 tons.

[17] In 1983, the U.S. Department of Energy identified nine potential repository sites west of the Mississippi River in the states of Louisiana, Mississippi, Nevada, Texas, Utah and Washington. At the same time, 17 other sites in states east of the Mississippi River were identified as a potential second repository. The Nuclear Waste Policy Amendments Act of 1987 officially ended the search for a second repository and selected Yucca Mountain as the only site in the country for characterization as a repository.

similar repositories elsewhere in the country to store the waste.[18] In the 1980s, before choosing Yucca Mountain, Nevada, as the nation's only high-level waste dump, the Department of Energy had studied sites in Texas, Washington, Georgia, Maine, Minnesota, New Hampshire, Virginia, Wisconsin and North Carolina as potential nuclear waste dumps—suggesting that they could be candidates for a future nuclear waste dumps under the McCain plan.[19]

Many proponents of nuclear power—including Sen. McCain—suggest that reprocessing spent fuel will reduce the need for nuclear waste storage. His statement is untrue. In fact, the current proposal for reprocessing—to separate plutonium from spent fuel and use it as fuel in the type of reactors that we have today—will mean that *less* waste could be stored in the same amount of space. This type of spent fuel would be so much more radioactive that it would have to be spaced farther apart in a repository. Moreover, reprocessing creates other waste streams that would have to also be stored in a repository. Finally, according to the National Academy of Sciences, reprocessing the radioactive waste that has been generated already at existing nuclear plants would cost $500 billion.[20] Since the nuclear industry has no interest in paying for it, taxpayers could end up picking up the tab yet again.

In order for radioactive waste to be stored at a geologic repository, it will have to travel on roads, rails and barges through large portions of the country. Nuclear waste transportation to Yucca Mountain would affect the road and rails of 44 states. According to the Department of Energy's plan for the waste from existing reactors, there would be more than 22,000 shipments by rail and truck and almost 3,000 barge shipments over 38 years, averaging out to about 658 shipments per year.[21] (For maps of local nuclear waste transport routes see: http://www.ewg.org/node/20912.) Under Sen. McCain's plan, the millions of Americans living along nuclear waste transport routes could see up to three times as many shipments of waste through their cities, towns and neighborhoods, with accidents in transport inevitable.

Clean energy: A better way to solve America's energy problems

If building 100 new nuclear power plants isn't the answer, what is? America has many ways we can use energy more wisely and get more of our energy from clean, homegrown renewable sources.

For example, by improving the energy efficiency of our homes and businesses, America could cut its use of energy by 25 to 30 percent over the next two decades—

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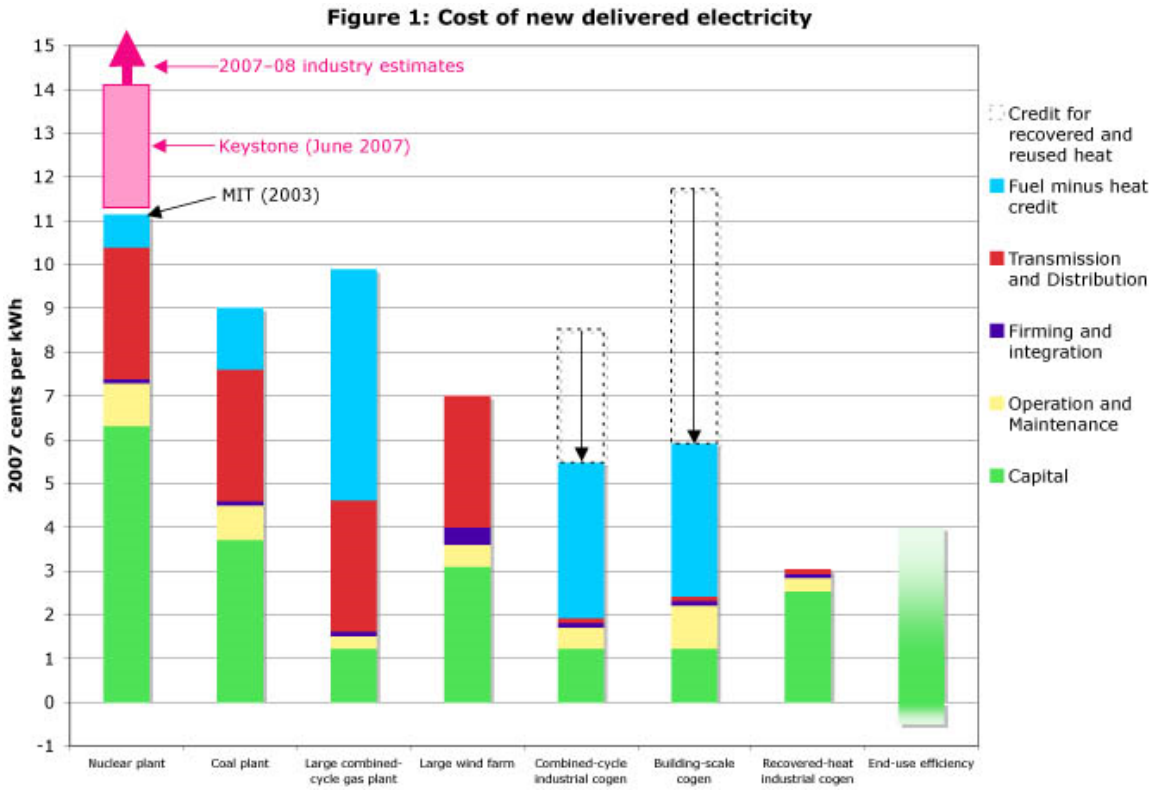
[18] The capacity of Yucca Mountain is limited by statute to 63,000 metric tons of waste. The 54,000 to 180,000 additional metric tons of waste represent an 85-280% expansion of the capacity of Yucca Mountain.
[19] U.S. General Accounting Office, *Nuclear Waste: Quarterly Report on DOE's Nuclear Waste Program as of December 31, 1985*, January 1986.
[20] National Academy of Sciences, *Nuclear Wastes: Technologies for Separations and Transmutation* (1996), http://books.nap.edu/openbook.php?record_id=4912&page=82, Page 82
[21] *Final Environmental Impact Statement for a Geologic Repository for the Disposal of High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada, Volume II,* page J-11 (Table J-1) and page J-83 (Table J-27).

while saving money.[22] Meanwhile, America has enough renewable energy potential to supply all of our electricity needs. America has doubled its wind-power generating capacity in just the last two years,[23] and also doubled the amount of energy we generate from solar panels on rooftops.[24]

Investing in clean energy can also renew America's economy. Renewable energy alone accounts for more than 440,000 jobs in the United States.[25] And investing in energy efficiency and renewable energy keeps our energy dollars at home rather than sending them overseas.

By every measure—cost, safety, environment and economic impact—a clean energy solution makes more sense for America than a massive expansion of nuclear power.

Cost: Clean energy is cheaper than nuclear power



(source http://www.rmi.org/sitepages/pid467.php)

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[22] Karen Ehrhardt-Martinez and John A. "Skip" Laitner, American Council for an Energy-Efficient Economy, *The Size of the U.S. Energy Efficiency Market: Generating a More Complete Picture*, May 2008.
[23] American Wind Energy Association, U.S. Wind Energy Installations Surpass 20,000 Megawatts [press release], 3 September 2008.
[24] Prometheus Institute and Solar Energy Industries Association, U.S. Solar Industry Year in Review 2007, downloaded from www.seia.org/galleries/pdf/Year_in_Review_2007_sm.pdf, 19 September 2008.
[25] Michael Renner, Worldwatch Institute, *Jobs in Renewable Energy Expanding*, 8 July 2008.

Energy efficiency and renewable energy such as wind are much cheaper sources of energy than nuclear and don't carry the attending problems of radioactive waste generation and safety concerns. The graph above shows that energy efficiency, in fact, often has a negative cost, saving more money than is spent. While Sen. McCain touts nuclear as a solution to global warming pollution because it emits no carbon dioxide, the chief global warming pollutant, both energy efficiency and wind are far more cost-effective at reducing global warming pollution.[26]

Timing: Clean energy can provide relief right now

While new nuclear power plants will take 10 years to come online, energy efficiency and renewable energy such as solar and wind can begin solving our energy woes much more quickly. Energy efficiency measures, such as switching to compact fluorescent light bulbs. take minutes, while weatherizing a house usually takes less than a month. Installing solar panels on a roof takes about one week, while constructing a large, concentrating solar plant takes a little more than a year.[27] Depending on their size, wind projects can take one to five years.

Jobs: Clean wnergy will jump-start our flailing economy

Unlike Sen. McCain's outlandish claims of job creation from nuclear power plants, many recent studies have shown the job creation potential of clean energy alternatives such as renewable energy and energy efficiency. According to one recent study, investing $100 billion in energy efficiency and renewable energy over two years would create more than 2 million new jobs over that time span—many of them good-paying jobs in construction and manufacturing.[28]

State-by-State Job Creation from $100 Billion: U.S. Green Recovery Program (figures are for 34 states)

State	Total Job Creation for State from Program
Alaska	4,959
Arizona	37,234
Arkansas	19,534
California	235,198
Colorado	32,849
Florida	123,756
Illinois	83,710
Indiana	43,353
Iowa	21,057
Kansas	19,142
Maine	9,132
Maryland	36,739
Massachusetts	42,530

[26] Amory B. Lovins, Imran Sheikh and Alex Markevich, Rocky Mountain Institute, *Forget Nuclear*, downloaded from www.rmi.org/sitepages/pid467.php, 13 October 2008.
[27] U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, *So You Want to Put PV on Your Roof …*, downloaded from www1.eere.energy.gov/solar/want_pv.html, 13 October 2008.
[28] Robert Pollin, Heidi Garrett-Peltier, James Heintz and Helen Scharber, Center for American Progress and Political Economy Research Institute, University of Massachusetts Amherst, *Green Recovery: A Program to Create Good Jobs and Start Building a Low-Carbon Economy*, September 2008.

Michigan	61,394
Minnesota	37,429
Missouri	43,047
Montana	6,335
Nebraska	12,766
Nevada	15,021
New Hampshire	9,245
New Jersey	57,228
New Mexico	13,717
New York	131,991
North Carolina	62,015
North Dakota	4,380
Ohio	80,360
Oregon	27,307
Pennsylvania	86,385
South Carolina	28,064
Tennessee	44,942
Virginia	56,459
Washington	42,690
West Virginia	12,149
Wisconsin	37,165

(Source: http://www.americanprogress.org/issues/2008/09/pdf/green_recovery.pdf)

The environment: Clean energy is less dangerous and more effective against global warming

Clean energy poses none of the risks to public safety and the environment as nuclear power. And because clean energy solutions—and particularly energy efficiency—are less expensive, we can make more progress in reducing global warming pollution, and do it faster, than we can through a massive expansion of nuclear power.

Sen. John McCain: Despite his claims, failure on clean energy

At the first presidential debate of 2008, John McCain said, "I have voted for alternate fuel all of my time...No one can be opposed to alternate energy." Had John McCain's words been true, we would be farther down the road to a new energy future.

In the 110th Congress, Sen. McCain failed to vote on a host of key energy measures before Congress. In 2007, McCain failed to support efforts to increase gas mileage standards for cars, promote alternative fuels, and cut gasoline consumption in America.[29] McCain failed to vote for strong energy efficiency standards for appliances, equipment and lighting,[30] and he failed to vote on measures that would support clean, renewable energy and create millions of new jobs in America.[31] Sen.

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[29] *Creating Clean Energy Act of 2007, HR 6,* http://www.gov/legislative/LIS/roll_call_lists/roll_call_vote_cfm.cfm?congress=110&session=1&vote=00226, 21 June 2007.

[30] *Amendment to HR 6, http://www.senate.gov/legislative/LIS/roll_call_lists/roll_call_vote_cfm.cfm?congress=110&session=1&vote=00223, 21 June 2007.*

[31] *Recovery Rebates and Economic Stimulus for the American People Act of 2008, HR 5140,* http://www.senate.gov/legislative/LIS/roll_call_lists/roll_call_vote_cfm.cfm?congress=110&session=2&vote=00008, 4 August 2007.

McCain has also voted against a renewable electricity standard, similar to those now in place in 26 states, that would increase America's production of clean, homegrown energy.

As a result of these and other votes, John McCain earned a 0 percent pro-environment score from Environment America in 2008 and has a lifetime pro-environment voting record of 30 percent.[32]

Barack Obama: For a clean energy future

Sen. Barack Obama understands the tremendous potential of clean energy technologies to protect our environment, address global warming, and reinvigorate our economy. Sen. Obama has a concrete plan to fast-track clean and renewable energy in the United States. Specifically, he will:

- Invest $150 billion over 10 years in clean energy to create 5 million new "green jobs."
- Ensure that America is getting 10 percent of its power from renewable sources within four years and 25 percent by 2025.
- Set an aggressive goal to reduce electricity consumption by 15 percent below projected levels by 2020 through aggressive policies to promote energy efficiency—the quickest, cheapest way to address America's energy challenges.[33]

About Environment America

We all want clean air, clean water and open space. But it takes independent research and tough-minded advocacy to win concrete results for our environment, especially when powerful interests stand in the way of environmental progress. That's the idea behind Environment America. We focus exclusively on protecting our air, water and open space. We speak out and take action at the local, state and national levels to improve the quality of our environment and our lives.

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[32] Environment America, *The Thinking Behind Our Endorsement*, downloaded from www.environmentamerica.org/issues/election-2008/background, 13 October 2008.
[33] Barack Obama, *Barack Obama: New Energy for America*, 3 August