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By John Hall

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Negative: Nuclear Investment

INHERENCY

NRC opening to foreign investment

Nuclear Regulatory Commission is setting new rules for greater degree of foreign investment

Nuclear Energy Institute 2015 (nuclear energy industry association) “NRC to Use Graded Approach on Foreign Ownership” http://www.nei.org/News-Media/News/News-Archives/NRC-to-Use-Graded-Approach-on-Foreign-Ownership

The U.S. Nuclear Regulatory Commission will update its approach to its decades-old positions concerning foreign ownership, control or domination (FOCD) of U.S. nuclear energy facilities. [NRC commissioners this week unanimously directed agency staff](http://pbadupws.nrc.gov/docs/ML1512/ML15124A940.pdf) to develop graded criteria to assess project applications by nuclear suppliers that may be partly owned, controlled or dominated by foreign entities. The move, which does not change the agency’s reading of its statutory obligation, recognizes that reviews of nuclear energy facility license applications should take into account “the realities of today’s interconnected and global nuclear energy markets,” NEI Vice President, General Counsel and Secretary Ellen Ginsberg said.

SOLVENCY

1. Not Solving for Over-Regulation (Aff only claims to solve lack of investment)

Over-regulation is the key factor blocking nuclear energy in the US today

Scientific American 2016 (oldest continuously published monthly magazine in the United States.) “Nuclear Power Critical to U.S. Climate Goals” <http://www.scientificamerican.com/article/nuclear-power-critical-to-u-s-climate-goals/>

But Sen. Mike Crapo (R-Idaho) said that government influence in the energy market is part of why the nuclear industry is in such dire straits in the United States, even as energy demand grows. "This demand is not enough to overcome the challenges that are leading some plants to shut down," he said. "One of the challenges against the demand for nuclear energy is bad public policy and, in my opinion, overregulation. The government nearly regulated the industry out of business in the 1970s and 1980s."

There were plenty of investors – but they got scared off by all the regulations

Jack Spencer 2007 (Research Fellow in Nuclear Energy in the Thomas A. Roe Institute for Economic Policy Studies at The Heritage Foundation.) “Competitive Nuclear Energy Investment: Avoiding Past Policy Mistakes” <http://www.heritage.org/research/reports/2007/11/competitive-nuclear-energy-investment-avoiding-past-policy-mistakes>

However, the commercial nuclear energy industry in the U.S. is no longer thriving. Investors hesitate to embrace nuclear power fully, despite significant regulatory relief and economic incentives. This reluctance is not due to any inherent flaw in the economics of nuclear power or some unavoidable risk. Instead, investors are reacting to the historic role that federal, state, and local governments have played both in encouraging growth in the industry and in bringing on its demise. Investors doubt that federal, state, and local governments will allow nuclear energy to flourish in the long term. They have already lost billions of dollars because of bad public policy.

Nuclear energy is being regulated out of existence

Jack Spencer 2007 (Research Fellow in Nuclear Energy in the Thomas A. Roe Institute for Economic Policy Studies at The Heritage Foundation.) “Competitive Nuclear Energy Investment: Avoiding Past Policy Mistakes” <http://www.heritage.org/research/reports/2007/11/competitive-nuclear-energy-investment-avoiding-past-policy-mistakes>

The United States once led the world in commer­cial nuclear technology. Indeed, the world's leading nuclear companies continue to rely on American technologies. However, in the 1970s and 1980s, federal, state, and local governments nearly regulated the U.S. commercial nuclear industry out of existence. U.S. companies responded by reallocating their assets, consolidating or selling their commercial nuclear capabilities to foreign companies in pro-nuclear countries.

Over-regulation is the key obstacle and must be mitigated before nuclear energy can grow

Jack Spencer 2007, (Research Fellow in Nuclear Energy in the Thomas A. Roe Institute for Economic Policy Studies at The Heritage Foundation.) “Competitive Nuclear Energy Investment: Avoiding Past Policy Mistakes” <http://www.heritage.org/research/reports/2007/11/competitive-nuclear-energy-investment-avoiding-past-policy-mistakes>

This paper reviews how overregulation largely destroyed the nuclear industry and why it remains an obstacle to investment in the industry. This dynamic must be understood and mitigated before the true economics of nuclear power can be harnessed for the benefit of the American people.

Heavy regulations slow down the US nuclear energy industry

Lauren Sukin 2016, (Ph.D. student in political science at Stanford Univ.) 19 May 2016 National Review “How America Can Dominate Global Nuclear Energy” <http://nationalinterest.org/feature/how-america-can-dominate-global-nuclear-energy-16274?page=1>

The U.S. government’s heavy regulations and comparative lack of investment in the industry mean that U.S. projects tend to be slow-moving—leading nuclear energy importers to turn to other nuclear technology exporters, like Russia, whose governments have adopted more industry-favorable outlooks than the United States.

1. Nuclear is too expensive for long-term growth

Cost crunch blocks nuclear from solving carbon emissions

US News and World Report 2016, (journalist Alan Neuhauser) 30 March 2016 “Nuclear Power, Once Cheap, Squeezed by Mounting Costs” <http://www.usnews.com/news/articles/2016-03-30/nuclear-power-once-cheap-squeezed-by-mounting-costs>

Since the Atomic Age exploded into being in the New Mexico desert in 1945, nuclear power has been styled the future of American energy: a wellspring of cheap, reliable and near carbon-free electricity in exchange for a big upfront investment to build each plant. But in the past decade, saddled by a cost crunch some experts say could threaten safety and imperil the world's efforts to slow global warming, nuclear power has had a tougher time than ever delivering on that promise.

Nuclear is too expensive to make more than a modest contribution to clean energy in the US

Dr. Joe Romm 2016, (PhD physics; Fellow at Center for American Progress and is the Founding Editor of Climate Progress) 8 March 2016 “The Nuclear Industry Prices Itself Out Of Market For New Power Plants” <http://thinkprogress.org/climate/2016/03/08/3757281/nuclear-industry-prices/>

For now, the nuclear industry has priced itself out of the market for new power plants in market economies. If the world pursues the emissions and energy pathway needed to keep total warming below 2°C path, and if the nuclear industry can avoid another major disaster while resolving a variety of issues, especially cost escalation, then nuclear power can make a modest but important contribution. But it remains increasingly clear that new renewable energy will play a far bigger role in the transition.

Studies and experience show: Nuclear will continue to get more expensive over time

Dr. Joe Romm 2016, (PhD physics; Fellow at Center for American Progress and is the Founding Editor of Climate Progress) 8 March 2016 “The Nuclear Industry Prices Itself Out Of Market For New Power Plants” <http://thinkprogress.org/climate/2016/03/08/3757281/nuclear-industry-prices/>

In the modern era, nuclear power plants have almost always become more and more expensive over time. They have a “negative learning curve” — along with massive delays and cost overruns in market economies. This is confirmed both by recent studies and by the ongoing cost escalations of nuclear plants around the world, as I’ll detail in this post.

Nuclear won’t get cheaper

Center for American Progress, 2008 (The Center for American Progress is an independent nonpartisan policy institute that is dedicated to improving the lives of all Americans, through bold, progressive ideas, as well as strong leadership and concerted action. Our aim is not just to change the conversation, but to change the country.) “10 Reasons Not to Invest in Nuclear Energy” <https://www.americanprogress.org/issues/green/news/2008/07/08/4735/10-reasons-not-to-invest-in-nuclear-energy/>

The American nuclear industry has benefited from $100 billion in direct and indirect subsidies since 1948, and nuclear power provides 20 percent of electricity in the United States. The technology behind nuclear power is fully developed, so nuclear energy is unlikely to get much cheaper. Continued subsidies would be necessary to make nuclear cost-competitive with other energy sources, but will not lower the overall price of nuclear power.

Georgia Vogtle plant experience proves: Even nuclear advocates admit it’s too expensive to work

Dr. Joe Romm 2016, (PhD physics; Fellow at Center for American Progress and is the Founding Editor of Climate Progress) 8 March 2016 “The Nuclear Industry Prices Itself Out Of Market For New Power Plants” <http://thinkprogress.org/climate/2016/03/08/3757281/nuclear-industry-prices/> (brackets in original)

In the United States, the cost of Georgia Power’s newest twin Vogtle reactors may top initial estimates of $14 billion and reach $21 billion, according to recent Georgia Public Service Commission testimony. Of course, the first two Vogtle Units begun in 1971 took 18 years to build (a decade over schedule) at a final price of $9 billion — ten times the original price tag. BloombergBusiness wrote last fall, “Even as sympathetic an observer as John Rowe [former chair of the U.S.’s largest nuclear utility] warns that the new units at Vogtle will be uneconomical when — or if — they’re completed.”

Nuclear plant construction costs rising rapidly

Center for American Progress, 2008 (The Center for American Progress is an independent nonpartisan policy institute that is dedicated to improving the lives of all Americans, through bold, progressive ideas, as well as strong leadership and concerted action. Our aim is not just to change the conversation, but to change the country.) “10 Reasons Not to Invest in Nuclear Energy” <https://www.americanprogress.org/issues/green/news/2008/07/08/4735/10-reasons-not-to-invest-in-nuclear-energy/>

Nuclear power plant construction costs—mainly materi als, labor, and engineering—rose by 185 percent between 2000 and 2007. More recently, costs have been increasing even faster: In mid-March, Progress Energy informed state regulators that the twin 1,100 MW nuclear plants it intends to build in Florida would cost $14 billion, which “triples estimates the utility offered little more than a year ago.”

Anti-nuclear activism increasing the costs

Jack Spencer 2007, (Research Fellow in Nuclear Energy in the Thomas A. Roe Institute for Economic Policy Studies at The Heritage Foundation.) “Competitive Nuclear Energy Investment: Avoiding Past Policy Mistakes” <http://www.heritage.org/research/reports/2007/11/competitive-nuclear-energy-investment-avoiding-past-policy-mistakes>

Overall, regulation increased the cost of constructing a nuclear power plant fourfold. Such cost escalation would have been justified if it had been rooted in scientific and technical analysis. Regrettably, it was largely a function of anti-nuclear activism, agenda-driven politicians, activist regulators, and unsubstantiated public fear. A total of $70 billion was added to the cost of nuclear reactors constructed by 1988, and this cost was passed on to the ratepayers. After 1981, the cost of constructing a nuclear power plan rose from two to six times, which means that either consumers paid significantly more or utilities incurred losses if they did not charge market prices. Neither circumstance was sustainable.

Nuclear power seems doomed with cost escalation

Lina Escobar Rangel and Prof. Francois Leveque 2015 (Rangel - PhD student in Economics at Mines ParisTech, French engineering school. Leveque – professor of law & economics at Mines ParisTech.) [Economics of Energy & Environmental Policy](http://econpapers.repec.org/article/aeneeepjl/), 2015, vol. Volume 4, issue Number 2 “Revisiting the Cost Escalation Curse of Nuclear Power: New Lessons from the French Experience” <http://econpapers.repec.org/article/aeneeepjl/eeep4-2-escobar.htm>

In several OECD countries such as the United Kingdom, the United States and France, nuclear power is envisioned as having a role to play alongside renewables to reduce greenhouse gas emissions. Leaving aside post-Fukushima-Daiichi safety concerns, the major issue for nuclear power is whether new builds could be achieved at reasonable costs. In fact, ever since the completion of the first wave of nuclear reactors in 1970, and continuing with the ongoing construction of new reactors in Europe, nuclear power seems to be doomed with the curse of cost escalation.

1. Natural gas. It’s more competitive, nuclear can’t win

Nuclear is impossible in the face of competition from cheaper natural gas

PBS News Desk, 2013 (Public Broadcasting Service)“Cheap natural gas is putting nuclear power out of business” <http://www.pbs.org/newshour/rundown/cheap-natural-gas-is-putting-nuclear-power-out-of-business/>

Aging facilities, new saftey regulations, and most of all, cheaper sources of power in deregulated markets is making the plants impossible to operate. The news is discouraging for nuclear proponents who tout the technology as the only reliable, climate-change friendly energy source.

Natural gas is putting nuclear power out of business and will continue over next couple decades

PBS News Desk, 2013 (The Public Broadcasting Service (PBS) is an American public broadcaster and television program distributor. Headquartered in Arlington, Virginia, PBS is an independently operated non-profit organization and is the most prominent provider of television programs to public television stations in the United States)“Cheap natural gas is putting nuclear power out of business” <http://www.pbs.org/newshour/rundown/cheap-natural-gas-is-putting-nuclear-power-out-of-business/>

Natural gas-generated power has gotten so cheap, it’s putting nuclear plants out of business. That’s the news out of New York, where two nuclear plants, the James A. FitzPatrick Nuclear Power Plant and the R.E. Ginna Nuclear Power Plant, are facing possible economic shutdown. The Syracuse Post-Standard reports: ”We should expect more early (plant) retirements,” nuclear critic Mark Cooper, senior fellow at the Institute for Energy and the Environment at Vermont Law School, wrote in a July report. “Rising costs of an aging fleet and the availability of lower cost alternatives are likely to persist over the next couple of decades.”

Natural gas has far lower fixed costs and don’t have to pay to manage security and radioactivity issues

PBS News Desk, 2013 (The Public Broadcasting Service (PBS) is an American public broadcaster and television program distributor. Headquartered in Arlington, Virginia, PBS is an independently operated non-profit organization and is the most prominent provider of television programs to public television stations in the United States)“Cheap natural gas is putting nuclear power out of business” <http://www.pbs.org/newshour/rundown/cheap-natural-gas-is-putting-nuclear-power-out-of-business/>

But, the Guardian reports: Fixed costs run about $15,000 per megawatt of capacity for modern gas plants, about $30,000 for coal plants and $90,000 for nuclear plants, according to federal estimates. Nuclear plants also spend heavily on security and other safeguards, and their equipment costs are higher than those for other kinds of generating plants because they handle radioactive material and operate at extreme temperatures.

Nuclear costs rising Natural Gas costs falling

New York Times By Rebecca Smith, 2013, (Reported for the New York Times) “Can Gas Undo Nuclear Power?” <http://www.wsj.com/articles/SB10001424127887323644904578272111885235812>

Though fuel costs have been rising for nuclear plants, fuel isn't a big factor in their expenses. But at gas plants, fuel is the biggest single expense, and its cost has been plunging. For the U.S. as a whole, average spot prices for natural gas fell 31% in 2012, to $2.77 per million British thermal units from $4.02, according to the federal Energy Information Administration.

Can’t compete with cheap natural gas

New York Times By Rebecca Smith, 2013, (Reported for the New York Times) “Can Gas Undo Nuclear Power?” <http://www.wsj.com/articles/SB10001424127887323644904578272111885235812>

Nuclear output is already showing signs of weakness, logging a 2.5% decline in the first 11 months of 2012 compared with a year earlier. Output from plants fired by natural gas jumped almost 24%, according to the EIA. Cheaper prices for natural gas depressed power prices, which fell between 15% and 47% in U.S. markets last year, with California at the low end and Texas at the high end. Wholesale electricity prices fell 27% in New York last year to the lowest level since the state deregulated its wholesale electricity market a dozen years ago. State officials said wholesale electricity cost half as much in 2012 as in 2008, before gas production boomed and the economy tanked.

1. State Regulations

Not just federal: State and local regulations block nuclear energy too

Jack Spencer 2007, (Research Fellow in Nuclear Energy in the Thomas A. Roe Institute for Economic Policy Studies at The Heritage Foundation.) “Competitive Nuclear Energy Investment: Avoiding Past Policy Mistakes” <http://www.heritage.org/research/reports/2007/11/competitive-nuclear-energy-investment-avoiding-past-policy-mistakes>

At the same time, state and local governments expanded their oversight functions. States often claimed jurisdiction over construction and operations permits as well as environmental regulation. For example, while the Federal Water Pollution Control Act as amended by the Clean Water Act of 1977, the Clean Air Act, and the Solid Waste Disposal Act mandated that states enforce minimal federal environmental standards, many states chose to adopt additional regulations. Environmental standards that varied from jurisdiction to jurisdiction imposed additional costs and opened additional avenues for anti-nuclear activists to exploit.

States have significant oversight power, even banning nuclear in some cases

Jack Spencer 2007, (Research Fellow in Nuclear Energy in the Thomas A. Roe Institute for Economic Policy Studies at The Heritage Foundation.) “Competitive Nuclear Energy Investment: Avoiding Past Policy Mistakes” <http://www.heritage.org/research/reports/2007/11/competitive-nuclear-energy-investment-avoiding-past-policy-mistakes>

Today, many states exercise significant authority over the location and construction of nuclear reactors. Some jurisdictions have outright moratoria on new nuclear construction. For example, California prevents further construction of nuclear power plants until both the California Energy Commission and the federal government approve a method of disposing of nuclear waste. Most states that limit construction of nuclear plants use some variation of this theme. Public commissions and referenda can impose additional restrictions.

13 states banned nuclear energy construction

Cornelius Milmoe & Jack Spencer 2012 (Milmoe - lawyer and nuclear energy expert who has worked in the government and private sector.)(Spener - Research Fellow in Nuclear Energy in the Thomas A. Roe Institute for Economic Policy Studies at The Heritage Foundation. “Obama Administration: No Confidence in Nuclear Energy,” Heritage Foundation. March 5, 2012 <http://www.heritage.org/research/reports/2012/03/obama-administration-no-confidence-in-nuclear-energy#_ftnref14>

Nuclear opponents exploited the uncertainty caused by that policy change. They argued that because there was no program to remove the SNF from reactor sites, the NRC could not license new reactors without studying the environmental impact of perpetual on-site waste storage. They demanded that there be no new reactors until the “waste issue” was resolved. As a result, 13 states passed legislation banning new nuclear construction. Federal courts ruled that the NRC could not issue a reactor license unless it either studied the long-term impact of on-site waste storage or expressed confidence as part of its regulatory determinations that SNF would not remain on-site for an extended period of time. The NRC chose to adopt the waste confidence rule and avoid the long-term impact study for each individual site. In adopting the rule, the NRC promised that it would not continue to license reactors if it did not have “reasonable confidence that the wastes can and will in due course be disposed of safely.”

DISADVANTAGES

1. Fewer Jobs

Fewer jobs from foreign nuclear investment

Center for American Progress, 2008 (independent nonpartisan policy institute) “10 Reasons Not to Invest in Nuclear Energy” <https://www.americanprogress.org/issues/green/news/2008/07/08/4735/10-reasons-not-to-invest-in-nuclear-energy/>

The United States must produce more electricity to keep up with increasing demand, but relying on foreign companies to build nuclear plants means fewer jobs for Americans in the energy sector.

1. Nuclear accidents

Link: Chinese nuclear expert He Zuoziu reveals China has low safety standards

Emma Graham-Harrison 2015 (journalist) THE GUARDIAN (British newspaper) 25 May 2015 “China warned over 'insane' plans for new nuclear power plants “ (brackets added; “He” is his name, not a pronoun referring to him) <https://www.theguardian.com/world/2015/may/25/china-nuclear-power-plants-expansion-he-zuoxiu>

He [Zuoxiu], who worked on China’s nuclear weapons programme, said the planned rollout was going too fast to ensure it had the safety and monitoring expertise needed to avert an accident. “There are currently two voices on nuclear energy in China. One prioritises safety while the other prioritises development,” He told the Guardian in an interview at the Chinese Academy of Sciences. He spoke of risks including “corruption, poor management abilities and decision-making capabilities”. He said: “They want to build 58 (gigawatts of nuclear generating capacity) by 2020 and eventually 120 to 200. This is insane.” He’s challenge to the nuclear plans is particularly powerful because of his scientific credentials and a long history of taking a pro-government stance on controversial issues, from the 1950s destruction of Beijing’s city walls to the crackdown in the 1990s on the religious group Falun Gong.

Backup Link: Chinese government nuclear oversight is fake

Emma Graham-Harrison 2015 (journalist) THE GUARDIAN (British newspaper) 25 May 2015 “China warned over 'insane' plans for new nuclear power plants “ (brackets added; “He” is his name, not a pronoun referring to him) <https://www.theguardian.com/world/2015/may/25/china-nuclear-power-plants-expansion-he-zuoxiu>

He [Zuoxiu], said: “At the moment, the ministry of environmental protection is considering a new watchdog. When they invited me over for a discussion, I told them: ‘Your safety watchdog is not independent. It listens to the national nuclear corporation and hence the scrutiny is fake’.”

Brink: China’s standards are lower than Japan’s, and even Japan couldn’t avoid a massive accident

Emma Graham-Harrison 2015 (journalist) THE GUARDIAN (British newspaper) 25 May 2015 “China warned over 'insane' plans for new nuclear power plants “ (brackets added; “He” is his name, not a pronoun referring to him) <https://www.theguardian.com/world/2015/may/25/china-nuclear-power-plants-expansion-he-zuoxiu>

“Japan has better technology and better management, and yet it couldn’t avoid an accident despite the fact that it tried very hard to learn from the US and USSR,” He [Zuoxiu], said, adding that China’s nuclear monitor has sparser staffing than Japan’s, and offers low salaries that will not attract the best young scientists. China had considered and then rejected stronger standards, He said, because of the huge pressure for a rapid expansion and companies powerful enough to put corporate profits ahead of national security.

Impact: Massive environmental and social destruction. Example: Fukushima disaster

Steven Starr 2012 (board member and [senior scientist for Physicians for Social Responsibility](http://www.psr.org/about/experts-speakers/steven-starr.html), and director of the Clinical Laboratory Science Program at the University of Missouri. ) “Costs and Consequences of the Fukushima Daiichi Disaster” <http://www.psr.org/environment-and-health/environmental-health-policy-institute/responses/costs-and-consequences-of-fukushima.html>

However, all of the land within 12 miles (20 km) of the destroyed nuclear power plant, encompassing an area of about 230 square miles (600 sq km), and an additional 80 square miles (200 sq km) located northwest of the plant, were declared too radioactive for human habitation. All persons living in these areas were evacuated and the regions were declared to be permanent “exclusion” zones.  The precise value of the abandoned cities, towns, agricultural lands, businesses, homes and property located within the roughly 310 sq miles (800 sq km) of the exclusion zones has not been established.  Estimates of the total economic loss range from $250-$500 billion US.  As for the human costs, in September 2012, Fukushima officials stated that 159,128 people had been evicted from the exclusion zones, losing their homes and virtually all their possessions. Most have received only a small compensation to cover their costs of living as evacuees.  Many are forced to make mortgage payments on the homes they left inside the exclusion zones. They have not been told that their homes will never again be habitable.

1. Less focus on other green energy

Link: Increased investment in green energy would be more cost effective than nuclear at replacing Status Quo energy sources

Center for American Progress, 2008 (independent nonpartisan policy institute) “10 Reasons Not to Invest in Nuclear Energy” <https://www.americanprogress.org/issues/green/news/2008/07/08/4735/10-reasons-not-to-invest-in-nuclear-energy/>

Solar power, photovoltaics, advanced biofuels, wind power, and other energy technologies promise to revolutionize how electricity is generated in the 21st century. Already, wind energy can produce electricity for less than five cents per kWh, and concentrated solar power can produce energy for 11-12 cents per kWh—even at night—and these costs are decreasing. Alternatives do not produce nuclear waste, and they do not face the same extensive safety, regulatory, and construction costs and delays that nuclear does.

Link: We need focused government policy to move us toward renewables and away from nuclear

Steven Cohen 2015 (Executive Director, Columbia Univ. Earth Institute) 25 November 2013 HUFFINGTON POST “The Answer to Climate Change Is Renewable Energy, Not Nuclear Power” <http://www.huffingtonpost.com/steven-cohen/the-answer-to-climate-cha_b_4337435.html>

Nuclear remains a problematic technology. We need a focused, well-funded national effort to implement smart grids and decentralized renewable energy. We need leadership from the White House and an energy strategy that makes choices. This is not an argument made from a fear of all things nuclear. There are plenty of examples of nuclear facilities that are safe and well-managed. But political and organizational experts necessarily focus on human failures as well as successes. Even though the probability of nuclear failure is low, the certainty of occasional failure has already been demonstrated. The cost of those failures has been too high. Nuclear power is not the answer; the answer is renewable energy. Let’s accept that and get to work.

Impact 1: Lost health benefits from green energy

Union of Concerned Scientists, 2013 (The Union of Concerned Scientists (UCS) is a nonprofit science advocacy organization based in the United States. The UCS membership includes many private citizens in addition to professional scientists.)“Benefits of Renewable Energy Use” <http://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/public-benefits-of-renewable.html#.V4QD4uAkpEZ>

Generating electricity from renewable energy rather than fossil fuels offers significant public health benefits. The air and water pollution emitted by coal and natural gas plants is linked to breathing problems, neurological damage, heart attacks, and cancer. Replacing fossil fuels with renewable energy has been found to reduce premature mortality and lost workdays, and it reduces overall healthcare costs. The aggregate national economic impact associated with these health impacts of fossil fuels is between $361.7 and $886.5 billion, or between 2.5 percent and 6 percent of gross domestic product (GDP).

Impact 2: Reduced quality of life. Decentralized renewables would offer better quality of life

Steven Cohen 2015 (Executive Director, Columbia Univ. Earth Institute) 25 November 2013 HUFFINGTON POST “The Answer to Climate Change Is Renewable Energy, Not Nuclear Power” <http://www.huffingtonpost.com/steven-cohen/the-answer-to-climate-cha_b_4337435.html>

An important advantage of decentralized, distributed generation of energy is that it is less vulnerable to catastrophic, large-scale disruption. As our lifestyles require more and more energy, even a few days of disrupted supply can have a significant negative effect on quality of life. After Hurricane Sandy, many suburbanites in the Northeast went out and bought electric generators and gasoline tanks to keep their homes powered during and after storms. A solar system in the home, with an advanced storage battery, would be a more convenient and cleaner way to do the same job.

1. Hazardous nuclear waste

Link: Nuclear waste is stored on site in overcrowded facilities with few safety systems

Union of Concerned Scientists, 2013 (non-profit group advocating scientific research to solve environmental and social problems) “Infographic: Safer Storage for Nuclear Waste” <http://www.ucsusa.org/nuclear_power/making-nuclear-power-safer/handling-nuclear-waste/infographic-dry-cask-cooling-pool-nuclear-waste.html#.V8IGVJMrKRs>

As spent fuel piles up at reactors, most operators continue to store it in pools. As a result, cooling pools now hold significantly more nuclear material than originally intended. In fact, while concern tends to focus on the nuclear fuel in the cores at operating reactors, U.S. cooling pools contain some five and a half times more nuclear material than the reactor cores themselves—with far fewer safety systems.

Impact: Nuclear waste storage accident or terrorism could cause tens of thousands of deaths and displace millions more

Union of Concerned Scientists, 2013 (non-profit group advocating scientific research to solve environmental and social problems) “Infographic: Safer Storage for Nuclear Waste” <http://www.ucsusa.org/nuclear_power/making-nuclear-power-safer/handling-nuclear-waste/infographic-dry-cask-cooling-pool-nuclear-waste.html#.V8IGVJMrKRs>

While storing nuclear waste in cooling pools is safe under normal conditions, a severe accident or terrorist attack that interrupts cooling for hours or days—depending on the scenario—could have catastrophic consequences, made worse by overcrowding. A 2013 study by the Nuclear Regulatory Commission (NRC)—the U.S. government agency charged with nuclear power plant safety—estimated the results of such an event. Using the Peach Bottom #3 reactor in Pennsylvania as an example, the study found that a cooling pool accident could contaminate thousands of square miles with radioactive material, force the long-term displacement of millions of people, and cause tens of thousands of cancer deaths.