## \*\*\* 1AC

### 1AC—Warming Adv

**Contention One – The Environment**

**Warming is real, anthropogenic, and reversible if we start mitigation now.**

**Nuccitelli 11** (Dana Nuccitelli is an environmental scientist at a private environmental consulting firm in the Sacramento, California area. He has a Bachelor's Degree in astrophysics from the University of California at Berkeley, and a Master's Degree in physics from the University of California at Davis. He has been researching climate science, economics, and solutions as a hobby since 2006, and has contributed to Skeptical Science since September, 2010., Updated 2011, Originally Posted 9/24/2010, “The Big Picture”, http://www.skepticalscience.com/big-picture.html)

The Earth is Warming We know the planet is warming from surface temperature stations and satellites measuring the temperature of the Earth's surface and lower atmosphere. We also have various tools which have measured the warming of the Earth's oceans. Satellites have measured an energy imbalance at the top of the Earth's atmosphere. Glaciers, sea ice, and ice sheets are all receding. Sea levels are rising. Spring is arriving sooner each year. There's simply no doubt - the planet is warming (Figure 1). Global Warming Continues And yes, the warming is continuing. The 2000s were hotter than the 1990s, which were hotter than the 1980s, which were hotter than the 1970s. 2010 tied for the hottest year on record. The 12-month running average global temperature broke the record three times in 2010, according to NASA Goddard Institute for Space Studies (GISS) data. Sea levels are still rising, ice is still receding, spring is still coming earlier, there's still a planetary energy imbalance, etc. etc. Contrary to what some would like us to believe, the planet has not magically stopped warming. Those who argue otherwise are confusing short-term noise with long-term global warming (Figure 2). Foster and Rahmstorf (2011) showed that when we filter out the short-term effects of the sun, volcanoes, and El Niño cycles, the underlying man-made global warming trend becomes even more clear (Figure 3). For as much as atmospheric temperatures are rising, the amount of energy being absorbed by the planet is even more striking when one looks into the deep oceans and the change in the global heat content (Figure 4). Humans are Increasing Atmospheric Greenhouse Gases The amount of greenhouse gases in the atmosphere - particularly carbon dioxide (CO2) - has been rising steadily over the past 150 years. There are a number of lines of evidence which clearly demonstrate that this increase is due to human activities, primarily burning fossil fuels. The most direct of evidence involves simple accounting. Humans are currently emitting approximately 30 billion tons of CO2 per year, and the amount in the atmosphere is increasing by about 15 billion tons per year. Our emissions have to go somewhere - half goes into the atmosphere, while the other half is absorbed by the oceans (which is causing another major problem - ocean acidification). We also know the atmospheric increase is from burning fossil fuels because of the isotopic signature of the carbon in the atmosphere. Carbon comes in three different isotopes, and plants have a preference for the lighter isotopes. So if the fraction of lighter carbon isotopes in the atmosphere is increasing, we know the increase is due to burning plants and fossil fuels, and that is what scientists observe. The fact that humans are responsible for the increase in atmospheric CO2 is settled science. The evidence is clear-cut. Human Greenhouse Gases are Causing Global Warming There is overwhelming evidence that humans are the dominant cause of the recent global warming, mainly due to our greenhouse gas emissions. Based on fundamental physics and math, we can quantify the amount of warming human activity is causing, and verify that we're responsible for essentially all of the global warming over the past 3 decades. The aforementioned Foster and Rahmstorf (2011) found a 0.16°C per decade warming trend since 1979 after filtering out the short-term noise. In fact we expect human greenhouse gas emissions to cause more warming than we've thus far seen, due to the thermal inertia of the oceans (the time it takes to heat them). Human aerosol emissions are also offsetting a significant amount of the warming by causing global dimming. Huber and Knutti (2011) found that human greenhouse gas emissions have caused 66% more global warming than has been observed since the 1950s, because the cooling effect of human aerosol emissions have offset about 44% of that warming. They found that overall, human effects are responsible for approximately 100% of the observed global warming over the past 60 years (Figure 5). There are also numerous 'fingerprints' which we would expect to see from an increased greenhouse effect (i.e. more warming at night, at higher latitudes, upper atmosphere cooling) that we have indeed observed (Figure 6). Climate models have projected the ensuing global warming to a high level of accuracy, verifying that we have a good understanding of the fundamental physics behind climate change. Sometimes people ask "what would it take to falsify the man-made global warming theory?". Well, basically it would require that our fundamental understanding of physics be wrong, because that's what the theory is based on. This fundamental physics has been scrutinized through scientific experiments for decades to centuries. The Warming will Continue We also know that if we continue to emit large amounts of greenhouse gases, the planet will continue to warm. We know that the climate sensitivity to a doubling of atmospheric CO2 from the pre-industrial level of 280 parts per million by volume (ppmv) to 560 ppmv (we're currently at 390 ppmv) will cause 2–4.5°C of warming. And we're headed for 560 ppmv in the mid-to-late 21st century if we continue business-as-usual emissions. The precise sensitivity of the climate to increasing CO2 is still fairly uncertain: 2–4.5°C is a fairly wide range of likely values. However, even if we're lucky and the climate sensitivity is just 2°C for doubled atmospheric CO2, if we continue on our current emissions path, we will commit ourselves to that amount of warming (2°C above pre-industrial levels) within the next 75 years. The Net Result will be Bad There will be some positive results of this continued warming. For example, an open Northwest Passage, enhanced growth for some plants and improved agriculture at high latitudes (though this will require use of more fertilizers), etc. However, the negatives will almost certainly outweigh the positives, by a long shot. We're talking decreased biodiversity, water shortages, increasing heat waves (both in frequency and intensity), decreased crop yields due to these impacts, damage to infrastructure, displacement of millions of people, etc. Arguments to the contrary are superficial One thing I've found in reading skeptic criticisms of climate science is that they're consistently superficial. For example, the criticisms of James Hansen's 1988 global warming projections never go beyond "he was wrong," when in reality it's important to evaluate what caused the discrepancy between his projections and actual climate changes, and what we can learn from this. And those who argue that "it's the Sun" fail to comprehend that we understand the major mechanisms by which the Sun influences the global climate, and that they cannot explain the current global warming trend. And those who argue "it's just a natural cycle" can never seem to identify exactly which natural cycle can explain the current warming, nor can they explain how our understanding of the fundamental climate physics is wrong. There are legitimate unresolved questions Much ado is made out of the expression "the science is settled." The science is settled in terms of knowing that the planet is warming rapidly, and that humans are the dominant cause. There are certainly unresolved issues. As noted above, there's a big difference between a 2°C and a 4.5°C warming for a doubling of atmospheric CO2, and it's an important question to resolve, because we need to know how fast the planet will warm in order to know how fast we need to reduce our greenhouse gas emissions. There are significant uncertainties in some feedbacks which play into this question. For example, will clouds act as a net positive feedback (by trapping more heat, causing more warming) or negative feedback (by reflecting more sunlight, causing a cooling effect) as the planet continues to warm? And exactly how much global warming is being offset by human aerosol emissions? These are the sorts of questions we should be debating, and the issues that most climate scientists are investigating. Unfortunately there is a there is a very vocal contingent of people determined to continue arguing the resolved questions for which the science has already been settled. And when climate scientists are forced to respond to the constant propagation of misinformation on these settled issues, it just detracts from our investigation of the legitimate, unresolved, important questions. Smart Risk Management Means Taking Action People are usually very conservative when it comes to risk management. Some of us buy fire insurance for our homes when the risk of a house fire is less than 1%, for example. When it comes to important objects like cars and homes, we would rather be safe than sorry. But there is arguably no more important object than the global climate. We rely on the climate for our basic requirements, like having enough accessible food and water. Prudent risk management in this case is clear. The scientific evidence discussed above shows indisputably that there is a risk that we are headed towards very harmful climate change. There are uncertainties as to how harmful the consequences will be, but uncertainty is not a valid reason for inaction. There's very high uncertainty whether I'll ever be in a car accident, but it would be foolish of me not to prepare for that possibility by purchasing auto insurance. Moreover, uncertainty cuts both ways, and it's just as likely that the consequences will be worse than we expect as it is that the consequences won't be very bad. We Can Solve the Problem The good news is that we have the tools we need to mitigate the risk posed by climate change. A number of plans have been put forth to achieve the necessary greenhouse gas emissions cuts (i.e. here and here and here). We already have all the technology we need. Opponents often argue that mitigating global warming will hurt the economy, but the opposite is true. Those who argue that reducing emissions will be too expensive ignore the costs of climate change - economic studies have consistently shown that mitigation is several times less costly than trying to adapt to climate change (Figure 7). This is why there is a consensus among economists with expertise in climate that we should put a price on carbon emissions (Figure 8). should US reduce emissions The Big Picture The big picture is that we know the planet is warming, humans are causing it, there is a substantial risk to continuing on our current path, but we don't know exactly how large the risk is. However, uncertainty regarding the magnitude of the risk is not an excuse to ignore it. We also know that if we continue on a business-as-usual path, the risk of catastrophic consequences is very high. In fact, the larger the uncertainty, the greater the potential for the exceptionally high risk scenario to become reality. We need to continue to decrease the uncertainty, but it's also critical to acknowledge what we know and what questions have been resolved, and that taking no action is not an option. The good news is that we know how to solve the problem, and that doing so will minimize the impact not only on the climate, but also on the economy. The bottom line is that from every perspective - scientific, risk management, economic, etc. - there is no reason not to immeditately take serious action to mitigate climate change, and failing to do so would be exceptionally foolish.

**Reducing CO2 is key. We are reaching a tipping point.**

**Hansen et al 10** – Director of NASA/Goddard Institute for Space Studies [Dr. James Hansen, Dr. Makiko Sato (Physicist @ NASA/Goddard Institute for Space Studies), Dr. Pushker Kharecha (Researcher of earch sciences and astrobiology @ NASA/Goddard Institute for Space Studies), Dr. David Beerling (Professor of Animal and Plant Sciences @ University of Sheffield), Dr. Robert Berner (Professor Geology and Geophysics @ Yale University), Valerie Masson-Delmotte (Lab. Des Sciences du Climat et l’Environnement/Institut Pierre Simon Laplace, CEA-CNRS-Universite de Versailles Saint-Quentin en Yvelines), Dr. Mark Pagani (Professor of paleoceanography and paleoclimatology @ Yale University), Dr. Maureen Raymo (Paleoclimatologist/marine geologist @ Boston University), Dr. Dana L. Royer (Professor of Earth and Environmental Sciences @ Wesleyan University) & Dr. James C. Zachos ( Professor of Earth & Planetary Sciences @ University of California – Santa Cruzo) “Target atmospheric CO2: Where should humanity aim?” Open Atmos. Sci. J. (2008), vol. 2, pp. 217-231

Realization that today’s climate is far out of equilibrium with current climate forcings raises the specter of ‘tipping points’, the concept that climate can reach a point where, without additional forcing, rapid changes proceed practically out of our control [2, 7, 63, 64]. Arctic sea ice and the West Antarctic Ice Sheet are examples of potential tipping points. Arctic sea ice loss is magnified by the positive feedback of increased absorption of sunlight as global warming initiates sea ice retreat [65]. West Antarctic ice loss can be accelerated by several feedbacks, once ice loss is substantial [39].

We define: (1) the tipping level, the global climate forcing that, if long maintained, gives rise to a specific consequence, and (2) the point of no return, a climate state beyond which the consequence is inevitable, even if climate forcings are reduced. A point of no return can be avoided, even if the tipping level is temporarily exceeded. Ocean and ice sheet inertia permit overshoot, provided the climate forcing is returned below the tipping level before initiating irreversible dynamic change.

Points of no return are inherently difficult to define, because the dynamical problems are nonlinear. Existing models are more lethargic than the real world for phenomena now unfolding, including changes of sea ice [65], ice streams [66], ice shelves [36], and expansion of the subtropics [67, 68].

The tipping level is easier to assess, because the paleoclimate quasi-equilibrium response to known climate forcing is relevant. The tipping level is a measure of the long-term climate forcing that humanity must aim to stay beneath to avoid large climate impacts. The tipping level does not define the magnitude or period of tolerable overshoot. However, if overshoot is in place for centuries, the thermal perturbation will so penetrate the ocean [10] that recovery without dramatic effects, such as ice sheet disintegration, becomes unlikely.

4.2. Target CO2

Combined, GHGs other than CO2 cause climate forcing comparable to that of CO2 [2, 6], but growth of non-CO2 GHGs is falling below IPCC [2] scenarios. Thus total GHG climate forcing change is now determined mainly by CO2 [69]. Coincidentally, CO2 forcing is similar to the net human-made forcing, because non-CO2 GHGs tend to offset negative aerosol forcing [2, 5].

Thus we take future CO2 change as approximating the net human-made forcing change, with two caveats. First, special effort to reduce non-CO2 GHGs could alleviate the CO2 requirement, allowing up to about +25 ppm CO2 for the same climate effect, while resurgent growth of nonCO2 GHGs could reduce allowed CO2 a similar amount [6]. Second, reduction of human-made aerosols, which have a net cooling effect, could force stricter GHG requirements. However, an emphasis on reducing black soot could largely off-set reductions of high albedo aerosols [20].

Our estimated history of CO2 through the Cenozoic Era provides a sobering perspective for assessing an appropriate target for future CO2 levels. A CO2 amount of order 450 ppm or larger, if long maintained, would push Earth toward the ice-free state. Although ocean and ice sheet inertia limit the rate of climate change, such a CO2 level likely would cause the passing of climate tipping points and initiate dynamic responses that could be out of humanity’s control.

**Extinction**

**Brandenberg 99** (John & Monica Paxson, Visiting Prof. Researcher @ Florida Space Institute, Physicist Ph.D., Science Writer, Dead Mars Dying Earth, Pg 232-233)

The ozone hole expands, driven by a monstrous synergy with global warming that puts more catalytic ice crystals into the stratosphere, but this affects the far north and south and not the major nations’ heartlands. The seas rise, the tropics roast but the media networks no longer cover it. The Amazon rainforest becomes the Amazon desert. Oxygen levels fall, but profits rise for those who can provide it in bottles. An equatorial high-pressure zone forms, forcing drought in central Africa and Brazil, the Nile dries up and the monsoons fail. Then inevitably, at some unlucky point in time, a major unexpected event occurs—a major volcanic eruption, a sudden and dramatic shift in ocean circulation or a large asteroid impact (those who think freakish accidents do not occur have paid little attention to life or Mars), or a nuclear war that starts between Pakistan and India and escalates to involve China and Russia . . . Suddenly the gradual climb in global temperatures goes on a mad excursion as the oceans warm and release large amounts of dissolved carbon dioxide from their lower depths into the atmosphere. Oxygen levels go down precipitously as oxygen replaces lost oceanic carbon dioxide. Asthma cases double and then double again. Now a third of the world fears breathing. As the oceans dump carbon dioxide, the greenhouse effect increases, which further warms the oceans, causing them to dump even more carbon. Because of the heat, plants die and burn in enormous fires, which release more carbon dioxide, and the oceans evaporate, adding more water vapor to the greenhouse. Soon, we are in what is termed a runaway greenhouse effect, as happened to Venus eons ago. The last two surviving scientists inevitably argue, one telling the other, “See! I told you the missing sink was in the ocean!” Earth, as we know it, dies. After this Venusian excursion in temperatures, the oxygen disappears into the soil, the oceans evaporate and are lost and the dead Earth loses its ozone layer completely. Earth is too far from the Sun for it to be the second Venus for long. Its atmosphere is slowly lost—as is its water—because of ultraviolet bombardment breaking up all the molecules apart from carbon dioxide. As the atmosphere becomes thin, the Earth becomes colder. For a short while temperatures are nearly normal, but the ultraviolet sears any life that tries to make a comeback. The carbon dioxide thins out to form a thin veneer with a few wispy clouds and dust devils. Earth becomes the second Mars—red, desolate, with perhaps a few hardy microbes surviving.

**Geologic history is on our side**

**Bushnell 10** - Chief scientist at the NASA Langley Research Center [Dennis Bushnell (MS in mechanical engineering. He won the Lawrence A. Sperry Award, AIAA Fluid and Plasma Dynamics Award, the AIAA Dryden Lectureship, and is the recipient of many NASA Medals for outstanding Scientific Achievement and Leadership.) “Conquering Climate Change,” The Futurist, May-June, 2010

Carbon-dioxide levels are now greater than at any time in the past 650,000 years, according to data gathered from examining ice cores. These increases in CO2 correspond to estimates of man-made uses of fossil carbon fuels such as coal, petroleum, and natural gas. The global climate computations, as reported by the ongoing Intergovernmental Panel on Climate Change (IPCC) studies, indicate that such man-made CO2 sources could be responsible for observed climate changes such as temperature increases, loss of ice coverage, and ocean acidification. Admittedly, the less than satisfactory state of knowledge regarding the effects of aerosol and other issues makes the global climate computations less than fully accurate, but we must take this issue very seriously.

I believe we should act in accordance with the precautionary principle: When an activity raises threats of harm to human health or the environment, precautionary measures become obligatory, even if some cause-and-effect relationships are not fully established scientifically. As paleontologist Peter Ward discussed in his book Under a Green Sky, several “warming events” have radically altered the life on this planet throughout geologic history. Among the most significant of these was the Permian extinction, which took place some 250 million years ago. This event resulted in a decimation of animal life, leading many scientists to refer to it as the Great Dying. The Permian extinction is thought to have been caused by a sudden increase in CO2 from Siberian volcanoes. The amount of CO2 we’re releasing into the atmosphere today, through human activity, is 100 times greater than what came out of those volcanoes.

During the Permian extinction, a number of chain reaction events, or “positive feedbacks,” resulted in oxygen-depleted oceans, enabling overgrowth of certain bacteria, producing copious amounts of hydrogen sulfide, making the atmosphere toxic, and decimating the ozone layer, all producing species die-off. The positive feedbacks not yet fully included in the IPCC projections include the release of the massive amounts of fossil methane, some 20 times worse than CO2 as an accelerator of warming, fossil CO2 from the tundra and oceans, reduced oceanic CO2 uptake due to higher temperatures, acidification and algae changes, changes in the earth’s ability to reflect the sun’s light back into space due to loss of glacier ice, changes in land use, and extensive water evaporation (a greenhouse gas) from temperature increases.

The additional effects of these feedbacks increase the projections from a 4°C–6°C temperature rise by 2100 to a 10°C–12°C rise, according to some estimates. At those temperatures, beyond 2100, essentially all the ice would melt and the ocean would rise by as much as 75 meters, flooding the homes of one-third of the global population. Between now and then, ocean methane hydrate release could cause major tidal waves, and glacier melting could affect major rivers upon which a large percentage of the population depends. We’ll see increases in flooding, storms, disease, droughts, species extinctions, ocean acidification, and a litany of other impacts, all as a consequence of man-made climate change. Arctic ice melting, CO2 increases, and ocean warming are all occurring much faster than previous IPCC forecasts, so, as dire as the forecasts sound, they’re actually conservative. Pg. 7-8 //1ac

**The difference between total extinction and near extinction is infinite potential.**

**Matheny 7** (Jason, Ph.D. Candidate in the Department of Health Policy and Management at the Bloomberg School of Public Health at Johns Hopkins University, *Reducing the Risk of Human Extinction*, Risk Analysis, Volume 27, Number 5, Available Online at http://www.upmc-biosecurity.org/website/resources/publications/2007\_orig-articles/2007-10-15-reducingrisk.html)

We may be poorly equipped to recognize or plan for extinction risks (Yudkowsky, 2007). We may not be good at grasping the significance of very large numbers (catastrophic outcomes) or very small numbers (probabilities) over large timeframes. We struggle with estimating the probabilities of rare or unprecedented events (Kunreuther et al., 2001). Policymakers may not plan far beyond current political administrations and rarely do risk assessments value the existence of future generations.18 We may unjustifiably discount the value of future lives. Finally, extinction risks are market failures where an individual enjoys no perceptible benefit from his or her investment in risk reduction. Human survival may thus be a good requiring deliberate policies to protect. It might be feared that consideration of extinction risks would lead to a reductio ad absurdum: we ought to invest all our resources in asteroid defense or nuclear disarmament, instead of AIDS, pollution, world hunger, or other problems we face today. On the contrary, programs that create a healthy and content global population are likely to reduce the probability of global war or catastrophic terrorism. They should thus be seen as an essential part of a portfolio of risk-reducing projects.Discussing the risks of “nuclear winter,” Carl Sagan (1983) wrote: Some have argued that the difference between the deaths of several hundred million people in a nuclear war (as has been thought until recently to be a reasonable upper limit) and the death of every person on Earth (as now seems possible) is only a matter of one order of magnitude. For me, the difference is considerably greater. Restricting our attention only to those who die as a consequence of the war conceals its full impact. If we are required to calibrate extinction in numerical terms, I would be sure to include the number of people in future generations who would not be born. A nuclear war imperils all of our descendants, for as long as there will be humans. Even if the population remains static, with an average lifetime of the order of 100 years, over a typical time period for the biological evolution of a successful species (roughly ten million years), we are talking about some **500 trillion people** yet to come. By this criterion, the stakes are **one million times greater** for extinction than for the more modest nuclear wars that kill “only” hundreds of millions of people. There are many other possible measures of the potential loss—including culture and science, the evolutionary history of the planet, and the significance of the lives of all of our ancestors who contributed to the future of their descendants. Extinction is the undoing of the human enterprise. In a similar vein, the philosopher Derek Parfit (1984) wrote: I believe that if we destroy mankind, as we now can, this outcome will be much worse than most people think. Compare three outcomes:

1. Peace

2. A nuclear war that kills 99% of the world’s existing population

3. A nuclear war that kills 100%

2 would be worse than 1, and 3 would be worse than 2. Which is the greater of these two differences? Most people believe that the greater difference is between 1 and 2. I believe that the difference between 2 and 3 is very much greater.... The Earth will remain habitable for at least another billion years. Civilization began only a few thousand years ago. If we do not destroy mankind, these thousand years may be only a **tiny fraction** of the whole of civilized human history. The difference between 2 and 3 may thus be the difference between this tiny fraction and all of the rest of this history. If we compare this possible history to a day, what has occurred so far is only a **fraction of a second**. Human extinction in the next few centuries could reduce the number of future generations by thousands or more. We take extraordinary measures to protect some endangered species from extinction. It might be reasonable to take extraordinary measures to protect humanity from the same.19 To decide whether this is so requires more discussion of the methodological problems mentioned here, as well as research on the extinction risks we face and the costs of mitigating them.20

**Warming outweighs structural violence.**

Bostrom 12—Professor in the Faculty of Philosophy & Oxford Martin School, Director of the Future of Humanity Institute, and Director of the Programme on the Impacts of Future Technology at the University of Oxford, recipient of the 2009 Eugene R. Gannon Award for the Continued Pursuit of Human Advancement, holds a Ph.D. in Philosophy from the London School of Economics [March 6, 2012, Nick Bostrom interview with Ross Andersen, a freelance writer, a regular contributor to the technology channel at *The Atlantic*, “We're Underestimating the Risk of Human Extinction,” *The Atlantic*, http://www.theatlantic.com/technology/archive/2012/03/were-underestimating-the-risk-of-human-extinction/253821/]

Some have argued that we ought to be directing our resources toward humanity's existing problems, rather than future existential risks, because many of the latter are highly improbable. You have responded by suggesting that existential risk mitigation may in fact be a dominant moral priority over the alleviation of present suffering. Can you explain why?

Bostrom: Well suppose you have a moral view that counts future people as being worth as much as present people. You might say that fundamentally it doesn't matter whether someone exists at the current time or at some future time, just as many people think that from a fundamental moral point of view, it doesn't matter where somebody is spatially---somebody isn't automatically worth less because you move them to the moon or to Africa or something. A human life is a human life. If you have that moral point of view that future generations matter in proportion to their population numbers, then you get this very stark implication that existential risk mitigation has a much higher utility than pretty much anything else that you could do. There are so many people that could come into existence in the future if humanity survives this critical period of time---we might live for billions of years, our descendants might colonize billions of solar systems, and there could be billions and billions times more people than exist currently. Therefore, even a very small reduction in the probability of realizing this enormous good will tend to outweigh even immense benefits like eliminating poverty or curing malaria, which would be tremendous under ordinary standards.

**Nuclear power solves warming.**

**It offers significant advantages over all alternative options.**

**Cohen 12** (Armond, Co-founder and Executive Director of the Clean Air Task Force, Actively involved in CATF projects focusing on Arctic stabilization, low carbon technology innovation and coal transition, Armond led the Conservation Law Foundation's Energy Project starting in 1983, Graduate of Brown University and Harvard Law School, Served as judicial clerk for the late Harlington Wood, Jr. of the United States Court of Appeals for the Seventh Circuit 1982-1983, Published numerous articles on climate, energy, and air pollution, and speaks and testifies frequently on these topics, Member of the Keystone Energy Board and US EPA's Clean Air Act Advisory Committee, *Decarbonization: The Nuclear Option*, February 13th, http://energy.nationaljournal.com/2012/02/is-america-poised-for-nuclear.php)

Three years ago, MIT’s Richard Lester published a simple analysis of what would be required to meet President Obama’s 83%-by-2050 greenhouse gas emission reduction target. The results were stark: Even if energy efficiency were to improve at rates 50% better than historical averages, and biofuels were able to meaningfully reduce transportation emissions in the near term (a proposition with which we disagree), meeting Obama’s goal would require retrofitting every existing coal plant in the country with carbon capture and sequestration (CCS), building twice again that much fossil capacity with CCS, building close to 3,000 wind farms the size of Massachusetts’ Cape Wind, and building nearly 4,000 solar farms the size of California’s Ivanpah. And, having done all that, increasing the amount of nuclear power we generate by a factor of five. Just on its face, this is a tall order. The capital investment is jaw-dropping, and it is becoming increasingly difficult to site new energy projects, regardless of whether they are solar or wind farms, transmission lines, CCS infrastructure, shale gas drilling, or nuclear facilities. More subtly, integrating these various energy sources—especially balancing output of intermittent renewables in an electric grid with no significant ability to store energy—is a major challenge; it is far from certain it can even be done at very large scale. To maximize our odds of meeting the target, we will need to prioritize development and deployment of technologies that appear capable of growing economically to full scale. Cheap unscrubbed natural gas is a “McSolution” to the problem—tempting, but probably not the healthiest long-term choice. In order to make a major contribution to climate abatement, methane emissions from natural gas production and distribution will need to be reduced, and gas-fired power plants will need to use CCS technologies. And, although gas in the United States today is sold at prices below production costs, that cannot continue for long, especially in increasingly international markets. Similarly, “soft energy paths” like PV power (also sometimes today sold below cost) will need significant grid support and zero-carbon balancing to generate meaningful emission reductions. The economic supply curve for large, attractive sites for these projects is bound to bend sharply upwards over time as well. In this context, nuclear power has potentially **significant advantages** to offer: It is demonstrably low-carbon; it provides baseload energy; unlike wind and solar, it has high power density; and, although gas is cheap today, the price of new nuclear power appears to approach that of new coal. Perhaps more importantly, the price of new nuclear plants will decline as years pass. Standardization will lead to some cost reductions; factory assembly of **small**, modular units could bring about further step-change reductions (as it has for automobiles and airplanes) in production costs. None of this means that nuclear is poised for a renaissance in the United States. Utilities and their regulators won’t argue with $3 gas, Congress is unwilling to put a price on carbon, and some people remain vehemently opposed to nuclear energy. Ultimately, however, nuclear energy is probably an **indispensible element** of any credible plan to substantially decarbonize the country. The Nuclear Regulatory Commission’s recent approval of the new Westinghouse reactor design is good news in this regard, as it should help revitalize the American nuclear industry and keep it moving on a path of continuous improvement. In the longer term, a host of newer technologies, including passively cooled small reactors, gas-cooled reactors, and reactors with liquid fuels offer significant potential for further improvements in cost and safety. The country would do well to support continued development and deployment of these designs. In an ideal world, we might wait to scale up nuclear power until after we’ve exhausted all efficiency and renewables options. Unfortunately, however, we don’t have decades to do this, even if we thought traditional green sources would eventually fill the zero-carbon void, which seems unrealistic. Half of the CO2 emitted today will still be warming the planet 1,000 years from now, and these legacy emissions won’t erase themselves. We need to develop all low-carbon energy options **now** to hedge against the risk of **serious climate consequences**; nuclear power, despite its genuine challenges, cannot be left off the table.

**SMRs are the only solution that addresses the magnitude of warming before it’s too late.**

**Palley 11 (**Reese Palley, The London School of Economics, 2011, The Answer: Why Only Inherently Safe, Mini Nuclear Power Plans Can Save Our World, p. 186-90)

The central investigation of this book has been directed at the scale of the nuclear industry. The book has argued that all anthropogenic challenges that put in question **continued human existence** on Earth are a **matter of scale**. It was nature’s unanticipated success with her human experiment, the evolutionary choice of brains over brawn, setting in motion the underlying scale problems that opened our Pandora’s box of calamities. The history of man on Earth can best be viewed as a race between population and resources in which, for some millennia, population expansion leads and the Earth’s resources have been straining to catch up. When population bloomed from 100 million brainy humans to a billion, the problems of scale emerged as the price we had to pay for success as a species. The conversion of forests to agriculture, responding to the need to feed a burgeoning population, initiated the emerging problem of scale. The elimination of oxygen-emitting forests was mitigated to a large measure in the beginning of our population growth by the slow rate of change of the deforestation, which allowed an absorbable increase of CO2 in the atmosphere. Natural processes, such as the ability of the oceans to take up CO2, tamped down global warming. But as the scale of the release of warming gases exploded a few hundred years ago, our remaining forests and our seas, our first line of defense against CO2 imbalance, could not cope and the level of CO2 has risen alarmingly each year since 1800. When human population climbed from a billion to six billion and these six billion reveled in the enormous energy content of coal, the scenario for **disaster on a global scale** came into play. The impact of the loss of forest paled in comparison to the havoc that the use of fossil fuels represented. In a world that was hungry for energy and, not incidentally, living on a Malthusian edge of food supply, coal burst upon us as manna from heaven. Coal was everywhere, easy to mine, and in enormous, almost unending supply It generated the cheap heat needed to run the engines of early industrialization. An unintended Faustian bargain was struck. The immediate cost of coal in the cities, dirt and pollution, were not out of sync with what urban man had lived with for centuries. It was beyond the science and the understanding of the time that burning vast millennial coal deposits would do little more than discommode the proximate few and benefit many. Again it was not the burning, it was **the scale** of the burning that dumped billions of tons of CO2 into the atmosphere. We are now presented with a horrendous invoice that must be paid if we are to **survive** in anywhere near the comfort to which we have become accustomed. It has been the intent of this book to argue that the **scale of the warming catastrophe** must be viewed primarily in terms of the continuing flow of CO2 into the atmosphere. Every possible source of CO2, no matter how small, must be identified and interdicted, since every fourth molecule of the gas will remain with us as a climate moderator for thousands of years. What we find is that all of the sources of energy including so-called green energy are CO2-culpable and that each, in spite of claims to the contrary, adds its tiny mite or enormous mass to the climate changes looming in man’s future. The book argues that the scale of the consumption of fossil fuels is clearly unsustainable and, more to the point, that the feeble attempts to restrict CO2 production are little more than a glossing over of the problem. Capping but not ending production of greenhouse gases only magnifies the unthinkable future costs of bringing the level of CO2 and other greenhouse gases back into balance. Logic dictates that merely limiting greenhouse gases pushes possible solutions farther and farther into the future and does little to mitigate the difficulties that will arise in the near future. Logic dictates that our reasonably comfortable survival depends on the immediate and total cessation of increases to parts per million of CO2 in the air. Logic dictates that if we are to continue to enjoy the level of comfort, wealth, and ease afforded us since the beginning of the twentieth century we must not only halt the increase but commence the actual decrease of warming gases at work in the atmosphere. That conclusion brings the book to the problems and the solutions inherent in nuclear power, the **only energy source** that can guarantee us a reasonable future that might be resistant to CO2 warming. Here the argument returns once again to the problem of scale of nuclear reactors, especially as the size of these reactors is related to the brief time left to us to get a grip on calamitous climate changes. The beginnings of nuclear energy lay in the demands of war. The battle between good and evil characterized by the Second World War gave hurried birth to a discovery that had the inherent power to both destroy and salvage. The power to destroy required plutonium on an enormous scale, which was projected forward into the postwar development of civilian reactors. The demand for scarce plutonium for the bombs of the cold war defined the type of reactors that were being developed. These were the breeder reactors, which spewed out plutonium measured in tons that had previously been available only in ounces, and would continue to do so when the wartime need was far behind us. What was once precious, rare, and desirable has become dangerous nuclear waste, and the imperfectly perceived scale of the waste problem has seriously inhibited the logical growth and development of nuclear power. By some unthinkable universal coincidence, nuclear power became available to man for war at the same time that it could prove to be the solution to man’s greatest peacetime challenge. But the gigawatt nuclear power plants that emerged from the war had within them the seeds of their own severe limitation. The scale of the risks, real and imagined, grew exponentially as the scale of energy output grew only linearly. These risks, some merely perceived, some dangerously real and some financial, have conspired to restrict the enormous expansion of nuclear power that is needed to quickly replace our present consumption of energy from fossil fuels. The present rate of replacement of fossil with nuclear sources is at a pace that will have little impact on ultimately dealing with the CO2 imbalance. This slow rate of change is compounded of public fears, bureaucratic regulatory mechanisms resistant to novel solutions, and a private capital market that is unable to conjure with the imagined and real risks of the huge gigawatt reactors that dominate the industry. It is a Gordian knot that cannot be unraveled but which can only be cut by a political sword that, alas, still lacks the edge to do the job. By another rare act of cosmic fortuity, there is a parallel existing nuclear technology that, barring political interference, is capable of addressing the scale problems inherent in gigawatt reactors. From the beginning of the nuclear era, researchers such as Weinberg and Wigner and Teller developed small, inherently safe nuclear reactors that did not breed plutonium. This was reason enough for the military, balancing urgent demands on research and development budgets, to consign the concept of “smaller and safer is better” to dusty shelves in our national science attic. This book has argued that small reactors, that produce a tenth of the energy of the giants also generate inordinately less of the risk that inhibits growth of the industry. Construction of small reactors is a fraction of the cost of construction of gigawatt reactors. Thus the number of years that scarce capital is tied up and at risk is substantially reduced. The book argues that a 100 MWe reactor88 is a much bigger hardware bargain than a gigawatt reactor, which, from start to output, can cost $15 billion. It is not only the hardware costs that contribute to the devilish details of risk. The problem is the inability of the market to accurately or even approximately estimate the real cost of the capital that would be tied up for over a decade in a project that, through technological advancements, could be obsolete before it ever joins the grid.

**All alternatives to SMRs are insufficient in scope—plus safety concerns are all hype.**

**Nordhaus 12** (Michael Shellenberger, Jessica Lovering, Founder of the Breakthrough Institute, graduate of Earlham College and holds a masters degree in cultural anthropology from the University of California, Santa Cruz, "New Nukes: Why We Need Radical Innovation to Make New Nuclear Energy Cheap", September 11, http://thebreakthrough.org/index.php/programs/energy-and-climate/new-nukes/)

Arguably, the biggest impact of Fukushima on the nuclear debate, ironically, has been to force a growing number of pro-nuclear environmentalists out of the closet, including us. The reaction to the accident by anti-nuclear campaigners and many Western publics put a fine point on the gross misperception of risk that informs so much anti-nuclear fear. Nuclear remains the only proven technology capable of reliably generating zero-carbon energy at a scale that can have any impact on global warming. Climate change -- and, for that matter, the enormous present-day health risks associated with burning coal, oil, and gas -- simply dwarf any legitimate risk associated with the operation of nuclear power plants. About 100,000 people die every year due to exposure to air pollutants from the burning of coal. By contrast, about 4,000 people have died from nuclear energy -- ever -- almost entirely due to Chernobyl. But rather than simply lecturing our fellow environmentalists about their misplaced priorities, and how profoundly inadequate present-day renewables are as substitutes for fossil energy, we would do better to take seriously the real obstacles standing in the way of a serious nuclear renaissance. Many of these obstacles have nothing to do with the fear-mongering of the anti-nuclear movement or, for that matter, the regulatory hurdles imposed by the U.S. Nuclear Regulatory Commission and similar agencies around the world. As long as nuclear technology is characterized by enormous upfront capital costs, it is likely to remain just a hedge against overdependence on lower-cost coal and gas, not the wholesale replacement it needs to be to make a serious dent in climate change. Developing countries need large plants capable of bringing large amounts of new power to their fast-growing economies. But they also need power to be cheap. So long as coal remains the cheapest source of electricity in the developing world, it is likely to remain king. The most worrying threat to the future of nuclear isn't the political fallout from Fukushima -- it's economic reality. Even as new nuclear plants are built in the developing world, old plants are being retired in the developed world. For example, Germany's plan to phase-out nuclear simply relies on allowing existing plants to be shut down when they reach the ends of their lifetime. Given the size and cost of new conventional plants today, those plants are unlikely to be replaced with new ones. As such, the combined political and economic constraints associated with current nuclear energy technologies mean that nuclear energy's share of global energy generation is unlikely to grow in the coming decades, as global energy demand is likely to increase faster than new plants can be deployed. To move the needle on nuclear energy to the point that it might actually be capable of displacing fossil fuels, we'll need new nuclear technologies that are cheaper and smaller. Today, there are a range of nascent, smaller nuclear power plant designs, some of them modifications of the current light-water reactor technologies used on submarines, and others, like thorium fuel and fast breeder reactors, which are based on entirely different nuclear fission technologies. Smaller, modular reactors can be built much faster and cheaper than traditional large-scale nuclear power plants. Next-generation nuclear reactors are designed to be incapable of melting down, produce drastically less radioactive waste, make it very difficult or impossible to produce weapons grade material, use less water, and require less maintenance. Most of these designs still face substantial technical hurdles before they will be ready for commercial demonstration. That means a great deal of research and innovation will be necessary to make these next generation plants viable and capable of displacing coal and gas. The United States could be a leader on developing these technologies, but unfortunately U.S. nuclear policy remains mostly stuck in the past. Rather than creating new solutions, efforts to restart the U.S. nuclear industry have mostly focused on encouraging utilities to build the next generation of large, light-water reactors with loan guarantees and various other subsidies and regulatory fixes. With a few exceptions, this is largely true elsewhere around the world as well. Nuclear has enjoyed bipartisan support in Congress for more than 60 years, but the enthusiasm is running out. The Obama administration deserves credit for authorizing funding for two small modular reactors, which will be built at the Savannah River site in South Carolina. But a much more sweeping reform of U.S. nuclear energy policy is required. At present, the Nuclear Regulatory Commission has little institutional knowledge of anything other than light-water reactors and virtually no capability to review or regulate alternative designs. This affects nuclear innovation in other countries as well, since the NRC remains, despite its many critics, the global gold standard for thorough regulation of nuclear energy. Most other countries follow the NRC's lead when it comes to establishing new technical and operational standards for the design, construction, and operation of nuclear plants. What's needed now is a new national commitment to the development, testing, demonstration, and early stage commercialization of a broad range of new nuclear technologies -- from much smaller light-water reactors to next generation ones -- in search of a few designs that can be mass produced and deployed at a significantly lower cost than current designs. This will require both greater public support for nuclear innovation and an entirely different regulatory framework to review and approve new commercial designs. In the meantime, developing countries will continue to build traditional, large nuclear power plants. But time is of the essence. With the lion's share of future carbon emissions coming from those emerging economic powerhouses, the need to develop smaller and cheaper designs that can scale faster is all the more important. A true nuclear renaissance can't happen overnight. And it won't happen so long as large and expensive light-water reactors remain our only option. But in the end, **there is no credible path to mitigating climate change without a massive global expansion of nuclear energy**. If you care about climate change, nothing is more important than developing the nuclear technologies we will need to get that job done.

**Don't let perfect be the enemy of good. Nuclear is the best choice among imperfect options.**

**Lynas 11** (Mark, Visiting Research Associate at Oxford University’s School of Geography and the Environment, Appointed advisor on climate change to the President of the Maldives, Longlisted for the Samuel Johnson Award for Non-Fiction, and short-listed for the Guardian First Book Award, Author of The God Species: How the Planet Can Survive the Age of Humans, *Why nuclear power is still a good choice*, http://articles.latimes.com/print/2011/apr/10/opinion/la-oe-lynas-nukes-20110410)

What a strange turn of events. Instead of uniting the environmental movement in renewed opposition to nuclear power, the Fukushima disaster in Japan has divided it still further. An increasing number of green advocates, including some very prominent voices, have declared their support for nuclear power as a clean energy option, even as radioactive water accumulates and the timeline for cleaning up the contaminated areas extends by decades. Can they be serious?

They can. The irony of Fukushima is that in forcing us all to confront our deepest fears about the dangers of nuclear power, we find many of them to be **wildly irrational** -- based on scare stories propagated through years of **unchallenged mythology** and the **repeated exaggerations** of self-proclaimed "experts" in the anti-nuclear movement. As the British environmental writer George Monbiot has pointed out, if we took the scientific consensus on nuclear energy as seriously as we take the scientific consensus on climate change, we environmentalists would be telling a very different story.

The science on radiation tells us that the effects of Fukushima are serious but so far much less so than some of the more hyperbolic media coverage might suggest. The power plant operator, Tokyo Electric Power Co., has been releasing enormous quantities of radioactive water into the sea, for example. It sounds scary, but a member of the public would have to eat seaweed and seafood harvested just one mile from the discharge pipe for a year to receive an effective dose of 0.6 millisieverts. To put this in context, every American receives on average 3 millisieverts each year from natural background radiation, and a hundred times more than this in some naturally radioactive areas. As for the Tokyo tap water that was declared unsafe for babies, the highest measured levels of radioactivity were 210 becquerels per liter, less than a quarter of the European legal limit of 1,000 becquerels per liter. Those leaving Tokyo because of this threat will have received more radiation on the airplane flight out than if they had been more rational and stayed put.

For the green movement, which is often justifiably accused of **making the perfect the enemy of the good**, having to confront real-world choices about energy technologies is painful. Most environmentalists assert that a combination of renewables and efficiency can decarbonize our energy supply and save us both from global warming and the presumed dangers of nuclear power. This is technically possible but extremely unlikely in practice. In the messy real world, countries that decide to rely less on nuclear will almost certainly dig themselves even deeper into a dependence on dirty fossil fuels, especially coal.

In the short term, this is already happening. In Germany -- whose government tried to curry favor with a strongly anti-nuclear population by rashly closing seven perfectly safe nuclear plants after the Fukushima crisis began -- coal has already become the dominant factor in electricity prices once again. Regarding carbon dioxide emissions, you can do the math: Just add about 11 million tons per year for each nuclear plant replaced by a coal plant newly built or brought back onto the grid.

In China the numbers become even starker. Coal is cheap there (as are the thousands of human lives lost in extracting it each year), and if the hundred or so new nuclear plants previously proposed in China up to 2030 are not built, it is a fair bet that more than a billion tons can be added to annual global carbon dioxide emissions as a result.

Japan is also heavily dependent on coal, so it is a fair bet that less nuclear power there will add substantially to the country's emissions. No wonder the Japanese are insisting on backing off from the Kyoto climate treaty. Looking at the entire global picture, I estimate that turning away from nuclear power could make the difference between whether the world warms by 2 degrees Celsius (bad but manageable) and 3 degrees Celsius (disastrous) in the next century.

We have already made this mistake once. In the 1970s it looked as if nuclear power was going to play a much bigger role than eventually turned out to be the case. What happened was Three Mile Island, and the birth of an anti-nuclear movement that stopped dozens of half-built or proposed reactors; coal plants were substituted instead. It is therefore fair to say that the environmental movement played a **substantial role in causing** global warming, surely an ecological error it should learn from in years ahead.

Don't get me wrong: I am an enthusiastic proponent of replacing fossil fuels with renewable energy sources. I strongly support wind, solar and other clean-tech options. But all energy technologies come with an ecological price tag. Wind turbines kill and injure birds and bats. Solar thermal plants proposed in the Mojave Desert have conservationists up in arms. If we are serious about taking biodiversity into consideration as well as climate change, these concerns cannot be idly dismissed. In terms of land use, nuclear scores very well, because the comparatively small quantities of fuel required means less land disturbed or ruined by mines, processing and related uses.

Take Japan again. According to some recent number crunching by the Breakthrough Institute, a centrist environmental think tank, phasing out Japan's current nuclear generation capacity and replacing it with wind would require a 1.3-billion-acre wind farm, covering more than half the country's total land mass. Going for solar instead would require a similar land area, and would in economic terms cost the country more than a trillion dollars.

Those debating the future of nuclear power also tend to focus on **out-of-date technology**. No one proposes to build boiling-water reactors of 1960s-era Fukushima vintage in the 21st century. Newer designs have a much greater reliance on passive safety, as well as a host of other improvements. Fourth-generation options, such as the "integral fast reactor" reportedly being considered by Russia, could be even better. Fast-breeders like the IFR will allow us to power whole countries cleanly by burning existing stockpiles of nuclear waste, depleted uranium and military-issue plutonium. And the waste left over at the end would become safe after a mere 300 years, so no Yucca Mountains needed there. IFRs exist only on paper, however; we need to urgently research prototypes before moving on to large-scale deployment.

What is needed is perspective. Nuclear energy is not entirely safe, as Fukushima clearly shows, even if the current radiation-related death toll is zero and will likely remain so. But coal and other fossil fuels are **far, far worse**. And insisting only on renewables risks worsening global warming as an unintended consequence. We need a portfolio of clean energy technologies, deployed in the most environmentally responsible way. Above all, let us base our energy policy on a **scientifically valid appreciation** of real-world risk, and not on scare stories from the past.

### Solvency

**Plan – The United States federal government should reduce restrictions external to a fast track process for small modular reactors.**

**Contention Two – Solvency**

**The plan solves the only major roadblock to the creation of a robust domestic SMR industry.**

**Loris 11** (Nicolas D. Loris – Research Associate in the Roe Institute, Jack Spencer – Research Fellow in Nuclear Energy in the Thomas A. Roe Institute for Economic Policy Studies, Currently is The Heritage Foundation’s senior reesrach fellow in nuclear energy policy, Previously worked on commercial, civilian and military components of nuclear energy at the Babcock & Wilcox Companies, Holds a bachelor's degree in international politics from Frostburg State University and a master's degree from the University of Limerick, *A Big Future for Small Nuclear Reactors?*, February 2nd, http://www.heritage.org/research/reports/2011/02/a-big-future-for-small-nuclear-reactors)

Abstract: More and more companies—in the U.S. and abroad—are investing in new commercial nuclear enterprises, chief among them, small modular reactors (SMRs). The SMR industry is growing, with many promising developments in the works—which is precisely why the government should not interfere, as subsidies and government programs have already resulted in an inefficient system for large reactors. Heritage Foundation nuclear policy experts explain how the future for small reactors can remain bright.

Small modular reactors (SMRs) have garnered significant attention in recent years, with companies of all sizes investing in these smaller, safer, and **more cost-efficient** nuclear reactors. Utilities are even forming partnerships with reactor designers to prepare for potential future construction. Perhaps most impressive is that most of this development is occurring without government involvement. Private investors and entrepreneurs are **dedicating resources** to these technologies based on their future prospects, not on government set-asides, mandates, or subsidies, and despite the current regulatory bias in favor of large light water reactors (LWRs).

The result is a young, robust, innovative, and growing SMR industry. Multiple technologies are being proposed that each have their own set of characteristics based on price, fuel, waste characteristics, size, and any number of other variables. To continue this growth, policymakers should reject the temptation to offer the same sort of subsidies and government programs that have proven ineffective for large LWRs. While Department of Energy cost-sharing programs and capital subsidies seem attractive, they have yet to net any new reactor construction. Instead, policymakers should focus on the systemic issues that have continued to thwart the expansion of nuclear power in recent years. Specifically, the federal government needs to develop an efficient and **predictable regulatory pathway** to new reactor certification and to develop a sustainable nuclear waste management strategy.

Why SMRs?

Small modular reactors share many of the attractive qualities of large reactors, such as providing abundant emissions-free power, while adding new features that could make them more appropriate for certain applications, such as providing power to rural communities or for dedicated industrial use. SMRs are not yet positioned to take the place of traditional large LWRs, but they represent an important growth area for the commercial nuclear industry.

Indeed, should the promise of small modular reactors be realized, the technology could transform the nuclear industry. That is because these attributes would potentially mitigate some of the financial and regulatory problems that nuclear energy has recently faced. SMRs potentially cost less (at least in up-front capital), are more mobile and multifunctional, provide competition, and can largely be produced by existing domestic infrastructure.

Lower Costs Up Front. Large reactors are very expensive to license and construct and require massive up-front capital investments to begin a project. Small reactors, while providing far less power than large reactors, can be built in modules and thus be paid for over time. For example, estimates for larger reactors range from $6 billion to $10 billion and must be financed all at once. The Babcock & Wilcox Company’s modular mPower reactors, alternatively, can be purchased in increments of 125 megawatts (MW), which would allow costs to be spread out over time. Though cost estimates are not yet available for the mPower reactor, its designers have stated that they will be competitive. This should not be used as a reason to refrain from building larger, 1,000-plus MW reactors. Each utility will have its own set of variables that it must consider in choosing a reactor technology, but given that one of the primary justifications for government subsidies is that the high costs of large reactors puts unacceptable strain on utility balance sheets, an option that spreads capital outlays over time should be attractive.

Safe Installation in Diverse Locations. Some designs are small enough to produce power for as few as 20,000 homes. One such reactor, Hyperion Power’s HPM (Hyperion Power Module) offers 25 MW of electricity for an advertised cost of $50 million per unit. This makes the HPM a potential power solution for isolated communities or small cities.[1] The Alaskan town of Galena, for example, is planning to power its community with a small reactor designed by Toshiba, while Fairbanks is looking into a small plant constructed by Hyperion.[2] In addition, Western Troy Capital Resources has stated that it will form a private corporation to provide electric power from small reactors for remote locations in Canada.[3] Public utility officials in Grays Harbor, Washington, have spoken with the NuScale Power company about powering the community with eight small nuclear plants;[4] and Hyperion Power has reported a high level of interest in small nuclear reactor designs from islands around the world.[5]

Using a small nuclear reactor could cut electricity costs in isolated areas since there would be no need for expensive transmission lines to carry power to remote locations.[6] SMRs could also potentially be integrated into existing energy infrastructure. SMRs could be built into old coal plants, for instance. The reactors would replace the coal boilers and be hooked into the existing turbines and distribution lines. According to the Nuclear Regulatory Commission, these modifications could be completed safely since small reactors will likely be easier to control during times of malfunction.[7]

Multi-functionality. SMRs can be used in a variety of applications that have substantial power and heat requirements. The chemical and plastics industries and oil refineries all use massive amounts of natural gas to fuel their operations. Similarly, small reactors could produce the heat needed to extract oil from tar sands, which currently requires large amounts of natural gas. While affordable today, natural gas prices vary significantly over time, so the long-term predictable pricing that nuclear provides could be very attractive. SMRs may also provide a practical solution for desalination plants (which require large amounts of electricity) that can bring fresh water to parts of the world where such supplies are depleting.[8] Perhaps most important, is that SMRs have the potential to bring power and electricity to the 1.6 billion people in the world today that have no access to electricity, and to the 2.4 billion that rely on biomass, such as wood, agricultural residue, and dung for cooking and heating.[9]

Competition. While competition among large nuclear-reactor technologies currently exists, small reactors will add a new dimension to nuclear-reactor competition. Multiple small technology designs are set to emerge on the market. Not only will competition among small reactors create a robust market, it will also provide an additional incentive for large reactors to improve. If smaller reactors begin to capture a share of the nuclear market and the energy market at large, it will drive innovation and ultimately lower prices for both new and existing technologies.

Domestic Production. Although the nuclear industry necessarily shrank to coincide with decreased demand, much of the domestic infrastructure remains in place today and could support the expansion of small-reactor technologies. Although the industrial and intellectual base has declined over the past three decades, forging production, heavy manufacturing, specialized piping, mining, fuel services, and skilled labor could all be found in the United States. Lehigh Heavy Forge Corporation in Bethlehem, Pennsylvania, could build the forges while Babcock & Wilcox could provide the heavy nuclear components, for instance. AREVA/Northrop Grumman Shipbuilding broke ground on a heavy components manufacturing facility last June.[10] Further, a number of companies are expanding manufacturing, engineering, and uranium enrichment capabilities—all in the United States.

If SMRs are so great, where is the construction?

While some designs are closer to market introduction than others, the fact is that America’s **regulatory** and policy environment is not sufficient to support a robust expansion of existing nuclear technologies, much less new ones. New reactor designs are difficult to license efficiently, and the lack of a sustainable nuclear waste management policy causes significant risk to private investment.

Many politicians are attempting to mitigate these market challenges by offering subsidies, such as loan guarantees. While this approach still enjoys broad support in Congress and industry, the reality is that it has not worked. Despite a lavish suite of subsidies offered in the Energy Policy Act of 2005, including loan guarantees, insurance against government delays, and production tax credits, no new reactors have been permitted, much less constructed. These subsidies are in addition to existing technology development cost-sharing programs that have been in place for years and defer significant research and development costs from industry to the taxpayer.

The problem with this approach is that it ignores the larger systemic problems that create the unstable marketplace to begin with. These systemic problems generally fall into three categories:

Licensing. The Nuclear Regulatory Commission (NRC) is ill prepared to build the regulatory framework for new reactor technologies, and no reactor can be offered commercially without an NRC license. In a September 2009 interview, former NRC chairman Dale E. Klein said that small nuclear reactors pose a dilemma for the NRC because the commission is uneasy with new and unproven technologies and feels more comfortable with large light water reactors, which have been in operation for years and has a long safety record.[11] The result is that enthusiasm for building non-light-water SMRs is generally squashed at the NRC as potential customers realize that there is little chance that the NRC will permit the project within a timeframe that would promote near-term investment. So, regardless of which attributes an SMR might bring to the market, the **regulatory risk** is such that real progress on commercialization is difficult to attain. This then leaves large light water reactors, and to a lesser extent, small ones, as the least risky option, which pushes potential customers toward that technology, which then undermines long-term progress, competition, and innovation.

Nuclear Waste Management. The lack of a sustainable nuclear waste management solution is perhaps the greatest obstacle to a broad expansion of U.S. nuclear power. The federal government has failed to meet its obligations under the 1982 Nuclear Waste Policy Act, as amended, to begin collecting nuclear waste for disposal in Yucca Mountain. The Obama Administration’s attempts to shutter the existing program to put waste in Yucca Mountain without having a backup plan has worsened the situation. This outcome was predictable because the current program is based on the flawed premise that the federal government is the appropriate entity to manage nuclear waste. Under the current system, waste producers are able to largely ignore waste management because the federal government is responsible. The key to a sustainable waste management policy is to directly connect financial responsibility for waste management to waste production. This will increase demand for more waste-efficient reactor technologies and drive innovation on waste-management technologies, such as reprocessing. Because SMRs consume fuel and produce waste differently than LWRs, they could contribute greatly to an economically efficient and sustainable **nuclear waste management strategy**.

Government Intervention. Too many policymakers believe that Washington is equipped to guide the nuclear industry to success. So, instead of creating a stable regulatory environment where the market value of different nuclear technologies can determine their success and evolution, they choose to create programs to help industry succeed. Two recent Senate bills from the 111th Congress, the Nuclear Energy Research Initiative Improvement Act (S. 2052) and the Nuclear Power 2021 Act (S. 2812), are cases in point. Government intervention distorts the normal market processes that, if allowed to work, would yield the most efficient, cost-effective, and appropriate nuclear technologies. Instead, the federal government picks winners and losers through programs where bureaucrats and well-connected lobbyists decide which technologies are permitted, and provides capital subsidies that allow investors to ignore the systemic problems that drive risk and costs artificially high. This approach is especially detrimental to SMRs because subsidies to LWRs distort the relative benefit of other reactor designs by artificially lowering the cost and risk of a more mature technology that already dominates the marketplace.

How to Fix a Broken System

At the Global Nuclear Renaissance Summit on July 24, 2008, then-NRC chairman Dale Klein said that a nuclear renaissance with regard to small reactors will take “decades to unfold.”[12] If Members of Congress and government agencies do not reform their current approach to nuclear energy, this will most certainly be the case. However, a new, market-based approach could lead to a different outcome. Instead of relying on the policies of the past, Congress, the Department of Energy, and the NRC should pursue a new, 21st-century model for small and alternative reactor technologies by doing the following:

Reject additional loan guarantees. Loan guarantee proponents argue that high up-front costs of new large reactors make them unaffordable without loan guarantees. Presumably, then, a smaller, less expensive modular option would be very attractive to private investors even without government intervention. But loan guarantees undermine this advantage by subsidizing the capital costs and risk associated with large reactors. A small reactor industry without loan guarantees would also provide competition and downward price pressure on large light water reactors. At a minimum, Congress should limit guarantees to no more than two plants of any reactor design and limit to two-thirds the amount of any expanded loan guarantee program that can support a single technology. Such eligibility limits will prevent support from going only to a single basic technology, such as large light water reactors.[13]

Avoid subsidies. Subsidies do not work if the objective is a diverse and economically sustainable nuclear industry. Despite continued attempts to subsidize the nuclear industry into success, the evidence demonstrates that such efforts invariably fail. The nuclear industry’s success stories are rooted in the free market. Two examples include the efficiency and low costs of today’s existing plants, and the emergence of a private uranium enrichment industry. Government intervention is the problem, as illustrated by the government’s inability to meet its nuclear waste disposal obligations.

Build expertise at the Nuclear Regulatory Commission. The NRC is built to regulate large light water reactors. It simply does not have the regulatory capability and resources to efficiently regulate other technologies, and building that expertise takes time. Helping the NRC to develop that expertise now would help bring new technologies into the marketplace more smoothly. Congress should direct and resource the NRC to develop additional broad expertise for liquid metal-cooled, fast reactors and high-temperature, gas-cooled reactors. With its existing expertise in light water technology, this additional expertise would position the NRC to effectively regulate an emerging SMR industry.

Establish a new licensing pathway. The current licensing pathway relies on reactor customers to drive the regulatory process. But absent an efficient and predictable regulatory pathway, few customers will pursue these reactor technologies. The problem is that the legal, regulatory, and policy apparatus is built to support large light water reactors, effectively discriminating against other technologies. Establishing an alternative **licensing pathway** that takes the unique attributes of small reactors into consideration could help build the necessary regulatory support on which commercialization ultimately depends.[14]

Resolve staffing, security, construction criteria, and fee-structure issues by December 31, 2011. The similarity of U.S. reactors has meant that the NRC could establish a common fee structure and many general regulatory guidelines for areas, such as staffing levels, security requirements, and construction criteria. But these regulations are inappropriate for many SMR designs that often have smaller staff requirements, unique control room specifications, diverse security requirements, and that employ off-site construction techniques. Subjecting SMRs to regulations built for large light water reactors would add cost and result in less effective regulation. The NRC has acknowledged the need for this to be resolved and has committed to doing so, including developing the budget requirements to achieve it. It has not committed to a specific timeline.[15] Congress should demand that these issues be resolved by the end of 2011.

**Advocacy of the nuclear power is vital to galvanizing public support to act on climate change.**

**Bennett 7** (Matt – Vice President for Public Affairs, Rob Keast – Senior policy advisor, John Dyson – Third Way Trustee, *Another Inconvenient Truth: Solving Global Warming and Energy Security Requires Nuclear Power,* http://www.thirdway.org/data/product/file/84/Third\_Way\_Nuclear\_Memo.pdf)

However, few in the environmental community or their allies in policymaking have championed—indeed, most have actively opposed—the one climate change solution that can make a substantial difference in the near term: nuclear power. This raises a serious problem—there does not seem to be a realistic path to resolving climate change that does not significantly expand nuclear energy, but most of those at the

frontlines of fighting climate change have not yet embraced it. We must **resolve this contradiction** if we are to confront global warming effectively. In this paper, we argue that nuclear energy in America is one important key to solving the global warming crisis—not just in terms of reducing dangerous emissions, but in **breaking the logjam** in the public domain over climate change.

Of course we are aware that there are outstanding issues or questions regarding nuclear energy, particularly with regard to waste storage and plant safety. But the flipside of that equation is that some of the other technologies and ideas being offered as solutions to climate change are too small, costly or far off. We cannot allow any large-scale potential fixes to be taken off the table. If, indeed, the existence of the earth as we know it hangs in the balance, we are confident that nuclear safety and waste issues can be resolved to most people’s satisfaction.

This memo makes the case for why progressive policymakers and activists should support nuclear power expansion in the United States. We offer three reasons:

1. Expanding nuclear power will make a difference in addressing the problem of global warming.

2. Embracing nuclear power by progressive leaders would have a galvanizing impact on the public, **demonstrating the severity** of the climate change problem and the **need for everyone** to make hard choices.

3. Moving forward efficiently on nuclear power could help **provide momentum** to take additional steps to curb carbon emissions.

1. Expanding Nuclear Power Can Help Fight Global Warming

The facts are quite simple, and they speak for themselves: nuclear power is the only mature, major source of electric power in the United States that is essentially carbon-free.† In 2005, nuclear power made up 19 percent of our energy mix and prevented 3.32 million tons of sulfur dioxide, 1.05 million tons of nitrogen oxide and 681.9 million tons of carbon dioxide emissions in the United States alone.1 But that is today. US electricity demand is predicted to rise by 45% by 2030. That means 350,000 megawatts of new generation capacity must be built to meet that demand. Unless this country changes course, coal will constitute a larger share of new power generation than it would otherwise.2

One reason is that growth of domestic nuclear power production had, until very recently, totally stalled. There are currently 103 licensed reactors‡ in the US, at 65 plant sites in 31 states. Most have gotten or will get 20-year license extensions from the Nuclear Regulatory Commission (NRC). But no new nuclear power plants have been brought online since 1996, and since 1973, every new plant order—totaling more than 100—has been cancelled. Moreover, industry consolidation has meant that fewer firms are operating nuclear plants.3

There is some good news of late—the 2005 Energy Policy Act provides various incentives which support currently operating plants and encourages future construction. Since the 2005 law was passed, 13 companies have filed licenses with the NRC to build as many as 31 new reactors.4

But the growth in nuclear production is not without controversy—serious debates relating to nuclear waste and plant safety continue. Still, we think the risks are worth taking. America has grappled with a nuclear waste dilemma for decades—it is a serious and currently unsolved problem, but we believe it can be managed safely in the short term and handled effectively in the long term.

As for plant safety, there is simply no such thing as completely risk-free power, and nuclear is no exception. That being said, our nuclear sites are some of the most fortified, well-protected industrial spaces in the nation. The industry’s security is regulated and closely watched by on-site federal inspectors and overseers, and the FBI has categorized nuclear plants as “difficult targets.” Furthermore, a new generation of plant design and technologies has made nuclear facilities more efficient, safe and less costly than in the past.5

Yet despite good safety records and a recent resurgence in interest in new reactors, on its current trajectory, total nuclear generation is projected to grow from 780 billion kilowatt-hours in 2005 to only 896 billion kilowatt-hours in 2030 (that is, if the new reactors cited above come on-line). Even with this projected increase, the nuclear share of total electricity generation is expected to fall from 19 percent in 2005 to 15 percent in 2030. We would need another four plants (for a total of 35 new plants) simply to maintain nuclear power’s current piece of the US energy pie.6

So from a global warming perspective, the American energy production outlook is not great now, and, without substantial change, it is projected to get much worse, as this chart demonstrates:

That, in our view, is an unacceptable outcome. We must face the reality that a growing population and evolving technology will place ever-increasing demands on our energy production. We believe that policymakers and **advocates** should set as a general goal that we expand non- or low-carbon sources, such as nuclear, wind, solar, and “clean coal,” to meet much of the new demand for power that our expanding nation and modern life require. As a specific and measurable target, we should aim to advance nuclear energy to a point where it provides for 25 percent of America’s energy. This is an ambitious but achievable goal; unless we get closer to it, meeting increased energy needs while dealing with the reality of climate change is probably a pipe dream.

2. Embracing Nuclear Power Can Help Rally the Public on Climate Change

Recent public opinion polling reveals a seeming paradox: Americans believe that global warming is real, but they don’t feel any urgency about dealing with it. A Pew poll in January found that 77% of Americans believe there is solid evidence of global warming, and the same number believe global warming is a very serious or somewhat serious problem.7 But another Pew poll of global attitudes found that only 19% of Americans who had heard of global warming expressed a great deal of personal concern over the issue, the smallest percentage of any country in a survey of 15 nations. And climate change ranks 20th out of 23 in Pew’s annual list of policy priorities (only 38% rank it as a top priority).8 Another January poll found that less than half of respondents said global warming worries them “a great deal” or “a good amount.”9 In short, awareness of climate change is high, but urgency—and demand for government action—is low.

In part, this is because the solutions that many offer seem **incommensurate** to the scope of the problem. For example, almost no one disagrees that we should use more solar power, but solar makes up 1/30th of 1 percent of current US power usage. It is a very important but very small part of a near- or even mid-term solution. We simply must have more mature, low-carbon power generation methods if we are to addressthis issue aggressively over the next several decades.

One glaring problem is the failure on the part of leading climate change **advocates**—from most environmental groups to leading Members of Congress—to support the only existing, mature energy source that can almost immediately help save our planet from catastrophic climate change. Consider what the three largest US environmental groups are still saying about nuclear power:

[I]t is completely unacceptable that the U.S. government is pushing for more nukes when most of the rest of the world is saying "so long."10

– Greenpeace

Unfortunately, the nuclear power industry in its present state suffers from toomany security, safety, and environmental exposure problems and excessivecosts to qualify as a leading means to combat global warming pollution.11

– Natural Resources Defense Council

The Sierra Club opposes the licensing, construction and operation of new nuclear reactors utilizing the fission process …12

– Sierra Club

Clearly, the mainstays of the movement still have not even lost their hostility to nuclear power, much less acknowledged the role that nuclear power can play a major part of the solution to global warming.

And despite what some are calling a “nuclear renaissance” that is pegged to the climate issue and rising power needs, anti-nuclear forces have worked hard to muddy the waters. For example, the following polling question was asked on a survey by the Civil Society Institute:

Experts have proposed a range of long-term and short-term solutions to the energy crisis and the threat posed by global warming. Some solutions— including solar energy and wind power—are already in place and would be expanded in the near-term. Others—such as increased conservation—could start immediately. Still others—including nuclear power and hydrogen fuel cells—would take a decade to put in place, or longer. What is your view of the best way for America to proceed? Would you say... the energy and global warming problem is happening now. We need most of the emphasis placed on immediate and near-term solutions that will deliver fast results or we need most of the emphasis placed on solutions that will deliver results a decade from now or later?

Not surprisingly, 62% of respondents to this sharply slanted and misleading question said we need to take action now. Never mind that solar and wind are not mature power generation techniques and simply cannot provide “near term solutions” to our CO2 problems.

Many advocates have taken this approach, attempting to keep the debate fixed solely on conservation and renewable sources. And no one denies that both are crucial to addressing the problem of global warming—a solution is impossible without real shifts in public behavior and a huge increase in our investment in renewable energy. But we believe that **by talking** only about conservation and renewable energy, advocates have **undercut the seriousness** of their own argument on climate change. The American public may not know much about base-load capacity, but they understand that we are not going to get out of our CO2 problem by relying solely on wind farms or geothermal power at this point in time. And they may be reluctant to make hard changes in their own lives—or demand policy fixes to climate change—until environmentalists start making some tough choices too.

Indeed, if advocates were to embrace nuclear power, which many have spent their careers fighting, it would help prove to the public that a dramatic shift in our thinking as a nation is required when our way of life or very existence may be at risk. Some individuals in the movement have begun doing precisely that. The most prominent is Greenpeace Founder Patrick Moore, who told Congress:

If nothing is done to revitalize the American nuclear industry, the industry’s contribution to meeting US energy demands could drop from 20 percent to 9 percent. What sources of energy would make up the shortfall? Very likely, the US would turn to an even greater reliance on fossil fuels.13

And in an editorial last year, Dr. Moore put the fundamental point quite plainly:

“Nuclear energy is the only large-scale, cost-effective energy source that can reduce these emissions while continuing to satisfy a growing demand for power. And these days, it can do so safely.”14

Patrick Moore is not alone—a few other movement leaders, and some environmental advocates in Congress—have begun to come to this conclusion. They include Stewart Brand, founder of The Whole Earth Catalog, and Hugh Montefiore, former Chairman of Friends of the Earth. Senator Barbara Boxer, one of the staunchest environmentalists in Congress and Chair of the Environment and Public Works Committee, recently noted the trend toward nuclear on her committee and has signaled a possible shift in her own thinking about nuclear power as it relates to climate change.15

Some of the groups are starting to come around as well. Environmental Defense calls nuclear power one of many “wedges” to be used in attacking global warming, and they note that if “the unresolved concerns can be answered satisfactorily, however, nuclear power may one day have the potential to be a factor in slowing the emissions that contribute to global warming. For that reason, it is worth pursuing continued research.”16

The public appears ready for this change. A January 2007 poll by UPI of nearly 7,000 Americans found that 62 percent agree that new nuclear plants should be built.17 This is precisely the same percentage of Americans that an LA Times survey last summer found would support “the increased use of nuclear power as a source of energy in order to prevent global warming.”18

The data are clear: Americans understand that climate change is real, and they are ready to embrace nuclear power as one piece of the long-term solution. But the public will **need to hear from environmental advocates** to seal the deal.

**We have a moral obligation to advocate nuclear---any alternative results in extinction due to warming**

**Baker 12**—Executive Director of PopAtomic Studios, the Nuclear Literacy Project (7/25/12, Suzy, Climate Change and Nuclear Energy: We Need to Talk, ansnuclearcafe.org/2012/07/25/climate-change-and-nuclear-energy-we-need-to-talk/)

Ocean Acidification¶ While I was making artistic monuments to single celled organisms in the ceramics studio, new research was emerging about ocean acidification affecting these beautiful and integral pieces of our ecosystem. As the ocean absorbs excess carbon from humans burning fossil fuels, the pH of the ocean is rapidly changing. This means that our ancient oxygen-making pals cannot properly do their job. As their ocean home becomes inhospitable, they are dying off in droves. This not only impacts the ocean’s ability to naturally sequester man made carbon emissions; it also negatively impacts the entire food chain, since they are the primary food source for other multi-cellular ocean creatures, some of which we enjoy eating.¶ Oh, and did I mention that these little phytoplankton are also responsible for creating the ozone layer that protects **all life on the planet** from cosmic radiation, and they churn out 70-80% of the oxygen we breathe? These creatures are much more than just a pretty floating form.¶ Ocean acidification is the issue that brought me to supporting nuclear energy. Ocean acidification is an often-overlooked aspect of climate change that is potentially more threatening than the heat, the super storms, the fires, the drought, the crop losses, and all of the other trends that we are seeing now, which climate scientists have been warning us about for decades.¶ Climate Change and Nuclear Energy: Like Oil and Water?¶ It didn’t take long for me to find out that in the nuclear industry, climate change is not something we all agree on. Discussing climate change as a concern is often polarizing, and brings up intrinsic conflicts of interest in the larger energy sector (the companies who design/build/run the nuclear plants also happen to design/build/run the fossil fuel plants). I’ve been advised by people who deeply care about me, and the success of my organization, not to bring up climate at all, and to be extremely careful not to base my support of nuclear on climate issues. I’ve also been specifically advised not to make the argument that nuclear energy is the only solution to climate change.¶ When you are the new kid, it is usually best not to make waves if you can help it. So, for the most part, I have heeded that advice and held my tongue, despite myself.¶ However, as I watch the news (and my wilting vegetable garden) and see the magnitude of human suffering that is directly related to increasingly severe weather events, I cannot keep silent. Climate change is why I am here supporting nuclear energy, so what am I doing not talking about it?¶ The CEO of Exxon Mobile recently made clear that despite his company’s acknowledgement of the irrefutable evidence of climate change, and the huge ecological and human cost, he has no intentions of slowing our fossil fuel consumption. In fact, he goes as far to say that getting fossil fuels to developing nations will save millions of lives. While I agree that we need stronger, better energy infrastructure for our world’s poorest nations, I wholly disagree that fossils are the right fit for the job.¶ Fossil fuel usage could be cast as a human rights issue only to the extent that access to reliable and affordable electricity determines what one’s standard of living is. At the same time, **fossil fuel usage is the single largest threat to our planet and every species on it**. **Disregarding the impacts that fossil fuel use poses**, merely to protect and increase financial profits, **is unethical**, and cloaking fossil fuel use as a human rights issue is immoral.¶ Although we are all entitled to our own opinions and beliefs, the idea that climate change and ocean acidification are even up for debate is not reasonable. Just think: The CEO of the largest fossil fuel company in America freely speaks out about climate change, while nuclear energy advocates are pressured to stay silent on the subject.¶ **Silence is No Longer an Option**¶ I am someone who avoids conflict, who seeks consensus in my personal and professional lives, and so I have followed the advice of well-meaning mentors and stayed silent in hopes of preserving a false peace within my pro-nuclear circles, including my family and friends. But my keeping silent is now over— starting here and starting now—**because this is too big and too important to stay silent.** I am not alone in believing this, and the nuclear industry does itself no favors by tacitly excluding the growing movement of people who are passionate about the need to use nuclear energy to address climate change.¶ And nuclear power is the only realistic solution. It would be great if there were also other viable solutions that could be easily and quickly embraced; **however, the numbers just don’t work out**. Renewables and conservation may have done more good if we had utilized them on a large scale 40 years ago, when we were warned that our ecosystem was showing signs of damage from fossils fuels…but at this point it’s really too late for them. And burning more fossil fuels right now, when we have the technologies and know-how to create a carbon-free energy economy, would be the height of foolishness.¶ In the meantime, there is real human suffering, and we here in the developed world are directly causing it. Our poorest brothers and sisters cannot escape the heat. They cannot import food when their crops fail. They cannot buy bottled water when there is a drought. They cannot “engineer a solution” any more than my childhood friends the phytoplankton can.¶ ¶ Energy Choices as an Ethical Obligation¶ **We have an ethical obligation to stop killing people with our energy consumption**. That statement may sound oversimplified, but let’s be honest—we know that fossil fuels kill approximately 1.3 million people each year through respiratory diseases and cancers, and the death toll for climate change related events rises every day. Yet, we do nothing but dither about climate change politics. Where is the outrage?¶ The fossil fuel industry has been successful at presenting a united front and maintaining consistent strategic communications. In contrast, the safety record and clean energy contributions of nuclear are always overshadowed by politics favoring fossil fuel use. If anything, nuclear advocates should be particularly sensitive that the very same politics are happening with climate science.¶ We should be championing nuclear energy as a science-based solution, instead of enforcing a meek code of silence. People from outside the nuclear industry, like Gwyneth Cravens, Barry Brooks and Tom Blees, have pointed out these relationships, yet the nuclear industry has yet to internalize and accept these realities.¶ How can we expect people to listen to science and not politics when it comes to nuclear energy, but not climate change?¶ Disagreeing with a policy does not change the facts. You can disagree with policy to limit carbon emissions, but that doesn’t change the fact that our fossil fuel consumption is changing the PH of our oceans. Many people disagree with the use of nuclear energy, but that doesn’t change the fact that nuclear is our largest source of carbon free electricity and the safest source of electricity per kilowatt hour.¶ Nuclear Must Lead by Example¶ If we want the public to overcome the cognitive dissonance between science and policy when it comes to nuclear energy, **we need to lead by example** and overcome our own cognitive dissonance when it comes to climate change — even if it means risking our own interests as members of the larger energy industry. We are not going to run out of fossil fuels any time soon, so the decision to move to carbon-free energy—to move to nuclear energy—must be made willingly, and based on ethical principles, not the limits of our natural resources.¶ As green groups wait endlessly for renewable technologies to have some kind of breakthrough, and nuclear supporters stay mum on climate change, we continue using fossil fuels. Our collective inaction is allowing the destruction of our planet’s ecosystem, the dying of our oceans, and the suffering of the poorest members of our own species. The climate conversation has become so convoluted by politics and greed that many smart, compassionate people have “thrown in the towel.” We should be more concerned than ever at our lack of a comprehensive global response.¶ I strongly believe that **there’s still time to reclaim the dialogue about climate change based on ocean acidification evidence, and to use nuclear technologies to improve the long-term outcome for our planet** and our species. The first step is acknowledging the complicated and unique role of the nuclear industry in this conflict, **and the conflicts of interest that are impeding open communication.** The second step is to realize that the climate change community is a potential ally, and that openly addressing the subject of climate change in our communications is in the best interest of the nuclear community. The third step is choosing to do the right thing, not just the polite thing, and reclaim our legitimate role in the energy community as the “top dog” of carbon-free electricity, instead of quietly watching natural gas become “the new coal.”¶ Climate change is not going away—it is getting worse—and **each one of us** in the nuclear community **has an ethical obligation to speak up and to do something about it**. I am speaking up for the oceans, for the cyano-bacteria and diatoms and our shared mitochondrial RNA that still fills me with wonder at the beauty of this world. Please join me if you can, to speak up for what you love—and if you cannot, please understand that we all remain nuclear advocates, and that the nuclear community is much stronger with the no-longer-silent climate change harbingers in it.

**The state is inevitable and an indispensable part of the solution to warming**

**Eckersley 4** Robyn, Reader/Associate Professor in the Department of Political Science at the University of Melbourne, “The Green State: Rethinking Democracy and Sovereignty”, MIT Press, 2004, Google Books, pp. 3-8

While acknowledging the basis for this antipathy toward the nation- state, and the limitations of state-centric analyses of global ecological degradation, I seek to draw attention to the positive role that states have played, and might increasingly play, in global and domestic politics. Writing more than twenty years ago, Hedley Bull (a proto-constructivist and leading writer in the English school) outlined the state's positive role in world affairs, and his arguments continue to provide a powerful challenge to those who somehow seek to "get beyond the state," as if such a move would provide a more lasting solution to the threat of armed conflict or nuclear war, social and economic injustice, or environmental degradation.10 As Bull argued, **given that the state is here to stay whether we like it or not**, then the call to get "beyond the state is a counsel of despair, at all events if it means that we have to begin by abolishing or subverting the state, rather than that there is a need to build upon it.""¶ In any event, rejecting the "statist frame" of world politics ought not prohibit an inquiry into the emancipatory potential of the **state as a crucial "node" in any future network of global ecological governance**. This is especially so, given that one can expect states to persist as major sites of social and political power for at least the foreseeable future and that **any green transformations of the present political order will, short of revolution, necessarily be state-dependent**. Thus, like it or not, those concerned about **ecological destruction must contend with existing institutions** and, where possible, seek to "rebuild the ship while still at sea." And if states are so implicated in ecological destruction, then an inquiry into the potential for their transformation even their modest reform into something that is at least more conducive to ecological sustainability would seem to be compelling.¶ Of course, it would be unhelpful to become singularly fixated on the redesign of the state at the expense of other institutions of governance. States are not the only institutions that limit, condition, shape, and direct political power, and it is necessary to keep in view the broader spectrum of formal and informal institutions of governance (e.g., local, national, regional, and international) that are implicated in global environmental change. Nonetheless, while the state constitutes only one modality of political power, it is an especially significant one because of its historical claims to exclusive rule over territory and peoples—as expressed in the principle of state sovereignty. As Gianfranco Poggi explains, the political power concentrated in the state "is a momentous, pervasive, critical phenomenon. **Together with other forms of social power, it constitutes an indispensable medium for constructing and shaping larger social realities**, for establishing, shaping and maintaining all broader and more durable collectivities."12 States play, in varying degrees, significant roles in structuring life chances, in distributing wealth, privilege, information, and risks, in upholding civil and political rights, and in securing private property rights and providing the legal/regulatory framework for capitalism**. Every one of these dimensions of state activity has, for good or ill, a significant bearing on the global environmental crisis**. Given that the green political project is one that demands far-reaching changes to both economies and societies, it is difficult to imagine how such changes might occur on the kind of scale that is needed **without the active support of states**. While it is often observed that states are too big to deal with local ecological problems and too small to deal with global ones, the state nonetheless holds, as Lennart Lundqvist puts it, "a unique position in the constitutive hierarchy from individuals through villages, regions and nations all the way to global organizations. The state is inclusive of lower political and administrative levels, and exclusive in speaking for its whole territory and population in relation to the outside world."13 In short, it seems to me inconceivable to advance ecological emancipation without also engaging with and seeking to transform state power.¶ Of course, not all states are democratic states, and the green movement has long been wary of the coercive powers that all states reputedly enjoy. Coercion (and not democracy) is also central to Max Weber's classic sociological understanding of the state as "a human community that (successfully) claims the monopoly of the legitimate use of physical force within a given territory."14 Weber believed that the state could not be defined sociologically in terms of its ends\* only formally as an organization in terms of the particular means that are peculiar to it.15 Moreover his concept of legitimacy was merely concerned with whether rules were accepted by subjects as valid (for whatever reason); he did not offer a normative theory as to the circumstances when particular rules ought to be accepted or whether beliefs about the validity of rules were justified. Legitimacy was a contingent fact, and in view of his understanding of politics as a struggle for power in the context of an increasingly disenchanted world, likely to become an increasingly unstable achievement.16¶ In contrast to Weber, my approach to the state is explicitly normative and explicitly concerned with the purpose of states, and the democratic basis of their legitimacy. It focuses on the limitations of liberal normative theories of the state (and associated ideals of a just constitutional arrangement), and it proposes instead an alternative green theory that seeks to redress the deficiencies in liberal theory. Nor is my account as bleak as Weber's. The fact that states possess a monopoly of control over the means of coercion is a most serious matter, but it does not necessarily imply that they must have frequent recourse to that power. In any event, whether the use of the state's coercive powers is to be deplored or welcomed turns on the purposes for which that power is exercised, the manner in which it is exercised, and whether it is managed in public, transparent, and accountable ways—a judgment that must be made against a background of changing problems, practices, and under- standings. The coercive arm of the state can be used to "bust" political demonstrations and invade privacy. **It can also be used to prevent human rights abuses, curb the excesses of corporate power, and protect the environment.**¶ In short, although the political autonomy of states is widely believed to be in decline, **there are still few social institution that can match the** same degree of capacity and potential legitimacy that **states have to redirect societies and economies along more ecologically sustainable lines to address ecological problems** such as global warming and pollution, the buildup of toxic and nuclear wastes and the rapid erosion of the earth's biodiversity. States—particularly when they act collectively—have the capacity to curb the socially and ecologically harmful consequences of capitalism. They are also more amenable to democratization than cor- porations, notwithstanding the ascendancy of the neoliberal state in the increasingly competitive global economy. There are therefore many good reasons why green political theorists need to think not only critically but also constructively about the state and the state system. While the state is certainly not "healthy" at the present historical juncture, in this book I nonetheless join Poggi by offering "a timid two cheers for the old beast," at least as a potentially more significant ally in the green cause.17

**Scientific knowledge is best because it subjects itself to constant refinement based on empirical evidence**

**Hutcheon** **93**—former prof of sociology of education at U Regina and U British Columbia. Former research advisor to the Health Promotion Branch of the Canadian Department of Health and Welfare and as a director of the Vanier Institute of the Family. Phd in sociology, began at Yale and finished at U Queensland. (Pat, A Critique of "Biology as Ideology: The Doctrine of DNA", http://www.humanists.net/pdhutcheon/humanist%20articles/lewontn.htm)

The introductory lecture in this series articulated the increasingly popular "postmodernist" claim that all science is ideology. Lewontin then proceeded to justify this by stating the obvious: that scientists are human like the rest of us and subject to the same biases and socio-cultural imperatives. Although he did not actually say it, his comments seemed to imply that the enterprise of scientific research and knowledge building could therefore be no different and no more reliable as a guide to action than any other set of opinions. The trouble is that, **in order to reach such an conclusion, one would have to ignore all those aspects of the scientific endeavor that do** in fact **distinguish it from other** **types** and sources **of belief formation**.¶ Indeed, if the integrity of the scientific endeavor depended only on the wisdom and objectivity of the individuals engaged in it we would be in trouble. North American agriculture would today be in the state of that in Russia today. In fact it would be much worse, for the Soviets threw out Lysenko's ideology-masquerading-as-science decades ago. Precisely because an alternative scientific model was available (thanks to the disparaged Darwinian theory) the former Eastern bloc countries have been partially successful in overcoming the destructive chain of consequences which blind faith in ideology had set in motion. This is what Lewontin's old Russian dissident professor meant when he said that the truth must be spoken, even at great personal cost. How sad that Lewontin has apparently failed to understand the fact that while scientific knowledge -- with the power it gives us -- can and does allow humanity to change the world, ideological beliefs have consequences too. By rendering their proponents politically powerful but rationally and instrumentally impotent, they throw up insurmountable barriers to reasoned and value-guided social change.¶ What are the crucial differences between ideology and science that Lewonton has ignored? Both Karl Popper and Thomas Kuhn have spelled these out with great care -- the former throughout a long lifetime of scholarship devoted to that precise objective. Stephen Jay Gould has also done a sound job in this area. How strange that someone with the status of Lewontin, in a series of lectures supposedly covering the same subject, would not at least have dealt with their arguments!¶ Science has to do with the **search for regularities** in what humans experience of their physical and social environments, beginning with the most simple units discernible, and gradually moving towards the more complex. It has to do with expressing these regularities in the clearest and most precise language possible, so that cause-and-effect relations among the parts of the system under study can be **publicly and rigorously tested**. And it has to do with devising explanations of those empirical regularities which have survived all attempts to falsify them. These explanations, once phrased in the form of testable hypotheses, become **predictors of future events**. In other words, they lead to further conjectures of additional relationships which, in their turn, **must survive repeated public attempts to prove them wanting** -- if the set of related explanations (or theory) is to continue to operate as a fruitful guide for subsequent research.¶ This means that **science, unlike** mythology and **ideology, has a self-correcting mechanism at its very heart.** A conjecture, to be classed as scientific, must be amenable to empirical test. **It must, above all, be open to refutation by experience**. There is a rigorous set of rules according to which hypotheses are formulated and research findings are arrived at, reported and replicated. It is this **process** -- not the lack of prejudice of the particular scientist, or his negotiating ability, or even his political power within the relevant university department -- that ensures the reliability of scientific knowledge. The conditions established by the community of science is one of precisely defined and regulated "intersubjectivity". Under these conditions the theory that wins out, and subsequently prevails, does so not because of its agreement with conventional wisdom or because of the political power of its proponents, as is often the case with ideology. **The survival of a scientific theory** such as Darwin's **is due**, instead, **to its power to explain and predict observable regularities in human experience**, **while withstanding** worldwide **attempts to refute it** -- **and proving itself open to elaboration and expansion in the process**. **In this sense only is scientific knowledge objective and universal. All this has little relationship to the claim of an absolute universality of objective "truth" apart from human strivings** that Lewontin has **attributed to scientists**.¶ Because ideologies, on the other hand, do claim to represent truth**, they are incapable of** **generating a means by which they can be corrected** **as circumstances change.** Legitimate science makes no such claims. Scientific tests are not tests of verisimilitude. **Science does not aim for "true" theories** **purporting to reflect an accurate picture of the "essence" of reality. It leaves such claims of infallibility to ideology**. The tests of science, therefore, are in terms of workability and falsifiability, and its propositions are accordingly tentative in nature. **A successful scientific theory is** one which, while guiding the research in a particular problem area, is **continuously** elaborated, **revised and refined**, until it is eventually superseded by that very hypothesis-making and testing process that it helped to define and sharpen. An ideology, on the other hand, would be considered to have failed under those conditions, for the "truth" must be for all time. More than anything, it is this difference that confuses those ideological thinkers who are compelled to attack Darwin's theory of evolution precisely because of its success as a scientific theory. For them, and the world of desired and imagined certainty in which they live, that very success in contributing to a continuously evolving body of increasingly reliable -- albeit inevitably tentative -- knowledge can only mean failure, in that the theory itself has altered in the process.

## \*\*\* 2AC

**2AC—Framework**

**There interpretation is arbitrary --- there are no standards for evaluating if people are good people --- this devolves to bad political advocacy --- it limits the personal to the political and results in policing operations.   
Scott 92** Joan Harold F. Linder Professor at the School of Social Science in the Institute for Advanced Study in Princeton “Multiculturalism and the Politics of Identity” *October* Summer p. 16-19

The logic of individualism has structured the approach to multiculturalism in many ways. The call for tolerance of difference is framed in terms of respect for individual characteristics and attitudes; group differences are conceived categorically and not relationally, as distinct entities rather than interconnected structures or systems created through repeated processes of the enunciation of difference. Administrators have hired psychological consulting firms to hold diversity workshops which teach that conflict resolution is a negotation between dissatisfied individuals. Disciplinary codes that punish "hate-speech" justify prohibitions in terms of the protection of individuals from abuse by other individuals, not in terms of the protection of members of historically mistreated groups from discrimination, nor in terms of the ways language is used to construct and reproduce asymmetries of power. The language of protection, moreover, is conceptualized in terms of victimization; the way to make a claim or to justify one's protest against perceived mistreatment these days is to take on the mantle of the victim. (The so-called Men's Movement is the latest comer to this scene.) Everyone-whether an insulted minority or the perpetrator of the insult who feels he is being unjustly accused-now claims to be an equal victim before the law. Here we have not only an **extreme form of individualizing**, but a conception of **individuals without agency.** There is nothing wrong, on the face of it, with teaching individuals about how to behave decently in relation to others and about how to empathize with each other's pain. The problem is that difficult analyses of how history and social standing, privilege, and subordination are involved in personal behavior entirely drop out. Chandra Mohanty puts it this way: There has been an erosion of the politics of collectivity through the reformulation of race and difference in individualistic terms. The 1960s and '70s slogan "**the personal is political**" **has been recrafte**d in the 1980s **as "the political is personal**." In other words, **all politics is collapsed into the personal**, and questions of individual behaviors, attitudes, and life-styles **stand in** for political analysis of the social. Individual political struggles are seen as the only relevant and legitimate form of political struggle.5 Paradoxically, individuals then generalize their perceptions and claim to speak for a whole group, but the groups are also conceived as unitary and autonomous. This individualizing, personalizing conception has also been be- hind some of the recent identity politics of minorities; indeed it gave rise to the intolerant, doctrinaire behavior that was dubbed, initially by its internal critics, "political correctness." It is particularly in the notion of "experience" that one sees this operating. In much current usage of "experience," references to structure and history are implied but not made explicit; instead, **personal testimony of oppression re- places analysis**, and this testimony comes to stand for the experience of the whole group. The fact of belonging to an identity group is taken as authority enough for one's speech; the direct experience of a group or culture-that is, membership in it-becomes the only test of true knowledge. The exclusionary implications of this are twofold: all those not of the group are denied even intellectual access to it, and those within the group whose experiences or interpretations do not conform to the established terms of identity must either suppress their views or **drop out**. An appeal to "experience" of this kind forecloses discussion and criticism and **turns politics into a policing operation:** the borders of identity are patrolled for signs of nonconformity; the test of membership in a group becomes less one's willingness to endorse certain principles and engage in specific political actions, less one's positioning in specific relationships of power, than one's ability to use the prescribed languages that are taken as signs that one is inherently "of" the group. That all of this isn't recognized as a highly political process that produces identities is troubling indeed, especially because it so closely mimics the politics of the powerful, naturalizing and deeming as discernably objective facts the prerequisites for inclusion in any group. Indeed, I would argue more generally that separatism, with its strong insistence on an exclusive relationship between group identity and access to specialized knowledge (the argument that only women can teach women's literature or only African-Americans can teach African-American history, for example), is a simultaneous refusal and imitation of the powerful in the present ideological context. At least in universities, the relationship between identity- group membership and access to specialized knowledge has been framed as an objection to the control by the disciplines of the terms that establish what counts as (important, mainstream, useful, collective) knowledge and what does not. This has had an enormously important critical impact, exposing the exclusions that have structured claims to universal or comprehensive knowledge. When one asks not only where the women or African-Americans are in the history curriculum (for example), but why they have been left out and what are the effects of their exclusion, one exposes the process by which difference is enunciated. But one of the complicated and contradictory effects of the implementation of programs in women's studies, African-American studies, Chicano studies, and now gay and lesbian studies is to totalize the identity that is the object of study, reiterating its binary opposition as minority (or subaltern) in relation to whatever is taken as majority or dominant.

**Finally, energy policy advocacy is a tool not a trap --- we should build momentum and support for energy changes.**

**Shove & Walker 7** Elizabeth Sociology @ Lancaster Gordon Geography @ Lancaster “CAUTION! Transitions ahead: politics, practice, and sustainable transition management” *Environment and Planning C* 39 (4)

For academic readers, our commentary argues for loosening the intellectual grip of ‘innovation studies’, for backing off from the nested, hierarchical multi-level model as the only model in town, and for exploring other social scientific, but also systemic theories of change. The more we think about the politics and practicalities of reflexive transition management, the more complex the process appears: for a policy audience, our words of caution could be read as an invitation to abandon the whole endeavour. If agency, predictability and legitimacy are as limited as we’ve suggested, this might be the only sensible conclusion.However, we are with Rip (2006) in recognising the value, productivity and everyday necessity of an ‘**illusion of agency’**, and of the working expectation that a difference can be made even in the face of so much evidence to the contrary. The outcomes of actions are unknowable, the system unsteerable and the effects of deliberate intervention inherently unpredictable and, ironically, it is this that sustains concepts of agency and management. As Rip argues ‘**illusions are productive** because they **motivate action** and repair work, and thus something (whatever) is achieved’ (Rip 2006: 94). Situated inside the systems they seek to influence, governance actors – and actors of other kinds as well - are part of the **dynamics of change**: even if they cannot steer from the outside they are **necessary to processes within**. This is, of course, also true of academic life. Here we are, busy critiquing and analysing transition management in the expectation that somebody somewhere is listening and maybe even taking notice. If we removed that illusion would we bother writing anything at all? Maybe we need such fictions to keep us going, and maybe – fiction or no - somewhere along the line something really does happen, but not in ways that we can anticipate or know.

**2AC—Case O/w**

**Coal turns systemic impacts --- it is one of the largest proximate causes of daily deaths in the world.**

**Zelman 11** Joanna, The Huffington Post, "Power Plant Air Pollution Kills 13,000 People Per Year, Coal-Fired Are Most Hazardous: ALA Report", 3/15, www.huffingtonpost.com/2011/03/14/power-plant-air-pollution-coal-kills\_n\_833385.html

The American Lung Association (ALA) recently released a new report on the dramatic health hazards surrounding coal-fired power plants.¶ The report, “Toxic Air: The Case For Cleaning Up Coal-Fired Power Plants,” reveals the dangers of air pollution emitted by coal plants.¶ One of the starkest findings in the report claims, “**Particle pollution from power plants** is estimated to **kill** approximately **13,000 people a year.**”¶ So what's the biggest culprit?¶ “**Coal-fired power plants that sell electricity to the grid produce more hazardous air pollution in the U.S. than any other industrial pollution sources**.” According to the report details, over 386,000 tons of air pollutants are emitted from over 400 plants in the U.S. per year. Interestingly, while most of the power plants are located in the Midwest and Southeast, **the entire nation is threatened by their toxic emissions**.¶ An ALA graph shows that while pollutants such as acid gases stay in the local area, metals such as lead and arsenic travel beyond state lines, and fine particulate matter has a global impact. In other words, while for some workers the pollution may be a tradeoff for employment at a plant, other regions don’t reap the same benefits, but still pay for the costs to their health.¶ The report connected specific pollutants with their health effects. According to the ALA, 76% of U.S. acid gas emissions, which are known to irritate breathing passages, come from coal-fired power plants. Out of all industrial sources, these plants are also the biggest emitter of airborne mercury, which can become part of the human food chain through fish and wildlife -- high mercury levels are linked to brain damage, birth defects, and damage to the nervous system. Overall, **air pollutants from coal plants can cause heart attacks, strokes, lung cancer, birth defects, and premature death**.¶ The American Lung Association isn’t the only group to connect coal plants with death and illness. A recent study released in the Annals of the New York Academy of Sciences found that, due in large part to health problems, coal costs the U.S. $500 billion per year. Specifically, the study found that the health costs of cancer, lung disease, and respiratory illnesses connected to pollutant emissions totaled over $185 billion per year.

**This is an issue of justice—minority communities bear the brunt of environmental damage with massive effects on health**

**Clark, 2008** [Catherine, MA in public Policy @ Oregon State, “Environmental Justice and Energy Production: Coal-Fired Power Plants in Illinois” http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/9770/clark-mpp.pdf?sequence=1]

Two grievances are particularly relevant today to encourage viewing energy¶ production through the **justice** perspective: the stagnation in U.S. national energy policy¶ and the negative health affects associated with coal-fired power plants. Resource¶ mobilization theory suggests that with these grievances properly framed, taken with an¶ upcoming window in national politics, it may be a propitious time to evolve the¶ movement’s agenda.

The stagnation in U.S. energy policy in reference to coal-fired power plants is¶ related to the Clean Air Act and its enforcement. The Environmental Protection Agency¶ (2008a) describes how the act was originally passed by Congress in 1970. The Clean Air¶ Act applied to, among other sources of air pollution, coal-fired power plants built after¶ 1970. It also included a “grandfather clause” that exempted existing coal-fired power¶ plants from being regulated under the act. The goal of Congress was to allow plants with¶ cleaner technology to replace old plants thereby cleaning up the air without an undo¶ burden on the energy industry or customers having to pay suddenly higher energy price

As new plants opened to replace old plants, more and more plants would be regulated by¶ and subject to the restrictions of the Clean Air Act (Hawkins, 2000).¶ However, a large number of the coal-fired power plants built before 1970 are still¶ in operation. Instead of not being regulated at all, they are regulated under the Clean Air¶ Act’s New Source Review program (NSR) (Rogers, 1990). When a grandfathered plant¶ is "modified," it becomes subject to the Clean Air Act. “Modification” is defined broadly¶ to include “any physical change or change in method of operation” that increases¶ emissions. The EPA rules, however, provide an exclusion for “routine maintenance,¶ repair, and replacement” (Hawkins, 2000). It is this exclusion that has allowed many old¶ coal-fired power plants to stay in operation emitting higher levels of pollution. It has¶ become the strategy of the power industry to use capital investments to upgrade existing¶ plants to run longer rather than having them retire and be replaced by newer more¶ efficient and cleaner plants (Hawkins, 2000). This problem may have been exacerbated¶ by the mid 1990’s push for electricity deregulation. Long (1997) and Coequyt and¶ Stanfield (1999) indicate that with individuals able to choose their own energy supplier,¶ many are choosing the least expensive. This moves an even greater demand for¶ electricity back to the oldest and dirtiest coal-fired power plants that are able to deliver a¶ cheap product at the expense of environmental concerns.¶ The second grievance is the possible negative health effects of living near a coalfired¶ power plant. Keating and Davis (2002) and Keating (2004) have studied the¶ connection between coal-fired power plants and African American and Latino¶ communities. They describe the most troublesome pollutants as ozone, sulfur dioxides,¶ particulate matter, nitrogen oxides, mercury, and carbon dioxide. Particulate matter¶ comes in two forms: particulate matter 10 micrometers or less in diameter (PM10) and¶ particulate matter 2.5 micrometers or less in diameter (PM2.5, also known as fine¶ particulate matter). Mercury has only recently been limited and only for those plants¶ subject to the full Clean Air Act, and carbon dioxide is not currently regulated (EPA,¶ 2008b). The other pollutants listed above have been regulated as part of the Clean Air¶ Act for the past few decades. Keating and Davis (2002) describe that asthma attacks send¶ African Americans to the emergency room at three times the rate (174.3 visits per 10,000¶ persons) of whites (59.4 visits per 10,000 persons). African Americans are hospitalized¶ for asthma at more than three times the rate of whites (35.6 admissions per 10,000¶ population vs. 10.6 admissions per 10,000 population). More than fifty percent of¶ Latinos live in areas that violate the federal air pollution standards for ozone (Keating,¶ 2004). The health effects from dirty air may be exacerbated in poor and minority¶ communities where health coverage rates are low (Keating and Davis, 2002, Keating,¶ 2004).

Given these grievances, the resources currently available to the environmental¶ justice movement and its new agenda of global climate change, PERRO may be leading¶ the way for the movement to begin addressing **energy production** from a **justice**¶ **perspective**. This paper examines the claim of disproportionate siting of coal-fired power¶ plants in poor and minority communities in the state of Illinois by employing geographic¶ and regression analysis techniques.

**AT: Waste DA**

**SMRs can reprocess and solve waste**

**Biello 12** David, March 27, "Small Reactors Make a Bid to Revive Nuclear Power", www.scientificamerican.com/article.cfm?id=small-reactors-bid-to-revive-nuclear-power

Alternative fuel?¶ Small modular reactors may help with two of the biggest challenges facing the nuclear industry: the growing stores of waste from existing reactors and residue from the mass production of nuclear weapons as well as the overall safety of nuclear power. GE's PRISM fast reactor, General Atomic's helium-cooled fast reactor, or Hyperion Power's liquid lead-bismuth cooled reactor **could all turn waste into fuel**. Hyperion hopes to demonstrate its reactor, capable of generating 25 megawatts of electricity, at the Savannah River National Laboratory in South Carolina. The site has also signed memorandums of understanding to host prototypes of the NuScale and Holtech reactors.

**2AC—Dillon**

**Preventing death is the first ethical priority --- it’s the only impact you can’t recover from.**

**Bauman 95** Zygmunt Bauman, University of Leeds Professor Emeritus of Sociology, 1995, Life In Fragments: Essays In Postmodern Morality, p. 66-71

The being‑for is like living towards‑the‑future: a being filled with anticipation, a being aware of the abyss between future foretold and future that will eventually be; it is this gap which, like a magnet, draws the self towards the Other,as it draws life towards the future, making life into an activity of overcoming, transcending, leaving behind. The self stretches towards the Other, as life stretches towards the future; neither can grasp what it stretches toward, but it is in this hopeful and desperate, never conclusive and never abandoned stretching‑toward that the self is ever anew created and life ever anew lived. In the words of M. M. Bakhtin, it is only in this not‑yet accomplished world of anticipation and trial, leaning toward stubbornly an‑other Other, that life can be lived ‑ not in the world of the `events that occurred'; in the latter world, `it is impossible to live, to act responsibly; in it, I am not needed, in principle I am not there at all." Art, the Other, the future: what unites them, what makes them into three words vainly trying to grasp the same mystery, is the modality of possibility. A curious modality, at home neither in ontology nor epistemology; itself, like that which it tries to catch in its net, `always outside', forever `otherwise than being'. The possibility we are talking about here is not the all‑too‑familiar unsure‑of‑itself, and through that uncertainty flawed, inferior and incomplete being, disdainfully dismissed by triumphant existence as `mere possibility', `just a possibility'; possibility is instead `plus que la reahte' ‑ both the origin and the foundation of being. The hope, says Blanchot, proclaims the possibility of that which evades the possible; `in its limit, this is the hope of the bond recaptured where it is now lost."' The hope is always the hope of *being fu filled,* but what keeps the hope alive and so keeps the being open and on the move is precisely its *unfu filment.* One may say that the paradox *of hope* (and the paradox of possibility founded in hope) is that it may pursue its destination solely through betraying its nature; the most exuberant of energies expends itself in the urge towards rest. Possibility uses up its openness in search of closure. Its image of the better being is its own impoverishment . . . The togetherness of the being‑for is cut out of the same block; it shares in the paradoxical lot of all possibility. It lasts as long as it is unfulfilled, yet it uses itself up in never ending effort of fulfilment, of recapturing the bond, making it tight and immune to all future temptations. In an important, perhaps decisive sense, it is selfdestructive and self‑defeating: its triumph is its death. The Other, like restless and unpredictable art, like the future itself, is a *mystery.* And being‑for‑the‑Other, going towards the Other through the twisted and rocky gorge of affection, brings that mystery into view ‑ makes it into a challenge. That mystery is what has triggered the sentiment in the first place ‑ but cracking that mystery is what the resulting movement is about. The mystery must be unpacked so that the being‑for may focus on the Other: one needs to know what to focus on. (The `demand' is *unspoken,* the responsibility undertaken is *unconditional;* it is up to him or her who follows the demand and takes up the responsibility to decide what the following of that demand and carrying out of that responsibility means in practical terms.) Mystery ‑ noted Max Frisch ‑ (and the Other is a mystery), is an exciting puzzle, but one tends to get tired of that excitement. `And so one creates for oneself an image. This is a loveless act, the betrayal." Creating an image of the Other leads to the substitution of the image for the Other; the Other is now fixed ‑ soothingly and comfortingly. There is nothing to be excited about anymore. I know what the Other needs, I know where my responsibility starts and ends. Whatever the Other may now do will be taken down and used against him. What used to be received as an exciting surprise now looks more like perversion; what used to be adored as exhilarating creativity now feels like wicked levity. Thanatos has taken over from Eros, and the excitement of the ungraspable turned into the dullness and tedium of the grasped. But, as Gyorgy Lukacs observed, `everything one person may know about another is only expectation, only potentiality, only wish or fear, acquiring reality only as a result of what happens later, and this reality, too, dissolves straightaway into potentialities'. Only death, with its finality and irreversibility, puts an end to the musical‑chairs game of the real and the potential ‑ it once and for all closes the embrace of togetherness which was before invitingly open and tempted the lonely self." `Creating an image' is the dress rehearsal of that death. But creating an image is the inner urge, the constant temptation, the *must* of all affection . . . It is the loneliness of being abandoned to an unresolvable ambivalence and an unanchored and formless sentiment which sets in motion the togetherness of being‑for. But what loneliness seeks in togetherness is an end to its present condition ‑ an end to itself. Without knowing ‑ without being capable of knowing ‑ that the hope to replace the vexing loneliness with togetherness is founded solely on its own unfulfilment, and that once loneliness is no more, the togetherness ( the being‑for togetherness) must also collapse, as it cannot survive its own completion. What the loneliness seeks in togetherness (suicidally for its own cravings) is the foreclosing and pre‑empting of the future, cancelling the future before it comes, robbing it of mystery but also of the possibility with which it is pregnant. Unknowingly yet necessarily, it seeks it all to its own detriment, since the success (if there is a success) may only bring it back to where it started and to the condition which prompted it to start on the journey in the first place. The togetherness of being‑for is always in the future, and nowhere else. It is no more once the self proclaims: `I have arrived', `I have done it', `I fulfilled my duty.' The being‑for starts from the realization of the bottomlessness of the task, and ends with the declaration that the infinity has been exhausted. This is the tragedy of being‑for ‑ the reason why it cannot but be death‑bound while simultaneously remaining an undying attraction. In this tragedy, there are many happy moments, but no happy end. Death is always the foreclosure of possibilities, and it comes eventually in its own time, even if not brought forward by the impatience of love. The catch is to direct the affection to staving off the end, and to do this against the affection's nature. What follows is that, if moral relationship is grounded in the being-for togetherness (as it is), then it can exist as a project, and guide the self's conduct only as long as its nature of a project (a not yet-completed project) is not denied. Morality, like the future itself, is forever not‑yet. (And this is why the ethical code, any ethical code, the more so the more perfect it is by its own standards, supports morality the way the rope supports the hanged man.) It is because of our loneliness that we crave togetherness. It is because of our loneliness that we open up to the Other and allow the Other to open up to us. It is because of our loneliness (which is only belied, not overcome, by the hubbub of the being‑with) that we turn into moral selves. And it is only through allowing the togetherness its possibilities which only the future can disclose that we stand a chance of acting morally, and sometimes even of being good, in the present.

**2AC—Rodriguez**

**Anti-blackness isn’t a monolithic root cause---they shut off productive debate over solutions – means the alt fails**

**Shelby 7** – Tommie Shelby, Professor of African and African American Studies and of Philosophy at Harvard, 2007, We Who Are Dark: The Philosophical Foundations of Black Solidarity

**Others** might **challenge the distinction between** **ideological and structural causes of black disadvantage**, on the grounds that **we are rarely**, if ever, **able to** so **neatly separate these factors**, an epistemic situation that is only made worse by the fact that these causes interact in complex ways with behavioral factors. These distinctions, while perhaps straightforward in the abstract, are difficult to employ in practice. For example, **it would be** difficult, if not **impossible**, **for the members of a poor black community to determine** **with any accuracy** **whether their impoverished condition is due** **primarily to institutional racism**, the impact of past racial injustice, **the increasing technological basis of the economy**, **shrinking state budgets**, the vicissitudes of **world trade**, the ascendancy of **conservative ideology**, **poorly funded schools**, lack of personal initiative, **a violent drug trade** that deters business investment, **some combination of these factors**, **or some other explanation altogether**. Moreover, it is notoriously difficult to determine when the formulation of putatively race-neutral policies has been motivated by racism or when such policies are unfairly applied by racially biased public officials.¶ **There are** very real **empirical difficulties** **in determining the** **specific causal significance** **of the factors that create and perpetuate black disadvantage**; nonetheless, it is clear that these factors exist and that **justice will demand** **different practical remedies according to** **each factor's relative impact** **on blacks' life chances**. **We must acknowledge that our social world is complicated** and not immediately transparent to common sense, **and thus that** **systematic empirical inquiry**, **historical studies, and rigorous social analysis are required to reveal its systemic structure** and sociocultural dynamics. There is, moreover, no mechanical or infallible procedure for determining which analyses are the soundest ones. In addition, given the inevitable bias that attends social inquiry, legislators and those they represent cannot simply defer to social-scientific experts. **We must instead rely on** **open public debate**—among politicians, scholars, policy makers, intellectuals, and ordinary citizens—**with the aim of garnering** **rationally motivated** and informed **consensus**. And even if our practical decision procedures rest on critical deliberative discourse and thus live up to our highest democratic ideals, some trial and error through actual practice is unavoidable.¶ These difficulties and complications notwithstanding, a general recognition of the distinctions among the ideological and structural causes of black disadvantage could help blacks refocus their political energies and self-help strategies. **Attention to these distinctions might help** **expose the superficiality of theories** **that seek to** **reduce all the social obstacles that blacks face to** contemporary forms of racism or **white supremacy**. **A more** penetrating, **subtle, and empirically grounded** **analysis** **is needed to** **comprehend the causes of racial inequality and black disadvantage**. Indeed, these distinctions highlight the necessity to probe deeper to find the causes of contemporary forms of racism, as some **racial conflict may be a symptom of broader problems or recent social developments** (**such as immigration policy** or reduced federal funding for higher education).

**Our advancement of democracy combats anti-blackness – it’s not all-pervasive**

**Winant 97** – Howard Winant, Professor of Sociology and Director of the Center for New racial Studies at UC Santa Barbara, September-October 1997, “Behind Blue Eyes: Contemporary White Racial Politics,” online: http://www.soc.ucsb.edu/faculty/winant/whitness.html

So, **monolithic white supremacy is over**, yet in a more concealed way, white power and privilege live on. **The overt politics of racial subordination has been destroyed**, yet it is still very possible to "play the racial card" in the political arena. **Racially-defined minorities are no longer subject to legal segregation, but they have not been relieved of the burdens of discrimination**, even by laws supposedly intended to do so. Whites are no longer the official "ruling race," yet they still enjoy many of the privileges descended from the time when they were.

In this situation the old recipes for racial equality, which involved creation of a "color-blind" society, have been transformed into formulas for the maintenance of racial inequality. The old programs for eliminating white racial privilege are now suspected of creating nonwhite racial privilege. **The welfare state, once seen as the instrument for overcoming poverty and social injustice**, **is now accused of fomenting these very ills.**

Therefore, **not only blacks (and other racially-identified minorities), but also whites, now experience a division in their racial identities**. **On the one hand, whites inherit the legacy of white supremacy**, from which they continue to benefit. **But on the other hand, they are subject to the moral and political challenges posed to that inheritance by the partial but real successes of the black movement** (and affiliated movements). **These movements advanced a countertradition to white supremacy, one which envisioned a radicalized, inclusive, participatory democracy**, **a substantively egalitarian economy, and a nonracial state**. **They deeply affected whites as well as blacks**, exposing and **denouncing often unconscious beliefs in white supremacy, and demanding new and more respectful forms of behavior in relation to nonwhites**. Just as the **movements partially reformed white supremacist institutions**, **so they partially transformed white racial consciousness**. **Obviously, they did not destroy** the deep structures of **white privilege, but they did make counterclaims on behalf of the racially excluded and subordinated**. **As a result, white identities have been displaced and refigured**: **they are now contradictory, as well as confused and anxiety ridden**, to an unprecedented extent. It is this situation which can be described as white racial dualism.[1]

**Their argument elevates whiteness to an all-pervasive force that explains nearly all global oppression – means alt fails**

**Andersen 3** – Margaret L. Andersen, Professor of Sociology and Women's Studies and Vice Provost for Academic Affairs at the University of Delaware, 2003, “Whitewashing Race: A Critical Perspective on Whiteness,” in White Out: The Continuing Significance of Racism, ed Doane & Bonilla-Silva, p. 28

Conceptually, **one of the major problems in the whiteness literature is the** **reification of whiteness as a concept**, as an experience, and as an identity. **This** practice **not only leads to** **conceptual obfuscation** **but also** **impedes the possibility for empirical analysis**. In this literature, **"whiteness" comes to mean** just about **everything associated with racial domination.** As such, **whiteness becomes a** **slippery and elusive concept**. Whiteness is presented as any or all of the following: identity, self-understanding, social practices, group beliefs, ideology, and a system of domination. As one critic writes, "**If historical actors are said to have behaved the way they** **did** **mainly because they were white**, **then there's** **little room left for more nuanced analysis of their motives and meanings**" (Stowe 1996:77). And Alastair Bonnett points out that **whiteness "emerges from this critique as an** **omnipresent and all-powerful historical force**. **Whiteness is seen to be responsible for the failure of socialism to develop in America, for racism**, **for the impoverishment of humanity**. With the 'blame' comes a new kind of centering: **Whiteness, and White people, are turned into the key agents of historical change, the shapers of contemporary America**" (1996b:153).

**Despite** noting that there is differentiation among whites and **warning against using whiteness as a** **monolithic category**, **most of the literature still proceeds to do** **so**, **revealing a reductionist tendency**. Even claiming to show its multiple forms, **most writers essentialize and reify whiteness as something that directs most of Western history** (Gallagher 2000). Hence **while trying to "deconstruct” whiteness and see the ubiquitousness of whiteness**, **the literature at the same time reasserts and reinstates it** (Stowe 1996:77).

For example, Michael Eric **Dyson suggests that whiteness is identity, ideology, and institution** (Dyson, quoted in Chennault 1998:300). **But if it is all these things, it becomes an analytically useless concept**. Christine Clark and James O'Donnell write: "to reference it reifies it, to refrain from referencing it obscures the persistent, pervasive, and seemingly permanent reality of racism" (1999:2). **Empirical investigation requires being able to** **identify and measure a concept**— **or at the very least to have a clear definition—but** **since whiteness has come to mean just about everything**, **it ends up meaning hardly anything**.

**AT: State Bad**

**State focused nuclear power solutions key**

**Nordhaus 11**, chairman – Breakthrough Instiute, and Shellenberger, president – Breakthrough Insitute, MA cultural anthropology – University of California, Santa Cruz, 2/25/‘11

(Ted and Michael, <http://thebreakthrough.org/archive/the_long_death_of_environmenta>)

Tenth, we are going to have to get over our suspicion of technology, **especially nuclear power.** There is **no credible path** to reducing global carbon emissions without an enormous expansion of nuclear power. It is the only low carbon technology we have today with the demonstrated capability to generate large quantities of centrally generated electrtic power. It is the low carbon of technology of choice for much of the rest of the world. Even uber-green nations, like Germany and Sweden, have reversed plans to phase out nuclear power as they have begun to reconcile their energy needs with their climate commitments. Eleventh, **we will need to embrace** again **the role of the state** as a direct provider of public goods. The modern environmental movement, borne of the new left rejection of social authority of all sorts, has embraced the notion of state regulation and even creation of private markets while largely rejecting the generative role of the state. In the modern environmental imagination, government promotion of technology - whether nuclear power, the green revolution, synfuels, or ethanol - almost always ends badly. Never mind that virtually the **entire history** of American industrialization and technological innovation is the story of government investments in the development and commercialization of new technologies. Think of a transformative technology over the last century - computers, the Internet, pharmaceutical drugs, jet turbines, cellular telephones, nuclear power - and what you will find is government investing in those technologies at a scale that private firms simply cannot replicate. Twelveth, big is beautiful. The rising economies of the developing world will continue to develop **whether we want them to or not.** The solution to the ecological crises wrought by modernity, technology, and progress will be more modernity, technology, and progress. The solutions to the ecological challenges faced by a planet of 6 billion going on 9 billion **will not be decentralized energy///**

technologies like solar panels, small scale organic agriculture, and a drawing of unenforceable boundaries around what remains of our ecological inheritance, be it the rainforests of the Amazon or the chemical composition of the atmosphere. Rather, these solutions will be: large central station power technologies that can meet the energy needs of billions of people increasingly living in the dense mega-cities of the global south without emitting carbon dioxide, further intensification of industrial scale agriculture to meet the nutritional needs of a population that is not only growing but eating higher up the food chain, and a whole suite of new agricultural, desalinization and other technologies for gardening planet Earth that might allow us not only to pull back from forests and other threatened ecosystems but also to create new ones. The New Ecological Politics The great ecological challenges that our generation faces demands an ecological politics that is **generative, not restrictive.** An ecological politics capable of addressing global warming will require us to reexamine virtually every prominent strand of post-war green ideology. From Paul Erlich's warnings of a population bomb to The Club of Rome's "Limits to Growth," contemporary ecological politics have consistently embraced green Malthusianism despite the fact that the Malthusian premise has persistently failed for the better part of three centuries. Indeed, the green revolution was exponentially increasing agricultural yields at the very moment that Erlich was predicting mass starvation and the serial predictions of peak oil and various others resource collapses that have followed have continue to fail. This does not mean that Malthusian outcomes are impossible, but neither are they inevitable. **We do have a choice** in the matter, but it is not the choice that greens have long imagined. The choice that humanity faces is not whether to constrain our growth, development, and aspirations or die. It is whether we will continue to innovate and accelerate technological progress in order to thrive. Human **technology and ingenuity have repeatedly confounded Malthusian predictions** yet green ideology continues to cast a suspect eye towards the very technologies that have allowed us to avoid resource and ecological catastrophes. But such solutions will require environmentalists to abandon the "small is beautiful" ethic that has also characterized environmental thought since the 1960's. We, the most secure, affluent, and thoroughly modern human beings to have ever lived upon the planet, must abandon both the dark, zero-sum Malthusian visions and the idealized and nostalgic fantasies for a simpler, more bucolic past in which humans lived in harmony with Nature.

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#### A singular *best* method for environmental justice denies the plurality of both theory and practice that energizes diverse communities. This turns the case.

David **SCHLOSBERG** Director of Environmental Studies Program @ Northern Arizona **‘7** *Defining Environmental Justice* p. 166-173

In both of these texts, the need for a political ethic of justice is articulated and defended, but only in the singular. Yet why cannot there be a variety of ethics and definitions of justice that come into play on various environmental decisions, in different contexts? In contrast to Low and Gleeson, and to Baxter, on ecological justice, those who write about environmental justice movements, such as those discussed in Chapters 3 and 4, have much less of a problem with multiple or plural conceptions of justice. Many authors see at least a dualistic focus on distribution and participation, and others acknowledge the role of recognition as well. There can be multiple reasons, based in different conceptions of justice, for opposing trash incinerators in minority communities, the bioengineering of food, or snowmaking with wastewater on a sacred mountain. Plurality in definition does not make justice disappear; on the contrary, acceptance of such varied arguments highlights the importance of justice as it is experienced and articulated in numerous ways. It is the insistence on singularity and universalism in a theory and practice of justice that would produce exclusion and the disappearance of multiple articulations, issues, and movements///

. Pluralism is both empirically real in the expression of justice claims, and pragmatically necessary to avoid the mistakes of exclusion so common to universalism and paternalism. My goal here is not the development of a universally defensible, singularly defined, and permanent notion of environmental and ecological justice; rather, my aim is to layout and bring attention to a broad and overlapping set of environmental and ecological justice discourses that exist in practice. Claims for environmental and ecological justice have, can, and will be made in different ways and terms in different places, contexts, and times. Conceptions of justice have, can, and will be articulated using the language of distribution, recognition, participation, and/or capabilities. The point is not to dismiss one or the other conception, or to insist on one or the other approach in the singular, but to find a way to incorporate these disparate claims and notions in a broad, inclusive, and pragmatic understanding of, and movement for, environmental and ecological justice. Interestingly, Peter Wenz (1988) used this approach in one of the earliest theoretical discussions of environmental justice; it has, unfortunately, since been ignored. For Wenz, such pluralistic notions of justice are quite welcome on a both theoretical and practical level. Environmental justice, he argues, is understood in numerous ways, depending on context. He sees value in the fact that we are 'attracted to using one theory in one kind of situation and a different theory in a different kind of situation'. Wenz argues that we need a pluralistic theory of environmental justice 'that enables us to appeal in a consistent manner to principles featured in a variety of theories, even when those principles can not all be reduced to or derived from a single master principle' (1988: 313). It is simply important to comprehend different peoples' interpretations of justice, as it helps us to understand and tolerate others (p. 2). In this, Wenz illustrates the importance of the relationship between pluralism and justice; I want to explore this connection more thoroughly. Pluralist Defenses of Multiplicity While defenses of pluralistic notions of justice may be few in the literature of ecological justice, they have become more common in political theories of justice. Traditional theories of just distribution, such as Rawls's, tend to focus on absolutely universal principles; Rawls's basic principles of justice, the principle of equal liberty and the difference principle, form the basis of many an undergraduate course. Walzer (1983) began a move away from a concern with a singular universal theory of justice in favor of understanding the concept in historical and cultural place; this move has particular resonance in dealing with environmental justice. While still wed to the notion of distribution, Walzer (p. 6) attempts to introduce a language of difference. He argues that the principles of justice are themselves pluralistic in form; that different social goods ought to be distributed for different reasons, in accordance with different procedures, by different agents; and that all these differences derive from different understandings of the social goods themselves-the inevitable product of historical and cultural particularism. For Walzer, not only are different things valued differently by different people, but this means that the very criteria for distribution will differ according to how we value things. Social meanings of objects, procedures, and principles are historical and will change over time; hence Walzer introduces a notion of a 'distributive sphere', where conceptions of justice are limited in place and time. Walzer's approach to the discussion of justice in a real, diverse world is more complex and more grounded than Rawls's 'veil of ignorance'. While Walzer remains tied to the concept, and language, of justice purely as a concept of distribution, we can extend his arguments regarding justice and plurality into additional conceptions of justice, in addition to various interpretations of distribution. Most contemporary justice theorists consider themselves pluralist in a sense, in that they accept a variety of notions of the good (and we can see this in relation to different ways of understanding and relating to both human communities and nature). Some are also 'contextualist' like Walzer, meaning that they see different principles of justice applicable in different sorts of situations. Miller (2003: 350), for example, argues that principles of justice should be developed depending on the social makeup of those making the claim and on the relationship they have with other parties in a justice dispute. Even so, a thorough and critical concept of pluralism has not thoroughly taken root in most writing on justice. A critical pluralism, I believe, offers us a possible framework for thinking about the validity of plurality in social justice generally, and environmental and ecological justice specifically; with it, we can theorize generally while remaining open to the very real and practical differences that exist in practice. Connolly (2005) argues that pluralism prizes diversity along several dimensions, and actively supports the plural against various drives to singular, unitary, and universal ends. He suggests that such an approach requires a 'bicameral' approach to political life, in which we can accept ambiguity and 'keep a foot on two worlds, straddling two or more perspectives to maintain tension between the two' (p. 4). The starting point for such a point of view is the empirical reality, and pragmatic acceptance, of the reality of difference. Connolly consciously resurrects a classic notion of pluralistic philosophy, best articulated by William James. James saw the methodology of 'radical empiricism' as the basis of pluralist philosophy; here, 'all we are required to admit as the constitution of reality is what we ourselves find empirically realized in every minimum of finite life' Games [1909] 1977: 145). James argued that as both what is experienced and the consciousness of that experience varies for people, a pluralist universe is empirically and objectively grounded. He was adamant that the pluralistic philosophy captured the actual world better than universalist theories, and that the 'prestige of the absolute has rather crumbled in our hands' (1909 [1977]: 63), as pluralism is realized as more empirically evident than universalism. James's pluralist approach was not just a validation of the empirical reality of difference, but an insistence on understanding that difference will never come together in to a single coherent unity, as the philosophical absolutists desired. According to James, the pluralist view is willing to believe that there may ultimately never be an all-form at all, that the substance of reality may never get totally collected, that some of it may remain outside of the largest combination of it ever made, and that a disruptive form of rea lity, the each-form is logically as acceptable and empirically as probable as the all-form commonly acquiesced in as so obviously the self-evident thing. Games [1912]1976: 14-15) Connections can be made in the pluralistic universe without recourse to an insistence on singularity or uniformity; the result is what James calls a 'multiverse' rather than a universe. Incommensurability-of values, ViSions, and reality itself-was central to James's explication of pluralism; he simply wanted philosophy to recognize and embrace the real world of difference and disunity. LikeWise, the tenets of value pluralism and incommensurability were central to Isaiah Berlin's examination of the relationship between political pluralism and liberalism. While Berlin is most well known for his work on liberty, he premises the need for such a focus with an acknowledgment against the universalist, monist view. ' [S]ince some values may conflict intrinsically, the very notion that a pattern must in principle be discoverable in which they are all rendered harmonious is founded on a false a priori view of what the world is like' (Berlin 1969: Ii). Universalism , he argued, reduces every value to the lowest common denominator, and 'drained both lives and ideals of the specific content which alone gave them point' (Serlin 1990: 245). The belief that there is a final, single unity 'rests on the conviction that all the positive values in which men have believed must, in the end, be compatible, and perhaps even entail one another . .. [but] not all good things are compatible, still less all the ideals of mankind' (Serlin 1969: 167). Berlin, of course, used such a view to justify multiple forms of liberty; but, along with James, we can apply such a pluralist view to justice as well. By the 1980s, a number of authors began to both resurrect important aspects of pluralism's earlier generation and imagine new paths for pluralist theory. The epistemological foundation of pluralism, born in James's radical empiricism though ignored by seemingly everyone but Berlin in the postwar years, came back to the forefront of pluralist thought in order to justify and validate different ways of seeing and knowing the world. Key to this, as McClure (1992) argues, was the revitalization of feminist epistemology and the radical pluralist potential in the multiple subjectivities suggested by Haraway and other feminist theorists. Haraway's descriptions of situated knowledge and embodied objectivity (1988) were based on a metaphor of vision-that depending on one's experience, context, or view from one's body we can see and understand the same object in multiple ways. In this sense, as with James, only partial perspectives can be considered objective. Similarly, Deleuze and Guattari (1983) inspired postmodern pluralists with their argument to return to a focus on multiplicity. Empirically, they argued, we live in an age of partiality, where we are defined by the many and varied states, situations, and groups through which we pass. These arguments resurrected James's radical empiricism in the postmodern context, and reawakened the pluralist political response to the reality of difference. Mouffe, for example, explicitly claims a pluralist intent-starting political analysis with the recognition of difference, and refusing 'the objective of unanimity and homogeneity which is .. . based on acts of exclusion (1996: 246). As Hardt and Negri (2000) argue, the move is one from a focus on transcendence to immanence; here, there is a recognition that we can no longer simply use a single, universal, and transcendent standard to evaluate the world (Moore 2006: 6). As Connolly (2005: 80) explains, James was a theorist who broke from the tradition of theorists reaching for certainty, and yet one who combined a 'vigorous defense of his philosophy to modesty about its status'. Connolly himself continues this tradition, arguing that as you come to feel this larger web of loose affinities and uncertain connections, you outgrow the implicit idea that the world was designed for us alone, or that human beings can master it entirely, or that we can in principle know it completely . . . or that we can insulate ourselves from the rest of the world. (p. 92) Connolly and these other contemporary pluralist theorists illustrate that plu rality has once again become the basis of a radical and critical political theorizing, focusing on the reality and political meaning of difference, as well as the potential of relations across that difference, rather than on the dreams of monist or universal definitions of political concepts.2 Plurality and Conceptions of Justice Still, very few of these theorists have directly linked the focus on pluralism with definitions of justice. Lyotard (1984) is the exception here. Lyotard insisted, in his definition of the postmodern condition, that singularity and consensus on theoretical definitions are both outmoded and suspect. Famously, however, he asserted that justice was neither-and argued that we simply need to develop an idea and practice of justice that is not linked to the universalism of consensus (p. 66). The recognition of heterogeneity is central to Lyotard's understanding of the future of justice; here, we must understand individuals as existing in a complex fabric of relations, located at a post through which diverse messages pass (p. 15). The fabric and post metaphors may be mixed, but the point is simple: we are each subject to messages about, and discourses of, justice that are multiple, diverse, and overlapping. The key is to pay attention to empirically extant differences, engage them, and understand them as parts of the whole that make up the broader understanding and discourse of justice. My pOint is to combine the recognition of the empirical reality of plurality, and the related dismissal of attempts at Singular, monist, unitary definitions of justice, in coming to understand and accept a plural conception and discourse of social, environmental, and ecological justice. There are two ways that plurality is a crucial and vital element of understanding and defining environmental justice. Fi rst, one of the important caveats in discussing the various elements of justice I have discussed is that one is never to be considered a replacement for the others. While recognition or participation may be considered central components of environmental or ecological justice, distributional considerations and/or capabilities must be understood as additional and/or complementary notions. It is absolutely essential to tie together conceptions of misrecognition and social subordination and the denial of capabilities with discussions of maldistribution and, importantly, participation. It is not a question of one or the other as the focus of justice, but of understanding that two or more conceptions can be in play Simultaneously, depending on situation and context. Fraser, for example, argues that the remedy for maldistribution must focus on political and economic restructuring; but movements understand that such considerations will only come along, in part, with recognition, where the remedy is in cultural and symbolic changes in how we regard the presently misrecognized. In addition, we often cannot address distribution, and we cannot deal with misrecognition, without a focus on institutional procedures. Fraser's recent work on justice (2000, 2001) is based on the premise that these three central components of justice are integrally linked. Likewise, Nussbaum (2000, 2006a) understands that recognition forms the basis of many items on both human and animal capabilities lists, and includes the important capacity of 'control over one's environment'-including the right of political participation-in capabilities lists for both populations. The point here is that multiple notions of justice are to be cited and called for, in various combinations and prioritizations, depending on situation and context. We can look at a single instance and see such multiple conceptions. In the case of the use of reclaimed wastewater to make snow at a ski resort on a mountain sacred to local tribes, we can easily see distributional (Native Americans get more environmental bads than others), recognition-based (lack of acknowledgment of tribal cultures), participation-focused (exclusion from decision-making and lack of materials in tribal languages), and capabilities-based (the impact on tribes capability to retain cultural meanings and teachings) notions of environmental justice; we can also see distributional (water moved from one watershed to another), recognition-based (nature's processes ignored), participation-focused (no proxies for impacted species or communities), and capabilities-based (what will water laced with pharmaceuticals do to the reproductive capacity of local animals and plants) notions of ecological justice. All of these exist simultaneously in a single snowmaking proposal. My argument here is not that all conceptions of justice must be present in every case of environmental or ecological justice, as it is in the snowmaking case, only that we should be open to examining and emphasizing various conceptions of justice-and experiences of injustice-on different issues. We have numerous components and conceptions of justice, and see that different and multiple theories can apply to various issues, cases, and contexts. Using the range of theories available to us, and understanding how they overlap and interact, will illuminate problems more thoroughly. Such an approach will also bring us to see that what we may now understand as disparate issues and movements may be brought together with this shared and overlapping discourse of justice.