## 1AC NDT Round 3

### Plan

#### The United States federal government should create a prize system for electricity in the United States produced from solar power satellite rectenna conversion.

### Contention One is Warming

#### Fossil fuel dependence is unsustainable and other renewables fail – SPS-ALPHA solves world energy needs and can be exported globally

Dvorsky 11-28 – George Dvorsky, writer for Io9, a daily science and technology publication, November 28th, 2012, "How space-based solar power will solve all our energy needs" io9.com/5963955/how-space+based-solar-power-will-solve-all-our-energy-needs

Humanity's demand for energy is growing at an astonishing rate. Combine this with an ever-dwindling supply of fossil fuels, and it becomes painfully clear that something innovative and powerful is required. There's one high-tech proposal that holds tremendous promise — an idea that has been around since the late 1960s. Here's how space-based solar power will **eventually** solve all our energy needs.¶ Humans needs more power¶ Assuming that economic progress and globalization continues at its current pace, **we'll need to produce twice the amount of energy that's consumed today by the 2030s — what will reach a monumental 220 trillion kiloWatt hours per year. And by the end of the century, we'll need four times the current rate of consumption.**¶ **Just as importantly, we're also going to have to kick the fossil fuel habit — and not only because it'll eventually run out. Rising CO2 emissions are wreaking havoc on the Earth's atmosphere, what's creating environmentally deleterious side-effects at a rate faster than expected.**¶ Moreover, if greenhouse gases are to be brought under control over the course of the next several decades, we'll need to get upwards of 90% of all our energy from either renewable or nuclear sources.¶ While there are a number of proposals on the table for how we might be able to meet these challenges, **none** really **appear to be truly viable**.¶ Except for solar powered satellites.¶ Obvious benefits¶ A closer look at a space-based solution yields a lengthy list of advantages.¶ Solar powered satellites **don't produce any greenhouse gases**, nor do they take up valuable real estate on Earth. Once the initial costs are met, they would be relatively cheap to maintain; the solar modules used for generating solar energy have a long service life, not to mention the astounding ROI that would come from a virtually unlimited energy source.¶ Additionally, they're not constrained by night/day cycles, the weather, or the changing seasons. And indeed, they would be much more efficient than any kind of ground-based station. The collection of solar energy in space is seven times greater per unit area than on the surface of the planet. Moreover, **the amount of solar energy available up there is staggering — on the order of billions of times greater than what we draw today; the Earth receives only one part in 2.3 billion of the Sun's output**. The potential for scalability is enormous, to say the least.¶ Solar powered satellites won't be prone to terrorist attacks and they'll **reduce geopolitical pressure for oil.** According to futurist Keith Henson, space-based solar could be used to power vehicles, like electric cars, or by enabling the production of synthetic fuels — which at a penny per kiloWatt hour would result in gasoline that costs one dollar a gallon.¶ At the same time, space-based solar would provide true energy independence for those nations who choose to implement it. And on top of that, the energy could be exported to virtually anywhere in the world; it would be especially valuable for isolated areas of the globe, including Africa and India.¶ Lastly, **space-based solar power would also yield** tremendous benefits to human and robotic space exploration**, including the powering of off-planet colonies on the Moon, Mars, and space stations.** It could also serve as the first seed in the development of a Dyson Sphere — a massive array of solar collectors that would completely envelope the sun at a distance of about 1 AU.¶ How it's going to work¶ Back in the late 1960s, Peter Glaser proposed the idea of solar powered satellites (SPS), what he envisioned as space-based photovoltaics that could transfer energy wirelessly back down to Earth. His design called for a large platform positioned in space in a high Earth orbit that would continuously collect and convert solar energy into electricity. In turn, that power would be used to drive a wireless power transmission (WPT) that beams the solar energy to receiving stations on Earth — what would be comprised of massive receiving dishes.¶ A number of visionaries have updated Glaser's vision to include the use of a microwave wireless power transmitter. This would involve large discrete structures (like a solar array and transmitter) that would have to be assembled in space. SPS systems could also include a modular electric/diode array laser WPT concept, involving self-assembling solar power-laser-thermal modules. Other designs call for an extremely modular microwave WPT SPS "sandwich structure" concept, requiring a significant number of small solar power-microwave-thermal modules that would be robotically assembled on orbit.¶ But to make it happen, we'll need to develop low-cost, environmentally-friendly launch vehicles. Eventually we'll send the materials up in a space elevator, but until then we'll have to come up with something more efficient. Thankfully, SpaceX and other private firms are already working on more efficient launch solutions.¶ Additionally, we'll require large scale construction and operations stations in orbit — space-based workplaces that would be more complex, larger, and more energy-demanding than the ISS. They would allow for the production of large, simple panels, that are easy to assemble and consist of many identical parts. Eventually, it may be possible to construct an entire flotilla of these solar collectors using materials extracted from asteroids.¶ Design proposals¶ As word gets out about the potential for SPS, and as the technology catches up to the idea, a number of design proposals have been put forth; this isn't just idle speculation anymore — it's something that's just about ready for prime-time.¶ For example, there's SPS-ALPHA (Solar Power Satellite via Arbitrarily Large PHased Array) which is being developed by NASA's John Mankins. Using a "biomimetic" approach, the project calls for huge platforms constructed from tens of thousands of small elements that could deliver tens to thousands of megawatts via wireless power transmission.¶ It would do this by using a large array of individually controlled thin-film mirrors outfitted on the curved surface of a satellite. These adjustable mirrors would intercept and redirect incoming sunlight toward photovoltaic cells affixed to the backside of the solar power satellite's large array. The Earth-pointing side of the array would be tiled with a collection of microwave-power transmission panels that generate the coherent, low-intensity beam of radio frequency energy and transmits that energy to Earth.¶ And what's particularly cool about this concept is that **it would enable the construction of a solar-power satellite that can be assembled entirely from individual system elements that weigh no more than 110 to 440 pounds (**50 **to 200** kilograms**), allowing all pieces to be** mass produced at low cost.

#### **SPS-Alpha can be up and running in a few years with only a few billion dollars – new tech ensures feasibility and low costs**

Mankins 12 – John C. Mankins, President of Artemis Innovation Management Solutions LLC is an internationally recognized leader in space systems and technology innovation, spent 25 years at NASA and CalTech's Jet Propulsion Laboratory. He holds undergraduate (Harvey Mudd College) and graduate (UCLA) degrees in Physics and an MBA in Public Policy Analysis (The Drucker School at Claremont Graduate University). Mr. Mankins is a member of the International Academy of Astronautics (IAA) and Chair of the Academy Commission III (Space Systems and Technology Development); and a member of the International Astronautical Federation (IAF), the American Institute of Aeronautics and Astronautics (AIAA), and the Sigma Xi Research Society. Editor/Authors are :Brian Wang, Director of Research. Sander Olson, Interviews and other articles Phil Wolff, Communications and social technologist. Alvin Wang. Computer, technology, social networking, and social media expert. June 7th, 2012, "A New Paradigm for Space-Based Solar Power," nextbigfuture.com/2012/06/new-paradigm-for-space-based-solar.html

Question: How exactly has the technology evolved since the 1970s? ¶ There have been a number of improvements. The **efficiency of solar photovoltaics has improved** from less than 10% efficiency to more than 30% efficiency now. I'm confident that within the next decade, solar photovoltaics could achieve efficiencies of up to 50%. There have also been **substantial improvements in key electronic components**, such as solid-state power amplifiers. The efficiencies have gone from 15% in the 1970s to **70% now**. With focused investments, we should be able to get devices with efficiencies approaching 80% by 2020. This will further increase the viability of space-based solar power. A wide range of other technologies have also improved dramatically, including **light-weight and high-strength materials, robotics, in-space propulsion and others.** ¶ Question: You are the chief architect behind the SPS-ALPHA design. What are the central aspects of this new paradigm? ¶ The SPS-ALPHA concept facilitates the design and development of a very large solar power satellite out of a large number of very small pieces. Each piece weighs perhaps 25-100 kilograms, but there are tens of thousands of pieces in the final product. **The beauty of this system is that all of the parts of the design can be manufactured readily in a standard factory – resulting in very low costs for the system hardware.** ¶ Question: So the power satellite would be composed of vast numbers of identical modules? ¶ Yes, the modules would be stackable – like pizza boxes – for ease of transportation to space, and then unstacked and assembled once they reach the operational orbit for the satellite. There might be about 6 or 8 different types of modular elements, and each type would be mass produced with from hundreds to tens of thousands of copies. They would initially be launched into a low Earth orbit, and from there transferred to a higher orbit for integration into the SPS platform. We are looking at using robotic systems to assemble the panels. ¶ Question: So your plan employs robots for most of the construction? ¶ Yes. The SPS-ALPHA architecture would only employ people on the ground to supervise the robots operating in space. The goal would be to assume the intervention of astronauts only in the event of a problem that could not be resolved using robots. As a rule of thumb, we expect that it may cost from 100-times to 1000-times more to have a suited astronaut perform a task in a high Earth orbit than to have a remotely-supervised robot do it. This field of technology has advanced rapidly in the past decade, and so we plan to employ robots extensively. ¶ Question: How long would it take to get a prototype system up and running? ¶ With sufficient funding, we could have a ground based, rudimentary prototype up and running by 2014. **An early prototype in orbit could be** built by 2017-2018. And in about a decade, a larger pilot plant could be in geosynchronous Earth orbit, generating 10 megawatts. The total cost for this roadmap could be several billion dollars, with most of the cost coming in the last few years. As a point of comparison, the pilot plant would be approximately the same size as the International Space Station, which cost $100 billion to manufacture, launch into space and assemble. **The cost savings would result from using standard, mass-produced pieces, standard launch systems and robotic assembly in space.**

#### Creating a prize system encourages SPS development and makes it economically viable

Globus 11Al Globus, Chair of the National Space Society's Space Settlement Advocacy Committee, July 2011, “A SPACE SOLAR POWER INDUSTRY FOR $2 BILLION OR YOUR MONEY BACK”

The proposed prize pays out for each kilowatt-hour (kwh – one thousand watts of energy for one hour) of power delivered from space to an operational electrical system on Earth. To receive prize money, power must be sold to a utility or other entity on Earth at near market rates. This insures that the power is delivered in a way that can and will be used, and provides additional income to the contestants. The prize is divided into three levels: $1, $0.7 and $0.3 per kwh. This is to provide continuing incentive to develop SSP at successively lower prices on the way to unsubsidized economic viability. Furthermore: 1. To encourage the development of a competitive industry, at each level the prize money is divided such that at least three satellites are needed to capture all of the funds. No individual satellite can earn more than 60% of the prize money and no two satellites more than 90%, leaving 10% for a third satellite. 2. To encourage development of multiple approaches to SSP, each satellite earning prize money at a single level must be owned and operated by a different entity and must use a substantially different approach to SSP generation. 3. To encourage development of successively more cost-effective systems, each satellite may only win prize money at a single level. Thus, this particular approach to structuring the prize will pay out all the prize money only if nine satellites are developed using at least three different approaches by at least three different companies. Table 1 describes the prize system quantitatively. Note that the number of levels, the pricing, and the percentages are somewhat arbitrary. They are chosen to give one or two satellites a real chance at profitability and the others a significant subsidy. Obviously, there may be other sets of levels that may be more effective. If successful, this prize system would require $2 billion, about one year’s development of the new human deep space system that might put humans on an asteroid in 2025, about the cost of a flagship deep space mission, or a little more than the cost of one shuttle launch6. While all of these are worthy projects, their impact pales beside the impact of a successful SSP industry. If successful, SSP could deliver essentially unlimited clean energy for a billion years and put the nations developing it in the world’s economic driver’s seat. It should also be noted that the launch systems and other development needed for a successful SSP industry would **make other space projects much easier** and cheaper than they are today. In an era of limited budgets, one wonders why billions are allocated to projects of great interest but little practical day-to-day value while projects such as SSP that could revolutionize life on Earth, not to mention space development, languish with essentially no funding.

#### Scientific consensus concludes warming is real, anthropogenic, and will be catastrophic if left unchecked – SPS solves

Flournoy 12 –Dan Flournoy, PhD and MA from the University of Texas, Former Dean of the University College at Ohio University, Former Associate Dean at State University of New York and Case Institute of Technology, Project Manager for University/Industry Experiments for the NASA ACTS Satellite, Currently Professor of Telecommunications at Scripps College of Communications @ Ohio University, January 2012, "Solar Power Satellites," Springer Briefs in Space Development

In the Online Journal of Space Communication , Dr. Feng Hsu, a NASA scientist at Goddard Space Flight Center, a research center in the forefront of science of space and Earth, writes, “The **evidence of global warming is alarming**,” noting the potential for a catastrophic planetary climate change is real and troubling (Hsu 2010 ) . Hsu and his NASA colleagues were engaged in monitoring and analyzing climate changes on a global scale, through which they received first-hand scientific information and data relating to global warming issues, including the dynamics of polar ice cap melting. After discussing this research with colleagues who were world experts on the subject, he wrote: I now have no doubt global temperatures are rising, and that global warming is a serious problem confronting all of humanity. No matter whether these trends are due to human interference or to the cosmic cycling of our solar system, there are two basic facts that are crystal clear: (a) there is overwhelming scientific evidence showing **positive correlations between the level of CO2 concentrations** in Earth’s atmosphere **with respect to** the historical **fluctuations of global temperature** changes; and (b) the overwhelming majority of the world’s scientific community is in agreement about the risks of a potential catastrophic global climate change. That is, if we humans continue to ignore this problem and do nothing, if we continue dumping huge quantities of greenhouse gases into Earth’s biosphere, humanity will be at dire risk (Hsu 2010 ) . As a technology risk assessment expert, Hsu says he can show with some confidence that the planet will face more risk doing nothing to curb its fossil-based energy addictions than it will in making a fundamental shift in its energy supply. “This,” he writes, “is because the risks of a catastrophic anthropogenic climate change can be potentially the **extinction of human species**, a risk that is simply too high for us to take any chances” (Hsu 2010 ) . It was this NASA scientist’s conclusion that humankind must now embark on the next era of “sustainable energy consumption and re-supply, the most obvious source of which is the mighty energy resource of our Sun” (Hsu 2010 ) (Fig . 2.1 ).

#### Contrary evidence is unqualified and funded by oil hacks

Prothero 12 [Donald R. Prothero, Professor of Geology at Occidental College and Lecturer in Geobiology at the California Institute of Technology, 3-1-2012, "How We Know Global Warming is Real and Human Caused," Skeptic, 17.2, EBSCO]

How do we know that global warming is real and primarily human caused? There are numerous lines of evidence that converge toward this conclusion. 1. Carbon Dioxide Increase Carbon dioxide in our atmosphere has increased at an unprecedented rate in the past 200 years. Not one data set collected over a long enough span of time shows otherwise. Mann et al. (1999) compiled the past 900 years' worth of temperature data from tree rings, ice cores, corals, and direct measurements in the past few centuries, and the sudden increase of temperature of the past century stands out like a sore thumb. This famous graph is now known as the "hockey stick" because it is long and straight through most of its length, then bends sharply upward at the end like the blade of a hockey stick. Other graphs show that climate was very stable within a narrow range of variation through the past 1000, 2000, or even 10,000 years since the end of the last Ice Age. There were minor warming events during the Climatic Optimum about 7000 years ago, the Medieval Warm Period, and the slight cooling of the Litde Ice Age in the 1700s and 1800s. But the magnitude and rapidity of the warming represented by the last 200 years is simply unmatched in all of human history. More revealing, the timing of this warming coincides with the Industrial Revolution, when humans first began massive deforestation and released carbon dioxide into the atmosphere by burning an unprecedented amount of coal, gas, and oil. 2. Melting Polar Ice Caps The polar icecaps are thinning and breaking up at an alarming rate. In 2000, my former graduate advisor Malcolm McKenna was one of the first humans to fly over the North Pole in summer time and see no ice, just open water. The Arctic ice cap has been frozen solid for at least the past 3 million years (and maybe longer),[ 4] but now the entire ice sheet is breaking up so fast that by 2030 (and possibly sooner) less than half of the Arctic will be ice covered in the summer.[ 5] As one can see from watching the news, this is an ecological disaster for everything that lives up there, from the polar bears to the seals and walruses to the animals they feed upon, to the 4 million people whose world is melting beneath their feet. The Antarctic is thawing even faster. In February-March 2002, the Larsen B ice shelf -- over 3000 square km (the size of Rhode Island) and 220 m (700 feet) thick -- broke up in just a few months, a story -typical of nearly all the ice shelves in Antarctica. The Larsen B shelf had survived all the previous ice ages and interglacial warming episodes over the past 3 million years, and even the warmest periods of the last 10,000 years -- yet it and nearly all the other thick ice sheets on the Arctic, Greenland, and Antarctic are vanishing at a rate never before seen in geologic history. 3. Melting Glaciers Glaciers are all retreating at the highest rates ever documented. Many of those glaciers, along with snow melt, especially in the Himalayas, Andes, Alps, and Sierras, provide most of the freshwater that the populations below the mountains depend upon -- yet this fresh water supply is vanishing. Just think about the percentage of world's population in southern Asia (especially India) that depend on Himalayan snowmelt for their fresh water. The implications are staggering. The permafrost that once remained solidly frozen even in the summer has now thawed, damaging the Inuit villages on the Arctic coast and threatening all our pipelines to the North Slope of Alaska. This is catastrophic not only for life on the permafrost, but as it thaws, the permafrost releases huge amounts of greenhouse gases which are one of the major contributors to global warming. Not only is the ice vanishing, but we have seen record heat waves over and over again, killing thousands of people, as each year joins the list of the hottest years on record. (2010 just topped that list as the hottest year, surpassing the previous record in 2009, and we shall know about 2011 soon enough). Natural animal and plant populations are being devastated all over the globe as their environments change.[ 6] Many animals respond by moving their ranges to formerly cold climates, so now places that once did not have to worry about disease-bearing mosquitoes are infested as the climate warms and allows them to breed further north. 4. Sea Level Rise All that melted ice eventually ends up in the ocean, causing sea levels to rise, as it has many times in the geologic past. At present, the sea level is rising about 3-4 mm per year, more than ten times the rate of 0.1-0.2 mm/year that has occurred over the past 3000 years. Geological data show that the sea level was virtually unchanged over the past 10,000 years since the present interglacial began. A few mm here or there doesn't impress people, until you consider that the rate is accelerating and that most scientists predict sea levels will rise 80-130 cm in just the next century. A sea level rise of 1.3 m (almost 4 feet) would drown many of the world's low-elevation cities, such as Venice and New Orleans, and low-lying countries such as the Netherlands or Bangladesh. A number of tiny island nations such as Vanuatu and the Maldives, which barely poke out above the ocean now, are already vanishing beneath the waves. Eventually their entire population will have to move someplace else.[ 7] Even a small sea level rise might not drown all these areas, but they are much more vulnerable to the large waves of a storm surge (as happened with Hurricane Katrina), which could do much more damage than sea level rise alone. If sea level rose by 6 m (20 feet), most of the world's coastal plains and low-lying areas (such as the Louisiana bayous, Florida, and most of the world's river deltas) would be drowned. Most of the world's population lives in low-elevation coastal cities such as New York, Boston, Philadelphia, Baltimore, Washington, D.C., Miami, and Shanghai. All of those cities would be partially or completely under water with such a sea level rise. If all the glacial ice caps melted completely (as they have several times before during past greenhouse episodes in the geologic past), sea level would rise by 65 m (215 feet)! The entire Mississippi Valley would flood, so you could dock an ocean liner in Cairo, Illinois. Such a sea level rise would drown nearly every coastal region under hundreds of feet of water, and inundate New York City, London and Paris. All that would remain would be the tall landmarks such as the Empire State Building, Big Ben, and the Eiffel Tower. You could tie your boats to these pinnacles, but the rest of these drowned cities would lie deep underwater. Climate Change Critic's Arguments and Scientists' Rebuttals Despite the overwhelming evidence there are many people who remain skeptical. One reason is that they have been fed distortions and misstatements by the global warming denialists who cloud or confuse the issue. Let's examine some of these claims in detail: \* "It's just natural climatic variability." No, it is not. As I detailed in my 2009 book, Greenhouse of the Dinosaurs, geologists and paleoclimatologists know a lot about past greenhouse worlds, and the icehouse planet that has existed for the past 33 million years. We have a good understanding of how and why the Antarctic ice sheet first appeared at that time, and how the Arctic froze over about 3.5 million years ago, beginning the 24 glacial and interglacial episodes of the "Ice Ages" that have occurred since then. We know how variations in the earth's orbit (the Milankovitch cycles) controls the amount of solar radiation the earth receives, triggering the shifts between glacial and interglacial periods. Our current warm interglacial has already lasted 10,000 years, the duration of most previous interglacials, so if it were not for global warming, we would be headed into the next glacial in the next 1000 years or so. Instead, our pumping greenhouse gases into our atmosphere after they were long trapped in the earth's crust has pushed the planet into a "super-interglacial," already warmer than any previous warming period. We can see the "big picture" of climate variability most clearly in ice cores from the EPICA (European Project for Ice Coring in Antarctica), which show the details of the last 650,000 years of glacial-inters glacial cycles (Fig. 2). At no time during any previous interglacial did the carbon dioxide levels exceed 300 ppm, even at their very warmest. Our atmospheric carbon dioxide levels are already close to 400 ppm today. The atmosphere is headed to 600 ppm within a few decades, even if we stopped releasing greenhouse gases immediately. This is decidedly not within the normal range of "climatic variability," but clearly unprecedented in human history. Anyone who says this is "normal variability" has never seen the huge amount of paleoclimatic data that show otherwise. \* "It's just another warming episode, like the Medieval Warm Period, or the Holocene Climatic Optimum or the end of the Little Ice Age." Untrue. There were numerous small fluctuations of warming and cooling over the last 10,000 years of the Holocene. But in the case of the Medieval Warm Period (about 950-1250 A.D.), the temperatures increased only 1°C, much less than we have seen in the current episode of global warming (Fig. 1). This episode was also only a local warming in the North Atlantic and northern Europe. Global temperatures over this interval did not warm at all, and actually cooled by more than 1°C. Likewise, the warmest period of the last 10,000 years was the Holocene Climatic Optimum ( 5,000-9,000 B.C.E.) when warmer and wetter conditions in Eurasia contributed to the rise of the first great civilizations in Egypt, Mesopotamia, the Indus Valley, and China. This was largely a Northern Hemisphere-Eurasian phenomenon, with 2-3°C warming in the Arctic and northern Europe. But there was almost no warming in the tropics, and cooling or no change in the Southern Hemisphere.[ 8] From a Eurocentric viewpoint, these warming events seemed important, but on a global scale the effect was negligible. In addition, neither of these warming episodes is related to increasing greenhouse gases. The Holocene Climatic Optimum, in fact, is predicted by the Milankovitch cycles, since at that time the axial tilt of the earth was 24°, its steepest value, meaning the Northern Hemisphere got more solar radiation than normal -- but the Southern Hemisphere less, so the two balanced. By contrast, not only is the warming observed in the last 200 years much greater than during these previous episodes, but it is also global and bipolar, so it is not a purely local effect. The warming that ended the Little Ice Age (from the mid-1700s to the late 1800s) was due to increased solar radiation prior to 1940. Since 1940, however, the amount of solar radiation has been dropping, so the only candidate remaining for the post-1940 warming is carbon dioxide.[ 9] "It's just the sun, or cosmic rays, or volcanic activity or methane." Nope, sorry. The amount of heat that the sun provides has been decreasing since 1940,[ 10] just the opposite of the critics' claims (Fig. 3). There is no evidence of an increase in cosmic ray particles during the past century.[ 11] Nor is there any clear evidence that large-scale volcanic events (such as the 1815 eruption of Tambora in Indonesia, which changed global climate for about a year) have any long-term effects that would explain 200 years of warming and carbon dioxide increase. Volcanoes erupt only 0.3 billion tonnes of carbon dioxide each year, but humans emit over 29 billion tonnes a year,[ 12] roughly 100 times as much. Clearly, we have a bigger effect. Methane is a more powerful greenhouse gas, but there is 200 times more carbon dioxide than methane, so carbon dioxide is still the most important agent.[ 13] Every other alternative has been looked at and can be ruled out. The only clear-cut relationship is between human-caused carbon dioxide increase and global warming. \* "The climate records since 1995 (or 1998) show cooling." That's simply untrue. The only way to support this argument is to cherry-pick the data.[ 14] Over the short term, there was a slight cooling trend from 1998-2000, but only because 1998 was a record-breaking El Nino year, so the next few years look cooler by comparison (Fig. 4). But since 2002, the overall long-term trend of warming is unequivocal. All of the 16 hottest years ever recorded on a global scale have occurred in the last 20 years. They are (in order of hottest first): 2010, 2009, 1998, 2005, 2003, 2002, 2004, 2006, 2007, 2001, 1997, 2008, 1995, 1999, 1990, and 2000.[ 15] In other words, every year since 2000 has been on the Top Ten hottest years list. The rest of the top 16 include 1995, 1997, 1998, 1999, and 2000. Only 1996 failed to make the list (because of the short-term cooling mentioned already). \* "We had record snows in the winter of 2009-2010, and also in 2010-2011." So what? This is nothing more than the difference between weather (short-term seasonal changes) and climate (the long-term average of weather over decades and centuries and longer). Our local weather tells us nothing about another continent, or the global average; it is only a local effect, determined by short-term atmospheric and oceano-graphic conditions.[ 16] In fact, warmer global temperatures mean more moisture in the atmosphere, which increases the intensity of normal winter snowstorms. In this particular case, the climate change critics forget that the early winter of November-December 2009 was actually very mild and warm, and then only later in January and February did it get cold and snow heavily. That warm spell in early winter helped bring more moisture into the system, so that when cold weather occurred, the snows were worse. In addition, the snows were unusually heavy only in North America; the rest of the world had different weather, and the global climate was warmer than average. Also, the summer of 2010 was the hottest on record, breaking the previous record set in 2009. \* "Carbon dioxide is good for plants, so the world will be better off." Who do they think they're kidding? The Competitive Enterprise Institute (funded by oil and coal companies and conservative foundations[ 17]) has run a series of shockingly stupid ads concluding with the tag line "Carbon dioxide: they call it pollution, we call it life." Anyone who knows the basic science of earth's atmosphere can spot the gross inaccuracies in this ad.[ 18] True, plants take in carbon dioxide that animals exhale, as they have for millions of years. But the whole point of the global warming evidence (as shown from ice cores) is that the delicate natural balance of carbon dioxide has been thrown off balance by our production of too much of it, way in excess of what plants or the oceans can handle. As a consequence, the oceans are warming[ 19, 20] and absorbing excess carbon dioxide making them more acidic. Already we are seeing a shocking decline in coral reefs ("bleaching") and extinctions in many marine ecosystems that can't handle too much of a good thing. Meanwhile, humans are busy cutting down huge areas of temperate and tropical forests, which not only means there are fewer plants to absorb the gas, but the slash and burn practices are releasing more carbon dioxide than plants can keep up with. There is much debate as to whether increased carbon dioxide might help agriculture in some parts of the world, but that has to be measured against the fact that other traditional "breadbasket" regions (such as the American Great Plains) are expected to get too hot to be as productive as they are today. The latest research[ 21] actually shows that increased carbon dioxide inhibits the absorption of nitrogen into plants, so plants (at least those that we depend upon today) are not going to flourish in a greenhouse world. It is difficult to know if those who tell the public otherwise are ignorant of basic atmospheric science and global geochemistry, or if they are being cynically disingenuous. \* "I agree that climate is changing, but I'm skeptical that humans are the main cause, so we shouldn't do anything." This is just fence sitting. A lot of reasonable skeptics deplore the right wing's rejection of the reality of climate change, but still want to be skeptical about the cause. If they want proof, they can examine the huge array of data that points directly to human caused global warming.[ 22] We can directly measure the amount of carbon dioxide humans are producing, and it tracks exactly with the amount of increase in atmospheric carbon dioxide. Through carbon isotope analysis, we can show that this carbon dioxide in the atmosphere is coming directly from our burning of fossil fuels, not from natural sources. We can also measure the drop in oxygen as it combines with the increased carbon levels to produce carbon dioxide. We have satellites in space that are measuring the heat released from the planet and can actually see the atmosphere getting warmer. The most crucial evidence emerged only within the past few years: climate models of the greenhouse effect predict that there should be cooling in the stratosphere (the upper layer of the atmosphere above 10 km or 6 miles in elevation), but warming in the troposphere (the bottom layer below 10 km or 6 miles), and that's exactly what our space probes have measured. Finally, we can rule out any other suspects (see above): solar heat is decreasing since 1940, not increasing, and there are no measurable increases in cosmic rays, methane, volcanic gases, or any other potential cause. Face it -- it's our problem. Why Do People Continue to Question the Reality of Climate Change? Thanks to all the noise and confusion over climate change, the general public has only a vague idea of what the debate is really about, and only about half of Americans think global warming is real or that we are to blame.[ 23] As in the evolution/creationism debate, the scientific community is virtually unanimous on what the data demonstrate about anthropogenic global warming. This has been true for over a decade. When science historian Naomi Oreskes[ 24] surveyed all peer-reviewed papers on climate change published between 1993 and 2003 in the world's leading scientific journal, Science, she found that there were 980 supporting the idea of human-induced global warming and none opposing it. In 2009, Doran and Kendall Zimmerman[ 25] surveyed all the climate scientists who were familiar with the data. They found that 95-99% agreed that global warming is real and human caused. In 2010, the prestigious Proceedings of the National Academy of Sciences published a study that showed that 98% of the scientists who actually do research in climate change are in agreement over anthropogenic global warming.[ 26] Every major scientific organization in the world has endorsed the conclusion of anthropogenic climate change as well. This is a rare degree of agreement within such an independent and cantankerous group as the world's top scientists. This is the same degree of scientific consensus that scientists have achieved over most major ideas, including gravity, evolution, and relativity. These and only a few other topics in science can claim this degree of agreement among nearly all the world's leading scientists, especially among everyone who is close to the scientific data and knows the problem intimately. If it were not such a controversial topic politically, there would be almost no interest in debating it since the evidence is so clear-cut. If the climate science community speaks with one voice (as in the 2007 IPCC report, and every report since then), why is there still any debate at all? The answer has been revealed by a number of investigations by diligent reporters who got past the PR machinery denying global warming, and uncovered the money trail. Originally, there were no real "dissenters" to the idea of global warming by scientists who are actually involved with climate research. Instead, the forces with vested interests in denying global climate change (the energy companies, and the "free-market" advocates) followed the strategy of tobacco companies: create a smokescreen of confusion and prevent the American public from recognizing scientific consensus. As the famous memo[ 27] from the tobacco lobbyists said "Doubt is our product." The denialists generated an anti-science movement entirely out of thin air and PR. The evidence for this PR conspiracy has been well documented in numerous sources. For example, Oreskes and Conway revealed from memos leaked to the press that in April 1998 the right-wing Marshall Institute, SEPP (Fred Seitz's lobby that aids tobacco companies and polluters), and ExxonMobil, met in secret at the American Petroleum Institute's headquarters in Washington, D.C. There they planned a $20 million campaign to get "respected scientists" to cast doubt on climate change, get major PR efforts going, and lobby Congress that global warming isn't real and is not a threat. The right-wing institutes and the energy lobby beat the bushes to find scientists -- any scientists -- who might disagree with the scientific consensus. As investigative journalists and scientists have documented over and over again,[ 28] the denialist conspiracy essentially paid for the testimony of anyone who could be useful to them. The day that the 2007 IPCC report was released (Feb. 2, 2007), the British newspaper The Guardian reported that the conservative American Enterprise Institute (funded largely by oil companies and conservative think tanks) had offered $10,000 plus travel expenses to scientists who would write negatively about the IPCC report.[ 29] In February 2012, leaks of documents from the denialist Heartland Institute revealed that they were trying to influence science education, suppress the work of scientists, and had paid off many prominent climate deniers, such as Anthony Watts, all in an effort to circumvent the scientific consensus by doing an "end run" of PR and political pressure. Other leaks have shown 9 out of 10 major climate deniers are paid by ExxonMobil.[ 30] We are accustomed to hired-gun "experts" paid by lawyers to muddy up the evidence in the case they are fighting, but this is extraordinary -- buying scientists outright to act as shills for organizations trying to deny scientific reality. With this kind of money, however, you can always find a fringe scientist or crank or someone with no relevant credentials who will do what they're paid to do. Fishing around to find anyone with some science background who will agree with you and dispute a scientific consensus is a tactic employed by the creationists to sound "scientific". The NCSE created a satirical "Project Steve,"[ 31] which demonstrated that there were more scientists who accept evolution named "Steve" than the total number of "scientists who dispute evolution". It may generate lots of PR and a smokescreen to confuse the public, but it doesn't change the fact that scientists who actually do research in climate change are unanimous in their insistence that anthropogenic global warming is a real threat. Most scientists I know and respect work very hard for little pay, yet they still cannot be paid to endorse some scientific idea they know to be false. The climate deniers have a lot of other things in common with creationists and other anti-science movements. They too like to quote someone out of context ("quote mining"), finding a short phrase in the work of legitimate scientists that seems to support their position. But when you read the full quote in context, it is obvious that they have used the quote inappropriately. The original author meant something that does not support their goals. The "Climategate scandal" is a classic case of this. It started with a few stolen emails from the Climate Research Unit of the University of East Anglia. If you read the complete text of the actual emails[ 32] and comprehend the scientific shorthand of climate scientists who are talking casually to each other, it is clear that there was no great "conspiracy" or that they were faking data. All six subsequent investigations have cleared Philip Jones and the other scientists of the University of East Anglia of any wrongdoing or conspiracy.[ 33] Even if there had been some conspiracy on the part of these few scientists, there is no reason to believe that the entire climate science community is secretly working together to generate false information and mislead the public. If there's one thing that is clear about science, it's about competition and criticism, not conspiracy and collusion. Most labs are competing with each other, not conspiring together. If one lab publishes a result that is not clearly defensible, other labs will quickly correct it. As James Lawrence Powell wrote: Scientists…show no evidence of being more interested in politics or ideology than the average American. Does it make sense to believe that tens of thousands of scientists would be so deeply and secretly committed to bringing down capitalism and the American way of life that they would spend years beyond their undergraduate degrees working to receive master's and Ph.D. degrees, then go to work in a government laboratory or university, plying the deep oceans, forbidding deserts, icy poles, and torrid jungles, all for far less money than they could have made in industry, all the while biding their time like a Russian sleeper agent in an old spy novel? Scientists tend to be independent and resist authority. That is why you are apt to find them in the laboratory or in the field, as far as possible from the prying eyes of a supervisor. Anyone who believes he could organize thousands of scientists into a conspiracy has never attended a single faculty meeting.[ 34] There are many more traits that the climate deniers share with the creationists and Holocaust deniers and others who distort the truth. They pick on small disagreements between different labs as if scientists can't get their story straight, when in reality there is always a fair amount of give and take between competing labs as they try to get the answer right before the other lab can do so. The key point here is that when all these competing labs around the world have reached a consensus and get the same answer, there is no longer any reason to doubt their common conclusion. The anti-scientists of climate denialism will also point to small errors by individuals in an effort to argue that the entire enterprise cannot be trusted. It is true that scientists are human, and do make mistakes, but the great power of the scientific method is that peer review weeds these out, so that when scientists speak with consensus, there is no doubt that their data are checked carefully Finally, a powerful line of evidence that this is a purely political controversy, rather than a scientific debate, is that the membership lists of the creationists and the climate deniers are highly overlapping. Both anti-scientific dogmas are fed to their overlapping audiences through right-wing media such as Fox News, Glenn Beck, and Rush Limbaugh. Just take a look at the "intelligent-design" cre-ationism website for the Discovery Institute. Most of the daily news items lately have nothing to do with creationism at all, but are focused on climate denial and other right-wing causes.[ 35] If the data about global climate change are indeed valid and robust, any qualified scientist should be able to look at them and see if the prevailing scientific interpretation holds up. Indeed, such a test took place. Starting in 2010, a group led by U.C. Berkeley physicist Richard Muller re-examined all the temperature data from the NOAA, East Anglia Hadley Climate Research Unit, and the Goddard Institute of Space Science sources. Even though Muller started out as a skeptic of the temperature data, and was funded by the Koch brothers and other oil company sources, he carefully checked and re-checked the research himself. When the GOP leaders called him to testify before the House Science and Technology Committee in spring 2011, they were expecting him to discredit the temperature data. Instead, Muller shocked his GOP sponsors by demonstrating his scientific integrity and telling the truth: the temperature increase is real, and the scientists who have demonstrated that the climate is changing are right (Fig. 5). In the fall of 2011, his study was published, and the conclusions were clear: global warming is real, even to a right-wing skeptical scientist. Unlike the hired-gun scientists who play political games, Muller did what a true scientist should do: if the data go against your biases and preconceptions, then do the right thing and admit it -- even if you've been paid by sponsors who want to discredit global warming. Muller is a shining example of a scientist whose integrity and honesty came first, and did not sell out to the highest bidder.[ 36] \* Science and Anti-Science The conclusion is clear: there's science, and then there's the anti-science of global warming denial. As we have seen, there is a nearly unanimous consensus among climate scientists that anthropogenic global warming is real and that we must do something about it. Yet the smokescreen, bluster and lies of the deniers has created enough doubt so that only half of the American public is convinced the problem requires action. Ironically, the U.S. is almost alone in questioning its scientific reality. International polls taken of 33,000 people in 33 nations in 2006 and 2007 show that 90% of their citizens regard climate change as a serious problem[ 37] and 80% realize that humans are the cause of it.[ 38] Just as in the case of creationism, the U.S. is out of step with much of the rest of the world in accepting scientific reality. It is not just the liberals and environmentalists who are taking climate change seriously. Historically conservative institutions (big corporations such as General Electric and many others such as insurance companies and the military) are already planning on how to deal with global warming. Many of my friends high in the oil companies tell me of the efforts by those companies to get into other forms of energy, because they know that cheap oil will be running out soon and that the effects of burning oil will make their business less popular. BP officially stands for "British Petroleum," but in one of their ad campaigns about 5 years ago, it stood for "Beyond Petroleum."[ 39] Although they still spend relatively little of their total budgets on alternative forms of energy, the oil companies still see the handwriting on the wall about the eventual exhaustion of oil -- and they are acting like any company that wants to survive by getting into a new business when the old one is dying. The Pentagon (normally not a left-wing institution) is also making contingency plans for how to fight wars in an era of global climate change, and analyzing what kinds of strategic threats might occur when climate change alters the kinds of enemies we might be fighting, and water becomes a scarce commodity. The New York Times reported[ 40] that in December 2008, the National Defense University outlined plans for military strategy in a greenhouse world. To the Pentagon, the big issue is global chaos and the potential of even nuclear conflict. The world must "prepare for the inevitable effects of abrupt climate change -- which will likely come [the only question is when] regardless of human activity." Insurance companies have no political axe to grind. If anything, they tend to be on the conservative side. They are simply in the business of assessing risk in a realistic fashion so they can accurately gauge their future insurance policies and what to charge for them. Yet they are all investing heavily in research on the disasters and risks posed by climatic change. In 2005, a study commissioned by the re-insurer Swiss Re said, "Climate change will significantly affect the health of humans and ecosystems and these impacts will have economic consequences."[ 41] Some people may still try to deny scientific reality, but big businesses like oil and insurance and conservative institutions like the military cannot afford to be blinded or deluded by ideology. They must plan for the real world that we will be seeing in the next few decades. They do not want to be caught unprepared and harmed by global climatic change when it threatens their survival. Neither can we as a society.

#### The plan solves for global emissions

Kammen 7 – Professor of Public Policy @ UC Berkeley (Daniel, "Green Jobs Created by Global Warming Initiative," September 25th, http://www.unep.org/civil\_society/GCSF9/pdfs/karmen-senate.pdf)

In addition to supporting domestic job creation, clean energy is an important and fastest growing international sector, and one where overseas policy can be used to support poor developing regions – such as Africa (Jacobsen and Kammen, 2007) and Central America – as well as regaining market share in solar, fuel cell and wind technologies, where European nations and Japan have invested heavily and are reaping the benefits of month to year backlogs in clean energy orders. Some of those orders are for U. S. installations, but many more could be if we choose to make clean and green energy a national priority for both domestic installation and overseas export. Technology exports have impacts well beyond domestic job creation. In fact, if properly managed, the development of a thriving ‘cleantech’ sector can address a vital global issues, namely the emissions trajectories of major developing nations. China and India are often singled out for attention as major, emerging global emitters. China, in fact, will become the world’s largest greenhouse emitter in the near future, if it has not already. This fact, is often used – mistakenly in my view – to argue against unilateral climate protection efforts by nations such as the United States.  This view is shortsighted in two vital respects. First, China is demonstrably already suffering from the impacts of fossil fuel use. Crop yields in many parts of China are significantly lower than they would be without the significant sulfur and particulate burden that results from domestic coal combustion. (In fact, coal combustions emissions from China have significant air quality impacts on Japan, and can be measured in the U. S. as well.) Crop losses of over 20% have been reported in part of China, with the decrease unambiguously linked to air pollution. China also experiences significant human health impacts from this pollution burden as well. Second, China has committed, on paper, to a ‘circular economy’ where waste is reduced and overall productivity is enhanced. If the United States were to become a major exporter, or even a partner, in the production of low-emissions technologies – from truly carbon-capture coal-fired power plants, to increased numbers of solar, wind, and biofuel technologies – China would be an eager trading partner, so that they could install increasing numbers of low-emissions technologies. This would directly help the Chinese economy and their environmental and public health situation. On both of these grounds, U. S. domestic expansion of the clean energy sector will likely positively impact the ability and the actions of a number of emerging economies to ‘go green’.

#### It is not too late to reverse warming – taking action now is critical – the alternative to reducing emissions is mass death

Nuccitelli 12 – Dana, environmental scientist at a private environmental consulting firm in Sacramento and 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, 2012, “Realistically What Might The Future Climate Look Like?”, http://thinkprogress.org/climate/2012/09/01/784931/realistically-what-might-the-future-climate-look-like/

This is Why Reducing Emissions is Critical¶ We’re not yet committed to surpassing 2°C global warming, but as Watson noted, we are quickly running out of time to realistically give ourselves a chance to stay below that ‘danger limit’. However, 2°C is not a do-or-die threshold. Every bit of CO2 emissions we can reduce means that much avoided future warming, which means that much avoided climate change impacts. As Lonnie Thompson noted, the more global warming we manage to mitigate, the less adaption and suffering we will be forced to cope with in the future.¶ Realistically, based on the current political climate (which we will explore in another post next week), limiting global warming to 2°C is probably the best we can do. However, there is a big difference between 2°C and 3°C, between 3°C and 4°C, and anything greater than 4°C can probably accurately be described as catastrophic, since various tipping points are expected to be triggered at this level. Right now, we are on track for the catastrophic consequences (widespread coral mortality, mass extinctions, hundreds of millions of people adversely impacted by droughts, floods, heat waves, etc.). But we’re not stuck on that track just yet, and we need to move ourselves as far off of it as possible by reducing our greenhouse gas emissions as soon and as much as possible.¶ There are of course many people who believe that the planet will not warm as much, or that the impacts of the associated climate change will be as bad as the body of scientific evidence suggests. That is certainly a possiblity, and we very much hope that their optimistic view is correct. However, what we have presented here is the best summary of scientific evidence available, and it paints a very bleak picture if we fail to rapidly reduce our greenhouse gas emissions.¶ If we continue forward on our current path, catastrophe is not just a possible outcome, it is the most probable outcome. And an intelligent risk management approach would involve taking steps to prevent a catastrophic scenario if it were a mere possibility, let alone the most probable outcome. This is especially true since the most important component of the solution – carbon pricing – can be implemented at a relatively low cost, and a far lower cost than trying to adapt to the climate change consequences we have discussed here (Figure 4).¶ Climate contrarians will often mock ‘CAGW’ (catastrophic anthropogenic global warming), but the sad reality is that CAGW is looking more and more likely every day. But it’s critical that we don’t give up, that we keep doing everything we can do to reduce our emissions as much as possible in order to avoid as many catastrophic consequences as possible, for the sake of future generations and all species on Earth. The future climate will probably be much more challenging for life on Earth than today’s, but we still can and must limit the damage.

#### Continued reliance on coal kills 13,000 people every year and spreads hazardous pollution

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.

### Contention Two is Advocacy

#### Debating energy policy joins members of different fields and philosophies to create a consciousness shift towards sustainable environmental policy – how students are trained matters immensely to public policy

Crist 4 (Eileen, Professor at Virginia Tech in the Department of Science and Technology, “Against the social construction of nature and wilderness”, Environmental Ethics 26;1, p 13-6, http://www.sts.vt.edu/faculty/crist/againstsocialconstruction.pdf)

Yet, constructivist analyses of "nature" favor remaining in the comfort zone of zestless agnosticism and noncommittal meta-discourse. As David Kidner suggests, this intellectual stance may function as a mechanism against facing the devastation of the biosphere—an undertaking long underway but gathering momentum with the imminent bottlenecking of a triumphant global consumerism and unprecedented population levels. Human-driven extinction—in the ballpark of Wilson's estimated 27,000 species per year—is so unthinkable a fact that choosing to ignore it may well be the psychologically risk-free option.¶ Nevertheless, this is the opportune historical moment for intellectuals in the humanities and social sciences to join forces with conservation scientists in order to help create the consciousness shift and policy changes to stop this irreversible destruction. Given this outlook, how students in the human sciences are trained to regard scientific knowledge, and what kind of messages percolate to the public from the academy about the nature of scientific findings, matter immensely. The "agnostic stance" of constructivism toward "scientific claims" about the environment—a stance supposedly mandatory for discerning how scientific knowledge is "socially assembled"[32]—is, to borrow a legendary one-liner, striving to interpret the world at an hour that is pressingly calling us to change it.

#### Debate empirically inculcates portable skills that lead to better energy policy – it gives voice to buried arguments and challenges bias and institutional affiliations

Mitchell 10 (Gordon R, Associate Professor and Director of Graduate Studies in the Department of Communication at the University of Pittsburgh, where he also directs the William Pitt Debating Union, “SWITCH-SIDE DEBATING MEETS DEMAND-DRIVEN RHETORIC OF SCIENCE”, <http://www.pitt.edu/~gordonm/JPubs/Mitchell2010.pdf>)

An additional dimension of nuance emerging from this avenue of analysis pertains to the precise nature of the deliberative goals set by bridge. Program descriptions notably eschew Kettering-style references to democratic citizen empowerment, yet feature deliberation prominently as a key ingredient of strong intelligence tradecraft. This caveat is especially salient to consider when it comes to the second category of rhetorically informed critical work invited by the contingent aspect of specific debate initiatives. To grasp this layer it is useful to appreciate how the name of the bridge project constitutes an invitation for those outside the intelligence community to participate in the analytic outreach effort. According to Doney, bridge “provides an environment for Analytic Outreach—a place where IC analysts can reach out to expertise elsewhere in federal, state, and local government, in academia, and industry. New communities of interest can form quickly in bridge through the ‘web of trust’ access control model—access to minds outside the intelligence community creates an analytic force multiplier.”48 This presents a moment of choice for academic scholars in a position to respond to Doney’s invitation; it is an opportunity to convert scholarly expertise into an “analytic force multiplier.”¶ In reflexively pondering this invitation, it may be valuable for scholars to read Greene and Hicks’s proposition that switch-side debating should be viewed as a cultural technology in light of Langdon Winner’s maxim that “technological artifacts have politics.”49 In the case of bridge, politics are informed by the history of intelligence community policies and practices. Commenter Thomas Lord puts this point in high relief in a post offered in response to a news story on the topic: “[W]hy should this thing (‘bridge’) be? . . . [The intelligence community] on the one hand sometimes provides useful information to the military or to the civilian branches and on the other hand it is a dangerous, out of control, relic that by all external appearances is not the slightest bit reformed, other than superficially, from such excesses as became exposed in the cointelpro and mkultra hearings of the 1970s.”50 A debate scholar need not agree with Lord’s full-throated criticism of the intelligence community (he goes on to observe that it bears an alarming resemblance to organized crime) to understand that participation in the community’s Analytic Outreach program may serve the ends of deliberation, but not necessarily democracy, or even a defensible politics. Demand-driven rhetoric of science necessarily raises questions about what’s driving the demand, questions that scholars with relevant expertise would do well to ponder carefully before embracing invitations to contribute their argumentative expertise to deliberative projects. By the same token, it would be prudent to bear in mind that the technological determinism about switch-side debate endorsed by Greene and Hicks may tend to flatten reflexive assessments regarding the wisdom of supporting a given debate initiative—as the next section illustrates, manifest differences among initiatives warrant context-sensitive judgments regarding the normative political dimensions featured in each case.¶ Public Debates in the EPA Policy Process¶ The preceding analysis of U.S. intelligence community debating initiatives highlighted how analysts are challenged to navigate discursively the heteroglossia of vast amounts of different kinds of data flowing through intelligence streams. Public policy planners are tested in like manner when they attempt to stitch together institutional arguments from various and sundry inputs ranging from expert testimony, to historical precedent, to public comment. Just as intelligence managers find that algorithmic, formal methods of analysis often don’t work when it comes to the task of interpreting and synthesizing copious amounts of disparate data, public-policy planners encounter similar challenges.¶ In fact, the argumentative turn in public-policy planning elaborates an approach to public-policy analysis that foregrounds deliberative interchange and critical thinking as alternatives to “decisionism,” the formulaic application of “objective” decision algorithms to the public policy process. Stating the matter plainly, Majone suggests, “whether in written or oral form, argument is central in all stages of the policy process.” Accordingly, he notes, “we miss a great deal if we try to understand policy-making solely in terms of power, influence, and bargaining, to the exclusion of debate and argument.”51 One can see similar rationales driving Goodwin and Davis’s EPA debating project, where debaters are invited to conduct on-site public debates covering resolutions crafted to reflect key points of stasis in the EPA decision-making process. For example, in the 2008 Water Wars debates held at EPA headquarters in Washington, D.C., resolutions were crafted to focus attention on the topic of water pollution, with one resolution focusing on downstream states’ authority to control upstream states’ discharges and sources of pollutants, and a second resolution exploring the policy merits of bottled water and toilet paper taxes as revenue sources to fund water infrastructure projects. In the first debate on interstate river pollution, the team of Seth Gannon and Seungwon Chung from Wake Forest University argued in favor of downstream state control, with the Michigan State University team of Carly Wunderlich and Garrett Abelkop providing opposition. In the second debate on taxation policy, Kevin Kallmyer and Matthew Struth from University of Mary Washington defended taxes on bottled water and toilet paper, while their opponents from Howard University, Dominique Scott and Jarred McKee, argued against this proposal. Reflecting on the project, Goodwin noted how the intercollegiate debaters’ ability to act as “honest brokers” in the policy arguments contributed positively to internal EPA deliberation on both issues.52 Davis observed that since the invited debaters “didn’t have a dog in the fight,” they were able to give voice to previously buried arguments that some EPA subject matter experts felt reticent to elucidate because of their institutional affiliations.53¶ Such findings are consistent with the views of policy analysts advocating the argumentative turn in policy planning. As Majone claims, “Dialectical confrontation between generalists and experts often succeeds in bringing out unstated assumptions, conflicting interpretations of the facts, and the risks posed by new projects.”54 Frank Fischer goes even further in this context, explicitly appropriating rhetorical scholar Charles Willard’s concept of argumentative “epistemics” to flesh out his vision for policy studies: Uncovering the epistemic dynamics of public controversies would allow for a more enlightened understanding of what is at stake in a particular dispute, making possible a sophisticated evaluation of the various viewpoints and merits of different policy options. In so doing, the differing, often tacitly held contextual perspectives and values could be juxtaposed; the viewpoints and demands of experts, special interest groups, and the wider public could be directly compared; and the dynamics among the participants could be scrutizined. This would by no means sideline or even exclude scientific assessment; it would only situate it within the framework of a more comprehensive evaluation.55¶ As Davis notes, institutional constraints present within the EPA communicative milieu can complicate efforts to provide a full airing of all relevant arguments pertaining to a given regulatory issue. Thus, intercollegiate debaters can play key roles in retrieving and amplifying positions that might otherwise remain sedimented in the policy process. The dynamics entailed in this symbiotic relationship are underscored by deliberative planner John Forester, who observes, “If planners and public administrators are to make democratic political debate and argument possible, they will need strategically located allies to avoid being fully thwarted by the characteristic self-protecting behaviors of the planning organizations and bureaucracies within which they work.”56 Here, an institution’s need for “strategically located allies” to support deliberative practice constitutes the demand for rhetorically informed expertise, setting up what can be considered a demand-driven rhetoric of science. As an instance of rhetoric of science scholarship, this type of “switch-side public debate”57 differs both from insular contest tournament debating, where the main focus is on the pedagogical benefit for student participants, and first-generation rhetoric of science scholarship, where critics concentrated on unmasking the rhetoricity of scientific artifacts circulating in what many perceived to be purely technical spheres of knowledge production.58 As a form of demand-driven rhetoric of science, switch-side debating connects directly with the communication field’s performative tradition of argumentative engagement in public controversy—a different route of theoretical grounding than rhetorical criticism’s tendency to locate its foundations in the English field’s tradition of literary criticism and textual analysis.59¶ Given this genealogy, it is not surprising to learn how Davis’s response to the EPA’s institutional need for rhetorical expertise took the form of a public debate proposal, shaped by Davis’s dual background as a practitioner and historian of intercollegiate debate. Davis competed as an undergraduate policy debater for Howard University in the 1970s, and then went on to enjoy substantial success as coach of the Howard team in the new millennium. In an essay reviewing the broad sweep of debating history, Davis notes, “Academic debate began at least 2,400 years ago when the scholar Protagoras of Abdera (481–411 bc), known as the father of debate, conducted debates among his students in Athens.”60 As John Poulakos points out, “older” Sophists such as Protagoras taught Greek students the value of dissoi logoi, or pulling apart complex questions by debating two sides of an issue.61 The few surviving fragments of Protagoras’s work suggest that his notion of dissoi logoi stood for the principle that “two accounts [logoi] are present about every ‘thing,’ opposed to each other,” and further, that humans could “measure” the relative soundness of knowledge claims by engaging in give-and-take where parties would make the “weaker argument stronger” to activate the generative aspect of rhetorical practice, a key element of the Sophistical tradition.62¶ Following in Protagoras’s wake, Isocrates would complement this centrifugal push with the pull of synerchésthé, a centripetal exercise of “coming together” deliberatively to listen, respond, and form common social bonds.63 Isocrates incorporated Protagorean dissoi logoi into synerchésthé, a broader concept that he used flexibly to express interlocking senses of (1) inquiry, as in groups convening to search for answers to common questions through discussion;64 (2) deliberation, with interlocutors gathering in a political setting to deliberate about proposed courses of action;65 and (3) alliance formation, a form of collective action typical at festivals,66 or in the exchange of pledges that deepen social ties.67¶ Returning once again to the Kettering-informed sharp distinction between debate and deliberation, one sees in Isocratic synerchésthé, as well as in the EPA debating initiative, a fusion of debate with deliberative functions. Echoing a theme raised in this essay’s earlier discussion of intelligence tradecraft , such a fusion troubles categorical attempts to classify debate and deliberation as fundamentally opposed activities. The significance of such a finding is amplified by the frequency of attempts in the deliberative democracy literature to insist on the theoretical bifurcation of debate and deliberation as an article of theoretical faith.¶ Tandem analysis of the EPA and intelligence community debating initiatives also brings to light dimensions of contrast at the third level of Isocratic synerchésthé, alliance formation. The intelligence community’s Analytic Outreach initiative invites largely one-way communication flowing from outside experts into the black box of classified intelligence analysis. On the contrary, the EPA debating program gestures toward a more expansive project of deliberative alliance building. In this vein, Howard University’s participation in the 2008 EPA Water Wars debates can be seen as the harbinger of a trend by historically black colleges and universities (hbcus) to catalyze their debate programs in a strategy that evinces Davis’s dual-focus vision. On the one hand, Davis aims to recuperate Wiley College’s tradition of competitive excellence in intercollegiate debate, depicted so powerfully in the feature film The Great Debaters, by starting a wave of new debate programs housed in hbcus across the nation.68 On the other hand, Davis sees potential for these new programs to complement their competitive debate programming with participation in the EPA’s public debating initiative.¶ This dual-focus vision recalls Douglas Ehninger’s and Wayne Brockriede’s vision of “total” debate programs that blend switch-side intercollegiate tournament debating with forms of public debate designed to contribute to wider communities beyond the tournament setting.69 Whereas the political telos animating Davis’s dual-focus vision certainly embraces background assumptions that Greene and Hicks would find disconcerting—notions of liberal political agency, the idea of debate using “words as weapons”70—there is little doubt that the project of pursuing environmental protection by tapping the creative energy of hbcu-leveraged dissoi logoi diff ers significantly from the intelligence community’s effort to improve its tradecraft through online digital debate programming. Such difference is especially evident in light of the EPA’s commitment to extend debates to public realms, with the attendant possible benefits unpacked by Jane Munksgaard and Damien Pfister:¶ Having a public debater argue against their convictions, or confess their indecision on a subject and subsequent embrace of argument as a way to seek clarity, could shake up the prevailing view of debate as a war of words. Public uptake of the possibility of switch-sides debate may help lessen the polarization of issues inherent in prevailing debate formats because students are no longer seen as wedded to their arguments. This could transform public debate from a tussle between advocates, with each public debater trying to convince the audience in a Manichean struggle about the truth of their side, to a more inviting exchange focused on the content of the other’s argumentation and the process of deliberative exchange.71¶ Reflection on the EPA debating initiative reveals a striking convergence among (1) the expressed need for dissoi logoi by government agency officials wrestling with the challenges of inverted rhetorical situations, (2) theoretical claims by scholars regarding the centrality of argumentation in the public policy process, and (3) the practical wherewithal of intercollegiate debaters to tailor public switch-side debating performances in specific ways requested by agency collaborators. These points of convergence both underscore previously articulated theoretical assertions regarding the relationship of debate to deliberation, as well as deepen understanding of the political role of deliberation in institutional decision making. But they also suggest how decisions by rhetorical scholars about whether to contribute switch-side debating acumen to meet demand-driven rhetoric of science initiatives ought to involve careful reflection. Such an approach mirrors the way policy planning in the “argumentative turn” is designed to respond to the weaknesses of formal, decisionistic paradigms of policy planning with situated, contingent judgments informed by reflective deliberation.

#### Debate over energy policy is a reflexive forum that facilitates effective decision-making and deliberation

Mitchell 10 (Gordon R, Associate Professor and Director of Graduate Studies in the Department of Communication at the University of Pittsburgh, where he also directs the William Pitt Debating Union, “SWITCH-SIDE DEBATING MEETS DEMAND-DRIVEN RHETORIC OF SCIENCE”, <http://www.pitt.edu/~gordonm/JPubs/Mitchell2010.pdf>)

Yet the picture grows more complex when one considers what is happening over at the Environmental Protection Agency (EPA), where environmental scientist Ibrahim Goodwin is collaborating with John W. Davis on a project that uses switch-side debating to clean up air and water. In April 2008, that initiative brought top intercollegiate debaters from four universities to Washington, D.C., for a series of debates on the topic of water quality, held for an audience of EPA subject matter experts working on interstate river pollution and bottled water issues. An April 2009 follow-up event in Huntington Beach, California, featured another debate weighing the relative merits of monitoring versus remediation as beach pollution strategies. “We use nationally ranked intercollegiate debate programs to research and present the arguments, both pro and con, devoid of special interest in the outcome,” explains Davis. “In doing so, agency representatives now remain squarely within the decision-making role thereby neutralizing overzealous advocacy that can inhibit learned discourse.”7¶ The intelligence community and EPA debating initiatives vary quite a bit simply by virtue of the contrasting policy objectives pursued by their sponsoring agencies (foreign policy versus environmental protection). Significant process-level differences mark off the respective initiatives as well; the former project entails largely one-way interactions designed to sluice insight from “open sources” to intelligence analysts working in classified environments and producing largely secret assessments. In contrast, the EPA’s debating initiative is conducted through public forums in a policy process required by law to be transparent. This granularity troubles Greene and Hicks’s deterministic framing of switch-side debate as an ideologically smooth and consistent cultural technology. In an alternative approach, this essay positions debate as a malleable method of decision making, one utilized by different actors in myriad ways to pursue various purposes. By bringing forth the texture inherent in the associated messy “mangle of practice,”8 such an approach has potential to deepen our understanding of debate as a dynamic and contingent, rather than static, form of rhetorical performance.¶ Juxtaposition of the intelligence community and EPA debating initiatives illuminates additional avenues of inquiry that take overlapping elements of the two projects as points of departure. Both tackle complex, multifaceted, and technical topics that do not lend themselves to reductionist, formal analysis, and both tap into the creative energy latent in what Protagoras of Abdera called dissoi logoi, the process of learning about a controversial or unresolved issue by airing opposing viewpoints.9 In short, these institutions are employing debate as a tool of deliberation, seeking outside expertise to help accomplish their aims. Such trends provide an occasion to revisit a presumption commonly held among theorists of deliberative democracy—that debate and deliberation are fundamentally opposed practices—as the intelligence community’s Analytic Outreach program and the EPA’s debating initiatives represent examples where debating exercises are designed to facilitate, not frustrate, deliberative goals.

#### The state is an inevitable and 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

#### The discourse of environmental action must be attached to the state garner public support and lead to policy action

[Note: EM = ecological modernization]

Doran and Barry 6 – worked at all levels in the environment and sustainable development policy arena - at the United Nations, at the Northern Ireland Assembly and Dáil Éireann, and in the Irish NGO sector. PhD--AND-- Reader in Politics, Queen's University School of Politics, International Studies, and Philosophy. PhD Glasgow (Peter and John, Refining Green Political Economy: From Ecological Modernisation to Economic Security and Sufficiency, Analyse & Kritik 28/2006, p. 250–275, http://www.analyse-und-kritik.net/2006-2/AK\_Barry\_Doran\_2006.pdf)

Viewed in isolation EM can be painted as a reformist and limited strategy for achieving a more sustainable economy and society, and indeed questions could be legitimately asked as to whether the development of a recognisably ‘green’ political economy for sustainable development can be based on it. In this paper, it is contended that there are strategic advantages in seeking to build upon and radicalise EM. There are indications in the UK that the debate on sustainable consumption may lead to new deliberative fora for a re-negotiation of the meaning and ends of consumption. Could it be that ‘suﬃciency’ will emerge as the logical complement (on the consumer side) of the early production-side debate on EM on the limits of ‘eﬃciency’ without an ecological context? ¶ While there are various reasons one can give for this, in this conclusion we focus on two—one normative/principled the other strategic.¶ From a strategic point of view, it is clear that, as Dryzek and his colleagues have shown, if green and sustainability goals, aims and objectives are to be integrated within state policy, these need to attach themselves to one of the core state imperatives—accumulation/economic growth or legitimacy (Dryzek et al. 2003; Barry 2003b). It is clear that the discourse of EM allows (some) green objectives to be integrated/translated into a policy language and framework which complements and does not undermine the state’s core imperative of pursuing orthodox economic growth. Therefore if (in the absence of a Green Party forming a government or being part of a ruling coalition, or even more unlikely of one of the main traditional parties initiating policies consistent with a radical understanding of sustainable development), the best that can be hoped for under current political conditions is the ‘greening of growth and capitalism’ i. e. a narrow, ‘business as usual’ version of EM. Or as Jonathan Porritt has put it, “We need more emphasis about the inherent unsustainability of our dominant economic model, even as we seek to improve the delivery of that model in the short to medium term” (Porritt 2004, 5). 23 ¶ On a more principled note, the adoption of EM as a starting point for the development of a model/theory of green political economy does carry with it the not inconsiderable beneﬁt of removing the ‘anti-growth’ and ‘limits to growth’ legacy which has (in our view) held back the theoretical development of a positive, attractive, modern conceptualisation of green political economy and radical conceptualisations of sustainable development. Here the technological innovation, the role of regulation driving innovation and eﬃciency, the promise that the transition to a more sustainable economy and society does not necessarily mean completely abandoning currently lifestyles and aspirations—strategically important in generating democratic support for sustainable development, and as indicated above, importance if the vision of a green sustainable economy is one which promotes diversity and tolerance in lifestyles and does not demand everyone conform to a putative ‘green’ lifestyle. Equally, this approach does not completely reject the positive role/s of a regulated market within sustainable development. However, it does demand a clear shift towards making the promotion of economic security (and quality of life) central to economic (and other) policy. Only when this happens can we say we have begun the transition to implementing the principles of sustainable development rather than fruitlessly seeking for some ‘greenprint’ of an abstract and utopian vision of the ‘sustainable society’.

#### Public advocacy is key to effective action on climate change

CAG 10—Climate Change Communication Advisory Group. Dr Adam Corner School of Psychology, Cardiff University - Dr Tom Crompton Change Strategist, WWF-UK - Scott Davidson Programme Manager, Global Action Plan - Richard Hawkins Senior Researcher, Public Interest Research Centre - Professor Tim Kasser, Psychology department, Knox College, Galesburg, Illinois, USA. - Dr Renee Lertzman, Center for Sustainable Processes & Practices, Portland State University, US. - Peter Lipman, Policy Director, Sustrans. - Dr Irene Lorenzoni, Centre for Environmental Risk, University of East Anglia. - George Marshall, Founding Director, Climate Outreach , Information Network - Dr Ciaran Mundy, Director, Transition Bristol - Dr Saffron O’Neil, Department of Resource Management and Geography, University of Melbourne, Australia. - Professor Nick Pidgeon, Director, Understanding Risk Research Group, School of Psychology, Cardiff University. - Dr Anna Rabinovich, School of Psychology, University of Exeter - Rosemary Randall, Founder and director of Cambridge Carbon Footprint - Dr Lorraine Whitmarsh, School of Psychology, Cardiff University & Visiting Fellow at the, Tyndall Centre for Climate Change Research. (Communicating climate change to mass public audience, http://pirc.info/downloads/communicating\_climate\_mass\_audiences.pdf)

This short advisory paper collates a set of recommendations about how best to shape mass public communications aimed at increasing concern about climate change and motivating commensurate behavioural changes.¶ Its focus is not upon motivating small private-sphere behavioural changes on a piece-meal basis. Rather, it marshals evidence about how best to motivate the ambitious and systemic behavioural change that is necessary – including, crucially, greater public engagement with the policy process (through, for example, lobbying decision-makers and elected representatives, or participating in demonstrations), as well as major lifestyle changes. ¶ Political leaders themselves have drawn attention to the imperative for more vocal public pressure to create the ‘political space’ for them to enact more ambitious policy interventions. 1 While this paper does not dismiss the value of individuals making small private-sphere behavioural changes (for example, adopting simple domestic energy efficiency measures) it is clear that such behaviours do not, in themselves, represent a proportional response to the challenge of climate change. As David MacKay, Chief Scientific Advisor to the UK Department of Energy and Climate change writes: “Don’t be distracted by the myth that ‘every little helps’. If everyone does a little, we’ll achieve only a little” (MacKay, 2008).¶ The task of campaigners and communicators from government, business and non-governmental organisations must therefore be to motivate both (i) widespread adoption of ambitious private-sphere behavioural changes; and (ii) widespread acceptance of – and indeed active demand for – ambitious new policy interventions.¶ Current public communication campaigns, as orchestrated by government, business and non-governmental organisations, are not achieving these changes. This paper asks: how should such communications be designed if they are to have optimal impact in motivating these changes? The response to this question will require fundamental changes in the ways that many climate change communication campaigns are currently devised and implemented. ¶ This advisory paper offers a list of principles that could be used to enhance the quality of communication around climate change communications. The authors are each engaged in continuously sifting the evidence from a range of sub-disciplines within psychology, and reflecting on the implications of this for improving climate change communications. Some of the organisations that we represent have themselves at times adopted approaches which we have both learnt from and critique in this paper – so some of us have first hand experience of the need for on-going improvement in the strategies that we deploy. ¶ The changes we advocate will be challenging to enact – and will require vision and leadership on the part of the organisations adopting them. But without such vision and leadership, we do not believe that public communication campaigns on climate change will create the necessary behavioural changes – indeed, there is a profound risk that many of today’s campaigns will actually prove counter-productive. ¶ Seven Principles¶ 1. Move Beyond Social Marketing¶ We believe that too little attention is paid to the understanding that psychologists bring to strategies for motivating change, whilst undue faith is often placed in the application of marketing strategies to ‘sell’ behavioural changes. Unfortunately, in the context of ambitious pro-environmental behaviour, such strategies seem unlikely to motivate systemic behavioural change.¶ Social marketing is an effective way of achieving a particular behavioural goal – dozens of practical examples in the field of health behaviour attest to this. Social marketing is really more of a framework for designing behaviour change programmes than a behaviour change programme - it offers a method of maximising the success of a specific behavioural goal. Darnton (2008) has described social marketing as ‘explicitly transtheoretical’, while Hastings (2007), in a recent overview of social marketing, claimed that there is no theory of social marketing. Rather, it is a ‘what works’ philosophy, based on previous experience of similar campaigns and programmes. Social marketing is flexible enough to be applied to a range of different social domains, and this is undoubtedly a fundamental part of its appeal.¶ However, social marketing’s 'what works' status also means that it is agnostic about the longer term, theoretical merits of different behaviour change strategies, or the cultural values that specific campaigns serve to strengthen. Social marketing dictates that the most effective strategy should be chosen, where effective means ‘most likely to achieve an immediate behavioural goal’. ¶ This means that elements of a behaviour change strategy designed according to the principles of social marketing may conflict with other, broader goals. What if the most effective way of promoting pro-environmental behaviour ‘A’ was to pursue a strategy that was detrimental to the achievement of long term pro-environmental strategy ‘Z’? The principles of social marketing have no capacity to resolve this conflict – they are limited to maximising the success of the immediate behavioural programme. This is not a flaw of social marketing – it was designed to provide tools to address specific behavioural problems on a piecemeal basis. But it is an important limitation, and one that has significant implications if social marketing techniques are used to promote systemic behavioural change and public engagement on an issue like climate change. ¶ 2. Be honest and forthright about the probable impacts of climate change, and the scale of the challenge we confront in avoiding these. But avoid deliberate attempts to provoke fear or guilt. ¶ There is no merit in ‘dumbing down’ the scientific evidence that the impacts of climate change are likely to be severe, and that some of these impacts are now almost certainly unavoidable. Accepting the impacts of climate change will be an important stage in motivating behavioural responses aimed at mitigating the problem. However, deliberate attempts to instil fear or guilt carry considerable risk. ¶ Studies on fear appeals confirm the potential for fear to change attitudes or verbal expressions of concern, but often not actions or behaviour (Ruiter et al., 2001). The impact of fear appeals is context - and audience - specific; for example, for those who do not yet realise the potentially ‘scary’ aspects of climate change, people need to first experience themselves as vulnerable to the risks in some way in order to feel moved or affected (Das et al, 2003; Hoog et al, 2005). As people move towards contemplating action, fear appeals can help form a behavioural intent, providing an impetus or spark to ‘move’ from; however such appeals must be coupled with constructive information and support to reduce the sense of danger (Moser, 2007). The danger is that fear can also be disempowering – producing feelings of helplessness, remoteness and lack of control (O’Neill and Nicholson-Cole, 2009). Fear is likely to trigger ‘barriers to engagement’, such as denial2 (Stoll-Kleemann et al., 2001; Weber, 2006; Moser and Dilling, 2007; Lorenzoni, Nicholson-Cole & Whitmarsh, 2007). The location of fear in a message is also relevant; it works better when placed first for those who are inclined to follow the advice, but better second for those who aren't (Bier, 2001).¶ Similarly, studies have shown that guilt can play a role in motivating people to take action but can also function to stimulate defensive mechanisms against the perceived threat or challenge to one’s sense of identity (as a good, moral person). In the latter case, behaviours may be left untouched (whether driving a SUV or taking a flight) as one defends against any feelings of guilt or complicity through deployment of a range of justifications for the behaviour (Ferguson & Branscombe, 2010). ¶ Overall, there is a need for emotionally balanced representations of the issues at hand. This will involve acknowledging the ‘affective reality’ of the situation, e.g. “We know this is scary and overwhelming, but many of us feel this way and we are doing something about it”.¶ 3. Be honest and forthright about the impacts of mitigating and adapting to climate change for current lifestyles, and the ‘loss’ - as well as the benefits - that these will entail. Narratives that focus exclusively on the ‘up-side’ of climate solutions are likely to be unconvincing. While narratives about the future impacts of climate change may highlight the loss of much that we currently hold to be dear, narratives about climate solutions frequently ignore the question of loss. If the two are not addressed concurrently, fear of loss may be ‘split off’ and projected into the future, where it is all too easily denied. This can be dangerous, because accepting loss is an important step towards working through the associated emotions, and emerging with the energy and creativity to respond positively to the new situation (Randall, 2009). However, there are plenty of benefits (besides the financial ones) of a low-carbon lifestyle e.g., health, community/social interaction - including the ‘intrinsic' goals mentioned below. It is important to be honest about both the losses and the benefits that may be associated with lifestyle change, and not to seek to separate out one from the other.¶ 3a. Avoid emphasis upon painless, easy steps. ¶ Be honest about the limitations of voluntary private-sphere behavioural change, and the need for ambitious new policy interventions that incentivise such changes, or that regulate for them. People know that the scope they have, as individuals, to help meet the challenge of climate change is extremely limited. For many people, it is perfectly sensible to continue to adopt high-carbon lifestyle choices whilst simultaneously being supportive of government interventions that would make these choices more difficult for everyone. ¶ The adoption of small-scale private sphere behavioural changes is sometimes assumed to lead people to adopt ever more difficult (and potentially significant) behavioural changes. The empirical evidence for this ‘foot-in-thedoor’ effect is highly equivocal. Some studies detect such an effect; others studies have found the reverse effect (whereby people tend to ‘rest on their laurels’ having adopted a few simple behavioural changes - Thogersen and Crompton, 2009). Where attention is drawn to simple and painless privatesphere behavioural changes, these should be urged in pursuit of a set of intrinsic goals (that is, as a response to people’s understanding about the contribution that such behavioural change may make to benefiting their friends and family, their community, the wider world, or in contributing to their growth and development as individuals) rather than as a means to achieve social status or greater financial success. Adopting behaviour in pursuit of intrinsic goals is more likely to lead to ‘spillover’ into other sustainable behaviours (De Young, 2000; Thogersen and Crompton, 2009).¶ People aren’t stupid: they know that if there are wholesale changes in the global climate underway, these will not be reversed merely through checking their tyre pressures or switching their TV off standby. An emphasis upon simple and painless steps suppresses debate about those necessary responses that are less palatable – that will cost people money, or that will infringe on cherished freedoms (such as to fly). Recognising this will be a key step in accepting the reality of loss of aspects of our current lifestyles, and in beginning to work through the powerful emotions that this will engender (Randall, 2009). ¶ 3b. Avoid over-emphasis on the economic opportunities that mitigating, and adapting to, climate change may provide. ¶ There will, undoubtedly, be economic benefits to be accrued through investment in new technologies, but there will also be instances where the economic imperative and the climate change adaptation or mitigation imperative diverge, and periods of economic uncertainty for many people as some sectors contract. It seems inevitable that some interventions will have negative economic impacts (Stern, 2007).¶ Undue emphasis upon economic imperatives serves to reinforce the dominance, in society, of a set of extrinsic goals (focussed, for example, on financial benefit). A large body of empirical research demonstrates that these extrinsic goals are antagonistic to the emergence of pro-social and proenvironmental concern (Crompton and Kasser, 2009).¶ 3c. Avoid emphasis upon the opportunities of ‘green consumerism’ as a response to climate change.¶ As mentioned above (3b), a large body of research points to the antagonism between goals directed towards the acquisition of material objects and the emergence of pro-environmental and pro-social concern (Crompton and Kasser, 2009). Campaigns to ‘buy green’ may be effective in driving up sales of particular products, but in conveying the impression that climate change can be addressed by ‘buying the right things’, they risk undermining more difficult and systemic changes. A recent study found that people in an experiment who purchased ‘green’ products acted less altruistically on subsequent tasks (Mazar & Zhong, 2010) – suggesting that small ethical acts may act as a ‘moral offset’ and licence undesirable behaviours in other domains. This does not mean that private-sphere behaviour changes will always lead to a reduction in subsequent pro-environmental behaviour, but it does suggest that the reasons used to motivate these changes are critically important. Better is to emphasise that ‘every little helps a little’ – but that these changes are only the beginning of a process that must also incorporate more ambitious private-sphere change and significant collective action at a political level.¶ 4. Empathise with the emotional responses that will be engendered by a forthright presentation of the probable impacts of climate change. ¶ Belief in climate change and support for low-carbon policies will remain fragile unless people are emotionally engaged. We should expect people to be sad or angry, to feel guilt or shame, to yearn for that which is lost or to search for more comforting answers (Randall, 2009). Providing support and empathy in working through the painful emotions of 'grief' for a society that must undergo changes is a prerequisite for subsequent adaptation to new circumstances.¶ Without such support and empathy, it is more likely that people will begin to deploy a range of maladaptive ‘coping strategies’, such as denial of personal responsibility, blaming others, or becoming apathetic (Lertzman, 2008). An audience should not be admonished for deploying such strategies – this would in itself be threatening, and could therefore harden resistance to positive behaviour change (Miller and Rolnick, 2002). The key is not to dismiss people who exhibit maladaptive coping strategies, but to understand how they can be made more adaptive. People who feel socially supported will be more likely to adopt adaptive emotional responses - so facilitating social support for proenvironmental behaviour is crucial.¶ 5. Promote pro-environmental social norms and harness the power of social networks¶ One way of bridging the gap between private-sphere behaviour changes and collective action is the promotion of pro-environmental social norms. Pictures and videos of ordinary people (‘like me’) engaging in significant proenvironmental actions are a simple and effective way of generating a sense of social normality around pro-environmental behaviour (Schultz, Nolan, Cialdini, Goldstein and Griskevicius, 2007). There are different reasons that people adopt social norms, and encouraging people to adopt a positive norm simply to ‘conform’, to avoid a feeling of guilt, or for fear of not ‘fitting in’ is likely to produce a relatively shallow level of motivation for behaviour change. Where social norms can be combined with ‘intrinsic’ motivations (e.g. a sense of social belonging), they are likely to be more effective and persistent.¶ Too often, environmental communications are directed to the individual as a single unit in the larger social system of consumption and political engagement. This can make the problems feel too overwhelming, and evoke unmanageable levels of anxiety. Through the enhanced awareness of what other people are doing, a strong sense of collective purpose can be engendered. One factor that is likely to influence whether adaptive or maladaptive coping strategies are selected in response to fear about climate change is whether people feel supported by a social network – that is, whether a sense of ‘sustainable citizenship’ is fostered. The efficacy of groupbased programmes at promoting pro-environmental behaviour change has been demonstrated on numerous occasions – and participants in these projects consistently point to a sense of mutual learning and support as a key reason for making and maintaining changes in behaviour (Nye and Burgess, 2008). There are few influences more powerful than an individual’s social network. Networks are instrumental not just in terms of providing social support, but also by creating specific content of social identity – defining what it means to be “us”. If environmental norms are incorporated at this level (become defining for the group) they can result in significant behavioural change (also reinforced through peer pressure).¶ Of course, for the majority of people, this is unlikely to be a network that has climate change at its core. But social networks – Trade Unions, Rugby Clubs, Mother & Toddler groups – still perform a critical role in spreading change through society. Encouraging and supporting pre-existing social networks to take ownership of climate change (rather than approach it as a problem for ‘green groups’) is a critical task. As well as representing a crucial bridge between individuals and broader society, peer-to-peer learning circumnavigates many of the problems associated with more ‘top down’ models of communication – not least that government representatives are perceived as untrustworthy (Poortinga & Pidgeon, 2003). Peer-to-peer learning is more easily achieved in group-based dialogue than in designing public information films: But public information films can nonetheless help to establish social norms around community-based responses to the challenges of climate change, through clear visual portrayals of people engaging collectively in the pro-environmental behaviour.¶ The discourse should be shifted increasingly from ‘you’ to ‘we’ and from ‘I’ to ‘us’. This is starting to take place in emerging forms of community-based activism, such as the Transition Movement and Cambridge Carbon Footprint’s ‘Carbon Conversations’ model – both of which recognize the power of groups to help support and maintain lifestyle and identity changes. A nationwide climate change engagement project using a group-based behaviour change model with members of Trade Union networks is currently underway, led by the Climate Outreach and Information Network. These projects represent a method of climate change communication and engagement radically different to that typically pursued by the government – and may offer a set of approaches that can go beyond the limited reach of social marketing techniques.¶ One potential risk with appeals based on social norms is that they often contain a hidden message. So, for example, a campaign that focuses on the fact that too many people take internal flights actually contains two messages – that taking internal flights is bad for the environment, and that lots of people are taking internal flights. This second message can give those who do not currently engage in that behaviour a perverse incentive to do so, and campaigns to promote behaviour change should be very careful to avoid this. The key is to ensure that information about what is happening (termed descriptive norms), does not overshadow information about what should be happening (termed injunctive norms). ¶ 6. Think about the language you use, but don’t rely on language alone¶ A number of recent publications have highlighted the results of focus group research and talk-back tests in order to ‘get the language right’ (Topos Partnership, 2009; Western Strategies & Lake Research Partners, 2009), culminating in a series of suggestions for framing climate-change communications. For example, these two studies led to the suggestions that communicators should use the term ‘global warming’ or ‘our deteriorating atmosphere’, respectively, rather than ‘climate change’. Other research has identified systematic differences in the way that people interpret the terms ‘climate change’ and ‘global warming’, with ‘global warming’ perceived as more emotionally engaging than ‘climate change’ (Whitmarsh, 2009).¶ Whilst ‘getting the language right’ is important, it can only play a small part in a communication strategy. More important than the language deployed (i.e. ‘conceptual frames') are what have been referred to by some cognitive linguists as 'deep frames'. Conceptual framing refers to catchy slogans and clever spin (which may or may not be honest). At a deeper level, framing refers to forging the connections between a debate or public policy and a set of deeper values or principles. Conceptual framing (crafting particular messages focussing on particular issues) cannot work unless these messages resonate with a set of long-term deep frames.¶ Policy proposals which may at the surface level seem similar (perhaps they both set out to achieve a reduction in environmental pollution) may differ importantly in terms of their deep framing. For example, putting a financial value on an endangered species, and building an economic case for their conservation ‘commodifies’ them, and makes them equivalent (at the level of deep frames) to other assets of the same value (a hotel chain, perhaps). This is a very different frame to one that attempts to achieve the same conservation goals through the ascription of intrinsic value to such species – as something that should be protected in its own right. Embedding particular deep frames requires concerted effort (Lakoff, 2009), but is the beginning of a process that can build a broad, coherent cross-departmental response to climate change from government.¶ 7. Encourage public demonstrations of frustration at the limited pace of government action¶ Private-sphere behavioural change is not enough, and may even at times become a diversion from the more important process of bringing political pressure to bear on policy-makers. The importance of public demonstrations of frustration at both the lack of political progress on climate change and the barriers presented by vested interests is widely recognised – including by government itself. Climate change communications, including government communication campaigns, should work to normalise public displays of frustration with the slow pace of political change. Ockwell et al (2009) argued that communications can play a role in fostering demand for - as well as acceptance of - policy change. Climate change communication could (and should) be used to encourage people to demonstrate (for example through public demonstrations) about how they would like structural barriers to behavioural/societal change to be removed.

#### Taking action against warming represents an opportunity to rebuild progressive politics for a better society – we must set aside differences based on identity in favor of a broad-based coalition

Smith 10 Brendan, co-founder of Labor Network for Sustainability, 11-23, “Fighting Doom: The New Politics of Climate Change,” Common Dreams, http://www.commondreams.org/view/2010/11/23-1

I admit I have arrived late to the party. Only recently have I begun to realize what others have known for decades: The climate crisis is not, at its core, an environmental issue. In fact it is not an "issue" at all; it is an existential threat to every human and community on the planet. It threatens every job, every economy in the world. It threatens the health of our children. It threatens our food and water supply. Climate change will continue to alter the world our species has known for the past three thousand years. As an oyster farmer and longtime political activist, the effects of climate change on my life will be neither distant nor impersonal. Rising greenhouse gases and ocean temperatures may well force me to abandon my 60-acre farm within the next forty years. From France to Washington state, oystermen are already seeing massive die-offs of seed oysters and the thinning shells science has long predicted. I can see the storm clouds and they are foretelling doom. But my political alter ego is oddly less pessimistic. Rather than triggering gloom, the climate crisis has surprisingly stirred up more hope than I have felt in twenty years as a progressive activist. After decades of progressive retreat it is a strange feeling. But I am haunted by the suspicion that this coming crisis may be the first opportunity we have had in generations to radically re-shape the political landscape and build a more just and sustainable society. The Power of Doom The modern progressive movement in the U.S. has traditionally grounded its organizing in the politics of identity and altruism. Organize an affected group -- minorities, gays, janitors or women -- and then ask the public at large to support the cause -- prison reform, gay marriage, labor rights, or abortion -- based on some cocktail of good will, liberal guilt, and moral persuasion. This strategy has been effective at times. But we have failed to bring these mini-movements together into a force powerful enough to enact broad-based social reform. It takes a lot of people to change society and our current strategy has left us small in numbers and weak in power. The highlights of my political life -- as opposed to oystering -- have been marked by winning narrow, often temporary, battles, but perennially losing the larger war. I see the results in every direction I look: growing poverty and unemployment, two wars, the rise of the right, declining unionization, the failure of the Senate's climate legislation and of Copenhagen, the wholesale domination of corporate interests. The list goes on and on. We have lost; it's time to admit our strategy has been too tepid and begin charting anew. This time can be different. What is so promising about the climate crisis is that because it is not an "issue" experienced by one disenfranchised segment of the population, it opens the opportunity for a new organizing calculus for progressives. Except for nuclear annihilation, humanity has never faced so universal a threat where all our futures are bound inextricably together. This universality provides the mortar of common interest required for movement building. We could literally knock on every door on the planet and find someone -- whether they know it or not -- who has a vital self-interest in averting the climate crisis by joining a movement for sustainability. With all of humanity facing doom, we can finally gather under one banner and count our future members not in the thousands but in the millions, even billions. But as former White House "Green Jobs Czar" Van Jones told the New Yorker in 2009, "The challenge is making this an everybody movement, so your main icons are Joe Six-Pack, Joe the Plumber, becoming Joe the Solar Guy, or that kid on the street corner putting down his handgun, picking up a caulk gun." The climate crisis is carrying us into uncharted waters and our political strategy needs to be directed toward making the climate movement an "everybody movement." Let me use a personal example. As an oysterman on Long Island Sound my way of life is threatened by rising greenhouse gases and ocean temperatures. If the climate crisis is not averted my oysters will die and my farm will be shuttered. Saving my livelihood requires that I politically engage at some level. Normally I would gather together my fellow oyster farmers to lobby state and federal officials and hold a protest or two. Maybe I would find a few coalitions to join. But we would remain small in number, wield little power, and our complaints about job loss would fall on largely unsympathetic ears in the face of so many suffering in so many ways. And what would we even petition our government to do about the problem? Buyouts and unemployment benefits? Re-training classes? Our oysters will still die and we will still lose our farms. To save our lives and livelihood we need to burrow down to the root of the problem: halting greenhouse gas emissions. And halting emissions requires joining a movement with the requisite power to dismantle the fossil fuel economy while building a green economy. To tackle such a large target requires my support for every nook and cranny effort to halt greenhouse gases and transition to a green economy. I need to gather up my fellow oyster farmers and link arms with students blocking new coal-fired power plants while fighting for just transition for coal workers; I need to join forces with other green workers around the country to demand government funding for green energy jobs, not more bank and corporate bailouts; I need to support labor movement efforts in China and elsewhere to climb out of poverty by going "green not dirty." I have a stake in these disparate battles not out of political altruism, but because my livelihood and community depend on stopping greenhouse gases and climate change. In other words, the hidden jewel of the climate crisis is that I need others and others need me. We are bound together by the same story of crisis and struggle. Some in the sustainability movement have been taking advantage of the "power of doom" by weaving together novel narratives and alliances around climate change. Groups in Kentucky are complementing their anti-mountain top removal efforts by organizing members of rural electrical co-ops into "New Power" campaigns to force a transition from fossil fuels to renewable power -- and create jobs in the process. Police unions in Canada, recognizing their members will be first responders as climate disasters hit, have reached out to unions in New Orleans to ensure the tragedies that followed Katrina are not repeated. Artists, chefs, farmers, bike mechanics, designers, and others are coalescing into a "green artisan movement" focused on building vibrant sustainable communities. Immigrant organizers, worried about the very real possibility of ever-worsening racial tensions triggered by millions of environmental refugees flooding in from neighboring countries, are educating their membership about why the climate crisis matters. My hope is that over the coming years we will be able to catalog increasing numbers of these tributaries of the climate crisis. Our power will not stem from a long list of issue concerns or sponsors at events -- we have tried that as recently as the October 2nd Washington D.C. "One Nation Working Together" march with little impact. Nor, with the rise of do-it-yourself organizing, will our power spring from top-down political parties of decades past. Instead oystermen like me, driven by the need to save our lives and livelihood, will storm the barricades with others facing the effects of the climate crisis. We will merge our mini-movements under a banner of common crisis, common vision and common struggle. We will be in this fight together and emerge as force not to be trifled with. This Time We Have an Alternative I am also guardedly optimistic because this time we have an alternative. My generation came of age after the fall of communism, and as a result, we have been raised in the midst of one-sided debate. We recognize that neoliberalism has ravaged society, but besides nostalgic calls for socialism, what has been the alternative? As globalization swept the globe, we demanded livable wages and better housing for the poorest in our communities; we fought sweatshops in China; we lobbied for new campaign finance and corporate governance laws. But these are mere patchwork reforms that fail to add up to a full-blown alternative to our current anti-government, free-market system. Never being able to fully picture the progressive alternative left me not fully trusting that progressive answers were viable solutions. But when I hear the proposed solutions to the climate crisis, the fog lifts. I can track the logic and envision the machinery of our alternative. And it sounds surprisingly like a common sense rebuttal to the current free-market mayhem: We face a global emergency of catastrophic proportions. Market fundamentalism will worsen rather than solve the crisis. Instead we need to re-direct our institutions and economic resources toward solving the crisis by replacing our carbon-based economy with a green sustainable economy. And by definition, for an economy to be sustainable it must addresses the longstanding suffering ordinary people face in their lives, ranging from unemployment and poverty to housing and healthcare. For years I have tossed from campaign to campaign, but the framework of our new progressive answer to the climate crisis now provides a roadmap for my political strategy. It helps chart my opponents -- coal companies and their political minions, for example -- as well as my diverse range of allies. It lays out my policy agenda, ranging from creating millions of new green jobs to building affordable green housing in low-income communities. I finally feel confident enough in my bearings to set sail. The Era of Crisis Politics While building a new green economy makes sense on paper, it is hard to imagine our entrenched political system yielding even modest progressive reform, let alone the wholesale re-formatting of the carbon economy. But I suspect this will change in the coming years, with our future governed by cascading political crises, rather than political stasis. We are likely entering an era of crisis politics whereby each escalating environmental disaster -- ranging from water shortages and hurricanes to wildfires and disease outbreaks -- will expose the impotence of our existing political institutions and economic system. In the next 40 years alone, scientists predict a state of permanent drought throughout the Southwest US and climate-linked disease deaths to double. As Danny Thompson, secretary-treasurer of the Nevada AFL-CIO, told the Las Vegas Review Journal, the ever-worsening water crisis could be "the end of the world" that could "turn us upside down, and I don't know how you recover from that." As if that is not enough, these crises will be played out in the context of a global economy spiraling out of control. Each hurricane, drought or recession will send opinion polls and politicians lurching from right to left and vice versa. Think of how quickly, however momentarily, the political debate pivoted in the wake of Katrina, the BP disaster, and the financial crisis. As White House chief of staff Rahm Emanuel famously said "Never let a serious crisis go to waste...It's an opportunity to do things you couldn't do before." While addressing the climate crisis requires radical solutions that cannot be broached in today's political climate, each disaster opens an opportunity to advance alternative agendas -- both for the left and right. While politicians debate modest technical fixes, ordinary people left desperate by floods, fires, droughts and other disasters will increasingly -- and angrily -- demand more fundamental reforms. While our current policy choices appear limited by polls and election results, in an era of crisis politics what appears unrealistic and radical before a storm may well appear as common sense reform in its wake. My generation has been raised in the politics of eternal dusk. Except for a passing ray of hope during the Obama campaign, our years have been marked by the failure of every political force in society -- whether it be political elites or social movement leaders -- to address the problems we face as a nation and world. They have left us spinning towards disaster. We can forge a better future. Climate-generated disasters will bring our doomed future into focus. The failure of political elites to adequately respond to these cascading crises will transform our political landscape and seed the ground for social movements. And if we prepare for the chaos and long battle ahead, our alternative vision will become a necessity rather than an impossibility. As a friend recently said to me, "God help us, I hope you're right."

#### Engagement within the existing system of market mechanisms is necessary to avoid reproducing the status quo

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However, pointing this out and deriding market based solutions doesn’t get us very far. In fact, such a response to proposed market-based solutions is downright dangerous and irresponsible. The fact of the matter is that 1) we currently live in a market based world, 2) there is not, in the foreseeable future an alternative system on the horizon, and 3), above all, we need to do something now. We can’t afford to reject interventions simply **because they don’t meet our ideal conceptions** of how things should be. We have to work with the world that is here, not the one that we would like to be here. And here it’s crucial to note that pointing this out does not entail that we shouldn’t work for producing that other world. It just means that we have to grapple with the world that is actually there before us.¶ It pains me to write this post because I remember, with great bitterness, the diatribes hardcore Obama supporters leveled against legitimate leftist criticisms on the grounds that these critics were completely unrealistic idealists who, in their demand for “purity”, were asking for “ponies and unicorns”. This rejoinder always seemed to ignore that words have power and that Obama, through his profound power of rhetoric, had, at least the power to shift public debates and frames, opening a path to making new forms of policy and new priorities possible. The tragedy was that he didn’t use that power, though he has gotten better.¶ I do not wish to denounce others and dismiss their claims on these sorts of grounds. As a Marxist anarchists, I do believe that we should fight for the creation of an alternative hominid ecology or social world. I think that the call to commit and fight, to put alternatives on the table, has been one of the most powerful contributions of thinkers like Zizek and Badiou. If we don’t commit and fight for alternatives those alternatives will never appear in the world. Nonetheless, we still have to grapple with the world we find ourselves in. And it is here, in my encounters with some Militant Marxists, that I sometimes find it difficult to avoid the conclusion that they are unintentionally aiding and abetting the very things they claim to be fighting. In their refusal to become impure, to work with situations or assemblages as we find them, to sully their hands, they end up reproducing the very system they wish to topple and change. Narcissistically they get to sit there, smug in their superiority and purity, while everything continues as it did before because they’ve refused to become politicians or engage in the difficult concrete work of assembling human and nonhuman actors to render another world possible. As a consequence, they occupy the position of Hegel’s beautiful soul that denounces the horrors of the world, celebrate the beauty of their soul, while depending on those horrors of the world to sustain their own position. ¶ To engage in politics is to engage in networks or ecologies of relations between humans and nonhumans. To engage in ecologies is to descend into networks of causal relations and feedback loops that you cannot completely master and that will modify your own commitments and actions. But there’s no other way, there’s no way around this, and we do need to act now.

#### Simulation and institutional deliberation motivate effective responses to climate risks

Marx et al. 7 (Sabine M, Center for Research on Environmental Decisions (CRED) @ Columbia University, Elke U. Weber, Graduate School of Business and Department of Psychology @ Columbia University, Benjamin S. Orlovea, Department of Environmental Science and Policy @ University of California Davis, Anthony Leiserowitz, Decision Research, David H. Krantz, Department of Psychology @ Columbia University, Carla Roncolia, South East Climate Consortium (SECC), Department of Biological and Agricultural Engineering @ University of Georgia and Jennifer Phillips, Bard Centre for Environmental Policy @ Bard College, “Communication and mental processes: Experiential and analytic processing of uncertain climate information”, 2007, http://climate.columbia.edu/sitefiles/file/Marx\_GEC\_2007.pdf)

Based on the observation that experiential and analytic processing systems compete and that personal experience and vivid descriptions are often favored over statistical information, we suggest the following research and policy implications.¶ Communications designed to create, recall and highlight relevant personal experience and to elicit affective responses can lead to more public attention to, processing of, and engagement with forecasts of climate variability and climate change. Vicarious experiential information in the form of scenarios, narratives, and analogies can help the public and policy makers imagine the potential consequences of climate variability and change, amplify or attenuate risk perceptions, and influence both individual behavioral intentions and public policy preferences. Likewise, as illustrated by the example of retranslation in the Uganda studies, the translation of statistical information into concrete experience with simulated forecasts, decisionmaking and its outcomes can greatly facilitate an intuitive understanding of both probabilities and the consequences of incremental change and extreme events, and motivate contingency planning.¶ Yet, while the engagement of experience-based, affective decision-making can make risk communications more salient and motivate behavior, experiential processing is also subject to its own biases, limitations and distortions, such as the finite pool of worry and single action bias. Experiential processing works best with easily imaginable, emotionally laden material, yet many aspects of climate variability and change are relatively abstract and require a certain level of analytical understanding (e.g., long-term trends in mean temperatures or precipitation). Ideally, communication of climate forecasts should encourage the interactive engagement of both analytic and experiential processing systems in the course of making concrete decisions about climate, ranging from individual choices about what crops to plant in a particular season to broad social choices about how to mitigate or adapt to global climate change.¶ One way to facilitate this interaction is through group and participatory decision-making. As the Uganda example suggests, group processes allow individuals with a range of knowledge, skills and personal experience to share diverse information and perspectives and work together on a problem. Ideally, groups should include at least one member trained to understand statistical forecast information to ensure that all sources of information—both experiential and analytic—are considered as part of the decision-making process. Communications to groups should also try to translate statistical information into formats readily understood in the language, personal and cultural experience of group members. In a somewhat iterative or cyclical process, the shared concrete information can then be re-abstracted to an analytic level that leads to action.¶ Risk and uncertainty are inherent dimensions of all climate forecasts and related decisions. Analytic products like trend analysis, forecast probabilities, and ranges of uncertainty ought to be valuable contributions to stakeholder decision-making. Yet decision makers also listen to the inner and communal voices of personal and collective experience, affect and emotion, and cultural values. Both systems—analytic and experiential—should be considered in the design of climate forecasts and risk communications. If not, many analytic products will fall on deaf ears as decision makers continue to rely heavily on personal experience and affective cues to make plans for an uncertain future. The challenge is to find innovative and creative ways to engage both systems in the process of individual and group decision-making.

#### Science is a process – it subjects itself to constant refinement based on empirical evidence – we can make sufficient contingent claims about the world

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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.