Renewables make global warming worse- even if all of their arugments about decreasing output with more turbines assuming SQ levels of production, they don’t account for the jervon’s paradox- when we think that energy is efficient and green, we use more of it which ultimately results in massive increases in emissions

Alexander 12

(Samuel, co-director of the Simplicity Institute and a lecturer in ‘Consumerism and Sustainability’ at the Office for Environmental Programs, University of Melbourne, “Can renewable energy sustain consumer societies?”, http://www.energybulletin.net/stories/2012-04-26/can-renewable-energy-sustain-consumer-societies-save-friday)

Most people, including many environmentalists, seem to believe that Western-style consumer lifestyles can be sustained and even globalised, provided the world transitions to systems of renewable energy and produces goods more cleanly and efficiently. This assumption is reflected especially clearly in political discussion on environmental issues, which consistently pushes the message that we can grow our economies while reducing ecological impact. This view relies heavily on the expectation that renewable energy sources can be substituted for fossil fuels, but very little attention is given to the question of whether that expectation is realistic. Environmentalists want to believe it, but of course merely wanting something does not affect the laws of physics. With little recognition, Dr. Ted Trainer has spent the best part of a decade tirelessly surveying the best available data on renewable energy and other technologies, and he has recently published the culmination of his efforts with the Simplicity Institute. Contradicting widely held assumptions, Trainer presents a formidable case that renewable energy and other ‘tech-fixes’ will be unable to sustain growth-based and energy-intensive consumer societies, with implications that are as profound as they will be unwelcome. Trainer’s general point on technology is that the extent of ecological overshoot is already so great that technology alone will never be able to solve the ecological crises of our age, certainly not in a world based on economic growth and with a growing global population. The best-known advocate of technological solutions to ecological problems is probably Amory Lovins, most famous for his ‘factor four’ thesis. He argues that if we exploit technology we could have four times the economic output without increasing environmental impact (or maintain current economic output and reduce environmental impact by a factor of four). In response Trainer points out that if the rich economies grow at 3% until 2070, and by that stage the poorest nations have attained similarly high living standards – which seems to be the aim of the global development agenda – total world economic output and impact could be 60 times larger than it is today. If we assume that sustainability requires that fossil fuel use and other resource consumption must be half of what they are today (and the greenhouse problem would probably require a far larger reduction than this), then what is needed is something like a factor 120 reduction in the per unit impact of GDP, not merely a factor 4 reduction. Even allowing for some uncertainty in these calculations, the claim that technological solutions can solve the ecological crises and sustain limitless economic growth is simply not credible. Trainer has shown that the necessary reductions in ecological impact that are just beyond what is remotely possible. The final nail in the coffin of techno-optimists is the fact that despite decades of extraordinary technological advance, the overall ecological impact of the global economy is still increasing, making even a factor four reduction through technological advance seem wildly optimistic. Trainer has also levelled a narrower critique of technological solutions, which focuses on renewable energy. This is not the place to review in detail Trainer’s arguments and research, which would be a laborious task given the meticulous and necessarily dry nature of his analysis of the evidence. For the facts and fixgures, readers are referred to Trainer’s latest essay. But the critical findings of his technical research can be easily summarised. After examining the evidence on varieties of solar, wind, biomass, hydrogen, etc., as well as energy storage systems, Trainer concludes that the figures just do not support what almost everyone assumes; that is to say, they do not support the argument that renewable energy can sustain consumer societies. This is because the enormous quantities of electricity and oil required by consumer societies today simply cannot be converted to any mixture of renewable energy sources, each of which suffer from various limitations arising out of such things as intermittency of supply, storage problems, resource limitations (e.g. rare metals, land for biomass competing with food production, etc.), and inefficiency issues. Ultimately, however, the cost is the fundamental issue at play here. Trainer provides evidence showing that existing attempts to price the transition to systems of renewable energy are wildly understated. This challenging conclusion, however, only defines the magnitude of the present problem. If we were to commit ourselves to providing nine or ten billion people with the energy resources currently demanded by those in the richest parts of the world, then the problems and costs become greater by orders of magnitude. The challenges are exacerbated further by the existence of the “rebound effect,” a phenomenon that often negates the expected energy use reductions of efficiency improvements. At times efficiency improvements can even be the catalyst for increased energy consumption, a phenomenon known as the “Jevons” paradox. Going directly against the grain of mainstream thinking on these issues, Trainer is led to conclude that renewable energy and efficiency improvements will never be able to sustain growth-based, consumer societies, primarily because it would be quite unaffordable to do so. It is of the utmost importance to emphasise that this is not an argument against renewable energy; nor is it an argument more broadly against the use of appropriate technologies to achieve efficiency improvements. Trainer argues without reservation that the world must transition to full dependence on systems of renewable energy without delay and exploit appropriate technology wherever possible. We cannot afford not to! But given the limitations and expense of renewable energy systems, any transition to a just and sustainable world requires a vastly reduced demand for energy compared to what is common in the developed regions of the world today, and this necessitates giving up growth-based, consumer societies and the energy-intensive lifestyles they support and promote. The implications of this can hardly be exaggerated. It means that the global consumer class must learn how to live ‘simpler lives’ of reduced resource and energy consumption, as well as build new economic systems based on notions of sufficiency rather than excess. But as I have argued elsewhere, this does not need to sound so depressing. A growing number of people are seeing the hollowness of consumer culture and are finding a new abundance in oppositional lifestyles of voluntary simplicity. The necessary cultural shift obviously requires a radical change in worldview, and it is difficult to be optimistic that the necessary changes will ever arrive. But as Lao Tzu once said: ‘Those who know they have enough are rich,’ which also suggests that those who have enough, but who do not know it, are poor.

**This makes all of their scenarios way worse- both energy scarcity and global warming are worse which amplify the magnitude of their impacts that they can’t solve.**

# Warming

#### Rapid deployment increases emissions—manufacturing/installation increases

Science Daily '12

"Low-Carbon Technologies 'No Quick Fix'" May Not Lessen Global Warming Until Late This Century," 2/15/12 [www.sciencedaily.com/releases/2012/02/120216094801.htm AD 8/25/12](http://www.sciencedaily.com/releases/2012/02/120216094801.htm%20AD%208/25/12)

\*\*Citing Nathan Myhrvold, PhD in theoretical and mathematical physics; Ken Caldeira, PhD in Atmospheric Sciences, atmospheric scientist at the Carnegie Institution for Science; in a pee-reviewed article in Environmental Research Letters\*\*

ScienceDaily (Feb. 15, 2012) — A drastic switch to low carbon-emitting technologies, such as wind and hydroelectric power, may not yield a reduction in global warming until the latter part of this century, new research suggests. Furthermore, it states that technologies that offer only modest reductions in greenhouse gases, such as the use of natural gas and perhaps carbon capture and storage, cannot substantially reduce climate risk in the next 100 years. The study, published February 16, in IOP Publishing's journal Environmental Research Letters, claims that the rapid deployment of low-greenhouse-gas-emitting technologies (LGEs) will initially increase emissions as they will require a large amount of energy to construct and install. These cumulative emissions will remain in the atmosphere for extended periods due to the long lifetime of CO2, meaning that global mean surface temperatures will increase to a level greater than if we continued to use conventional coal-fired plants.

#### Wind power increases emissions – cycling inefficiency outweighs reduction

BENTEK 12 (BENTEK Energy is the leading energy markets information company, “How Less Became More”, <http://docs.wind-watch.org/BENTEK-How-Less-Became-More.pdf>, Acc: 8/1/12, og)

The study details the surprising conclusion that the use of wind energy in the PSCO and ¶ ERCOT context results in increased SO2 and NOX and, in the case of PSCO, CO2. The ¶ mechanism driving increased emissions is the need to cycle coal facilities in order to ¶ accommodate wind, which is considered a “must-take” resource due to the respective states’ ¶ RPS mandates. When wind generation comes online, generation from coal (and natural gasfired) plants is curtailed until the wind subsides, then their generation is once again ramped up ¶ to meet demand. Cycling coal units in this manner drives their heat rate up and their ¶ operating efficiency down, resulting in higher emissions of SO2, NOX and CO2 than would ¶ have been the case if the units had not been cycled.

#### Studies prove wind turbines increased localized warming by .72 degrees Celsius over a decade

Science Daily '12

"Night-Warming Effect Found Over Large Wind Farms in Texas," 4/30/12 www.sciencedaily.com/releases/2012/04/120430152045.htm AD 8/25/12

ScienceDaily (Apr. 30, 2012) — Large wind farms in certain areas in the United States appear to affect local land surface temperatures, according to a paper published April 30 in the journal Nature Climate Change. The study, led by Liming Zhou, an atmospheric scientist at the State University of New York- (SUNY) Albany, provides insights about the possible effects of wind farms. The results could be important for developing efficient adaptation and management strategies to ensure long-term sustainability of wind power. "This study indicates that land surface temperatures have warmed in the vicinity of large wind farms in west-central Texas, especially at night," says Anjuli Bamzai, program director in the National Science Foundation's (NSF) Division of Atmospheric and Geospace Sciences, which funded the research. "The observations and analyses are for a relatively short period, but raise important issues that deserve attention as we move toward an era of rapid growth in wind farms in our quest for alternate energy sources." Considerable research has linked the carbon dioxide produced by burning fossil fuels with rising global temperatures. Consequently, many nations are moving toward cleaner sources of renewable energy such as wind turbines. Generating wind power creates no emissions, uses no water and is likely "green." "We need to better understand the system with observations, and better describe and model the complex processes involved, to predict how wind farms may affect future weather and climate," said Zhou. There have been a growing number of studies of wind farm effects on weather and climate, primarily using numerical models due to the lack of observations over wind farms. As numerical models are computationally intensive and have uncertainties in simulating regional and local weather and climate, said Zhou, remote sensing is likely the most efficient and effective way to study wind farm effects over larger spatial and longer temporal scales. To understand the potential impact of wind farms on local weather and climate, Zhou's team analyzed satellite-derived land surface temperatures from regions around large wind farms in Texas for the period 2003-2011. The researchers found a night-time warming effect over wind farms of up to 0.72 degrees Celsius per decade over the nine-year-period in which data were collected. Because the spatial pattern of warming mirrors the geographic distribution of wind turbines, the scientists attribute the warming primarily to wind farms. The year-to-year land surface temperature over wind farms shows a persistent upward trend from 2003 to 2011, consistent with the increasing number of operational wind turbines with time. "This warming effect is most likely caused by the turbulence in turbine wakes acting like fans to pull down warmer near-surface air from higher altitudes at night," said Somnath Baidya Roy of the University of Illinois at Urbana-Champaign, a co-author of the paper.

**Read**

#### Wind too expensive—doesn’t outweigh the future damage done by CO2 emissions

Worstall '12

Tim, Fellow at the Adam Smith Institute in London and Contributor, Forbes, "Wind Power's Just Too Expensive To Actually Use," 3/6/12 [www.forbes.com/sites/timworstall/2012/03/06/wind-powers-just-too-expensive-to-actually-use/](http://www.forbes.com/sites/timworstall/2012/03/06/wind-powers-just-too-expensive-to-actually-use/) AD 8/28/12

So, what we want is some method of working out what are the benefits to us of having lots of lovely heat and power as against the damage that we’re doing to the future us through those emissions. That’s a complex task, yes, but fortunately all of the heavy lifting has already been done for us. It’s all in the Stern Review. The essential answer at the end is that each tonne of CO2 (actually, it’s CO2-e, all the methane and other gases converted to their equivalent effect as if they were CO2) causes $80 worth of future damage. This number is a little fuzzy as we’re uncertain of how bad the effects could be (This is from the Weizman paper). But $80 a tonne is the basic economic estimate of the costs of an extra tonne of CO2 emissions.¶ At which point basic economics tells us what we want to do. Our aim is to maximise the utility of all humans over time. That really is what we’re trying to do: get everyone that optimal mix of whatever it is that makes them as happy as they can be within the constraints we face of resources and technology.¶ So, given that utility maximisation we would like people not to do the emitting of a tonne of CO2 if they get less that $80 of utility from it but to go on and emit it if they get more than $80 of utility from it. This is how we maximise utility over time: sure, using a petrol driven ambulance to get the pre-eclampsic mother to hospital causes $80 of damage in the future but a live, not dead, mother and baby right now. My driving to buy the bread for lunch probably has less value and so perhaps I should walk rather than driving with the associated emissions.¶ Now exactly how we introduce this calculation into society is still argued about: some say cap and trade, others like myself argue for a carbon tax. But that’s not quite the point here.¶ What is the point is that if something costs us more than $80 a tonne to stop CO2 emissions then we shouldn’t be doing it. We should instead be spending that money on something else. Perhaps on some other, cheaper, emissions reduction scheme but perhaps not: perhaps we’d get more utility from the money by vaccinating children, caring for the old, something else entirely. That $80 number from the Stern Review is thus our limit: things more expensive than this just shouldn’t be done. For if we spend more than $80 a tonne on CO2 reductions then we have reduced the amount of money, the resources we have, to increase human utility in other ways.¶ And that’s the part that I think doesn’t get enough attention about climate change. What the economic analysis of the whole thing has said is that, well, even if it’s all true and Greenland really will melt in 2500 AD and Flipper will be barbecued on the summer beaches of Spitzbergen then it can still be too expensive to try to prevent it. We’d be better off allowing it to happen and adapting to it, spending that prevention money on some other ways of making humans happy.¶ Yes, it really is true that even proof that climate change is happening, even proof that it’s going to be a real, serious and expensive problem, is not proof that we either must do a particular thing about it nor even proof that we need to do anything about it. For it’s entirely possible that doing something will cost us more than doing nothing.¶ And that’s what is so important about this report on wind power in the UK.¶ Yes, of course, I’d be delighted to see any arguments stating that the numbers in this report are wrong. Do point me to them if you see them. But assume that these numbers are correct for a moment.¶ If they are correct then they’re saying that we simply shouldn’t be building wind turbines to deal with climate change. Because the cost of doing so, £270 per tonne CO2 not emitted, is very much larger than the $80 (currently, around £50) than the future cost of allowing the CO2 to be emitted. The cure is costing more than the problem itself would cost.¶ It could be true that we should indeed use some other, cheaper, cure, but it absolutely is not true that we should be using this grossly expensive one.¶ Which is something of a problem because the British Government’s current plan for beating climate change is to litter the countryside with thousands of these windmills that don’t meet the most basic cost/benefit analysis.

#### Emissions reductions insignificant—crowds out gas, not coal

Cullen '12

Joseph PhD Economics,Measuring the Environmental BenefitsofWind-Generated Electricityconducted with financial support from the University of Arizona and the Harvard Univer -sity Center for the Environment. June 2012 [www.josephcullen.com/resources/measuringwind.pdf](http://www.josephcullen.com/resources/measuringwind.pdf) AD 8/30/12

Renewable energy subsidies have been a politically popular program over the past decade.¶ These subsidies have led to explosive growth in wind power installations across the US,¶ especially in the Midwest and Texas. Renewable subsidies are largely motivated by their¶ environmental benefits as they do not emit CO2, NOx, SO2, or other pollutants which are¶ produced by fossil fuel generators. Given the lack of a national climate legislation,¶ renewable energy subsidies are likely to be continued to be used as one of the major policy¶ instruments for mitigating carbon dioxide emissions in the near future. As such, a better¶ understanding of the impact of subsidization on emissions is imperative. This paper¶ introduces an approach to directly measure the impact of wind power on emissions using¶ observed generating behavior.¶ The quantity of pollutants offset by wind power depends crucially on which generators¶ reduce production when wind power comes online. By exploiting the quasi-experimental¶ variation in wind power production driven by weather fluctuations, it is possible to¶ 40 The identify generator specific production offsets due to wind power. Importantly, dynamics¶ play a critical role in the estimation procedure. Failing to account for dynamics in¶ generator operations leads to overly optimistic estimates of emi

#### Large scale wind power will disrupt atmospheric flow causing climate change and slowing the atmospheric kinetic energy generation rate

Miller et al. 2011

(Lee Miller, PhD Max-Planck Institute for Biogeochemistry; F. Gans I am a PhD candidate in the Biospheric Theory and Modeling group. My background is in medical physics and did my diploma thesis on time series analysis on sleep-EEG data.; and Axel Kleidon, studied physics, mathematics and meteorology at the University of Hamburg and Purdue University, Indiana, USA. Ph.D. in meteorology, Univ. Hamburg (1998), Postdoctoral scientist, Stanford Univ. (1998-2000), Assistant Professor, Univ. Maryland (2001-2006), Leader, Max Planck Research Group (since 2006) “Estimating maximum global land surface wind power extractability and associated climatic consequences,” http://www.earth-syst-dynam.net/2/1/2011/esd-2-1-2011.pdf )

We estimate that between 18–68TW of mechanical wind power can be extracted from the atmospheric boundary layer over all non-glaciated land surfaces. Although wind power extractionfrom a single turbine has little effect on the global atmosphere, many more will influence atmospheric flow and reduce the large-scale extraction efficiency. Any extraction of momentum must also compete with the natural process of wind power dissipation by boundary layer turbulence.Our study focuses on the rate of wind power generation in the climate system rather than previous near-surface estimates that focused on measured wind velocities and engineering limitations (e.g. Archer and Jacobson, 2005; Lu et al., 2009; Santa Maria and Jacobson, 2009). This consideration results in our estimate being significantly less than previous studies while also being independent of wind turbine size or layout. Given that only 0.03TW of wind-derived electricity was produced in 2008 (World Wind Energy Association, 2008), there is still substantial wind power development possible with relatively minor climatic impacts. However, future plans for large-scale wind power development must recognize the finite potential of the Earth system to generate kinetic wind energy**.** It has also been suggested that with increased carbon dioxide concentrations, the total atmospheric dissipation rate, and therefore its kinetic energy generation rate, will decrease (Lucarini et al., 2010; Hern´andez-Deckers and von Storch, 2010). Future plans must accept that the human appropriation of wind power must be accompanied by a climatic effect and with large-scale deployment, will be associated with a decrease in the total atmospheric kinetic energy generation rate.Our estimation methods are certainly extreme, but they nevertheless provide critical understanding of the limits of wind power in the climate system and how it can serve human energy requirements. Faced with the present-day global energy demand of 17TW and a predicted change to 16–120TW by 2100 (EIA, 2009; IPCC, 2007), extreme calculations such as this will provide the maximum power potentials and possible climatic effects of different forms of renewable energy sources planned to fulfill future human energy requirements. This in turn helps to prioritize which renewable energy resources are likely to be successful in meeting the future global human energy demand. More complex modeling studies can help refine our estimates and climatic impacts, but the presence of a maximum in wind power extractability and the associated climatic consequences from this extraction are fundamental.

#### This decrease in atmospheric kinetic energy will lower atmospheric pressure making it impossible to breathe killing everyone

NSBRI 2010

(National Space Biomedical Research Institute “The Atmosphere,” http://www.nsbri.org/humanphysspace/introduction/intro-environment-atmosphere.html)

On an average cool, clear day, the Earth's atmosphere (air) is made up of 78% nitrogen (N2), 21% oxygen (O2), 0.5% water vapor (H2O), along with very small amounts of argon, carbon dioxide, neon, helium, krypton, xenon, hydrogen, methane, and a variety of other trace gases. This particular mixture of gases may vary slightly depending on the temperature, altitude, and humidity level, but human life has evolved to depend on just such an atmospheric mixture. Take a deep breath. Each time you inhale, air is drawn into your lungs and oxygen is absorbed into the bloodstream, carried to the cells and used to fuel (oxygenate) the many actions that your body performs every second. Meanwhile, carbon dioxide is being expelled from your system each time you exhale. This breathing cycle continues through the lifetime of all human beings. We depend on the correct mixture of gases in the atmosphere to sustain our lives. We also depend on the pressure of our atmosphere to be able to breathe. Atmospheric pressure is a measure of the force that is exerted by the gas molecules in the air on any surface area in contact with them. The atmospheric pressure exerts a force that pushes air through your trachea (windpipe) and into your lungs while at the same time the air in your lungs is exerting a force (pulmonary pressure) that pushes air back out into the atmosphere. As you breathe in and out, your pulmonary pressure decreases below atmospheric pressure, by expanding the lung volume, to allow air to come into your lungs; and then it increases above atmospheric pressure, by reducing the lung volume, to push the air back out again. It is the same principle that explains how air moves into and out of an accordion. Of course, there is more to breathing than this simple explanation of pressures and lung volumes, but we will go into more detail in a later chapter. The important thing to under stand now is that the atmospheric pressure is essential to breathing. The density(number of molecules in a given volume) and kinetic energy (related to how fast the molecules are moving) of gas molecules in the air greatly influence the level of pressure in the atmosphere. The greater the number of molecules moving around, the more collisions that occur. The more collisions that occur, the faster the molecules move. And then the faster the molecules move, the higher the temperature. Let's talk about this a little more because this is where one of the most dramatic differences exist between the environments of Earth and space.

#### Counter-veiling duties make their impacts inevitable

NAW Staff ‘13, 22 January 2013, “U.S. Slaps Hefty Tariffs On Wind Towers From China, Vietnam,” http://www.nawindpower.com/e107\_plugins/content/content.php?content.10999#.UU7\_bVt8JIg

The U.S. International Trade Commission (ITC) [has determined](http://www.usitc.gov/press_room/news_release/2013/er0118ll1.htm) that the U.S. wind energy industry has been materially injured by dumped and subsidized imports of utility-scale wind turbine towers from China and Vietnam. The case [was brought](http://www.nawindpower.com/e107_plugins/content/content.php?content.9143) on Dec. 29, 2011, by the Wind Tower Trade Coalition (WTTC), a group of producers of utility-scale wind towers in the U.S. The case covers utility-scale wind towers with a minimum height of 50 meters that are designed to support turbines with generating capacities in excess of 100 kW. The U.S. Department of Commerce (DOC), which [issued its final ruling](http://www.nawindpower.com/e107_plugins/content/content.php?content.10863) on the case in December 2012, will now impose antidumping (AD) and countervailing-duty (CVD) orders against Chinese producers of utility-scale wind towers with AD margins of between 44.99% and 70.63% and CVD margins of between 21.86% and 34.81%, according to law firm [Wiley Rein](http://www.wileyrein.com/), which represented the WTTC in the case. The DOC will also impose an AD order against Vietnamese producers of utility-scale wind towers at margins of between 51.50% and 58.49%. “The commission’s determination today recognizes that over the last two years, in a period of peak demand, the U.S. [wind] industry should have been profitable,” says Alan H. Price, a partner in Wiley Rein's international trade practice and lead counsel to the WTTC. “Instead, due to the surge in dumped and subsidized imports, the industry lost market share, saw its profits collapse, producers leave the industry and its workers laid off.”

ssion offsets. Although a¶ static model would indicate that wind has a significant impact on the operation of coal¶ generators, the results from a dynamic model show that wind power only crowds out¶ electricity production fueled by natural gas.¶ The model was used to estimate wind power offsets for generators on the Texas electricity¶ grid. The results showed that one MWh of wind power production offsets less than half a¶ ton of CO2, almost one lb of NOx , and no discernible amount of SO2 . As a benchmark for¶ the economic benefits of renewable subsidies, I compared the value of offset emissions to¶ the cost of subsidizing wind farms for a range of possible emission values. I found that the¶ value of subsidizing wind power is driven primarily by CO2 offsets, but that the social¶ costs of CO2, would have to be greater than $42/ton in order for the environmental benefits¶ of wind power to have outweighed the costs of subsidies.

# China

#### Neodymium supplies necessary for wind are limited now but demand is keeping pace – the plan causes massive bottlenecks and price spikes. We are 100% dependent on China.

Cho 9-20 (Cho, analyst and reporter for Phys.org "rare earth metals: will we have enough?" September 20, 2012 phys.org/news/2012-09-rare-earth-metals.html

"To provide most of our power through renewables would take hundreds of times the amount of rare earth metals that we are mining today," said Thomas Graedel, Clifton R. Musser Professor of Industrial Ecology and professor of geology and geophysics at the Yale School of Forestry & Environmental Studies. There is no firm definition of rare earth metals, but the term generally refers to metals used in small quantities. Rare earth metals include: rare earth elements—17 elements in the periodic table, the 15 lanthanides plus scandium and yttrium; six platinum group elements; and other byproduct metals that occur in copper, gold, uranium, phosphates, iron or zinc ores. While many rare earth metals are actually quite common, they are seldom found in sufficient amounts to be extracted economically. According to a recent Congressional Research Service report, world demand for rare earth metals is estimated to be 136,000 tons per year, and projected to rise to at least 185,000 tons annually by 2015. With continued global growth of the middle class, especially in China, India and Africa, demand will continue to grow. High-tech products and renewable energy technology cannot function without rare earth metals. Neodymium, terbium and dysprosium are essential ingredients in the magnets of wind turbines and computer hard drives; a number of rare earth metals are used in nickel-metal-hydride rechargeable batteries that power electric vehicles and many other products; yttrium is necessary for color TVs, fuel cells and fluorescent lamps; europium is a component of compact fluorescent bulbs and TV and iPhone screens; cerium and lanthanum are used in catalytic converters; platinum group metals are needed as catalysts in fuel cell technology; and other rare earth metals are essential for solar cells, cell phones, computer chips, medical imaging, jet engines, defense technology, and much more. Ads by Google Donate Car to Make-A-Wish - Donate Your Car to Help NC Kids Free Towing & Maximum Tax Deduction - WheelsForWishes.org/Make-A-Wish Wind power has grown around 7 percent a year, increasing by a factor of 10 over the last decade, noted Peter Kelemen, Arthur D. Storke Memorial Professor of Geochemistry at the Earth Institute's Lamont-Doherty Earth Observatory. "Every megawatt of electricity needs 200 kilograms of neodymium—or 20 percent of one ton," he said. "So if every big wind turbine produces one megawatt, five turbines will require one ton of neodymium. If wind is going to play a major part in replacing fossil fuels, we will need to increase our supply of neodymium." A recent MIT study projected that neodymium demand could grow by as much as 700 percent over the next 25 years; demand for dysprosium, also needed for wind turbines, could increase by 2,600 percent. China currently supplies 97 percent of global rare earth metal demand, and 100 percent of heavy rare earth metals such as terbium and dysprosium, used in wind turbines. In 2005, it began restricting exports to preserve resources and protect the environment, causing prices to soar. Today, the United States is 100 percent dependent on imports for rare earth metals. From the mid-1960s through the 1980s, however, Molycorp's Mountain Pass mine in California was the world's main source of rare earth metals. As the U.S. share of rare earth metal production declined, China used government support, research and development, training programs, cheap labor and low prices to develop its supply chain, increasing its share of rare earth metal production from 27 percent in 1990 to 97 percent in 2011. In March, the U.S., Japan and the European Union lodged a complaint with the World Trade Organization over China's limits on rare earth exports. In response, China announced that it will export 30,996 more metric tons of rare earth metals in 2012 than it did in 2011.

#### An increase in demand for wind turbines triggers the link – government incentives distort the market

GCC 12 (Green Car Congress, report based on MIT Research "MIT study finds shift to green energy sources could mean crunch in supply of key rare earth elements" 9 March, 2012 www.greencarcongress.com/2012/03/ree-20120309.html)

A large-scale shift from coal-fired electric power plants and gasoline-fueled cars to wind turbines and electric vehicles could increase demand for two already-scarce rare earth elements (REE)—dysprosium and neodymium, available almost exclusively in China—by 600-2,600 percent over the next 25 years, according to a new study published in the ACS journal Environmental Science & Technology. The study by researchers at MIT also points out that production of the two metals has been increasing by only a few percentage points per year. ...the availability of REEs appears to be at risk based on a number of factors. Of particular significance, one country (China) controls 98% of current supply (production). Historically, much lower levels of market concentration have harmed manufacturing firms. For example, in 1978 Zaire controlled 48% of the cobalt supply and yet political unrest in Zaire resulted in a disruption to global supply that became known as the “Cobalt Crisis”. Another contributor to supply risk for REEs is the fact that they are comined; individual REEs are not mined separately. REEs are found together in geological deposits, rendering mining of individual elements economically inefficient. The supply of any individual REE depends on the geology of the deposits, the costs of the extraction technology employed, and the price of the basket of rare earths (RE). Finally, REEs have come under global scrutiny due to the environmental and social conditions under which they are mined, further increasing their supply risk. —Alonso et al. While the literature contains a number of reports that evaluate different aspects of RE availability, Randolph E. Kirchain, Ph.D., and colleagues evaluated future potential demand scenarios for REEs with a focus on the issue of comining. They analyzed the supply of lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium and yttrium under various scenarios, and projected the demand for these 10 rare earth elements through 2035. In particular, they estimated resource requirements for electric vehicles and windturbines (revolutionary demand areas for REEs) from performance specifications and vehicle sales or turbine deployment projections. Future demand was estimated for a range of scenarios including one developed by the International Energy Agency (IEA) with adoption of electric vehicles and wind turbines at a rate consistent with stabilization of CO2 in the atmosphere at a level of 450 ppm. In one scenario, demand for dysprosium and neodymium could be higher than 2,600 and 700 percent respectively. To meet that need, production of dysprosium would have to grow each year at nearly twice the historic growth rate for rare earth supplies. The applications that will be most negatively affected by constraints in these REEs (i.e., increased costs) will be those dependent upon high performance magnets. Applications such as petroleum refining, which depend on elements whose supply is projected to exceed demand, may be positively affected if primary producers increase overall production to meet the higher demand for specific elements. If a secondary market emerges to meet the higher demand for specific elements (i.e., recycling of magnets, but not catalysts), then, given that the portfolio of recycled REEs would be significantly different from the portfolio of primary supply, the overall supply portfolio of REEs could change. ...In the end, prices are not the only forces that will influence the REE markets. Government intervention in this market is prevalent. Also, corporate social responsibility policies may influence some firm’s decisions to use REE unless environmental concerns around their mining are addressed. These issues should be considered carefully by interested stakeholders and future research on this topic.

#### A supply bottleneck causes War with China –

Anthony 12/30/12 (Lead editor at Ziff Davis, Inc. Owner at SA Holdings Past Columnist at Tecca Editor at Aol (Weblogs, Inc) Educationm University of Essex, http://www.extremetech.com/extreme/111029-rare-earth-crisis-innovate-or-be-crushed-by-china/2)

 The doomsday event that everyone is praying will never come to pass, but which every Western nation is currently planning for, is the eventual cut-off of Chinese rare earth exports. Last year, 97% of the world’s rare earth metals were produced in China — but over the last few years, the Chinese government has been shutting down mines, ostensibly to save what resources it has, and also reducing the amount of rare earth that can be exported. Last year, China produced some 130,000 tons of rare earths, but export restrictions meant that only 35,000 tons were sent to other countries. As a result, demand outside China now outstrips supply by some 40,000 tons per year, and — as expected — many countries are now stockpiling the reserves that they have. Almost every Western country is now digging around in their backyard for rare earth-rich mud and sand, but it’ll probably be too little too late — and anyway, due to geochemistry, there’s no guarantee that explorers and assayers will find what they’re looking for. The price of rare earths are already going up, and so are the non-Chinese-made gadgets and gizmos that use them. Exacerbating the issue yet further, as technology grows more advanced, our reliance on the strange and magical properties of rare earths increases — and China, with the world’s largest workforce and a fire hose of rare earths, is perfectly poised to become the only real producer of solar power photovoltaic cells, computer chips, and more. In short, China has the world by the short hairs, and when combined with a hotting-up cyber front, it’s not hard to see how this situation might devolve into World War III. The alternate, ecological point of view, is that we’re simply living beyond the planet’s means. Either way, strategic and logistic planning to make the most of scarce metals and minerals is now one of the most important tasks that face governments and corporations. Even if large rare earth deposits are found soon, or we start recycling our gadgets in a big way, the only real solution is to somehow lessen our reliance on a finite resource. Just like oil and energy, this will probably require drastic technological leaps. Instead of reducing the amount of tantalum used in capacitors, or indium in LCD displays, we will probably have to discover completely different ways of storing energy or displaying images. My money’s on graphene.

#### China won’t go to war – prefer our evidence.

Fettweis ‘11 – Professor of Political Science @ Tulane

Christopher, Professor of Political Science @ Tulane, Dangerous Times?: The International Politics of Great Power Peace, pg. 117

The diminution of military influence on policymaking is indicative of a broader generational change that seems to be occurring inside Beijing. A number of China experts have begun to argue that the current leadership of the PRC has little in common with the founding members of the communist party, and are far less dogmatic in their approach to both economics and politics." While it is surely a bit premature to suggest that there is a Chinese Gorbachev ready to bring political freedom to his people, at the very least Beijing has altered the way it treats its neighbors. China's much-discussed "charm offensive" has won it many friends in East Asia, and it has helped solidify many of the complex economic ties that cement stability across the region and avoid the regional tensions that realists have expected to see in response to its rapid economic growth." Beijing has been reluctant to use its military superiority to threaten or bully its neighbors into cooperation. Perhaps it is on its way to internalizing the norm of peaceful conflict resolution and will soon no longer contemplate the use of force to achieve its goals; for now, perhaps, the determination to be a good neighbor is the best step for which anyone can hope.

#### Trade can’t solve war.

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Colin. Associate professor UMKC school of law. “Trade and Security: Empiricism, Change, Emotion & Relevancy.” 2006. Online.

The changed environments in which the new conflicts arise suggest that trade policy will not very easily influence those conflicts. For the most part, the environments that have changed the nature of armed conflict originated in or emerged after the end of the Cold War. Of course, some of these conditions existed before and some are still in formation, but the end of the Cold War presented a paradigm shift in the environments and nature of armed conflicts that is significant enough to merit the use of the word "new" in this context. The end of the Cold War changed the conflict landscape in many significant ways. For example, the conclusion of the Cold War has likely reduced one significant source of the rampant externalization of internal conflicts. Also, the primary source of global stress and differing economic ideologies was largely replaced by other tensions including differing ethnic and religious beliefs previously suppressed during the Cold War. Similarly, the end of the Cold War led to widespread demilitarization of many of its participants, both within the NATO and the former-Warsaw Pact, leaving them less able to intervene, positively or negatively, in emerging conflicts or failing states.24 Other examples of post-Cold War phenomena that have impacted the conflict environment in recent times include: “Globalization”, with its impact on propaganda/information and the supply of weapons (including WMDs); The rise of humanitarian intervention; The initial post-Cold War UN Security Council revival and its subsequent descent into near impotence; and The increase in uncontrolled non-state participants in conflicts, including through global terrorism and narco-terrorists. Most of these new dimensions of the conflict environment share a common crucial characteristic: they, for the most part, exist independently of global economic forces such as international trade. For example, economic factors are not obviously or perhaps even at all the source of conflicts involving ethnic tensions. Similarly, the rise of religious fundamentalism and the growth of humanitarian intervention are also largely isolated from global economic forces. True, there are some environments that are directly influenced by economic factors, such as globalization and the proliferation of weapons of all sorts, but clearly there are many conflict-producing environments they are immune to economic considerations. Accordingly, where an environment that gives birth to a conflict is impervious or resistant to economic forces, including the new international trade environment (the WTO and the many RTAs), it is less likely that those same economic forces will be able to have an influence on the birth and development of that armed conflicts. Similarly, those economic forces will likely not impact future conflicts that may arise within the same on-going environments. This conclusion should raise concerns for those that advocate employment of trade policy in conflict situations.

#### Empirical studies show no causal relationship between economic decline and war

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Morris, Professor of Economics, Poverty: A Cause of War?, http://archive.peacemagazine.org/v17n1p08.htm

Library shelves are heavy with studies focused on the correlates and causes of war. Some of the leading scholars in that field suggest that we drop the concept of causality, since it can rarely be demonstrated. Nevertheless, it may be helpful to look at the motives of war-prone political leaders and the ways they have gained and maintained power, even to the point of leading their nations to war. Poverty: The Prime Causal Factor? Poverty is most often named as the prime causal factor. Therefore we approach the question by asking whether poverty is characteristic of the nations or groups that have engaged in wars. As we shall see, **poverty has never been as significant a factor as one would imagine**. Largely this is because of the traits of the poor as a group - particularly their tendency to tolerate their suffering in silence and/or be deterred by the force of repressive regimes. Their **voicelessness and powerlessness translate into passivity**. Also, because of their illiteracy and ignorance of worldly affairs, the poor become susceptible to the messages of war-bent demagogues and often willing to become cannon fodder. The situations conductive to war involve political repression of dissidents, tight control over media that stir up chauvinism and ethnic prejudices, religious fervor, and sentiments of revenge. The poor succumb to leaders who have the power to create such conditions for their own self-serving purposes. Desperately poor people in **poor nations cannot organize wars**, which are exceptionally costly. The statistics speak eloquently on this point. In the last 40 years the global arms trade has been about $1500 billion, of which two-thirds were the purchases of developing countries. That is an amount roughly equal to the foreign capital they obtained through official development aid (ODA). Since ODA does not finance arms purchases (except insofar as money that is not spent by a government on aid-financed roads is available for other purposes such as military procurement) financing is also required to control the media and communicate with the populace to convince them to support the war. Large-scale armed conflict is so expensive that governments must resort to exceptional sources, such as drug dealing, diamond smuggling, brigandry, or deal-making with other countries. The reliance on illicit operations is well documented in a recent World Bank report that studied 47 civil wars that took place between 1960 and 1999, the main conclusion of which is that the key factor is the availability of commodities to plunder. For greed to yield war, there must be financial opportunities. **Only affluent political leaders and elites can amass such weaponry**, diverting funds to the military even when this runs contrary to the interests of the population. In most inter-state wars the antagonists were wealthy enough to build up their armaments and propagandize or repress to gain acceptance for their policies. Economic Crises? Some scholars have argued that it is not poverty, as such, that contributes to the support for armed conflict, but rather some catalyst, such as an economic crisis. However, a study by Minxin Pei and Ariel Adesnik shows that this **hypothesis lacks merit**. After studying 93 episodes of economic crisis in 22 countries in Latin American and Asia since World War II, they concluded that much of the conventional thinking about the political impact of economic crisis is wrong: "The severity of economic crisis - as measured in terms of inflation and negative growth - bore no relationship to the collapse of regimes ... or (in democratic states, rarely) to an outbreak of violence... In the cases of dictatorships and semi-democracies, the ruling elites responded to crises by increasing repression (thereby using one form of violence to abort another)."

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#### Venture capital shifting away from renewables to grid modernization now

NBC 12 [Dinah Wisenberg Brin, award-winning writer with a strong background producing financial, healthcare, government news, “Clean Tech Investing Shifts, With Lower-Cost Ventures Gaining Favor” March 1, http://www.cnbc.com/id/46222448/Clean\_Tech\_Investing\_Shifts\_With\_Lower\_Cost\_Ventures\_Gaining\_Favor]

For many investors, that change means shifting funds from capital-intensive alternative-energy technologies, such as solar panels, to lower-cost ventures focused on energy efficiency and “smart grid” technologies that automate electric utility operations.¶ “We continue to be very optimistic about things like the smart grid and the infusion of information technologies and software services” into old lines like electricity, agriculture and the built environment," says Steve Vassallo, general partner in Foundation Capital. “We’re very bullish on what I would consider the nexus of information technology and clean tech.”¶ Foundation, based in Menlo Park, Calif., reflects this in investments such as Sentient Energy Inc., a smart-grid monitoring company that allows utilities to remotely find power outages, and Silver Spring Networks, which provides utilities a wireless network for advanced metering and remote service connection.¶ Another holding, EnerNOC [ENOC 10.13 -0.22 (-2.13%) ], a demand-response business with technology to turn off noncritical power loads during peak periods, went public in 2007.¶ EMeter, a one-time Foundation investment, was recently acquired by Siemens Industry [SI 93.09 0.23 (+0.25%) ].¶ To be sure, investors have not abandoned costlier technologies with longer-term horizons, but many — put off, in part, by last year’s bankruptcy and shutdown of solar power firm Solyndra — now favor smaller infusions in businesses with a quicker potential payoff.¶ Rob Day, partner in Boston-based Black Coral Capital, says his cleantech investment firm maintains some solar holdings, but he sees a shift from an emphasis on those types of plays to more “intelligence-driven, software-driven, web-driven businesses.” These technologies can be used to improve existing businesses, he says.¶ One Black Coral smart-technology investment is Digital Lumens of Boston, which makes high-efficiency, low-cost LED lighting for warehouses and factories. Software and controls are embedded in the fixtures, which can cut lighting bills by 90 percent, providing customers a two-year payback, says Day. ¶ U.S. venture capital investment in cleantech companies hit $4.9 billion last year, down 4.5 percent in dollar terms but flat in the number of transactions, according to Ernst & Young LLP, which analyzed data from Dow Jones VentureSource. Cleantech companies raised 29 percent more capital last year than in 2009, E&Y said recently.¶ Most of that decline, however, came from less investment in sectors that were once hot.¶ Investment in energy and electric generation, including solar businesses, fell 5 percent to $1.5 billion, while that of industry products and services companies plunged 34 percent to $1 billion, according to E&Y's analysis of equity investments from venture capital firms, corporations and individuals.¶ The energy efficiency category leads the diverse industry in deals with 78 transactions worth $646.9 million. Energy-storage companies raised $932.6 million, a 250 percent increase and 47 percent deal increase.¶

#### Plan reverses that trend—causes capital diversion

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http://mercatus.org/publication/assessing-department-energy-loan-guarantee-program

3. Mal-investments Loan guarantee programs can also have an impact on the economy beyond their cost to taxpayers. Mal-investment—the misallocation of capital and labor—may result from these loan guarantee programs. In theory, banks lend money to the projects with the highest probability of being repaid. These projects are often the ones likely to produce larger profits and, in turn, more economic growth. However, considering that there isn’t an infi- nite amount of capital available at a given interest rate, loan guarantee programs could displace resources from non-politically motivated projects to politically motivated ones. Think about it this way: When the government reduces a lender’s exposure to fund a project it wouldn’t have funded otherwise, it reduces the amount of money available for projects that would have been viable without subsidies. This government involvement can distort the market signals further. For instance, the data shows that private investors tend to congregate toward government guarantee projects, independently of the merits of the projects, taking capital away from unsubsidized projects that have a better probability of success without subsidy and a more viable business plan. As the Government Accountability Office noted, “Guarantees would make projects [the federal government] assists financially more attractive to private capital than conservation projects not backed by federal guarantees. Thus both its loans and its guarantees will siphon private capital away.”[26] This reallocation of resources by private investors away from viable projects may even take place within the same industry—that is, one green energy project might trade off with another, more viable green energy project. More importantly, once the government subsidizes a portion of the market, the object of the subsidy becomes a safe asset. Safety in the market, however, often means low return on investments, which is likely to turn venture capitalists away. As a result, capital investments will likely dry out and innovation rates will go down.[27] In fact, the data show that in cases in which the federal government introduced few distortions, private inves- tors were more than happy to take risks and invest their money even in projects that required high initial capital requirements. The Alaska pipeline project, for instance, was privately financed at the cost of $35 billion, making it one of the most expensive energy projects undertaken by private enterprise.[28] The project was ultimately aban- doned in 2011 because of weak customer demand and the development of shale gas resources outside Alaska. [29] However, this proves that the private sector invests money even when there is a chance that it could lose it. Private investment in U.S. clean energy totaled $34 billion in 2010, up 51 percent from the previous year.[30] Finally, when the government picks winners and losers in the form of a technology or a company, it often fails. First, the government does not have perfect or even better information or technology advantage over private agents. In addition, decision-makers are insulated from market signals and won’t learn important and necessary lessons about the technology or what customers want. Second, the resources that the government offers are so addictive that companies may reorient themselves away from producing what customers want, toward pleasing the government officials.

Solves water scarcity

Muys et al 11 [Jerome C. Muys, Jr., Jeffrey M. Karp, and Van P. Hilderbrand, Jr. Sullivan & Worcester LLP, “The Intersection Between Water Scarcity And Renewable Energy” April, http://www.sandw.com/assets/htmldocuments/Intersection%20Between%20Water%20Scarcity%20and%20Renewable%20Energy%20-%20Muys%20Karp%20Hilderbrand%20W0230759.PDF]

The starting point for any discussion of the intersection between water scarcity and renewable energy is the now generally-accepted correlation between climate change and water resource impacts, which is creating further¶ imperatives for both reduction of GHG emissions and water¶ conservation. Most projections conclude that the water resource impacts of climate change will almost certainly be both diverse and wide-ranging, necessitating the implementation of new protocols for allocating water resources such as the Model Interstate Water Compact. However, a less obvious impact of predicted water shortages will be on the future ability to site new renewable energy facilities and, perhaps more importantly, on which¶ types of renewable energy gain prominence in the future. Consequently, water reuse and reclamation facilities are¶ increasingly being co-located with renewable energy¶ projects, and, indeed, technological development in the two¶ areas has begun to converge in ways that were completely¶ unforeseen twenty years ago.

#### Extinction

Reilly ‘2

(Kristie, Editor for In These Times, a nonprofit, independent, national magazine published in Chicago. We’ve been around since 1976, fighting for corporate accountability and progressive government. In other words, a better world, “NOT A DROP TO DRINK,” <http://www.inthesetimes.com/issue/26/25/culture1.shtml>)

\*Cites environmental thinker and activist Vandana Shiva Maude Barlow and Tony Clarke—probably North America’s foremost water experts

The two books provide a chilling, in-depth examination of a rapidly emerging global crisis. “Quite simply,” Barlow and Clarke write, “unless we dramatically change our ways, between one-half and two-thirds of humanity will be living with severe fresh water shortages within the next quarter-century. … The hard news is this: Humanity is depleting, diverting and polluting the planet’s fresh water resources so quickly and relentlessly that every species on earth—including our own—is in mortal danger.” The crisis is so great, the three authors agree, that the world’s next great wars will be over water. The Middle East, parts of Africa, China, Russia, parts of the United States and several other areas are already struggling to equitably share water resources. Many conflicts over water are not even recognized as such: Shiva blames the Israeli-Palestinian conflict in part on the severe scarcity of water in settlement areas. As available fresh water on the planet decreases, today’s low-level conflicts can only increase in intensity.

#### Water scarcity destroys agriculture and makes life unsustainable.

Ganter, 8 Carl. Jul 9 2008 http://www.csrwire.com/press\_releases/15163-U-S-Faces-Era-Of-Water-Scarcity-Profligate-Use-Hurts-In-Unexpected-Places-Quest-For-New-Supplies-Nationwide

Scientists and resource specialists say freshwater scarcity, even in unexpected places, threatens farm productivity, limits growth, increases business expenses, and drains local treasuries.¶ In May, for example, Brockton, Massachusetts, inaugurated a brand-new, [$60 million reverse osmosis desalinization plant](http://www.circleofblue.org/waternews/world/new-desalinization-plant-for-seemingly-water-rich-new-england/) to supply a portion of its drinking water. The Atlantic coast city, which receives four feet of rain annually, was nevertheless so short of freshwater that it was converting brackish water into water people actually could drink.¶ Builders in the Southeast are confronting limits to planting gardens and lawns for new houses as a result of local water restrictions prompted by a continuing drought. The Ogallala Aquifer, the vast underground reservoir beneath the Great Plains, is steadily being depleted. California experienced the driest spring on record this year.¶ And scientists at the [Scripps Institution of Oceanography](http://www.sio.ucsd.edu/) in San Diego forecast that within 13 years Lake Mead and Lake Powell along the Colorado River, the two largest reservoirs in the southwest United States, could become "dead pool” mud puddles.¶ "The whole picture is not pretty, and I don’t think that anyone has looked at the subject with the point of view of what's sustainable," said Tim Barnett, a research marine geophysicist at Scripps and co-author of the the study. "We don't have anybody thinking long range, at the big picture that would put the clamps on large-scale development."