# 2nc Overview

**Its try or die for the neg, food shortage is inevitable even without warming—only an increase in CO2 boosts rice yield which solves famine and environmental collapse**

**IDSO 2006** (Sherwood, Craig, Keith, all PhDs, “Can the World Produce 40% More Rice by 2030?” CO2 Science Magazine, Volume 9, Number 9, March 1, http://www.co2science.org/articles/V9/N9/EDIT.php)

What will it take to feed five billion rice consumers in 2030? That is the question that plagues the mind of Gurdev S. Khush (2005) of the International Rice Research Institute in Metro Manila, Philippines. "According to various estimates," in his words, "we will have to produce 40% more rice by 2030 to satisfy the growing demand without affecting the resource base adversely," because, as he continues, "if we are not able to produce more rice from the existing land resources, land-hungry farmers will destroy forests and move into more fragile lands such as hillsides and wetlands with disastrous consequences for biodiversity and watersheds," echoing sentiments previously expressed by Wallace (2000), Tilman et al. (2001; 2002), Foley et al. (2005), and Green et al. (2005). Hence, as Khush puts it, the expected increase in the demand for food "will have to be met from less land, with less water, less labor and fewer chemicals." How is it to be done? Khush suggests a number of strategies for attacking the multifaceted problem, including conventional hybridization and selection procedures, ideotype breeding, hybrid breeding, wide hybridization and genetic engineering, all designed to increase the yield potential of rice. In addition, he emphasizes breeding for increased resistance to diseases and insect pests, as well as for enhanced abiotic stress tolerance, which is needed to withstand the negative impacts of drought, excess water, soil mineral deficiencies and toxicities, as well as unfavorable temperatures (both hot and cold). We agree that all of these things are needed; however, as indicated by Tilman et al. (2001), "even the best available technologies, fully deployed, cannot prevent many of the forecasted problems." This was also the conclusion of Idso and Idso (2000), who acknowledged that "expected advances in agricultural technology and expertise will significantly increase the food production potential of many countries and regions," but who went on to note that these advances "will not increase production fast enough to meet the demands of the even faster-growing human population of the planet." **Fortunately, we have a strong ally** in the ongoing rise in the air's CO2 concentration that may help us meet and surmount this daunting global challenge. Atmospheric CO2 enrichment, for example, has been demonstrated to significantly increase rice photosynthesis and biomass production (see our compilations of over 100 individual experimental results for photosynthesis and biomass responses of rice to CO2-enriched air in the Data section of our website). In addition, elevated CO2 concentrations have been shown to enhance the ability of rice to cope with both biotic and abiotic stresses (see Agriculture (Species - Rice) in our Subject Index). Hence, in addition to our purposeful directed efforts to increase rice yields in the years and decades to come, we will experience the unplanned help provided by the CO2 emissions that result from the burning of fossil fuels. Working together, these two positive forces may help us meet the clear and present need to ramp up rice production to the degree required to adequately feed the world a mere quarter-century from now, and to do so without usurping all of the planet's available land and water resources and thereby consigning the bulk of "wild nature" to the **ash heap of history**. Without the help of both approaches, we will in all likelihood fail and, with the **rest of the biosphere**, suffer **unimaginable negative consequences**.

**Comparatively outweighs warming**

**IDSO 2007** (Unclear which ones, but they’re all esteemed scientists with PhDs and decades of CO2 research experience, “Breeding Food Crops to Take Advantage of Rising Atmospheric CO2 Concentrations,” August 1, http://www.co2science.org/articles/V10/N31/B2.php)

There is growing concern that it will be difficult to feed the expanding human population of the planet just a few decades from now without the taking of great quantities of land (Waggoner, 1995; Tilman et al., 2001, 2002; Huang et al., 2002) and nearly all available freshwater resources (Wallace, 2000) from what might be called "wild nature," which habitat usurpation could lead to the extinction of far greater numbers of plant and animal species (Raven, 2002) than what climate alarmists are predicting will be caused by global warming. Idso and Idso (2000) have described how the aerial fertilization effect of the ongoing rise in the atmosphere's CO2 concentration can boost the yields of current crop varieties and help avert this disaster, as we discuss in more detail in our Editorial of 4 Sep 2002. The most recent work of De Costa et al. suggests an additional way of profiting from the expected increase in the air's CO2 content and its ability to stimulate agricultural productivity and water use efficiency. What was done The authors grew 16 genotypes of rice (Oryza sativa L.) under standard lowland paddy culture with adequate water and nutrients at the Rice Research and Development Institute in Sri Lanka from May to August (the yala season) and from November to March (the maha season) within open-top chambers maintained at either the ambient atmospheric CO2 concentration (370 ppm) or at an elevated CO2 concentration (570 ppm). What was learned De Costa et al. report that the CO2-induced enhancement of the light-saturated net photosynthetic rates of the 16 different genotypes during the grain-filling period of growth ranged from +2% to +185% in the yala season and from +22% to +320% in the maha season. Likewise, they found that the CO2-induced enhancement of the grain yields of the 16 different genotypes ranged from +4% to +175% in the yala season and from -5% to +64% in the maha season. What it means The five Sri Lanka researchers say their results "demonstrate the significant genotypic variation that exists within the rice germplasm, in the response to increased atmospheric CO2 of yield and its correlated physiological parameters," and they go on to suggest that "the significant genotypic variation in this response means that genotypes that are highly responsive to elevated CO2 may be selected and incorporated into breeding programs to produce new rice varieties which would be higher yielding in a future high CO2 climate," whereas Idso and Idso (2000) had merely calculated the increase in yield expected to result from projected increases in the air's CO2 content for existing crop varieties. The latter of these critically important benefits will occur automatically; but to achieve the benefits envisioned by De Costa et al. - and to avert the biological catastrophe foreseen by the scientists cited in the background section of this review - will require that the breeding programs De Costa et al. propose be initiated as soon as possible.

**And biodiversity collapse risks extinction**

**Diner** 19**94**

David JD Ohio State, Military Law Review, Winter

Biologically diverse ecosystems are characterized by a large number of specialist species, filling narrow ecological niches. These ecosystems inherently are more stable than less diverse systems. "The more complex the ecosystem, the more successfully it can resist stress... [l]ike a net, in which each knot is connected to others by several strands, such a fabric can resist collapse better than a simple, unbranched circle of threads -- which is cut anywhere breaks down as a whole." By causing widespread extinctions, humans have artificially simplified many ecosystems. As biologic simplicity increases, so does the risk of ecosystem failure. The spreading Sahara Desert in Africa, and the dustbowl conditions of the 1930s in the United States are relatively mild examples of what might be expected if this trend continues. Theoretically, each new animal or plant extinction, with all its dimly perceived and intertwined affects, could cause total ecosystem collapse and human extinction. Each new extinction increases the risk of disaster. Like a mechanic removing, one by one, the rivets from an aircraft's wing, mankind may be edging closer to the abyss.

**C02 is the only way to stave it off**

**IDSO AND IDSO 2007** (Sherwood B., Craig D.. Craig received his B.S. in Geography from Arizona State University, his M.S. in Agronomy from the University of Nebraska - Lincoln, and his Ph.D. in Geography from Arizona State University. Investigated urban CO2 levels via a National Science Foundation grant as a faculty researcher in the Office of Climatology at Arizona State University. Sherwood is a Doctor of Geography former Director of Environmental Science at Peabody Energy in St. Louis, Missouri and is a member of the American Association for the Advancement of Science, American Geophysical Union, American Meteorological Society, Arizona-Nevada Academy of Sciences, Association of American Geographers, Ecological Society of America, and The Honor Society of Phi Kappa Phi. Carbon Dioxide and Global Change:. 6 June. 24 June 2008 <co2science.org>. )

How much land can ten billion people spare for nature? This provocative question was posed by Waggoner (1995) in an insightful essay wherein he explored the dynamic tension that exists between the need for land to support the agricultural enterprises that sustain mankind, and the need for land to support the natural ecosystems that sustain all other creatures. This challenge of meeting our future food needs - and not decimating the rest of the biosphere in the process - was stressed even more strongly by Huang et al. (2002), who wrote that humans "have encroached on almost all of the world's frontiers, leaving little new land that is cultivatable." And in consequence of humanity's usurpation of this most basic of natural resources, Raven (2002) stated in his Presidential Address to the American Association for the Advancement of Science that "species-area relationships, taken worldwide in relation to habitat destruction, lead to projections of the loss of fully two-thirds of all species on earth by the end of this century." In a more detailed analysis of the nature and implications of this impending "global land-grab" - which moved it closer to the present by a full half-century - Tilman et al. (2001) concluded that the task of meeting the doubled world food demand, which they calculated would exist in the year 2050, would likely exact a toll that "may rival climate change in environmental and societal impacts." But how could something so catastrophic manifest itself so soon? Tilman and his nine collaborators shed some light on this question by noting that at the end of the 20th century [hu]mankind was already appropriating "more than a third of the production of terrestrial ecosystems and about half of usable freshwaters." Now, think of doubling those figures, in order to meet the doubled global food demand that Tilman et al. predict for the year 2050. The results suggest that a mere 43 years from now [hu]mankind will be appropriating more than two thirds of terrestrial ecosystem production plus all of earth's remaining usable freshwater, as has also been discussed by Wallace (2000). In terms of land devoted to agriculture, Tilman et al. calculate a much less ominous 18% increase by the year 2050. However, because most developed countries are projected to withdraw large areas of land from farming over the next fifty years, the loss of natural ecosystems to crops and pastures in developing countries will amount to about half of their remaining suitable land, which would, in the words of the Tilman team, "represent the worldwide loss of natural ecosystems larger than the United States." What is more, they say that these land usurpations "could lead to the loss of about a third of remaining tropical and temperate forests, savannas, and grasslands." And in a worrisome reflection upon the consequences of these land-use changes, they remind us that "species extinction is an irreversible impact of habitat destruction." What can be done to avoid this horrific situation? In a subsequent analysis, Tilman et al. (2002) introduced a few more facts before suggesting some solutions. First of all, they noted that by 2050 the human population of the globe is projected to be 50% larger than it was just prior to the writing of their paper, and that global grain demand by 2050 could well double, due to expected increases in per capita real income and dietary shifts toward a higher proportion of meat. Hence, they but stated the obvious when they concluded that "raising yields on existing farmland is essential for 'saving land for nature'." So how can this readily-defined but Herculean task be accomplished? Tilman et al. proposed a strategy that focuses on three essential efforts: (1) increasing crop yield per unit of land area, (2) increasing crop yield per unit of nutrients applied, and (3) increasing crop yield per unit of water used. With respect to the first of these efforts - increasing crop yield per unit of land area - the researchers note that in many parts of the world the historical rate-of-increase in crop yield is declining, as the genetic ceiling for maximal yield potential is being approached. This observation, in their estimation, "highlights the need for efforts to steadily increase the yield potential ceiling." With respect to the second effort - increasing crop yield per unit of nutrients applied - they note that "without the use of synthetic fertilizers, world food production could not have increased at the rate [that it did in the past] and more natural ecosystems would have been converted to agriculture." Hence, they say that the ultimate solution "will require significant increases in nutrient use efficiency, that is, in cereal production per unit of added nitrogen." Finally, with respect to the third effort - increasing crop yield per unit of water used - Tilman et al. note that "water is regionally scarce," and that "many countries in a band from China through India and Pakistan, and the Middle East to North Africa either currently or will soon fail to have adequate water to maintain per capita food production from irrigated land." Increasing crop water use efficiency, therefore, is also a must. Although the impending man vs. nature crisis and several important elements of its potential solution are thus well defined, Tilman and his first set of collaborators concluded that "even the best available technologies, fully deployed, cannot prevent many of the forecasted problems." This was also the finding of Idso and Idso (2000), who concluded that although "expected advances in agricultural technology and expertise will significantly increase the food production potential of many countries and regions," these advances "will not increase production fast enough to meet the demands of the even faster-growing human population of the planet."

**CO2 fertilization solves their impact.**

**Idso Cubed** October 20**10**

Sherwood, Keith and Craig Idso, They've Left Life Out of the Equations …, Volume 13, Number 42: 20, http://www.co2science.org/articles/V13/N42/EDIT.php

All else being equal, we would tend to agree with Lacis et al. on this point. However, as we all know, "all else being equal" is hardly ever the case in the real world; and in the case in point, CO2 affects earth's climate in several more ways than through its thermal radiative properties. **CO2 is**, after all, **the elixir of life**, promoting plant growth, both on land and throughout the surface waters of the world's oceans. And this vast assemblage of plant life has the ability to impact earth's climate in a number of different ways, all of which tend **to counteract** the heating or cooling effects of carbon dioxide's thermal radiative forcing as its concentration either rises or falls, thereby helping to maintain earth's temperature within a range that is conducive to the continued existence, and even flourishing, of the planet's myriad life forms. Time and space do not allow us to go into great detail about these several phenomena in this editorial; but in our website's Subject Index, under the general heading of Feedback Factors (Biophysical), we report the results of numerous observational studies that describe how earth's plants -- ranging all the way from unicellular algae in the sea, to grasses, shrubs and majestic trees on land -- emit copious quantities of gases that are converted to particles in the atmosphere, forming aerosols that reflect significant amounts of incoming solar radiation back to space, thereby cooling the planet, or that serve as condensation nuclei for cloud droplets that create more numerous, more extensive, longer-lasting and brighter clouds that also cool the globe. Therefore, depending on whether the air's CO2 content is increasing or decreasing, these phenomena result in changes in global radiative forcing similar in magnitude but opposite in sign to the direct thermal forcing induced by the increases or decreases in the air's CO2 concentration, which suggests that CO2 might well be considered the "principal control knob governing earth's temperature." However, CO2 controls the planet's temperature in such a way as to prevent the occurrence of both unduly hot and cold temperature extremes. Thus, the end result of these several simultaneous and interacting phenomena is that the ongoing rise in the air's CO2 content is of great benefit to the biosphere, helping to increase both the amount and quality of life on earth, while not materially altering the globe's temperature, by stimulating biological phenomena that ultimately tend to negate the greenhouse gas's own global warming potential.

# 2NC CO2 GOOD (RICE SPECIFIC)

**Extend our 1NC Idso evidence—experimental evidence shows that CO2 increases rice yields enough to solve impending famine in Asia. All of our evidence is specific to rice yield, not crops in general—aff evidence doesn’t apply and it’s impossible to win offense because famine is coming now even if there’s no warming.**

**And, CO2 improves rice growth and solves droughts and parasites**

**NIPCC 2009** (Nongovernmental International Panel on Climate Change, “Climate Change Reconsidered,” June, http://www.nipccreport.org/reports/2009/pdf/CCR2009FullReport.pdf)

In summary, as the CO2 concentration of the air continues to rise, rice plants will likely experience greater photosynthetic rates, produce more biomass, be less affected by root parasites, and better deal with environmental stresses, all of which effects should lead to greater grain yields.

**And, it improves both photosynthesis and dark respiration**

**NIPCC 2009** (Nongovernmental International Panel on Climate Change, “Climate Change Reconsidered,” June, http://www.nipccreport.org/reports/2009/pdf/CCR2009FullReport.pdf)

DeCosta et al. (2003a) grew two crops of rice (Oryza sativa L.) at the Rice Research and Development Institute of Sri Lanka from January to March (the maha season) and from May to August (the yala season) in open-top chambers in air of either ambient or ambient plus 200 pppm CO2, determining that leaf net photosynthetic rates were significantly higher in the CO2-enriched chambers than in the ambient-air chambers: 51-75 percent greater in the maha season and 22-33 percent greater in the yala season. Likewise, in the study of Gesch et al. (2002), where one-month-old plants were maintained at either 350 ppm CO2 or switched to a concentration of 700 ppm for 10 additional days, the plants switched to CO2enriched air immediately displayed large increases in their photosynthetic rates that at the end of the experiment were still 31 percent greater than those exhibited by unswitched control plants. With respect to the opposite of photosynthesis, Baker et al. (2000) reported that rates of carbon loss via dark respiration in rice plants decreased with increasing nocturnal CO2 concentrations. As a result, it is not surprising that in the study of Weerakoon et al. (2000), rice plants exposed to an extra 300 ppm of atmospheric CO2 exhibited a 35 percent increase in mean season-long radiation-use efficiency, defined as the amount of biomass produced per unit of solar radiation intercepted. In light of these several observations, therefore, one would logically expect rice plants to routinely produce more biomass at elevated levels of atmospheric CO2.

And, higher CO2 levels solve lodging—this increases yield

IDSO 2007 (Some combination of them, excellent scientists all, “Effect of Elevated CO2 on Lodging in Rice,” Feb 14, http://www.co2science.org/articles/V10/N7/B2.php)

The authors note that lodging - the beating down of a crop - "can occur under heavy rains and strong winds," and that this phenomenon "decreases canopy photosynthesis due to self-shading (Setter et al., 1997) and disturbs the translocation of carbon and nutrients to the rice grains (Hitaka and Kobayashi, 1961), resulting in lower yield and poor grain quality." In fact, they report that Setter et al. (1997) showed that a moderate degree of lodging, which reduced canopy height by 35%, decreased yield by about 20%, and that severe lodging, which reduced canopy height by 75%, decreased yield by up to 50%." What was done In a Free-Air CO2-Enrichment (FACE) study designed to discover the effect of atmospheric CO2 enrichment on lodging in rice (Oryza sativa L.) plants, Shimono et al. grew the cultivar Akitakomachi in paddy fields at Shizukuishi, Iwate, Japan, under three nitrogen (N) fertilization regimes - low N (6 g N m-2), medium N (9 g N m-2) and high N (15 g N m-2) - at two different season-long 24-hour mean CO2 concentrations - 375 ppm (ambient) and 562 ppm (enriched) - while the degree of naturally-occurring lodging was measured at the time of grain maturity on a scale of 0-5 based on the bending angles of the stems at 18° intervals, where 0 = 0° from the vertical, 1 = 1°-18°, 2 = 19°-36°, 3 = 37°-54°, 4 = 55°-72° and 5 = 73°-90°. What was learned As expected, and as often has been observed before, the six scientists found that lodging was significantly higher under high N than under medium and low N. However, they found that the lodging experienced in the high N treatment "was alleviated by elevated CO2," because the lowest internodes of the rice stems "became significantly shorter and thicker under elevated CO2," which presumably "strengthened the rice culms against the increased lodging that occurred under high N." In addition, they found that the reduced lodging experienced under elevated CO2 in the high N treatment increased the grain ripening percentage of the rice by 4.5% per one-unit decrease in lodging score. What it means Some people have worried, in the words of Shimono et al., that "to increase rice yield under projected future CO2 levels, N fertilization must be increased to meet increased plant demand for this nutrient as a result of increased growth rates," but that greater N fertilization might enhance lodging, thereby defeating the purpose of the fertilization. However, they learned from their study that "elevated CO2 could significantly decrease lodging under high N fertilization, thereby increasing the ripening percentage and grain yield," in what amounts to another CO2-induced success story for what the researchers call "the most important crop for feeding the world's population."

# A2: WARMING OVERWHELMS

**CO2 and warming are both good for plants—even if all of their warming arguments are true, CO2 alone is enough to solve famine**

**MICHAELS AND BALLING 2000** (Patrick, Research Professor of Environmental Studies at the University of Virginia and Former President of the American Association of State Climatologists; Robert, Professor of Geography and Director of the Office of Climatology at Arizona State University, The Satanic Gases, 182-183)

We state with confidence that doubling the air’s CO2 content causes a rise in optimum C3 plant growth temperature that is even larger than is predicted to result from co-occurring CO2-induced global warming. Clearly, such warming would not adversely affect the vast majority of plants; for fully 95 percent of them are of the C3 variety. The remainder of the planet’s species are largely tropical and will not experience quite so large a CO2-induced rise in optimum temperature, but then they are already adapted to the earth’s warmer climates and use the other photosynthetic pathways (C4 and CAM). Bear in mind that the tropics are expected to warm much less than other portions of the globe, according to both observed data and IPCC. Even at the highest air temperature plants encounter, atmospheric CO2 enrichment is still desirable. Indeed, it can mean the difference between life and death. Countless studies show that elevated CO2 typically enables plants to maintain positive carbon exchange rates in situations (such as very hot environments) where plants would otherwise exhibit negative growth rates that ultimately led to their demise. This type of research fills such journals as Environmental and Experimental Botany and the American Journal of Botany. It is abundantly obvious from a large body of detailed scientific investigations that a CO2-induced warming would not produce a massive poleward or up-slope migration of plants seeking cooler weather. After all, the temperatures at which nearly all plants perform at their optimum would rise even higher than the temperatures of their respective environments under such conditions. Indeed, elevated levels of atmospheric CO2 will enable most plants not merely to cope with predicted air temperature increases, but to thrive in their presence, performing even better than they do today.

**CO2 solves the damage of warming and the synergy of both helps plants**

**NIPCC 2009** (Nongovernmental International Panel on Climate Change, “Climate Change Reconsidered,” June, http://www.nipccreport.org/reports/2009/pdf/CCR2009FullReport.pdf)

Finally, even if the air’s CO2 content were to cease rising or have no effect on plants, it is possible that temperature increases alone would promote plant growth and development. This was the case in the study of Wurr et al. (2000), where elevated CO2 had essentially no effect on the yield of French bean. However, a 4°C increase in air temperature increased yield by approximately 50 percent. In conclusion, the recent scientific literature continues to indicate that as the air’s CO2 content rises, agricultural crops will likely exhibit enhanced rates of photosynthesis and biomass production that will not be diminished by any global warming that might occur concurrently. In fact, if the ambient air temperature rises, the growth-promoting effects of atmospheric CO2 enrichment will likely rise along with it.

**Warming can only be good for plants—when it gets too hot they emit OCS which creates a negative feedback**

**NIPCC 2009** (Nongovernmental International Panel on Climate Change, “Climate Change Reconsidered,” June, http://www.nipccreport.org/reports/2009/pdf/CCR2009FullReport.pdf)

The first portion of this response can be explained by the fact that most terrestrial plants prefer much warmer temperatures than a mere 3°C, so that as their surroundings warm and they grow better, they extract more OCS from the atmosphere in an attempt to promote even more warming and grow better still. At the point where warming becomes a detriment to them, however, they reverse this course of action and begin to rapidly reduce their rates of OCS absorption in an attempt to forestall warming-induced death. And since the consumption of OCS by lichens is under the physiological control of carbonic anhydrase—which is the key enzyme for OCS uptake in all higher plants, algae, and soil organisms—we could expect this phenomenon to be generally operative over most of the earth. Hence, this thermoregulatory function of the biosphere may well be powerful enough to define an upper limit above which the surface air temperature of the planet may be restricted from rising, even when changes in other forcing factors, such as increases in greenhouse gas concentrations, produce an impetus for it to do so. Clearly, this multifaceted phenomenon is extremely complex, with different biological entities tending to both increase and decrease atmospheric OCS concentrations at one and the same time, while periodically reversing directions in this regard in response to climate changes that push the temperatures of their respective environments either above or below the various thermal optima at which they function best. This being the case, there is obviously much more we need to learn about the many plant physiological mechanisms that may be involved. State-of-the-art climate models totally neglect the biological processes we have described here. Until we fully understand the ultimate impact of the OCS cycle on climate, and then incorporate them into the climate models, we cannot be certain how much of the warming experienced during the twentieth century, if any, can be attributed to anthropogenic causes.

### 2nc overview

### 2nc CP solvency

#### Performance-based incentives solve without picking winners – substantially boosts innovation more than the plan

**Jenkins, 12** – Director of Energy and Climate Policy at the Breakthrough Institute (Jesse, Congressional Testimony before the Senate Committee on Energy and Natural Resources, 5/22, <http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=31b79a1a-83a0-4ae6-8c80-30fe754ad0ea>)

Several policies could be structured to meet these criteria, including:

• Competitive deployment incentives could be created for various clean tech segments of similar maturity, with incentives for each segment falling steadily over time to demand and reward continual innovation and price improvements.20

• Steadily improving performance‐based standards could create both market demand and spur consistent technology improvement.21

• “Top-runner” programs competitively establish performance standards or financial incentive levels based on the leading industry performers in each market segment, forcing other firms to steadily innovate to stay competitive in the market.22

• Demanding federal procurement opportunities could be created to drive both market opportunities and ensure steady improvement of each successive generation of product, particularly when advanced energy technology products align with strategic military needs.23

• Reverse auction incentives could be established for varying technologies to drive industry competition and innovation.24

If structured to adhere to these criteria, a new era of advanced energy deployment policies will neither select “winners and losers” a priori, nor create permanently subsidized industries. Rather, these policies will provide opportunity for all emerging advanced energy technologies to demonstrate progress in price and performance, foster competitive markets within a diverse energy portfolio, and put these segments on track to full subsidy independence.

#### The CP’s cost reduction conditions pressure companies to innovate – this is the only way to ensure continued innovation and making new energy competitive. Otherwise, natural gas will out-compete the plan despite the incentives, causing a market bust

**Jenkins et al, 12** - Director of Energy and Climate Policy at the Breakthrough Institute (Jesse, “Beyond Boom & Bust: PUTTING CLEAN TECH ON A PATH TO SUBSIDY INDEPENDENCE” April,

[http://assets.nationaljournal.com/Beyond%20Boom%20and%20Bust\_Embargoed\_4\_17.pdfhttp://assets.nationaljournal.com/Beyond%20Boom%20and%20Bust\_Embargoed\_4\_17.pdf](http://assets.nationaljournal.com/Beyond%20Boom%20and%20Bust_Embargoed_4_17.pdfhttp%3A//assets.nationaljournal.com/Beyond%20Boom%20and%20Bust_Embargoed_4_17.pdf))

These and other clean energy technologies, however, must continue to improve substantially. Costs overall remain higher than fossil competitors, and as the emergence of low-cost shale gas demonstrates, the energy sources that clean technologies are competing against are not standing still. After three decades of private and public-sector collaboration to develop cost-effective technologies to extract natural gas from shale deposits, the “shale revolution” has unlocked large new supplies of domestic natural gas and slashed spot market prices to one-fifth of the peak levels reached in 2008. 85 Solar, wind, nuclear and other zero-carbon energy must now redouble efforts to reduce costs to stay competitive in North American electricity markets (see Part 2 above).

Fortunately, energy technology experts at the International Energy Agency 86 point to numerous remaining technical opportunities to achieve significant cost reductions and performance improvements across a range of clean tech segments, from wind and solar power to enhanced geothermal energy systems, advanced nuclear designs, and improved vehicle technologies and fuels. Successful competition with fossil fuels is possible in the near- to medium-term—the steady process of innovation is the key.

Still, the reality is that until technological innovation and cost declines can secure independence from ongoing subsidy, clean tech segments will remain continually imperiled by the threat of subsidy expiration and political uncertainty. Meanwhile, public tolerance for significant energy subsidies or the internalization of higher prices for energy is limited. 87 If clean energy technologies scale up without corresponding declines in price, this limited tolerance will eventually be expended, leading to another market bust. This means that the simple, perpetual extension of today’s clean energy subsidies and policies, with its somewhat passive approach to innovation, offers no sustainable path beyond a cycle of clean tech boom and bust.

It is true that the federal government has historically devoted greater total subsidies to fossil energy sources than to clean energy sources 88—a fact that changed only recently with the large temporary increase in federal clean tech spending documented in this report 89—and that fossil sectors continue to enjoy subsidies to this day. It is long-past time to end subsidies for mature fossil energy technologies as well. If subsidies for clean tech sectors must phase out as these sectors mature, there is little rationale for perpetual subsidization of well-established fossil energy production methods and technologies.

At the same time, subsidies for clean tech markets in the United States are many times greater than US fossil fuel subsidies when considered per unit of energy generated, meaning that the wholesale termination of all energy subsidies would not automatically make clean energy technologies cost competitive.

Policy makers who may disagree about the appropriate role of government in the energy sector should therefore seek neither across the board cuts to energy subsidies nor their simple maintenance. Rather, they must engage in serious-minded, innovation-centered reform.

For their part, clean tech companies and investors would do well to lead this energy policy reform effort. While many clean tech entrepreneurs deserve credit for achieving innovation and technology improvements under existing subsidy regimes that should better reward their efforts, others have obtained subsidies without facing pressure to reduce costs or improve performance. Embracing innovation-focused policy reform will ensure US firms are well positioned to outcompete international challengers, as well. Simple deployment subsidies or policies to create demand, for example, still allow foreign competitors to undercut domestic manufacturers and seize larger and larger market shares, as Chinese solar PV companies have proven in the last three years. 90 Only steady innovation can keep US firms at the leading edge of clean tech sectors, and a supportive policy regime will be essential.

Businesses and policy makers alike must therefore understand that the true economic rewards in clean energy industries will come not from producing technology for subsidy-created markets that vacillate wildly with the public mood and the political cycle but rather by producing cheap and reliable clean energy technologies that can compete on cost with both international competitors and conventional fossil fuels.

The coming collapse of US clean tech policies thus presents a critical opportunity for intelligent energy policy reform. With the US clean energy policy system set to be effectively wiped clean in the coming years, American business and policy makers must now unite to craft a coordinated new set of limited but direct federal strategies optimized to drive innovation and make clean energy subsidy independent over time. With such a strategy in place, the United States also has the potential to successfully make clean energy technologies cheap enough for widespread export to energy-hungry markets throughout the world.

#### Star this evidence – it directly compares the CP’s solvency to the plan. Increasing incentives alone leads to technological stagnation – conditioning incentives on performance will drive innovation and will spur Moore’s law in the energy sector

**Stepp, 12 -** Senior Policy Analyst with the Information Technology and Innovation Foundation (ITIF) specializing in climate change and clean energy policy (Matthew, “Clean Tech Headed for Stagnation,”, 5/14, <http://theenergycollective.com/node/84873>)

But even if much of this funding continues, the nascent clean tech industry is on a potential path of stagnation. In absence of long-term, significantly larger subsidies (which are politically unlikely), government support for clean energy R&D are central to developing and deploying competitive clean tech. In other words, clean tech growth nationwide (and globally) will be determined not by subsidies, but by innovation that can lead to technologies that are better and cheaper than fossil fuels.

Yet, our policy choices often don’t reflect this reality. According to ITIF’s Energy Innovation Tracker, the U.S. is investing roughly $6 billion in clean energy R&D in FY2012 – on average a third what leading experts think the U.S. should be investing. In fact, the bulk of the federal government’s historic investment in clean energy – nearly three quarters of the $150 billion – is going to the deployment of existing technologies that are not cost-competitive with fossil fuel sources of energy. While these deployment incentives expand domestic supply chains and are spurring incremental innovations, the policies are acting like blunt force tools propping up lower-risk technologies while playing little role in incenting innovation and technologies to put clean energy on a path to subsidy independence. By not orienting the significant federal investment in clean tech towards spurring innovation while grossly underfunding R&D, the U.S. is failing to jump start and accelerate the clean tech innovations needed to create a robust, long-term sustainable industry. Even if the expiring tax incentives are extended as is, the long-term stagnation of the industry will still occur due to a lack of innovation. If we want a global clean tech revolution driven by the marketplace, we need to bring the equivalent of “Moore’s law” (the prediction that computing power would double every 24 months while costs would fall by half) to clean energy. Nothing less will work.

But it’s not too late to avert both the short-term clean tech bust and long-term innovation stagnation if federal policymakers and clean energy advocates truly make innovation less like empty rhetoric and more its core goal. This means fully funding key clean energy innovation R&D programs even in a time of budget austerity. Consistent support for innovation is absolutely necessary – just ask the fossil fuel industry which continues to reap the benefits of a century’s worth of government largesse deficits or not – and cutting innovation programs does more harm than good to the deficit and economy.

Policymakers must also reform clean tech deployment subsidies to link early stage tech development with commercialization. Simply extending expiring or expired subsidies and tax incentives are simply not enough and will only continue to marginally grow the industry. It’s surely not a long-term solution to continue deploying technologies carte blanche even if they don’t hold the promise of competitiveness. A group re-think on clean tech subsidy programs is critical. It’s for “smart” deployment policies that work to pull transformative innovations, rather than just extend incremental innovations of costly energy technologies.

### AT: Certainty key

#### Plan links more – the CP establishes a more predictable framework

**Trabish, 12** – edits NewEnergy News (Herman, “TODAY’S STUDY: THE BACKING NEW ENERGY IS GETTING AND THE BACKING IT NEEDS” 5/7, <http://newenergynews.blogspot.com/2012/05/todays-study-backing-new-energy-is.html>)

g Cost competitiveness is achievable, but until technological innovation and cost declines can secure independence from ongoing subsidy, clean tech segments will remain continually imperiled by the threat of policy expiration and political uncertainty. Continual improvement in price and performance is thus the only real pathway beyond the cycle of clean tech boom and bust.

### 2nc heg overview

**Disad outweighs the risk of a solvency deficit- collapse of competitiveness eviscerates hegemony- that is the only thing keeping in check our rivals and nationalistic rivalries- those escalate to nuclear war and extinction**

**Heg is a controlling impact- deters any sort of conflict escalation functions as impact defense to their impacts**

**Faster timeframe- the net benefit is based on investor confidence collapse comes quickly, and spreads globally**

**Turns the aff all of our solvency arguments are reason why they would collapse investor confidence which short circuits the deployment of the technology**

### 2nc solvency overview

**Their incentives strategy fails**

 **a). kills innovation and cost competitiveness if their project is inevitably supported there’s no incentive to innovate or reach market parity- means that their project won’t spread and only the cp solves. Also diverts capital from other parts of the market which**

 **b). aff perpetuates the energy bubble – overreaches what the industry can do collapses investment which hinders investment and implementation of the aff**

 **c). we don’t need to win that our solvency turns hurt implementation just that the cp’s strategy is in some way better than the aff.**

 **d). no offense- government doesn’t have access to information necessary to make competent decisions and subsidy placement is politically motivated even if in theory subsidies could work**

### Tax Credit Link

#### Tax policies function as the equivalent as subsidies- cause distortion and government corruption, and undermine incentives for cost reduction

Loris, 11 - policy analyst in the Thomas A. Roe Institute for Economic Policy Studies at The Heritage Foundation (Nicolas, “Real Energy Tax Reform Eliminates Subsidies”, 11/3, <http://www.heritage.org/research/reports/2011/11/real-energy-tax-reform-eliminates-subsidies>)

Targeted tax credits have become a popular and prevalent method for the government to award preferential treatment to certain energy industries. Over the past decade, the number of tax preferences for the production and consumption of government-picked energy technologies has expanded considerably.[1] This favored tax treatment acts as a subsidy by favoring one industry or technology at the expense of another. Such political decisions misallocate resources, waste taxpayer dollars, and prematurely force technologies into the marketplace, while taking away the incentive to lower costs.

Some Members of Congress are pushing to extend and expand energy tax subsidies, but eliminating them would be best for American producers, consumers, and taxpayers. The Energy Freedom and Economic Prosperity Act of 2011(HR 3308)sponsored by Representative Mike Pompeo (R–KS) would do just that, while lowering the corporate tax rate to encourage investment and spur economic growth in America.

Not the Right Kind of Tax Cut

Lower tax rates are good, but using the tax code to pick winners and losers is not, and it has a number of adverse effects on the economic system. Special tax credits for politically picked technologies artificially reduce the price for producers and consumers—and those costs are picked up by the taxpayer. Rather than increasing competition, the energy tax subsidy distortion gives these technologies an unfair price advantage over other technologies and allocates labor and capital away from other areas of the economy where it could be used more efficiently. In effect, by politically picking winners, these tax credits crowd out investment and make it difficult for new technologies that do not receive a handout from the government to enter the market. Furthermore, targeted tax credits move the decision-making process away from the market and consolidate power with policymakers and lobbyists, who then determine who produces what products.

Companies seeking special tax treatment justify their handouts by convincing Congress that they need only a small subsidy for a limited time until their technology becomes profitable. Inevitably, successful requests for subsidies beget more requests, and soon the companies call for tax credit expansions or extensions.

Ethanol is a prime example of a policy that has enjoyed preferential tax treatment for decades, and when the 2004 Volumetric Ethanol Excise Tax Credit (VEETC) was set to expire at the end of 2010, Congress extended the credit yet another year. Now the corn lobby is pushing for tax credits for blender pumps and infrastructure technology to further push ethanol onto the market. The industry’s continual clinging to taxpayer-funded handouts is a result of receiving the initial tax credit. Once an industry secures the initial tax credits, it will push hard to keep them from expiring, since it either keeps the business afloat or pads the bottom line.

In the event that the tax credit goes to a market-viable industry, it still has harmful effects. The tax subsidy:

Offsets private-sector investments that would have been made instead and wastes taxpayer dollars,

Creates industry complacency and perpetuates economic inefficiency by disconnecting market success from production costs, and

Provides policymakers the ability to tout the tax credit as a success, thereby increasing the likelihood of Members of Congress wanting to expand targeted tax credits with more lobbyists telling them they should do so.

### AT: Tax Credit not a subsidy

#### Tax Credits are the market equivalent of a subsidy- cause market distortion and government interference- props up cronyism

**Brooks, 12** - David Brooks became a New York Times Op-Ed columnist in September 2003. He has been a senior editor at The Weekly Standard, a contributing editor at Newsweek and the Atlantic Monthly, and he is currently a commentator on "The Newshour with Jim Lehrer." (New York Times, 2/24 “America Is Europe”, <http://www.nytimes.com/2012/02/24/opinion/brooks-america-is-europe.html?_r=2>

You might say that a tax break isn’t the same as a spending program. You would be wrong.

The late David Bradford, a Princeton economist, had the best illustration of how the system works. Suppose the Pentagon wanted to buy a new fighter plane. But instead of writing a $10 billion check to the manufacturer, the government just issued a $10 billion “weapons supply tax credit.” The plane would still get made. The company would get its money through the tax credit. And politicians would get to brag that they had cut taxes and reduced the size of government!

This is essentially what’s been happening in sphere after sphere. Government controls more and more of the economy. It just does it by getting people to do what it wants by manipulating the tax code. Politicians get to take credit for addressing problem after problem, but none of their efforts show up as unpopular spending.

Many of these individual tax expenditures are good for the country, like the charitable deduction and the earned income tax credit. But, as the economist Bruce Bartlett demonstrates in his impeccably fair-minded book, “The Benefit and the Burden,” the cumulative effect of these tax breaks is terrible. Like overgrown weeds, the tangle of tax breaks distorts behavior, clogs the economy and deprives the government of revenue.

And because they are hidden, many of the tax expenditures go to those who need them least, the well connected and established over the vulnerable and the entrepreneurial.

### 2nc – government fails

#### Accurately predicting the viability of energy technologies in advance is empirically impossible

**Morris, 12** – Deputy Director of the Climate and Energy Economics Project at Brookings (Adele, CLEAN ENERGY: REVISITING THE CHALLENGES OF INDUSTRIAL POLICY, 6/4, <http://www.brookings.edu/~/media/research/files/papers/2012/6/04%20clean%20energy%20morris%20nivola%20schultze/04_clean_energy_morris_nivola_schultze.pdf>)

All of which leads us to examine a little more fully the practical difficulties facing policymakers in the real world of American government as they struggle to choose and sustain the right enterprises.

Identifying plausible candidates might be a more dependable process if the commercial prospects of emerging technologies could be accurately predicted. Too often, however, the predictions have foundered. Decades ago the government launched robust programs to develop nuclear breeder reactors and to facilitate synthetic fuels.

These did not appear to be fanciful schemes in the contexts of their times. But they proved to be premised on unreliable forecasts. In the first instance, experts were anticipating continued explosive growth of domestic demand for electricity. (Instead, demand, especially for baseload capacity, settled onto a much slower trajectory.) In the second, the forecasters assumed that the price of petroleum would not plunge far below $40 a barrel, over $100 a barrel in today’s money. (Instead, it collapsed by the mid-1980s.) Similar unexpected twists have bedeviled attempts to foretell the potential market for various forms of cleaner energy. When prices tumble, as they do periodically, the government’s best-laid plans get stranded.

The caprice of the marketplace frustrates energy planning. So does the fact that public decisions regarding which producers to favor are all but impossible to insulate from political pressures. For the sake of argument, let us suppose that technocrats in highly competent government agencies were able to foresee and then objectively compare the lead-times for commercializing the multiple options under consideration. With that knowledge, one might think, only the most viable green businesses would be tapped to receive public funds. The power of the purse, however, lies with Congress—and the irresistible temptation there is to distribute resources widely and often injudiciously, not to concentrate them on just a few worthy targets.

#### This is a fundamental flaw with the aff that causes error replication

**Gordon, 8** - professor emeritus of mineral economics at the Pennsylvania State University (Richard, “The Case against Government Intervention in Energy Markets Revisited Once Again” CATO Policy Analysis, 12/1, <http://www.cato.org/pubs/pas/pa-628.pdf>)

Many politicians and pundits are panicked over the existing state of the oil and gasoline markets. Disregarding past experience, these parties advocate massive intervention in those markets, which would only serve to repeat and extend previous errors. These interventionists propose solutions to nonexistent problems.

This Policy Analysis reviews the academic literature relevant to these matters and argues that the prevailing policy proposals are premised on a misunderstanding of energy economics and market realities. The interventionists do not distinguish between problems that government can remedy and those that it cannot. They ignore lessons that should have been learned from past experience. They embrace at best second- and third-best remedies rather than first-best remedies for the alleged problems. Moreover, they ignore the extreme difficulty associated with ensuring efficient policy response even when it seems to be theoretically warranted.

Fear of oil imports is premised on pernicious myths that have long distorted energy policy. The U.S. defense posture probably would not be altered by reducing the extent to which oil is imported from troublesome regions. Fears about a near-term peak in global oil production are unwarranted, and government cannot help markets to respond properly even if the alarm proved correct. Market actors will produce the capital necessary for needed investments; no “Marshall Plans” are necessary. Price signals will efficiently order consumer behavior; energy-consumption mandates are therefore both unwise and unnecessary. Finally, more caution is needed regarding the case for public action to address global warming.

The omnipresent calls for more aggressive energy diplomacy are misguided. Economic theory validated by historical experience implies that the diplomatic initiatives are exercises in futility because they seek to divert countries from the wealth maximization that is their goal. Similarly, the search for favorable access to crude oil is futile. Despite their popularity, rules to force reductions in energy use lack economic justification. Attacks on American oil companies and speculators seek to shift blame to those subject to U.S. government control from the uncontrollable foreign oil-producing governments that are truly to blame.

### 2nc – Bubble turn

#### Even if they initially succeed – it generates a long-term investment bubble that makes the collapse worse

**Loris and Spencer, 11** - Nicolas D. Loris is a Policy Analyst and Jack Spencer is Research Fellow in Nuclear Energy in the Thomas A. Roe Institute for Economic Policy Studies at The Heritage Foundation (“Obama's Department of Energy Should Not Be the Green Banker”, 10/11, <http://www.thecuttingedgenews.com/index.php?article=52893pageid=16pagename=Opinion>)

Reshaping, Not Stimulating, the Economy

The CBO’s cost estimate for CEDA notes that funding would be available for “energy, transportation, manufacturing, commodities, residential, commercial, municipal, and other sectors of the economy.” Expanding the list of potential recipients to include coal with carbon capture and sequestration, natural gas vehicles, and energy efficiency technologies would not make the green bank acceptable. It would simply expand the green bank’s potential to distort more sectors of the economy with subsidized financing.

As the subsidies are removed from these green energy industries, they collapse because they were developed in a bubble in which market demand and price signals were muted. The European experience with subsidizing renewable energy is a perfect example. This inevitable confrontation with reality demonstrated that the industry lacks the tools to survive unaided. When faced with a need for drastic budget cuts and job creation, Spain, the United Kingdom, Germany, France, and the Czech Republic decided to reduce subsidies for green energy programs, such as wind and solar energy. As a result, some industries have collapsed and others are either collapsing or face difficult roads ahead. Although each European country has taken a different approach to subsidize green technologies, the results have been the same: Artificially propping up industries by reallocating labor and capital toward uncompetitive projects, forcing higher energy prices on ratepayers, and failing projects are costly to the economy and the taxpayer.

Protecting Taxpayers and the Economy

Congress should resist the temptation to distort the energy market even further. Specifically, Congress should refuse to expand loan guarantee programs or to implement any new capital subsidy programs, whether through CEDA or the infrastructure bank.

American taxpayers cannot afford these programs, and they would put taxpayers on the hook for an untold number of projects that could fail. Even if the selected projects succeed, such programs give preferential treatment to those companies lucky enough to receive a loan guarantee from the government and increase the opportunity for and likelihood of fraud and corruption. The government needs to stop trying to pick winners and losers in the marketplace.

#### An energy bubble collapse spills over to other sectors and collapses the economy

**Ruppert, 10 -** former Los Angeles Police Department narcotics investigator turned investigative journalist (“Michael Ruppert: “Beware the Green Investment Bubble”, excerpt from Confronting Collapse: The Crisis of Energy and Money in a Post Peak Oil World, 4/11 <http://www.chelseagreen.com/content/michael-ruppert-beware-the-green-investment-bubble/>)

It would be unwise to instantly forget what happened with the dot-com and housing bubbles. Both were illusions and well-orchestrated wealth transfers from the middle and lower classes to the wealthiest people in the country. The housing bubble was created and fanned white-hot by intentionally deregulating the mortgage industry, fraud and a host of crimes which sucked people into buying homes they could not afford and could never hope to pay for. A ton of money was created and it went to the people who ran the schemes: the largest banks, mortgage lenders and political campaign donors.

When that bubble collapsed, the taxpayers were asked to bail out first Bear Stearns and then Fannie Mae and Freddie Mac at total costs that will top $1 trillion dollars before counting the October 2008 bailout of $800 billion and all those that followed under many deliberately confusing names into the first quarter of 2009. As I write, the total “value” of various U.S. government bailouts has topped $10 trillion.

This doesn’t count the U.S. banks that have failed and are going to fail before banks are inevitably nationalized. Those are the same banks where green energy companies will be forced to look for financing. Personally, I think that the sooner the big banks fail, the sooner people can get to devising local currencies, which is what they’ll need to survive anyway. It is imperative to start that process while bridges are still standing and fresh water still runs. We need to start the transition to local currencies while there is still electricity and while fiber-optic cables are maintained and relatively new; while airlines fly and cell phones operate.

None of the above takes into account all the cash that homebuyers put into down payments initially. That money was lost too. That’s the same thing as the money that gullible investors poured into the dot-com bubble. The ones at the bottom of the pyramid are always us, and it is always our money that disappears first. The current monetary paradigm offers no other option. The above does not address the equity (energy) that was lost in each collapse. These are real costs.

In the market crash of 2002 and 2003 (which I accurately predicted, saying it was only a precursor to today’s events) hundreds of billions of dollars of shareholder equity were destroyed by the fraud of major corporations. Those dollars represented a lot more energy than what circulates today. The Federal Reserve has doubled its capitalization in less than a year, having left it alone for the previous nine decades. The equity was destroyed, but the wealth was transferred. And equity is where wealth resides in the dying economic paradigm.

There may be 40% less equity in the Dow Jones than there was in late 2007, but there is more equity that has been hidden and disguised by those who hold it. But even wealth transfers have a law of entropy. This is not a case where all those investments were converted 1:1 into some other form. The elites who thought they were immune are going down too, like dinosaurs who cannot grasp their impending extinction. Even the Oracle of Omaha, Warren Buffet, has discovered himself mortal.

As the networks blithely talked about shareholder equity that was lost at the beginning of the collapse, they almost never mentioned how many billions of dollars pension funds, other institutional investors and individuals put back in to the markets when they bought more shares at newly lowered prices. When bubbles burst, those on the bottom literally pay twice. The first time, when they buy stocks that later tank, and again when they purchase new shares, hoping to make up for the equity they lost when the previous bubble burst. Does this sound like an out-of-control gambling addiction to you? What happened was that the people at the top got “their” money out, at the top. They sold their shares before the bubble burst. That’s why they call it “pump and dump.”

An American president cannot let this happen with a “Green Economy” for three reasons. First, the Treasury is empty and the United States now has its largest budget deficit ever, with the national debt exceeding $11 trillion. It doesn’t have many bailouts left, and these do absolutely nothing to solve the fundamental problem. They only impair the system’s ability to respond to new challenges, like feeding you when the time comes. Second, the infrastructure costs to assist in some kind of stable transition and to maintain basic services as oil and gas fade away are going to be astronomical. Third, the Green Economy has got to produce and deliver useable solutions quickly. We cannot afford energy bridges to nowhere that make great profit for investors but provide little or no real-world benefit. If the Green Economy doesn’t do this, then the nation will be left with a non-functioning energy infrastructure.