### 1ac Adv 1

#### Advantage 1: Environment

#### **Domestic ground water pollution causes extinction**

**Miller 4** (Prof of Geology, 04 http://www.geosun.sjsu.edu/~jmiller/Geo1\_Lecture12\_SurfaceProcesses.html, 08-Dec-2004 EARTH SURFACE PROCESSES II: GROUNDWATER)

Groundwater is extremely important because it is a source of clean drinkable water for human survival. In arid areas especially (like the western U.S.) it has allowed humans to flourish and in the early part of the colonization of the west it was vital to the establishiment of agriculture because we tapped the groundwater by digging wells and then used it to irrigate our crops. It is still important today for this reason (although we also now impond water in dams and divert it for agriculture using aqueducts). As the population of the west has grown, the demands put on groundwater to provide for human well-being have been increasing, and their is great concern today about how long our groundwater will last, and whether or not we can make sure that it is clean and drinkaable over the long term. It is for this reason, one of the most pressing environmental issues faced by citizens the world over.

#### So does air pollution

**Driesen 2003 –** Professor of Law, Syracuse, Buffalo Environmental Law Journal (David,, Fall, 2002 / Spring, 2003, p. LN)

Air pollution can make life unsustainable by harming the ecosystem upon which all life depends and harming the health of both future and present generations. The Rio Declaration articulates six key principles that are relevant to air pollution. These principles can also be understood as goals, because they describe a state of affairs [\*27] that is worth achieving. Agenda 21, in turn, states a program of action for realizing those goals. Between them, they aid understanding of sustainable development's meaning for air quality. The first principle is that "human beings. . . are entitled to a healthy and productive life in harmony with nature", because they are "at the center of concerns for sustainable development." n3 While the Rio Declaration refers to human health, its reference to life "in harmony with nature" also reflects a concern about the natural environment. n4 Since air pollution damages both human health and the environment, air quality implicates both of these concerns.

#### Soil depletion causes extinction

**Horne and McDermott 2001** (James and Maura, Kerr Center for Sustainable Agriculture, “The Next Green Revolution: Essential Steps to a Healthy, Sustainable Agriculture”, p. 69, Google Print)

Topsoil is crucial to agriculture. This first step-creating and conserving healthy soil-is the foundation of a sustainable agriculture. It is closely linked to the next two steps-conserving water and protecting its quality, and managing organic wastes and farm chemicals so they don't pollute. How well agriculture manages soil, water, and organic wastes will determine its future health. Conserving healthy soil by guarding it against erosion and other forces that would degrade it is the most basic step. This step has as its corollary actively building soil health, because soil used for agricultural purposes today is not as healthy as it could be. It is both less diverse and less active biologically. Without healthy topsoil, the world cannot begin to feed its billions. Although American popular culture discourse in recent years has speculated on the fate of live on earth in case of alien invasion, asteroid bombardment, or rampaging killer viruses, the slow loss of quality soil is more of a threat to life on the planet than any of these scenarios.

#### Livestock agriculture is the key link—drives all forms of persistent pollution—biogas solves it as well as methane emissions

**Cuellar and Webber 8**—Department of Chemical Engineering, UT-Austin AND Center for International Energy and Environmental Policy, UT-Austin

(Amanda and Michael, “Cow power: the energy and emissions beneﬁts of converting manure to biogas”, Environ. Res. Lett. 3 (2008) 034002 (8pp). dml)

In the United States livestock animals produce over one billion tons of manure annually [1]. Currently, most of this manure is collected in lagoons or stored outdoors to decompose. Animal waste stored in this fashion can emit unpleasant odors, harmful air pollutants and greenhouse gases. The air pollutants emitted from manure include ammonia, VOCs, hydrogen sulﬁde and particulate matter, many of which can cause health problems in humans [2]. Besides polluting the air, ammonia emissions from manure can contaminate ground water and lead to eutrophication of the soil [3]. Manure also emits methane and nitrous oxide, two potent greenhouse gases [4]. Using standards developed by the Intergovernmental Panel on Climate Change (IPCC), methane has 21 times the global warming potential of carbon dioxide and nitrous oxide has 310 times the warming potential of carbon dioxide over a 100 year timespan [5]. According to the Environmental Protection Agency (EPA), in total, GHG emissions from the agricultural sector in the US amounted to 536 million metric tons (MMT) of carbon dioxide equivalent, or 7% of the total US emissions in 2005 [6]. Of this agricultural contribution at least 50.8 MMT of carbon dioxide equivalent (and possibly much more) resulted from methane and nitrous oxide emissions from livestock manure alone [6]. Moreover, methane and nitrous oxide emissions from manure show an increasing trend from 1990 to 2005 [6]. Because of the scale and growth in GHG emissions from manure, ﬁnding other approaches to manure management that decrease these emissions represents a valuable starting point for mitigating concerns about global climate change in the agricultural sector. Notably, through anaerobic digestion, which is a wellknown and time-tested process [7, 8], animal **manure can be converted** to methane-rich biogas and sludge, which is nearly odorless [7, 9] and useful as a fertilizer [10]. Furthermore, the biogas is a valuable fuel that can be used in a variety of applications such as cooking and home heating. It can also be converted into compressed natural gas (CNG) after a scrubbing process that removes carbon dioxide and hydrogen sulﬁde [11, 12]. Biogas’ greatest potential for mitigating greenhouse gas emissions, though, is as a substitute for coal in electricity generation due to coal’s role as the primary source of carbon dioxide emissions [13] from the power sector.

#### That’s sufficient to solve runaway warming—ground-level emissions key

**NASA 5**—the space people

(“Methane's Impacts on Climate Change May Be Twice Previous Estimates,” <http://www.nasa.gov/centers/goddard/news/topstory/2005/methane.html>, dml)

Scientists face difficult challenges in predicting and understanding how much our climate is changing. When it comes to gases that trap heat in our atmosphere, called greenhouse gases (GHGs), scientists typically look at how much of the gases exist in the atmosphere. However, Drew Shindell, a climatologist at NASA's Goddard Institute for Space Studies, New York, NY, believes we need to look at the GHGs when they are emitted **at Earth's surface**, instead of looking at the GHGs themselves after they have been mixed into the atmosphere. "The gas molecules undergo chemical changes and once they do, looking at them after they've mixed and changed in the atmosphere doesn't give an accurate picture of their effect," Shindell said. "For example, the amount of methane in the atmosphere is affected by pollutants that change methane's chemistry, and it doesn't reflect the effects of methane on other greenhouse gases," said Shindell, "so it's not directly related to emissions, which are what we set policies for." Chemically reactive GHGs include methane and ozone (carbon dioxide, the most important GHG, is largely unreactive). Once methane and the molecules that create ozone are released into the air by both natural and human-induced sources, these gases mix and react together, which transforms their compositions. When gases are altered, their contribution to the greenhouse warming effect also shifts. So, the true effect of a single GHG emission on climate becomes very hard to single out. Some of the major investigations into the state of our warming planet come from a series of reports from the Intergovernmental Panel on Climate Change (IPCC) Assessment. These reports involved the work of hundreds of climate experts. The reports rely on measurements of greenhouse gases as they exist in the atmosphere, after they may have mixed with other gases. In other words, the findings in the report do not reflect the quantities that were actually emitted. Shindell finds there are advantages to measuring emissions of greenhouse gases and isolating their impacts, as opposed to analyzing them after they have mixed in the atmosphere. His study on the subject was recently published in the journal Geophysical Research Letters. In the study, when the individual effects of each gas on global warming were added together, the total was within 10 percent of the impacts of all the gases mixed together. The small difference in the two amounts was a sign to Shindell that little error was introduced by separating the emissions from one another. After isolating each greenhouse gas and calculating the impact of each emission on our climate with a computer model, Shindell and his colleagues found some striking differences in how much these gases contribute overall to climate change. The leading greenhouse gases include carbon dioxide, methane, nitrous oxide, and halocarbons. These gases are called ‘well mixed’ greenhouse gases because of their long lifetimes of a decade or more, which allows them to disperse evenly around the atmosphere. They are emitted from both man-made and natural sources. Ozone in the lower atmosphere, called tropospheric ozone, a major component of polluted air or smog that is damaging to human and ecosystem health, also has greenhouse warming effects. In the upper atmosphere, ozone protects life on Earth from the sun’s harmful ultraviolet rays. **According to new calculations**, the impacts of methane on climate warming may be double the standard amount attributed to the gas. The new interpretations reveal methane emissions may account for a third of the climate warming from well-mixed greenhouse gases between the 1750s and today. The IPCC report, which calculates methane’s affects once it exists in the atmosphere, states that methane increases in our atmosphere account for only about one sixth of the total effect of well-mixed greenhouse gases on warming. Part of the reason the new calculations give a larger effect is that they include the sizeable impact of methane emissions on tropospheric ozone since the industrial revolution. Tropospheric ozone is not directly emitted, but is instead formed chemically from methane, other hydrocarbons, carbon monoxide and nitrogen oxides. The IPCC report includes the effects of tropospheric ozone increases on climate, but it is not attributed to particular sources. By categorizing the climate effects according to emissions, Shindell and colleagues found the total effects of methane emissions are substantially larger. In other words, the true source of some of the warming that is normally attributed to tropospheric ozone is really due to methane that leads to increased abundance of tropospheric ozone. According to the study, **the effects of other pollutants were relatively minor**. Nitrogen oxide emissions can even lead to cooling by fostering chemical reactions that destroy methane. This is partly why estimates based on the amount of methane in the atmosphere give the gas a smaller contribution to climate change. Molecule for molecule, Methane is 20 times more potent than carbon dioxide as a greenhouse gas, but CO2 is much more abundant than methane and the predicted growth rate is far greater. Since 1750, methane concentrations in the atmosphere have more than doubled, though the rate of increase has slowed during the 1980-90s, and researchers don’t understand why. **Controlling methane could reap a big bang for the buck**. Another bonus of this perspective is that in order to manage greenhouse gases, policy decisions must focus on cutting emissions, because that's where humans have some control. "If we control methane, which the U.S. is already starting to do, then we are likely to mitigate global warming more than one would have thought, so that's a very positive outcome," Shindell said. "Control of methane emissions turns out to be a more powerful lever to control global warming than would be anticipated."

#### Extinction

**Ryskin 3** (Gregory, Department of Chemical Engineering, Northwestern University, Illinois, “Methane-driven oceanic eruptions and mass extinctions” Geology 31(9): 741-744, dml)

The consequences of a methane-driven oceanic eruption for marine and terrestrial life are likely to be catastrophic. Figuratively speaking, the erupting region ‘‘boils over,’’ ejecting a large amount of methane and other gases (e.g., CO2, H2S) into the atmosphere, and flooding large areas of land. Whereas pure methane is lighter than air, methane loaded with water droplets is much heavier, and thus spreads over the land, mixing with air in the process (and losing water as rain). The air methane mixture is explosive at methane concentrations between 5% and 15%; as such mixtures form in different locations near the ground and are ignited by lightning, explosions2 and conflagrations destroy most of the terrestrial life, and also produce great amounts of smoke and of carbon dioxide. Firestorms carry smoke and dust into the upper atmosphere, where they may remain for several years (Turco et al., 1991); the resulting darkness and global cooling may provide an additional kill mechanism. Conversely, carbon dioxide and the remaining methane create the greenhouse effect, which may lead to global warming. The outcome of the competition between the cooling and the warming tendencies is difficult to predict (Turco et al., 1991; Pierrehumbert, 2002). Upon release of a significant portion of the dissolved methane, the ocean settles down, and the entire sequence of events (i.e., development of anoxia, accumulation of dissolved methane, the metastable state, eruption) begins anew. No external cause is required to bring about a methane-driven eruption—its mechanism is self-contained, and implies that eruptions are likely to occur repeatedly at the same location.¶ Because methane is isotopically light, its fast release must result in a negative carbon isotope excursion in the geological record. Knowing the magnitude of the excursion, one can estimate the amount of methane that could have produced it. Such calculations (prompted by the methane-hydrate-dissociation model, but equally applicable here) have been performed for several global events in the geological record; the results range from 1018 to 1019 g of released methane (e.g., Katz et al., 1999; Kennedy et al., 2001; de Wit et al., 2002). These are very large amounts: the total carbon content of today’s terrestrial biomass is ;2 3 1018 g. Nevertheless, relatively small regions of the deep ocean could contain such amounts of dissolved methane; e.g., the Black Sea alone (volume ;0.4 3 1023 of the ocean total; maximum depth only 2.2 km) could hold, at saturation, ;0.5 3 1018 g. A similar region of the deep ocean could contain much more (the amount grows quadratically with depth3). Released in a geological instant (weeks, perhaps), 10**18** to 10**19** g of methane could **destroy** the **terrestrial life** almost entirely. Combustion and explosion of 0.75 x 10**19** g of methane would liberate energy equivalent to 108 Mt of TNT, ;10,000 times greater than the world’s stockpile of nuclear weapons, implicated in the nuclear winter scenario (Turco et al., 1991).

#### Animal waste is key—proper treatment prevents antibiotic resistance and epidemic spread

**Sayre 9**—writer for Mother Earth, cites IDSA and FDA reports

(Lauren, “The Hidden Link Between Factory Farms and Human Illness”, <http://www.motherearthnews.com/Natural-Health/Meat-Poultry-Health-Risk.aspx>, dml)

You may be familiar with many of the problems associated with concentrated animal feeding operations, or CAFOs. These “factory farm” operations are often criticized for the smell and water pollution caused by all that concentrated manure; the unnatural, grain-heavy diets the animals consume; and the stressful, unhealthy conditions in which the animals live. You may not be aware, however, of the threat such facilities hold for you and your family’s health — even if you never buy any of the meat produced in this manner. Factory farms are **breeding grounds for virulent disease**, which can then spread to the wider community via many routes — not just in food, but also in water, the air, and the bodies of farmers, farm workers and their families. Once those microbes become widespread in the environment, it’s very difficult to get rid of them. A 2008 report from the Pew Commission on Industrial Farm Animal Production, a joint project of the Pew Charitable Trusts and the Johns Hopkins Bloomberg School of Public Health, underscores those risks. The 111-page report, two years in the making, outlines the public health, environmental, animal welfare and rural livelihood consequences of what they call “industrial farm animal production.” Its conclusions couldn’t be clearer. Factory farm production is intensifying worldwide, and rates of new infectious diseases are rising. Of particular concern is the rapid rise of antibiotic-resistant microbes, an inevitable consequence of the widespread use of antibiotics as feed additives in industrial livestock operations. Scientists, medical personnel and public health officials have been sounding the alarm on these issues for some time. The World Health Organization and the Food and Agriculture Organization (FAO) have recommended restrictions on agricultural uses of antibiotics; the American Public Health Association (APHA) proposed a moratorium on CAFOs back in 2003. All told, more than 350 professional organizations — including the APHA, American Medical Association, the Infectious Diseases Society of America, and the American Academy of Pediatrics — have called for greater regulation of antibiotic use in livestock. The Infectious Diseases Society of America has declared antibiotic-resistant infections an epidemic in the United States. The FAO recently warned that global industrial meat production poses a serious threat to human health. The situation is akin to that surrounding global climate change four or five years ago: near-universal scientific consensus matched by government inaction and media inattention. Although the specter of pandemic flu — in which a virulent strain of the influenza virus recombines with a highly contagious strain to create a bug rivaling that responsible for the 1918 flu pandemic, thought to have killed as many as 50 million people — is the most dire scenario, antibiotic resistance is a clear and present danger, already killing thousands of people in the United States each year. People, Animals and Microbes From one perspective, picking up bugs from our domesticated animals is nothing new. Approximately two-thirds of the 1,400 known human pathogens are thought to have originated in animals: Scientists think tuberculosis and the common cold probably came to us from cattle; pertussis from pigs or sheep; leprosy from water buffalo; influenza from ducks. Most of these ailments probably appeared relatively early in the 10,000-year-old history of animal domestication. Over time, some human populations developed immunity to these diseases; others were eventually controlled with vaccines. Some continued to kill humans until the mid-20th century discovery of penicillin, a miracle drug that rendered formerly life-threatening infections relatively harmless. Other antibiotics followed, until by the 1960s leading researchers and public health officials were declaring that the war on infectious diseases had been won. Beginning in the mid 1970s, however, the numbers of deaths from infectious diseases in the United States started to go back up. Some were from old nemeses, such as tuberculosis, newly resistant to standard antibiotic treatments; others were wholly novel. “In recent decades,” writes Dr. Michael Greger, director of public health and animal agriculture for the Humane Society of the United States and author of Bird Flu: A Virus of Our Own Hatching, “previously unknown diseases have surfaced at a pace unheard of in the recorded annals of medicine: more than 30 newly identified human pathogens in 30 years, most of them newly discovered zoonotic viruses.” (Zoonotic viruses are those that can be passed from animals to humans.) Why is this happening? There are many reasons, including the increased pace of international travel and human incursions into wild animals’ habitats. But one factor stands out: the rise of industrial farm animal production. “Factory farms represent the most significant change in the lives of animals in 10,000 years,” Greger writes. “This is not how animals were supposed to live.” Chicken and pig production are particularly bad. In 1965, the total U.S. hog population numbered 53 million, spread over more than 1 million pig farms in the United States — most of them small family operations. Today, we have 65 million hogs on just 65,640 farms nationwide. Many of these “farms” — 2,538, to be exact — have upwards of 5,000 hogs on the premises at any given time. Broiler chicken production rose from 366 million in 1945 to 8,400 million in 2001, most of them in facilities housing tens of thousands of birds. On a global scale, the situation is even worse. Fifty-five billion chickens are now reared each year worldwide. The global pig inventory is approaching 1 billion, an estimated half of which are raised in confinement. In China and Malaysia, it’s not unheard of for hog facilities to house 20,000 or even 50,000 animals. The Mechanics of Resistance “Concentrated animal feeding operations are comparable to poorly run hospitals, where everyone is given antibiotics, patients lie in unchanged beds, hygiene is nonexistent, infections and re-infections are rife, waste is thrown out the window, and visitors enter and leave at will,” write Johns Hopkins researchers Ellen Silbergeld, Jay Graham and Lance Price in the 2008 Annual Review of Public Health. By concentrating large numbers of animals together, factory farms are terrific incubators for disease. The stress of factory farm conditions weakens animals’ immune systems; ammonia from accumulated waste burns lungs and makes them more susceptible to infection; the lack of sunlight and fresh air — as well as the genetic uniformity of industrial farm animal populations — facilitates the spread of pathogens. The addition of steady doses of antibiotics to this picture tips the balance from appalling to catastrophic. Poultry producers discovered by accident in the 1940s that feeding tetracycline fermentation byproducts accelerated chickens’ growth. Since then, the use of antibiotics as feed additives has become standard practice across much of the industry. The Union of Concerned Scientists estimates that non-therapeutic animal agriculture use (drugs given to animals even when they are not sick) accounts for 70 percent of total antibiotic consumption in the United States. The medical community has been cautioning for years against irresponsible antibiotic use among people, but in terms of sheer numbers, livestock use is far more significant. It’s a simple scientific fact that the more antibiotics are used — especially prolonged use at low doses as in factory farms — the more antibiotic-resistant microbes will become. Bacteria and viruses are also notoriously promiscuous, swapping genes across species and even across genera, creating what the Johns Hopkins researchers call “reservoirs of resistance.” “In some pathogens, selection for resistance also results in increased virulence,” they note. In other cases, otherwise harmless microbes can transfer resistance genes to pathogenic species. There also are indications that factory farm conditions make animals more likely to excrete pathogenic microbes — suggesting another mechanism by which conversion to more humane farming methods would offer greater protection for human health. Routes of Transmission Most so-called bio-containment procedures for confinement livestock operations are more concerned with protecting the crowded animals from disease outbreaks than from preventing human pathogens from escaping into the wider environment. As the report from the Pew Commission points out, every step in the industrial farm animal production system holds the potential for disease transmission, from transportation and **manure handling**, to meat processing and animal rendering. The increasingly globalized nature of the farm animal production system means that live animals, as well as fresh and frozen meat, are constantly crossing international borders, ensuring that diseases present in one location will soon spread elsewhere. But the biggest transmission route is waste: Confined livestock operations in the United States produce three times as much waste each year as our country’s entire human population — and yet all that manure is much more loosely regulated and handled than human waste. Antibiotic-resistant microbes, as well as the antibiotics themselves, are now widely present as environmental contaminants, with unknown consequences for everything from soil microorganisms to people. Canada’s largest waterborne disease outbreak, which infected 1,346 people and killed six, was traced to runoff from livestock farms into a town’s water supply. The U.S. Geological Survey found antimicrobial residues in 48 percent of 139 streams tested nationwide from 1999 to 2000. Other studies have detected resistant bacteria in the air up to 30 meters upwind and 150 meters downwind of industrial hog facilities. A wealth of evidence links industrial meat and poultry directly with foodborne illness. When dioxin-contaminated chicken feed led to the removal from the market of all chicken and eggs in Belgium for several weeks in June of 1999, doctors there noted a 40 percent decline in the number of human Campylobacter infections. Repeated studies have concluded that as much as 80 percent of retail supermarket chicken in the United States is contaminated with Campylobacter. Similarly, the Centers for Disease Control and Prevention estimates that Salmonella-contaminated eggs caused 180,000 cases of sickness in the United States in 2000. E. coli O157:H7 is blamed for 73,000 illnesses in this country each year, including about 2,000 hospitalizations and 60 deaths. Although thorough cooking and careful handling can minimize your risks, antibiotic resistance raises the stakes when someone gets ill: “One in two human cases of Campylobacter, and one in five cases of Salmonella are now antibiotic-resistant,” says Steve Roach, public health program director for the Food Animal Concerns Trust and a member of the executive committee for the Keep Antibiotics Working coalition. “And when you have antibiotic resistance, you have more complications, more blood infections, more mortality.” In fact, public health experts are beginning to suspect that a whole host of infections not previously thought of as food-related may ultimately be linked to the overuse of antibiotics in animal agriculture. Researchers at the University of California-Berkeley, for example, traced a multi-state outbreak of urinary tract infections among women in 1999 and 2000 to contamination with a single strain of drug-resistant E. coli found in cows. Dr. Lee Riley, lead author of a paper on the findings published in Clinical Infectious Diseases, cautioned that the findings indicated that “the problem of foodborne disease is much greater in scope than we had ever previously thought.” And then there’s methicillin-resistant Staphylococcus aureus, or MRSA. Previously confined largely to hospitals, MRSA is now killing more people in the United States each year than HIV/AIDS. A series of recent studies in Europe have demonstrated a strong causal link between MRSA and intensive pig farming in the Netherlands, Germany and France. Little or no data are available on MRSA in animals in the United States, but the bacterium is widely present on pig farms in Canada, which sells millions of live pigs to the United States annually, so it seems pretty likely it’s in U.S. pig factories, too. All in all, the CDC reports that 2 million people in the United States now contract an infection each year while in the hospital. Of those, a staggering 90,000 die — a toll higher than that from diabetes. Numbers such as that are prompting some medical investigators to suggest that we may be entering a “post-antibiotic era,” one in which (as a paper published in Environmental Health Perspectives in 2007 put it) “there would be no effective antibiotics available for treating many life-threatening infections in humans.” Connections such as these aren’t always easy to prove, however, especially for drugs that have already been in widespread use for decades, which is one reason why regulations to reign in the non-therapeutic use of antimicrobials have so far been largely lacking in the United States. The pending approval of an antibiotic called cefquinome to treat respiratory diseases in cattle offered a recent test case. Cefquinome is similar to cefepime, a last-resort antibiotic used to treat serious infections in people. (Both are fourth-generation cephalosporins, one of the small number of new antibiotics developed in recent years.) The FDA’s Veterinary Medicine Advisory Committee, along with the Centers for Disease Control and Prevention and the American Medical Association, recommended against approval, warning that using cefquinome for animals would almost certainly render cefepime less effective for humans. But the FDA has apparently caved to industry pressure, claiming it lacks the authority to deny the drug companies’ request.

#### Extinction

**GREGER 08 –** M.D., is Director of Public Health and Animal Agriculture at The Humane Society of the United States (Michael Greger, , Bird Flu: A Virus of Our Own Hatching, <http://birdflubook.com/a.php?id=111>)

Senate Majority Leader Frist describes the recent slew of emerging diseases in almost biblical terms: “All of these [new diseases] were advance patrols of a great army that is preparing way out of sight.”3146 Scientists like Joshua Lederberg don’t think this is mere rhetoric. He should know. Lederberg won the Nobel Prize in medicine at age 33 for his discoveries in bacterial evolution. Lederberg went on to become president of Rockefeller University. “Some people think I am being hysterical,” he said, referring to pandemic influenza, “but there are catastrophes ahead. We live in evolutionary competition with microbes—bacteria and viruses. There is no guarantee that we will be the survivors.”3147 There is a concept in host-parasite evolutionary dynamics called the Red Queen hypothesis, which attempts to describe the unremitting struggle between immune systems and the pathogens against which they fight, each constantly evolving to try to outsmart the other.3148 The name is taken from Lewis Carroll’s Through the Looking Glass in which the Red Queen instructs Alice, “Now, here, you see, it takes all the running you can do to keep in the same place.”3149 Because the pathogens keep evolving, our immune systems have to keep adapting as well just to keep up. According to the theory, animals who “stop running” go extinct. So far our immune systems have largely retained the upper hand, but the fear is that given the current rate of disease emergence, the **human race is losing the race**.3150 In a Scientific American article titled, “Will We Survive?,” one of the world’s leading immunologists writes: Has the immune system, then, reached its apogee after the few hundred million years it had taken to develop? Can it respond in time to the new evolutionary challenges? These perfectly proper questions lack sure answers because we are in an utterly unprecedented situation [given the number of newly emerging infections].3151 The research team who wrote Beasts of the Earth conclude, “Considering that bacteria, viruses, and protozoa had a more than two-billion-year head start in this war, a victory by recently arrived Homo sapiens would be remarkable.”3152 Lederberg ardently believes that emerging viruses may imperil human society itself. Says NIH medical epidemiologist David Morens, When you look at the relationship between bugs and humans, the more important thing to look at is the bug. When an enterovirus like polio goes through the human gastrointestinal tract in three days, its genome mutates about two percent. That level of mutation—two percent of the genome—has taken the human species eight million years to accomplish. So who’s going to adapt to whom? Pitted against that kind of competition, Lederberg concludes that the human evolutionary capacity to keep up “may be dismissed as almost totally inconsequential.”3153 To help prevent the evolution of viruses as threatening as H5N1, the least we can do is take away a few billion feathered test tubes in which viruses can experiment, a few billion fewer spins at pandemic roulette. The human species has existed in something like our present form for approximately 200,000 years. “Such a long run should itself give us confidence that our species will continue to survive, at least insofar as the microbial world is concerned. Yet such optimism,” wrote the Ehrlich prize-winning former chair of zoology at the University College of London, “might easily transmute into a tune whistled whilst passing a graveyard.”3154

### 1ac Adv 2

#### Advantage 2: Agriculture

#### Farms vulnerable now—energy input costs weaken US agriculture—plan’s key to resilience

**Kruger 9—**Director of Outreach, Climate Friendly Farming, Washington State University

(Chad, “On-Farm Evaluation and Demonstration of Small-Scale Biogas Technology”, http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewRept&pn=FW06-325&y=2009&t=1, dml)

Rapidly rising costs for energy and agricultural inputs produced from non-renewable sources pose a **critical threat** to the economic viability of US farms. Small diversified and organic farms, while more insulated than chemically intensive farms, are still not immune to the effects of volatile energy markets and stand to gain considerably from the use of renewable energy technologies on farm. In particular, energy technologies focused on **waste biomass** – or bioenergy technologies – hold great promise for efficiently and inexpensively treating organic farm wastes, reducing odor and methane emissions (a powerful greenhouse gas), providing nutrient-rich material for land application, as well as producing renewable energy for use on farm. Biogas technology, also known as anaerobic digestion, is a natural, biological process that has been used worldwide for the treatment of wet, organic wastes and the production of biogas which is a form of renewable energy. Currently, less than 100 US farms use the technology. Eighty seven percent of Washington’s farmers are classified as “small farms.” Many of these farms have shown a significant interest in the adoption of small-scale on-farm technologies for production and use of bioenergy and related co-products. These farmers are underserved by existing biogas technology providers as no commercially available technologies are suited to small-farm applications in the northern latitudes of the US. Currently available commercial biogas technologies of US or European design have limited applicability on small farms – they are primarily designed for digesting manure from large Confined Animal Feedlot Operations (CAFO’s) – and do not meet the technical or economic needs of the majority of small farmers in Washington State. Several small-scale biogas technologies are currently available from Asia. Three primary technologies are the Chinese fixed dome digester (Figure 1), the Indian floating cover digester (Figure 2), and the Taiwanese polyethylene tubular digester (Figure 3). Each of these technologies has been used successfully by subsistence farmers in the developing world, but could be improved with additional research and development. Furthermore, commercial application of these technologies in northern latitude, cold-climate regions such as Washington State will require improvements in engineering and design as these existing technologies were developed for tropical and sub-tropical application. Washington’s small farmers have requested research, education, and technology development in regard to small-scale biogas technology. Refinement of small-scale biogas technology will **improve the resiliency** of small farms in the Western region to volatile energy prices and ultimately improve their sustainability. Key challenges for deploying commercially appropriate biogas technology on small-scale farms in the region include developing climate appropriate applications of the technology and financially appropriate turn-key packages, evaluating the role of biogas technology in the farming systems (including trade-offs with other waste-management practices, such as composting), education on use and maintenance of the systems, and identification of technologies for making the most valuable uses of the biogas (i.e. water heaters and stoves, small generators, liquid fuel conversions, etc.). The development of successful, small-scale biogas technology has tremendous application for farms throughout the Western region for improved waste management and as a substitute for non-renewable sources of energy. For example, the average cost/person for heating water in California in 2003 ranged from $163 (natural gas) to $488 (electricity) (California Energy Commission). As prices for non-renewable energy continue to rise, the use of on-farm biogas could provide a significant financial savings.

#### Ag collapse causes extinction

**Lugar 4** – U.S. Senator (Richard, http://www.unep.org/OurPlanet/imgversn/143/lugar.html)

In a world confronted by global terrorism, turmoil in the Middle East, burgeoning nuclear threats and other crises, it is easy to lose sight of the long-range challenges. But we do so at our peril. One of the most daunting of them is meeting the world’s need for food and energy in this century. At stake is not only preventing starvation and saving the environment, but also world peace and security. History tells us that states may go to war over access to resources, and that poverty and famine have often bred fanaticism and terrorism. Working to feed the world will minimize factors that contribute to global instability and the proliferation of weapons of mass destruction.

With the world population expected to grow from 6 billion people today to 9 billion by mid-century, the demand for affordable food will increase well beyond current international production levels. People in rapidly developing nations will have the means greatly to improve their standard of living and caloric intake. Inevitably, that means eating more meat. This will raise demand for feed grain at the same time that the growing world population will need vastly more basic food to eat.

Complicating a solution to this problem is a dynamic that must be better understood in the West: developing countries often use limited arable land to expand cities to house their growing populations. As good land disappears, people destroy timber resources and even rainforests as they try to create more arable land to feed themselves. The long-term environmental consequences could be disastrous for the entire globe.   Productivity revolution  To meet the expected demand for food over the next 50 years, we in the United States will have to grow roughly three times more food on the land we have. That’s a tall order. My farm in Marion County, Indiana, for example, yields on average 8.3 to 8.6 tonnes of corn per hectare – typical for a farm in central Indiana. To triple our production by 2050, we will have to produce an annual average of 25 tonnes per hectare.

Can we possibly boost output that much? Well, it’s been done before. Advances in the use of fertilizer and water, improved machinery and better tilling techniques combined to generate a threefold increase in yields since 1935 – on our farm back then, my dad produced 2.8 to 3 tonnes per hectare. Much US agriculture has seen similar increases.

But of course there is no guarantee that we can achieve those results again. Given the urgency of expanding food production to meet world demand, we must invest much more in scientific research and target that money toward projects that promise to have significant national and global impact. For the United States, that will mean a major shift in the way we conduct and fund agricultural science. Fundamental research will generate the innovations that will be necessary to feed the world.

The United States can take a leading position in a productivity revolution. And our success at increasing food production may play a decisive humanitarian role in the survival of billions of people and the health of our planet.

#### Small farms solve extinction

**Boyce 2006** (James, Prof. Econ. @ UMass Amherst, in “Human Development in the Era of Globalization: Essays in Honor of Keith B. Griffin”, Ed. Keith B. Griffin, Stephen Cullenberg, Prasanta K. Pattanaik, p. 99, Google Print)

There is a future for small farms. Or, to be more precise, there can be and should be a future for them. Given the dependence of 'modern' low-diversity agriculture on 'traditional' high-diversity agriculture, the long-term food security of humankind will depend on small farms and their continued provision of the environmental service of in situ conservation of crop genetic diversity. Policies to support small farms can be advocated therefore not merely as a matter of sympathy, or nostalgia, or equity. Such policies are also a matter of human survival.

#### Plan solves monocultures

**Thran 12**—Head of department Bioenergy Systems, DBFZ

(Daniela, “Focus on Biomethane”, <http://www.greengasgrids.eu/sites/default/files/files/fh_biomethane_engl_2.pdf>, dml)

**Energy crops for biogas** production are cultivated according to the requirements and obligations of traditional agricultural production. Legal standards on good agricultural practise (e.g. through the Plant Protection Act (PflSchG), thefederal soil protection act and the fertiliser ordinance) are just as relevant for the cultivation of energy crops as for the cultivation of other crops (for example, for the feed market). The cultivation of energy crops within the fremwork of multiple crop rotation has significant advantages from an agricultural point of view. For example, multiple crop rotations with a sensible mix of shallow and deep-rooted plants, humus augmenters and **digesters** reduce attack by weeds, fungal diseases and other pests and increase general nutrient and water availability in the soil compared to monoculture cultivation. Among other things, this reduces pesticide costs. Due to possible all-year ground cover, energy crop cultivation in crop rotation also provides opportunities for reducing soil erosion and possible nitrogen washout during the winter months.

#### Extinction

**Mulvany and Berger 2001** – \*chair of the Ford Group, senior policy advisor at Practical Action, Oxfam trustee, member of the Institute of Biology, \*\*climate change Policy Advisor with Practical Action (Patrick and Rachel, "Agricultural biodiversity: farmers sustaining the web of life", http://practicalaction.org/docs/advocacy/fwn\_bio-div\_briefing.pdf)

Agricultural biodiversity embraces the living matter that produces food and other farm products, supports production and shapes agricultural landscapes. The variety of tastes, textures and colours in food is a product of agricultural biodiversity. This biodiversity is the result of the interaction by smallholder farmers, herders and artisanal fisherfolk with other species over millennia. Selecting and managing these for local nutritional, social and economic needs has produced the agricultural biodiversity on which humanity depends. Food production systems need to be rooted in sustaining agricultural biodiversity so that farmers everywhere can continue to provide food and livelihoods and maintain life on Earth.STRENGTH IN DIVERSITYAt a time of unprecedented changes in society, population and the environment, agricultural biodiversity also provides some security against future adversity, be it from climate change, war, industrial developments, biotechnological calamities or ecosystem collapse. There is greater strength in diversity than in susceptible uniformity. A diversity of varieties, breeds and species will ensure that there will continue to be agricultural production whatever the threat, and hidden in the genetic code of today's crop plants and livestock are many invisible traits that may become useful in confronting future challenges.

### 1ac Adv 3

#### Advantage 3: California

#### Initial federal funding is key to viability and cost-competitiveness—stimulates the California dairy industry which is critical to their economy

**Krich et al 5**—Research Manager for ABC

(Ken, with Don Augenstein, JP Batmale, John Benemann, Brad Rutledge, and Dara Salour, “Biomethane from Dairy Waste”, <http://www.americanbiogascouncil.org/pdf/biomethaneFromDairyWaste.pdf>, dml)

Like other pioneering renewable energy technologies, the production and distribution of dairy biomethane is not currently cost effective for the private developer without a public subsidy. In time, after a number of small-scale plants are built, costs are likely to come down. Our estimated costs for producing biogas and upgrading it to biomethane can compete only marginally with today’s natural gas prices. Pioneering plants may have higher costs due to inexperience. At today’s market prices, a large dairy could likely produce biomethane for a price lower than that paid by small retail commercial users (like dairies); while a smaller dairy’s cost of production would be higher than the going market rate. Added to the cost of production is the cost of storage and transportation. In contrast, generating electricity from biogas can offset retail electric purchases and can be simpler and more profitable than biomethane production. However, the farmer may produce more electricity than he can use; if this occurs, the farmer cannot be compensated for the excess dairy biogas electricity under California’s current market structure, and the present net metering program in California is not as attractive for the small biogas electric generator as it is for the solar generator. Also, obtaining an interconnection agreement is time-consuming and expensive. Why Support the Development of the Biomethane Industry? Swedish experience demonstrates that a viable biomethane industry is possible. It is important to note, however, that the economics in Sweden are much more favorable for a biomethane industry than they are in the USA. The most important lesson we learned during our trip to Sweden was that no biomethane plant should be built until a market for the biomethane has been established and a distribution system designed that can move the biomethane to the market. The current economics for development of the biomethane industry in the USA are challenging if there is no public subsidy. We feel, however, that there are a number of valid reasons to support the development of this industry through publicly funded subsidies, regulation, or tax incentives. Such subsidies and incentives are always necessary to develop a new source of renewable energy or an alternative transportation fuel. A society that is heavily dependent on fossil fuel energy should be actively developing a wide variety of alternative energy resources. We cannot always predict which technologies will prove the most viable for our future needs. We need to invest in research and development and to build pilot plants for a variety of these technologies. Biomethane production addresses California’s commitment to renewable energy and to reducing dependence on imported petroleum. Development of a dairy biomethane industry would help to stimulate California’s economy, particularly its rural economy. Biomethane production provides a series of environmental benefits both during the production process and because it can be substituted for fossil fuels. Development of biomethane production technologies and markets today will ensure future preparedness for the growth of this industry should conditions arise that make the production and use of biomethane a more financially viable and/or necessary option. The biomethane industry, like the rest of the renewable energy sector, needs public subsidies, tax credits, or market rules that will help earn a premium for the product during its start-up phase. Regulators and lobbyists for the industry also need to be aware of the cost structure of the biomethane industry. In contrast to anaerobic digester systems that generate electricity, which have higher capital costs than operating costs, biogas upgrading plants that produce biomethane typically have higher operating costs than capital costs. Subsidies that cover even a large portion of the capital costs may be insufficient to stimulate industry growth. If biomethane facilities are to become viable, ongoing sources of renewable energy, they will likely need the support of ongoing production tax credits, a long-term fixed price contract, and/or market rules that provide a premium for its output.

#### The plan sustains California growth and it’s reverse causal—federal commitment is key

**Coleman 11**—California Chamber of Commerce

(Brenda, “Energy Infrastructure Upgrade/Expansion Critical for State’s Economy to Grow”, <https://www.calbizcentral.com/GovernmentRelations/IssueReports/Documents/2011-Reports/energy_2011.pdf>, dml)

Although these certainly are steps in the right direction, much more needs to be done if the United States wants to advance its renewable energy commitment. According to policy experts, **the country must focus on federal subsidies**, streamlining the approval process for projects, and of course, transmission infrastructure in order to update and expand the electrical grid to accommodate new sources of energy. Subsidies in the form of tax credits and loan guarantees will help stimulate production. With expired federal tax credits for several renewable development projects, however, **investors remain cautious until Congress commits** to multiyear programs of support. Finally, streamlining the approval process for projects is just as important at the federal level as it is at the state level. The projects recently certified by the Interior Department took five years and nine years to receive all permits. In order to advance renewable energy goals and job creation promised with clean energy projects, the permit process must be more responsive with swifter completion of regulatory hurdles. CalChamber Position It is critical that California’s electricity generation keeps pace with its growing population and increasing demand. The state should focus its attention on the construction of new transmission lines to sustain future economic growth and to ensure renewables are able to come on line in time to keep up with the various programs being implemented across agencies. With the various new programs undergoing implementation in the next couple of years, California will be expected to have a far more diversified portfolio of energy sources. In order for the state to meet these energy efficiency and renewable standards, projects must be streamlined through the approval process, which means effective interagency collaboration and communication is necessary. The construction of the state’s energy infrastructure is **vital to** the **economic growth of California**. Moreover, investments must be made in natural gas pipelines to more efficiently move the gas to where it is needed. Continued research and development is needed in technologies like smart grid that help advance energy efficiency goals, reduce cost and increase grid reliability. Finally, continued research in fuel technology is necessary for understanding the role of alternative fuels in enhancing the state’s energy mix and reaching California’s environmental goals. If the state delays growth of much-needed infrastructure and development, California will fail to meet tomorrow’s energy demand.

#### Can’t delay—demand is increasing and imports are tenuous—now is key

**Coleman 11**—California Chamber of Commerce

(Brenda, “Energy Infrastructure Upgrade/Expansion Critical for State’s Economy to Grow”, <https://www.calbizcentral.com/GovernmentRelations/IssueReports/Documents/2011-Reports/energy_2011.pdf>, dml)

The production, transmission and cost of energy continue to be a central issue to California residents, the business community and the state’s economy. The success of **California’s economy, and by extension the nation’s, relies on** the ability of local, state and federal leaders to find common ground and determine the most efficient and equitable means of upgrading and expanding energy infrastructure. As California pursues its goal to address climate change by reducing greenhouse gas emissions, the driving force for the state’s energy policies continues to be maintaining a reliable, efficient and affordable energy system that is aligned with the state’s economic growth and environmental initiatives. Although the economic downturn has reduced energy demand in the short-term, demand is expected to grow over time as the economy recovers. It is important that in making key energy decisions, policy makers and stakeholders be flexible enough to respond to future fluctuations in the economy in a way that enables the state to continue to develop and adopt energy policies and technologies that are critical for long-term reliability and economic growth. California’s Electricity Outlook Since the energy crisis of 2000–01, California has maintained **a delicate balance** between supply and demand, largely by relying on imported electricity from the North and Southwest and older, less efficient in-state power plants. With the demand in the North and Southwest growing, future imports are becoming more expensive and less available. Moreover, due to landmark legislation to cut the state’s greenhouse gas emissions (AB 32 and SB 1368), **California is limited to what types of power plants may be used** to serve the current and increases in load. Although conservation, energy efficiency standards and increased energy sources have helped keep supply greater than demand, continued population and economic growth edges the state closer to an imbalance of supply and demand. California’s population grows at a rate of more than 1 percent a year, according to the Legislative Analyst’s Office. According to the California Energy Commission (CEC), the state’s primary energy policy and planning agency, electricity consumption is projected to grow at a rate of 1.2 percent per year from 2010–2018, with peak demand growing at an average annual rate of 1.3 percent over the same period. The current forecast is lower than the CEC had estimated in a previous report, primarily due to lower-than-expected economic growth in both the near- and long-term, as well as increased expectations of savings from energy efficiency. According to the Energy Commission’s 2009 Integrated Energy Policy Report, more than 24,000 megawatts (MW) of new capacity has been licensed since 1998. Only 15,220 MW has come on line, however. The 2009 report states that the Energy Commission has a historic high level of more than 30 proposed projects under review, totaling more than 12,000 MW, many of which are large solar thermal power plants that present new and challenging environmental impacts that must be considered.

#### California key to US and global econ

**Navarro, ‘8** Professor of Economics and Public Policy at the Paul Merage School of Business, University of California, Irvine and holds a Ph.D. in Economics from Harvard University (Peter Navarro, SFGate, 15 August 2008, “California nightmare for the global economy?” http://www.sfgate.com/opinion/article/California-nightmare-for-the-global-economy-3273234.php)//CC

Will the California budget crisis tip the United States into recession? The California economy is certainly large enough to inflict such damage. It's the seventh-largest economy in the world and home to close to 38 million Americans. California's budget deficit is by any reasonable measure enormous. This budget deficit is estimated at $17.2 billion and represents more than 17 percent of the state's general fund expenditures (about $101 billion). In contrast, New York, which faces the second-worst budget gap in the nation for fiscal year 2009, has a gap of about $5 billion, which represents less than 10 percent of its budget. In closing its past budgetary gaps, California has acted more like the federal government rather than merely one of 50 states. Indeed, unlike the federal government (or sovereign nations), each state is required to balance its budget each year; and no state, at least in principle, has the authority to engage in the kind of discretionary deficit spending both the federal government and nations around the world routinely use to stimulate their economies. In the past, a profligate California has gotten around this balanced-budget requirement by using a technique that effectively allows the Golden State to administer its own fiscal stimulus. In particular, California - under both Democratic and Republican governors - has simply issued new bonds every time that it has spent far beyond its means. California's problem this time, however, is that its deficit is so big, its balance sheet is so bad, and world credit markets are so tight that issuing new bonds alone is no longer a viable option. Instead, California's politicians are inexorably being forced toward a solution that will prominently feature both a large tax increase and significant spending cuts. Indeed, this is not a partisan matter of choosing one's poison. The budget deficit is so large that it cannot be eliminated without raising taxes, anathema to the state's Republicans, and spending cuts, equally unpalatable to California Democrats. Of course, the faster the state Legislature accepts this harsh reality, the faster the deadlock can be broken. Viewed from a macroeconomic perspective, there is an even harsher reality. Increased taxes and reduced spending will send a very nasty contractionary shock through a California economy that is already reeling from a housing market meltdown and punishing gas prices. Should Gov. Arnold Schwarzenegger's budgetary medicine - including firing many state employees - trigger a recession, this may well serve as a tipping point for a national recession and, in the worst case scenario, even a global recession. In considering these dangers, it is worth noting that California provides close to 13 percent of America's real GDP growth. In contrast, the second-largest contributor to U.S. gross domestic product is Texas, and it provides only half that stimulus. It also worth noting that California is an important destination for both U.S. manufactured goods and world imports, particularly from Asia. Already, California's unemployment rate is more than 6.8 percent and well above the national average of 5.7 percent. At least some economists believe California may already be experiencing negative growth. The economy is likely to get a lot worse before its gets better. If there is any one civics lesson to be learned from this fine mess, it is that the state's politicians must learn to resist overspending in good times so that the state won't face bankruptcy when bad times hit. It should be equally clear that any damn fool can issue bonds to balance a budget. However, it takes real political courage and economic foresight to put a state budget on an even keel through fiscally conservative tax-and-spend policies. At this juncture, California is nowhere close to that - and the rest of the country, and perhaps the world, may soon pay the Golden State's piper.

#### Global war

Harris and Burrows 9 Mathew, PhD European History @ Cambridge, counselor in the National Intelligence Council (NIC) and Jennifer is a member of the NIC’s Long Range Analysis Unit “Revisiting the Future: Geopolitical Effects of the Financial Crisis” <http://www.ciaonet.org/journals/twq/v32i2/f_0016178_13952.pdf> Increased Potential for Global Conflict

Of course, the report encompasses more than economics and indeed believes the future is likely to be the result of a number of intersecting and interlocking forces. With so many possible permutations of outcomes, each with ample Revisiting the Future opportunity for unintended consequences, there is a growing sense of insecurity. Even so, history may be more instructive than ever. While we continue to believe that the Great Depression is not likely to be repeated, the lessons to be drawn from that period include the harmful effects on fledgling democracies and multiethnic societies (think Central Europe in 1920s and 1930s) and on the sustainability of multilateral institutions (think League of Nations in the same period). There is no reason to think that this would not be true in the twenty-first as much as in the twentieth century. For that reason, the ways in which the potential for greater conflict could grow would seem to be even more apt in a constantly volatile economic environment as they would be if change would be steadier. In surveying those risks, the report stressed the likelihood that terrorism and nonproliferation will remain priorities even as resource issues move up on the international agenda. Terrorism’s appeal will decline if economic growth continues in the Middle East and youth unemployment is reduced. For those terrorist groups that remain active in 2025, however, the diffusion of technologies and scientific knowledge will place some of the world’s most dangerous capabilities within their reach. Terrorist groups in 2025 will likely be a combination of descendants of long established groups\_inheriting organizational structures, command and control processes, and training procedures necessary to conduct sophisticated attacks\_and newly emergent collections of the angry and disenfranchised that become self-radicalized, particularly in the absence of economic outlets that would become narrower in an economic downturn. The most dangerous casualty of any economically-induced drawdown of U.S. military presence would almost certainly be the Middle East. Although Iran’s acquisition of nuclear weapons is not inevitable, worries about a nuclear-armed Iran could lead states in the region to develop new security arrangements with external powers, acquire additional weapons, and consider pursuing their own nuclear ambitions**.** It is not clear that the type of stable deterrent relationship that existed between the great powers for most of the Cold War would emerge naturally in the Middle East with a nuclear Iran. Episodes of low intensity conflict and terrorism taking place under a nuclear umbrella could lead to an unintended escalation and broader conflict if clear red lines between those states involved are not well established. The close proximity of potential nuclear rivals combined with underdeveloped surveillance capabilities and mobile dual-capable Iranian missile systems also will produce inherent difficulties in achieving reliable indications and warning of an impending nuclear attack. The lack of strategic depth in neighboring states like Israel, short warning and missile flight times, and uncertainty of Iranian intentions may place more focus on preemption rather than defense, potentially leading to escalating crises. 36 Types of conflict that the world continues to experience, such as over resources, could reemerge, particularly if protectionism grows and there is a resort to neo-mercantilist practices. Perceptions of renewed energy scarcity will drive countries to take actions to assure their future access to energy supplies. In the worst case, this could result in interstate conflicts if government leaders deem assured access to energy resources, for example, to be essential for maintaining domestic stability and the survival of their regime. Even actions short of war, however, will have important geopolitical implications. Maritime security concerns are providing a rationale for naval buildups and modernization efforts, such as China’s and India’s development of blue water naval capabilities. If the fiscal stimulus focus for these countries indeed turns inward, one of the most obvious funding targets may be military. Buildup of regional naval capabilities could lead to increased tensions, rivalries, and counterbalancing moves, but it also will create opportunities for multinational cooperation in protecting critical sea lanes. With water also becoming scarcer in Asia and the Middle East, cooperation to manage changing water resources is likely to be increasingly difficult both within and between states in a more dog-eat-dog world.

#### Strong Californian economy bolsters military-industrial innovation

**Gvosdev 3**—Editor at the National Interest

(Nikolas, “Recall Madness-- and Much Ado about Missiles”, <http://nationalinterest.org/article/recall-madness-and-much-ado-about-missiles-2406>, dml)

But the real issue is this: people "inside the Beltway" sometimes seem to forget that there is no "United States" apart from the fifty states (and associated territories and commonwealths). A fiscal and economic crisis in California has a direct impact on the power of the United States, since some 13 percent of the total U.S. output is produced by California. California on its own is the sixth largest economy in the world, worth some $1.309 trillion--yet this represents a decline of approximately 2.3 percent from 2000, when California's economy outperformed that of France. California represents a significant share of the country's technological base and of its human capital. The high-tech weaponry which led to a swift initial military victory in Iraq is in part a product of the technology and defense sectors of the California economy. A state budget crisis that significantly cuts back on everything from education (including higher education, where so many innovative breakthroughs have taken place) to health care has ramifications for how the United States projects its influence throughout the world. In previous issues of In the National Interest, other authors have pointed out the dangerous implications of continued deficit spending by the federal government to support overseas operations, and this problem can only increase if a continuing crisis in the principal engine of America's economy continues. And, of course, **California is the bellweather** for the nation as a whole. Twenty-nine states have either passed or are considering tax hikes to close budget deficits. Several states--including Hawaii, Georgia and North Carolina--will call special fall sessions of their legislatures to deal with the fact that collected taxes have fallen short of budget projections. Yet the attitude is that the recall in California is amusing political comedy, nothing more. There seems to be almost no recognition of the fact that whoever sits in the governor's chair after October 7 --whether Grey Davis survives or is "terminated" --must work quickly to solve the problems that have led California into its current quagmire. Few other countries in the world would be so blasé if political turmoil and economic collapse threatened the welfare of a key component of its national power. The California crisis reminds us that there is no neat line dividing "domestic" and "foreign" policy. Ensuring that California survives its current crisis is no less a priority than stabilizing Iraq or containing North Korea.

#### That’s key to deterrence and the de-escalation of conflict

**O’Hanlon et al 12** (Mackenzie Eaglen, American Enterprise Institute Rebecca Grant, IRIS Research Robert P. Haffa, Haffa Defense Consulting Michael O'Hanlon, The Brookings Institution Peter W. Singer, The Brookings Institution Martin Sullivan, Commonwealth Consulting Barry Watts, Center for Strategic and Budgetary Assessments “The Arsenal of Democracy and How to Preserve It: Key Issues in Defense Industrial Policy January 2012,” pg online @ <http://www.brookings.edu/~/media/research/files/papers/2012/1/26%20defense%20industrial%20base/0126_defense_industrial_base_ohanlon> //um-ef)

The current wave of defense cuts is also different than past defense budget reductions in their likely industrial impact, as **the U.S. defense industrial base is in a much different place than it was in the past**. Defense industrial issues are too often viewed through the lens of jobs and pet projects to protect in congressional districts. **But the overall health of the firms that supply the technologies our armed forces utilize does have national security resonance**. Qualitative superiority in weaponry and other key military technology has become an essential element of American military power in the modern era—**not only for winning wars but for deterring them**. **That requires world-class** scientific and **manufacturing capabilities—**which in turn can also generate civilian and military export opportunities for the United States in a globalized marketplace.

#### Multiple hotspots make defense manufacturing key --- these go nuclear

**Watts 8** (Barry D Watts, Senior Fellow, The Center for Strategic and Budgetary Assessments, “The US Defense Industrial Base, Past, Present and Future,” CBA, <http://www.csbaonline.org/4Publications/PubLibrary/R.20081015._The_US_Defense_In/R.20081015._The_US_Defense_In.pdf>)

Since the 1950s, the US defense industrial base has been a source of long-term strategic advantage for the United States, just as it was during World War II. American defense companies provided the bombers and missiles on which nuclear deterrence rested and armed the US military with world-class weapons, including low-observable aircraft, wide-area surveillance and targeting sensors, and reliable guided munitions cheap enough to be employed in large numbers. They also contributed to the development of modern digital computers, successfully orbited the first reconnaissance satellites, put a man on the moon in less than a decade, and played a pivotal role in developing the worldwide web. Critics have long emphasized President Eisenhower’s warning in his farewell television address that the nation needed to “guard against the acquisition of undue influence, whether sought or unsought, by the military-industrial complex.” Usually forgotten or ignored has been an earlier, equally important, passage in Eisenhower’s January 1961 speech: A vital element in keeping the peace is our military establishment. Our arms must be mighty, ready for instant action, so that **no potential aggressor** may be **tempted to risk** his own destruction. Eisenhower’s warning about undue influence, rather than the need to maintain American military strength, tends to dominate contemporary discussions of the US defense industrial base. While the percentage of US gross domestic product going to national defense remains low compared to the 1950s and 1960s, there is a growing list of defense programs that have experienced problems with cost, schedule, and, in a few cases, weapon performance. In fairness, the federal government, including the Department of Defense and Congress, is at least as much to blame for many of these programmatic difficulties as US defense firms. Nevertheless, those critical of the defense industry tend to concentrate on these acquisition shortcomings. The main focus of this report is on a larger question. How prepared is the US defense industrial base to meet the needs of the US military Services in coming decades? The Cold War challenge of Soviet power has largely ebbed, but new challenges have emerged. There is the immediate threat of the violence stemming from SalafiTakfiri and Khomeinist terrorist groups and their state sponsors, that have consumed so much American blood and treasure in Iraq; the longer-term challenge of authoritarian capitalist regimes epitomized by the rise of China and a resurgent Russia; and, not least, the worsening problem of proliferation, particularly of **nuclear weapons.** In the face of these more complex and varied challenges, it would surely be premature to begin dismantling the US defense industry. From a competitive perspective, therefore, the vital question about the defense industrial base is whether it will be as much a source of long-term advantage in the decades ahead as it has been since the 1950s.

#### No defense --- collapse of the perception  leads to miscalculation and alliance shift

**Cooper 07** (Horace Cooper, Senior Fellow and deputy director of the Alliance for American Manufacturing, “Making it in America”, April 04, 2007, <http://www.americanmanufacturing.org/articles/making-it-america>)

But perhaps greater than the economic disruption in the lives of the workforce and their companies is the incalculable loss of a manufacturing base for our nation as a whole. There are those in Washington who fail to appreciate the attendant decline in our nation’s security and flexibility in foreign affairs that results from the collapse of this sector. The fall of the Berlin Wall and the unipolarity that resulted presents the United States far greater responsibilities and concerns than those that existed during the Cold War. Yet, our failure to sustain our domestic manufacturing base and instead pursuing a strategy of relying on other countries for military products and technologies isn’t just short-sided, it’s dangerous. This decline in our country’s **military readiness** is a **signal** to the rest of the world that we may not be capable of defending our interests or allies. And perhaps one of the greatest lessons of the 20th century is that **weakness at home is provocative.** Essentially, we provoke rogue nations into taking ill-advised actions that mustinevitably be countered by America’s military might. A policy that results in a diminished security for Americans, fewer jobs, a declining tax base for communities and states and that rejects our nation’s history is a policy that should be reassessed. Supporters of liberty and freedom recognize that American ingenuity and know-how is a core ingredient of our manufacturing sectorand has led to much of the high standard of living we Americans take for granted.

### 1ac solvency

#### IRS mechanism key to solvency

**Bilek 10**—2011 John J. McCloy Fellowship in Environmental Policy Energy Policy Specialist, Great Plains Institute

(Amanda, “SPOTLIGHT ON BIOGAS: POLICIES FOR UTILIZATION AND DEPLOYMENT IN THE MIDWEST”, <http://www.gpisd.net/vertical/Sites/%7B1510F0B9-E3E3-419B-AE3B-582B8097D492%7D/uploads/%7B6DEFD5AC-B930-4ED1-AB05-0AD7EB86EA6B%7D.PDF>, dml)

Tax credits are an attractive policy mechanism for biogas projects because they may provide an additional incentive for ownership and management models beyond individual farm ownership and also provide an incentive for industrial or municipal systems Tax credits will continue to be an important financing mechanism for biogas projects in the future as large-scale and industrial biogas projects are constructed The existing production incentives are geared toward electricity production and do not currently allow for advanced utilization options, such as renewable gas or thermal applications, to qualify for the incentives Expanding incentive program definitions to allow additional utilizations of biogas could spur additional project development The current policy environment at the state and federal level does not recognize the tremendous resource potential from biogas Without additional mechanisms and incentives geared towards diverse biogas utilizations and expanded ownership or management models, biogas development will struggle to grow and an opportunity will be missed to diversify our energy supply with a stable and versatile renewable resource 26Danny and Josie Kluthe’s neighbors were pleasantly surprised when the Kluthes were able to double the size of their hog operation while dramatically reducing the smell of the hog manure The Kluthes were able to achive this goal thanks to their anaerobic digester The complete mix digester system is an in-ground concrete tank with an insulated flexible cover that stores all the manure from the 8,000 head of swine on the Kluthe Farm near Dodge, Nebraska The Kluthe’s number one goal with the installation of the digester was to reduce the odor from their operation The Kluthes created Olean Energy to sell the electricity from their digester to the Nebraska Public Power District (NPPD) The farm produces and sells 549,000 kilowatt hours - enough to power 65 homes for one year -under a buy-all, sell-all contract Olean Energy sells the electricity produced to the power company at a wholesale rate and purchases it back off the grid at retail rates Nebraska’s first methane-powered electrical energy production project got off the ground with the financial support of a $200,000 grant from the Nebraska Environmental Trust and an $80,000 grant from USDA Rural Development Nebraska’s first methane-powered electrical generator has reduced greenhouse gas emissions by 4,878 metric tons of CO2 on an equivalent basis per year Besides the amazing environmental benefits, the Kluthe Farm digester has reduced odor, created nutrient-rich fertilizer, and provided consistent income amidst volatile hog market prices The Production Tax Credit (PTC) is one of the most popular renewable energy tax credits The PTC has been in operation since 1992 with intermittent periods of availability that depend upon Congressional action Renewable energy development ramps up when the credit is available and grinds to a halt when the credit expires The PTC is a ten-year per-kilowatt-hour tax credit for qualified renewable energy resources, including landfill gas, anaerobic digestion, and closed- and open-loop biomass facilities The 2009 American Recovery and Reinvestment Act (ARRA) revised the PTC by extending the in-service deadline by three years for a majority of qualified renewable energy technologies and allows qualified facilities to take advantage of the Business Energy Investment Tax Credit (ITC) or take it alternatively as a cash grant from the U S Department of Treasury (DSIRE, 2010d) The Business Energy Investment Tax Credit (ITC) is similar to the PTC but has traditionally provided tax credits for solar power, fuel cells, small wind systems, geothermal energy, microturbines, and combined heat and power facilities Instead of providing a per-kilowatt-hour credit, a percentage tax credit based on qualifying costs has been available The 2009 ARRA changed the ITC to allow PTC eligible facilities, including closed- and open-loop biomass facilities, to qualify for a 30 percent tax credit through 2013 Prior to this change closed-and-open-loop biomass facilities were not eligible for the ITC New facilities take advantage of the ITC or a cash grant from the U S Department of Treasury (described below) if construction begins in 2010 This change to the ITC allows biogas projects, generally classified as open-loop biomass facilities, to use the ITC to help finance projects over the long-term A grant program (Section 1603) of the U S Department of Treasury was included as part of the 2009 ARRA and provides up to 30 percent of construction and installation costs for a depreciable or amortizable renewable energy facility in lieu of tax credits Facilities can take advantage of either the cash grant or the ITC This grant is available to facilities placed in service or beginning construction in 2009 or 2010 The current program excludes open-loop biomass facilities that have a nameplate capacity rating of 150 kilowatts or less A proposal by U S Senators Diane Feinstein (D-Calif ) and Jeff Merkley (D-Ore ) would extend the grant program until 2012 The bill needs Congressional action in order to extend the program and, at time of publication, no action has been taken The creation or extension of these production incentives or cash grant programs gives biogas project developers financing structure options for the project, but more choices can also create confusion The Lawrence Berkeley National Laboratory and the National Renewable Energy Laboratory (NREL) conducted a quantitative analysis and considered qualitative factors of the PTC, ITC and the U S Treasury cash grant program Results were presented in the report, “PTC, ITC, or Cash Grant? An Analysis of the Choice Facing Renewable Energy Power Projects in the United States,” which concluded that, based on quantitative factors, open-loop biomass projects would receive more value from the ITC rather than the PTC Qualitative considerations, such as no performance risk, more immediate use of tax base, and no power sale requirement, gave the edge to closed-loop biomass projects utilization of the PTC Quantitative analysis alone could not conclusively determine if closed-loop biomass projects would fare better under the PTC or ITC Combining the qualitative and quantitative factors analyzed, open- and closed-loop biomass would receive a greater benefit utilizing the ITC (Bolinger et al , 2009) Although existing tax credits have provided some incentives for biogas projects, a federally dedicated production incentive for biogas does not currently exist In an effort to level the playing field among renewable energy incentives, Senator Ben Nelson of Nebraska introduced the Biogas Production Incentive Act of 2009 (S 306) The legislation, if passed, would provide a $4 27 tax credit for every million British thermal units (BTUs) of biogas produced Biogas is defined as gas derived from the processing of a qualified energy feedstock, such as livestock manure, or organic agricultural or food industry byproduct The legislation specifies the gas must contain at least 50% methane (Thomas, 2010a) The bill currently has 14 co-sponsors, including Democrats and Republicans from across the United States A companion bill (H R 1158) has also been introduced in the House of Representatives by Representative Brian Higgins of New York The Higgins companion bill has 27 co-sponsors Both bills have been referred to the appropriate committees and no action has been taken to date H R 5581 was introduced by U S Representative Kind on June 23, 2010 This proposed legislation presents an opportunity to create a financial incentive for biogas projects producing biomethane to be used as a replacement for natural gas or compressed and used as a vehicle fuel to further diversify the utilization of biogas produced from agricultural livestock manure and processing byproducts The legislation proposes to amend the Internal Revenue Code for a qualified biogas facility to use clean renewable energy bonds to finance a project. Eligible projects could receive a 30 percent credit Biogas produced from eligible facilities must be at least 52 percent methane Biogas projects producing electricity from biogas would not qualify (Thomas, 2010b) The bill also directs the NREL to conduct a biogas study that would examine biogas quality, methods for maximizing energy content, and recommendations for production expansion (Biomass Intel, 2010)

#### Methane digesters solve but federal government assurance is key to handle startup cost

**Setzer 7** (Emily, 17 September 2007, “Farmers Seek Slice of Cow Pie,” http://featured.matternetwork.com/2007/9/farmers-want-expand-energy-slice.cfm, RBatra)

The dairy farm industry can't stop talking about the potential of cow power. But high costs and low incentives are slowing biogas development in America, which trails Europe in developing energy from bovine waste. Digesters capture methane from cow manure and turn it into biogas, which can be used to generate electricity or converted into natural gas. Turning manure into an energy source can reduce emissions of methane and the environmental impact , by up to 70 percent. Methane is a greenhouse gas with a global warming potential 23 times higher than carbon dioxide., But digester equipment ranges from $300,000 to $2 million, making it a cost prohibitive investment for many farmers. Many digesters are built using steel and concrete – two products with rising costs due to transportation and fuel, so digesters probably won't get any cheaper. Experimental Farmers Some smaller dairy farms have gathered to build community digesters, like in the Port of Tillamook Bay in Oregon, which collects manure from seven farms totaling close to 4,000 cows. Meanwhile, larger farms have chosen to team up with big utility companies. "We're trying to make a community digester work," said George Devore, who operates the Port of Tillamook Bay's digester and heads research and development for the community facility. It's been a learning experience for the Tillamook farmers. Some of the digesters only lasted one year. He thinks the government should provide assistance to keep equipment in running order in addition to helping farmers with the initial startup costs. "We're losing money like mad here. Our government won't help the existing (digesters) to make them perfect. They help start them and that's the last you see of them," said Devore.

#### Other actors fail—federal government key to scale of leverage and tech viability

**Gloy 8** – works at the Department of Applied Economics and Management at Cornell (Brent A., 21 October 2008, “Biogas: what options for Slurry power in the US?,” http://www.renewableenergyworld.com/rea/news/article/2008/10/biogas-what-options-for-slurry-power-in-the-us-53901, RBatra)

Public policy can play an important role in the development of a biogas industry in the United States. Currently, most policy related to biogas production has been implemented by individual states and utilities. In contrast, national policies have focused on incentives for construction of biogas production facilities, such as grants for feasibility studies, waste management related construction grants, and loan guarantees. There has been little by way of US national policy directed toward developing markets for energy produced by biogas production systems. Such efforts would be likely to play a much larger role in industry development than do the current subsidies for the construction of farm level digester operations. National level policies might include the development of national quality standards for biogas inserted into gas pipelines. Such standards would make clear the requirements that must be met before biogas can be included in the existing and well-developed gas transmission network. Similarly, national rules on the pricing of electricity generated from biogas applications would ease the negotiation process required to sell electricity into the grid. Although some utilities provide financial incentives for the production of electricity produced from biogas, the site-specific nature of biogas production will limit the scale of the industry. **National, rather than regional-, state-, or utility-level incentives** for this type of energy are more likely to be effective in stimulating the industry. A per unit credit for electrical production from biogas would also speed the development of systems, as would incentives for fleets to adopt the use of natural gas and biogas transportation fuels. The process of monetizing the environmental benefits associated with biogas production is complex. National policy aimed at clarifying the magnitude of environmental benefits associated with the production of biogas would be a tremendous benefit to the industry. Additionally, national policy to assist in developing the markets for these benefits is likely to be necessary as no one producer has a strong enough incentive to organize the market.

#### The plan solves—gotta change the US tax structure

**GTI 11**—Gas Technology Institute, an independent not-for-profit organization

(“The Potential for Renewable Gas”, <http://www.gasfoundation.org/ResearchStudies/agf-renewable-gas-assessment-report-110901.pdf>, dml)

Renewable gas offers numerous potential benefits for the United States: • It is another source of domestically produced energy. Under the two practical long term scenarios that were considered for this study, the market potential of renewable gas is from 1.0 – 2.5 quadrillion Btu’s per year. The technical potential, representing complete utilization of all available feedstocks, is approximately 9.5 quadrillion Btu’s per year. • The job creation potential of renewable biogas gas projects is significant. Direct jobs created range up to 83,000 depending on the depth of the market penetration. Using an average multiplier of 3.12,3,4,5,6 for indirect and induced jobs, total jobs created ranges up to 257,000. • Depending on the model of deployment, renewable gas production could result in 146 million metric tons of CO2 removed from the air annually. This is the equivalent of taking 29 million cars off the road. 7 • The California Air Resources Board (CARB), in a 2009 report, has determined that renewable gas is the lowest carbon transportation fuel available today. 8 • Almost every state in the U.S. has the resources to participate in the production of renewable gas with the potential to create new green jobs. • Renewable gas from renewable sources including animal manure, forest residues, and agricultural wastes can be produced at efficiencies ranging from 60–70%, thus, using our renewable resources in a responsible and efficient manner.9 • All of the technology components to produce renewable gas from this variety of biomass sources exist today. • Renewable biogas production in digesters provides the agricultural sector additional environmental benefits by improving waste management, nutrient control, and dramatically reducing carbon emissions through the control of methane by placing manure in enclosed vessels instead of open lagoons. • Renewable gas is an interchangeable fuel that can be delivered to customers via the existing U.S. pipeline infrastructure and can provide a renewable energy option in the natural gas energy market, an energy market that overall represents 25% of U.S. energy use. • Renewable gas, in many instances, is the low-cost option among renewable products.10 Legislative and regulatory support for renewable fuels is understood to be crucial in realizing scale production for these resources. The same will be true for realizing the potential presented by renewable gas. Over the past several decades the U.S. Congress and the Executive Branch have endorsed a variety of incentives to further the advancement of renewable energy. Much of this effort has focused on creating incentives for the production of renewable electricity or renewable transportation fuels. These incentives have made a positive impact on the growth of renewable liquid transportation fuels produced from biomass resources and on renewable electricity produced from woody biomass, animal manure, and landfill gas. Currently, **federal government** policy gives disparate treatment to processes for producing renewable gas as compared to those which generate renewable electricity or transportation fuels. Renewable gas production does not receive similar tax credits compared to other renewable energy products. In many instances, as set out in this report, biomass and other renewable resources may be more effectively and efficiently used to produce renewable gas directly. This potential is hindered by **the existing tax incentive structure** on renewable energy which drives these resources towards production of renewable electricity or liquid transportation fuels. Importantly, renewable gas can be a supply source for all current users of natural gas. Prudent and well conceived changes in policy can expand its use across the country. These policy changes have to incorporate the following two principles: • Parity – renewable gas being valued and incentivized similarly to renewable electricity or liquid transportation fuel. • Accessibility and integration – the purchase and transfer of renewable gas through our nation’s pipeline infrastructure to meet local, state, or federal goals for renewable fuels.

#### Targeted, stable federal-level financial incentives are key to industry certainty and growth

**Greene et al 11**—O’Brien and Gere Chair of ABC

(Paul, with Norma McDonald, Rolfe Phillip, Melissa VanOrnum, Nora Goldstein, Amy Kessler, Shonodeep Modak, Patrick Serfass, and Freeman White, Testimony to the House Ways and Means Committee RE: Joint Hearing on Energy Tax Policy and Tax Reform, September 29, 2011, dml)

The argument that renewable energy tax incentives should be scrapped because such policies “pick winners and losers” implies that the government should not incentivize certain technologies even if their development and adoption lead to better national outcomes such as economic growth or energy security. Tax policy should reinforce our national objectives to increase use of sustainable, reliable forms of energy, both to create new industries that can lead the world, and enhance our energy independence. The Defense Department recognizes the need to reduce its dependence on vulnerable and volatile fossil fuel supplies and an increasingly outdated and exposed power grid— all of which is driving the military to explore deeply a full range of alternatives, including biogas. The Department of Defense’s 2010 Strategic Sustainability Performance Plan states that “heavy reliance on fossil fuels creates significant risks and costs at a tactical as well as a strategic level” which can result in “lost dollars, in reduced mission effectiveness, and in U.S. soldiers’ lives.” The Committee should embrace tax policies that encourage emerging technologies that meet these sustainability objectives. This investment in our future also spurs domestic economic growth and job creation. A July 2011 Brookings Institution study entitled “Sizing the Clean Economy: A National and Regional Green Jobs Assessment” recognized that while the clean economy can be difficult to adequately quantify, “newer ‘cleantech’ segments produced explosive job gains” between 2003 and 2010. The report concluded “that vigorous private sector-led growth needs to be co-promoted through complementary engagements by all levels of the nation’s federal system to ensure the existence of well-structured markets, a favorable investment climate, and a rich stock of cutting-edge technology.” Over the past decades, federal support has facilitated the emergence of many new industries. Federal support also allows innovative capital intensive energy projects with long-term economic benefits. For example, sizeable federal investments in hydroelectric dams made years ago continue to provide clean, affordable electricity for large portions of the country. Likewise, tax policies incentivizing biogas production will produce reliable, clean energy and economic benefits for years to come. While beneficial, the energy provisions in the tax code are far from perfect. Most of the favorable tax provisions to fossil fuels were written into the U.S. Tax Code as permanent provisions. By contrast, many renewable energy tax provisions were implemented through energy bills and contain expiration dates that limit their usefulness to the renewables industry. Moreover, even within the sphere of these short-term renewable energy credits, the value of tax credits for different technologies varies, as do the expiration dates. For instance, biogas producers can only take advantage of the §45 credit if they generate electricity, and this credit expires at the end of 2013, while other technologies have tax credits that extend to the end of 2016. Depending on the rate the utility will pay to buy excess power, a biogas producer may find it more economically feasible to forgo producing electricity and to use the biogas produced onsite for heating purposes. Or the producer may decide to use the biogas as a fuel, either to be used on site or to be cleaned up and sent into a pipeline or used as vehicle fuel. While using biogas as fuel saves energy, reduces methane emissions, and does not impact food prices, no comparable tax benefit exists for biogas production that is not used for electricity generation. As a 2010 Congressional Research Service report highlighted, “Recent legislation pertaining to agricultural sources of renewable energy has focused primarily on corn-based ethanol and cellulosic ethanol for liquid fuel purposes, and not biogas.” Consequently, we support past efforts by Rep. Kind and Sen. Nelson to provide parity for biogas production, no matter the final use. We also support efforts to extend the §45 open-loop biomass credit until December 31, 2016 so as to be in line with other §48 sunset dates. Despite the imperfections of the tax code, eliminating renewable energy focused tax provisions is inconsistent with national economic and security interests. Emerging and underutilized technologies like anaerobic digestion increase our energy independence and create domestic jobs. Increasing deployment of these renewable technologies drives down costs, reducing the need for future subsidies. In addition, the United States spends a great deal to ensure our national security. Devoting a small fraction of that amount to deploying clean energy technologies is a cost effective way to increase our energy security for the long term. To the extent that federal energy tax provisions pick “winners,” they attempt to make certain technologies competitive with traditional fossil fuel energy technologies that have received federal subsidies in a variety of forms over decades, many of which are permanent features of the Code. Consequently, extending renewable energy tax policy is crucial to ensuring a fair and a balanced approach that encompasses a variety of solutions. Allowing renewable tax provisions to lapse while ignoring the permanent provisions in the code for fossil energy would only undermine the Committee’s stated aims. 3) The tax code should subsidize energy technologies to the extent that those technologies improve our natural environment and strengthen our energy security The American Biogas Council agrees that tax provisions that create jobs and enhance energy security should continue. ABC disagrees with those who assert that the tax code should not subsidize renewable energy. While we would welcome a simplified tax code in theory, removing energy tax incentives in the absence of substantive federal non-tax policies such as feed in tariffs, a clean energy standard, or well-funded grant programs would decrease our energy independence. While the ABC is intrigued by the technology-neutral reverse auction concept proposed by Rep. Nunes, we remain concerned about shifting to an incentive structure where the trust fund is subject to appropriations. The annual appropriations process gives investors little certainty, and it would be a step backwards to eliminate existing tax incentives without an adequate replacement policy. It is also our understanding that the reverse auction would only apply to electricity production and so would not provide any incentive to the deployment of biogas as a fuel.

#### Recycling tech makes it cost competitive

**Thran 12**—Head of department Bioenergy Systems, DBFZ

(Daniela, “Focus on Biomethane”, <http://www.greengasgrids.eu/sites/default/files/files/fh_biomethane_engl_2.pdf>, dml)

In a project sponsored by the German Federal Ministry of the Environment, Alantum Europe GmbH together with the Fraunhofer Institutes for Ceramic Technologies and Systems (Institut für Keramische Technologien und Systeme – IKTS) and Manufacturing Technology and Advanced Materials (“Institut für Fertigungstechnik und Angewandte Materialforschung” – IFAM), and Lehmann Maschinenbau GmbH, is working on a regenerable filter system. The substrate used is porous metal alloy foam, which – like the previous used wood chippings and pellets – is coated with iron oxide. Due to the higher loads with the sorbent, the metal foam based filters can be designed to be smaller and yet have the same cleaning efficiency. In addition, due to the larger surface area compared to wood pellets, the operating period before regeneration is expected to be up to 4 times longer, as the loading with elementary sulphur takes a longer time. The elementary sulphur left on the foam surface by the regeneration reduces the active surface area. The required purity is no longer guaranteed above a critical sulphur load and the filter element must be replaced. In this case, the technologies used to date (activated carbon, zinc oxide and wood pellets) only provide for disposal of the filter elements on land fill sites. The aim is to remove this disadvantage using technology with which the sulphur is removed from the foam surface, either thermally or chemically, without having a negative effect on the filter system (in particular, causing deactivation of the sorbent or permanent damage to the foam). The removed sulphur is collected and, for example, is returned to the economic cycle as fertiliser. After use, the filter does not have to be disposed of on a landfill site, but instead its components are returned to the material cycle using existing recycling concepts (e.g. melting them down). These advantages reduce the costs per kilogram of sulphur removed from 16 to 20 euros to date to around 10 euros. This definitely contributes to reducing the price of biogas, until now relatively high compared to natural gas.

#### Federal incentives are key

**NYT 9**—the New York Times

(“Producers Optimistic About Biogas Bill Aimed at Farmers”, http://greeninc.blogs.nytimes.com/2009/01/30/farmers-optimistic-about-biogas-bill/, dml)

Experts say such fiscal enticements **from the federal government** are needed for biogas to become a commercially viable alternative to natural gas. As of 2008, there were 121 biogas recovery systems in the United States generating about 256,000 megawatt hours of power, according to AgSTAR. But the agency found that biogas systems were technically feasible at about 7,000 existing dairy and swine operations, with a potential of producing up to six million megawatt hours of energy annually (PDF). “Existing incentives for biogas have been very weak compared to other renewables,” observed Brent Gloy, an associate professor at Cornell University’s Department of Applied Economics and Management. Mr. Gloy said the proposed legislation was “a real step in the right direction that could really get the industry going.”

#### California has huge potential

**Krich et al 5**—Research Manager for ABC

(Ken, with Don Augenstein, JP Batmale, John Benemann, Brad Rutledge, and Dara Salour, “Biomethane from Dairy Waste”, <http://www.americanbiogascouncil.org/pdf/biomethaneFromDairyWaste.pdf>, dml)



Based on the information presented in Table 1-3, we estimate that California dairies have a methane production potential of about 40 million cubic feet per day (ft3 /d) or 14.6 billion cubic feet per year (ft3 /y). Using the early 2005 delivered price of natural gas (about $10.00 per thousand cubic feet), this is equivalent to over $146 million per year in energy costs.1 In terms of electricity output, this corresponds to over 1.2 million megawatt-hours (MWh) of energy or about 140 MW of electricity (MWe). As new technologies are tried and proven the methane yield and electrical production per cow is likely to increase.