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### Prices

#### Winter is coming and so are high price spikes

**Shmuel, 9/17** (John Shmuel, Financial Post, 17 September 2012, “Natural gas could spike to US$4 this winter, says analyst,” http://business.financialpost.com/2012/09/17/natural-gas-could-spike-to-us4-this-winter-says-analyst/)//CC

If you like cheap natural gas, then you probably won’t be too thrilled with one analyst’s new forecast, which sees natural gas prices spiking this winter. Natural gas futures are currently trading at their lowest prices in more than a decade. Prices for natural gas are hovering at US$2.87 MMBTU (million British Thermal Units), which represents an 80% retreat from the peak prices touched in 2005. But Cannacord Genuity analyst John Gerdes said that a surge in demand by gas-fired power plants has led to a notable decline in storage reserves, and that has the potential to drive prices higher this winter. “In a sub-$3 gas price environment, gas-fired power generation served as the corrective mechanism to reduce the storage surplus,” he said in a note to clients. Surprisingly, natural gas continues to remain cheap even as winter approaches, when demand typically surges due to increased heating demands. One of the main factors behind slumping prices has been a glut of supply that has flooded the North American market in the last few years, driven by the development of unconventional natural gas deposits, such as those found in shale rock. But Mr. Gerdes said that if winter weather this year is in line with the 15-year average, then the smaller-than-expected gas reserves, combined with heating demand in winter, should push prices up to US$4. If the declining storage trend continues, Mr. Gerdes said that supply could decline to levels last seen in the winter of 2008, when natural gas prices were at US$7.

#### It’ll be quick and massive

Finger, 7/27 Forbes contributor (Richard Finger, Forbes, 27 July 2012, “Natural Gas Is Heading Higher: More Data,” http://www.forbes.com/sites/richardfinger/2012/07/27/more-data-natural-gas-is-heading-higher/)//CC

So when, not if, gas reaches $5.00 undoubtedly many drilled wells will be completed. COP and others will resume production on many of its shut in gas wells. Additionally, there will be some switching out of gas back into coal by power providers. Is all this enough to increase the supply to offset the super rapidly declining existing shale wells? Initially, I don’t think so. The market is getting stretched beyond a point of no return. An aircraft carrier cannot turn on a dime. It’s not even August and we have just seen the first mini supply panic. Gas prices are still perched only around the $3 mcf level. Rig counts for now remain low. So while the market is trying to get to the magic profitable $5 mcf gas, daily production will continue to decline and inevitably as below normal weekly storage injections mount up, the rubber band will get stretched to breaking point. Then one calm morning a catalyst will come. A hurricane, planned turnaround maintenance shutting down nuclear power plants, or in a few weeks when the report comes that gas storage has crossed below 1 and 5 year averages…. and what a about possible a cold winter. The slingshot effect will be sudden and powerful. It always is. Markets don’t adjust peacefully. Lock in your gas contracts now. I recently extended my home electricity contract by two years. Prices inexorably go lower than they should and higher than they should. This phase of the cycle is upon us. $8.00 gas is coming, so prepare.

#### Low prices give US manufacturing an edge – increasing domestic production key

Karen Boman (Writer for Downstream Today, a petrochemicals news agency) March 2012 “Panel: Low Natural Gas Prices Give US Manufacturers Edge” http://www.downstreamtoday.com/news/article.aspx?a\_id=35687&AspxAutoDetectCookieSupport=1

Low U.S. natural gas prices currently give the U.S. manufacturing sector a slight competitive cost edge that could enable the country to create the 20 million jobs in the next decade. Now, the biggest challenge facing the U.S. is not screwing up this opportunity, according to a panel of industry officials speaking at IHS CERAWeek in Houston on Tuesday. The U.S. unconventional resource boom, which has resulted in the creation of thousands of jobs associated with Pennsylvania’s Marcellus shale, has the potential to create more jobs as oil and gas producers begin scratching the surface on plays such as the Utica. Royalties generated from oil and gas production also could allow the U.S. to dig itself out of its financial hole, said Karen Harbert, president of the Institute for 21st Century Energy. However, the nation’s lack of comprehensive regulatory, tort and tax policies are still hurdles in the development of new energy projects, which in turn impacts the availability of fuel suppliers for the U.S. manufacturing base. “We have a regulatory environment that makes it easier to go to Nigeria than Nebraska,” said Harbert, noting that U.S. oil and gas production has increased only because of increase production from private and state lands, while restrictive federal policies have resulted in declines in oil and gas production from federally-held lands. While industry understands the need for health, safety and environmental regulations, the government should play the role as a facilitator of job development and work with businesses to achieve goals, rather than taking an adversarial posture with politicized decisions, said Jay Timmons, president and CEO of the National Association of Manufacturers (NAM). “We’re all guilty of the fact that we don’t understand the true cost of importing energy from foreign sources,” said Scott Angelle, secretary of Louisiana’s Department of Natural Resources. The high natural gas prices seen in 2008 prompted a number of petrochemical plant closures and layoffs in Louisiana, leading some state officials to believe the state’s petrochemical industry would never be the same, said Scott Angelle. That situation reversed itself in 2011 after the U.S. shale boom unlocked significant new gas resources. As a result, petrochemical companies such as Dow planning to open new plants or expand existing facilities. South Africa-based Sasol also unveiled plans last year to open a gas-to-liquids (GTL) facility in southwestern Louisiana. Angelle commented that GTL technology could be a real gamechanger in Louisiana’s petrochemical industry. Union Pacific Railroad also met with state officials to seek to invest $200 million in new rail capacity in Louisiana to meet industrial demand. “When railroads want to spend, you make it happen,” said Angelle. The abundance of natural gas in the U.S. has led to discussions of increasing gas use within the country, either through more gas-fired power generation or implementing gas-powered vehicles in the U.S. long haul fleet. However, new pipeline and other infrastructure will be needed to allow for more gas consumption. Efforts by the U.S. government to distort the market to increase gas consumption should also be avoided, said Harbert. Timmons did praise the White House’s efforts to offer job more job training. Educating skilled workers to fill U.S. manufacturing jobs poses another challenge for the sector, said Timmons, who noted than five percent of manufacturing jobs, or 600,000 positions, can’t be filled due to lack of skilled labor. NAM and the federal government have partnered to offer manufacturing job training programs at community colleges around the country. The skills that students learn through these programs are transferable between states, allowing students flexibility in what region of the country they go to work. The manufacturing industry has perception problem that the oil and gas industry has faced in attracting younger workers – that it’s old school and not as advanced technologically as other industries, said Jay Timmons. However, the reality is that today’s manufacturing industry “is not your grandfather’s manufacturing industry,” Timmons noted. “It’s new, it’s innovative,” Timmons said. “I would even venture to say it’s sexy.”

#### This locks in a manufacturing renaissance – draws companies back to the US

Jim Motavalli (Staff Writer for the New York Times specializing in Environmental journalism) April 2012 “Natural Gas Signals a ‘Manufacturing Renaissance’” <http://www.nytimes.com/2012/04/11/business/energy-environment/wider-availability-expands-uses-for-natural-gas.html?_r=1&pagewanted=all>

The rapid development of shale gas technology has helped reduce energy imports and, in some cases, encouraged companies producing petrochemicals, steel, fertilizers and other products to return to the United States after relocating overseas. Natural gas exports are growing and terminals built to hold imported supplies are being repurposed for international sales. The American petrochemical industry, for example, uses natural gas as both its primary raw material, in the form of liquid ethane, and as an energy fuel. And cheaper prices have led to a major expansion of capacity in the United States. The hydrocarbon molecules in natural gas are split apart and then recombined as building blocks for many products, including bulk chemicals and fertilizers. The chemical ethylene, which is largely derived from natural gas, is used to make things like pool liners, building insulation and food packaging. According to Kevin Swift, chief economist at the American Chemistry Council, European producers mostly use oil-derived raw materials for making these same products. “The U.S. has a competitive advantage when oil is seven times as expensive as natural gas, but now we have more like a 50-to-1 advantage,” he said. “The ‘shale gale’ is really driving this. A million B.T.U.’s of natural gas that might cost $11 in Europe and $14 in South Korea is $2.25 in the U.S. Partly because of that, chemical producers have plans to expand ethylene capacity in the U.S. by more than 25 percent between now and 2017.” A 2011 PricewaterhouseCoopers study estimates that high rates of shale gas recovery could result in a million new manufacturing jobs by 2025. Robert McCutcheon, United States industrial products leader at PricewaterhouseCoopers, said in a statement that the revived natural gas industry “has the potential to spark a manufacturing renaissance in the U.S., including billions in cost savings, a significant number of new jobs and a greater investment in U.S. plants.”

#### Economic shocks are inevitable – strong domestic manufacturing is key to economic resilience and retaining our innovation leadership

Michael Ettlinger (the Vice President for Economic Policy at the Center for American Progress, former director of the Economic Analysis and Research Network of the Economic Policy Institute) and Kate Gordon (the Vice President for Energy Policy at the Center for American Progress. Most recently, Kate was the co-director of the national Apollo Alliance, where she still serves as senior policy advisor. Former senior associate at the Center on Wisconsin Strategy) April 2011 “The Importance and Promise of American Manufacturing” <http://www.americanprogress.org/issues/2011/04/pdf/manufacturing.pdf>

Manufacturing is critically important to the American economy. For generations, the strength of our country rested on the power of our factory floors—both the machines and the men and women who worked them. We need manufacturing to continue to be a bedrock of strength for generations to come. Manufacturing is woven into the structure of our economy: Its importance goes far beyond what happens behind the factory gates. The strength or weakness of American manufacturing carries implications for the entire economy, our national security, and the well-being of all Americans. Manufacturing today accounts for 12 percent of the U.S. economy and about 11 percent of the private-sector workforce. But its significance is even greater than these numbers would suggest. The direct impact of manufacturing is only a part of the picture. First, jobs in the manufacturing sector are good middle-class jobs for millions of Americans. Those jobs serve an important role, offering economic opportunity to hard-working, middle-skill workers. This creates upward mobility and broadens and strengthens the middle class to the benefit of the entire economy. What’s more, U.S.-based manufacturing underpins a broad range of jobs that are quite different from the usual image of manufacturing. These are higher-skill service jobs that include the accountants, bankers, and lawyers that are associated with any industry, as well as a broad range of other jobs including basic research and technology development, product and process engineering and design, operations and maintenance, transportation, testing, and lab work. Many of these jobs are critical to American technology and innovation leadership. The problem today is this: Many multinational corporations may for a period keep these higher-skill jobs here at home while they move basic manufacturing elsewhere in response to other countries’ subsidies, the search for cheaper labor costs, and the desire for more direct access to overseas markets, but eventually many of these service jobs will follow. When the basic manufacturing leaves, the feedback loop from the manufacturing floor to the rest of a manufacturing operation—a critical element in the innovative process—is eventually broken. To maintain that feedback loop, companies need to move higher-skill jobs to where they do their manufacturing. And with those jobs goes American leadership in technology and innovation. This is why having a critical mass of both manufacturing and associated service jobs in the United States matters. The “industrial commons” that comes from the crossfertilization and engagement of a community of experts in industry, academia, and government is vital to our nation’s economic competitiveness. Manufacturing also is important for the nation’s economic stability. The experience of the Great Recession exemplifies this point. Although manufacturing plunged in 2008 and early 2009 along with the rest of the economy, it is on the rebound today while other key economic sectors, such as construction, still languish. Diversity in the economy is important—and manufacturing is a particularly important part of the mix. Although manufacturing is certainly affected by broader economic events, the sector’s internal diversity—supplying consumer goods as well as industrial goods, serving both domestic and external markets— gives it great potential resiliency. Finally, supplying our own needs through a strong domestic manufacturing sector protects us from international economic and political disruptions. This is most obviously important in the realm of national security, even narrowly defined as matters related to military strength, where the risk of a weak manufacturing capability is obvious. But overreliance on imports and substantial manufacturing trade deficits weaken us in many ways, making us vulnerable to everything from exchange rate fluctuations to trade embargoes to natural disasters.

#### Otherwise a complete collapse in domestic R&D is inevitable

Lind and Freedman 12 – Michael Lind (policy director of New America’s Economic Growth Program and a co-founder of the New America Foundation) and Joshua Freedman (program associate in New America’s Economic Growth Program) April 2012 “Value Added: America’s Manufacturing Future” [http://growth.newamerica.net/sites/newamerica.net/files/policydocs/Lind,%20Michael%20and%20Freedman,%20Joshua%20-%20NAF%20-%20Value%20Added%20America%27s%20Manufacturing%20Future.pdf](http://growth.newamerica.net/sites/newamerica.net/files/policydocs/Lind%2C%20Michael%20and%20Freedman%2C%20Joshua%20-%20NAF%20-%20Value%20Added%20America%27s%20Manufacturing%20Future.pdf)

Manufacturing, R&D and the U.S. Innovation Ecosystem Perhaps the greatest contribution of manufacturing to the U.S. economy as a whole involves the disproportionate role of the manufacturing sector in R&D. The expansion in the global market for high-value-added services has allowed the U.S. to play to its strengths by expanding its trade surplus in services, many of them linked to manufacturing, including R&D, engineering, software production and finance. Of these services, by far the most important is R&D. The United States has long led the world in R&D. In 1981, U.S. gross domestic expenditure on R&D was more than three times as large as that of any other country in the world. And the U.S. still leads: in 2009, the most recent year for which there is available data, the United States spent more than 400 billion dollars. European countries spent just under 300 billion dollars combined, while China spent about 150 billion dollars.14 In the United States, private sector manufacturing is the largest source of R&D. The private sector itself accounts for 71 percent of total R&D in the United States, and although U.S. manufacturing accounts for only 11.7 percent of GDP in 2012, the manufacturing sector accounts for 70 percent of all R&D spending by the private sector in the U.S.15 And R&D and innovation are inextricably connected: a National Science Foundation survey found that 22 percent of manufacturers had introduced product innovations and the same percentage introduced process innovations in the period 2006-2008, while only 8 percent of nonmanufacturers reported innovations of either kind.16 Even as the manufacturing industry in the United States underwent major changes and suffered severe job losses during the last decade, R&D spending continued to follow a general upward growth path. A disproportionate share of workers involved in R&D are employed directly or indirectly by manufacturing companies; for example, the US manufacturing sector employs more than a third of U.S. engineers.17 This means that manufacturing provides much of the demand for the U.S. innovation ecosystem, supporting large numbers of scientists and engineers who might not find employment if R&D were offshored along with production.

#### Economic decline causes war – strong statistical support

Royal 10 – Jedediah Royal, Director of Cooperative Threat Reduction at the U.S. Department of Defense, 2010, “Economic Integration, Economic Signaling and the Problem of Economic Crises,” in Economics of War and Peace: Economic, Legal and Political Perspectives, ed. Goldsmith and Brauer, p. 213-214

Less intuitive is how periods of economic decline may increase the likelihood of external conflict. Political science literature has contributed a moderate degree of attention to the impact of economic decline and the security and defence behaviour of interdependent states. Research in this vein has been considered at systemic, dyadic and national levels. Several notable contributions follow. First, on the systemic level, Pollins (2008) advances Modelski and Thompson's (1996) work on leadership cycle theory, finding that rhythms in the global economy are associated with the rise and fall of a pre-eminent power and the often bloody transition from one pre-eminent leader to the next. As such, exogenous shocks such as economic crises could usher in a redistribution of relative power (see also Gilpin. 1981) that leads to uncertainty about power balances, increasing the risk of miscalculation (Feaver, 1995). Alternatively, even a relatively certain redistribution of power could lead to a permissive environment for conflict as a rising power may seek to challenge a declining power (Werner. 1999). Separately, Pollins (1996) also shows that global economic cycles combined with parallel leadership cycles impact the likelihood of conflict among major, medium and small powers, although he suggests that the causes and connections between global economic conditions and security conditions remain unknown. Second, on a dyadic level, Copeland's (1996, 2000) theory of trade expectations suggests that 'future expectation of trade' is a significant variable in understanding economic conditions and security behaviour of states. He argues that interdependent states are likely to gain pacific benefits from trade so long as they have an optimistic view of future trade relations. However, if the expectations of future trade decline, particularly for difficult to replace items such as energy resources, the likelihood for conflict increases, as states will be inclined to use force to gain access to those resources. Crises could potentially be the trigger for decreased trade expectations either on its own or because it triggers protectionist moves by interdependent states.4 Third, others have considered the link between economic decline and external armed conflict at a national level. Blomberg and Hess (2002) find a strong correlation between internal conflict and external conflict, particularly during periods of economic downturn. They write: The linkages between internal and external conflict and prosperity are strong and mutually reinforcing. Economic conflict tends to spawn internal conflict, which in turn returns the favour. Moreover, the presence of a recession tends to amplify the extent to which international and external conflicts self-reinforce each other. (Blomberg & Hess, 2002. p. 89) Economic decline has also been linked with an increase in the likelihood of terrorism (Blomberg, Hess, & Weerapana, 2004), which has the capacity to spill across borders and lead to external tensions. Furthermore, crises generally reduce the popularity of a sitting government. "Diversionary theory" suggests that, when facing unpopularity arising from economic decline, sitting governments have increased incentives to fabricate external military conflicts to create a 'rally around the flag' effect. Wang (1996), DeRouen (1995). and Blomberg, Hess, and Thacker (2006) find supporting evidence showing that economic decline and use of force are at least indirectly correlated. Gelpi (1997), Miller (1999), and Kisangani and Pickering (2009) suggest that the tendency towards diversionary tactics are greater for democratic states than autocratic states, due to the fact that democratic leaders are generally more susceptible to being removed from office due to lack of domestic support. DeRouen (2000) has provided evidence showing that periods of weak economic performance in the United States, and thus weak Presidential popularity, are statistically linked to an increase in the use of force. In summary, recent economic scholarship positively correlates economic integration with an increase in the frequency of economic crises, whereas political science scholarship links economic decline with external conflict at systemic, dyadic and national levels.5 This implied connection between integration, crises and armed conflict has not featured prominently in the economic-security debate and deserves more attention.

#### Manufacturing key to overall military superiority and deterrence

Mackenzie Eaglen et al (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) January 2012 “The Arsenal of Democracy and How to Preserve It: Key Issues in Defense Industrial Policy

Yet there are severe challenges that could result to the nation’s security interests even with 10 percent cutbacks. Despite the likely potential of lesser resources, the demand side of the equation does not seem likely to grow easier. The international security environment is challenging and complex. China’s economic, political and now military rise continues. Its direction is uncertain, but it has already raised tension, especially in the South China Sea. Iran’s ambitions and machinations remain foreboding, with its nuclear plans entering a new phase of both capability but also crisis. North Korea is all the more uncertain with a leadership transition, but has a history of brinkmanship and indeed even the occasional use of force against the South, not to mention nuclear weapons-related activities that raise deep concern. And the hopeful series of revolutions in the broader Arab world in 2011, while inspiring at many levels, also seem likely to raise uncertainty in the broader Middle East. Revolutions are inherently unpredictable and often messy geostrategic events. On top of these remain commitments in Afghanistan and beyond and the frequent U.S. military role in humanitarian disaster relief. Thus, there are broad challenges for American defense planners as they try to address this challenging world with fewer available resources. 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. While procurement budgets have finally, in recent years, reached their historic norms as a percent of the overall defense budget, the legacy of the 1990s procurement “holiday” remains real. In that period, the United States as a matter of policy bought much less equipment than it would normally, enjoying the fruits of the 1980s buildup as it sought to reduce defense spending. But Reagan-era weaponry is wearing out, and the recent increase in procurement spending has not lasted long enough to replenish the nation’s key weapons arsenals with new weaponry. The last decade of procurement policy focused more on filling certain gaps in counterinsurgency capabilities than replacing the mainline weapons programs that make up the bulk of conventional capabilities. Meanwhile, the main elements of DoD’s weapons inventories—fighter jets, armored vehicles, surface vessels and submarines—continue to age. We often say that, in today’s American armed forces, people are our most cherished commodity and greatest asset. That is certainly true at one level, through the dedication and excellence shown by our brave men and women in uniform. But it is also true that adjusting the personnel size of the military up or down has been done with success multiple times, and seems likely to happen again. By contrast, scientific and manufacturing excellence in the defense space is not something easily moved up and down. Today’s industrial capabilities took decades to build and would be hard to restore if lost (Great Britain’s difficulty restoring its ability to build nuclear submarines is a frequently cited example.). Unlike the period just after the Cold War, there are no obvious surpluses of defense firms, such that a natural paring process will find the fittest firms and ensure their survival. While there are roughly five major firms, there are often just one or two suppliers in any given major area of defense technology. Similar challenges exist within the subcontractor community, which has become highly specialized, with certain key components or capabilities similarly reflecting monopolies or oligopolies, or being acquired by the primes in a way that risks future competition. The defense economy is also experiencing meta-changes in everything from shifts in traditional sectors, such as the move from manned to unmanned planes, to new sectors arising like cybersesecurity, to a broader move from the exclusive production of goods to the growing provision of defense services. Such issues in the defense economy also touch on broader areas of national economic and geopolitical competitiveness. Top class American firms rely on top class scientists and engineers. At present, the United States ranks in the lower half of industrial countries for the average math and science scores of its public school students and graduates just a fraction as many scientists and engineers a year from university-level studies as does either China or India. These trends should not be overstated; the quality of American scientists and engineers remains world class. But the trends still pose deep worries in the American defense industrial field as its looks towards the future of its work force, which is aging rapidly in numerous sectors. Not only then are the U.S. military services, but also American defense industry at a crossroads. Normally, defense policy decisions in times of retrenchment begin with strategy, threats, missions, and force structure and only address defense industrial issues as an afterthought. In past days of flush budgets and numerous duplicative suppliers, this approach may have made sense. It makes sense no longer. Careless defense reductions or poor planning won’t just cost jobs or competitiveness, but could actually result in lost American military industrial capability in core areas. The Department of Defense has recently made some encouraging moves towards emphasizing the role of the industrial base in its strategic and budgetary planning. The 2010 Quadrennial Defense Review examined the subject, for example, and Secretary Panetta and his deputies have convened several meetings in recent months with industry leaders to discuss their concerns. But industrial base considerations remain little discussed outside the specialist community and too frequently take a short term or single interest approach, such as asking a candidate to weigh in on an individual product or firm. Rather, it is the overall state of the field and its future that should be of concern to all, regardless of where they stand on the political spectrum. Thus, as presidential candidates and other national leaders develop their platforms for the 2012 elections and beyond, any serious discussion of national security and the current state and future of the military must also give direct attention to matters of the American national security scientific and industrial base. This discussion should be direct and forthright, recognizing the context of severe budgetary dilemmas for the nation, the success and challenges of the defense economy, changing military demands, and the gradual erosion of American manufacturing in many sectors over the last several decades. Among the core questions for candidates to develop their policy answers around are: 4 1. Are there any sectors within American defense industry or types of technologies for the Department of Defense that should be prioritized? If this is the case, what should be prioritized and what are the areas that are not quite as important as others—or even over resourced at present? 2. The Department of Defense is likely to reduce the size of the nation’s ground forces considerably in the years ahead, as the war in Afghanistan gradually winds down. Does this imply prioritizing investment in Air-Sea battle capabilities at the expense of ground force capability, or should the United States try to do all with less? 3. Do the Pentagon and Congress have enough tools for evaluating the strength of the nation’s industrial base and its access to key raw materials and technologies? If not, what should be done to give this subject greater scrutiny and sustained attention? 4. Should the Department of Defense move to more fixed-price contracts in its procurement policies? Should private companies be allowed to compete for a higher share of maintenance contracts, even if that means downsizing government depots? 5. Is the Pentagon’s increased focus on enlarging its acquisition oversight workforce making the acquisition process more innovative, economical, and efficient or more burdensome and bureaucratic? 6. Are there tools of export and trade policy that need to be adjusted to strengthen the U.S. defense industrial base? If so, what? Is the FMS program basically sound? Does the consolidation of export control lists within Commerce bode well or are other steps needed? 7. Are there certain allies from which the United States should be willing to import more defense technology, especially if the improved trade opportunities are reciprocated? Should we explore pooling and joint production options with our close allies, along the lines of what Britain and France have recently launched? 8. How should the nation strengthen STEM education in the United States, in high schools and colleges, to encourage more Americans to pursue careers in science, technology, engineering, and math? Does the nation need to revise any of its immigration and green-card policies to increase the ability of foreign scientists to remain in this country after studying here and contribute to its scientific and industrial strength? 9. Do government regulations and requirements deter new and innovative firms from entering the defense market to the detriment of the nation’s military? If so, what should be done to induce their entry? 10. Are there any other policy interventions that might be needed to ensure American military technological preeminence in the years ahead? A certain floor under R&D budgets? Targeted sustainment funding for specific capabilities such as independent weapons design teams at numerous firms? Greater DoD contributions to research and prototyping by defense firms? The United States, and its civilian leaders, cannot afford to avoid the hard questions that now come with maintaining a strong successful military, a top flight defense industrial base, and a fiscally sound national economy. Our defense industrial base is certainly not broken, but there are clear, unavoidable challenges that loom, which might undercut broader national security, and the looming big budget cutbacks raise the stakes and heighten the sense of urgency in addressing the issue. In sum, the arsenal of democracy that arms the best military in the world, took decades to build. If allowed to atrophy, it would take decades to rebuild. Those who would seek to lead the U.S. armed forces must answer the key questions to ensure these capabilities are not lost in a matter of years.

#### Independently de-escalates conflict and deters balancing

Mark Zachary Taylor (Ph.D. candidate, lecturer, and research assistant in the Department of Political Science at Massachusetts Institute of Technology) 2004 “The Politics of Technological Change: International Relations versus Domestic Institutions” http://web.mit.edu/polisci/research/wip/Taylor.pdf

Technological innovation is of central importance to the study of international relations (IR), affecting almost every aspect of the sub-field.2 First and foremost, a nation’s technological capability has a significant effect on its economic growth, industrial might, and military prowess; therefore relative national technological capabilities necessarily influence the balance of power between states, and hence have a role in calculations of war and alliance formation. Second, technology and innovative capacity also determine a nation’s trade profile, affecting which products it will import and export, as well as where multinational corporations will base their production facilities.3 Third, insofar as innovation-driven economic growth both attracts investment and produces surplus capital, a nation’s technological ability will also affect international financial flows and who has power over them.4 Thus, in broad theoretical terms, technological change is important to the study of IR because of its overall implications for both the relative and absolute power of states. And if theory alone does not convince, then history also tells us that nations on the technological ascent generally experience a corresponding and dramatic change in their global stature and influence, such as Britain during the first industrial revolution, the United States and Germany during the second industrial revolution, and Japan during the twentieth century.5 Conversely, great powers which fail to maintain their place at the technological frontier generally drift and fade from influence on international scene.6 This is not to suggest that technological innovation alone determines international politics, but rather that shifts in both relative and absolute technological capability have a major impact on international relations, and therefore need to be better understood by IR scholars indirect source of military doctrine. And for some, like Gilpin quoted above, technology is the very cornerstone of great power domination, and its transfer the main vehicle by which war and change occur in world politics.8 Jervis tells us that the balance of offensive and defensive military technology affects the incentives for war.9 Walt agrees, arguing that technological change can alter a state’s aggregate power, and thereby affect both alliance formation and the international balance of threats.10 Liberals are less directly concerned with technological change, but they must admit that by raising or lowering the costs of using force, technological progress affects the rational attractiveness of international cooperation and regimes.11 Technology also lowers information & transactions costs and thus increases the applicability of international institutions, a cornerstone of Liberal IR theory.12 And in fostering flows of trade, finance, and information, technological change can lead to Keohane’s interdependence13 or Thomas Friedman et al’s globalization.14 Meanwhile, over at the “third debate”, Constructivists cover the causal spectrum on the issue, from Katzenstein’s “cultural norms” which shape security concerns and thereby affect technological innovation;15 to Wendt’s “stripped down technological determinism” in which technology inevitably drives nations to form a world state.16 However most Constructivists seem to favor Wendt, arguing that new technology changes people’s identities within society, and sometimes even creates new cross-national constituencies, thereby affecting international politics.17 Of course, Marxists tend to see technology as determining all social relations and the entire course of history, though they describe mankind’s major fault lines as running between economic classes rather than nation-states.18 Finally, Buzan & Little remind us that without advances in the technologies of transportation, communication, production, and war, international systems would not exist in the first place.19

#### Prefer our internal links – explains the last five centuries of global hegemons

Daniel Drezner (professor of international politics at The Fletcher School of Law and Diplomacy at Tufts University) 2001 “State structure, technological leadership and the maintenance of hegemony” http://www.danieldrezner.com/research/tech.pdf

In this decade, proponents of globalization argue that because information and capital are mobile, the location of innovation has been rendered unimportant.6 While this notion has some popular appeal, the globalization thesis lacks theoretical or empirical support. Theoretically, even in a world of perfect information and perfect capital mobility, economists have shown that the location of technological innovation matters.7 Empirically, the claims of globalization proponents have been far-fetched. Capital is not perfectly mobile, and increased economic exchange does not lead to a seamless transfer of technology from one country to another.8 The location of innovation still matters. Long-cycle theorists have paid the most attention to the link between technological innovation, economic growth, and the rise and fall of hegemons.9 They argue that the past five hundred years of the global political economy can be explained by the waxing and waning of hegemonic powers. Countries acquire hegemonic status because they are the first to develop a cluster of technologies in leading sectors. These innovations generate spillover effects to the rest of the lead economy, and then to the global economy. Over time, these ‘technological hegemons’ fail to maintain the rate of innovations, leading to a period of strife until a new hegemonic power is found.

**Decline causes every scenario for extinction
Brzezinski, 12** [1/24/12, Zbigniew, Former National Security Advisor to President of the Great United States Jimmy Carter, Professor of American Foreign Policyat [Johns Hopkins University](http://en.wikipedia.org/wiki/Johns_Hopkins_University)'s [School of Advanced International Studies](http://en.wikipedia.org/wiki/Johns_Hopkins_SAIS), scholar at the Center for Strategic and International Studies, Strategic Vision: America and the Crisis of Global Power (Kindle Locations 1476-1485). Perseus Books Group. Kindle Edition]

An American decline would impact the nuclear domain most profoundly by inciting a **crisis of confidence** in the credibility of the American nuclear umbrella. Countries like South Korea, Taiwan, Japan, Turkey, and even Israel, among others, rely on the United States’ extended nuclear deterrence for security. If they were to see the United States slowly retreat from certain regions, forced by circumstances to pull back its guarantees, or even if they were to lose confidence in standing US guarantees, because of the financial, political, military, and diplomatic consequences of an American decline, then they will have to seek security elsewhere. That “elsewhere” security could originate from only two sources: from nuclear weapons of one’s own or from the extended deterrence of another power—most likely Russia, China, or India. It is possible that countries that feel threatened by the ambition of existing nuclear weapon states, the addition of new nuclear weapon states, or the decline in the reliability of American power would develop their own nuclear capabilities. For crypto-nuclear powers like Germany and Japan, the path to nuclear weapons would be easy and fairly quick, given their extensive civilian nuclear industry, their financial success, and their technological acumen. Furthermore, the continued existence of nuclear weapons in North Korea and the potentiality of a nuclear-capable Iran could prompt American allies in the Persian Gulf or East Asia to build their own nuclear deterrents. Given North Korea’s increasingly aggressive and erratic behavior, the failure of the six-party talks, and the widely held distrust of Iran’s megalomaniacal leadership, the guarantees offered by a declining America’s nuclear umbrella might not stave off a regional nuclear arms race among smaller powers. Last but not least, even though China and India today maintain a responsible nuclear posture of minimal deterrence and “no first use,” the uncertainty of an increasingly nuclear world could force both states to reevaluate and escalate their nuclear posture. Indeed, they as well as Russia might even become inclined to extend nuclear assurances to their respective client states. Not only could this signal a renewed regional nuclear arms race between these three aspiring powers but it could also create new and antagonistic **spheres of influence** in Eurasia driven by competitive nuclear deterrence. The decline of the United States would thus precipitate drastic changes to the nuclear domain. An increase in proliferation among insecure American allies and/or an arms race between the emerging Asian powers are among the more likely outcomes. This ripple effect of proliferation would undermine the transparent management of the nuclear domain and increase the likelihood of **interstate rivalry, miscalc**ulation, and eventually even perhaps of international **nuclear terror**. In addition to the foregoing, in the course of this century the world will face a series of novel geopolitical challenges brought about by significant changes in the physical environment. The management of those changing environmental commons—the growing scarcity of fresh water, the opening of the Arctic, and global warming—will require global consensus and mutual sacrifice. American leadership alone is not enough to secure cooperation on all these issues, but a decline in American influence would reduce the likelihood of achieving cooperative agreements on environmental and resource management. America’s retirement from its role of global policeman could create greater opportunities for emerging powers to further exploit the environmental commons for their own economic gain, **increasing the chances of resource-driven conflict**, particularly in Asia. The latter is likely to be the case especially in regard to the increasingly scarce water resources in many countries. According to the United States Agency for International Development (USAID), by 2025 more than 2.8 billion people will be living in either water-scarce or water-stressed regions, as global demand for

water will double every twenty years.9 While much of the Southern Hemisphere is threatened by potential water scarcity, interstate conflicts—the geopolitical consequences of cross-border water scarcity—are most likely to occur in Central and South Asia, the Middle East, and northeastern Africa, regions where limited water resources are shared across borders and political stability is transient. The combination of political insecurity and resource scarcity is a menacing geopolitical combination. The threat of water conflicts is likely to intensify as the economic growth and increasing demand for water in emerging powers like Turkey and India collides with instability and resource scarcity in rival countries like Iraq and Pakistan. Water scarcity will also test China’s internal stability as its burgeoning population and growing industrial complex combine to increase demand for and decrease supply of usable water. In South Asia, the never-ending political tension between India and Pakistan combined with overcrowding and Pakistan’s heightening internal crises may put the Indus Water Treaty at risk, especially because the river basin originates in the long-disputed territory of Jammu and Kashmir, an area of ever-increasing political and military volatility. The lingering dispute between India and China over the status of Northeast India, an area through which the vital Brahmaputra River flows, also remains a serious concern. As American hegemony disappears and **regional competition intensifies**, disputes over natural resources like water have the potential to develop into **full-scale conflicts**. The slow thawing of the Arctic will also change the face of the international competition for important resources. With the Arctic becoming increasingly accessible to human endeavor, the five Arctic littoral states—the United States, Canada, Russia, Denmark, and Norway—may rush to lay claim to its bounty of oil, gas, and metals. This run on the Arctic has the potential to cause severe shifts in the geopolitical landscape, particularly to Russia’s advantage. As Vladimir Radyuhin points out in his article entitled “The Arctic’s Strategic Value for Russia,” Russia has the most to gain from access to the Arctic while simultaneously being the target of far north containment by the other four Arctic states, all of which are members of NATO. In many respects this new great game will be determined by who moves first with the most legitimacy, since very few agreements on the Arctic exist. The first Russian supertanker sailed from Europe to Asia via the North Sea in the summer of 2010.10 Russia has an immense amount of land and resource potential in the Arctic. Its territory within the Arctic Circle is 3.1 million square kilometers—around the size of India—and the Arctic accounts for 91% of Russia’s natural gas production, 80% of its explored natural gas reserves, 90% of its offshore hydrocarbon reserves, and a large store of metals.11 Russia is also attempting to increase its claim on the territory by asserting that its continental shelf continues deeper into the Arctic, which could qualify Russia for a 150-mile extension of its Exclusive Economic Zone and add another 1.2 million square kilometers of resource-rich territory. Its first attempt at this extension was denied by the UN Commission on the Continental Shelf, but it is planning to reapply in 2013. Russia considers the Arctic a true extension of its northern border and in a 2008 strategy paper President Medvedev stated that the Arctic would become Russia’s “main strategic resource base” by 2020.12 Despite recent conciliatory summits between Europe and Russia over European security architecture, a large amount of uncertainty and distrust stains the West’s relationship with Russia. The United States itself has always maintained a strong claim on the Arctic and has continued patrolling the area since the end of the Cold War. This was reinforced during the last month of President Bush’s second term when he released a national security directive stipulating that America should “preserve the global mobility of the United States military and civilian vessels and aircraft throughout the Arctic region.” The potentiality of an American decline could embolden Russia to more forcefully assert its control of the Arctic and over Europe via energy politics; though much depends on Russia’s political orientation after the 2012 presidential elections. All five Arctic littoral states will benefit from a peaceful and cooperative agreement on the Arctic—similar to Norway’s and Russia’s 2010 agreement over the Barents Strait—and the geopolitical stability it would provide. Nevertheless, political circumstances could rapidly change in an environment where control over energy remains Russia’s single greatest priority. Global climate change is the final component of the environmental commons and the one with the greatest potential geopolitical impact. Scientists and policy makers alike have projected catastrophic consequences for mankind and the planet if the world average temperature rises by more than two degrees over the next century. Plant and animal **species could grow extinct** at a rapid pace, large-scale **ecosystems** **could** **collapse**, human **migration** could increase to untenable levels, and global **economic development could be** categorically **reversed**. Changes in geography, forced migration, and global economic contraction layered on top of the perennial regional security challenges could create a geopolitical reality of **unmanageable** complexity and **conflict**, especially in the densely populated and politically unstable areas of Asia such as the Northeast and South. Furthermore, any legitimate action inhibiting global climate change will require unprecedented levels of self-sacrifice and international cooperation. The United States does consider climate change a serious concern, but its lack of both long-term strategy and political commitment, evidenced in its refusal to ratify the Kyoto Protocol of 1997 and the repeated defeat of climate-change legislation in Congress, deters other countries from participating in a global agreement. The United States is the second-largest global emitter of carbon dioxide, after China, with 20% of the world’s share. The United States is the number one per capita emitter of carbon dioxide and the global leader in per capita energy demand. Therefore, US leadership is essential in not only getting other countries to cooperate, but also in actually inhibiting climate change. Others around the world, including the European Union and Brazil, have attempted their own domestic reforms on carbon emissions and energy use, and committed themselves to pursuing renewable energy. Even China has made reducing emissions a goal, a fact it refuses to let the United States ignore. But none of those nations currently has the ability to lead a global initiative. President Obama committed the United States to energy and carbon reform at the Copenhagen Summit in 2009, but the increasingly polarized domestic political environment and the truculent American economic recovery are unlikely to inspire progress on costly energy issues. China is also critically important to any discussion of the management of climate change as it produces 21% of the world’s total carbon emissions, a percentage that will only increase as China develops the western regions of its territory and as its citizens experience a growth in their standard of living. China, however, has refused to take on a leadership role in climate change, as it has also done in the maritime, space, and cyberspace domains. China uses its designation as a developing country to shield itself from the demands of global stewardship. China’s tough stance at the 2009 Copenhagen Summit underscores the potential dangers of an American decline: no other country has the capacity and the desire to accept global stewardship over the environmental commons. Only a vigorous Unites States could lead on climate change, given Russia’s dependence on carbon-based energies for economic growth, India’s relatively low emissions rate, and China’s current reluctance to assume global responsibility. The protection and good faith management of the global commons—**sea**, **space**, **cyberspace**, nuclear **prolif**eration, **water** security, **the Arctic**, and **the environment** itself—**are imperative to** the long-term growth of the global economy and **the continuation of** basic geopolitical **stability**. But in almost every case, the potential absence of constructive and influential US leadership would fatally undermine the essential communality of the global commons.     The argument that America’s decline would generate global insecurity, endanger some vulnerable states, produce a more troubled North American neighborhood, and make cooperative management of the global commons more difficult is not an argument for US global supremacy. In fact, the strategic complexities of the world in the twenty-first century—resulting from the rise of a politically self-assertive global population and from the dispersal of global power—make such supremacy unattainable. But in this increasingly complicated geopolitical environment, an America in pursuit of a new, timely strategic vision is crucial to helping the world avoid a dangerous slide into international turmoil.

#### Price spike prompts a broad switch back to coal plants

Reuters 9/12 (9/12/12, “Coal power to drive U.S. emissions higher next year: report,” <http://www.reuters.com/article/2012/09/12/us-usa-coal-emissions-idUSBRE88B1IM20120912>, RBatra)

U.S. fossil fuel emissions will rise 2.8 percent next year as higher costs for natural gas prompt power plant operators to switch to coal, according to a government energy report released on Wednesday. Coal-fired power generation will increase by 9.3 percent next year, the report said, in part because utilities are expected to pay almost 20 percent more for natural gas. Burning coal releases more carbon dioxide gas into the atmosphere than natural gas. Power plants have in recent years been using more natural gas to keep turbines churning, chiefly because an abundance of the fuel has made it more economical than coal. But a spike in the cost of natural gas in recent months will next year prompt more generators to burn coal, which has had more stable prices, said a report from the Energy Information Agency which supplies nonpartisan research. "The recent trend of substituting coal‐fired generation with natural‐gas ... may be slowing and will likely reverse," according to the report. "This is a function of price" said Carol Raulston of the National Mining Association. "Plants that have the capability to switch fuels are doing so." While emissions from petroleum and natural gas should be nearly flat next year, coal emissions will increase by 8.5 percent, the report said.

#### Independently, coal kills clean freshwater and causes acid rain

Bosselman 07 (Fred Bosselman (Professor of Law Emeritus, Chicago-Kent College of Law) 2007 “The new power generation: environmental law and electricity innovation: colloquium article: the ecological advantages of nuclear power”, New York University Environmental Law Journal, lexis)

Virtually all of the coal mined in the United States is used as boiler fuel to generate electricity, 122 and although few users of that electricity realize it, half of the nation's electric energy is provided by coal. 123 In his recent book, Big Coal, Jeff Goodell points out that in the United States, the mining and combustion of coal typically occur in such remote locations that most Americans have no idea "what our relationship with this black rock actually costs us." 124 This is particularly true with regard to public understanding of ecological systems that are being destroyed in remote places or through chains of causation that only experts understand. Coal is ecologically destructive through (1) mining, (2) air pollution, (3) greenhouse gas emissions, and (4) water pollution; and (5) while so-called "clean-coal" technology is a long-range hope, it is not likely to be common in the next decade. 1. Coal Mining Is Destroying Vast Amounts of Natural Landscape Originally, almost all coal mining took place through the construction of a network of shafts underground from which coal would be cut and brought to the surface. Such "underground" mining still takes place in the United States, 125 but each year a [\*26] larger share of the mining is "surface" mining. 126 Both kinds of coal mining have an impact on the landscape both directly and indirectly. Underground mining typically brings to the surface large volumes of minerals, only some of which constitutes usable coal. The residue is known as "gob" or "culm" and residue piles from both existing and abandoned underground mines are common sights in older mining areas. 128 The rain penetrates the piles and leaches out the soluble material, creating sulfuric and other acids, which are supposed to be stored in impoundments on the mine site but often flow directly into local watersheds or potable aquifers, particularly if the mine has been abandoned. 129 This kind of acid mine drainage pollutes streams throughout older mining regions, often turning them bright orange, rendering the water non-potable and uninhabitable by wildlife, and changing the ecological processes on the riparian landscape far beyond the mine site. Underground mining also destroys landscapes through subsidence. If a mine shaft is not properly supported, its roof will collapse, which typically causes the surface of the earth over the mine to subside. In older mines, such subsidence regularly happened only after a mineshaft was abandoned, but many newer mines use a system called "longwall" mining, which makes no attempt to support the roof over the area where coal is removed, resulting in intentional subsidence. Both intentional and unintentional subsidence can change drainage patterns on the surface in ways that may destroy existing ecosystems. Even more directly damaging to the natural landscape is surface mining, which now produces the majority of our coal. 132 The two most prominent examples of surface mining in the United States and the resulting ecological consequences are in the Powder River Valley of Wyoming, and in a section of the Southern Appalachians that includes parts of Virginia, West Virginia, Kentucky, and Tennessee. 133 In both areas, surface mining is used extensively, but the differences in the terrain result in quite different impacts. 134 The Powder River Valley is relatively flat and dry rangeland, supporting cattle and, in the streams, trout. 135 The coal seams in this valley tend to be massive, and the parts that have been mined are relatively close to the surface. 136 The earth overlying the coal, [\*28] known in the trade as "overburden," is blasted with explosives and then removed by massive machines built for the purpose. 137 The scale of the operations is so large that seventeen Wyoming surface mines supply over a third of U.S. coal consumption. 138 Despite the effects from the dust created in these operations, the Environmental Protection Agency (EPA) recently proposed to classify such dust as a non-pollutant. 139 In December 2005, the EPA issued proposed rules that would exempt mining operations in rural areas from dust emission regulations. 140 In the Southern Appalachians, surface mining is taking place in a forested landscape of rolling hills and mountains with relatively moist conditions. 141 The current mining method is known as "mountaintop mining," and involves blasting and scraping off the tops of mountains to obtain access to the coal underneath. In an earlier era, this coal would have been accessed by underground shafts, but today's massive machinery and cheap explosives makes it more economical to remove the mountaintop and use surface mining equipment to take out the coal. 142 The rubble that was once the top of the mountain is simply dumped into a valley adjacent to the mountain, creating what is euphemistically called "valley fill." The result is the destruction [\*29] not only of the ecological characteristics of the mountain itself but also of the adjacent valley. 143 Although this destruction has been widely criticized, it continues to be supported by both federal and state regulating agencies. 144 Although reserves of coal in the United States remain plentiful, the quality and accessibility of the coal is likely to decline. 145 "A good percentage of the coal that's left is too dirty to be burned in conventional power plants, and much of it is buried in inconvenient places - under homes, schools, parks, highways, and historical landmarks." 146 A future shortage of good quality coal may add to the ecological destruction involved in coal mining by requiring more disruption to get at equivalent amounts of coal. 2. Coal Combustion Pollutes a Wide Range of Environments In their recent "Nutshell" book on energy law, Joseph Tomain and Richard Cudahy concisely summarize the primary types of air pollution caused by coal combustion: [\*30] Coal combustion generates four main sources of pollution: sulfur oxide, nitrogen oxide, carbon dioxide, and particulate matter; all of which spoil land, water, and air. Sulfur oxide, which increases with the sulfur content of the coal, causes human health problems, crop damage, and acid rain. Nitrogen oxide contributes to the same problems and causes smog. Tons of particulate matter are emitted from coal burning facilities daily and cause property damage and health hazards. Finally, carbon dioxide causes what is known as the greenhouse effect, which is an increase in the temperature of the earth's surface. We have long known that air pollution from coal combustion damages crops and natural vegetation, in addition to its impact on human health. In the last thirty years, scientists have learned that pollutants from coal-burning power plants travel long distances and create acid rain that significantly harms plants and animals.

#### And, clean freshwater key to all life on earth

Jackson and Running 01 (Robert B. Jackson and Steven W. Running Spring 2001 “Water in a Changing World”, Issues in Ecology, Ecological Society of America, <http://www.biology.duke.edu/jackson/issues9.pdf>)

Life on earth depends on the continuous flow of materials through the air, water, soil, and food webs of the biosphere. The movement of water through the hydrological cycle comprises the largest of these flows, delivering an estimated 110,000 cubic kilometers (km3) of water to the land each year as snow and rainfall. Solar energy drives the hydrological cycle, vaporizing water from the surface of oceans, lakes, and rivers as well as from soils and plants (evapotranspiration). Water vapor rises into the atmosphere where it cools, condenses, and eventually rains down anew. This renewable freshwater supply sustains life on the land, in estuaries, and in the freshwater ecosystems of the earth. Renewable fresh water provides many services essential to human health and well being, including water for drinking, industrial production, and irrigation, and the production of fish, waterfowl, and shellfish. Fresh water also provides many benefits while it remains in its channels (nonextractive or instream benefits), including flood control, transportation, recreation, waste processing, hydroelectric power, and habitat for aquatic plants and animals. Some benefits, such as irrigation and hydroelectric power, can be achieved only by damming, diverting, or creating other major changes to natural water flows. Such changes often diminish or preclude other instream benefits of fresh water, such as providing habitat for aquatic life or maintaining suitable water quality for human use

#### Acid rain causes extinction

McKenzie 08 “Causes, Effects, and Solutions of Acid Rain” http://www.geocities.com/CapeCanaveral/Hall/9111/DOCS.HTML

Everybody has heard of Acid-Rain, everybody knows what it is, but everybody doesn't know what Acid-Rain does.  Acid-Rain has effects that just doesn't effect one place in the forest but it effects most of the forest.  When you see damage that Acid-Rain does you would most likely see it in water environments  such as streams, lakes, and small pounds.  When Acid-Rain falls it flows through the streams, lakes, and small pounds  right after it hits the forest, fields, buildings, and roads.  But only sometimes Acid-Rain can fall directly in the water. When Acid-Rain falls more and more different types of fish and other aquatic plants and animals that live in theses waters decrease by the day... week... year.  Because Acid-Rain causes the loss of acid-sensitive plants and animals, and fish that rely on these organisms for food may also be affected.  So just by Acid-Rain falling into water that is some of the things that Acid-Rain can do but there is a lot more.  When Acid-Rain comes down it hits the plants and kills the plants being unable to grow back.  The soil will dry up and stay hard until it is watered if this continues then there will be no more plants on Earth and if there is no more plants on Earth then all humans will die because plants have air and without air people will die.  Acid-Rain can effect not only water and water environments but it can effect land.  Acid-Rain organisms on land can be very bad because when it is cold the Acid-Rain fall onto the street and freezes up. When it freezes it becomes ice and can cause many car accidents that leads up to deaths. When Acid-Rains falls it kills animals homes all at the same time leaving nothing but broken trees and hard soil. As a result of their homes being near the water environments their food that comes from the water will most likely to harder to get  because  the population would be decreasing. People help with Acid-Rain in away because we pollute the air with our cars and other things that give off gas and Acid-Rain pollutes the air as it come down so nature and humans are polluting the air. Acid- Rain do not effect just water environments and land but one of the serious side effects of acid rain on human is "respiratory" problems. The dioxide and nitrogen oxide emission gives risk to respiratory problems such as dry coughs, asthma, headaches, eye, nose, and throat irritation. Polluted rainfall is especially harmful to those who suffer from asthma or those who have a hard time breathing. But even healthy people can have their lungs damaged by acid air and rain. Acid rain can aggravate a person's ability to breathe and may increase disease which could lead to death. The United States provide a glimpse of such costs. That acid precipitation destroys, overall, $13,000 million annually in the eastern part of the nation and could cause $1,750 million yearly in forest damage, $8,300 million in crop damage in the Ohio River basin alone by about the year 2000 and $40 million in health costs in the State of Minnesota. The only cost-effective solution to the problem, according to many people, is to reduce emissions at their point of origin. Anyone investigating acid rain should update these figures.  In conclusion, all these things kills off the forest in so many different ways if it is not by Acid-Rain then it is by cars. When we do things we are killing our self. So Acid-Rain can kill things that we need so know everybody knows about what it and everybody has heard of it and everybody knows what it does now.

### Warming

Adv 2 is warming

#### CO2 emissions will run away in the status quo—natural gas is the only effective alternative to coal—U.S. development is modeled globally and prevents extinction

Riley 8/13—BA, LL.M., PhD, professor of energy law at The City Law School at City University London (Alan, 8/13/12, “Shale Gas to the Climate Rescue,” http://www.nytimes.com/2012/08/14/opinion/shale-gas-to-the-climate-rescue.html, RBatra)

The battle against runaway climate change is being lost. The green movement and the energy industry — while engaged in a furious debate on issues from nuclear power to oil sands — are missing the bigger picture.

There is little recognition by either side that current policies to reduce carbon dioxide emissions are inadequate for dealing with the threat that they pose. It is the coal-fueled growth of countries like China and India that generates much of these emissions. Unless a cheap, rapidly deployable substitute fuel is found for coal, then it will be next to impossible to safely rein in rising carbon dioxide levels around the world.

Although the green movement might at first see shale gas as an enemy in this fight, it may in fact turn out to be a friend. Broad development of shale gas resources — with proper ecological safeguards — could be the best way to achieve the quick cuts in carbon dioxide emissions that we need to maintain a habitable environment on Earth.

The International Energy Agency has made it clear that, under current energy policies, the door is closing on our attempts to contain the carbon-driven rise in global temperatures to within 2 degrees Celsius (3.6 Fahrenheit) by the middle of the century. In fact, worldwide carbon dioxide emissions from burning fossil fuels reached a record high of 31.6 gigatons in 2011. With emissions rising by one gigaton per year, it appears the temperature-increase target will most likely be missed.

The shale gas revolution could be the means of blunting the rise of carbon dioxide emissions and give new hope for staying within the 2 degrees Celsius scenario. This resource is widely dispersed across the planet, cheap to develop and offers many of the same energy benefits as coal. If exploited properly, it could replace coal within a couple of decades as a primary fuel.

By developing shale gas as a replacement fuel for coal we retrieve the prospect of blunting — and possibly reversing — the upward climb of carbon dioxide emissions. Shale gas emits 50 percent less carbon dioxide than coal, and so if countries like China and India made the switch on a large scale, then we have a chance to reset the trajectory of global carbon dioxide emissions.

A widespread turn to the use of shale gas would give the planet precious time to develop other, renewable solutions to further lower our output of carbon dioxide. Current renewable energy sources cannot in any way deliver the same savings in carbon emissions that we can achieve by replacing coal with shale gas.

One only has to look to China to see the strong potential of this solution. With the world’s largest shale gas resources, the country has set out a vast gas development program in its latest five-year economic plan. Output would rise from 6.5 billion cubic meters of shale gas by 2015 to 100 billion cubic meters by 2020. And if China can produce that much by 2020, is there any reason to think it cannot pump out 800 billion cubic meters by 2030?

Such a development program would be similar in scale to that undertaken in the United States, which has seen shale gas rise from 1 percent of gas production in 2001 to 37 percent last year.

China can surely achieve these goals, especially given all the new technology available to the shale gas industry, along with abundant state capital. That the government is focusing its efforts in this direction is another reason to believe that China can reach these production levels. An output of 800 billion cubic meters a year — combined with far-higher levels of energy efficiency — would allow China to slow, and then terminate, its coal-expansion plans and ultimately end its reliance on coal-fired energy altogether.

The United States could play a key role in encouraging China and other developing nations to switch from coal to shale gas. The State Department has launched a Global Shale Gas Initiative to facilitate the transfer of technical expertise to other countries to ensure safe development of this new resource. The United States could also lead the way in creating a credible, alternative climate change strategy in which the use of shale gas becomes the driver of radical cuts in carbon dioxide emissions over the short and medium term.

#### And, natural gas acts as a bridge fuel—spurring broad renewable development

Ju 12 – Anne Ju (senior science writer for the Cornell Chronicle) July 17, 2012 “Study Proves Natural Gas Can Bridge the Gap to a Clean Energy Economy” <http://oilprice.com/Energy/Natural-Gas/Study-Proves-Natural-Gas-Can-Bridge-the-Gap-to-a-Clean-Energy-Economy.html>

Natural gas is a good transition step on the road to greener energy sources like wind, solar, and nuclear power, says a new study. Lawrence M. Cathles, Cornell University professor of earth and atmospheric sciences, says natural gas is a smart move in the battle against global climate change. Published in the most recent edition of the journal Geochemistry, Geophysics and Geosystems, Cathles’ study reviews the most recent government and industry data on natural gas “leakage rates” during extraction, as well as recently developed climate models. He concludes that regardless of the time frame considered, substituting natural gas energy for all coal and some oil production provides about 40 percent of the global warming benefit that a complete switch to low-carbon sources would deliver. “From a greenhouse point of view, it would be better to replace coal electrical facilities with nuclear plants, wind farms, and solar panels, but replacing them with natural gas stations will be faster, cheaper, and achieve 40 percent of the low-carbon-fast benefit,” Cathles writes in the study. “Gas is a natural transition fuel that could represent the biggest stabilization wedge available to us.” Cathles’ study includes additional findings about expanding the use of natural gas as an energy source, as well as the climate impact of “unconventional” gas drilling methods, including hydraulic fracturing in shale formations. They include the following: • Although a more rapid transition to natural gas from coal and some oil produces a greater overall benefit for climate change, the 40 percent of low-carbon energy benefit remains no matter how quickly the transition is made, and no matter the effect of ocean modulation or other climate regulating forces. • Although some critics of natural gas as a transition fuel have cited leakage rates as high as 8 percent or more of total production during drilling—particularly hydraulic fracturing extraction—more recent industry data and a critical examination of Environmental Protection Agency data supports leakage rates closer to 1.5 percent for both conventional and hydrofractured wells. • Even at higher leakage rates, using natural gas as a transition to low-carbon energy sources is still a better policy than “business as usual” with coal and oil, due to the different rates of decay (and hence long-term global warming effect) of carbon dioxide released in greater amounts by burning coal and oil and any methane released during natural gas extraction. • Using natural gas as a transition fuel supports the push to low-carbon sources by providing the “surge capacity” when needed, or a buffer when solar and wind production wanes. “The most important message of the calculations reported here is that substituting natural gas for coal and oil is a significant way to reduce greenhouse forcing, regardless of how long the substitution takes,” Cathles writes. “A faster transition to low-carbon energy sources would decrease greenhouse warming further, but the substitution of natural gas for other fossil fuels is equally beneficial in percentage terms no matter how fast the transition.”

#### Second, the plan is key to extract methane hydrates—prevents leaks

US Chamber of Commerce 11 (Institute for 21st Century Energy, Chamber of Commerce, no date given (website registered 2011), “Immediately Expand Domestic Oil and Gas Exploration and Production,” [http://www.energyxxi.org/immediately-expand-domestic-oil-and-gas-exploration-and-production)//CC](http://www.energyxxi.org/immediately-expand-domestic-oil-and-gas-exploration-and-production%29//CC)

Another potential source of significant amounts of domestic natural gas is methane hydrates, an icelike substance containing natural gas, found beneath the ocean floor and in the Arctic permafrost. The United States Geological Survey estimates there are some 317 quadrillion cubic feet of methane gas stored in hydrates in the United States. This represents more than 1,600 times the amount of conventional natural gas reserves estimated in the United States. More R&D is necessary to more accurately locate this resource and economically produce it with **minimal** geologic impact or **release of GHG emissions**. However, the moratorium preventing exploration and production of traditional natural gas on the OCS also acts to thwart work to develop methane hydrates.

#### Methane hydrates will inevitably be released – tech developments key to solve runaway warming

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A chunk of methane ice exposed to the air and ignited will burn until all of the methane in that ice has been consumed. Methane hydrates, however, require specific conditions of temperature and pressure to keep them contained within their ice cage. Reduce the pressure - for example, by reducing the sea level and the pressure of water above the deposit - or increased the temperature and the methane hydrate deposit becomes unstable and begins to release the trapped methane into the atmosphere. That is a problem. Methane is a greenhouse gas. In fact, it is 21-23 times more powerful as a greenhouse gas than carbon dioxide. When the methane trapped in the hydrate is released it expands by about 170 times.[1] Methane is lighter than CO2, lighter than air. As a result it rises rapidly through the atmosphere up to the lower-density stratosphere. On the positive side methane remains in the atmosphere for only about 10-20 years. CO2 remains in the atmosphere for over 100 years. Scientists studying global warming have long been seriously concerned about the possibility of large scale methane hydrate destabilization and methane release into the atmosphere. The greatest concern is about the large volumes of methane hydrates under the Arctic sea floor and that trapped in the vast permafrost zone surrounding the Arctic Ocean. That concern has now been heightened by recent discoveries of hundreds of methane plumes on the floor of the Arctic Ocean north of Norway and Siberia. [2] There is also evidence in pock-marked sea floors of large releases of methane plumes in the geological past. [3] Paleoclimatologists now believe that large scale, natural methane hydrate releases have been partly but significantly responsible for short-cycle global warming and global cooling cycles in the past. The recent discoveries in the Arctic, in fact, are thought to suggest that methane releases have contributed to the global warming that has occurred since the last ice age 15,000 years ago. [2] The problem is that these methane releases have a strong positive feedback loop. As they increase the warming of the atmosphere that warming in turn increases methane release which in turn increases warming which in turn releases more...... You get the picture. Acceleration of global warming through this positive feedback loop, by increased methane concentration in the atmosphere, far more than CO2 concentrations, represents, to paleoclimatologists, a far greater risk of pushing us into the Venus effect, runaway global warming. When it comes to satisfying the world's energy lust, however, caution may be thrown to the wind. Powering down human society is never an option put on the table when politicians and other leaders discuss energy policies and strategies. We have proven over and over again that business as usual is the only model that will be considered. How else can we explain the tar sands, oil shale development, deepwater oil extraction, coal mines extending out under the sea floor, and more? There are various technologies under consideration for extracting methane from hydrate deposits. Most involve some form of heating the hydrate deposits - one, probably the dumbest and most dangerous, even goes so far as to suggest using nuclear explosions beneath the deposit to heat it, also suggested by some as a means of releasing oil from tar sands and oil shale - causing them to release the methane which is then collected and piped to a processing facility of holding tank. Proponents of methane hydrate exploitation, conscious of environmental concerns, are quick to offer reassurances like ".....tapping into the gas hydrates assessed in the study is not expected to affect global warming, said Brenda Pierce, coordinator for the USGS Energy Resources Program." [4] The louder and more frequent such reassurances are, of course, the more it suggests they are trying to cover up the probability that the result will be the opposite. There are many projects underway, funded by governments throughout the world (Japan, India, China, South Korea, Russia, Norway, Canada, the U.S.), aimed at developing commercially viable technologies for exploiting the planet's vast methane hydrate deposits. The selection of sites for these projects are, themselves, a clear indication of one of the primary roadblocks to using methane hydrates as a societal-supporting energy source. They have sought out test sites with high methane hydrate concentrations. Most hydrate deposits are too small or too dispersed to be commercially exploited. Also, unlike oil and natural gas, those deposits are generally not capped in such a way that the geology can be used to contain releases. Most of those deposits on the sea floor, in fact, exist in unconsolidated, sandy or silt sediment. The geology surrounding them is inherently unstable, difficult to contain. Once the deposit, or any large portion of it, is destabilized it is very difficult to prevent unintended, uncontrolled methane releases into the atmosphere. Okay. I very begrudgingly accept that our leaders are not going to consider powering down as a potential tactic in the face of our impending energy crisis. Sooner or later the human race is going to have to accept that reality but clearly society is not prepared to accept it now. But methane hydrates are not like the other fossil fuels. And our approach to exploiting them is going to have to be very different. The risk to the climate and the environment is so much greater than has ever been the case with other fossil fuels. Most importantly, methane hydrates are globally affected by exactly the same constrains; temperature and pressure. Global warming itself - it doesn't matter whether it is naturally occurring or caused by human combustion of fossil fuels - is the greatest threat of tipping methane releases into a runaway warming mechanism. Scientists do not know with any certainty yet how much of a global temperature rise is necessary to reach the tipping point where methane hydrate release into the atmosphere accelerates out of control. They do know that once that happens the acceleration will be self-sustaining and self-accelerating. If our leaders take the same cavalier approach with scientific warnings about runaway methane release that they have taken with warnings about CO2 buildup in the atmosphere, and the long-term, safe storage of spent nuclear fuel, we are headed toward a much more serious atmospheric and climatic disaster than global warming experts have thus far suggested. Methane releases from the ocean floors and from Arctic permafrost have not been built into any of the current global warming models as a factor, including those models supporting the IPCC reports. Considering that methane hydrate deposits exceed the total of all other fossil fuels by magnitudes and that methane is more than 20 times more powerful as a greenhouse gas than CO2, that should be extremely worrying to anyone who accepts the validity of the global warming theory.

#### And, methane hydrates make the difference between solving and runaway warming

RC 5 (RealClimate, Realclimate.org, 12 December 2005, “Methane hydrates and global warming,” http://www.realclimate.org/index.php/archives/2005/12/methane-hydrates-and-global-warming/)//CC

The other possibility for our future is an increase in the year-in, year-out chronic rate of methane emission to the atmosphere. The ongoing release of methane is what supplies, and determines the concentration of, the ongoing concentration of methane in the atmosphere. Double the source, and you’d double the concentration, more or less. (A little more, actually, because the methane lifetime increases.) The methane is oxidized to CO2, another greenhouse gas that accumulates for hundreds of thousands of years, same as fossil fuel CO2 does. Models of chronic methane release often show that the accumulating CO2 contributes as much to warming as does the transient methane concentration. Anthropogenic methane sources, such as rice paddies, the fossil fuel industry, and livestock, have already more than doubled the methane concentration in the atmosphere from pre-industrial levels. Currently methane levels appear stable, but the reasons for this relatively recent phenomena are not yet clear. The amount of permafrost hydrate methane is not known very well, but it would not take too much methane, say 60 Gton C released over 100 years, to double atmospheric methane yet again. Peat deposits may be a comparable methane source to melting permafrost hydrate. When peat that has been frozen for thousands of years thaws, it still contains viable populations of methanotrophic bacteria [Rivkina et al., 2004] that begin to convert the peat into CO2 and CH4. It’s not too difficult to imagine 60 Gton C over 100 years from peat, either. Changes in methane production in existing wetlands and swamps due to changes in rainfall and temperature could also be important. Ocean hydrates have also been forecast to melt, but only slowly [Harvey and Huang, 1995]. Places to watch would seem to be the Arctic and the Gulf of Mexico. So, in the end, not an obvious disaster-movie plot, but a potential positive feedback that could turn out to be the difference between success and failure in avoiding ‘dangerous’ anthropogenic climate change. That’s scary enough.

#### Warming is real and causes extinction

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As horrifying as the scenario of human extinction by sudden, fast-burning nuclear fire may seem, the one consolation is that this future can be avoided within a relatively short period of time if responsible world leaders change Cold War thinking to move away from aggressive wars over natural resources and towards the eventual dismantlement of most if not all nuclear weapons. On the other hand, another scenario of human extinction by fire is one that may not so easily be reversed within a short period of time because it is not a fast-burning fire; rather, a slow burning fire is gradually heating up the planet as industrial civilization progresses and develops globally. This gradual process and course is long-lasting; thus it cannot easily be changed, even if responsible world leaders change their thinking about ‘‘progress’’ and industrial development based on the burning of fossil fuels. The way that global warming will impact humanity in the future has often been depicted through the analogy of the proverbial frog in a pot of water who does not realize that the temperature of the water is gradually rising. Instead of trying to escape, the frog tries to adjust to the gradual temperature change; finally, the heat of the water sneaks up on it until it is debilitated. Though it finally realizes its predicament and attempts to escape, it is too late; its feeble attempt is to no avail— and the frog dies. Whether this fable can actually be applied to frogs in heated water or not is irrelevant; it still serves as a comparable scenario of how the slow burning fire of global warming may eventually lead to a runaway condition and take humanity by surprise. Unfortunately, by the time the politicians finally all agree with the scientific consensus that global warming is indeed human caused, its development could be too advanced to arrest; the poor frog has become too weak and enfeebled to get himself out of hot water. The Intergovernmental Panel of Climate Change (IPCC) was established in 1988 by the WorldMeteorological Organization (WMO) and the United Nations Environmental Programme to ‘‘assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of humaninduced climate change, its potential impacts and options for adaptation and mitigation.’’[16]. Since then, it has given assessments and reports every six or seven years. Thus far, it has given four assessments.13 With all prior assessments came attacks fromsome parts of the scientific community, especially by industry scientists, to attempt to prove that the theory had no basis in planetary history and present-day reality; nevertheless, as more andmore research continually provided concrete and empirical evidence to confirm the global warming hypothesis, that it is indeed human-caused, mostly due to the burning of fossil fuels, the scientific consensus grew stronger that human induced global warming is verifiable. As a matter of fact, according to Bill McKibben [17], 12 years of ‘‘impressive scientific research’’ strongly confirms the 1995 report ‘‘that humans had grown so large in numbers and especially in appetite for energy that they were now damaging the most basic of the earth’s systems—the balance between incoming and outgoing solar energy’’; ‘‘. . . their findings have essentially been complementary to the 1995 report – a constant strengthening of the simple basic truth that humans were burning too much fossil fuel.’’ [17]. Indeed, 12 years later, the 2007 report not only confirms global warming, with a stronger scientific consensus that the slow burn is ‘‘very likely’’ human caused, but it also finds that the ‘‘amount of carbon in the atmosphere is now increasing at a faster rate even than before’’ and the temperature increases would be ‘‘considerably higher than they have been so far were it not for the blanket of soot and other pollution that is temporarily helping to cool the planet.’’ [17]. Furthermore, almost ‘‘everything frozen on earth is melting. Heavy rainfalls are becoming more common since the air is warmer and therefore holds more water than cold air, and ‘cold days, cold nights and frost have become less frequent, while hot days, hot nights, and heat waves have become more frequent.’’ [17]. Unless drastic action is taken soon, the average global temperature is predicted to rise about 5 degrees this century, but it could rise as much as 8 degrees. As has already been evidenced in recent years, the rise in global temperature is melting the Arctic sheets. This runaway polar melting will inflict great damage upon coastal areas, which could be much greater than what has been previously forecasted. However, what is missing in the IPCC report, as dire as it may seem, is sufficient emphasis on the less likely but still plausible worst case scenarios, which could prove to have the most devastating, catastrophic consequences for the long-term future of human civilization. In other words, the IPCC report places too much emphasis on a linear progression that does not take sufficient account of the dynamics of systems theory, which leads to a fundamentally different premise regarding the relationship between industrial civilization and nature. As a matter of fact, as early as the 1950s, Hannah Arendt [18] observed this radical shift of emphasis in the human-nature relationship, which starkly contrasts with previous times because the very distinction between nature and man as ‘‘Homo faber’’ has become blurred, as man no longer merely takes from nature what is needed for fabrication; instead, he now acts into nature to augment and transform natural processes, which are then directed into the evolution of human civilization itself such that we become a part of the very processes that we make. The more human civilization becomes an integral part of this dynamic system, the more difficult it becomes to extricate ourselves from it. As Arendt pointed out, this dynamism is dangerous because of its unpredictability. Acting into nature to transform natural processes brings about an . . . endless new change of happenings whose eventual outcome the actor is entirely incapable of knowing or controlling beforehand. The moment we started natural processes of our own - and the splitting of the atom is precisely such a man-made natural process -we not only increased our power over nature, or became more aggressive in our dealings with the given forces of the earth, but for the first time have taken nature into the human world as such and obliterated the defensive boundaries between natural elements and the human artifice by which all previous civilizations were hedged in’’ [18]. So, in as much as we act into nature, we carry our own unpredictability into our world; thus, Nature can no longer be thought of as having absolute or iron-clad laws. We no longer know what the laws of nature are because the unpredictability of Nature increases in proportion to the degree by which industrial civilization injects its own processes into it; through selfcreated, dynamic, transformative processes, we carry human unpredictability into the future with a precarious recklessness that may indeed end in human catastrophe or extinction, for elemental forces that we have yet to understand may be unleashed upon us by the very environment that we experiment with. Nature may yet have her revenge and the last word, as the Earth and its delicate ecosystems, environment, and atmosphere reach a tipping point, which could turn out to be a point of no return. This is exactly the conclusion reached by the scientist, inventor, and author, James Lovelock. The creator of the wellknown yet controversial Gaia Theory, Lovelock has recently written that it may be already too late for humanity to change course since climate centers around the world, . . . which are the equivalent of the pathology lab of a hospital, have reported the Earth’s physical condition, and the climate specialists see it as seriously ill, and soon to pass into a morbid fever that may last as long as 100,000 years. I have to tell you, as members of the Earth’s family and an intimate part of it, that you and especially civilisation are in grave danger. It was ill luck that we started polluting at a time when the sun is too hot for comfort. We have given Gaia a fever and soon her condition will worsen to a state like a coma. She has been there before and recovered, but it took more than 100,000 years. We are responsible and will suffer the consequences: as the century progresses, the temperature will rise 8 degrees centigrade in temperate regions and 5 degrees in the tropics. Much of the tropical land mass will become scrub and desert, and will no longer serve for regulation; this adds to the 40 per cent of the Earth’s surface we have depleted to feed ourselves. . . . Curiously, aerosol pollution of the northern hemisphere reduces global warming by reflecting sunlight back to space. This ‘global dimming’ is transient and could disappear in a few days like the smoke that it is, leaving us fully exposed to the heat of the global greenhouse. We are in a fool’s climate, accidentally kept cool by smoke, and before this century is over billions of us will die and the few breeding pairs of people that survive will be in the Arctic where the climate remains tolerable. [19] Moreover, Lovelock states that the task of trying to correct our course is hopelessly impossible, for we are not in charge. It is foolish and arrogant to think that we can regulate the atmosphere, oceans and land surface in order to maintain the conditions right for life. It is as impossible as trying to regulate your own temperature and the composition of your blood, for those with ‘‘failing kidneys know the never-ending daily difficulty of adjusting water, salt and protein intake. The technological fix of dialysis helps, but is no replacement for living healthy kidneys’’ [19]. Lovelock concludes his analysis on the fate of human civilization and Gaia by saying that we will do ‘‘our best to survive, but sadly I cannot see the United States or the emerging economies of China and India cutting back in time, and they are the main source of emissions. The worst will happen and survivors will have to adapt to a hell of a climate’’ [19]. Lovelock’s forecast for climate change is based on a systems dynamics analysis of the interaction between humancreated processes and natural processes. It is a multidimensional model that appropriately reflects the dynamism of industrial civilization responsible for climate change. For one thing, it takes into account positive feedback loops that lead to ‘‘runaway’’ conditions. This mode of analysis is consistent  with recent research on how ecosystems suddenly disappear. A 2001 article in Nature, based on a scientific study by an international consortium, reported that changes in ecosystems are not just gradual but are often sudden and catastrophic [20]. Thus, a scientific consensus is emerging (after repeated studies of ecological change) that ‘‘stressed ecosystems, given the right nudge, are capable of slipping rapidly from a seemingly steady state to something entirely different,’’ according to Stephen Carpenter, a limnologist at the University of Wisconsin-Madison (who is also a co-author of the report). Carpenter continues, ‘‘We realize that there is a common pattern we’re seeing in ecosystems around the world, . . . Gradual changes in vulnerability accumulate and eventually you get a shock to the system - a flood or a drought - and, boom, you’re over into another regime. It becomes a self-sustaining collapse.’’ [20]. If ecosystems are in fact mini-models of the system of the Earth, as Lovelock maintains, then we can expect the same kind of behavior. As Jonathon Foley, a UW-Madison climatologist and another co-author of the Nature report, puts it, ‘‘Nature isn’t linear. Sometimes you can push on a system and push on a system and, finally, you have the straw that breaks the camel’s back.’’ Also, once the ‘‘flip’’ occurs, as Foley maintains, then the catastrophic change is ‘‘irreversible.’’ [20]. When we expand this analysis of ecosystems to the Earth itself, it’s frightening. What could be the final push on a stressed system that could ‘‘break the camel’s back?’’ Recently, another factor has been discovered in some areas of the arctic regions, which will surely compound the problem of global ‘‘heating’’ (as Lovelock calls it) in unpredictable and perhaps catastrophic ways. This disturbing development, also reported in Nature, concerns the permafrost that has locked up who knows how many tons of the greenhouse gasses, methane and carbon dioxide. Scientists are particularly worried about permafrost because, as it thaws, it releases these gases into the atmosphere, thus, contributing and accelerating global heating. It is a vicious positive feedback loop that compounds the prognosis of global warming in ways that could very well prove to be the tipping point of no return. Seth Borenstein of the Associated Press describes this disturbing positive feedback loop of permafrost greenhouse gasses, as when warming ‘‘. already under way thaws permafrost, soil that has been continuously frozen for thousands of years. Thawed permafrost releases methane and carbon dioxide. Those gases reach the atmosphere and help trap heat on Earth in the greenhouse effect. The trapped heat thaws more permafrost and so on.’’ [21]. The significance and severity of this problem cannot be understated since scientists have discovered that ‘‘the amount of carbon trapped in this type of permafrost called ‘‘yedoma’’ is much more prevalent than originally thought and may be 100 times [my emphasis] the amount of carbon released into the air each year by the burning of fossil fuels’’ [21]. Of course, it won’t come out all at once, at least by time as we commonly reckon it, but in terms of geological time, the ‘‘several decades’’ that scientists say it will probably take to come out can just as well be considered ‘‘all at once.’’ Surely, within the next 100 years, much of the world we live in will be quite hot and may be unlivable, as Lovelock has predicted. Professor Ted Schuur, a professor of ecosystem ecology at the University of Florida and co-author of the study that appeared in Science, describes it as a ‘‘slow motion time bomb.’’ [21]. Permafrost under lakes will be released as methane while that which is under dry ground will be released as carbon dioxide. Scientists aren’t sure which is worse. Whereas methane is a much more powerful agent to trap heat, it only lasts for about 10 years before it dissipates into carbon dioxide or other chemicals. The less powerful heat-trapping agent, carbon dioxide, lasts for 100 years [21]. Both of the greenhouse gasses present in permafrost represent a global dilemma and challenge that compounds the effects of global warming and runaway climate change. The scary thing about it, as one researcher put it, is that there are ‘‘lots of mechanisms that tend to be self-perpetuating and relatively few that tend to shut it off’’ [21].14 In an accompanying AP article, Katey Walters of the University of Alaska at Fairbanks describes the effects as ‘‘huge’’ and, unless we have a ‘‘major cooling,’’ - unstoppable [22]. Also, there’s so much more that has not even been discovered yet, she writes: ‘‘It’s coming out a lot and there’s a lot more to come out.’’ [22]. 4. Is it the end of human civilization and possible extinction of humankind? What Jonathon Schell wrote concerning death by the fire of nuclear holocaust also applies to the slow burning death of global warming: Once we learn that a holocaust might lead to extinction**, we have no right to gamble**, because if we lose, the game will be over, and neither we nor anyone else will ever get another chance. Therefore, although, scientifically speaking, there is all the difference in the world between the mere possibility that a holocaust will bring about extinction and the certainty of it, morally they are the same, and we have no choice but to address the issue of nuclear weapons as though we knew for a certainty that their use would put an end to our species [23].15 When we consider that beyond the horror of nuclear war, another horror is set into motion to interact with the subsequent nuclear winter to produce a poisonous and super heated planet, the chances of human survival seem even smaller. Who knows, even if some small remnant does manage to survive, what the poisonous environmental conditions would have on human evolution in the future. A remnant of mutated, sub-human creatures might survive such harsh conditions, but for all purposes, human civilization has been destroyed, and the question concerning human extinction becomes moot. Thus, **we have no other choice but to consider the finality of it all**, as Schell does: ‘‘Death lies at the core of each person’s private existence, but part of death’s meaning is to be found in the fact that it occurs in a biological and social world that survives.’’ [23].16 But what if the world itself were to perish, Schell asks. Would not it bring about a sort of ‘‘second death’’ – the death of the species – a possibility that the vast majority of the human race is in denial about? Talbot writes in the review of Schell’s book that it is not only the ‘‘death of the species, not just of the earth’s population on doomsday, but of countless unborn generations. They would be spared literal death but would nonetheless be victims . . .’’ [23]. That is the ‘‘second death’’ of humanity – the horrifying, unthinkable prospect that there are no prospects – that there will be no future. In the second chapter of Schell’s book, he writes that since we have not made a positive decision to exterminate ourselves but instead have ‘‘chosen to live on the edge of extinction, periodically lunging toward the abyss only to draw back at the last second, our situation is one of uncertainty and nervous insecurity rather than of absolute hopelessness.’’ [23].17 In other words, the fate of the Earth and its inhabitants has not yet been determined. Yet time is not on our side. Will we relinquish the fire and our use of it to dominate the Earth and each other, or will we continue to gamble with our future at this game of Russian roulette while **time** increasingly **stacks the cards against** our chances of **survival**?

therefore

#### The United States federal government should substantially reduce restrictions on offshore natural gas production in the United States.

### Solvency

#### Status quo locks 98% of offshore natural gas production

Pyle 7/10 (Thomas J., July 10, 2012, “Energy Department sneaks offshore moratorium past public; Jobs and oil-supply potential are shut down,” The Washington Times, lexis)

While the Obama administration was taking a victory lap last week after the 5-4 Supreme Court decision to uphold the president's signature legislative accomplishment, Obamacare, the Interior Department was using the media black hole to release a much-awaited five-year plan for offshore drilling. That plan reinstitutes a 30-year moratorium on offshore energy exploration that will keep our most promising resources locked away until long after President Obama begins plans for his presidential library. Given the timing, it is clear that the self-described "all of the above" energy president didn't want the American people to discover that he was denying access to nearly 98 percent of America's vast energy potential on the Outer Continental Shelf (OCS).¶ The Outer Continental Shelf Lands Act (OCSLA) of 1953 provided the interior secretary with the authority to administer mineral exploration and development off our nation's coastlines. At its most basic level, the act empowers the interior secretary - in this case, former U.S. Sen. Kenneth L. Salazar of Colorado - to provide oil and gas leases to the highest-qualified bidder while establishing guidelines for implementing an oil and gas exploration-and-development program for the Outer Continental Shelf. In 1978, in the wake of the oil crisis and spiking gasoline prices, Congress amended the act to require a series of five-year plans that provide a schedule for the sale of oil and gas leases to meet America's national energy needs.¶ But since taking office, Mr. Obama and Mr. Salazar have worked to restrict access to our offshore oil and gas resources by canceling lease sales, delaying others and creating an atmosphere of uncertainty about America's future offshore development that has left job creators looking for other countries' waters to host their offshore rigs. More than 3 1/2 years into the Obama regime, nearly 86 billion barrels of undiscovered oil on the Outer Continental Shelf remain off-limits to Americans. Alaska alone has about 24 billion barrels of oil in unleased federal waters. The Commonwealth of Virginia - where Mr. Obama has reversed policies that would have allowed offshore development - is home to 130 million barrels of offshore oil and 1.14 trillion cubic feet of natural gas. But thanks to the president, Virginians will have to wait at least another five years before they can begin creating the jobs that will unlock their offshore resources.¶ Once you add those restrictions to the vast amount of shale oil that is being blocked, the administration has embargoed nearly 200 years of domestic oil supply. No wonder the administration wanted to slip its plan for the OCS under the radar when the whole country was focused on the health care decision.¶ But facts are stubborn things, and the Obama administration cannot run forever from its abysmal energy record. In the past three years, the government has collected more than 250 times less revenue from offshore lease sales than it did during the last year of the George W. Bush administration - down from $9.48 billion in 2008 to a paltry $36 million last year. Meanwhile, oil production on federal lands dropped 13 percent last year, and the number of annual leases is down more than 50 percent from the Clinton era.¶ Under the new Obama plan, those numbers will only get worse. The 2012-17 plan leaves out the entire Atlantic and Pacific coasts and the vast majority of OCS areas off Alaska. It cuts in half the average number of lease sales per year, requires higher minimum bids and shorter lease periods and dramatically reduces lease terms. Yet, somehow, we're supposed to believe that our "all of the above" president is responsible for increased production and reduced oil import.

#### It is directly responsible for all-time production lows

Hastings, 7/23 (Rep. Doc Hastings, The Hill, 23 July 2012, “President Obama’s offshore drilling plan must be replaced,” http://thehill.com/blogs/congress-blog/energy-a-environment/239529-president-obamas-offshore-drilling-plan-must-be-replaced)//CC

The president’s plan only offers 15 lease sales limited to the Gulf of Mexico and, very late in the plan, small parts of Alaska. It doesn’t open one new area for leasing and energy production. According to the non-partisan Congressional Research Service, President Obama’s 15 lease sales represent the lowest number ever included in an offshore leasing plan. President Obama rates worse than even Jimmy Carter. Thanks to President Obama, it’s as if the bipartisan steps to lift the drilling moratoria in 2008 never happened. Crippling $4 gasoline prices sparked Americans’ outrage and pressured the Democrat-controlled Congress to allow legislation to pass opening up new offshore areas to drilling. Unfortunately, four years later, American families and small businesses are experiencing the pain of higher gasoline prices and yet no progress has been made to expand production of our offshore resources. The Congressional moratorium on drilling has simply been replaced by the “Obama moratorium” on drilling. Gasoline prices were $1.89 when President Obama took office, and prices today are nearly double. Americans will continue to face volatile price spikes as long as we continue to keep the United States’ energy resources under lock-and-key.

#### Plan expands production – kick starts nearly 100 new projects

Paul Hillegeist et al (President and COO at Quest Offshore Resources, Inc, Sean Shafer, Project Director, Andrew Jackson, Project Manager, Leslie Cook , Senior Research Consultant) December 2011 “The State of the Offshore U.S. Oil and Gas Industry” http://energytomorrow.org/images/uploads/Quest\_2011\_December\_29\_Final.pdf

If drilling permits going forward were to be issued at pre‐moratorium rates, the number of shallow water projects delayed could be significantly reduced from 85 under the current path to 37 over the 2012 to 2015 period, and from 48 to 9 for the deepwater. The increased number of projects would increase investment in the Gulf of Mexico offshore oil and gas industry by over $15.6 billion dollars from 2012‐2015. This additional investment would increase average annual U.S. employment between 17,000 and 49,000 thousand jobs per year over that time period. Offshore oil production would be higher over the next decade, for example, by 2017 offshore oil production would rise by approximately 13 percent relative to its current projected path. A regulatory environment that eliminates unnecessary permitting delays and maintains competitiveness with development opportunities in other regions of the world would provide a first step to revitalizing the offshore oil and gas industry. Additional access to offshore areas currently off‐limits remains a key missing component of U.S. energy policy, and would provide substantial additional gains to the nation in terms of energy security, employment and government revenue.

#### That doubles production

Baker Institute, ‘8 (Baker Institute for Public Policy, Rice University, Baker Institute Policy Report, January 2008, “Natural Gas in North America: Markets and Security,” <http://connection.ebscohost.com/c/articles/30064519/study-lift-u-s-drilling-restrictions-avoid-international-lng-cartel>)//CC

As might be expected, the lower requirements for LNG under this scenario stem from larger, lowcost U.S. Lower 48 natural gas production. Modeling predicts that lifting access restrictions would lead to an increase overall in Lower 48 production of about 1.5 tcf in 2015 (or a 7.5 percent increase), increasing to 3.1 tcf greater production (or a 10.1 percent increase) in every year from 2015 through 2030. More specifically, OCS production would total 5.0 tcf in 2015 and 6.1 tcf in 2025 as compared to only 3.5 tcf in 2015 and 3.9 tcf in 2025 if the restrictions remain in place. Lifting restrictions in the Rocky Mountains adds another 0.10 tcf by 2015 and 0.93 tcf by 2025.

#### Otherwise, unpredictable regulatory shifts will crush predictability and timing of projects

Curry L. Hagerty (Specialist in Energy and Natural Resources Policy at the Congressional Research Service) June 15, 2010 “Outer Continental Shelf Moratoria on Oil and Gas Development” http://crs.ncseonline.org/nle/crsreports/10Jul/R41132.pdf

One legacy of congressional moratoria is their impact on the timing of possible OCS development. From a developer’s point of view, predictability in the pace, timing, and sequence of OCS development projects is key to strategic business decisions. From a regulator’s standpoint, agency discretion for OCS development is tied to program planning horizons set by statutory or regulatory timetables. Features of the annual congressional moratoria varied from year to year, and from region to region, as reflected in Table 1, and the resultant uncertainty had a disruptive effect on the pace of OCS activity, which was viewed negatively by those in favor of OCS drilling. Among those opposed to OCS drilling, the disruptive effect was considered a positive outcome.23 Changes to the specific provisions of annual moratoria measures created tensions due to the unpredictability of the bans on leasing activities, timeframes, and locations.24 It was not uncommon for developers to engage in litigation against the federal government and to claim damages related to reliance on leases and federal OCS policies that were disrupted by the annual congressional moratoria.25 Although observers agreed that appropriations measures were out of sync with the timetable used to coordinate federal OCS planning functions, proponents of annual congressional moratoria provisions countered that restrictions were defensible in the absence of more permanent alternatives for similar leasing prohibitions