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### Advantage 1 is Iran

#### **There’s a large natural gas supply now and production is high**

Buurma 10-25 – Christine Buurma, writer for Businessweek, October 25th, 2012, "Natural Gas Declines After Bigger-Than-Average Supply Increase" [www.businessweek.com/printer/articles/351414?type=bloomberg](http://www.businessweek.com/printer/articles/351414?type=bloomberg)

Natural gas futures dropped to a two-week low in New York after a government report showed U.S. stockpiles climbed by more than the five-year average last week.¶ Gas declined 0.5 percent after the Energy Department said inventories expanded by 67 billion cubic feet in the week ended Oct. 19 to 3.843 trillion cubic feet. Analyst estimates compiled by Bloomberg showed a gain of 67 billion. A survey of Bloomberg users predicted an increase of 66 billion. Supplies rose to a record 3.852 trillion cubic feet last year.¶ “The short story is that we’re not running out of gas,” said Tim Evans, an energy analyst at Citi Futures Perspective in New York. “We’re within 9 billion cubic feet of an all-time high storage level.”¶ Natural gas for November delivery fell 1.6 cents to $3.434 per million British thermal units on the New York Mercantile Exchange, the lowest settlement since Oct. 8. The futures have dropped 6.1 percent from a year ago.¶ November $3.50 calls were the most active gas options in electronic trading. They were 3 cents lower at 0.4 cent on volume of 1,115 contracts as of 3:46 p.m. Calls accounted for 56 percent of options volume.¶ The futures have created a bearish “double top” formation after failing to breach $3.65 per million Btu earlier this week and last week, said Aaron Calder, senior market analyst at Gelber & Associates in Houston. Prices may slip to $3.225 per million Btu, he said.¶ Stockpile Report¶ The stockpile increase was bigger than the five-year average gain for the week of 65 billion cubic feet, department data show. A surplus to the five-year average fell to 7 percent from 7.1 percent the previous week. Supplies were 4.1 percent above year-earlier levels, down from 5 percent a week earlier.¶ Inventories may climb to a record 3.903 trillion cubic feet by the end of this month, the Energy Department said Oct. 10 in its monthly Short-Term Energy Outlook.¶ U.S. natural gas production in 2012 will average an all- time high of 68.85 billion cubic feet a day, up 4 percent from last year, the department said.¶ **The number of rigs drilling for natural gas in the U.S. rose** by five to 427 last week, according to data released Oct. 19 by Baker Hughes Inc. in Houston. The rig count was down 47 percent this year.¶ Commodity Weather Group LLC in Bethesda, Maryland, predicted mostly warmer-than-normal weather on the East Coast through Oct. 29.¶ The low in New York on Oct. 27 may be 56 degrees Fahrenheit (13 Celsius), 9 above normal, according to AccuWeather Inc. in State College, Pennsylvania. The low in Boston may be 52 degrees, also 9 more than the usual reading.

#### US gas supply prevents Iran influence and proliferation through international cooperation on sanctions

Medlock et al. 11 - Dr. Kenneth B. Medlock, Ph.D. in economics, fellow in Energy and Resource Economics at the Baker Institute, and former advisor to the U.S. Department of Energy and the California Energy Commission, AND\*\*\* Amy Myers Jaffe, graduate from Princeton University, fellow of Energy Studies and director of the Energy Forum at the Baker Institute, and associate director of the Rice Energy Program, AND\*\*\* Dr. Peter R. Hartley, Ph.D in economics at Rice University, [July 2011, "Shale Gas and U.S. National Security,” http://bakerinstitute.org/publications/EF-pub-DOEShaleGas-07192011.pdf](file:///C:\Users\Pei\Desktop\ROGERS%20HOUSE\July%202011,%20%22Shale%20Gas%20and%20U.S.%20National%20Security,)

At the present time, economic sanctions against Tehran have been inhibiting natural gas export project development in Iran. This includes both its previously planned South Pars LNG export projects and a proposed pipeline to Pakistan and India. With no signs of conflict resolution between Iran and the West in sight, it is assumed that the development of Iranian export projects could not begin until 2020 at the earliest.¶ Greater shale gas production in the United States, and eventually Europe, will also make it **more difficult for Iran to profit** from exporting natural gas. Since Iran is **currently hampered by Western sanctions against investment in its energy sector**, by the time it can get its natural gas ready for export, the marketing window to Europe will likely be closed by the availability of shale gas. This reality may give the United States and its allies more leverage over Iran for a longer period of time, helping to shape **outcomes in the Middle East more positive** for U.S. and allied interests.¶ Iran is more likely to become a much larger exporter in the case in which no new shale is developed (Scenario Two), primarily because of greater LNG demand from the United States. In the Reference Case, Iran only emerges as an LNG exporter in the late 2020s and its market position is more limited. However, in the constrained shale case (Scenario Two), Iranian LNG exports grow more quickly and, by 2040, they are about 75 percent higher than in the Reference Case. Thus, shale gas plays an instrumental role in delaying the opening for Iran to sell its natural gas, thwarting its ability in the near term to use natural gas exports as a means to develop bilateral relations with major gas consuming countries and limiting its opportunity to use energy diplomacy to strengthen its regional position29 or buttress its pursuit of nuclear weapons. ¶ Although there are many complex factors that influence Iran’s political leverage globally, the circumstance of lower requirements for Iranian natural gas could make it easier for the United States to achieve buy-in for continued economic sanctions against Iran. Lower interest in Iranian gas reduces the chances that Iran can use its energy resources to drive a wedge in the international coalition against it. By delaying the need for Iranian gas by over a decade, the United States buys time **to find a better solution to the Iranian nuclear problem** and leaves open the possibility that political change will take place in Iran before its influence as a major global natural gas supplier grows. In addition, the long delay in the commerciality of Iranian gas means that Tehran will have trouble getting Asian pipelines to India or Pakistan off the ground with mutually acceptable terms, thereby reducing—for at least the time being—a potential source of tension between the United States and India.30

#### Iranian influence causes nuclear war

Ben-Meir 7 – Alon Ben-Meir, professor of international relations at the Center for Global Affairs at NYU, UPI, February 6, 2007, “Realpolitik: Ending Iran's defiance”

That Iran stands today able to challenge or even defy the United States in every sphere of American influence in the Middle East attests to the dismal failure of the Bush administration's policy toward it during the last six years. Feeling **emboldened and unrestrained**, Tehran may, however, miscalculate the consequences of its own actions, which could **precipitate a catastrophic regional war**. The Bush administration has less than a year to rein in Iran's reckless behavior if it hopes to prevent such an ominous outcome and achieve, at least, a modicum of regional stability. By all assessments, Iran has reaped the greatest benefits from the Iraq war. The war's consequences and the American preoccupation with it have provided Iran with an historic opportunity to establish Shiite dominance in the region while aggressively pursuing a nuclear weapon program to deter any challenge to its strategy. Tehran is fully cognizant that the successful pursuit of its regional hegemony has now become intertwined with the clout that a nuclear program bestows. Therefore, it is most unlikely that Iran will give up its nuclear ambitions at this juncture, unless it concludes that the price will be too high to bear. That is, whereas before the Iraq war Washington could deal with Iran's nuclear program by itself, now the Bush administration must also disabuse Iran of the belief that it can achieve its regional objectives with impunity. Thus, while the administration attempts to stem the Sunni-Shiite violence in Iraq to prevent it from engulfing other states in the region, Washington must also take a clear stand in Lebanon. Under no circumstances should Iranian-backed Hezbollah be allowed to topple the secular Lebanese government. If this were to occur, it would trigger not only a devastating civil war in Lebanon but a wider Sunni-Shiite bloody conflict. The Arab Sunni states, especially, Saudi Arabia, Egypt and Jordan, are terrified of this possible outcome. For them Lebanon may well provide the litmus test of the administration's resolve to inhibit Tehran's adventurism but they must be prepared to directly support U.S. efforts. In this regard, the Bush administration must wean Syria from Iran. This move is of paramount importance because not only could Syria end its political and logistical support for Hezbollah, but it could return Syria, which is predominantly Sunni, to the Arab-Sunni fold. President Bush must realize that Damascus' strategic interests are not compatible with Tehran's and the Assad regime knows only too well its future political stability and economic prosperity depends on peace with Israel and normal relations with the United States. President Bashar Assad may talk tough and embrace militancy as a policy tool; he is, however, the same president who called, more than once, for unconditional resumption of peace negotiation with Israel and was rebuffed. The stakes for the United States and its allies in the region are too high to preclude testing Syria's real intentions which can be ascertained only through direct talks. It is high time for the administration to reassess its policy toward Syria and begin by abandoning its schemes of regime change in Damascus. Syria simply matters; the administration must end its efforts to marginalize a country that can play such a pivotal role in changing the political dynamic for the better throughout the region. Although ideally direct negotiations between the United States and Iran should be the first resort to resolve the nuclear issue, as long as Tehran does not feel seriously threatened, it seems unlikely that the clergy will at this stage end the nuclear program. In possession of nuclear weapons Iran will intimidate the larger Sunni Arab states in the region, bully smaller states into submission, threaten Israel's very existence, use oil as a political weapon to blackmail the West and instigate regional proliferation of nuclear weapons' programs. In short, if unchecked, **Iran could plunge the Middle East into a deliberate or inadvertent nuclear conflagration**. If we take the administration at its word that it would not tolerate a nuclear Iran and considering these regional implications, Washington is left with no choice but to warn Iran of the severe consequences of not halting its nuclear program.

#### Sanctions prevent a nuclear Iran

Rubin 12 – Michael Rubin, Resident Scholar at the American Enterprise Institute, January 4, 2012, “The West should hand Iran's leadership a chalice of poison,” http://www.aei.org/article/foreign-and-defense-policy/the-west-should-hand-irans-leadership-a-chalice-of-poison/

**To relieve** economic and military **pressure on Iran would be** counterproductive. So long as Iran does not attain nuclear weapons, its threats to close the Strait of Hormuz remain simple bluster. If Iran is allowed to develop nuclear weapons, all bets are off. Tehran's ability to amplify its leverage over the international economy would increase exponentially.¶ Make no mistake: Iran cannot close the Strait of Hormuz for more than a day. When its navy mined the Persian Gulf in 1988, damaging a US vessel, president Ronald Reagan responded with Operation Praying Mantis, decimating the Iranian navy, a bloody nose that led Tehran to respect international waters for more than two decades.¶ Nor can Iran itself afford a closure of the strait. Not only does it need to export oil itself through the waterway, but, because of decades of financial mismanagement, it also depends on the strait for the import of refined petroleum products.¶ Without imported gasoline to fuel its car and factories, Iran's economy would grind to a halt. To close the strait even for a day would do far more economic damage to Iran than it would to Australia, east Asia or the West.¶ The leadership in Tehran knows better than anyone that every time Iran has experienced a fuel shortage, protesters have poured into the streets.¶ Despite bluster that sanctions have had no effect, Iranian behaviour suggests the opposite. Both the March 2007 Iranian attack on British sailors in the waters between Iraq and Iran, and the November 2011 attack on the British embassy in Tehran, came two days after the British government lent its support to new sanctions. Both attacks were overreactions that belied Tehran's insistence that sanctions are meaningless.¶ Even Iranian parliamentarians do not buy their government's rhetoric. Last month, 30 representatives called for a closed session of the parliament in order to dispense with polemic and to discuss sanctions truthfully. Abolghasem Mozaffari, the head of the Revolutionary Guards' economic wing, confessed that ''the sanctions have not been without impact''.¶ Iran's current provocations may have more to do with its own **desperation** than any real grievance. After the US Congress imposed unilateral sanctions on Iran last month, Iran's currency lost nearly half its value. Unemployment and inflation are both in double digits.

#### A nuclear Iran causes rapid global proliferation, nuclear terrorism, and Middle East nuclear war

Lindsay 10 – James M. Lindsay 10, Senior Vice President, Director of Studies, and Maurice R. Greenberg Chair at the Council on Foreign Relations and Ray Takeyh is a Senior Fellow at the Council on Foreign Relations, After Iran Gets the Bomb, Foreign Affairs, Mar/Apr2010, Vol. 89, Issue 2

The dangers of Iran's entry into the nuclear club are well known: emboldened by this development, Tehran might multiply its attempts at subverting its neighbors and encouraging terrorism against the United States and Israel; the risk of both conventional and nuclear war in the Middle East would escalate; more states in the region might also want to become nuclear powers; the geopolitical balance in the Middle East would be reordered; and broader efforts to stop the spread of nuclear weapons would be undermined. The advent of a nuclear Iran--even one that is satisfied with having only the materials and infrastructure necessary to assemble a bomb on short notice rather than a nuclear arsenal--would be seen as a major diplomatic defeat for the United States. Friends and foes would openly question the U.S. government's power and resolve to shape events in the Middle East. Friends would respond by distancing themselves from Washington; foes would challenge U.S. policies more aggressively.

#### Proliferation will be fast and destabilizing – guarantees nuclear war

Evans and Kawaguchi 9 (Gareth, Chancellor of the Australian National University, an Honorary Professorial Fellow at the University of Melbourne and President Emeritus of the Brussels-based International Crisis Group, and Yoriko Kawaguchi, Member of the House of Councillors for the Liberal Democratic Party since 2005. She was Special Adviser to the Prime Minister of Japan, “Eliminating Nuclear Threats,” International Commission on Nuclear Non-Proliferation and Disarmament, <http://www.icnnd.org/reference/reports/ent/part-ii-3.html>)

3.1 Ensuring that no new states join the ranks of those already nuclear armed must continue to be one of the world’s top international security priorities. Every new nuclear-armed state will add significantly to the inherent risks – of accident or miscalculation as well as deliberate use – involved in any possession of these weapons, and potentially encourage more states to acquire nuclear weapons to avoid being left behind. Any scramble for nuclear capabilities is bound to generate **severe instability** in bilateral, regional and international relations. The carefully worked checks and balances of interstate relations will come under severe stress. There will be enhanced fears of nuclear blackmail, and of irresponsible and unpredictable leadership behaviour. 3.2 In conditions of inadequate command and control systems, absence of confidence building measures and multiple agencies in the nuclear weapons chain of authority, the possibility of an accidental or maverick usage of nuclear weapons will remain high. Unpredictable elements of risk and reward will impact on decision making processes. The dangers are compounded if the new and aspiring nuclear weapons states have, as is likely to be the case, ongoing inter-state disputes with ideological, territorial, historical – and for all those reasons, strongly emotive – dimensions. 3.3 The transitional period is likely to be most dangerous of all, with the arrival of nuclear weapons tending to be accompanied by sabre rattling and competitive nuclear chauvinism. For example, as between Pakistan and India a degree of stability might have now evolved, but 1998–2002 was a period of disturbingly fragile interstate relations. Command and control and risk management of nuclear weapons takes time to evolve. Military and political leadership in new nuclear-armed states need time to learn and implement credible safety and security systems. The risks of nuclear accidents and the possibility of nuclear action through inadequate crisis control mechanisms are very high in such circumstances. If this is coupled with political instability in such states, the risks escalate again. Where such countries are beset with internal stresses and fundamentalist groups with trans-national agendas, the risk of nuclear weapons or fissile material coming into possession of non‑state actors cannot be ignored. 3.4 The action–reaction cycle of nations on high alerts, of military deployments, threats and counter threats of military action, have all been witnessed in the Korean peninsula with unpredictable behavioural patterns driving interstate relations. The impact of a proliferation breakout in the Middle East would be much wider in scope and make stability management extraordinarily difficult. Whatever the chances of “stable deterrence” prevailing in a Cold War or India–Pakistan setting, the prospects are significantly less in a regional setting with multiple nuclear power centres divided by multiple and cross-cutting sources of conflict.

#### There’s a high risk of nuclear terrorism – causes extinction

Hellman 8 [Martin E. Hellman, emeritus prof of engineering @ Stanford, “Risk Analysis of Nuclear Deterrence” SPRING 2008 THE BENT OF TAU BETA PI, http://www.nuclearrisk.org/paper.pdf]

The threat of nuclear terrorism looms much larger in the public’s mind than the threat of a full-scale nuclear war, yet this article focuses primarily on the latter. An explanation is therefore in order before proceeding. A terrorist attack involving a nuclear weapon would be a catastrophe of immense proportions: “A 10-kiloton bomb detonated at Grand Central Station on a typical work day would likely kill some half a million people, and inflict over a trillion dollars in direct economic damage. America and its way of life would be changed forever.” [Bunn 2003, pages viii-ix]. **The likelihood of such an attack is also significant**. Former Secretary of Defense William Perry has estimated the chance of a nuclear terrorist incident within the next decade to be roughly 50 percent [Bunn 2007, page 15]. David Albright, a former weapons inspector in Iraq, estimates those odds at less than one percent, but notes, “We would never accept a situation where the chance of a major nuclear accident like Chernobyl would be anywhere near 1% .... A nuclear terrorism attack is a low-probability event, but we can’t live in a world where it’s anything but extremely low-probability.” [Hegland 2005]. In a survey of **85 national security experts**, Senator Richard Lugar **found** a median estimate of 20 percent for the “probability of **an attack involving a nuclear explosion occurring** somewhere in the world in the next 10 years,” with 79 percent of the respondents believing “it more likely to be carried out by terrorists” than by a government [Lugar 2005, pp. 14-15]. I support increased efforts to reduce the threat of nuclear terrorism, but that is not inconsistent with the approach of this article. Because terrorism is one of the potential trigger mechanisms for a full-scale nuclear war, the risk analyses proposed herein will include estimating the risk of nuclear terrorism as one component of the overall risk. If that risk, the overall risk, or both are found to be unacceptable, then the proposed remedies would be directed to reduce which- ever risk(s) warrant attention. Similar remarks apply to a number of other threats (e.g., nuclear war between the U.S. and China over Taiwan). his article would be incomplete if it only dealt with the threat of nuclear terrorism and neglected the threat of full- scale nuclear war. If both risks are unacceptable, an effort to reduce only the terrorist component would leave humanity in great peril. In fact, society’s almost total neglect of the threat of full-scale nuclear war makes studying that risk all the more important. The cosT of World War iii The danger associated with nuclear deterrence depends on both the cost of a failure and the failure rate.3 This section explores the cost of a failure of nuclear deterrence, and the next section is concerned with the failure rate. While other definitions are possible, this article defines a failure of deterrence to mean a full-scale exchange of all nuclear weapons available to the U.S. and Russia, an event that will be termed World War III. Approximately 20 million people died as a result of the first World War. World War II’s fatalities were double or triple that number—chaos prevented a more precise deter- mination. In both cases humanity recovered, and the world today bears few scars that attest to the horror of those two wars. Many people therefore implicitly believe that a third World War would be horrible but survivable, an extrapola- tion of the effects of the first two global wars. In that view, World War III, while horrible, is something that humanity may just have to face and from which it will then have to recover. In contrast, some of those most qualified to assess the situation hold a very different view. In a 1961 speech to a joint session of the Philippine Con- gress, General Douglas MacArthur, stated, “Global war has become a Frankenstein to destroy both sides. … If you lose, you are annihilated. If you win, you stand only to lose. No longer does it possess even the chance of the winner of a duel. It contains now only the germs of double suicide.” Former Secretary of Defense Robert McNamara ex- pressed a similar view: “If deterrence fails and conflict develops, the present U.S. and NATO strategy carries with it a high risk that Western civilization will be destroyed” [McNamara 1986, page 6]. More recently, George Shultz, William Perry, Henry Kissinger, and Sam Nunn4 echoed those concerns when they quoted President Reagan’s belief that nuclear weapons were “totally irrational, totally inhu- mane, good for nothing but killing, possibly destructive of life on earth and civilization.” [Shultz 2007] Official studies, while couched in less emotional terms, still convey the horrendous toll that World War III would exact: “The resulting deaths would be far beyond any precedent. Executive branch calculations show a range of U.S. deaths from 35 to 77 percent (i.e., 79-160 million dead) … a change in targeting could kill somewhere between 20 million and 30 million additional people on each side .... These calculations reflect only deaths during the first 30 days. Additional millions would be injured, and many would eventually die from lack of adequate medical care … millions of people might starve or freeze during the follow- ing winter, but it is not possible to estimate how many. … further millions … might eventually die of latent radiation effects.” [OTA 1979, page 8] This OTA report also noted the possibility of serious ecological damage [OTA 1979, page 9], a concern that as- sumed a new potentiality when the TTAPS report [TTAPS 1983] proposed that the ash and dust from so many nearly simultaneous **nuclear explosions** and their resultant fire- storms **could usher in a nuclear winter that might** erase homo sapiens from the face of the earth, much as many scientists now believe the K-T Extinction that wiped out the dinosaurs resulted from an impact winter caused by ash and dust from a large asteroid or comet striking Earth. The TTAPS report produced a heated debate, and there is still no scientific consensus on whether a nuclear winter would follow a full-scale nuclear war. Recent work [Robock 2007, Toon 2007] suggests that even a limited nuclear exchange or one between newer nuclear-weapon states, such as India and Pakistan, could have devastating long-lasting climatic consequences due to the large volumes of smoke that would be generated by fires in modern megacities. While it is uncertain how destructive World War III would be, prudence dictates that we apply the same engi- neering conservatism that saved the Golden Gate Bridge from collapsing on its 50th anniversary and assume that preventing World War III is a necessity—not an option.

### Advantage 2 is Manufacturing

#### **Natural gas prices are low now**

Silha 10-25 – Joe Silha, reporter for Reuters, October 25th, 2012, "UPDATE 3-Front US natgas futures end down, storage nears new high" [www.reuters.com/article/2012/10/25/markets-nymex-natgas-idUSL1E8LP58U20121025](http://www.reuters.com/article/2012/10/25/markets-nymex-natgas-idUSL1E8LP58U20121025)

NEW YORK, Oct 25 (Reuters) - Front-month U.S. natural gas futures ended lower on Thursday for the third time this week, as traders shrugged off a neutral weekly inventory report and focused instead on two more weeks of builds that should drive storage to a new all-time high.

#### Low prices are stabilizing and key to long-term investment

CCES 12 – Center for Climate and Energy Solutions, May 2012, "Natural Gas in the Industrial Sector," [www.c2es.org/docUploads/natural-gas-industrial-sector.pdf](http://www.c2es.org/docUploads/natural-gas-industrial-sector.pdf)

Increased availability and low prices of natural gas have significant implications for domestic manufacturing, which has historically been concerned about supply availability and price volatility. Recently, abundant supply and low prices have led to an **increase in domestic manufacturing, creating new jobs and economic value.** Numerous companies have cited natural gas supply and price in announcing plans to open new facilities in the chemicals, plastics, steel, and other industries in the United States.18 In the past few years, the number of firms disclosing the **positive impact of new gas resources** for facility power generation and feedstock use to the Securities and Exchange Commission **has increased substantially**.19 In 2010, exports of basic chemicals and plastics increased 28 percent from the previous year, yielding a trade surplus of $16.4 billion.20 If the expectation that low prices will continue is correct, these economic benefits would be significant over the long term. A study by the American Chemistry Council, for instance, estimates that a 25 percent increase in ethane supplies would yield a $32.8 billion increase in U.S. chemical production.21 Industry, however, needs more than just abundance and low prices to maintain use of natural gas. Price stability is necessary to encourage long-term investments in industry, and **increased natural gas supplies** also have the potential to stabilize prices.22

#### **They’re key to manufacturing and the chemical industry**

PWC 11 – PwC's Industrial Products (IP) practice provides financial, operational, and strategic services to global organizations. December 2011, "Shale Gas - A Renaissance in US Manufacturing?"www.pwc.com/en\_US/us/industrial-products/assets/pwc-shale-gas-us-manufacturing-renaissance.pdf

The economic environment remains difficult for many US manufacturers, with soft demand and margin pressures making it harder to grow their domestic workforces. In this analysis, we present our point of view on how **shale gas** resources **can** help the sector **address these challenges** and create more jobs in the United States.¶ Executive summary¶ Shale, savings, growth, and jobs¶ During the last couple of years, increased commercialization of alternative energy has ushered in mounting debate on the impact – or lack of impact – that the deployment of new energy sources has on US job creation. Shale gas is one such alternative energy source that has drawn momentous investment and discussion as the country pursues a cleaner and more sustainable energy mix. Indeed, the shale gas industry has captured national attention, with even the names of reserves – Marcellus, Utica, Bakken, Barnett, and Eagle Ford – recognizable as national assets by even the casual observer… And for good reason. The amount of shale gas in these reserves and others potentially makes the United States one of the top producers of shale gas in the world.¶ While there has been a sharp focus cast upon shale gas – both on its potential promise and possible drawbacks – as a tenable energy source, there has been less focus on how shale gas impacts other industries. This led PsC to ask a simple but important question: “What could a growing shale gas industry mean for manufacturing job creation in the United States going forward?”¶ Potential opportunities¶ A PwC analysis finds that full-scale and robust shale gas development through 2025 would likely have a number of knock-on effects for other industries, particularly the manufacturing and chemical sectors. Given a scenario calling for high recovery of shale gas and low prices of natural gas, **the US manufacturing sector and the** **broader US economy** could stand to **benefit** in the following ways:¶ Energy affordability¶ Lower feedstock and energy costs could help US manufacturers reduce natural gas expenses by as much as $11.6 billion annually through 2025.¶ Demand growth¶ In 2011, 17 chemical, metal, and industrial manufacturers commented in SBC filings that shale gas developments drove demand for their products, compared to none in 2008.¶ More jobs¶ US manufacturing companies could employ approximately one million more workers by 2025 due to benefits from affordable energy and demand for products used to extract the gas.¶ This report demonstrates how shale gas can lead to each of these opportunities, based upon our analysis of trends in, and forecasts of, the domestic economy, manufacturing, and employment.¶ An increase in domestic investment¶ With shale gas resources more abundant than previously thought, US manufacturers can look forward to multiple new opportunities and a significant uptick in employment in the sector. Chemicals **and metals** companies are expected to gain the greatest benefit over the next several years. Chemicals companies can acquire affordable feedstock, meriting greater capital expenditures in the United States. For metals companies and some industrial manufacturers, opportunities abound to sell the equipment required for more robust drilling activity.¶ Many **companies have already announced new investment plans** geared to the development of shale gas. Our research on recent capex plans shows an increase in domestic investment going to support incremental gas production, along with more explicit communication to investors about shale-related growth opportunities. An underappreciated part of the shale gas story is the substantial cost benefit to manufacturers, based on estimates of future natural gas prices as more shale gas is recovered., Historically, there has been an indirect relationship between the level of energy prices, such as those for natural gas, and the level of domestic manufacturing employment, as manufacturers consume approximately one-third of all the energy produced in the United States. Consequentially, this relatively abundant domestic energy source has the potential to **drive an uptick in US manufacturing over the** long term **and create new jobs in the sector.**

#### **Manufacturing is the basis of competitiveness---massive multiplier effects---key to US tech innovation and hegemony**

Boushey 12 – Heather Boushey, Senior Economist, Center for American Progress Action Fund, July 19th, 2012, "Testimony before the U.S. House of Representatives Committee on Ways and Meanson Tax Reform and the U.S. Manufacturing Sector" waysandmeans.house.gov/uploadedfiles/boushey\_testimony.pdf

**Having a strong manufacturing industry in the United States should be at the top of our national economic agenda. Without a vibrant and innovative manufacturing base,** we will not be a global leader **for long. Moreover, as more of our energy** future will rely on high-tech manufacturing**, our** economic competitiveness will be even more closely aligned with our ability to be an innovator and producer of manufactured goods**.**¶ Further, this is an urgent national issue and one of those cases where success begets success. Economists have begun to study and show that the “industrial commons” matters for innovation and the extent to which we allow manufacturing processes to continue to go overseas, we only make it that much harder to regain our place as a global leader.11 As my colleagues Michael Ettlinger and Kate Gordon have put it, “the cross-fertilization and engagement of a community of experts in industry, academia, and government is vital to our nation’s economic competitiveness.”12¶ Manufacturing is not only a key part of our economy, but moving forward it will remain critical to our nation’s economic vitality¶ **The U.S. manufacturing sector is still a force internationally and an important part of our economy, despite employment losses and the relative rise in manufacturing in other countries over the past few decades**.13 **Last year, manufacturing contributed over** $1.8 trillion **to U.S.** g**ross** d**omestic** p**roduct, or about** 12 percent of the economy.14 Two years ago, manufacturing accounted for 60 percent of all U.S. exports.15 In 2008, the United States ranked first in the world in manufacturing value added, and it was the third largest exporter of manufactured goods to the world, behind only China and Germany and ahead of Japan and France.16 Between 1979 and 2010 manufacturing output per hour of labor in the United States increased by an average of 4 percent annually, and the United States has one of the world’s most productive workforces.17 Moreover, in 2009 there were 11.8 million direct jobs in manufacturing and 6.8 million additional jobs in related sectors.18 Put another way, one in six U.S. private-sector jobs is directly linked to manufacturing.19¶ Yet the industry suffered declines in the 2000s. The U.S. share of worldwide manufacturing value added dropped from 26 percent in 1998 to less than 20 percent in 2007, and we have gone from being a net exporter of manufactured goods in the 1960s to a net importer.20 Manufacturing as a share of U.S. GDP has declined from more than 15 percent in 1998 to 11 percent in 2009.21 And jobs in U.S. manufacturing declined from 17.6 million in January 1998 to 11.5 million in January 2010.22 And although the manufacturing sector has gained jobs in every month since then, for a total of 504,000 jobs as of June 2012, its share of total employment is down from 16.8 percent in 1998 to 10.8 percent today.23¶ These trends matter because the United States needs a strong manufacturing sector. **Manufacturing** provides good, middle-class jobs; **propels U.S. leadership in technology and innovation**, which is critical to our economic growth and vitality; and is important to balancing the trade deficit, as well as important for our nation’s long-term national security. The manufacturing sector has historically been a source of solid, middle-class jobs and it continues to be so today. **The average manufacturing worker earns a weekly wage that is 8.4 percent higher than non-manufacturing workers,** taking into account worker and job characteristics that influence wages, including unionization.24 **Economist Susan Helper and her colleagues conclude** that the economic evidence points to the fact that “the main reason why manufacturing wages and benefits are higher than those outside of manufacturing is that manufacturers need to pay higher wages to ensure that their workers are appropriately skilled and motivated.” 25 U.S.-based **manufacturing underpins a broad range of jobs in other industries,** including higher skill service jobs such as accountants, bankers, and lawyers, as well as a broad range of other jobs such as basic research and technology development, product and process engineering and design, operations and maintenance, transportation, testing, and lab work.26 Compared to jobs in other economic sectors, manufacturing jobs have the highest “multiplier effect**,” that is, the largest effect on the overall economy for each job created, relative to jobs in other industries.** To put this in perspective, each job in motor vehicle manufacturing creates 8.6 indirect jobs, each job in computer manufacturing creates 5.6 indirect jobs, and each job in steel product manufacturing creates 10.3 indirect jobs.27¶ Manufacturing is also important because it fuels the United States’ leadership in technology and innovation, which are critical to maintain for our future economic competitiveness.28 Manufacturing firms are more likely to innovate than firms in other industries: **Research from the National Science Foundation finds that 22 percent of manufacturing companies are active innovators compared to only 8 percent of nonmanufacturing companies.**29 This number is even higher for specific sectors within manufacturing. For example, in computer and electronic products manufacturing, 45 percent of companies are product innovators and 33 percent are process innovators.30 Manufacturing firms also **perform the vast majority of private research and development**: Despite comprising just 12 percent of the nation’s GDP in 2007, manufacturing companies contributed 70 percent of private research and development spending.31 ¶ In addition to what manufacturers spend on innovation, there is **increasingly strong empirical evidence showing a tight link between innovation and manufacturing production.** Economic research now shows that the United States will not likely be able to keep the highly skilled technical jobs if the production jobs go overseas. Harvard Business School professors Gary Pisano and Willy Shih have written about the decline of the “industrial commons” in the United States: the collective R&D, engineering, and manufacturing capabilities that mutually reinforce each other to sustain innovation.32 **For many types of manufacturing,** geographic proximity is key **to having a strong “commons,” and they point to evidence showing that there are few hightech industries where the feedback loop from the manufacturing process is not a factor in developing new products.**33 As they put it, “product and process innovation are intertwined.” Pisano and Shih point to the example of rechargeable batteries as a product where innovation followed manufacturing. Rechargeable battery manufacturing left the United States many years ago, leading to the migration of the batteries commons to Asia. Now new technology (batteries for hybrid and electric vehicles) are being designed in Asia where the commons are located. I’d draw your attention to a January New York Times article on China’s increasing investment in research and development, which asked, “**Our global competitiveness is based on being the origin of the newest, best ideas.** How will we fare if those ideas originate somewhere else?”34

#### Domestic manufacturing is vital to US military tech innovation---key to primacy

Ettlinger and Gordon 11 – Michael Ettlinger is the Vice President for Economic Policy at American Progress. Kate is a Senior Fellow at American Progress. “The Importance and Promise of American Manufacturing,” April, http://www.americanprogress.org/wp-content/uploads/issues/2011/04/pdf/manufacturing.pdf

Beyond innovation and competitiveness, basing manufacturing in the United States also is important to our overall national **and economic** security. The most clear-cut example of this, of course, is the importance of **being able to produce for the needs of our armed forces**. The importance of domestic capabilities in defense manufacturing is obvious—one doesn’t want to be dependent on foreign suppliers in a time of conflict. Equally obvious is the importance of **keeping innovations in military technology close to home**.

#### Military tech innovation is key to heg

Segal 4 – Maurice R. Greenberg Senior Fellow in China Studies at the Council on Foreign Relations. Foreign Affairs, November 2004 - December 2004, Is America Losing Its Edge?, Adam Segal, Pg. 2 Vol. 83 No. 6, Technology Enterprises in China.

The United States' **global primacy** **depends** in large part **on its ability to** develop new technologies and industries **faster than anyone else.** **For** the last five decades, **U.S. scientific innovation and** technological **entrepreneurship** **have** ensured the country'seconomic prosperity and military power. It was Americans who invented and commercialized the semiconductor, the personal computer, and the Internet; other countries merely followed the U.S. lead.¶ Today, however, **this technological edge**-so long taken for granted-may be slipping, and the most serious challenge is coming from Asia. Through competitive tax policies, increased investment in research and development (R&D), and preferential policies for science and technology (S&T) personnel, Asian governments are improving the quality of their science and ensuring the exploitation of future innovations. The percentage of patents issued to and science journal articles published by scientists in China, Singapore, South Korea, and Taiwan is rising. Indian companies are quickly becoming the second-largest producers of application services in the world, developing, supplying, and managing database and other types of software for clients around the world. South Korea has rapidly eaten away at the U.S. advantage in the manufacture of computer chips and telecommunications software. And even China has made impressive gains in advanced technologies such as lasers, biotechnology, and advanced materials used in semiconductors, aerospace, and many other types of manufacturing.¶ **Although the** United States' **technical dominance** remains solid**, the globalization** of research and development **is exerting** **considerable pressures on the American system**. Indeed, as the United States is learning, globalization cuts both ways: it is both a potent catalyst of U.S. technological innovation and a significant threat to it. **The** United States **will never be able to** prevent rivals from developing new technologies**; it can** remain dominant only **by** continuing to innovate faster **than everyone else.** But this won't be easy; to keep its privileged position in the world, **the** United States **must get better at** fostering technological entrepreneurship at home.

#### Hegemonic decline causes nuclear war and extinction

Barnett 11 – Thomas P.M. Barnett is Former Senior Strategic Researcher and Professor in the Warfare Analysis & Research Department, Center for Naval Warfare Studies, U.S. Naval War College American military geostrategist and Chief Analyst at Wikistrat., worked as the Assistant for Strategic Futures in the Office of Force Transformation in the Department of Defense, March 7th, 2011, “The New Rules: Leadership Fatigue Puts U.S., and Globalization, at Crossroads,” http://www.worldpoliticsreview.com/articles/8099/the-new-rules-leadership-fatigue-puts-u-s-and-globalization-at-crossroads

It is worth first examining the larger picture: We live in a time of arguably **the greatest structural change in the global order yet endured**, with this historical moment's most amazing feature being its relative and absolute lack of mass violence. That is something to consider when Americans contemplate military intervention in Libya, because if we do take the step to prevent larger-scale killing by engaging in some killing of our own, we will not be adding to some fantastically imagined global death count stemming from the ongoing "megalomania" and "evil" of American "empire." We'll be engaging in the same sort of system-administering activity that has marked our stunningly successful stewardship of global order since World War II. Let me be more blunt: As the **guardian of globalization**, the U.S. military has been the greatest force for peace the world has ever known. Had America been removed from the global dynamics that governed the 20th century, the **mass murder never would have ended**. Indeed, it's entirely conceivable there would now be no identifiable human civilization left, once nuclear weapons entered **the killing equation.** But the world did not keep sliding down that **path of perpetual war**. Instead, America stepped up and changed everything by **ushering in our now-**perpetual great-power peace. We introduced the **international liberal trade order known as globalization** and played loyal Leviathan over its spread. What resulted was the collapse of empires, an explosion of **democracy,** the persistent spread of **human rights**, the liberation of women, the doubling of life expectancy, a roughly 10-fold increase in adjusted global GDP and a **profound** and persistent **reduction in** battle deaths from state-based **conflicts**. That is what American "hubris" actually delivered. Please remember that the next time some TV pundit sells you the image of "unbridled" American military power as the cause of global disorder instead of its cure. With self-deprecation bordering on self-loathing, we now imagine a post-American world that is anything but. Just watch who scatters and who steps up as the Facebook revolutions erupt across the Arab world. While we might imagine ourselves the status quo power, we remain the world's most vigorously revisionist force. ¶ As for the sheer "evil" that is our military-industrial complex, again, let's examine what the world looked like before that establishment reared its ugly head. The last great period of global structural change was the first half of the 20th century, a period that saw **a death toll of about 100 million across two world wars**. That comes to an average of 2 million deaths a year in a world of approximately 2 billion souls. Today, with far more comprehensive worldwide reporting, researchers report an average of less than 100,000 battle deaths annually in a world fast approaching 7 billion people. Though admittedly crude, these calculations suggest a 90 percent absolute drop and a 99 percent relative drop in deaths due to war. We are **clearly headed for a world order characterized by multipolarity**, something the American-birthed system was designed to both encourage and accommodate. But given how things turned out the last time we collectively faced such a fluid structure, we would do well to keep U.S. power, in all of its forms, deeply embedded in the geometry to come.

#### Perception of decline will cause the US to lashout---triggers hegemonic wars

Goldstein 7 Professor of Global Politics and International Relations @ University of Pennsylvania “Power transitions, institutions, and China's rise in East Asia: Theoretical expectations and evidence,” Journal of Strategic Studies, Volume 30, Issue 4 & 5 August 2007, pages 639 – 682

Two closely related, though distinct, theoretical arguments focus explicitly on the consequences for international politics of a shift in power between a dominant state and a rising power. In War and Change in World Politics, Robert Gilpin suggested that peace prevails when a dominant state’s capabilities enable it to ‘govern’ an international order that it has shaped. Over time, however, as economic and technological diffusion proceeds during eras of peace and development, other states are empowered. Moreover, the burdens of international governance drain and distract the reigning hegemon, and challengers eventually emerge who seek to rewrite the rules of governance. As the power advantage of the erstwhile hegemon ebbs, **it may become desperate enough to resort to** the ultima ratio of international politics, **force,** to forestall the increasingly urgent demands of a rising challenger. Or as the power of the challenger rises, it may be tempted to press its case with threats to use force. It is the rise and fall of the great powers that creates the circumstances under which major wars, what Gilpin labels ‘hegemonic wars’, break out.13 Gilpin’s argument logically encourages pessimism about the implications of a rising China. It leads to the expectation that international trade, investment, and technology transfer will result in a steady diffusion of American economic power, benefiting the rapidly developing states of the world, including China. As the US simultaneously scurries to put out the many brushfires that threaten its far-flung global interests (i.e., the classic problem of overextension), it will be unable to devote sufficient resources to maintain or restore its former advantage over emerging competitors like China. While the erosion of the once clear American advantage plays itself out, the US will find it ever more difficult to preserve the order in Asia that it created during its era of preponderance. The expectation is an increase in the likelihood for the use of force – either by a Chinese challenger able to field a stronger military in support of its demands for greater influence over international arrangements in Asia, or by a besieged American hegemon desperate to head off further decline. Among the trends that alarm those who would look at Asia through the lens of Gilpin’s theory are China’s expanding share of world trade and wealth (much of it resulting from the gains made possible by the international economic order a dominant US established); its acquisition of technology in key sectors that have both civilian and military applications (e.g., information, communications, and electronics linked with to forestall, and the challenger becomes increasingly determined to realize the transition to a new international order whose contours it will define. the ‘revolution in military affairs’); and an expanding military burden for the US (as it copes with the challenges of its global war on terrorism and especially its struggle in Iraq) that limits the resources it can devote to preserving its interests in East Asia.14 Although similar to Gilpin’s work insofar as it emphasizes the importance of shifts in the capabilities of a dominant state and a rising challenger, the power-transition theory A. F. K. Organski and Jacek Kugler present in The War Ledger focuses more closely on the allegedly dangerous phenomenon of ‘crossover’– the point at which a dissatisfied challenger is about to overtake the established leading state.15 In such cases, when the power gap narrows, the dominant state becomes increasingly desperate. Though suggesting why a rising China may ultimately present grave dangers for international peace when its capabilities make it a peer competitor of America, Organski and Kugler’s power-transition theory is less clear about the dangers while a potential challenger still lags far behind and faces a difficult struggle to catch up. This clarification is important in thinking about the theory’s relevance to interpreting China’s rise because a broad consensus prevails among analysts that Chinese military capabilities are at a minimum two decades from putting it in a league with the US in Asia.16 Their theory, then, points with alarm to trends in China’s growing wealth and power relative to the United States, but especially looks ahead to what it sees as the period of maximum danger – that time when a dissatisfied China could be in a position to overtake the US on dimensions believed crucial for assessing power. Reports beginning in the mid-1990s that offered extrapolations suggesting China’s growth would give it the world’s largest gross domestic product (GDP aggregate, not per capita) sometime in the first few decades of the twentieth century fed these sorts of concerns about a potentially dangerous challenge to American leadership in Asia.17 The huge gap between Chinese and American military capabilities (especially in terms of technological sophistication) has so far discouraged prediction of comparably disquieting trends on this dimension, but inklings of similar concerns may be reflected in occasionally alarmist reports about purchases of advanced Russian air and naval equipment, as well as concern that Chinese espionage may have undermined the American advantage in nuclear and missile technology, and speculation about the potential military purposes of China’s manned space program.18 Moreover, because a dominant state may react to the prospect of a crossover and believe that it is wiser to embrace the logic of **preventive war** and act early to delay a transition while the task is more manageable, Organski and Kugler’s power-transition theory also provides grounds for concern about the period prior to the possible crossover.19 pg. 647-650

#### Low prices bring chemical innovation back to the US

Brady 12 – Jeff Brady, writer for NPR, February 13, 2012, "Natural Gas Boom Energizing The Chemical Industry" [www.npr.org/2012/02/13/146803953/natural-gas-boom-energizing-the-chemical-industry](http://www.npr.org/2012/02/13/146803953/natural-gas-boom-energizing-the-chemical-industry)

Just outside of West Virginia's capital city, Charleston, on the banks of the Kanawha River, sits the Institute Industrial Park. Chemical plants have operated here continuously since World War II, when the local factories cranked out synthetic rubber. Today there are industrial pipes, tanks and buildings stretching in just about every direction.¶ Soon, there could be more.¶ U.S. chemical companies are the latest beneficiaries of the nation's natural gas drilling boom. Long focused on cheap gas sources elsewhere in the world, companies are now looking to expand here. **A surplus of natural gas has pushed down prices, making it more attractive for chemical companies** that use lots of gas to reopen shuttered plants and build new ones.¶ Sleepy rural communities across the country are turning into industrial zones — and that worries people who live nearby. But the boom is good news for manufacturers that need cheap, plentiful supplies of natural gas.¶ The natural gas drilling boom near Charleston has local business boosters lobbying for a huge new chemical plant, called an ethane cracker, which could bring jobs to the state.¶ "It will take approximately 2,000 construction workers two years just to build the facility," says Matthew Ballard, president and chief executive officer of the Charleston Area Alliance. "Once up and running, there will be several hundred jobs at that cracking facility."¶ The plant would "crack" ethane — break it down at the molecular level — and turn it into ethylene. Kevin DiGregorio, executive director of the Chemical Alliance Zone in Charleston, says ethylene is used to produce all sorts of things, from the cushions we sit on to the clothes we wear.¶ "Everything that's not wood, or maybe brick, is made with chemicals, certainly. But probably 40 to 60 percent of it is made from ethylene," DiGregorio says. "It's very, very important to our daily lives."¶ States Compete For Plants, Jobs¶ The Marcellus Shale, from which nearby drillers are pulling natural gas, is particularly ethane-rich. Most natural gas contains anywhere from 2 to 8 percent of ethane, DiGregorio says, but "Marcellus natural gas contains as much as 14 to 16 percent" of ethane.¶ Bayer CropScience, the company that operates the industrial park near Charleston, is talking with companies interested in building ethane crackers in the region. No official announcement has been made, but business leaders here are keeping their fingers crossed.¶ The same is true elsewhere around northern Appalachia. Ohio, Pennsylvania and West Virginia are competing to lure a new ethane cracker that the oil company Shell plans to build. Firms in Canada also see opportunity in the Marcellus Shale.¶ Economy¶ Project's Promise Of Jobs Has Appalachia Seeing Stars¶ "We wouldn't have to go back very far — literally just seven or eight years — and the picture for the industry here in North America was pretty uncertain," says Randy Woelfel, CEO of NOVA Chemicals in Calgary, Alberta.¶ He says high oil prices sent a lot of petrochemical manufacturing overseas to the Middle East and Asia. But now, low natural gas prices and the ethane-rich Marcellus Shale have changed everything.¶ "That means ... that we'll be back in the hiring business, rather than the consolidation and survival/cost-cutting mode that NOVA was clearly in for much of the last decade," Woelfel says.

#### The chemical industry solves extinction

Baum 99 – Baum, Founder of Chemical and Engineering News Washington, 12-6-99 (Rudy, “MILLENNIUM SPECIAL REPORT,” C&EN Washington, Volume 77, Number 49, http://pubs.acs.org/cen/hotarticles/cenear/991206/7749spintro2.html)

Computers and the Internet are clearly one of the driving forces shaping all aspects of society at the turn of the millennium. But despite the stock market's insistence that "tech stocks" equal "computer stocks," we here at C&EN believe that chemistry in all its permutations remains a vital component of high technology. Which brings me to this "Millennium Special Report: Chemistry In The Service Of Humanity." The pace of change in today's world is truly incomprehensible. Science is advancing on all fronts, particularly chemistry and biology working together as they never have before to understand life in general and human beings in particular at a breathtaking pace. Technology ranging from computers and the Internet to medical devices to genetic engineering to nanotechnology is transforming our world and our existence in it. It is, in fact, a fool's mission to predict where science and technology will take us in the coming decade, let alone the coming century. We can say with finality only this: We don't know. We do know, however, that we face enormous challenges, we 6 billion humans who now inhabit Earth. In its 1998 revision of world population estimates and projections, the United Nations anticipates a world population in 2050 of 7.3 billion to 10.7 billion, with a "medium-fertility projection," considered the most likely, indicating a world population of 8.9 billion people in 2050. According to the UN, fertility now stands at 2.7 births per woman, down from 5 births per woman in the early 1950s. And fertility rates are declining in all regions of the world. That's good news. But people are living a lot longer. That is certainly good news for the individuals who are living longer, but it also poses challenges for health care and social services the world over. The 1998 UN report estimates for the first time the number of octogenarians, nonagenarians, and centenarians living today and projected for 2050. The numbers are startling. In 1998, 66 million people were aged 80 or older, about one of every 100 persons. That number is expected to increase sixfold by 2050 to reach 370 million people, or one in every 24 persons. By 2050, more than 2.2 million people will be 100 years old or older! Here is the fundamental challenge we face: The world's growing and aging population must be fed and clothed and housed and transported in ways that do not perpetuate the environmental devastation wrought by the first waves of industrialization of the 19th and 20th centuries. As we increase our output of goods and services, as we increase our consumption of energy, as we meet the imperative of raising the standard of living for the poorest among us, we must learn to carry out our economic activities sustainably. There are optimists out there, C&EN readers among them, who believe that the history of civilization is a long string of technological triumphs of humans over the limits of nature. In this view, the idea of a "carrying capacity" for Earth—a limit to the number of humans Earth's resources can support—is a fiction because technological advances will continuously obviate previously perceived limits. This view has historical merit. Dire predictions made in the 1960s about the exhaustion of resources ranging from petroleum to chromium to fresh water by the end of the 1980s or 1990s have proven utterly wrong. While I do not count myself as one of the technological pessimists who see technology as a mixed blessing at best and an unmitigated evil at worst, I do not count myself among the technological optimists either. There are environmental challenges of transcendent complexity that I fear may overcome us and our Earth before technological progress can come to our rescue. Global climate change, the accelerating destruction of terrestrial and oceanic habitats, the catastrophic loss of species across the plant and animal kingdoms—these are problems that are not obviously amenable to straightforward technological solutions. But I know this, too: Science and technology have brought us to where we are, and only science and technology, coupled with innovative social and economic thinking, can take us to where we need to be in the coming millennium. Chemists, chemistry, and the chemical industry—what we at C&EN call the chemical enterprise—will play central roles in addressing these challenges. The first section of this Special Report is a series called "Millennial Musings" in which a wide variety of representatives from the chemical enterprise share their thoughts about the future of our science and industry. The five essays that follow explore the contributions the chemical enterprise is making right now to ensure that we will successfully meet the challenges of the 21st century. The essays do not attempt to predict the future. Taken as a whole, they do not pretend to be a comprehensive examination of the efforts of our science and our industry to tackle the challenges I've outlined above. Rather, they paint, in broad brush strokes, a portrait of scientists, engineers, and business managers struggling to make a vital contribution to humanity's future. The first essay, by Senior Editor Marc S. Reisch, is a case study of the chemical industry's ongoing transformation to sustainable production. Although it is not well known to the general public, the chemical industry is at the forefront of corporate efforts to reduce waste from production streams to zero. Industry giants DuPont and Dow Chemical are taking major strides worldwide to manufacture chemicals while minimizing the environmental "footprint" of their facilities. This is an ethic that starts at the top of corporate structure. Indeed, Reisch quotes Dow President and Chief Executive Officer William S. Stavropolous: "We must integrate elements that historically have been seen as at odds with one another: the triple bottom line of sustainability—economic and social and environmental needs." DuPont Chairman and CEO Charles (Chad) O. Holliday envisions a future in which "biological processes use renewable resources as feedstocks, use solar energy to drive growth, absorb carbon dioxide from the atmosphere, use low-temperature and low-pressure processes, and produce waste that is less toxic." But sustainability is more than just a philosophy at these two chemical companies. Reisch describes ongoing Dow and DuPont initiatives that are making sustainability a reality at Dow facilities in Michigan and Germany and at DuPont's massive plant site near Richmond, Va. Another manifestation of the chemical industry's evolution is its embrace of life sciences. Genetic engineering is a revolutionary technology. In the 1970s, research advances fundamentally shifted our perception of DNA. While it had always been clear that deoxyribonucleic acid was a chemical, it was not a chemical that could be manipulated like other chemicals—clipped precisely, altered, stitched back together again into a functioning molecule. Recombinant DNA techniques began the transformation of DNA into just such a chemical, and the reverberations of that change are likely to be felt well into the next century. Genetic engineering has entered the fabric of modern science and technology. It is one of the basic tools chemists and biologists use to understand life at the molecular level. It provides new avenues to pharmaceuticals and new approaches to treat disease. It expands enormously agronomists' ability to introduce traits into crops, a capability seized on by numerous chemical companies. There is no doubt that this powerful new tool will play a major role in feeding the world's population in the coming century, but its adoption has hit some bumps in the road. In the second essay, Editor-at-Large Michael Heylin examines how the promise of agricultural biotechnology has gotten tangled up in real public fear of genetic manipulation and corporate control over food. The third essay, by Senior Editor Mairin B. Brennan, looks at chemists embarking on what is perhaps the greatest intellectual quest in the history of science—humans' attempt to understand the detailed chemistry of the human brain, and with it, human consciousness. While this quest is, at one level, basic research at its most pure, it also has enormous practical significance. Brennan focuses on one such practical aspect: the effort to understand neurodegenerative diseases like Alzheimer's disease and Parkinson's disease that predominantly plague older humans and are likely to become increasingly difficult public health problems among an aging population. Science and technology are always two-edged swords. They bestow the power to create and the power to destroy. In addition to its enormous potential for health and agriculture, genetic engineering conceivably could be used to create horrific biological warfare agents. In the fourth essay of this Millennium Special Report, Senior Correspondent Lois R. Ember examines the challenge of developing methods to counter the threat of such biological weapons. "Science and technology will eventually produce sensors able to detect the presence or release of biological agents, or devices that aid in forecasting, remediating, and ameliorating bioattacks," Ember writes. Finally, Contributing Editor Wil Lepkowski discusses the most mundane, the most marvelous, and the most essential molecule on Earth, H2O. Providing clean water to Earth's population is already difficult—and tragically, not always accomplished. Lepkowski looks in depth at the situation in Bangladesh—where a well-meaning UN program to deliver clean water from wells has poisoned millions with arsenic. Chemists are working to develop better ways to detect arsenic in drinking water at meaningful concentrations and ways to remove it that will work in a poor, developing country. And he explores the evolving water management philosophy, and the science that underpins it, that will be needed to provide adequate water for all its vital uses. In the past two centuries, our science has transformed the world. Chemistry is a wondrous tool that has allowed us to understand the structure of matter and gives us the ability to manipulate that structure to suit our own purposes. It allows us to dissect the molecules of life to see what makes them, and us, tick. It is providing a glimpse into workings of what may be the most complex structure in the universe, the human brain, and with it hints about what constitutes consciousness. In the coming decades, we will use chemistry to delve ever deeper into these mysteries and provide for humanity's basic and not-so-basic needs.

#### And it’s key to aerospace

Delpy and Pike 10 – Professor David Delpy FRS, chief executive at Oxford Economics, AND\*\*\* Dr. Richard Pike, Ph.D. in chemical sciences, September 2010, “The economic benefits of chemistry research to the UK,” http://www.rsc.org/images/Economic\_Benefits\_of\_Chemistry\_Sep\_2010\_tcm18-191337.pdf

Aerospace - The modern aerospace industry depends on high-performance products that are lightweight, yet strong enough to take harsh loading conditions, and it is indeed the fruits of chemistry research which have **given rise to advanced materials** such as the polymers and composite materials now used in tails, fuselages and propellers. Chemistry research also impacts this industry through the development of coatings (e.g. to inhibit corrosion) and fuel additives to enhance performance. The aerospace industry also relies on computational chemistry to better understand combustion and the impact of elevated temperatures on the stability of various components e.g. metal oxide surface coatings and catalysts. Finally, key to the continued success of the aerospace industry are the advances that chemistry research has provided in security in aviation. The devices which safeguard the security of passengers, workers and cargo in airports and during transit are heavily dependent upon chemistry research (i.e. metal detectors, x-ray systems, trace explosives and narcotics screening devices, and, more recently, biometric passports). The future of aerospace is based upon the ability of researchers to provide solutions which lessen the environmental impacts of aviation with examples including the continued development of lightweight materials. Such materials enable new wing designs aimed at **increasing efficiency** and reducing drag and thereby fuel consumption, which **would not be possible with traditional materials**. In addition, the role that functional coatings can have in helping to improve the performance maintainability of the aircraft should not be underestimated.

#### Aerospace solves cyberterrorism

Deloitte 12 | (Deloitte is a consulting and financial advisory service, Report Commissioned by the Aerospace Industries Association, " The Aerospace and Defense Industry in the U.S. A financial and economic impact study," March, http://www.aia-aerospace.org/assets/deloitte\_study\_2012.pdf)

The world continues to demonstrate how dangerous it is and how our civilization and way of life can be put in jeopardy quickly. The surprise attacks on Pearl Harbor and the tragic events surrounding the terrorist attacks of 9/11 have shown our nation how vulnerable it can be. Technology innovations and products developed in the aerospace and defense industry have made our nation safer, from sophisticated sensors that can “see” nefarious activities of our adversaries, to the bomb and metal detectors that have become ubiquitous at airports around the world, the industry continues to innovate to produce the necessary defenses used to increase our national security. Recent advances to counter the next generation national security threats include for example, sophisticated software to trace bank transactions of terrorists, advanced listening sensors to eavesdrop on communications of known terrorists, and sophisticated sensors to help discover threats at our airports, borders, and seaports. Of course, the unmanned aerial vehicle (UAV) has been extraordinarily successful in helping to see, then attack if necessary, our adversaries. Lastly, the specter of a potential cyber-attack on our nation’s water, power, transportation or communications infrastructure is cause for alarm, and the industry continues to develop the next generation technologies to address these and future threats.

#### Nuclear war

Fritz 9 | Researcher for International Commission on Nuclear Nonproliferation and Disarmament [Jason, researcher for International Commission on Nuclear Nonproliferation and Disarmament, former Army officer and consultant, and has a master of international relations at Bond University, “Hacking Nuclear Command and Control,” July, <http://www.icnnd.org/latest/research/Jason_Fritz_Hacking_NC2.pdf>]

This paper will analyse the threat of cyber terrorism in regard to nuclear weapons. Specifically, this research will use open source knowledge to identify the structure of nuclear command and control centres, how those structures might be compromised through computer network operations, and how doing so would fit within established cyber terrorists’ capabilities, strategies, and tactics. If access to command and control centres is obtained, terrorists could fake or actually cause one nuclear-armed state to attack another, thus provoking a nuclear response from another nuclear power. This may be an easier alternative for terrorist groups than building or acquiring a nuclear weapon or dirty bomb themselves. This would also act as a force equaliser, and provide terrorists with the asymmetric benefits of high speed, removal of geographical distance, and a relatively low cost. Continuing difficulties in developing computer tracking technologies which could trace the identity of intruders, and difficulties in establishing an internationally agreed upon legal framework to guide responses to computer network operations, point towards an inherent weakness in using computer networks to manage nuclear weaponry. This is particularly relevant to reducing the hair trigger posture of existing nuclear arsenals. All computers which are connected to the internet are susceptible to infiltration and remote control. Computers which operate on a closed network may also be compromised by various hacker methods, such as privilege escalation, roaming notebooks, wireless access points, embedded exploits in software and hardware, and maintenance entry points. For example, e-mail spoofing targeted at individuals who have access to a closed network, could lead to the installation of a virus on an open network. This virus could then be carelessly transported on removable data storage between the open and closed network. Information found on the internet may also reveal how to access these closed networks directly. Efforts by militaries to place increasing reliance on computer networks, including experimental technology such as autonomous systems, and their desire to have multiple launch options, such as nuclear triad capability, enables multiple entry points for terrorists. For example, if a terrestrial command centre is impenetrable, perhaps isolating one nuclear armed submarine would prove an easier task. There is evidence to suggest multiple attempts have been made by hackers to compromise the extremely low radio frequency once used by the US Navy to send nuclear launch approval to submerged submarines. Additionally, the alleged Soviet system known as Perimetr was designed to automatically launch nuclear weapons if it was unable to establish communications with Soviet leadership. This was intended as a retaliatory response in the event that nuclear weapons had decapitated Soviet leadership; however it did not account for the possibility of cyber terrorists blocking communications through computer network operations in an attempt to engage the system. Should a warhead be launched, damage could be further enhanced through additional computer network operations. By using proxies, multi-layered attacks could be engineered. Terrorists could remotely commandeer computers in China and use them to launch a US nuclear attack against Russia. Thus Russia would believe it was under attack from the US and the US would believe China was responsible. Further, emergency response communications could be disrupted, transportation could be shut down, and disinformation, such as misdirection, could be planted, thereby hindering the disaster relief effort and maximizing destruction. Disruptions in communication and the use of disinformation could also be used to provoke uninformed responses. For example, a nuclear strike between India and Pakistan could be coordinated with Distributed Denial of Service attacks against key networks, so they would have further difficulty in identifying what happened and be forced to respond quickly. Terrorists could also knock out communications between these states so they cannot discuss the situation. Alternatively, amidst the confusion of a traditional large-scale terrorist attack, claims of responsibility and declarations of war could be falsified in an attempt to instigate a hasty military response. These false claims could be posted directly on Presidential, military, and government websites. E-mails could also be sent to the media and foreign governments using the IP addresses and e-mail accounts of government officials. A sophisticated and all encompassing combination of traditional terrorism and cyber terrorism could be enough to launch nuclear weapons on its own, without the need for compromising command and control centres directly.

#### Aerospace is key to solve cruise missile prolif

Gardner 99 (Lt Col Igor J.P., School of Advanced Airpower Studies, “THEATER LAND ATTACK CRUISE MISSILE DEFENSE: GUARDING THE BACK DOOR”)

LACM = Land Attack Cruise Missile

While few likely regional adversaries currently possess an LACM capability, a serious threat could materialize in a relatively short period of time. LACMs provide an adversary with several important advantages over alternative delivery means. Their small size could provide a greater survivability, both before and after launch, than either theater ballistic missiles or manned aircraft. LACM flight characteristics make them well suited for WMD delivery, particularly for chemical and biological agents. The means to achieve a highly accurate LACM capability are rapidly becoming widely available, through the purchase or transfer of existing off-the-shelf technology and conversion of widely proliferated ASCMs and UAVs. While some uncertainties exist about how future LACM threats will evolve (quantities, ranges, types of payloads, degrees of low observable technology incorporated), even relatively “low tech” LACMs could present serious challenges to today’s defenses. WMD warheads, the 360-degree threat, combat identification and fratricide avoidance are major challenges that must be solved to effectively counter LACM threats. Theater missile defense (against both ballistic and cruise missiles) is a key aspect of counter air strategy, and the ability to effectively counter LACMs will be essential to achieving air superiority, much less air supremacy. As defense budgets continue to decline in search of the elusive peace dividend, the U.S. military will continue to face the problem of doing more with less. These resource reductions, combined with the likelihood that future adversaries will learn form their predecessors and attempt to counter U.S. strategy asymmetrically, make it all the more important that the services fight as an integrated and effective joint team. Currently, no single service has the resources required to defend a theater against a serious LACM threat. This will require a balanced, joint force trained to operate under common doctrine, with fully integrated command and control, and overlapping sensor and shooter system coverage. Defense against LACMs will require a mix of attack operations, active and passive defense, and C 4 I optimized for the particular theater. It will require a mix of surface, air and space systems to gain command of the air rapidly by destroying enemy cruise missiles and their support systems on the ground and in the air. Only through such concerted efforts will the joint force commander achieve freedom from attack in order to gain freedom to attack. To assure integration, cruise missile defense doctrine and capabilities require the same level of effort currently focused on theater ballistic missile defense in the areas of common doctrine, system modernization and integration, and joint training.

#### Global nuclear war

Telegraph 11

(Missile Technology Control Regime (MTCR) Reinforced Point Of Contact (RPOC) Meeting, April 10, 2008, Wikileaks Transcript Classified by ISN/MTR Director Pam Durham, February 2, 2011, pg online @ Telegraph)

21. (C) Additionally, many countries are pursuing cruise missile programs as alternatives or supplements to their ballistic missile capabilities. Like ballistic missiles, cruise missiles can be a platform for WMD delivery and provide a more effective vehicle for biological and chemical weapons distribution than ballistic missiles. These trends are especially evident in the key regions of tension, the Middle East and Persian Gulf, Northeast Asia, and South Asia. 22. (C) Ballistic and cruise missile programs in these regions are evolving in different ways. While nearly all ultimately seek to obtain indigenous production capabilities, some rely primarily on direct missile purchases from countries such as North Korea, while others solicit extensive foreign assistance in missile design, development, and/or production. In other cases, more limited, specialized assistance is sought from foreign sources to sustain domestic design efforts and overcome technological impediments that prevent self-sufficiency in a state's missile program. 23. (C) The procurement efforts required to support missile development are global in scope, utilizing the territories and economies of a wide range of countries as sources of equipment and technology, as re-export/transit cutouts, and as brokering and finance centers. Many of these countries, including MTCR Partner countries, are not aware that their entities are inadvertently assisting ballistic missile proliferation. 24. (C) In several cases, broad international consensus has been reached that certain national missile programs constitute a threat to international peace and security. With respect to Iran, UNSCRs including 1696, 1737, and 1747, and 1803, prohibit technological transfers and other assistance by all states to Iran's missile programs. UNSCRs 1695 and 1718 require similar actions regarding ballistic missile programs in North Korea. These UNSCRs reflect the fact that ongoing nuclear tensions in the Persian Gulf and Northeast Asia threaten the viability of the global nonproliferation and security system. These tensions are aggravated and made more real and widespread by the open development and testing of ballistic missiles capable of delivering WMD. 25. (S/REL MTCR) For example, Iran has publicly revealed it had conducted some tests related to solid-propellant missile technology and implied that it was working on a design for a two-stage, 2,000 km-range system. Iran has also worked to improve the capabilities of its liquid propellant missile systems, claiming that a variant of the Shahab-3 missile has a 2,000 km-range and improved accuracy. Not only would missile-delivered WMD in Northeast Asia or the Middle East have the potential to cripple the global economy, the development of longer-range ballistic missiles carries with it the ability to deliver WMD to other regions. 26. (C) There are similar implications related to missile proliferation in South Asia, where a nuclear and missile arms race has the direct potential to lead to nuclear war in the world's most densely populated area and a region of increasing global economic significance. As we have already seen in South Asia in the nuclear area, the possession and development of missile technology there also carries with it the risk that this technology will spread to other regions. 27. (C) In an increasingly interdependent world, missile programs for WMD delivery in regions of tension threaten stability -- not just in those regions, but globally. Moreover, the challenge posed by these programs is growing as they improve qualitatively and quantitatively, often by drawing on all of us for various forms of facilitation.

#### Aerospace is key to stability in Asia - the impact is nuclear and biological warfare

Khalilzad and Lesser 98 | Counselor @ CSIS, President of Khalilzad Associates, and Former US Ambassador to the UN AND PhD Senior Transatlantic Fellow @ the German Marshall Fund (Zalmay and Ian, "Sources of Conflict in the 21st Century," p.164-165)

The first key implication derived from the analysis of trends in Asia suggests that American air and space power will continue to remain critical for conventional and unconventional deterrence in Asia. This argument is justified by the fact that several sub-regions of the continent still harbor the potential for full-scale conventional war. This potential is most conspicuously on the Korean peninsula and to a lesser degree, in South Asia, the Persian Gulf, and the South China Sea. In some of these areas such as Korea and the Persian Gulf, the United States has clear treaty obligations and therefore has pre-planned the use of air power should contingencies arise. U.S. Air Force assets could also be called upon for operations in some of these other areas. In almost all these cases, US airpower would be at the forefront of an American politico-military response because (a) of the vast distances on the Asian continent; (b) the diverse range of operational platforms available to the U.S. Air Force, a capability unmatched by any other country or service, (c) the possible unavailability of naval assets in close proximity, particularly in the context of surprise contingencies; and (d) the heavy payload that can be carried by U.S. Air Force platforms. These platforms can exploit speed, reach, and high operating tempos to sustain continual operations until the political objectives are secured. The entire range of warfighting capability—fighters, bombers, electronic warfare (EW), suppression of enemy air defense (SEAD), combat support platforms such as AWACS and J-STARS and tankers—are relevant in the Asia-Pacific region, because many of the regional contingencies will involve large, fairly modern, conventional forces, most of which are built around large land armies, as is the case in Korea, China-Taiwan, India-Pakistan and the Persian Gulf. In addition to conventional combat, the demands of unconventional deterrence will increasingly confront the U.S. Air Force in Asia. The Korean peninsula, China, and the Indian subcontinent are already arenas of WMD proliferation. While emergent nuclear capabilities continue to receive the most public attention, chemical and biological warfare threats will progressively become future problems. The delivery systems in the region are increasing in range and diversity. China already targets the continental United States with ballistic missiles. North Korea can threaten northeast Asia with existing Scud-class theater ballistic missiles. India will acquire the capability to produce ICBM-class delivery vehicles, and both China and India will acquire long-range cruise missiles during the time frames examined in this report. The second key implication derived from the analysis of trends in Asia suggests that airand space power will function as a vital rapid reaction force in a breaking crisis. Current guidance tasks the Air Force to prepare for two major regional conflicts that could break out in the Persian Gulf and on the Korean peninsula. In other areas of Asia, however, such as the Indian subcontinent, the South China Sea, Southeast Asia, and Myanmar, the United States has no treaty obligations requiring it to commit the use of its military forces. But as past experience has shown, American policymakers have regularly displayed the disconcerting habit of discovering strategic interests in parts of the world previously neglected after conflicts have already broken out. Mindful of this trend, it would behoove U.S. Air Force planners to prudently plan for regional contingencies in nontraditional areas of interest, because naval and air power will of necessity be the primary instruments constituting the American response.

#### Bioweapons cause extinction

Ochs 2 | Past president of the Aberdeen Proving Ground Superfund Citizens Coalition, Member of the Depleted Uranium Task force of the Military Toxics Project, and M of the Chemical Weapons Working Group [Richard Ochs, , June 9, 2002, “Biological Weapons Must Be Abolished Immediately,” <http://www.freefromterror.net/other_articles/abolish.html>]

Of all the weapons of mass destruction, the genetically engineered biological weapons, many without a known cure or vaccine, are an extreme danger to the continued survival of life on earth. Any perceived military value or deterrence pales in comparison to the great risk these weapons pose just sitting in vials in laboratories. While a “nuclear winter,” resulting from a massive exchange of nuclear weapons, could also kill off most of life on earth and severely compromise the health of future generations, they are easier to control. Biological weapons, on the other hand, can get out of control very easily, as the recent anthrax attacks has demonstrated. There is no way to guarantee the security of these doomsday weapons because very tiny amounts can be stolen or accidentally released and then grow or be grown to horrendous proportions. The Black Death of the Middle Ages would be small in comparison to the potential damage bioweapons could cause. Abolition of chemical weapons is less of a priority because, while they can also kill millions of people outright, their persistence in the environment would be less than nuclear or biological agents or more localized. Hence, chemical weapons would have a lesser effect on future generations of innocent people and the natural environment. Like the Holocaust, once a localized chemical extermination is over, it is over. With nuclear and biological weapons, the killing will probably never end. Radioactive elements last tens of thousands of years and will keep causing cancers virtually forever. Potentially worse than that, bio-engineered agents by the hundreds with no known cure could wreck even greater calamity on the human race than could persistent radiation. AIDS and ebola viruses are just a small example of recently emerging plagues with no known cure or vaccine. Can we imagine hundreds of such plagues? HUMAN EXTINCTION IS NOW POSSIBLE. Ironically, the Bush administration has just changed the U.S. nuclear doctrine to allow nuclear retaliation against threats upon allies by conventional weapons. The past doctrine allowed such use only as a last resort when our nation’s survival was at stake. Will the new policy also allow easier use of US bioweapons? How slippery is this slope?

#### Low prices are key to the steel industry

IHS 11 (IHS Global Insight - leading economic analysis and forecasting firm, December 2011, "The Economic and Employment Contributions of Shale Gas in the United States," anga.us/media/235626/shale-gas-economic-impact-dec-2011.pdf)

**Energy from** electricity or **natural gas makes up a high**er **proportion of the value of iron ore** processed¶ from taconite in the Great Lakes region. Given that the price for iron ore is essentially a global price, domestic¶ producers of iron **ore pellets** are benefitting from higher margins due to lower electricity and natural gas prices. With these incrementally higher margins, domestic iron ore pellet production is likely¶ higher than it would otherwise be.¶ The steel industry is **expected to be** reactivated with the improvement of auto manufacturing and an increase¶ in construction activity. Moreover, the development of shale gas has given a considerable boost¶ **to the steel industry** by increasing the demand for steel pipes. Used for drilling, production, transportation,¶ and distribution, steel pipes are essential to the natural gas industry, and the large infrastructure¶ investments already announced could have quite a significant impact on the steel industry.

#### That’s key to aircraft carriers and the navy

Gibson 11 – Thomas J. Gibson received his law degree from Georgetown University where he graduated magna cum laude. He holds a Master of Marine Affairs degree from the University of Rhode Island and a B.S. in Naval Architecture from the United States Naval Academy. Gibson served as Senior Vice President of Advocacy for the American Chemistry Council. Previously, Gibson served as the Senior Vice President, Government Affairs for the Portland Cement Association. Prior to joining PCA in 2004, Gibson served as Chief of Staff for the U.S. Environmental Protection Agency. 2011, "Profile of the American Iron and Steel Institute 2010-2011"www.steel.org/~/media/Files/AISI/About AISI/Profile Brochure F-singles\_CX.pdf

Military uses for steel are extensive. Thousands of skilled men and women of the American steel industry work to produce high-quality, cost-competitive products that are used by the military in various applications ranging from aircraft carriers and nuclear submarines to Patriot and Stinger missiles, armor plate for tanks and field artillery pieces, as well as every major military aircraft in production today. Some examples of steel use in defense applications are: 􀀩 The USS New York was built with 24 tons of scrap steel reclaimed and recycled from the World Trade Center. 􀀩 The USS George H.W. Bush, an aircraft carrier named after the 41st President, contains 47,000 tons of structural steel and serves as home to 6,000 Navy personnel. 􀀩 Steel is a strategic material needed to strengthen existing U.S. infrastructure and installations. All segments of the domestic steel industry contribute directly or indirectly to the defense industrial base. Whether it is missiles, jet aircraft, submarines, helicopters, Humvees® or munitions, American-made steels and specialty metals are crucial components of U.S. military strength. **Steel plate is used in the bodies and propulsion systems of the naval fleet**. The control cables on virtually all military aircraft, including fighter jets and military transport planes, are produced from steel wire rope. In addition, land-based vehicles such as the Bradley Fighting Vehicle, Abrams Tank and mine-resistant ambush-protected (MRAP) vehicles use significant amounts of steel.

#### Carriers prevent rogue generals from using Pakistani nuclear weapons

Gordon et al. 6 – John Gordon, Senior Policy Analyst At RAND Corporation, Ph.D. in public policy, George Mason University; M.A. in international relations, St. Mary's University; M.B.A., Marymount University; B.A. in history, The Citadel, May 9th, 2006, John Gordon IV, Peter A. Wilson, John Birkler, Steven Boraz, Gordon T. Lee, Leveraging America’s Aircraft Carrier Capabilities, http://www.rand.org/pubs/monographs/2006/RAND\_MG448.pdf

This vignette examined the possibility that a radical group within the Pakistani military attempts to overthrow the government in Islamabad. Although the coup attempt fails, the rebels seize one or more nuclear-weapons storage sites and a number of missile launchers. The Pakistani government asks the United States for assistance in the form of intelligence, surveillance, and reconnaissance (ISR), precision strike, and Special Operations Forces liaison personnel to assist in its attempts to quickly retake the storage facilities and prevent the launch or removal of nuclear weapons. Strike and reconnaissance aircraft or unmanned aerial vehicles (UAVs) from carriers operating in the Indian Ocean are a key U.S. capability that can assist the Pakistanis. The vignette highlights the need for the United States to quickly establish liaison with both Pakistani and Indian authorities. In this situation, U.S. forces would provide detailed, real-time, persistent, all-weather ISR support to Pakistani forces, as well as precision-strike assets that the Pakistani military would lack. It should be pointed out that support by current and projected long-endurance UAVs or manned ISR aircraft cannot be provided unless those systems operate below any cloud layers, which thus makes them subject to attack by man-portable air defense systems (MANPADS) and other air defenses.

#### Extinction

Caldicott 2 (Helen Caldicott, Founder, Physicians for Social Responsibility, THE NEW NUCLEAR DANGER, 2002, p. xii)

The use of Pakistani nuclear weapons could trigger a chain reaction. Nuclear-armed India, an ancient enemy, could respond in kind. China, India's hated foe, could react if India used her nuclear weapons, triggering a nuclear holocaust on the subcontinent. If any of either Russia or America's 2, 250 strategic weapons on hair-trigger alert were launched either accidentally or purposefully in response, nuclear winter would ensue, meaning the end of most life on earth.

#### Collapse of the navy causes great power wars

Conway et al. 7 [James T., General, U.S. Marine Corps, Gary Roughead, Admiral, U.S. Navy, Thad W. Allen, Admiral, U.S. Coast Guard, “A Cooperative Strategy for 21st Century Seapower,” October, http://www.navy.mil/maritime/MaritimeStrategy.pdf]

No other disruption is as potentially disastrous to global stability as war among major powers. Maintenance and extension of this Nation’s comparative seapower advantage is a key component of deterring major power war. While war with another great power strikes many as improbable, the near-certainty of its ruinous effects demands that it be actively deterred using all elements of national power. The expeditionary character of maritime forces—our lethality, global reach, speed, endurance, ability to overcome barriers to access, and operational agility—provide the joint commander with a range of deterrent options. We will pursue an approach to deterrence that includes a credible and scalable ability to retaliate against aggressors conventionally, unconventionally, and with nuclear forces. Win our Nation’s wars. In times of war, our ability to impose local sea control, overcome challenges to access, force entry, and project and sustain power ashore, makes our maritime forces an indispensable element of the joint or combined force. This expeditionary advantage must be maintained because it provides joint and combined force commanders with freedom of maneuver. Reinforced by a robust sealift capability that can concentrate and sustain forces, sea control and power projection enable extended campaigns ashore.

#### The navy solves piracy

Hilley 8 – Mass Communication Specialist 1st Class (Monique, “Coalition Forces Work To Deter Piracy In Gulf Of Aden”, The United States Department of the Navy, 1/17/09, Story Number: NNS090117-01, Online @ http://www.navy.mil/submit/display.asp?story\_id=41897)

USS SAN ANTONIO, At sea (NNS) -- Combined Task Force (CTF) 151 is working closely with international navies in the Gulf of Aden to conduct counterpiracy operations and ensure a lawful maritime order in the region. "We're out here as a force, with the coalition nations, to ensure commerce flows freely throughout the world," explained Rear Adm. Terry McKnight, commander, CTF 151. "We are working to achieve an objective of preventing piracy at sea. Over the past few years, we've learned from many combined operations that working with the coalition is key to our success throughout the world." The mission of CTF 151 is to prevent and deter piracy operations in the Gulf of Aden. The task force, which has assembled on board the amphibious transport dock ship USS San Antonio (LPD 17), has many capabilities which are enhanced by the ship's crew. The personnel currently embarked aboard San Antonio in support of CTF 151 counterpiracy operations include a helicopter squadron, fleet surgical team, boarding teams and several elements from the U.S. Marine Corps and U.S. Coast Guard. "This mission is very important for the maritime strategy of our nation and also to work with our coalition nations," said McKnight. "We are out here to demonstrate that the United States Navy will not allow criminal acts on the high seas and that we want, as best we can, to improve the open trade agreements throughout the world." Piracy acts spiked in the region in mid-August due to a very aggressive increase in activity by a clan on the north coast of Somalia. In response to the activity, Vice Adm. William Gortney, commander, Combined Maritime Forces, directed the establishment of the maritime security patrol area (MSPA), an area coalition ships and aircraft patrol to prevent destabilizing activity. "Because of the complexity of the operations, I determined it was necessary to establish CTF 151 to create a task force with a mission and a mandate from the United Nations to conduct counterpiracy operations throughout the area of responsibility," said Gortney during a press briefing at the Pentagon Jan. 15. Although the Combined Maritime Forces (CMF) do not have a mandate to conduct counterpiracy operations, combined task forces each have a particular mandate under which they operate. Any nation that does not yet have the authority to conduct counterpiracy operations will continue to work in Combined Task Force 150, while those that seek the authority to operate with CTF 151 will bring their collective capabilities together to deter, disrupt and eventually bring to justice the maritime criminals involved in the piracy events. "It's really a fascinating story to watch unfold as, at this point, 14 nations have sent their navies to work against the destabilizing activity," added Gortney. CTF 151, with the International Maritime Organization, created the maritime security patrol area as a place to channel the shipping so that they could concentrate naval activity. The task force includes three phases, which outline critical mission goals. The first phase is focused on bringing more international navies into the efforts to help solve this international problem. The second phase involves working with the shipping industry to develop and share practices that prevent pirates from successfully boarding their vessels. The third phase, once authorized, will allow the task force to deliver suspected pirates to court, where they will be held accountable for their actions. "We've had great effects on the first two," explained Gortney. "Fourteen nations are down there. The shipping industry is having the greatest impact. They're doing a terrific job of sharing best practices, speed, maneuver and non-kinetic defensive measures that will prevent pirates from getting aboard the vessel. We have had a great effect on that. In the last six weeks, there have only been four successful piracy attacks." CTF 151 is working very closely with the U.S. State Department to finalize an agreement with one of the nations in the area that will allow CTF 151 and coalition forces to disrupt, deter, capture and hold suspected pirates accountable for their actions. The task force expects that authority to be granted within the next week. "**We are going to aggressively go after the pirates** that are conducting pirate activity," said Gortney. "We have to make it unpleasant to be a pirate." CTF 151 is a multinational task force conducting counterpiracy operations to detect and deter piracy in and around the Gulf of Aden, Arabian Sea, Indian Ocean and Red Sea. It was established to create a lawful maritime order and develop security in the maritime environment.

#### Extinction

The Independent 99 (July 4th, “Pirates could snatch plutonium”, <http://www.independent.co.uk/news/pirates-could-snatch-plutonium-1104109.html>)

BRITAIN is about to ship enough plutonium for more than 60 atomic bombs half way around the world in freighters vulnerable to armed attack from "nuclear pirates". **Military experts say there is a real possibility that the vessels could be targeted by terrorist groups or rogue states intent on acquiring nuclear weapons**. They say the guns mounted on **the ships are inadequate to fend off a well orchestrated attack by pirates with superior weapons**. Janes, the internationally renowned arms and naval authority, agrees. "It would not take much fire-power to knock them out," it said. The ships were "capable of repelling only a lightly armed attack" and should be protected by "at least one well-armed frigate". The shipment, which will take place in the next few months, is planned as the first of many over the next year. The number will increase sharply if ministers allow a new plutonium plant at Sellafield, the controversial Cumbrian complex, to start up. The plutonium, for power stations, is extracted from spent Japanese fuel which is reprocessed at Sellafield and at Cap la Hague, France. The prospect of such shipments has long worried security experts. Eleven years ago the US defence department said they would be "accessible and vulnerable throughout the voyage, particularly when the vessel is passing through channels, straits, and other restricted waterways, or when it is near the coast". The last plutonium shipment from Europe to Japan, in 1992, was accompanied by a specially built patrol boat operated by the Japanese Maritime Security Agency. The US, which provided the original nuclear fuel to Japan and, under a special agreement, has to approve security arrangements for shipments of plutonium extracted from it, has repeatedly promised that all of them would be accompanied by "an armed escort vessel". But it is now clear that the new shipment will not be protected by a warship. Britain, France and Japan all refuse to give details of the route or the security arrangements and will only name the ships, describe what they are carrying, and say when they are setting out, "only on one or two days before departure from Europe". US government documents show that the two freighters - the Pacific Teal and the Pacific Pintail - will each carry three 30mm guns and will be staffed by officers of the United Kingdom Atomic Energy Authority armed with "assault rifles, shotguns and hand weapons". Paul Leventhal, director of Washington's Nuclear Control Institute, said: "Two freighters riding shotgun for each other will not repel a real-world attack." Dr Fr ank Barnaby, former director of Stockholm Peace Research Institute, said **maritime hijackings were "becoming more frequent and violent"** - there were 66 in the first three months of this year - and added: "The attacks are generally made at night using speedboats. This should give those responsible for the security of nuclear cargoes pause for thought." Many studies have shown that **a terrorist group, let alone a rogue state, could get the plutonium from the fuel and make it into nuclear weapons.** The US has approved the scaled-down security because, critics say, it does not want to antagonise France, Britain and Japan. It says the freighters count as armed escort vessels because the shipments are being carried out "on government service" by British Nuclear Fuels (BNFL), a nationalised industry. Critics say security has been lessened partly to save money and partly as a public relations exercise because using a warship escort would demonstrate vividly how dangerous the cargo is. Martin Foreward, campaign co-ordinator of Cumbrians Opposed to a Radioactive Environment, who has been monitoring the arming of the freighters at Barrow-in-Furness, said: "Once again BNFL is taking the cheap option, but this time it is putting not just Cumbria but the whole world at risk."

### Plan

#### The United States federal government should lessen restrictions on natural gas production in the Environmental Protection Agency’s New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews.

### Solvency

#### **The EPA restrictions will crush the natural gas industry**

ARI 12 – Advanced Resources International Inc. report for the American Petroleum Institute, "Estimate of Impacts of EPA Proposals to Reduce Air Emissions from Hydraulic Fracturing Operations, February 2012, "www.api.org/~/media/Files/Policy/Hydraulic\_Fracturing/NSPS-OG-ARI-Impacts-of-EPA-Air-Rules-Final-Report.ashx

Depending on the REC-Set Use Rate scenario assumed, the following impacts from base case levels are projected in the first 4 years after the requirements go into effect (through 2015):¶ • Overall **well drilling** for unconventional resources producing natural gas over 2012 - 2015 would be **reduced by** 31% to 52%, amounting to reductions in drilling ranging from 12,700 to 21,400 wells.¶ • 5.8 to 7.0 quadrillion Btu (Quads) of otherwise economic unconventional natural gas would not be developed and produced by 2015, a 9% to **11% reduction**.¶ • 1.0 to 1.8 billion barrels of otherwise economic unconventional liquids would not be developed and produced by 2015, a 21% to 37% reduction.¶ • Federal royalties of $7.0 to $8.5 billion that would otherwise be collected would not be paid in the first 4 years after the requirements go into effect.¶ • State revenues from severance taxes amounting to $1.9 to $2.3 billion would be delayed beyond the first 4 years after the requirements go into effect.¶ Under either scenario of REC equipment availability, a significant slowdown in unconventional resource development **would occur, resulting in less reserve additions, less production, lower royalties to the Federal government and** private landowners, **and l**ower severance tax payments **to state governments**. The **delays in drilling results in delays in production, which result in the delays in** the **economic benefits** associated with that production. This analysis did not attempt to estimate lost jobs associated with reduced drilling, oil and gas supply services, and indirect employment.

#### **Even with the 2015 extension, producers do not have the technology to comply with the restrictions**

Davidson 12 – Mark Davidson is Editorial Director for Platts’ North American natural gas news coverage. Based in Washington, D.C., Mark also has served as Chief Editor of Gas Daily and Managing Editor of Inside FERC’s Gas Market Report. A graduate of the E.W. Scripps School of Journalism at Ohio University, Mark was a general assignment and local government reporter for daily newspapers in Ohio and Virginia for nearly a decade before joining Platts in November 1995. June 20th, 2012, "Flexibility urged on 'green completion' of wells" s3.amazonaws.com/cuttings/cuttingpdfs/18531/075d95107cdd5ed278a19f158843771f.pdf

Regulators from Western states urged the Environmental Protection Agency on Tuesday to remain flexible with its upcoming rule requiring that all new natural gas wells have “green completions” by 2015 while leaving the bulk of implementation to states.¶ Wyoming and Colorado often require green completions now, officials from those states testified to the US Senate Committee on Environment and Public Works’ clean air subcommittee. And they said the practice has reduced the amount of air pollution in gas production areas such as Colorado’s Wattenberg field and Wyoming’s Jonah-Pinedale field. Green completions take place during the clean-up stage after a well has been hydraulically fractured. During the process, gas is separated from the flowback water and piped away instead, of being flared or otherwise allowed to escape into the atmosphere.¶ Darren Smith, environmental manager for Oklahoma City-based Devon Energy, cautioned senators that EPA’s baseline estimate of how much natural gas is emitted during the completion process is two-thirds higher than indicated by actual experience.¶ That data is driving policy research in **the wrong direction**, Smith told the subcommittee.¶ “This overestimate has allowed EPA to justify the promulgation of new air standards for the natural gas industry,” Smith maintained. “More important, we continue to see new policy research being based on a foundation of this bad data — **guaranteeing that the wrong conclusions are reached.”** Smith singled out Cornell University’s oft-cited 2010 study, which claimed natural gas is as dirty as coal, as “absurd.”¶ Basically, EPA’s estimate is based on the amount of natural gas collected by operators over the first 10 days of a well’s life. In actual experience, Smith said, operators exit the flowback period — when the mixture coming back up the bore is more water than gas — in about 3.5 days.¶ Devon has data from eight other producers to buttress its claim, but EPA has ignored the company’s request to correct its 9,000 Mcf/well estimate of how much methane is escaping new wells, according to Smith.¶ “The error must be corrected now,” he pleaded. “**We have already seen its misuses to justify** air quality **rules for fracking. It will continue to fuel bad public policy** and research that overshadows the benefits of natural gas.” Wyoming Director of Environmental Quality John Corra said EPA’s New Source Performance Standards requiring all completions to be green is modeled after rules Wyoming put in place to combat air pollution problems in the state’s Sublette County.¶ But he cautioned that Wyoming’s rules are flexible and don’t have a onesize- fits-all approach, and he urged EPA to adopt that model.¶ “**Infrastructure and other factors are** not readily available **in order for green completions to be implemented statewide, and we simply require best management practices and flaring in those instances**,” Corra testified. “State regulatory schemes can take these factors into account more readily than a national-level rule.”

#### **And, the restrictions send a signal of uncertainty to investors**

Gerard 12 – Jack Gerard has a degree in political science and a juris doctor from George Washington University, and formerly worked with the U.S. Senate Energy and Natural Resources Committee, now he is the head of the American Petroleum Institute, June 19th, 2012, "Supporting Common-Sense Regulation"energy.nationaljournal.com/2012/06/epas-cleanair-rules-defend-del.php

That said, the oil and natural gas industry supports common-sense environmental regulation. EPA’s current incremental approach, which often **comes with a price tag that dwarfs estimated benefits**, needs to be replaced with one that’s not unnecessarily **burdensome or counter-productive**. EPA seems to have understood this principle in some cases recently. In others, it hasn’t.¶ For example, EPA and the administration appropriately recognized concerns raised by industry and others and pulled back a proposed new standard for ozone. By some estimates the proposal would’ve put 85 percent of the country in non-compliance. Millions of jobs might have been in jeopardy, and the economy could have faced $1 trillion a year in costs.¶ EPA also recognized concerns about a proposed rule on emissions resulting from oil and natural gas development, agreeing to allow companies until 2015 to develop the equipment needed for compliance and to train workers to use it.¶ But in other areas legitimate concern about the cost effectiveness of proposals seemingly has been dismissed. Our industry urged EPA to consider keeping the current standard on fine-particle soot that had lowered concentrations 27 percent between 2000 and 2010 – evidence that this pollution problem is being addressed, that air quality is improving. But the agency released a more stringent standard last week based, we believe, on faulty data and without sufficient correlating benefit. As written it could discourage investment in areas that fail to meet the standard, costing jobs and economic opportunity.¶ The scenario is similar when it comes to EPA’s push for E15 gasoline, which could damage the engines of millions of vehicles now on our roads, and its aggressive mandate to refiners on cellulosic biofuels, basically requiring them to use a fuel that doesn’t exist. In this context it’s not hard to understand why some are concerned about EPA’s forthcoming Utility MACT Rule on emissions from coal-fired power plants and industrial boilers.¶ The larger point is the signal **government is sending to industry and investors with the current approach:** inconsistency and uncertainty**.** Both profoundly **hinder economic activity and job creation.** Coupled with a sense that legitimate cost-benefit analysis isn’t being uniformly conducted, the seeming **disconnect between the regulators and the regulated** isn’t surprising.¶ Our industry supports environmental protection and is constantly striving to improve the safety and efficiency of its operations. But without a common-sense regulatory approach that sees the entire picture, America will continue to create problems for itself in terms of fostering economic growth, creating jobs and, in the case of our industry, generating the energy we need for better lives now and in the future.

#### This uncertainty causes shortages in future gas supply

Stevens August 2012 – Professor Paul Stevens is Senior Research Fellow for Energy at Chatham House and Emeritus Professor at Dundee University. He taught at the American University of Beirut in Lebanon (1973–79); the University of Surrey (1979–93); and as Professor of Petroleum Policy and Economics at CEPMLP, University of Dundee (1993–2008). He is also Consulting Professor at University College London (Australia), August 2012, "The 'Shale Gas Revolution': Developments and Changes,"www.chathamhouse.org/sites/default/files/public/Research/Energy, Environment and Development/bp0812\_stevens.pdf

There is a real danger that investor uncertainty will inhibit investment in future gas supplies. If the shale gas revolution can be continued and replicated this does not matter. Shale gas can provide abundant supplies of cheap natural gas. However, if it disappoints then, as the 2010 report notes, in five to ten years gas markets could **face** significant shortages **as a result of the very long lead times on upstream gas projects.**

#### And independently, the restrictions destroy independent producers, which are key to the industry

Banerjee 12 – Neela Banerjee, writer for the Los Angeles Times, April 18th, 2012, "New EPA rules target pollution at fracking sites" articles.latimes.com/2012/apr/18/business/la-fi-epa-drilling-20120419

The rules are expected to affect about 11,000 new wells annually that undergo fracking and an additional 1,200 that are re-fracked to boost production. The rules go into effect in 60 days, but the EPA gave the industry a three-year transition period to install technology to capture methane.¶ Most environmentalists welcomed the new rules, although some expressed disappointment over the three-year phase-in of the methane-capturing requirement.¶ "Obviously, this will be an improvement from the status quo," said Frank O'Donnell, president of Clean Air Watch. "But the delays mean a heck of a lot of smog-forming emissions during the next several years. Breathers will pay that price.¶ "Industry groups, however, complained that the rules were still too onerous, especially for smaller companies. They asserted that the EPA's data are faulty, a charge that the EPA denied, and could stunt the growth of natural gas development.¶ Barry Russell, chief executive of the Independent Petroleum Assn. of America, said the effect of the rules on independent oil and natural gas producers, which drill 95% of wells, as well as on the economy and the national security has the "potential to be profound."

#### The restrictions will be used to shut down all production if an accident happens

Cappiello 12 – Dina is an Associated Press writer. “EPA sets natural gas pollution standards,” April 21, <http://theadvocate.com/home/2607063-125/epa-sets-natural-gas-pollution>

Don Briggs, president of the Louisiana Oil and Gas Association, called the regulations an unnecessary intrusion.¶ “The industry already has in place so many of the different things they’re suggesting,” he said. “It’s a continuation of a great deal more control over the oil and gas industry.”¶ Briggs and other industry members fear federal oversight of hydraulic fracturing. The industry worries the EPA will use air quality regulations and the findings of an upcoming report on hydraulic fracturing to restrict the practice, which is what led to the huge increase in domestic natural gas and oil production.¶ “It will only take one accident or mishap for the EPA to step in and halt all hydraulic fracturing in the United States,” Briggs said in a column released Wednesday. “If this were to happen, 85 percent of all wells in the United States would be shut down.”

#### Status quo state regulations are sufficient – the EPA restrictions tank production and drive up costs

Loris 8-29 – Nicolas D. Loris is the Herbert and Joyce Morgan Fellow in the Thomas A. Roe Institute for Economic Policy Studies at The Heritage Foundation, August 29th, 2012, "Hydraulic Fracturing: Critical for Energy Production, Jobs, and Economic Growth," [www.thecuttingedgenews.com/index.php?article=75622&pageid=&pagename](http://www.thecuttingedgenews.com/index.php?article=75622&pageid=&pagename)=

One of the reasons why hydraulic fracturing has been so successful in promoting oil and gas development, while maintaining a strong environmental record, is the state regulatory regime. States in which fracturing takes place each have comprehensive regulation that ensures that oil and gas companies operate safely and in an environmentally sensible manner, and administer fines and implement punitive measures to correct any wrongdoing. In November 2011, the EPA’s Lisa Jackson acknowledged the states' role: “**States are stepping up and doing a good job. It doesn’t have to be EPA that regulates the 10,000 wells that might go in.”** But states are not just now stepping up—states have effectively regulated oil and gas production and hydraulic fracturing for decades. In Pennsylvania, fracking has been taking place since the 1960s with nearly 100,000 oil and gas wells fracked and no instances of contamination of groundwater. The same clean record is true for Ohio, where over 70,000 oil and gas wells have been fracked since the 1960s. The Interstate Oil and Gas Compact Commission has compiled statistics for all 50 states, each of which has a flawless record when it comes to fracking and groundwater protection. Detailed in the appendix of this paper is an overview of each state’s regulations regarding chemical disclosure, groundwater protection, and wastewater management, as well as links to each state’s statutes and regulations that pertain to oil and gas operations.¶ Despite the states' effectiveness in regulating hydraulic fracturing and despite Jackson’s comments, the EPA is pursuing **onerous and duplicative regulations with weak scientific support.** Many activities of oil and gas production are already subject to a number of major federal regulations, including the Clean Air Act (emissions), the Clean Water Act (surface water discharge), the Safe Drinking Water Act (wastewater management), the Emergency Planning and Community Right-to-Know Act (chemical disclosure for emergency responders), and the National Environmental Policy Act (production on federal lands), among others.¶ While many of these statutes are in need of serious reform, the White House’s recently proposed fracking rules are unneeded and duplicative. The Department of the Interior released a draft rule on public disclosure of chemicals on federal lands despite the fact that states have successfully managed chemical disclosure. Congress has also introduced legislation that would regulate fracking fluids under the Safe Drinking Water Act (SDWA) despite the fact that the 2005 Energy Policy Act codified that Congress never intended to regulate fracking (except when using diesel oil in the fracking process under SDWA). Hydraulic fracturing had been safely regulated for a quarter century before Congress even enacted SDWA in 1974.¶ In April 2012, the EPA announced its first air-emission rules for hydraulic fracturing. Rather than being aimed at fracking itself, this is a backdoor global warming regulation: The rule highlights the supposed environmental benefits of reducing emission of methane, a greenhouse gas. The EPA’s rule miserably fails the cost-benefit test; the agency’s own analysis projects $745 million in annual costs and just $11 million to $19 million in environmental benefits. Moreover, the EPA has grossly overestimated methane emissions from the wells. The rule also fails to quantify any benefits from reducing volatile organic compounds (VOC) and hazardous air pollutants (HAP). While the rule asserts that benefits exist, the draft also says that “with the data available, we [the EPA] are not able to provide credible health benefit estimates for the reduction in exposure to [hazardous air pollutants], ozone and [particulate matter] (2.5 microns and less) (PM2.5) for these rules.”¶ Congress: Prevent Federal Overreach on Fracking¶ The states' effective regulation underscores the need for Members of Congress to prevent **federal intervention** **that would** unnecessarily stall the oil and gas boom and drive up costs for producers (and thus consumers). The states with tremendous oil and natural gas reserves have the most to gain economically, and have the greatest incentive to protect their environments. States have qualified experts to handle the regulatory requirements surrounding hydraulic fracturing. To that end, Congress should:¶ Prevent any federal agency from adding new regulations to hydraulic fracturing. The proposed federal regulations are unnecessary and duplicative.¶ Prohibit federal regulators from using any statute to regulate greenhouse gas emissions. Greenhouse gas regulations would drive up the cost of energy for no meaningful change in the Earth’s temperature.¶ Reaffirm the states’ authority and effectiveness in regulating hydraulic fracturing. The states have effectively handled the disclosure of chemicals used in the fracking process and have effectively protected drinking water for decades.¶ Fracking: It’s Important¶ Hydraulic fracturing and horizontal drilling should be celebrated as important technological progress that has opened new opportunities for the safe development of affordable, reliable energy. The facts and history of hydraulic fracturing indicate that many of the fears associated with the process are **exaggerated or unsubstantiated**. Entrepreneurs created an energy boom and state regulators have been ensuring that energy production occurs in an environmentally sensible way. Congress should keep it that way.