### ADV 1: Grid

#### The electrical grid is highly vulnerable – threats could shut it down for years and status quo efforts fail.

Magnuson 12 (Stew Magnuson, managing editor of National Defense Magazine, Washington, D.C.-based journalist and the author of The Death of Raymond Yellow Thunder: And Other True Stories from the Nebraska-Pine Ridge Border Towns, the Nebraska Nonfiction Book of the Year for 2009, bronze medal in the regional nonfiction category, September 2012, “Feds Fear Coordinated Physical, Cyber-Attacks on Electrical Grids,” http://www.nationaldefensemagazine.org/archive/2012/september/Pages/FedsFearCoordinatedPhysical,Cyber-AttacksonElectricalGrids.aspx)

Electrical grids in the United States are vulnerable to both cyber-attacks and space weather, federal officials have said.¶ But an assault that combines the skills of a hacker with a physical attack on key parts of a grid’s infrastructure may result in hundreds of millions of U.S. homes and businesses losing electricity.¶ “I am most concerned about coordinated physical and cyber-attacks intended to disable elements of the power grid or deny electricity to specific targets, such as government or business centers, military installations, or other infrastructures,” Gerry Cauley, president and CEO of the North American Electric Reliability Corp., said at a recent Senate hearing. ¶ Scott Pugh, of the Department of Homeland Security’s interagency program office, said at an energy conference in April that there are maps — not available for public viewing — that “show you a handful of substations — six or so — [where] you could take out those six substations and black out most of the U.S. east of the Mississippi, if you knew which six [they] were. And in many cases you could do it with a hunting rifle from a couple hundred yards away.”¶ There are some 1,500 companies that generate electricity in the United States, and the hodgepodge of federal agencies that oversee them have limited statutory authorities to force them to protect themselves against attacks, the Senate Energy and Natural Resources Committee hearing revealed. ¶ “Limitations in federal authority do not fully protect the grid against physical and cyberthreats,” Joseph McClelland, director of the office of reliability at the Federal Energy Regulatory Commission, said. ¶ Legislation passed in 2005 gave the agency the authority to impose reliability standards on “bulk,” or large-scale, power systems. That law excludes local distribution facilities, federal installations located inside grids, and major cities such as New York. Hawaii and Alaska also don’t fall under the commission’s jurisdiction.¶ Officials are concerned about two threats: electromagnetic pulses, which come from solar storms or weapons, and cyber-attacks, particularly on “smartgrids,” which it turns out, are not very “smart” when it comes to protecting against hackers.¶ “No single security asset, technique, procedure or standard — even if strictly followed — will protect an entity from all potential cyberthreats,” said Gregory Wilshusen, director of information security issues at the Government Accountability Office. “The cybersecurity threat environment is constantly changing and our defenses must keep up.”¶ However, in the case of smartgrids, utilities continue to employ them without the necessary safeguards, the GAO has found. There is a lack of security features consistently being integrated into smartgrids and the current regulatory environment makes it difficult to ensure that power companies are properly protecting them.¶ Physical attacks against the grid can cause equal or greater destruction than cyber-attacks, McClelland said. An electromagnetic pulse, or EMP event, could seriously degrade or shut down large swaths of the nation. Depending on the attack, a significant part of the infrastructure could be “out of service for periods measured in months to a year or more,” he said.¶ “The self-reporting requirements, the enforcement provisions under the existing standards are important,” he said. “But at the end of the day, if there’s no enforcement provisions, there’s no teeth behind the provisions.”¶ The National Institute of Standards and Technology has guidelines for utilities to gird themselves from physical and cyber-attacks, but they do not address coordinated attacks, said Wilshusen. NIST “guidelines did not address an important element essential to securing smartgrid systems — the risk of attacks using both cyber and physical means.”¶ Meanwhile, there have been three major studies that looked at the possible effects of a massive solar storm on U.S. electrical grids. They reached different conclusions, Pugh said at the National Defense Industrial Association Environment, Energy Security and Sustainability symposium in New Orleans.¶ Experts are trying to map the grid and figure out what would happen in the event of an attack or solar storm, Pugh said. But there is nothing that requires the 1,500 companies to share proprietary data about their equipment, so coming to firm conclusions is difficult. ¶ Transformers — which number about 2,000 nationwide — are a key vulnerability. Strong electrical pulses caused by a weapon or solar storm can irreparably damage them, he said. ¶ “If you need a dozen of those tomorrow because somebody attacked the grid, or we had a space weather event that took out a dozen, you might be waiting quite a while,” he said. They weigh about 300 tons, can only be delivered by special rail car, and most are now manufactured overseas.

1. Obama has invested billions in the smart grid

Morris 6/16 (Lindsay, “Obama Administration Pushes for Smart Grid, But is Industry Ready?” Renewable Energy World. Web, Acc 9/27/2012) <http://www.renewableenergyworld.com/rea/blog/post/2011/06/obama-administration-pushes-for-smart-grid-but-is-the-industry-ready>, 6/16/2012

Smart Grid is abuzz recently. The Obama Administration outlined a [nine-point Smart Grid plan](http://www.powergenworldwide.com/index/display/articledisplay/6487473242/articles/powergenworldwide/t-and-d/smart-grid/2011/06/Obama-Smart-Grid-plan-calls-for-250mn-in-loans.html) on June 13 that includes funding Smart Grid projects in rural areas and making Smart Grid successes and failures publically available. As a result of the American Recovery and Reinvestment Act, the Obama Administration has already invested $4.5 billion in recovery investments into Smart Grid projects, which has resulted in the installation of over five million smart meters and more.¶ The new plan includes a commitment to invest a minimum of $250 million in loans for Smart Grid projects in the rural U.S. and the creation of a non-profit called Grid 21 focused on consumer tools. In addition, the Administration has launched an initiative that will seek to share the lessons learned from the Smart Grid stimulus investments, and a “Renewable Energy Rapid Response Team” has also been created that will review clean power and transmission line projects and improve federal coordination for getting clean power projects deployed.¶ Cameron Brooks, senior director of market development and policy strategy at Tendril, a Smart Grid and home energy management company, said the loan for rural Smart Grid development should be viewed like a down payment that rural utilities can choose to build upon. “There’s an element of establishing the foundation upon which others can innovate,” Brooks said.¶ The investment into rural areas will help aid transmission in parts of the country that are lacking adequate transmission, said John Christens, vice president of Smart Energy Services for the consulting company Capgemini. But more importantly, Christens said, the government will be making Smart Grid information more readily available through the new plan. “The government is saying it will serve as an ombudsman, publishing the results of pilot programs and smart meter programs. This is a statement of further commitment by the government to establish better standards of grid interoperability.”¶ Brooks said the Grid 21 campaign, which will grant customers more detailed and faster access to information on their own meter, is a great step forward for Smart Grid. “Very few meters have any information that goes directly into the home, but this plan is looking at ways that can nudge industry and regulators about this issue.”

#### That guarantees complete collapse and blackouts within three years.

Huff 12 Ethan, “Hacking Expert David Chalk says 100 percent certainty of catastrophic failure of smart energy grid within three years” Natural News. Web, Acc 9/27/2012) http://www.naturalnews.com/035755\_power\_grid\_failure\_blackouts.html

For at least the past five years, the federal government has been pushing utility companies across America to “upgrade” their infrastructures to support “smart grid” technology that allows two-way communication with, and centralized control of, the energy grid through an internet-based network. But cyber expert David Chalk says that a complete and catastrophic failure of the entire smart energy grid is definitely going to occur within the next three years, and that few are aware of this.¶ Traditionally, the electric meters attached to structures, the wired and underground poles that deliver electricity to them, and the plants where electricity are generated have all been operated and maintained independently by field workers who gather data in a one-way system of communication. In other words, when a problem occurs with an electric meter or a pole in the traditional system, an expert has to go out and assess the problem, as there is no automated way for the system itself to send feedback.¶ For this reason and others, many have hailed smart grid technology as the solution, and as the way to bring the electric grid into the 21st century. But according to Chalk and many other experts in the field, smart grid technology is highly vulnerable to cyber attacks, and the technology is so digitally centralized that hackers are sure to “crack the code,” so to speak, and eventually bring down the system.¶ “We’re in a state of crisis,” says Chalk. “The front door is open and there is no lock to be had. There is not a power meter or device on the grid that is protected from hacking — if not already infected — with some sort of trojan horse that can cause the grid to be shut down or completely annihilated.”¶ Solar storms, digital warfare threaten to bring down the smart grid¶ Smart grid technology is also vulnerable to failure from solar storms and digital warfare, both of which could quickly take down the entire system in an instant, leaving millions, and potentially billions, of people in the dark without power. Smart grid technology also comes with its own unique health and privacy risks that are being ignored by its proponents as well.¶ “Unless we wake up and realize what we’re doing, there is 100 percent certainty of total catastrophic failure of the entire power infrastructure within three years,” adds Chalk. “This could actually be worse than a nuclear war, because it would happen everywhere. How governments and utilities are blindly merging the power grid with the Internet, and effectively without any protection, is insanity at its finest.”

#### Cyber-attack’s coming now---actors are probing US electricity weaknesses

Reed 10/11 John, Reports on the frontiers of cyber war and the latest in military technology for Killer Apps at Foreign Policy, "U.S. energy companies victims of potentially destructive cyber intrusions", 2012, killerapps.foreignpolicy.com/posts/2012/10/11/us\_energy\_companies\_victims\_of\_potentially\_destructive\_cyber\_attacks

Foreign actors are probing the networks of key American companies in an attempt to gain control of industrial facilities and transportation systems, Defense Secretary Leon Panetta revealed tonight.¶ "We know that foreign **cyber actors are probing America's critical infrastructure networks**," said Panetta, disclosing previously classified information during a speech in New York laying out the Pentagon's role in protecting the U.S. from cyber attacks. "They are targeting the computer control systems that operate chemical, **electricity** and water plants, and those that guide transportation thorough the country."¶ He went on to say that the U.S. government knows of "specific instances where intruders have gained access" to these systems -- frequently known as Supervisory Control and Data Acquisition (or SCADA) systems -- and that "they are seeking to create advanced tools to attack these systems and cause panic, destruction and even the loss of life," according to an advance copy of his prepared remarks.¶ The secretary said that **a coordinated attack on enough critical infrastructure could be a "cyber Pearl Harbor" that would "cause physical destruction and loss of life, paralyze and shock the nation, and create a profound new sense of vulnerability.**"¶ While there have been reports of criminals using 'spear phishing' email attacks aimed at stealing information about American utilties, Panetta's remarks seemed to suggest more sophisticated, nation-state backed attempts to actually gain control of and damage power-generating equipment. ¶ Panetta's comments regarding the penetration of American utilities echo those of a private sector cyber security expert Killer Apps spoke with last week **who said that the networks of American electric companies were penetrated, perhaps in preparation for a Stuxnet-style attack**.¶ Stuxnet is the famous cyber weapon that infected Iran's uranium-enrichment centrifuges in 2009 and 2010. Stuxnet is believed to have caused some of the machines to spin erratically, thereby destroying them.¶ "**There is hard evidence** that there has been penetration of our power companies, and given Stuxnet, that is a staging step before destruction" of electricity-generating equipment, the expert told Killer Apps. Because uranium centrifuges and power turbines are both spinning machines, "**the attack is identical -- the one to take out the centrifuges and the one to take out our power systems is the same attack**."¶ "If a centrifuge running at the wrong speed can blow apart" so can a power generator, said the expert. "If you do, in fact, spin them at the wrong speeds, you can blow up any rotating device."¶ Cyber security expert Eugene Kaspersky said two weeks ago that one of his greatest fears is someone reverse-engineering a sophisticated cyber weapon like Stuxnet **-- a relatively easy task** -- and he noted that Stuxnet itself passed through power plants on its way to Iran. "Stuxnet infected thousands of computer systems all around the globe, I know there were power plants infected by Stuxnet very far away from Iran," Kaspersky said.

#### Old defense doesn’t apply---Stuxnet changed the game

**Gross 11** Michael Joseph, Vanity Fair contributing editor, he covers topics including politics, technology, and national security, has also written extensively for The New York Times, The Boston Globe, and GQ, attended Williams College, and later studied at Princeton Theological Seminary. After graduating, he wrote speeches for Massachusetts Governor William Weld, “A Declaration of Cyber-War”, April, http://www.vanityfair.com/culture/features/2011/04/stuxnet-201104?currentPage=all

Regardless of how well it worked, there is no question that Stuxnet is something new under the sun. At the very least, it is a blueprint for a new way of **attacking industrial-control systems**. In the end, the most important thing now publicly known about Stuxnet is that Stuxnet is **now publicly known.** That knowledge is, on the simplest level, a warning: **America’s own critical infrastructure is a sitting target for attacks like this**. That aside, if Stuxnet really did attack Iran’s nuclear program, it could be called the first unattributable act of war. The implications of that concept are confounding. Because cyber-weapons pose an almost **unsolvable problem of sourcing**—who pulled the trigger?—war could evolve into something **more and more like terror**. Cyber-conflict makes military action more like a **never-ending game of uncle**, where the fingers of weaker nations are perpetually bent back. The wars would often be secret, waged by members of anonymous, elite brain trusts, none of whom would ever have to look an enemy in the eye. For people whose lives are connected to the targets, the results could be **as catastrophic as a bombing** **raid, but would be even more disorienting**. People would suffer, but would never be certain whom to blame.¶ **Stuxnet is the Hiroshima of cyber-war**. That is its true significance, and all the speculation about its target and its source should not blind us to that larger reality. **We have crossed a threshold, and there is no turning back**.

1. Blackouts will be long term and tank the economy

Bruch and Hunter 12 MICHAEL BRUCH Head of R&D Risk Consulting LARRY HUNTER Risk Engineer Allianz Risk Consulting Worldwide risk consulting, risk management and loss investigation services for corporate, industrial and specialty risks. Energy risks: Power trip http://www.agcs.allianz.com/assets/PDFs/GRD/GRD%20individual%20articles/Power\_blackout\_risks\_article.pdf

Many companies are unprepared for business disruptions caused by power blackouts, and are often unaware of the true costs and impact that they can have on their operations. While the majority of power failures from national grids last only a few hours, some blackouts can last days or even weeks, completely shutting down production at companies and critical infrastructures such as telecommunication networks, financial services, water supplies and hospitals. Furthermore, it is likely that power blackouts will become more frequent owing to the lack of incentives to invest in aged national grid infrastructures in Europe and the US, as well as the fact that energy from decentralized, “volatile” renewable sources is not well aligned to work on electricity grids that were designed 50 or 60 years ago. Also, as more and more grids are interconnected, a blackout in one region can trigger a domino effect that could result in supra-regional blackouts. Heightened risk from terrorism, cyber attacks and solar flares also highlights how vulnerable the world’s energy grids are to systemic failure. Research shows that the financial impacts of even a small power cut can be catastrophic. Analyses from blackout events in the US show that a 30-minute power cut results in an average loss of US$15,709 for medium and large industrial clients, and nearly US$94,000 for an eight-hour interruption. Even short blackouts – which occur several times a year in the US – add up to an annual estimated economic loss of between US$104 and US$164 billion. SOLAR STORMS AS TRIGGER A potential trigger for large-scale blackouts within the next two years may be space weather events. Geomagnetic induced solar flare storms follow an 11-year cycle and are expected to peak again in 2013. Particularly in the northern hemisphere, space weather events could severely damage high-voltage transformers whose repair can take weeks.

1. Economic collapse causes nuclear war.

Mead 9 Senior Fellow in U.S. Foreign Policy at the Council on Foreign Relations, Only Makes You Stronger, The New Republic, [www.tnr.com/politics/story.html?id=571cbbb9-2887-4d81-8542-92e83915f5f8&p=2](http://www.tnr.com/politics/story.html?id=571cbbb9-2887-4d81-8542-92e83915f5f8&p=2)

The greatest danger both to U.S.-China relations and to American power itself is probably not that China will rise too far, too fast; it is that the current crisis might end China's growth miracle. In the worst-case scenario, the turmoil in the international economy will plunge China into a major economic downturn. The Chinese financial system will implode as loans to both state and private enterprises go bad. Millions or even tens of millions of Chinese will be unemployed in a country without an effective social safety net. The collapse of asset bubbles in the stock and property markets will wipe out the savings of a generation of the Chinese middle class. The political consequences could include dangerous unrest--and a bitter climate of anti-foreign feeling that blames others for China's woes. (Think of Weimar Germany, when both Nazi and communist politicians blamed the West for Germany's economic travails.) Worse, instability could lead to a vicious cycle, as nervous investors moved their money out of the country, further slowing growth and, in turn, fomenting ever-greater bitterness. Thanks to a generation of rapid economic growth, China has so far been able to manage the stresses and conflicts of modernization and change; nobody knows what will happen if the growth stops. India's future is also a question. Support for global integration is a fairly recent development in India, and many serious Indians remain skeptical of it. While India's 60-year-old democratic system has resisted many shocks, a deep economic recession in a country where mass poverty and even hunger are still major concerns could undermine political order, long-term growth, and India's attitude toward the United States and global economic integration. The violent Naxalite insurrection plaguing a significant swath of the country could get worse; religious extremism among both Hindus and Muslims could further polarize Indian politics; and India's economic miracle could be nipped in the bud. If current market turmoil seriously damaged the performance and prospects of India and China, the current crisis could join the Great Depression in the list of economic events that changed history, even if the recessions in the West are relatively short and mild. The United States should stand ready to assist Chinese and Indian financial authorities on an emergency basis--and work very hard to help both countries escape or at least weather any economic downturn. It may test the political will of the Obama administration, but the United States must avoid a protectionist response to the economic slowdown. U.S. moves to limit market access for Chinese and Indian producers could poison relations for years. For billions of people in nuclear-armed countries to emerge from this crisis believing either that the United States was indifferent to their well-being or that it had profited from their distress could damage U.S. foreign policy far more severely than any mistake made by George W. Bush. It's not just the great powers whose trajectories have been affected by the crash. Lesser powers like Saudi Arabia and Iran also face new constraints. The crisis has strengthened the U.S. position in the Middle East as falling oil prices reduce Iranian influence and increase the dependence of the oil sheikdoms on U.S. protection. Success in Iraq--however late, however undeserved, however limited--had already improved the Obama administration's prospects for addressing regional crises. Now, the collapse in oil prices has put the Iranian regime on the defensive. The annual inflation rate rose above 29 percent last September, up from about 17 percent in 2007, according to Iran's Bank Markazi. Economists forecast that Iran's real GDP growth will drop markedly in the coming months as stagnating oil revenues and the continued global economic downturn force the government to rein in its expansionary fiscal policy. All this has weakened Ahmadinejad at home and Iran abroad. Iranian officials must balance the relative merits of support for allies like Hamas, Hezbollah, and Syria against domestic needs, while international sanctions and other diplomatic sticks have been made more painful and Western carrots (like trade opportunities) have become more attractive. Meanwhile, Saudi Arabia and other oil states have become more dependent on the United States for protection against Iran, and they have fewer resources to fund religious extremism as they use diminished oil revenues to support basic domestic spending and development goals. None of this makes the Middle East an easy target for U.S. diplomacy, but thanks in part to the economic crisis, the incoming administration has the chance to try some new ideas and to enter negotiations with Iran (and Syria) from a position of enhanced strength. Every crisis is different, but there seem to be reasons why, over time, financial crises on balance reinforce rather than undermine the world position of the leading capitalist countries. Since capitalism first emerged in early modern Europe, the ability to exploit the advantages of rapid economic development has been a key factor in international competition. Countries that can encourage--or at least allow and sustain--the change, dislocation, upheaval, and pain that capitalism often involves, while providing their tumultuous market societies with appropriate regulatory and legal frameworks, grow swiftly. They produce cutting-edge technologies that translate into military and economic power. They are able to invest in education, making their workforces ever more productive. They typically develop liberal political institutions and cultural norms that value, or at least tolerate, dissent and that allow people of different political and religious viewpoints to collaborate on a vast social project of modernization--and to maintain political stability in the face of accelerating social and economic change. The vast productive capacity of leading capitalist powers gives them the ability to project influence around the world and, to some degree, to remake the world to suit their own interests and preferences. This is what the United Kingdom and the United States have done in past centuries, and what other capitalist powers like France, Germany, and Japan have done to a lesser extent. In these countries, the social forces that support the idea of a competitive market economy within an appropriately liberal legal and political framework are relatively strong. But, in many other countries where capitalism rubs people the wrong way, this is not the case. On either side of the Atlantic, for example, the Latin world is often drawn to anti-capitalist movements and rulers on both the right and the left. Russia, too, has never really taken to capitalism and liberal society--whether during the time of the czars, the commissars, or the post-cold war leaders who so signally failed to build a stable, open system of liberal democratic capitalism even as many former Warsaw Pact nations were making rapid transitions. Partly as a result of these internal cultural pressures, and partly because, in much of the world, capitalism has appeared as an unwelcome interloper, imposed by foreign forces and shaped to fit foreign rather than domestic interests and preferences, many countries are only half-heartedly capitalist. When crisis strikes, they are quick to decide that capitalism is a failure and look for alternatives. So far, such half-hearted experiments not only have failed to work; they have left the societies that have tried them in a progressively worse position, farther behind the front-runners as time goes by. Argentina has lost ground to Chile; Russian development has fallen farther behind that of the Baltic states and Central Europe. Frequently, the crisis has weakened the power of the merchants, industrialists, financiers, and professionals who want to develop a liberal capitalist society integrated into the world. Crisis can also strengthen the hand of religious extremists, populist radicals, or authoritarian traditionalists who are determined to resist liberal capitalist society for a variety of reasons. Meanwhile, the companies and banks based in these societies are often less established and more vulnerable to the consequences of a financial crisis than more established firms in wealthier societies. As a result, developing countries and countries where capitalism has relatively recent and shallow roots tend to suffer greater economic and political damage when crisis strikes--as, inevitably, it does. And, consequently, financial crises often reinforce rather than challenge the global distribution of power and wealth. This may be happening yet again. None of which means that we can just sit back and enjoy the recession. History may suggest that financial crises actually help capitalist great powers maintain their leads--but it has other, less reassuring messages as well. If financial crises have been a normal part of life during the 300-year rise of the liberal capitalist system under the Anglophone powers, so has war. The wars of the League of Augsburg and the Spanish Succession; the Seven Years War; the American Revolution; the Napoleonic Wars; the two World Wars; the cold war: The list of wars is almost as long as the list of financial crises. Bad economic times can breed wars. Europe was a pretty peaceful place in 1928, but the Depression poisoned German public opinion and helped bring Adolf Hitler to power. If the current crisis turns into a depression, what rough beasts might start slouching toward Moscow, Karachi, Beijing, or New Delhi to be born? The United States may not, yet, decline, but, if we can't get the world economy back on track, we may still have to fight.

1. Even if there isn’t a large-scale blackout, electricity unreliability costs $500 billion of the GDP, massive unemployment, and decreased competitiveness in trade.

EDR 11 Economic Development Research Group, Inc. (EDR Group), is a consulting firm focusing specifically on applying state-of-the-art tools and techniques for evaluating economic development performance, impacts, and opportunities. La Capra Associates is an independent consulting firm which has specialized in the electric, natural gas and water industries for over 30 years. This report was prepared for the American Society of Civil Engineers by Economic Development Research Group, Inc. in association with La Capra Associates. FAiluRE to ACt The economic impacT of current Investment trends In ElEctr icity Infrastructure http://www.asce.org/uploadedFiles/Infrastructure/Failure\_to\_Act/energy\_report\_FINAL2.pdf

If annual investments in electric energy infrastructure through 2040 continue to average $63 billion, as they did during the past decade, then by 2020 the cumulative deficit (gap) for investment in electricity infrastructure will be $107 billion, and this would increase to $732 billion by 2040. The direct cost to businesses and households would be even greater than the missed investment, rising to $197 billion by 2020 and $998 billion by 2040. Nationally, these costs are passed into the national economy in the form of business expenses, lost production and household spending diverted to satisfying demand for electrical power. These broader impacts on the U.S. economy would represent a cumulative loss of gross domestic product (GDP) amounting to $496 billion by 2020 and $1.95 trillion by 2040. The loss of competitiveness for businesses that sell to overseas markets, and the higher prices paid for foreign imports, would also lead to a loss of jobs. These estimated job “losses” will occur in the form of a lower rate of national economic growth, and hence a lower rate of job growth. Overall, the U.S. economy will end up with an average of 529,000 fewer jobs than it would otherwise have by 2020. And even with economic adjustments occurring later on, with catch-up investments, the result would still be 366,000 fewer jobs in 2040, as shown in Table 5. Table 21 illustrates that job losses will fall heavily on the retail and other consumer spending sectors due to the expected diversion of household spending. Personal consumption expenditures 25 are projected to be reduced by a cumulative $400 billion by 2020 and $2.1 trillion by 2040 (in 2010 dollars). Moreover, service disruptions that force businesses to shut down will have a disproportional impact on hourly workers and also on business locations that require direct personal interaction, such as stores and restaurants. Lastly, retail is the nation’s largest economic sector in terms of numbers of jobs. Therefore, job impacts will be disproportionately assumed in that sector compared to others that might contribute more to GDP or be more energy intensive. Substantial losses in manufacturing sectors are also anticipated due to less reliable electricity service with a shortfall in electricity infrastructure investment. These losses will signify reduced competitiveness of U.S. industries. Figure 13 indicates which industries will be most harmed.

1. Continued economic decline creates geopolitical instability, regime change, and prevents the US from maintaining critical interests abroad.

Blair 9 Dennis C. Blair Director of National Intelligence 12 February 2009 Annual Threat Assessment of the Intelligence Community for the Senate Select Committee on Intelligence http://intelligence.senate.gov/090212/blair.pdf

The financial crisis and global recession are likely to produce a wave of economic crises in emerging market nations over the next year, prompting additional countries to request IMF or other multilateral or bilateral support. Since September 2008, ten nations committed to new IMF programs intended to provide balance of payments support. All face the task of tackling economic problems in a less benign global economic environment. Unlike the Asian financial crisis of 1997-98, the globally synchronized nature of this slowdown means that countries will not be able to export their way out of this recession. Indeed, policies designed to promote domestic export industries—so-called beggar-thy-neighbor policies such as competitive currency devaluations, import tariffs, and/or export subsidies—risk unleashing a wave of destructive protectionism. Time is probably our greatest threat. The longer it takes for the recovery to begin, the greater the likelihood of serious damage to US strategic interests. Roughly a quarter of the countries in the world have already experienced low-level instability such as government changes because of the current slowdown. Europe and the former Soviet Union have experienced the bulk of the anti-state demonstrations. Although two-thirds of countries in the world have sufficient financial or other means to limit the impact for the moment, much of Latin America, former Soviet Union states and sub-Saharan Africa lack sufficient cash reserves, access to international aid or credit, or other coping mechanism. Statistical modeling shows that economic crises increase the risk of regime-threatening instability if they persist over a one to two year period. Besides increased economic nationalism, the most likely political fallout for US interests will involve allies and friends not being able to fully meet their defense and humanitarian obligations. Potential refugee flows from the Caribbean could also impact Homeland security.

1. Failed states comparatively outweigh great power war—cause international instability, terrorism, trafficking, prolif, and interventionist wars.

Yoo 5 professor of law at UC Berkeley School of Law, visiting scholar at AEI (John, Northwestern University International Colloquium, “Failed states”, http://www.law.northwestern.edu/colloquium/international/Yoo.pdf, WEA)

Failed states pose perhaps the most dangerous threat to both American national security and international peace and stability. Failed states have served as the incubator of international terrorist groups, such as the al Qaeda organization that attacked the United States on September 11, 2001, or as trans-shipments points for illicit drugs, human trafficking, or the proliferation of weapons of mass destruction technologies. In Somalia, Rwanda, Haiti, and the former Yugoslavia, failed states have produced the catastrophic human rights disasters. Since the end of World War II, far more lives have been lost due to internal wars than international armed conflicts, and many of the former have occurred in failed states. Military intervention in response, often led by the United States and its allies, incurs high costs in terms of money, material, and lives. Finding a comprehensive and effective solution to these challenges of terrorism, human rights violations, or poverty and lack of economic development requires some answers to the problem of failed states.

1. Distributed generation diversifies backup generation and solves in the case of a cyber attack

Hirsh et al. 5 Richard F. Hirsh, Benjamin K. Sovacool, & Ralph D. Badinelli “Distributed Generation and Momentum Change in the American Electric Utility System: A Social-science systems Approach” *Electric Power Networks Efficiency and Security*.

Surprisingly, perhaps, DG facilities offer enhancements for the transmission of power. By producing local power for users, DG technologies can decongest the grid by reducing demand during peak times, one of the causes of the 2000-2001 California crisis and the 2003 blackout on the Eastern seaboard.[33] Most important, by constructing large numbers of decentralized power facilities rather than a few large plants located distantly from load centers, DG use can reduce the need to upgrade and expand transmission facilities during a period when investment in such facilities remains restricted due to siting policies and local opposition. And in an increasingly securityminded era, proponents further argue that DG technologies may enhance protection of the grid. Decentralized power generation reduces the terrorist targets that large nuclear and conventional facilities and natural gas refineries offer. It also helps the system by diversifying fuels, enhancing emergency stand-by generation, and better insulating the grid from failure if a large power plant goes down due to an attack.[34]

1. DG increases critical infrastructure’s ability to island

DOE 7 “The Potential Benefits Of Distributed ¶ Generation And Rate-Related Issues ¶ That May Impede Their Expansion¶ A Study Pursuant To Section 1817¶ Of The Energy Policy Act Of 2005” http://www.ferc.gov/legal/fed-sta/exp-study.pdf

To address the vulnerabilities of the electric system to intentional disruptions, particularly those ¶ perpetrated by organized acts of terror, and to improve grid resilience, the National Research Council ¶ (NRC) of the National Academy of Sciences (NAS) recently recommended that “technology should be ¶ developed for an intelligent, adaptive power grid that combines a threat warning system with a distributed ¶ intelligent-agent system (NRC 2002).” Distributed generation can play an important role in such a ¶ system. In fact, the NRC points out: ¶ “The trend over time has been to build large, remote generating plants, which require ¶ large, complex transmission systems. Today there is a growing interest in distributed ¶ generation – generators of a more modest size in close proximity to load centers. This ¶ trend may lead to a more flexible grid in which islanding to maintain key loads are easier ¶ to achieve. Improved security from distributed generation should be credited when ¶ planning the future of the grid (NRC 2002).” ¶ DG can improve resilience through its reliance on larger numbers of smaller and more geographically ¶ disperse power plants, rather than large, central station power plants and bulk-power transmission ¶ facilities. Although larger numbers of smaller-scale power plants increases the number of targets for ¶ intentional attack, they reduce the number of customers who might potentially be affected. Electricity ¶ consumers are less vulnerable to supply disruptions when they have the ability to “island” themselves and ¶ thus to protect segments of the grid, particularly in critical infrastructure facilities such as fire and safety ¶ buildings, telecommunications systems, hospitals, and natural gas and oil delivery stations. ¶ A simulated terrorist attack on California’s electric grid, which included a 25% reduction in power ¶ supplies, showed that recovery time would be about two weeks, at a direct cost to California’s economy ¶ of almost $11 billion. Much of these costs would have resulted from lost manufacturing output, and ¶ wholesale and retail trades. Greater DG by the electric utilities that serve these sectors, or by the sectors ¶ themselves, could lessen these economic impacts (ICF Consulting 2003). ¶ In fact, research has shown that larger numbers of DG systems result in “potentially significant reliability ¶ advantages to increasing the amount of distributed generation in the system (Zerriffi 2004).”

1. DG solves cascading failures and ensures power for critical infrastructure.

Andres and Loudermilk 12 Richard B. Andres, PhD, is Professor of National Security Strategy at the National War College and Senior Fellow and Chair of the Energy & Environmental Security Policy Program with the Institute for National Strategic Studies at the National Defense University. Micah J. Loudermilk is Senior Research Associate for the Energy & Environmental Security Policy Program with the Institute for National Strategic Studies at the National Defense University, contracted through ASE, Inc. “National Security & Distributed Power Generation” No. 24, Sep 2012 http://livebettermagazine.com/eng/magazine/article\_detail.lasso?id=352&-session=user\_pref:42F9487313cd739475NXKWN2440B

TODAY, PEOPLE OF THE UNITED STATES ARE ENTIRELY DEPENDENT ON ELECTRICITY FOR SURVIVAL. Without power, virtually all commerce would stop within seconds. Telecommunications would become nearly impossible after a few hours. Water supplies in most cities would last only for hours as electric pumps stopped. Food would become difficult to obtain within a few days. Most importantly, in a continent-size blackout, systems needed to resupply diesel emergency response generators would be unavailable, meaning the emergency generators fueled by nonrenewable sources would not last more than a few days either. One way to substantially reduce the risk of wide-scale power outages is to modernize and decentralize the North American electric grid. The grid as currently conceived is both interdependent and vulnerable. It is not, however, difficult to conceptualize a system far more decentralized and, consequently, less vulnerable to catastrophic long-term outages. Such a distributed model would enable and encourage widespread integration of smaller power sources closer to end-users – including renewable power options. CUBA OFFERS A CASE STUDY IN THE ABILITY OF DISTRIBUTED GENERATION TO BOOST GRID RESILIENCY AND SECURITY. Throughout the last century, Cuba achieved 95 percent electrification using a centralized grid fueled by a system of large fossil fuel power plants. However, the system was brittle and old – much like the American grid today. As recently as 2005, structural inefficiencies in the plants and events, including natural disasters, left the Cuban people suffering more than 200 days of blackouts. Yet by 2008, this number had fallen to zero as a result of a massive program to decentralize power distribution across the country. By adding thousands of microgenerators and backup generators around the country, the Cuban government cut its reliance on centralized power plants while simultaneously increasing resilience of the grid in the event of outages. When disasters did strike, the decentralized generation system maintained critical services and islands of operation throughout the country while service was restored. Expanded to a much larger scale, the type of decentralization Cuba implemented could help to reduce U.S. vulnerability to wide-scale and long duration outages. A large part of the vulnerability of the current power system in the U.S. is caused by centralization – relying on massive power plants and tens of thousands of miles of high-voltage transmission lines to move power from the point of generation to the point of use. When a problem arises in one portion, the interconnected nature of the grid creates potential for the type of massive outages and cascading failures that proved so problematic in 2003. With a distributed grid network, however, smaller assets are deployed around the country. During the 2003 blackout, for instance, Kodak’s factory in Rochester, New York, escaped unscathed simply by having its own onsite power units. Ensuring critical institutions and infrastructure, such as military assets, hospitals, police stations, financial institutions, industrial plants, water and sewage systems, can generate power from renewable sources that will be available during a crisis is only common sense. However, to be economically viable, institutions investing in this type of renewable and localized generation must be able to sell their power back to the grid when not in crisis. Beyond the benefits of localized power generation in crises, a decentralized system can help to prevent crises entirely because, when power is produced closer to end-users, the need is reduced for high-voltage transformers and transmission lines. A city with thousands of generators – rooftop solar, city cogeneration and so forth – contributes far less to a cascading failure and is capable of providing “edge” capability to facilitate restoring regional grids after a large scale failure.

### ADV 2: Financial Speculation

1. Current tax credits for renewables bolster the tax equity industry of banks and Wall Street firms who reap all the profit

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A regular tax credit reduces the amount of taxes a business or person pays dollar for dollar, down to zero. In the case of the PTC, it provides 2.2 cents for every kilowatt-hour produced by the wind power project, over 10 years. But for the many individuals and businesses that don’t owe a lot of taxes, they have limited use. That’s why there’s an entire “tax equity industry” made up of large banks and Wall Street firms that partner with wind and solar developers to reduce their tax bills. The drawback of these partnerships is that as much as half of the tax credit’s value is consumed by the Wall Street firms and not the renewable energy project. With a refundable tax credit, wind and solar project owners wouldn’t require big tax bills or Wall Street to finance projects.

1. Now is the time to pay attention. New investors are creeping into the third-party solar financing market

Linder and Di Capua 12 Stefan Linder, Analyst, Clean Energy Economics, Michel Di Capua, Head of Research, North America, Bloomberg New Energy Finance. US SOLAR – WHITE PAPER, 6-4

US solar financing US solar projects have historically been bankrolled by some combination of energy sector players, banks, and the federal government, but the landscape is rapidly changing. New business models are emerging with an emphasis on third-party financing. New investors, including institutional players, are entering. And new financing vehicles such as project bonds and other securities are being assembled to tap the broader capital markets. This report, commissioned by Reznick Group and undertaken by Bloomberg New Energy Finance, describes the ongoing evolution of US solar financing: where the market is today, where it is heading, and what’s behind this important transition. ● Maintaining US solar deployment growth will require substantially more investment. Asset financing for US photovoltaic (PV) projects has grown by a compound annual growth rate of 58% since 2004 and surged to a record $21.1bn in 2011, fuelled by the one-year extension of the Department of Treasury cash grant programme. But funding the next nine years of growth (2012-20) for US PV deployment will require about $6.9bn annually on average. ● Traditional players are taking a smaller role. Regulations, primarily in the EU, are curtailing banks from providing long-term debt as easily as previously. In the US, the Department of Energy loan guarantee programme’s expiry has meant less direct federal government support. ● New models are emerging. Distributed generation is driving innovation and creating new models for solar deployment. Few homeowners can afford the upfront cost of a solar system, giving rise to third-party financing models, which allow them to 'go solar' with little or no money down. These models also give investors a diversified opportunity to back solar. ● New investors are taking interest. Institutional players such as insurance companies and pension funds seek stable, long-lived assets to match long-term liabilities; some utilities may seek solar portfolios to offset revenue loss from distributed generation.

Financial trading of energy ensures future Enrons - high prices and bankrupt states

Coile 4 Zachary, SF Gate, New evidence of Enron schemes 6-15, http://www.sfgate.com/news/article/New-evidence-of-Enron-schemes-Documents-tapes-2713873.php#ixzz25SsxruqA

Enron, which was once a natural gas pipeline company, expanded into virtually every aspect of the gas and electricity business by early 2000, and at its peak was the nation's seventh-largest corporation, with close ties to the Bush administration. But financial and accounting scandals drove the company into bankruptcy in December 2001. The taped phone conversations unearthed by lawyers for the Snohomish County utility have provided some of the most explosive revelations about Enron's traders -- and angered California officials, who believed throughout the 18 months that market manipulation fanned the crisis that led to rolling blackouts, nearly bankrupted the state's largest utilities, and forced soaring power bills on California ratepayers. In one phone conversation, first reported by CBS News earlier this month, the head of Enron's Western trading desk, Timothy Belden, is overheard bragging about how one of his traders, Jeffrey Richter, had stolen money from California. "He steals money from California to the tune of about a million...," Belden said in the Aug. 8, 2000, call.

1. Enron shortage empirically have caused higher energy prices and cost billions of dollars

Hildyard et al 12 Nicholas, The Corner House, Larry Lohmann and Sarah Sexton.12 Energy Security For Whom? For What? February 2012

Market manipulation and outright criminality are frequent features of the increased use of financial markets to ramp up profits. The most notorious example is Enron, the US energy multinational that went spectacularly bust in December 2001 after its bets went sour and billions of dollars of losses came to light. The European Commission believes that such speculation has led to higher energy prices, costing the consumer billions of dollars.83 Enron and other energy traders also got power plants to shut down their power generation in order to push prices up, causing a wave of power cuts that affected Californians in 2000 (see Box: “Fat Boy, Get Shorty, Death Star”, pp.5051).84 Such outages, however, are frequently cited in energy security stories as an illustration of fossil fuel supplies running out. Although derivative-based energy trading in the US shrank dramatically in the wake of the Enron scandal, the practices still continue.

1. Independently, depending on third party Wall Street financing jacks up the cost of energy

Farrell 10 John, GRIST, How renewable incentives affect project ownership, 12-7

It’s not just the owner who benefits when projects don’t require complex partnerships to get tax credits, but also ratepayers. As noted in a previous post, tax equity partnerships increase transaction costs, making solar power more expensive. graphIt doesn’t stop with owners or ratepayers. Communities or even states looking to boost their clean energy portfolio lose out on economic benefits. Locally owned projects provide one to three times the economic impact of absentee owned projects. Referencing our earlier example, a solar lease will send more than half of the local revenue away, reducing the economic impact by a multiplier, whereas local ownership would keep most revenues local.

1. As companies financialize their debt -- they are creating the conditions for another recession – high energy means consumers can’t pay mortgages and can’t pay for food

Lipson 11 Daniel N. Assistant Professor of Political Science and International Relations at SUNY New Paltz, *New Political Science* Volume 33, Issue 4, pages 555-575

At the macro level, home construction and sales were two sectors that kept economic growth going a little bit longer over the previous decade. Americans were being assured that purchasing a home would be the best investment they could make. Banks were extraordinarily lax in approving home mortgages that were far too expensive for buyers to afford. And mega-banks were able to reap profits by chopping up mortgages into securities and hiding high-risk mortgages in newly authorized derivatives and securities that were being approved by ratings agencies as being safe investments. In short, increasingly risky financial deregulatory moves were being promoted as a way to keep increasing profits of major corporations, and this deregulation was being touted as a way to help Americans invest in their own financial future and increase the gross domestic product at the same time. But according to peak oil experts, it was all a ticking time bomb because it was merely postponing the bad news: that the debt being shouldered by home owners and by financial institutions would only grow, especially as energy costs inched higher. At the micro-level, consumers have a difficult time making mortgage payments and heating their homes as energy prices (and the ensuing cost of food) rise. As we can see as of spring 2011, inflation is beginning to increase as prices rise (primarily because of rises in energy costs) for most goods and services.

1. Rising energy prices cause resource wars, inhumane austerity measures, famine, pandemics and turn America into Detroit

Lipson 11 Daniel N. Assistant Professor of Political Science and International Relations at SUNY New Paltz, *New Political Science* Volume 33, Issue 4, pages 555-575

Peak oil experts predict that volatile but sharply rising energy costs along with supply disruptions will make it increasingly difficult for governments to maintain infrastructure and service debt. Feeding the growing global population will become increasingly difficult as the costs of fertilizers and pesticides and other key ingredients of industrial agriculture—combined with the operational and transportation energy costs required—rise and as industrial farming and urban sprawl continue to erode needed soil. Even the stability of the electrical grid and telecommunications grids required for the functioning of modern society are at risk of increased disruptions and even shutdowns if the companies/governments running this infrastructure are unable to adjust to the rising costs of maintaining this infrastructure. When combined with the economic havoc wrought by the inter-related climate crisis, depletion of so many other essential resources, environmental degradation, the government's failure to invest in infrastructure, and economic austerity due to government debt crises, the perfect storm has arrived. Over the coming generation, peak oil experts envision a range of scenarios unfolding. Under the most dystopic, right-wing scenario, the US federal government would engage in even more aggressive resource wars and become even more repressive in stamping out dissent. Austerity measures would become more drastic, and government would pursue other increasingly risky measures of energy extraction and starving-the-beast fiscal policies in its desperate and doomed effort to restore economic growth (as measured by GDP). The less devastating path (as envisioned by Heinberg, Gilding, Kunstler, and others) would be for citizens and lawmakers to acknowledge that continued GDP growth is not attainable and to instead prepare for contraction and transition to a steady-state economy via planned relocalization. Over the course of the coming century, peak oil experts predict that substantial economic, societal, and governmental relocalization is inevitable. This is, of course, the precise opposite of the modern trend of globalization.86 It entails going back to the basics of life in earlier American history. Food will increasingly be grown the old-fashioned way: far more will be grown through solar power, and far less will be grown through fossil-fuel-based industrial agriculture. Towns will need to become resilient by reinvesting in local production of the basic functions any community needs. Instead of relying so heavily on a complex network of global extraction and production of goods via coal-powered factories in Asia that are shipped by diesel-powered cargo ships half-way across the world and then driven by gas-guzzling tractor trucks to big-box stores (or shipped via online purchases directly to the consumers' suburban homes), the US will have to adapt to the new reality by recreating local credit unions, insurance companies, municipal utilities, blacksmiths, tailors, farms powered by animal-based plowing, slaughterhouses, farmers' markets, and other essential services, all in compact, walkable neighborhoods and towns. In short, all levels of government and society would be wise to be taking part in the “Transition Town” initiatives, which focus on rebuilding resilient communities.87 Most peak oil experts do not naïvely embrace relocalization as some idyllic pastoral vision. To the contrary, most envision it as the inevitable and brutal result of ecological limits to growth after the end of the age of cheap and plentiful fossil fuels. The high material standard of living Americans know today is a product of “the one-time-only process of extracting and burning hundreds of millions of years' worth of chemically stored sunlight.”88 During the ensuing era of severe economic contraction, one can expect to see greater trampling of the rights of people inhabiting land with precious natural resources. One can expect to see significant global population decline (via worsening famine, pandemics, drought, civil wars, resource wars, natural disasters, and so forth). In short, peak oil/limits-to-growth theory provides a common denominator to explain how the terrain of the politics of rights is transforming and may continue to transform. It predicts growing conflicts over the civil, human, and economic rights of people daring to stand in the way of increasingly risky military, economic, and political leaders' doomed efforts to prolong the twilight of cheap natural resource acquisition. Peak oil experts differ from anarchist theorists in that they view relocalization as occurring inevitably via the market forces of supply and demand rather than as occurring only as a product of utopian consciousness-raising. The depopulation, deindustrialization, and in general deterioration of the city of Detroit provides a template of the dystopic path that peak oil analysts fear might continue to unfold across much of the country if the country continues to operate with its head in the sand. Here I am referring to the high levels of violent crime, the racist scapegoating and racial subordination, the hypersegregation, the increasingly militarized police state, the lack of employment opportunities, the austerity measures accompanying the shrinking tax base, the “feral” houses in abandoned neighborhoods, and in general an urban core that resembles a bombed-out city in the aftermath of war. The counter-trends taking place in Detroit—including the “shrinking cities” movement, the consolidation of neighborhoods and reinvestment in dense and walkable neighborhoods, the transformation of abandoned neighborhoods into green spaces (community gardens, urban farms, wetlands, and parks), and in general a concerted urban planning initiative rooted in an acceptance of economic contraction and partial relocalization—provide a case study that peak oil experts might find promising. Some trends toward relocalization are already happening across the United States. Farmers' markets are growing in popularity, and not just in gentrified neighborhoods. Interest in small-scale organic farming has risen dramatically over the past decade. And housing prices have spiked in the most walkable neighborhoods of progressive cities and towns, indicating a growing demand for the lifestyle made possible by walkable neighborhoods. That said, so much of the path being followed by the national and state governments is diametrically opposed to the peak oil remedy. For example, the federal government's subsidies to agribusiness and to the oil industry continue (though the fate of both subsidies remains uncertain as the federal government continues to pursue austerity measures ostensibly in the name of reducing the mounting budget debt in the aftermath of the 2011 compromise to raise the debt ceiling). President Obama and Congressional Democrats have begun to push more aggressively for expanded offshore drilling, coal mining, uranium mining, and natural gas hydrofracking as leaders perceive pressure from the voters to lower gas prices.

1. Resource wars cause prolif and nuclear war.

Wooldridge 9 political writer and former lecturer at Cornell University (Frosty, “Humanity galloping toward its greatest crisis in the 21st century” http://www.australia.to/index.php?option=com\_content&view=article&id=10042:humanity-galloping-toward-its-greatest-crisis-in-the-21st-century&catid=125:frosty-wooldridge&Itemid=244)

It is clear that most politicians and most citizens do not recognize that returning to “more of the same” is a recipe for promoting the first collapse of a global civilization. The required changes in energy technology, which would benefit not only the environment but also national security, public health, and the economy, would demand a World War II type mobilization -- and even that might not prevent a global climate disaster. Without transitioning away from use of fossil fuels, humanity will move further into an era of resource wars (remember, Africom has been added to the Pentagon’s structure -- and China has noticed), clearly with intent to protect US “interests” in petroleum reserves. The consequences of more resource wars, many likely triggered over water supplies stressed by climate disruption, are likely to include increased unrest in poor nations, a proliferation of weapons of mass destruction, widening inequity within and between nations, and in the worst (and not unlikely) case, a nuclear war ending civilization.

1. Plan: The United States Federal Government should provide Section 1603 Cash Grants to nontaxable entities and individuals for community and residential solar power and require just compensation for the excess power they place on the grid.

### Solvency

1. The current tax code discriminates against local and public entities that want to produce residential solar- only shifting away from tax credits solves.

Farrell 12 John Farrell directs the Energy Self-Reliant States and Communities program at the Institute for Local Self-Reliance and he focuses on energy policy developments that best expand the benefits of local ownership and dispersed generation of renewable energy. “Rooftop Revolution Changing Everything with Cost-Effective Local Solar” Institute for Local self-reliance, march http://www.ilsr.org/wp-content/uploads/2012/03/rooftop-revolution-ilsr.pdf

But keeping solar subsidies unchanged also seems senseless. Solar developers in sunny regions like California or high electricity price areas like New York would get out-sized returns from installing solar even as solar reached grid parity in the rest of the country. Furthermore, the tax incentive system continues to create friction by preventing cities, schools and other non-taxable entities from using federal incentives. The guiding principle for solar subsidies should be to continue the enormous strides toward democratizing the electricity system by maintaining the growth of distributed solar while maximizing local ownership and economic benefit. One strategy would be to shift away from the tax code. The use of the tax code for solar incentives has long discriminated against solar for schools or libraries (and other public buildings) because these entities don’t pay taxes. The public-private partnerships required to make use the tax credits have inevitable transaction costs that mean public solar can never quite compete with private solar and that also water down the value of federal money for solar. 32 One option is to shift to a refundable tax credit, allowing those who are eligible for tax credits to take the full value whether or not they have sufficient tax equity. A better step would be to shift away from tax credits entirely, using cash payments. Research has shown that federal taxpayers can get twice the solar for each dollar of solar subsidy given in cash rather than credit.

1. Cash grants are the most effective mechanism.

CAP 10 Center for American Progress Will We Bet on a Clean Energy Economy? The Chips Are Down. It’s Time for Congress to Ante Up Bracken Hendricks and Tina Ramos | May 27, 2010 Bracken Hendricks is a Senior Fellow at American Progress and works at the interface of global warming solutions and economic development. http://www.americanprogress.org/issues/green/news/2010/05/27/7796/will-we-bet-on-a-clean-energy-economy/

The need to incentivize private capital flow into clean energy development is greater than ever and will become more urgent with time. Financing mechanisms and incentives will evolve as the market demand for clean energy evolves. Yet the 1603 Grant Program has proven to be the most effective financing mechanism right now for filling this critical gap as the economic recovery sets in. Exchanging investment risk for upfront cash grants to cover 30 percent of the clean energy project costs makes investing in the development of clean energy projects attractive to investors and is the right boost for the nascent clean energy industry. Further, because it is delivered by Treasury and not through the tax code, the Section 1603 cash grant also provides greater transparency and accountability making it even more effective government spending than most other energy subsidies.

1. Requiring just compensation would incentivize customer generators.

Baker-Branstetter 11 (Shannon, “ARTICLE: DISTRIBUTED RENEWABLE GENERATION: THE TRIFECTA OF ENERGY SOLUTIONS TO CURB CARBON EMISSIONS, REDUCE POLLUTANTS, AND EMPOWER RATEPAYERS”. Villanova Environmental Law Journal. Shannon Baker-Branstetter serves as policy counsel for Consumers Union and is a member of the California Bar. She earned her undergraduate degree from Yale University, Master's in Public Policy from the University of California, Los Angeles, and J.D. from Georgetown University Law Center.) Lexis.

Congress should institute minimum federal standards for net metering to set a floor of protection for customer-generators. Non-discrimination, streamlined requirements, and "full credit" for all kilowatt-hours produced would remove the hurdles some utilities and states have placed before would-be customer-generators. Net metering that uses non-monetary transactions to credit kilowatt-hours and does not reimburse the customer-generator for net excess generation is certainly more administratively efficient and palatable to IOUs. However, customer-generators should not be forced to give their net excess generation to the utility for free when the utility resells the power at market rate. Revenue streams to customer-generators for net excess generation are an important incentive for DRG, and the federal government should require that customer-generators receive just compensation for the excess power they place on the grid. State PUCs can further delineate "full credit" and "just compensation" on a utility-by-utility basis, but Congress should mandate the standard that customer-generators must receive at the maximum value for excess generation that does not burden other customer classes.

1. Utility refusal to pay customer generators sufficiently is a barrier.

Ferrey 4 \* Steven, Professor of Law, Suffolk University Law School. New York University Environmental Law Journal, 12 N.Y.U. Envtl. L.J. 507

The Congressional impetus for Title II of PURPA - authorizing QFs - was to encourage conservation of energy, optimization of efficient use of electric utility facilities and resources, and equitable electric rates to consumers. Congress' goal was to accomplish greater diversity in the supply of electric power by providing incentives for development of small [\*541] alternative power and cogeneration resources. 159 Congress perceived both a reluctance among electric utilities to transact business with alternative power producers and a fear held by alternative power developers that they would be regulated as "public utilities" if they sold power. 160 One of the impediments to self-generation projects historically was that electric utilities could employ one of several methods to discourage such customer generation. 161 First, they could cut the retail rates that they would otherwise offer such a customer to discourage self-generation. Resultant lower retail revenues could be offset by shifting costs to other consumers, thereby causing other consumers without the option to self-generate to bear the subsidy used to discourage self-generation. Second, utilities could impose discouraging rates, terms, and conditions on stand-by and back-up power requirements for self-generating entities. This could make it prohibitively expensive to self-generate. With deregulation, a third tool presented itself: Exit fees could be proposed to discourage exodus from the conventional system. 162

1. Oversupply of solar panels now.

Forbes 12 “Report: Solar Panel Supply Will Far Exceed Demand Beyond 2012” 6/27 http://www.forbes.com/sites/uciliawang/2012/06/27/report-solar-panel-production-will-far-exceed-demand-beyond-2012/

Solar panel makers are on track to deliver 59 gigawatts of their products worldwide this year when demand will likely hit 30 gigawatts, according to a report released by GTM Research Wednesday. To re-establish a healthy balance of supply and demand, an estimated 21 gigawatts of existing factories will close by 2015, said Shyam Mehta, author of the report. The oversupply problem began to surface in early 2011 and led to a near 50% drop in wholesale solar panel prices last year. Lower government subsidies and worries about the financial health of Europe – the largest solar market – tempered demand for solar equipment last year. Emerging markets such as the Japan, China and India should see a big jump in solar panel installations this year. The U.S. also could experience a 75% growth in 2012. But all these increases aren’t going to be enough to make use of most of the solar panels that will be rolling off assembly lines, especially when some manufacturers have built new factories over the past year and a half or plan to add more production lines in the next few years.

#### 285,000 acres set aside for centralized solar now.

Dearen, Associated Press, 10/13 (Jason, “U.S. approves land set-aside for large solar power plants” Philadelphia Inquirer. Web, Acc 10/28/2012) http://articles.philly.com/2012-10-13/news/34432092\_1\_solar-energy-zones-solar-projects-solar-power-plants

SAN FRANCISCO - Federal officials on Friday approved a plan that sets aside 285,000 acres of public land for the development of large-scale solar power plants, cementing a new government approach to renewable energy development in the West after years of delays and false starts.¶ At a news conference in Las Vegas, Interior Secretary Ken Salazar called the new plan a "road map . . . that will lead to faster, smarter utility-scale solar development on public lands."¶ The plan replaces the department's previous first-come, first-served system of approving solar projects, which let developers choose where they wanted to build utility-scale solar sites and allowed for land speculation.¶ The department no longer will decide projects on case-by-case basis as it had since 2005, when solar developers began filing applications. Instead, the department will direct development to land it has identified as having fewer wildlife and natural-resource obstacles.¶ The government is establishing 17 new "solar energy zones" on 285,000 acres in six states: California, Nevada, Arizona, Utah, Colorado, and New Mexico. Most of the land - 153,627 acres - is in Southern California.¶ The Obama administration has authorized 10,000 megawatts of solar, wind and geothermal projects that, when built, would provide enough energy to power more than 3.5 million homes, Salazar said.¶ The new solar energy zones were chosen because they are near existing power lines, allowing for quick delivery to energy-hungry cities. Also, the chosen sites have fewer of the environmental concerns - such as endangered desert tortoise habitat - that have plagued other projects

1. People will say yes- multiple examples prove there is a growing grassroots movement for DG.

Bronin 10 Sara C. Bronin Associate Professor of Law, University of Connecticut “Curbing Energy Sprawl with Microgrids” December, 2010 Connecticut Law Review 43 Conn. L. Rev. 547 lexis

Lower infrastructure costs, flexible configurations, and the ability to use waste heat result in big savings to microgrid users. It may be important to conclude this section with some thoughts about the feasibility of small-scale energy sharing among neighbors. Some may doubt the ability of neighbors to cooperate enough to conceive, execute, and maintain something as complicated as a microgrid. Reviewing the American experience with district energy systems may assuage these doubts. District energy systems are small-scale systems that offer institutions, groups of individuals, or certain economies of scale to heat and/or cool several buildings at once through a small- or mid-sized facility. 79 Note that heating and cooling are not as regulated as electricity and other energy production. 80 As one example of a successful district energy system, a condominium community in New Hampshire uses a central pellet boiler plant which uses locally produced biomass fuel for heat and hot water. 81 The twenty-nine units range in size, and some are [\*565] freestanding buildings. 82 The central plant has helped the community to obtain the highest rank in the widely-recognized certification system administered by the U.S. Green Building Council. 83 Concerns about the safety, utility, or effectiveness of district energy systems, which like microgrids serve multiple distinct physical spaces, have been greatly reduced as such systems have become more common. Moreover, various groups around the country are building networks that rely on the mutual support of neighbors to achieve alternative energy goals. In the nation's capitol, for example, several solar cooperatives have been established to share information, ideas, and labor. 84 In Maryland, a chamber of commerce has worked with a local clean energy broker to negotiate bulk rates for the purchase of wind power. 85 In New Hampshire, neighbors install alternative energy equipment for neighbors, in "energy rais[ing]" events not unlike the barn raising events of yesteryear. 86 These efforts reveal a growing grassroots initiative among neighbors to mobilize for alternative energy. The time to capitalize on this movement by facilitating the proliferation of microgrids is now.

1. High electricity demand occurs when there is high solar supply

Clean Technia 12 “California’s Solar Energy Passes a Milestone” Sept 7 http://cleantechnica.com/2012/09/07/californias-solar-energy-passes-a-milestone/

During a recent heatwave, California reached a solar energy milestone. Its solar power plants hit over 1,000 MW (1 GW) of electricity generation, almost as much as their combined 1,160 MW capacity, which is equal to the power production of two large 500-MW gas-fired power stations. The power plants reached this milestone on several occasions during the heatwave. Despite their large size, solar panels have the potential to utilize the least land of all types of power plants, due to the fact that they can be integrated into almost anything, whether it is on the ground or installed on rooftops which are usually hardly utilized. Electricity demand tends to be higher on sunny days, and this is especially due to the power requirements of air conditioners, standing fans, and evaporative coolers. Generally speaking, the sunnier the weather is, the hotter it becomes (not including those times of day in certain places when it simply becomes “hot” due to high humidity). This is clearly a great match for solar. Heat rises, electricity demand rises, and solar electricity is rising at the same time. This is one reason solar panels are complemented so nicely by air conditioners (or vice versa). Typical coal-fired power plants are not very adjustable because they take a long time to start up and shut down, so it is difficult for them to increase power production in time to meet increased air conditioner power consumption in such heatwaves.

1. Community solar solves the disads to large scale solar.

Bailey 12 Insecurity For Community Solar: Three Strategies To Confront An Emerging Tension Between Renewable Energy Investment And Federal Securities Laws Kristin L. Bailey J.D. Candidate, University of Colorado Law School Class of 2012. http://www.jthtl.org/content/articles/V10I1/JTHTLv10i1\_Bailey.PDF January 2012 Journal on Telecommunications & High Technology Law;Winter2012, Vol. 10 Issue 1, p123

Community solar is a term with varying definitions, but for purposes of this Note “community solar” will refer to “the ability of multiple users—often lacking the proper on-site solar resource, fiscal capacity or building ownership rights—to purchase a portion of their electricity from a solar facility located off-site.” 10 Other community solar models are variations on this idea, often influenced by state and local law. 11 Traditionally, solar installations are placed directly on energy consumers’ rooftops. Under this model, the typical consumer is connected to the grid but only pays the utility company the difference between what the solar panels produce and the consumer’s total usage— a practice called “net metering.” In contrast, community solar is located off-site. There are multiple benefits unique to community solar. First, there is no need for consumers to personally clean and maintain the solar panels. If panels are not cleaned and maintained regularly, their efficiency drops. Second, there is no need to move the panels when consumers need to install a new roof. Third, a group approach can take advantage of economies of scale; upfront capital costs, such as the transformer, and ongoing maintenance costs, like cleaning and repairs, can be spread over several purchasers, lowering costs per consumer. This, in turn, reduces the solar panels’ payback time. And fourth, under some community solar models, consumers actually purchase and own a panel or a number of solar panels. Therefore, they own the means of energy production and are locked into a low energy rate should prices increase in the future. In addition, homeowners in shady areas, homeowners whose roofs lack sun exposure, or renters who do not own their roofs can join a community solar array and support solar energy when they otherwise would be prevented by these circumstances. Finally, depending on the utility company servicing the area, rebates for solar energy may be available to members or subscribers to a community solar project. For example, Holy Cross Energy in Colorado provides a rebate of $1.50 per watt, up to $9,000, for subscribers to the Clean Energy Collective project described below. 12

1. Solves Quick

Farrell 11 (John, “Democratizing the Electricity System: A Vision for the 21st Century Grid” The New Rules Project, June 2011)

Distributed generation offers a cost-effective and fast-scaling alternative to centralized generation of electricity, and at a cost competitive with centralized renewable energy development. Most importantly, it offers an opportunity to democratize the electricity system, dispersing power generation and its attendant economic benefits. The technical barriers to the transformation are surmountable. In the short run, much more distributed generation can be added to the existing grid system without substantial difficulty. In the long run, new technical expertise and cheaper energy storage will transform the static, centralized grid into a dynamic and primarily decentralized renewable energy system. While the transformation is a technical one, the largest barriers are political. From the federal to the state to the local level, policies shield the legacy electric grid from a democratic transformation. New policies are needed to level the playing field for local, distributed generators. Rules are needed to change the historic paradigm of a few large-scale, fossil fuel power plants supplying a grid connected by long-distance transmission lines. Rules are also needed to prevent regulators from forcing the same paradigm on inherently distributed renewable energy production. These rule changes range from ending perverse and unnecessary incentives for new high-voltage transmission lines to transforming federal incentives to cash and production-based payments to tearing down interconnection barriers to the democratization of the grid.

1. Grants empirically helped renewables weather the recession

Farrell 10 John, GRIST, How renewable incentives affect project ownership, 11-7, http://grist.org/article/2010-11-17-why-tax-credits-make-lousy-renewable-energy-policy/

For two years, solar and wind energy producers seeking federal incentives have been able to take cash grants in lieu of tax credits. The stimulus act program helped keep the renewable energy industry afloat as the credit crunch and economic downturn dried up the market for reselling tax credits to banks and other investors with large tax bills. The cash grant program is set to sunset at the end of this year, but solar and wind energy advocates are hoping it will be extended, for good reason: In fact, the tax credits were always an awkward tool, some argue. Rhone Resch, the head of the Solar Energy Industries Association, said that many of the companies doing the installations were not making a profit either, so these tax credits were sold as “tax equity,” a secondary market, at a loss of 30 to 50 cents on the dollar to the seller. [Emphasis mine.] The tax credits were worth 30 percent of a project’s value, so the transaction costs of reselling the credits meant that renewable energy projects without sufficient internal tax liability were 13 to 21 percent more expensive than projects that could use the credits themselves. This is dumb policy. Ratepayers pay a higher price for renewable energy because incentives filter through the tax code instead of the general fund

#### Installation will take only a few months.

Pursley and Wiseman 11

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Small-scale renewables on rooftops, parking garages, factories, and in yards, on the other hand, are an immediate and substantial step toward increasing renewable energy capacity. A homeowner or business in an area with adequate enabling regulations for small-scale renewable electricity generation can have a system up and running in several months. n112 Distributed generation systems may also attract less political attention than wind and solar farms. Small-scale projects, often initiated by cities, are less likely to draw in the organized landowners and special interest groups that tend to successfully block higher profile, large-scale systems. n113 Indeed, some surveys have shown that the public holds a more favorable attitude toward small-scale renewables, n114 although there are still strong local zoning battles over their placement. n115 A final benefit of distributed generation is that it could quickly reduce America's dependence on fossil fuels. Small-scale renewable generation systems, individually considered, generate relatively low quantities of electricity, but their contribution could be large in the aggregate. Electrical utilities face a unique challenge due to the characteristics of their product. Electricity cannot yet be effectively and economically stored in large quantities, n116 but it must be instantaneously available when demanded. n117 Many power plants therefore exist only to meet consumer demand for electricity when demand exceeds the normal base load. These plants power up [\*900] during times of "peak" electricity demand n118 such as hot summer days when air conditioners run at maximum capacity. Outside of the peak periods, these "peaker" plants sit idle or operate at low levels as spinning reserves. n119 This is where renewables, including distributed renewables, show one of their greatest strengths. By providing the additional electricity needed during peak times, n120 distributed renewables may have a disproportionately large effect on clean energy production n121 and could reduce the need for fossil-fuel-burning peaking plants. n122 Distributed renewables, considered collectively, offer several unique advantages over centralized utilities. They can be built and deployed quickly, they may not face as much consumer or political opposition, and they reduce the need for fossil-fuel-fired energy. Much effort will be required, however, to move these promising technologies to a point of greater prominence within the energy system.

1. Plan solves prolonged blackouts

CEE 12

Clean Energy Exchange “Smart Grid sustains social services during blackout” july 9 http://www.thecleanenergyexchange.org/posts/view/smartgrid-sustains-social-services-during-blackout/6fkfnh0tce/

Keeping the lights on' can be a challenge during extreme weather and other disasters like those affecting the East Coast of the U.S. this summer, but real options may be available to avoid some of the power-related crises that follow upon such events. Leading researchers from Carnegie Mellon University suggest that rethinking the solution to sustaining electric power--namely, starting small--could keep critical services going, even when the high-voltage 'grid' is crippled. It is worth noting that the U.S. military is already taking steps to protect its power supplies in the event of a massive grid failure by adopting small, local energy technologies, and California Governor Jerry Brown recently announced that he wants 12,000 megawatts of such power supplies in his state. This natural disaster demonstrated that, despite ongoing efforts to improve electric power transmission reliability, the risk of prolonged regional blackouts remains a significant concern. To combat future widespread and extended power outages, Carnegie Mellon University researchers have devised a strategy to use local distributed electricity generation, distribution automation, and smart meters to form small electricity "islands" that would support critical social services in the event of a substantial disruption resulting from extreme weather, terrorism, or other causes. Distributed generation (DG) collects and distributes electricity from many small energy sources rather than relying on large centralized power facilities. Carnegie Mellon University researchers Anu Narayanan and M. Granger Morgan examined the incremental cost of adding DG units and smart meters to a hypothetical community of 5,000 households covering an area of 5 km2. The research was conducted with funding from the John D. and Catherine T. MacArthur Foundation, the Gordon and Betty Moore Foundation, and Carnegie Mellon University. The study, titled "Sustaining Critical Social Services During Extended Regional Power Blackouts," appears in the July 2012 issue of Risk Analysis, published by the Society for Risk Analysis. Under normal operation, large centralized utility generators send electricity along a high-voltage transmission system to a low-voltage distribution system that ultimately delivers power to homes, schools, police stations and other local consumers. An extreme disturbance such as a hurricane can disrupt the high-voltage transmission system and eliminate power to entire regions. Under the Narayanan and Morgan strategy, electricity circuits would be manually or automatically rerouted to form isolated energy islands powered by local DG units. To achieve a "smart grid" DG system, utility companies would need to install smart meters that can efficiently disconnect non-critical loads, add automated components to reroute electricity circuits, and upgrade fault-handling equipment and control software to ensure the smaller grid's reliability.