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THE GREEN DIVIDEND

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Introduction: The Challenge

The president didn't want the engine. The Pentagon chief didn't want the engine. Even the Air Force didn't want to spend \$485 million to develop a second engine for the F-35 fighter jet. After all, Pratt & Whitney had already won the bid for the F-35 and was already developing it. A second engine was, literally, overkill. Yet in May 2010, Congress decided to defy the Pentagon and risk a presidential veto by restoring funding for this second engine.¹

The second engine, to be built by General Electric and Rolls Royce, represents jobs, and U.S. politicians have a difficult time saying no to jobs. Even Rep. Barney Frank (D-MA), who has taken the most courageous stand against military spending by calling for a 25 percent reduction in the Pentagon budget, voted in favor of the backup engine because it meant jobs at the GE plant in his state.² This was no isolated example. It repeated a pattern from 2009 when the president, the Pentagon, and even the defense contractor Lockheed Martin teamed up to remove funding for the F-22 fighter jet from the budget only for the House to restore the money (the item eventually was dropped during the reconciliation process).

It has never been easy to cut U.S. military spending. Even after the end of the Cold War, which had sustained military spending at unprecedented levels, it was difficult to persuade military contractors to take up a different line of work. The Clinton administration made sure to provide new export markets for defense contractors who were losing U.S. government

work. U.S. military exports skyrocketed from under the leadership of Ron Brown in the Commerce Department.³ The “peace dividend” evaporated as the military budget resumed its upward climb in the second half of the 1990s before increasing dramatically during the George W. Bush administration.

But a decade into the 21st century, the United States faces another key opportunity—if we understand crisis as the midwife to opportunity—to shift resources from the military sector to meet the other pressing needs of the country and the world. The United States remains mired in an economic recession. We face the twin threats of the energy and climate crises. Huge sums of money are required to fix our health care system, revive our educational system, and repair our infrastructure.

The obvious solution is to reduce military spending and apply those savings to a green technology initiative that reduces our dependency on fossil fuels, shrinks our carbon footprint, and creates jobs. Such a “green stimulus” could pull our economy out of recession. Other countries have pursued something similar. Both China and South Korea, two countries with very different political and economic systems, have backed “green growth.” And, indeed, the Obama administration made such funds a feature of the original stimulus package and also created a position of “green jobs” czar.

But so far the United States has only pursued half-measures. The “obvious solution” is not so obvious to defense contractors worried about losing contracts—

and unions and workers worried about losing existing jobs—all in exchange for the promise of a different kind of manufacturing. Politicians who might ordinarily back the “obvious solution” are reluctant to be seen as anti-job. The *promise* of a green job has a hard time competing with the reality of an existing military job. And instead of a “green growth” narrative, the country has essentially bought a very different story—of the Pentagon helping a foundering U.S. economy by providing essential jobs.

In this report, we will show that many of the elements of this “obvious solution” are already in place. There is an extensive literature on the virtues and experiences of the successful conversion of military-oriented manufacturing. The institutions that might perhaps be most resistant to change—the Pentagon and the nuclear labs of the Department of Energy—have begun to shift toward energy sustainability. The Obama administration has begun to lay the groundwork for a profound shift in budget priorities.

This report will describe these important and exciting shifts. But it will also identify the key missing piece, the factor that has thus far made the “obvious solution” politically unlikely. Until we figure out how to shift jobs from the military sector to the “green growth” sector, fiascos like the F-35 engine and the F-22 fighter will continue to paralyze any efforts to meaningfully reduce military spending. In this report, we will discuss how to play matchmaker and marry defense sector workers to green technology jobs, using Hartford, Connecticut (the home of Pratt & Whitney) as our example.

Combining the existing track record on conversion and the ongoing efforts inside the Pentagon,

the DOE, and the White House with this district-level focus on jobs, we will transform our green dividend proposal from an obvious solution into a workable one.

Part One: Missed Opportunities

Review of the Literature

There were three principal institutions active during the post-Cold War period (defined here as the years 1990-1995) on converting military resources to civilian use.

The National Commission on Economic Conversion and Disarmament (ECD): ECD was founded and chaired by Columbia University professor Seymour Melman. It produced a series of 18 briefing papers on such topics as the structural differences between military and commercial firms, the size of the military economy, “peace without depression,” and criteria for economic conversion legislation. These publications began with two primers, one on economic conversion and the other on disarmament, and included several editions of “Successful Conversion Experiences” that compiled case studies of companies moving from military to civilian production. ECD also published a monthly magazine, *The New Economy*, which reported on developments on the national political and legislative fronts, and initiatives on the part of states, labor unions, visionary companies, and nonprofit conversion advocates, as well as international developments. In 1997, in conjunction with the Bonn International Conversion Centre, ECD Director Greg Bischak produced a comprehensive evaluation of U.S. conversion activity entitled “U.S. Conversion after the Cold War, 1990-1997.” That year, ECD ran out of money and disbanded.

Bonn International Conversion Centre: Since its founding in 1994, this German institution has tracked the global progression (or lack of it) toward disarmament and the transfer of resources from the military to the civilian sector. Its annual conversion survey includes an index that amalgamates data for each country in the world on its military expenditures, weapon holdings, armed forces and defense industry employment, from which it derives an aggregate score showing progress or regression on the path to demilitarization. According to this massive data collection, the world made substantial progress along this path from 1995–2001. From 2001 to the present, that progress has stalled and in some cases (most notably the United States) been reversed. BICC continues to track international developments such as arms control agreements, the control of small arms and light weapons, the connections between resource depletion and conflict, and the conversion of military bases. The Centre is still in operation, though its focus has shifted beyond the conversion agenda and toward broader topics of demilitarization.

The Project on Regional and Industrial Economics (PRIE): The third leading center of conversion studies during the post-Cold War period was based at Rutgers University, led by Prof. Ann Markusen. PRIE assembled research teams that produced a series of monographs, most of which examined and evaluated the attempts of key defense-dependent regions to diversify their economies in response to the loss of major defense contracts. Their targets included St. Louis, MO;

Long Island, NY; and Los Angeles, CA. They also produced studies of special topics such as “The Economics of Defense Industry Mergers and Divestitures” (1993) and a study of conversion potential at the federal nuclear weapons complex.

Markusen and a colleague, Joel Yudken, also produced the most comprehensive book-length study of conversion published in the post-Cold War period, “Dismantling the Cold War Economy.” Among other things it parsed the range of definitions then being peddled for inclusion under the term conversion. Company “diversification,” they said, was questionably worthy of the name, since it often meant closing a plant in Massachusetts and opening up a non-union plant in South Carolina. The worker-adjustment model, emphasizing training and job-search assistance for laid-off workers, was necessary but not sufficient. The best models, she said, involved labor-community alliances. At the federal level, unions and other conversion supporters needed to press for spending on projects like mass transit and environmental cleanup that could benefit society while creating new, unsaturated markets for defense contractors to enter.

During the last stages of the Cold War Employment Research Associates, an economic consulting firm, produced several reports that became foundational resources for the conversion work of the post-Cold War period. The most important was “Converting the American Economy,” which examined the job impacts of a shift from military to civilian public spending. It used economic modeling to calculate the effects of shifting an average of \$70 billion a year from 1991 to 1994 on specific job categories, in sectors from durable goods and services to construction and banking. According to

this model, such a shift would result in 1,688,000 fewer military-related jobs and a gain of 2,165,000 civilian jobs, for a net gain of 477,000 jobs. Of the 53 major industry groups examined, 41 showed net gains in employment. In addition, a shift of a billion dollars would generate an additional \$250 million in economic activity. This analysis became key evidence of the economic benefits of reinvesting defense savings in the civilian economy.

These results have been replicated and updated in two studies from the Political Economy Research Institute (PERI) at the University of Massachusetts at Amherst: one published in 2007, *The Employment Effects of Military and Domestic Spending Priorities*,⁴ and an updated analysis published in 2009.⁵

In addition, the congressional Office of Technology Assessment produced two high-quality studies of conversion to a new post-Cold War economic footing. Its Advisory Panel on Technology and Defense Conversion drew together the talents of academics, defense and commercial contractors, government and private sector technology, and labor market consultants. The result was “After the Cold War: Living With Lower Defense Spending.”⁶ This study examined the history of previous U.S. conversion experiences following the end of 20th-century conflicts in comparison to post-Cold War conditions. It laid out options and recommendations for government assistance to ease the transition for displaced defense workers, engineers, veterans, states, communities, and defense companies. For defense company transition, their recommendations included tax credits for companies converting to commercial production (or spinning off new companies exploiting the commercial uses of defense technology) and the ex-

pansion of Manufacturing Extension Networks to allow small defense-dependent subcontractors to share equipment and receive technical and financial assistance in developing new products and adapting to commercial market practices.

The other major conversion study produced by this agency was “Defense Conversion: Redirecting R&D.”⁷ It analyzed how the government’s main institutions of defense R&D, particularly the federal labs and the Defense Department’s Defense Advanced Research Projects Administration could be redirected toward new national missions. It also examined the alternative scenario of radically downsizing the labs. It concluded by focusing on one potential target of redirected federal R&D: energy-efficient transportation, with special emphasis given to electric vehicles and clean mass transit.

Unfortunately, when the Republican Party assumed control of Congress in 1994 it shut down this agency, and the period of fruitful government research on the ways and means of conversion in the post-Cold War period essentially ended.

MISSED OPPORTUNITIES OF THE POST-COLD WAR PERIOD

On election night in 1992, President-elect Bill Clinton declared his victory “a clarion call for our country to face the challenges of the end of the Cold War...to face problems too long ignored—the conversion of our economy from a defense to a domestic economic giant.”

During the campaign, Clinton had from time to time laced his speeches with fine rhetorical flourishes about the historic opportunity to reorient our economy

to peaceful purposes. But he had also spent campaign time gazing approvingly at some weapons systems even his Republican opponent wanted to cut. Case in point was his trip to the Electric Boat facility in Groton, Connecticut, where the Seawolf was assembled, to pledge his allegiance to the idea of building a second boat—for what, besides defense industry jobs, it wasn’t clear. There were few weapons systems he seemed not to like. Those he publicly embraced included such troubled programs as the C-17 transport plane and the V-22 tilt helicopter. This discrepancy between rhetoric and policy proved to be a foreshadowing of the “triangulation” that characterized Clinton’s approach to policymaking in general and conversion policy in particular.

Congress had worked a modest \$150 million into the 1991 budget to cushion the blow of defense budget cuts. But it was focused on retraining laid-off defense workers and giving defense-dependent communities, especially those clustered around closing military bases, planning grants they could use to map out alternative economic futures. Missing was any attention to helping defense companies avoid layoffs by converting to civilian production. Many legislators believed that this was an appropriate federal role; they just couldn’t agree on exactly how it should be done. Accompanying their debate was the consistent strain of resistance from conservatives, who opposed doing anything at all. The market, in their view, would kill what needed to die and support what needed to prosper.

One point nobody bothered to debate: Winning the Cold War had been the nation’s mission for 40-some years, organizing and focusing vast quantities of its resources. Some conversion advocates argued that a replacement mission was needed, one that would give

coherence and national purpose to comparable proportions of civilian spending that otherwise would shatter into the million—or 500-odd—pieces of every congressman’s pet projects. Now that providing for the common defense was going to be a lot less expensive, was there another big goal that Americans could agree on?

The most frequently mentioned candidate for a post-Cold War mission has been the transformation of modern life along sustainable lines. Since the early 1970s, water and air that kept on getting dirtier had become a political issue. By the early 1990s, the phrase “greenhouse gases,” carrying the specter of rising temperatures, droughts, famines, and weather extremes, had entered the lexicon and the debate. Individual effort, and guarantees of individual freedom, could not solve these problems. This would require a combination of conserving energy, developing cleaner sources of power, and retrofitting the other technologies of modern life to run on them. A national transition, in cooperation with an international one, to clean power, energy efficiency, clean manufacturing, and clean transportation would be a massive undertaking—one of the magnitude and importance of a 40-year Cold War.

Conversion advocates and engineers began to look for the potential fits between defense technologies and the needs of this new mission. Upgrading the railroads had been proposed as a conversion mission at the end of both World Wars I and II. When goods and services move more easily around, the productivity of the economy as a whole benefits. Now, in addition to becoming more efficient, our transportation clearly had to become cleaner. The notorious cases of weapons platform makers like Boeing Vertol trying and fail-

ing to build railcars had been analyzed and explained; the mistakes they made were understood and fixable. A serious national commitment to building a clean, fast, environmentally sustainable rail system, as one big piece of the sustainability puzzle, would create sufficient incentive for major defense manufacturers to commit reciprocally to entering this market, and doing the job right this time.

WHAT ACTUALLY HAPPENED

From a Cold War peak in 1989 to the low point of 1997, the U.S. government cut military spending by one-third, and weapons procurement by two-thirds. More than two-and-a-half million defense workers lost their jobs. Forecasts of economic disaster that would result from this economic shock proved wrong. But a policy sufficiently robust to turn these savings into a productive peace dividend, and solidify them with new designs for cooperative security, fell short of what was needed.

In spring 1992, *Foreign Affairs* provided opponents of a serious conversion policy with their signature sound bite. “The record of massive defense conversion,” the article’s first sentence read, “is one unblemished by success,” with the exception of postwar Japan and Germany.⁸ The article was written by Norman Augustine, the CEO of defense giant Martin Marietta, and Kenneth Adelman, whose record as head of the Reagan administration’s Arms Control and Disarmament Agency, and since, has been virtually unblemished by support for arms control. Ironically, buried deep in this conversion-skeptical article were propositions that most American conversion advocates would happily endorse:

Ex-military workers can be employed in similar civilian jobs; welding a tank resembles welding a truck. Even design engineers may be salvageable; designing a radar resembles designing a television. Some capital assets can be retained; factory buildings care little whether rifles or refrigerators are made with them. The bad news here is for the managers, most of whom become unsalvageable...bulldoze the management, not the factories. And, while they are at it, bulldoze the corporate culture.

In other words, managers at home in the world of low-volume, cost-plus contracting simply lack the skills to remake production for the requirements of the civilian sector. Converting companies need to import civilian management expertise. This was, of course, exactly the lesson most people derived from the Boeing Vertol subway car failures of the 1970s.

While the “unblemished by success” line was attractive to many defense managers, it just wasn’t true. A February *Wall Street Journal* article, entitled “Peace Initiative,” quoted Bob Napier, the head of technology development at Lockheed Information Management Services, saying, “We’re all looking for ways to take swords and turn them into plowshares.” Lockheed was then moving to apply its expertise in complex information processing to improving postal sorting, developing “smart highways” to move traffic more efficiently, and map routes for hazardous material shipments. The *Wall Street Journal* article also reported on the efforts of top-10 defense contractor TRW to develop its technologies for the automotive market, and Westinghouse to develop its sensor technology for residential security systems. Hughes was also mentioned as trying to reduce

its defense dependency from 70-30 percent to 50-50. Rockwell International had reduced its defense share to 25 percent by making newspaper printing presses, factory-automation equipment, and auto parts. For every top 10 contractor, like General Dynamics, declaring an unshakeable and exclusive commitment to defense, there was another getting down to the job of finding other sources of revenue.

But firms looking for clear signals of encouragement from their government, not to mention concrete support, weren’t finding them. The \$200 million Congress had allocated back in 1990 to help communities and workers adjust to defense cutbacks mostly languished unspent in the bowels of bureaucracy. The bipartisan House Armed Services Committee’s panel demurred even on the goal of *adjusting* the defense industrial base. It set its sights on *preserving* it.

Embedded in this predominantly conservative mission, though, were a few far-thinking ideas. Defense facilities and skills would be preserved from atrophy by *shifting their focus* to pressing economic tasks. The tasks mentioned included upgrading the country’s transportation and communications networks and cleaning up the environment. Defense capabilities in fields such as material fabrication, electronics, sensors, and information systems could be used, their report said, to develop high-speed railways and smart highways. It recommended earmarking 25 percent of defense savings for this purpose.

Defense cutbacks, according to *Business Week*, would “knock a powerful prop out from under America’s industrial base,” but “also offer a historic opportunity” of “freed-up resources” to get the economy onto a new

footing. Government could “boost research spending across a wide range of technologies,” create new tax incentives for private-sector civilian R&D, offer technical assistance to help small businesses learn new manufacturing techniques, and invest in the communications and transportation infrastructure to grease the wheels of higher productivity. The public also seemed to be on board. In the same issue, a national *Business Week*/Harris poll found strong majorities actually favoring government support for conversion.

President (and candidate) George H.W. Bush had his own line on preserving defense industry jobs even while constricting their U.S. procurement lifeline. Although the United States would cut \$50 billion out of the defense budget over the next five years, it would push harder on overseas arms sales to take up the slack. The poster child for this strategy was the sale of F-15 fighter jets he negotiated with Saudi Arabia that year.

During his 1992 presidential campaign, Clinton promised a “dollar-for-dollar” reinvestment of defense dollars in the civilian economy. On top of President Bush’s plan to cut defense spending by \$50 billion over five years, most of it applied to the deficit, Clinton would add \$60 billion in cuts, all of it publicly invested. There was not a lot of meat on these conceptual bones, at least judging by the literature coming out of the Clinton campaign.

CALIFORNIA BREAKS NEW GROUND

But there were promising models indicating what was possible. California was serving in its customary role of trendsetter. One of its congressmen,

Howard Berman, had figured out a way to link two of the state’s looming problems: world-class smog and an economy suffering from a dwindling market for defense aerospace. He inserted an amendment into a federal transportation bill steering \$10 million to three consortia working to develop electric vehicles for personal use and mass transit. Preference would be given to proposals that included “defense and aerospace suppliers and manufacturers.”

Thus was born CALSTART, a Burbank-based consortium that included defense giants Lockheed and Hughes, the Lawrence Livermore National Lab, the South Coast Air Quality Management District, and the International Association of Machinists, along with almost 40 other public and private entities. First on the agenda was developing a prototype electric car, using components and systems from about 20 California firms. This prototype would then become the showcase vehicle for these firms to market their products to the car companies. CALSTART’s other major project would be developing a zero-emissions bus.

The Machinists’ union (IAM) was working to see that this ambitious effort at industrial gear-changing also became an opportunity for advancements in labor-management cooperation. As a partner in CALSTART, IAM worked with the lead coordinating company, Amerigon, to develop a list of technical skills necessary to build the electric car and match them with the skills of laid-off aerospace workers.

The Amerigon deal would also link productivity with job security by establishing the price of each car part on an agreed-upon unit of labor and profit. Productivity increases would then increase profits while

maintaining wages and jobs, an idea that United Auto Worker leader Walter Reuther had tried and failed to sell to General Motors in 1946, during the country's last major effort at defense conversion.⁹

It would not be easy to name a field of manufacturing with more potential to promote the general welfare, by solving about half of America's fossil fuel addiction problem, than the electric car. In addition to its social utility, this market was seen as a conversion opportunity. A major obstacle contributing to the inertial resistance of most contractors to conversion was the competitive disadvantage of being the new kid on the block, in markets saturated with firms that already knew what they were doing. In the electric car market of 1992, nobody knew what they doing. They would be playing on a field that was at least approximately level.

One of CALSTART's principal developer-manufacturers was Hughes Aircraft. In the challenging world of conversion, Hughes had an advantage over many of its fellow military contractors: Adaptations of its principal field of advanced electronics were a lot easier to dream up than new uses for jet fighters and submarines. Though its first venture working with NBC and Rupert Murdoch to develop a satellite TV network had fallen flat, they were not giving up. The goal was to get to a military-commercial mix of 50-50 within the next couple of years. The idea was to remake Hughes as a technology company capable of moving into commercial markets while retaining the diminishing but still substantial revenues available to them from the Pentagon.

Of course, Hughes was also moving nimbly in other ways. It had plentiful engineering talent in Cali-

fornia for commercial projects because it had consolidated its missile division in Tucson, leaving hundreds of employees looking for other work. The costs of consolidation were heavily subsidized by the Arizona Defense Conversion Act of 1991. Arizona had lured some of California's jobs away with its legislative quick fix, falsely packaged as conversion.

California was going a different route. It had laid some key groundwork for the CALSTART initiative, in accordance with its trend-setting ways, by enacting the country's toughest air quality standards. The regulations required car companies to sell approximately 40,000 electric cars annually by 1998. That year the Office of Technology Assessment published *After the Cold War: Living With Lower Defense Spending*, which identified several possible policy tools the public sector could use to help conversion succeed. Federal R&D programs, like the one that funded CALSTART, was one. Regulatory action like California's CAFE air quality standards was another. A third was federal purchasing, which, the report pointed out, had jumpstarted several crucial industries in the United States such as semiconductors, computers, and aircraft engines. If, say, U.S. postal vehicles went electric, the private market would get a huge boost.

CUT THE DEFICIT OR INVEST IN AMERICA?

The Clinton campaign professed to be interested in all three of these tools as it sought to engage in the debate over the "peace dividend." The core of the debate: Should most of the savings be applied to reducing the massive national debt—the product of Reagan-era tax cuts and military spending increases—or to in-

vestments in education, health care, and transportation infrastructure that would improve Americans' quality of life and economic productivity as a whole? According to polls, substantial majorities of Americans favored applying military budget savings to neglected domestic needs such as education, housing, and health care.

This argument for emphasizing public investment, rather than deficit reduction, had some surprising allies. Back in the States, the March issue of *Aerospace America* weighed in on behalf of civilian public investment as the salvation of the aerospace industry. This industry was one of the most defense-dependent and its trade association, the Aerospace Industries Association, remained one of the most aggressive lobbyists for Cold-War levels of defense spending. *Aerospace America*, however, the organ of the American Institute of Aeronautics and Astronautics, saw this as a losing battle. The Bush administration, the periodical observed, seemed determined to apply defense savings mostly to deficit reduction. If this happened, many in the industry could see their workplaces going the way of defense-giant Grumman's production plants in Bethpage, Long Island, which had been razed and replaced by a shopping mall.

In the end, though, deficit reduction won. From 1990–1997, about 85 percent of the \$116 billion in cumulative military savings was applied to the deficit. About \$16.5 billion was cumulatively invested in the civilian side of the budget—in a grab bag of programs for worker retraining, community adjustment, and technology reinvestment.¹⁰

The centerpiece of the Clinton administration's modest conversion program was its Technology Reinvestment Program (TRP). It encouraged applicants for

its grant program to put together partnerships among institutions that were not used to working with each other: defense contractors and civilian businesses; small businesses; labor unions; academic institutions and the federal labs. And it designated some areas of focus that were relevant to building the infrastructure of environmental sustainability, such as technologies for advanced battery storage, environmental monitoring, and alternative vehicle power sources.

The major focus of the program, though, was dual-use technology. A major study of the grant awards during the program's high-watermark years of 1993 and 1994 found that 80 percent of them went to projects that were closely linked to the Defense Department's own list of new technology priorities. Conversion, it wasn't.¹¹

Its other problem was its scale. The TRP spent a total of \$1.3 billion from 1993–1997, out of a total of \$16.5 billion in federal conversion-related investment, itself a minority fraction of the \$116 billion peace dividend. In sum, it was not enough, and it was mostly spent on technologies that defense companies could use to stay in the weapons business.

Here, then, are the three big missed opportunities of the post-Cold War period:

1. The chance offered by the miraculously bloodless end to the Cold War to embark on a new national mission of environmental sustainability, involving a crash program of redirecting military assets to civilian purposes, was pursued too tentatively. The centerpiece technology-reinvestment policy

was fatally compromised by the requirements favoring “dual-use.”

2. The decision to invest most of the defense savings in deficit reduction, rather than public investment, also undermined the prospects for this new national mission, and failed to provide much “demand-pull” drawing defense contractors into alternative production. As a result, contractors devoted most of their energies to promoting new rationales for ramping up military spending.
3. This, coupled with the fears of politicians about appearing “weak on defense,” ensured that a vision of the United States as sole superpower, rather than as a participant in multilateral arrangements for cooperative security, would drive up defense budgets.

As we struggle to deal with the effects of the worst oil spill in U.S. history, the authors will not refrain from indulging, for a moment, the impulse to say, “We told you so.” Had the country invested the lion’s share of its peace dividend in a crash program to develop the infrastructure of clean transport, clean manufacturing processes and clean energy, we wouldn’t now be hearing the conventional wisdom, articulated by our president, that our economy will be dependent on fossil fuels for years to come.

GUSHERS, AND OTHER GUSHERS

The lingering effect of 9/11, including, of course, its legacy of two ongoing wars, has propelled a no-limits approach to U.S. military spending—what

Defense Secretary Robert Gates recently termed “a gusher.”¹² In 2009, the United States spent \$661 billion on its base budget alone—not counting what it spent on those wars. This was a 7.7 percent real increase over 2008 and a 75.8 percent real increase over 2000.

The Obama administration has taken steps to bring the era of no limits to an end.

In his speech to a joint session of Congress during his first week in office, President Obama promised to “reform our defense budget so that we’re not paying for Cold War-era weapons systems we don’t use.” He supported and signed the Weapons System Acquisition Reform Act of 2009, an approach that will constrain some of the worst abuses while unfortunately leaving wide loopholes for many others to slide through. He won the fight to finally cancel a major sacred-cow weapons system with broad congressional support, the F-22 fighter jet, and is using the same tool—his veto power—to take on a few more this year.

In May, Gates invoked the concerns of Eisenhower, 60 years ago, that the country was becoming “a muscle-bound, garrison state—militarily strong, but economically stagnant and strategically insolvent.”¹³ He claims to have turned off the gusher. His National Security Strategy has elevated the importance of economic health, diplomacy, and attention to climate change as key factors of national security.

There are two important caveats, though, to the administration’s talk of limits. First, Gates plans to plow virtually all of the savings he manages to wring *out* of his department’s budget back *into* this budget, re-programmed for other military purposes: “The goal,” he

said, “is to cut our overhead costs and to transfer those savings to force structure and modernization within the programmed budget.” He and Obama have both invoked Eisenhower’s prosaic but fundamentally sound call for “balance in and among national programs.” Neither Gates’ budgets to date, nor the future plans he has announced, indicate any change in the extreme imbalance between the resources devoted to the military and to every other portion of the discretionary budget.

Second, his major defense policy statements to date, the National Security Strategy and the Quadrennial Defense Review, talk of hard choices but largely forgo them. While changing some emphases in military strategy, neither document seriously examines the military’s roles and missions to evaluate, in this era of constrained choices, which missions the United States can safely forgo and what risks are acceptable. Fully funding the force structure “requirements” for all the missions listed in the document are likely to push budget “requirements” even higher.

Written during the worst economic crisis since the Great Depression, the rhetoric in the National Security Strategy invokes the need to rebuild the U.S. economy and reduce the federal deficit as national security issues. But neither the administration’s plans for recycling the envisioned savings within the military budget, nor its expansive view of the military’s roles and missions, will do anything to fix these problems.

In his “Eisenhower” speech, Gates did ask a set of provocative rhetorical questions suggesting a more serious approach to actually reining in military spending. Here are his last two: “Does the number of warships we

have and are building really put America at risk when the U.S. battle fleet is larger than the next 13 navies combined, 11 of which belong to allies and partners? Is it a dire threat that by 2020 the United States will have only 20 times more advanced stealth fighters than China?”

These questions point the way beyond a defense of current practices to a reconsideration of actual military needs and current military overkill, proceeding then to a program of real reductions, and real savings. Two recent reports, the Unified Security Budget¹⁴ and the Sustainable Defense Task Force’s “Debt, Deficits, & Defense: A Way Forward,”¹⁵ outline such real reductions, and the rationale for why these cuts can be made with no sacrifice to our security.

The case for applying a large portion of those savings to the new national mission of building an environmentally sustainable economy was compelling enough at the end of the Cold War. During the 20 years since then, it has strengthened exponentially. The scientific consensus around climate change that emerged during that time has redefined the threat of environmental contamination from widespread damage to air, water, and biological diversity to an existential threat to life on earth.

But concern over this threat has risen like the water temperature around the oblivious frog in the slowly boiling water. This year, the worst environmental catastrophe in U.S. history—the gusher in the Gulf—should be enough to send us leaping from the pot. The folly of pursuing ever more dangerous strategies to feed our oil addiction is clear. The unfolding tragedy in the

Gulf of Mexico (and beyond) should be enough to propel us into a crash program to make an energy transition beyond petroleum.

Such a transition will reap abundant economic benefits, but it will also require investment. As the United States has been busily outstripping the Chinese in building advanced fighter jets, the Chinese have been investing circles around us in the green economy. In 2010, the United States will use what remains of the 2009 Recovery Act money to spend about \$8 billion on green technology investments. Meanwhile China will be investing in these technologies at the rate of \$9 billion *a month*.

Economic crisis, environmental crisis, and unsustainable military spending combine to make a compelling case for a green dividend underwriting a green transition. We will examine now this transition's ways and means.

Part Two: Components of a Solution

Inside the Pentagon

To what extent can the national defense establishment—which encompasses the Pentagon, the nuclear budget of the Department of Energy (DOE), and components of several other federal agencies—become an important force for the greening of the U.S. economy?

The Pentagon is the largest institutional energy user—and greenhouse gas emitter—on the planet. If it undertook a crash program to convert to renewable energy sources and clean vehicles, it could make a significant impact on global emissions. No such crash program is currently underway, or planned. But there are initiatives to report, including the following:

- The Air Force is seeking to power one-quarter of its bases with renewable energy by 2025, and run half its aircraft on biofuel by 2016.
- The Navy intends to launch a strike group in 2016 that uses no fossil fuels.
- In the next three years the Army plans to be running a fleet of 4,000 electric vehicles, one of the largest in the world.
- In Afghanistan, the Navy is trying to reduce reliance on fuel convoys, and on fossil fuels to purify water, by introducing solar and wind power generators.¹⁶

The Pentagon can also have tremendous influence through how it uses its research and development funds. At nearly \$7 billion in 2008, the DoD's R&D budget is second only, among federal R&D accounts, to the National Institutes of Health.¹⁷ While the Energy Department commands the next largest budget, only 6 percent of it—\$400 million—is devoted to energy efficiency and renewable energy, while a much larger percentage—32 percent—is used for R&D on nuclear weapons.

The Defense Department's 2010 blueprint for defense policy over the next four years, the Quadrennial Defense Review, makes the primary purpose of these activities clear. The Department will “speed innovative energy and conservation technologies from laboratories to *military end users* (emphasis added).” “Energy efficiency,” DoD planners write, “can serve as a force multiplier, because it increases the range and endurance of forces in the field and can reduce the number of combat forces diverted to protect energy supply lines.”

But while the DoD's focus in improving its fuel efficiency is clearly its military mission, can the results also benefit the rest of us? The DoD believes that it can. According to the QDR, “the Environmental Security and Technology Certification Program uses military installations as a test bed to demonstrate and create a market for innovative energy efficiency and renewable energy technologies coming out of the private sector and DoD and Department of Energy laboratories.”¹⁸ In addition, “solving military challenges—through such

innovations are more efficient generators, better batteries, lighter materials, and tactically deployed energy sources—has the potential to yield spinoff technologies that benefit the civilian community as well.”

Our bottom line conclusion, however, is that relying on DoD to lead the way to a clean energy future is an inefficient way to get there. The urgency of the mission of averting climate catastrophe requires dedicated, head-on effort. It will not succeed as the by-product of a military mission. The solution is to invest in the greenhouse gas-reducing mission at a scale commensurate with the dimensions of the problem. This must begin with a rebalancing of accounts: redirecting much of the \$7 billion military R&D budget toward the vastly underfunded \$400 million account, focused directly on designing and implementing a U.S. transition to a low-emissions future.

Defining national problems as national security concerns has, no question, proven to be a potent strategy for marshalling large-scale resources. Eisenhower secured funding for the National Security Highway System as a necessary element to mobilize the country to fend off an attack. The rationale to get to the moon was provided by that Sputnik launch by our Cold War enemy.

But where national security purposes can give to the cause of a robust green technology base, it can also take away. A case in point: Eastern Oregon, circa 2010.

The pieces of the puzzle to build the world’s largest wind farm were in place. Caithness Energy had spent nearly four decades learning the business and

working out the kinks. A group of local landowners in an economically depressed community had signed up to host wind turbines on their properties. Another company, GE, was already at work on its largest renewable energy contract of 2009, manufacturing those turbines. The congressional delegation provided its strong support, and the Obama administration had committed Recovery Act funds. The project had a guaranteed market: the wind farm is supposed to begin supplying power to Southern California Edison by the end of 2011. And a regulatory lever was in place helping to create that market: California’s strict renewable portfolio standards pushing Edison to bring wind power on line quickly.

Two weeks before the project was to get underway, the Defense Department halted it in its tracks: The wind farm would interfere with radar at a military base nearby. Immediately, the pieces began breaking apart. The Energy Department stopped working on the project’s application for a loan guarantee. GE began pulling back from building the turbines. Recovery Act money, which needs to be spent out by 2012, was thrown in jeopardy, as were 16,000 American jobs. And proposed wind farm projects in states from Illinois to Texas were likewise suddenly in doubt.

Thus our conclusion: The national push toward a green economy can be Pentagon-assisted but not Pentagon-led.

OUTSIDE THE PENTAGON

The Pentagon could actually contribute much in many instances by simply getting out of the way, by handing over unneeded military installations to be converted into green job incubators. Consider the ex-

perience of the Navy Yard in Philadelphia. The former Philadelphia Navy Yard is now blazing a promising trail showing how this can be done. Following the end of the Cold War, Congress appropriated \$200 million to finance alternative community economic development and job retraining for regions whose mainstay of defense contracts had disappeared. Most of the grants were relatively small and widely dispersed. The sore thumb on the list was \$50 million, one-quarter of the nation's total allotment, targeted to one project: converting the Philadelphia Navy Yard. What patronage reaped, patronage also managed to squander, at least as it appeared to the outside observer. The money disappeared into various pockets and the Navy Yard languished.

Or, to be charitable, we could say it produced its results on an extremely protracted timetable. Nearly 20 years and another \$50 million in public money later, a new solar manufacturing facility is coming to the Navy Yard. It will manufacture thin-film photovoltaic panels, which are gaining ground in the solar market because of their low cost. When it opens in 2011 it will employ 400 Philadelphians—by ironic coincidence, exactly the number of workers furloughed in November at the Sunoco refinery directly across the river from the Yard, in Westville, NJ. Pennsylvania Governor Ed Rendell says he and Philadelphia Mayor Michael Nutter intend the solar plant to become the anchor for a campus of clean-energy businesses at the Navy Yard.

This happy ending to our Philadelphia story is embedded in the real world, which means, as in most cases, that it comes with a few flaws. First, the company, Heliosphera, engineered a bidding war among potential U.S. sites, and Pennsylvania offered \$10 million more than New York did to lure it there. The winners also of-

fered to exempt the company from state and local business taxes until 2025. State and local coffers will take a big hit, one they can't afford.

Second, the manufacturer is a new Greek company licensing Swiss technology. It's a story similar to the one playing out in California, among many other places. In California, U.S. taxpayer dollars are funding a much-needed high-speed rail network, which will employ many California workers. The main contractor for the project, however, will be Chinese. Having put far too many of its manufacturing eggs in the military technology basket, the United States has allowed other countries to speed far ahead in the green technology market. As we struggle to play catch-up, U.S. green investment will need to lead a belated push to grow domestic manufacturing enterprises to fill our green technology needs.

INSIDE THE DEPARTMENT OF ENERGY

During the Cold War, the government's largest scientific and technological interest was in the design, manufacture, and maintenance of nuclear weapons. The United States devoted significant resources to funding the research and development of nuclear weapons, which required large numbers of highly specialized scientists and advanced scientific facilities. This need spawned a system of federally financed laboratories that performed the research and development necessary to meet strategic goals related to nuclear arms.

Though the Cold War ended more than two decades ago, this system of laboratories has remained largely intact. Today, the Department of Energy main-

tains 21 major scientific facilities which, in 2010, cost more than \$11 billion to operate and employed tens of thousands of researchers. These labs spend much of their time maintaining the U.S. nuclear arsenal and dealing with its environmental implications, but they also perform basic scientific research, research on energy technology, and cooperate with corporations and universities to further private research.

The comparative advantage of the labs lies not in the applications of their work—which is in nuclear and weapons technology—but in their core competencies: design, analysis, technological innovation, production, etc. Additionally, many labs are highly specialized in fields such as semiconductors, energy, lasers, computers, and basic physics. These competencies make the DoE labs a perfect motor for the research needed for a green dividend. But there are several obstacles.

The decision-making process in the DoE has historically been decentralized, which makes large-scale, top-down changes difficult. This is partly a management issue. Since the dissolution of the OTA in 1994, the DoE's Office of Science has struggled to provide a comprehensive scientific and technological vision for the Department.

But a more fundamental roadblock lies in the purpose and methods of the lab system as a whole. Nuclear weapons labs have been responsible for a highly specialized, hazardous, and secure set of operations for many decades. Consequently, they are designed for stability and long-term stewardship, and are purposely not amenable to rapid change. DoE's specialty is big science, and by nature of being big, it is not exactly nimble.

Though this specialization makes the labs unsuitable, at least in the short term, as technology incubators, it does mean they have important resources to offer. Their specialized and costly pieces of equipment, such as particle accelerators, are unique resources that can enhance research projects. The big science that makes the labs slow to change also gives them the capacity to undertake large-scale research projects that only large labs with generous budgets can undertake.

There has been change in the 20 years since the end of the Cold War, but the DoE labs are by no means innovators churning out impressive new technologies. Radical change would be needed for the labs to successfully tackle the pressing energy, transportation, and climate problems facing the country, and the needed political and funding decisions have not been made in that direction. Still, as the following examples suggest, many of the DoE labs have devoted at least some staff and funding to critical non-nuclear issues.

DOE AFTER THE COLD WAR

At the end of the Cold War, when it appeared that history was putting the central purpose of the DOE labs' nuclear weapons design out of business, lab administrators suddenly concentrated on finding other uses for them. The now-defunct congressional Office of Technological Assessment (OTA) authored a report in 1993 on the future of the labs, which serves as an authoritative view on the thinking at the time. Its in-depth analysis laid out three possibilities for the labs' future: to downsize, to refocus the mission, or to make no major changes. Because a decision choosing one of these options was never made—in large part because of political disagreements over modernization of the

nuclear program—the situation today is some combination of all three.

Since the mid-1980s the Energy Department had encouraged the OTA to explore the possibilities of technology transfer to private industry, without much success. In 1989 this changed, with legislation creating the system of Cooperative Research and Development Agreements (CRADAs), establishing partnerships between the labs and industry in the commercialization of the labs' technology. A federally chartered organization, the Federal Laboratory Consortium for Technology Transfer (FLC), helps the technology transfer process by “expanding communication among industry, government, and academia.” Through their work, public-private cooperation has developed energy-saving roofs and thermal imaging technology to fight forest fires. In 1992 DOE claimed technology transfer as a “formal, integrated mission” of all its labs. The primary purpose was to be “assisting U.S. based companies in the global race for competitive technologies.”¹⁹

CRADAs have now been in place for almost three decades, and they have provided important opportunities for public-private cooperation. Two caveats, however, apply to their use for energy innovation. First, CRADAs are tools to achieve an end, and not an end in itself. If the labs are not researching the correct subjects, CRADAs will not solve that. Second, the details of intellectual property and data rights have made implementation of CRADAs difficult and limited the number of CRADAs successfully completed.

According to the OTA's review, consideration of the third option should focus not just on transferring technology, but on developing a new public purpose or

purposes that the market would not supply. While the reviewers were skeptical that any single purpose could command the support and resources that had been devoted to the nuclear arms race, they concluded that environmental protection was in fact the most promising. Global environmental issues were rising to the top of the policy agenda, they said. And they focused on the particular need for renewable energy sources and energy-efficient transportation.

Citing Americans' love affair with the car, the OTA promoted the development of the electric vehicle, given an appropriate push from emissions regulation, as having the best potential to absorb the talents and technology left over from the Cold War. OTA viewed the development of high-speed rail as having lower potential for job creation and defense conversion, since in the short term they saw it as viable only in “a few heavily traveled corridors like the out from San Francisco to San Diego, the Eastern seaboard, and parts of Texas.”²⁰

It is painful to read this assessment in 2010, knowing how few of these possibilities were pursued, how much they were needed, and how much time we have lost. Nevertheless, many of the DoE labs have begun the slow process of mission change. For instance, a number of laboratories have specialized centers to study energy-related issues or, in the case of the National Renewable Energy Lab (NREL), a whole lab for them. Founded in 1977 as Solar Energy Research Institute, NREL changed its name in 1991 when it became a national lab. Originally founded to perform research on solar technology, it had its budget cut under President Reagan and was funded at around a paltry \$200 million through FY 2006. In the last few years, its funding has shot up, and it was boosted in FY 2009 to over

\$500 million, with a \$100 million stimulus award for construction upgrades. Its major projects are on wind, biofuel, and solar energy technologies.

Another exciting new project is the Hub for Innovation in the Transportation Energy Community (HITEC), located at Sandia National Laboratory. HITEC plans to work collaboratively with research institutions around the world to focus on engine efficiency, vehicle electrification, and alternative fuels. It will soon work with the new Livermore Valley Open Campus, a complex designed to allow closer work with private sector organizations looking to work with HITEC on common goals. Oak Ridge National Laboratory in Tennessee has an Energy & Transportation Science Division whose goal is “to develop and deploy knowledge and technology that enables the transformation of our energy systems in a manner that allows America to achieve energy independence, energy security, global economic leadership and environmental sustainability.” Its four centers focus on building technologies, electric power, fuels and engines, and transportation analysis.

The National Ignition Facility (NIF) at Lawrence Livermore National Laboratory finished construction in 2009, and is trying to develop viable nuclear fusion. In 2009, the Department of Energy created 46 Energy Frontier Research Centers (EFRC). The majority of these are at universities, though some are located at national labs, and they investigate narrower energy-related issues. Funded at around \$2-5 million per year over course of five years, they will investigate the basic scientific principles related to specific technological hurdles, such as the physics of superconductors or solid-state conversion of solar energy to electricity. This year

ARPA-E, modeled after the famed DARPA, starting awarding its first contracts for projects in the energy field. And Oak Ridge Lab’s Center for Transportation Analysis is launching an Integrated Modeling, Analysis and Visualization Center to work on energy efficiency in American life.

Current politics may prevent sufficient funding streams from heading their way. The Obama administration has announced its commitment to nuclear abolition and has negotiated a new bilateral accord with Russia on the reduction of strategic nuclear weapons. But part of the congressional deal to win approval of the new START has been support for a \$7 billion nuclear modernization program. In other words, the United States supports nuclear abolition, but will continue to pour billions of dollars into the improvement of the very weapons we are committing to eliminate. This huge influx of money into the DOE will largely go to the nuclear labs and make the shift toward renewable energy and other missions that much less likely. In contrast to the \$7 billion modernization, ARPA-E, for example, has an annual budget of around \$300-400 million.

A GREEN START

The Obama administration has made investing in the green economy a priority. But the great majority of these investments have come in the one-time American Recovery and Reinvestment Act—otherwise known as the “Recovery Act ”—of 2009. Most of the money is already spoken for. If these are truly to lay the groundwork for a green economy, such investments will in future need to be built into the regular budget.

While the Recovery Act has been criticized, with some justification, for policy incoherence, it has targeted substantial resources toward solving key pieces of the green economy puzzle, including building a robust manufacturing base for advanced electric vehicle battery components, recharging infrastructure, and high-speed rail networks.

Recovery Act funds for these and other green infrastructure projects have been spread across the country. But the administration is also interested in targeting federal funds to help develop regional models to lead innovation in specific dimensions of the green economy. In 2010 the cooperating Departments of Energy, Commerce, Labor, and Education launched the Regional Innovation Cluster Initiative. Its first pilot project was chosen to support the “two key national strategic objectives” of energy security and reducing the U.S. carbon footprint. The idea of this first project is to build on a region’s existing base in the field of energy-efficient building systems and design. Federal funding will underwrite the expansion of this base by a consortium that includes local manufacturing enterprises, government entities, universities, financial institutions, and nonprofits.

But the collection of such initiatives on the administration’s drawing board—carbon capture and storage, Gulf Coast Ecosystem Restoration, modernizing federal environmental remediation laws, increasing energy efficiency and renewable energy in federal buildings, and a taskforce on oceans, in addition to “Recovery Through Retrofit”—do not add up to a green industrial policy. They do not come close. There is, we have been told by senior administration officials closely associated with these initiatives, currently no integrated

strategy, coordinating an interagency process, devoted to the often-cited goal of building a green economy.

The administration is, however, trying to revive some programs that had been languishing since the post-cold war period, and adapt them to this new mission. In 1992 Congress appropriated funds--totaling less than \$100 million--to government programs that would “allow defense industries to convert to civilian activities.” Part of this money was devoted to expanding a network of Manufacturing Extension Centers. The new centers would refocus their mission to give special attention to the problems of small- and medium-sized businesses needing to adapt their technology to new civilian work.

The Bush administration cut funding for the Centers; the Obama administration used Recovery Act money to restore funding and to redirect the network toward the green-economy-building mission. In February of this year a large coalition of manufacturing associations, including the National Association of Manufacturers, the Business Council for Sustainable Energy, and the National Electrical Manufacturers Association, wrote to the Senate majority leader about the need to “provide significant stimulus to the manufacturing sector for investments in energy efficiency and tooling for the production of energy-efficient and clean energy products.” They focused on two key recommendations: \$4 billion for energy-efficient manufacturing grant program and an additional \$50 million for the Manufacturing Extension Partnership (MEP) Program.²¹

These Manufacturing Centers have been modeled on the Agricultural Extension offices that had been offering a helping hand to American farmers since the

1920s. In addition to providing a model for assistance to small manufacturers, the Agricultural Extension Service can offer broader lessons about the role the government can play in catalyzing a green transition.²² During the 1920s, U.S. agriculture faced a serious crisis: Farming was labor-intensive, yields were comparatively low, and food prices were high. Scientists and agronomists had a wealth of ideas on how to boost agricultural productivity. But farmers, a conservative lot, were reluctant to risk crop failure by adopting new techniques and new seeds. It was not the market that ultimately forced farmers to raise their game. The U.S. Department of Agriculture established pilot projects with a handful of daring farmers around the country. The success of these pilot projects convinced other farmers to follow suit, and a revolution ensued.

For the Green Dividend to take root, the federal government must follow a similar path. It must establish pilot projects—like CALSTART, the Oregon wind farm, the solar project at the Philadelphia Navy Yard—and make sure that they are well-funded and well-publicized. On the basis of these pilot projects, a green manufacturing extension program—like the agricultural extension program before it—can effect a transformation of the way we think of defense: from the production of weapons to the strengthening of our national infrastructure.

MEETING INTERNATIONAL STANDARDS

If the United States does not embark on such a dramatic transformation, comparable to the farmers' revolution or the Apollo initiative, we will very quickly find ourselves outclassed internationally. Other coun-

tries have embarked on their own sustainable energy initiatives. In Germany, the government instituted a number of laws that favored the sustainable energy sector, such as requiring businesses to buy energy from renewable sources first before turning to non-renewable sources. Because of this and other laws, the share of electricity provided by renewable energy rose in nine years from 6 percent to 16 percent of the total.²³ Portugal, too, has embarked on a new clean energy program, powered by a huge increase in wind farms. This year, nearly 45 percent of Portugal's electricity will come from renewable sources, compared to only 17 percent five years ago.²⁴

But it is perhaps in Asia where the most dramatic efforts have taken place so far. In 2001, the Chinese government took advantage of its privileged position in the economy to direct national spending toward the sustainable energy component of its technology R&D initiative, the 863 program. "In 2006, Chinese leaders redoubled their commitment to new energy technology," writes Evan Osnos.²⁵ "They boosted funding for research and set targets for installing wind turbines, solar panels, hydroelectric dams, and other renewable sources of energy that were higher than goals in the United States. China doubled its wind-power capacity that year, then doubled it again the next year, and the year after. The country had virtually no solar industry in 2003; five years later, it was manufacturing more solar cells than any other country, winning customers from foreign companies that had invented the technology in the first place."

The Chinese government, of course, largely does not have to deal with the particularist concerns of politicians, the heavy lobbying of sunset industries, or

the voting preferences of citizens. It can shift around resources with relative ease. But let's turn to another Asian country that has made green technology a comparable feature of its economic transformation, South Korea. As in the United States, the South Korean government must contend with all the messy contradictions of democratic politics. Yet, despite those potential obstacles, South Korea under its current president Lee Myung Bak, has embarked on its own "green growth" path.

In August 2008, the South Korean government unveiled its first five-year plan devoted to green growth. The country is dependent for 97 percent of its energy on imports. By 2050, the government aimed to become energy independent through a mixture of sustainable energy sources, such as wind and solar; new regulations on energy efficiency; promoting public transportation, particularly trains; placing green technology at the core of the government's R&D investments; and establishing a model green city that can serve as an example to transform all Korean urban environments. The UN Environment Program has recommended that all countries invest at least 1 percent of GDP into green growth. South Korea is already investing 2 percent of its considerable GDP.

In South Korea, the private sector is leading this green growth initiative. The government is providing targeted R&D investment, tax incentives, appropriate regulatory measures, and infrastructure development.

If the United States doesn't follow the lead of East Asia—whether the emphasis is more on the public side (China) or the private sector (South Korea)—we will find ourselves behind the curve. Our factories will not be manufacturing useful or marketable items, we

will remain heavily dependent on imported fossil fuels, and we will not be able to take the lead in tackling global warming, the major existential crisis of our generation.

Part Three: Mapping the Transition

The Jobs Argument

The global economy has taken a beating from the latest economic crisis. Economic growth has remained stagnant in 2010. The sovereign debt crisis that enveloped Greece has threatened to throw the Eurozone into a double-dip recession, which would have a devastating impact on the global economy. In the United States, the number of unemployed has doubled since December 2007, the unemployment rate still hovers around 10 percent, and the recovery has been very slow in coming.²⁶

The Obama administration, under pressure from the Republican opposition, has shifted from an emphasis on stimulus spending to a concern for deficit reduction. It has assembled a deficit reduction commission and promised to find ways of cutting government spending. Social Security will likely be on the cutting board, and the administration may look to new ways of boosting revenue, such as a value-added tax. Accompanying this emphasis on deficit reduction is Obama's proposed freeze on government spending.

What is not part of the spending freeze, so far at least, are the immense military budget and the supplemental spending on the Iraq and Afghanistan wars. Indeed, the Obama administration increased military spending even at this time of economic crisis. In 2009, the administration proposed a \$663 billion Pentagon budget (which doesn't include the military portions of other budgets, such as the Department of

Energy). This was a 4 percent increase over 2009 spending (a 2.1 percent increase adjusted for inflation). For 2011, the Obama administration proposed the largest military budget since World War II: \$709 billion, which includes about \$160 billion for war spending. Obama also called for an additional \$33 billion for ongoing war costs associated with the surge in Afghanistan.

Some big-ticket weapons systems went under the ax; Gates has promised to cut waste and overhead in Pentagon spending. But the latest budget includes a fair share of big-ticket items like two Virginia-class submarines and two DDG-51 destroyers. And Gates promises to cut waste only so that he can redistribute that money to other missions.

In the absence of any more stimulus money in the budget, the federal government has only one major prime-the-pump option: the use of military spending to stimulate the economy and pull the country out of recession. Proponents of this approach even enlist FDR on their side, by arguing that the United States didn't exit the Great Depression until it shifted to a war footing after Pearl Harbor. Today, the advocates of high military spending propose increasing the Pentagon's budget to 4 percent of GDP.²⁷ Even if the proponents of high military spending don't explicitly invoke its capacity to stimulate the economy, their efforts to maintain a very high Pentagon budget when all other aspects of government spending are coming under the knife amount to the only Keynesian strategy that survives in an era of deficit reductions: military Keynesianism.

The rationale for maintaining such high levels of military spending has shifted. Under the Obama administration, talk of a “global war on terror” has receded. With Washington depending on Beijing to help pull the global economy out of recession, the China “threat” no longer has the capacity to pry open government coffers for more military dollars.²⁸ The operative word in Washington isn’t “terror” or “China;” it’s “employment.” Defense contractors are scrambling to prove that they play an essential role in keeping factories running and workers employed. Lockheed Martin last year ran a full-page ad in *The Washington Post* that linked its F-22 Raptor—an expensive weapon of dubious utility in today’s strategic context—to 95,000 jobs in 44 states. Not to be outdone, the shipbuilding industry lobbied Congress to send a letter to Obama arguing for a doubling of the rate of naval shipbuilding: to preserve 400,000 jobs in 47 states. Despite hundreds of billions of dollars of stimulus spending—and the government’s recent hiring of over 400,000 temporary workers for the census—the unemployment rate remains stubbornly at 9.7 percent (as of May 2010).

The argument linking military spending and jobs is the only example of strategic planning currently enjoying bipartisan support in Washington. For the last 60 years or more, the U.S. government has intervened into the economy to support defense contractors, pick winners and cut funding to losers, and plan years into the future for specific weapons systems, all in contradiction of the prevailing economic wisdom of *laissez-faire*. Except for extraordinary circumstances—such as the first Obama stimulus package—the U.S. government can intervene into the economy and prime the pump largely through one method: military spending.

This has to change. Breaking the stranglehold of military Keynesianism over the U.S. economy won’t be easy. But it is necessary. What is required is a combination of master planning at the federal level and concerted action at the regional and local levels. To those who would decry the “creeping socialism” implied by that statement, we only need to reiterate: Federal master planning is what military Keynesianism is, in collusion with regions and localities that have become entangled in its web. Only an equally strong alternative has a chance of replacing it.

MASTER PLANNING

The public interest in an inhabitable planet, now threatened by climate change, requires us to rethink an old topic: industrial policy. This topic has been off limits to public discourse for decades. But the Obama administration has shown an inclination toward integrative, systemic approaches to analyzing and solving the nation’s problems. It is capable of seeing and working through the task of shifting from a militarized to a green economy in an integrated way. Yet the bruising fights of the past two years over health care reform and financial sector reform has made the Obama administration very careful about what battles to fight. Defending the idea of industrial policy is probably one of those battles.

Obama, however, has been pushing harder on the idea of an integrated strategy to revive domestic manufacturing. And green technology is at the heart of this strategy. This strategy needs an additional dimension. The public interest in averting climate catastrophe requires a manufacturing policy that steers production toward the urgent necessity of avoiding climate catas-

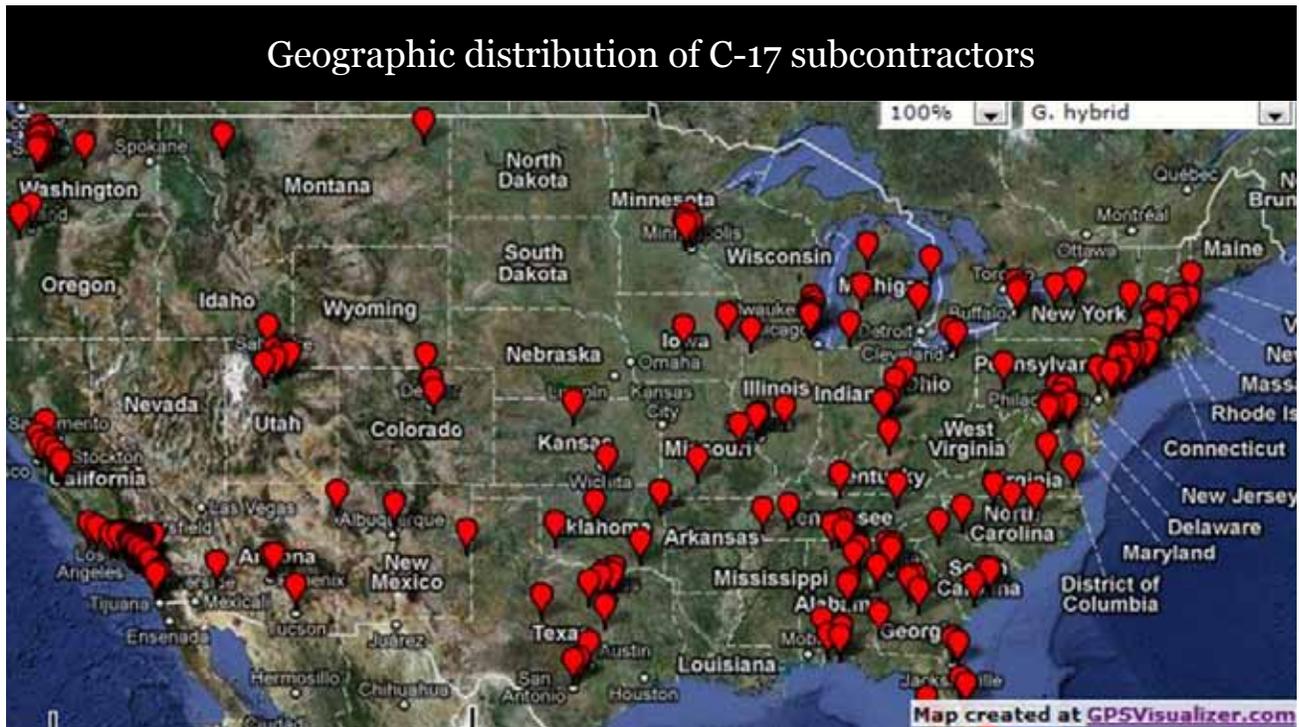
trophe *and* sacrifices production of weapons systems we don't need. Those sacrifices will require job creation policies for those who will lose their jobs in the process.

The Obama administration wants to cut Pentagon waste, but is facing the big obstacle of entrenched defense dependency in virtually every state. The administration needs to map out the locations where military production is employing people making things for which we have no strategic need. It needs to determine which nascent elements of the green economy in those locations can be strengthened to become viable economic alternatives. And it needs to direct some of the federal resources available for green economic development to these locations. To the extent that an alternative green economic base can be built there, the pressure to maintain unnecessary military production will diminish. Ending this production will, again, generate more resources to finance the green transition.

Time for an illustration. A good place to start reining in defense spending unrelated to our security needs is by focusing on contracts the Pentagon itself certifies we don't need. One of these is the C-17 cargo plane. Its contractors have strategically distributed the component subcontracts to form a political protection racket that would impress the mafia.

Members of Congress with near-impeccable progressive credentials continue to appropriate money for this program, hoping to avoid political suicide.

This program has been in trouble for most of its life. Even Dick Cheney tried to phase it out when he was defense secretary. Now the administration says it will veto the entire defense bill if it includes money for more C-17s. If this decision sticks, 5,000 workers in Long Beach, California alone will lose their jobs.



Data compiled by Robert Miller/IPS; map designed by Stimson Center.

So Boeing is looking for ways to show it can cut costs. Of course, cost containment has never been the defense contracting industry's strong suit. So in recent years Long Beach officials have come up with a raft of ideas for how they can do it for them: give Boeing more tax breaks, cut the company's water bill, de-privatize Boeing's in-house fire service, and so on. What sorts of services will be left for Long Beach's residents once all these breaks are in place is anybody's guess. At the end of the Cold War, Long Beach was working with CAL-START, the public-private partnership formed to link two of the state's looming problems: world-class smog and an economy suffering from a dwindling market for defense aerospace. Today it remains firmly wedded to military Keynesianism and the jobs linked to traditional defense contractors.

A reinvestment of the green dividend must rectify that problem. A homegrown industrial base for high speed rail manufacture can be one result. Here is the geographic distribution of Recovery Act investment in a high-speed rail network. Next to it is a partial list of the C-17 contractors in those regions. If the administration follows through on its threat to veto the defense appropriations bill if it includes money for more C-17s, these will be among the businesses that will be affected. These businesses might be able to get involved in the technologically complex process of improving U.S. productivity with the kind of high-speed rail network that our economic competitors have been using for years.

Making the cancellation of the C-17 stick is only the first step in the task of connecting military spending to strategic need. The reports cited above—by the Task Force on a Unified Security Budget, and the Sustainable Defense Task Force—lay out the next steps.

Here is the beginning of a green transition roadmap:

- A partial list of weapons systems shown in these two reports to be expendable,
- Their principal production locations, organized by state, and
- Some data indicating the green technology strengths of those locations.

{See Appendix Two for an extensive chart}

To draw this roadmap, we still need to have information on the numbers of workers at these facilities who will need to transition to other work in an expanded green economy. This information is actually quite hard to come by. Military producers for the most part treat the job classifications of their employees as proprietary information and withhold this information from the public.

Partial information on military production jobs is available from two sources, however. The first is from facilities owned by the military itself, which, in some cases, are more forthcoming than private military contractors in providing information to the public about the jobs of people who work there. The Norfolk Naval Shipyard in Portsmouth, Virginia, for example, owned by the Navy, is one of the largest shipyards in the world, specializing in repairing, overhauling, and modernizing ships and submarines. Work performed there includes construction, conversion, overhaul, repair, alteration, and outfitting ships, as well as assigned manufacturing, research, development, and test work. On a typical day, shipyard employees work on over 15 percent of the Navy's active fleet. The workforce consists of ap-

proximately 6,750 civilian employees and permanent military personnel. The production work performed is considered 70 percent highly skilled, 20 percent moderately skilled, and 10 percent unskilled.²⁹

As a public facility, the shipyard posts the major categories of jobs performed by its workforce. Although most private military contractors do not, they do, of course, post advertisements for new job hires. The second source is therefore these advertisements for new job openings posted by these contractors.

On the other side of the equation, the best source on green jobs is the Political Economy Research Institute (PERI) at the University of Massachusetts at Amherst. Its economist team has broken out job categories for building and retrofitting, mass transit and freight rail, a smart grid for electrical transmission, wind and solar power, and advanced biofuels.³⁰

The following two tables put this information together. The first matches jobs at the Norfolk Naval Shipyard with similar green job classifications.

Norfolk Naval Shipyard Jobs and Green Job Equivalents	
Norfolk Naval Shipyard Job Position	Green Jobs Equivalent Position
Air Conditioning Equipment Mechanic Series Positions	Heating/Air Conditioning Installers (Building Retrofitting)
Chemist	Chemical Engineers (Cellulosic Biofuels)
Chemist	Chemists (Cellulosic Biofuels)
Crane Operator Series Positions	Construction Equipment Operators (Building Retrofitting, Wind Power, Solar Power)
Electrical Engineering	Electricians (Building Retrofitting, Mass Transit, Solar Power)
Electrical Series Positions	Electrical Engineers (Energy Efficient Automobiles, Solar Power)
Electrical/Electronics Shop General Facilities and Equipment	Engineering Technicians (Energy Efficient Automobiles)
Electronic Industrial Controls Mechanic Series Positions	Electrical Equipment Assemblers (Wind Power, Solar Power)
Electronic Integrated Systems Mechanic Series Positions	Computer Software Engineers (Energy Efficient Automobiles)
Electronic Measurement Equipment Mechanic Series Positions	Computer Software Engineers (Energy Efficient Automobiles)
Electronics Engineer	Computer Software Engineers (Energy Efficient Automobiles)
Electronics Mechanic Series Positions	Computer Software Engineers (Energy Efficient Automobiles)

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Electronics Technician	Computer Software Engineers (Energy Efficient Automobiles)
Engine & Pump Operator	Computer Software Engineers (Energy Efficient Automobiles)
Engineering Aid/Technician	Engine Assemblers (Mass Transit, Energy Efficient Automobiles)
	Civil Engineers (Mass Transit)
Environmental Engineer	Environmental Engineers (Wind Power)
General Engineer	Environmental Engineers (Wind Power)
General Engineer	Civil Engineers (Mass Transit)
Heavy Mobile Equipment Series Positions	Construction Equipment Operators (Building Retrofitting, Wind Power, Solar Power)
Heavy Mobile Equipment Series Positions	Computer-Controlled Machine Operators (Energy Efficient Automobiles)
Heavy Mobile Equipment Series Positions	Rail Track Layers (Mass Transit)
High Voltage Electrician Series Positions	Electrical Equipment Assemblers (Wind Power, Solar Power)
Industrial Equipment Maintenance Series Position	Machinist (Wind Power)
Industrial Equipment Mechanic Series Positions	Millwright (Wind Power)
Information Technology (IT) Specialist	Computer Software Engineers (Energy Efficient Automobiles)
Insulating Series Positions	Insulation Workers (Building Retrofitting)
Inventory Management Specialist Series Positions	First-Line Production Supervisors (Wind Power)
Inventory Management Specialist Series Positions	Operations Managers (Energy Efficient Automobiles)
Lifting and Handling Dept General Facilities and Equipment	Production Helpers (Mass Transit, Energy Efficient Automobiles)
Lifting and Handling Dept General Facilities and Equipment	Laborers (Solar Power)
Lifting and Handling Dept General Facilities and Equipment	Installation Helpers (Solar Power)
Machinist Series Positions	Machinists (Wind Power)
Marine Machinery Mechanic Series Positions	Millwrights (Wind Power)
Metal Forging	Metal Fabricators (Mass Transit, Energy Efficient Automobiles, Solar Power)

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Metal Forging	Welders (Mass Transit, Energy-Efficient Automobiles, Solar Power)
Metal Forging	Iron and Steel Workers (Wind Power)
Metal Worker Series Positions	Metal Fabricators (Mass Transit, Energy Efficient Automobiles, Solar Power)
Metal Worker Series Positions	Welders (Mass Transit, Energy-Efficient Automobiles, Solar Power)
Metal Worker Series Positions	Iron and Steel Workers (Wind Power)
Metal Worker Series Positions	Sheet Metal Workers (Wind Power)
Production Controller	Production Helpers (Mass Transit, Energy Efficient Automobiles)
Production Controller	First-Line Production Supervisors (Wind Power)
Production Controller	Industrial Production Managers (Wind Power)
Quality Assurance Specialist	Building Inspectors (Building Retrofitting)
Rigging Series Positions	Construction Equipment Operators (Building Retrofitting, Wind Power, Solar Power)
Rigging Series Positions	Computer-Controlled Machine Operators (Energy Efficient Automobiles)
Sheet Metal Mechanic Series Positions	Sheet Metal Workers (Wind Power)
Shipfitting Series Positions	Iron and Steel Workers (Wind Power)
Shipfitting Series Positions	Sheet Metal Workers (Wind Power)
Shipfitting Series Positions	Millwrights (Wind Power)
Shipfitting Series Positions	Civil Engineers (Mass Transit)
Boilermaker	First-Line Production Supervisors (Wind Power)
Supply Program Management Series Positions	Industrial Production Managers (Wind Power)
Tool and Equipment Repairing Series Positions	Millwrights (Wind Power)
Toolmaking Series Positions	Machinists (Wind Power)
Transportation Clerk & Assistant	Construction Managers (Building Retrofitting, Solar Power)
Transportation Clerk & Assistant	First-Line Transportation Supervisors (Mass Transit)
Welding Series Positions	Welders (Mass Transit, Energy-Efficient Automobiles, Solar Power)
Shipwright Series Positions	Carpenters (Building Retrofitting)
Wood Crafter Series Positions	Carpenter Helpers (Building Retrofitting)
Boatbuilding and Repairing	Carpenter Helpers (Building Retrofitting)
Industrial Engineer	Industrial Machinery Mechanics (Solar Panel)

The second table matches the job openings advertised in late 2008 for work on the F-22 fighter jet, the C-130J transport plane, and the Expeditionary Fighting Vehicle with similar green-job classifications.

Illustrative Military Jobs and Green Job Equivalents	
F-22 job	Green job equivalent
Systems Engineer Principle, Air and Vehicle Systems & Software Chief Engineer	Computer Software Engineer (Energy Efficient Automobiles)
Embedded S/W Engineer Stf	Computer Software Engineer (Energy Efficient Automobiles)
Embedded S/W Engineer Sr	Computer Software Engineer (Energy Efficient Automobiles)
Software Developer	Computer Software Engineer (Energy Efficient Automobiles)
Systems Engineer, Engineering Product Development	Green Building Consultant-Mechanical Engineer
QA Engineer Stf—QA Test and Inspection	Green Building Consultant-Mechanical Engineer
Integrated Avionics Systems	Engine Assembler (Mass Transit/Freight Rail)
Aircraft Structural Maintenance assembler	Engine Assembler (Mass Transit/Freight Rail)
Aircraft Structural Maintenance assembler	Metal Fabricator (Mass Transit)
Air Force Mechanic	Industrial Machinery Mechanic (Solar Power)
Machinist	Machinist (Wind Power)
Aeronautic Sheet Metal Fabricator	Sheet Metal Fabricator (Solar Power, Mass Transit/Rail, Wind Power)
Assembly Supervisor	First-Line Production Supervisor (Wind Power)
C-130J job	Green job equivalent
C130J Propulsion System Program Manager	Propulsion Engineer (Energy Efficient Automobiles)
Aeronautic Sheet Metal Fabricator	Metal Fabricator (Solar Power, Mass Transit/Rail, Wind Power)
Expeditionary Fighting Vehicle Job	Green Job Equivalent
Automotive Systems Engineer	Automotive Engineer, Automotive Technician (Energy Efficient Automobiles)
General Engineer	Chemical Engineer, Electrical Engineer, Mechanical and Industrial Technician (R&D Industry—Alternative Energy Production and Efficiency)

Mechanical Engineer	Mechanical Engineer (R&D Industry—Alternative Energy Production and Efficiency)
EFV Repairman/Technician	Diesel Service Technician/Mechanic (Energy Efficient Automobiles)
General Military Aerospace Job (not specific to any one weapons program)	Green Job Equivalent
Aerospace Specialized Welder/Fitter	Welder (Energy Production Industry-Photovoltaic technologies, Mass Transit/Freight Rail)
Electronic Technician—Aerospace	Electronic Technician (Green Building Construction/Retrofitting—Lighting Industry)
Electrical Engineer	Electrical Engineer (R&D Industry)
Assembly Line Worker	Team Assembler, Electrical Equipment Assembler (Smart Grid, Solar Power)

Obviously these comparisons are illustrative rather than comprehensive. But they do indicate the following bottom line: Many current military production jobs, like many green jobs, are highly skilled and also involve many of the same kinds of skills. For many workers, therefore, the transition from one to the other will not be difficult. And the Obama administration has allocated substantial resources to reorienting the federal job retraining network to develop specialized training for area green jobs.

Local action

The other necessary component of a green transition is strong initiative at the state and local levels: to assess local assets, plan a transition that capitalizes on them, and access the federal resources available to help.

A case in point is East Hartford. The cornerstone of the U.S. military-industrial complex was laid down in Connecticut. In 1798, Eli Whitney became our first

military contractor, by fulfilling the War Department’s first contract to supply the army with 10,000 muskets. Gun manufacturers Colt, Remington, and Winchester soon joined him in setting up shop in the state. By the end of World War I, 80 percent of Connecticut’s manufacturers were producing for the military.

In 1860, Whitney’s gun manufacturing enterprise became Pratt & Whitney Machine Tool Company, then based in Hartford. By now its gun business has evolved into the construction of highly sophisticated engines for a fleet of military aircraft, including the F-15, F-16, and F-22 fighter jets and the C-17 cargo plane—an evolution indicating that success in military contracting may have less to do with core manufacturing competencies than with an intimate knowledge of the special world, and rules, of contracting itself, and the personal relationships that grease it.

Connecticut’s defense dependency meant that the state’s economy took a huge hit in the post-Cold

War defense downturn. The state then went about the painful work of diversifying this economic base, with some success. As with most of the rest of the country, though, this mainly involved a transition to services. By 2009, a manufacturing workforce that numbered 400,000 in 1976 had shrunk to 180,000. Manufacturing now only accounts for 12 percent of Connecticut's economy.

East Hartford is one of those manufacturing strongholds. Pratt & Whitney is by far its largest employer, generating \$121 million in revenue in 2006, compared to \$23 million from the next largest source. The post-9/11 military build-up has, of course, been good to the military contracting business.

But the price of East Hartford's defense dependency is also visible all over the city. Among the shuttered Pratt & Whitney facilities around town is the former Andrew Willgoos jet engine testing facility, a hulking complex slowly rusting on three acres next to the Connecticut River. The closing of this and other P&W facilities have played a large role in East Hartford's unemployment rate, which, at 10.3 percent, exceeds the national average. The first revenue decline occurred in 2009, precipitating the largest recent layoff of a thousand workers, announced in February. But these jobs didn't simply disappear; rather, the company moved many of them to Japan, Singapore, and, state-side, to non-union Georgia.

And more job losses could be on the way as the Obama administration's modest first steps to end the no-limit post-9/11 military spending trajectory have put significant portions of Pratt & Whitney's business in greater jeopardy. East Hartford needs to create a future

for itself that is held hostage neither to an unsustainable post-9/11 military buildup nor to Pratt & Whitney's race-to-the-bottom outsourcing strategies. It needs to construct an economic foundation based in building things we need, rather than things even the Pentagon says we don't. The signature element of contemporary economic development is a city's public officials striking deals to lure companies to town by offering bigger tax breaks than its competitor cities. We propose a strategy for places like East Hartford that involves broader community participation in the decision-making over their economic futures.

As it happens, the military has devised a model we can learn from. The process that has been devised in the post-Cold War period to manage the closure of military bases deserves much respect. A Base Closure and Realignment Commission, whose members are not members of Congress and therefore serve no constituents' parochial interests, draws up the list of bases to be closed; Congress then approves or rejects the list without being able to modify it. More to the point of this paper, the bases the government no longer needs are required to plan for new uses for the property by means of a planning process that involves a broad range of stakeholders, including public officials, the business community, labor unions, and community groups.

We believe that communities like East Hartford should map out their expansion into the new frontier of the green economy by means of a similar process.

The starting point could, again, begin with the military. The Defense Department's Office of Economic Adjustment offers planning grants for communities weaning themselves from defense dependency. During

the last decade, these grants have been applied almost exclusively to help communities adjust to the loss of bases. But these grants are also available to facilitate adjustments to defense contract losses and contractions. East Hartford could pull together its stakeholders and apply.

Alternatively, the Commerce Department's Economic Development Administration also offers community planning grants. The Global Climate Change Mitigation Incentive Fund, for instance, strengthens linkages between economic development and environmental quality.³¹ This is another option for East Hartford to underwrite a planning process for its green economic development.

Once funds are secured, East Hartford's development commission will need to examine the assets the community has to build on in constructing an economic future based in the green economy. Here are a few:

- An organization in place that could coordinate the planning process. Grow Jobs Connecticut is a coalition of labor unions and community groups that, among other things, is currently working to convert idle manufacturing facilities in the state to new uses. One project is focusing on reviving one such facility in Bristol to retrofit railroad diesel engines to eliminate particulate emissions and save 30 percent on fuel use.
- A regional strength in fuel cells. United Technologies, the parent company of Pratt & Whitney, has focused part of its power systems division on supplying fuel cells that are powering commercial buses in the

United States and Europe as well as stationary fuel cells for large-scale enterprises like supermarkets, hospitals, hotels, industrial facilities, and schools. The smaller fuel cell industry has become dominated by Asian countries like China and Japan. The Connecticut Center for Advanced Technology, also based in East Hartford, coordinates a Fuel Cell Coalition that includes UTC and a few smaller companies in the area and is looking to expand the region's capabilities to capture a larger share of this market.

- Local officials that are interested in thinking creatively about joining several economic development pieces together. East Hartford Director of Economic Development Jeanne Webb said in an interview, for example, that it was her dream to build a model moderate-income housing development that would be powered by a central fuel cell. A local manufacturing base could supply it.
- A local college, Goodwin College, whose specialty is developing training programs for its students tailored to emerging and growing areas of the job market. Looking out his window at the dormant Willgoos testing facility, Goodwin Vice President for Institutional Development Todd Andrews talked about using it to train students in environmental remediation. "If East Hartford develops a manufacturing base in residential fuel cells," he said, "we would develop a curriculum to train, or retrain, workers in the skills they'd need for the jobs that would be created."

- Other possible strengths to capitalize on, like Pratt & Whitney's deep knowledge of jet engine turbines that could be applied to wind turbine manufacture for, say, the new Cape Wind project off Cape Cod.
- A congressional delegation, including Representatives Chris Murphy, John Larson, and Rosa DeLauro, who are all interested in bringing community stakeholders together to propel Connecticut's economic revival with a special focus on strengthening its capabilities in clean energy and manufacturing.
- State resources that can be leveraged to do so, including the Connecticut Clean Energy Fund.
- Federal resources, including tax incentives for green manufacturing, economic development planning grants, and technical and training assistance (and see appendix)

Here are a few other things that would help:

- A new study by the New England Council of ways to revive manufacturing in the region recommends the creation of an advanced manufacturing institute to offer technical training for workers, and marketing training and networking for small manufacturers.
- The Investments for Manufacturing Progress and Clean Technology (IMPACT) Act, introduced by Sen. Sherrod Brown (D-OH), would provide grants to states

allowing them to establish revolving loan funds to facilitate clean energy manufacturing projects.

- New budgetary authority to extend the Manufacturing Tax Credit supporting increased manufacturing capacity for clean energy technologies. The \$2.3 billion provided under the Recovery Act is supporting 183 projects in 43 states, but had three times more applicants than this funding allowed.

The last word on the larger meaning of an East Hartford initiative to grow new productive capacity in the markets for hydrogen fuel cells comes from T. Nejat Veziroglu, the president of the International Association for Hydrogen Energy. Being able to cost-effectively produce hydrogen from a renewable source "would grow demand for hydrogen extensively," he said in an interview for *Wired* magazine, adding that if the United States had a Manhattan Project-like commitment to developing hydrogen production, it could create the necessary infrastructure within 20 years. "If half the money being spent on terrorism was spent on hydrogen production, we'd have a permanent solution to terrorism." Veziroglu said, referring to the link between some oil-producing countries and terrorist activities.³²

Conclusion: The Choice

Countries, like individuals, rarely get second chances. After the Cold War ended, the United States missed a golden opportunity to use a “peace dividend” to fund a large-scale conversion program to transform the defense sector into the core of a new manufacturing system. We have suffered grievously because of this error of foresight. The United States has witnessed a continued erosion of manufacturing capacity, as our products can’t compete globally and our workers lose jobs to outsourcing. Despite considerable evidence of our dangerous reliance on imported fossil fuels, we did not take the necessary steps to invest in sustainable alternatives and develop world-class green technology. And our military sector remained hypertrophied, which only encouraged U.S. leaders to use these capabilities in a series of wars that have further saddled the country with debt.

We wasted the peace dividend opportunity. But we are fortunate to have a second chance. The current leadership recognizes the importance of green jobs. It has already devoted some funds in the initial stimulus package to encouraging green technology. It has embraced nuclear abolition and promised to wind up the wars in Iraq and Afghanistan. And it acknowledges the climate crisis and the role the United States must play to address global warming.

To date, however, the Obama administration has not integrated these insights into a green dividend: a major shift of resources from the military budget to sustainable energy. It is not too late to make this shift. In this report, we have synthesized the lessons learned

from previous attempts at conversion. We have looked at where the Pentagon and the Department of Energy can be enlisted in support of such a transformation. We have identified components in the current Obama strategy—particularly the manufacturing extensions centers—that can be built upon. We have noted where other countries have successfully embarked on similar green technology programs.

And, in the case study of East Hartford, we have showed how a community-level approach that involves government, industry, and labor can overcome the chief obstacle in any conversion proposal: jobs. In the early part of the 20th century, farmers were concerned that agricultural experimentation would lose them their jobs. If the new seeds and techniques failed, they’d go hungry and lose the land. But even if the new techniques succeeded, fewer farmers would be needed to raise the food to feed America.

American workers face a similar dilemma in the manufacturing sector. The trick of the green dividend is to ensure that new manufacturing jobs are created to replace the defense sector employment. These new jobs are necessary to ensure support of unions, industry, and the politicians who will refuse to cut even the smallest fraction of the U.S. military budget as long as it generates employment.

The green dividend is perhaps our last shot at transforming the U.S. economy. We have been given a second chance. If we blow it this time, there will not likely be another.

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