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A U.S. Program for Controlling Climate Change and Expanding Job Opportunities

A Review of a Proposal by Robert Pollin, Heidi Garrett-Peltier, James Heintz, and Bracken Hendricks

JEREMY BRECHER

Few have come up with a proposal to reduce greenhouse emissions adequately without a reduction in economic growth, which would mean lost jobs. A proposal by Robert Pollin and colleagues, published by the Center for American Progress, is among the more ambitious. Historian and climate author Jeremy Brecher analyzes their proposal and finds much to recommend it.

How can the United States actually meet the targets for reducing greenhouse gas emissions that climate scientists say are necessary to forestall catastrophic climate change without catastrophic economic impacts on American workers? *Green Growth: A U.S. Program for Controlling Climate Change and Expanding Job Opportunities* by Robert Pollin, Heidi Garrett-Peltier, James Heintz, and Bracken Hendricks represents a significant step forward in answering that question.¹ But it also provokes some important questions that climate-protection strategies need to address.

Green Growth properly, and inevitably, deals extensively with the methods by which it arrived at its findings. This review leaves those issues aside and focuses on presenting and evaluating the findings themselves.

Green Growth presents what it calls the Political Economy Research Institute and Center for American Progress (PERI-CAP) scenario. While most discussion about climate protection policy has focused on “putting a price on carbon” through cap-and-trade or a carbon tax, the PERI-CAP program is at its core an investment model addressed to the question of what investments are necessary to lower carbon emissions and how they can be secured. It could be integrated with a carbon tax or cap, but it could also stand alone.

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The PERI-CAP scenario could be the investment component of a wide range of different climate protection strategies. Indeed, some version of it could be incorporated in almost any energy reform program. Conversely, it is hard to envision an effective climate protection program that did include large parts of its investment plan. The PERI-CAP plan proposes a pathway to reducing U.S. greenhouse gas (GHG) emissions by 40 percent over twenty years—by 2030–35. It would reduce energy sector CO₂ emissions from today's 5,600 million metric tons (mmt) to 3,200 mmt annually (pp. 6, 18). The plan is based on energy efficiency and clean renewable energy rather than natural gas or nuclear energy.

The PERI-CAP scenario is important in part because of its time frame. The Intergovernmental Panel on Climate Change (IPCC) finds that global GHG emissions must fall by 80 percent by 2050 to prevent a devastating temperature increase of more than two degrees Celsius (14). Current policies “prescribe the initial path” but “will not lead to the final goal” of making the necessary reductions in greenhouse gases (2). PERI-CAP instead “works backward from the IPCC goal” (5). The focus on what is necessary in the next twenty years is crucial because if we do not make significant changes by then, we cannot possibly meet the 2050 targets. It provides the necessary missing link between short- and long-term reduction. And it is probably the hardest part of the job, because it requires what might be described as “track jumping” between what we have today and an economy based on a very different energy system.

Green Growth is also important because it examines and quantifies both the jobs that will be added and those that will be lost as a result of climate protection. It projects that the PERI-CAP plan will create 4.2 million new jobs, including direct, indirect, and induced jobs. But it also recognizes that 1.5 million fossil fuel-related jobs will be lost. All told, there will be a net increase of 2.7 million jobs and a 1.5 percent reduction of the unemployment rate in the 2030 labor market, all else equal. It proposes a “Superfund” and other protections for workers and communities whose livelihoods have been harmed by climate protection.

THE INVESTMENT STRATEGY

Green Growth proposes spending \$200 billion annually on clean energy—one-quarter from public resources, three-quarters from private ones (3). Total public and private expenditures would be 1.2 percent of current U.S. GDP (3). The public expenditure would be \$55 billion per year—0.3 percent of current GDP and 1.4 percent of the current federal budget (3). The PERI-CAP investment strategy focuses on energy efficiency and low-to-zero-emissions renewable energy with no expansion of nuclear due to public safety and market considerations (5).

The PERI-CAP plan proposes investing \$90 billion annually from private and public sources to raise efficiency for buildings, transportation systems, and industrial equipment. That will reduce U.S. energy consumption by 30 percent relative to today, from 100 Q-BTUs (quadrillion BTUs) to 70 Q-BTUs (3, 19). The feasibility of energy efficiency gains on this scale is evidenced by the fact that the energy efficiency rate in many advanced economies is already double that of the United States. Energy efficiency investment will be returned in an average of three years, followed by net gains (3).

PERI-CAP proposes \$110 billion per year investment in renewable energy with low to zero emissions, for a total of \$2.1 trillion over twenty years (3, 23). This requires a very different mix of renewable energy sources than today; more than half of current “renewable” energy comes from corn ethanol and other high-emissions sources and one-third from large-scale hydro, which cannot be expanded because there are no appropriate new sites (19). But “beneficial” biomass from energy crops that do not compete with food crops—crop residues like wheat straw and corn stover—forest residues, and clean municipal and industrial wastes can make a significant contribution and also provide four times as many continuing jobs as most other forms of energy for each \$1 million invested (115, 212).

New investment will raise the production of solar, wind, geothermal, small-scale hydro, and low-emissions bioenergy fourfold, from the current level of 3.5 Q-BTUs to 15 Q-BTUs (3). That 7.5 percent increase per year will provide 20 percent of U.S. energy within twenty years (11). The U.S. Energy Information Administration projects rough cost parity to fossil fuels for wind, hydro, geothermal, and clean bioenergy by 2017 (3). While solar energy costs will not be at parity that soon, its price is dropping fast. According to Jon Wellinghoff, when he stepped down as chair of the Federal Energy Regulatory Commission, “Solar is growing so fast it is going to overtake everything.” It is going to be “the dominant player.” “Everybody’s roof is out there” (140). Upfront investments in renewable energy should be fully returned in energy savings in three to five years (11).

Current CO₂ emissions are 5,600 mmt (6). The PERI-CAP plan will reduce CO₂ emissions by 40 percent through a 30 percent reduction of overall U.S. energy consumption and a quadrupling of energy production from low- and zero-emissions renewables (4). The plan would reduce total energy consumption to seventy Q-BTUs (6), fifteen of those Q-BTUs coming from clean renewable sources. Energy from fossil fuels would be reduced from eighty-three Q-BTUs today to fifty-five Q-BTUs twenty years from now (28). This would mean a 60 percent reduction for coal, 40 percent for oil, and 30 percent for natural gas (4). The result would be CO₂ emissions of 3,200 mmt (6). (See figure 5.1, “Alternative U.S. Energy-Consumption Scenarios for 2030,” p. 189.)

THE POLICY STRATEGY

Green Growth aims to lay out a pathway that is achievable using existing technologies under reasonable assumptions about market conditions (6). It limits itself to policies that are already in use at federal, state, or municipal levels (31). Almost all involve public/private partnerships (32).

The PERI-CAP strategy presumes that policies “must be effective in mobilizing private business owners to invest in clean energy” because “the scale of the energy transformation is simply too large for public-sector resources and programs to tackle alone” (32). It includes enterprises that are large and small, including cooperative and community-based as well as individually owned ones.

The strategy sets out to “identify policy interventions that can best encourage private-sector investments” (32). This requires “removing the obstacles that, to date, have held back large-scale private investments.” It identifies three basic problems: unpredictable demand; lack of certainty in tax code and policy incentives; and unavailability of long-term, low-cost financing (32). *Green Growth* proposes four kinds of policies for overcoming these obstacles.

First are “market-shaping rules” to affect energy, real estate, and financial markets (6). These include strict EPA enforcement of the Clean Air Act; renewable energy standards; revised building codes; vehicle fuel-efficiency standards; and state and local regulation of electricity markets (6). They might include a carbon cap or tax, but the PERI-CAP program does not depend on one.

Second are government investments (6). These would include energy efficiency retrofits for public buildings; infrastructure; renewable energy procurement; and research and development (6).

Third are incentives for private investment (7). These include restructuring clean energy production and investment tax credits; feed-in tariffs; green banks to finance energy investments; and government loan guarantees.

The fourth, providing a just transition for workers and communities, will be addressed in the next section of this review.

The PERI-CAP proposal would require \$200 billion a year in public and private investment. The net annual cost to government would be \$50 billion, .03 percent of GDP (12). Part of this cost would be paid by the \$10 billion that governments would save annually as a result of energy-efficient building retrofits (33).

One way to fund the rest of the public share would be a cap-and-trade system or a carbon tax. *Green Growth* uses an analysis of a hypothetical carbon tax made by the U.S. Energy Department that would initially charge \$25 per ton of carbon emissions in 2013 and rise to \$75 per ton in 2035, yielding \$200 billion per year (3, 150). One quarter of that revenue would pay for the

entire public share of the PERI-CAP plan. So even if the other three-quarters of the yield were returned to taxpayers, the PERI-CAP investment program would be fiscally neutral (12)—\$10 billion annually in public sector energy savings plus \$50 billion from one-quarter of the tax or cap would put the investment program in fiscal balance (33).

Reducing demand for fossil fuels might lower their price, leading to a “rebound effect” by which people would use more energy because it was cheaper. Such an effect is factored into the PERI-CAP calculations (21). If the rebound effect was greater than anticipated, it could be compensated for by accelerating the proposed policies (22).

Green Growth notes that its many policy recommendations require “coordinated interventions at each of the three levels of U.S. policymaking—federal, state, and municipal government” and that “strong ties” among the different policies is “critical for achieving overall success” (274).

THE WORKER AND COMMUNITY PROTECTION STRATEGY

Clean energy investments require more labor than equivalent fossil fuel investments—they are more labor intensive. They also use a higher proportion of labor within the United States—they have a higher domestic content (29). Each “direct job” creating clean energy will produce 0.7 “indirect jobs” for suppliers and 0.4 “induced jobs” that result from the wages workers spend (258). As a result, the PERI-CAP investment plan will create 4.2 million new jobs (4). Jobs will increase at all levels of credentials and pay (29).

However, the PERI-CAP plan also requires a 34 percent contraction in employment in fossil fuels compared to what the U.S. Energy Information Administration (EIA) expects in 2030 if there are no significant changes in public policy (28). So the net increase in jobs, factoring in losses in fossil fuel industries, will be 2.7 million (4). This will lead to a 1.5 percent reduction in unemployment.

Green Growth argues that transition support for affected communities and workers hit by reduced consumption of fossil fuels should be a “first-order priority” (32). At the community level, this means targeted community-adjustment assistance. Clean energy investment should be regarded as a way to promote economic development and job opportunity (4).

States with above average fossil fuel employment should receive compensation focused on adjustment and relocation (308). Texas and Montana could receive support for wind energy; Appalachia for building energy efficiency and electrical transmission (309). A possible model is the Department of Energy’s 1994–2004 Worker and Community Transition program that provided grants and other assistance for communities affected by shutdown of nuclear facilities. For example, a nuclear test site

in Nevada was repurposed to demonstrate concentrated solar power technologies (310).

Approximately 212,000 workers are directly employed in oil and gas extraction and 79,000 in coal mining, with about the same number in support activities (312). (These figures do not include such workers as truck drivers, train crews, and power plant workers whose jobs are indirect rather than direct parts of the fossil fuel economy, and who might find work as a result of overall green job growth.). If oil and gas production fell by 20 percent and coal production fell by 50 percent, there would be a loss of 100,000 direct jobs. If downsizing was spread over twenty years, 10,000 jobs a year would be lost (312).

Trade Adjustment Assistance (TAA) provides displaced workers an average of \$10,000 over a two-year period. This level of support for laid-off fossil fuel workers would cost \$200 million per year (313). *Green Growth* recognizes that this level of support is “insufficient.” It borrows from labor and environmental leader Tony Mazzocchi the idea of a “Superfund for workers” to assist those who lose their jobs due to necessary environmental transitions. As Mazzocchi put it in 1993, “There is a Superfund for dirt. There ought to be one for workers” (313). *Green Growth* calculates the cost if such a Superfund provided an average of \$40,000 over two years for the average displaced fossil fuel worker, four times the level of TAA. The cost would be \$800 million per year, about .02 percent of the current federal budget (313).

THE CRITIQUE OF FALSE SOLUTIONS

An important contribution of *Green Growth* is to provide a standard for evaluating other proposed climate protection pathways.

The EIA publishes a “reference case” that lays out what it considers the most likely future energy profile. Its reference case for 2030 projects GHG emissions of 5,733 mmt, 80 percent above the IPCC target (6, 26). So much for business as usual.

Green Growth also calculates what it calls an “aggressive reference” case that assumes full and successful implementation of the Obama administration’s current initiatives around climate change (27). Even on that far-from-certain assumption, the result would still be 4,441 mmt of GHGs, 40 percent above the 3,200 mmt target (6).

Green Growth also disposes of some often proposed technological solutions. Nuclear energy is unlikely to be either cheap enough or safe enough to provide more of our energy mix than now. Switching from other fossil fuels to natural gas is inadequate; even with a complete phase-out of coal and replacement by natural gas, emissions would be 26 percent above the 3,200 target. “Any significant expansion in natural gas production will almost certainly contribute to the United States failing to reach its

emissions-reduction target” (25). (Under the PERI-CAP strategy, natural gas consumption will actually shrink 30 percent.) (4).

Corn ethanol has GHG emissions comparable to those of petroleum, and the use of corn as a fuel forces up food prices (22). Despite decades of highly publicized efforts, carbon capture and storage (CCS) has not been implemented in a single large-scale coal plant anywhere in the world (171). Further, all of these proposed solutions are unnecessary because the PERI-CAP pathway is both more economical and more effective in reducing GHG emissions.

Green Growth persuasively concludes that there are “no workable alternatives” to something like the PERI-CAP “clean energy investment project” to reach the emission-reduction target of 3,200 mmt in twenty years (13, 26). But that does not mean that the plan is fully adequate or that it could not be improved.

DOES THE PERI-CAP PLAN CUT GHGs FAST ENOUGH?

The PERI-CAP scenario is based on reducing U.S. GHG emissions from 2005 levels by 40 percent by 2035 (2). This is based on an IPCC finding that the world as a whole must reduce GHG emissions by 40 percent by 2035 or face dire consequences (2). *Green Growth* notes that these targets “are not based on a stringent reading of the climate science” but rather a “minimum threshold for carbon emissions reductions” (192).

There are two questions about using a reduction of “40 percent by 2035” as the target for GHG reduction. First, retired NASA head James Hansen and other leading climate scientists have concluded that the IPCC targets, based on reducing atmospheric GHG concentrations to 450 parts per million (ppm) to keep global warming below 2 degrees Celsius, are dangerously inadequate. According to Hansen it is necessary to hold GHG concentrations in the atmosphere at or below 350 ppm. Since concentrations have already reached 400 ppm, to reach 350 ppm by the end of the century, starting from 2012 as a baseline, will require a global reduction of 6 percent per year in fossil fuel emissions, combined with the extraction of 100 gigatons of carbon dioxide from the atmosphere. Global carbon emissions will need to be near zero by around 2050.² A reduction of 40 percent by 2035, about 2 percent a year, is not nearly fast enough to meet that target.

Second, *Green Growth*’s “40 percent by 2035” uses the IPCC’s reduction targets for “the world as a whole” (2). But *Green Growth* itself points out that the fair share of reduction would be substantially higher for wealthy countries like the United States that have contributed large amounts of GHGs in the past. U.S. residents are 4.4 percent of the world’s population. but the US emits 17 percent of the world’s GHGs (14). U.S. emissions per capita are sixty times higher than those of low-income countries and three times China’s (18). For the United States to reduce its emissions at the same rate

as Bangladesh is neither just nor likely to win the cooperation of other countries in reducing GHG emissions.

Although a more rapid GHG reduction timetable may be necessary from both a scientific and an ethical perspective, the PERI-CAP investment proposal will still be relevant. It will still define the first steps that need to be taken immediately. It will need to be modified in three ways. First, it will need to be accelerated; for example, to double the level of reduction necessary to accomplish the PERI-CAP goals in ten years rather than twenty. *Green Growth* recognizes that in some circumstances it may be necessary to “go beyond what we have developed” to “push overall consumption below 70 Q-BTUs” and “expand clean renewables beyond 15.4 BTUs” (195). It estimates that if the PERI-CAP program were instituted in fifteen rather than twenty years, the result would be 5.7 million rather than 4.2 million new jobs per year (215).

Second, some of the measures that are advocated for the more distant future—for example, a move from private to public transportation—will have to be initiated immediately and rapidly expanded.³

Third, and as a consequence, it will be necessary to plan for and adapt to much greater political, economic, and social impacts. It will require something that looks less like the Eisenhower interstate highway system or the Apollo project and more like mobilization for World War II.⁴

HOW RELIABLE ARE THE PROJECTIONS?

Green Growth generally appears to use the best available data, handles it honestly, and makes conservative assumptions that are not driven primarily by the authors' hopes and wishes. But as has been said, prediction is risky, especially about the future. *Green Growth* points out discrepancies in the available data and projections, even noting that the EIA's projections of the energy future may involve “guesswork” (108). The EIA's reference case, on which *Green Growth* relies heavily, projects, for example, that even without significant policy changes, U.S. energy consumption will increase by only 6 percent over twenty years, even assuming that GDP will grow 64 percent.

More seriously, the vagaries of the international energy market and the global economy make projections about energy costs and markets extremely unreliable. Few, for example, predicted the present boom in U.S. oil and gas production, which has transformed U.S. energy markets. Conversely, few predicted or took into account the October 2014 Saudi decision to significantly lower its price for oil, undercutting the growth of both other fossil fuel sources and renewable alternatives. And almost nobody predicted the Great Recession and its aftermath of ongoing stagnation. Long-term interest rates are crucial for costing out options but are largely unpredictable. Even a small

annual error repeated over twenty years may lead to a huge gap between projection and reality.

A serious climate protection plan cannot be based on short-term assumptions about the prices of various energy sources; it must chart and implement a course based on what is necessary for future climate security. Course corrections will no doubt be necessary along the way, but the basic course toward climate safety must not depend on the vagaries of the market.

WHAT ABOUT MARKET FAILURE?

The PERI-CAP plan asserts that effective investment in GHG reduction depends on private sector capital mobilization. The role of public investment is “setting the platform upon which individual market decisions are made” (7). But what if “right” decisions do not follow?

Lord Stern described global warming as the greatest market failure in world history. The continuing inability to reduce GHG emissions despite what we now know about climate change—and about how little it would cost to reduce emissions—might well count as the second *Green Growth* analyzes obstacles to climate protection and proposes policies to overcome them. But we have to keep in mind that economic models have often been highly inaccurate in predicting the effects of policies. Market failure is ubiquitous. We cannot gamble the future of the world on the presumption that markets actually operate the way economists presuppose.

The actual context of climate protection efforts is an out-of-control global economy. While the speculative and irrational aspects of capitalism are nothing new, a deregulated, financialized, neoliberal global economy puts them on steroids. *Green Growth* notes that between October 2010 and May 2011 gasoline prices rose 35 percent, more than a dollar a gallon, with four-fifths of the increase due to speculative market forces and only one-fifth due to all supply and demand factors combined (247).

The PERI-CAP plan depends on private investors responding in a rational way to incentives offered by public policy. For example, *Green Growth* confidently asserts that once the “financial and market infrastructures” for building efficiency mature, investment “should come rapidly once the initial set of business models, market structures, and financial innovations take hold” (59).

No doubt it is desirable to encourage private investment in GHG reduction. But what if we fix the policies and the investors still do not come? Creating incentives is not sufficient to ensure a result. In our current climate emergency, we need to do what is necessary, not just provide incentives and hope they will lead somebody or other to do what is necessary. If markets will not make the necessary changes in GHG emissions, nonmarket forces and institutions, however imperfect they also may be, must.

FIX CLIMATE AND LEAVE EVERYTHING ELSE THE SAME?

Green Growth seeks a pathway to climate protection that minimizes disturbing side effects. This may be an effective way to minimize resistance among those who cling to the social and economic status quo. But many social critics and climate justice advocates will see it as, at best, neglecting an opportunity to reduce injustice and economic irrationality, if not as attempting to fix the climate while maintaining an unjust and irrational status quo. *Green Growth* touches, albeit lightly, on several such concerns.

Green Growth touts clean energy investments as a way to “improve prospects for long-term GDP growth” and return the U.S. economy to a “healthy long-term economic growth trajectory” (319, 10–11). However, *Green Growth* moves beyond GDP as the measure of growth, noting that we need to begin “incorporating environmental effects in the measurement of output and productivity.” Spending on fossil fuels, for example, creates “the output ‘good’ of energy to power machines,” but it also creates “the output ‘bad’ of pollution and CO₂ emissions” (245). The “net increase” in output is greater to the extent that we are “not producing the ‘bad’ of pollution and greenhouse gas emissions” (245).

Green Growth argues that its investment program would result in a reduction of unemployment that would contribute to social justice goals. Full employment—“an abundance of decent jobs available for all people seeking work”—would make it possible for displaced workers to find another decent job (314). It would increase workers’ bargaining power and therefore raise wages—at least if minimum-wage laws and union rights were strengthened (229).

Green Growth also advocates training programs for the clean energy economy that would “open opportunities for women and minorities” (310). As an example of the kind of thing that might be done, it cites a federal Energy Efficiency and Renewable Energy Training Program that includes “Pathways Out of Poverty” demonstration grants that are prioritized for low-income populations, but notes that so far funding has been limited (311).

A clean, renewable energy future could emphasize either a continuation of our current highly centralized energy system or a far more decentralized one. While *Green Growth* advocates both large- and small-scale energy development, it puts considerable emphasis on “distributed energy systems”—small-scale renewable installations like rooftop solar and small-scale hydro.

A program like that advocated in *Green Growth* will present a great many policy choices. They can either reinforce the status quo or attempt to move it in a more just and rational direction. That wider impact needs to be part of the climate protection debate.

HOW CAN THE PERI-CAP PLAN BE IMPLEMENTED?

The PERI-CAP investment plan could be implemented by many different political processes. It could be a core part of congressional legislation as a successor to the failed Waxman-Markey bill. But with appropriate modifications, it could also be a core part of a climate protection program for the labor movement, for the climate justice movement, or even for a climate insurgency.⁵ Here are three elements that might contribute to implementing this or a similar plan.

First, while the PERI-CAP plan emphasizes the role of federal policy, the current balance of political forces has created a stalemate that prevents effective federal climate action. At the same time, there are active efforts at climate protection, including many forms of investment in GHG reduction, that are taking place at municipal, state, and civil society levels. These both provide building blocks for the kind of federal effort described in *Green Growth* and demonstrate their feasibility. They need to be actively pursued until effective climate protection legislation can be passed at a national level.

Second, the coordination problems identified in *Green Growth* are unlikely to be solved within the framework of existing public and private institutional arrangements. In its discussion of the national electric grid, *Green Growth* notes that the federal executive branch alone is “positioned to provide leadership and a shared vision for mobilizing the nation to rewire the grid.” The White House needs to take an active role in “coordinating with utilities, governors, state regulators, and tribal governments” similar to how “President Franklin Roosevelt led the massive project of building an electrical grid system” during the New Deal era (284).

Indeed, actually implementing something like the PERI-CAP plan may well require a process more like World War II mobilization, with agencies like the War Production Board conducting public planning and wielding the authority to override governmental and private obstacles to climate protection.⁶ In particular, a significant reduction in fossil fuel production and use cannot be left to the market, even one guided by a “price on carbon.” (The many detailed policy proposals in *Green Growth* reflect a recognition of this reality.). Fossil fuel producers and users are far too likely to resist such a reduction by evasion, political counterattack, and/or cutting prices to retain market share. Effective climate protection requires the capacity to threaten or implement the shutdown of carbon emitters comparable to the shutdown of civilian auto production during World War II.

Third, *Green Growth* emphasizes that its program can be fiscally neutral. However, a fiscally expansionary Keynesian policy may be advisable or even necessary to kick-start the GHG-reduction process. Such a policy would help compensate for some of the PERI-CAP plan’s negative impacts on fossil fuel workers. Expanding employment would also create a favorable political

context for the plan. And in the event of steeper reduction targets, or of a failure by private capital to invest adequately in GHG-reduction, such a policy would provide a way to pay for the necessary reductions nonetheless.

Green Growth states that an adequate GHG-reduction agenda “must be effective in mobilizing private business owners to invest in clean energy.” There is “no other way” in which the targets can be met. The scale of the energy transformation is “simply too large for public-sector resources and programs to tackle alone.” While clean energy investment by private business owners is highly desirable, to treat it as the necessary condition for GHG reduction is to give private business owners a veto power over climate protection. In a true existential emergency there is, however, another possible pathway: a government-led mobilization on the scope and scale of the economic mobilization for World War II.

NOTES

1. Robert Pollin, Heidi Garrett-Peltier, James Heintz, and Bracken Hendricks, *Green Growth: A U.S. Program for Controlling Climate Change and Expanding Job Opportunities* (Amherst, MA and Washington, DC: PERI and Center for American Progress, September 2014). Available at http://www.peri.umass.edu/fileadmin/pdf/Green_Growth_2014/GreenGrowthReport-PERI-Sept2014.pdf.

2. James Hansen et al., “The Case for Young People and Nature: The Path to a Healthy, Natural, Prosperous Future,” available at http://www.columbia.edu/~jeh1/mailings/2011/20110505_CaseForYoungPeople.pdf (p.12).

3. “Appendix 1: Public Transportation and Energy Efficiency” makes the case for investment in public transit as a long-term but not a short-term priority.

4. For a mobilization scenario, see Jeremy Brecher, Ron Blackwell, and Joe Uehlein, “If Not Now, When? A Labor Movement Plan to Address Climate Change,” *New Labor Forum*, 1–7, 2014.

5. For climate insurgency, see Jeremy Brecher, *Climate Insurgency: A Strategy for Survival* (Boulder, CO: Paradigm, 2015).

6. See Brecher, Blackwell, and Uehlein, “If Not Now, When.”