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RESPONSE TO “SEVEN MYTHS ABOUT GREEN JOBS” AND “GREEN JOBS MYTHS”

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Two new papers purport to debunk “myths” about recent studies on the employment effects of investments in the clean energy economy. The full 97 page version of this work is titled “Green Jobs Myths” and the 21 page summary paper is titled “Seven Myths about Green Jobs.”¹

These papers are written as a response to what they term the “rapidly gaining popularity” of four studies that attempt to show the employment gains that can emerge from investments in building a clean energy economy in the United States. The four studies to which they refer are *U.S. Metro Economies: Current and Potential Green Jobs in the U.S. Economy*, published by the U.S. Conference of Mayors; *Renewable Energy and Energy Efficiency*, published by the American Solar Energy Society; *Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World*, published by the United Nations Environmental Program; and *Green Recovery*, co-published by the Center for American Progress (CAP) and Political Economy Research Institute (PERI) at the University of Massachusetts-Amherst.²

These papers offer a few useful correctives on some detailed points regarding the links between green investments and jobs. But overall, they end up accomplishing exactly the opposite of what they intend. They attempt to identify and puncture “myths,” on the green economy, but instead offer no challenge to the central explanations as to how investing in the green economy will provide significant benefits throughout the U.S. economy.

¹ The four authors of both papers are Andrew Morriss, William Bogart, Andrew Dorchak, and Roger Meiners. The longer version of this report is at: <http://www.instituteforenergyresearch.org/wp-content/uploads/2009/03/morriss-green-jobs-myths.pdf>; the shorter version is at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1357440#

² *U.S. Metro Economies: Current and Potential Green Jobs in the U.S. Economy* is available at <http://www.usmayors.org/pressreleases/uploads/GreenJobsReport.pdf>; *Renewable Energy and Energy Efficiency* is available at http://www.ases.org/index.php?option=com_content&view=article&id=465&Itemid=58; *Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World* is available at http://www.unep.org/labour_environment/PDFs/Greenjobs/UNEP-Green-Jobs-Report.pdf; and *Green Recovery* is available at http://www.peri.umass.edu/green_recovery/

I was the lead author of *Green Recovery*, and my co-authors were Heidi Garrett-Peltier, James Heintz, and Helen Scharber. I am also the Co-Director of PERI, and all three of my co-authors are also with PERI. This paper was a relatively brief interim report within an ongoing research program, on which we work closely with colleagues at CAP, particularly the managers of the project at CAP, Bracken Hendricks and Kit Batten (though Dr. Batten has recently taken a new position at the Department of the Interior).

The two "Myths" papers combine criticisms of our paper, *Green Recovery*, with those of the other three studies. They also discuss some issues of their own choosing, beyond the immediate themes on which our study and the other three concentrate. Within this structure, at no point do they offer a sustained point-by-point refutation of *Green Recovery* or any of the other three studies. They rather begin their summary paper by listing the "seven myths" and the "facts" that they claim will refute those myths. However, in the body of both the shorter and longer papers, they do not return to that basic structure of 'myths vs. facts,' but rather offer three broad themes, "defining 'green jobs,'" "mistakes in economic analysis," and "ignoring technical literatures." These are all obviously very broad issues. As such, it will help us to focus the discussion if I respond to their claims regarding each of the seven myths.

Their Myth #1: "Everyone understands what a 'green job' is."

Their Fact #1: "No standard definition of a 'green job' exists."

We can dispense with this issue readily. Despite the fact that they choose to present their point in a sophomoric, unprofessional tone, ("everybody understands..." Who is the "everybody" to whom they refer?), I nevertheless agree with them on substance. In fact, at no point in *Green Recovery* do we make reference to the term "green jobs." In a recent press story, I am quoted as follows:

Exactly what a "green job" is, though, most people aren't quite sure yet... "There's no such thing; that's my definition," said Robert Pollin, co-director of the [Political Economy Research Institute](#) at the University of Massachusetts, Amherst. "I'm greatly in favor of investing in things that will promote a clean environment, fight global warming, and those investments will all create jobs, and I don't really care what color they are."³

I have been quoted making similar statements in other media stories. What is at issue here? Of course, there are basic commonalities between the focus in *Green Recovery* on green investments and job creation and the terms "green jobs" or "green collar jobs." In all cases, we are clearly referring to initiatives that can successfully link policies to promote both a clean environment and the expansion of decent job

³ See Emily Badger, Miller-McCune Business, "What Shade of Green Best Suits the Economy," http://www.miller-mccune.com/business_economics/what-shade-of-green-best-suits-the-economy-910.print, 1/22/09.

opportunities. Moreover, the term “green jobs” obviously has wide resonance among sectors of the public—as well as the Obama administration—in suggesting the broad range of initiatives that will have to be undertaken to build a clean energy economy over time.

Despite these commonalities, it is nevertheless the case that we face serious problems in attempting to establish a single operational definition of the term “green jobs.” For example, if a truck driver is delivering solar panels to a construction site, should that count as a “green job?” What if, the next day, the same truck driver delivers pumping equipment to an offshore oil drilling project? Even within the project to install solar panels on rooftops, we would of course consider the electricians and roofers doing the installation as having green jobs. But what about the secretaries and accountants in the back office?

This last observation raises a concern that is particularly relevant as regards the approach we took in *Green Recovery* and related work. That is, how should we consider jobs that are not directly involved in improving environmental conditions, but are indirectly involved? The accountants and secretaries at the back office of a construction company are two examples of this consideration. But the issue is actually still broader. In this research, we are focused not just on the jobs that are directly created by investments in energy conservation and renewables, but rather the total number of jobs created, including jobs that are both indirectly created (jobs created for suppliers of energy producing firms) and “induced” (jobs created when those newly employed by green investments in turn spend their newly acquired wages). We are also concerned to distinguish the proportion of jobs—direct, indirect, and induced—created in the domestic U.S. economy, as opposed to the jobs created in other countries when our environmental investments create an increased demand for imports.

In short, there are many useful points and positive policy ideas associated with the high level of attention now being given to the concepts of “green” and “green-collar” jobs. But in the work my co-authors and I have done, we have found it more constructive to not attempt to define these terms or rely on them in any substantive sense.

Their Myth #2: “Creating green jobs will boost productive employment.”

Their Fact #2: “Green job estimates in these oft-quoted studies include huge numbers of clerical, bureaucratic, and administrative positions that do not produce goods and services for consumption.”

Green Recovery offers arguments and evidence to demonstrate that investments in energy efficiency and renewable energy will create employment through the three channels mentioned above, i.e. direct jobs, indirect jobs, and induced jobs. Indeed, the central finding of our work is that investments of a given dollar amount in energy efficiency and renewable energy—concentrating on building retrofits, public transportation and freight rail, and smart grid electrical transmission systems in the efficiency area, along with renewable energy investments in solar, wind, and biomass

fuels—will produce roughly three times more jobs than spending the same amount of money within the oil, natural gas and coal industries. That is, within the context of the U.S. economy in its present structure—and as derived from the Department of Commerce U.S. Input-Output Accounts—spending \$1 million within the clean energy areas with 70 percent of funds for energy efficiency and 30 percent for renewables, will create about 17 jobs. Spending that same \$1 million within the fossil fuel industries will create about five jobs. The authors of “seven myths” make no attempt to directly refute this central empirical finding.

They also do not make clear how they distinguish “productive employment.” Two ideas are suggested through their ‘factual’ claim regarding “huge numbers of clerical, bureaucratic, and administrative positions that do not produce goods and services for consumption.” First, they claim to know that investments in the green economy produce more “clerical, bureaucratic, and administrative positions” than investments in alternative economic activities, including, presumably, investments in fossil fuels and lobbying firms guiding credit to fossil fuel firms, and the like. But they offer no systematic evidence to support this claim. They also claim to know that “clerical, bureaucratic, and administrative positions” do not “produce goods and services for consumption.” Let us consider, for example, secretaries employed at the Environmental Protection Agency, an agency engaged in pollution control. Are the authors suggesting that these secretaries are not providing a “productive” service? Is their work less “productive” than that of secretaries working for an oil company producing a product that damages the environment? The authors offer no explanation.

Their Myth #3: “Green job forecasts are reliable.”

Their Fact #3: “The green job studies made estimates using poor economic models based on dubious assumptions.”

The authors here are actually raising two distinct questions. The first question is, Are green job forecasts reliable? I will speak only to the figures reported in *Green Recovery*. Those figures, in fact, are not forecasts at all. They are figures generated directly from data from the Commerce Department’s surveys of businesses within the United States, and organized systematically within their input-output model. Within the given structure of the current U.S. economy, these figures provide the most accurate evidence available as to what happens within private and public enterprises when they produce the economies’ goods and services—i.e. how many workers do they hire, and what are the materials they purchase? Our methodology is to work within this detailed survey evidence and data set, and to pose simple questions within it: e.g. if we spend an additional \$1 million on building retrofits, how will businesses utilize that million dollars to actually complete the service of the retrofit?

Through this approach, we have been able to make observations as to the potential job effects of alternative energy investment strategies, at a level of detail that is not available through any alternative approach. The authors of “Seven Myths” offer no

evidence that any alternative to the U.S. input-output tables can provide more reliable evidence on the detailed workings of the U.S. economy.

Now to the second question: Does our model constitute an example of "using poor economic models based on dubious assumptions?" There are certainly weaknesses with our use of the input-output model. The most important are that it is a) a static model; and b) a linear model. But these deficiencies need to be considered in the context of alternative approaches that, in my view, have even more serious weaknesses. Consider these points:

1. Static model. We are making estimates as though everything is happening at a fixed point in time. A more realistic picture of the economy would of course have to recognize that the spending effects of a government recovery program will take place over time, and that these timing effects are important. Adding a time dimension would make the model "dynamic," in the technical jargon.

The problem here is how to incorporate a time dimension in an effective way. This issue has plagued econometric forecasting efforts for a long time, and there is no sign of the problem abating. The dismal record of even the most prestigious forecasting models even over the past year attests to the issue.

Consider two highly relevant and interrelated cases in point. First, few, if any, economic forecasting models predicted that, by June 2008, crude oil would be selling at \$140 a barrel. This would include forecasts generated less than one year before crude hit \$140 a barrel.⁴ Once the price of crude oil did rise to \$140 a barrel, few, if any forecasters then predicted that the price would collapse to \$35 a barrel only six months later. More generally, almost no economic forecasts predicted that the U.S. economy would enter into a recession in December 2007 of historic severity. This includes even the forecasts that were published after the recession had already begun.⁵

In principle, a dynamic model does offer a more complete picture than a static model as to how the economy operates over time. But because dynamic forecasting models are so unreliable, I think it is preferable to work within a simpler framework, and

⁴ Three prominent forecasts published in 2007 of where crude oil prices would be in 2008 include JP Morgan, in August 2007, estimating \$59.75 a barrel; Goldman Sachs, in September 2007, estimating \$85 a barrel; and the U.S. Energy Information Agency, also in September 2007, estimating \$71.17 a barrel. Crude oil prices in the U.S. market are reported at: <http://tonto.eia.doe.gov/dnav/pet/hist/wtotworldw.htm>

⁵ This general problem of making accurate economic forecasts was captured well by former Federal Reserve Chair Alan Greenspan's unintentionally amusing observation made at the 1999 annual meeting of the International Monetary Fund and World Bank that "The fact that our econometric models at the Fed, the best in the world, have been wrong for fourteen straight quarters does not mean they will not be right in the fifteenth quarter" (Martin Mayer (2001), *The Fed*, p. 180).

5. This approach is consistent with the conclusions reached by Lawrence Summers in his outstanding paper, "The Scientific Illusion in Empirical Macroeconomics," *Scandinavian Journal of Economics*, 93:2, 1991, pp. 129-48.

draw out assessments of how transitions over time affect the results within this simple framework.

2. *Linear model.* Our model assumes that a given amount of spending will have a proportionate effect on employment, no matter how much the level of spending changes, either up or down. For example, the impact of spending \$1 billion on an energy efficiency project will be exactly 1,000 times greater than spending \$1 million on the exact same project.

The most significant consideration here is that we take no account of potential supply constraints in moving from a \$1 million to a \$1 billion project. Under some circumstances, this could be a significant deficiency in the model. But under current conditions in the U.S. economy, with widespread slack in the midst of a severe recession—i.e. with deep and worsening unemployment and with private-sector lending and investment almost flat—we are on pretty safe grounds with our assumption that supply constraints will not exert a major influence how the spending on green recovery impacts the economy.

A variation on the problem of linearity in our model is to recognize that the model, in the technical jargon, is a “partial” rather than a “general” equilibrium model. The model does not take account of, for example, feedback effects of prices of solar panels when demand for these panels rises due to the stimulus program. Again, a more fully specified model would take account of such factors—that is, if the stimulus program leads to increased demand for solar panels, prices of the panels will rise, all else equal. Then for a given level of spending, fewer panels will be purchased at higher prices/panel. This will then mean that a given level of spending on panels will likely mean that fewer jobs will get created to build, deliver, and install the panels.

But here again, the forecasting record of more fully specified “computable general equilibrium models” is not encouraging. Moreover, again, the fact that we are operating within an economy with widespread slack means that these feedback effects are likely to be weak.

Overall, I am confident that our relatively simple input-output framework provides the basis for as accurate a set of job forecasts as can be obtained through the existing available models and modeling techniques. The authors of “Seven Myths” disagree. They offer brief general impressions as to what the features might be of an alternative model. But they provide no evidence showing how an alternative model will perform more effectively than our own. They also make no attempt to consider the pitfalls facing such models, suggesting perhaps that they are unaware that these alternative models have severe limitations.

Their Myth #4: “Green jobs promote employment growth.”

Their Fact #4: “By promoting more jobs instead of more productivity, the green jobs described in the literature actually encourage low-paying jobs

in less desirable situations. Economic growth cannot be ordered by Congress or by the United Nations. Government interference in the economy—such as restricting successful technologies in favor of speculative technologies favored by special interests—will generate stagnation.”

The green investment agenda that we advance in *Green Recovery* does indeed “promote employment growth” in the precise way that we have defined that term—that is, the employment levels in a portfolio of clean energy areas generates about three times more employment than spending within traditional fossil fuel industries. As described above, we derive these findings directly from the U.S. input-output model. Despite the limitations of that model—of which I am aware and describe above—this still provides the most accurate framework for establishing the relative employment effects of alternative spending targets. The authors of “Seven Myths” offer no evidence to suggest otherwise.

But are the jobs generated by the clean energy agenda “low paying” in “less desirable situations.” Are we erroneously “promoting more jobs instead of more productivity”?

On the issue of pay levels, we were quite explicit in *Green Recovery* on the breakdown between high- and low-paying jobs, as well as on future job opportunities. We wrote:

Green investments generate not only significant numbers of well-paying jobs with benefits but also a relatively high proportion of lower, entry level jobs that offer career ladders that can move low-paid workers into better employment positions over time.⁶ The average pay for employees associated with green investment areas is about 20 percent less than the average for those connected to the oil industry. But this number is deceptive because a green investment program will create roughly triple the number of good jobs—paying at least \$16 dollars an hour—as the same level of spending within the oil industry. A green infrastructure investment program creates more jobs at all wage levels than spending within the oil industry because of both higher labor intensity and greater domestic content —resulting in average wages that are lower than the oil industry but spread across a greater number of jobs created (pp 11-12).

If the green investment agenda creates three times the number of good jobs as spending within the oil industry, how is it, as the authors of “Seven Myths” suggest that

⁶ In fact, a high proportion of the low-paying jobs created by green investments will be in construction and manufacturing, where career ladders are substantially more effective than in service-sector areas—such as hotel and restaurant workers—associated with household consumption.

all the jobs created by green investments are “low paying” in “less desirable situations?” They do so only by ignoring the evidence we have provided.

Are jobs within the green economy low productivity jobs? This is a serious question, deserving careful consideration. If we begin with the standard definition of labor productivity as output/worker, it then follows by definition that, if clean energy jobs on average operate at higher labor intensity, this means they produce less output/worker.

Yet, aside from this conventional definition of labor productivity, three other considerations are crucial here. First, by raising overall employment, the green investment agenda is giving new opportunities to previously unemployed workers. This raises the productivity level of millions of workers from zero to a positive number. Second, the green investment agenda is creating new opportunities for underemployed workers—and thereby raising their productivity from a lower to a higher level. Third, given the crisis of global warming, we need to begin incorporating environmental effects in the measurement of output and productivity. That is, spending on fossil fuels creates the output “good” of, for example, electrical power. But it also creates the output “bad” of pollution and greenhouse gas emissions. This point has long been recognized in discussions of the environmental costs of economic growth, and is included in virtually every introductory economics textbook. The authors of “Seven Myths” make no reference to such considerations.

Their Myth #5: “The world economy can be remade by reducing trade and relying on local production without dramatically decreasing our standard of living.”

Their Fact #5: “History shows that individual nations cannot produce everything its citizens need or desire. People and countries have talents that allow specialization in products and services that made them ever more efficient, lower-cost producers, thereby enriching all people.”

There is nothing in *Green Recovery* that suggests that the U.S. economy should “rely on local production.” On the other hand, both the current economic and the long-term environmental crisis do in fact suggest the need for ‘the world economy to be remade.’ Indeed, there is little controversy across the political spectrum as well as the economics profession on this need. The only real question is not whether the world economy should be “remade” but what exactly is the best approach for remaking it.

There are certainly benefits to be gained through international trade. The economics of the “Asian Tigers,” including now most dramatically China itself, attest to this. However, recognizing these benefits does not lead inexorably to an endorsement of unfettered free trade across all countries under all circumstances, as the “Seven Myths” authors seem to believe.

The U.S. economy has run a persistent trade deficit for over forty years, which has had destabilizing effects, most clearly through the build up of huge dollar reserves by

our trading partners. We have also experienced serious political difficulties due to our reliance on foreign oil imports. The green investment agenda offers a major opportunity to reduce our reliance on foreign oil. More specifically, as we describe in *Green Recovery*, the domestic content of green investments is significantly higher than with fossil fuels specifically, and the oil industry in particular. This, along with higher labor intensity, are the two major factors creating relatively more jobs through the green investment agenda than through fossil fuel production.

There are two primary ways through which the green investment agenda raises domestic content. The first is through reducing oil imports. The second is from the fact that most energy-efficient investments are naturally location specific. That is, homes located in Silver Spring, Maryland can only be retrofitted by workers in Silver Spring. Similarly, the electrical grid system in Maryland can be upgraded only in Maryland. Clearly, the simple reality of location-specific activities has nothing to do with the creation of trade barriers.

The higher domestic content of the green investment agenda—as well as the net job creation effects in general—have another major benefit, which is that they offer a counterforce to the pressures on U.S. workers from global outsourcing. The potential effects of global outsourcing on U.S. workers were explored forcefully in *Foreign Affairs* magazine in 2006 by the Princeton economist and former Vice Chair of the Federal Reserve Alan Blinder. Blinder argued that, increasingly, services that can be carried over the internet—including the telephone operators in India with whom we are already familiar, but also back-office accountants, lawyers, engineers, and laboratory technicians as well as their support staffs—can be effectively supplied by employees in poor countries that work for, say, one-fifth the wages of their U.S. counterparts. These would be in addition to the manufacturing jobs that have long been forced to compete with China and other low-wage producers. Blinder’s conclusion was that something like 20 – 30 percent of all jobs in the United States today—between 30 and 40 million jobs in total—are vulnerable to these outsourcing pressures. The single most effective way to counter these pressures is for employment creation to be set as a centerpiece of U.S. public policy. The green investment agenda cannot fulfill this role on its own, but it can move us a good distance in the right direction. The authors of “Seven Myths” ignore this consideration within U.S. trade policy, despite its prominence in both academic and policymaking circles.

Their Myth #6: “Government mandates are a substitute for free markets.”

Their Fact #6: “Companies react more swiftly and efficiently to the demands of their customers/markets, than to cumbersome government mandates.”

This Myth/Fact pair has little connection to the content of *Green Recovery*. The programs proposed in *Green Recovery* include direct government spending programs, tax incentives for businesses, and loan guarantees for private lenders who will support business investment in green activities. The majority of total spending proposed in *Green*

Recovery is channeled to private businesses through tax incentives and loan guarantees. In addition, Appendix 2 is devoted in full to analytic issues associated with maximizing the effectiveness of our proposed loan guarantee proposal. We were pleased that the Obama recovery program closely reflects this priority for private business initiatives. Moreover, private businesses will also benefit directly through the public spending features of both the program we presented in *Green Recovery* and the Obama plan, through new opportunities for government construction projects and the spending stimulus being injected into private markets. It isn't clear how these business incentive programs could be construed, in the terms used in “Seven Myths” as “ignoring incentive effects” or “market hostility.”

Green Recovery does briefly discuss one government mandate program, which is a cap-and-trade measure to require reductions in greenhouse emissions. The need for a carbon cap—or some variation on this, such as a carbon tax—emerges precisely through the failure of the free market to incorporate into market prices the environmental costs of burning fossil fuels. Again, such material is standard fare in virtually all introductory economics textbooks. But the authors of “Seven Myths” do not consider this even though their discussion around “Myth 6” would have been an obvious place for such a discussion.

Their Myth #7: “Wishing for technological progress is sufficient.”

Their Fact #7: “Some technologies preferred by the green jobs studies are not capable of efficiently reaching the scale necessary to meet today’s demands.”

It is hard to take seriously assertions of this nature. Who has stated anything on the order of “wishing for technological progress is sufficient?” Certainly, nothing close to any such claims were expressed in *Green Recovery*.

In fact, there was a specific reason why, in *Green Recovery*, we proposed that 70 percent of the allocation for all green investments be channeled to energy efficiency measures as opposed to 30 percent for renewable energy. That is precisely because the technologies for achieving energy efficiency are known, relatively simple for the most part, and provide short-term, high-probability, paybacks. In *Green Recovery*, we work through the investment and payback opportunities available through a \$2,500 retrofit of an average-sized U.S. home, based on data available through the EPA as well as through my University of Massachusetts colleague Professor Paul Fiset. Professor Fiset is one of the country’s leading experts on the materials science issues associated with building retrofits. We showed in our discussion that, relying on simple, available and affordable technologies, the \$2,500 retrofit would lower home energy costs by about one-third. This would mean a payback for the initial \$2,500 investment within three years (p. 15).

A wide range of such opportunities are clearly available now in the area of energy efficiency, using known technologies. The renewable energy technologies are more uncertain at present. That is why we proposed channeling a smaller overall proportion of

green investment funds into these areas. The amounts we proposed will be enough to accelerate research and commercialization in renewable energy over the next decade, while energy efficiency remains the leading edge of the green investment agenda.

Again, I don't see how this approach advanced in *Green Recovery* could somehow be construed as "wishing for technological progress is sufficient." It would be more constructive if the authors of "Seven Myths" were to consider the arguments and evidence that were actually advanced in *Green Recovery*. That would have enabled us to perhaps conduct a healthy debate on these matters of great importance. That is simply not possible on the basis of the unsubstantiated claims they have chosen to make.