

# BHI Policy Study



## **“Green Collar” Job Creation: A Critical Analysis**

David G. Tuerck, PhD

Benjamin Powell, PhD

Paul Bachman, MSIE

**THE BEACON HILL INSTITUTE AT SUFFOLK UNIVERSITY**

8 Ashburton Place

Boston, MA 02108

Tel 617-573-8750, Fax 617-994-4279

Email [bhi@beaconhill.org](mailto:bhi@beaconhill.org), Web [www.beaconhill.org](http://www.beaconhill.org)

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## Executive Summary

Government promotion of green jobs is becoming increasingly popular. We critically review the main claims of three of the most influential green jobs studies and find serious economic flaws in all three. Counter to the claims by green jobs advocates, if the advice of these studies is followed, the American economy will be harmed and growth will slow. We also estimate how a state-based cap and trade policy will hurt job growth and wages.

We review:

- The United Nations Environment Programme, International Labor Organization, International Trade Union Confederation’s Green Jobs Initiative, “Green Jobs: Towards Sustainable Work in a Low-Carbon World.”<sup>1</sup>
- The Center for American Progress, “Green Recovery: A Program to Create Good Jobs and Start Building a Low-Carbon Economy.”<sup>2</sup>
- The U.S. Conference of Mayors, “U.S. Metro Economics: Current and Potential Green Jobs in the U.S. Economy” prepared by Global Insight.<sup>3</sup>

The first two of these studies contain a common fundamental error that is frequently made throughout the green jobs literature. Although the Conference of Mayors’ study doesn’t explicitly make the same error, the leadership of the Conference of Mayors has in the past. The error is that

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<sup>1</sup> Worldwatch Institute and Cornell University Global Labor Institute for the United Nations Environmental Programme, International Labor Organization and the International Trade Union Confederation, Green Jobs Initiative “Green Jobs: Towards Decent Work in a Sustainable, Low-carbon World,” (September 2008), [http://www.unep.org/labour\\_environment/features/greenjobs.asp](http://www.unep.org/labour_environment/features/greenjobs.asp).

<sup>2</sup> Robert Pollin, Heidi Garrett-Peltier, James Heintz, and Helen Scharber with Kit Batten and Bracken Hendricks, “Green Recovery A Program to Create Good Jobs and Start Building a Low-Carbon Economy,” (September 2008) [http://www.americanprogress.org/issues/2008/09/pdf/green\\_recovery.pdf](http://www.americanprogress.org/issues/2008/09/pdf/green_recovery.pdf).

<sup>3</sup> Global Insight for U.S. Conference of Mayors “U.S. Metro Economics: Current and Potential Green Jobs in the U.S. Economy (October 2008), [http://www.americanprogress.org/issues/2008/09/pdf/green\\_recovery.pdf](http://www.americanprogress.org/issues/2008/09/pdf/green_recovery.pdf).

the Conference of Mayors counts the creation of a green job as a benefit and rationale for its proposed program in and of itself. Jobs, green or otherwise, are not benefits but are instead costs.

The creation of a green job makes work for someone and it diverts resources from elsewhere in the economy. If the green job is a net benefit it has to be because the value the job produces for consumers is greater than the cost of performing the job. This argument is never made in any of these three green jobs studies. In fact the opposite, that it takes more work to provide the same amount of energy, is often argued as a benefit. The energy itself is the benefit, the work that goes into creating energy is a cost that we benefit by minimizing. The green jobs literature is riddled with this fundamental misunderstanding.

We find numerous other errors throughout each of the reports. Our main findings for each are:

*“Green Jobs: Towards Sustainable Work in a Low-Carbon World”*

The U.N.’s report contains the most serious economic errors of the three reports we review. It argues for radical changes in industrial and agricultural policy that would have disastrous economic consequences and would likely result in widespread impoverishment and mass starvation. It mistakenly claims that increased labor productivity results in unemployment. As a result it advocates moving to less productive modes of transport, farming, and energy production. Taking people out of taxis and putting them into rickshaws, forcing people to use more labor to produce fewer crops, and doing more work to produce the same amount of energy would plunge society back to pre-modern standards of living. Humanity has advanced as productivity has increased. As the labor force has expanded so have the number of jobs to be done. The U.N. report amounts to a call for a return to the stone-age.

*“Green Recovery: A Program to Create Good Jobs and Start Building a Low-Carbon Economy”*

The argument for the creation of green jobs should be made separately from proposals for economic recovery. This report makes a shameless effort to hijack the current crisis for purposes of creating a “green” program that would do nothing to fix the crisis and would likely prolong it by subsidizing labor and capital to stay in some over-expanded bubble industries. If the green technology could pay for itself through cost savings as promised in the report, then the subsidies are not necessary. The report never performs a cost-benefit test to argue that the value created by

the green jobs justifies their cost. The study uses an inappropriate input-output analysis for its forecast. And finally, the report overestimates the number of green jobs that could be created compared to alternative policies. In short, the study is a flawed attempt to justify a green subsidy program by attaching it to an economic recovery proposal.

*“U.S. Metro Economies: Current and Potential Green Jobs in the U.S. Economy”*

This report, prepared by Global Insight, never attempts to argue that the creation of jobs, green or otherwise, is good. Nor does it argue that green polices are cost-benefit efficient. It simply tries to forecast how many green jobs will be created given legislative desires and market conditions. Unfortunately, because the Conference of Mayors’ leadership views the creation of green jobs as the benefit itself, the large increases in green jobs forecast by Global Insight has itself become the rationale for trying to make Global Insight’s predictions a reality. Even if one were counting jobs as a benefit, Global Insight’s work does not justify claiming any net increase in jobs. Nowhere does Global Insight analyze how the creation of green jobs will impact job (and value) creation in other sectors. More amazingly, their forecast number of green jobs is based on a single scenario with arbitrary assumptions which the report never attempts to justify. Despite its ostensible precision (4,214,700 green jobs), there is no reason to attach any weight to the forecast.

### *Case Study: Indiana under a Cap and Trade System*

Cap and trade, like most green jobs proposals requiring increased use of alternative energy sources, would raise the cost of energy. To examine the impact of higher energy costs on net job creation and income in Indiana under a cap and trade system, we utilize our Indiana-STAMP general equilibrium model. We find that under such a system, Indiana would lose more than 18,000 jobs in 2009, with losses increasing to almost 29,000 jobs in 2011, and that real disposable income would slump by almost \$1 billion in 2009 and nearly \$1.5 billion in 2011. In Indiana, we find that a policy that raises energy prices would cause income and job losses rather than net gains for the economy and net gains in employment that green jobs advocates like to claim their programs would produce. If such a policy were implemented at the national level some businesses may migrate overseas but few U.S. citizens would likely emigrate. Therefore, the impact of a similar nationwide program that increased the cost of energy would likely be absorbed in the form of lower incomes for citizens rather than net job losses in the long-run.

### *Conclusion*

All three green jobs studies we reviewed suffer from serious flaws in their economic analysis. Green job subsidization will do nothing to help the United States recover from the current recession. Based on arbitrary assumptions or faulty methodologies, the forecasts of future green jobs are completely unreliable. When BHI applies its own general equilibrium model to a cap and trade proposal in the state of Indiana, we find net job losses rather than gains. In viewing the creation of jobs as a benefit, green job studies and advocates all make a fundamental error. Jobs are a cost in the process of production; the services a job provides are the benefit. Green job advocates often claim that so-called sustainable technology for power generation, transport, or food production will require more labor per unit of output than do conventional methods. This is a major cost of their proposals – not a benefit as they claim. Decreased labor productivity is the path to poverty.

All three green jobs studies we reviewed are riddled with economic errors, incorrect methods, and dubious assumptions. Economic policy should not be based on such faulty analysis. Serious economic studies of costs and benefits are desperately needed before the adoption of any green jobs proposal.

# 1. Introduction

Proponents of “green collar” jobs promise that government subsidization of these jobs will create a net increase in employment, economic growth, recovery from the current crisis, and energy savings, all in addition to environmental benefits. Unfortunately, these claims are based on seriously flawed economic analysis. Despite this fact, green jobs are becoming increasingly politically popular.

During the presidential campaign, then candidate Barack Obama promised to create 5 million new green jobs. Now, as President, he plans to have the government invest \$150 billion over 10 years to:

[A]ccelerate the commercialization of plug-in hybrids, promote development of commercial scale renewable energy, encourage energy efficiency, invest in low emissions coal plants, advance the next generation of biofuels and fuel infrastructure, and begin transition to a new digital electricity grid.<sup>4</sup>

He claims this plan will “help the private sector create 5 million new green jobs, good jobs that cannot be outsourced.” President Obama’s recent proposed budget for the next fiscal year also contains a cap and trade policy that is supposed to reduce carbon emissions by 14 percent by 2020 from their 2005 levels. Obama and the federal government are not alone. Many states and cities are considering subsidizing the creation of green jobs and implementing cap and trade emissions limitations.

Green job advocates often argue for these programs as if the creation of the job itself is the main benefit of the program. This is a serious error. The creation of a job is only valuable if the service the job provides is greater than the cost of performing the job. This fundamental point is rarely recognized or argued by green jobs advocates. Furthermore, advocates’ estimates of the jobs they will create ignore the (often more valuable) jobs their programs will displace elsewhere in the economy. A study by the Universidad Rey Juan Carlos evaluates Spain’s recent initiative to create green jobs. Spain has been at the forefront of the creation of green jobs. The study found

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<sup>4</sup> Barack Obama and Joe Biden, “New Energy for America,” (March 2008)  
[http://www.barackobama.com/pdf/factsheet\\_energy\\_speech\\_080308.pdf](http://www.barackobama.com/pdf/factsheet_energy_speech_080308.pdf).

that for every four jobs created by green subsidies, nine jobs were lost in non-subsidized areas.<sup>5</sup> Yet most green job proposals for the United States ignore the loss of jobs that will occur in other sectors.

This report critically reviews three influential green jobs studies:

- The U.N.E.P., I.L.O., I.T.U.C. Green Jobs Initiative, “Green Jobs: Towards Sustainable Work in a Low-Carbon World.”
- The Center for American Progress, “Green Recovery: A Program to Create Good Jobs and Start Building a Low-Carbon Economy.”
- The U.S. Conference of Mayors, “U.S. Metro Economics: Current and Potential Green Jobs in the U.S. Economy” prepared by Global Insight.

The next section of this report summarizes the main claims of each of these studies. Section 3 explains the basic problem with arguments for green jobs generally and then critiques specific problems with each of these reports. Section 4 estimates the effect a cap and trade emissions limitation would have on a specific U.S. state using a general equilibrium mode. The final section concludes.

## 2. The Claims of Green Job Studies

We focus on claims made by three of the most influential green jobs studies. Each of these studies focuses on a different aspect of green jobs but all share the goal of encouraging the government and private industry to expand the number of green jobs in the economy. All three believe that green job creation is good for the economy as well as the environment.

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<sup>5</sup> Gabriel Calzada Alvarez, Raquel Merino Jara, Juan Ramon Rallo Julian, Jose Ignacio Garcia Bielsa, “Study of the Effects on Employment of Public Aid to Renewable Energy Sources.” <http://www.clean-coal.info/drupal/pubs/090327-employment-public-aid-renewable.pdf>, Universidad Rey Juan Carlos. March 2009.

The first study, “Green Jobs: Towards Sustainable Work in a Low-Carbon World,” prepared by the Worldwatch Institute, was a joint project of the United Nations Environment Programme, the International Labor Organization, and the International Trade Union Confederation. This is the broadest of the three studies and examines the creation of, and supposed benefits from, green jobs both in the United States and around the world.

The second study, “Green Recovery: A Program to Create Good Jobs and Start Building a Low-Carbon Economy,” was prepared by the Political Economy Research Institute at the University of Massachusetts Amherst for the Center for American Progress. This report focuses on the current economic crisis in the United States and proposes a green jobs stimulus package to aid economic recovery.

The third study, “U.S. Metro Economies: Current and Potential Green Jobs in the U.S. Economy,” was prepared by Global Insight for the United States Conference of Mayors. This study estimates the current number of green jobs across the U.S. and then forecasts estimates of potential green job creation.

We review the main claims of each of these reports in turn.

*“Green Jobs: Towards Sustainable Work in a Low-Carbon World”*

The Worldwatch Institute’s report on green jobs for the U.N., I.L.O., and the I.T.U.C., is a sprawling 177 page document. It’s the compilation of the work of 10 authors that passed through multiple U.N. reviewers. Possibly due to the number of contributors it’s difficult to say the report has a single focus.

The main body of the report surveys four sectors of green jobs: energy supply alternatives, energy efficient buildings, transportation, and food and agriculture. In each section the report surveys existing estimates of the number of green jobs in the sector and forecasts future job creation. Each section also contains a myriad of arguments in favor of using governmental policy to force the creation of more green jobs in the sector.

Despite difference between sectors, the overall tone of the report is that the world faces dual environmental and employment challenges that voluntary market action cannot solve and that government creation of green jobs can. As the introduction puts it:

Timely action on the scale needed will occur only with a strong set of targets and mandates, and policy changes that will put an end to today's unsustainable business practices. As current experience in various areas – from vehicle fuel economy to carbon trading – demonstrates, a purely voluntary, market-driven process alone will not deliver. An ambitious mix of regulations, business incentives, and genuine public private partnerships is required (p. xxvi).

Our analysis below will focus on the report's claims of economic benefits stemming from green job creation in each of the four major sectors. We will demonstrate that the report is riddled with a profound misunderstanding of the economic process and an erroneous belief in a "make work" fetish that would result in widespread impoverishment if implemented.

*"Green Recovery: A Program to Create Good Jobs and Start Building a Low-Carbon Economy"*

The Center for American Progress's report advocates creating green jobs in order to speed recovery from the current economic downturn in the United States. Specifically, it advocates a "green economic recovery" package that would have the government spend \$100 billion over two years on six green infrastructure investment areas. Spending would focus on retrofitting buildings to improve energy efficiency, expanding mass transit, constructing "smart" electrical grid transmission systems, wind power, solar power, and biofuels. Half of the \$100 billion would be used for tax credits for private businesses and homeowners to retrofit buildings and make investments in renewable energy, \$46 billion would be directly spent by the government, and \$4 billion would be used for federal loan guarantees to finance building retrofits and investments in renewable energy.

The report estimates that the program will create two million new jobs and that it has the potential to lower the unemployment rate by 1.3 percentage points. They contrast this estimate with a proposal to rebate the \$100 billion to taxpayers in a manner similar to the April of 2008 stimulus and find that investing in green jobs would create 300,000 more jobs than the equivalent tax rebate.

The study's overall claim is that by creating a government program to spend money on green jobs, we can help the economy recover from the downturn and simultaneously lower our carbon emissions. The authors conclude:

[W]e can be certain that the green economic recovery program will serve as a strong counterforce against pressures that currently are pushing unemployment up as well as more broadly increasing economic disparities. Our green infrastructure investment proposal also makes significant long-term advances towards creating the green, low-carbon economy that we need (p. 19).

Unfortunately, as we will demonstrate below, the authors' certainty is unjustified. Such a green economic recovery package will do little to help the economy recover.

*“U.S. Metro Economies: Current and Potential Green Jobs in the U.S. Economy”*

Global Insight's report for the United States Conference of Mayors attempts to count the current stock of green jobs in the United States and forecast the future growth of green jobs. Unlike the other reports, Global Insight does not overtly claim that creating more green jobs is beneficial or should be the object of government policy. Instead it seeks to forecast how market demand and legislative efforts will impact the creation of green jobs.

Global Insight estimates that there were approximately 750,000 green jobs in the United States in 2006. They define green jobs as:

Any activity that generates electricity using renewable or nuclear fuels, agriculture jobs supplying corn or soy for transportation fuel, manufacturing jobs producing goods used in renewable power generation, equipment dealers and wholesalers specializing in renewable energy or energy-efficiency products, construction and installation of energy and pollution management systems, government administration of environmental programs, and supporting jobs in the engineering, legal, and research and consulting fields (p. 5).

The report then discusses areas in which Global Insight believes there is potential for green job growth and estimates how many new jobs will be created. They separate jobs into three broad categories: Renewable Power Generation, Residential and Commercial Retrofitting, and Renewable Transportation Fuels.

Global Insight estimates that there is the potential to add 4.2 million new green jobs to the U.S. economy by 2038. They estimate that approximately 1.2 million jobs will be created in Renewable Power Generation, 81,000 in Residential and Commercial Retrofitting, 1.5 million in Renewable Transportation fuels, and an additional 1.4 million jobs in related support fields.

There is nothing inherently wrong with attempting to forecast the growth (or decline) of green jobs. However, as described below, we have no reason to put much, if any, weight on this specific forecast provided by Global Insight.

### **3. Errors in Green Jobs Studies**

The three studies we review suffer from numerous errors in their economic analysis and we will evaluate each in turn. However, two of these studies contain a common fundamental error that is frequently made throughout the green jobs literature. Although the Conference of Mayors' study doesn't explicitly make the same error, the leadership of the Conference of Mayors does. The error is that they count the creation of a green job as a benefit and rationale for their proposed program in and of itself. Jobs, green or otherwise, are not benefits but costs. This is a common mistake worth reviewing in greater detail.

The Center for American Progress is quite explicit in its assumption that one of the main benefits of its green jobs proposal is that it will create more jobs than equivalent government funding of a tax cut or investment in the oil industry. In fact, the entire report is constructed around estimating how many jobs could be created by these alternative policies and concludes that "This green economic recovery program will create more jobs."<sup>6</sup> Similarly, the Conference of Mayors report lists "job creation" as a benefit.<sup>7</sup> The U.N. report repeatedly refers to alternative energy or labor

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<sup>6</sup> Center for American Progress, Political Economy Research Institute, "Green Recovery," 19.

<sup>7</sup> Global Insight, "Current and Potential Green Jobs in the U.S. Economy," 2.

intensive agriculture as being beneficial because it takes more labor to produce the same amount of power or food.

In each of these cases the reports are mistakenly arguing that a cost is actually a benefit. We value the services and products that are provided when workers perform a job – not the actual performing of the work. The work that the job entails is a cost we must endure in order to receive the benefit the work provides. People generally prefer leisure to work – in fact that’s why employers pay employees and not vice versa!

An alternative job creation proposal might make this point more clear. The government could create a program to hire half of all unemployed people to dig holes for eight hours a day and the other half of all unemployed people to follow around the first half and fill them back in. Millions of jobs would be created but it should be obvious to all that there would be no benefit for society. Nothing new would be created for anyone to consume. At a minimum, society would have lost the value that all of the diggers would have placed on their leisure.

Such a program would obviously have to pay the hole-diggers but this pay must come from somewhere. The government would either have to tax others, borrow, or print the money. This would shift real resources away from people’s preferred consumption bundle and towards hole digging. In the process some jobs that were providing services consumers valued would be lost. A “hole-digging” jobs program is bad for the economy because it creates nothing that people value and it takes real resources in terms of lost leisure and other lost consumer goods.

When green jobs studies tout the creation of “green jobs” themselves as benefits, they are essentially committing the “hole-digging” fallacy. The creation of a green job gives someone work by allocating resources that would have gone elsewhere in the economy. If green jobs are to be beneficial it derives from the fact that the value the jobs produce is greater than the costs of hiring workers to do the jobs. This fundamental economic argument is never made in any of these two green jobs studies. In fact, the opposite is often argued as a benefit: that it takes more work (or more green jobs) to provide the same amount of energy. Minimizing the cost (doing more with fewer workers) should be the desired outcome. But green job studies desire more jobs in the production of less energy.

Keeping in mind this fundamental problem of these studies, we now examine the specific problems with each of these studies.

*Worldwatch for U.N.E.P et. al “Green Jobs: Towards Sustainable Work in a Low-Carbon World”*

The Worldwatch Institute’s report contains the most serious economic errors of the three reports we review. It argues for radical changes in industrial and agricultural policy that would have disastrous economic consequences and would likely result in widespread impoverishment and mass starvation.

These errors all stem from a fundamental misunderstanding of our economic system. The report refers to the “world’s employment challenge.”<sup>8</sup> It argues as if there is a surplus of labor sitting around with nothing to do and that we will benefit those laborers and the rest of society by putting them to work in environmentally-friendly ways. The report is explicit about this:

Harking back to the early days of the Industrial Revolution, businesses have sought to economize on their use of labor. Labor – and especially skilled labor – was scarce, but land and natural resources seemed inexhaustible.<sup>9</sup>

The past preference for wringing more out of each hour of human work has indeed brought rapid economic progress. But today, given evidence of increasing resource scarcity and environmental degradation on one hand, and the *growing abundance of human labor*, [emphasis added] particularly in developing countries on the other, it is time to base competitiveness and economic progress far more on energy and materials productivity.<sup>10</sup>

The process of economic development that has resulted in vast segments of the human population escaping the wretched poverty that humanity experienced for most of its existence is a direct result of increasing labor productivity. Unfortunately many in the Third World have not participated fully in the process of growth and increasing labor productivity driven by economic

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<sup>8</sup> Worldwatch Institute, “Green Jobs,” 33.

<sup>9</sup> Ibid., 12.

<sup>10</sup> Ibid., 13.

freedom. Intentionally designing policies to limit labor productivity condemns them to future poverty and limits the increases that the more developed world could enjoy as well.

Increased labor productivity does not result in unemployment. There is no fixed pool of work to be accomplished. As we get more productive we put those unemployed by technology to work doing other jobs. The report notes that labor productivity has tripled since 1950. Yet over this period, there has been no widespread increase in unemployment in countries with free and flexible labor markets. There is simply no evidence to support a need to create policies to “make work.” Yet many of the policies advocated in this study are justified in their minds simply because they put people to work in less productive ways.

In the energy supply sector the report notes that “renewable energy generates more jobs per average megawatt of power manufactured and installed, per unit of energy produced, and per dollar of investment.”<sup>11</sup> In other words, for all of our scarce inputs, including labor, we get less energy. It will take more people working to give us the same amount of energy. Contrary to the report’s implication, it does not add jobs on net basis, but instead takes people away from other valuable jobs they could have been doing if energy is produced with less labor.

In the transportation sector the report favorably reviews non-motorized transport:

Non-Motorized transport modes have the unfortunate distinction of being overlooked by most traffic planners and economists. But they fulfill an important function in all societies. For short distances, they are an easy and non-polluting, quintessentially green, mode of transport. In poorer countries, they are often a critical source of income for those providing low-cost pedicab transportation services.”<sup>12</sup>

These forms of transport undoubtedly provide needed transport services in poorer countries. But that is because the countries are poor and can not afford the more expensive and productive mechanized transport. The report notes that Uganda has about 200,000 bicycle taxis and that “In both Uganda and Kenya [these taxis] provide employment for large numbers of previously

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<sup>11</sup> Ibid., 43.

<sup>12</sup> Ibid., 88.

unemployed youth.”<sup>13</sup> Yet when Ugandans and Kenyans migrate to the United States they choose to provide transport services using motorized taxicabs. In doing so they help move more people a greater total distance and earn correspondingly more money. The decrease in pedicabs is a sign of prosperity. Policies designed to promote pedicabs instead of more efficient forms of transport lead to impoverishment.

The Worldwatch Institute’s report demonstrates its anti-modern outlook in its section on agriculture. The report notes that from 1995 to 2006 the percent of the Earth’s population employed in growing crops and raising livestock fell from 44.4% to 36.1%. In industrialized nations, the number of people employed in agriculture fell 80% since 1950. The report finds:

Productivity improvements throughout the global food system have, along with the globalization of food, therefore generally *reduced* employment levels in food and related industries.<sup>14</sup>

Yet the reduction in employment in agriculture has accompanied a massive increase in the population without a corresponding increase in starvation. This is cause to celebrate! As fewer and fewer workers are required to feed the population more people are freed up to provide more goods and services to others. The greater the proportion people needed to feed the world, the fewer other things (including leisure) we can enjoy.

The report divides its section on agriculture into two parts. The first looks at proposals from the World Bank, IPCC, and WTO to improve the existing food system. The Worldwatch Institute finds that, “employment issues do not feature in these reports, and specific details pertaining to jobs – green or otherwise – are almost absent”<sup>15</sup> and that, “Taken together, these proposals are part of an effort to make existing agriculture more sustainable. It presents a scenario where jobs may be gained, but they may also be lost.”<sup>16</sup>

In short, the Worldwatch Institute finds these reports unsatisfactory because they only deal with proposals to improve environmental sustainability and do not focus on the “duel challenge of

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<sup>13</sup> Ibid.

<sup>14</sup> Ibid., 96.

<sup>15</sup> Ibid., 101.

<sup>16</sup> Ibid., 106.

employment.” To remedy this “shortcoming” they consider proposals to go “Beyond the Agro-Industrial Model” and return to small scale labor intensive farming. As they describe it:

Small farm-based agriculture involves a qualitative shift in farming methods away from dependency on environmentally harmful inputs, such as fossil-fuel based energy, chemicals and fertilizers, towards methods that utilize more human labor.<sup>17</sup>

In other words, more people working the fields to feed the same number of mouths resulting in a decrease in agricultural productivity. The report favorably cites an instance in Brazil where small scale agriculture requires one laborer for every 8 cultivated hectares compared to one laborer for every 67 hectares in large scale mechanized farming.

Not very reassuringly, the Worldwatch Institute informs us that it is “beyond the scope of this report is any assessment of the productive potential of this [small scale farming] system” (p. 109). Apparently whether widespread starvation would result from a dramatic drop in agricultural productivity is not worthy of considering before they advocate providing employment with such a system.

The Worldwatch Institute’s report for the United Nations et al. is a call for policies that would return humanity to pre-modern living standards. It is an explicit call for the reduction of labor productivity that, by definition, would result in lower material standards of living and decreased leisure time. It advocates this with an erroneous economic assertion that there is a world “employment challenge” and that jobs must be created by making each individual job less productive.

The reality is that humans have limitless desires for goods and services and will always find ways to employ those whose current jobs are displaced by productivity enhancements. If there is a justification for the creation of environmental jobs it has to be the environmental benefits that it provides to humans – not the simple fact that it forces humans to work more to get less.

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<sup>17</sup> Ibid., 109.

*Center for American Progress: “Green Recovery: A Program to Create Good Jobs and Start Building a Low-Carbon Economy”*

If implemented, the Center for American Progress’s green recovery plan would not live up to the promises made in its report. The program would not help the United States recover from its current recession and instead it would likely prolong the recession. If the green technology could pay for itself through cost savings as promised then the subsidies are not necessary. The report never performs a cost-benefit test to argue that the value created by the green jobs justifies their cost. And finally, the report overestimates the number of green jobs that could be created compared to alternative policies.

The argument for the creation of green jobs should be made separately from proposals for economic recovery. This report makes a shameless effort to hijack the current crisis for purposes of creating a “green” program that would do nothing to fix the crisis and would likely prolong it.

This program would use government fiscal policy to ramp up the demand for green jobs. However, fiscal policy is a poor policy tool for dealing with recessions. Long and varied lead times often render fiscal policy ineffective. Furthermore, this green recovery would target precisely the wrong industries. The report notes that, “The green recovery provides a needed transfusion of new credit and investment into the construction industry, which could rapidly provide job opportunities that are badly needed.”<sup>18</sup>

The construction industry would surely expand to do the work that the green jobs program would subsidize. However, this would not aid the economic recovery. It is clear that the current recession is the result of the over-extension of housing and construction sector. As with all bubbles, unsustainable levels of labor and capital flowed into these sectors. With asset prices falling, the price signals from the current recession indicate a need to reallocate capital and labor out of the housing sector and into other industries producing products of greater value to consumers, not the reverse. Subsidizing an overly expanded construction industry only delays the capital and labor reallocation that is necessary for recovery.

Apart from flawed claims about economic recovery, the Center for American Progress report does little to quantitatively justify the green jobs it would create. Most of the claimed benefits

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<sup>18</sup> Center for American Progress, “Green Recovery,” 2.

seem to be the creation of the jobs themselves. The report does mention “self-financing energy efficiency” as an additional benefit claiming that “money spent now on energy efficiency will pay for itself through lower energy bills over the long term.”<sup>19</sup> In some cases this is no doubt true. However, investments that are truly self-financing require no government subsidies since both private businesses and consumers would seek out these energy efficiency improvements.

Private businesses are generally long-term profit maximizers. When presented with market incentives, they can increase their profits by making their businesses more energy efficient. Yet this green recovery plan would “propose a program of strong financial incentives – including both loan guarantees and tax credits – to advance such an initiative.”<sup>20</sup> If private businesses need such subsidies in order to induce them to undertake energy efficiency “improvements” then that is a strong indication that the decreased energy costs would not actually offset the true cost of the improvement. In other cases, in which the cost savings does offset the improvement cost, businesses would have made the investments anyway and such subsidies are a waste. Either the program matters – and energy savings is not self-financing – or the program needlessly subsidizes investments that would have been made anyway. More than half of the proposed green recovery spending (\$54 billion) would be dedicated to such wasteful programs.

The Center for American Progress’s study focuses job creation as the main benefit of its proposal. As argued above, this is mistaken because jobs are a cost, not a benefit. Despite this major flaw, even taken on their own terms, we find that they are unjustified in claiming that more jobs will be created by subsidizing green infrastructure than by simply rebating money to the taxpayers.

The report estimates that 2 million jobs will be created by the green recovery program while only 1.7 million would be created if a rebate to consumers similar to the April 2008 stimulus was implemented.<sup>21</sup> Unfortunately, we are limited in how closely we can examine these claims because the report directs readers to Appendix 1 for details about their estimation methodology. But the appendix simply mentions an untitled “forthcoming” study on the employment effects of alternative energy funding using input-output models: “In our forthcoming full study for the Center for American Progress, we present an extended discussion of our methodology in building

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<sup>19</sup> Ibid., 3.

<sup>20</sup> Ibid., 7.

<sup>21</sup> Ibid., 3.

these input-output models.”<sup>22</sup> With no access to these models, we are limited in our ability to judge the reasonableness of their estimates.

Despite the limitation imposed by the lack of transparency, it is still obvious that there is a problem with such an analysis. As Morriss et al. discuss in “7 Myths About Green Jobs” input-output analysis is completely inappropriate for green jobs proposals.<sup>23</sup> Input-output analysis assumes that technology does not change to enable some inputs to produce more output while requiring the price ratios of the various inputs to remain constant. Yet green jobs proposals clearly violate both of these assumptions since they assume alternative energy technology will improve and they assume a move to higher cost energy which would change the relative price ratio of energy inputs to other inputs!

Even if input-output analysis were the appropriate methodology, there are still additional problems with their claim that 300,000 more jobs would be created by a green recovery program than a tax rebate. Their report admits:

The relative labor intensity of spending on household consumption is roughly equivalent to that of green investments... This means relative labor intensity is not a factor in explaining the differential job-creating effects of a green stimulus program versus increasing household consumption spending.<sup>24</sup>

So why does a green recovery program create more jobs? According to the report, “The green investment program relies much more on products and services made within the U.S. economy and less on imports compared to spending...on household consumption.”<sup>25</sup> Specifically they estimate that 22 percent of household expenditures would go to imports while 9 percent of green infrastructure expenditures would go towards imports. These estimates do not imply that there must be a difference in the number of jobs created. The report seems to ignore what foreigners will do with our dollars after we buy imports from them. The foreigners would either buy American products and thus create demand for American jobs, or foreigners would make investments in the U.S., or pursue some combination of the two. When the foreigners make

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<sup>22</sup> Ibid., 20.

<sup>23</sup> Andrew Morriss, William Bogart, Andrew Dorchak, and Roger Meiners, “7 Myths About Green Jobs.” *University of Illinois Law and Economics Working Paper* LE09-007 (March 11, 2008).

<sup>24</sup> Center for American Progress, 11.

<sup>25</sup> Ibid.

investments this creates jobs much like when they buy American products. For example, when Toyota opens an auto factory in the U.S. it obviously creates jobs. The Center for American Progress seems to completely leave out what foreigners do with their dollars. This alone accounts for their ability to claim that subsidizing green infrastructure would create more jobs than rebating money to taxpayers.

The Green Recovery Proposal from the Center for American Progress does not give policy makers any real reason to fund such green job creation. The jobs themselves are not the benefit, and even if they were, the Center's methodology shouldn't allow it to claim that more jobs would be created by its proposal than by a tax rebate. More importantly, the true benefit of job creation, the value to individuals produced by doing the job, is never meaningfully quantified anywhere in the report. If green jobs should be created, advocates need to argue that the jobs create a value in excess of their cost and explain why the market is not creating enough of the jobs. This report does none of this. It instead erroneously justifies a green subsidy program by attaching it to an economic recovery proposal.

*U.S. Conference of Mayors: "U.S. Metro Economies: Current and Potential Green Jobs in the U.S. Economy"*

Global Insight's report is the least objectionable of the three analyzed here. It never attempts to argue that the creation of jobs, green or otherwise, is good. Nor does it argue that green policies are cost-benefit efficient. It simply tries to forecast how many green jobs will be created given legislative desires and market conditions.

Unfortunately, because many mistakenly view the creation of green jobs as the benefit itself, the large increases in green jobs forecast by Global Insight has itself become the rationale for trying to make Global Insight's predictions a reality. The leadership of the Conference of Mayors who commissioned the study consistently makes this mistake.

The Conference of Mayors President, Miami Mayor Manny Diaz, claimed that the report makes "a very compelling economic argument for investing in the green economy and that we're going to get a huge return for it" and that "This report proves that being green is not optional, it is necessary for a healthy and robust economy... Creating green jobs is an investment we must

continue to make.”<sup>26</sup> Similarly, Conference Vice President, Seattle Mayor Greg Nickels claimed, “This gives us a glimpse into the future and the sizable economic benefits that will come from a green economy.”<sup>27</sup> The report does no such thing. It merely forecasts the number of jobs Global Insight expects to be created in the “green sector” if market forces and legislative action push for a greater movement towards green technology. Nowhere are any economic benefits claimed or forecasted in the study. The mayors are mistaking the jobs themselves to be the benefit.

Even if one were counting jobs as a benefit, Global Insight’s work does not justify claiming any net increase in jobs. Nowhere do they analyze how the creation of green jobs will impact job (and value) creation in other sectors. If creating green jobs by forcing the consumption of more expensive forms of power is pursued one would have to investigate how increased power prices will slow growth in other industries. Global Insight’s report simply focuses on one sector, green jobs, and estimates how many will be created in that sector without regard for what effects it will have on jobs or any other aspect of the U.S. economy on net.

The criticisms thus far have been of the misuse of Global Insight’s work, not the work itself. However, there is a major problem with even its own forecast of the number of green jobs that will be created. It is based entirely on a set of assumptions in a single scenario that is not well defended as being most likely or even a plausible scenario.

Global Insight simply assumes:

- 40% of electricity must come from alternative resources;
  - Of this, 30% will be generated by wind, 20% from solar, 10% from incremental hydropower, 10% from geothermal and 30% from biomass;
- Energy consumption by the current stock of residential and commercial buildings must fall by 35%; and

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<sup>26</sup> [Associated Press, “Report: 4.2 million new environmentally-friendly 'green' jobs possible,” October 10 2008, \[http://www.nydailynews.com/money/2008/10/01/2008-10-01\\\_report\\\_42\\\_million\\\_new\\\_environmentallyfri.html\]\(http://www.nydailynews.com/money/2008/10/01/2008-10-01\_report\_42\_million\_new\_environmentallyfri.html\) and <http://www.miamigov.com/cms/Files/First Metro Green Jobs Survey.pdf>.](http://www.nydailynews.com/money/2008/10/01/2008-10-01_report_42_million_new_environmentallyfri.html)

<sup>27</sup> Ibid.

- 30% of gasoline and diesel for passenger cars and light trucks will be satisfied by alternative fuels.

These drastic changes in power generation and energy consumptions are never given empirical support. The realism of the assumptions is never justified nor are probability distributions attached to these or alternative scenarios. They are simply assumed and then green jobs are forecast with these radical assumptions. Global Insight admits:

It is important to recognize these forecast results depend heavily on our chosen scenarios. Altering any of the assumptions regarding the share of electricity to be generated from alternative resources, the extent of retrofitting, or the share of transportation fuels from renewable sources would obviously change the results (p. 17).

This is an important admission, especially considering that little to no justification has been given for the realism of these assumptions. After reading the report one is left with the feeling that we could as justifiably cut in half or double any of these assumptions and accordingly cut in half or double (or anything else for that matter) the number of forecasted green jobs.

In arguing for the favored policies, green jobs advocates have misused the Global Insight study. Furthermore, the study itself really isn't a study. It is a set of nearly arbitrary assumptions used to generate a projected number of green jobs. Unfortunately, once something is precisely forecast (4,214,700 green jobs), people stop questioning how much confidence they should place in the method used to generate the number. In this case, there is little reason to attach any weight to the forecast.

#### **4. Case Study: Indiana under a Cap and Trade System**

One of the many problems of green jobs forecasts is that advocates have used input-output analysis to make their predictions. As one recent review pointed out, input-output analysis rests on the assumption that the ratio of inputs to outputs is constant, or in other words that there is no

technological change. Input-output analysis also requires that ratio of prices between productive inputs are constant. In the case of green jobs proposals neither of these assumptions hold.<sup>28</sup>

The policies green jobs advocates recommend specifically require the advance of new green production technologies. They also advocate policies that will increase the relative price of energy, an input to production. Therefore input-output analysis is inappropriate. In another study the Beacon Hill Institute used a more appropriate general equilibrium methodology to study the impact of a cap and trade emission policy on income, investment, and employment.<sup>29</sup> Here we use that methodology to model the effects in the state of Indiana.

Cap and trade, like green jobs proposals, depends on alternative energy sources that inevitably raise the cost of energy. So it is useful for us to examine the impact increased energy costs would have on net job creation and income in Indiana under a cap-and-trade system when using a general equilibrium, rather than input-output, modeling approach.

Although some important generalizations may be drawn it is important to keep in mind how the effect of a state level and a national level cap-and-trade policy might differ. One important difference is the ability to migrate. When states or the national government adopt policies that put employers at a disadvantage many opt to relocate to other jurisdictions. When policies are adopted at the state level this leads to net job losses in that state and net job gains in another state and individual citizens migrate across state borders.

When policies are adopted at the national level some businesses will relocate to other countries but few U.S. citizens are likely to emigrate. This will cause short-term job losses in the United States. However, in the long-run the impact will be felt in the form of decreased incomes rather than net lost jobs because displaced workers will eventually be reemployed. With these cautionary notes in mind we examine how a state level cap-and-trade policy would affect Indiana.

The state of Indiana has an economy that has tracked the national economy fairly closely over the past few years. The state's unemployment rate bottomed out in the spring of 2007 at 4.4 percent. The rate held steady through the remainder of 2007, but began a steady rise in January of 2008

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<sup>28</sup> Morriss, et. al. "7 Myths About Green Jobs."

<sup>29</sup> For a discussion of the general equilibrium methodology see the Beacon Hill Institute's report, "The Economic Analysis of the Western Climate Initiative's Regional Cap-and-Trade Program" <http://www.beaconhill.org/BHISTudies/WCI-2009/WCIReportFinal090323.pdf>

and hit 9.4 percent, or 298,818 workers as of February, the most recent reading available. Manufacturing industries, especially motor vehicle manufacturing for the “Big Three” automakers, account for over 25% of the Indiana economy compared to only 12% of the U.S. economy.<sup>30</sup> Thus, Indiana can expect to suffer more job losses in the near term, as the “Big Three” automakers and other manufacturers continue to suffer and pair back production.

These heavy manufacturing industries tend to use higher quantities of energy, and GHG emissions, in their production process relative to other industries. Therefore, policies intended to reduce the production of greenhouse gas emissions would likely impact the Indiana economy more than other states with less dependence on manufacturing.

Under a cap-and-trade system, emissions would be capped at a certain level and a government agency would either grant or auction tradable permits to companies that produce emissions. Proponents of cap-and-trade systems see them as a market-based solution because firms can compare their costs to reduce emissions with the price of the permit and choose to either reduce their emissions, if the cost is lower than the price of the permit and sell their permits to firms that would incur emission reduction costs that are higher than the permit prices. Thus, GHG emissions are reduced at the lowest cost.

However, firms incur a cost to either reduce emissions or buy permits and this cost raises the cost of production and the prices consumers pay relative to the baseline assumption of no policy changes. This price increase is not accompanied by a corresponding increase in productivity and thus wages. Therefore, consumers must absorb these costs in the form of lower real income.

However, a cap-and-trade program would likely alter the competitive position of renewable based energy, such as solar and wind power, relative to fossil fuel based power. In doing so, the program would increase the number of green jobs as touted in the three studies we review above. However, the higher energy, and thus production, costs produced by the program for even moderately energy intensive industries, would produce negative economic consequences.

If Indiana were to join such a cap-and-trade system the state would realize these price increases and the negative economic effects. One cap-and-trade system that has been proposed is the

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<sup>30</sup> U.S. Department of Commerce, Bureau of Economic Analysis, “Gross Domestic Product by State,” <http://www.bea.gov/regional/gsp/> (accessed January 15, 2008 1/15/08).

WCI.<sup>31</sup> WCI was launched in February 2007 as a collaboration of seven U.S. governors and four Canadian Premiers. WCI's mission is to identify, evaluate and implement collective and cooperative ways to reduce greenhouse gases in the region, focusing on a market-based cap-and-trade system.

On September 23, 2008, WCI released a report entitled, "Design Recommendations for the WCI Regional Cap-and-Trade Program."<sup>32</sup> The report recommends a broad based cap-and-trade system to achieve the WCI regional goal to reduce greenhouse gas (GHG) emissions by 15 percent below 2005 levels (President Obama's national proposal would lower them by 14 percent by 2020). The system would cover emissions of carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride. Industries that are covered include the electricity generation sector, industrial and commercial facilities, industrial processing (including oil and gas), residential, commercial and fuel combustion facilities, and transportation fuel combustion.

According to the report, the WCI system is intended to mitigate economic impacts, specifically on consumers, income and employment. The WCI reports that its cap-and-trade system combined with complementary policies, such as tighter building codes and appliance and vehicle efficiency standards, can meet their emission goals and produce a small net savings to the economy. The savings derive primarily from the complementary programs, which would be funded through the auctioning of emissions allowances.<sup>33</sup> Yet, the report fails to quantify "small net savings" in dollar terms, provide details of the model results or break out the results for the cap-and-trade proposal and complementary policies separately.

Incredibly, the WCI has not even identified the complementary policies that would help achieve the small net savings. They simply identify the targets that these policies would be expected to achieve. They include a one-percent reduction in vehicle miles traveled and a two-percent reduction in the growth of energy demand through 2020. Without any details, one cannot attempt to analyze the programs to see if the goals are, in fact, achievable.

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<sup>31</sup> Beacon Hill Institute, The Economic Analysis of the Western Climate Initiative's Regional Cap-and-Trade Program, (March 2009) <http://www.beaconhill.org/BHISTudies/WCI-2009/WCIReportFinal090323.pdf>.

<sup>32</sup> Western Climate Initiative, "Design recommendations for the WCI Regional Cap-And-Trade Program" [http://www.westernclimateinitiative.org/WCI\\_Documents.cfm](http://www.westernclimateinitiative.org/WCI_Documents.cfm) (accessed October 3, 2008).

<sup>33</sup> Ibid.

**Table 1: The WCI Projections for Fuel Price Changes, 2020**

	<i>Base Case</i>	<i>Broad w/ No</i>	<i>Broad w/</i>	<i>Narrow w/</i>
		<i>Offsets</i>	<i>Offsets</i>	<i>Offsets</i>
	<i>(\$, per mmBtu)</i>	<i>(% increase)</i>	<i>(% increase)</i>	<i>(% increase)</i>
<b>Residential</b>				
Electricity	30.10	-0.3	1.0	12.7
Natural Gas	14.50	31.4	12.2	1.0
Oil	25.50	20.4	7.7	-0.1
Liquid Propane Gas	21.60	14.6	5.6	0.0
<b>Commercial</b>				
Electricity	27.30	-2.4	-0.2	14.3
Natural Gas	10.10	23.7	7.9	-1.0
Oil	24.60	4.9	2.1	0.4
Liquid Propane Gas	21.40	9.2	4.4	1.3
<b>Industrial</b>				
Electricity	15.40	4.7	6.6	35.6
Natural Gas	6.30	19.2	7.1	20.2
Coal	2.10	167.4	64.3	182.4
Oil	20.70	17.2	6.5	19.4
Liquid Propane Gas	23.10	6.2	2.9	7.0
<b>Transportation</b>				
Gasoline	28.00	17.4	6.6	0.0
Diesel	27.70	16.8	6.4	0.0

The WCI does produce the change in energy and transportation prices under the cap-and-trade system relative to the reference case. Table 1 below contains the price changes for three different scenarios.

The general conclusion is that energy and transportation prices in WCI region are expected to increase. BHI considers these price increases to be very low due to the fact that the complementary policies have yet to be defined and we have no way of knowing if the policies will be effective in reaching their goals.

These price effects can be expected to be even greater for Indiana due to the economies heavy reliance on manufacturing outlined above. Nevertheless, we took an average of these very conservative estimates of price changes and simulated the affect they would have on the Indiana economy using the Institute's competitive general equilibrium model called Indiana-STAMP.

Table 2 presents the changes to the different economic indicators caused by implementing a cap-and-trade system based on the WCI proposal.

The cap-and-trade system would damage the Indiana economy. The economy would shed over 18,000 jobs in 2009, with losses increasing to almost 29,000 jobs in 2011. The private sector would absorb the brunt of the job losses, as energy and transportation price increases push up the cost of doing business in the state. Some firms would react by cutting back on production and subsequently payrolls; others would relocate to a lower cost (out of state) production site; and yet others, no longer able to compete, would simply shut their doors.

**Table 2: Economic Impact of Cap-and-Trade**

	<b>2009</b>	<b>2010</b>	<b>2011</b>
Total Employment (Jobs)	(18,372)	(20,848)	(28,886)
Gross Wage Rate (\$)	(178)	(192)	(219.00)
Investment (\$ millions)	(78)	(90)	(110)
Nominal Personal Income (\$ millions)	(1,277)	(1,458)	(1,909)
Real Disposable Income (\$millions)	(948)	(1,078)	(1,486)
Real Disposable Income per Capita (\$)	(93)	(101)	(131)

The higher cost of energy would hurt profit margins, causing firms to reduce investment in Indiana. We estimate that investment in Indiana would drop by \$90 million in 2009 and \$110 million in 2011. The job losses would result in sharply lower incomes for Indiana residents. Annual gross wages would drop by over \$178 in 2009, increasing to \$219 by 2011, and real (price-adjusted) disposable income would slump by almost \$1 billion or \$93 dollars per person in 2009 and nearly \$1.5 billion, or \$131 per person in 2011.

We find that implementing a cap-and-trade emissions policy that raises energy prices would create income and job losses rather than net gains for the economy and net gains in employment that green jobs advocates like to claim. Almost all green jobs proposals involve increasing the cost of energy by moving to higher cost alternative power sources. Whether the higher energy prices are caused by a cap-and-trade policy or a move to alternative energy sources, we believe more appropriate general equilibrium models capture the economic consequences: job losses and economic contraction rather than the optimistic net gains.

## 5. Conclusion

BHI has reviewed three of the most influential green jobs studies. It has also conducted a simulation of how increased energy prices caused by a cap-and-trade system in Indiana would influence economic activity and job creation. All three green jobs studies suffer from serious flaws in their economic analysis. The BHI simulation of the impact of a cap-and-trade emissions policy shows net job and income losses rather than job gains in the state of Indiana. At the national level the effect would likely manifest mostly as decreased incomes.

Green job advocates all make a fundamental error when they view the creation of jobs as the benefit arising from their green plans. *Jobs are a cost.* The services a job provides are the benefit. Green job advocates believe that greener technology for power generation, transport or food production will require more labor per unit of output than non-green or conventional methods. The fact that more workers will have to be hired to produce less energy is a cost not a benefit as they claim. Decreased labor productivity is the make-work path to poverty.

Green job subsidization will do nothing to help the United States recover from the current recession. It will only lower living standards by promoting inefficient technologies and artificially keeping labor and capital in construction and related industries that were the most over inflated during the bubble. These are the very industries that need to contract.

Forecasts of future green jobs are completely unreliable. The Center for American Progress's report relies on the application of inappropriate methodology. Yet even if this methodology were appropriate, the authors fail to account for foreign purchases of U.S. goods and investments. The Conference of Mayors based its forecasts on nothing more than an arbitrary set of assumptions of how many jobs will be created. The application of BHI's own general equilibrium model to a cap-and-trade proposal, such as in the state of Indiana, finds net job losses rather than gains.

All three green jobs studies under review here are riddled with economic errors, incorrect methods and dubious assumptions. Economic policy should not be based on such faulty analysis.

Serious economic studies of costs and benefits are desperately needed before any green jobs proposal is adopted.

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## The Beacon Hill Institute Study Team

**David G. Tuerck** is Executive Director of the Beacon Hill Institute for Public Policy Research at Suffolk University where he also serves as Chairman and Professor of Economics. He holds a Ph.D. in economics from the University of Virginia and has written extensively on issues of taxation and public economics.

**Benjamin Powell** is a Senior Economist at the Beacon Hill Institute and Assistant Professor of Economics at Suffolk University. He holds a Doctorate in Economics from George Mason University.

**Paul Bachman** is Director of Research at BHI. He manages the institute's research projects, including the STAMP model and conducts research on other projects at the BHI. Mr. Bachman has authored research papers on state and national tax policy and on state labor policy and produces the institute's state revenue forecasts for the Massachusetts legislature. He holds a Master Science in International Economics from Suffolk University.

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The Beacon Hill Institute at Suffolk University in Boston focuses on federal, state and local economic policies as they affect citizens and businesses. The institute conducts research and educational programs to provide timely, concise and readable analyses that help voters, policymakers and opinion leaders understand today's leading public policy issues.

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**THE BEACON HILL INSTITUTE  
FOR PUBLIC POLICY RESEARCH**

**Suffolk University  
8 Ashburton Place  
Boston, MA 02108  
Phone: 617-573-8750 Fax: 617-994-4279  
bhi@beaconhill.org  
<http://www.beaconhill.org>**