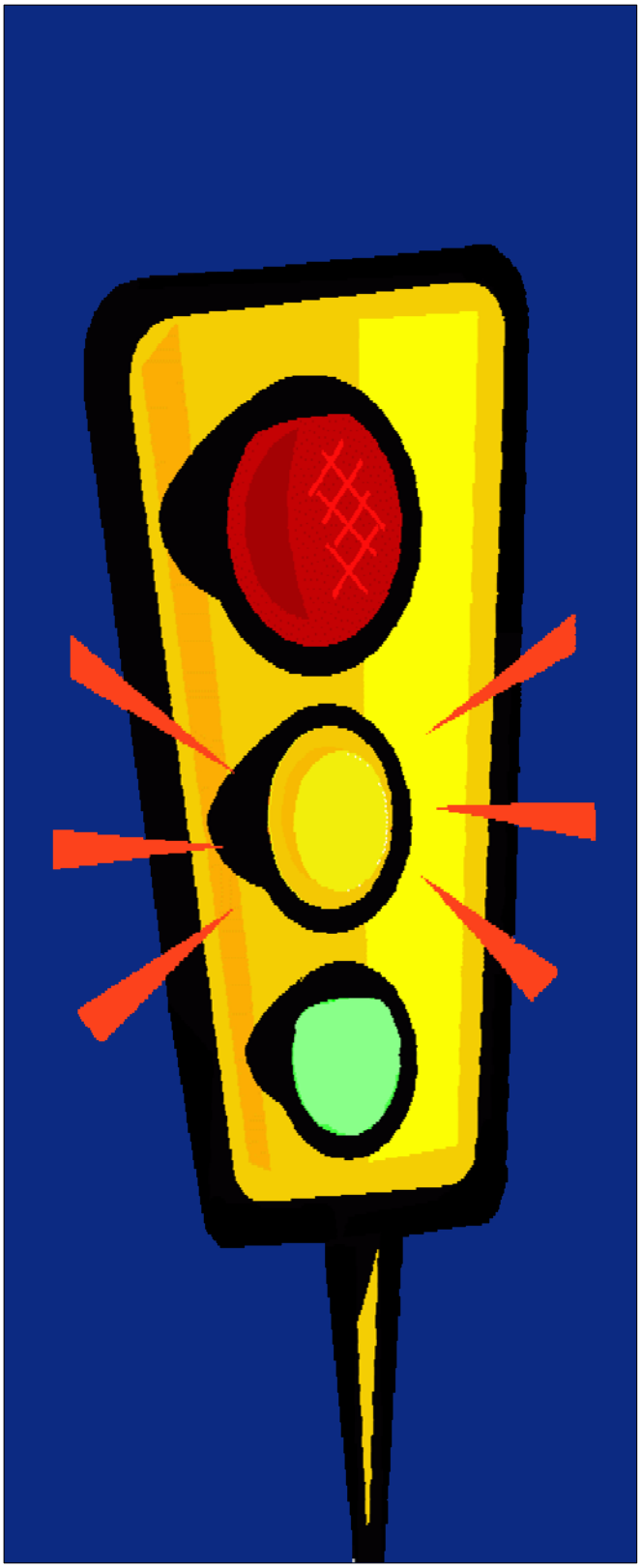
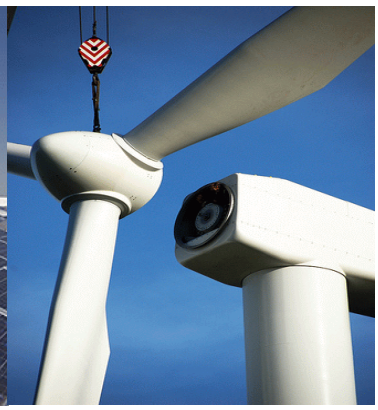


YELLOW LIGHT ON GREEN JOBS

A Report by the U.S. Senate Subcommittee on Green Jobs and the New Economy Ranking Member Senator Kit Bond

Spring 2009



U.S. Senator Kit Bond

Christopher S. "Kit" Bond is serving his fourth term in the U.S. Senate representing the State of Missouri. He is a long-time member of the Senate Environment and Public Works Committee and is currently Ranking Member of the Green Jobs and the New Economy Subcommittee. He also serves as Vice-Chairman of the Senate Select Committee on Intelligence, Ranking Member of the Transportation, Housing and Urban Development Subcommittee of the Committee on Appropriations and as a member of the Committee on Small Business. He previously served two terms as Governor of the State of Missouri.

About This Report

With the 111th Congress, the Senate Environment and Public Works Committee created a new Subcommittee on Green Jobs and the New Economy. This subcommittee affords the opportunity to take a deeper look into the issue of green jobs, their benefits and costs. With this in mind, Ranking Member Kit Bond conducted a review of green job programs, experiences and examples. Expert opinion and conclusions across dozens of reports were reviewed. As the endnotes indicate, reports by green jobs advocates and supporters formed the overwhelming majority of material reviewed. Nevertheless, a mixed picture of green jobs efforts presented itself with massive taxpayer subsidies required to create green jobs and higher energy prices and lost existing jobs expected from current proposals to fund green jobs creation. All of this signals a yellow light urging caution with green jobs.

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1 Executive Summary

Some see green jobs as a cure-all for the Nation's ills, transforming the environment and the economy, even heralding a new era of prosperity for underemployed urban and poor communities.

However, State and local governments are spending tens of millions of dollars to attract in some cases only a few hundred new green jobs. Green jobs subsidies are costing over $100,000 per job in many cases. Created green jobs often offer sub-par wages insufficient to support a family.

Studies by green jobs advocates, labor unions and environmental groups confirm that many green jobs:

- require expensive taxpayer subsidies to create
- pay low wages
- kill existing jobs to pay for creating new green jobs

To pay for expensive green jobs programs and subsidies, green jobs advocates propose government spending of hundreds of billions of dollars.

Some even suggest passage of climate change legislation as a way to generate revenue to pay for green jobs. However, imposing climate change legislation would cost families and communities trillions of dollars in higher energy costs and kill millions of jobs in manufacturing and energy-intensive sectors.

All of these green jobs creation problems and pitfalls signal a yellow light urging caution with green jobs. Lessons for policymakers and political leaders include:

- ➢ Promote green jobs that make economic sense
- ➢ Avoid expensive green jobs taxpayer subsidies and programs
- ➢ Do not kill existing jobs to create green jobs



2 Green Jobs Described

Green jobs are viewed as expansively as the hopes for their potential. The new administration of President Obama describes green jobs as "jobs that somehow contribute to the improvement of environmental quality."[1] Some focus on a specific environmental issue such as climate change, and whether the jobs are related to preventing or adapting to climate change.[2] Climate change is chosen to maximize the breadth of environmental issues (air, water, wildlife, waste) and economic sectors (energy, building, transportation).

Others answer the question of what is a green job by describing the jobs associated with green strategies such as building retrofitting, mass transit, energy-efficient automobiles, wind power, solar power or cellulosic biofuels.[3]

JOBS THAT WILL BUILD THE GREEN U.S. ECONOMY AND FIGHT GLOBAL WARMING[3]

Green Strategy	Representative Jobs
Building Retrofitting	Electricians, Heating/Air Conditioning Installers, Carpenters, Construction Equipment Operators, Roofers, Insulation Workers, Carpenter Helpers, Industrial Truck Drivers, Construction Managers, Building Inspectors
Mass Transit	Civil Engineers, Rail Track Layers, Electricians, Welders, Metal Fabricators, Engine Assemblers, Production Helpers, Bus Drivers, First-Line Transportation Supervisors, Dispatchers
Hybrid & Plug-In Automobiles	Computer Software Engineers, Electrical Engineers, Engineering Technicians, Welders, Transportation Equipment Painters, Metal Fabricators, Computer-Controlled Machine Operators, Engine Assemblers, Production Helpers, Operation Managers
Wind Power	Environmental Engineers, Iron and Steel Workers, Millwrights, Sheet Metal Workers, Machinists, Electrical Equipment Assemblers, Construction Equipment Operators, Industrial Truck Drivers, Industrial Production Managers, First-Line Production Supervisors



Solar Power	Electrical Engineers, Electricians, Industrial Machinery Mechanics, Welders, Metal Fabricators, Electrical Equipment Assemblers, Constr. Equipment Operators, Installation Helpers, Laborers, Constr. Managers
Biofuels	Chemical Engineers, Chemists, Chemical Equipment Operators, Chemical Technicians, Mixing and Blending Machine Operators, Agricultural Workers, Industrial Truck Drivers, Farm Product Purchasers, Agricultural and Forestry Supervisors, Ag. Inspectors

Of course, such an analysis can take green job proponents past where they intend to go. Within the solar power sector, all would agree that workers who assemble and install solar panels are engaged in green jobs. Many would agree that manufacturers of solar panel components employ green labor. There is less agreement on those who also are essential to run a solar panel manufacturing plant such as accountants, clerks and housekeeping personnel. Still more tenuous are the workers which supply raw materials to the solar panel plant such as steel workers, aluminum smelters, copper miners, and coal power plant operators.

Regardless of how far up the supply chain one looks, there are plenty of ways to apply green labor. Construction may be a single job type within the building retrofit strategy, but a green-skilled worker will have work in:[4]

Wall insulation	Hot water temp. reduction
Ceiling insulation	Hot water heater wrapping
Rimjoist insulation	Low-flow showerheads
Air-leak sealing	Pipe insulation
Furnace replacement	Refrigerator replacement
Boiler replacement	Washer replacement
Boiler controls	Fluorescent lighting
Boiler pipe insulation	LED exit signs
Hot water heater replacement	Outdoor lighting control



RENEWABLE ENERGY AND ENERGY EFFICIENCY

With all of these green applications, green jobs are a large and rapidly expanding source of employment. In 2007, by one estimate the renewable energy (RE) and energy efficiency (EE) industries combined generated more than $1 trillion in sales responsible for more than 9 million jobs.[5] By 2030, even under a business as usual scenario, RE & EE revenues are expected to grow to nearly $2 trillion associated with 16 million jobs. Aggressive growth scenarios place 2030 RE & EE at $4 trillion and 37 million jobs. Current RE revenue and jobs break out as follows:

RENEWABLE ENERGY INDUSTRY IN THE UNITED STATES[5]

Industry Segment	**2007 Revenues** (billions)	**Industry Jobs** (thousands)	**Total Jobs** (thousands)
Wind	$3.30	17.3	39.6
Photovoltaics	$1.30	8.7	19.8
Solar Thermal	$0.14	1.3	3.1
Hydroelectric	$3.50	7.5	18.0
Geothermal	$2.10	10.1	23.2
Ethanol	$8.40	83.8	195.7
Biodiesel	$0.40	3.2	7.3
Biomass Power	$17.40	67.1	154.5
Fuel Cells	$1.10	5.6	12.8
Hydrogen	$0.81	4.1	9.4
Total Private Sector Revenues	**$38.45**	**208.7**	**483.4**
Federal Government	$0.65	0.9	2.1
DOE Labs	$1.90	3.8	8.7
State & Local Govt.	$0.95	2.6	5.8
Total Government Spending	**$3.50**	**7.3**	**16.6**



Associations & NGOs	$0.63	1.6	3.5
Total All Sectors	**$42.58**	**217.6**	**503.5**

As large as the number of green jobs is in the RE sector, green jobs engaged in EE is an order of magnitude larger. Gross EE revenues in 2007 represented more than the combined sales of the three largest U.S. corporations - WalMart, ExxonMobil and General Motors ($905 billion).[5]

ENERGY EFFICIENCY INDUSTRY IN THE UNITED STATES[5]

Industry Segment	**2007 Revenues** (billions)	**Industry Jobs** (thousands)	**Total Jobs** (thousands
Energy services	$3.8	23	53
Recycling, reuse & remanufacturing	$290.0	1,372	3,154
Vehicle manufacturing	$86.0	193	443
Household appliance & lighting	$35.0	134	308
Windows & doors	$13.0	54	123
Computers, printers, copiers	$105.0	360	828
TV, video, and audio equipment	$48.0	193	447
HVAC systems	$13.0	47	108
Industrial & related machinery	$21.0	82	187
Misc. durable manufacturing	$110.0	397	901
Nondurable manufacturing	$218.0	518	1,183
Utilities	$2.2	14	32
Construction	$48.0	288	660
Total Private Sector Revenues	**$933.0**	**3,675**	**8,427**



Federal govt. EE spending	$3.8	16	37
State govt. EE spending	$3.2	29	65
Local govt. EE spending	$2.4	22	50
Total Government Spending	**$9.4**	**67**	**152**
Associations & NGOs	$0.5	3	7
Total All Sectors	**$1,002.9**	**3,745**	**8,586**

GREEN JOBS FROM NUCLEAR POWER

Beyond traditional sources of green jobs such as renewable energy and energy efficiency, policymakers and lawmakers must also examine other green job strategies if they are truly committed to maximizing environmental improvement.

Nuclear power will generate both massive amounts of zero-carbon electricity and large numbers of green jobs. U.S. electricity demand is expected to grow by 355 gigawatts by 2030. If 64 gigawatts of this new demand is provided by nuclear power as experts recommend,[6] between 64,000 and 83,000 construction jobs will result with a peak employment of 128,000.[7] That equates to between 1,400 and 1,800 jobs per plant during construction with peak employment of up to 2,800 jobs.

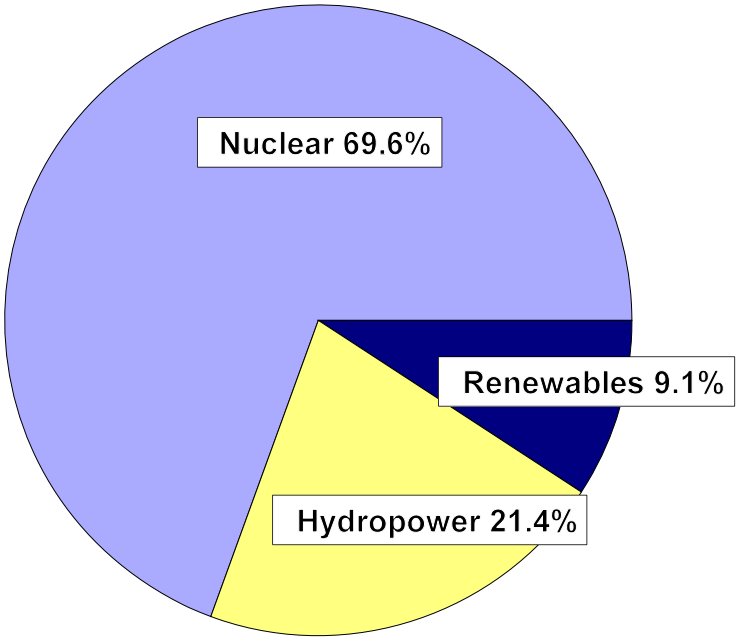
New nuclear construction jobs will include welders, pipefitters, sheet metal workers, electricians, ironworkers, heavy equipment operators, engineers, project managers, and construction supervisors. Jobs will also be created throughout the manufacturing supply chain at a time when many manufacturing states are reeling from job losses in the manufacturing sector. Manufacturers will deliver pumps, valves, and containment vessels. Commodity suppliers will deliver massive amounts of cement and steel.

Once these new nuclear plants become operational, they will directly create 18,400 to 32,200 permanent full-time jobs.[7] The plants will generate $19.8 billion annually in goods and services expenditures, $920 million in state and local tax revenue, and $3.45 billion in federal tax revenues.



Nuclear energy will not only produce large numbers of green jobs and revenues, but it will also continue to deliver massive amounts of clean energy. While green job strategies may be measured by the number of jobs they produce or revenues they generate, another measure is the amount of clean energy they produce. On that basis, nuclear energy produces the largest amount of clean energy of all clean energy sources.[8]

2008 U.S. Clean Power Generation



Nuclear power generates more than seven times as much zero carbon electricity as all renewable sources of energy including wind, solar and biomass combined. In 2007, nuclear energy prevented the emission of 693 million metric tons of carbon dioxide, roughly the equivalent of taking all U.S. passenger cars off the road.[9]



Even some environmentalists previously opposed to nuclear power are beginning to realize that carbon emissions cannot substantially decrease without expanding nuclear energy. The Union of Concerned Scientists believes that:

> "...we're going to need virtually every tool in the toolbox. I'd like to see nuclear be a contender for a piece of the emission reduction pie."[10]

The chief scientist for the group Environmental Defense similarly believes that:

> "[T]o solve this problem, we need to have all technologies on the table. Therefore, nuclear energy...needs to be considered."[11]

He goes so far as to feel that:

> "[I]t's somewhat disingenuous that folks who agree that global warming is such a serious issue could sort of dismiss [nuclear energy] out of hand. It's got to be at least considered."[12]



3 Green Jobs Promoted

Green Jobs Advocates

Green jobs advocates see green job creation fulfilling a social as well as environmental and economic goal.[13] For them, a green job must not only improve the environment, but also provide a family-supporting wage or a career ladder to move low-income workers into higher-skilled occupations. They offer green job creation as an urban renewal strategy to lift workers out of poverty. Prominent green jobs creation proposals include:

The New Apollo Program billed by the Apollo Alliance as "a comprehensive investment strategy to build America's 21st century clean energy economy."[14] The program envisions a combination of government mandates and taxpayer spending in a variety of green strategies including: upgrading the energy efficiency of all buildings by at least 30% by 2025, public support for clean energy projects to produce 25 percent of the nation's power by 2025, new environmentally sound transmission corridors and smart grids to bring clean power to market, efficiency measures for existing utility and industrial power systems, investments in carbon capture and sequestration projections and affordable and convenient transit connecting America's neighborhoods and cities. Sponsors predict that their $500 billion government funded program would create 5 million new green jobs.

Green Recovery by the Center for American Progress seeks to put the economy in "a better position for sustainable prosperity."[15] The program would use taxpayer dollars to focus on six green infrastructure investment areas including: retrofitting buildings to improve energy efficiency, expanding mass transit and freight rail, constructing "smart" electrical grid transmission systems, wind power, solar power and next generation biofuels. Sponsors predict their $100 billion program would create 2 million new green jobs.

Clean Energy Corps (CEC) by a coalition of green jobs advocates proposes a federal government program to combine service, training



and job creation "to combat global warming, grow local and regional economies, and demonstrate the equity and employment promise of the clean energy economy."[16] The CEC would engage millions of Americans in volunteer work related to climate protection, work with employers, unions, educators and community organizations to put more Americans, particularly low-income and unemployed, on green-collar career pathways, preserve and enlarge green public spaces and launch a national effort to comprehensively apply cost-effective energy efficiency measures to our nation's building stock. CEC advocates envision the government spending $33 billion over 5 years across the Department of Energy, Department of Labor and the Corporation for National Community Service.

Universities

Educational institutions are increasingly viewing green jobs promotion as part of their social mandate to create a thriving, healthy society. Beyond providing courses of study and research on ways to eliminate global warming emissions, they are educating and preparing workers for new, reoriented, or emerging jobs in the clean energy economy.[17]

Local governments

Local governments are promoting green job strategies to create clean and healthy cities. Los Angeles leaders see "a unique opportunity to set a national precedent for how urban cities across the country can capture investment in [renewable energy and energy efficiency] technologies to develop an equitable, environmentally sustainable and economically viable green industry.[18] For New York City, green jobs "present a new paradigm for equitable economic development. [They] are accessible both to current workers and to those New Yorkers often shut out of the job market - youth, people of color, and the court-involved."[19]

Federal Government

Green jobs are receiving attention from the highest levels of government and policymakers. The White House recently announced the addition of a Special Advisor for Green Jobs, Enterprise and Innovation, a first ever for that type of position.[20] The first meeting of the White House



Middle Class Task Force chaired by the Vice President focused on green jobs.[21]

Indeed, the Obama administration views promotion of the creation of green jobs as part of its agenda to reform how the nation creates and consumes energy in America.[22] Green jobs "offer the dual promise of providing good jobs while meeting the environmental challenge to reduce our dependence on finite fossil fuels that generate harmful carbon emissions."

The new administration used the 2009 stimulus bill as a significant down payment toward building the green jobs movement. The American Recovery and Reinvestment Act (ARRA) funded investments in green technology and jobs including: $11 billion in new smart grid technology and new or modernized high-tech transmission lines, $500 million for research and job training to prepare workers for careers in RE and EE, $6 billion for a loan guarantee program to enable green industry growth, and $5 billion for weatherization assistance.[23]

However, massive new government spending on green jobs programs is leading to mixed results, with heavy subsidies required to spur low numbers of job creation, sub-par wages and the threat of lost jobs in traditional manufacturing sectors, as the next chapters will reveal.



4 Green Jobs Creation Can Be Expensive

FEDERAL GOVERNMENT SUBSIDIES AND SPENDING PROGRAMS

As touched upon above, the green jobs creation programs proposed by advocates would cost billions of dollars. The New Apollo Program would cost $500 billion over ten years. Green Recovery would cost $100 billion over two years. Only the federal government could afford such expenditures, and that is exactly the source of funding that green jobs advocates envision. Thus, these green jobs proposals would become new federal government programs with taxpayers paying the cost of new green jobs.

PROPOSED FEDERAL TAXPAYER FUNDED GREEN JOBS PROGRAMS

Program	Total Cost	Avg. Annual Cost	Cost per Job
New Apollo Program	$500 billion	$50 billion	$100,000
Green Recovery	$100 billion	$50 billion	$50,000

This massive new federal spending funded by taxpayers would come on top of existing tax benefits and subsidies already funded by taxpayers to support the renewable power industry. In 2007, according to the U.S. Energy Information Administration the federal government subsidized the renewable energy industry with $4.0 billion in tax benefits.[24] This was a four-fold increase in taxpayer subsidy of renewable power from 1990's $1.0 billion subsidy level.

The prime source of federal taxpayer subsidy for wind power is a production tax credit for the first 10 years of a wind facility's operation. The current value of the credit is 2 cents/kWh of electricity produced.



New wind capacity is so dependent on this federal subsidy that installation falls off dramatically in years Congress allows tax subsidy to lapse (2000, 2002 and 2004). In 1999-2000, wind-capacity installation dropped 93 percent, with a 73 percent drop in 2001-2002, and 77 percent drop from 2003-2004.[25]

Federal taxpayer subsidy on a per unit of energy generated basis for wind and solar energy, a prime source of expected green jobs creation, is more than ten times than other sources of clean energy such as nuclear:

2007 FEDERAL TAXPAYER SUBSIDY OF RENEWABLE ENERGY GENERATION[26]

Fuel	**Net Generation** (BkWh)	**Subsidy Value** ($ in millions)	**Subsidy/ Unit Generated** ($/MWh)
Solar	1	$14	$24.34
Wind	31	$724	$23.37
Nuclear	794	$1,267	$1.59
Geothermal	15	$14	$0.92
Hydroelectric	258	$174	$0.67
Coal	1,946	$854	$0.44
Nat. Gas & Petrol. Liquid	919	$227	$0.25

STATE AND LOCAL GOVERNMENT TAXPAYER SUBSIDIES

While proposals for federal green jobs subsidies of $50,000 to $100,000 per job on top of multi-billion dollar federal renewable energy tax subsidies may not seem to make economic sense, State and local governments in some cases are paying even higher tax and grant subsidies per green job to attract new green job manufacturing to their locales.



A coalition of environmental and labor organizations including the Sierra Club, International Brotherhood of Teamsters and Service Employees International Union found that State and local taxpayer subsidies of tens of millions of dollars often times produced only a few hundred jobs. Several per job taxpayer subsidies ranged well over $100,000 per job.[27]

STATE & LOCAL GREEN JOBS TAXPAYER SUBSIDIES[28]

Company	City	State	Workers	Taxpayer Subsidy	Taxpayer Subsidy/Job
Solaicx	Portland	OR	66	$21,500,000	$325,758
United Solar Ovonic	Battle Creek	MI	350	$96,900,000	$276,857
Sanyo Solar	Salem	OR	200	$26,985,000	$134,925
Suniva	Norcross	GA	100	$10,000,000	$100,000
LM Glasfiber	Little Rock	AR	350	$33,800,000	$96,571
Xunlight	Toledo	OH	160	$14,900,000	$93,125
United Solar Ovonic	Greenville	MI	400	$37,000,000	$92,500
Evergreen Solar	Devens	MA	700	$44,000,000	$62,857
Evergreen Solar	Midland	MI	100	$5,700,000	$57,000
AE Polysilicon	Fairless Hills	PA	145	$8,200,000	$56,552
Vestas Americas	Pueblo	CO	450	$23,800,000	$52,889
Schott Solar	Albuquerque	NM	360	$17,000,000	$47,222
Solar World	Hillsboro	OR	1,000	$41,000,000	$41,000
Gamesa	Ebensburg	PA	298	$11,310,000	$37,953
Siemens Power Generation	Fort Madison	IA	380	$12,500,000	$32,895
Acciona Windpower	West Branch	IA	130	$4,850,000	$37,308
Flabeg Solar	Findlay	PA	300	$9,000,000	$30,000



First Solar	Perrysburg	OH	834	$20,960,000	$25,132
OptiSolar	Sacramento	CA	1,000	$20,000,000	$20,000
TPI Composites	Newton	IA	330	$6,600,000	$20,000
Trinity Structural Towers	Clinton	IL	140	$2,000,000	$14,286
Clipper Windpower	Cedar Rapids	IA	250	$3,150,000	$12,600
Heliovolt	Austin	TX	168	$1,600,000	$9,529
Trinity Structural Towers	Newton	IA	140	$1,280,000	$9,143
LM Glasfiber	Grand Forks	ND	900	$7,800,000	$8,667
Gamesa	Fairless Hills	PA	509	$3,930,000	$7,721
Vestas Americas	Brighton	CO	1,350	$8,500,000	$6,296
Vestas Americas	Windsor	CO	420	$1,100,000	$2,619

An examination of some of the richest incentives provided reflects a host of different subsidy strategies nevertheless costing more than $100,000 per job:

Solaicx, Portland, OR - Subsidy: $325,758 per job
Solaicx manufacturers silicon ingots and wafers for photovoltaic applications. It expanded with a new plant in Portland in 2007, attracted in part by state and local taxpayer subsidies including a business energy tax credit or BETC approved by the state legislature that year. That BETC supplied $9 million of the $21.5 million in taxpayer subsidies green jobs advocates report Solaicx received.[29] Their report pegged the number of jobs these taxpayer subsidies created at 66[30], although the most recent press account reports 50 jobs.[31] Solaicx indicates no further job openings at this time.[32] Even with a $325,758 per job subsidy, Solaicx will pay its production workers only $13 per hour, as described in the next chapter.

United Solar Ovonic, Battle Creek, MI - Subsidy: $276,857 per job
United Solar Ovonic manufacturers thin-film flexible photovoltaic laminates for use in the solar power industry. Green advocates



placed state and local economic incentives to entice the plant to Battle Creek at $96.9 million.[33] The firm's announcement release detailed incentives totaling $120 million including: $67 million for a so-called tax-free Renaissance Zone and property tax abatements, $41.4 million in a Michigan Business Tax, and $12.6 million from a Community Development Block Grant awarded to the local county government with additional funding for training assistance.[34] This approximately one hundred million dollars in incentives will result in 350 jobs when the plant is fully operational. Even with a $276,857 per job subsidy, United Solar Ovonic will pay its production workers only $14 per hour, as described in the next chapter.

Suniva, Norcross, GA - Subsidy: $100,000 per job
Suniva will manufacture crystalline silicon photovoltaic cells for the solar power industry. Green jobs advocates place state and local incentives at $10 million.[35] Press accounts confirm this figure and describe taxpayer subsidies including: waiving $3.6 million in state sales tax on manufacturing equipment, school board and city ceding of $4.8 million in property tax revenue and county real property tax incentives worth $1.3 million.[36] These incentives will result in 100 jobs when the plant is fully operational.[37]

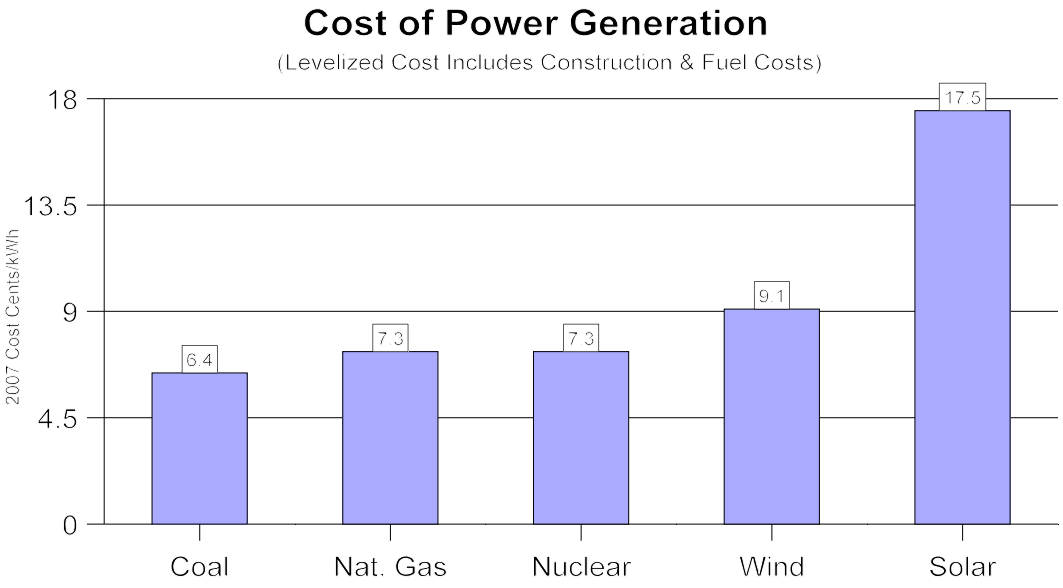
Certainly, large green jobs taxpayer subsidies are within the prerogative of government. Local conditions, including unemployment and limited economic development, may be so severe that taxpayers in those localities accept payment of large taxpayer subsidies to attract a limited number of jobs offering modest wages. However, elected officials concerned about burdening taxpayers with excessive government spending or limited return on investment will pause before devoting tens of millions of dollars to produce a few hundred jobs. Similarly, for many jurisdictions, creation of jobs paying less than what is required to support an average family will not justify expenditure of tens of millions of dollars.

GREEN POWER COSTS TO CONSUMERS

Not only will consumers pay more for green jobs creation through taxpayer subsidies and spending, reliance on green energy sources will raise consumer energy costs because "wind and solar power are generally more expensive then than the fossil fuels they are meant to supplant."[38]



Comparisons of wind, solar, nuclear, natural gas and coal sources of power coming on line by 2015 show that solar power will be 173% more expensive per unit of energy delivered than traditional coal power, 140% more than nuclear power and natural gas and 92% more expensive than wind power.[39] Wind power is 42% more expensive than coal and 25% more expensive than nuclear and natural gas power.



Even this analysis understates the cost of wind and solar power given the additional source of power that is needed when the sun is not shining or the wind is not blowing. Wind and solar's "capacity factor" or availability to supply power is around 33%,[40] which means 67% of the time wind and solar cannot supply power and must be supplemented by a traditional energy source such as nuclear, natural gas or coal.

The need to construct and operate a traditional power source along with renewable energy sources "pushes the price of [wind power] up to just over 12 cents [per/kWh], making it more than 50 percent more expensive than a kWh of coal."[41] For families and workers in the Midwest now depending overwhelmingly upon coal generated power, a shift to reliance on renewable energy sources would raise electricity costs for them dramatically.



5 Green Jobs Can Mean Low Pay

Even with tens of millions of dollars in State and local taxpayer subsidies and the prospect of hundreds of billions of dollars in further in federal taxpayer subsidy, worker advocates are finding that their assumption that green jobs will be good, middle-class jobs is not always valid.[42] They find that:

- Low pay is not uncommon in wind and solar energy, green construction and recycling workplaces. Jobs in recycling processing pay as low as $8.25 an hour and jobs in renewable energy manufacturing facilities pay as little as $11 an hour.

- Wage rates at many wind and solar manufacturing facilities are below the national average for workers employed in the manufacture of durable goods. In some locations, average pay rates fall short of income levels needed to support a single adult with one child.

- Some wind and solar manufacturers have already begun to offshore production of components destined for U.S. markets to low-wage havens such as China and Mexico.

- Construction wages analyzed indicated that a majority of green sector carpenters, roofers, painters and laborers make less than $12.50 an hour and a third make less than the federal poverty wage for a family of four ($10.19/hr).

According to the Bureau of Labor Statistics, the average hourly earnings of a manufacturing worker is $18.00 per hour.[43] However, a majority of surveyed wind and solar manufacturing plants paid their green jobs workers less.[44] A group of environmental and labor advocates surveyed prominent green jobs providers to determine whether the wages they offered to their green manufacturing workers met national standards. Their results are distressing:



AVG. HOURLY WAGE RATE OF WIND & SOLAR MANUFACTURING WORKERS[24]

Company	City	State	Wages	Diff from Avg.
Avg. Hourly Manufacturing Wage	**Nationwide**		**$18**[23]	**-**
LM Glasfiber	Grand Forks	ND	$11-15	-39% to -17%
Gamesa	Ebensburg	PA	$13-20	-28% to +11%
Solaicx	Portland	OR	$13	-28%
TPI Composites	Newton	IA	$13-14	-28% to -22%
United Solar Ovonic	Greenville	MI	$13.50	-25%
LM Glasfiber	Little Rock	AR	$14-17	-22% to -6%
Gamesa	Fairless Hills	PA	$14-20	-22% to +11%
United Solar Ovonic	Battle Creek	MI	$14	-22%
Acciona Windpower	West Branch	IA	$15	-17%
XUNlight	Toledo	OH	$15.50	-14%
Evergreen Solar	Midland	MI	$16	-11%
Schott Solar	Albuquerque	NM	$16	-11%
First Solar	Perrysburg	OH	$17	-6%
Vestas Americas	Pueblo	CO	$17.50	-3%
Trinity Structural Towers	Newton	IA	$18	-
Vestas Americas	Brighton	CO	$18	-
Vestas Americas	Windsor	CO	$18	-
Siemens Power Generation	Fort Madison	IA	$19	6%
Clipper Windpower	Cedar Rapids	IA	$20	11%
Sanyo Solar	Salem	OR	$22	22%



A closer examination of green job providers shows that many are prospering and expanding operations, even while they offer sub-par wages.

LM Glasfiber, Grand Forks, ND - based in Denmark with facilities in Europe, India, China and the U.S., LM Glasfiber is owned by the London-based private investor group Doughty Hanson & Co. LM Glasfiber built its Grand Forks wind turbine manufacturing facility in 1999 and has expanded it multiple times to meet demand. It doubled in size in 2006 and currently employs 800 people. In January, LM Glasfiber's head of North America operations praised the Grand Forks plant, calling it one of the company's "best performing plants in the world."[45] However, LM Glasfiber pays its production workers as low as $11 per hour or up to 39% less than the average national manufacturing wage.

Gamesa, Ebensburg, PA - based in Spain with facilities in Europe, Asia and the U.S., Gamesa opened its Ebensburg, PA plant in 2006 and currently employs approximately 300 workers. Last year, Gamesa wind turbine sales expanded 25% to 3.5 billion euros generating a record 320 million euro profit.[46] According to a spokesperson, "[t]he company considers its Ebensburg facility one of the finest in the world."[47] However, Gamesa pays its production workers as low as $13 per hour or up to 28% less than the average national manufacturing wage.

TPI Composites, Newton, IA - based in Arizona with facilities in the U.S., Mexico and China, TRI Composites opened its Newton wind turbine facility in 2008. The new plant with 500 workers is expected to meet growing turbine demand, which led TPI to triple its capacity last year and helped it raise $20 million in new financing from General Electric's investment arm, Landmark Growth Capital Partners, NGP Energy Technology Partners and Angeleno Group.[48] However, TPI Composites plans to pay its production workers up to 28% less than the average national manufacturing wage.

United Solar Ovonic, Greenville, MI - based in Michigan with facilities in the U.S. and Mexico, United Solar Ovonic opened its first Greenville plant in 2007. A second plant at Greenville opened a year



later and the firm plans to expand operations at the site again by 2010 to 800 employees.[49] The companies' growth helped it obtain $400 million in new investment financing. However, United Solar Ovonic paid its Greenville production workers 25% less than the average national manufacturing wage.

Certainly, renewable energy manufacturers have every right to pay their workers at competitive rates, including those competitive to the plant's location. In these difficult economic times, communities welcome such investment and new jobs. However, nearly all of the surveyed green job production workers earned hourly wages below the level needed in their location to match the median family wage ($22.26), and some were just above the federal poverty wage for a family of four ($10.19).[50] That does not make these green jobs bad jobs or these providers bad companies, but it does mean that green jobs are not providing the overwhelming financial benefits that green jobs advocates ascribe.



6 Green Jobs Creation Can Kill Jobs

Proposals to create green jobs will kill millions of existing jobs. Government mandates and heavy government spending necessary to provide the incentives and taxpayer subsidies necessary to spur green job creation will raise costs for employers, force layoffs and shift production (and emissions) overseas to lower cost nations. Furthermore, capital resources that would have gone to create private sector jobs will instead go through public programs to create fewer green jobs by comparison.

Climate Change Legislation Job Loss

One of the most expensive and burdensome strategies to fund green jobs creation would piggy-back on proposals to cut greenhouse gas emissions in an effort to limit climate change. Climate change legislation limiting greenhouse gases emitted by power plants and manufacturing facilities could also impose fees on those facilities reflecting the greenhouse gases they do emit. Green jobs advocates recommend imposing such fees and diverting a portion of this new government revenue to green jobs creation programs. The Apollo Alliance recommends spending revenue from climate change legislation on its $500 billion green jobs proposal.[51] Similarly, the Center for American Progress recommends additional revenue from climate change legislation, such as that debated last year in the Senate, as the primary source of funding for its $100 billion green recovery program.[52]

Fees from climate change legislation would certainly generate large amounts of new federal revenue given that everything that uses traditional forms of energy, such as coal, oil and natural gas, emits large amounts of greenhouse gases. Last year, the U.S. Senate debated climate change legislation that sponsors estimated would generate $6.7 trillion in program fees. However, policymakers cannot expect energy using firms and shareholders to bear these costs themselves. Firms paying additional climate legislation fees to the government would certainly pass on those costs to their customers. That would mean higher energy costs and more expensive goods and services. President Obama said that under his plan to address climate change, “electricity prices would necessarily skyrocket.”[53]



With just about every consumer product requiring energy at some point in its production, the U.S. Environmental Protection Agency (EPA) estimated that the legislation the Senate debated would by 2050 annually cost the average U.S. household $4,377 and raise gasoline prices by $1.40 per gallon. EPA projected electricity prices would increase 44% by 2030.

Climate legislation would also force massive job loss, especially in energy dependent manufacturing sectors. Workers manufacturing steel, aluminum, cement, fertilizer, plastics, pharmaceuticals or assembling just about any product all need large amounts of energy as part of their manufacturing process. Higher energy costs would force energy-intensive manufacturers to cut costs, including through a reduction in their workforce or relocation to foreign countries with cheaper energy costs. Experts estimated that climate legislation the Senate debated last year would kill between 1.2 million and 1.8 million by 2020 and 3 million to 4 million by 2030.[54]

Climate legislation induced job loss would hit hardest manufacturing dependent States, especially those in the Midwest. Similarly, States in the Great Plains and South, which use higher proportions of carbon intensive coal to generate electricity, would face large job loss. A selection of estimated climate change legislation State job loss includes:

SELECTED STATE JOB LOSS UNDER CLIMATE CHANGE LEGISLATION[54]

State	Job Loss	State	Job Loss
Ohio	143,000	Michigan	121,800
Pennsylvania	139,000	Illinois	156,900
Indiana	78,600	Louisiana	61,100
Missouri	76,100	Arkansas	39,600
Tennessee	80,400	Kentucky	54,700
Nebraska	25,100	West Virginia	27,200



LOST JOBS FROM LOST INVESTMENT

In addition to jobs lost from higher energy costs, workers would also lose out on jobs that payers of higher energy costs failed to create. Indeed, each dollar sent to the government in the form of climate legislation fees or additional tax to provide a green job subsidy is a dollar that a person or firm could not invest in new job creation.

Free market economists argue that "government job creation is private-sector job destruction with wide ranging (negative) effects on the economy."[55] For them, the need for a government subsidy proves that the private sector could have created a different job at a lower cost. Furthermore, the need for continued government subsidy makes the job less productive and less of a contributor to economic growth than a private sector job.

Whether these free-market economic theories on government job destruction hold true is reflected in the experience of foreign countries that have embraced renewable energy and green job taxpayer subsidies. Indeed, president-elect Obama, visiting an Ohio wind power manufacturer, advocated his renewable energy subsidy proposal by asking the audience to "think of what's happening in countries like Spain, Germany...where they're making real investments in renewable energy."[56]

However, examination of the German and Spanish experiences find reason for concern. A study of heavy German subsidies for the solar industry revealed that "it is quite doubtful whether [the solar subsidies] net employment effects are positive at all."[57] The 35,000 German solar sector jobs in 2007 came at a cost of 7.2 billion euros in mandated higher electricity prices. As with the American cap-and-trade analysis, experts found that the resulting drain of purchasing power and investment capital of private and industrial electricity consumers causes negative employment effects in other sectors. They also noted that the 35,000 jobs at a cost of 7.2 billion euros meant a 205,000 euro or $281,000 per job subsidy.

A study of the Spanish renewable energy experience put Spanish investment at the equivalent of $37 billion to sustain 50,200 jobs through wind, mini-hydro and photovoltaic programs.[58] This alone is a subsidy of over $700,000 per job. This study delved further to determine the number of jobs



which were not created because funds went instead to green jobs taxpayer subsidies. Comparing the amount capital the private sector employed per worker to the level of government subsidy per green job revealed that the private sector creates 2.2 jobs for every green job the government created. The study also compared the government green job subsidy to the productivity of its average worker to again find a 2.2 ratio. "Thus, on average, the subsidized green job destroys the resources required to create 2.2 jobs in the private economy." To be fair, the decision of the private sector to create jobs with available capital rests with executives and shareholders who may favor other forms of investment or dividend with firm resources at any given time. However, these examples do confirm the high cost of green job creation and their potential to kill jobs directly or indirectly elsewhere in the economy.

NEWTON, IOWA

The example of the TPI Composites wind turbine facility in Newton, Iowa shows how American workers and communities are net losers when traditional jobs are destroyed and subsidized green jobs created. At the time, press accounts portrayed location of a new green jobs source in an economically depressed community as a positive outcome.[59]



TPI Composites Wind Turbine Facility at Newton, Iowa

The TPI Composites Newton facility manufacturing wind turbine components will provide 700 desperately needed jobs to this town of 16,000 in rural central Iowa. The town lost 1,800 jobs when the Maytag washing machine



factory closed in 2007. Generations of Newton residents had worked there and now Newton was set to become another example of American industrial decline. The new green jobs are billed as saving them from this fate.

However, a critical examination shows that Newton is still worse off replacing its manufacturing workers with green collar workers. The Maytag factory closure ended 1,800 jobs, yet the TPI Composites opening replaced only 700 of those jobs. The Maytag workers earned $20 an hour in addition to health benefits. Newton TPI turbine workers will earn only $13 an hour. Newton workers went from wages that could support a middle class family to wages not much higher than the federal poverty wage for a family of four.

Of course, Newton did not play a role in or have a choice in losing their good paying manufacturing jobs. Similarly, the city and its workers rightfully welcome TPI Composites' new green jobs as a positive source of income and employment. However, national policymakers and legislators do have a choice over whether they will enact climate change legislation to fund green jobs creation programs that result in the destruction of good paying manufacturing jobs like those that were in Newton, in part to create fewer, lower paying green jobs like those that came to Newton.

CALIFORNIA ANALYSIS

Some claim that the environmental mandates of climate change legislation itself will result in green jobs creation sufficient to outweigh its higher energy cost and traditional job killing effects. However, such claims are meeting with criticism and charges of intentionally skewed analysis.

The State of California argued that its climate plan would produce a net increase in economic activity and individual earnings. Disturbingly, a review by six independent economists found California's analysis "deeply flawed," and several even said the state hand-picked data to improve the economic case for reducing greenhouse gas emissions.[60] An economics professor at the University of California Los Angeles was "troubled by the economic modeling analysis...[for the California climate plan that] is presented as a riskless 'free lunch'" that would provide a "'win-win' of much lower greenhouse gas emissions and increased economic growth."[61]



However, a Harvard reviewer, "c[a]me to the inescapable conclusion that [California's] economic analysis is terribly deficient in critical ways and should not be used by the state government or the public for the purpose of assessing the likely costs of [their] plans."[62]

Reports that California officials "intentionally skewed"[63] the analysis of the positive economic effects of their climate plans along with federal and independent expert findings of trillions of dollars in costs, greatly higher gasoline and electricity prices, reduced family incomes and potentially millions of lost jobs from climate change legislation, means extreme caution should be exercised before imposing them to fund green jobs proposals. The United States has already lost 6 million manufacturing jobs over the last 30 years.[64] Funding for green jobs creation should not justify killing millions of existing jobs, this time consciously by policymakers and legislators.



7 Recommendations

Some see green jobs as a cure-all for the Nation's ills, transforming the environment and the economy, even heralding a new era of prosperity for underemployed urban and poor communities.

However, State and local governments are spending tens of millions of dollars to attract in some cases only a few hundred new green jobs. Green jobs subsidies are costing over $100,000 per job in many cases. Created green jobs often offer sub-par wages insufficient to support a family.

Studies by green jobs advocates, labor unions and environmentalist groups confirm that many green jobs:

- require expensive taxpayer subsidies to create
- pay low wages
- kill existing jobs to pay for creating new green jobs

To pay for expensive green jobs programs and subsidies, green jobs advocates propose government spending of hundreds of billions of dollars.

Some even suggest passage of climate change legislation as a way to generate revenue to pay for green jobs. However, imposing climate change legislation would cost families and communities trillions of dollars in higher energy costs and kill millions of jobs in manufacturing and energy-intensive sectors.

All of these green jobs creation problems and pitfalls signal a yellow light urging caution with green jobs. Lessons for policymakers and political leaders include:

- ➢ Promote green jobs that make economic sense
- ➢ Avoid expensive green jobs taxpayer subsidies and programs
- ➢ Do not kill existing jobs to create green jobs

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