

U. S. CLEAN ENERGY BENEFITS AND COSTS

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Abstract: This paper mentions, evaluates and gives suggestions on some of the United States government programs that promote clean energy. It also shows the programs effectiveness and cost. The reason the United States was chosen as an example is due to the fact that it is the world's largest investor in clean and renewable energy and can be used as a model demonstrating what happens when the government, not the free market is the main promoter of a clean and renewable energy program. The programs that will be discussed and analyzed are: Nuclear clean-up, weatherizing modest income homes, the manufacturing of advanced car battery (traction) systems and components and the Car Allowance Rebate System. The cost ineffectiveness of each program is demonstrated clearly when it becomes evident that all of these programs can not continue without government funding. Additionally, deadlines for finishing projects are not met, costs exceed estimates, and government funding is used for purposes other than its original intention.

Key words: clean energy; jobs; economic growth; sustainability

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Is clean and renewable energy the next big economic boom for the United States and will the rest of the world follow in its footsteps? In theory, clean renewable energy can create jobs, income, and economic growth. What is the cost of it all and can it be sustained for the long-term without government assistance? Does the current path of clean renewable energy create growth and prosperity or just more indebtedness? It is up to the reader to determine if these programs are worthwhile and worth continuing.

The American Recovery and Reinvestment Act[ARRA] of February 2009 allotted more than \$ 48 billion for improving U. S. energy infrastructure, efficiency and renewable energy research^[1]. Energy infrastructure spending totaling more than \$ 21 billion included:

- (1) \$ 6 billion cleanup of radioactive waste.
- (2) \$ 4. 5 billion was allotted for the Office of

Electricity and Energy Reliability to improve the nations electrical grid.

- (3) \$ 4. 5 billion to increase energy efficiency in federal buildings.

- (4) \$ 3. 25 billion for upgrading the Western Area Power Administration transmission system.

- (5) \$ 3. 25 billion for upgrading Bonneville Power Administration transmission system.

Energy efficiency and renewable energy research and investment totaling more than \$ 27 billion included 20 categories of improvements with the largest 6 listed below.

- (1) \$ 6 billion for renewable energy and electric transmission technologies loan guarantees.

- (2) \$ 5 billion for weatherizing modest-income homes.

- (3) \$ 3. 4 billion for carbon capture and low emission coal research

- (4) \$ 3. 2 billion toward Energy Efficiency and

Conservation Block Grants^[2].

(5) \$ 3.1 billion for the State Energy Program to help states invest in energy efficiency and renewable energy.

(6) \$ 2 billion for manufacturing of advanced car battery (traction) systems and components.

Now it is 2012, more than three years later, we can analyze and see the progress of these programs and conclude whether or not the money was well spent.

1 Nuclear cleanup

Nuclear Cleanup program will cost 6 billion. The office of Environmental Management (EM) has been or is currently responsible for cleaning up nuclear sites across the United States^[3]. The sites were a result of the nation's nuclear weapons program and other experiments. The most recent update on the EM website was March 31st, 2010. Of a total of 31 sites, 17 were closed and 14 were still active. Of the 14 sites still active, I selected the four states with the most money allocated to them as a measure for how many jobs were produced and at what cost.

1.1 Washington state

Washington state was supplied with \$ 1.9 billion in government stimulus money to rid two sites of its nuclear waste. 6 432 jobs were created in the process. Taking the stimulus money divided by the number of jobs created, we learn that each job created cost the government \$ 295,398.

1.2 South Carolina

South Carolina was given \$ 1.61 billion of government stimulus money to clean 1 nuclear site. 3 340 jobs were created in the process. That comes out to \$ 482,000 per job. In 2010 that is more than ten times the GDP per capita in the United States.

1.3 Tennessee

Tennessee was given \$ 755 million of stimulus money to clean up 1 site. 3 749 jobs were created in the process at a cost of \$ 201,000 per job.

1.4 Idaho

Idaho was given \$ 467 million of stimulus

money that created 1 902 jobs at a government cost of \$ 245,000 per job.

In 2010, United States GDP per capita was \$ 47,800. It took \$ 4.73 billion dollars of government spending to create 15 423 jobs that still are not complete. That is an astounding \$ 306,000 per job or more than 6.4 times 2010 GDP per capita in 2010. At such a high rate of pay, there certainly would be no rush to complete the job. The workers will likely spend all of the allocated stimulus money before finishing the job. The result will be asking the government for more money before completing the job. This is a clear example of the wreckless government spending of tax payer dollars.

2 Weatherizing modest-income homes

Weatherizing modest-income homes will cost about 5 billion. The objective of the weatherization plan which was one of President Obama's campaign promises back in 2009 was to weatherize 1 million homes per year. The government estimates weatherization returns \$ 2.69 for each \$ 1 spent on the program realized in energy and non-energy benefits. \$ 437 is the expected utilities savings on a weatherized house^[4]. As of September 2011 \$ 3.46 billion of \$ 4.75 billion (73 percent) has been spent^[5].

For people to get a better idea of what weatherization meant, a list was created by the government to clarify the program. Weatherization or "whole house weatherization" includes but is not limited to:

(1) Sealing bypasses (cracks, gaps, holes), especially around doors, windows, pipes and wiring that penetrate the ceiling and floor, and other areas with high potential for heat loss, using caulk, foam sealant, weather-stripping, window film, door sweeps, electrical receptacle gaskets, and so on to reduce infiltration.

(2) Sealing recessed lighting fixtures ['can lights' or 'high-hats'], which leak large amounts of air into unconditioned attic space.

(3) Sealing air ducts, which can account for 20% of heat loss, using fiber-reinforced mastic [not duck/duct tape, which is not suitable for this purpose].

(4) Installing/replacing dampers in exhaust ducts, to prevent outside air from entering the house when the exhaust fan or clothes dryer is not in use.

(5) Protecting pipes from corrosion and freezing.

(6) Installing footing drains, foundation waterproofing membranes, interior perimeter drains, sump pump, gutters, downspout extensions, downward-sloping grading, French drains, swales, and other techniques to protect a building from both surface water and ground water.

(7) Providing proper ventilation to unconditioned spaces to protect a building from the effects of condensation.

(8) Installing roofing, building wrap, siding, flashing, skylights or solar tubes and making sure they are in good condition on an existing building.

(9) Installing insulation in walls, floors, and ceilings, around ducts and pipes, around water heaters, and near the foundation and sill.

(10) Installing storm doors and storm windows.

(11) Replacing old drafty doors with tightly sealing, foam-core doors.

(12) Replacing older windows with low-energy, double-glazed windows.

The department of Energy's production target for the \$4.75 billion is to weatherize 607 000 homes. That is a significant lower number than the 1 million promised by President Obama. Using \$4.75 billion to weatherize 607 000 homes, comes down to an average cost of \$7,825 per modest-income home. If \$437 can be saved per year on utility costs, it will take 17.9 years to break even on the \$7,825 investment. To meet the government's target of a return of \$2.69 for every \$1 spent, it would take 48.2 years. That is assuming no further maintenance costs will occur during that time. Looking at the above list of what defines weather-

ization, it is debatable whether or not this plan is a worse allocation of government stimulus funds than the nuclear cleanup plan.

3 Car battery systems and components

\$2 billion [Revised to \$2.4 billion] was allotted for manufacturing of advanced car battery [traction] systems and components. On August 5th, 2009, President Obama made a speech saying if Americans want to reduce dependence on oil and put Americans back to work and rebuild our manufacturing sector, we must produce advanced efficient vehicles of the future^[6]. The \$2.4 billion dollars is the largest single investment in advanced battery technology for hybrid and electric-drive vehicles and claims to be able to create tens of thousands of new jobs. The plan allotted \$1.5 billion in grants to U. S. based manufactures to produce batteries, battery components and to expand battery recycling capacity. \$500 million in grants to U. S. based manufactures to produce electric drive components for vehicles, including electric motors, power electronics, and other drive train components. And finally \$400 million in grants to purchase thousands of plug-in hybrid and all-electric vehicles for test demonstrations in several dozen locations; to deploy them and evaluate their performance; to install electric charging infrastructure; and to provide education and workforce training to support the transition to advanced electric transportation systems.

In 2009, Johnson Controls was awarded \$299.5 million by the U. S. government to manufacture batteries and other components for electric vehicles in Michigan. Johnson is a profitable company because it has three business units: Automotive Experience, Building Efficiency and Power Solutions. Its building efficiency unit completed the world's largest building in 2009, the Burj Khalifa Tower and the Khalifa hospital in 2010. Its core business is not making non profitable electric batteries but the company was happy to take a free investment [grant] from the U. S. government.

Another company named A123 whose sole business is electric batteries and related components tells quite a different story. The company requested \$1.84 billion in direct government loans to establish a manufacturing base in Michigan. A123 later received \$249 million in August 2009 from the U. S. government^[6]. In December 2009 just a mere four months after receiving \$249 million in government money, A123 announced a joint venture with Shanghai Automotive Industries Company [SAIC] to produce complete battery packs in China^[7]. The Joint venture will be 51% owned by SAIC and 49% owned by A123. Effectively no longer making A123 an American company.

It should also be noted that in September 2009 A123 raised an additional \$380 million going public on the NASDAQ stock exchange with ticker symbol AONE priced at \$13.50 per share. Earnings Per Share [EPS] in March 2012 is \$2.12 per share and the stock is trading at \$1.70 per share with only a \$250 million market capitalization. Despite its unprofitability, one of the most important stated objectives of the U. S. loan was to establish the base of manufacturing in the United States and create new jobs in the United States. That objective failed miserably.

Today Electric cars make up about 1% of the U. S. car market despite billions of dollars of direct investment, loans and subsidies. The electric cars currently have tax break subsidies of \$7500 per vehicle but they are still very expensive compared to gas operated cars. President Obama is currently trying to increase the subsidy to \$10,000 per car. Even with a \$10,000 subsidy to date it is just impracticable to buy an electric car both for its high cost and inconvenience. Not very many people would dare to drive across country in an electric car because there are too many areas like deserts and small towns with few or no charging stations. If the government took a different form of action and substantially raised the price of gasoline by levying additional green tax, the likely result would be more electric car sales. Realistically after the U. S.

election, the U. S. gas price could be raised to \$6-8 a gallon to promote additional sales of electric vehicles while the government collected more tax revenues. The initial reaction would be a short-term outrage by the American people similar to the Occupy Wall Street movement. But after protests waned there would be a better chance Americans would purchase more affordable electric cars as opposed to taking public transportation or riding a bicycle.

4 Car Allowance Rebate System

\$3 billion was allotted for Car Allowance Rebate System. In the midst of the worst recession since the Great Depression of the 1930's, the U. S. government decided it was time for people to go out and buy a new car. Colloquially known as "Cash for Clunkers" the program was intended to provide stimulus to the U. S. economy via increased sales for car dealers and increased jobs for the struggling Detroit automobile industry. Its duration was from July 1st 2009 to August 25th 2009. The plan didn't stipulate that the purchases had to be American cars. On August 26th the Department of Transportation reported that 690 114 dealer transactions were submitted requesting nearly \$2.9 billion in rebates^[8]. Toyota accounted for 19.4% of sales, General Motors had 17.6%, Ford 14.4%, Honda 13% and Nissan 8.7%^[9].

In an economic recession, the government was trying to stimulate the economy by giving its citizens a cash incentive to have their old cars destroyed and buy new ones therefore putting the average U. S. citizen further into debt. The logic was the new cars would get better gas mileage therefore reducing pollution and the use of gas. In 2009 the U. S. unemployment rate was 10%. Gas mileage really doesn't matter to people who don't have jobs. Not very many people are going to go driving across the country while they are unemployed.

The program was extremely wasteful for a multitude of reasons. Creating a financial incentive to buy

new car temporarily distorts the market. The result naturally will be that more cars will be sold during the cash incentive programs but fewer cars will be purchased after the financial incentive ends. Additionally, the plan should have stipulated that the cars purchased were American cars produced in America which would give unemployed American auto workers at least temporary employment due to the increased demand for cars. Instead 41% of the sales were foreign cars. Finally, this type of program should be initiated when the economy is expanding, jobs are plentiful and people can financially afford to buy a new car. Saddling citizens with more debt when they don't even have jobs to buy items they don't need is absolutely ludicrous.

5 Conclusion

The current path for United States clean renewable energy is sustainable only with the use of large U. S. government assistance in the forms of loans and subsidies. A moral hazard is created when any government awards money and subsidizes an industry. The companies that receive government assistance have no intention of using the money in a cost effective way. In fact if something is financially wrong with a subsidized company the expectation is for more government financial assistance. This is to say that government assistance encourages more risk taking behavior. The current situation of the clean energy movement has striking similarities to the U. S. automobile industry and the banking system that also expect to be bailed out by the government.

If the clean energy industry can really be sustained indefinitely, government loans and subsidies have to be removed to find out the true viability of the programs. If the result is bankruptcy for many of the companies with a focus on clean energy, it only proves

the companies were inefficient and should go bankrupt. If the industry is truly promising and profitable, new and more innovative companies will rise and take the place of the bankrupt ones. Only with the threat of bankruptcy will any company or organization act responsibly with the funds it has.

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美国清洁能源的成本和效益

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摘要:将从分析美国新能源战略的有效性和成本入手,梳理和评估美国政府的新能源方案,同时提出一些关于清洁能源的建议。选择了美国推广清洁能源行为作为对象来讨论,不仅因为美国是世界上最大的清洁能源和可再生能源的投资者,同时还强调美国在运行这一投资的时候并没有使用自由市场来推动,而是完全由政府买单和控制。具体要讨论的方案是:核清理;低收入家庭房屋采暖;先进的汽车电池(牵引)系统及组件;电动汽车补贴退税制度。通过对每个方案内容的阐述和成本、效益的分析,来评估这些方案是否是有价值的和值得继续的。最后的结论可以归纳为这些清洁能源实施项目非常低效,并且提出一系列的证据表明这些项目在没有政府巨额经费支持的情况下是无法继续的,同时表明在没有严格的项目完成日期、持续发生超过预算的额外支出的情况下,政府的支持计划很可能和初衷背道而驰。

关键词:清洁能源;工作;经济增长;可持续性

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