

TESTIMONY BEFORE THE  
HOUSE SELECT COMMITTEE ON ENERGY INDEPENDENCE  
AND GLOBAL WARMING  
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**TESTIMONY OF GABRIEL CALZADA ÁLVAREZ, PhD**

Chairman Markey, Congressman Sensenbrenner and Members of the Select Committee, thank you for the invitation to testify today.

My name is Gabriel Calzada Álvarez. I am an Associate Professor at Universidad Rey Juan Carlos (King Juan Carlos University) in Madrid, where I teach Applied Economics at the Environmental Science Faculty. In March 2009 me and two colleagues from the same University, Raquel Merino Jara and Juan Ramón Rallo Julián, released our study on the Spanish experience with “green jobs” with the technical auditing help of José Ignacio García Bielsa, a professional with large experience in the electricity market. Our study (“[Study of the effects on employment of public aid to renewable energy sources](#)”) has been provided to the Committee.

**SUMMARY**

President Obama has made clear his intention to follow Europe’s lead in employing state intervention in the economy to “create” what are called “green jobs”, specifically as a path out of the current economic troubles. Europe’s experience actually suggests that this is precisely the wrong approach, and I appreciate the opportunity to comment for your hearing record on our research which put these claims to the test using official data.

Our study sought to answer the seminal question—what was the price of Spain’s attempt to lead the world in a clean energy transformation. Our research shows that that price was very high. Here are some highlights from our study:

- For every 1 green job financed by Spanish taxpayers, 2.2 jobs were lost as an opportunity cost.
- Only 1 out of 10 green job contracts were in maintenance and operation of already installed plants, and most of the rest of the working positions are only sustainable in an expansive environment related to high subsidies.
- Since 2000, Spain has committed €571,138 (\$753,778) per each “green job,”
- Those programs resulted in the destruction of nearly 110,500 jobs.
- Each “green” megawatt installed on average destroyed 5.39 jobs elsewhere in the economy, and in the case of solar photovoltaics, the number reaches 8.99 jobs per megawatt hour installed.

Spain has already attempted to lead the world in a clean energy transformation. But our research shows that Spain’s policies were economically destructive.

When the president of a country with a relatively low unemployment rate like the US decides to learn how to create jobs from a country like Spain with the highest unemployment rate among developed countries, it should be in a field where that country has a demonstrable track record of job creation. Unfortunately, this is not the case of job creation in Spain through public support for the renewable energy.

Spain might have some original and efficient policies to show the rest of the world but unfortunately renewables aid is not one of them.

### **Bubbles Burst**

In Spain, we are witnessing the logical conclusion of an unsustainable policy of government subsidies and mandates of uneconomic forms of Energy. The bubble is bursting. In this case, it is a bubble created by government policies requiring more and more revenue best described so well by former British Prime Minister Lady Margaret Thatcher: “the problem with socialism is that eventually you run out of other people’s money.” That is what is happening in Spain’s renewable energy business today.

And while small and localized bubbles have occurred throughout history because of many individuals making the same bad decision, the magnitude of potential problems is tremendously amplified when those decisions are sanctioned and encouraged by government largesse and misguided interventions in the market. Governments have a bad track record of picking winners and losers in markets, and in fact, generally pick economic losers because it lacks the necessary incentives to avoid mal-investment and loss of capital. This eventually results in the withdrawal of political and economic support for the government’s created market. The bubble bursts.

### **A SHORT HISTORY OF SPAIN’S ATTEMPT TO CLEAN THE WORLD IN A CLEAN ENERGY TRANSFORMATION**

Although what the president has called “new” energy sources such as wind and solar have been around for centuries, the idea of a broad state-financed regime supporting renewable energy in Europe dates back to 1997 (EU White paper “Energy for the future: renewable sources of energy”). The creation of jobs in the “renewables” industry emerged as one of the main justifications and focal points of the plan.

Ten years later, the Commission presented an energy and climate policy package that would “set the pace for a new global industrial revolution.” On January 23rd 2008, the very same day that the Commission proposed the package in the new directive, Commission President José Manuel Barroso said that the proposal would be “an opportunity that should create thousands of new businesses and millions of jobs in Europe. We must grasp that opportunity.”

The same idea was repeated, albeit with different tones, by various political leaders, giving fodder to a press release by the Commission that captured comments by its members under the title, “Boosting jobs and growth by meeting our climate change commitments.” Spain, the country with the greatest problem with Kyoto’s cap and trade agreement—having increased emissions more than 50% over the base year when the Spanish-committed target was 15%—saw renewables as a possible solution to its emission woes.

During the 2004 general election campaign the socialist party candidate, José Luis Rodríguez Zapatero, promised “a reorientation of the energy model (...) towards one that is more centralized, more diversified and safe, less wasteful and also more solidary” (meaning it requires payment by many into a system “for the common good” from which they achieve little benefit). It was a change

in energy policy that would take place—and this is paramount—“built on all renewables, and in particular, solar energy.”

Soon after approving a new Royal Decree, Prime Minister Zapatero defended the change from the existing energy model to his energy model “of the future”—which Spain would lead, using language similar to that now employed in the U.S.— and correlated his efforts in the promotion of renewables with the creation of a high volume of jobs in the renewable energy sector. History would partially prove him right.

## **PRESIDENT OBAMA PROMOTES THE SPANISH MODEL**

On January 16th, 2009, president-elect Barack Obama visited an Ohio business that manufactures components for wind power generators. Under the watchful eyes of both factory workers and the press, Obama assured, amid deepening unemployment and the onset of one of the gravest economic crises in recent history, that renewable energy “can create millions of additional jobs and entire new industries.”

The president then defended his energy subsidy package by citing examples from other countries: “And think of what’s happening in countries like Spain, Germany and Japan, where they’re making real investments in renewable energy. They’re surging ahead of us, poised to take the lead in these new industries.” He repeated this reference to the Spanish model as a basis for his plan on several other occasions.

President Obama is correct in observing that Spain provides a reference for the establishment of government aid to renewable energy. No other country has given such broad support to the construction and production of electricity through renewable sources. The arguments for Spain’s and Europe’s 20-20-20 “green energy” schemes are the same arguments now made in the U.S., principally that massive public support would produce large numbers of green jobs. The question that we and my colleagues have tried to answer through extensive academic research is “at what price?”

## **THE RENEWABLE ENERGY BUBBLE—HOW WAS IT CREATED?**

The way Spanish politicians have supported renewable energy production is the so-called feed-in price system or tariff. Under this scheme, distributors of energy pay the producers of renewable energy a regulated price above the market price, reaching more than 100% over market price in wind energy and over 500% in solar photovoltaic energy in the Spanish case. This system has led to a myriad of decrees by which politicians and bureaucrats have tried to find the price and other artificially created incentives that would stimulate renewable energies at the lowest possible cost.

Under those stimuli wind energy grew from 1,715 installed MW at the beginning of 2000 to 14,836 MW at the end of 2008. In the same period of time solar photovoltaic energy production grew from practically nothing at the beginning to almost 3,000 MW. The growing installed capacity produced a significant growth in related jobs: from a small number of workers to 50,200 equivalent jobs. Moreover, according to one of Spain’s largest trade unions only 9.58% of the contracted green jobs at the renewable sector were in the field of maintenance and operation, and 66.27% in construction, fabrication and installation. Therefore, the growth of the installed capacity meant more public aid but it also meant more contracted workers in fields like installation, construction and fabrication that can only be sustained by additional plants that in return require new public aid.

The feed-in price system and the bubble produced a deficit to the energy distributors (called the rate deficit) that the government promised to repay. The rate deficit (mainly produced by renewable subsidies) that started in year 2000 with 250 million Euros and in year 2008 was already 5 billion Euros (3.4 billion due to renewables), has now an accumulated amount of over 16 billion Euros (more than \$23 billion USD).

Given Spain's experiment with feed-in tariffs, I was very surprised to learn from the publication Greenwire that two US Congressmen, Representatives Bill Delahunt and Jay Inslee are preparing a similar feed-in tariff law for your country. Our experience shows this will be economically harmful for consumers of electricity and for the society as a whole. The only ones who benefit...and benefit handsomely.... are the corporate interests who are paid princely sums for their fashionable but inefficient energy.

## **OPPORTUNITY COST**

Public investment in renewable energy cites job creation as one of its explicit goals, which, given the current economic crisis, suggests an intention of seeding a future recovery with "green job" subsidies. The problem with this plan is that the resources used to create "green jobs" must be obtained from elsewhere in the economy. Therefore, this type of policy tends to create not just a crowding-out effect but also a net destruction of capital insofar as the investment necessary must be subsidized to a great extent and this is carried out by absorbing or destroying capital from the rest of the economy.

The money spent by the government cannot, once committed to "green jobs", be consumed or invested by private parties and therefore the jobs that would depend on such consumption and investment will disappear or not be created. Moreover, if the electricity produced by these sources ends up costing more to consumers, economic damage is compounded.

Investment in green jobs will only prove convenient if the expense by the public sector is more efficient at generating wealth than the private sector. This would only be possible if public investment were able to be self-financing without having to resort to subsidies, i.e., without needing to absorb wealth generated by the rest of the economy in order to support a production that cannot be justified through the incurred incomes and costs. We have calculated that the total public subsidy in Spain, both spent and committed, totals 28,671 million Euros (€28.7 billion or appx. \$41.4 billion USD at present exchange rates), and sustained 50,200 jobs. In other words every green job the government program has tried to create has cost 0.571 million Euros (\$824,000 USD). This number should also be placed in the context of an economy that is less than 1/10th the size of that in the United States. (2008 Spain GDP \$1.378 trillion vs. \$14.29 trillion for US)

In order to know how many net jobs are destroyed or avoided—as opposed to "created or saved"—by a green job program, for each one that it is intended to create we use two different methods: with the first, we compare the average amount of capital destruction (the subsidized part of the investment) necessary to create a green job against the average amount of capital that a job requires in the private sector; with the second, we compare the average annual productivity that the subsidy to each green job would have contributed to the economy had it not been consumed in such a way, with the average productivity of labor in the private sector that allows workers to remain employed.

## **JOBS**

Using Spain as a model, and optimistically treating data funded in part by the European Commission, we find, by the above mentioned two different methods, that for every renewable

energy job that the State manages to finance, 2.2 jobs are lost on average, or about 9 jobs lost for every 4 created, to which we have to add those jobs that non-subsidized investments with the same resources would have created. Thus, the study calculates that the programs creating those jobs resulted in the destruction of nearly 110,500 jobs elsewhere in the economy. Since 2000 Spain spent €571,138 to create each “green job”, including subsidies of more than €1 million per wind industry job.

## **ENERGY**

Each “green” megawatt installed destroys 5.28 jobs on average elsewhere in the economy: 8.99 jobs lost per MW/h of photovoltaics, 4.27 by wind energy, and 5.05 by mini-hydro. (“mini-hydro” includes low-head and other inefficient forms of hydropower)

These costs do not appear to be unique to Spain’s approach but instead are largely inherent in schemes to promote renewable energy sources.

The total over-cost—the amount paid over the cost that would result from buying the electricity generated by the renewable power plants at the market price—that has been incurred from 2000 to 2008 (adjusting by 4% and calculating its net present value [NPV] in 2008), amounts to 7,918.54 million Euros (appx. \$11.4 billion USD)

The total subsidy spent and committed (NPV adjusted by 4%) to these three renewable sources amounts to 28,671 million Euros (\$41.35 billion USD at present exchange rates), as was already stated.

## **WHO PAYS?**

To pay for this experiment, Spanish citizens must therefore cope with either an increase of electricity rates or increased taxes (and public deficit), as will the U.S. if it follows Spain’s model. The price of a comprehensive electricity rate (paid by the end consumer) in Spain would have to be increased 31% to repay the historic debt generated by this rate deficit mainly produced by the subsidies to renewables, according to Spain’s energy regulator.

Renewables consume enormous societal resources. In Spain, the average annuity payable to renewables is equivalent to 4.35% of all VAT collected, 3.45% of the household income tax, or 5.6% of the corporate income tax for 2007.

The regulator should consider whether citizens and companies need expensive and inefficient energy—a factor of production usable in virtually every human project—or affordable energy to help overcome the economic crisis instead.

The Spanish system also jeopardizes conventional electricity facilities, which are the first to deal with the electricity tariff deficit that the State owes them. During this period, 2000 to 2008, renewable technologies remained the beneficiaries of new credit while others began to struggle, though this disparate treatment was solely due to subsidies, mandates and related programs. As soon as subsequent programmatic changes take effect, which has become necessary due to “unsustainable” solar growth, its credit will also cease.

Principally, the high cost of electricity affects costs of production and employment levels in metallurgy, non-metallic mining and food processing, beverage and tobacco industries.

The high cost of electricity due to the green job policy tends to drive the relatively most electricity-intensive companies and industries away, seeking areas where costs are lower. The example of the stainless steel manufacturer Acerinox, which exported its growth from Europe to Kentucky thereby

creating U.S. and not European manufacturing jobs, is just such a case. I am surprised that the United States, which has seen the benefits of lower electricity prices in attracting business investment and jobs from other countries, would be considering a similar course and expecting a different result.

## CONCLUSION

The study offers a caution against a certain form of green energy mandate. Minimum guaranteed prices generate surpluses that are difficult to manage. In Spain's case, the minimum electricity prices for renewable-generated electricity, far above market prices, wasted a vast amount of capital that could have been otherwise economically allocated in other sectors. Arbitrary, state-established price systems inherent in "green energy" schemes leave the subsidized renewable industry hanging by a very weak thread and, it appears, doomed to dramatic adjustments that will include large unemployment, loss of capital, dismantlement of productive facilities and perpetuation of inefficient ones.

These schemes create serious "bubble" potential, as Spain is now discovering. The most paradigmatic bubble case can be found in the photovoltaic industry. Even with subsidy schemes leaving the mean sale price of electricity generated from solar photovoltaic power 6 times higher than the mean price of the pool, solar failed even to reach 1% of Spain's total electricity production in 2008. The energy future has been jeopardized by the current state of wind or photovoltaic technology (more expensive and less efficient than conventional energy sources). These policies will leave Spain saddled with and further artificially perpetuating obsolete fixed assets, far less productive than cutting-edge technologies, the soaring rates for which soon-to-be obsolete assets the government has committed to maintain at high levels during their lifetime.

This proves that the only way for the "renewables" sector—which was never feasible by itself at this large scale on the basis of consumer demand—to be "countercyclical" in crisis periods, or lead a state out of economic difficulty—is also via government subsidies which of course is a problematic approach. These schemes create a bubble, accelerated as soon as investors find in "renewables" one of the few profitable sectors while fleeing other investments. Yet it is axiomatic, as we are seeing now, that when crisis arises, the Government cannot afford this growing subsidy cost either, and finally must penalize the artificial renewable industries which then face collapse.

In sum, I would urge the Committee to closely investigate the experience that other nations have had with renewable energy schemes as we have done with our analysis of the Spanish model. Deliberately pursuing more expensive and less efficient energy in order to create green jobs has been the source of social harm and net job destruction, and many citizens of a nation are hurt when such policies are pursued.

The reality of renewable energy economics has forced the Spanish government to admit some of our findings at the introduction to the Royal Decree of April the 30th 2009 where it stated that the rate deficit, mainly caused by the feed-in-tariff system to support renewable energies, "is deeply harming the system and puts at risk not only the financial situation of the electric sector companies' but also sustainability of the system itself. This disadjustment turns out to be unsustainable and has grave consequences since it deteriorates the security and financial capacity of the investments necessary for providing electricity at the levels of quality and security the Spanish society demands."

The bubble bursts.

Some in the investment community already know this. In a 16 April, 2007, *Portfolio.com* article entitled “Behind the Green Doerr,” the investment strategy of one of America’s most aggressive investors in alternative energy, the venture capital firm Kleiner Perkins, was discussed:

Asked if greentech could repeat the dotcom crash, Doerr admits, “It’s possible.” He pauses and rubs his forehead before repeating, “It’s possible.”

Kleiner Perkins partner Ray Lane, a sage 60-year-old, goes further. “A bubble? You can almost count on it,” he says. “Bubbles are common. They end badly for those who come in late. For those who come in early, it’s not that bad.” Lane thinks Kleiner Perkins’ greentech portfolio has big, long-term winners in it. But he predicts that alternative energy will get overheated and others will undoubtedly go up in flames. “If the bubble develops out of a whim,” he says, “then shame on investors. They need to get burned.”

Thank you.