This is the print version of the Skeptical Science article 'Renewable energy investment kills jobs', which can be found at http://sks.to/jobs.

Renewable energy creates more jobs than fossil fuels

What The Science Says:
The claim that 2.2 conventional jobs are destroyed for every new job created in the alternative energy industry is based on a study which relies on incorrect numbers, cherrypicked dates, faulty theory, flawed methodology, and is disproven by real-world examples. In reality, renewable energy investment and development tends to create more jobs than fossil fuel energy.

Climate Myth: Renewable energy investment kills jobs
"for every renewable energy job that the State manages to finance, Spain's experience...reveals with high confidence, by two different methods, that the U.S. should expect a loss of at least 2.2 jobs on average" (Gabriel Calzada Álvarez)

A study published by a Spanish economist claims that investment in renewable energy will result in a net job loss:

> "for every renewable energy job that the State manages to finance, Spain's experience...reveals with high confidence, by two different methods, that the U.S. should expect a loss of at least 2.2 jobs on average"

This study was authored by Gabriel Calzada Álvarez, who happens to be the founder of one libertarian think tank and a fellow of a second, which in recent years received funding from Exxon Mobil. But of course despite this potential conflict of interest, we will evaluate the study's claims on their own merits (or more accurately as we will see, the lack thereof).

Underestimating Green Job Creation

One key flaw in the Calzada study is in its estimate of green job creation through renewable energy projects. Obviously when evaluating the net effect on Spanish employment, this is a key figure to get right. According to Calzada (page 25),

> "Since 2000, the renewable subsidies have created less than 50,200 jobs."

However, his reference for this figure is unclear. Calzada cites an Instituto Sindical de Trabajo, Ambiente y Salud (ISTAS) study for the beakdown of those jobs (percentage of construction, maintenance, administration, etc.), but not for the 50,200 job claim itself. The number seems to stem from estimated predictions made in 2003 of what the renewable energy job creation ***would*** turn out to be, rather than recent estimates of what the numbers ***did*** turn out to be.

In reality, as noted by a United Nations Environment Programme (UNEP) study, the ISTAS actually estimates that 188,000 green jobs have been created in Spain, the majority since 2000. Getting this figure so wrong invalidates Calzada's conclusions by itself.

Falling Unemployment in Navarre

Navarre is a region in Spain which has invested heavily in renewable energy, currently obtaining 65% of its energy from renewable sources including 993 megawatts (MW) of wind and almost 100 MW of solar photovoltaic power. So if Calzada's argument is correct and investing in renewable energy kills jobs, we would expect to see high unemployment in this

region.

The Regional Minister of Innovation, Enterprise and Employment for the Government of Navarre, José María Roig Aldasoro, wrote a letter in response to Calzada's study, in which he noted:

> "In Navarre, the development of renewable energies, and above all wind energy, has created wealth, employment and technological development, and I can assert that this can be achieved in any other region or country.
>
> Our region's GDP is among the three highest in Spain, participation by the industrial sector is 12 points higher than the entire country's, and for many years Navarre has had unemployment rates inferior to Spain's. Before the beginning of the current world crisis our region enjoyed full employment. Now, after the strong economic and employment crisis that affects Spain in particular, Navarre maintains itself as the Spanish region with the least unemployment."

Aldasoro went on to note that in 1994, when the first wind farm was erected in Navarre, unemployment in the region was at 12.8%. As more and more renewable energy was installed and worker training centers were opened, the unemployment rate consistently dropped, reaching a level of under 5% in 2007. Navarre provides a real-world example which is hard to jibe with Calzada's claims of job destruction.

Cherrypicking

Another letter was published in response to the Calzada report by Jesús Caldera, the vice president of the IDEAS Foundation and former minister for public works, and Carlos Mulas-Granados, the executive director of the IDEAS Foundation and former economic advisor to Prime Minister Zapatero. Caldera and Mulas-Granados note that the Calzada report suffers from a common tactic which Skeptical Science readers will recognize: cherrypicking.

> "Professor Calzada tries to find a long-term trend, but only cites employment data for the last year during Spain's serious recession. He argues that solar energy has destroyed 15,000 jobs in the last year, but neglects to cite official figures showing an increase in this job sector of about 500% in the preceding three years. The loss he refers to is thus nothing more than a minor downturn in an economy that is troubled by the recent economic crisis....This is a report which fails to meet even the minimum standards of academic integrity. But worst of all, Professor Calzada's report ignores – or hides - the positive figures in net employment creation of other renewable energy sectors, such as windmills, where Spain has truly become a world leader."

Faulty Theory

The Calzada report explains the theory behind its faulty numbers on page 37:

> "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."

In short, Calzada argues that government investment "crowds out" private investment, which he claims is more efficient at job creation, and thus any public investment in renewable energy must necessarily result in job destruction. In reality, there are only a few circumstances in which this "crowding out" argument holds true; generally when the economy's resources are being fully utilized, which is rarely the case. It's certainly not true in today's stagnant economic conditions, when private investment and growth is low. Under these conditions, public investment provide jobs to the unemployed without "crowding out" private investment.

The study also fails to take infrastructure improvements into account, which improves private-sector performance by raising average productivity.

Flawed Methodology

A white paper from the US National Renewable Energy Laboratory (NREL) describes the many fundamental flaws in the Calzada paper methodologies, summarizing the study as follows:

> "The analysis by the authors from King Juan Carlos University represents a significant divergence from traditional methodologies used to estimate employment impacts from renewable energy. In fact, the methodology does not reflect an employment impact analysis. Accordingly, the primary conclusion made by the authors – policy support of renewable energy results in net jobs losses – is not supported by their work."

The NREL paper also provides a list of recent studies in Europe as a whole (including Spain) and Germany in particular have found that public investment in renewable energy development results in a net positive impact on employment.

> "recent research has found that it is only when conventional energy prices are forecast to be very low that net employment impacts from [renewable energy] investments are negative."

Renewable Energy Creates More Jobs than Fossil Fuels

Calzada's argument is also directly contradicted by reality, because renewable energy investment and development tends to create more jobs than fossil fuel energy because a larger share of renewable energy expenditures go to manufacturing equipment, installation, and maintenance, all of which are typically
more labor-intensive than extracting and transporting fossil fuels.

Indeed a 2004 UC Berkeley study concluded:

> "Across a broad range of scenarios, the renewable energy sector generates more jobs than the fossil fuel-based energy sector per unit of energy delivered (i.e., per average megawatt)."

The study found that implementing a Renewable Portfolio Standard and investing in various types of renewable energy would create approximately twice as many jobs in the USA by 2020 as investing in coal and natural gas. Similarly, a 2001 Renewable Energy Policy Project report found that wind and solar photovoltaic investments lead to at least 40% more jobs per dollar than coal.

It's a complicated comparison, because renewable energy sources tend to be more expensive than fossil fuel energy. Thus hypothetically, the extra money invested in renewable energy could have been spent elsewhere to create new jobs in a different sector of the economy. However, fossil fuel energy is also artificially cheap because its price does not account for various external costs like climate change and impacts on public health. When accounting for all factors, it's likely that renewable energy results in more jobs per dollar invested than fossil fuels.

Calzada is Wrong

As shown above, the Calzada paper is flawed in almost every conceivable way: it relies on incorrect numbers, cherrypicked dates, faulty theory, flawed methodology, and is disproven by real-world examples. In reality, investment in renewable energy results in a net positive effect on employment.

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