

Is Renewable Energy Promoting net Creation of Jobs and GNP Growth in Europe ?

Jean-Pierre SCHAEKEN WILLEMAERS



Jean-Pierre SCHAEKEN WILLEMAERS holds a Master's Degree in electrical and mechanical engineering and graduated in nuclear engineering and economics (University of Louvain, Belgium). He began his career as a Lecturer at the University of Louvain. He then held different executive positions in the industry sector as he worked for the Suez-Tractebel group. He was a Sales & Marketing Director and a Member of the Executive Committee of Tractebel Engineering before being appointed Executive Vice-President of Tractebel EGI (Electricity & Gas International). He has been in charge of several subsidiaries in Europe (Germany, Italy, Hungary) and Central Asia. He is currently a Vice-Chairman and an Executive Board Member of Unit International SA, a Board Member of Unit Invest NV and of a number of Industrial Companies. He is also a member of the Thomas More Institute Advisory board.

For many years, green employment has been one of the key expectations in Europe and more recently in the USA. The real question is whether promoting renewable energy resources (RES) impact positively on the net creation of jobs and whether in the long run the related incentives are the most efficient way to reduce the greenhouse gas emissions (GHG).

Another issue concerns the justification of subsidizing massively RES in countries which are not able to develop a competitive export oriented industry. It appears indeed that only technological leaders will really benefit from RES incentives. However some of those countries like Spain which have initiated green investments early in the game, have to cut in their support schemes because of an excessive burden on their national budget.

The main objective of the European energy policy is securing the European energy future at competitive prices while curbing GHG emissions or as stated by the Commission: " an energy policy for Europe combating climate change, limiting the EU's external vulnerability to imported hydrocarbons and promoting growth and jobs".

It is all very well but is the target of promoting economic growth and jobs through green policy just wishful thinking or is there some substance in it? To what extent is it achievable? There are indeed uncertainties about the real contribution of renewables to employment and GNPs.

Employ RES report

A research report has been contracted (1) by the European Commission to an association of consultants (2) to gain further understanding of renewables on economic growth and employment in the EU. This report "Employ RES" was published in 2009 balancing the positive effects against the negative ones of RES deployment. Before commenting on the conclusions of this report it should be noted that important negative effects have been neglected or not sufficiently taken into account:

- x The impact of increased electricity prices on competitiveness of energy intensive industries and the possible relocation of such businesses in more attractive countries with consequential disaggregated employment effect. Already in 2006, the Spanish trade union UNESID (Union de Empresas Siderurgicas) warned that a good portion of the industry would be relocated because of a loss of competitiveness caused by high energy costs due to energy policy linked to the promotion of renewable energy. In 2008, the European

Trade Union Confederation (ETUC) stressed the necessity to guarantee European jobs because they saw the potential risk of employment destruction due to the package's "green energy" requirements;

- x the operation/maintenance costs of thermal power plants in standby to take over power generation from renewables when there is no wind or no sun (3);
- x the impact of non-productive green employment on costs for consumers: people writing and enforcing regulations, filling out forms, processing paperwork, in brief positions not creating value;
- x the economic impact of public aid given to renewables on the rest of the economy;
- x the impact of important investments in power networks made necessary by an extensive use of renewable electricity generation including the development of smart grids;
- x biased optimism about which technologies will improve.

It is obvious that the conclusions of the "Employ RES" report will be negatively affected if above considerations are taken into account. This will be discussed further down. However the report rightly emphasises that a modelling analysis like the one presented, contains different forms of uncertainty: "the most important ones are the uncertainty connected with the input data (e.g. on the costs of RES technologies), the inherent uncertainty about the future (e.g. future energy prices) and the uncertainty of the modelling system".

This being said the report concludes that:

- x RES policies are able to stimulate moderate economic growth in European countries. Current RES policies (BAU-ME) in the EU member states result in an increase of GDP by 0.11%-0.14% by 2020. More ambitious policy assumptions result in an even stronger increase of the GDP by 0.23-0.25% in 2020.
- x Jobs would also be stimulated by RES policies but to a lesser degree than GDP. The positive effects on employment strongly depends on the rise of energy cost caused by the increased use of RES technologies. Therefore a thorough analysis of which RES technology best fits each country in terms of the specific production cost is a prerequisite for a successful renewable policy.
- x Business as usual RES policies in the EU members states combined with moderate expert expectations have a roughly constant positive effect on employment with 115,000/200,000 jobs in 2020. The advanced scenario combined with moderate expert expectations leads to a higher increase in average employment of 396,000/417,000 jobs by 2020.

Although above figures are disputed as explained below, they are far from the important impact of renewables on employment and GDP some European governments and even Mr Obama are claiming. Moreover according to MITRE (4), to meet the EU targets on renewables, "government and policy makers should kickstart the wide scale implementation of renewable technology by reducing the risk of investment to developers". That means further increasing the costs of the support schemes at the expense of the other sectors of the economy, of the competitiveness and so on.

Impact of RES on employment and GDP growth: positive or negative?

Is the European policy producing a net creation of jobs? In other words does the creation exceed the destruction of jobs? Reference is made above to the Employ-RES research project and to MITRE overview report on renewables. It is interesting for the sake of an open debate to read a contrary view, "the study of the effects on employment of public aid to renewable energy sources" (5).

The report draws the lessons from the Spanish renewable bubble. The key points of this study are given hereafter:

- x "As President Obama correctly remarked, 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 "green jobs" 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 is "at what price?"
- x Despite its hyper-aggressive (expensive and extensive) "green jobs" policies it appears that Spain has created a surprisingly low number of jobs, two thirds of which came in construction, fabrication and installation, one quarter in administrative positions, marketing and projects engineering, and just one out of ten jobs has been created at the more permanent level of actual operation and maintenance of the renewable sources of electricity.
- x This came at great financial cost as well as cost in terms of jobs destroyed elsewhere in the economy.
- x The study calculates that since 2000, Spain spent €571,138 to create each "green job", including subsidies of more than €1 million per wind industry job. Since 2000, the renewable subsidies have created less than 50 200 jobs. This amounts to 0.2% of Spain workforce. Total subsidy since 2000 is € 28,651 MM.
- x The study calculates that the programs creating those jobs also resulted in the destruction of nearly 110,500 jobs elsewhere in the economy, or 2.2 jobs destroyed for every "green job" created. While it is not possible to directly translate Spain's experience with accuracy to claim that the U.S. would lose at least 6.6 million to 11 million jobs (in addition to the jobs lost due to the opportunity cost of private capital employed in renewable energy), the study clearly reveals the tendency that the U.S. should expect such an outcome.
- x The high cost of electricity especially affects costs of production and employment levels in metallurgy, non-metallic mining and food processing, beverage and tobacco industries.
- x Each "green" megawatt installed destroys 5.28 jobs on average elsewhere in the economy: 8.99 by photovoltaics, 4.27 by wind energy, 5.05 by mini-hydro.
- x These costs do not appear to be unique to Spain's approach but instead are largely inherent in schemes to promote renewable energy sources.
- x 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 (approximately \$10 billion).
- x The total subsidy spent and committed to these three renewable sources amounts to 28,671 million euros (\$36 billion).
- x The price of a comprehensive electricity tariff (paid by the end consumer) in Spain would have to be increased by 31% (according to Spain's energy regulator) to repay the historic debt generated by this deficit mainly produced by the subsidies to renewables.
- x Spanish citizens must therefore cope with either an increase of electricity tariff or increased taxes, as will the U.S. if it follows Spain's model.
- x 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. Acerinox is a point in case.
- x 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 massive unemployment, loss of capital, dismantlement of productive facilities and perpetuation of inefficient ones.

- x 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 7 times higher than the mean price of the pool, solar failed even to reach 1% of Spain's total electricity production in 2008.
- x 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.
- x 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.
- x The Spanish system also jeopardizes conventional electricity facilities, which are the first to deal with the electricity tariff deficit that the State owes them.
- x This proves that the only way for the "renewables" sector - which was never feasible by itself on the basis of consumer demand - to be "countercyclical" in crisis periods is via government subsidies. These schemes create a bubble, which is boosted as soon as investors find in "renewables" one of the few profitable sectors. It is obvious that when crisis arises, the Government cannot afford this growing subsidy cost, and finally must penalize the artificial renewable industries which then face collapse.
- x Renewables consume enormous taxpayer resources. In Spain, the average annuity payable to them 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.

This study does not mean that RES should be abandoned or that renewable energy does not contribute to GHG emission reduction. The point is that alternative views should not be discarded as they are too often today just because they are not "politically correct". In developed countries, few policy makers dare to question the so-called clean energy policies and in particular their impact on employment and GDP growth. This issue should be openly debated! Political leaders should be more careful and think twice before granting massive and sometimes poorly structured financial support to controversial clean technologies.

Sustainability of the investments in renewable energies

Current enthusiasm for renewable energies is based on statements like "the scientific evidence is now overwhelming: climate change presents very serious global risks and it demands an urgent global response". But is scientific evidence for dangerous change that overwhelming to justify massive public aids at the expense of other sectors of the economy? Is it not too alarmist? Do climate studies take proper account of the uncertainties and major gaps in the knowledge of climate science? Is a too large credence not given to model projections over firmly established data and findings?

The IPCC (Intergovernmental panel on climate change) warned that: "In climate research and modelling we should recognise that we are dealing with a coupled non-linear chaotic system, and therefore that long term prediction of future climate states is not possible. The most we can expect

to achieve is the prediction of the probability distribution of the system's future possible states by the generation of ensembles of model solutions.". IPCC also highlighted the "process whereby uncertainty accumulates throughout the process of climate change prediction and impact assessment has been variously described as a cascade of uncertainty".

The alternative and renewable energy benefit from heavy backing from governments, a massive liquidity surge created by world's central banks, financial stimulus, great expectations about new technologies, emphatic statements by some corporate executives, herd behaviour from venture capitalists and all that in spite of uncertainties associated with climate change projections.

What about those uncertainties?

In its last Assessment Report, the IPCC rated the level of scientific understanding of nine out of twelve identified climate forcings as low or very low, highlighted the limitations of climate models and recognised large uncertainties about how clouds react to climate forcing. What about the role of solar changes (sunspots), cosmic rays, aerosols, local heating caused by urbanization and industrialization and so on? The actual impact of these phenomena is largely unknown and substantially affect the climate models. Are the warming trends not exaggerated? Weather balloon measurements (since 1958) and satellite microwaves sounding units (since 1978) indicate a warming trend of about 0.1-0.2 °C/decade instead of 0.3-0.4°C/decade announced by the Stern Review.

The most recently revised satellite data show little change after 1979 especially in the tropics and southern hemisphere. Models which are successful in predicting the current warming phase, suggest even a cooling over the next few decades! NASA and the Russian Academy of Sciences have both issued predictions that cooling will occur early in the 21st century as solar activities decrease.

As far as CO₂ is concerned, it should be noted (6) that:

- x the increase of CO₂ emissions between 1945 and 1965 was accompanied by a falling temperature;
- x according data from ice cores, increases in temperature preceded parallel increases in CO₂ by at least 100 years;
- x in a doubling CO₂ scenario, from 20 climate models 5 showed a positive and 14 a negative cloud forcing;
- x alarming predictions all require that water vapour and clouds act as to greatly amplify the impact of CO₂ whereas even the third assessment of the IPCC Report acknowledged that water vapour and especially clouds are poorly modelled while the underlying physics for determining their behaviour is missing or even unknown;
- x concerning ice sheets, papers based on satellite altimetry show a slight net gain in the mass of the Greenland ice sheet (1998-2008) although the ice margin of Greenland is shrinking, ice is building up inland due to higher snow fall.
- x moreover temperatures in the Arctic as a whole are as warm now as they were in the 1930's and the much larger Antarctic ice sheet is growing .

In the wake of the dot-com and housing bubble are we now heading for a renewable energy bubble? There is already in some cases a strong diversion of asset prices from the intrinsic value of the related business. Some alternative energy stocks trade at exaggerated multiples of the expected earnings. It is the case for instance of First Solar with a USD 22 billion market capitalization and of GCL Silicon Technology which filed a registration statement with SEC for a USD 863 million public offering. The latter company based in Hong Kong was founded just two years ago. Financial stars seem to be aligning around alternative energy just as they did around the internet and we know how that ended!

The popping up of the bubble would lead to companies failures. But before reaching that point governments could change their policy regarding renewable energies. There could be different reasons for such a decision or accumulation of those reasons: the financial burden of the (too) generous support schemes, recession, a revised assessment of the climate change, exaggerated optimism about some technologies and techniques that could prove to be inappropriate or too inefficient or too expensive even in the long term. As the renewable energy business heavily depends on public subsidies, significant reductions of such aids would strongly affect that industry.

Spain is in that respect a point in case. Indeed this country provides a reference for the establishment of government aid to the renewable industry. No other country has given such broad support to the construction and production of energy through renewable sources. The government view was that massive public aid would generate many green jobs. The question is: to what extent and at what price? "Contrary to expectations it appears that Spain has created a low number of jobs at great financial cost in terms of jobs destroyed elsewhere in the economy. Each green MW installed destroys 5.28 jobs on average elsewhere in the economy: 8.99 by photovoltaics, 4.27 by wind energy, 5.05 by minihydro. Spanish citizens must therefore cope with either increase of electricity rates or increased taxes (and public deficit). Arbitrary State established price systems inherent to green energy schemes, leave the subsidized renewable industry hanging by a very weak thread and it appears doomed to dramatic adjustments that will include massive unemployment. These schemes create serious bubble potential as Spain is now discovering. In a recession period, the government cannot afford the subsidy cost and finally must penalize the artificial renewable industry which then face collapse" (7).

The weakest segment of this business is the photovoltaic sector. A most generous scheme was worked out which grants a regulated tariff 575% above the mean reference (TMR) during the first 25 years of operation for plants up to 100 kW. Higher capacity plants however are "penalized" with a retribution over the TMR of "only" 300% in the first 25 years.

As is common with such schemes this only emboldens craftiness. Indeed in order to take advantage of 575% over TMR, "solar farms of various MW started to proliferate, motivated by business which ran these installations under several client names, usually assigning to each one less than the 100 kW limit. Those firms could manage a big solar farm (for exemple 10 MW) connected by a series of transformers up to 100 kW each. In short such artificial subsidy schemes encourage massive inefficiencies which increase the renewable cost. For 2008, the mean sale price of electricity generated from solar photovoltaic (PV) power in Spain, is 7 times higher than the mean price of the pool (electricity market price originated in the wholesale market). In spite of the economic efforts, solar energy failed to reach 1% of Spain's total electricity production".

In this context a very restrictive regulation on photovoltaic was issued in September 2008." It greatly decreases the retributions to new installations, favouring roof installations (on buildings), applying a reduction of 30% which especially affects the ground photovoltaic industry (the most developed sofar), and a quota system is implemented to monitor the expansion of this industry. The photovoltaic Industry Association, in a press release of February 6, 2009 estimates that there have been 15,000 job losses in the solar sector just a few months after the decrease became effective. This reflects the boom/burst nature of renewable industries, or any other which exist and subsist solely thanks to subsidies, mandates and similar regimes" (8).

In spite of this experience, the European Photovoltaic Industry Association (EPIA) supports the conclusions of the "SET for 2020" study according to which PV electricity could provide up to 12% of the EU electricity demand by 2020 (from less than 1% today). However EPIA acknowledges that above target can be reached "provided the right conditions are created by EU policy makers, national governments and energy industry stakeholders" i.e. at the expense of the consumers.

Conclusions

The studies showing a net creation of green jobs fail to properly account for the job destructions that their recommendation would entail. They also tend to count as new jobs, the ones that are the

result of a shift from other sections of the RES industry. Moreover it appears that a number of green employments turn out to be in non-productive and expensive positions that raise costs for consumers.

The green jobs studies are using models which contain different forms of uncertainties including the modelling system itself. Those models are based on questionable assumptions like for instance data from interest groups, extrapolation of growth rates and a biased and very selective optimism about which technology will improve. The massive subsidization of RES by governments is based on the assumption that we should act as if the worst case scenario in terms of climate change, is the most probable one. This is contrary to a rational approach whereby in the presence of wide and deep uncertainties, policies should be as flexible and little distorting as possible.

Stewart Fleming, a London based reporter, writes in *The Economist* that "far from the fabled green shoots of recovery, Mervyn King, the governor of the Bank of England, said the economic outlook was more uncertain now than ever".

In developed countries a minority of policy and opinion makers dare to dispute (and so be against the trend with the threat of jeopardizing their career) the so-called clean energy policies and in particular their impact on employment and GDP growth, the majority of them and even more recently the President of the US claiming the important net creation of jobs and the positive contribution to GDP growth. Is that not an example of the tyranny of the majority and the standardization of opinions? Does "the global warming crowd like to deride skeptics as the equivalent of the church refusing to accept the Copernic theory" (*Wall Street Journal*)? Is science taking a backseat to ideology? It is highly unfortunate that clean energy policies are not openly debated. Concerns and reservations of contrary views are sufficiently important to warrant a serious review of the official political positions!

Confronting official positions with contrary views like the ones of the "Study of the effect on employment of public aid to RES" (9) or the dual critique of the *Stern review* by Robert M. Carter et al. or even the analysis of Alan Carlin, a senior analyst in the EPA's (Environment Protection Agency) National Center for Environmental Economics (10) would be highly profitable and enhance the political decisions.

Jean-Pierre SCHAEKEN WILLEMAERS

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- (1) Contract TREN/DI/474/2006.
 - (2) EEG partners: Fraunhofer (Germany), Ecofys (Netherlands), Rütter Partner (Switzerland), LEI (Lithaniz), Energy Economics group (Austria).
 - (3) Wind energy current high growth rate is expected to continue. Under ARS (Advanced Renewable Strategy) wind represents a share of 29% of total renewable energy production in 2010 and 38% by 2020.
 - (4) Monitoring and Modelling Initiative on the Targets for Renewable Energy partially funded by DG TREN (Energy and Transport) of the European Commission under the Altener programme.
 - (5) Gabriel Calzada Alvarez et al., Universidad Rey Juan Carlos.
 - (6) "The Stern review: a dual critique", Robert M. Carlter et al.
 - (7) Gabriel Calzada Alvarez et al., Universidad Rey Juan Carlos.
 - (8) *Ibid.*
 - (9) *Ibid.*
 - (10) Mr Carlin argues that "the science behind man-made global warming is inconclusive at best. Its analysis notes that global temperatures are on a downward trend. It points out problems with climate models and highlights new research that contradicts apocalyptic scenarios".
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