**Letter from Whitehaven**

There was a letter in the *Daily Telegraph* at the beginning of October 2012 from Tom Stout in Cumbria who clearly felt that public subsidies for solar-voltaic panels were a drain on the tax-payer. Tom may be right. It is a rip-off, but not in the same way as wind farms...although there are some underlying parallels.

In the UK, to maintain the national obsession with the alleged efficiency of the private sector as deliverers of government policy, green energy technologies are being peddled…to a deeply sceptical public…wrapped up in private sector inducements designed to guarantee excess profits...and hence enthusiastic commitment to the green energy programme…by one or several private parties. [1]

Invariably this can only happen by playing havoc with the returns to other stake-holders and by riding roughshod over any semblance of democratic deliberation...and consent.

Mr Stout is a sensible chap. When he was told that it would cost him £20 000 to install solar panels on his roof, he did the lawyer's trick: pursed his lips, shook his head…and half an hour later had a price of £15 000. He was assured that his £ 15 000 investment would yield savings of £50 000. [2]

But as Mr Stout explained in his letter to the *Telegraph*, he was planning to downsize so had little interest in 'savings' on the never-never. But he was concerned about the £200 a month in loan repayments...and the £4 000 of accumulated interest the banks would take off him if he stayed on in his house for 25 years.

He clearly doubted whether a new owner would agree to take over the bank loan...and probably knew enough about buying and selling houses in England to know that the price of his house would be most unlikely to be £50 000 higher because of a promise of future savings in electricity bills. So Tom, a sensible man, decided to keep calm about the alleged certainty of electricity bills rising 6% per year for 25 years, and carry on. This disappointed the solar panel salesman whose sales commission soon vanished up the chimney. On to the next punter.

The good sense of ordinary people is often under-estimated by commercial organisations and the PR companies and the advertisers they use to soften up their victims. You really can't fool all the people all the time. They talk to each other. But even without Tom's downsizing, would this deal have made much sense?

Ms Lean is a professional woman in her mid-fifties on an annual salary of £60,000…forty after income tax deductions. Her priorities are to see her two sons safely through college and into gainful employment, to pay off her mortgage and build up her pension...and to have enough discretionary income left over to go to theatre, eat out from time to time, take holidays abroad and do all those things that she could not do while bringing up her children.

Anyone can promise the moon over 25-years. But the reduction of a percent or two in her monthly outgoings would not persuade Ms Lean to take out a loan of £15 000 unless she could see a payback within a couple of years. She also shares Mr Stout's financial concerns…for they are hers too…so she wants to know when her cash flow is positive…and regulators should make sure that the seller is liable for three-times penalties if she is not told the truth.

Of course nobody should doubt that the mandarins in Whitehall who cobbled together *Her Majesty's Government's* green energy programme really believe it to be in the national interest. So why don't they put their money where their mouth is and give Ms Lean a £15 000 grant…no strings attached…for the dirt and disturbance she must endure as she lies back and thinks of England? The governments have been throwing their money at energy conservation projects and justifying it by claiming that what is good for *Stout & Lean plc* is good for England. But is it?

An overriding principles of *Public Private Partnerships* in the energy sector is that the national government is the 'public partner' while the corporate purveyors of centralized generated electricity distributed over national electricity grids (and not the little individual) is the 'private partner'. *Public Private Partnerships* are between large

[1] In the case of wind farms and wind turbines the selected beneficiary is the land owner who receives a substantial subsidy from the public purse, more than sufficient to persuade him to railroad through the project with bogus claims of its economic and net energy returns over the head and in the face of objections from his friends and neighbours. His personal vested interest in the scheme is seldom declared.

[2] These savings take 25 years to arrive. And the costs assume average general price inflation of 3% per annum over the next 25 years, with energy inflation at twice this. An 80% energy device efficiency was also assumed which means that the solar-voltaic panels deliver at 80% of their rated capacity...whatever that means, given the propensity of the electricity supply companies to operate a *Curtailment Regime* that ensures electricity supplies from small private solar installations are cut off whenever the companies choose...which they do whenever there is plenty of surplus electricity available and electricity prices from the pool are lower than the cost of solar-generated electricity at contractually fixed prices: i.e. when the sun shines.

private corporations and *Her Majesty's Treasury*...the former fleeces *Stout & Lean* with sky-high electricity prices while the latter rips off *Stout & Lean* with ever-increasing tax grabs to subsidize the inefficient private electricity producers and distributors. And then there is the poorly understood question of scale.

Normally what is meant when scale is mentioned is either the economies of large scale…though more often than not there is just as much diseconomy inherent in the complexity and inflexibility of large scale…or the scaling-up from pilot to full-scale. But much of the social infrastructure is too big, so scaling-down is needed in equal measure.

Furthermore scale is about more than the engineer's scale-testing in wind tunnels. Water does not just expand or contract as it becomes hotter or cooler...it changes state from water to steam and from water to ice. The appropriate design for a solar-voltaic electricity system depends on its end use. The 'state' may well depend on the scale of the installed system. Is the semi-detached house the appropriate scale for efficient design of local energy and electricity systems in an infrastructure of centralized electricity production transmitted by a national grid system?

Ms Lean lives on a seventies estate in one of a hundred properties [3] being sold off gradually by the institutional owner over a 5-10 year period. Current UK Government policy is to shift national energy usage from fossil fuel electricity generation to renewable energy sources. Maximizing solar-voltaic generated electricity on estates like this by installing solar-voltaic roof panels is part of government policy.

*A Scale Model of the Dream Chaser® Completed Aerodynamic Testing at the Texas A&M Low-Speed Wind Tunnel.*

But doing this one roof at a time, using the private sector…with its sky-high director pensions (remuneration up a further 28% last year) and shareholder dividends…is economically inefficient. The problem is not to rewire a hundred houses with solar electricity but to reduce fossil fuel consumption on all the residential housing estates in the country by maximizing the use of non-fossil renewable energy to generate heat and electricity. What to do?

A good place to start is by separating the heating problem from the electricity problem. Householders need hot water all the year round and space heating to twenty degrees Celsius for four months of the year. Air cooling is not a British issue.

Swedish [4] experience suggests that plans should be drawn up for the burning of combustible waste in a combined heat and power (CHP) plant, producing enough hot water to meet the winter heating needs of the 100 households on the estate. [5] This ought to be included in any feasibility plan for renewing the energy infrastructure of the estate.

However the appropriate scale of a CHP plant would depend on the other heat and electricity generation options being considered...and on the wider urban and rural infrastructure into which this particular estate is embedded. None of this can be sensibly appraised from the perspective of an individual house owner.

For instance, the most efficient way to use a south-facing roof to heat water may not be by solar-voltaic arrays at all, with their inefficient double conversion, and consequent double losses, but by coating the roof with black roofing felt and running coils of the copper water pipes across the roof. This system was one of the schemes being pioneered at *Solviva Gardens* on Martha's Vineyard a quarter of a century ago. It works. [6]

Sweden has similar hot water needs to the United Kingdom and more demanding specifications for space heating…outside temperatures are much colder in the winter. They have long solved their heating problem by distributing hot water through heavily lagged underground pipes...and by designing the development of their urban expansion since the 1920s and the 1930s in their three major city regions (Stockholm, Gothenburg & Malmö) to maximize the efficiency of central heating distribution system to several hundred houses and apartment buildings. [7]

Other non-fossil fuel energy options should also come under consideration...not just photo-voltaics…and why not incorporate green-houses and food production? For instance, Buckminster Fuller made the observation that it made

[3] There are many similar situations in the British Isles with clusters of properties spread over a limited geographical area.

[4] The feasibility and desirability of low-tech solutions was demonstrated by the *New Alchemy Institute* at Cape Cod in Massachusetts and at *Solviva Gardens* on Martha's Vineyard thirty years ago...see the *Shepherd Chronicles* at http://williamshepherd.blog.co.uk/2006/06/11/sunday_11th_june~869928/ .

[5] Most CHP plants produce both heat and electricity from burning household waste. The appropriate mix of hot water, electricity, waste fuel, wood pellets etc. would be a matter of detailed design within the context of the optimum facility design for the whole estate. A standard CHP plant design, because of the economies of manufacturing scale, might make sense despite being sub-optimum to the needs of the estate.

[6] For further details see http://www.chelseagreen.com/bookstore/item/solviva/ .

[7] See http://cesc.net/passagen/democracy/Chapter_03.html .

little engineering sense to place wind turbines at the end of long poles and hoist them up in the air. Instead it should be possible to shape the natural and built landscape to create the necessary changes in pressure that would use *Bernoulli's Principle* to bring the wind down to turbines placed at ground and underground level. Solar-voltaic cells look, more and more, like a solution looking for a problem. Good engineers start by defining the problem.


Vast resources are being misdirected into foisting solar voltaic electricity on a poorly educated public. Originally the *US Congress* believed that solar energy meant green jobs. So massive subsidies were handed out, only for the government to discover, to its chagrin, that all the jobs disappeared to the Far East where labour was cheap. Surprise, surprise! Final scorecard on solar subsidies: increased American jobs: zero; increased American taxes: billions; corporate shareholder dividends: millions.

Present electricity supply systems are dimensioned to meet peak daily and seasonal demand pattern…a very inefficient approach. Punters get the quality the electricity industry gives them. Like it or lump it...and nowadays this includes regular black-outs and brown-outs. Improvement is not in the brochure.

But new emerging *Smart Grid Technology* will allow customers to select from a range of electricity supply quality packages in their contracts. A change in specification would reduce the amount of installed capacity required and eliminate the impact of brown-outs and black-outs, which are extremely costly to customers as they become increasingly dependent on digital equipment driven by a reliable electricity supply. [8]

Solar-voltaic panels need a south-facing roof. Large solar arrays to service the whole estate might be viable…or not. Estimates can be made from anecdotal evidence, scaling up from two or three case studies. How much available south-facing roof area is there? Why not replace all the roof tiles on the estate with *Solar-Voltaic Roof Tiles* and carry out improvements in attic insulation at the same time? Are factory-built solar panels from *Solar Energy Manufacturers* the best option? Could *Smart Tiles* provide the basis for a new local microbusiness…while providing half a dozen jobs for estate-dwellers? *Production for Use* beats *Rigged Market* every time. There are options.

With the homework done, the feasibility and desirability of including solar energy in the energy mix can by determined. The future pattern of electricity usage can then be evaluated…starting with understanding energy end use needs & wants and the energy quality required. [9] The *Residents Association* should instruct a *Chartered Surveyor* [10] to draw up a *Specification of Works* and cost it all out. Costs of decommissioning, recycling and reselling the old energy and electricity components should be included…as well as realistic price & cost contingencies. Using a competent professional building surveyor will save tens of thousands of pounds.

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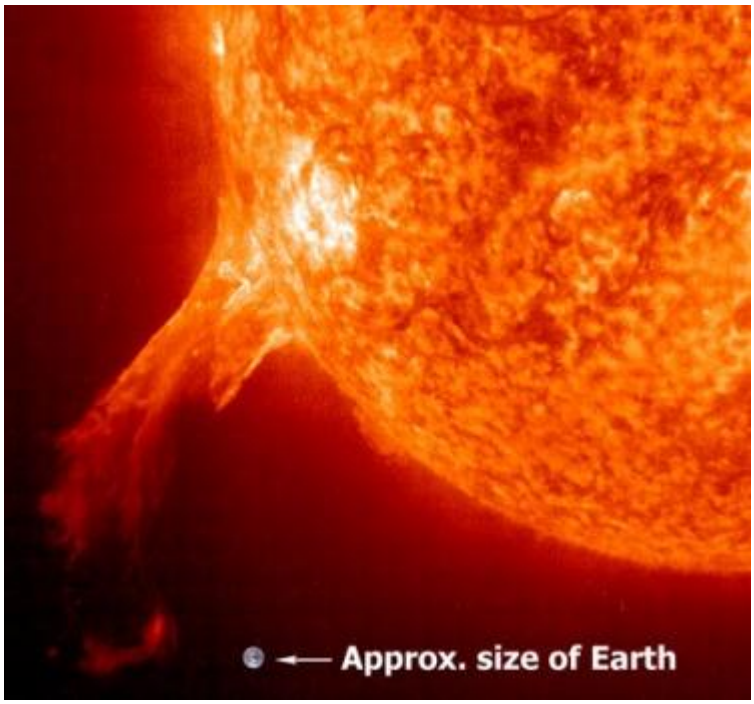
[8] See *Increasing the Hosting Capacity of Distributed Energy Resources using Storage and Communication* by Nicholas Etherden (2012) at: http://pure.ltu.se/portal/files/36777611/Nicholas_Etherden.pdf .

[9] One day this will be available as a free service, administered at county level as part of a national programme to drastically reduce electricity transfers across county lines. Electricity meters at all county crossing points administered by a national confederation of *County Treasuries* as a non-profit service would allow large energy users to be taxed, eliminating the need for (regressive) central government subsidies. Applied fairly this electricity tax would go a long way to ensure that exotic financial engineering schemes....such as the mansion taxes, poll taxes and local income taxes being proposed to replace the rates on domestic properties and small microbusinesses...become no more than footnotes in the history of electricity.

[10] This is what building surveyors do…and do very well. A typical set of tasks includes ensuring projects are completed on budget and to schedule are: advising clients on schemes and determining requirements; preparing scheme designs with costings, programmes for completion of projects and specification of works; and preparing documents for tender.

There are wider implications. Americans use more than 4,000 billion kilowatt hours in electric energy every year. Only 12% of this energy is created using renewable energy - from geothermal, hydroelectric, organic waste and the sun. But Germany uses a record 23.4 gigawatts daily of solar power generated from 1.3 million solar systems. More than 8.5 million people live or work in buildings that use the sun to power their electricity needs entirely or in part.




Germany holds the solar-power record, with Czechs and Bulgarians close behind. A new solar-power record was reached a few months ago in April 2013 by the installation of more than 33.5 GW of photovoltaics.

Industrialized nations can produce massive amounts of clean, non-petroleum based energy through adopting correct public policies and incentives for solar panels in private homes and businesses.

Without buying into the global warming narrative, diesel fuels and gasoline needs to be phased out for its pollution impact.

Oil is toxic to almost every form of life. Crude oil is full of carcinogens, which cause cancer and other diseases.

Crude petroleum causes birth defects, leukemia (due to the presence of Benzene, a volatile organic compound) and lowered white blood cell count, which is indicative of a compromised immune system.

Oil spills including the *Kuwaiti Oil Fires*, the *Lakeview Gusher* in Kern County, California, *Gulf War Spill*, and the British Petroleum oil disaster, *Deepwater Horizon* have damaged countless forms of aquatic life and ruined pristine beaches. Three of these spills are considered to be among the worst environmental tragedies of our time.

*Solviva Future Solar Design by Anna Edey in West Tidsbury on Martha's Vineyard, Massachusetts*

The combustion of crude oil or petroleum contaminates the air with cancer-causing particles and the high temperatures required to burn crude oil also creates acid rain, or nitrous oxides which also harm human and animal health. Many of our coral reefs have been damaged by the acid rain caused by nitrous oxides, along with sulfur dioxide from the sulfur in the oil, combining with water in the atmosphere to create acid rain.

In sharp contrast to Germany, Mr Stout and Ms Lean are being sabotaged in their desire to install clean energy alternatives by the abdication of public responsibility for creating intelligent policy for renewing the country's energy infrastructure.