The Disastrous Impact of Renewable Energy in Devon

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Summary

I have carried out a review of the development of renewable energy in Devon over the last 13 years. The review is based upon the information given in the annual reports produced by RegenSW, the leading promoter of renewable energy in the South West. The review also looks at renewable energy in Cornwall and the South West, but providing less detail. Over 80% of renewable energy capacity is in the form of electricity generation, so the review has predominantly focussed on renewable electricity.

The major findings of the review are:

1. Up until 2010, there was slow growth in renewable energy capacity. This consisted mainly of gas from waste together with the first small wind farms in Cornwall. The Introduction of the large subsidies via the Renewable Obligation scheme in 2002 led to the deployment of larger wind farms. The introduction of the Feed-in Tariff (FiT) scheme in 2010 led to a rapid increase in deployment of small wind farms, individual wind turbines, rooftop solar and solar farms. From 2011 solarPV became the dominant technology and the average capacity of renewable generators factor fell markedly. However, the reduction in subsidies in 2015 and 2016 together with more stringent planning rules has led to a virtual standstill in planning applications and a reduction in deployment rates.
2. The renewable energy industry has been entirely dependent on subsidies for its growth and its survival.
3. Most of the renewable electricity capacity consists of the two least effective technologies, namely solar power and wind power, which have capacity factors of about 10% and 25% respectively.
4. The generation of energy from ineffective and inefficient renewable sources has created subsidised employment and has thus led to a huge reduction in productivity. Wealth has been destroyed on a massive scale.

5. There is no evidence that the deployment of renewable energy has led to any reduction in carbon dioxide (CO_2) emissions; on the contrary, it is possible that overall, emissions have increased.
6. The deployment of renewable energy technologies has resulted in a detrimental impact on the landscape, on tranquillity, on heritage aspects, on residential amenity, on property values, on tourism, on local businesses, on agricultural land and on grid reliability and security of supply.
7. The amount of renewable electricity currently generated in the whole of the South West could be produced by a single generator at a gas-fired power station for less than a seventh of the capital cost. No subsidies would be required. The excess cost of renewable electricity to all consumers (domestic, industrial and commercial) in Devon is over £80million per year and in the South West is over £400million per year. The brunt of the extra costs has been felt most by those in fuel poverty.
8. The deployment of weather-dependent, unpredictable and intermittent wind and solar power have resulted in increased grid stability problems, a reduced capacity margin and thus an increased risk of blackouts.
9. The results of the analysis confirm the statement made by the late Professor Sir David MacKay, former Chief Scientific Adviser to the Department for Energy and Climate Change (DECC) that "*wind turbines and solar power are a waste of money*"[1].

I conclude that the deployment of renewable energy in Devon and the South West has been an unmitigated disaster. The only beneficiaries have been landowners, developers, foreign manufacturers and renewable energy promoters.

[1] http://www.telegraph.co.uk/news/2016/05/03/wind-and-solar-a-waste-of-money-for-uk-prof-sir-david-mackay-sai/

1 Introduction

This paper reviews the development of renewable energy in Devon over the last 13 years. It also examines the impacts of renewable energy in the South West. It focuses primarily on renewable electricity, the predominant form of renewable energy. Data on renewable energy deployment and performance is based upon the annual reports produced by RegenSW, the leading promoter of renewable energy in the South West.

2 Regen SW Information

The major promoter of renewable energy in the South West is Regen SW. Regen SW is the first port of call of the BBC in the South West for all things to do with renewable energy. Regen SW is an independent not for profit organisation that "*passionately believes that sustainable energy has a vital role at the heart of a successful economy and thriving local communities*" and whose sole goal is "*creating an excellent environment for sustainable energy in the south west*"[2]. It has published a manifesto in which "*We pledge in the next parliament to work to establish the south west of England as a leader in renewable energy and energy efficiency – enabling us to achieve 15% of our energy from renewables and attracting over £10 billion of investment to the south west*"[3].

Since 2004 it has produced an annual progress report concerning renewable energy in the South West. The 2004 and 2005 reports state that it received core funding from the South West Regional Development Agency. The 2006 report suggests it was called the South West Renewable Energy Agency and had its own website www.regensw.co.uk. In 2008 it also used the name Sustainable Energy Agency.

The 2004 report consists of four pages, is dated December 2003, is entitled 'Grid-connected renewable energy projects in the South West' and consists of a list of all projects by County (former Avon, Cornwall, Devon, Dorset, Gloucestershire, Somerset and Wiltshire) and by technology and has an accompanying map identifying all sites. Total renewable capacity was 105MW. It is assumed that the report summarises the position at the end of 2003.

[2] https://www.regensw.co.uk/
[3] The South West Renewable Energy Manifesto 2015

The 2005 report, dated February 2005, is 13 pages and It is assumed that the report summarises the position at the end of 2004.

From 2007 onwards the report has become a glossy brochure, not just a presentation of the facts and figures. The size of the reports has gradually increased to 44 pages. For the first time the 2015/2016 report covers not just the South West, but the whole of England. No explanation is given for this change. However, the result of a report covering the whole of England (nine regions) means that much less information is given for Devon and the South West than in previous reports. A brief discussion of the situation in England is given in Appendix 1.

The amount and detail of the data presented varies from year to year and so some of the information shown below is estimated from the graphs. The data in the first reports ran to the end of the year, but in the 2011 report, the year ran from 1st February 2010 to 30th January 2011 and in the 2012 report it appears that the 2011 year end became the end of March 2012, although this is not stated. Subsequent years appear to be to the end of the following March (although the 2011/2012 data run to April 5th 2012) but this cannot be confirmed for all years. Because the amount of detail changes from year to year, making direct comparisons is difficult. Less detail is provided as more pictures appear. There are large data inconsistencies between many successive reports. For example, the report for 2012/2013 states that renewable electricity capacity grew by 268MW to 852MW (i.e. from 584MW in 2011). However, the report for 2011/2012 states that the capacity in 2011 was 525MW. There are also significant errors in the reports. For example the current report for 2015/2016 states that Torridge in Devon is one of the top five districts in England by percentage of electricity generated from renewables. However this is based on the false premise that "*Other leading areas on this metric have a large capacity of onshore wind, such as Fullabrook, the 66 MW wind farm, in Torridge*". In fact the Fullabrook wind farm is in North Devon, not Torridge. Overall, it may be said that the reports are produced with the emphasis on propaganda and glossy pictures rather than on accuracy and consistency. All data and graphs have to be treated with a degree of scepticism.

The reports are long on headlines and short on the implications. No details are provided on the total cost of the installed capacity nor on the subsidies received for the

electricity produced. There is no mention of the impact of the intermittency on grid stability and on the need for and cost of back-up. There is no mention of the carbon footprint of the installed capacity nor of the impact on increasing emissions from back-up plant.

Use of different colours within an individual report and from year to year makes it difficult to visualise the changes (see for example Figures 2 and 3 below).

3 Renewable Electricity

Concentrating on electricity capacity in Cornwall, Devon and the South West, the total installed capacities are shown in Table 1. The final column shows the average capacity factor (where available), derived from the electricity generation data. The capacity factor is the average amount of electricity produced compared to the amount that would be produced operating at full power. It is a measure of the effectiveness of the technology.

Table 1

Year	Cornwall Capacity (MW)	Devon Capacity (MW)	South West Capacity (MW)	South West Capacity Factor (%)
2003	49	18	105	
2004	47	23	109	
2005	50	25	123	
2006	53	29	137	
2007	57	29	151	
2008	58	33	155	
2009	58	35	172	
2010	75	37	200 (218)	Est 50%
2011/2012	132	131*	525	30.3
2012/2013	~255	~265	852	23.7
2013/2014	~300	~310	1,185	19.4
2014/2015	605	501	2,206	17.2
2015/2016	688	609	3,006 (or 3,030)	14.7

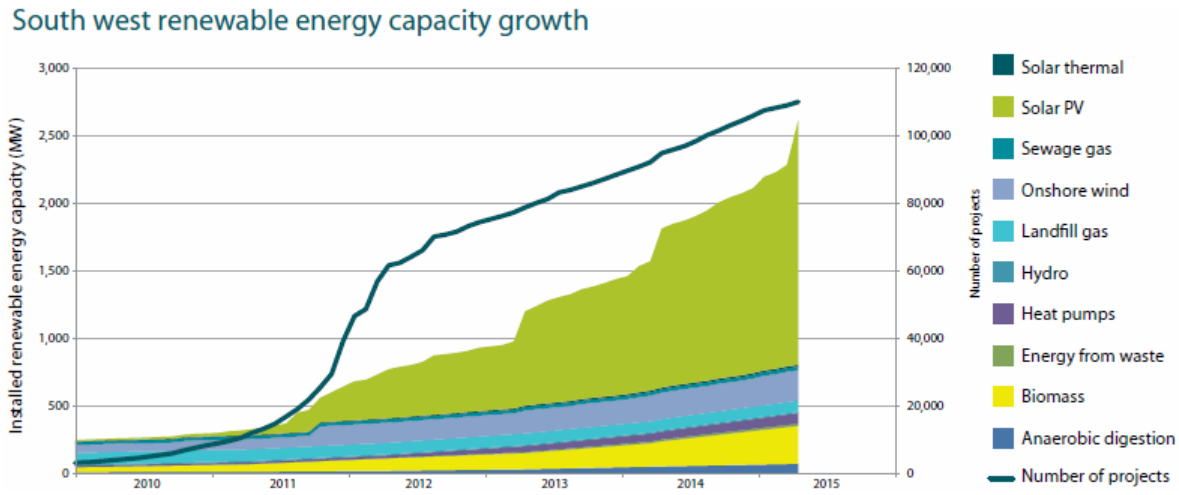
* Fullabrook 66MW wind farm commissioned in North Devon.

Up to 2010, gas from waste (landfill, sewage etc) accounted for about 50-55% of the electricity capacity, with about 30-35% from wind and the rest (about 10%) from hydro and solarPV. From 2011, solarPV started to dominate, increasing from 5% of installed capacity in 2010 to 50% of installed capacity in 2011/2012 and 85% of installed capacity in 2015/2016. The 85% of solarPV capacity produced 62% of the electricity The overall capacity factor fell by a factor of two between 2011/2012 and 2015/2016 as solarPV with a capacity factor of ~11% dominated over energy from waste (including lanndfill gas and sewage gas) with a capacity factor of ~50% and wind with a capacity factor of ~25%. It is noted that the capacity factors have been calculated based on the installed capacity data and the RegenSW estimates of the electricity generation. How RegenSW estimates the generation is not stated, but is presumably based on known generation for large schemes and an assumed capacity factor for small-scale solarPV projects.

The capacity factor in Devon in 2015/2016 was 16.4%.

Growth over the 5 years to March 2015 is shown in Figure 1 below. Note that this is for total renewable energy. However the vast majority of installed capacity is for electricity generation (84%), with the majority of the heat capacity being from biomass. The rapid uptake of solarPV starting in 2011 is evident. The step changes in solarPV capacity are believed to be due to the rush to complete schemes before Feed-in-Tariff (FiT) subsidy reductions come into effect.

Fig 1



The most recent data (end of March 2015 and end of March 2016) are shown in Figures 2, 3 and 4 below (note the colour change between the two figures):

Fig 2 Capacity at end of March 2015

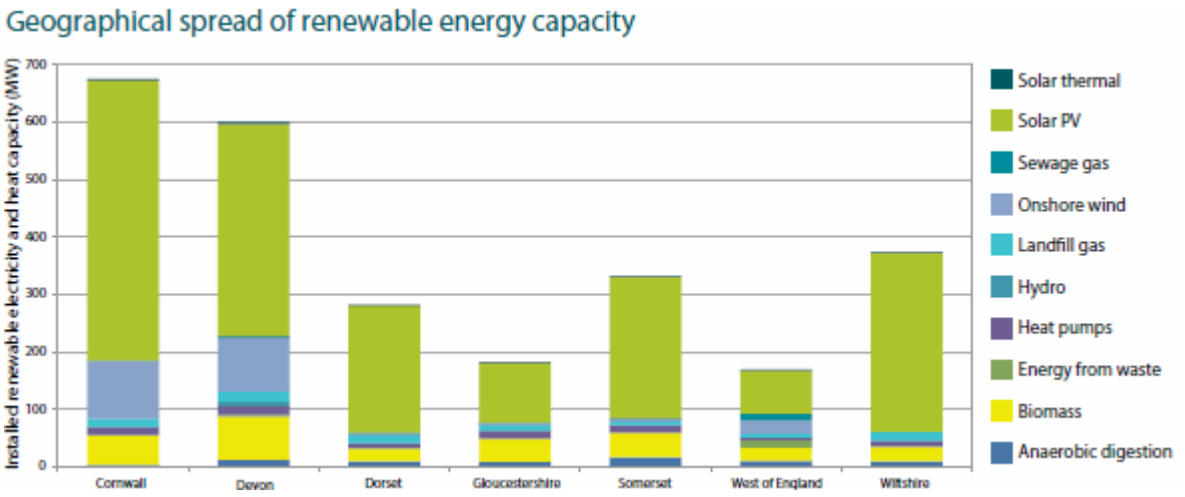


Fig 3 Capacity at end of March 2016

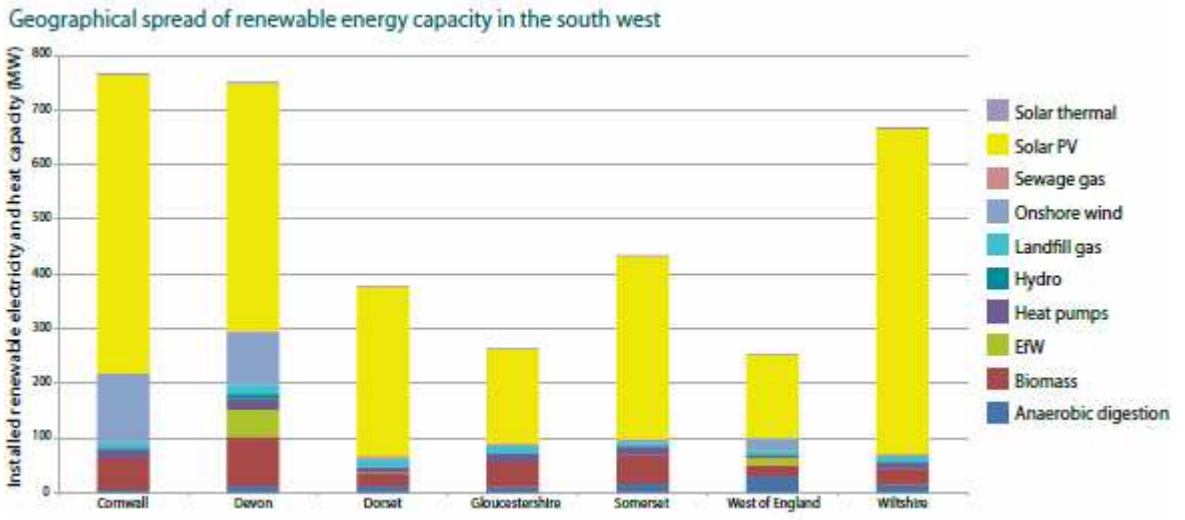
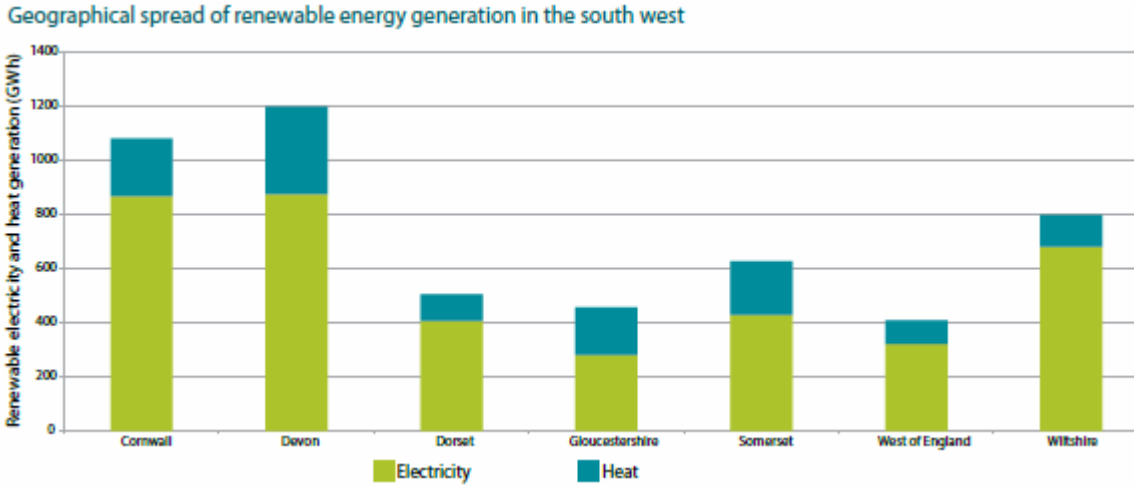


Fig 4 Renewable energy generation in 2015/2016



The status at the end of March 2016 is shown in Figure 5, with the deployment by technology being shown in Figure 6 (note the discrepancy in the two sets of data).

Fig 5 Status by area at end March 2106

Area	Number of projects	Renewable electricity		Renewable heat	
		Capacity (MW)	Estimated generation (GWh)	Capacity (MW)	Estimated generation (GWh)
Cornwall	19,412	687.7	864	80.7	238
Devon	34,494	608.8	876	143.4	494
Dorset	15,550	334.7	407	43.4	141
Gloucestershire	13,029	195.7	282	67.4	196
Somerset	15,402	357.5	430	76.7	236
West of England	17,153	204.4	323	49.3	208
Wiltshire	12,823	617.4	680	50.6	159
South west total	**127,863**	**3,006.1**	**3,862**	**511.5**	**1,672**

Fig 6 Status by technology at end March 2016

Technology	Number of projects	Renewable electricity		Renewable heat	
		Capacity (MW)	Estimated generation (GWh)	Capacity (MW)	Estimated generation (GWh)
Anaerobic digestion	59	52.4	344	48.8	299
Biomass	3,826	-	-	318.9	978
Energy from waste	4	39.9	113	23.3	143
Heat pumps	10,047	-	-	96.3	192
Hydropower	143	11.8	28	-	-
Landfill gas	34	79.6	400	-	-
Onshore wind	820	255.3	562	-	-
Sewage gas	16	8.8	39	8.4	51
Solar PV	108,675	2,582.4	2,421	-	-
Solar thermal	4,456	-	-	15.9	10
South west total	**128,080**	**3,030.2**	**3,907**	**511.6**	**1,673**

From Figure 5, it can be seen that the total annual electricity production in the South West in 2015/2016 from 3,006MW of installed capacity was 3,862GWh, an average capacity factor of 14.7%. In Devon, 608.8MW of installed capacity produced 876GWh of electricity, an average capacity factor 16.4%.

Wind

Table 2 looks in detail at wind power in the South West:

Table 2 Wind Power in the South West

Year	Wind capacity (MW)	Wind projects	Average project size (kW)	Average project size added (kW)
2003	39 (Cornwall)	9	4,330	-
2004	43	12	3,580	333
2005	43	16	2,690	-
2006	43	-	-	-
2007	53	-	-	-
2008	55	143	385	95
2009	56	192	292	20
2010	70	278	252	16
2011/2012	150	405	370	63*
2012/2013	155	679	228	18
2013/2014	178	716	249	62
2014/2015	224	772	290	82
2015/2016	255	820	311	65

The initial small wind farms, mainly in Cornwall, were subsidised by the Non-Fossil Fuel Obligation (which ran from 1990 to 2002) and the Renewables Obligation (RO) scheme which replaced the Non-Fossil Fuel Obligation from April 2002. The Feed-in-Tariff (FiT) scheme for installations of less than 5MW capacity, which was introduced in April 2010, led to the rapid growth in capacity from 2011.

SolarPV

Table 3 looks in detail at solar power in the South West:

Table 3 Solar Power in the South West

Year	Solar capacity (MW)	Solar projects	Average project size (kW)	Average project size added (kW)
2003	<1	6		
2004	<1	14		
2005	<1	53		
2006	<1	-		
2007	<1	-		
2008	1	215	4.6	
2009	2	571	3.5	2.8
2010	10	3,546	2.8	2.7
2011/2012	260	54,928	4.7	4.9
2012/2013	565	65,223	8.7	29.6
2013/2014	852	79,439	10.7	20.2
2014/2015	1810	92,385	19.6	74.0
2015/2016	2582	108,675	23.8	47.4

The initial surge in both capacity and number of solarPV projects in 2011/2012 was mainly due to rooftop installations (mostly domestic, typically less than 5kWe capacity) following the introduction of the FiT scheme in April 2010. In 2012 the rate of installation of rooftop installations fell rapidly and about 80% of solarPV capacity was due to solar farms (>1MWe capacity). Since 2012 the solarPV market has been dominated by large solar farms.

CO_2 Emissions

The purpose of renewable energy is to reduce CO_2 emissions. Table 4 shows the RegenSW data on CO_2 emissions avoided (i.e. the CO_2 emissions that would have been emitted by displaced electricity generation plant, such as coal-fired or gas-fired power stations).

Table 4 CO_2 emissions avoided

year	CO_2 avoided (te)	Basis (kg/kWh)
2003	-	
2004	313,000	0.598 (DTI)
2005	363,543	0.598 (DTI)
2006	423,031	0.598 (DTI)
2007	451,279	0.598 (DTI)
2008	415,870	0.537 (Defra)
2009	477,640	0.543 (Defra)
2010	Not given	-
2011/2012	Not given	-
2012/2013	Not given	-
2013/2014	Not given	-
2014/2015	Not given	-
2015/2016	2,092,000	(0.536) Not given

The capacity between 2009 and 2015/2016 has increased by a factor of 17.6, whereas the CO_2 emissions avoided have only increased by a factor of 4.4. It should be noted that the DECC figure for CO_2 emissions avoided in 2015 is 0.312kg/kWh, much lower than that assumed by RegenSW. Thus RegenSW uses an incorrect figure for the CO_2 emissions avoided and the total emissions avoided should be 1,218,000te CO_2. Thus the increase in capacity by a factor 17.6 has led to an increase in avoided CO_2 emissions by a factor 2.5, a rapidly diminishing rate of return.

The CO_2 emissions avoided is only a part of the impact of the renewable electricity generation on total CO_2 emissions. Two other factors, which RegenSW has ignored, have to be taken into account. The first is the carbon footprint of the renewable energy schemes. The carbon footprint of a renewable energy generator is the total amount of CO_2 emissions that occur due to the mining of the raw materials, the manufacture of the components, the transportation, the construction, the operation and maintenance, the decommissioning and the disposal of the components. The second factor is the impact of the intermittent and unpredictable operation of the

weather-dependent renewable energy generators on the operation of the electricity grid and the need for back-up operation of conventional fossil fuel generators to balance generation with consumption and maintain grid stability. It is likely that when these two factors are taken into account, CO_2 emissions may have been increased rather than decreased as the result of deployment of renewable energy.

Furthermore, renewable energy generators have priority access to the grid and so weather dependent generators (wind and solarPV) displace conventional, despatchable generators (coal-fired and gas-fired power stations) from the grid. This makes it less economic to operate these power stations and uneconomic to build new ones. With the closure of aging power stations and few power stations being built to replace them, the margin of capacity over the peak demand has fallen to very low levels[4]. To ensure grid stability and that the lights stay on, small diesel generators are being built to provide short term operating reserve (STOR). These are the most-polluting form of generation, in terms of particulate emissions, nitrogen dioxide emissions and CO_2 emissions[5]. Thus the deployment of wind and solarPV are directly the cause of the deployment of these highly polluting diesel generators, resulting in increased pollution and increased CO_2 emissions.

Neither RegenSW nor the Government has produced any evidence to show that the deployment of renewable energy has resulted in any reduction in CO_2 emissions. In other words, the UK renewable energy policy has been, and continues to be, based not on evidence, but on an assumption.

Targets

The draft Regional Spatial Strategy (RSS) for the South West was revoked before adoption on 20th May 2013. The targets for renewable electricity installed capacity by 2020 were 151MWe for Devon and 850MWe for the South West. Table 1 shows that both targets had been exceeded by March 2012. By March 2016 the target for Devon had been exceeded by a factor of four and that for the South West by a factor of 3.5.

[4] http://utilityweek.co.uk/news/uk-faces-further-6gw-capacity-crunch-in-2016/1180613#.WCA3zCSPVME
[5] http://ippr.org/read/mad-maths-how-new-diesel-generators-are-securing-excessive-returns-at-billpayers-expense#

Productivity and costs

The latest figure given by RegenSW for investment and employment (2014/2015) is £3billion to date and 12,200 in employment, of which 7,700 are in renewable electricity. This is a very large employment figure for the small amount of energy produced and shows a very low rate of productivity.

There is a complete absence in the RegenSW reports of the cost of all the renewable capacity and of the amount of subsidy received by the industry. The reports tend to use the term "policy support" or "support" or "incentive" rather than "subsidy" when describing renewable energy. It uses the word "subsidy" when referring to fossil fuels, e.g. "*The key factor holding back renewables now is the massive subsidies governments continue to pay to prop up fossil fuels*". This statement contradicts Government statements concerning fossil fuel subsidies "*The Government therefore has no fossil fuel subsidies*"[6]. RegenSW falsely claims, without any evidence, that "*Costs for renewables are falling rapidly, already wind costs are cheaper than new fossil fuel generation*". In fact in the latest allocation round of Contract for Difference (CfD) contracts, fifteen onshore wind farm projects, with a capacity of 748 MW, were awarded deals worth, at current prices, between £83.42 and £87.40/MWh. These prices are guaranteed and index linked for fifteen years. The current wholesale price of electricity is approximately £42/MWh and thus the cost of onshore wind power is about twice that of fossil fuel generation. What is certain is that the reduced subsidies and the lack of local public support have led to a rapid reduction in proposals for new renewable energy schemes. In the immediate future, only those schemes in the approved pipeline are likely to get built. In the South West, grid constraints are also having a huge impact on new proposals.

Typical costs for wind turbines range from about £1.5million/MWe capacity for large wind turbines typical of wind farms to about £6million/MWe for smaller farm-scale wind turbines. Based on a study of DECC data[7] giving a capital cost of £1.6million/MWe, the capital cost of the South West's installed capacity of 255MWe of wind power would be about £400million. The study of DECC data for solar power gives a capital cost of £1million/MWe. A minimum cost for the South West's installed solar capacity of

[6] Review of the Feed-in Tariffs Scheme. DECC. 17 December 2015.

[7] An Examination of National Grid's Future Energy Scenarios. Gibson and Aris.

2,582MWe would be about £2.6billion. In total, the capital cost of the South West's installed renewable electricity capacity of 3,006MWe would be well over £3.5billion.

Based on the same data, the capital cost of Devon's installed renewable electricity capacity of 609MWe would be about £800million.

No information is given by RegenSW concerning the cost of the electricity produced. Subsidies for the electricity via the RO or FiT schemes range from about two to 11 times the wholesale cost of electricity, dependent on three factors:

- when the capacity was commissioned
- the size of the scheme
- the type of technology.

Over 60% of electricity is produced from solarPV, with the majority of the rest coming from wind and anaerobic digestion. Most of the electricity is subsidised through the FiT scheme at average subsidy rates estimated to be in excess of 15p/kWh (£150/MWh). It is thus estimated that the South West's renewable electricity generation of 3,862GWh in the year 2015/2016 will have cost electricity consumers at least £600million pounds. It is estimated that Devon's renewable electricity generation of 876GWh in the year 2015/2016 will have cost electricity consumers at least £130million pounds.

Land area utilised

Nothing is stated in the RegenSW reports about the area of agricultural land lost for food production due to being built on, covered in solar panels or used to grow biomass (such as crops for anaerobic digesters). However the figure will be many tens of square miles.

4 Detrimental Impacts

All of the RegenSW reports are silent on the detrimental impact of the deployment of renewable energy. The negative impact on the landscape, on tranquillity, on heritage aspects, on residential amenity, on property values, on tourism, on local businesses, on agricultural land, on grid stability and security of supply and on fuel poverty are completely ignored by RegenSW.

Industrialisation of the landscape has occurred on a massive scale. Deployment of individual wind turbines, wind farms and solar farms has had a devastating impact on the landscape. The tranquillity of many locations has been destroyed. As a Government Planning Inspector stated recently when dismissing a solar appeal in Cornwall *'The uniform nature of the development would give rise to an industrial appearance contrary to the subtle changes in land colour and texture currently apparent. It is therefore clear that the proposal would adversely alter the landscape character of the immediate area by the introduction of these new elements*".

In Devon there are three large wind farms adjacent to Exmoor and Dartmoor which have destroyed the iconic Devon landscape and there are hundreds of individual wind turbines of all shapes and sizes. In many areas there are so many individual wind turbines that they appear as unplanned wind farms. Over six square miles of fields are covered with solar panels and several square miles of land are now used to grow crops to feed anaerobic digesters.

The settings of many heritage assets, including many of national importance, have been ruined. Figure 7 is a typical example.

Fig 7 View of Pancrasweek Church, Devon

Residential amenity has been severely compromised. Many residents suffer noise and visual issues from wind turbines, with the consequential health issues Many people have had to move out of their homes. Figure 8 is a typical example.

Fig 8 Wind turbine in Devon

5 Alternatives

As shown above, the total amount of renewable electricity produced in the South West in 2015/2016 was estimated by RegenSW to be 3,862GWh from 127,863 projects with a total installed capacity of 3,006MWe (Figure 5). The total amount of renewable electricity produced in Devon in 2015/2016 was estimated by RegenSW to be 876GWh from 34,494 projects with a total installed capacity of 609MWe (Figure 5).

A single 500MWe generator unit of a Combined Cycle Gas Turbine (CCGT) power station operating at a capacity factor of 90% would produce 3,942GWh per year, i.e. more than the total renewable electricity produced in the South West.

The total cost of the renewable electricity projects in the South West was estimated above to be over £3.5billion. The total cost of a 500MWe CCGT unit is currently

estimated to be less than £500million[8]. For example, the 900MWe Langage CCGT in Devon, completed in 2010, was estimated to cost £400million[10].

The wholesale price of electricity is historically in the range of £40 to £50/MWh[11]. Thus the South West's 3,862GWh of renewable electricity in 2015/2016 could have been produced by a CCGT for less than £190million and Devon's 876GWh of renewable electricity in 2015/2016 could have been produced by a CCGT for less than £44million. It was shown above that the South West's renewable electricity generation in 2015/2016 will have cost electricity consumers at least £600million pounds. It is estimated that Devon's renewable electricity generation in 2015/2016 will have cost electricity consumers at least £130million pounds. Thus the excess cost of renewable electricity to consumers in the South West has been in excess of £400million and to consumers in Devon the excess cost has been in excess of £80million.

The RegenSW data for 2014/2015 shows that about 7,700 people were employed in renewable electricity in the South West. A 500MWe CCGT unit would employ fewer than 50 people[12]. This shows how low the productivity of renewable electricity is, as reflected in the massive subsidies needed to make renewable energy projects viable. The deployment of renewable energy in Devon and the South West has resulted a massive reduction of productivity and a massive increase in the cost of the electricity produced. The reduction in productivity is essentially a reduction in efficiency and this has resulted in a massive destruction of wealth. The poorest members of society have suffered most from this destruction of wealth as more of their income is spent on energy.

6 Conclusions

1. RegenSW, the propaganda arm of the renewable energy industry in the South West, produces annual progress reports on renewable energy which are nothing short of biased and incomplete propaganda sheets designed to fool the media and the public.

[8] http://www.platts.com/latest-news/electric-power/boston/combined-cycle-gas-fired-unit-costs-coming-in-21948694
[9] http://www.eia.gov/todayinenergy/detail.php?id=26532
[10] http://www.energy-uk.org.uk/energy-industry/lighting-up-britain/british-gas-langage-power-station.html
[11] http://www.energybrokers.co.uk/electricity/historic-price-data-graph.htm
[12] https://www.edfenergy.com/energy/power-stations/west-burton-b-ccgt

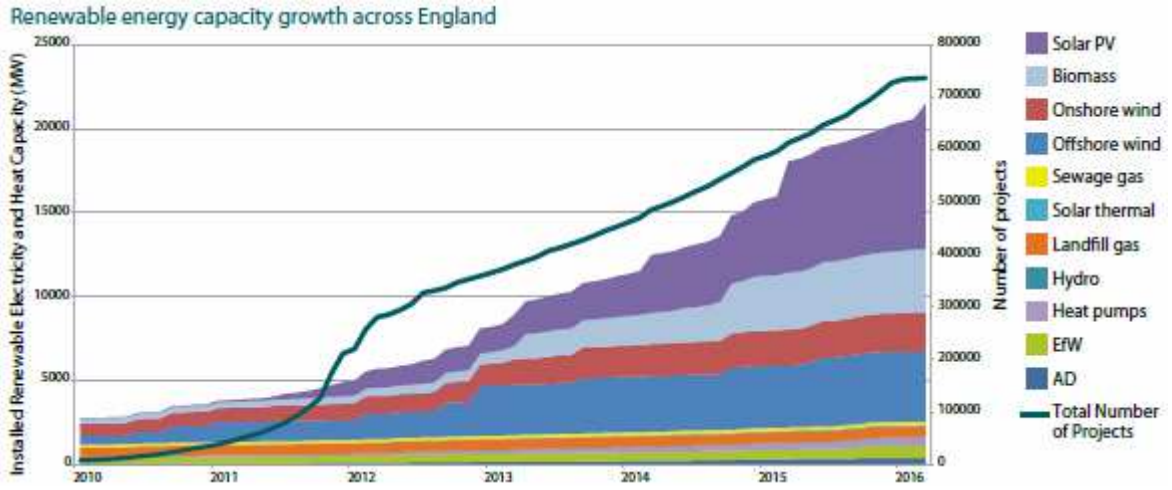
2. It is unlikely that the deployment of renewable energy has resulted in any savings of CO_2 emissions. In fact it is resulting in the deployment of large numbers of diesel generators, the most highly polluting and CO_2 intensive form of electricity generation.
3. The deployment of renewable energy has required massive subsidies and has wasted a huge amount of money.
4. The deployment of renewable energy in Devon and the South West has had a negative impact on the landscape, on tranquillity, on heritage aspects, on residential amenity, on property values, on tourism, on local businesses, on agricultural land, on grid stability and security of supply and on fuel poverty.
5. The total amount of renewable electricity produced in the South West could have been produced by a small gas-fired power station without any subsidy and would have saved electricity consumers hundreds of millions of pounds per year.
6. The deployment of renewable energy in Devon and the South West has been and continues to be an expensive and unmitigated disaster for the region and its residents.

Appendix 1 Renewable Energy in England, 2015/2016

As stated above, the RegenSW report for 2015/2016 covers England for the first time.

Figure A1 shows the growth in renewable energy capacity since the introduction of subsidies through the FiT scheme.

Fig A1



Step changes in capacity shown in Fig 9 result from installations rushed to completion before the year end or quarter end when FiT and ROC rates are reduced. There are 736,998 projects in total. The near-cessation of projects due to the reduction in subsidies and the change to planning law is evident in the first quarter of 2016. This pattern mirrors that shown in Figure 1 for the South West.

Electricity generation from the different technologies is shown in Table A1.

Table A1 Renewable electricity generation in England:

	Capacity (MWe)	Estimated generation (TWh/year)	Capacity factor
SolarPV	8,711	8.20	10.7%
Offshore wind	4,182	13.49	36.8%
Onshore wind	2,344	5.37	26.2%
Biomass	1,882	9.13	55.4%
Waste	820	4.59	64.0%
Landfill gas	622	3.18	58.4%
Anaerobic digestion	283	1.66	67.0%
Sewage gas	197	0.81	46.9%
Hydropower	39	0.12	35.1%
Total	19,080	46.5	27.9%

When renewable heat is included, 35% of all renewable energy is derived from wind, 28% is derived from biomass and 15% is derived from solarPV.

There are a lot of comparisons in the RegenSW report of installed capacity and the percentage of renewable generation by local authority and by regions, but these are meaningless because of the large differences in area and populations of the local authorities and regions. For example Yorkshire and Humberside is the region with the highest installed capacity and Selby is the local authority with the highest installed capacity, both because of the presence of the Drax co-firing power station (part burning imported wood chips and part still coal-fired). It should be noted that burning imported wood chips to produce electricity emits far more CO_2 than does burning coal, but that does not prevent it from being classified as renewable. The source of the major push for renewable energy, London, is the lowest performing region, with ironically most of its renewable energy coming from waste!