

● OUR SOLAR FUTURE

SOLAR REVOLUTION STRATEGY FOR THE UK



SOLAR
TRADE
ASSOCIATION

Supporters of www.oursolarfuture.org.uk – the campaign for a solar revolution in the UK

"The Government's reckless plan to review solar feed-in tariffs has created uncertainty in one of the few industries to have generated thousands of new green jobs. Proposals to slash financial support to solar projects over 50kW have further laid bare the shocking lack of ambition on solar energy. The feed-in tariff scheme is crucial to helping solar projects, like the Lewes community-owned power station, OVESCO, get off the ground. Thanks to the uncertainty brought about by the review, it will be difficult for renewables companies or investors to trust the Government again."

CAROLINE LUCAS, Leader of the Green Party, England and Wales

"Britain would be crazy to pay for expensive (nuclear) energy we don't need, rather than the cheaper solar energy that we do. The Government needs to listen to the Germans or Japanese. Nuclear is dead in the water. Solar and other renewables are the future. "

ALAN SIMPSON, Sustainable Energy Advisor, Friends of the Earth

"Solar is being side lined in the UK by the Coalition Government. There is so much potential to harness the power of the sun to generate clean green energy."

DALE VINCE, Green Energy Pioneer and Founder of Ecotricity

"Solar can easily meet a third of the UK's electricity needs."

RAY NOBLE, PV Specialist, Solar Trade Association

"In Germany we plan to deliver more than 20 times the UK 2020 solar target, providing more than 50% of our day-time peak electricity needs, and cheaper than grid electricity from fossil and nuclear power."

HANS-JOSEF FELL, German Politician and Co-Architect of Feed-In Tariffs

"New technologies like solar have huge potential but could be squeezed out by subsidised nuclear power."

DR DOUG PARR, Chief Scientist and Policy Director at Greenpeace UK

"Solar democratizes energy – if the government lets the investment flow today, everyone could benefit tomorrow."

THURSTAN CROCKETT, Head of Sustainability & Environment Policy, Brighton & Hove City Council

"The earth and the sun's vast natural energy will easily power our world, but the science shows we must act today."

PROFESSOR IAIN STEWART, Professor of Geosciences, Plymouth University & TV Presenter

"One way or the other, most of our future energy will come from the Sun. We need to recognise that fact now and get the solar revolution moving today."

TONY JUNIPER, Environmentalist and Writer

"The UK government must wake up to the potential of solar."

HUW IRRANCA-DAVIES, Shadow Climate Change and Energy Minister

EXECUTIVE SUMMARY

The cost of generating electricity directly from the sun is falling faster than the cost of any other energy generation technology. Many countries are appreciating the benefit of solar power, and the UK had just begun to do the same. You may have noticed solar panels going up on rooftops near you. This has been happening more since the “Feed-In Tariff” policy began, in April last year.

The Coalition Government does not understand the tremendous potential of solar power, and is proposing damaging cuts to its solar support scheme. We are asking Government to think again.

Our Alternative Solar Revolution Strategy shows that a solar revolution is possible, affordable and sensible for the UK. It is informed by new European research, industry experts and by the Solar Trade Association’s [STA] own calculations. It shows that **the UK could unlock its own solar revolution**. If the UK supports solar now, in around six to eight years’ time, the costs will have come down so much that new solar capacity will not need to be subsidised. We estimate this solar revolution will cost **between £6.50-£9 per household per year for the next 30 years**.

Over this current Parliament (until 2015), cost per household will average £3 per annum. Making this investment now will allow solar to go on to deliver over 30% of the UK’s electricity needs, without any further public subsidy, completely transforming the energy markets of the future.

This solar investment would massively reduce the cost to consumers of new ‘grid’ networks and centralised power stations, estimated to be over £110 billion in the next 20 years alone (equivalent to around £70 per household per year¹). We estimate, combined with new build and retrofit regulations, this investment will deliver around 140,000 green jobs by 2015 and up to 360,000 jobs by 2020².

BRITAIN’S SOLAR REVOLUTION would cost around £6.50 - £9 per annum per household per year. It would deliver around 140,000 jobs by the end of this Parliament, bring inward investment in new manufacturing and improve our energy security. It would also cut carbon emissions and could save consumers billions by reducing requirements for new central power stations and networks.

Solar is a democratising technology. It puts the power to generate energy directly in the hands of millions of people, rather than a handful of energy companies.

The cost of this solar revolution is substantially less than the cost of disposing of today’s nuclear waste. Britain could follow the lead of Germany, Japan and Switzerland and build an energy future free

¹ If costs are shared on a similar basis to FIT costs, i.e. with 34% of costs falling on the domestic sector.

² Using the EPIA/Greenpeace estimate of 30 jobs per MW installed.

from the costs (and risks) of new nuclear. The public would no longer be asked to bear the cost of everlasting subsidies and uninsurable risk.

With solar, no new expensive centralised infrastructure is required. It is a 'plug in' technology, easily deployable now. By investing in it, Britain's solar revolution could pay for a breakthrough into inflation-free, safe, green power - forever.

Investment today will strengthen our position in the global green tech market. If the UK invests in a solar future now, we can bring down costs faster, and encourage enterprise and manufacturing here in the UK. If we wait for the costs to fall, it will take longer to reach the time when no subsidy is needed and the delayed investment will result in the UK losing major manufacturing, tax revenue, export, employment and market-share opportunities in this vital new global industry.

WHAT WE WANT THE GOVERNMENT TO DO ...

1. **Embrace the future by committing to a solar revolution** - don't decapitate the fledgling UK solar industry by supporting only 'micro-generation' schemes.
2. **Reduce the Feed-In Tariffs by 25%, for all sizes of PV project.** Since the tariffs began, costs have already fallen significantly. This is a sign of success. However if the government cuts the tariff levels at the rate it proposes, which are much more drastic (up to 70%) it will damage the UK's emerging solar industry so badly we won't be able to reap the benefits described above.
3. **Model the benefits of a healthy new PV industry.** For example the avoided costs of new centralised infrastructure; new jobs & manufacturing opportunities; taxes paid to HMT etc. – none of these major benefits have yet been accounted for.
4. **Include solar under the Electricity Market Reform agenda** to open up a new competitive frontier in UK electricity markets. Solar is far more competitive than the UK Government acknowledges because the costs of solar PV must be compared with the *retail* electricity price (the price per unit paid by a householder) not the *wholesale* cost (which is what utilities pay when they buy power from large power generators). This is the right comparison, because the power is generated right where it is needed, avoiding most of the costs of centralised grid electricity.
5. **Set out a clear UK pathway for solar to achieve parity with the cost of grid electricity.** We estimate current investment in solar needs to roughly double in order to achieve parity by around 2017-2019. This depends on establishing a mature market, which can minimise costs by installing minimum 1GW capacity per annum.
6. **Build investor confidence** through a transparent and predictable programme of Tariff reductions linked to the installation rate of solar PV.
7. **Develop the UK solar market further** through introducing a BIPV Tariff³, and through regulatory and fiscal measures, including in new build, roof replacements and electric vehicle charging.

³ Building Integrated PV is incorporated into the roofing fabric itself, e.g. as solar tiles which avoid the need for roof slates. The UK has important manufacturing opportunities in this area.

WHAT YOU NEED TO KNOW ABOUT SOLAR

- Solar is the fastest growing energy generation technology in the world.
- Independent analysis predicts solar PV will be competitive with all forms of electricity generation – fossil and renewable - by 2020⁴.
- Many major nations are putting solar at the heart of their energy strategy for the future.
- Solar on all south-facing roofs and facades across the UK will deliver around 30% of our electricity needs – the technical potential is many times greater⁵.
- Germany estimates over 50% of daytime electricity needs will be met by solar by 2020⁶.
- In the UK, large solar roofs (e.g. warehouses) and ground-mounted PV farms are already cheaper than wave and tidal energy, and under a mature market large solar systems should reach the same price as offshore wind around 2014. At the domestic scale subsidy should no longer be needed after around 2017, when the UK should near “grid parity”.
- The Energy Consultancy Firm Mott MacDonald estimates an average installed domestic solar system will cost marginally over £3000 in 2020⁷. This prices solar electricity at 9p per kWh⁸. Under the electricity regulator Ofgem’s Slow Growth scenario grid electricity will cost 18p per kWh in 2020.
- According to a recent study by consultancy firm AT Kearney, commissioned by the European Photovoltaic Industry Association, over the next five years solar PV will become cheaper than the retail price of electricity in key EU countries with mature solar markets, and even become competitive with new investments in gas CCGT electricity.
- A solar revolution in the UK will bring many benefits to the UK including:
 - ✓ 100,000s of jobs in installation and new manufacturing
 - ✓ avoided cost of importing fossil fuels
 - ✓ greater energy security
 - ✓ reduced carbon dioxide emissions
 - ✓ power in the hands of the consumer (literally!)
- No other energy technology is as easy to deploy and as simple to use, as maintenance free or long lasting – solar produced in the 1970s is still generating power today.
- The Government proposal to cut back the Feed-In Tariffs for solar power (by 40 – 70%) is damaging to investor confidence, and threatens the establishment of both a healthy solar market in the UK, as well as the prospect of investment in other low carbon energy sources.
- Solar energy should be recognised as a key technology in the UK’s energy portfolio.
- We want to make solar cheap so that everyone can benefit from investing in it.

⁴ See for example International Energy Agency roadmap, or recent study by AT Kearney set out in this report.

⁵ *2020 A vision for UK PV*, UK Photovoltaic Manufacturers Assoc, March 2009 (140TWh S roofs and facades); *IEA PVPS Annual Report 2002* (105TWh S roofs only); Prof David McKay, *Sustainable Energy Without the Hot Air*, 2009 (111TWh S roofs only);

⁶ Pers. Comm from office of Hans-Joseph Fell, the German politician who jointly established the first FIT scheme.

⁷ Recent cost assessments by Mott MacDonald for the Committee on Climate Change

⁸ Under a 25 year Levelised Cost Of Energy (LCOE) calculated using Engensa’s LCOE tool.

- We need to drive the solar revolution in the UK from the ground up – which is why we are launching a campaign – Solar Needs You – to campaign for a solar revolution.



SOLAR NEEDS YOU ...

A campaign supported by influencers, environmentalists, businesses, consumers - to encourage people to show their support for solar.

We need the government to know that people – individuals, businesses, NGOs and communities - want clean, safe solar power.

We are inviting people to sign up and pledge support at www.oursolarfuture.org.uk

Let the Government know you support solar, today.

A SOLAR REVOLUTION STRATEGY FOR THE UK

INTRODUCTION

Solar has the power to revolutionise the way we produce electricity in the UK, providing secure, affordable green electricity which will significantly reduce our carbon emissions. With global emissions now at a record high, we urgently need an energy revolution.

Current government policy is threatening the future of solar PV. The Department of Energy and Climate Change (DECC) has proposed drastic reductions in Feed in Tariffs for any project larger than 50kW, in its “Fast Track Review” published in March. The Government plans to support installing PV only on a relatively small number of households, with very limited opportunities for community or public sector solar and no commercial sector or ground-mounted PV schemes. The Budget further proposed to reduce the tax benefits for community renewables schemes⁹.

DECC’s treatment of solar as a niche technology is out of date and out of touch. Solar PV is the world’s fastest growing energy generation technology. Last year, more solar PV capacity was installed across Europe than any other renewable technology¹⁰. In 2010, Germany installed more than double the amount of solar the UK plans to install in total by 2020¹¹. German politicians now estimate that solar will meet over 50% of daytime electricity needs by 2020.

At a conservative estimate, solar PV has the power to supply enough power to meet 30% of UK electricity needs¹² and it should form a vital part of our energy mix. Solar has a complementary annual generation profile to wind, meaning it supports the development of other renewables.

The Solar Trade Association (STA) has worked with industry experts¹³ to produce the Alternative Solar Revolution Strategy, which shows how the Government could create a thriving solar PV industry in the UK with relatively modest public investment. This is not intended to be a blueprint for the definitive option. It is intended to illustrate that solar could enable nothing less than an energy revolution sooner and more cheaply than the public and politicians realise.

The STA is urging the Government to reconsider its policy towards solar and increase investment in solar PV¹⁴. Using excel calculations the STA estimates the cost per household of a UK solar revolution will be around £200 - £250 in total spread over 31 to 33 years. That equates to an average per annum household cost of £6.50 - £7.50, depending on when competitiveness with grid

⁹ The EIS tax relief scheme

¹⁰ EPIA press release 22/2/2011

¹¹ Germany installed around 8GW last year, while the UK Renewable Energy Strategy plans 2.7GW by 2020

¹² See reference above

¹³ In particular Pieterjan Vanbuggenhout at EPIA, Ben Cosh at TCG, Dr Toby Ferenczi at Engensa and Jan Sladek

¹⁴ To be clear, STA is not proposing this is at the expense of other renewable technologies supported by FITs, but in addition.

electricity is reached¹⁵. These ball-park calculations are similar to TGC's findings of £9 per household per annum using their model and a similar scenario. This investment will provide safe, clean energy, create new jobs and help build Britain's new green economy.

Over the term of this Parliament, we estimate the cost of our Solar Revolution Strategy will average just £3 per household per annum i.e. £15 in total per household to 2015.

According to our estimates, driving a revolution requires Government investment in solar to be roughly doubled from current plans, therefore total expenditure by the end of 2015 is around £1.2 billion¹⁶. *We have not quantified the possible savings for consumers as a result of this investment, which are potentially vast¹⁷. We urge the government to do so.*

The strategy is based on creating a mature solar PV market in the UK with sufficient scale to reduce costs and provide a significant contribution to the country's energy needs. STA estimates the UK would need to install a minimum of 1GW per year for the market to mature to the point that PV prices would be as low as overseas and low enough for solar to compete with UK grid electricity. Broader considerations, such as ensuring energy security, cutting emissions and meeting renewable energy targets argue for allowing growth well beyond 1GW per annum, as soon as possible.

With a kick-start the UK can create a mature PV industry, and bring down the costs of distribution and installation with dramatic effects. Investing in solar today is an investment in the subsidy-free energy revolution we so badly need and which solar can deliver well before the end of the decade.

THE GOVERNMENT NEEDS TO RE-THINK SOLAR IN THE UK

Global solar revolution – UK failing to understand the opportunity

There is a global solar revolution happening. Solar is portrayed by some UK politicians as a marginal technology, but by failing to see the potential of solar PV, the Government is allowing the UK to fall behind our international competitors.

Solar has been excluded from most DECC assessments of technology costs and its role is barely mentioned in the Electricity Market Reform (EMR) proposals. The Redpoint modelling which informs EMR proposals does not even consider solar. Yet mainstream analysts expect solar to be cheaper than fossil fuel generation before 2020.

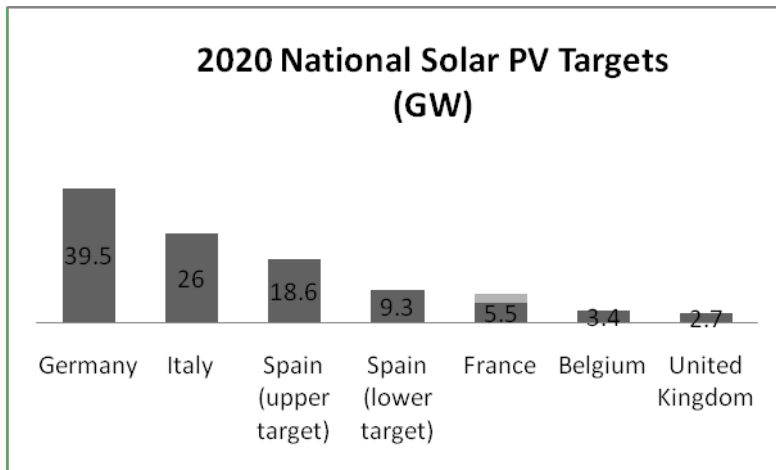
¹⁵ We have also included an estimate by STA member TGC of £9 per annum for a similar scenario reaching 1GW deployment in the headline findings.

¹⁶ There has been confusion about the budget for the FIT scheme. In a written answer by DECC Minister Greg Barker on 16 May, 2011 to James Wharton MP the costs of the FIT were estimated to be £980million by the end of the 2014/2015 year. We estimate roughly £600million would be spent on solar, and therefore our estimate of £1.2 billion total scheme cost by 2015 effectively suggests that expenditure on solar should be doubled during this period.

¹⁷ This will include network savings which are likely to be considerable given findings from IEA scenario analyses.

In countries, such as Germany, which share a similar climate with the UK, supporting solar is a major part of the strategy to build renewable energy and a dynamic economy. German politician Hans-Josef Fell's office anticipates around 50% of daytime electricity demand will be met by solar by 2020.

Germany leads the world in the amount of Solar PV capacity installed while Belgium has also successfully delivered Solar PV at significant scale. Germany's target is now 52GW and Belgium's is 3.4GW compared to 2.7GW DECC currently anticipates in the UK by 2020. The table below sets out how the UK's ambitions compare to other countries.



Germany has now increased its target to 52GW.

France has also tripled its planned solar volume for the next 2 years, and developed a major PV R&D programme meaning its 2020 PV Targets will increase.

Solar is good for employment and manufacturing in the UK

Despite David Cameron's early pledges to lead "the greenest government ever" and create a new low carbon economy, DECC is cutting investment in solar that would create new jobs and build Britain's green economy.

Ongoing work carried out for the Renewable Energy Association (REA) has shown that 3,000 people were employed by the UK Solar PV industry in January 2009. By December 2010, this figure had already risen to 10,000 people.

Around 70% of jobs in the solar industry are on the supply and installation side. These are local jobs which cannot be exported abroad. If the tariff scheme had not been disrupted in February 2011, 17,000 jobs were anticipated by April 2011, 20,000 by the end of 2011, and a further 10,000 during 2012. A total of 30,000 jobs were forecast by the end of 2012.

Under our Solar Revolution Strategy we estimate there could be as many as 140,000 jobs in solar by the end of 2015, and 360,000 jobs by 2020¹⁸.

STA wants to secure exceptional UK opportunities for solar manufacturing for commercial and public sector applications. Kingspan has spent millions of pounds developing an integrated highly energy efficient commercial building envelope that incorporates solar PV. Kingspan was preparing to manufacture these systems in the UK before the rug was pulled from under its feet by the FIT Reviews. This would provide a major export opportunity given the acceleration of the European solar marketplace and Kingspan's huge market share in commercial buildings across Europe.

Given price reductions in polysilicon production we are also confident about the outlook for UK cell manufacturing. The UK currently accounts for 4% of global PV cells production. UK manufacturers are achieving prices increasingly competitive to producers in Asia, but they need a mature local market to help drive economies of scale on mass production. UK manufacturers can avoid shipping costs and have the potential to sell to the greatly expanding EU market.

STA has specifically proposed a Building Integrated PV (BIPV) Tariff as the UK already manufactures solar PV integrated into roofing materials. Unless there is a specific BIPV Tariff, this important area of UK manufacturing risks being damaged by sharp reductions in Tariffs designed for cheaper standard PV retrofits. When PV is actually incorporated within roofing materials, installing renewable energy becomes part of the mainstream construction industry. PV installation becomes cheaper, faster and the end results can be more aesthetically pleasing.

The STA's alternative Solar Revolution Strategy promises to create new green jobs and help Britain develop the strong low carbon economy it will need if it is to compete successfully in the future. We urge DECC to join up with the Department of Business, Innovation and Skills and capitalise on these industrial opportunities.

¹⁸ As above, we have used EPIA/Greenpeace's estimate that each MW of solar capacity produces 30 jobs.

The costs of solar. Comparing like with like.

Only 40% of our domestic electricity bills pay for actually producing the electricity – the other 60% is made up of distribution, supplier profits, levies and other costs. Because solar PV is installed on the property where the bulk of energy is being used, it saves on these costs.

That’s why when the cost of most solar installations is being compared with other forms of generation they need to be compared with retail costs (the cost to the consumer) not wholesale costs (the cost to buy the electricity from the wholesale market).

This critical point has been fundamentally overlooked by UK policy makers, DECC, the Committee on Climate Change (CCC) and often by the consultants that inform them. Effectively DECC is comparing apples with pears, and seriously underestimating the rate at which solar can compete un-subsidised in the marketplace.

The price breakdown below shows the components of the electricity bill for a domestic customer, taken from Ofgem’s Low Growth scenario (note that electricity prices are in fact higher today!).

<i>Slow Growth Ofgem Scenario</i>		Price Breakdown £ MWh
Domestic Bill		2011
Wholesale electricity costs		39.24
Renewables Obligation + CCS subsidies		3.95
Energy efficiency + smart meters		2.86
Transmission & Distribution charges		27.29
Gross margin (profits)		34.85
BSUOS (system balancing costs)		1.58
VAT		5.49
Total		115.27

In the UK solar is commonly compared to technologies entering the market at the wholesale level. But wholesale prices comprise just 40% of electricity bills.

Because solar generates power onsite it is competing directly with the retail price consumers pay for electricity. In this domestic sector illustration solar therefore needs to compete with this price.

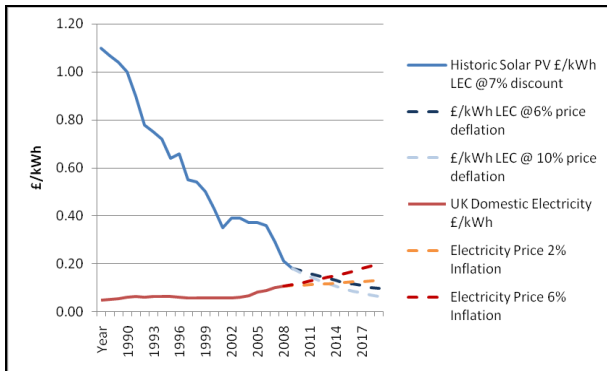
Need for project diversity and economies of scale – capacity drives down costs

The cost of solar PV is falling faster than any other generation technology. The cost of solar PV has dropped in the same way that the cost of computer power has dropped over the last forty years.

During the last 12 months alone, market volume and competition, encouraged by Britain’s Feed-in-Tariffs, has brought UK domestic prices down by at least 20 per cent. This should be an encouraging indicator relevant to future assessment of the technology’s potential.

The price of solar PV modules has reduced by nearly a quarter (22 per cent) every time capacity has doubled. Crystalline panels are a world-wide market, and already cost less than \$1 per Watt to manufacture. Just like mobile and computer technology, this trend shows no signs of slowing.

Chart showing 20-year drop in German domestic solar prices set against UK electricity costs

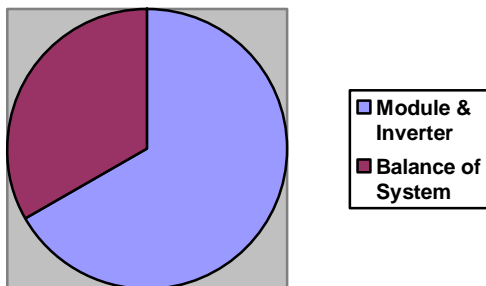


In practice, the UK cannot reach grid parity in the domestic sector as early as this chart suggests because, unlike Germany, the UK does not have a mature industry that can minimise the costs of solar installations.

In contrast to major European countries, as well as China, India and some states in America, the UK has not yet factored in the steep price reductions in solar PV into its strategic decision making.

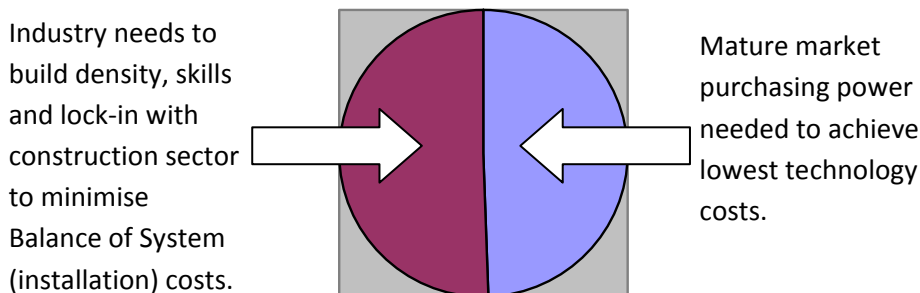
But scale of project and size of market is vital to making solar competitive. The UK needs an industry at scale in order to have sufficient purchasing power to secure and help drive lowest cost technology. And, importantly, it needs to be a competitive market with initial stable 10% margins as banks become more comfortable with the technology and trust the regulatory environment.

Pie Chart showing pv module and inverter costs as proportion of total installed costs of pv system in 2011



According to Mott MacDonald’s recent cost assessments, solar modules and inverters make up around 65% of the total installed cost of solar on a typical domestic roof top system. The Balance of System costs includes labour, scaffolding, project development, electrical works, transformers etc. However this proportion will change as module and inverter costs drop rapidly – see below.

Pie Chart showing pv module and inverter costs as proportion of total installed costs of pv system in 2020. Installation will form a greater portion of costs, as technology prices drop.



German experience proves that, to bring Solar PV unit costs down fast, both a certain size of market and a stable long term support framework are needed. The above pie charts show that a mature market is needed to reduce both technology and installation (Balance of System) costs. The UK needs to invest significantly in installation infrastructure to ensure UK consumers can benefit from reducing solar prices. It is not enough to wait for solar prices to fall – as currently proposed by the Government.

All UK investors stand to benefit from volume in the supply chain, which also helps reduce costs, develop skills and supply chains and network integration. Limiting UK aspirations to just the micro-PV sector (i.e. just households) is also certain to deter inward investment and new manufacturing opportunities.

STA estimates that the UK would need to install a minimum of 1GW per annum for the market to mature to the point that PV prices are as low as they could be, with the distribution, installation and finance component at a reasonable price to compete with fossil fuels in the UK.

Need for continued investment in projects greater than 50kW

DECC has announced major reductions in FITs for solar PV projects over 50kW (a 70% reduction in ground-mounted schemes, and up to 50% for others). The STA believes this policy ignores the experience of the international market and jeopardises the potential to develop a mature solar industry in the UK.

In the first FIT review in February 2011, the Government described 5MW solar installations as ‘small-scale’ developments. The Coalition Agreement also promises to increase opportunities for communities to generate power from renewable energy. But in an about turn, the Government is now reducing the incentives for projects over 50kW. Apparently a victim of its own success, FITs were successfully encouraging retailers, schools, councils, community projects and land owners to invest in solar PV – begging the question, why stop an incentive scheme that is working so well? STA agrees adjustments are justified, but not on this scale or in this damaging fashion. The STA has argued for a 25% reduction across all size ranges of PV project.

Many communities have shown an appetite for developing solar projects. For example, larger solar projects can give members of the community, who may live in flats, or may not be able to afford their own system, the opportunity to invest in solar PV and benefit from the FIT scheme. These schemes are often larger than 50kW and DECC’s proposed tariff reductions have stopped many of these innovative projects in their tracks. Public sector schemes, for example on leisure centres or schools, open up access to this technology and create local engagement with a renewable future.

Ground mounted solar has applications for ex-industrial/contaminated sites which would be expensive to return to ‘greenfield’ or develop in a traditional manner. By developing Solar PV on these sites they make a positive environmental contribution. Furthermore, low value agricultural

land¹⁹ with marginal returns can be used for dual purpose (the actual foot-print of panels is less than 35% of the land used on a site) with sheep grazing on PV sites not uncommon.

The STA wants the Government to realise the potential of solar PV, not just for the domestic market, but also at the community, commercial and utility scale, where it can make a major contribution to electricity production.

The alternative Solar Revolution Strategy is based on reaching competitiveness with grid prices at different times for different sub-sectors of the solar market. Our results are supported by a major new study by AT Kearney for EPIA. This report shows solar will become cheaper than grid price electricity in major EU countries within the next 5 years. In 3 countries (Italy, France and Spain) it will even reach competitiveness with investment in new natural gas (CCGT) electricity in the same time frame.

Beyond FITs - solar should be integral to housebuilding and the roof replacement cycle

In addition, DECC and the Department of Communities and Local Government (DCLG) should insist on solar in new build developments. With around 100,000 new homes built per annum, plus non-domestic construction this should provide a minimum further 250MW market. Housebuilders previously argued that solar was too expensive to include without FIT support, but with solar modules now reaching less than US \$1 per Watt to produce – around £550 per kW, this situation has changed dramatically. House-building provides a very cost effective opportunity as scaffold and labour are already on site, and BIPV solar can displace the cost of roofing materials.

Vast numbers of homes were built in the UK after the war, when construction reached 400,000 units per annum. With roofs lasting 50-60 years, the roofs of many UK homes are in a poor state and require replacement. Around 80,000 whole roof replacements take place every year²⁰, but more can be incentivised with an attractive solar offer. Again, given the scaffold and labour is already required, this provides another highly cost effective intervention point to ensure solar is included on domestic roof space, and we urge DECC/CLG to explore a roof replacement scheme.

Strategic importance of solar power in UK energy mix must be recognised

Solar PV has no emissions, no moving parts, needs no fuel, is completely safe and can work in nearly all locations. Its lifespan is exceptionally long with guaranteed life typically set to increase from 25 to 35 years by 2020. In fact solar lasts much longer than this – installations from the 1970s are still generating power today.

Solar PV generates electricity in a predictable way, during the day when consumption is high. Solar PV provides an essential part of the energy mix also offering a complementary annual generation profile to wind.

¹⁹ Grade 2b or less

²⁰ Estimates provided by STA members in the construction sector

The UK solar resource is huge. Technically solar could meet UK electricity demand twice over, but a guide is to look at solar on south-facing roofs and facades alone, which could deliver more than a third of UK electricity demand per annum.

The 'virtual power station' concept in Germany proves that renewables can be engineered together to accurately match demand – and this flexibility will improve with the development of smart grids and Demand Side Management and storage technologies.

STA's basic model and AT Kearney's analysis shows that, by 2017 - 2019, solar PV could be more attractive and more financially viable than grid electricity for onsite users. During this period it will be comparable to gas and nuclear at a commercial and utility scale with none of the ongoing risks of rising fuel costs or waste disposal.

PV is a trusted and proven technology and in countries with mature and stable PV regulations, required returns from PV are similar to long term treasury bonds i.e. 6-7%²¹. This compares well with other generating technologies which are 8-13.5%²² range.

Solar PV means that consumers will increasingly have the choice to invest in self-generation and they will benefit both from a competitive solar market and competition with solar by other electricity providers. In fact, solar has the potential to transform electricity market competition.

Since 1970s the cost of nuclear has risen 5-fold²³, while the cost of solar has dropped 5-fold. Uranium prices have risen even faster than oil prices from \$13/kg to \$95/kg between 2001 and 2008²⁴.

Widespread industry and influencer support for solar

A consistent and affordable energy supply is vital to the UK's economy and solar is a key part of the energy mix to provide the stable supply of electricity that consumers and businesses need.

More than thirty leading British organisations backed REA and Friends of the Earth's campaign for the FITs scheme, including Greenpeace, Federation of Small Businesses, Country Land and Business Association, British Retail Consortium, NFU, The Co-operative, RIBA and many others.

"Farmers and growers can make a substantial contribution to solar electricity from large rooftops as well as smaller installations. It is absurd that the government should now be proposing to clip the wings of a soaring solar sector. This is hardly the way to reward the success and entrepreneurship shown by NFU members as they diversify into renewable energy of all kinds."

JONATHON SCURLOCK, Chief Advisor on Renewable Energy and Climate Change, NFU

²¹ EPIA analysis

²² Redpoint EMR analysis

²³ *The costs of French nuclear scale-up: a case of negative learning by doing*, Gruber, A., Energy Policy Journal, May 2010

²⁴ <http://www.iea.org/techno/essentials4.pdf>

We are now remobilising support for solar to again press the case on Government. We are launching the Solar Needs You campaign at www.oursolarfuture.org.uk where we are encouraging people to sign our letter to call for the Government to re-think solar, to review current data with independent experts, and to get solar back on track as one of the core power generation technologies for our future.

CONCLUSION

For a young and critically important industry trying to get off the ground in the UK this exceptionally volatile start to the FIT scheme has been damaging. Technologies like solar challenge deep-held assumptions about our energy system, and they can present a threat to incumbent technologies. Experience across Europe shows major conceptual barriers have to be overcome before the potential for mass market technologies to deliver utility scale power is appreciated by politicians and the electricity supply industry. We need to expedite that understanding in the UK. Government support is urgently needed to create space for new technologies that disrupt Business As Usual.

The Solar Trade Association is calling for informed and holistic decision-making based on a transparent framework evaluating all technologies. Current UK solar policy is based on out-of-date cost inputs, a very limited assessment of benefits and poor consideration of practical and strategic arguments. **A revised decision-making framework is needed**, as set out below.

UNDERSTAND COSTS	QUANTIFY BENEFITS	STRATEGIC + PRACTICAL CONSIDERATIONS
<ul style="list-style-type: none"> • Solar requires up-to-date cost inputs given the dynamism of the international market • Recognise that future costs are affected by the stability of the investment framework and the size and maturity of the industry • Investment must be set against realistic fossil fuel cost projections 	<ul style="list-style-type: none"> • Savings on central generation and networks • Employment • Inward investment & manufacturing • Electricity sector choice & competition • Tax receipts • Energy security • Zero inflation electricity 	<ul style="list-style-type: none"> • Widespread public acceptance • Complementarity with other forms of renewable generation • Integration with roofing infrastructure • Potential for lowest cost generation • Rapid deployment possible • Global market share

This Solar Revolution Strategy argues increased investment is needed in solar power to optimise public benefits given exceptional rates of price reduction and the technical and competitive potential of solar. The UK has underestimated the potential of this popular and disruptive technology, whilst overestimating its cost - and ignoring its potential for reducing centralised infrastructure costs. More ambitious investment is needed to drive grid parity and to optimise UK industrial and employment opportunities.

This Strategy is a sensible alternative to current Government proposals to crush the solar industry when it has barely begun. This is a serious strategic mistake based on out-of-date data and poor understanding of solar's potential. A technology as dynamic and fast-moving as solar needs regular appraisal in a complex energy context by specialists. It greatly concerns the industry that the Treasury on a 4-year Comprehensive Spending Review cycle appears set to dictate energy policy and we challenge this approach, which is neither sensible nor in the public interest.

Without doubt, FITs are the preferred option for supporting solar. REA and Friends of the Earth campaigned for FITs for good reason – they are user-friendly for diverse people and organisations outside the energy sector and their popularity has now been proven. The campaign for FITs was strongly supported by both the Conservatives and LibDems in opposition. The RO is a far less attractive support scheme for investors outside the energy sector, but in the absence of an adequate FIT budget, RO support should be increased to 4 ROCs.

The industry cannot wait until April 2013, when the results of the RO's current Banding Review will be implemented. This might require a separate emergency review to ensure this increased support is introduced early in 2012 at the latest. This would seem reasonable, given that an emergency review has already been carried out for off shore wind in the RO, and this is the same procedure the Government intends to use to reduce FIT tariffs.

We cannot afford to let this vital industry flounder. Solar's future is our future.

STA Excel Model Calculations

The purpose of our calculations is to show a more ambitious approach to solar is affordable and will deliver substantial economic, security and environmental benefits in the UK. Experts from the REA and STA together with members with many years of experience in the global solar PV market have pooled expertise to develop a framework for optimising economic benefits and to deliver a greater proportion of power from solar.

We are, however, not expert in modelling and have done our best to calculate possible costs using a relatively simple excel model with criteria set out in Appendix 2 below. Our findings are supported by STA member TGC's own model, which anticipates the cost per household of a 1GW minimum scenario to drive parity at £9 per annum. We have therefore included this £9 figure in our headline estimates.

We recognise a diversity of views among STA members and this model is not intended to present a definitive option. It is intended to provide an alternative to the currently damaging proposals and illustrate the ball-park affordability of a solar revolution.

Our model anticipates that parity is reached with UK electricity prices in most sub-sectors of solar by 2017-2019. The big unknown is of course future electricity prices, and how power exported from solar PV on to the grid will be rewarded in the UK²⁵. In the 2017 scenario our model withdraws support beyond 2017, at which point a short period of intermediate support may be needed, for example soft loans, or net metering. We assume modest growth beyond this period at 20% per annum. In total this delivers around 9.6GW of solar pv by the end of 2020. In addition we anticipate a 250MW per annum market for new build, retrofits and electric car charging, delivering a further 2.5GW of solar by 2020.

Therefore our 2017 scenario delivers 12 GW of solar PV by 2020. This comprises 2.2million domestic installations, 42,000 community schemes, 3,900 commercial sector schemes and 390 utility scale schemes. It creates 360,000 jobs and costs households £6.50 per annum over 31 years.

Given future electricity prices are uncertain we also modelled the cost of parity being reached in 2019. **The 2019 scenario results in 11GW of solar pv by 2020 comprising 2million domestic installations, 37,000 community schemes, 3,400 commercial sector schemes and 340 utility schemes. It creates 330,000 jobs and costs households £7.50 per annum over 33 years.**

Both scenarios incur the same costs during this Parliament, requiring a total of just under £1.2 billion investment by the end of 2015, adding £3 per household, per annum to household electricity bills over this period.

In addition to policies set out above our Solar Revolution Strategy recommends the following:

²⁵ Current arrangements where solar is paid 3p per kWh exported do not adequately reflect the true value of locally generated electricity.

Further supporting investment in the uk solar industry

A wide range of complementary measures can be taken to further support investment in the solar sector, at no cost to the tax payer. These include; regulatory measures on new build to drive solar; extension of Enhanced Capital Allowances to FIT technologies; start up corporation tax relief for Cleantech focused SME's; large corporate SME investment relief; creation of £5,000 Green ISAs plus an increased £5m annual limit for EIS; VCT investment in Cleantech manufacturing; tax free community (or mutual) investment bonds – to generate £1-£2 billion annually of additional investment in community interest companies and public-private partnerships; exemption from carbon reduction commitment for corporates generating renewable energy from majority owned renewable energy generation onsite/off site; creative deployment of the Green Investment Bank.

Optimising public value through beneficial financial models

A range of options exist for financing solar developments, some of which offer greater added public value. STA is particularly keen to see the social housing and community sectors benefit from investment models that optimise value for vulnerable householders or community benefits, including revolving funds for energy efficiency. The removal of EIS tax relief has had a serious impact on the viability of co-operative and IP community models – these should be exempted. We understand from local authority lawyers that it is perfectly possible to specify Tariff rates specifically for public organisations including Registered Social Landlords, local authorities and charities.

Recognise value of brownfield sites

STA does not advocate the use of quality agricultural land for ground-mounted solar. However, we know of few instances where this has been suggested. Ground-mounted solar should be used on low-grade land of grade 2b and below, including contaminated land or other brownfield sites. The NFU have developed policies which would ensure compatibility and not competition with farming use. Such sites can have real value and provide a cost-effective solution in many instances, where they are located close to demand.

Working positively with DECC

The solar industry wants to develop a positive working relationship with DECC. As with other European models we want to see the establishment of an industry roundtable to inform Tariff reviews. The roundtable should be populated by industry leaders from across all sub-sectors of the solar industry.

APPENDIX TWO

Detailed Input Assumptions on STA Excel Model

- Model assumes FIT rather than RO support, but in worst case RO could apply to 100kW+ bands.
- Model starts from 2011 Tariffs, with 30% cuts in current rates aligned to DECC cost reductions analysis. This ambitious degression depends on commitment to developing a mature industry.
- FIT eligibility up to 5MW in size for 25 years.
- Banding structure, as follows: 1-4kW (retrofit and BIPV), 4-10kW (retrofit and BIPV), 10-100kW (retrofit and BIPV); 100-250kW; 250kW – 1MW; 1MW – 5MW
- New Tariff payments for BIPV at 35p, 30p and 29p/kWh
- Output per kW(p) of 850kWh per annum which is UK average
- A dedicated BIPV Tariff, which will enable the UK to optimise the opportunities for building integrated manufacturing up to 100kW in size.
- No new-build Tariff. We expect solar to be driven in new build by regulation
- Growth doubles every year from 200MW installed in 2011, to reach 1GW by 2014.
- 1GW capacity continues until parity is reached.

- Model anticipates degression in 2013 of 15%, in response to foreseeable market developments.
- Degression post 2013 of 10%, though the industry wants to see regular 6-monthly revisions to minimise the risk of steep reductions stranding projects.
- Model anticipates a split between sub-sectors of 40% domestic [1-10kW], 30% community [10-250kW]; 20% commercial [250kW – 1MW] and 10% utility [1MW – 5MW].
- Model based on more realistic grid price increases, using Ofgem's Project Discovery scenario Low Growth. This was chosen because it is close to current prices and concerns about current rate of renewables investment/growth but note that current electricity prices are higher than these.
- Model removes support once Tariff are lower than retail electricity prices in domestic, community and commercial sub-sector and when commercial wholesale prices matched for utility.
- Model assumes (as per DECC calculations) that 34% of cost falls on domestic sector, with 26 millions homes today, and 29 million homes from 2020

2 June 2011

● OUR SOLAR FUTURE

SOLAR REVOLUTION STRATEGY FOR THE UK

Prepared by the Solar Trade Association.
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Enfinity	Sharp	



The Solar Trade Association has over 30 years of experience representing solar PV and solar thermal in the UK.

The Renewable Energy Association covers the full range of renewable technologies across power, heat and transport.



The two associations recently affiliated, creating a combined membership of over 800 corporate members.

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