

The Fifth Carbon Budget - Call for Evidence

www.theccc.org.uk/call-for-evidence

Response from the Solar Trade Association

When responding please provide answers that are as specific and evidence-based as possible, providing data and references to the extent possible. Please limit your response to a maximum of 400 words per question.

Questions for consideration:

A. Climate Science and International Circumstances

Climate science and international circumstances are important criteria in setting carbon budgets.

- The science indicates the impacts associated with different levels of climate change and the limit on emissions globally if these risks are to be contained.
- International circumstances inform the prospects of future action to reduce emissions globally, potential requirements of the UK to contribute to those actions, and prospects for low-carbon technology development and carbon pricing.
- The EU places obligations on Member States to reduce emissions to contribute to reductions in the bloc as a whole. These imply a minimum level of effort for the UK's carbon budgets.

The Committee intends to draw primarily on the work of the IPCC, as published in the Fifth Assessment Report, in assessing the implications of climate science for the budget advice

The Committee's advice is based on a climate objective to limit central estimates of temperature rise to as close to 2°C as possible, with a very low chance of exceeding 4°C by 2100 (henceforth referred to as "the climate objective"). This is broadly similar to the UNFCCC climate objective, and that of the EU.

In order to achieve this objective, global emissions would have to peak around 2020, before decreasing to roughly half of recent levels by 2050 and falling further thereafter.

The UNFCCC is working toward a global deal consistent with such reductions. Individual parties are submitting pledges for effort beyond 2020, with the details of the agreement to be discussed in Paris late in 2015.

The EU has agreed a package that requires a reduction in emissions of at least 40% on 1990 levels by 2030, on the way to an 80-95% reduction by 2050. The UK Government supported this package, while arguing for an increase to 50% in the context of a global deal.

The US and China have jointly made pledges for the period beyond 2020. The US has pledged a reduction of 26-28% by 2025 versus 2005, requiring a doubling of the rate of carbon reduction compared to 2005-2020 and on a trajectory to economy-wide cuts of the order of 80% by 2050. China has pledged to peak CO₂ emissions around 2030, and to make best efforts to do so earlier.

Question 1 *The IPCC's Fifth Assessment Report will form the basis of the Committee's assessment of climate risks and global emissions pathways consistent with climate objectives. What further evidence should the Committee consider in this area?*

ANSWER: We believe that the IPCC Fifth Assessment Report is the most authoritative source of information and evidence and is therefore the correct source to draw from.

Question 2 *To what extent are the UN talks in Paris likely to have implications for the Committee's advice beyond the pledges and positions announced in advance of the talks?*

ANSWER: We hope that the UN talks in Paris will create a more level playing field between countries within the global marketplace (in terms of emissions reductions commitments), allowing the Committee on Climate Change to be more assertive in the advice it gives to the UK government.

Question 3 *Based on the available evidence, does the EU 2030 package reflect the best path to its stated 2050 ambition? How might this package change, specifically its targeted emissions reduction, either before the end of Paris or after Paris?*

ANSWER: We believe that solar energy would be able to make a much greater and more cost-effective contribution to emissions reduction if the EU 2030 package contained a more ambitious renewable energy target, and if the target was shared out between Member States, as the current 2020 target is. Such a target at Member State level would help to focus the government on implementing a more ambitious UK solar energy policy.

Question 4 *How does the UK's legislated 2050 target affect its ability to support international efforts to reduce emissions, including its position in negotiations? Does the level of UK carbon budgets have any additional impact (over-and-above the 2050 target) for the UK in international discussions?*

ANSWER: The UK's 2050 target greatly strengthens the UK's ability to support international efforts, including its position in negotiations. Setting a clear and ambitious trajectory through the successive interim carbon budgets definitely gives the UK's position additional impact in international discussions.

B. The cost-effective path to the 2050 target

The carbon budgets need to set a path that is achievable from today without being over-optimistic about what is achievable in later periods to prepare for the 2050 target.

The Committee has previously set out scenarios for 2030 that balance effort before 2030 with potential opportunities from 2030 to 2050. The scenarios aim to include ways of reducing emissions that are likely to be relatively low cost and actions that will develop options that may need to be deployed at scale by 2050.

These scenarios, reviewed in detail in the Committee's report *The Fourth Carbon Budget Review – the cost-effective path to the 2050 target*, include substantial investment in low-carbon power generation, roll-out of low-carbon heat (heat pumps and district heating), development of the markets for ultra-low emissions vehicles and a combination of energy efficiency measures and fuel switching in industrial sectors.

The scenarios also reflect detailed assessments of what is practically deliverable, and the Committee monitors progress towards them as part of its statutory duties. The *2014 Progress Report to Parliament* indicated that current policy would not be enough to meet the fourth carbon budget, but that the 'policy gap' could be closed at affordable cost.

The set of policy options required to close the gap include:

- Strengthening the EU Emissions Trading System.
- Setting a clear objective for Electricity Market Reform (EMR) beyond 2020.
- Focusing on low-cost residential energy efficiency.
- Simplifying policies targeting commercial energy efficiency.

- Tackling financial and non-financial barriers to low-carbon heat.
- Pushing for strong EU targets for new vehicle efficiency in 2030.

The Government has subsequently published various documents, including its formal response, as required under the Climate Change Act, and the National Infrastructure Plan. The Plan includes investments of around £100 billion in low-carbon power generation in the 2020s, in line with the scenarios from the EMR Delivery Plan that reach 100 gCO₂/kWh by 2030. It also has significant investments in offshore oil and gas and in the road network. This includes £15 billion of new spending on roads and around £50 billion on offshore oil and gas.

Question 5 *In the area(s) of your expertise, what are the opportunities and challenges in reducing emissions to 2032, and at what cost? What may be required by 2032 to prepare for the 2050 target, recognising that this may require that emissions in some areas are reduced close to zero?*

ANSWER: We fully support the Committee’s view that the Government should be implementing a clear decarbonisation target for electricity generation in 2030 and we recommend that this target should be 50gCO₂/kWh (average grid intensity).

Solar energy, with its minimal carbon emissions, can make a very substantial contribution to decarbonisation, both in the medium and longer term. One of its great strengths is its scalability and the relative speed with which it can be deployed, as demonstrated in recent years. By 2025 we expect large-scale solar generation to be fully competitive with the prevailing wholesale electricity cost – see our recent report [Cost reduction potential of large scale solar PV](#) and the Cebr’s analysis of [Solar powered growth in the UK](#). The key graph from the first report is as follows:

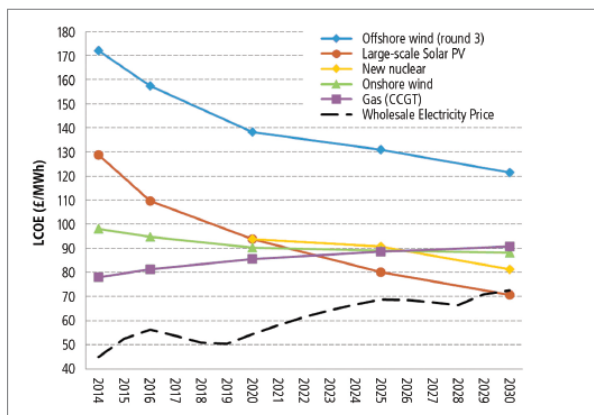


Figure 1:

LCOE values for various technologies in 2014 £.

Source: DECC Electricity Generation Costs (Table 13) and DECC Updated energy and emissions projections: 2014 (Annex M).

All values are central/reference scenarios.

Just like mobile phones or laptop computers, solar's costs keep coming down. We project solar PV to reach cost parity with conventional energy sources in all key market segments within the next decade such that, by 2028, it will be one of the most economically competitive sources of electricity supply (if not the most competitive). A typical solar module will have 40 years life, generating electricity at near zero marginal cost, after the initial investment. This will reduce the wholesale and retail cost of electricity while solar is generating without increasing the levies paid by consumers under the Levy Control Framework.

Over £5bn of investment has been made into battery storage technologies by industry in the past few years, so it is highly likely that a daily arbitrage market will develop – buying cheap solar electricity and selling it into the peak demand markets in the evenings. Arguably, even at British latitudes, 100% of summer demand can be met by solar + storage. During winter months solar would be complemented by higher wind generation, storage and the capacity market. These technologies have repeatedly shown their ability to reduce costs and deploy faster than civil servants predict.

The UK needs a clear national roadmap to at least 2030 for the deployment of solar technology and we see this as DECC's primary responsibility, with positive encouragement from the Committee. In the short term we need a government-industry task force to plan for grid parity and a much more assertive approach to reinforcing the electricity distribution grid to accommodate wider use of solar power. The key point on cost is that, once parity has been achieved, solar has the potential to save the UK economy many billions of pounds into the future by setting the benchmark on price.

Question 6 *What, if any, is the role of consumer, individual or household behaviour in delivering emissions reductions between now and 2032? And, separately, after 2032?*

ANSWER: As solar energy becomes more cost-effective we will see households, businesses and communities becoming “prosumers” of electricity i.e. both consumers and producers. We believe that between now and 2032 grid parity will be reached for all market segments and solar energy will become a default choice for consumers, thereby producing millions of small distributed generators – exactly what the former DECC minister Greg Barker suggested by calling for the ‘big 60,000 rather than the big 6’ in reference to commercial generators. This will have profound impacts on the UK's generation mix, especially when coupled with smart grids, electricity demand management and storage. After 2032 we see the trend continuing, with increasing electricity production from distributed sources, increasing storage and a reducing requirement for centralised generation.

Question 7 *Is there evidence to suggest that actions to further reduce emissions after 2032 are likely to be more or less challenging to achieve than actions in the period up to 2032?*

ANSWER: After 2032 the actions are likely to be more challenging as the easier options and low hanging fruit are taken up, however technological improvements such as improved solar conversion efficiencies and more cost-effective storage solutions will have a profound impact, further improving the economics of solar generation. Further cost reductions are likely but progress is predicated on continuing and stable political support for solar.

Question 8 *Are there alternatives for closing the 'policy gap' to the fourth carbon budget that could be more effective? What evidence supports that?*

ANSWER: Two areas require major focus by government and regulators: the electricity grid and electricity storage. There is an urgent need to reconfigure and reinforce the grid to accommodate geographically distributed generation and significant volumes of storage will be required to accommodate higher penetration of variable renewable energy technologies. For solar much of the storage is likely to be integral with the generation at the consumer's location, allowing consumers to maximise self-consumption.

In order to reduce carbon emissions from new buildings we require much tougher Building Regulations and increased emphasis on removing market barriers (for example the fact that lower energy bills are not taken into account when valuing homes or calculating mortgages). We very much regret the watering down of the zero carbon homes agenda over recent years, such that homes built to the currently proposed 2016 "zero carbon" standard will only save around one third of the carbon envisaged by the originally proposed policy. It will be important for government to continue to tighten Building Regulations in the years following the 2016 uplift and we expect solar to be able to make a significant contribution to mitigating on-site carbon emissions. In the interim local authorities should be able to continue to use the authority vested in them by the Planning and Energy Act 2008 to set requirements for renewable energy through planning conditions.

As homes and buildings become more efficient, hot water will become a more significant share of the energy bill. Solar thermal is well suited to meeting this requirement and requires less roof space than solar PV, so is often suitable for buildings where PV may be problematic (e.g. through partial shading).

Question 9 *Are the investments envisaged in the National Infrastructure Plan consistent with meeting legislated carbon budgets and following the cost-effective path to the 2050 target? Would they have wider implications for global emissions and the UK's position in international climate negotiations?*

ANSWER: We believe that a much greater emphasis within the National Infrastructure Plan needs to be placed on reconfiguring the electricity grid for distributed generation and investing in energy storage both at the consumer and grid level.

We would like to see the Committee take a much more positive approach to the impact that solar/wind/storage can have at the distribution grid level. We have attached a presentation from one of our members, Good Energy, that provides an example of a vision for a subsidy-free future.

C. Budgets and action

The UK's statutory 2050 target requires actions across the economy to reduce emissions. Many of these actions will be driven by (UK and devolved) Government policy and implemented by businesses and consumers. There will be an important role for Local Authorities in successful delivery.

Although the carbon budgets do not require specific actions, they provide an important indication of the overall direction that policy will take in future. Once set, carbon budgets can only be changed if there has been a significant change in the relevant circumstances set out in the Climate Change Act.

Feedback from businesses as part of the Committee's 2013 Call for Evidence for the review of the fourth carbon budget was that stability is an important and valuable characteristic of carbon budgets.

Question 10 *As a business, as a Local Authority, or as a consumer, how do carbon budgets affect your planning and decision-making?*

ANSWER: Carbon budgets provide a crucial framework for stimulating investment by providing long term certainty for investors. They do this by incentivising government to take the necessary steps through legislation and regulation.

Question 11 *What challenges and opportunities do carbon budgets bring, including in relation to your ability to compete internationally? What evidence do you have for this from your experience of carbon budgets to date?*

ANSWER: The worldwide market for solar energy is increasing at 30% per year. If the UK's carbon budgets are translated into ambitious UK policy to encourage deployment of solar energy, as we believe they should, UK industry will be in a very strong position to benefit from this expanding and lucrative global market.

Question 12 *What would you consider to be important characteristics of an effective carbon budget? What is the evidence for their importance?*

ANSWER: An effective carbon budget is one that sends clear signals to the market place and to government. In particular it is crucial that mechanisms are put in place to ensure that the environmental cost of carbon emissions is reflected in their market price. Long-term predictability of the carbon price is also crucial if it is going to stimulate the required investment in capital intensive technologies.

D. Other issues

The Climate Change Act requires that in designing the fifth carbon budget we consider impacts on competitiveness, fiscal circumstances, fuel poverty and security of energy supply, as well as differences in circumstances between UK nations. High-level conclusions on these from our advice on the fourth carbon budget were:

- **Competitiveness** risks for energy-intensive industries over the period to 2020 can be addressed under policies already announced by the Government. Incremental impacts of the fourth carbon budget are limited and manageable.
- **Fiscal impacts.** The order of magnitude of any fiscal impacts through the 2020s is likely to be small, and with adjusted VED banding and full auctioning of EU ETS allowances could be neutral or broadly positive.
- **Fuel poverty.** Energy policies are likely to have broadly neutral impacts on fuel poverty to 2020, with the impact of increases in electricity prices due to investment in low-carbon generation being offset by energy efficiency improvement delivered under the Energy Company Obligation. Incremental

impacts through the 2020s are likely to be limited and manageable through a combination of further energy efficiency improvement, and possible income transfers or social tariffs.

- **Security of supply** risks due to increasing levels of intermittent power generation through the 2020s can be managed through a range of flexibility options including demand-side response, increased interconnection and flexible generation. Decarbonisation of the economy will reduce the reliance on fossil fuels through the 2020s and thus help mitigate any geopolitical risks of fuel supply interruption and price volatility.
- **Devolved administrations.** Significant abatement opportunities exist at the national level across all of the key options (i.e. renewable electricity, energy efficiency, low-carbon heat, more carbon-efficient vehicles, agriculture and land use).

Question 13 *What evidence should the Committee draw on in assessing the (incremental) impacts of the fifth carbon budget on competitiveness, the fiscal balance, fuel poverty and security of supply?*

ANSWER: We are confident that the reducing cost of solar generation will have a profound impact on the UK's electricity market within a decade, so long as the government tackles the barriers to deployment and creates a favourable market and regulatory framework. The evidence will be in the form of market take-up of solar following the removal of subsidies, decreasing fossil fuel imports and increasing tax take from the solar industry.

Question 14 *What new evidence exists on differences in circumstances between England, Wales, Scotland and Northern Ireland that should be reflected in the Committee's advice on the fifth carbon budget?*

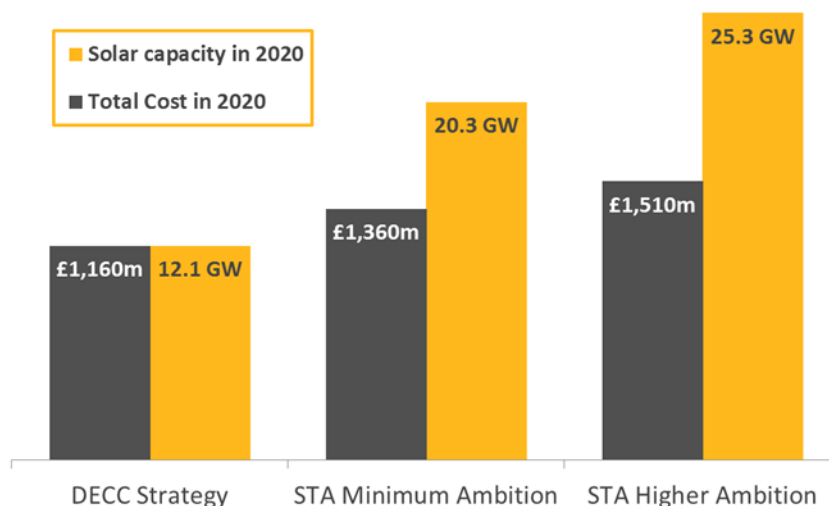
ANSWER: We believe that solar can play an increasingly significant role in meeting the energy demand of every country in the United Kingdom – even in the more northerly latitudes of Scotland solar can make a huge contribution to Scotland's 100% renewable electricity target. It is therefore important that this be reflected in the policies of each country. We would like to see the government funding more

work on regional levels of the solar resource

Question 15 *Is there anything else not covered in your answers to previous questions that you would like to add?*

ANSWER: Above all, investment in solar energy will be stimulated by government providing a stable legislative and regulatory environment that recognises the capital intensive nature of the technology and the variable nature of the resource. Such certainty reduces risk and lowers the cost of capital, thereby greatly enhancing the economics. It is in the government's gift to produce such a long-term framework.

We will be publishing a major new report on Monday 8th June 2015 – the STA's Solar Independence Plan. It is [available on our website now](#), but it is embargoed for publication until 8 June. It demonstrates how the various solar power support schemes can be adjusted to provide better value for money while achieving higher deployment (up to 25GW in 2020), removing the need for subsidy in all sectors within a decade (see the graph below). We urge the Committee to review this report and we would be very pleased to engage with the Committee on its detail.



We would also be pleased to meet with the Committee to discuss our answers to this call and see whether there is additional evidence that can be provided to meet the Committee's needs.

Finally, this response has focused on the opportunities provided by solar PV but we must remember that solar thermal technology can also make a significant

contribution to heat demand. As homes and commercial buildings become better insulated their space heating demand goes down but demand for hot water does not. Solar thermal often competes for roof space with solar PV and has suffered from the recent rapid rise in deployment of the latter, but there are situations where solar thermal can meet an energy need where PV cannot; in particular it requires less roof space to meet domestic hot water demand and is less sensitive to shading. We are very keen to see an ongoing focus by government on incentivising its deployment.