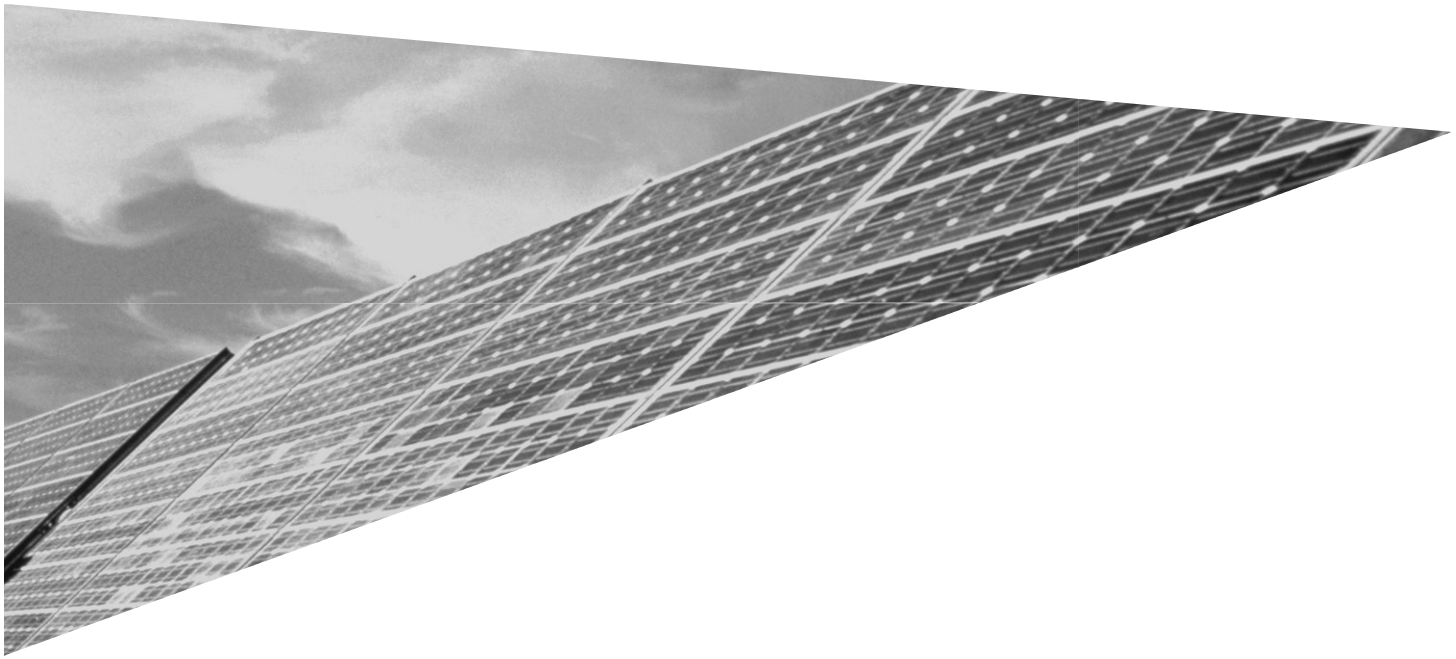
Ernst & Young UK solar PV industry outlook

The UK 50kW to 5MW solar PV market

June 2011



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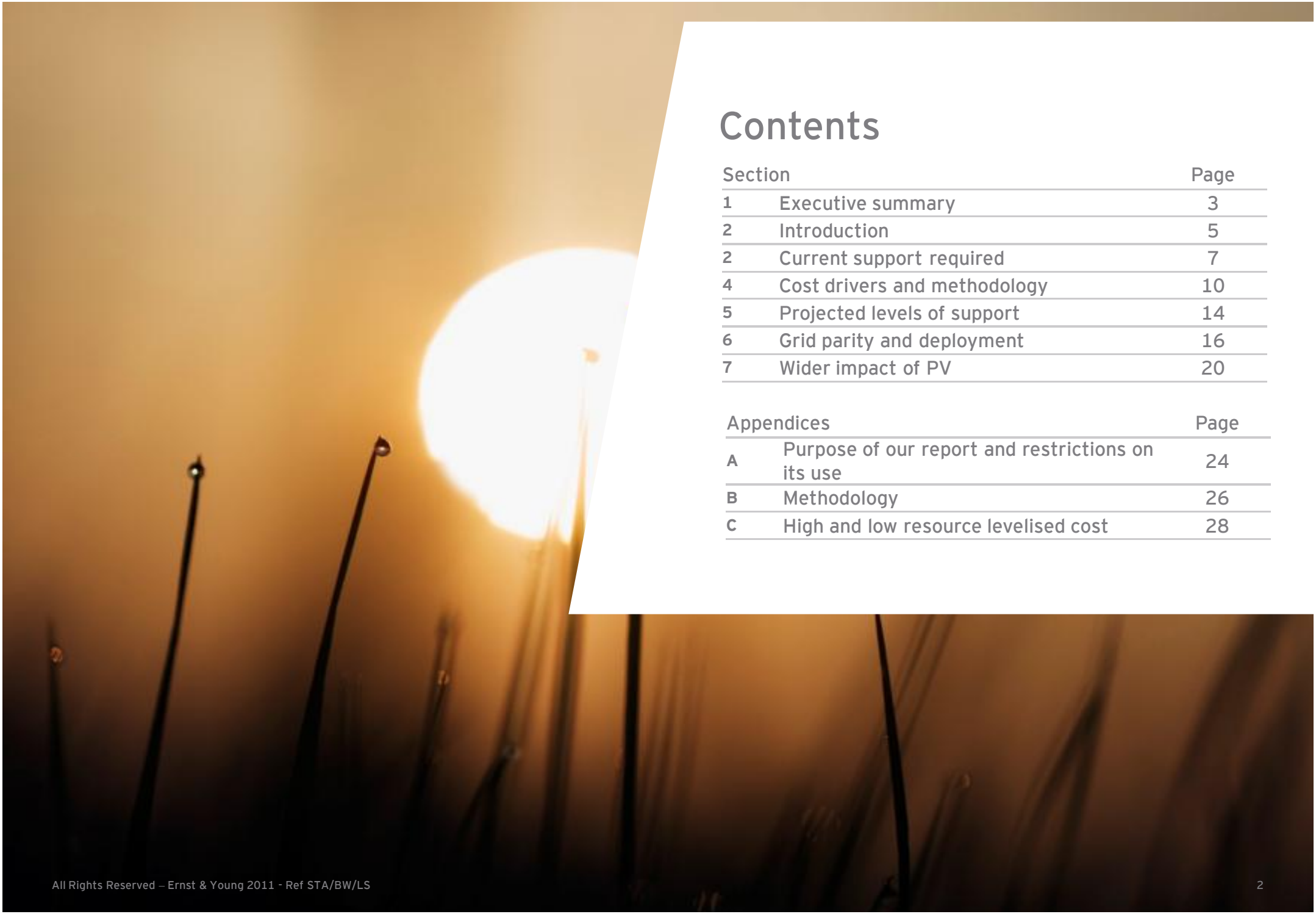

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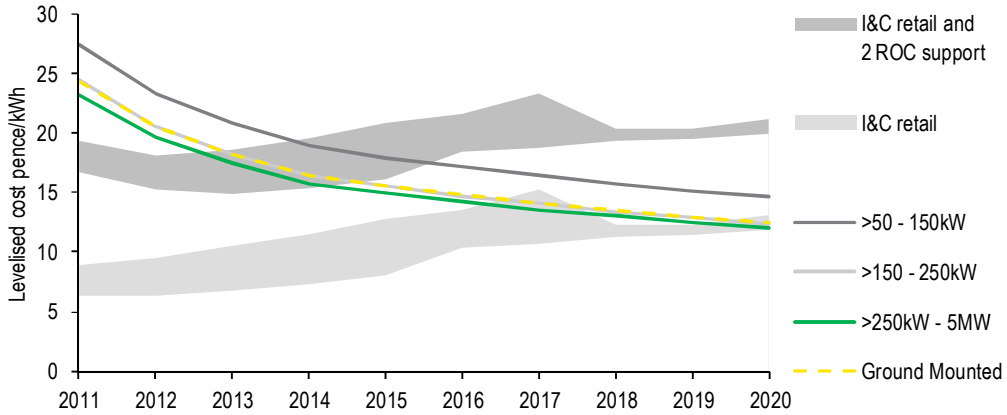
Section 1

Executive summary

Executive summary

Tariff levels for 50kW to 5MW solar PV

- This analysis shows current cost data provided by ten UK solar PV developers in May 2011 representing an estimated 10% of solar PV capacity deployed in the UK in 2010 and a significant proportion of future build out.
- While costs are still above more mature markets, they are expected to align with those in Germany and Italy.
- Approximately 40% of capex costs are currently attributed to modules; industry expects module cost reductions of 13-17% annually driven by reductions in silicon usage and efficiency of non-silicon based costs.
- If the UK were to adopt net metering, large scale building connected projects could be generating 5% real pre-tax returns with 2 ROCs between 2013 and 2014. Without net metering and ROC or FiT support, our analysis indicates that solar PV is likely generate this level of return to be the case by 2017.
- Grid parity with retail prices is expected to be achieved in the UK by 2020 without subsidy for non-domestic, on-site installations.
- Assuming support continues for solar PV under the FiT at the levels estimated in this analysis, the annual spending will remain within the budget agreed under the comprehensive spending review. However other industry forecasts are significantly higher and may therefore exceed the budget.
- The instability of the UK regulatory regime is reducing the attractiveness of the UK market to investors, which is likely to increase the overall cost of finance for solar PV above levels that would have existed under a stable FiT regime.



Contribution of solar PV to UK plc

- The emerging UK solar sector has resulted in a significant amount of employment in the UK with over 2,400 MCS installers accredited to date. Applying GreenPeace / EPIA estimate of 30 jobs per MW installed implies 2,500 new jobs were created in 2010, increasing to around 15,000 by 2014, given deployment levels included in this report. As the industry gears up, some of these jobs may be created in advance of capacity installation.
- Solar PV should be considered as playing an important role in contributing to the wider UK renewable energy targets.
- The contribution to the UK economy, in terms of Gross Value Added (GVA), also needs to be addressed by considering the cost of policy support, cost of carbon saved, income and corporation tax revenues, and inbound investment opportunities from the creation of new markets and manufacturing opportunities for Building Integrated Photovoltaic (BIPV) and reroofing. The Spanish REA estimate that for every €1 invested in PV the benefit to the economy is €3.
- The solar PV sector has provided the opportunity for a number of new, non-traditional players to enter the UK energy market. As such, the sector is a useful platform for increasing the level of competition in the UK energy market.
- Due to it's relative simplicity as a passive asset, solar has been observed as an entry point for large corporates particularly within the utilities and facilities management sectors to change their business model to address the decarbonisation of the built environment. The instability of the FiT regime may impact on their confidence to invest in broader flagship Coalition Government policies such as the Green Deal and RHI.
- Access to new sources of finance, including low cost, long term institutional capital was starting to be introduced into solar PV projects. These sources of capital are critical if the UK is to attract the £200bn of investment needed in new energy infrastructure. The instability of the UK regulatory regime is reducing the attractiveness of the UK market to such investors.

Section 2

Introduction

Introduction

This paper has been commissioned by the Solar Trade Association in response to the Fast Track Review of UK feed in tariffs to present an independent analysis on the level of support required to deliver targeted returns, as well as the associated cost of this support based on deployment scenarios. Please refer to Appendix A for an important notice in respect of restrictions on the use of this report.

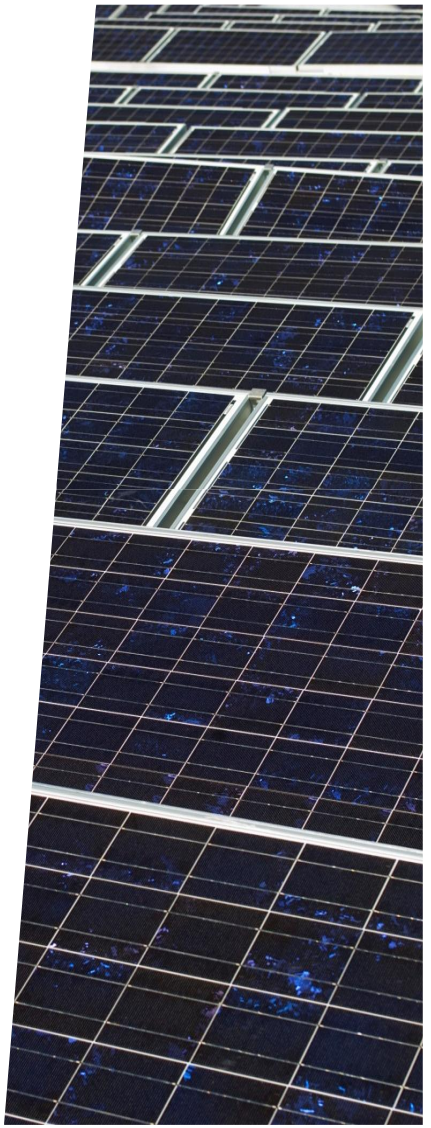
We have undertaken an independent analysis of cost and deployment information provided by a sample of ten developers, installers and manufacturers for a range of system sizes, above 50kW, being installed commercially in the UK. Respondents made up approximately 10% of solar PV capacity deployed in the UK in 2010. This data was used to assess the required level of support to deliver the rates of returns that have been targeted under tariff legislation.

This report also seeks to identify the current and expected reduction in solar PV costs, based on a robust and comprehensive data set provided by industry. This data has been used to recalculate the levelised retail costs of solar PV up to 2015, coinciding with the proposed FiT cap timeframe. The costs that have been assessed include:

- Capital costs
- Operation and maintenance costs
- Lifecycle costs
- Investor cost of capital

Recognising that the regime is currently subject to DECC's departmental budgetary spend and therefore subject to budgetary cuts, we consider the potential cost of the FiT under the current spending review period through a number of deployment scenarios. Given that DECC is required to reduce the revenue spent on the FiT by 10% in 2014/2015, effectively placing a cap on the overall budget for the FiT, we have included analysis on the likely cost under different deployment and tariff scenarios and consider ways of deploying this limited level of support. This report has only considered solar PV technology, and not other technologies covered by the current UK FiT regime.

We draw a comparison of the cost and tariff regime to more mature solar PV markets, most notably Germany. The UK and Germany have similar levels of solar irradiation for large areas of the country, and since introducing the solar FiT regime in 2000, Germany has developed a significant solar industry. In 2010, Germany installed around 7GW of capacity, which equated to half of global deployment in that year (Deutsche Bank). As such this market is a significant driver of supply and demand factors and recent revisions to their FiT regime impact heavily on global pricing.



Section 3

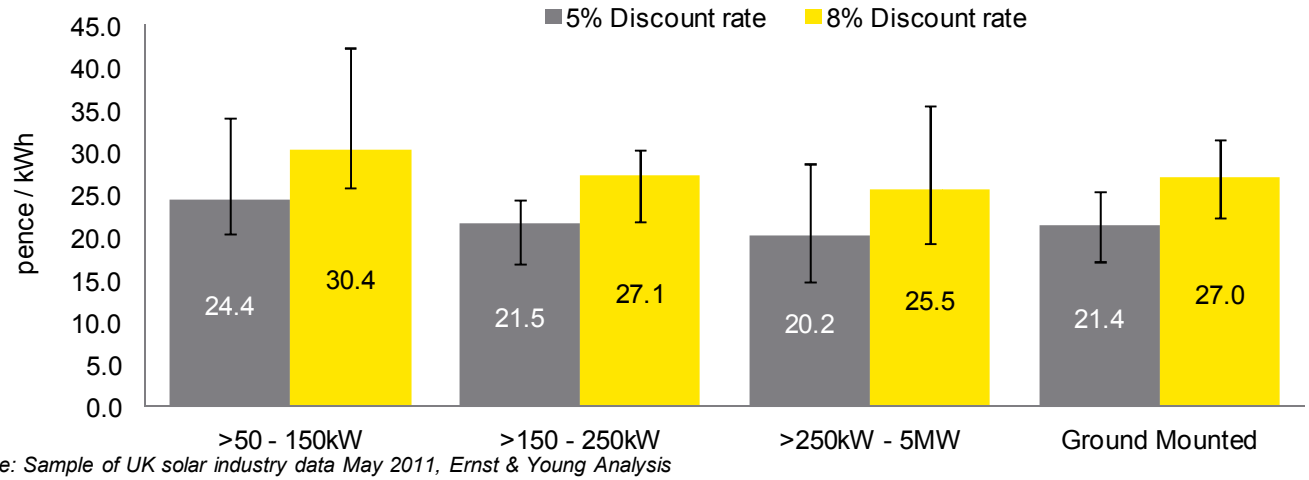
Current support required

Our analysis of current cost data provided by industry shows a generation tariff of 20 to 24p/kWh is required

Approach

- We have collated detailed data on current capex and ongoing operating costs as well as energy output data from ten prominent developers in the UK solar market for a range of system sizes.
- Data has been aggregated by applying a weighted average (by deployment levels) for system costs under each tariff category. This data has then been modelled on a real, pre-tax basis to calculate the levelised cost over the 25 year tariff life. Based on this data set, we have estimated the level of FiT support required in addition to the export tariff using this standard LCOE methodology required to give the stated level of return.
- We assume that the export tariff relating to all electricity generated is included in the project cash flows. We have calculated the required tariff levels both assuming the export tariff remains flat in 2010 real terms at 3p/kWh, and that it increases in line with Ofgem Project Discovery forecasts for wholesale electricity prices (shown on the following page).
- We present below the level of support required to generate a 5% and 8% real pre-tax return, given the current level of costs within each proposed tariff band in addition to the export tariff payment. We have applied an average yield scenario throughout our analysis.

Generation tariff under constant export tariff



Source: Sample of UK solar industry data May 2011, Ernst & Young Analysis

Proposed fast track review tariff	19 p/kW	15 p/kW	8.5 p/kW	8.5 p/kW
Original 2011 tariff	33 p/kW	30.7 p/kW	30.7 p/kW	30.7 p/kW
German tariff (01.01.2011)	24.5/23.3 p/kW	23.3 p/kW	23.3/19.4 p/kW	19.0 p/kW
German tariff scales	30-100/100-1000 kW	100-1000 kW	100-1000/>1000 kW	Ground-mounted

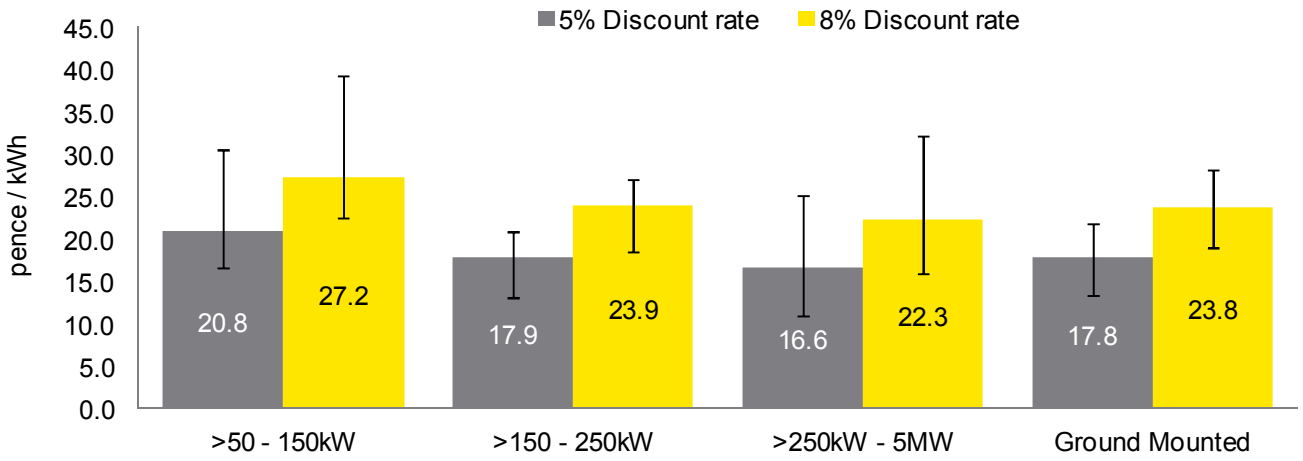
Key observations

- The 50-150 kW scale requires the highest level of support per kWh, with weighted average required FiTs of 24.4p/kWh and 30.4p/kWh at 5% and 8% return hurdles respectively. Based on the highest developer capex data submitted for this scale, the maximum tariffs required would be 34.1p/kWh and 42.4p/kWh respectively.
- The 150-250kW, 250kW-5MW and ground mounted scales, all demonstrated similar tariff requirements. The 250kW-5MW scale displays the greatest uncertainty over project costs, as the required FiTs vary from 14.6p/kWh to 28.6p/kWh at a 5% real pre-tax return and 19.2p/kWh to 35.4p/kWh at an 8% real pre-tax return on current capex levels.

* Exchange rate: £0.8987 / €
Source: European Central Bank, 06 May 2011

Applying wholesale power price increases to the export tariff implies the required level of support is in the range of 16-21p/kWh

Generation tariff assuming wholesale power price for export tariff



Source: Sample of UK solar industry data May 2011, Ofgem, Ernst & Young Analysis

Proposed fast track review tariff	19 p/kW	15 p/kW	8.5 p/kW	8.5 p/kW
Original 2011 tariff	33 p/kW	30.7 p/kW	30.7 p/kW	30.7 p/kW
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German tariff scales	30-100/100-1000 kW	100-1000 kW	100-1000/>1000 kW	Ground-mounted

Key observations

- We have estimated the level of FiT support required in addition to the export tariff where the export tariff increases rather than remaining flat in the previous page analysis. We have used for this scenario the Ofgem Project Discovery projected wholesale power prices until 2020, with prices assumed constant in real terms thereafter.
- The weighted average tariff required at each of the scales shown in the graph is circa 10-15% lower than if it is assumed that export tariffs will remain flat at the 2010 levels.
- The relationship between scales remains as before, with the 50-150kW scale proving the most expensive per kWh, with maximum costs of 30.6p/kWh and 39.2p/kWh.
- Our analysis of data provided suggests that costs have reduced from the original FiT levels. A reduction in tariffs could be supported whilst delivering the targeted rates of return.
- Tariffs proposed in the fast track review do not deliver proposed rates of return at current costs levels.
- Based on data provided, the proposed tariff reductions are not in line with cost reductions seen during the last 12 months in the market.

* Exchange rate: £0.8987 / €
Source: European Central Bank, 06 May 2011

Section 4

Cost drivers and methodology

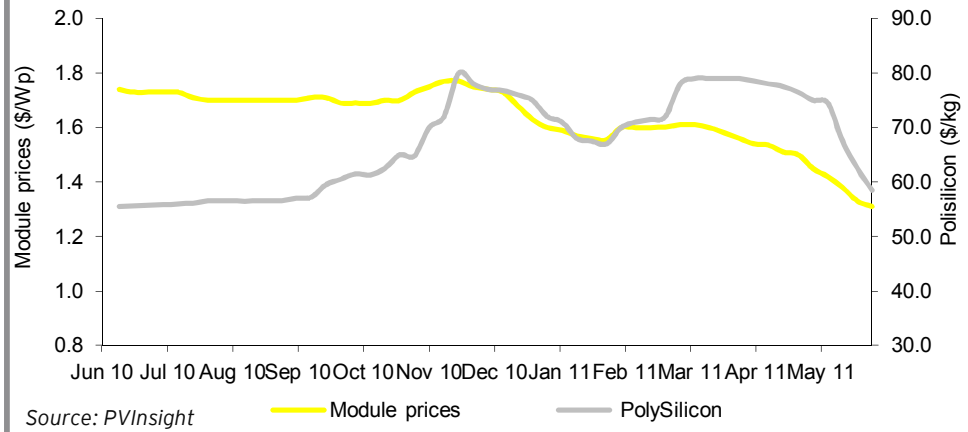
Reductions in non silicon costs and silicon usage are expected to drive annual module cost reductions of 13-17%

Supply and demand factors

- The cost of solar panels has been declining due to industry learning from widespread deployment in countries such as Germany and Spain, and the over supply of panels by manufacturers in the key EU solar markets, predominantly due to the recent regulatory change in Germany.
- Germany has now moved to quarterly tariff revisions whereby a 3% reduction is implemented for every 3,500MW installed up to a maximum of a 15% tariff reduction. It is important to note that while tariffs in Germany are lower than the UK, there is no additional export payment nor tariff inflation.
- Tariff reductions across Europe, particularly in Germany which has traditionally dominated the global solar market, have resulted in a global reduction in demand for solar panels leading to a situation of oversupply and a sharp decrease in the cost of panels as shown in the graph below. Tariff reductions in Germany and other markets are likely to be less aggressive from 2012 onwards.
- Oversupply has been enhanced by an increasing number of vertically integrated manufacturers who are well positioned to cut costs, and the escalating production from manufacturers particularly in China, albeit with varying degrees of quality and track record.
- The number of quality inverter manufactures is far lower, due to higher barriers to entry as well as higher sophistication of manufacturing required. There was a bottle neck in supply last year resulting in short term price hikes for inverters. Reduced demand has however resulted in a slight decrease in prices.

Recent cost reductions

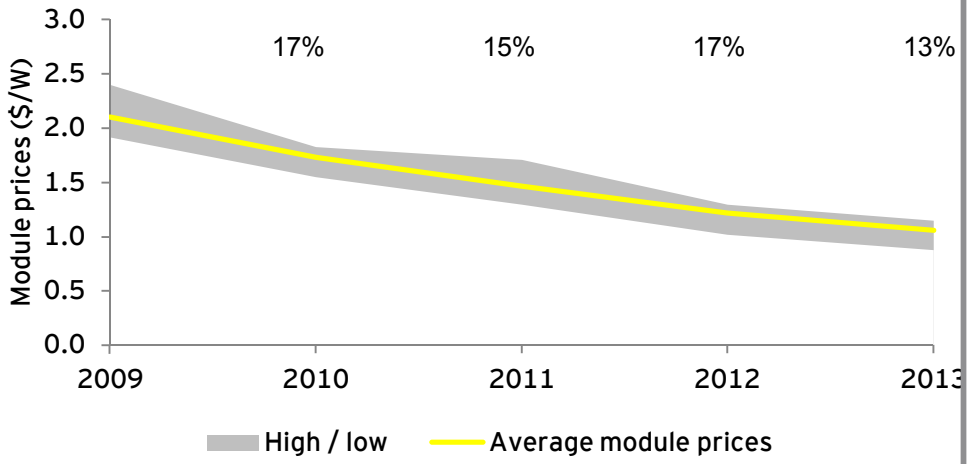
- While prices for poly silicon have fluctuated greatly, increased efficiency of manufacturing and improvements in non poly silicon costs has lead to cost reductions overall. Additionally manufacturers continue to make steady reductions in silicon usage (g/W).
- These factors combined with erosions in margins have lead to average selling prices (ASP) of both cells, and modules to have decreased as shown in the chart below.



Source: PVInsight

Module price evolution

- Analysis of broker reports shows range of expectations of module average selling price (ASP) to 2013.
- Average year on year percentage reductions are also shown.
- We note that modules are priced in US dollars and we have not included the impact of future foreign exchange movements in our analysis.

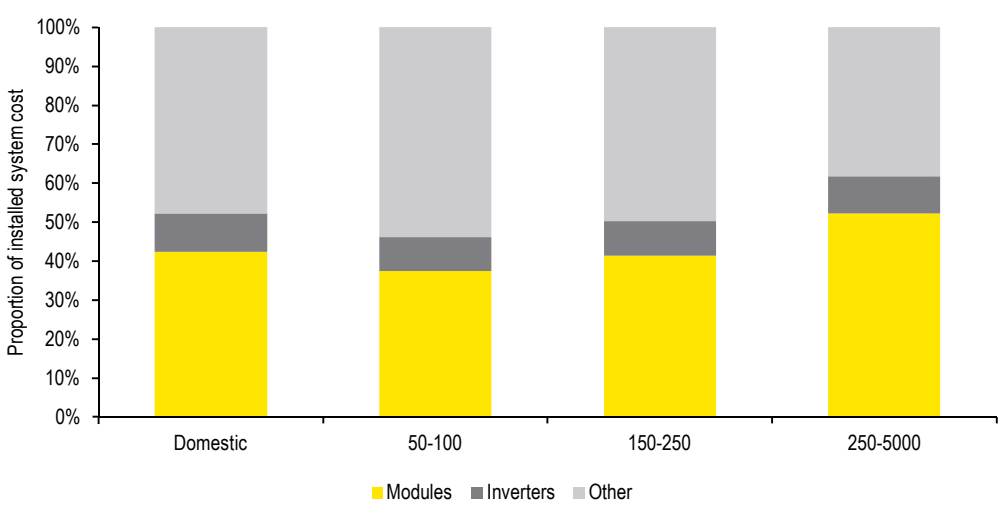


Source: HSBC, Numora, Morgan Stanley, Rolf, JP Morgan, EY analysis

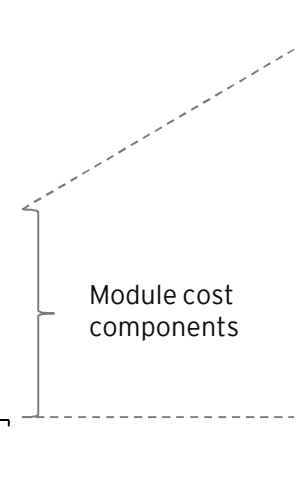
Cost reductions in module prices are the key cost driver for solar installations

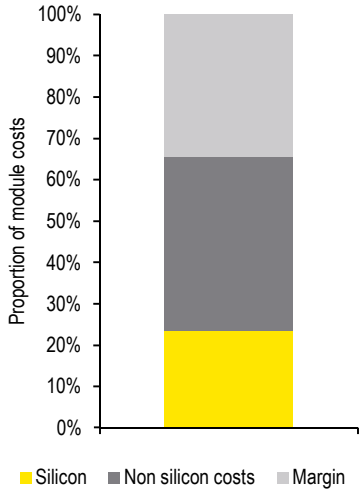
Capex cost drivers

- For fully installed systems, respondents indicated a range in the proportion of costs that comprise the turn-key price as follows:



Source: Survey respondents





Source: Rolf, Trina Solar

Cost drivers methodology

- A number of respondents provided a full breakdown of turn-key EPC prices. We have analysed the proportion of costs relating to modules, inverters and other costs which include balance of system costs including mounting systems, cabling, development costs as well as installation costs.
- We have applied this breakdown to total capex figures provided under each tariff category and have applied rates of cost reduction to each of these components of capital expenditure based on expected learning rates or real cost reductions.
- Learning rates or progress ratios would typically be applied in proportion to doubling of global deployment. However, the relatively immature status of the UK market and necessary convergence of costs to those in mature markets, as well as relatively well understood roadmaps for cost reductions in module, cell and wafer manufacturers means that theoretical learning rates are not applicable in this case. We have instead used a pricing convergence methodology to forecasting cost reductions.
- Reductions in projected costs of solar PV in the UK market that have been applied in this analysis are based on global bench marks as well as compiled data from broker notes.

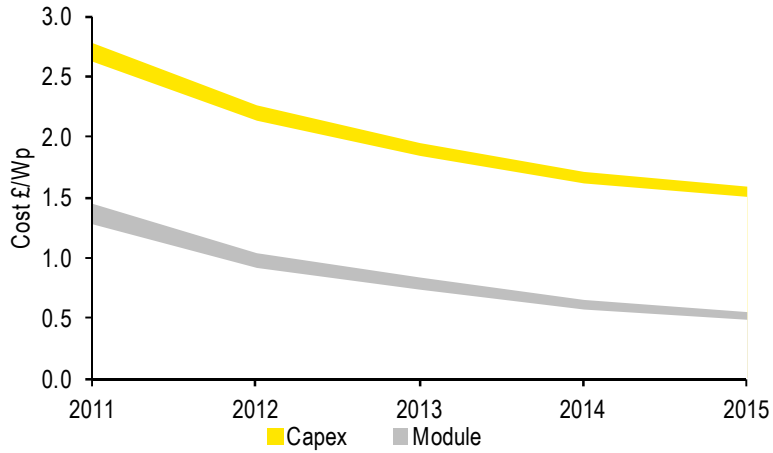
Capex costs in the UK are currently up to 35% above global benchmarks

Forecast capex approach

- Our analysis of current module prices provided by developers shows that costs in the UK were approximately 30-35% above global prices.
- We recognise that due to necessary lead times in the supply chain, module price reductions will likely take a few months to be reflected in EPC prices. This has been amplified in recent months with global supply and demand factors resulting in a sharp decline in module prices. Recognition in the global supply chain of the relative importance of the UK market will help drive down costs achievable in the UK.
- We have therefore assumed in this analysis that UK prices will align with global module prices over a period of two years. Realising this assumption will depend on the market's view on the relative attractiveness of the UK market, for which consistency and stability of regulatory support is critical in the global context.
- In addition, balance of system costs and installation costs are still above global benchmarks; and learning in the UK market has been assumed as costs align with mature markets such as Germany. Margins and labour costs have been assumed to remain constant in real terms.

Forecast module and installation price

- The graph below illustrates implied module and capex prices per Wp.



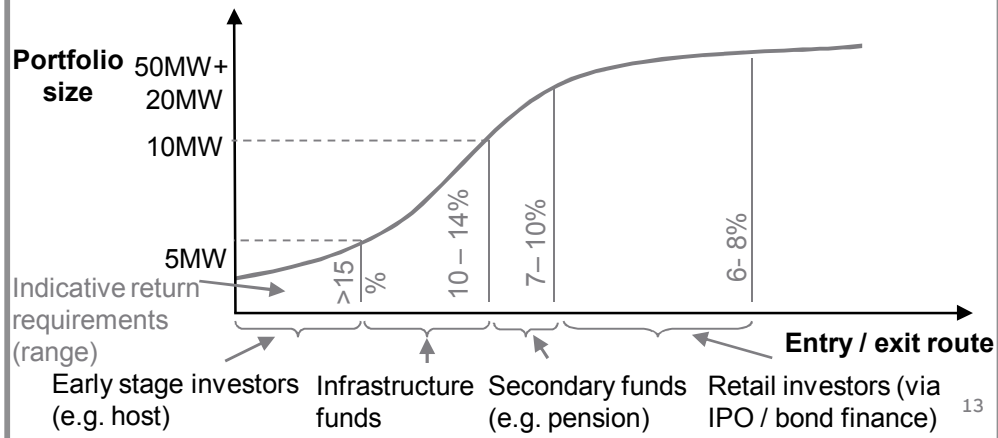
Source: Survey respondents, EY analysis, broker reports, global benchmarks

IRR

- The FiT for solar PV in the UK targets a 5% return for well located installations. This is at the low end of the 5-8% return targeted under the FiT, reflecting the relative maturity of this technology.
- Analysis in this report assumes that returns are on a pre-tax, real basis.
- We note that the target rate of return for the German FiT is 5-7% and 5-11% in Spain.
- For individuals investing in solar PV alternative investments rates of return offered by the FiT compare favourably to current low yield savings. FiT is a very different investment class, particularly in terms of liquidity.

Corporate and institutional investors

- While we acknowledge the Government's current lack of appetite to attract institutional investment to the FiT regime, community and social housing schemes principally rely on institutional investment.
- Solar PV are reasonably passive assets with relatively well understood energy output. This combined with support of an RPI linked FiT has resulted in the potential for access to new sources of capital to finance renewable energy in the UK, such as annuity and fixed income investors, who are critical for the wider UK energy market.
- Low cost capital is a fundamental driver of long term cost.
- Scale of deployment, blue chip project sponsors and a stable regulatory regime are all required to facilitate this capital transformation.



Source: Ernst & Young analysis

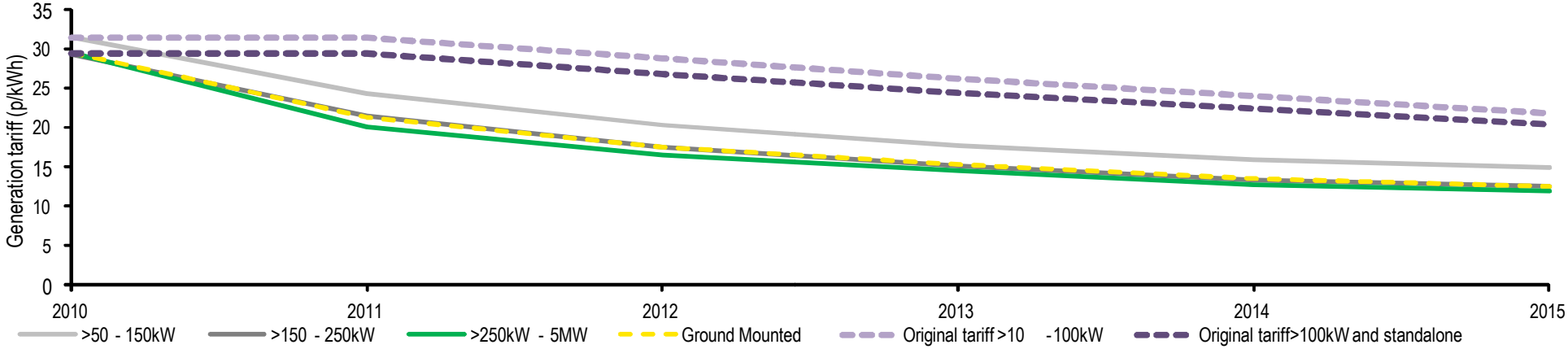
Section 5

Projected levels of support

Implied required levels of generation tariff support

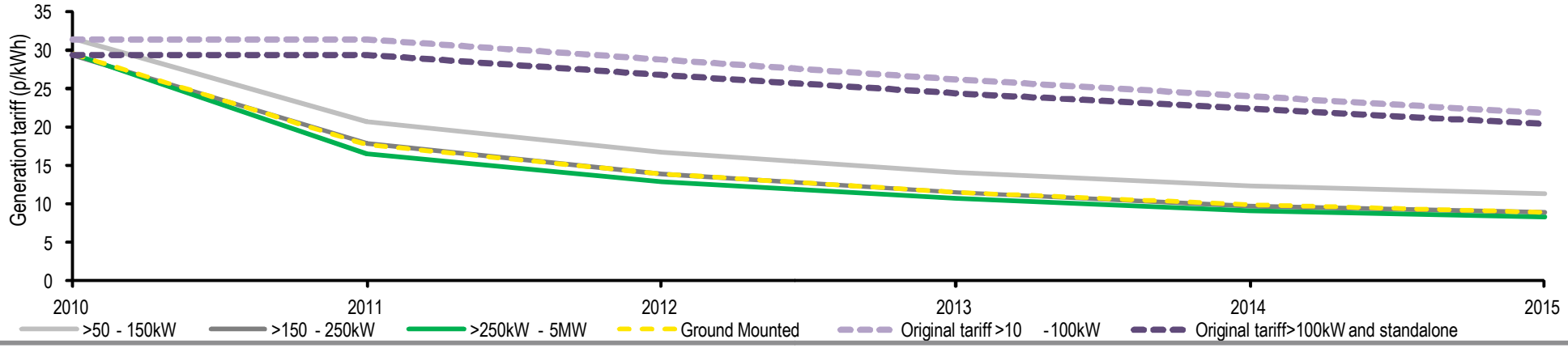
Estimated generation tariff under constant export tariff scenario of 3p/kWh

- The chart below illustrates the level of generation tariff in addition to an export tariff required to deliver 5% real pre-tax returns.



Estimated generation tariff under Ofgem wholesale price scenario

- We illustrate below the impact of including potential upside from export tariff levels if linked to forecast increases in the whole sale power price. The graph below assumes the average wholesale power price as forecasted under Ofgem's Project Discovery projections.
- We have assumed that project revenues are limited to export and generation tariff. We note that there is potential for additional benefit for projects where there is demand for electricity on site. The value of the electricity generated may be up to the price paid by the occupant, or the prevailing retail price. This is discussed in further detail on the following page.



Section 6

Grid parity and deployment

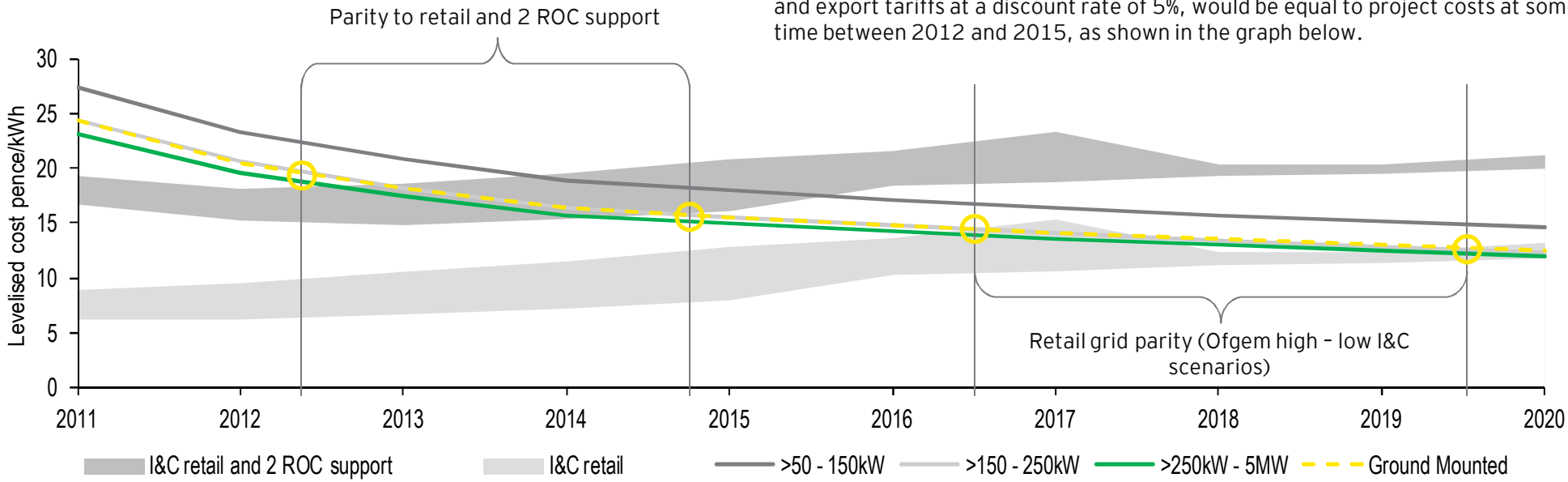
Parity to retail grid Industrial and Commercial prices may be reached by 2016

Approach

- The chart below shows the levelised cost calculated in this analysis. Taking cost projections, we have forecast the likely timing of returns being affordable (at the 5% pre-tax real discount rate) in the event of 2 ROCs.
- We have also shown on the graph high and low estimates of retail electricity prices as calculated by Ofgem in their Project Discovery.
- Given the importance of affordability of renewable energy deployment, as well as the challenging budget available for the FiT regime and in the context of lower levels of deployment under the ROC we have shown the value of retail electricity and two ROCs and therefore the point at which solar PV may become economic under ROC support.
- The uncertainty of revenue under the ROC buy out and recycle price, would typically result in a higher discount rate assumed under this regime. However, we note that the impact of transition to a FiT scheme under the Electricity Market Reform (EMR) means projects under the ROC are likely to become indexed linked, removing the comparative uncertainty of this regime.
- The graph below shows grid parity estimations for average irradiation levels .
- We have included analysis of this dynamic grid parity for projects sited in high and low resource areas in Appendix C of this report. We note that in addition to the range of irridation levels, there are other factors, including exchange rate movements, capex reductions that will also impact on this range.

Retail grid parity at average irradiation levels

- At a 5% pre-tax real required return, the levelised cost of revenues from 2 ROCs and export tariffs at a discount rate of 5%, would be equal to project costs at some time between 2012 and 2015, as shown in the graph below.

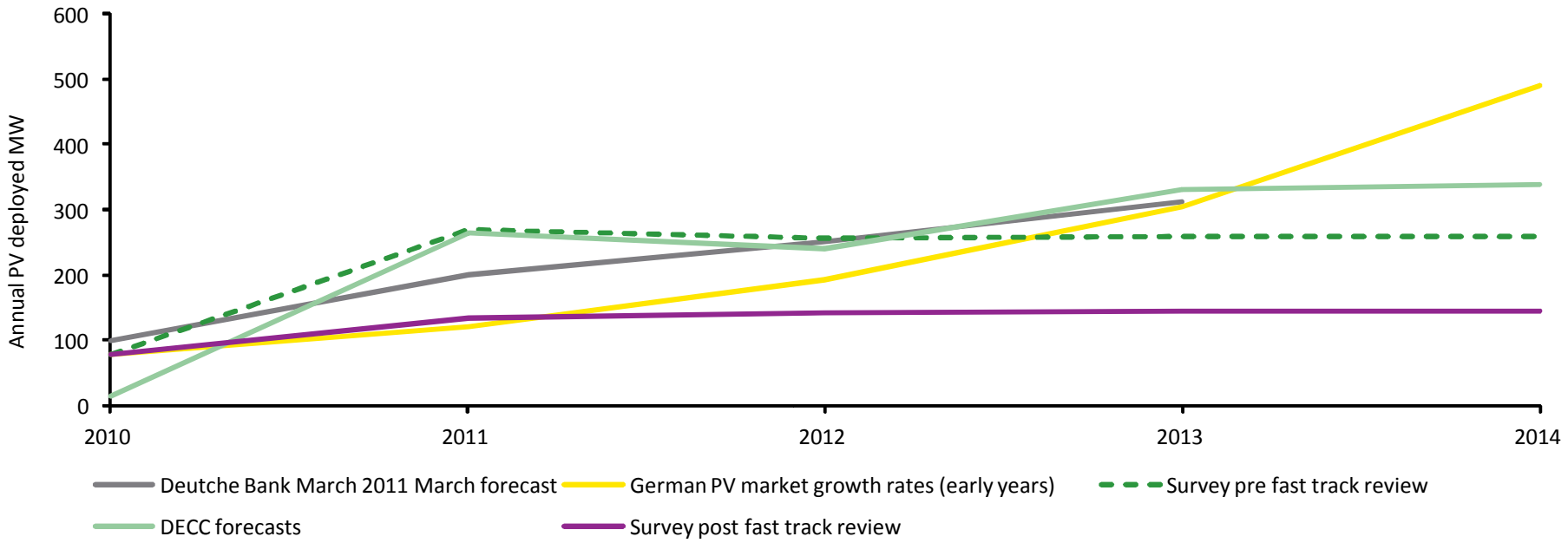


Source: Sample of UK solar industry data May 2011, Ernst & Young Analysis

Estimates for deployment in 2013 in the UK range from 145MW to 330MW per annum

- Respondents were asked for projected levels of deployment prior to the fast track review and revised projections since the fast track review.
- In preparing 'bottom up' deployment projections from our survey, we have also included expected levels of deployment for other key players in the UK solar market.
- Our base case deployment scenario is based on an annual doubling in solar PV capacity until 2014. This deployment rate has been achieved in the early years of other solar PV markets such as Germany.
- Pre fast track review, estimates for deployment of the same sample were 270MW in 2012, however deployment expectations were constant in 2013 and 2014.
- These range of deployment projections for the UK are illustrated on the graph below.

Estimated UK solar PV deployment per annum



Source: Deutsche Bank, Sample of UK solar industry data May 2011, Department of Energy and Climate Change, Ernst & Young analysis

The fast track review may result in an increased deployment of small scale systems leading to a higher uptake of the sub 50kW tariff

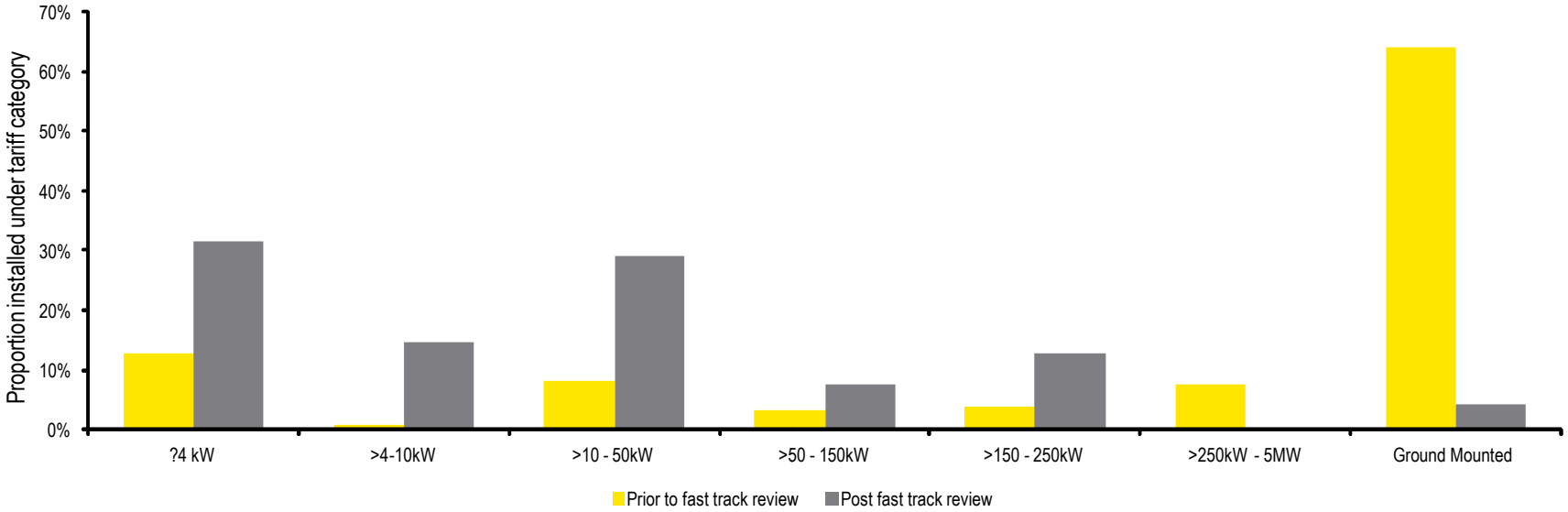
Impact of fast track review on deployment

Data provided by developers, in addition to Ernst & Young's experience as financial advisors in the UK solar sector, demonstrates the following trends since the publication of the fast track review:

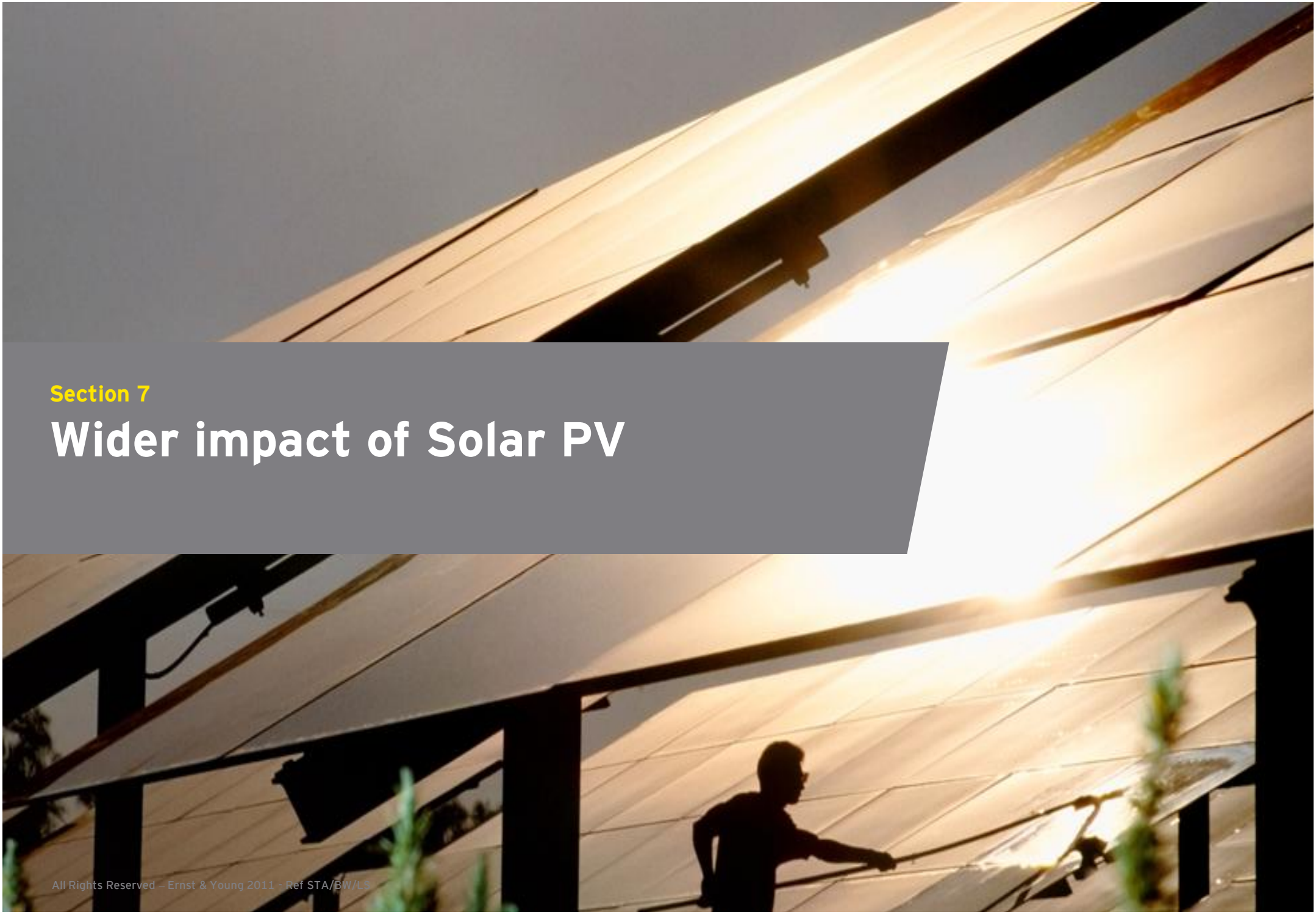
- A number of developers have put on hold or cancelled planned ground mounted and commercial rooftop projects in the UK. Deployment of larger systems has been a key driver for large scale solar deployment over short time periods and thus resulted in price reductions in the market.
- Given the uneconomic returns generated under the new proposed tariff, a large proportion of developers are shifting proposed deployment to systems unaffected by the fast track review ie, below 50kW, which will result in a higher average cost for solar kWh produced.
- The chart below illustrates this trend for the sample of larger developers included in this study. The chart presents the proportion of proposed deployments under each tariff category before and after the fast track review was announced.

Beyond 2012

- Larger scale developers and installers who have financed PV projects through institutional investors are now unable to secure funding beyond April 2012 due to the regulatory uncertainty in the FiT regime.
- Funds raised under VCT and EIS schemes which will be ineligible to invest in FiT projects beyond April 2012 are either seeking investment in aggregated sub 50kW tariff categories or returning funds to investors. The fast track review has undermined investor confidence not just in relation to FiT investments, but also wider UK energy investments.
- Setting tariff levels, which generate a uniform rate of return across all tariff categories, is vital for generating sustainable and consistent growth in UK deployment.



Source: Sample of UK solar industry data May 2011, Ernst & Young Analysis



Section 7

Wider impact of Solar PV

Levels of generation tariff support calculated in this analysis deliver spending within budgeted tariff cap

Recognising the budgetary constraints necessarily enforced by all government departments, and the 10% cut in budget for DECC, we have undertaken some analysis on the estimated real annual cost of support of the FiT under a number of solar PV tariff assumptions.

In preparing our analysis we have made the following assumptions:

- We have used the actual deployment data for the first year of the FiTs – April 2010 to April 2011.
- We illustrate costs under our base case. Constant deployment is assumed in other technologies.
- We have applied industry benchmark load factors for all technologies to calculate the expected annual output. Output for solar is calculated on a regional basis, applying expected levels of irradiation.

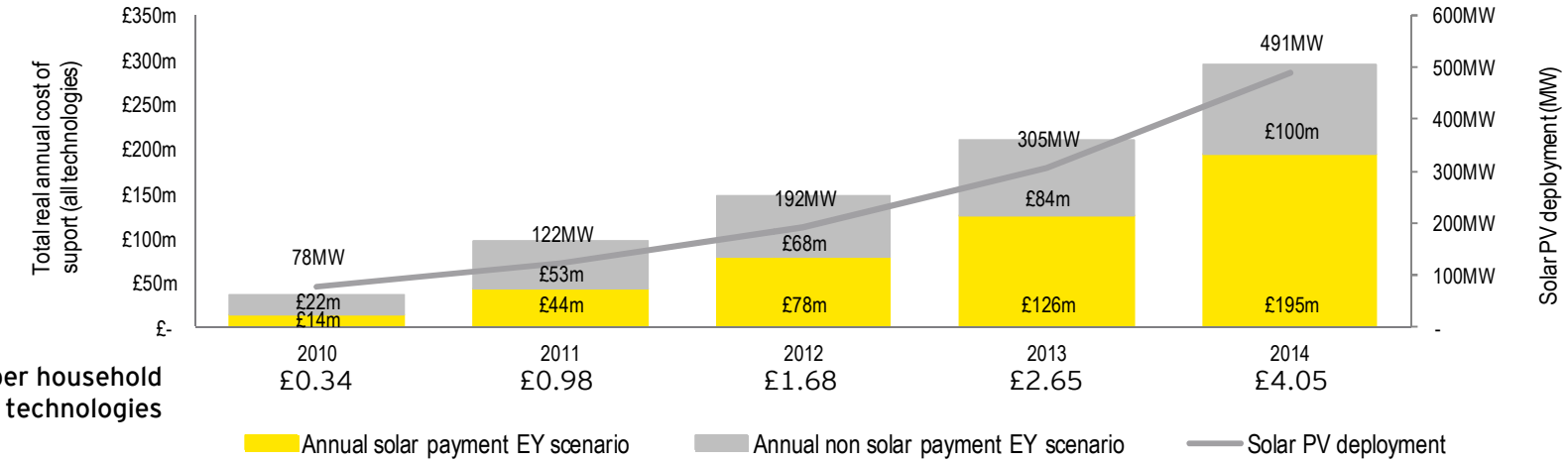
Tariff

- The tariff for AD is increased as proposed in the fast track review, other tariff levels are assumed to be consistent with original tariff legislation.
- Tariff levels are in line with revised levels at a 5% discount rate illustrated on page 8.
- Full export tariff remaining constant in real terms is assumed on all technologies.
- Other technologies assume full tariff rates as published in *Feed-in Tariffs Government's Response to the Summer 2009 Consultation*

Observations

The cost for 2010 is calculated on a fully annualised basis for actual data calculated on expected yield by region and taking into account timing of deployment levels during the year. However, we note that actual FiT payments as recorded by Ofgem for this year are only £8m (data for Q4 is unaudited).

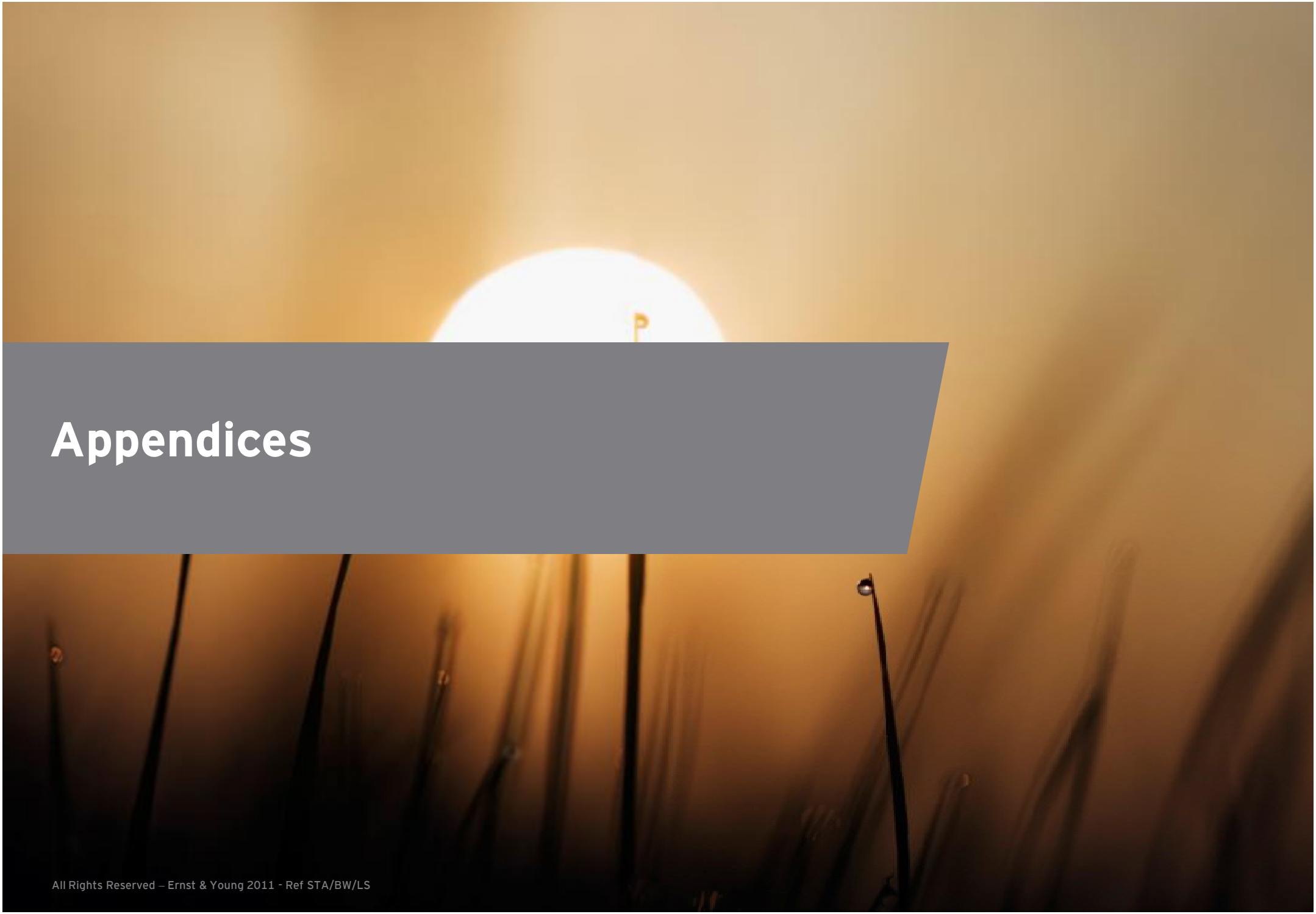
This trend suggests that estimates are therefore likely to be significantly higher than actual FiT levelisation payments, suggesting that under the first year of the FiT regime, actual payments were less than half those forecast under standard yield expectations for that region. Costs under these tariff levels are below the Government comprehensive spending review cap and are not exceeded for these tariff levels under any of the deployment projections outlined on the previous page.



Source: Ofgem, Ernst & Young Analysis, BSW solar, Communities and Local Government

How does solar PV address wider UK energy policy objectives?

Energy policy objective	Contribution of commercial scale PV to objective
Security of supply - Secure, reliable supply to homes and businesses - Replacement of life expired capacity (mix of baseload and flexible plant) - Reduced reliance on importation of oil and gas	- Strong response from potential new investors to the RE sector - Ensure flexibility of conventional power generation portfolio to balance/ backup PV - Commercial scale PV under FiT in Germany, Italy has contributed to strong rollout growth in RE. FiT was then reduced in line with cost reductions (for example through a pre-agreed regression formula), but only after the sector has had opportunity to develop - Reduced reliance on imported energy sources provided time is given for the UK to build up its solar industry
Decarbonisation - Meeting 2020 emission reduction targets - Low carbon economy contribution - Demand side responses / energy efficiency - Community engagement	- Contributes to 2020 RE targets - PV as enabler for decarbonising the built environment. PV is a low risk, passive asset, easy to maintain, which acts as an attractive entry technology for investors and new entrants into renewable energy compared to other, higher risk low carbon energy technologies, eg RHI with feedstock issues, or demand reduction with more complex monetisation and financing models - Engagement of large corporates, entrepreneurs, communities, capital providers in low carbon agenda
Affordability - Minimising cost increases to consumers - Maximising economic benefits - Value for money - Cost effective investment in generating capacity - Provide low cost energy to social housing	- Solar PV is a low risk passive RE asset with FiT, and attracts investors with a low cost of capital. For example, decreased pricing volatility enables capital to be deployed for other projects, and reduces risk. Financing cost to decrease as financiers become more familiar with RE market – solar PV is lower risk compared to many other technologies (technology risk, lower construction risk, understandable) - Solar PV FiT is an enabler for the introduction of new entrants to the market – platform for corporate, financial investors, pension funds, international investors to enter RE sector, with potential to invest in other lower cost technologies as risk appetite and familiarity with sector increases. Introduces competition to incumbent utility suppliers - Investment in supply chain R&D, develop UK as centre of excellence for engineering and technology
Other policy objectives - Attracting international investment - Fostering entrepreneurship in UK	- Attracts international solar PV players across supply chain and financiers to UK market - Having invested in relatively low risk solar PV, entrepreneurs may be more willing to graduate to taking more risk for other, less proven RE technologies. Solar is likely to be a first step to fostering entrepreneurship due to successes elsewhere in Europe



Appendices

Appendix A

Purpose of our report and restrictions on its use

Ernst & Young LLP
1 More London Place
London SE1 2AF

Tel: +44 (0)20 7951 2000
Fax: +44 (0)20 7951 1345
www.ey.com/uk

Private and confidential

9 June 2011

Barry Marsh
Solar Trade Association
Capital Tower
91 Waterloo Road
London
SE1 8RT

Dear Barry,

Assessment of UK solar PV

We enclose our UK solar report which we understand will be used to respond to the fast track review of the feed in tariff. This report has been prepared in accordance with our engagement agreement dated 04 May 2010.

Purpose of our report and restrictions on its use

This report was prepared on your instructions solely for the purpose of the Solar Trade Association (STA) and should not be relied upon for any other purpose. In carrying out our work and preparing our report, we have worked solely on the instructions of the STA and for the Solar Trade Association's purposes only. As such, EY owes no duty of care to any parties other than the STA.

Our report may not have considered issues relevant to any third parties. Any use such third parties may choose to make of our report is entirely at their own risk and we shall have no responsibility whatsoever in relation to any such use. This report should not be provided to any third parties without our prior approval and without them recognising in writing that we assume no responsibility or liability whatsoever to them in respect of the contents of our deliverables.

Our work in connection with this assignment is of a different nature to that of an audit. Our report to you is based on publicly available information, project information provided by solar industry stakeholders, Ernst & Young proprietary data (where it has been legally possible to share it) and discussions with the Solar Trade Association. We have not sought to verify the accuracy of the data or the information and explanations provided by any such sources.

The indicative results presented in the report have been calculated from information collected and analysed in a limited time frame. If you would like to clarify any aspect of this review, including the results and methodology, or discuss other related matters then please do not hesitate to contact us.

Yours sincerely

Ben Warren
Partner
Ernst & Young LLP

Appendix B

Methodology

Methodology

Inputs

Cost database
- Capex including module prices (thin film, poly and mono crystaline, inverters, installation cost, grid connection.
- Opex including remote monitoring,

Cost drivers
- Commodity prices
- Silicon prices
- Labour
- Learning rates

Capacity build out
- Global
- UK

General assumptions
- Valuation date – annual calculations 2010 to 2015
- Discount rate
- Asset life

Revenue assumptions
- UK retail and wholesale power price forecasts
- Export tariff assumptions

Project Assumptions

- 50-100kWp
- 100-250kWp
- 250-5,000kWp
- Stand alone system

Business model and investor types for each tariff category
Project type including modules
Project location and irridation assumptions

Financing and tax assumptions

Rates of return
- Profiling for different types of investors and business models
- Hurdle rates

Taxation
- All analysis assumed on a pre-tax basis

Calculations

- Apply cost drivers and progress ratios to obtain annual capital and operational cost forecasts for 2010- 2015.
- Levelised cost calculation for each tariff category and investor type
  Discounted total capex + opex /discounted output over project life.
- Goal seek required level of FIT to generate IRR to meet hurdle rates of identified investor types.

Outputs

- Annual levelised cost for each tariff category
- Required level of generation tariff for each solar PV tariff category
- Comparison of levelised cost to forecast UK wholesale and retail power price forecasts

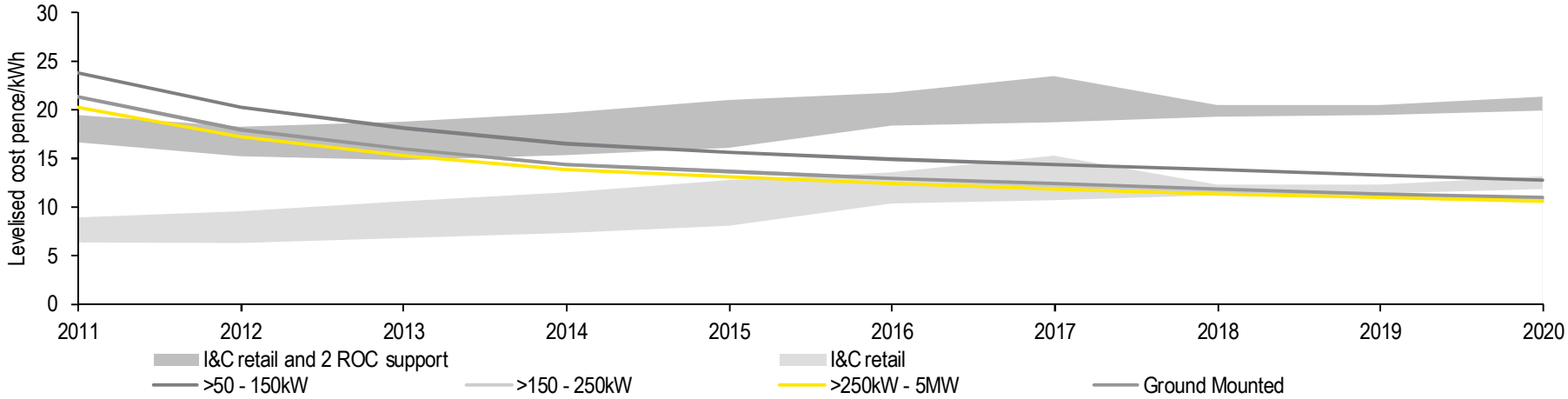
Appendix C

High and low resource levelised cost

Projects at high irradiation locations may become economic with 2 ROCs by 2012, and reach parity with retail power by 2017

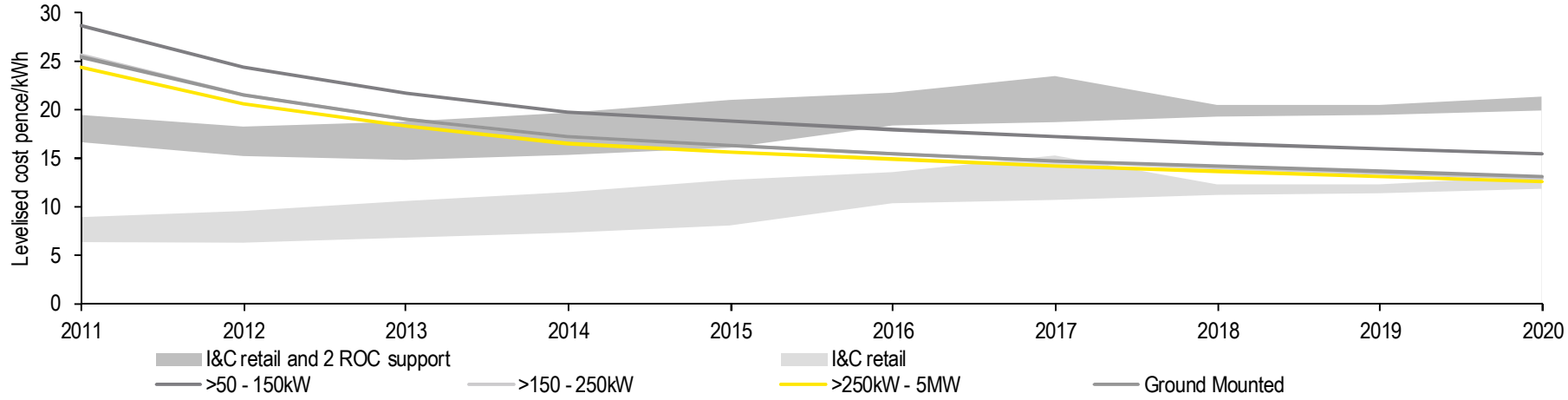
Levelised cost for high yield 1032kWh/kWp (1323kWh/m²)

The chart below shows the impact on levelised cost and grid parity for high irradiation sites, illustrating the impact of irradiation on our analysis.



Levelised cost for low yield 861kWh/kWp (1104kWh/m²)

The chart below shows the impact on levelised cost and grid parity for low irradiation sites, illustrating the impact of irradiation on our analysis.



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Ernst & Young LLP, 1 More London Place, London SE1 2AF.