

Fact Sheets for Selected Financial Schemes

United Kingdom

PV Financing Project

Deliverable 3.2



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Self-Funded

In this model, the building owner or tenant funds the system themselves, and is paid back through energy savings and the Feed in Tariff. There is no financing player other than the owner themselves and they hold the equity of the system and the tariff as well. The Feed in Tariff lasts for 20 years, so in many cases this is considered the length of the investment, even though many systems will last long beyond that. The homeowner needs to have sufficient capital to put through the upfront cost. Their decision is typically a sound financial one if they do have this capital, with interest rates for savings much lower than IRRs available through solar (e.g. ~2% compared to 10%).

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| Key Players | Homeowner |
| Risks | Large upfront investment Changes in government policy |
| Rights | Homeowner |
| Obligations | MCS and RECC requirements from the installer |

Application on the segment

In the United Kingdom the self-funded model for single residential homes has been very popular. There are 670,000 domestic solar homes in the UK, with at present about 150,000 extra homes going solar every year. Solar in the UK provides residential households a low cost, secure energy supply. Providing more stability with future electricity bills and moving away from a dependence on the Big Six. This business models currently works very well in the UK however due to recent government proposals this financial model will not work in the future. Government's own figures show their extreme Feed-In Tariff proposals will decimate the British solar industry and result in just £38 million of expenditure on solar power from 2016-2019. Per annum, this would represent a 60% reduction in total resourcing for solar power compared to this financial year.

The advantages and challenges are presented below:

| Advantages | Challenges |
|--|--|
| <ul style="list-style-type: none"> Secure energy supply | <ul style="list-style-type: none"> High upfront cost |
| <ul style="list-style-type: none"> Good return on investment | <ul style="list-style-type: none"> Reliance on government subsidy |
| <ul style="list-style-type: none"> Tax-free income from the government's feed-in tariff | <ul style="list-style-type: none"> Long term commitment |

Leasing

In this model, a third party builds the system and retains tariff, and delivers electricity to the building for a PPA less than the retail cost of their electricity. These models are relatively new in the UK, and two major providers have launched schemes in the past year. These are Sunedison (TerraForm) and Lightsource (Octopus). The model is being applied to both residential and commercial segments. The length of investment is typically 20-25 years, and the only requirement is that the household must own their house for residential, or their own building for commercial.

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| Key Players | A Shade Greener, Macquarie, Lightsource, Octopus and SunEdison |
| Financial Terms/ Conditions | The homeowner receives free or discounted electricity in return for leasing out their roof to the company. The contract is usually fixed for the 20/25 year lifespan of the solar plant. |
| Risks | Minimised risk for the home owner, risk falls on technical partner. |
| Rights | The responsibility for planning, installing and running the plant and bears all associated risks. Additionally, the lessor is also responsible for service, insurance and maintenance and liable for any damage. Therefore, in the case of any irregularities, the lessee has the right to demand for them to be fixed by the lessor |
| Obligations | Home owner is obliged to own the house |
| Investment Criteria | Fixed electricity price for the term of the contract, use of PV without upfront cost. |

Application on the segment

In a low or zero subsidy world, PPA rates will need to be set at a level that is still attractive for the consumer, i.e. is lower than their current electricity price, while also being attractive for the third party owner by providing a financial return. In both “rent-a-roof” and funded PPA schemes, the amount financed is the entire CAPEX and OPEX cost: in the “rent-a-roof” model, this is recovered through the feed in tariff payments, while the tenants of the solar installation obtain free or lower price of the electricity generated. PPAs will need to increase in order to substitute for the lack of revenue from the Feed in Tariff. In the UK, costs must come down, or PPAs must rise, in order to make this model profitable. Given that the market has not experienced significant growth in the last year, despite higher profitability and government strategic focus, it will take time for the market to adjust.

The advantages and challenges are presented below:

| Advantages | Challenges |
|--------------------------------------|------------------------|
| • Solar panels with no up-front cost | • Less flexibility |
| • Savings on your electricity bill | • Subsidies |
| • Improved energy security | • Long-term commitment |

Application on business models

This business model structure was used for commercial rooftop market segment. However it can also be used in residential and domestic segment.

Crowdfunding

Crowdfunding is an innovative way of raising money for investments directly from a large number of people putting in relatively small amounts of money. In the UK, there are many ‘crowdfunding platforms’ where individuals can post a project in need of funding. Any user can contribute to the projects finance. Crowdfunding enables people with great ideas to raise the money they need, in return for ‘rewards’. The public can back your idea with pledges of money and project owners can ‘thank’ their backers with rewards that reflect the money contributed. It is also being labelled “democratic finance” because it enables people on ordinary incomes who do not have access to expensive funds to decide what to do with their money.

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| Key Players | Abundance Generation, Trillion Fund |
| Financial Terms / Conditions | 8.6% of financial returns with debentures that last for 20 years. |
| Risks | Long term investment risk Risk of project failure |
| Rights | Installer |

Application on the segment

Crowdfunding has become very popular in recent years for solar and other renewables. For Multi-Family Residents it allows individuals to share the cost of installation as well as the benefits. In the UK we have seen an increase in solar installations on council flats or shared properties. Through crowdfunding platforms the residents have the flexibility to invest in low carbon technologies. Currently it is highly dependent on government subsidies for the revenue. The project would not currently survive in a zero subsidy environment unless the cost of installation reduced and storage was more readily available.

The advantages and challenges are presented below:

| Advantages | Challenges |
|---|---|
| <ul style="list-style-type: none"> • Investment into green technology | <ul style="list-style-type: none"> • Risk of project failure |
| <ul style="list-style-type: none"> • Flexibility in the amount of investment | <ul style="list-style-type: none"> • Long term investment |

2 Green bonds

Green bonds were created to fund projects that have positive environmental and/or climate benefits. The majority of the green bonds issued are green “use of proceeds” or asset-linked bonds. Currently in the UK private investors invest in mini bonds against existing farms to fund the development of further farms. Knowledge of this scheme was developed through existing expertise within the project team as well as informal discussions with industry participants involved in this scheme

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| Key Players | Big60Million, Rockfire Capital, Belectric |
| Financial Terms / Conditions | Returns are around 6-7% |
| Risks | Political risk |

Application on the segment

This debt-based model is only currently applicable to solar farms, and is a 5-year investment. However, there is no reason that it could not be extended to other application segments such as commercial rooftop or residential programmes, if significant portfolios of these were developed. In a similar way to debentures, as a crowdfunding model the requirements for investors are very low, with one bond costing £60. This low investment threshold was specifically targeted at those with relatively modest savings to invest. Returns are around 6-7%, typically higher than other savings opportunities for private investors, for example other long-term bonds or fixed-term Individual Savings Account (ISAs).

The advantages and challenges are presented below:

| Advantages | Challenges |
|--|---|
| <ul style="list-style-type: none"> • Investment into clean energy • Return on investment | <ul style="list-style-type: none"> • Green-washing |

Loan

In the UK loans are commonly used for financing the commercial sector. The loan is made directly by the bank to the company operating the scheme. The full value of the loan sits on the bank's balance sheet and absorbs a proportional amount of the bank's available capital. The loan is financed through the bank's conventional channels and is ultimately backed by customer deposits.

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| Key Players | RBS, Santander, Investec |
| Financial Terms / Conditions | Returns are around 6-7% |
| Risks | Political risk |
| Rights | Operating company |
| Investment Criteria | Planning and grid connection prior to funding Positive project cash flow Financial criteria to be met Reduced electricity costs |

Application on the segment

This application has been very popular in the UK for the commercial sector. Both shopping centers and office buildings use debt financing for solar projects. The risk involved with the loan either falls with the developer or the end consumer. During construction short term non-recourse financial structures are used. Long term debt facilities are used once the site is operational. The PV industry sees a lot of investor activity into buying operating PV systems. Most developers place their loan into a special purpose vehicle (SPV) limited company for protection.

The advantages and challenges are presented below:

| Advantages | Challenges |
|--|--|
| <ul style="list-style-type: none"> • Financial security | <ul style="list-style-type: none"> • Political risk – subsidies |
| <ul style="list-style-type: none"> • Production of clean energy | <ul style="list-style-type: none"> • Project failure |

Crowdfunding

Crowdfunding is an innovative way of raising money for investments directly from a large number of people putting in relatively small amounts of money. Crowdfunding enables people with great ideas to raise the money they need, in return for ‘rewards’. The public can back your idea with pledges of money and project owners can ‘thank’ their backers with rewards that reflect the money contributed. It is also being labelled “democratic finance” because it enables people on ordinary incomes who do not have access to expensive funds to decide what to do with their money.

| | |
|-------------------------------------|---|
| Key Players | Abundance Generation, Trillion Fund |
| Financial Terms / Conditions | 8.6% of financial returns with debentures that last for 20 years. |
| Risks | Long term investment risk Risk of project failure |
| Rights | Installer |

Application on the segment

Crowdfunding has rapidly grown in recent years and has the potential to be used innovatively in the future for commercial solar projects. It is still dependent on government subsidies for its revenue however price reductions and energy inflation will contribute to its success. For environmentally minded individuals crowdfunding can still be used to raise capital for renewable projects. Future developments into new technologies such as storage will also help improve the returns for investors in a subsidy free world.

The advantages and challenges are presented below:

| Advantages | Challenges |
|---|---|
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| <ul style="list-style-type: none"> • Flexibility in the amount of investment | <ul style="list-style-type: none"> • Political risk |

Crowdfunding

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|-------------------------------------|--|
| Key Players | Abundance Generation, Trillion Fund |
| Financial Terms / Conditions | a return on investment of up to 5% annually for 20 years |
| Risks | Long term investment risk Risk of project failure |
| Rights | Installer |

Application on the segment

The emergence of Solar Schools has grown in the UK. Organisations such as 10:10 have set up programs helps schools raise funds to buy and install their own solar panels whilst reduce their energy bills and educating children about climate change. Crowdfunding platforms have allowed parents, businesses and others to donate virtual panels to fundraising schools and follow their fundraising progress online. 10:10’s campaign has seen 15 schools successfully gaining a place on the programme this year, giving them access to free training, tools and support to help them run their own solar crowdfunding campaign. To date, the 50 schools already participating in the project have raised more than £400,000 to buy solar panels and it expects to reach more than half a million pounds this academic year. The campaign helps schools crowdfund the full cost of a solar installation. The panels and all of the benefits associated with them belong entirely to each school.

The advantages and challenges are presented below:

| Advantages | Challenges |
|---|---|
| <ul style="list-style-type: none"> • Investment into green technology | <ul style="list-style-type: none"> • Risk of project failure |
| <ul style="list-style-type: none"> • Flexibility in the amount of investment | <ul style="list-style-type: none"> • Political risk |

Green Co-operative

A cooperative is a group of people acting together to meet the common needs and aspirations of its members, sharing ownership and making decisions democratically. Co-ops can be owned by workers, residents, consumers, farmers, the community or any combination of the above. What they have in common is that they are not about making big profits for shareholders, but rather circulating the benefits back to their member-owners, and these benefits ripple out to the broader community. Solar cooperatives are helping independently owned solar integrators share best practices, allowing homeowners to install PV systems more economically and giving renters or people living in apartments a simple way to join the solar revolution.

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| Key Players | 10:10, Bristol Energy Cooperative |
| Financial Terms / Conditions | 5% interest per annum |
| Risks | Long term investment risk Risk of project failure |
| Rights | Shared ownership |

Application on the segment

Co-operatively-owned energy generation is a vibrant and growing sector in the UK. Despite the government reducing the level of subsidy, green co-operatives allow communities to produce clean energy as well as improve the local community. In the UK renewable energy co-operatives are on the rise with over 30 having registered between 2008 and 2012. Solar is a very straight forward and easy development which improves the potential risk for co-operatives. Despite the reductions in the Feed-in Tariff subsidy green co-operatives have the potential to be an innovative financial scheme. Green Co-operatives are often driven by environmental and community benefits and therefore many expect this market to grow.

The advantages and challenges are presented below:

| Advantages | Challenges |
|--|---|
| <ul style="list-style-type: none"> • Investment into green technology | <ul style="list-style-type: none"> • Risk of project failure |
| <ul style="list-style-type: none"> • Community benefits | <ul style="list-style-type: none"> • Political risk |

Private Financing

In this model, a developer builds the solar farm, and then sells system to investor once built and accredited. Key finance players in the UK include Bluefield and Foresight. The financiers own the equity of the site after the sale, and this is predominately for solar farms (i.e. industrial parks). The Renewables Obligation lasts for 20 years, and the new Contracts for Difference scheme guarantees payments for 15 years. Planning permission for solar farms is typically granted for 25 years so this is the normal length of investment: longer than either of the subsidy schemes. Investors are looking for stable returns and well-built farms, so they typically require a high standard of installation and equipment.

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|----------------------------|--|
| Key Players | Bluefield, Foresight, Primrose Solar |
| Risks | Risk of project failure during construction Low risk once built |
| Rights | Developer and then Investor |
| Obligations | |
| Investment Criteria | Stable returns and good infrastructure |
| Legal Requirements | Contractual agreement |

Application on the segment

Due to reliable subsidies from the UK government private financing has been the main financial model used by developers for large scale solar farms. As the technology has become more commonly accepted investor confidence has grown for private financing. However recent changes to government policy have made the future of private financing very uncertain. This model relies on the economic return for investors, until the cost of the technology can come down private financing of solar farms will decrease in the UK.

The advantages and challenges are presented below:

| Advantages | Challenges |
|--|---|
| <ul style="list-style-type: none"> • High economic return | <ul style="list-style-type: none"> • Emerging technology |
| <ul style="list-style-type: none"> • Green investment | <ul style="list-style-type: none"> • Political risk |

2 Green Co-operative

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| | |
|-------------------------------------|--|
| Key Players | 10:10, Bristol Energy Cooperative |
| Financial Terms / Conditions | 5% interest per annum |
| Risks | Long term investment risk Risk of project failure |
| Rights | Shared ownership |

Application on the segment

Co-operatively-owned energy generation is a vibrant and growing sector in the UK. Co-operative solar farms allow communities to produce their own energy sustainably and share the benefits. Many rural farms have worked with their local community to build solar farms and have seen a large amount of benefits. It provides a secure and reliable energy supply to the area with protection from energy price inflation. Despite the government reducing the level of subsidy, green co-operatives have the potential to be an innovative financial scheme. Green Co-operatives are often driven by environmental and community benefits and therefore many expect this market to grow.

The advantages and challenges are presented below:

| Advantages | Challenges |
|--|---|
| <ul style="list-style-type: none"> • Investment into green technology • Community benefits | <ul style="list-style-type: none"> • Risk of project failure • Political risk |