

Business Case

Ground Mounted Solar Arrays

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Project Manager: Various proposed (see project scope/plan)

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The source of the document will be found at: [Ground Mounted Solar](#)

Revision History

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Revision Date	Prev Revision Date	Summary of Changes	Changes Marked
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Approvals

This document requires the following approvals.

Signed approval forms are filed in the (*state location*) section of the project files.

Name	Signature	Title	Date of Issue	Version
Simon Hubbard		Director of Operational Services/Programme Director	26 th Nov 2018	v.2

Distribution

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Name	Title	Date of Issue	Version
Simon Hubbard	Director of Operational Services/Programme Director	26 th Nov 2018	v.2
Victoria Conheady	Assistant Director of Regeneration and Culture/Senior User	26 th Nov 2018	v.2
Peter Grace	Chief Finance Officer/Senior User	1 st Nov 2018	v.1
Andrew Palmer	Assistant Director of Housing and Built Environment/Senior User	1 st Nov 2018	v.1
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Christine Barkshire-Jones	Chief Legal Officer/Programme Assurance	1 st Nov 2018	v.1
Amy Terry	Estates Manager	1 st Nov 2018	v.1
Murray Davidson	Environment and Natural resources Manager	1 st Nov 2018	v.1
Gavin Fownes	Technical Support Officer	1 st Nov 2018	v.1
Chantal Lass	Sustainability Manager	1 st Nov 2018	v.1

1. **Executive Summary**

This business case presents a high level summary of the opportunity and options for Hastings Borough Council (HBC) to establish ground mounted solar arrays, or 'solar farms'. If the recommended option is accepted it also outlines the actions and resources required to test assumptions in detail, and to get to the next decision point, or project gateway.

HBC has already agreed, as part of its Income Generation Strategy to invest in three policy objectives in a 'commercial' manner; one of those investment themes is energy generation. When the Council adopted this strategy it put up to £6m of funding into the Capital Programme for the delivery of energy related projects.

Following an energy options study conducted over the summer of 2017 a series of energy generation opportunity measures were identified, including the establishment of ground mounted solar arrays. Cabinet has already approved some of the measures identified within the options study (such as roof top solar) on 4th December 2017 through a report entitled, '*An energy transition for Hastings*'. When accepting these measures Cabinet set aside up to £1.76m of the capital allocation to those projects.

Work has progressed sufficiently on ground mounted solar to consider committing further resources to the development of a more detailed business case.

In essence, the Council has a good opportunity to establish these sorts of 'solar farms' because it is a significant landowner and has no land acquisition problems. The other two critical pre-cursors of a successful project are also in place: Firstly, the local energy grid, operated by the Distribution Network Operator (DNO) UK Power Network (UKPN) has capacity to accept generated power without unnecessarily high costs of connecting to its grid. Secondly, through HBC's existing relationship with LASER (an energy broker) it has access to a range of customers for any energy that it produces.

The revenue and power available could be used in a number of ways:

- Contribution to the Council's General Fund.
- Offsetting the Council's utility bills.
- Mitigate loss of revenue at Hastings Country Park and help contribute to future management of the Nature Reserve.
- Using power in support of social, environmental and economic development objectives.

The option recommended by this business case in summary:

a. Business summary.

HBC will establish three separate 1 MWp ground mounted solar arrays. One of these will be located on the Council's property at Upper Wilting Farm, Crowhurst. The other two will be located on land close to The Milking Parlour, Fairlight.

The Council will use its relationship with LASER (its procured energy broker) to sell the power generated on the open market. The majority of the revenue can be received into the General Fund in order that the Council can continue to support the Energy Strategy and other services for Hastings. A portion of revenue can be diverted to the parks budget to protect these assets without which the solar arrays cannot be established.

If the business case is approved, and plans prove viable after next stage analysis, the earliest predicted date that the arrays will be commissioned and revenue received is February 2020. Should identified risks materialise the latest date the arrays could be commissioned and revenue received is February 2021.

b. Financial summary.*

Funds required getting to the next gateway (Detailed business case)	£ 80,400
Predicted capital requirement	£2,100,000
Predicted minimum gross revenue	£ 165,000**
To	£ 430,000***
Predicted costs of borrowing	£ 120,000****
Predicted operation and maintenance	£ 20,000
Predicted existing income lost	£ 3,211

* Subject to further detailed analysis.

** Based on the sale of energy at the lower but more secure rates (see para.10)

*** Assumes sale of energy at average retail rates (14.37p p/kWh)

**** Based on a planning interest rate of 3% (current rates are 2.46%)

2. Current Situation.

The Council's Income Generation Strategy targets investment of up to £6m in energy projects in support of its policy objectives. The investment period is over financial years 2018/19 to 2020/21. To date £1.76m of investment of this £6m allocation has been approved.

In order to keep pace with the stated investment objectives further suitable opportunities need to be identified. The early stage analysis in the 2017 Energy Options Study indicated that ground mounted solar would be a suitable investment opportunity. This assumption has been tested further and has resulted in the production of this business case; the opportunity does indeed seem to meet the required criteria.

The energy generation and supply landscape is shifting dramatically. The National Infrastructure Assessment 2018 (National Infrastructure Commission) sets out the Commission's plan of action to upgrade for the UK's infrastructure over the next 10-30 years. Its recommendations include a pathway for the UK's economic infrastructure including 'low cost, low carbon' electricity. This is reflected in the plans of the local Distribution Network Operator (UK Power Networks) to move to a Distribution Supply Operator model which promotes local generation and consumption of power. The Council has addressed these issues and its aspirations are outlined in the draft Energy Strategy.

3. Proposed Solution

To establish ground mounted solar arrays on the Council's estate.

a. Key outcomes

- That the investment can be committed in time to support the Income Generation Strategy.
- A net contribution is derived in accordance with the criteria of the Income Generation Strategy.
- Protect the future management of the nature reserve and landscape.
- Increased security of generation and supply of energy for Hastings.
- Have the potential to contribute to Hasting's fuel poverty issues.
- Have the potential to keep money within the local economy.
- Contribute to carbon reduction.

b. Precursors for success

There are three principal precursors of success, as follows:

- Land (planning permission).
- Connection capacity.
- Effective use of power generated (cost effective).

They are discussed in detail in the following paragraphs.

4. Land.

Three distinct areas were originally identified during the summer of 2017 as having the potential for ground mounted solar arrays. Those areas have been subjected to a first stage operational review, with the following outcomes:

- a. Pebsham landfill – The land at Pebsham is still settling. A consequence of this instability is that ground mounted solar arrays are currently unviable as they would likely break. As the land settles over the coming years the situation will improve and a solar farm may become viable. For the purposes of this business case the site has been discounted.
- b. Upper Wilting Farm – The land is currently let for agriculture. The existing arrangements could be replaced with the loss of some rental income. The view is that a solar farm may, on parts of the farm be a preferable arrangement than the current agriculture. From an operational perspective Upper Wilting Farm is a suitable location for the proposed project. The land required to deliver this project currently provides an income to the Council of £446 per annum under an agricultural tenancy.
- c. Hastings Country Park – The fields around The Milking Parlour is the area under consideration. These potentially suitable fields are subject to agricultural subsidy payments. The land required to deliver this project currently provides an income to the Council of £2,765 per annum under the Basic Payment Scheme.
- d. Ecological and scientific impact – The land in question has been subject to ecological and scientific (e.g. archaeological) professional analysis. The view of the managers is that the land identified at upper Wilting Farm and Hastings Country Park is of lower value from these perspectives. This should mitigate some potential obstacles to a successful planning application although the land in question abuts a SSSI and SAC and this will bring other issues. Consultation with Natural England will be required.
- e. Neither Upper Wilting Farm nor the Milking Parlour appear to require crossing other owners property to connect to the grid.

- f. Planning permission – Upper Wilting Farm is in the planning jurisdiction of Rother District Council and Hastings Country Park in that of Hastings Borough Council. A key element of preparing a detailed business case, should the recommendation be accepted, is that a pre-planning consultation should take place with each authority. Advice has been taken from Rother and HBC's own planning departments on this process, and a list of requirements identified. There will be a cost attached to prepare and conduct the pre-application consultations.
- g. Mitigating lost income – the Council may be able to continue to derive income from the proposed sites by mounting actual panels in a way that allows livestock to continue to use the fields in question. There are operational advantages to this as the animals keep vegetation down and this maintenance task gets taken care of. If the recommendation is accepted then options to mount the array in this way should be examined as part of detailed business case development.



5. Connection capacity.

- a. The author visited UK Power Networks (UKPN) the Distribution Network Operator (DNO) on Friday 31st August 2018 to informally discuss connection capacity on the Council's estate at Upper Wilting Farm and the fields Hastings Country Park.
- b. The advice received was informal and is subject to a proper process. This formal process costs £10,000 per proposed connection for the assessment only (i.e. does not include any special connection upgrade costs). At the point an application is approved the DNO is committed to allowing the Council to connect (subject to the other conditions such as planning being met).
- c. Both sites are suitable for individual connections of power stations with up to 1MW capacity provided certain technical conditions are met. This is basically the establishment of a sub-station dedicated to the proposed 1MW power station. A high voltage (HV) sub-station for a 1MW array will cost £120,000 each, inclusive. In addition UKPN will charge £400 per meter to connect that sub-station to the nearest ring. There may be some additional costs for safety equipment further back in the electricity

distribution chain but without running the computer modelling (£10,000 assessment fee) it is impossible to say what those costs will be, if any.

- d. The local rings can handle a quantum of generation of 1MW at Upper Wilting Farm and 2MW at Hastings Country Park.
- e. If the Council was interested in arrays larger than 1MW it would be required to pay for HV cable upgrades from the proposed sites to the Ore Valley major sub-station. The minimum cost is likely to be £2m from each location. This would make the project unviable.
- f. A 1MW ground mounted power station covers approximately 5 acres including service areas and buildings. Therefore 5 acres in the northern portion of Upper Wilting Farm will need to be identified. At Hastings Country Park this will be 10 acres (2 x 5 acres).

6. Use of power.

- a. The author and the Sustainability Manager visited HBC's energy broker, LASER on Thursday 6th September 2018 to informally discuss opportunities for the buying and selling of power. The conversation was framed in the context of 4.3MW of combined generation capacity through roof top generation and the proposed ground mounted solar arrays. The problem of needing surety of income prior to business case approval was put to LASER for their comment.
- b. The advice received was early stage and informal. LASER is happy to work with us to develop more detailed and specific proposals. These could be attached to business cases for senior decision makers' consideration.
- c. HBC is already signed up to the LASER frameworks for the buying of energy. In doing so it has access to Power Purchase Agreements pre-procured from various Energy Supply Licence holders including HBC's electricity supplier, n-Power. In short, HBC can already sell any of its existing or future power generation to a properly procured purchaser. Other councils have taken advantage of this opportunity. An example is West Sussex County Council's (WSSCC) arrangements for the disposal of energy generated at their ground mounted solar array, at Tangmere:

www.bpg.co.uk/project/tangmere-solar-farm

The author understands from officers of WSSCC that they are using this network of frameworks to underpin the business case for its next stage investment in ground mounted solar:

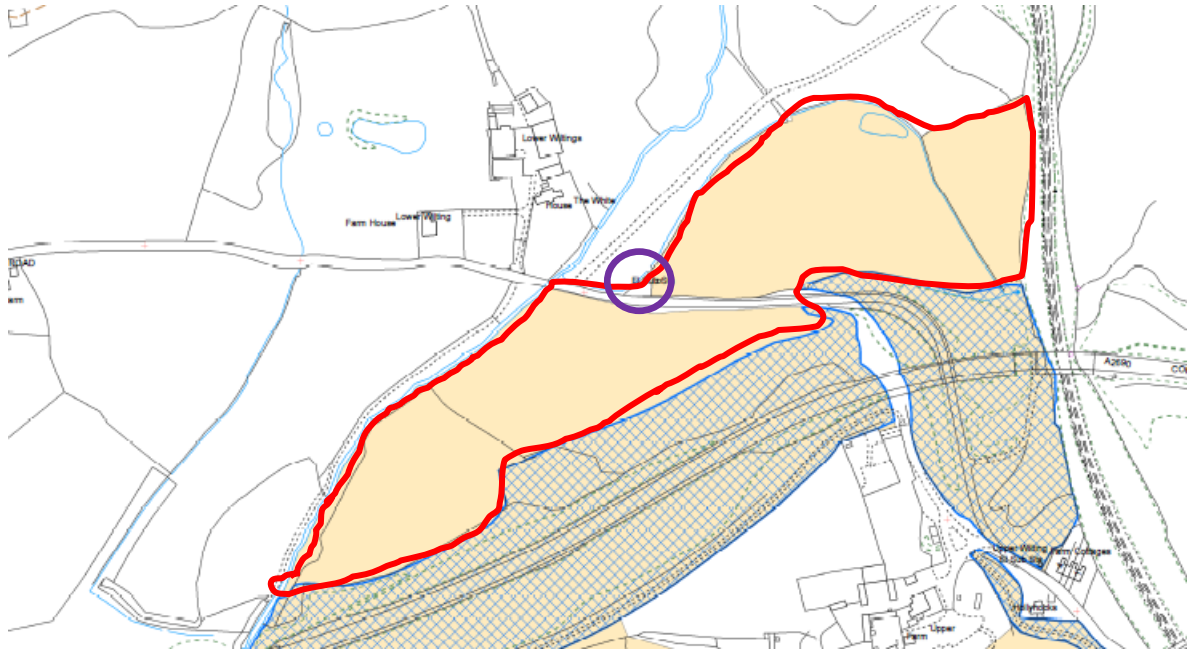
www.westsussex.gov.uk/planning/local-environmental-projects/westhampnett-solar-farm

- d. LASER is currently reviewing its Framework suppliers; the new list and the contracts (which will last from 2020 to 2024) will be available for HBC's inspection in Q4 of this financial year. As HBC's agreement with LASER expires in 2020 we will have to start the process of re-tendering in 2019 anyway. We could elect to start that process as soon as the new Frameworks are available and build in commercial surety to our proposed energy projects.
- e. LASER takes a commission on the revenue it receives for the sale of our energy. It can sell our energy in a variety of ways:
- Fixed price and period trade - this is where the market is asked to bid for future generation of energy. The longer the sale period sought, the lower the fixed price achieved is likely to be.
 - Half-hourly to monthly trading - this is where power is live traded in the prescribed periods in response to market conditions. The returns are potentially very lucrative (especially given prevailing conditions in the energy market where there is an ongoing generation short fall) but there is also the downside risk that prices may go in the other direction.
 - Blended approach - HBC may decide to sell some of its power in one way and some in another. Some may be sold for a fixed price and period (for example to ensure that debts can be serviced) but the remainder sold on the half-hourly market for the possibility of maximum returns. Recommendations about blends can be made on receipt of the information outlined at para. 13.
- f. Base load vs peak load. Our power will be worth different amounts depending on what time of day we make it available to the market. Generally there is a lower price for 'base load' requirements and a higher price for 'peak load' requirements, which can be described as weekdays between 0700 and 1900. Battery storage can therefore make a huge difference to a scheme's commercial viability and will need to be considered with our appointed energy broker when developing business cases and designing potential power stations.
- g. The sales arrangements for different asset types need to be considered. For example, the generation from a ground mounted solar array is predictable and may be viewed as a good candidate for a sale to a buyer of a long period of generation at a fixed price – there are unlikely to be imbalance charges if the deal is set up correctly. Conversely, predicting the spillage from multiple rooftops arrays where the principal customer will be the building occupiers will be difficult. In these circumstances trading on the half-hourly market may be the most sensible option as imbalance charges are not a factor.

- h. When HBC enters into an agreement to sell power it will accept penalties for failing to deliver the contracted power generation; these penalties are known as imbalance charges. In some cases these charges can be considerable. Imbalance charges can be mitigated in two ways:
- HBC can elect to trade 'in baskets'. A 'basket' is the term for a collection of generators selling their power together. In this way the possibilities for under generation across the basket are reduced and consequently the market will pay a higher price and insist on a lower imbalance charge. Care must be taken that HBC's objectives are shared in the terms of the basket.
 - We can elect to under trade. By committing to sell less power than we are expecting to generate we minimise the risk of not meeting contractual generation requirements and incurring imbalance charges. This approach could be used in the early days of the operation of a new power station until real time performance data (as opposed to theoretical predictions) has become available. At this point a different approach to the risk of selling power can be considered. The author understands that this is the approach WSCC took with the first year of operation of Tangmere.
- i. The revenue derived from the sale of our energy can be received in the form of a payment or it can be used to offset HBCs energy bill. Although the result to the Council's bottom line is the same, the political message would be very different. This needs to be considered.
- j. The impact to HBCs capacity should be minimal under an arrangement such as this. A well set-up broker can handle all the administrative arrangements of the sales on the Council's behalf.
- k. To provide HBC with more detailed advice, tailored to the Council's specific requirements they require early stage guidance on the following:
- What generation capacity we have to sell.
 - An analysis of the generation profile we would like to sell.
 - An indication of the Council's appetite for trading risk.
 - Confirmation of HBC's business objectives.
 - Confirmation of timelines.

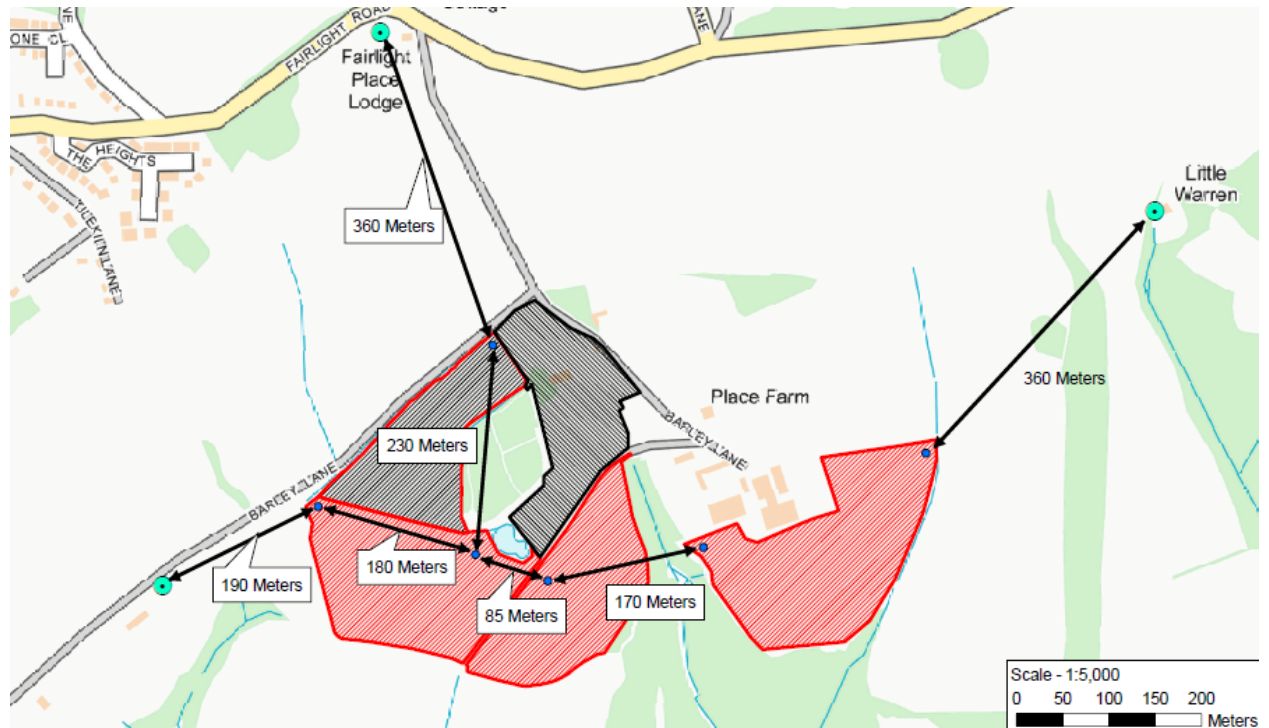
7. Site maps.

a. Upper Wilting Farm



The area suitable for ground mounted solar is in the fields contained within the red border; the sub-station would best be positioned with the existing sub-station in the purple circle. Early discussion with the Estates Manager seems to indicate that these areas may be suitable from an operational perspective. The connection costs are minimal.

b. Hastings Country Park



The areas suitable for ground mounted solar are shown in this diagram. The distance from connection points are also annotated. Early discussion with the Environment and Natural Resources Manager seems to indicate that these areas may be suitable from an operational perspective. The connection costs are minimal.

8. Options and cost benefit.

Option	Description	Advantage	Disadvantage
1	Do nothing	No fees at risk No risk of failed project.	No financial contribution No contribution to the objects of the Energy Strategy or the Income Generation Strategy
2	Proceed with all three solar arrays	Greatest revenue potential. Greatest opportunity to contribute to the object of the energy strategy.	The Council takes on a commercial risk
3	Proceed with partial recommendation (only one or two or the sites)	Opportunity to cap risk levels.	Some opportunity wasted

a. Recommendation.

The recommendation is to proceed with option 2. A project plan is with the Income Generation Board which shows how this project can be delivered. The next step is to test assumptions in detail and produce a detailed business case. Consideration of the detailed business case is the next schedule project gateway.

9. Impact Analysis (major risks and opportunities).

	Factor	Impact	Mitigation/opportunity
Political	(+) Generating energy from a renewable source owned by the Council	Lowering the carbon footprint of HBC and/or Hastings	Capture communications and publicity opportunities and engage Councillors at all stages
	(-/+) Construction and ongoing use of solar farms	Opposition or support from the public Damage to the environment/ecology, visual impact of the farm	Public consultation and communication around benefits and possible mitigation methods the Council will use. Appropriate assessments carried out and results communicated appropriately
	(-/+) Large scale project will attract a lot of public/media interest	Damage or boost to Councils reputation	Develop communication strategy for each stage of the project
Environmental	(-) Construction phase, Delivery of machinery and equipment	Impact to the Environment	Traffic impact assessment and management plans in place. Contract specification to ensure any and all works carried out minimise any impact on the environment, disposal of all waste is managed appropriately
	(-/+) Ongoing use of the solar farm	Impact on the Environment	Soft Market to assess technology available to minimise impact on the environment (e. g. raised arrays allowing continual grazing), Contract specification to ensure contractor uses appropriate technology

	Factor	Impact	Mitigation/opportunity
Environmental (cont.)	(-/+) Sites identified have agricultural implications AND solar farms are considered temporary and should be removed after a specified period	Construction and installation should be reversible	Soft market to assess technologies available based on assessments provided. Contract specification to ensure site is reversible.
Social	(+) Council will own its own fully operational generation assets (+) Council will procure and manage the installation/project	Energy could be used to tackle fuel poverty or keep money within the local economy Construction phase could provide skills training, apprenticeships, work experience, employment opportunities and training	Council to consider best use of energy generated Scope potential social benefits from contractor and specify in contract
Technological	(-) Connection capacity (-/+) Fluctuation in solar market	Determines the size of arrays Cost of delivering the project	Early approval of applications Contract specification to allow HBC to capture benefits of decreasing cost in solar panels
Legal	(-) Solar farms will need to connect to the grid. (-) The use of energy, will require the development of legal documents	Grid connections may require access to land not owned by HBC Will require specific skillsets for development of these documents	Identify grid connection sites, identify possible routes, identify owners of land which HBC\UKPN may need access to Identify whether HBC legal service currently have these skill sets. If not identify appropriate third party to undertake duties

	Factor	Impact	Mitigation/opportunity
Legal (cont.)	(-) Judicial review of planning	Up to a 1 year delay	Early stage engagement with community and other stakeholders
Economic	(+) Revenue for HBC	Contributes to bridging the funding gap	Consider selling on the most financially advantageous
	(-) Complex project with many stages and requires significant upfront costs	Risk that project may not reach construction phase and as such upfront costs are unrecoverable	Maintain proper project governance. This will include formal gateway reviews
	(-/+) Subsidies and other income from potential sites already received by HBC	The council could lose subsidies and/or income generated by identified sites. This income underpins some existing budgets (e.g. Hastings Country Park)	Identify all current income streams on a site by site basis. Assess impact on income streams. Identify mitigation methods to ensure continuation of income streams, or measure loss of income stream against potential income from solar farm

10. Financial analysis.

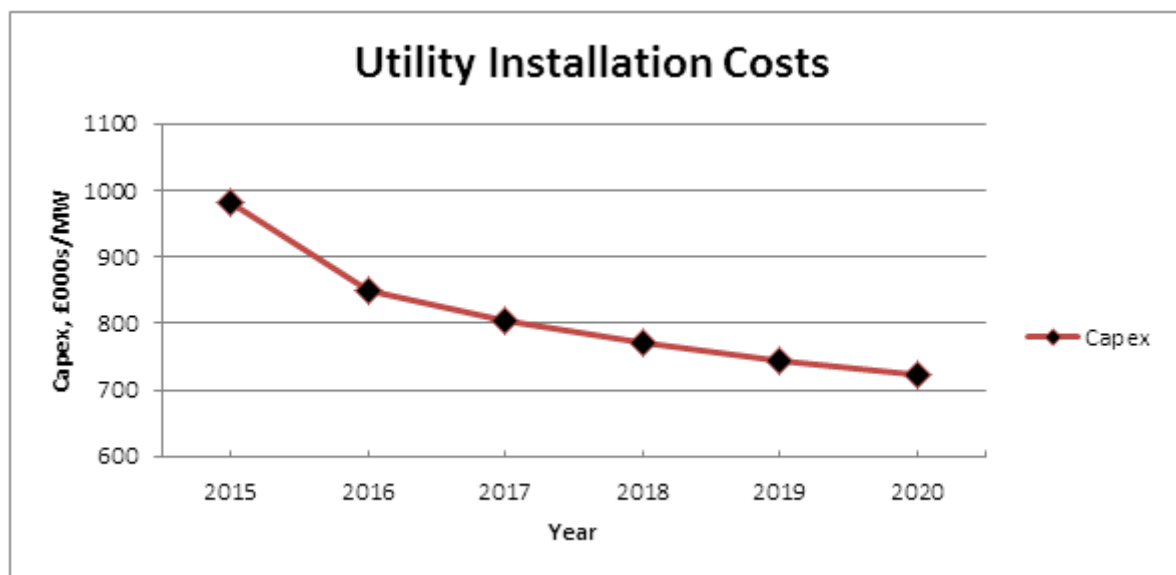
a. Projected cost of next gateway - £80,400

This money is to commission the specialist studies needed for a pre-planning application. This is broken down as follows (for each of the three sites):

- Heritage assessment £10,000
- Landscape and visual impact assessment £10,000
- Review by energy consultancy £ 4,000
- Land management, Ecology & Agricultural review £ 1,000
- Pre-planning consultation forum £ 1,800

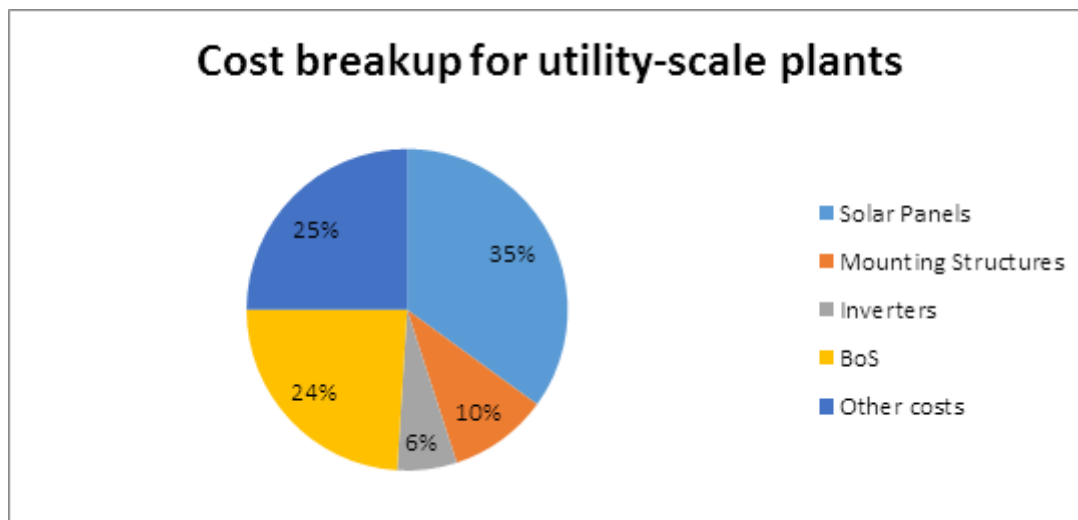
b. Projected capital costs - £2,100,000

According to Solar Trade Association (STA), the capital cost of installing ground mounted solar has been steadily reducing with the average cost per 1kWp installed capacity at just under £800 in 2018 and projected at £700 when the project would reach procurement. This would make the cost of a 1MW array £700,000 (excluding land value). This includes all connection costs (trenching, cabling, substations, etc.) They are predicting further reductions over the life of a potential HBC project.



Source: STA 2018

This expenditure is broken down as follows:



Source: STA 2018

c. **Projected revenue - £165,000 to £430,000 per annum**

As an early stage indication of how the HBC proposed ground mounted solar might perform financially we could look at the WSCC experience at Tangmere. This facility is now one year old. For the first year of operation WSCC elected to pre-sell the generation for a fixed price which capped earnings but minimised risk. This also gave them the basis to approve the capital spend for the project. Under this regime they were able to achieve a gross return of £55,000 per MW of installed capacity. If HBC were to replicate this arrangement for its proposed arrays we would achieve a gross yield of £165,000. Greater revenue can be derived by selling some, or all of the power in different markets in return for greater risk (uncertainty). Accurate revenue profiles will be developed with an energy broker (see para.6).

d. **Projected costs of borrowing – £120,000**

The cost has been calculated based on a 100% LTV annuity loan over 25 years from the Public Works Loan Board at an assumed rate for planning purposes of 3% (although the current rate 2.46%). The rate was set on 14th September 2018 and 20 basis points deducted for HBCs pre-registration.

e. **Projected operation and maintenance - £20,000.**

These assumptions are derived from conversation with officers of West Sussex County Council. Detailed examination of the options for operation and maintenance is an object of the next phase of the project.

11. Next steps

If the recommendations are accepted the following critical path will be followed:

Serial	Action	Responsible?	When?
1	Review high level business case and commence work, or stop.	Simon Hubbard/ Programme Board	13 th November 2018
2	Prepare and submit Invest to Save bid.	Marcus Lawler/ Programme Board	19 th November 2018
3	Begin a project to test assumptions and deliver a more detailed business case	Simon Hubbard/ Programme Board	19 th November 2018 to 16 th April 2019
3a.	Soft market test (concept designs and indicative pricing)	Project Lead/ Programme Board	19 th November 2018 to 8 th February 2019
3b.	Commission and conduct specialist studies	Project Lead/ Programme Board	19 th November 2018 to 8 th February 2019
3c.	Develop options for the use of generated power (with LASER)	Project Lead/ Programme Board	19 th November 2018 to 8 th February 2019
3d.	Pre-planning applications (with both Rother District and Hastings Borough Councils).	Project Lead/ Programme Board	11 th February to 22 nd March 2019
3e.	Pre-planning consultation forum	Project Lead/ Programme Board	11 th February 2019 to 22 nd March 2019
4.	Produce detailed business case and conduct Board review.	Marcus Lawler/ Programme Board	25 th March to 10 th April 2019
5.	Project Gateway Review detailed business case and make recommendations to Cabinet, or stop.	Simon Hubbard/ Corporate Management Group	16 th April 2019

- a. Project governance - The establishment of ground mounted solar arrays is already a project within the Income Generation Programme and it will remain the responsibility of the programme to deliver it. There is a project scope and plan available from the Programme Board.
- b. Organisational impact – The project plan will outline the resource requirements in detail. In summary, during the next phase (development of the detailed business case) the project will require from internal resource:
 - Time from the Income Generation Manager to act as project sponsor and to write the plan and reports to the Programme Board/Corporate Management Group.
 - Time from the Sustainability Manager to assist in the development of plans.
 - Full time from the Technical Support Officer for 16 weeks to manage the process.
 - Support from Legal, Finance, Estates, Planning and Environment and Natural resources departments to review and contribute to the detailed business case.
 - Support from procurement – oversight of a soft market test during the next phase; oversight of the ITQ process to commission specialist studies; assistance with developing plans for next stage procurements.

12. Conclusion.

The indication at this stage is that this is a viable project which will meet the criteria to make a suitable contribution to objectives outlined in the Income Generation Strategy. There needs to be further analysis and testing of assumptions as outlined within this business case; this forms the next clear stage of the project plan.

Other documents (HBC restricted items)

Income Generation Strategy at: [Income Generation Strategy](#)
Draft Energy Strategy at: [Energy Strategy](#)
Project Plan and Scope at: [Project plan - detailed business case](#)