

### **Business case - background including the model**

#### **A.1 Available roof area and grade for each site**

This was based on study of aerial photographs and existing knowledge of all HFRS buildings to assess areas of roof available for installation of Solar PV panels.

The grade (A,B,C,D,E) determines how much electricity panels put onto those roof areas produce in the financial model – the grade is a professional judgement which looks at orientation, tilt, and obvious shading from other buildings or trees. A grade 'A' roof area is the best and grade 'E' the worst.

#### **A.2 Considering the utilisation of each site to determine the best size of solar PV array**

There are different tariff bands for the Feed-In Tariff and so consideration has been given to the most appropriate size.

Retained fire stations are infrequently occupied during the day (when solar PV is producing electricity) but still have equipment consuming electricity, such as our communications systems, running all the time. So for retained fire stations the cap has been placed at a level which provides the maximum Feed-In Tariff (a small PV array <4kWp<sup>1</sup>) and is around the base electrical demand of the sites. Increasing numbers of retained stations are being shared with partner organisations so daytime electrical demand is likely to increase.

For wholetime fire stations the daytime electricity demand is much higher both because of the higher base electrical load (larger sites with more equipment) and the high occupancy levels – leading to a higher cap being set (<50kWp) which coincides with another threshold in the Feed-In Tariff rate.

For the Headquarters buildings and the Stores/Fleet Maintenance Centre buildings there are both high occupancy and a lot of equipment consuming large amounts of electricity – leading to a higher cap of <150kWp. The Feed-In Tariff rates above 150kWp begin to drop significantly.

All these caps are reasonable working assumptions for the purposes of the outline business case financial modelling only. During the procurement phase the successful contractor will be required to undertake detailed site surveys and assess optimum array sizes for each site.

#### **A.3 The HCC financial model**

HCC Property Services has developed a model for the HCC estate which has been validated externally and financially verified internally. This model has been used to assess the HFRS estate.

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<sup>1</sup> Kilowatt peak (kWp)

The area of roof of each grade for each band in the Feed-In Tariff, and the number of sites involved is entered into the financial model. The model produces outputs for each grade (not for each site). The sum of the outputs across all the grades gives the overall output.

The model has assumptions about RPI and energy price inflation, and when the solar panels will be installed which affects the likely Feed-In Tariff which will apply.

The assumptions for energy production from different site grades are conservative – actual energy production from the existing solar PV array at Winchester Fire Station has been significantly higher than is predicted by the financial model (see text box in exempt Appendix B).

The model involves the following key steps:

- Area of panels in a particular grade and Feed-In tariff band is converted to the size of the array in kWp.
- Each kWp of panels produces a set amount of electricity (in kWh) in a year. This is used to determine the financial benefits:
  - income from the Feed-In Tariff (both generation and export tariffs); and
  - saving by not having to purchase that electricity.
- This provides the total income in a given year in the model. Each year the amount of electricity produced by the panels is reduced by 0.5% to represent a gradual loss in efficiency as the panels gradually age.
- The one off capital costs and professional fees for the procurement and delivery are applied in the first year of the model. These are based on the total kWp of panels to be installed (with market researched costs for both pitched and flat roof installations) and the number of sites (as some costs depend on numbers of sites rather than just array size). The professional fee for the procurement and delivery of the work is taken as a fixed percentage of the rest of the capital cost.
- Each year thereafter the total cost is the maintenance cost which is per kWp of array installed (again based on market research).
- For each year in the 25 years of the model the income and cost figures are adjusted for the effects of inflation and the treasury discount rate to produce an overall Net Present Value, the Internal Rate of Return and discounted payback.

#### **A.4 Summary model outputs presented to Authority for an investment decision subject to specific site surveys to confirm each scheme meets the Authority's return on investment**

Summary model outputs are being presented to the Finance and General Purposes Committee; seeking a recommendation to the Authority to agree to invest in renewable technologies up to a given value. This investment decision would provide officers delegated authority to proceed to procurement and delivery.

## **A.5 Next steps - procurement and delivery phase**

If approval is given HCC Property Services will manage the next stages of procurement and delivery. During the procurement phase the successful contractor will do detailed site surveys and assess optimum array sizes for each site. Under the governance of the Carbon Management Programme Board officers will take the final decisions for approval of individual site installations within the total investment agreed and subject to achieving the required return on the investment. Installed arrays will be registered for the Feed-In Tariff as part of the delivery process.