

GCEC-SDC Next Generation Community Energy Project

Project Model Commentary

Introduction

This note is part of GCEC's response to questions 6 and 12 in the Clarifications Proforma provided by SDC to GCEC to take forward SDC's consideration of the community energy project proposed by GCEC. It provides an explanation of the logic and assumptions in spreadsheet "GCEC-SDC financial model as reviewed by Sharenergy.xlsx". This spreadsheet is an updated version of that supplied with GCEC's original proposal. It reflects findings of an independent review of GCEC's original model conducted by community energy consultants Sharenergy Ltd. Their report has also been provided alongside this note to demonstrate GCEC's commitment to a transparent and "open book" approach to the project.

Layout and operation of the model

The coloured blocks each have a function as follows:

Orange (starting at B3). This holds assumptions concerning the heat and electricity required by each dwelling, and the specification of the heat pump, pv, and battery system to be installed. The heat requirement is a typical value from the Energy Performance Certificates (EPCs) of the example properties (7 sheltered bungalows at Dracott). The cost values for the PV and battery are low because they reflect a contribution totalling £26.6K to the capital cost from the Next Generation grant that has been awarded to GCEC.

Brown (starting at B28). This holds a typical set of Economy 7 tariffs that a tenant might currently be paying. The PV export tariff is assumed to be paid to GCEC under the Ofgem Smart Export Guarantee scheme.

Grey (starting at F3). This gives in G4 the current annual cost of electricity being paid by the tenant based on the heat load and tariffs assumed above (£1512). The savings with respect to that cost from the proposed system are then summarised. Note the savings at G6 include export revenue, the savings to the tenant are at L29 (£843). Tenants who are frugal or have found lower tariffs will still save about 50% of their energy costs but proportionately less in cash terms.

Purple (starting at F12). This is a simplified model of how the smart control of the battery will operate on a day-by-day basis. A key assumption is the number of days per year the tenant will require heating (C12: 220). In the heating season the battery is charged overnight using the overnight E7 tariff. That low cost electricity combined with modest PV generation supplies the electricity used during the day for heating and appliances. Outside of the heating season (i.e. 365-220 days) the battery is charged during the day by PV generation that would otherwise be exported. That free electricity is then used to supply demand when PV generation drops, typically in the evening. In practice the smart control of the battery would make use of both E7 and PV charging on any given day to ensure that the c. 4kWh it delivers to the consumer is obtained at the lowest possible cost.

Light Green (starting at J3). This gives the business model for GCEC arising from the subsidised investment in batteries and PV and resulting income, calculated on a single dwelling basis over 20 years. There is a nominal income to GCEC from occasional use of the battery to supply grid balancing services. This would be invisible to the consumer and is an immature market but expected to become more significant as electrification of heat and transport proceeds. GCEC also gains the Smart Export Guarantee payments. GCEC's costs are interest and repayments to investors, and replacement of the battery at 10 years.

Dark Green (starting at J32). This is the business model for GCEC arising from the total investment in a shared ground loop and heat pumps for the 7 dwellings covered by the model. It assumes that this investment attracts the Non-Domestic Renewable Heat Incentive (NDRHI). This pays a tariff (K48- 9.6p/kWh) for each kWh of deemed heat demand on the system based on the EPCs. The tariff is payable for 20 years (L55 onwards). This on its own is not sufficient to cover GCEC's costs of interest and repayment to investors, and administration (L39-41 onwards). So we propose a service charge based on the deemed heat demand of each dwelling in MWh per annum (K52 - £75). This amounts to £525 per annum for each of these dwellings (K53). This service charge could be paid by the tenant, or SDC, or shared between them. In a sense for SDC it is like a mortgage repayment since for this model at the end of the 20 year term all the assets revert to SDC. Other models are possible.

Blue (starting at J60). This combines the two GCEC business models in the green blocks above to give an aggregate GCEC business model for the project over 20 years. It shows that the model is just viable, with no substantial risk margin.