AGENDA ITEM 4
RBD/4/17

HIGHLAND COUNCIL

Committee:	**Redesign Board**
Date:	**19th December 2017**
Report Title:	**Opportunity to generate income by installing solar PV on the Council estate**
Report By:	**Director of Development & Infrastructure**

1. Purpose

1.1. Project Catalyst identified a number of energy related opportunities for how the Council can either increase income or reduce expenditure through efficiency. Whilst a key opportunity relating to the supply of energy is no longer being progressed due to the pending establishment of a Scottish Government supply company, it is imperative that the Council progresses with the other opportunities. To this end, a tender for the switching of void Council house supplies and changing the behaviour of staff are already in progress.

1.2. This paper considers another opportunity, specifically installing solar PV on the Council estate to generate a net profit.

2. Recommendations sought

2.1. The Redesign Board is asked to provide a recommendation to the next Environment, Development and Infrastructure Committee in support of the use of £2.3m **self-financing** capital to install 2.5MW of solar PV across the Council estate.

3. Overview of the solar PV opportunity

3.1. The Catalyst project team, working with the Energy & Sustainability Team and APSE Energy, has profiled the renewable energy opportunities open to the Council throughout its estate. Of the technologies considered, solar PV is considered most suited to create 'financial quick wins' as it is:

- Relatively straightforward to deploy.
- Reliable and market proven.
- Offers attractive returns.

3.2. It should be highlighted that the financial landscape for the deployment of solar PV arrays has changed considerably in recent years. Previously there was a reliance on Government incentives such as the feed in tariff (FiT) but, as these have been reducing, there has been a shift to the onsite consumption of energy generated through a direct, private wire arrangement. The latter is more sustainable and means that the business case does not need to manage the risk of incentives being reduced in the future.

3.3. When considering the scale of the opportunity to roll out solar PV on the Council estate, a total of 37 sites have been identified as being able to accommodate an array. These sites have the ability to match generation with demand from buildings. A list of the 37 sites can be found in annex 1.

3.4. For the purposes of this opportunity, ground mounted solar PV is being proposed. This is because ground mounted is more advantageous than building and car canopy PV for a number of reasons:

- **Most financial advantageous:** Average cost per kWh installed for ground is £650 compared to £800 for building and £1,200 for car canopy.
- **Flexible:** Can be easily moved if required (important as the Council could look to rationalise it's estate) and scalable, easy to expand in the future.
- **Quicker implementation period:** From arriving on site, ground arrays can be operational in a matter of days whereas building and car canopy take longer due to civil engineering costs (which has the potential to reduce income levels).

4. *Financial modelling*

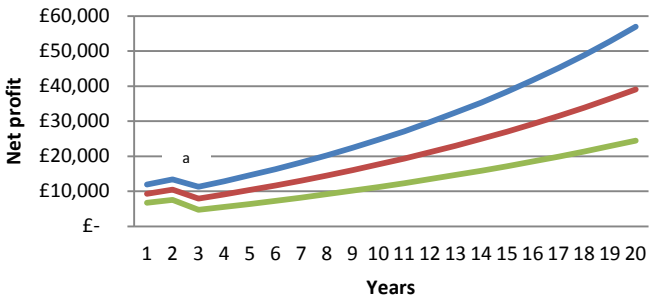
4.1. The Catalyst project team has been working closely with APSE Energy and the Finance Team (specifically Mike Mitchell) to develop financial models that demonstrate what is achievable from ground mounted solar PV arrays. These models are based on three different scenarios (with the exact parameters used outlined in annex 2):

APSE Standard: Uses market intelligence from APSE Energy on what the average purchase costs for the solar panels should be and typical install costs. It also uses projections of how the electricity prices will increase in the future and how much energy will be generated by the panels (based on geographical models)

Conservative & ultra conservative: All of the parameters built into the APSE standard have been stressed progressively further to understand if the installations remain sustainable in extreme circumstances.

4.2. All financial figures reported from this point on are based on the **conservative model**, so there is significant potential that by running competitive tendering process and selecting sites with straight forward installation parameters, a higher than projected level of net profit could be realised.

4.3. To achieve 2.5MW of generation capacity, it is anticipated that approximately ten 250kWp solar PV arrays would need to be developed. A summary of the financial picture associated with an individual 250kWp installation is as follows:



a) Maintenance charges become payable from year 2 onwards

The lines show net profit:

- Blue is APSE standard
- Red conservative
- Green ultra conservative

Conservative Capital cost: £198k

Conservative IRR: 12.42%

Net profit from year 1: £9.3k

4.4. Financial models take account of a wide range of financial obligations during the lifespan of the equipment (estimated at 20 years), namely: maintenance, insurance, repayments for capital borrowing, planning fees and grid connection fees.

4.5. With a capital cost of £198k per 250 kWp solar array, it is anticipated that the total cost for 2.5MW will be £1.98m. A 10% contingency has subsequently been included along with £100k for the 1nos HC11 Principal

Project Manager on a 2 year temporary contract (tasked to plan and deliver the solar arrays whilst also developing business cases for a subsequent phase of renewable energy installations on the council estate). This gives a total implementation cost of £2.3m.

4.6. The anticipated net profit by year over 20 years is set out below, with the total estimated at £4.01m.

Year	**1**	**2**	**3***	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Net profit	£93.3	£104.9	£79.6	£91.4	£103.8	£116.9	£130.7	£145.2	£160.5	£176.5
Year	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Net profit	£193.4	£211.2	£229.9	£249.5	£270.2	£291.9	£314.8	£338.9	£354.2	£390.8
Total projected net profit over 20 years:										
£4.01m										

* For years 1 and 2 the installer pays for maintenance costs. The financial model builds in an allowance for maintenance from year 3, explaining the slight dip in net profit to be achieved.

5. Benefits to be realised

Financial	**Social**	**Environmental**
By 'selling' energy from the array to the Council building, net profit can be achieved each year for the anticipated 20 year lifespan of the assets. The conservative model assumes that electricity prices will increase by 5% year on year. Actual increases are likely to be higher than this meaning the Council will save money on their electricity bills compared to purchasing it from the grid.	Achieving a net profit from the solar arrays enables the Council to make choices about how it allocates the money, potentially using it to retain or enhance services provided to communities that would have been stopped in light of wider ongoing budget reductions.	It is projected (using UK Government CRC conversion factors) that the anticipated carbon reduction that could be achieved using renewable power compared to carbonised grid energy is 921 tonnes per year for 2.5MW of installed solar PV capacity. Integrating renewables into existing buildings has the potential to improve their Energy Performance Certificate (EPC) rating.

6. Risks

6.1. Once the Principal Project Manager is recruited to deliver this work a full Project Initiation Document (PID), Gantt chart and risk register will be developed. However, three early risks that have been identified by the Catalyst project team are:

Risk	**Proposed mitigation(s)**	**Lead team / officer**
There is a risk that…. the solar PV arrays become damaged or vandalised. ***The impact is that….*** the projected income and net profit achieved is lower than projections.	▪ The cost of insurance is included in the financial models, should this be required.	Principal Project Manager to work with the Head of Property to manage this issue as the arrays enters business as usual.
There is a risk that…. Council buildings are re-purposed or closed. ***The impact is that….*** Demand for the power being generated decreases, affecting the feasibility of the business model.	▪ Ground mounted arrays have been selected as they can be easily moved if required. ▪ If possible, sites that have multiple Council buildings in close proximity will be selected as this means the business case will still stand even if one building closes.	Principal Project Manager (and subsequently the Energy & Sustainability Team when the arrays enter business as usual) to work with the Estate Team led by Graham Bull to understand and resolve the impacts of any future property rationalisation activities.
There is a risk that…. higher than anticipated costs are incurred to install the arrays. ***The impact is that….*** the net profit to be achieved will be lower than anticipated.	▪ Financial models already include conservative parameters that stress anticipated returns. This means that net profit achieved could actually be higher than projected. ▪ Work with APSE Energy to develop a strategy that drives down costs, perhaps by joint procurement with other LAs. ▪ Implement using Agile principles with a fixed budget, prioritising sites that will achieve the highest net profit.	Principal Project Manager working under the governance of Stuart Black (Sponsor) with support from the Energy and Sustainability Team.

7. *Implementation considerations*

7.1. It is anticipated that the implementation period for the solar arrays would be approximately 18 months. Of the £2.3m being sought, £100k relates to the recruitment of a HC11 Principal Project Manager with considerable experience delivering capital projects. This role will focus on

Planning	**Implementing**	**Scoping further work**
▪ Secure agreement from services working on sites suitable for solar PV systems to be installed ▪ Work with SSE to secure permission for the systems to connect to the grid ▪ Develop designs for the systems ▪ Secure planning permission for the systems ▪ Complete procurement activities with the development of a work pipeline that is attractive to bidding organisations	▪ Oversee the implementation of the solar PV systems ▪ Successfully complete the commissioning, registering and business processes associated with the systems ▪	▪ Undertake a further review of the Council's estate to identify potential sites that would be suitable for renewable energy installations. ▪ Develop a financial plan and business case for future development activity.

Annex 1: List of sites identified by the Energy & Sustainability Team as being suitable for accommodating solar arrays, of which 10 will be progressed in the initial phase of work.

Site	Potential size of installation to be accommodated
Alness - Bridgend Primary School	250kW
Alness Academy	500kW
Ardersier Primary School	250kW
Balintore - Grazing Land East	250kW
Bettyhill - Farr High School	250kW
Broadford Primary School	250kW
Brora Primary School	250kW
Culloden Pitches	250kW
Dingwall Academy	250kW
Drumnadrochit - Glenurquhart High/Primary School	250kW
Dunbeath Primary School	250kW
Fort Augustus - Kilchuimen Academy	250kW
Fort William - Inverlochy Primary School	250kW
Gairloch High School	250kW
Golspie Primary School	250kW
Halkirk Primary School	250kW
Invergordon Academy/Leisure Centre/Isobel Rhind Centre	500kW
Invergordon - South Lodge Primary School	250kW
Inverness Royal Academy Playing Field	250kW
Inverness - Hilton Primary School	250kW
Inverness - Millburn Academy	250kW
Inverness - Merkinch Primary School	250kW
Inverness - Dalneigh Primary School	250kW
Lybster Primary School	250kW
Nairn Academy	250kW
Tain TEC Services Depot and Recycling Centre	250kW
Tain - Craighill Primary School	500kW
Thurso High School	250kW
Thurso Swimming Pool	250kW
Pennyland Primary School	250kW
Rose Street car park	115kW
Ullapool Primary School/Lochbroom Leisure Centre	250kW
Wick South Primary School	250kW
Wick - Pulteney House Elderly Residential Home	250kW
Wick - Harmsworth Park	1000kW
Hillhead Primary School	250kW
Wick - Development Land at TECS Depot	1000kW

Annex 2: Parameters used to develop solar PV financial models

Factor	Scenario developed			Comment
	APSE Energy insight*	Conservative	Ultra conservative	
Credit period: Spread over the operational life of the asset.	25 years	25 years	25 years	
Debt interest rate:	4.7%	4.7%	4.7%	
Electricity costs: What year on year escalator are energy prices likely to experience in the future?	6%	5%	4%	The industry is indicating that a level of 6% is extremely low, due to the investment required in the network to respond to smart grids, localised generation and the expansion in the use of electric vehicles. However, for the conservative and ultra conservative models, a lower annual increase has been used.
Net present value:	5%	7.5%	10%	
Annual increase in RPI:	2.5%	2.8%	3.1%	
Irradiation: The factor used is based on geographical positioning in the UK and determines how much electricity the panels will generate.	850	800	750	APSE Energy has suggested that this figure for the Highlands is 850. This is supported by a company who provided a quote for a solar PV installation in Inverness for the Council. To stress the model, however, lower irradiation figures have been used for conservative and ultra conservative options
Installation costs *Ground* *Building* *Car canopy*	 £650 £800 £1,200	 £715 £880 £1,320	 £780 £960 £1,440	Starting with the highest charge in the APSE banding provided, more expensive figures have been used for conservative and ultra conservative.