Agenda Item	**13**
Report No	**RES/10/18**

HIGHLAND COUNCIL

Committee: Corporate Resources Committee

Date: 28 February 2018

Report Title: Opportunity to generate income by installing solar PV on the Council estate

Report By: Depute Chief Executive / Director of Corporate Resources

1. Purpose/ Executive Summary

1.1 During 2017 the Corporate Improvement Team worked with the Redesign Board to identify opportunities for how the Council could both generate income and reduce expenditure through energy related opportunities. These opportunities fell into three categories: the supply, generation and management of energy.

1.2 This paper focuses on a self-financing proposal to generate income and achieve net profit by installing solar PV on the Council estate. Specifically, installing 2.5MW of solar PV made up of 10nos 250kWp arrays.

2. Recommendations

2.1 Following a unanimous recommendation from the Redesign Board on 19th December 2017, Resources Committee are asked to approve that £2.3m of **self-financing** capital be used to install 2.5MW of solar PV on the Council estate, achieving the net profit projections set out in figure ii which equates to £4.01m over a 20 year period

3 Overview of the solar PV opportunity

3.1 Council Officers have worked with APSE Energy to profile renewable energy opportunities that could be deployed throughout our 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 The financial viability 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) to make them financially viable. However, as these tariffs have been reducing, the financial model has shifted towards the onsite consumption of energy generated by the arrays 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 With this model in mind, a total of 37 locations throughout the Council estate have been identified by the Energy & Sustainability Team where there is the potential for buildings to consume all of the energy generated from arrays 250kWp in size.

3.4 It is anticipated that the solar PV deployed will be ground mounted. This is because it is more advantageous than building and car canopy (roof structure applied to a car park that allows cars to park underneath, with solar panels on the roof) 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.
- **Flexibility:** Can be easily moved if required (important as the Council could look to rationalise its 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).

3.5 There are a number of factors that could affect the ability of any of the 37 potential sites to accommodate an array including estate rationalisation activities, land use, 24hr electricity consumption pattern and the security of the site.

3.6 This opportunity will be implemented in phases, with the first refining the long list of potential locations to a confirmed list of sites that can definitely accommodate arrays (supported by the RPOs and local Members). Whilst the focus will be on ground mounted arrays, if it becomes clear that a

building or canopy array could be delivered at a site for a similar cost profile as ground mounted then this will also be considered.

4 Financial modelling

4.1 Financial models have been developed for a range of different renewable energy technologies to determine the viability and associated return on investment. These models have been created by APSE Energy with support from the Energy & Sustainability Manager and the Finance Manager for Development & Infrastructure.

4.2 The model for solar PV has been developed for a 250 kW array using APSE Energy data from their experience working with other local authorities throughout the United Kingdom (UK). Models include parameters relating to unit costs of PV panels from procurement activity they have been involved in, anticipated industry projections of inflationary increases in electricity unit costs, irradiation factors (used to determine how much energy panels will generate in different geographical areas) and net present value.

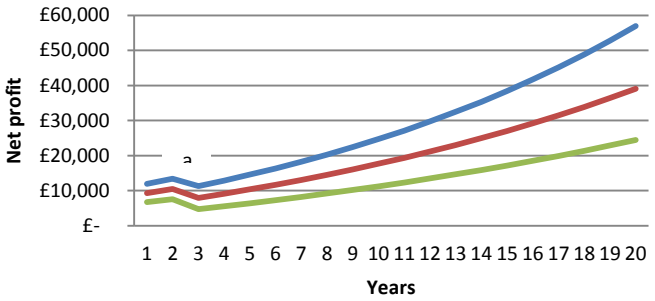
4.3 With a view to stressing the financial viability of solar PV installations, the Finance Manager was keen to see how the financial returns would vary if the factors outlined in paragraph 4.2 were not as advantageous. This has given rise to three scenarios:

> **APSE:** Based on market intelligence from work with local authorities throughout the UK.
> **Conservative & Ultra-conservative:** Progressive negative deterioration of key parameters in the financial models such as unit costs for the panels and inflationary factors.

4.4 The data outlined in **annex A** details the parameters that have been used to create the three scenarios.

4.5 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. Figure i shows outputs from the modelling for a 250 kW solar array.

Figure i: Summary of financial modelling associated with a 250kWp solar PV array



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

4.6 Net profit that the Council is projected to achieve from the arrays has been calculated after all financial obligations have been considered. These include, maintenance, insurance, repayments for capital borrowing, planning fees and grid connection charges.

4.7 With a view to developing a solar PV programme that can achieve efficiencies through both procurement and pipe line development activities, it is proposed that 2.5MW of capacity is developed in the form of approximately 10nos 250kWp arrays. With a capital cost of £1.98m, combined with a 10% contingency and £125k for the 1nos HC11 Principal Project Manager (on a temporary 2 year contract), the projected cost will be £2.3m.

4.8 In terms of financial return (figure ii), the repayments for this capital investment have been modelled over a 20 year period (the arrays are expected to have a lifespan of 20 – 25 years). The projected total net profit to be achieved during the 20 year period is £4.01m.

Figure ii: A 20 year breakdown of net profit once 2.5MW of solar is installed on the Council estate

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.

4.9 With an 18 month delivery timescales, it is anticipated that the arrays will be in a position to achieve net profit for the organisation by the middle of the 19/20 financial year.

5. Benefits to be realised

5.1 Financial

- By 'selling' energy from the arrays for use in the Council estate, 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, meaning the Council will save money on their electricity bills compared to purchasing it from the grid.

5.2 Social

- 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 where there are financial pressures due to wider ongoing budget reductions.

5,3 Environmental

- 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.

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 Commercial and Continual Improvement Team are:

Figure iii: Early risks identified by the project team for mitigation

Risk	Proposed mitigation(s)	Lead team / officer
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 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.
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. ▪ A fence or some sort of perimeter boundary should be installed around the array to limit access to authorised individuals only.	Principal Project Manager to work with the Head of Property to mitigate this issue during the planning and implementation delivery phases.

7. Implementation considerations

7.1 It is anticipated that the implementation period for the solar arrays would be approximately 2 years. Of the £2.3m being sought, £125k relates to the

recruitment of a HC11 Principal Project Manager who has experience planning and implementing similar capital projects.

7.2 This role will focus on:

Figure iv: Key tasks associated with the temporary HC11 Principal Project Manager post

Planning	Implementing	Scoping further work
▪ Secure agreement from RPOs, elected area representatives and 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 and registration of the arrays. ▪ Work with key Council teams to define business processes for how the arrays will be managed once the project finishes and they enter business as usual.	▪ 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.

7.3 Within Corporate Resources, the Commercial and Continual Improvement Team (CCIT), is tasked with managing the commercial portfolio of work for the organisation. It is proposed that the HC11 post sits within this team, working closely with key teams in the authority namely Property and Energy.

8. Governance arrangements

8.1 Given the scale of the self-financing investment that the Council would be providing for this opportunity and the work required to both finalise implementation and then install the solar PV arrays, it is critical that timely and proportionate governance is put in place.

8.2 At an officer level, this will be provided by a working group that will be made up of representatives from Corporate Resources (tasked with progressing commercial activity) and from Development and Infrastructure Officers (members of the Energy and Capital Projects teams).

8.3 Member scrutiny of this work should be provided by the Council's Commercial Board.

8.4 It is anticipated that project work will be divided into a number of different gateways, shaped by the Principal Project Manager recruited to deliver this work. The first such gateway review would see the consolidation of the long list of sites identified, to those that should actively be progressed following engagement with RPOs and elected area representatives along with an assessment of the technical suitability with representatives from planning & SSE (grid connection issues).

9. Next steps

9.1 If approved by Resources Committee, work will commence to recruit the HC11 Principal Project Manager, with the aim that this person will be in post early in the 18/19 financial year. Completion of work associated with the first gateway phase should be completed by mid-summer.

10. Implications

10.1 Resource: This opportunity requires the recruitment of an HC11 Principal Project Manager to deliver this work on a 2 year temporary contract. It will also require support from a wide range of different teams within the Council such as Estates, Energy & Sustainability, Property and Finance to successfully complete the project.

10.2 Legal: The Principal Project Manager will be required to manage legal and statutory obligations relating to procurement and planning requirements of the project.

10.3 Community: Work will take place with elected area representatives to gain support for the sites that are to be used for solar PVs throughout Highland.

10.4 Climate Change / Carbon Clever: This opportunity will reduce the carbon footprint of the organisation by an estimated 921 tonnes of CO_2 per year once the 2.5MW of solar PV capacity is installed.

10.5 Risk: Section 6 of this report highlights some early risks that have been identified relating to this opportunity. The principal Project Manager will develop an appropriate risk log that will be reported officer and member governance groups.

10.6 Gaelic: There are no implications arising from the proposals in this report.

Designation: Depute Chief Executive / Director of Corporate Resources

Date: 5th February 2018

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Annex 1: 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.	20 years	20 years	20 years	
Debt interest rate:	4.7%	4.7%	4.7%	This is the average pool rate, but as this proposal is being considered a standalone project it should attract the interest rate obtained at the time the money is borrowed. This is likely to be significantly lower, around 2-2.5%. This has the potential to increase net profit returns.
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%	
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.