WEST DUNBARTONSHIRE COUNCIL

Report by Strategic Lead, Regeneration

Infrastructure, Regeneration and Economic Development Committee: 12 February 2020

Subject: Use of Solar Photovoltaics (PV)

1. Purpose

1.1 The purpose of this report is to advise Committee of the progress made in relation to increasing the Council's energy self-sufficiency through the use of solar PV.

2. Recommendations

2.1 It is recommended that the Committee:
(i) note the content of this report.
(ii) note that officers will present options for new energy efficiency projects through the capital planning budget process each year.

3. Background

3.1 A motion was raised at the meeting of West Dunbartonshire Council on the 28th August 2019 by Councillor Dickson asking for officers to investigate and provide a report on increasing the council's energy self-sufficiency through the use of solar power. It was requested that the report should be available for councillors to consider in time for the budget setting meeting in March 2020.

4. Main Issues

4.1 West Dunbartonshire Council have and continue to install solar PV panels where technically feasible and financially viable with most of our new build properties now fitting these as standard. The installation of solar PV contributes to reduced electricity costs and to the decarbonisation of our energy use. However it should be noted that the average array of solar panels on a building only provides between 2.5% and 17% of the electricity required. This limitation is due to the availability of suitable roof space to provide the bulk of the electricity demand for the building.

4.2 To date WDC have installed solar PV in a number of schools and new buildings, these include St Mary's PS Duntocher, Dumbarton Academy, St Stephen's, Gartocharn and St Michael's, PS, New Dumbarton Office, Balloch Campus, Levenvale Park and Crosslet House.
Officers are currently exploring further potential opportunities having ruled out a number of buildings due to the current condition of roofs, which will need to be renewed in the short to mid-term and unsuitable roof orientation.

4.3 Appendix 1 illustrates the costs, anticipated payback period and financial return on investment for the installation of solar PV panels in larger operational buildings. The Council will also ensure that it maximises opportunities for solar PV in new building design exceeding building standards where feasible to reduce future electricity revenue costs. See Appendix 1.

4.4 The Energy team are also currently carrying out a number of energy efficiency projects which will result in financial savings and carbon reduction, such as lighting upgrades to energy efficient LED in a number of properties, boiler replacements, improvements to the Building Management System, electricity and water meter upgrades etc. These are shown in Appendix 2.

4.5 WDC are currently developing a District Heating Network at the Queens Quay site in Clydebank which is based on water source heat pump technology, taking energy from the River Clyde in order to provide low cost heat to the different users within the site including residential properties, College, Leisure Centre, Town Hall, Care Home and the Health and Care centre. Future proposals include expansion of the District Heating Network to provide heat to the Golden Jubilee Hospital and across the A814 towards the Clyde Regional Shopping centre and the wider residential area reducing the impacts of climate change and fuel poverty.

4.6 Officers have prepared a Capital bid for further projects in the coming years which will be prioritised on the estimated payback period. These include doing more in the following areas; lighting upgrades to LED lighting, heating controls upgrades and improvements, boiler and air handing unit replacements and general energy saving measures all as illustrated in Appendix 3.

4.7 Solar PV at St Peters the Apostle is currently at design feasibility stage with costs being confirmed. Please note one other PV system is being proposed in the capital bid at this time. Appendix 1 shows potential of PV on other buildings.

4.8 The team are continuously exploring further opportunities to reduce costs and emissions in council buildings such as air source and ground source heat pumps, wind generation and battery storage and will report and make further bids for funding as innovative technologies mature and become financially viable and technically feasible.

5. People Implications

5.1 Energy officer time investigating opportunities for additional sites to potentially install solar PV and carry out Energy Efficiency projects across the council's operational buildings.

6. Financial and Procurement Implications

6.1 There are no direct procurement implications arising from this report.

6.2 An investment of £141K at St Mary's, St Stephens, Gartocharn and St Michael's Primary Schools PV installations, has resulted in an average saving of £17.5K per annum giving an 8 year payback.

7. Risk Analysis

7.1 There is a risk that the energy generated will not match that anticipated if the weather is poorer than the average forecast, as solar panels achieve peak performance on clear, sunny days. In addition if any of the PV equipment fails then the output of the PV system will be reduced. It is therefore important that the performance of the PV against the expected yield is monitored. The inverters, converting the Direct Current from the solar panels to the required mains Alternating Current have an approximate lifespan/lifecycle of 10 years and replacement may be required to regain output. Remote monitoring systems and inverters have been included in the costs of PV in Appendix 1 to minimise this risk.

8. Equalities Impact Assessment (EIA)

8.1 A screening of the proposal did not indicate any relevance in terms of equalities groups, human rights or health. However, the Council is required to give due regard to the impact of strategic decisions in terms of the Fairer Scotland Duty.

9. Consultation

9.1 No consultation has been carried out with stakeholders to date in respect of this report, but will take place with relevant stakeholders prior to install should approval be given to proceed.

10. Strategic Assessment

10.1 This proposal will contribute to improving economic growth and employability; and improving local housing and environmentally sustainable infrastructure.

10.2 Installation of solar panels will contribute to delivery of the Council strategic priorities through contributing to improving economic growth and employability; and improving local housing and environmentally sustainable infrastructure. Further opportunities to maximise the positive social, economic and environmental impact for West Dunbartonshire through the contract will also be explored, e.g. through the use of Community Benefit Clauses.

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Appendices:	Appendix 1 Solar PV installation costs Appendix 2 Energy efficiency projects 2019/2020 Appendix 3 Proposed projects for 2020/2021 to 2021/2022
Background Papers:	None
Wards Affected:	All

Appendix 1. Solar PV installation costs

This illustrates the costs, anticipated payback period and financial return on investment for the installation of Solar PV panels in larger operational buildings.

	A	B	C	D	E	F	G	H	I	J
Site	System Size	Annual Generation	Annual Electricity saving	System Cost	Annual Maintenance cost	25 year Invertor Replacement Cost	Payback Period	Electricity Saved over 25 Years	Operational Maintenance costs over 25 Years	25 year Total Return on Investment
	kWp	kWh	£	£	£	£	Years	£	£	£
St Peter the Apostle	101.1	83,900	11,746	130,000	1,000	6,000	11	391,190	34,158	221,032
Vale of Leven Academy	269.75	210,405	29,058	299,750	1,500	13,000	10	977,523	51,237	613,536
Clydebank Leisure Centre	67.9	52,419	5996	58,850	1,000	3,500	10	201,697	34,158	105,189
Kilpatrick School	49	40,049	4,631	48,780	1,000	4,500	11	155,799	20,495	82,024
Our Lady & St Patricks	89.05	72,756	8,261	119,040	1,000	6,000	14	277,890	34,158	118,692
Aurora House	24.05	18,885	2,136	24,900	600	2,500	12	71,841	20,495	23,946
St Euans Primary	43.75	36,750	4,234	73,750	1,000	3,000	17	142,445	34,158	31,537

The above indicative industry standard costs are calculated in the following way:

1) A current day time electricity cost of 14p/kWh
2) A 3% increase in electricity prices per year
3) A PV module performance degredation of 0.6% per year
4) An RPI increase of 2.5% for operational maintenance
5) ROI calculated by H-D-F-I in the columns above

It should also be noted that the costs for PPP schools include additional contractual costs.

Following an assessment of the information above, projects at St Peter the Apostle (subject to approval from PPP funders) and Clydebank Leisure Centre will be progressed. St Peter the Apostle will be funded from an existing solar budget for 2019/20 (£130K). Clydebank Leisure Centre is included as a proposal in the Capital bid for 2020/21 due to return on investment and roof suitability.

Vale of Leven Academy, Aurora House and Kilpatrick school will be considered for future projects and prioritised in line with other energy efficiency opportunities as part of future Capital bids or building upgrades programme.

Our Lady & St Patricks and St Eunan's have not been considered at this stage but will be re-assessed in the future in line with increases in electricity costs which could make these more viable.

Appendix 2. Energy efficiency projects 2019/2020

Current projects 2019/2020

Site	Project	Capital cost	Energy Savings	Annual Savings	Payback period
Lighting		£	kWh	£	Years
Whitecrook Primary	Replace all existing lighting with LED	36,000	32,143	4,500	8
Carleith Primary	Replace all existing lighting with LED	18,000	12,857	1,800	10
Dumbarton Academy	Replace corridor only existing lighting with LE	33,000	29,464	4,125	8
Dumbarton Library	Replace all existing lighting with LED	8,000	71,429	10,000	8
Electricity Automatic meters	Across all Council and Leisure sites	48,000	68,571	9,600	5
		143,000			
Solar PV					
St Peter the Apostle High School	Solar Photovoltaic on roof	130,000	83,900	11,746	11
Oil to Gas Boiler Replacement					
Carleith Primary	Replace existing boilers	130,000	180,556	10,833	12
Braehead Primary	Replace existing boilers	160,000	222,222	13,333	12
Meadow Centre	AHU replacement	150,000	1,020,408	21,428	7
Quick wins	Replace faulty heating valves, improved biomass control	10,000	158,730	3,333	3
Water Projects - LA wide					
	Urinal Controls	45,000		22,500	2
	Water meter Down size	16,000		12,000	1.3
	Water automatic meters	28,000		7,000	4
		669,000		132,199	
	Total Capital Cost	**812,000**	**Ann Sav**	**132,199**	

Appendix 3. Proposed projects for 2020/2021 to 2021/2022

Capital bid/building upgrade projects for 2020/21 to 2021/22

Site	Project	Capital cost	Energy Savings	Annual Savings	Payback period
1 Lighting Projects		£	kWh	£	Years
St Patricks Primary	Lighting upgrade to LED	32,000	28,571	4,000	8
Our Lady of Lorreto	Lighting upgrade to LED	37,000	33,036	4,625	8
Braehead	Lighting upgrade to LED	32,000	28,571	4,000	8
Aurora House	Upgrade Staircase lighting and Downlighters to LED	6,000	5,760	806	7
Crosslet House	Replace existing CFC downlighters with LED.	10,000	20,966	2,935	3
St Stephens Primary	Replace 600x 600mm fluorescents with LED panels	18,000	15,834	2,217	8
St Michaels Primary	Replace 600x 600mm fluorescents with LED panels	18,000	15,834	2,217	8
Clydebank Town Hall	Replace Downlighters with LED	6,000	6,912	968	6
Dumbarton Academy	Replace failing Gym Hall lighting with LED lighting - with lighting control	12,000	12,245	1,714	7
		171,000		**23,482**	7
2 BEMS Heating control system					
Building Energy Management System (BEMS) / Heating Controls System	Current TREND Heating Control Systems (IQ100 and 200 series) are obselete and cost WDC in excess of £5000/year in call outs. This cost is expected to rise as controllers approach end of useful life and cause plant shut downs due to failure. The typical life of Trend controller is 10-15 years , but these controllers are 15 to 20 years old. By replacing the controllers with modern units, with energy saving strategies included, energy savings of 10-20% will be achieved. Of priority are sites with modem telephone dial up which TREND will no longer support .In addition savings in telephone line rental charges of £800 will be achieved by replacing with Internet connection. These modem sites account for £30,000 of overall expenditure neccessary. Current BEMS software is also obselete and not compatible with Microsoft Windows updates. Included in this bid cost is £10K for the BEMS upgrade.	160,000	1,020,428	22,857	7
		160,000		**22,857**	
3 Heating Controls					
Linnvale Primary, Gartocharn, Knoxland Primary	Replace existing failed 3 ports valves and modify controls	20,000	250,000	5,000	4
		20,000		**5,000**	
4 Boilers					
St Marys Alexandra	Oil to Gas Boiler Replacement	110,000	129,595	7,200	15
Municipal Buildings	Replace obsolete boiler	35,000	126,000	2,520	14
The Hub	Replace obsolete oil boiler	90,000	102,848	6,500	14
		235,000		**16,220**	
5 Heating Project					
Clydebank Town Hall	Install new Air Handling Unit (AHU) for main hall with heat recovery, including blanking off unecesssary high level air vents, reducing heat loss.	85,000	241,920	7,356	12
		85,000		**7,356**	
6 Quick wins					
Area wide	Including draught proofing doors , restricting staff radiator valve and wall thermostat control across Council buildings and schools. Clydebank Town Hall - Minimise Electric water heating control , Crosslet House - Modify CHP design operation to be thermally led as opposed to electrical led , Dumbarton Library Controls - Controls recommisioning-currently no control on space temperature on site	20,000	227,273	5,000	4
		20,000		**5,000**	
7 Solar PV					
Clydebank leisure Centre	Install solar PV	61,100	52,419	5,996	10
		61,100		**5,996**	
		752,100		**73,555**	
		Capital cost	Total	Savings	