

vayu

energy & business aligned



Energy Efficiency Audit Summary Report


of

Greenstar

Millennium Park Recycling Facility

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Revision Control

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The survey was undertaken on Thursday the 19th of May 2016, a normal working day with typical levels of site activity. It was a day with mixed wet, windy and sunny weather, although as there is a small cabin within the facility being heated using a plug in heater, weather has little impact on energy use.

The survey analyses energy use for 2014 and 2015.

There are currently 3 separate areas within the facility:

1. Confidential Papers shredding and bailing
2. Commercial Cardboard bailing
3. Municipal Solid Waste (MSW) waste storage and transfer

In February 2016 a Solid Recovered Fuel (SRF) line was decommissioned. In July 2014 a Construction and Demolition (C&D) line was also decommissioned. This has resulted in a changing electrical profile, meaning historical energy usage may not reflect the current consumption levels. There is also an administrative building on the site which shares a utility meter with the processing facility.

Energy Use

Table 1 - Site Energy Usage		Period	1 Jan - 31 Dec 2015
Energy Stream	Annual Quantity	Units	Comments
Electricity Consumed On Site	929,834	kWh	
Electricity Imported	929,834	kWh	
Electricity Generated On Site	-		
Electricity Exported Off Site	-		
Natural Gas Total	-		
Natural Gas for CHP	-		
Gas Oil			
LPG			
Light Fuel Oil	60,000	Litre	
Medium Fuel Oil	-		
Heavy Fuel Oil	-		
Other	-		

The table above provides a summary of the energy use.

Energy Performance Indicators

The primary driver of energy use at the site is expected to be tonnes of waste processed. All other things being equal tonnes processed is expected to have a partial proportionate impact on electricity use (in addition to fixed use associated with offices, lighting etc).

Analysis of Waste Processed		2014	2015
Quantity	Tonnes	79,992	101,288
Electricity	kWh/T	18.8	9.2
Onsite Diesel	kWh/T	9.7	6.2

Note – waste volumes increased in 2015 compared to 2014 but energy usage decreased. This is likely because the energy intensive C&D line was decommissioned in July 2014.

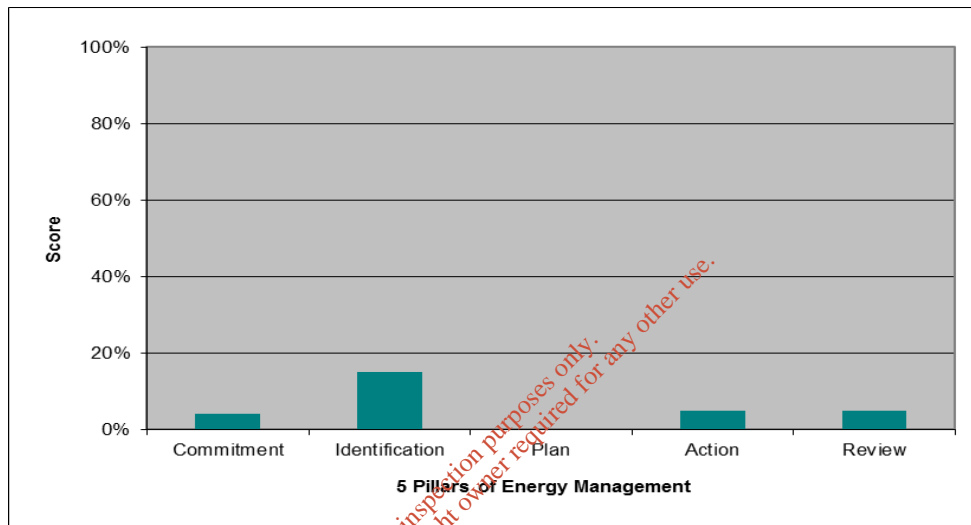
However this method does not take into consideration the high baseload electrical usage on the site which currently accounts for over 40% of the electricity used in Millennium Park.

Energy Management

An energy management questionnaire was completed during the site visit with management. The questionnaire is based around the 5 pillars of energy management and is designed to establish how well advanced Greenstar’s energy management practices are and identify areas for improvement.

The results of the questionnaire resulted in a score of 6% meaning that there is a lot of scope for improvement for energy management practices in the organisation. One of the barriers identified to implementing an effective structure within the organisation is a lack of resources being available to look at areas outside the key business area of waste management.

The full questionnaire can be seen in the appendix of the main report.



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1 Recommendations

Ref	Date	Recommendation	Investment Cost Category	Payback Period	Predicted Annual Energy Savings		Annual CO2 Savings	Target Completion Date	Responsibility	Comments
					[Years]	[kWh]				
5.1	24/05/2016	Install a photocell on the high bay lighting circuit and set it to switch off the high bay lights when adequate daylight is available for safe working conditions in the building. The lights should be switched at the entrance to the building and turned on/off by the operator when the processing starts/stops.	Low cost	>1 year	5,103	€ 659	2.6	3 months	Ivan McCormack	Assume 25% reduction in light usage during opening hours on account of the photocell sensor switching the lights automatically during operating hours. Note the requirement for a new switch at the building entrance. The existing lights are predominately fluorescent so they have a fast strike time.
5.2	24/05/2016	Investigate baseload consumption. An electrical survey, outside of normal operating hours is required to identify what loads are on. By taking ammeter readings at the various distribution panels it should be possible to establish at a high level where the demand is coming from. It is hoped this investigation will reveal some loads which could be isolated or ways of reducing energy use.	No/low cost	>1 year	81,021	€ 10,468	41.4	3 months	Ivan McCormack	Assuming 25% reduction in baseload is achievable. An attempt was made to identify what makes up the baseload consumption and ammeter readings were taken at all accessible distribution boards to see if there were any unexpected loads, but nothing unusual was found.
5.3	24/05/2016	Turn off high bay lights at night. As mentioned in recommendation 5.1, the lights should be switched off at the end of the day. New, dedicated lights with occupancy and daylight sensors should be installed in appropriate bays to provide the required light for occasional out of hour's deliveries.	No/low cost	>1 year	40,020	€ 5,170	20.5	3 months	Ivan McCormack	Assume lights are on for 5,000hrs more than required at the moment as they are on all night.

Ref	Date	Recommendation	Investment Cost Category	Payback Period	Predicted Annual Energy Savings		Annual CO2 Savings	Target Completion Date	Responsibility	Comments
					[Years]	[kWh]				
5.4	24/05/2016	Upgrade to LED lights, inside and out (savings assume above recommendations are carried out, but all non-functioning high bay lights replaced also)	Medium	<15 years	5,191	€ 671	2.7	When opportunity arises	Ivan McCormack	If the operational changes proposed are not made this savings figure would be substantially larger. This recommendation will also result in improved internal lighting conditions as many of the existing lights are not functioning.
5.5	31/05/2016	Energy management practices improvements. Commitment: Senior management commitment is key to setting up an effective system. Identification: A register of opportunities (this table) should be produced and updated regularly. Plan: An Action Plan should be developed and opportunities should be taken from the register and inserted into the Plan. Action: Manage the project implementation of the planned opportunities– set up a team to oversee it. Review: Once complete review level of performance.	Low	1 year	28,635	€ 3,699	14.6	6 months	Ivan McCormack	Assumed 4% annual electrical savings through energy management practices
5.6	07/06/2016	Monitor energy use and tonnes of waste processed per site. Set up EnPIs for each site and benchmark similar sites against each other. This can be used to track performance improvements on the site and identify sites where there may potentially be scope for performance improvement based on a poor EnPI.	Low	1 year				6 months	Ivan McCormack	This should be part of the organisations new energy management structure.

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Ref	Date	Recommendation	Investment Cost Category	Payback Period	Predicted Annual Energy Savings		Annual CO2 Savings	Target Completion Date	Responsibility	Comments
					[kWh]	[Euro]				
5.7	07/06/2016	Get the PLC programme for the baler changed to switch off the compactor motor after a period of time (5 minutes) where the level sensor in the hopper has not been triggered. When the sensor is triggered the motor will come on again automatically. The conveyor should also be linked in the strategy and after say 10 minutes of inactivity the conveyor should turn off requiring a manual restart.	Medium	>2 years	38,500	€ 4,974	5.0	6 months	Ivan McCormack	This strategy has been implemented on the Waterford site successfully and the system was programmed this way when making the order for the equipment. The manufacturer's engineer will need to visit the site to change the programme and commission the system.
5.8	07/06/2016	When procuring equipment, part of the decision on what to buy should be based on its efficiency. A life cycle cost analysis should be conducted to determine what the best selection is and this takes into consideration capital cost, O&M costs and expected lifespan and residual value.	Low					6 months	Ivan McCormack	There are excel templates and tutorials available online which may help to develop your own systems for conducting this kind of analysis.

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