

Attachment G 1 Resource Use

G1 - Resource Use

Facility operations involve the consumption of water, oil and electricity. Details of resource use in 2015 and 2016 are given in the Table below:

Table 4.1 Resources Used On-Site in 2015 & 2016

Resources	Quantities 2014	Quantities 2016
Road Diesel	1,220 litres	1360 litres
Electricity	56,100 KwH	64,000 KwH
Water	480m ³	840m ³

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RILTA
ENVIRONMENTAL LTD

ENERGY AUDIT
RILTA ENVIRONMENTAL LTD – Unit 402

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RIL-405 V1

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WEML

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1.0 EXECUTIVE SUMMARY

1.1 Compliance Requirements

Rilta Environmental Ltd operates a facility at Unit 402, Grants Drive, Greenogue Business Park, Rathcoole, Co Dublin under Waste Licence Ref: W0192-03 issued by the EPA on 22nd July 2010.

Clause 7.1 of the licence states that the, '*licensee shall carry out an audit of the energy efficiency of the site within one year of the date of grant of this licence. The audit shall be carried out in accordance with the guidance published by the Agency, "Guidance Note on Energy Efficiency Auditing". The energy efficiency audit shall be repeated at intervals as required by the Agency*'.

The energy audit carried out by WEML at the Rilta facility was a Type 1 energy audit, defined by ISO50002 as a basic energy audit which defines high level opportunities and has enough detail to develop low cost/short payback opportunities. A type 1 energy audit was carried out at Unit 402 in May 2016.

1.2 Scope of Energy Audit

Rilta Environmental Ltd operates a Hazardous Waste treatment, recycling and transfer facility at Unit 402, Grants Drive, Greenogue Business Park, Rathcoole, Co Dublin.

The 2015 total annual energy consumption (kWh) and total primary energy (TPE) consumed at the facility is shown in Table 1.

Table 1: Rilta Environmental Ltd Energy Consumption (kWh, TPEE, tCO₂ & Cost)

Location	Annual energy consumption kWh	Annual TPEE * Consumption kWh	tCO ₂	Cost
Unit 402, Greenogue Business Park	4,287,646	5,047,666	1,250	€396,489.19

*TPEE-Total Primary Energy Equivalent

The above table shows that Rilta Environmental Ltd, Unit 402 consumed 4,287,646 kWh of energy in 2015, emitting the equivalent of approximately 1,250 tonnes of CO₂. Electricity, transport diesel, heating oil and gas use at the site were included in the scope of this energy audit.

1.3 Energy Consumption

Total energy consumption (kWh) in 2015 of Rilta Environmental Ltd's facility at unit 402 was 4,287,646 kWh ie. 5,047,666 kWh Total Primary Energy Equivalent (TPEE) at a total cost of approximately €396,489.19. The breakdown of this energy use between electricity, gas, gas oil and transport diesel is shown in Table 2.

Table 2 – Annual Energy Consumption (kWh, TPE & Cost)

Energy Type:	Energy Use	Energy Use kWh	Energy Use kWh (TPEE)*	% Split kWh	Energy Cost exc. VAT (€):	% Split (€)
Diesel	273,266 litres	2,951,273	2,951,273	58%	€270,170.39	68%
Electricity	506,680 kWh	506,680	1,266,700	25%	€80,328.79	20%
Gas Oil (steam)	69,782 litres	711,776	711,776	14%	€38,972.34	10%
Gas	117,917 kWh	117,917	117,917	2%	€7,017.67	2%
Total		4,287,646	5,047,666	100%	€396,489.19	100%

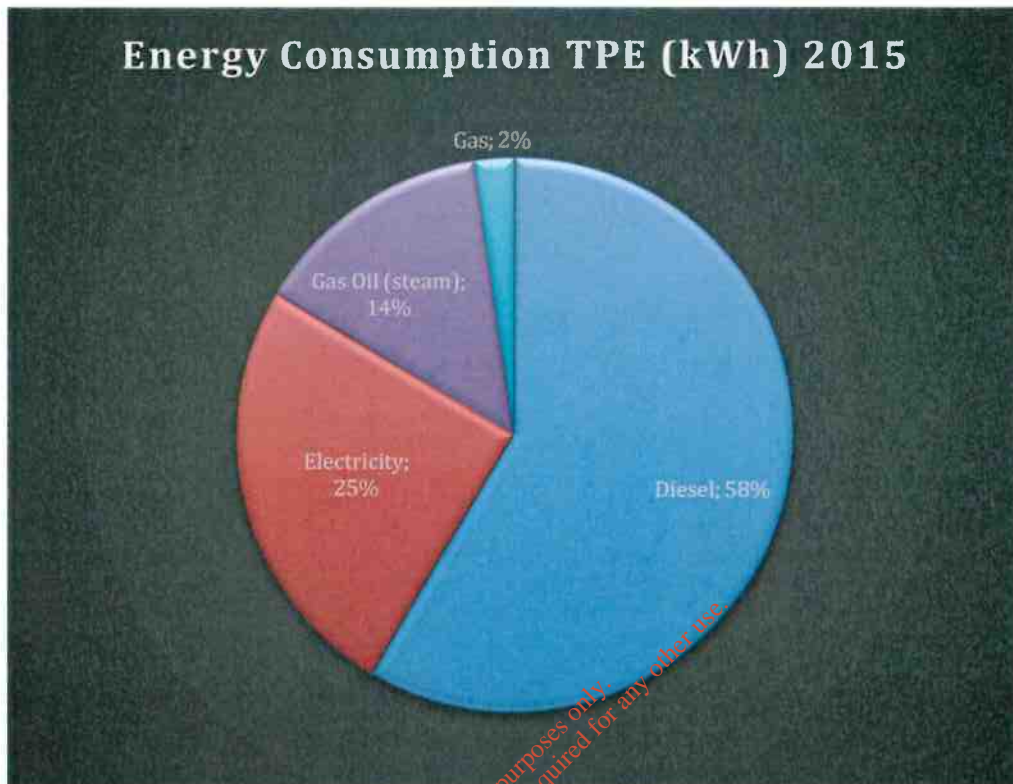
*TPEE - Total Primary Energy Equivalent

The above electricity and gas consumption and costs are based on recorded monthly data verified by utility bills provided by Rilta Environmental Ltd. Diesel and gas oil consumption and costs are based on data provided by Rilta. The energy data covers the period Jan to Dec 2015 inclusive.

Of the 2015 annual total primary energy equivalent use (TPEE) of 5,047,666 kWh, transport diesel accounts for 2,951,273 kWh ie. 58% TPEE electricity accounts for 1,266,700 kWh ie. 25% TPEE, gas oil (steam boiler) accounts for 711,776 kWh ie. 14% TPEE and gas accounts for 117,917 kWh ie. 2% TPEE (Figure 1).

The highest energy cost is transport diesel which accounted for €270,170.39 ie. 68% of the sites total energy bill for 2015.

Figure 1. Annual Energy Consumption (TPE kWh).



1.4 Opportunities and Recommendations

The results of the findings of this energy audit carried out at unit 402 are presented in section 4 of this report.

In summary the audit findings suggest:

- An annual potential energy saving total of 406,463 kWh and 24,000 litres of diesel could be achieved if all recommendations of this report are feasible and implemented.
- Identified potential savings represent around 9.5% of total audited energy consumption.
- Expected annual energy cost savings of approximately €89,000.
- Indicative implementation costs for all measures in the region of €60,000. However, these costs need to be investigated further and verified.
- The indicative payback period for implementing all of the recommendations in this report is approximately 8 months.

The recommendations detailed below are based on observation, calculations and professional judgement following a walk-round survey. Consequently, further investigations are required in order to confirm the potential savings, costs and feasibility of the recommendations presented in this report.

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2.0 THE ENERGY AUDIT PROCESS

2.1 Legal Requirements

The EU Energy Efficiency Directive (2012/27/EU) was transposed into Irish Law on 29th September 2014 as Statutory Instrument (SI) 426 of 2014. This legislation requires all 'non-SMEs' (ie. 250 employees or more or any number of employees and an annual turnover >€50 million turnover, and an annual balance sheet >€43 million), to carry out a mandatory energy audit of their operations every four years. The first such audit must be completed by 5th December 2015.

The basic compliance requirements for eligible companies is to either:

- carry out an energy audit, or
- demonstrate that they are implementing an energy or environmental management system, certified by an independent body according to the relevant European or international standards.

Rilta Environmental Ltd operates a Hazardous Waste treatment, recycling and transfer facility at Unit 402, Grants Drive, Greenogue Business Park, Rathcoole, Co Dublin.

Rilta Environmental Ltd employs less than 250 people and has an annual turnover that is less than €50 million. Based on the employee numbers and annual turnover, Rilta Environmental Ltd is classed as an SME and is therefore not required to comply with the EU Energy Efficiency Directive or SI 426.

However, clause 7.1 of EPA licence W0192-03 states that Rilta Environmental Ltd 'shall carry out an audit of the energy efficiency of the site within one year of the date of grant of this licence. The audit shall be carried out in accordance with the guidance published by the Agency, "Guidance Note on Energy Efficiency Auditing". The energy efficiency audit shall be repeated at intervals as required by the Agency'. This energy audit has been prepared in order to comply with clause 7.1 of the EPA licence.

2.2 Total Energy Consumption

Total energy consumption (kWh) in 2015 for unit 402 was 4,287,646 kWh ie. 5,047,666 kWh TPEE (Table 4). Electricity, gas, gas oil and diesel consumption is based on utility bills and recorded data provided by Rilta Environmental Ltd. Energy data covers the period January to December 2015.

Table 4: Rilta Environmental Ltd Energy Consumption (kWh, TPEE, tCO₂ & Cost)

Location	Annual energy consumption kWh	Annual TPEE Consumption kWh	tCO ₂	Cost
Unit 402, Greenogue Business Park	4,287,646	5,047,666	1,250	€396,489.19

The breakdown of the 2015 total annual energy consumption is shown in Table 5.

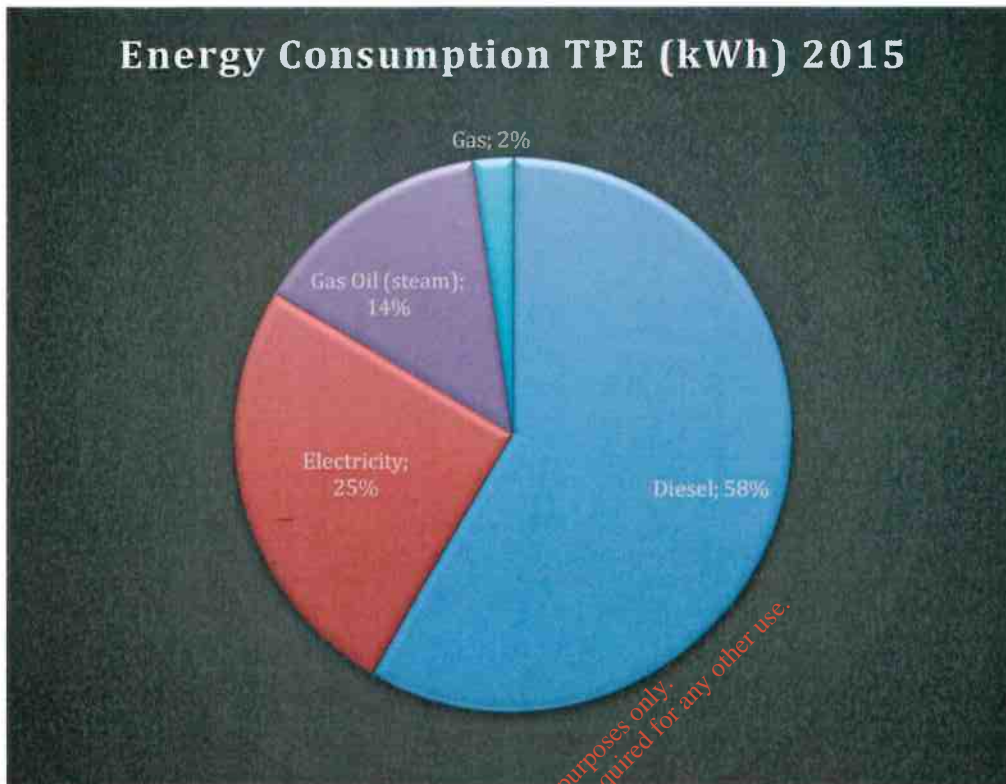
Table 5. Annual Energy Consumption (kWh, TPEE & Cost).

Energy Type:	Energy Use	Energy Use kWh	Energy Use kWh (TPEE)*	% Split kWh	Energy Cost exc. VAT (€):	% Split (€)
Diesel	273,266 litres	2,951,273	2,951,273	58%	€270,170.39	68%
Electricity	506,680 kWh	506,680	1,266,700	25%	€80,328.79	20%
Gas Oil (steam)	69,782 litres	711,776	711,776	14%	€38,972.34	10%
Gas	117,917 kWh	117,917	117,917	2%	€7,017.67	2%
Total		4,287,646	5,047,666	100%	€396,489.19	100%

*TPEE - Total Primary Energy Equivalent

2.3 Significant Energy Use

Of the 2015 annual total primary energy equivalent use (TPEE) of 5,047,666 kWh, transport diesel accounts for 2,951,273 kWh ie. 58% TPEE electricity accounts for 1,266,700 kWh ie. 25% TEE, gas oil (steam boiler) accounts for 711,776 kWh ie. 14% TPEE and gas accounts for 117,917 kWh ie. 2% TPEE (Figure 2).

Figure 2 – Annual Energy Consumption (kWh, TPE).

2.4 The Energy Audit

A type 1 energy audit was carried out at unit 402 on 25th May 2016.

The main participants involved in the energy audit are shown in Table 6.

Table 6. Key Participants.

Name	Title	Role/Involvement
Sean Cotter	Managing Director	Report Review & Sign Off
Colm Hussey	Site Manager	Report Review & Energy Data Provision
Sean Lawlor	EHS Officer	Energy Data Provision
Brenda Leahy	Accounts Officer	Energy Data Provision
Andy Wood	Energy Auditor	Energy Auditor

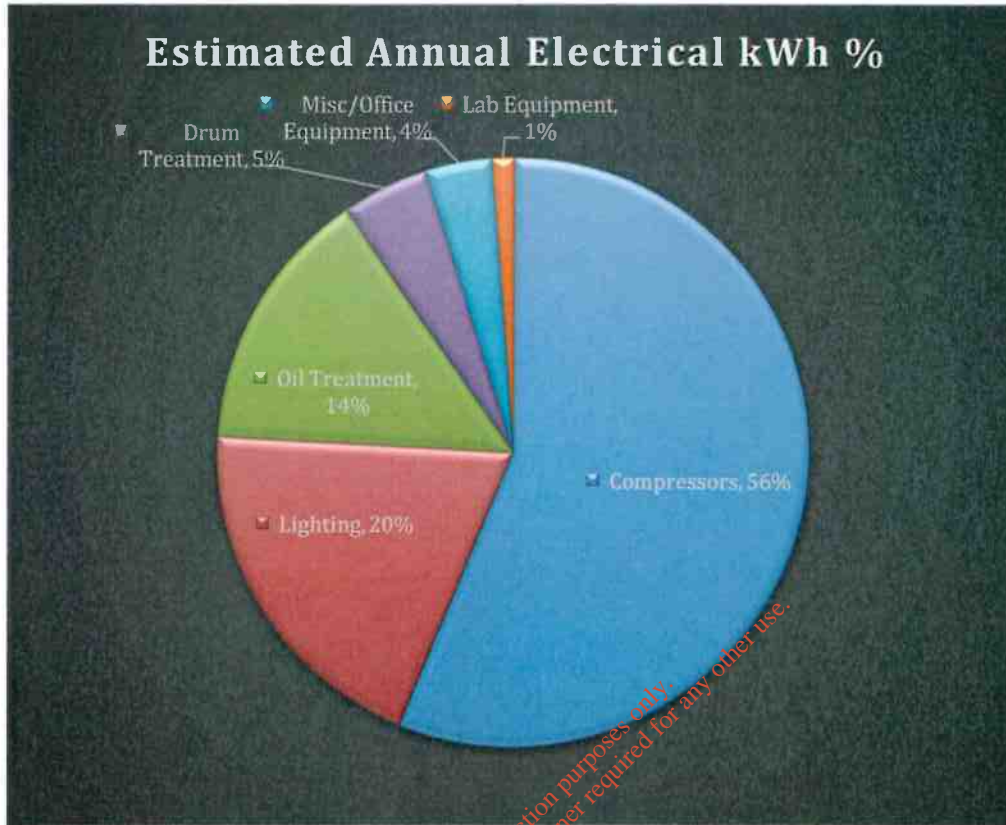
3.0 KEY ENERGY USERS

3.1 Analysis to identify Key Energy Users

Based on the available information, results of the energy audit and engineering calculations, the following table shows the Key Energy Users, their estimated consumption, and percentage of total consumption at unit 402.

Table 7. Key Energy Usages.

Consumer	KEU of Fuel (%)	Annual Consumption (kWh)	Fuel Type
Air Compressors & Driers	56%	284,608	Electricity
Lighting	20%	99,433	Electricity
Oil Treatment Process Equipment	14%	73,164	Electricity
Drum Treatment Process Equipment	5%	24,388	Electricity
Office Equipment/ Miscellaneous	4%	18,396	Electricity
Laboratory Equipment	1%	6,132	Electricity
Transport	100%	2,951,273	Diesel
Steam Boiler	100%	711,776	Gas Oil
Office Space Heating	81%	95,513	Gas
Hot water	19%	22,404	Gas

Figure 3. Key Electricity Users.

Based on the available information and calculated estimates, the above information shows that the air compressors and driers are the main electricity consumer accounting for around 56% of the total site electrical use. Lighting is the second highest electricity user (20%), followed by the oil treatment process (14%), the drum treatment process (5%), office equipment/miscellaneous (4%) and laboratory equipment (1%).

The 20% site lighting load has been further broken down into specific site areas/buildings. Table 8 and Figure 4 below show that Bay 5 has the biggest lighting load (28%), followed by the main admin/office block (21%), Bay 8 (17%), Bay 3 (13%), external (10%), Bay 7 (5%), Bay 4 (3%), Bay 2 (3%).

Table 8. Site Lighting Load Breakdown.

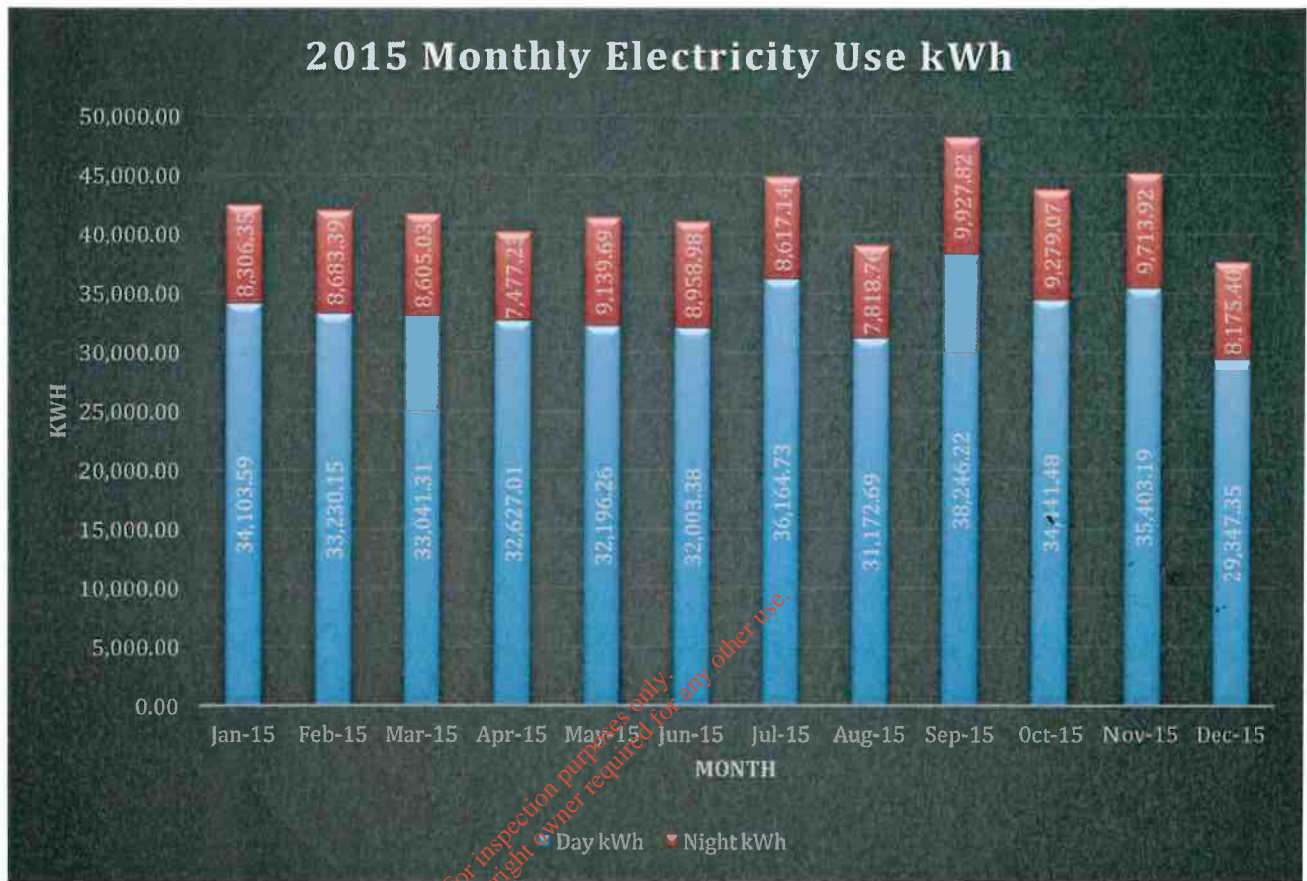
Building/Area	Nos Fittings	Nos Lamps	Total Energy Use kWh	Energy Cost	%
Bay 5	72	187	28,234.34	€4,517.49	28%
Main Admin Offices	85	328	20,876.13	€3,618.90	21%
Bay 8	30	44	16,806.82	€2,689.09	17%
Bay 3	66	205	13,085.90	€2,093.74	13%
External	7	7	9,755.20	€1,560.83	10%
Bay 7	7	7	4,877.60	€780.42	5%
Bay 4	24	48	3,010.18	€481.63	3%
Bay 2	2	2	2,787.20	€445.95	3%
TOTAL	293	828	99,433.36	€16,188.06	

Figure 4. Site Lighting Load Breakdown.

3.2 Energy Profiling

Electricity and gas consumption profiling was carried out on the 2015 monthly utility bill data for the main electricity and gas meters supplying the site. The 2015 monthly electricity and gas use profiles are presented in Figures 5 & 6 below.

Figure 5. Electricity Consumption Monthly Profile 2015 – Unit 402.



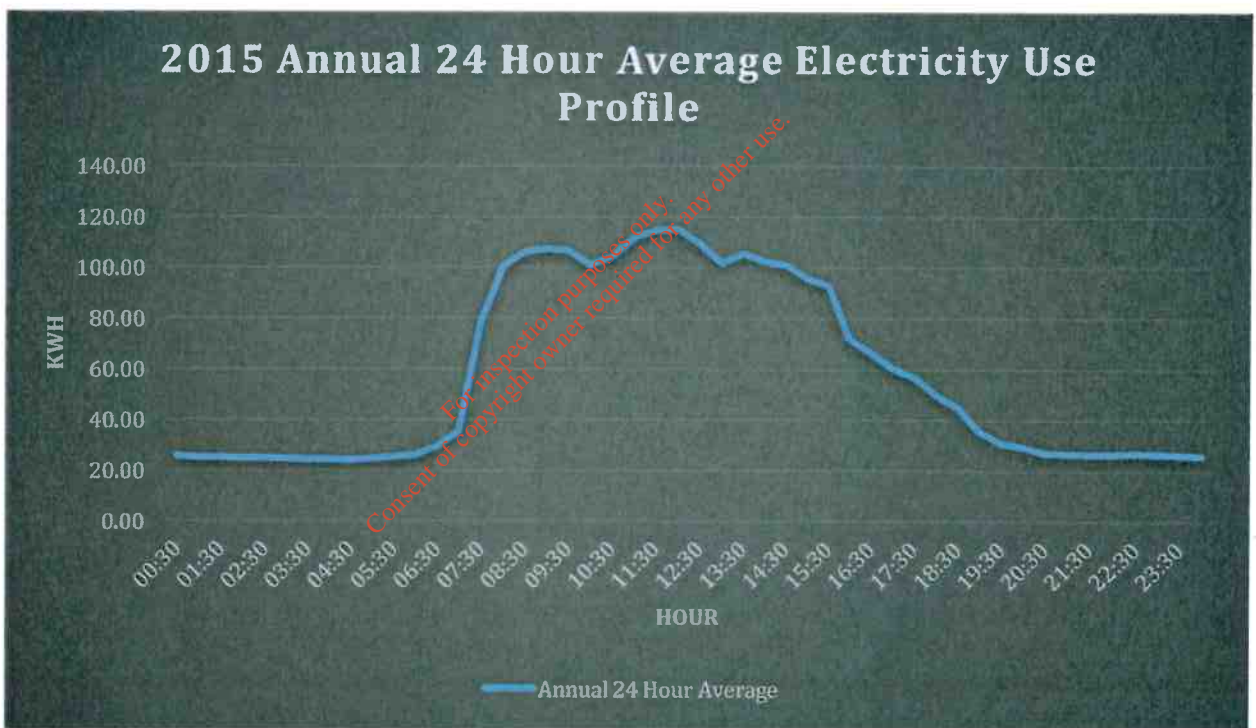
The above graph shows a fairly steady monthly electrical consumption with no clear seasonal pattern that may suggest eg. increased use of lighting in darker winter months or electrical heaters in colder months etc. There are however noticeable decreases in August & December which could reflect staff holiday periods. The months with the highest electricity use were July & September. This consumption could be related to increased productivity/treatment during these months. An analysis of monthly production/treatment data (if available) would help to clarify this increase.

A review of the day-time versus night-time monthly electricity consumption profile for 2015 as presented in Figure 5 shows that night-time electricity use (red bars) accounts for approximately 20% of the total monthly electricity consumption. This indicates that there may be potential scope to reduce the night-time use eg. by ensuring that non – essential items are switch off at night.

This could be facilitated by implementing an energy awareness campaign across the site and carrying out night time checks to ensure that PC's, office equipment, non essential laboratory equipment, hot water emersion heaters, HVAC/extraction units, lights, fans, motors, conveyors, electric heaters etc are switched off outside working/production hours.

High night time consumption could also be related to the use of the forklift battery charger at night time. The forklift charger should only be used when needed and unplugged at night if not required.

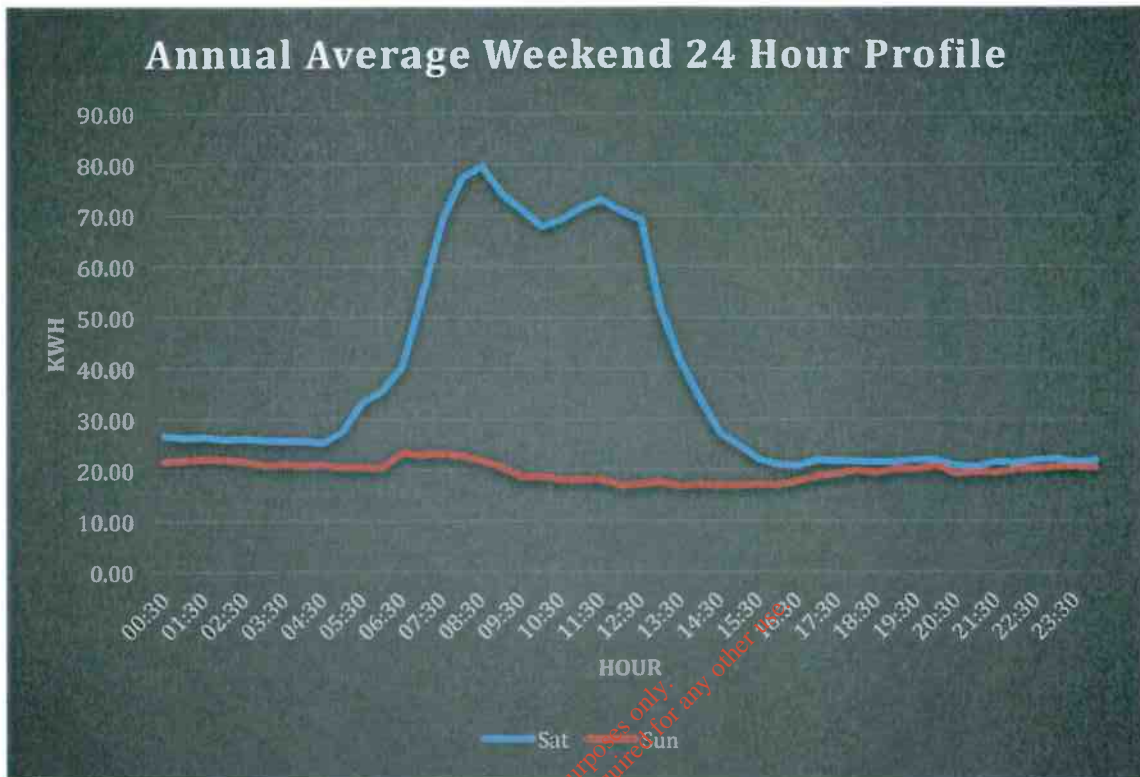
Figure 6. Electricity Consumption Annual Average 24 Hour Daily Profile.



The above graph shows a fairly common 24-hour energy use profile with energy use rising at around 7am and tailing off towards the end of the working day at around 5pm.

However, the above graph also shows that there is a fairly constant base-load of over 20kWh during non operational hours ie. between 8pm-6:30am. This indicates that there may be opportunities to reduce this base-load and save energy and money. This 20kWh base-load is currently costing Rilta approximately €28,000 per year.

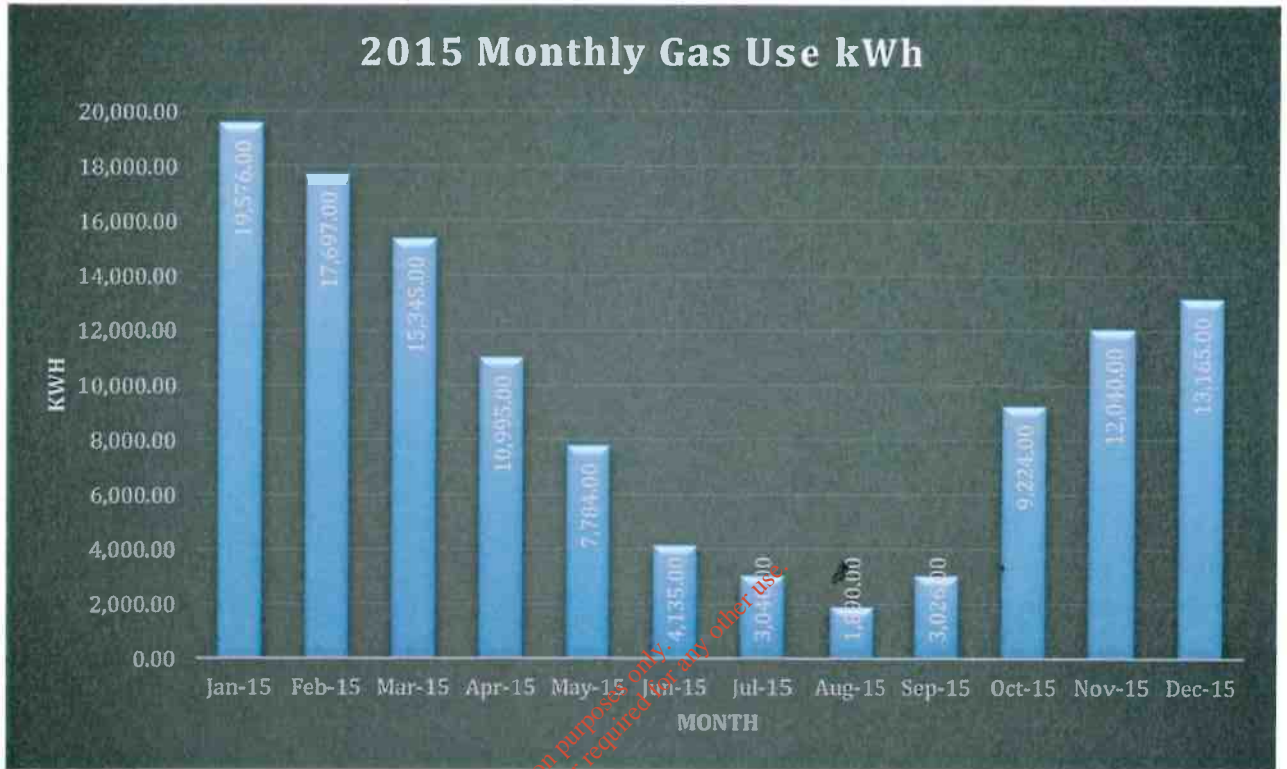
Figure 7. Electricity Consumption Annual Average 24-Hour Weekend Profile.



The above graph shows that the Saturday electricity profile follows a similar pattern to the working week, but indicates a slightly earlier start and end time on Saturdays ie. approximately 6am-12:30pm.

The Sunday annual average 24-hour energy use profile (red line) shows that when the site is non operational, a constant energy base-load of around 20kWh is being used by the facility. Again, this indicates that there may be opportunities to reduce the site base-load and save energy and money.

Figure 8. Gas Consumption Monthly Profile 2015 – Unit 402.



The above graph shows a clear seasonal pattern with higher gas use in the winter months compared to the summer months. This is a typical gas usage pattern that indicates increased gas use in the colder months for space heating.

Based on the above data and assuming that the August gas use data relates to water heating only and no space heating, it can be estimated that gas use for hot water accounts for approximately 19% of the annual gas use. The majority ie. 81% of gas use is for office space heating.

An analysis of daily gas use against heating degree days would show whether the insulation in the offices is sufficient and effective and indicate whether potential gas savings could be achieved by improving office insulation or heating controls/timers.

3.3 Transport Energy Use

Rilta Environmental Ltd operates a fleet of 48 vehicles and plant comprised of the following;

- Trucks & Vans
 - 11 x Vac Tankers
 - 9 x Commercial Vehicles/trucks
 - 3 x Camera Vans
 - 3 x Delivery Trucks

- Office/Company Cars
 - 9 x Company Cars

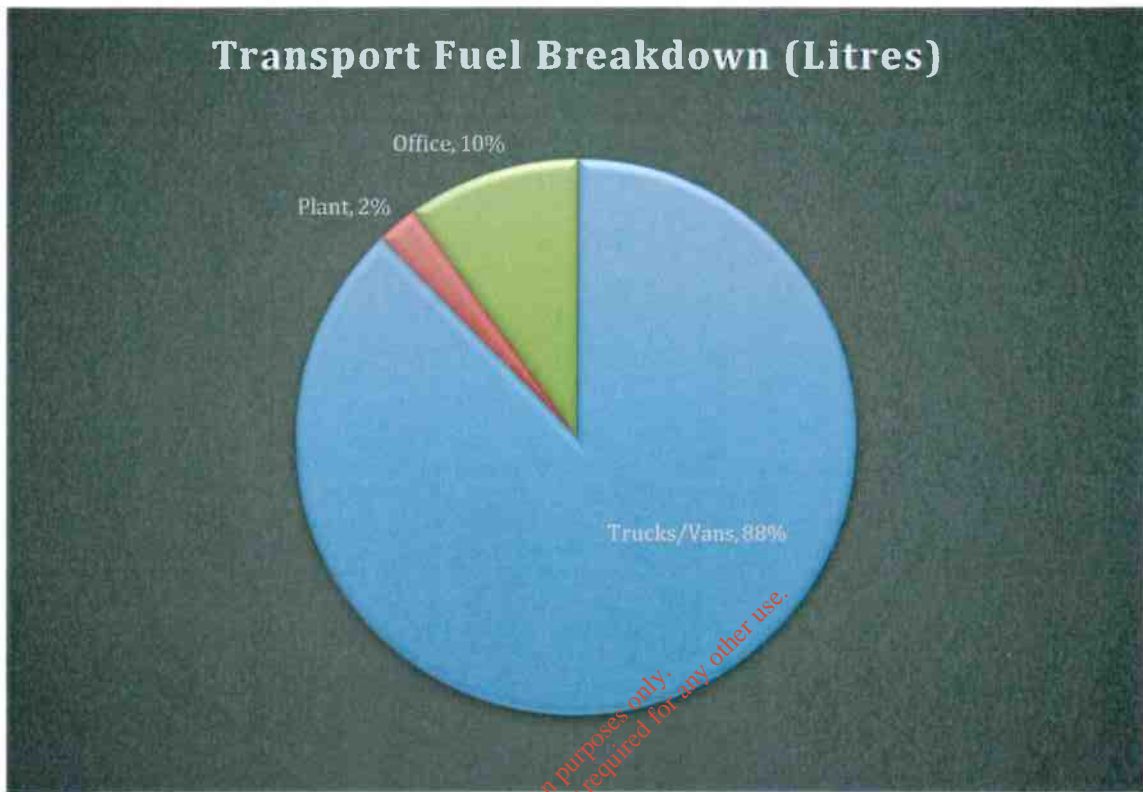
- Site Plant & Equipment
 - 11 x Forklift trucks
 - 2 x Excavators

Total transport diesel fuel use in 2015 was 273,266 litres at a cost of €270,170.39. Transport diesel is the single biggest energy use at the site accounting for 68% of the total energy costs.

Table 9 and Figure 9 below show that trucks and vans are the largest fuel users (88%), followed by office/company cars (10%) and finally site plant and equipment (2%).

Table 9. Transport Fuel Breakdown.

Building/Area	Total Litres	Fuel Cost	%
Trucks & Vans	239,661	€237,749.60	88%
Office/Company Cars	26,986	€27,017.00	10%
Site Plant	6,619	€5,403.40	2%
TOTAL	273,266	€270,170	

Figure 9. Transport Fuel Breakdown (Litres).

Studies have shown that fuel energy savings of up to 15% can be achieved by improved driver behaviour. For Rilta, this is equivalent to a potential annual transport saving of approximately 41,000 litres or €40,590 (based on an average of €0.99/litre).

Motivating drivers to change their behaviour is fundamental to achieving savings. This can be achieved by;

- Providing Information, tips and guidance regarding efficient driving
- Training
- Monitoring based solution eg. 'telematics', or in-vehicle data which can be used to track driver behaviour

4.0 ENERGY AUDIT FINDINGS

The energy audit of unit 402 has identified a number of potential energy savings opportunities as presented in Table 10.

The recommendations in Table 10 are based on observation, calculations and professional judgement following a walk around survey. Consequently, further investigations are required in order to confirm the potential savings, costs and feasibility of the recommendations presented in this report. Some of the following opportunities do not include implementation costs as further investigations are required in order to establish these costs.

In summary the audit findings suggest:

- An annual potential energy saving total of 406,463 kWh and 24,000 litres of diesel could be achieved if all recommendations of this report are feasible and implemented.
- Identified potential savings represent around 9.5% of total audited energy consumption.
- Expected annual energy cost savings of approximately €89,000.
- Indicative implementation costs for all measures in the region of €60,000. However, these costs need to be investigated further and verified.
- The indicative payback period for implementing all of the recommendations in this report is approximately 8 months.

Table 10. Energy Saving Opportunities

Item	Saving Opportunity	Assessed Annual Saving		Implementation Cost (€)	Simple Payback (Years)	Savings %
		(kWh)	(€)			
1	Fix compressed air leaks	42,691	€6,830	€5,000	<1 year	15%
2	Reduce air pressure by 1 bar	19,922	€3,187	€0	immediate	7%
3	Review CA use/need	28,461	€4,554	€1,500	4 months	10%
4	Introduce compressed air leak detection programme	2,846	€455	€0	Immediate	1%
5	Compressor maintenance programme	14,230	€2,277	€1,500	8 months	5%
6	Reduce day time and night time 20 kWh base-load by 50%	87,600	€14,016	€5,000	4 months	50%

Table 10. Energy Saving Opportunities continued.....

Item	Saving Opportunity	Assessed Annual Saving		Implementati on Cost (€)	Simple Payback (Years)	Savings %
		(kWh)	(€)			
7	Replace building lights with LED	64,632	€10,341	€20,000	2 years	65%
8	Reduce idle time drum treatment conveyors	8,000	€1,280	€0	Immediate	30%
9	Turn off equipment during breaks, lunch time	3,276	€524	€0	Immediate	13%
10	Review hot water emersion heaters	1,168	€187	€0	Immediate	66%
11	Consider developing & implementing ISO 50001	133,637	€21,400	€20,000	1 year	10%
12	Ensure that clothes driers are not on unnecessarily	Included in item 11 above				
13	Ensure that clothes driers are not on unnecessarily	Included in item 11 above				
14	Switch off lights & PC campaign	Included in item 11 above				
15	Ensure unnecessary Lab equipment is turned off	Included in item 11 above				
16	Building HVAC units programmed/timers	Included in item 11 above				
17	Review building heating settings/timers (Gas)	Included in item 11 above				
18	Ensure building heaters are on timers/thermostatically controiled (Gas)	Included in item 11 above				
19	Steam review/optimization (Gas Oil)	Included in item 11 above				
20	Transport energy review/behavior training	24,000 litres	€24,000	€10,000	5 months	10%
TOTAL		406,463	€89,051	€63,000	8.5 months	9.5%

Despite clear evidence that a number of potential energy reduction opportunities exist at unit 402, energy and cost savings will only be made if the identified opportunities are further developed and implemented.

Consequently, the first and most important energy management improvement opportunity is to obtain senior management commitment to implementing the identified opportunities and supporting a strategic energy management programme.

Auditor experience and numerous published case studies have shown that well resourced energy strategies that are developed, supported and communicated by senior management, consistently deliver superior and sustainable energy reductions and cost savings that far outweigh the costs associated with establishing and operating such programmes.

It is also widely acknowledged that energy management strategies or programmes that are developed without senior management commitment are likely to underperform and ultimately fail.

An opportunity therefore exists for Rilta Environmental Ltds' senior management to commit to driving the development and delivery of a strategic energy management programme based on the finding identified in this report and incorporate this programme into the sites existing certified ISO 14001 programme or via the development and implementation of the International Energy Management Standard ISO 50001.

A further significant energy management improvement opportunity available to Rilta Environmental is to better utilise the existing energy meters that already exist at the site. By recording (manually or automatically) daily or weekly consumption data at these meters, this would enable an immediate and beneficial understanding of the site energy consumption and profiles, and provide data to assist with effective energy management and identification and verification of energy reduction projects.

By implementing the above suggestions, Rilta Environmental Ltd will be able to develop a systematic, effective and beneficial approach to managing energy use, reducing consumption and sustaining cost savings. This will greatly improve energy management at the site.

5.0 CONCLUSIONS

The energy audit of Rilta Environmental Ltds' facility at Unit 402 has identified a number of potential energy improvement opportunities that could realize savings in

the region of 406,463 kWh and 24,000 litres of diesel at a saving of approximately €89,000 if all recommendations of this report are feasible and implemented.

The cost of implementing all recommendations needs further investigation in order to confirm the costs and establish the payback period.

An opportunity exists for Rilta Environmental Ltds' senior management to commit to driving the development and delivery of a strategic energy management programme based on the finding identified in this report, as part of the sites existing ISO 14001 system or via the development and implementation of the International Energy Management Standard ISO 50001.

By implementing the suggestions in this report, Rilta Environmental Ltd will be able to develop a systematic, effective and beneficial approach to managing energy use, reducing consumption and sustaining cost savings. This will greatly improve energy management at the site.

Finally, there maybe potential financial assistance to help with the development and implementation of an energy strategy and improvement projects through either SEAI or Enterprise Ireland Lean Business Offer or Green Offer Programmes (www.enterprise-ireland.com/en/productivity).

WEML would be happy to assist Rilta Environmental Ltd to investigate potential funding opportunities if required.

APPENDIX 1.

Unit 14a Energy Consumption (2015)

Rilta Environmental Ltd also operates a facility at Unit 14a, Greenogue Business Park, Rathcoole, Co Dublin under Waste Licence Ref: W0185-01 issued by the EPA on 31st May 2004, as amended.

There is no condition in Waste Licence Ref: W0185-01 to carry out an energy audit of the site. The following information is provided for information purposes only and is based on an analysis of 2015 electricity and gas bills for Unit 14a and an inspection of the premises.

Table 1a – Annual Energy Consumption (kWh & Cost)

Energy Type:	Energy Use kWh	% Split kWh	Energy Cost incl. VAT (€):	% Split (€)
Electricity	63,800	55%	€13,411.56	78%
Gas	52,858	45%	€3,891.73	22%
Total	116,658	100%	€17,303.29	100%

Of the 2015 annual energy use of 116,658 kWh, electricity accounts for 55% and gas 45%. Electricity accounts for 78% of the total annual energy costs, gas 22% (Figures 1a & 2a).

Figure 1a. 2015 Annual Energy Consumption (kWh).

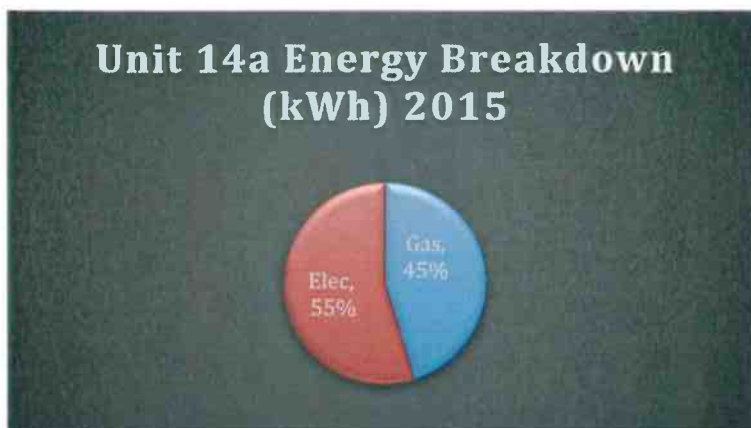
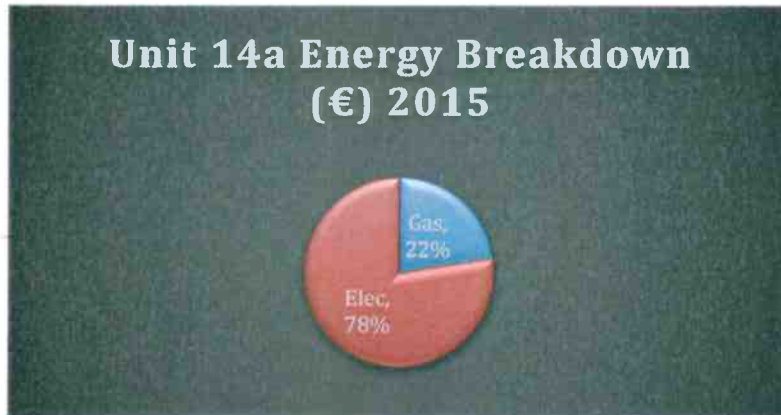


Figure 1b. 2015 Annual Energy Costs (€).



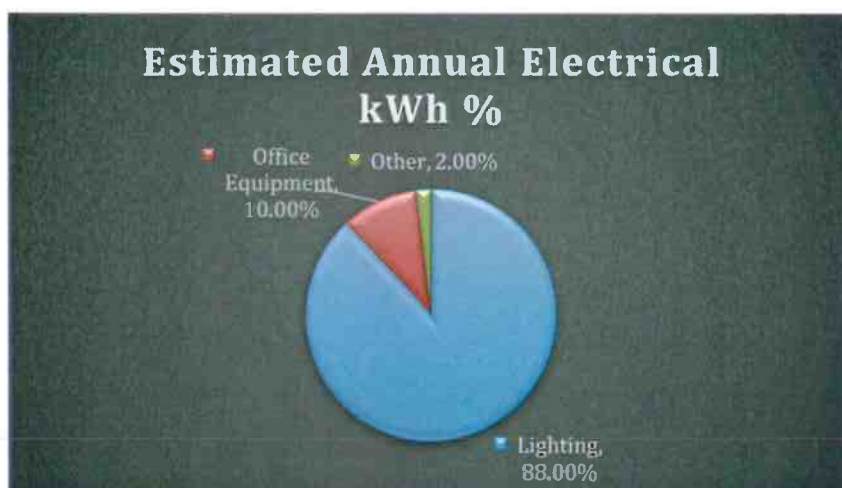
Based on the available information, results of the site inspection and engineering calculations, the following table shows the Key Energy Users, their estimated consumption, and percentage of total consumption at unit 14a.

Table 2a. Key Energy Usages.

Consumer	KEU of Fuel (%)	Annual Consumption (kWh)	Fuel Type
Lighting	88%	56,387	Electricity
Office Equipment	10%	6,380	Electricity
Other	2%	1,033	Electricity
Office Space Heating	81%*	42,815	Gas
Hot water	19%*	10,043	Gas

*Based on Block 402 breakdown

Figure 2a. Key Electricity Users.



Although the office building was unoccupied during the site inspection, it is clear that lighting is the main electricity consumer in unit 14a. Consequently, it would be beneficial to implement a program to replace existing blown lights with LED bulbs in the offices, warehouse and externally.

Potential gas savings could be achieved by ensuring that there is sufficient office insulation and heating controls/timers.

Finally, once Unit 14a is occupied fully, it would be beneficial to monitor monthly electricity and gas consumption in order to identify other potential energy saving initiatives.

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