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Property Surveyors, Building Regulation Compliance Experts

TSG Building Services plc

ESOS Phase 2 Report



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Introduction

- ESOS requirements

An organisation has a legal obligation to comply under ESOS if it meets any one of the following:

- The organisation has equal to, or more than, 250 members of staff
- Has an annual turnover of over €50 million Euros (£44.1m) or an annual balance sheet of over €43 million Euros (£37.9m)
- Is an overseas organisation with over 250 employees in the UK
- Is part of a larger organisation which falls into any of the above

A company is required to do the following to comply with ESOS regulations:

- Measure their total annual energy consumption within the qualifying dates.
- Conduct energy audits to identify cost-effective energy efficiency improvements
- Report compliance to the Environment Agency (the scheme administrator)

The deadline for the second compliance period (ESOS phase 2) was 5th December 2019. The compliance window was between 6th Dec 2015 and 5th December 2019, and must be valid at the final deadline date of 5th December 2019.

This will include transport as well as specific process energy, if the organisation in question is responsible for them.

Chris Proctor is appointed as the ESOS-qualified Lead Assessor, and will be responsible for signing off the ESOS Assessment.

Background to TSG Building Services plc

In TSG Building Services plc (TSG) annual accounts published for 31 - 04 - 2020, which covers the period 1st April 2019 to 31st March 2020, we see the following results, qualifying the company for ESOS:

• Total turnover of	£38,800,335 (appendix 2)
• Total net assets of	£6888425 (appendix 2)
• Total number of employees	At the reporting date (Dec 2018) the company had 272 employees. This dropped to 248 and below from May 2019.

TSG falls under the requirement for ESOS phase 2 on the grounds of the number of employees in 2019, the number being above the 250 threshold during the compliance period.

Executive summary

Synopsis of findings

This is the first ESOS report for TSG therefore there is no requirement to report on progress with previous recommendations. However the business is both financially and environmentally aware. Both these factors have a significant effect on their performance and their ability to qualify for Government, local Authority and Housing Association contracts.

Type of business

TSG describe themselves as “an award winning multi-disciplined building services and construction company who serve a large and varied client base including architects, developers, consultants, local authorities, housing associations and the private market.”

Their services cover a wide range of building and maintenance tasks, from the installation of heating, electrical and renewable technology to homes on a large scale to the building and commissioning of new homes. The knowledge for this has been built up over some 50 years as a family business.

They have a substantial number of accreditations as can be seen in appendix 1

Typical clients and how they acquired their work

TSG focuses on acquiring large contracts to work with local authorities and housing associations. As a result they have high levels of capability and skill in winning housing associations, local authority and Government tenders. There are several key elements to their operation:

- Competency in tender applications
- Ensuring that they are accredited with all the required accreditation bodies
- Have management ability to conduct and deliver large projects with remote teams

Short term plans and direction

There had been a plan to relocate the main office to a new site within the vicinity of the current one just before the events of Covid-19. This was not completed due to the loss of the new site and uncertainty caused by COVID. However this is now actively being pursued again and will take place in the near future. The key objective is to be able to draw the existing remote sites back to the main head office and provide more suitable accommodation for the existing over-staffed site.

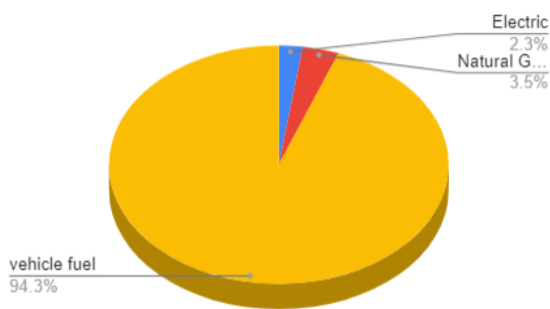
As a result of this, there are limited opportunities to focus on the existing building stock. Due to the short term occupancy and the fact that all remote sites have a limited life post consolidation, and are fully serviced by the landlords, TSG are not responsible for energy savings on these sites.

Analysis of the key areas of energy use

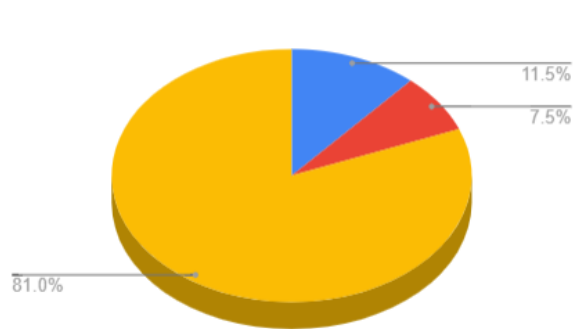
Using the data collected from the DEC analysis and comparing this to the fuel use of TSG, it is apparent that the main office represents only 6% of the total energy consumption in the business. The balance is used in fuel for the large fleet of vans and company cars used to service the customers projects.

Energy converted to kWh and Kg of CO2

Energy converted to kWh



Total Kg of co2



Fuel	Total kWh 2019	Fuel	Total kg of CO2
Electric	86,064.16	Electric	131,902.68
Natural Gas	131,902.68	Natural Gas	86,064.16
Total vehicle fuel	3,589,321.44	Total vehicle fuel	928,964.39

There are very limited opportunities for the company to significantly reduce their energy dependence in round 2 of ESOS in relation to the property they occupy. However the key area of focus within the company is on transport.

Energy Consumption

To compile the company's total energy consumption for ESOS we have used two methods of assessment. First, we have carried out a DEC analysis to quantify the total energy use in 2019, and further supported this with a level 5 EPC for the premises. (Appendix 3 and 4) In addition to this, an analysis of the vehicle fuel purchases has also been conducted.

Observations

The Building Fabric

Based on the fabric first principles we have assessed the current building to see if there are any easy wins.

The building is of a typical 1930s cavity construction with a flat roof. The cavities are not filled and this is a deliberate choice. There is evidence in the building of potential bridging of the cavities leading to efflorescence on the internal walls in places. In these situations the filling of these cavities would exacerbate the issue. This, combined with the short term plans to relocate, removes this from consideration as an energy saving opportunity.

100% of the openings have been upgraded to PVC double glazing. These all appear to be in excellent condition and again, in the time scale of the proposed relocation, it is not being focused on in this report. If the building was to be occupied for a longer period of time it would be a consideration to investigate the solar rejection on the existing fittings. If this was not included in the installation, then adding a solar reflective film may be worth considering in key locations. This would help reduce the cooling requirements in the hotter times of the year.

HVAC systems

There is cooling provided for this building all of which was originally purchased from the ECMA list. We are not aware of there having been a TM44 provided. Air conditioning systems that exceed 12kW should be inspected and have a TM44 lodged. This is the responsibility of every home or building owner who has an air conditioning system with a total or combined output of over 12kW. That means that even if you have a few small units with lower outputs, you still need an inspection if it totals more than 12kW.

The gas boiler is over 95% efficient and linked to a weather compensator. The building management system is appropriately set to adjust heating demand for both operating days

and weekends. I can see little opportunity here that would deliver significant savings in the short term.

Consideration has been given to the use of hot water. In all the facilities there are automated taps that all seem to be in good working order. The hot water is provided from the gas boilers and stored in a thermal heat store with a very low 1,9 kW per 24h standing loss.

Low Carbon technology

Renewables have been installed on this building. There are solar photovoltaic panels installed as well as some solar thermal (mainly used for training). (Appendix 6)

Waste Management

TSG has waste management systems in place and are actively encouraging employees to monitor and manage waste. Their contract includes penalties for contaminated waste and as a result helps focus any non compliance.

Building analysis conclusion

The above shows that TSG practices what they preach. They have taken the actions required to manage the building's energy use, however the building only represents 6% of the company's energy consumption. The vast majority of the 94% is contributed by the company's fleet of vehicles.

Fleet management

As stated above, the fleet represents the largest proportion of energy use by TSG, some 94%. As a result, the management of TSG fleet is a key focus of the company. Some considerable time and effort has been put into finding practical and affordable ways to achieve this. Most notably, the commissioning of an Energy Savings Trust report. Along with the report there has been much discussion with the consultants as to how the fleets assets could be improved. Consideration and trials have been conducted with all electric and hybrid vehicles. The general conclusion between the management team and the consultant is that these are not optimal for the TSG operation. These restrictions fall into three categories:

1. Insufficient range for electric vans
2. Hybrid vehicles running mainly on engines due to distance
3. Complications for providing remote charging facilities

As a result the focus has turned to fleet management systems to achieve the efficiencies. The key objectives here are:

1. Ensuring that the correct service schedules are maintained
2. Ensuring that fleet drivers are operating the vehicles in the optimum way to deliver a more efficient fleet performance


As a result of the above, the key recommendations of this report will focus on fuel use within the company fleet. TSG has already commissioned a report from the Energy Savings Trust and has been seeking solutions. The management shows a high level of awareness and responsiveness to environmental agendas, acting wherever they reasonably can to mitigate energy use. To this end they have trailed numerous electric vehicles but unfortunately the technology was not quite there yet.


The key issues were the remote nature of the fleet, leading to difficulties in installing local charging points. Often the drivers were living in rented high rise flats, meaning electric supplies could not be installed. In addition, the vehicles lacked the driving range required, and charging times were too long. There was consideration given to hybrid vehicles, however following consultation with the Energy Savings Trust consultant, it was agreed that these were also unsuitable at this point in time. The vehicles would spend a disproportionate amount of time on fossil fuel and therefore be carrying a heavy battery that is not being used. This would only lead to higher fuel use than required.


It is also worth pointing out that the vehicles and divers cover a substantial area of the South East of England to service their customers. The demand can come anywhere from Southampton in the South to Cambridgeshire in the North, with substantial demand within the London area itself. Vehicles are covering substantial distances. This can be seen from the fuel purchases for a fleet of 140 vehicles in the qualifying period of 2019 as can be seen in appendix 5.


Currently there is a trial in place with Lightfoot.co.uk. They claim that their vehicle target and monitoring systems help deliver the following improvements with its positive feedback and reward system for drivers. The Lightfoot systems trial has only been in operation for a short time, therefore it is difficult to provide any meaningful statistics. On contacting Lightfoot they have supplied a rough indication of fuel savings from another company who run 130 vehicles. This company's avenger mileage was 853 miles per vehicle per week and over the 3 year period saved in excess of £151,000. We would suggest that results need to be seen with actual performance of the TSG trial for proper evaluation. Please see appendices 8 and 9 for more details of the systems offered.

In addition there is the opportunity to upgrade the CMS system already installed in the fleet. This is capable of supplying similar benefits to the Lightfoot system. An additional benefit is that the CMS system is already owned by TSG, so once upgraded it only costs the monthly rental for the added benefits.

 **Fuel saving**
Up to +15% MPG uplift

 **CO₂ and NO_x reduction**
Proven reductions up to 15%

 **Accident reduction**
40% reduction in accidents

 **Downtime**
45% reduction in wear and tear

Benefits of the CMS and Lightfoot system's

- This is an inclusive system which appears to be easy and intuitive to operate
- It is designed to get participation through rewarding improved performance
- The system is a sensible addition to the targeting and monitoring approach
- If TSG achieved just 10% of the reduction in fuel use alone, this would have delivered the following in 2019: (modeling has been based on lower figures to ensure the benefits achieve a positive Discounted Cash Flow.)
 - 342267.2 kWh in a year based on 2019
 - 33992.812 litres of fuel
 - £ 37,849.75 saving in real terms on 2019 average fuel cost.

Notes:

EST report (appendix 7) demonstrated that the fleet was 15.3% better than the UK average and identified 5 vans not complying with the ULEZ. All vans operating within the ULEZ are now fully compliant today. There are a further 5 vehicles that do not meet this target but will be replaced with compliant models when replacement is due. These vehicles do not operate in the ULEZ area.

Our calculations are based on actual fleet fuel consumption (listed as the most accurate way in the EST report)

Fuel Conversion Factors

(Source: 2012 Guidelines to Defra/DECC's GHG Conversion Factors for Company Reporting, and Digest of UK Energy Statistics 2011 (DUKES))

Fuel	Gross Calorific Value			Carbon Emission Factors
	GJ per Tonne	Litres per Tonne	KWh per Tonne	Kg per kWh
Coal (industrial)	27.0		7500	0.0794
Coke	29.8		8278	0.1170
Electricity				0.0546
Petroleum Products	GJ per Tonne	Litres per Tonne	KWh per Litre	
Liquefied Petroleum Gas (LPG)	49.2	1914	7.1	0.0585
Ethane	50.7	2730	5.2	0.0545
Aviation turbine fuel (jet kerosene)	46.2	1247	10.3	0.0676
Motor Spirit (petrol)	47.1	1360	9.6	0.0643
Gas/Diesel oil (including DERV)	45.3	1156	10.9	0.0758
Fuel Oil	43.3	1015	11.9	0.0732
Naphtha	47.8			0.0646
Petroleum Coke	35.8			0.0908

kWh and CO2 conversions of fuel from UK.Gov sources

Burning a litre of diesel produces around 2.62 kgs of carbon dioxide, whereas petrol has a lower carbon content and produces about 2.39 kgs. Older engines might lose a few percent due to unburnt fuel, but otherwise technology can have little effect on this chemistry.

Following conversations with TSG there are trials of fleet management software that will support the business in fleet operation efficiency. In particular the involvement of the drivers in how they perform in their vehicles. We have assessed the additional costs of these systems for the fleet average costs and consumptions of fuel based on the compliance year of 2019. With the information available we have calculated three levels of improved fuel consumption. These are assumptions based on the suppliers reported fuel savings in selected case studies. We have not attempted to assess the cost benefits of reduced maintenance, insurance and well being of the drivers in this analysis. These are claimed by the suppliers and would definitely have additional financial and environmental benefits.

Attached in the appendices 8, 8a, 9 and 9a are documents supplied by two companies demonstrating fuel saving features and benefits of vehicle and driver monitoring systems. These systems are widely used in the road haulage and fleet management sector and are increasingly gaining in sophistication.

Both these systems are similar to full telematic systems but also feature in vehicle real time feedback to the driver. The obvious benefit here is that it is in a live environment training feature that helps modify driving style. It is reguly being claimed that there are fuel savings form these systems of 15% across the advertised media. As a result we have calculated the following results for TSG. These are based on the following information supplied and presented in three levels of achieved fuel savings over the time. We have also limited the savings to a maximum of 10%. This is in relation to the case studies supplied and the best match we could find with the suppliers of actual performance reported.

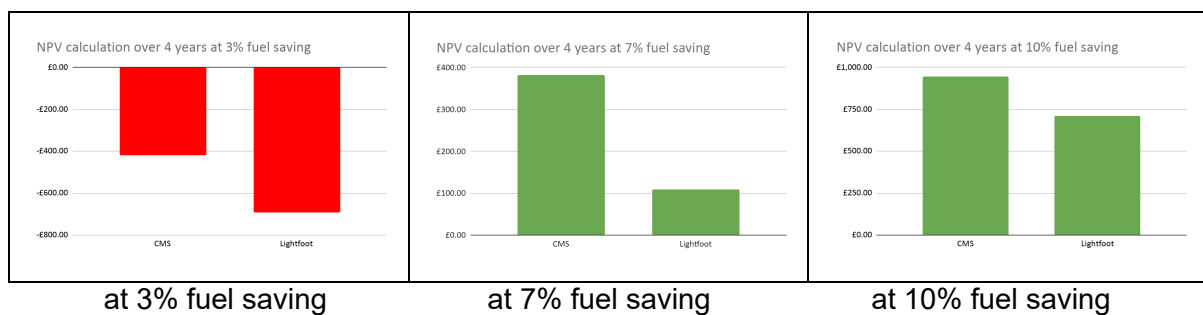
	Number of vehicles (current)	One off Install cost	Annual monthly cost
CMS	140	£110.73 per vehicle	£120
lightfoot	140	£260 per vehicle	£ 96

The above have been calculated as per vehicle bases for the following calculation. The benefit of this is that these results should be scalable for the number of actual vehicles they are fitted to. All data utilized in the calculations are based on the results from 2019 actual fuel consumption and cost to achieve average fuel per vehicle.

We have applied a discount rate of 18% to the Discounted Cash Flow (DCF) in order to test if this investment is likely to achieve a return on investment that matches the

reported ROC in the 2019 accounts of TSG. We are pleased to see that in two of the samples modeled this is the case, however the model is sensitive to the actual fuel savings achieved. These systems are worth further consideration by the management team.

It is important to note that the calculations in this report are based on the best figures available from the fleet manager at the time of writing this report. The costs for the Lightfoot trial are not fixed yet. These will be negotiated following the current trial as will the CMS additions. As a result the comparative information is presented as a guide in this report. Vehicle numbers, forecast fuel savings along with installation and annual operating costs will need firm figures when they are available to contribute to any management or investment decisions at the appropriate time.



The key point to note in relation to these results is that if there is a positive number, a green colour, they are exceeding the DCF test and if negative, a red colour, they have not. This means that the two of the results have met the test of achieving above 18% return on the cash flow generated. As a result they are worth further investigation for managing TSG's fleet management and should deliver above average results in relation to other projects within the business.

Any decision should be adjusted for current in year costs and volumes. In addition the benefits associated with each supplier should be closely monitored to ensure that the system is performing to specification.

Conclusions

TSG is a well respected contractor for a substantial number of government and local authorities as well as many housing associations in the south east of England. As a result, they are naturally encouraged to comply with a number of sustainability requirements in order to tender for contracts. This means that they are actively looking for ways to increase their sustainability and therefore competitiveness. This includes environmental and management performance criteria. In fact, immediately following this report process is their annual ISO audit.

The most obvious route to making energy savings is through the fuel used in delivering their services to clients. While consideration has been given to the fleet through the acquisition of fuel efficient vehicles, there is an ongoing focus on the monitoring of the fleets. This has three key objectives:

1. Ensuring that the correct service schedules are maintained
2. Ensuring that fleet drivers are operating the vehicles to the optimum
3. To deliver a more efficient fleet performance

In relation to this TSG are currently testing the CMA and lightfoot vehicle tracking systems(appendix's 8, 8a, 9 and 9a). This is a simplified version of a full telematic system but with the added benefit of involving the operators in the system. The system offers an in vehicle feedback using a traffic light system for the operator's performance. In addition, it also feeds the data back to the center where further analysis can be made of both the individual driver performance, as well as vehicle and the engine management system.

As a result, vehicle performance can be managed and encouraged as well as optimal maintenance and prevention of breakdowns. All in all, this should deliver not only improved fuel savings, but lower maintenance costs and better well-being of the drivers.

It is our recommendation that this trial, if successful, should be implemented across the whole fleet.

Appendices

Appendix 1 TSG Building Services plc accreditations

Appendix 2 TSG Building Services plc Accounts 2019

Appendix 3 Display Energy Certificate

Appendix 4 Level 5 EPC

Appendix 5 TSG Building Services Shell fuel Data

Appendix 6 MCS certificate for Photovoltaics

Appendix 7 EST Air Quality (Clean Air Zone) Report

Appendix 8 Lightfoot Brochure

Appendix 8a Lightfoot-QHS-Case-Study (11.3% fuel savings)

Appendix 9 CMS SupaTrak - Driver Behaviour Overview

Appendix 9a Huntingdonshire Case Study (3% fuel savings)