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# **GENERATING BUSINESS DATA AND ANALYSIS (BMSP4004)**

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## **DATA ANALYSIS AND REPORT**



MAY 4, 2018  
**OLUWAYEMISI SOBOLA**  
1601824

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### **Executive summary for Part 1: Prosumer**

This report will be analysing a variety of data using different concepts and principles of modelling and analysing data. Firstly, it will be discussing how the data was sourced/collected, stored, collated, analysed and then finally how they were presented using spreadsheets.

### **Executive summary for Part 2**

Four sets of files will be analysed to retrieve information that can be used in future decisions about the respective businesses. Spreadsheet modelling is a very good tool to utilise for this exercise.

## Part 1 Introduction: Prosumer

This paper will seek to explore the prosumer activities in different businesses, it will seek to understand who uses it and the participant. The paper will want to determine if it has benefits to the participants. The paper will seek find out whether prosumer applies to University as well.

The term prosumer is really new to me, but unknowingly, I have been participating in for a long time. As Mullins & Dettmer (2018) define prosumer as ‘consumers who share their knowledge with enterprises with the aim of creating values and benefits for enterprises and their own consumption’.

Prosumption is described by Tapscott & Williams (2006a) as “...where customers participate in the creation of products in an active and ongoing way”. Prosumption puts consumers to work, or it can also be likened to – do-it-yourself - by turning them into prosumers (Ritzer & Jurgenson, 2015, p.18-19). As it is the process through which prosumers share knowledge with businesses to produce valuable goods and services for themselves and businesses. They do share knowledge voluntarily and sometimes they do not expect any tangible benefits. They can still share knowledge under the in expectation of receiving benefits in return, and all these knowledge sharing is enabled by information and communication technologies (ICT) (Mullins & Dettmer, 2018). Figure 1 shows the model of business processes with prosumers’ participation.

Figure 1: The Model of Business Processes

| The model of business processes              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Business process                             | Possibilities of prosumers' participation                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2.0 Develop and Manage Products and Services | <ul style="list-style-type: none"> <li>• products' designing (colors, shape or design of product);</li> <li>• materials requirement (with what kind of materials the product should be done);</li> <li>• graphic elements (e.g. logo or package);</li> <li>• improving functionality of product;</li> <li>• improving reliability and durability of product;</li> <li>• improving ease of product use;</li> <li>• improving efficiency of product;</li> <li>• improving ICT made available to consumers</li> </ul> |
| 3.0 Market and Sell Products and Services    | <ul style="list-style-type: none"> <li>• creating advertising spots or taking part in marketing campaigns;</li> <li>• influencing products' prices;</li> <li>• influencing promotions, discounts or loan programs;</li> <li>• influencing product availability and new distribution channels</li> </ul>                                                                                                                                                                                                            |
| 4.0 Deliver Products and Services            | <ul style="list-style-type: none"> <li>• improving ordering process</li> <li>• establishing new ways of ordering products and their delivery</li> </ul>                                                                                                                                                                                                                                                                                                                                                            |
| 5.0 Manage Customer Service                  | <ul style="list-style-type: none"> <li>• improving quality and lead time of customer service</li> <li>• improving handling complaints and warranty services</li> <li>• defining success factors of effective and professional customer service</li> </ul>                                                                                                                                                                                                                                                          |

Mullins &amp; Dettmer, 2018.

One can experience prosumers' participation from when 'pumping one's own gasoline at the filling station to participation on Facebook activities and other social networking websites, where users create profiles composed of videos, photos, and text, interact with one another, and build communities' (Boyd, 2006, 2008a, 2008b; Appendix-1).

Furthermore, prosumer is a system where creativity meets consumption, it allows co-creation of product ideas and improvements, essentially, it is peer collaboration such as in 1998 when Lego Mindstorms allowed 'Lego customers and users to engage in program modification and software improvement activities', where prosumer community enhances innovation (Lego Mindstorms, 2017a; Figure 2; Ritzer & Jurgenson, 2015).

Figure 2: Lego Mindstorms



Lego Mindstorms, 2017b.

In the creative Prosumption, there are many challenges that businesses must navigate and manage carefully. Prosumers is company led, companies have to create a platform for consumers to co-create. The prosumers must be up-to-date on product development. Furthermore, for Prosumption to work, they must be offered reward. Again, prosumers are treated as co-creators therefore there is loss of control over innovation processes (e.g. Hacking), and products potential can be jeopardized because everything depends on what customers do with it (Tapscott & Williams, 2006b).

Nonetheless, businesses benefit from Prosumption, as it provides highly valuable information. Companies such as Google, Facebook and Amazon.com are provided with highly valuable information by the internet (Anderson, 2009). More so, businesses get free labour

from prosumers because some are not actually paying prosumers for the information provided (Appendix-1). Digital businesses do not need to hire traditional market researchers to collect and compile all of these data (Gritzer, 2012).

In addition, consumers benefit from Prosumption by participating in the creation of a better product that satisfies them, better service and better information is at their figure tip, and in a way, prosumer activity be can be regarded as altruistic because the product they help create, firstly, is to satisfy them and secondly to benefit other consumers.

In relation to the task of gathering information on companies that engaged in prosumers. This was a time consuming and difficult task. The obvious companies are the tech and game companies and finding all the required information was challenging but greatly satisfying. Furthermore, Universities like UWTSD and University of Glasgow (2013-2020) are using digital platforms such as Moodle as some forms of Prosumption, especially in reference to the personal learning environment.

In conclusion, prosumer activities can be filled with complications as alluded to above, nonetheless, it generates benefits for both the businesses and consumers. Businesses must always remember that consumers have become co-creators, and equally must be treated the same. They need feedback and up-to-date information on the product or services development. This gives them satisfaction and a continuous willingness to collaborate. For the business, they are able to create a product with a ready-made market, they did not have to pay for market research, and in many cases, the consumers become the promoters for the product and customers generally trust other customers.

## Part 2 Introduction

This paper will critically evaluate four files supplied that included File-1-Prosumer, File-2-Household Appliances, File-3-Swansea Business School and File-4-The Lampeter Farm. Several data tools for analysing and data modelling techniques will be utilised.

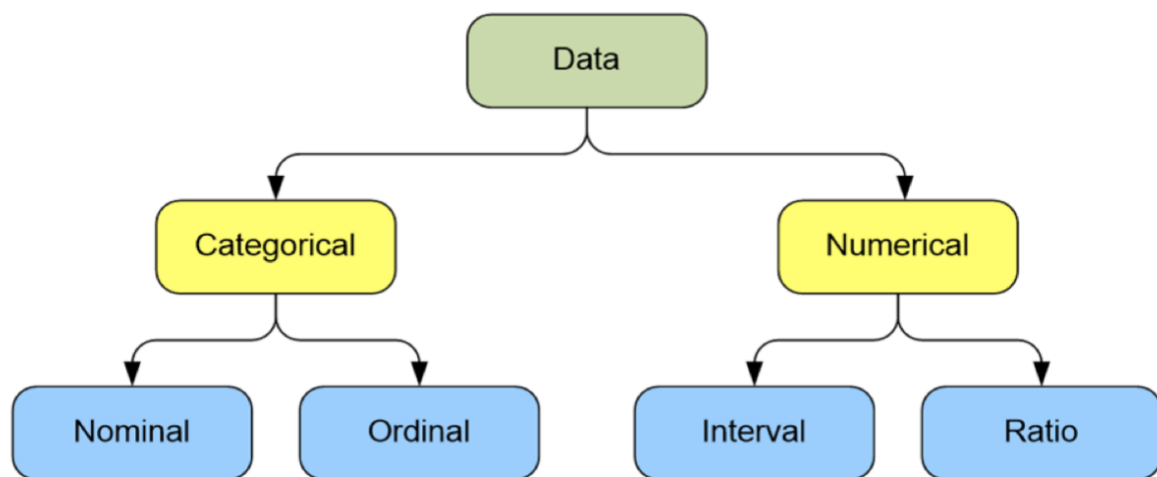
Evans (2014) argued that Business Analytics is the ‘use of data, information technology, statistical analysis, quantitative methods, and mathematical or computer-based models to help managers gain improved insight about their business operations and make better, fact-based decisions’. Therefore, in order to analyse the data provided, excel spreadsheet will be used. Excel is a spreadsheet application developed by Microsoft. Excel and makes it easy to visualise complex data and allows the ease of performing mathematical computations on segments of data easy as well. However, one of the shortcomings of excel is that it is a commercial software, its performance impacts on large datasets and cannot reproduce all types of graphs (Evans, 2014).

Edwards & Finley (1997) argued that when Excel spreadsheet is used as a modelling tool, it enables the summarisation of information from many sources in one place. It can present information in a format to help the decision-maker see the big picture of a given data. Furthermore, spreadsheet presents a specific view that is precise and well-structured. Edwards & Finley (1997) proposed further, that different types of data (figure 3) can be analysed in three different models:

- Logic Model
- Data Model
- Presentation Model

Evans (2014) described descriptive analytics as ‘using data to understand the past and current business performance in making informed decisions’. Evans (2014) further described predictive analytics as ‘predicting the future by examining historical data, and detecting patterns or relationships in these data, and then extrapolating these relationships forward in time’. Furthermore, Evans (2014) described prescriptive analytics as ‘identifying the best alternatives to minimizing or maximizing some objective’.

Figure 3: Types of spreadsheet Data.



(Sharda, Delen & Turban, 2014)

Furthermore, there are several data tools for analysing according to Evans (2014):

- List (database) queries and analysis
  - Dashboards to report key performance measures
  - Data visualization
  - Statistical methods
  - Spreadsheets and predictive models

- Scenario and “what-if” analyses
  - Simulation
  - Forecasting
  - Data and text mining
  - Optimization
- Social media, web, and text analytics

### **Benefits of Data Analysing**

Authors such as Ragsdale (2001) and Evans (2014) agreed that data analysing helps organisations to reduce costs, manage risk better, make more informed and faster decisions, improve productivity and higher profitability and customer satisfaction. Nonetheless, Data Analysing faces few challenges such as lack of understanding of how to use analytics, competing business priorities, among others.

In analysing the giving task, firstly, data must be the cleansed, as cleansing will generate accurate data analysis, as this will allow the data to be accurate, countable, standardised; that is, consistent in format; Irrelevant or inappropriate data are eliminated and Non-redundant (see Appendix-2 for the rest; O'Beirne, 2008). Data cleansing is as important as issues like redundant data are removed. Furthermore, many authors including Ragsdale (2001) and Evans (2012) recommended modelling stages for staging the analytic process.

#### **Model for Staging the Analytics Process**

- Recognizing a problem
- Defining the problem
- Structuring the problem
- Analysing the problem
- Interpreting results and making a decision
- Implementing the solution

## Recognising the Problem

### **File 1: Prosumer**

The focus here is determining companies' sustainability statements by checking their websites.

### **File 2: Household Appliances**

After looking through the household appliance data, the resource consumption of these appliances is given top consideration.

### **File 3: Swansea BS**

The data presented reveals different usage at different time of the day for the time period.

### **File 4: Farm Outside Lampeter Weather**

The recognisable pattern here is to determine the best weather forecast for the farm.

## Defining the Problem

### **File 1: Prosumer**

In defining the problem, the focus is on Sustainability. After examining the companies' websites, attempts will be made to determine the evidence and analysis of common stated words and expressions used will be determined.

### **File 2: Household Appliances**

The focus is on usage Rating, total carbon emission (kg CO<sub>2</sub>) per year, percentage of Kg CO<sub>2</sub> usage per Appliance/year, CO<sub>2</sub> Rating.

### **File 3: Swansea BS**

The focus is to project when the peak and lowest energy kilowatt-hour (kWh) consumption periods are. What effect season or time has on consumption.

### **File 4: Farm Outside Lampeter Weather**

From the supplied data, an attempt will be made to determine the best time for growing grass, the best dry days, the snowing days, the most raining days and compare 2010 and 2018 data to determine the consistencies in the data.

## Structuring the Problem

This stage involves cleaning the data to make a better sense of the data in all the files. Incomplete and missing data are removed or else the accuracy of the model may be affected. The first task conducted was to correct the errors and conduct general cleansing.

### **File 1: Prosumer**

The objective is to determine

- Determine the common sustainable words used
- Sorted by how many businesses says 'Yes' to Evidence of Sustainability focus
- Sorted how many did not have evidence of sustainability

Data is cleansed, by

- Sorting in alphabetical order,
- Cleanings: converted all unfilled rows questions to assume 'No' and Cleanings: Deleted all unfilled questions (Appendix-3a,3d)
- All Duplicate Companies name in red high and red text
- All cell questions with no answer is assumed to be 'No'
- Cleanings: converted all 'Private' answer to the Question 'what type of Business Sector' to Assume 'Technology'
- sorted by how many businesses says yes to Evidence of Sustainability focus

### **File 2: Household Appliances**

The objective is to determine

- A. the top 2 products with worst CO2 usage and rating and find out the relationship between them
- B. relationship between kettle and tumble drier usage and cost
- C. Household health and hygiene appliances therefore:
  - Deleted S9 and S18, converted word 'Yes' to binary (1) and assume that unfilled date meant 'NO' which is converted to (0) (Appendix-3e,3f)
  - By converting this, it will eliminate incorrect analysis and duplicating files

### **File 3: Swansea BS**

The objective is to determine

- 1. Is there a link between seasons when students are on campus and the energy usage? To determine
- 2. Total per day, average per pay, % usage per day, max usage, min usage. Then
  - File number were rounded to 2 decimal places
  - Date converted to text format
  - Files were deleted (Appendix-3g)

### **File 4: Farm Outside Lampeter Weather**

The objective is to determine

- The best time to grow grass
- Best time for outdoor events such as cut and roll hay
- Filtering and sorting were used extensively



using the mathematical model (MM)  $Z4/Z\$18$  (Appendix-4b). Total kg CO<sub>2</sub> per year for Electric Tumble Dryer was 2067, the formula to get the % was  $AE4/AE\$18$  (Appendix-4c) =15%, it was classed level 4 in the CO<sub>2</sub> Rating. The worst. while  $AE10/AE\$18$  is the Electric Hob, producing Total kg CO<sub>2</sub> per year 1548 and classed level 3 in the CO<sub>2</sub> Rating (Appendix-4d). To class the appliances the mathematical model  $VLOOKUP(AF4, RATING\_TABLE, 2)$  was used (Appendix-4c).

The second objective was to determine the relationship between kettle and tumble drier usage and cost, Pivot table was used Tab Electric Dryer & Kettle (Appendix-4e). Sum of Total kg CO<sub>2</sub> per year and Sum of Total Cost per year was used to compare the two appliances (Appendix-4f-4g).

The third objective was Household health and hygiene appliances Tab-Household-Appliances CO<sub>2</sub> PivotChart (Appendix-4h) was used.

### **File 3: Swansea BS**

The objective is to determine if there is a link between seasons when students are on campus and the usage? (Appendix-5a,5h-5i) To determine

- Total per day is  $=SUM(B7:AW7)$
- Average per day  $=AVERAGE(B5:AW5)$
- % per day  $=AX5/AX\$912$
- Maximum usage per day  $=MAX(B5:AW5)$
- Minimum usage per day  $=MIN(B5:AW5)$
- Total usage for specific hour maths model  $= SUM(AX5:AX910)$
- Average usage for a specific hour  $=AVERAGE(AW5:AW910)$

- Maximum usage was colour coded orange for each year
- Minimum usage was colour coded green for each year

#### **File 4: Farm Outside Lampeter Weather**

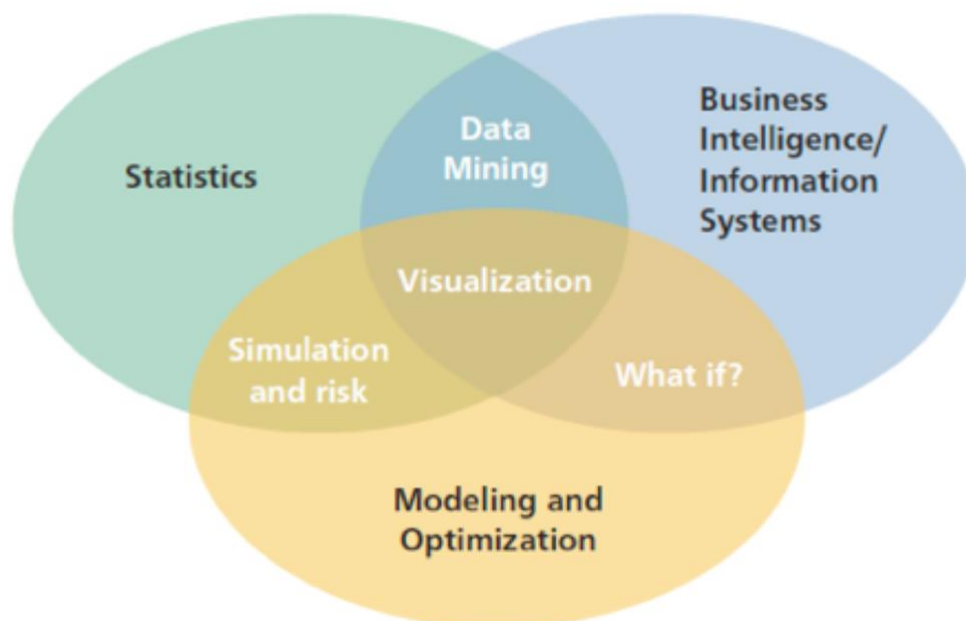
- Sorting revealed that the highest rain fall was 40 for 2018 (Appendix-6a), 198 was the total January rainfall (Appendix-6b). The maths model =AVERAGE(B8:B38), SUM(E8:E38) etc (Appendix-6c). For average January temperature was 4.41, 7.18, 1.71, 6.39 and 2.47 for Temp, High, Low, Rain and Average Wind for January
- the Maximum and Minimum levels for 'mean temp', 'high','low', and rainfall for January 2010 and January 2018, using inserted comment and colour coding to identify the in the excel file.
- Filter was used to extract the number of air night frosts record in January 2010 and January 2018, after Air Frost mathematical model IF(D8<=0,"Air Frost Night","No Air Frost Night") was used to sort the Air frost Night.
- Filter was used to extract the number of grass growing days record in January 2010 and January 2018, for the best time for growing grass, after Model was used IF(C10>=6,"Grass Growing","Not Growing"). Model =COUNTIF(H9:H34,"WNW") was used to determine the region with the most days for planting and model =IF(AND(K34="rain",J34="Grass Growing"),"priority location","") was used to determine the most suitable region to plant.
- Filter was used to extract the precipitation days for snow, dry and rain record in January 2010 and January 2018, after the precipitation model IF(D8<1,IF(E8>0,"Snow","Dry"),"Rain") was used. The most raining days and compare 2010 and 2018 data to determine the consistencies in the data.

## Interpreting Results and Making A Decision

### Visualisation:

Visualising the data using Graph, it has always been a best practice to Graphing data as it is always a common way to detect outliers, and data mining tools enables a good way to find patterns and breaks in patterns (O'Beirne, 2008; figure 5). It is not possible for all the Models on the Dashboard below to completely capture every possible analysis of various data supplied. Nonetheless, many summary models will still be analysed by graphs, tables, and placed in the Dashboard.

Figure 5: A Visual Perspective of Business Analytics



Adapted from Evans, J. R. 2014.

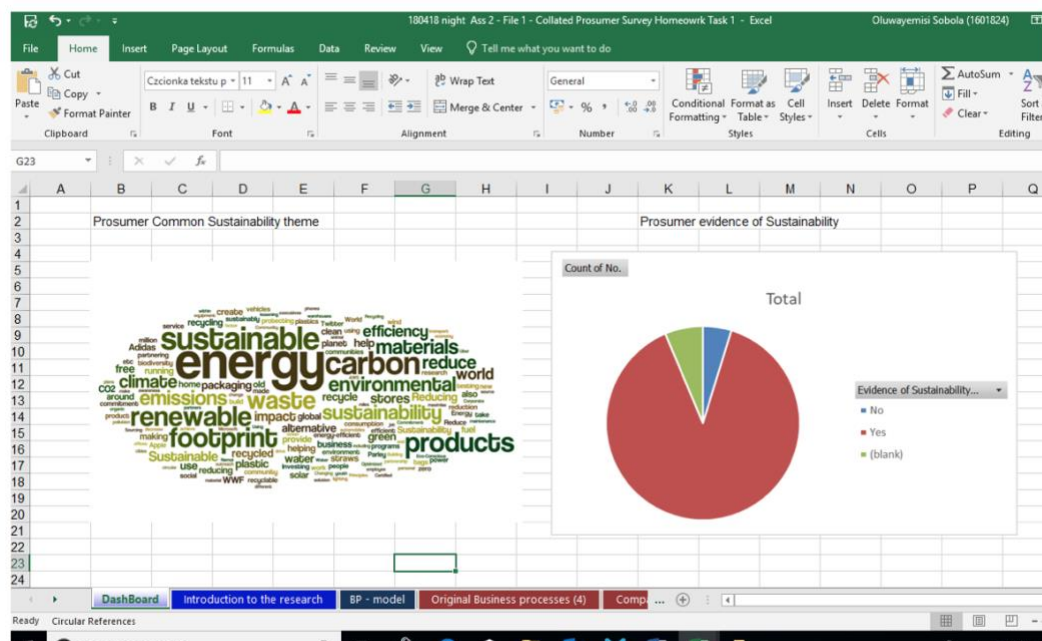
### **File 1: Prosumer**

The wordie.net was used for text mining the evidence of sustainability (Figure-6a). Some common themes emerged such as sustainable, energy, carbon renewable etc. These themes

proved that many businesses want stakeholders to see them as sustainable and are engaged in sustainable practices.

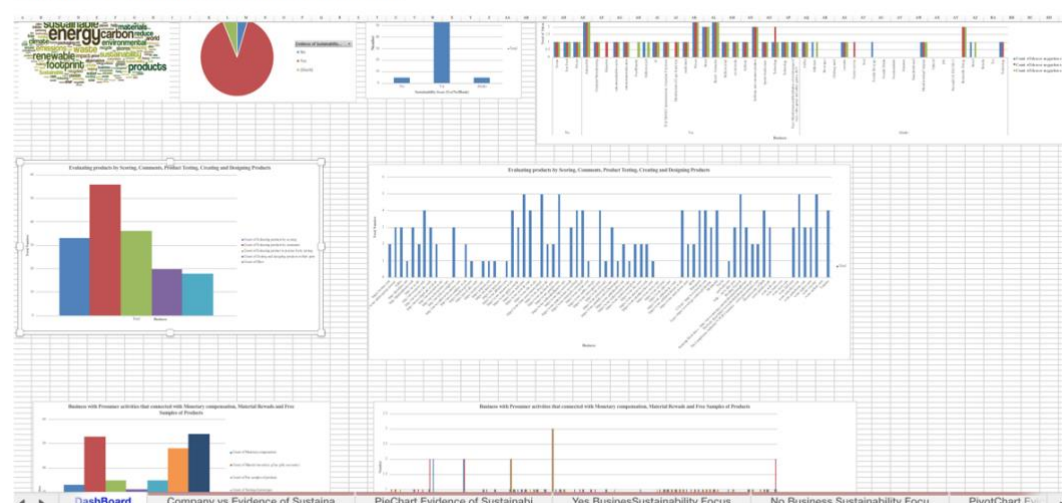
Furthermore, Pie Chart was used to visualise the evidence of Sustainability (Figure-6a), 56 businesses have evidence of sustainability and seven businesses do not show evidence of Sustainability

**Figure 6a: Prosumer Dashboard**



Sobola, 2018

**Figure 6a: Prosumer Dashboard**



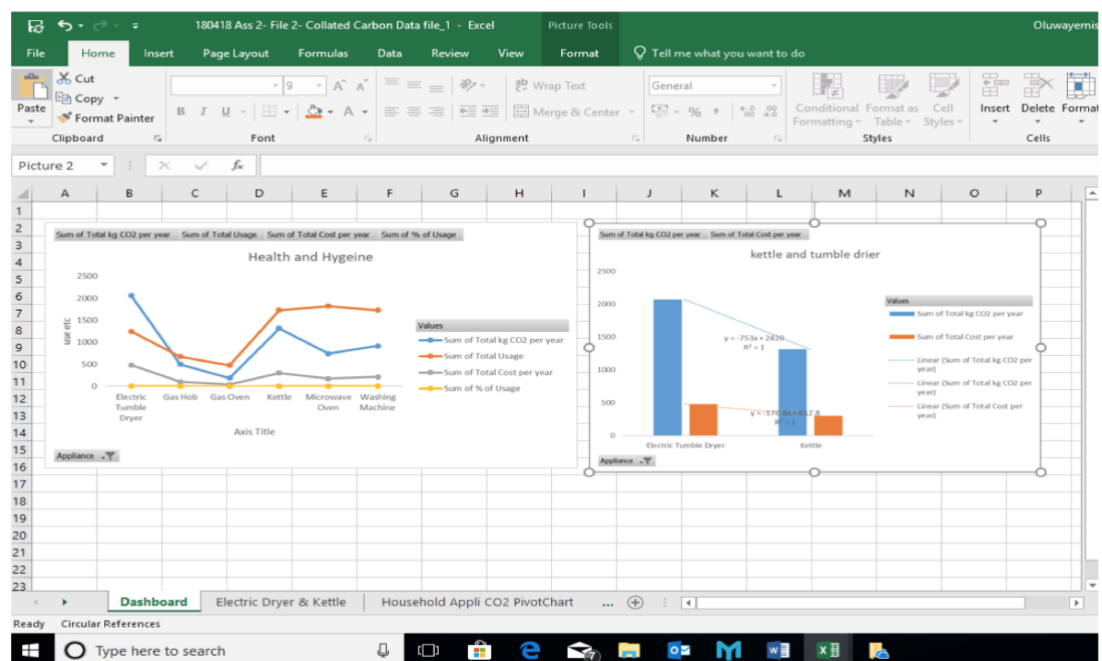
Sobola 2018

## **File 2: Household Appliances**

Figure 7a-7b, beneath revealed a perfect relationship between kettle and tumble drier usage, the total CO2 and total cost per year shows  $R^2 = 1$  respectively. They are both costly appliances in terms of maintenance, the usage of kettle and tumble drier is very high understandably. The CO2, cost and Usage is linear, that is the more you use the more it costs you financially and the less you use the less it cost, and the CO2 discharged is correspondingly high.

Nonetheless, CO2 is bad for the environment. Again, when Household health and hygiene appliances (tumble dryer, gas hob, gas oven, kettle, microwave and washing mashing) were analysed (Appendix-4f-4h), although the % of usage was relative, the CO2 generated by tumble dryers was outliers, its use should be discouraged. Furthermore, microwave is used more than gas oven (Appendix-4e-4h). Therefore, this has implications for manufactures and food producers. Appliances were rated, the tumble drier was rated the worst generator of CO2 (Appendix-4a), it was rated class 4.

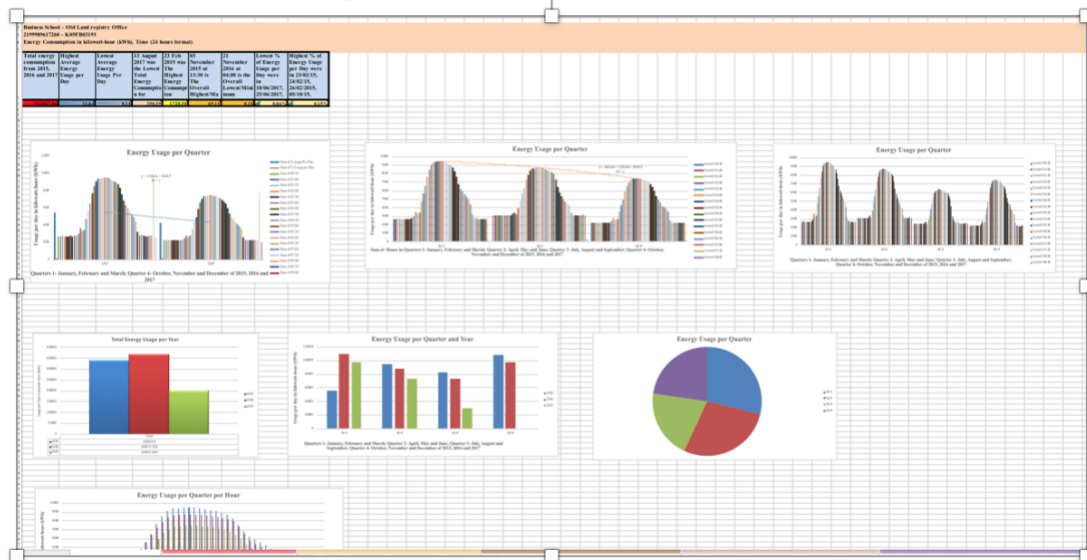
**Figure 7a: Kettle and Tumble Drier**



[illegible]

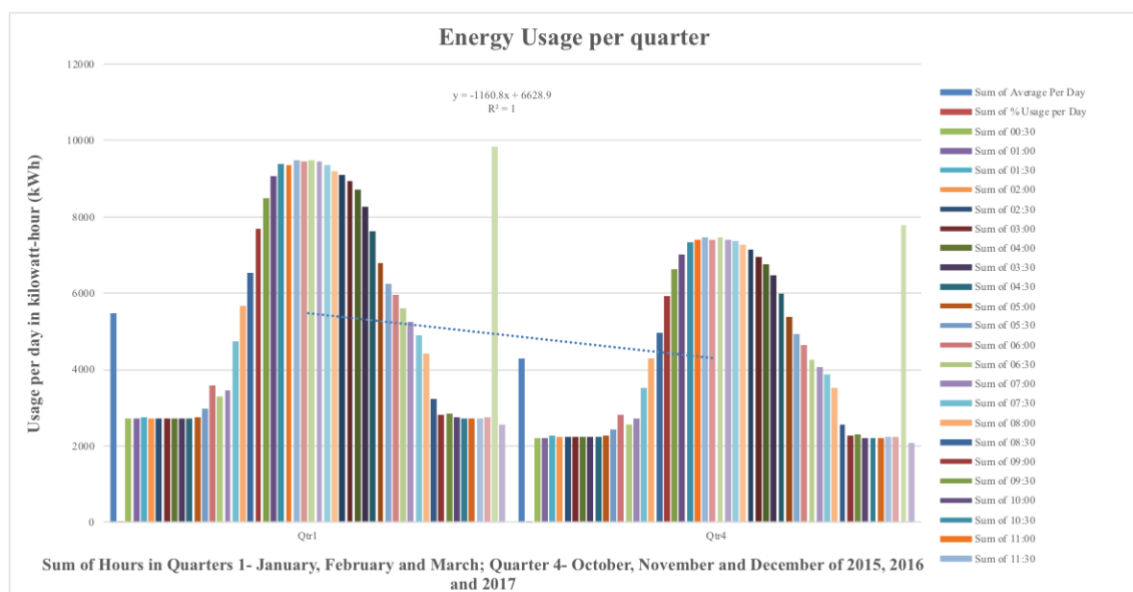
### **File 3: Swansea BS**

The date 29th April 2015 Between 21:30-06:00 on 30/04/2015 was an extremely high consumption date (Appendix-5e). This might be due to assignment submission being due or the start of examination. It was evident that the minimum energy consumption was between 9th -13th August (Appendix-5f), because University session was on holiday.

**Figure 8 Swansea CS Dashboard File 3**

Sobola, 2018.

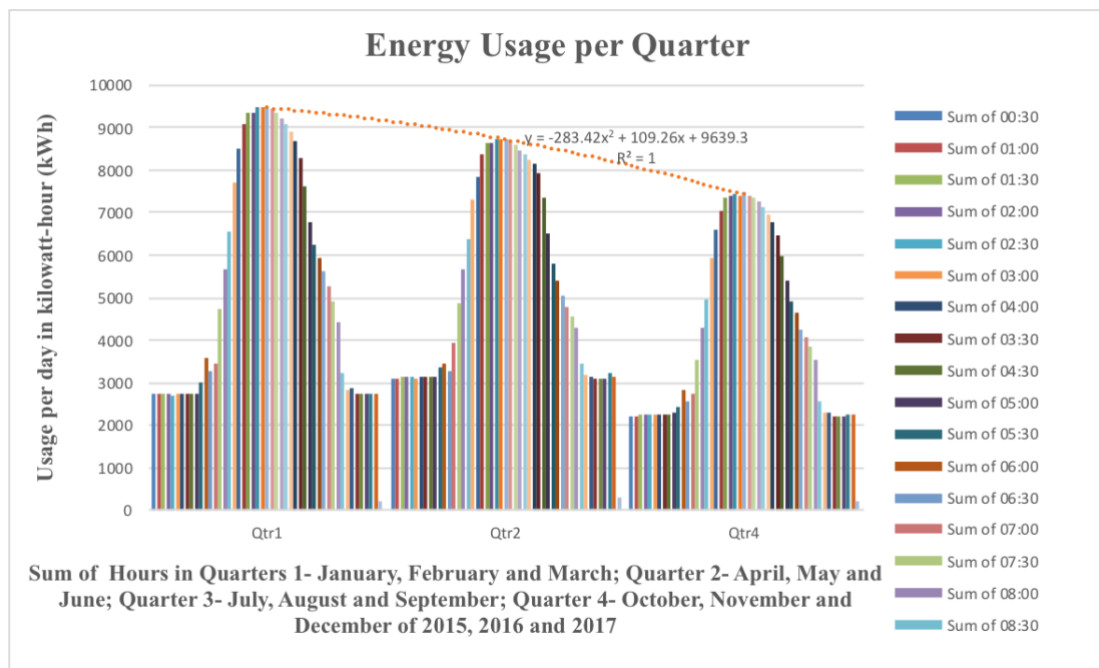
There was a perfect connection in energy consumption between both 1<sup>st</sup> quarter-January-February-March and 4<sup>th</sup> quarter-October-November-December of 2015-2016-2017, to show evidence of high usage during school times and days, that is  $y = -1160.8x + 6628.9$ ,  $R^2 = 1$  (Figure 9).

**Figure 9: Energy consumption between both 1<sup>st</sup> Quarter and 4<sup>th</sup> Quarter of 2015-2016-2017**

Sobola, 2018.

There is also evidence and a relationship between school time 1<sup>st</sup> Quarter-January-February-March; 2<sup>nd</sup> quarter-April-May-June; 4<sup>th</sup> quarter-October-November-December of 2015-2016-2017 (figure 10).

Figure 10: Energy consumption between both 1<sup>st</sup> Quarter, 2<sup>nd</sup> Quarter and 4<sup>th</sup> Quarter of 2015-2016-2017



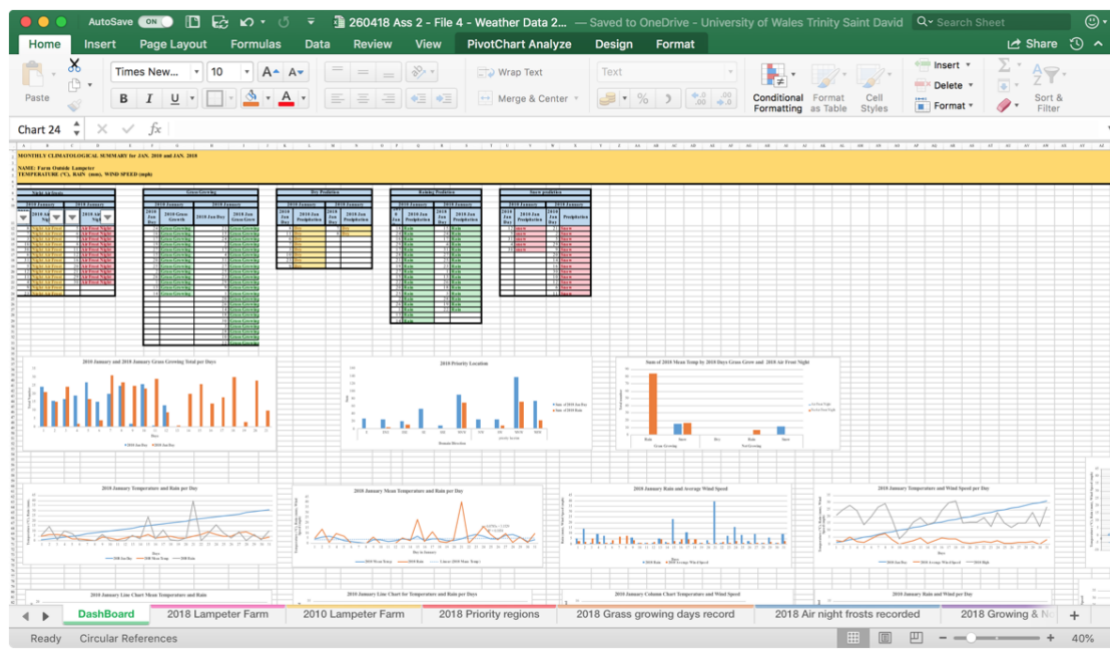
Sobola, 2018.

There is less consumption of energy in 3<sup>rd</sup> Quarter-July-August-September of 2015-2016-2017 which are school holidays (Appendix-5k-5l).

#### **File 4: Farm Outside Lampeter Weather**

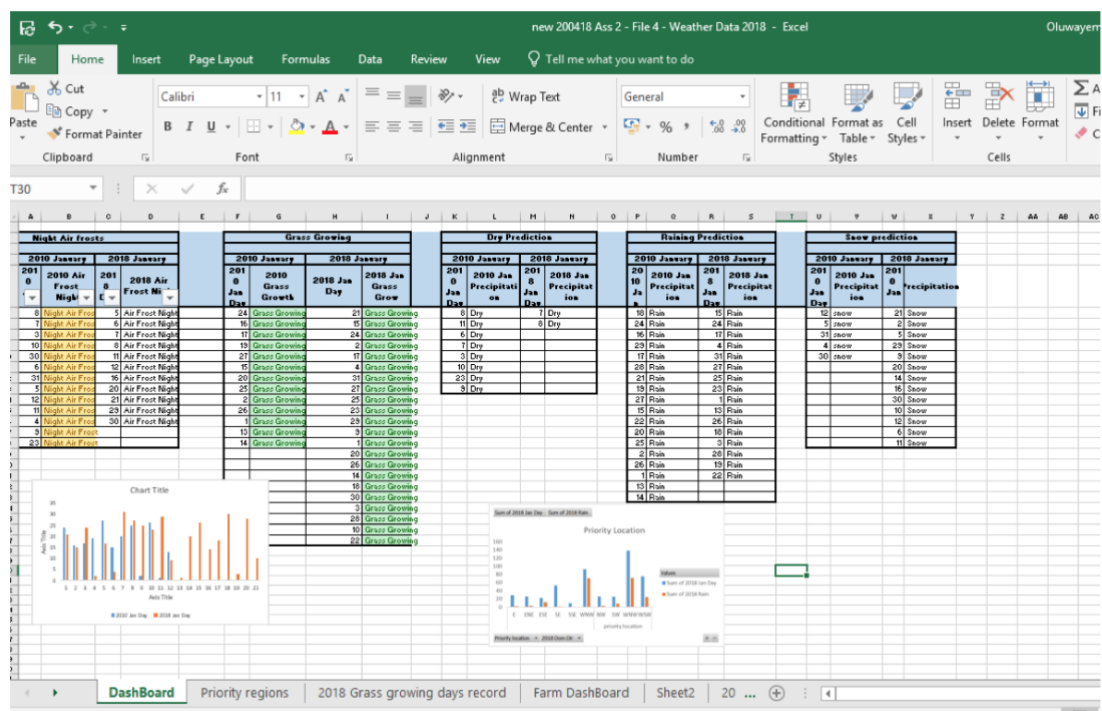
Figure 11a-11b for the Farm revealed that the highest rainfall for 2018 January was 40mm, 198mm was the total January rainfall (Appendix-6a). 2018 January average Mean Temperature, High, Low, Rain and Average Wind Speed was 4.41(°C), 7.18(°C), 1.71(°C), 6.39(mm) and 2.47(mph) (Appendix-6b).

**Figure 11a: Weather Dashboard File 4**



Sobola, 2018.

**Figure 11b: Weather Dashboard File 4**



Sobola, 2018.

Furthermore, the number of air night frosts record in January 2010 and January 2018 were gathered and compared in the dashboard above were similar. However, when the number of grass growing days record in January 2010 and January 2018 were compared, there were 9 more favourable days in January 2018. Similarly, the number of raining days are comparable between the two years. Also, there were more dry days in 2010 compared to 2018.

When the level of snow was compared between 2010 and 2018, there will be more than double the amount of snow fall in 2018 compared to 2010. Again, Countif showed that there will be 13 days of snow in 2018.

In another development, WNW, regions have the highest numbers of days for planting and has the most conditions for planting whereby, there is rain, and grass Growing (Appendix-6c).

## Recommendation

### **File 1: Prosumer**

It is a welcome news that most businesses are committed to sustainable practices. This is in line with Future Well-being Wales Act 2015 (Welsh Government, 2015). Furthermore, businesses need to show more evidence of sustainability activity to encourage participation and collaboration on more prosumer activities. Since, customer knowledge is becoming an important asset for every business and government thereby creating new and innovative products, and services for consumers.

### **File 2: Household Appliances**

CO<sub>2</sub> is bad for the environment, the public need to be made aware of using natural means to dry clothes and the velocity of boiling the kettle needs to be reduced. Instead of drinking lots of tea why not drink more water that is healthy.

Although the percentage (%) of usage was relative, the high cost and CO<sub>2</sub> generated by the tumble dryer was an outlier, its use should be discouraged. Furthermore, electric oven/hub is more costly and used more, with a higher CO<sub>2</sub> than the microwave, which is used more than the gas oven (Appendix-4f,4g,4h). Gas hob/oven should be encouraged to be used more because of its cost efficiency. Therefore, microwave manufactures can be assured of sustained business growth and the producers of readymade meals can be assured of a sustained growth in the demand for their products as less number of people are cooking.

Nonetheless, a new sustainable, innovative tumble drier and kettle are desperately needed in the market in order to reduce the environmental footprint.

**File 3: Swansea BS**

Appendix-5j-5l shows that energy consumption has reduced from 2015 level. From the top 10 energy consumed days, 8 were in 2015, only 2 were in 2016, and none for 2017 in top 10 (Appendix-5g). More so, the highest energy consumed day was 23/02/2015 with 1720.50kWh. This needs to be investigated further to see if there was any special event that led to the high-energy consumption.

The date 29th April 2015 between 21:30-06:00 on 30/04/2015 was an extremely high consumption date (Appendix-5e). This could be due to assignment being due or the start of examination, because this pattern might reoccur. Therefore, it is advised during budgeting that the university makes provision for a similar date close to the exams as potentially a costly period.

Also, there was a perfect connection in energy consumption in both the 1st quarter and 4th quarter and it could be utilised in future budgeting.

**File 4: Farm Outside Lampeter Weather**

Since, the number of air night frosts record in January 2010 and January 2018 were gathered, where similar consequently lessons should be learnt from what happen in 2010 and what failed. However, when the number of grass growing days record in January 2010 and January 2018 were compared, there were 9 more favourable days in January 2018. More planting could be done, and the chances of success are high. Similarly, the number of raining days are comparable between the two years. More planting is possible but outdoor works may be affected by rain.

Also, there were more dry days in 2010 compared to 2018. Consequently, outdoor activities are possible in 2018, but the cutting and rolling of hay could be difficult which may affect hay for feeding the animals during winter. Therefore, arrangements may have to be made to get hay from other sources.

There was more than twice the level of snow in 2018 compared to 2010. This will impact greatly on the farm. Animals will spend less time outside, less work can be done outdoors, heating cost may increase, staff may not be able to get to work therefore, contingencies would have to be put in place for animal welfare.

In another development, 'WNW' regions have the highest numbers of days for planting and has the most conditions for planting whereby, there is rain, and grass growing. Furthermore, the WNW is a priority zone to plant, due to perfect planting conditions.

## Conclusion

### **File 1: Prosumer**

All businesses are committed to sustainable practices, and the Future Well-being Wales Act 2015 must be upheld. The companies must continue to engage in sustainable practices.

### **File 2: Household Appliances**

CO<sub>2</sub> is bad for the environment, everyone need to be aware of this, and so could start utilising natural means to dry clothes instead of a tumble drier and the velocity of boiling the kettle needs to be reduced. Also, manufacturers need to find innovative and sustainable products to use for appliances production.

### **File 3: Swansea BS**

The energy consumption is reducing, still the reason behind high consumption during the exam could be investigated and seek a better sustainable method. During the winter period, there was perfect relationship between energy consumption in both the 1st quarter and 4th quarter and this could be utilised in future budgeting.

### **File 4: Farm Outside Lampeter Weather**

The Lampeter farm is advised to engage in more planting especially in the WNW area. The regions have the highest numbers of days for planting and has the most conditions for

planting. They should also be aware that rain may affect outdoor works. The cutting and rolling of hay will be difficult which may affect the quantity of hay for feeding the animals during winter. Therefore, arrangements may have to be made to get hay from other sources. Plans have to be made as animals will spend less time outside, therefore heating cost may increase. Contingencies will need to be made, as staff may not be able to get to work during snow season.

## Reference

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## Appendices

### Appendix-1

- working at the checkout counter at the supermarket by scanning one's own food, bagging it, and paying for it by credit card;
- using electronic kiosks to check into a hotel and at the airport, to purchase movie tickets, etc.;
- co-creating a variety of experiences such as moving oneself through Disney World and its many attractions or serving as an 'actor' in the theatre 'staged' by Starbucks designed to create the image of an old-fashioned coffee house (Ritzer, 2008[1993]);
- using do-it-yourself medical technologies (e.g. blood pressure monitors, blood glucose monitors, pregnancy tests) that allow patients to perform, without recompense, tasks formerly performed by paid medical professionals;
- being a caller on a call-in radio show;
- being part of Reality TV (Andrejevic, 2003);
- Wikipedia, where users generate articles and continually edit, update, and comment on them (Konieczny, 2009).
- Second Life, where users create the characters, communities, and the entire virtual environment (Herman et al, 2006).
- The blogosphere, blogs (Web logs), microblogging (Twitter) and the comments on them produced by those who consume them.
- eBay and craigslist, where consumers (along with retailers) create the market. (In recent years, eBay has moved away from user-generated auctions and toward those more dominated by traditional retailers and producers)
- YouTube and Flickr, where mostly amateurs upload and download videos and photographs.
- Current TV, where viewers create much of the programming, submit it via the internet, and decide which submissions are aired.
- Linux, a free, collaboratively-built, open-source operating system, and other open-source software applications, such as Mozilla Firefox, that are created and maintained by those who use them (Lessig, 2006; Stewart, 2005).
- Amazon.com, where consumers do all the work involved in ordering products and write the reviews. Also, the users' buying habits and site navigation are documented to recommend products.
- Yelp!, where users create an online city guide by ranking, reviewing and discussing various locations and activities in their area.
- The GeoWeb, which consists of online maps where, increasingly, users are creating and augmenting content with Google, Microsoft, and Yahoo tools (Helft, 2007). Google Maps users, for example, can fix errors; add the locations of businesses; upload photos; link Wikipedia articles to, and blog

about their experiences with, or reviews of, places on the map, thereby creating social communities.

- Additionally, new 'location awareness' tools, often used in conjunction with 'smart' cell phones with GPS technology, allow users to track where they are at any given moment and upload this information to websites such as Facebook, Twitter or one's blog. Some examples include Google Latitude, Yahoo's Fire Eagle and the Loopt mobile phone application (Google Latitude: <http://www.google.com/latitude/intro.html>; Fire Eagle: <http://fireeagle.yahoo.net/>; Loopt: <http://www.loopt.com/>; Twitter has also announced that it will allow users to embed their location when posting content with their service (<http://blog.twitter.com/2009/08/location-locationlocation.html>).

## Appendix-2

### □ Non-redundant - Not duplicated data

- all relevant data are input,
- data are input accurately,
- data are input for process at the correct time, and
- if data is passed from one file or worksheet to another, adequate controls are in place to ensure the completeness and accuracy of the transfer" (O'Beirne, 2008).

## Appendix 3a File 1 Prosumer deleted data

180418 night Ass 2 - File 1 - Collated Prosumer Survey Homework Task 1 [Read-Only] - Excel

File Home Insert Page Layout Formulas Data Review View Tell me what you want to do

Clipboard Font Alignment Number Conditional Formatting Styles Cells Editing

H19 <https://www.o2.co.uk/thinkbig/history>

| No. | Company name                                                        | Number of Employees | Business Sector                 | Evidence of Sustainability focus (Yes/No) | If Sustainability - where is the evidence? State words and expressions used | If Sustainability - where is the evidence? - state the web site                                                         | Short description of observed prosumers activity                                                                                                                                            | Products or its parts designed | Notes or suggestions relating to materials used in the production process (with what kind of material the product/part of the product is made from) | Is it a problem? |
|-----|---------------------------------------------------------------------|---------------------|---------------------------------|-------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| 36  | <a href="http://ee.co.uk/">http://ee.co.uk/</a>                     | 14,000              | Mobile Network Operator         | Yes                                       | Building a responsible business                                             | <a href="http://ee.co.uk/our-company/corporate-responsibility">http://ee.co.uk/our-company/corporate-responsibility</a> | <a href="http://ee.co.uk/help/help-organ-pages/my-ee-rewards">http://ee.co.uk/help/help-organ-pages/my-ee-rewards</a>                                                                       | Yes                            | Yes                                                                                                                                                 | Yes              |
| 71  | <a href="http://ee.co.uk/">http://ee.co.uk/</a>                     | 15,000              | 4G mobile connectivity services | Yes                                       | recycle old phones to help minimise materials harvest                       | <a href="https://recycle.ee.co.uk/">https://recycle.ee.co.uk/</a>                                                       | The longer you're a consumer of EE contract, the more likely to receive discount                                                                                                            | Yes                            | Yes                                                                                                                                                 | Yes              |
| 6   | <a href="http://ee.com">http://ee.com</a>                           | 15,000              | Technology                      | yes                                       | they sell a lot of products around the world                                | EE                                                                                                                      | <a href="http://www.lee.com">www.lee.com</a>                                                                                                                                                | Yes                            | Y                                                                                                                                                   |                  |
| 10  | <a href="https://shop.ee.co.uk/">https://shop.ee.co.uk/</a>         | 15,000              | Retailer                        |                                           |                                                                             |                                                                                                                         | <a href="https://shop.ee.co.uk/">https://shop.ee.co.uk/</a>                                                                                                                                 | Yes                            |                                                                                                                                                     |                  |
| 20  | <a href="https://www.apple.com/uk/">https://www.apple.com/uk/</a>   | 123,000             | Technology/Manufacturer         | Yes                                       | 100% renewable energy, using recycled materials & packaging                 | <a href="https://www.apple.com/uk/environment/">https://www.apple.com/uk/environment/</a>                               | Customer complaints, reviews, Twitter replies                                                                                                                                               |                                |                                                                                                                                                     |                  |
| 86  | <a href="https://www.apple.com/uk/">https://www.apple.com/uk/</a>   | 123,000             | Technology/Manufacturer         | Yes                                       | 100% renewable energy, using recycled materials & packaging                 | <a href="https://www.apple.com/uk/environment/">https://www.apple.com/uk/environment/</a>                               | Customer complaints, reviews, Twitter replies                                                                                                                                               |                                |                                                                                                                                                     |                  |
| 51  | <a href="http://www.arpac.co.uk/">http://www.arpac.co.uk/</a>       | 29,995              | Retailer                        |                                           |                                                                             |                                                                                                                         | <a href="https://www.arpac.co.uk">https://www.arpac.co.uk</a>                                                                                                                               | Yes                            | Yes                                                                                                                                                 | Yes              |
| 83  | <a href="http://www.arpac.co.uk/">http://www.arpac.co.uk/</a>       | 29,995              | Manufacturing Company           | Yes                                       | Low maintenance, low repairs, cool running & more reliable                  | <a href="https://www.dewalt.com/company-info/sustainability">https://www.dewalt.com/company-info/sustainability</a>     | <a href="https://www.dewalt.com/en-uk-support">https://www.dewalt.com/en-uk-support</a> & <a href="https://www.consumeraffairs.com/homeowner">https://www.consumeraffairs.com/homeowner</a> | Yes                            | Yes                                                                                                                                                 | Yes              |
| 96  | <a href="http://www.ikea.com">http://www.ikea.com</a>               | 163,600             | Furniture Retail                | Yes                                       | Water efficiency, Organic, sustainable                                      | <a href="http://www.ikea.com/en-thr/ikea-idea">http://www.ikea.com/en-thr/ikea-idea</a>                                 | <a href="https://www.facebook.com/ikeaUKapp">https://www.facebook.com/ikeaUKapp</a>                                                                                                         |                                |                                                                                                                                                     |                  |
| 108 | <a href="https://www.ikea.com">https://www.ikea.com</a>             | 163,600             | Furniture                       | Yes                                       | Sustainable Future, Sustainable home, people & planet                       | <a href="http://www.ikea.com/en-thr/ikea-idea">http://www.ikea.com/en-thr/ikea-idea</a>                                 | <a href="https://www.ikea.com/en-thr/ikea-idea">https://www.ikea.com/en-thr/ikea-idea</a>                                                                                                   | Yes                            | Yes                                                                                                                                                 | Yes              |
| 19  | <a href="https://www.lego.com/en-us">https://www.lego.com/en-us</a> | 19,000              | Manufacturer of Lego brand      | Yes                                       | Investing into alternative materials research, partnership                  | <a href="https://www.lego.com/en-us/about-us/newsroom">https://www.lego.com/en-us/about-us/newsroom</a>                 | Send designs into Lego to create                                                                                                                                                            | Yes                            | Yes                                                                                                                                                 | Yes              |
| 84  | <a href="https://www.lego.com/en-us">https://www.lego.com/en-us</a> | 19,000              | Manufacturer of Lego brand      | Yes                                       | Investing into alternative materials research, partnership                  | <a href="https://www.lego.com/en-us/about-us/newsroom">https://www.lego.com/en-us/about-us/newsroom</a>                 | Send designs into Lego to create                                                                                                                                                            | Yes                            | Yes                                                                                                                                                 | Yes              |
| 31  | <a href="https://www.o2.co.uk/">https://www.o2.co.uk/</a>           | 121,880             | phone provider                  | no                                        | no                                                                          | no                                                                                                                      | <a href="https://www.o2.co.uk/thinkbig/history">https://www.o2.co.uk/thinkbig/history</a>                                                                                                   | no                             | no                                                                                                                                                  | no               |
| 82  | <a href="http://www.asda.co.uk/">http://www.asda.co.uk/</a>         | 123,000             | Food Retailer                   | yes                                       | Changing plastic straws to recyclable straws                                | <a href="https://www.facebook.com/asdaexpress/">https://www.facebook.com/asdaexpress/</a>                               | Social media posts & letters                                                                                                                                                                | Yes                            | Yes                                                                                                                                                 | Yes              |
| 52  | <a href="http://www.asda.com">www.asda.com</a>                      | 123,000             | consumer company                | yes                                       | recycled, renewable energy, climate change                                  | <a href="https://www.asda.com/uk/en/our-company">https://www.asda.com/uk/en/our-company</a>                             | <a href="https://www.asda.com/uk/lego/poll/c42217110?m=8">https://www.asda.com/uk/lego/poll/c42217110?m=8</a>                                                                               | Yes                            | Yes                                                                                                                                                 | Yes              |
| 75  | <a href="http://www.asda.com">www.asda.com</a>                      | 150,000             | food                            | yes                                       | reduce our environmental impact                                             | <a href="https://sustainability.asda.com/">https://sustainability.asda.com/</a>                                         | <a href="https://sustainability.asda.com/customers">https://sustainability.asda.com/customers</a>                                                                                           | Yes                            | Yes                                                                                                                                                 | Yes              |
| 57  | <a href="http://www.asda.com">www.asda.com</a>                      | 150,000             | food                            | yes                                       | reduce our environmental impact                                             | <a href="https://sustainability.asda.com/">https://sustainability.asda.com/</a>                                         | <a href="https://sustainability.asda.com/customers">https://sustainability.asda.com/customers</a>                                                                                           | Yes                            | Yes                                                                                                                                                 | Yes              |
| 23  | <a href="http://www.asda.com">www.asda.com</a>                      | 150,000             | food                            | yes                                       | reduce our environmental impact                                             | <a href="https://sustainability.asda.com/">https://sustainability.asda.com/</a>                                         | <a href="https://sustainability.asda.com/customers">https://sustainability.asda.com/customers</a>                                                                                           | Yes                            | Yes                                                                                                                                                 | Yes              |

Company, sustainable Ordering P Deleted 2 Business Processes Business processes (2) Yes-E ...

Ready Circular References

Type here to search

19:34 19/04/2018

## Appendix-3b File 3 Prosumer deleted data

180418 night Ass 2 - File 1 - Collated Prosumer Survey Homework Task 1 [Read-Only] - Excel

File Home Insert Page Layout Formulas Data Review View Tell me what you want to do

Clipboard Font Alignment Number Styles Cells Editing

READ-ONLY We opened this workbook read-only from the server. Edit Workbook

K46

**The ways of prosumers knowledge sharing with companies**

Empty cells should be filled in by the URL addresses (i.e. <https://www.shoesofprey.com/>) of the web pages on which it was possible to observe prosumers activities connected with their ideas or knowledge. Subsequently these URLs will be used to verify the reality of gathered data. Grey cells (B and C columns) are filling in automatically.

| No. | Company name                                                              | Short description of observed prosumers activity                                                                                                                                                                  | Evaluating products by scoring | Evaluating products by comments | Evaluating product in practice by its testing | Creating and designing products or their parts | Other                   | SUM |
|-----|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------|-----------------------------------------------|------------------------------------------------|-------------------------|-----|
| 3   | <a href="https://twitter.com/">https://twitter.com/</a>                   | <a href="https://books.google.co.uk/books?isbn=1473987490">https://books.google.co.uk/books?isbn=1473987490</a>                                                                                                   |                                |                                 |                                               |                                                |                         | 0   |
| 4   | <a href="https://www.amazon.co.uk/">https://www.amazon.co.uk/</a>         | <a href="https://www.amazon.co.uk/">https://www.amazon.co.uk/</a>                                                                                                                                                 |                                |                                 |                                               |                                                |                         | 0   |
| 5   | <a href="https://www.facebook.com/">https://www.facebook.com/</a>         | <a href="https://www.facebook.com/">https://www.facebook.com/</a>                                                                                                                                                 |                                |                                 |                                               |                                                |                         | 0   |
| 7   | <a href="https://www.youtube.com/">https://www.youtube.com/</a>           | <a href="https://www.youtube.com/">https://www.youtube.com/</a>                                                                                                                                                   |                                |                                 |                                               |                                                |                         | 0   |
| 17  | <a href="https://www.apple.com/uk/">https://www.apple.com/uk/</a>         | Customer complaints, reviews, Twitter replies                                                                                                                                                                     |                                | Yes                             |                                               | Yes                                            |                         | 2   |
| 19  | <a href="https://www.sage.com/uk/">https://www.sage.com/uk/</a>           | Send designs and logs to create                                                                                                                                                                                   | Yes                            | Yes                             | Yes                                           | Yes                                            |                         | 3   |
| 20  | <a href="https://www.apple.com/uk/">https://www.apple.com/uk/</a>         | Customer complaints, reviews, Twitter replies                                                                                                                                                                     | Yes                            | Yes                             | Yes                                           |                                                | Your problems are fixed | 4   |
| 21  | <a href="http://www.samsung.co.uk/">http://www.samsung.co.uk/</a>         | Customer complaints, reviews, Twitter replies                                                                                                                                                                     | Yes                            | Yes                             | Yes                                           |                                                |                         | 3   |
| 23  | <a href="https://www.spcosavers.co.uk/">https://www.spcosavers.co.uk/</a> | <a href="https://www.spcosavers.co.uk/free-and-information/community">https://www.spcosavers.co.uk/free-and-information/community</a>                                                                             | Yes                            | Yes                             | Yes                                           |                                                |                         | 3   |
| 26  | <a href="https://www.amazon.co.uk/">https://www.amazon.co.uk/</a>         | ratings when buying products                                                                                                                                                                                      | Yes                            | Yes                             |                                               |                                                |                         | 2   |
| 31  | <a href="https://www.s2.co.uk/">https://www.s2.co.uk/</a>                 | <a href="https://www.s2.co.uk/knowledgebase">https://www.s2.co.uk/knowledgebase</a>                                                                                                                               |                                |                                 |                                               |                                                |                         | 0   |
| 33  | <a href="https://www.uber.com/en-GB/">https://www.uber.com/en-GB/</a>     | <a href="https://www.uber.com/en-GB/">https://www.uber.com/en-GB/</a>                                                                                                                                             |                                |                                 |                                               |                                                |                         | 0   |
| 36  | <a href="http://en.co.uk/">http://en.co.uk/</a>                           | <a href="http://en.co.uk/help/help-organ-pages/faq-rewards">http://en.co.uk/help/help-organ-pages/faq-rewards</a>                                                                                                 | Yes                            | Yes                             | Yes                                           |                                                | Volunte                 | 4   |
| 43  | <a href="https://www.apple.com/">https://www.apple.com/</a>               | <a href="https://www.apple.com/uk/newsroom/2018/04/18-new-product-reveals/">https://www.apple.com/uk/newsroom/2018/04/18-new-product-reveals/</a>                                                                 | Yes                            | Yes                             | Yes                                           | Yes                                            | Volunte                 | 5   |
| 48  | <a href="https://www.microsoft.com/">https://www.microsoft.com/</a>       | <a href="https://www.microsoft.com/en-gb/press/2018/04/18-microsoft-announces-new-features-for-windows-10/">https://www.microsoft.com/en-gb/press/2018/04/18-microsoft-announces-new-features-for-windows-10/</a> | Yes                            | Yes                             | Yes                                           | Yes                                            | Volunte                 | 5   |
| 48  | <a href="https://www.bbc.com/">https://www.bbc.com/</a>                   | <a href="https://www.bbc.com/news/technology-45678901">https://www.bbc.com/news/technology-45678901</a>                                                                                                           | Yes                            | Yes                             | Yes                                           | Yes                                            | Volunte                 | 5   |

Ready Circular References

Type here to search

19:10 19/04/2018

## Appendix-3c File 3 Prosumer deleted data

180418 night Ass 2 - File 1 - Collated Prosumer Survey Homework Task 1 [Read-Only] - Excel

File Home Insert Page Layout Formulas Data Review View Tell me what you want to do

Clipboard Font Alignment Number Styles Cells Editing

READ-ONLY We opened this workbook read-only from the server. Edit Workbook

AS1

**Incentives which enterprises use to encourage prosumers to knowledge sharing**

Empty cells should be filled in by the URL addresses (i.e. <https://www.shoesofprey.com/>) of the web pages on which it was possible to observe prosumers activities connected with their ideas or knowledge. Subsequently these URLs will be used to verify the reality of gathered data. Grey cells (B and C columns) are filling in automatically.

| No. | Company name                                                      | Short description of observed prosumers activity                                                                | Material rewards (e.g. free gifts, souvenirs) | Monetary compensation | Testing of prototypes | Free samples of products | Bonus points with financial value | Personal recommendations |
|-----|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-----------------------|-----------------------|--------------------------|-----------------------------------|--------------------------|
| 3   | <a href="https://twitter.com/">https://twitter.com/</a>           | <a href="https://books.google.co.uk/books?isbn=1473987490">https://books.google.co.uk/books?isbn=1473987490</a> |                                               |                       |                       |                          |                                   |                          |
| 4   | <a href="https://www.amazon.co.uk/">https://www.amazon.co.uk/</a> | <a href="https://www.amazon.co.uk/">https://www.amazon.co.uk/</a>                                               |                                               |                       |                       |                          |                                   |                          |
| 5   | <a href="https://www.facebook.com/">https://www.facebook.com/</a> | <a href="https://www.facebook.com/">https://www.facebook.com/</a>                                               |                                               |                       |                       |                          |                                   |                          |
| 7   | <a href="https://www.youtube.com/">https://www.youtube.com/</a>   | <a href="https://www.youtube.com/">https://www.youtube.com/</a>                                                 |                                               |                       |                       |                          |                                   |                          |
| 17  | <a href="https://www.apple.com/uk/">https://www.apple.com/uk/</a> | Customer complaints, reviews, Twitter replies                                                                   |                                               |                       |                       |                          |                                   |                          |

Ready Circular References

Type here to search

Average: 4 Count: 4 Sum: 8

19:12 19/04/2018

### Appendix-3d File 3 Prosumer deleted data

180418 night Ass 2 - File 1 - Collated Prosumer Survey Homework Task 1 [Read-Only] - Excel

READ-ONLY We opened this workbook read-only from the server. Edit Workbook

Empty cells should be filled in by the URL addresses (i.e. <https://www.shoesofprey.com/>) of the web pages on which it was possible to observe prosumers activities connected with their ideas or knowledge. Subsequently these URLs will be used to verify the reality of gathered data. Grey cells (B and C columns) are filling in automatically.

| No. | Company name                                                        | Short description of observed prosumers activity                                                                | E-mails | Internet forums | Own organizations' websites | Specialized organizations' websites | Popular information websites | Ind |
|-----|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------|-----------------|-----------------------------|-------------------------------------|------------------------------|-----|
| 3   | <a href="https://twitter.com/">https://twitter.com/</a>             | <a href="https://books.google.co.uk/books?isbn=1473987490">https://books.google.co.uk/books?isbn=1473987490</a> |         |                 |                             |                                     |                              |     |
| 4   | <a href="https://www.amazon.co.uk/">https://www.amazon.co.uk/</a>   | <a href="https://www.amazon.co.uk/">https://www.amazon.co.uk/</a>                                               |         |                 |                             |                                     |                              |     |
| 5   | <a href="https://www.facebook.com/">https://www.facebook.com/</a>   | <a href="https://www.facebook.com/">https://www.facebook.com/</a>                                               |         |                 |                             |                                     |                              |     |
| 7   | <a href="https://www.youtube.com/">https://www.youtube.com/</a>     | <a href="https://www.youtube.com/">https://www.youtube.com/</a>                                                 |         |                 |                             |                                     |                              |     |
| 17  | <a href="https://www.apple.com/uk/">https://www.apple.com/uk/</a>   | Customer complaints, reviews, Twitter replies                                                                   |         | Yes             | Yes                         |                                     | Yes                          |     |
| 19  | <a href="https://www.lego.com/en-gb">https://www.lego.com/en-gb</a> | Send designs into Lego to create.                                                                               | Yes     | Yes             | Yes                         |                                     |                              |     |
| 20  | <a href="https://www.apple.com/uk/">https://www.apple.com/uk/</a>   | Customer complaints, reviews, Twitter replies                                                                   | Yes     | Yes             | Yes                         |                                     | Yes                          |     |

Average: 52.5 Count: 11 Sum: 105

### Appendix-3e File 2 Carbon deleted data

180418 Ass 2- File 2- Collated Carbon Data file\_1 - Excel

READ-ONLY This workbook is locked for editing by another user. Save As

| Usage               | Assumptions                                                                                  | Cost per year | kg CO2 per year | S2 | S4 | S5 | S9  | S10 | S13 | S17 | S18 | S19 |
|---------------------|----------------------------------------------------------------------------------------------|---------------|-----------------|----|----|----|-----|-----|-----|-----|-----|-----|
| 96 times per year   | 0.945 kWh per use (based on 1.39 kWh for full power and 0.5 kWh for defrosting)              | £9.07         | 39              | 1  | 1  | 1  | YES | 1   | 1   | 1   | 1   | 1   |
| 187 washes per year | EU energy label A-rated gives an average consumption at 40°C using a 2kg load to be 0.63 kWh | £11.78        | 51              | 1  | 1  | 1  | YES | 1   | 1   | 1   | 1   | 1   |
| 2.50 kWh per cycle  |                                                                                              |               |                 |    |    |    |     |     |     |     |     |     |

Deleted - Converted Appliance Files

### Appendix-3f File 2 Carbon deleted data

180418 Ass 2- File 2- Collated Carbon Data file\_1 - Excel

READ-ONLY This workbook is locked for editing by another user. Save As

| Appliance                      | Usage                     | Power use | Cost per year | kg CO <sub>2</sub> per year | S4 | S8  | S9 | S18 |
|--------------------------------|---------------------------|-----------|---------------|-----------------------------|----|-----|----|-----|
| Primary TV - CRT (Cathode Ray) | On Power 6.5 hours a day  | 198.5 W   | ####          | 203                         | 0  |     |    |     |
| Primary TV - CRT (Cathode Ray) | Stand by 17.5 hours a day | 4.2 W     | £2.68         | 12                          | 0  | YES |    |     |
| Primary TV - LCD 34-37 inch    | On Power 6.5 hours a day  | 211 W     | ####          | 215                         | 4  |     |    |     |
|                                |                           |           |               |                             | 0  |     | 1  |     |

Deleted+Converted Appliance Files TV & adaptors Deleted Files

### Appendix-3g File 3 Swansea BS deleted data

180418 Ass 2 - File 3 - Swansea Business School - Half Hourly Data (Read-Only) - Excel

READ-ONLY We opened this workbook read-only from the server. Edit Workbook

|                      | AT    | AU    | AV    | AW    | AX | AY | AZ | BA | BB | BC                    | BD | BE | BF  | BG | BH | BI | BJ | BK | BL |
|----------------------|-------|-------|-------|-------|----|----|----|----|----|-----------------------|----|----|-----|----|----|----|----|----|----|
| Business School - OI |       |       |       |       |    |    |    |    |    |                       |    |    | 544 |    |    |    |    |    |    |
| 2199989617260 - K0   |       |       |       |       |    |    |    |    |    | Deleted Files 544 544 |    |    | 773 |    |    |    |    |    |    |
| Date                 | 22:30 | 23:00 | 23:30 | 00:00 |    |    |    |    |    |                       |    |    | 409 | 45 |    |    |    |    |    |
| 31 December 2012     | -     | -     | -     | -     |    |    |    |    |    |                       |    |    |     |    |    |    |    |    |    |
| 01 January 2013      | -     | -     | -     | -     |    |    |    |    |    |                       |    |    |     |    |    |    |    |    |    |
| 02 January 2013      | -     | -     | -     | -     |    |    |    |    |    |                       |    |    |     |    |    |    |    |    |    |
| 03 January 2013      | -     | -     | -     | -     |    |    |    |    |    |                       |    |    |     |    |    |    |    |    |    |
| 04 January 2013      | -     | -     | -     | -     |    |    |    |    |    |                       |    |    |     |    |    |    |    |    |    |
| 05 January 2013      | -     | -     | -     | -     |    |    |    |    |    |                       |    |    |     |    |    |    |    |    |    |
| 06 January 2013      | -     | -     | -     | -     |    |    |    |    |    |                       |    |    |     |    |    |    |    |    |    |
| 07 January 2013      | -     | -     | -     | -     |    |    |    |    |    |                       |    |    |     |    |    |    |    |    |    |
| 08 January 2013      | -     | -     | -     | -     |    |    |    |    |    |                       |    |    |     |    |    |    |    |    |    |
| 09 January 2013      | -     | -     | -     | -     |    |    |    |    |    |                       |    |    |     |    |    |    |    |    |    |
| 10 January 2013      | -     | -     | -     | -     |    |    |    |    |    |                       |    |    |     |    |    |    |    |    |    |
| 11 January 2013      | -     | -     | -     | -     |    |    |    |    |    |                       |    |    |     |    |    |    |    |    |    |
| 12 January 2013      | -     | -     | -     | -     |    |    |    |    |    |                       |    |    |     |    |    |    |    |    |    |
| 13 January 2013      | -     | -     | -     | -     |    |    |    |    |    |                       |    |    |     |    |    |    |    |    |    |
| 14 January 2013      | -     | -     | -     | -     |    |    |    |    |    |                       |    |    |     |    |    |    |    |    |    |
| 15 January 2013      | -     | -     | -     | -     |    |    |    |    |    |                       |    |    |     |    |    |    |    |    |    |

All Years 2014-2017 Sheet8 (2) Deleted Files Sheet6 Dashboard

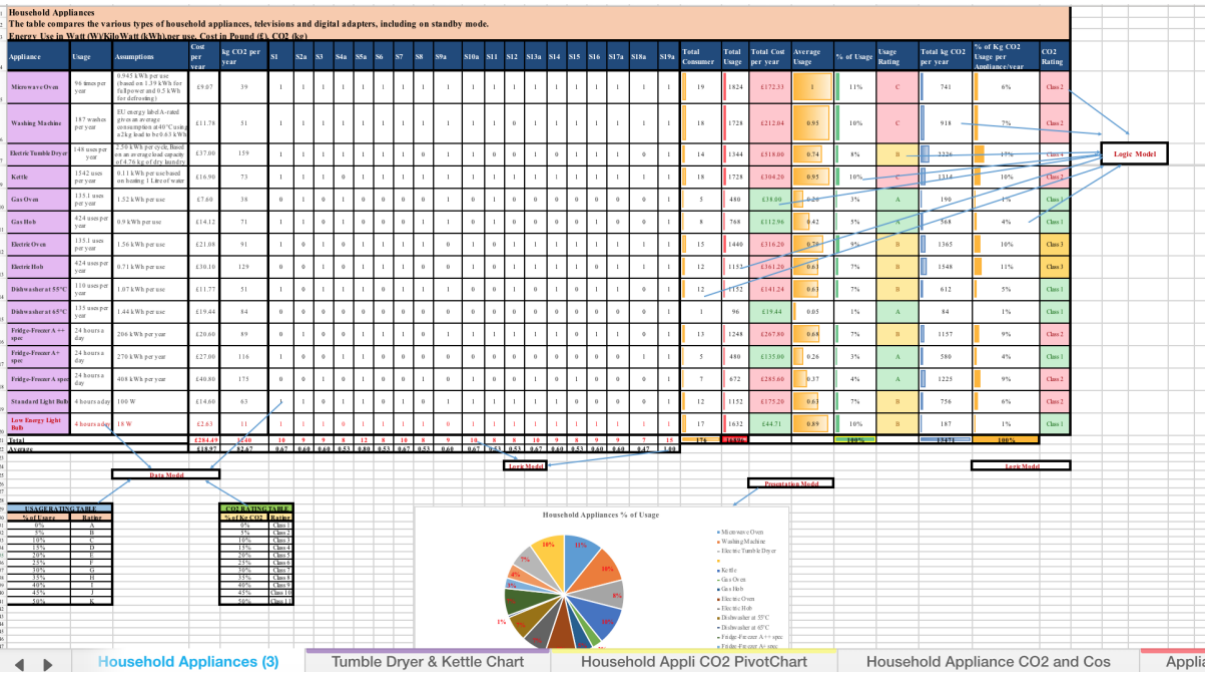
Appendix-4a File 2 Household Appliances

| Energy Use in Watt (W)/KiloWatt (kWh) per use, Cost in Pound (£), CO2 (kg) |                     |                                                                                                       |               |                 |     |     |     |     |     |     |     |     |     |      |     |     |      |     |     |     |      |      |      |                |             |                     |               |            |              |                       |                                      |            |
|----------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------|---------------|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|------|-----|-----|-----|------|------|------|----------------|-------------|---------------------|---------------|------------|--------------|-----------------------|--------------------------------------|------------|
| Appliance                                                                  | Usage               | Assumptions                                                                                           | Cost per year | kg CO2 per year | S1  | S2a | S3  | S4a | S5a | S6  | S7  | S8  | S9a | S10a | S11 | S12 | S13a | S14 | S15 | S16 | S17a | S18a | S19a | Total Consumer | Total Usage | Total Cost per year | Average Usage | % of Usage | Usage Rating | Total kg CO2 per year | % of Kg CO2 Usage per Appliance/year | CO2 Rating |
| Microwave Oven                                                             | 90 times per year   | 0.942 kWh per use (based on 1.0 kWh for full power and 0.5 kWh for defrosting)                        | £9.07         | 39              | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1    | 1   | 1   | 1    | 1   | 1   | 1   | 1    | 1    | 1    | 19             | 1824        | £172.33             | 1             | 11%        | C            | 741                   | 6%                                   | Class 2    |
| Washing Machine                                                            | 187 washes per year | 0.51 energy label A-rated gives an average consumption at 40°C using 2kg load or less 0.5 kWh         | £11.78        | 51              | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1    | 1   | 1   | 1    | 1   | 1   | 1   | 1    | 1    | 1    | 18             | 1728        | £212.04             | 0.95          | 10%        | C            | 918                   | 7%                                   | Class 2    |
| Electric Tumble Dryer                                                      | 140 uses per year   | 2.70 kWh per cycle, based on an average load capacity of 6kg and 1.5 kWh for heating 1 litre of water | £37.80        | 159             | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1    | 1   | 1   | 1    | 1   | 1   | 1   | 1    | 1    | 1    | 14             | 1344        | £518.00             | 0.74          | 8%         | B            | 2226                  | 13%                                  | Class 4    |
| Kettle                                                                     | 1542 uses per year  | 0.11 kWh per use based on heating 1 litre of water                                                    | £16.96        | 73              | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1    | 1   | 1   | 1    | 1   | 1   | 1   | 1    | 1    | 1    | 18             | 1728        | £304.20             | 0.95          | 10%        | C            | 1314                  | 10%                                  | Class 2    |
| Gas Oven                                                                   | 135.1 uses per year | 0.92 kWh per use                                                                                      | £7.60         | 38              | 0   | 1   | 1   | 0   | 0   | 0   | 0   | 1   | 0   | 1    | 0   | 0   | 0    | 0   | 0   | 0   | 0    | 1    | 0    | 5              | 480         | £38.00              | 0.26          | 3%         | A            | 190                   | 1%                                   | Class 1    |
| Gas Hob                                                                    | 624 uses per year   | 1.52 kWh per use                                                                                      | £14.12        | 71              | 1   | 1   | 0   | 1   | 0   | 0   | 0   | 1   | 1   | 0    | 1   | 0   | 0    | 0   | 0   | 1   | 0    | 0    | 1    | 8              | 768         | £112.96             | 0.42          | 3%         | A            | 568                   | 4%                                   | Class 1    |
| Electric Oven                                                              | 135.1 uses per year | 1.56 kWh per use                                                                                      | £21.08        | 91              | 1   | 0   | 1   | 0   | 1   | 1   | 1   | 1   | 0   | 1    | 1   | 1   | 1    | 1   | 1   | 1   | 1    | 1    | 1    | 15             | 1440        | £316.20             | 0.79          | 9%         | B            | 1365                  | 10%                                  | Class 3    |
| Electric Hob                                                               | 624 uses per year   | 0.71 kWh per use                                                                                      | £10.10        | 129             | 0   | 0   | 1   | 0   | 1   | 1   | 1   | 0   | 0   | 1    | 1   | 1   | 1    | 1   | 1   | 1   | 1    | 1    | 1    | 12             | 1152        | £361.20             | 0.63          | 7%         | B            | 1548                  | 11%                                  | Class 3    |
| Dishwasher at 55°C                                                         | 110 uses per year   | 1.07 kWh per use                                                                                      | £11.77        | 51              | 1   | 1   | 0   | 1   | 1   | 1   | 1   | 1   | 1   | 1    | 1   | 1   | 1    | 1   | 1   | 1   | 1    | 1    | 1    | 12             | 1152        | £141.24             | 0.63          | 7%         | B            | 612                   | 5%                                   | Class 1    |
| Dishwasher at 65°C                                                         | 110 uses per year   | 1.44 kWh per use                                                                                      | £19.44        | 84              | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0    | 0   | 0   | 0    | 0   | 0   | 0   | 0    | 0    | 1    | 1              | 96          | £19.44              | 0.05          | 1%         | A            | 84                    | 1%                                   | Class 1    |
| Fridge-Freezer A++ spec                                                    | 24 hours a day      | 286 kWh per year                                                                                      | £28.60        | 88              | 0   | 1   | 0   | 0   | 1   | 1   | 1   | 0   | 1   | 1    | 1   | 1   | 1    | 1   | 1   | 1   | 1    | 1    | 1    | 13             | 1248        | £267.80             | 0.68          | 7%         | B            | 1187                  | 9%                                   | Class 2    |
| Fridge-Freezer A+ spec                                                     | 24 hours a day      | 270 kWh per year                                                                                      | £27.00        | 116             | 1   | 0   | 0   | 1   | 1   | 0   | 0   | 0   | 0   | 0    | 0   | 0   | 0    | 0   | 0   | 0   | 0    | 1    | 1    | 5              | 480         | £135.00             | 0.26          | 3%         | A            | 580                   | 4%                                   | Class 1    |
| Fridge-Freezer A spec                                                      | 24 hours a day      | 408 kWh per year                                                                                      | £40.80        | 175             | 0   | 0   | 1   | 0   | 1   | 0   | 0   | 1   | 0   | 1    | 0   | 1   | 1    | 1   | 1   | 1   | 1    | 1    | 1    | 7              | 672         | £260.80             | 0.37          | 4%         | A            | 1225                  | 9%                                   | Class 2    |
| Standard Light Bulb                                                        | 4 hours a day       | 100 W                                                                                                 | £14.40        | 63              | 1   | 1   | 0   | 1   | 1   | 0   | 1   | 1   | 1   | 1    | 1   | 1   | 1    | 1   | 1   | 1   | 1    | 1    | 1    | 12             | 1152        | £175.20             | 0.63          | 7%         | B            | 756                   | 6%                                   | Class 2    |
| Low Energy Light Bulb                                                      | 4 hours a day       | 10 W                                                                                                  | £2.40         | 11              | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1    | 1   | 1   | 1    | 1   | 1   | 1   | 1    | 1    | 1    | 17             | 1632        | £44.71              | 0.89          | 10%        | B            | 187                   | 1%                                   | Class 1    |
| Total                                                                      |                     |                                                                                                       | £189.27       | 1245            | 10  | 10  | 4   | 6   | 12  | 6   | 10  | 6   | 10  | 6    | 10  | 6   | 10   | 6   | 10  | 6   | 10   | 6    | 10   | 176            | 1632        | £44.71              | 0.89          | 10%        | B            | 187                   | 1%                                   | Class 1    |
| Average                                                                    |                     |                                                                                                       | £18.92        | 124.5           | 1.0 | 1.0 | 0.4 | 0.6 | 1.2 | 0.6 | 1.0 | 0.6 | 1.0 | 0.6  | 1.0 | 0.6 | 1.0  | 0.6 | 1.0 | 0.6 | 1.0  | 0.6  | 1.0  | 17.6           | 163.2       | £4.47               | 0.89          | 10%        | B            | 18.7                  | 1%                                   | Class 1    |
| Levin Model                                                                |                     |                                                                                                       |               |                 |     |     |     |     |     |     |     |     |     |      |     |     |      |     |     |     |      |      |      |                |             |                     |               |            |              |                       |                                      |            |

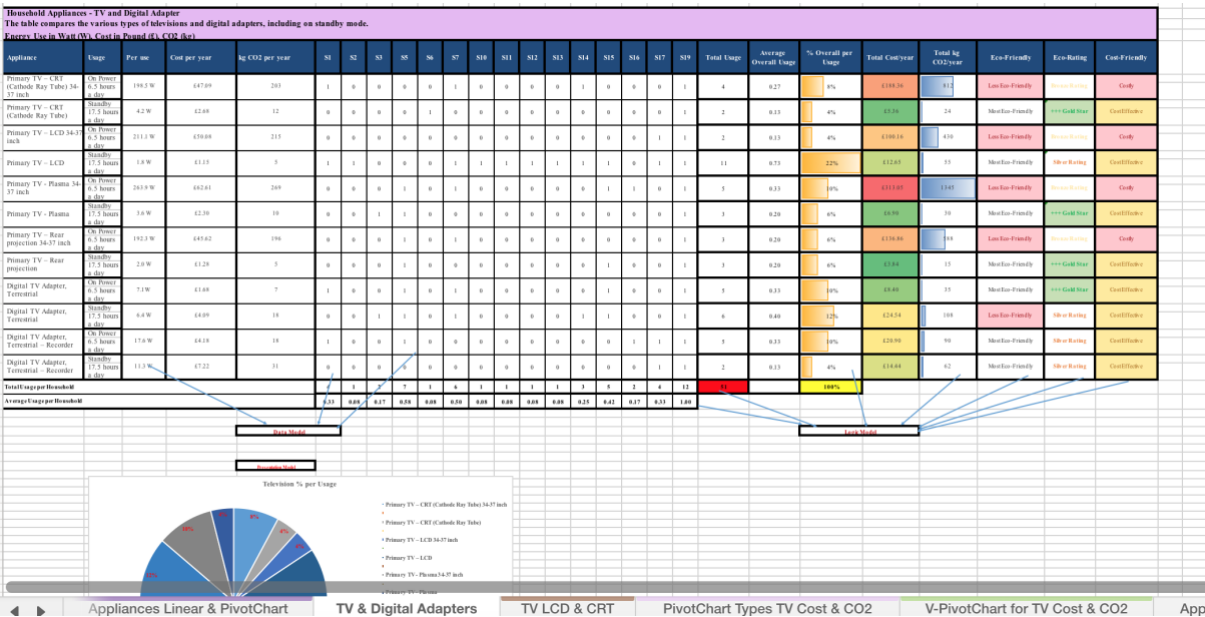
Appendix-4b File 2 CO2 Ratings

| Appliance             | S7 | S8 | S9a | S10a | S11 | S12 | S13a | S14 | S15 | S16 | S17a | S18a | S19a | Total Consumer | Total Usage | Total Cost per year | Average Usage | % of Usage | Usage Rating | Total kg CO2 per year | % of Kg CO2 Usage per Appliance/year | CO2 Rating |
|-----------------------|----|----|-----|------|-----|-----|------|-----|-----|-----|------|------|------|----------------|-------------|---------------------|---------------|------------|--------------|-----------------------|--------------------------------------|------------|
| Electric Tumble Dryer | 1  | 0  | 0   | 1    | 0   | 0   | 1    | 0   | 1   | 1   | 1    | 0    | 1    | 13             | 1248        | £481.00             | 0.68          | 7%         | B            | 2067                  | 15%                                  | Class 4    |
| Kettle                | 1  | 1  | 1   | 1    | 1   | 1   | 1    | 1   | 1   | 1   | 1    | 1    | 1    | 18             | 1728        | £304.20             | 0.95          | 10%        | C            | 1314                  | 10%                                  | Class 2    |
| Gas Oven              | 0  | 0  | 1   | 0    | 1   | 0   | 0    | 0   | 0   | 0   | 0    | 0    | 1    | 5              | 480         | £38.00              | 0.26          | 3%         | A            | 190                   | 1%                                   | Class 1    |
| Gas Hob               | 0  | 1  | 0   | 0    | 1   | 0   | 0    | 0   | 0   | 0   | 1    | 0    | 0    | 7              | 672         | £98.84              | 0.37          | 4%         | A            | 497                   | 4%                                   | Class 1    |
| Electric Oven         | 1  | 1  | 1   | 1    | 0   | 1   | 1    | 1   | 1   | 1   | 1    | 1    | 1    | 16             | 1536        | £337.28             | 0.84          | 9%         | B            | 1456                  | 11%                                  | Class 3    |
| Electric Hob          | 1  | 0  | 1   | 1    | 0   | 1   | 1    | 1   | 1   | 0   | 1    | 0    | 1    | 12             | 1152        | £361.20             | 0.63          | 7%         | B            | 1548                  | 12%                                  | Class 3    |

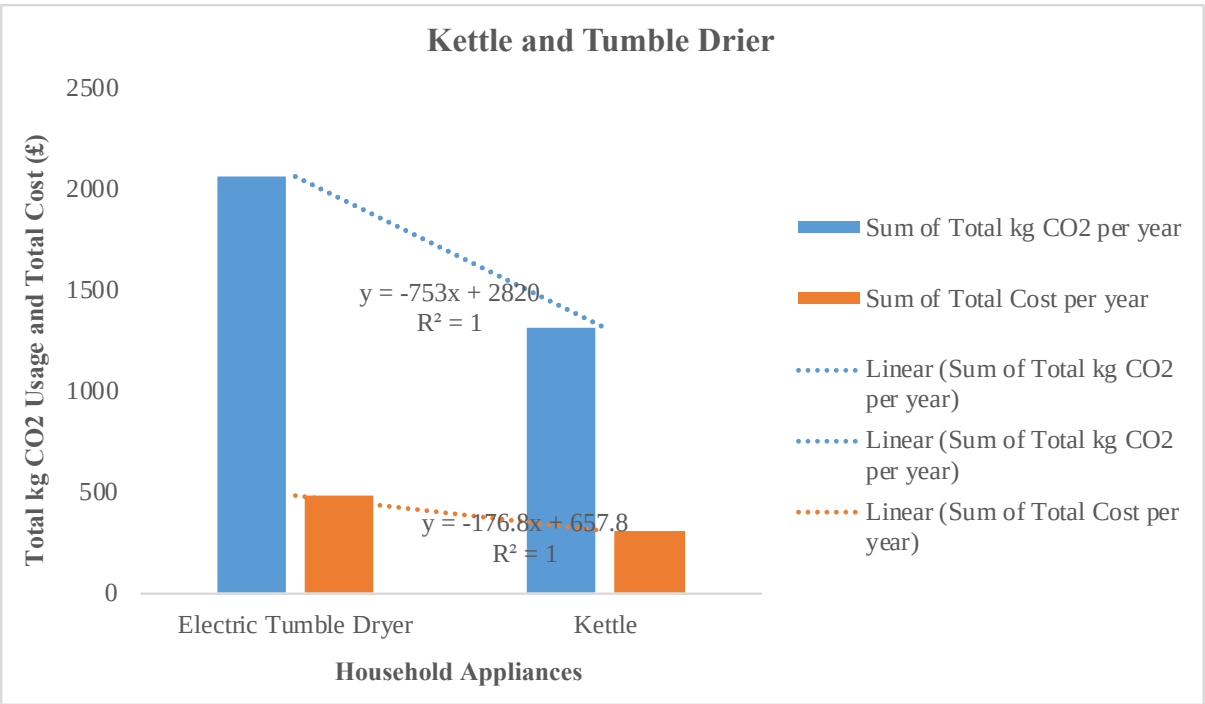
Appendix-4c File 2 Household Appliances



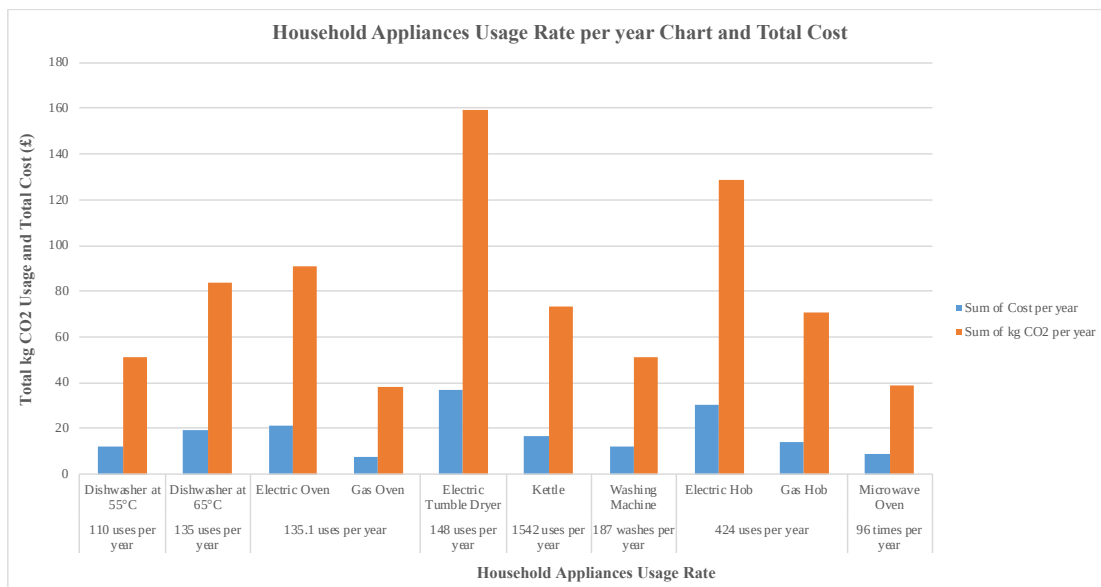
Appendix-4d File 2 Household Appliances



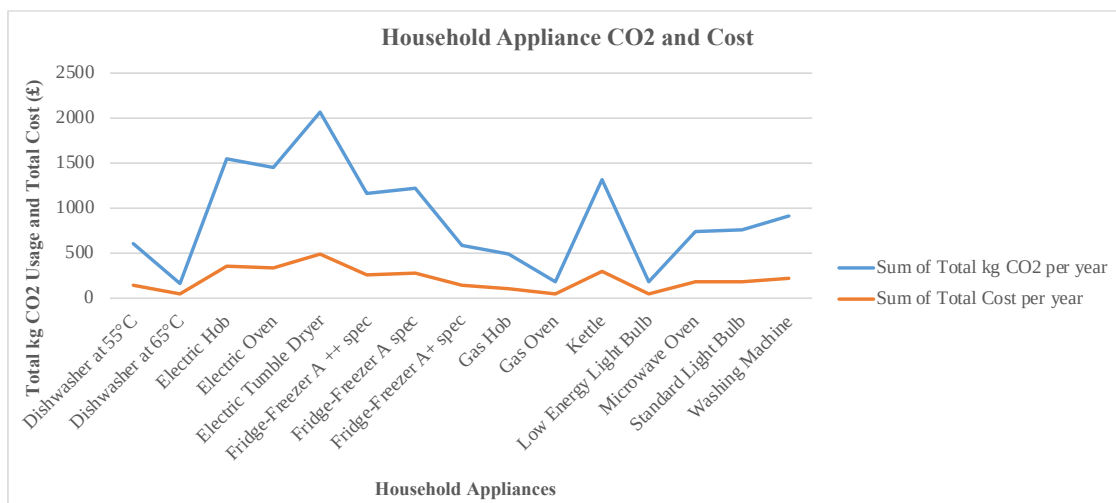
Appendix-4e File 2 Household Appliances



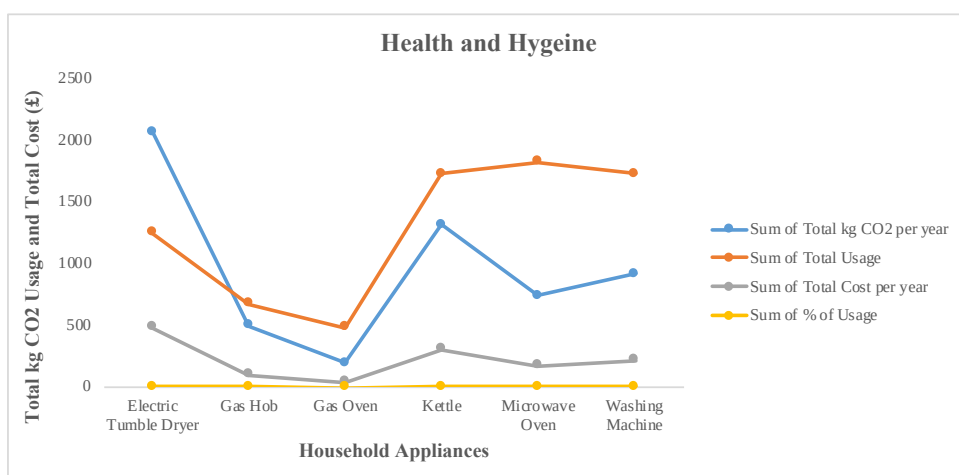
### Appendix-4f File 2 Household Appliances



### Appendix-4g File 2 Household Appliances



### Appendix-4h File 2 Household Appliances



## Appendix-5a Highest energy consumption day 23/02/2015

| 180418 Ass 2 - File 3 - Swansea Business School - Half Hourly Data [Protected View] - Excel                                                                       |   |       |       |       |       |       |       |       |       |       |         |               |                 |                 |       |     |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|---------------|-----------------|-----------------|-------|-----|----|
| PROTECTED VIEW Be careful—files from the Internet can contain viruses. Unless you need to edit, it's safer to stay in Protected View. <span>Enable Editing</span> |   |       |       |       |       |       |       |       |       |       |         |               |                 |                 |       |     |    |
| 11                                                                                                                                                                |   |       |       |       |       |       |       |       |       |       |         |               |                 |                 |       |     |    |
|                                                                                                                                                                   |   |       |       |       |       |       |       |       |       |       |         |               |                 |                 |       |     |    |
|                                                                                                                                                                   | A | AO    | AP    | AQ    | AR    | AS    | AT    | AU    | AV    | AW    | AX      | AY            | AZ              | BA              | BB    | BC  | BD |
|                                                                                                                                                                   |   | 00:00 | 20:00 | 20:00 | 21:00 | 21:00 | 22:00 | 22:00 | 23:00 | 23:00 | 00:00   | Total per Day | Average Per Day | % Usage per Day | Max   | Min |    |
| 17 February 2015                                                                                                                                                  |   | 29.04 | 18.22 | 13.76 | 14.10 | 13.44 | 13.65 | 13.14 | 13.29 | 14.72 | 1648.73 | 34.35         | 0.18%           | 61.15           | 13.14 |     |    |
| 18 February 2015                                                                                                                                                  |   | 25.89 | 17.60 | 13.75 | 14.54 | 14.23 | 14.08 | 13.86 | 13.74 | 13.90 | 1463.48 | 30.49         | 0.16%           | 51.97           | 13.31 |     |    |
| 19 February 2015                                                                                                                                                  |   | 30.29 | 19.17 | 17.01 | 15.27 | 14.98 | 13.97 | 13.92 | 14.34 | 14.30 | 1652.47 | 34.43         | 0.18%           | 63.09           | 13.47 |     |    |
| 20 February 2015                                                                                                                                                  |   | 13.57 | 13.94 | 14.09 | 14.29 | 13.99 | 14.76 | 13.72 | 13.90 | 14.79 | 1461.08 | 30.44         | 0.16%           | 60.55           | 13.57 |     |    |
| 21 February 2015                                                                                                                                                  |   | 13.15 | 14.28 | 13.92 | 14.04 | 14.02 | 13.91 | 14.62 | 14.02 | 13.54 | 905.68  | 18.87         | 0.10%           | 34.59           | 13.15 |     |    |
| 22 February 2015                                                                                                                                                  |   | 13.00 | 13.77 | 13.44 | 13.36 | 13.43 | 13.60 | 13.02 | 14.08 | 13.81 | 638.39  | 13.30         | 0.07%           | 15.16           | 12.05 |     |    |
| 23 February 2015                                                                                                                                                  |   | 29.57 | 19.43 | 15.38 | 15.46 | 14.94 | 14.81 | 14.24 | 15.08 | 14.78 | 1720.50 | 35.84         | 0.19%           | 68.54           | 13.19 |     |    |
| 24 February 2015                                                                                                                                                  |   | 30.54 | 18.84 | 15.00 | 15.28 | 14.36 | 14.13 | 14.50 | 14.79 | 14.47 | 1718.86 | 35.81         | 0.19%           | 64.91           | 14.13 |     |    |
| 25 February 2015                                                                                                                                                  |   | 25.86 | 17.96 | 15.18 | 15.81 | 14.85 | 15.02 | 14.48 | 15.33 | 14.97 | 1506.34 | 31.38         | 0.17%           | 53.36           | 14.10 |     |    |
| 26 February 2015                                                                                                                                                  |   | 29.13 | 18.97 | 15.61 | 15.88 | 14.84 | 14.77 | 14.69 | 14.89 | 14.79 | 1709.57 | 35.62         | 0.19%           | 67.05           | 14.55 |     |    |
| 27 February 2015                                                                                                                                                  |   | 13.37 | 13.06 | 13.30 | 13.88 | 13.47 | 13.72 | 13.16 | 13.74 | 13.34 | 1436.65 | 29.93         | 0.16%           | 60.35           | 13.06 |     |    |
| 28 February 2015                                                                                                                                                  |   | 13.51 | 13.13 | 13.37 | 14.18 | 13.44 | 13.15 | 13.21 | 13.80 | 12.92 | 925.40  | 19.28         | 0.10%           | 41.84           | 12.86 |     |    |
| 01 March 2015                                                                                                                                                     |   | 12.59 | 12.77 | 12.87 | 13.01 | 12.52 | 12.64 | 12.61 | 13.13 | 12.92 | 602.16  | 12.54         | 0.07%           | 13.54           | 11.29 |     |    |

## Appendix-5b the lowest energy consumption was on 13/08/2017

| 180418 Ass 2 - File 3 - Swansea Business School - Half Hourly Data [Protected View] - Excel                                                                       |                |       |       |       |       |       |       |        |               |                 |                 |      |     |    |    |    |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------|-------|-------|-------|-------|-------|--------|---------------|-----------------|-----------------|------|-----|----|----|----|----|
| PROTECTED VIEW Be careful—files from the Internet can contain viruses. Unless you need to edit, it's safer to stay in Protected View. <span>Enable Editing</span> |                |       |       |       |       |       |       |        |               |                 |                 |      |     |    |    |    |    |
| A645                                                                                                                                                              |                |       |       |       |       |       |       |        |               |                 |                 |      |     |    |    |    |    |
|                                                                                                                                                                   |                |       |       |       |       |       |       |        |               |                 |                 |      |     |    |    |    |    |
|                                                                                                                                                                   | A              | AR    | AS    | AT    | AU    | AV    | AW    | AX     | AY            | AZ              | BA              | BB   | BC  | BD | BE | BF | BG |
|                                                                                                                                                                   |                | 00:00 | 21:00 | 22:00 | 22:00 | 23:00 | 23:00 | 00:00  | Total per Day | Average Per Day | % Usage per Day | Max  | Min |    |    |    |    |
| 393                                                                                                                                                               | 28 July 2017   | 9.44  | 9.38  | 10.78 | 10.32 | 10.28 | 9.34  | 757.88 | 15.79         | 0.08%           | 28.10           | 9.17 |     |    |    |    |    |
| 394                                                                                                                                                               | 29 July 2017   | 9.68  | 9.63  | 9.87  | 9.44  | 9.57  | 9.61  | 496.00 | 10.33         | 0.05%           | 13.34           | 8.64 |     |    |    |    |    |
| 395                                                                                                                                                               | 30 July 2017   | 9.51  | 9.59  | 9.73  | 9.99  | 9.60  | 10.48 | 475.00 | 9.90          | 0.05%           | 12.03           | 8.80 |     |    |    |    |    |
| 396                                                                                                                                                               | 31 July 2017   | 9.98  | 9.10  | 10.44 | 9.24  | 9.15  | 9.31  | 808.40 | 16.84         | 0.09%           | 31.76           | 8.52 |     |    |    |    |    |
| 397                                                                                                                                                               | 01 August 2017 | 9.14  | 8.74  | 9.55  | 9.31  | 9.34  | 9.49  | 771.31 | 16.07         | 0.08%           | 29.00           | 8.00 |     |    |    |    |    |
| 398                                                                                                                                                               | 02 August 2017 | 9.15  | 9.16  | 9.94  | 9.12  | 9.34  | 9.40  | 802.28 | 16.71         | 0.09%           | 30.91           | 8.54 |     |    |    |    |    |
| 399                                                                                                                                                               | 03 August 2017 | 9.69  | 9.15  | 9.45  | 8.60  | 9.35  | 8.87  | 817.12 | 17.02         | 0.09%           | 29.61           | 8.60 |     |    |    |    |    |
| 400                                                                                                                                                               | 04 August 2017 | 9.38  | 9.56  | 9.91  | 9.12  | 8.90  | 9.04  | 743.24 | 15.48         | 0.08%           | 26.93           | 8.10 |     |    |    |    |    |
| 401                                                                                                                                                               | 05 August 2017 | 9.19  | 9.80  | 9.23  | 9.50  | 9.46  | 9.51  | 492.69 | 10.26         | 0.05%           | 13.44           | 8.36 |     |    |    |    |    |
| 402                                                                                                                                                               | 06 August 2017 | 9.59  | 9.94  | 9.91  | 9.98  | 9.67  | 9.02  | 445.42 | 9.28          | 0.05%           | 10.28           | 8.41 |     |    |    |    |    |
| 403                                                                                                                                                               | 07 August 2017 | 9.02  | 8.84  | 9.70  | 8.58  | 8.91  | 9.25  | 777.88 | 16.21         | 0.09%           | 31.00           | 7.90 |     |    |    |    |    |
| 404                                                                                                                                                               | 08 August 2017 | 8.54  | 9.12  | 9.31  | 8.84  | 8.72  | 8.22  | 721.78 | 15.04         | 0.08%           | 26.94           | 7.61 |     |    |    |    |    |
| 405                                                                                                                                                               | 09 August 2017 | 8.73  | 8.71  | 9.53  | 8.54  | 8.95  | 8.58  | 745.66 | 15.53         | 0.08%           | 29.10           | 8.15 |     |    |    |    |    |
| 406                                                                                                                                                               | 10 August 2017 | 8.43  | 9.07  | 9.15  | 8.44  | 8.40  | 8.90  | 719.61 | 14.99         | 0.08%           | 27.54           | 7.78 |     |    |    |    |    |
| 407                                                                                                                                                               | 11 August 2017 | 8.95  | 9.16  | 9.48  | 8.53  | 8.61  | 8.94  | 754.68 | 15.72         | 0.08%           | 31.98           | 7.86 |     |    |    |    |    |
| 408                                                                                                                                                               | 12 August 2017 | 8.16  | 8.66  | 8.91  | 9.01  | 8.72  | 8.41  | 412.02 | 8.58          | 0.05%           | 9.40            | 7.45 |     |    |    |    |    |
| 409                                                                                                                                                               | 13 August 2017 | 8.73  | 8.61  | 8.26  | 8.13  | 9.04  | 8.63  | 390.59 | 8.14          | 0.04%           | 9.27            | 7.28 |     |    |    |    |    |
| 410                                                                                                                                                               | 14 August 2017 | 8.98  | 9.52  | 9.86  | 9.33  | 9.26  | 9.09  | 768.23 | 16.00         | 0.08%           | 29.69           | 8.05 |     |    |    |    |    |

## Appendix-5c maximum usage

| PROTECTED VIEW Be careful—files from the Internet can contain viruses. Unless you need to edit, it's safer to stay in Protected View. <span>Enable Editing</span> |   |       |       |       |       |       |       |       |       |       |       |       |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 645                                                                                                                                                               |   |       |       |       |       |       |       |       |       |       |       |       |       |
|                                                                                                                                                                   | A | Q     | R     | S     | T     | U     | V     | W     | X     | Y     | Z     | AA    | AB    |
|                                                                                                                                                                   |   | 00:00 | 08:00 | 08:00 | 09:00 | 09:00 | 10:00 | 10:00 | 11:00 | 11:00 | 12:00 | 12:00 | 13:00 |
| 31 October 2015                                                                                                                                                   |   | 13.82 | 13.38 | 13.80 | 15.51 | 22.80 | 24.28 | 24.86 | 26.80 | 24.85 | 24.75 | 25.14 | 24.82 |
| 01 November 2015                                                                                                                                                  |   | 11.94 | 11.43 | 11.42 | 11.02 | 11.06 | 11.12 | 11.60 | 11.62 | 11.46 | 12.26 | 11.59 | 11.69 |
| 02 November 2015                                                                                                                                                  |   | 30.15 | 36.84 | 46.84 | 54.48 | 54.70 | 60.61 | 59.79 | 62.60 | 60.97 | 63.13 | 62.16 | 63.70 |
| 03 November 2015                                                                                                                                                  |   | 32.00 | 42.99 | 48.90 | 56.15 | 59.13 | 62.70 | 63.14 | 64.07 | 62.47 | 66.63 | 67.07 | 69.11 |

## Appendix-5d, minimum usage of £0.10 On 21/11/2016

| File Home Insert Page Layout Formulas Data Review View Tell me what you want to do                                                    |                  |       |       |       |       |       |       |       |       |       |
|---------------------------------------------------------------------------------------------------------------------------------------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| PROTECTED VIEW Be careful—files from the Internet can contain viruses. Unless you need to edit, it's safer to stay in Protected View. |                  |       |       |       |       |       |       |       |       |       |
| A645                                                                                                                                  |                  |       |       |       |       |       |       |       |       |       |
|                                                                                                                                       | A                | B     | C     | D     | E     | F     | G     | H     | I     | J     |
| 4                                                                                                                                     | 00:00            | 00:00 | 01:00 | 01:00 | 02:00 | 02:00 | 03:00 | 03:00 | 04:00 | 04:00 |
| 29                                                                                                                                    | 05 November 2016 | 11.19 | 11.47 | 11.54 | 11.62 | 11.86 | 11.51 | 12.62 | 11.67 | 11.67 |
| 30                                                                                                                                    | 06 November 2016 | 10.79 | 11.46 | 11.39 | 11.00 | 11.68 | 11.70 | 11.65 | 11.50 | 11.50 |
| 31                                                                                                                                    | 07 November 2016 | 11.50 | 11.12 | 12.64 | 11.57 | 11.16 | 11.90 | 11.45 | 11.37 | 11.37 |
| 32                                                                                                                                    | 08 November 2016 | 11.86 | 11.70 | 12.08 | 12.20 | 11.96 | 12.02 | 11.96 | 11.56 | 11.56 |
| 33                                                                                                                                    | 09 November 2016 | 11.68 | 12.02 | 12.30 | 12.65 | 13.10 | 12.81 | 12.26 | 12.46 | 12.46 |
| 34                                                                                                                                    | 10 November 2016 | 10.92 | 11.32 | 11.91 | 11.25 | 11.59 | 11.38 | 11.58 | 11.76 | 11.76 |
| 35                                                                                                                                    | 11 November 2016 | 11.40 | 11.75 | 11.86 | 10.99 | 11.25 | 11.09 | 11.39 | 11.29 | 11.29 |
| 36                                                                                                                                    | 12 November 2016 | 10.89 | 11.13 | 11.86 | 11.40 | 11.27 | 11.07 | 11.67 | 11.57 | 11.57 |
| 37                                                                                                                                    | 13 November 2016 | 10.80 | 11.57 | 11.43 | 10.97 | 11.42 | 11.12 | 11.42 | 11.27 | 11.27 |
| 38                                                                                                                                    | 14 November 2016 | 10.87 | 11.17 | 11.71 | 11.68 | 10.86 | 11.12 | 11.22 | 10.93 | 10.93 |
| 39                                                                                                                                    | 15 November 2016 | 11.31 | 11.61 | 11.22 | 11.66 | 11.13 | 11.47 | 10.99 | 11.54 | 11.54 |
| 40                                                                                                                                    | 16 November 2016 | 11.70 | 12.02 | 13.06 | 12.20 | 12.34 | 12.08 | 11.93 | 12.30 | 12.30 |
| 41                                                                                                                                    | 17 November 2016 | 11.24 | 11.33 | 12.04 | 11.62 | 11.54 | 11.93 | 11.31 | 11.25 | 11.25 |
| 42                                                                                                                                    | 18 November 2016 | 11.56 | 11.67 | 12.25 | 11.12 | 10.99 | 11.40 | 11.54 | 11.15 | 11.15 |
| 43                                                                                                                                    | 19 November 2016 | 9.11  | 9.15  | 9.18  | 9.28  | 9.82  | 9.70  | 9.41  | 10.06 | 10.06 |
| 44                                                                                                                                    | 20 November 2016 | 10.28 | 10.46 | 10.68 | 10.65 | 10.73 | 10.92 | 10.97 | 11.56 | 11.56 |
| 45                                                                                                                                    | 21 November 2016 | 9.84  | 10.19 | 10.45 | 9.79  | 10.16 | 10.66 | 10.37 | 0.10  | 0.10  |
| 46                                                                                                                                    | 22 November 2016 | 11.78 | 12.02 | 11.68 | 12.33 | 11.97 | 11.78 | 11.52 | 12.11 | 12.11 |
| 47                                                                                                                                    | 23 November 2016 | 11.69 | 12.07 | 11.83 | 11.67 | 12.79 | 12.11 | 11.62 | 11.79 | 11.79 |

## Appendix-5e April 29, 2015-April 30, 2015

|                                                                            |               |       |       |       |       |       |       |       |       |       |       |       |       |               |
|----------------------------------------------------------------------------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|
| READ-ONLY We opened this workbook read-only from the server. Edit Workbook |               |       |       |       |       |       |       |       |       |       |       |       |       |               |
| BA263                                                                      |               |       |       |       |       |       |       |       |       |       |       |       |       |               |
|                                                                            | A             | AL    | AM    | AN    | AO    | AP    | AQ    | AR    | AS    | AT    | AU    | AV    | AW    | AX            |
| 4                                                                          | 00:00         | 18:00 | 19:00 | 19:00 | 20:00 | 20:00 | 21:00 | 21:00 | 22:00 | 22:00 | 23:00 | 23:00 | 00:00 | Total per Day |
| 7                                                                          | 21 April 2015 | 38.60 | 33.56 | 30.89 | 31.11 | 21.18 | 15.86 | 14.78 | 15.12 | 15.28 | 14.85 | 15.28 | 15.27 | 1635.13       |
| 8                                                                          | 22 April 2015 | 31.28 | 28.90 | 26.08 | 25.84 | 18.98 | 15.33 | 15.41 | 15.26 | 15.42 | 14.89 | 15.48 | 14.99 | 1372.66       |
| 9                                                                          | 23 April 2015 | 36.76 | 31.20 | 28.37 | 26.21 | 17.46 | 14.14 | 14.05 | 13.91 | 14.37 | 13.58 | 13.64 | 14.04 | 1556.37       |
| 0                                                                          | 24 April 2015 | 15.35 | 14.70 | 14.82 | 14.90 | 14.62 | 13.91 | 14.03 | 13.70 | 15.08 | 13.58 | 13.34 | 13.99 | 1415.18       |
| 1                                                                          | 25 April 2015 | 13.57 | 13.69 | 13.48 | 13.31 | 13.71 | 13.56 | 13.55 | 14.15 | 13.74 | 13.19 | 13.50 | 14.05 | 858.06        |
| 2                                                                          | 26 April 2015 | 13.71 | 13.88 | 14.11 | 13.40 | 14.02 | 14.04 | 13.60 | 13.74 | 14.28 | 13.82 | 13.40 | 14.20 | 656.66        |
| 3                                                                          | 27 April 2015 | 39.05 | 32.70 | 30.70 | 28.47 | 17.40 | 15.26 | 14.70 | 14.65 | 15.23 | 14.72 | 14.42 | 15.17 | 1578.70       |
| 4                                                                          | 28 April 2015 | 40.41 | 38.64 | 37.38 | 31.00 | 23.59 | 17.15 | 16.04 | 15.02 | 16.41 | 15.12 | 15.32 | 15.58 | 1641.28       |
| 5                                                                          | 29 April 2015 | 33.92 | 29.90 | 27.47 | 26.89 | 19.43 | 16.50 | 16.10 | 15.88 | 17.44 | 15.80 | 15.80 | 16.09 | 1462.90       |
| 6                                                                          | 30 April 2015 | 38.25 | 32.06 | 29.94 | 29.62 | 19.56 | 14.81 | 14.81 | 14.55 | 15.42 | 14.22 | 14.61 | 14.84 | 1574.41       |
| 7                                                                          | 01 May 2015   | 14.36 | 13.41 | 13.17 | 12.55 | 12.41 | 13.32 | 13.20 | 12.87 | 13.98 | 12.49 | 13.26 | 13.69 | 1418.66       |
| 8                                                                          | 02 May 2015   | 13.96 | 14.16 | 14.20 | 14.40 | 14.09 | 14.38 | 14.45 | 14.60 | 14.44 | 14.00 | 15.22 | 14.55 | 850.67        |
| 9                                                                          | 03 May 2015   | 13.03 | 13.85 | 13.56 | 13.28 | 13.49 | 13.88 | 13.50 | 13.48 | 13.21 | 13.21 | 14.28 | 13.74 | 630.47        |
| 0                                                                          | 04 May 2015   | 13.52 | 12.83 | 12.15 | 12.28 | 12.71 | 12.61 | 11.81 | 12.14 | 12.99 | 13.13 | 12.11 | 11.98 | 687.57        |
| 1                                                                          | 05 May 2015   | 38.68 | 34.77 | 31.69 | 27.46 | 17.98 | 14.60 | 13.59 | 13.17 | 14.12 | 12.98 | 13.11 | 13.37 | 1529.21       |
| 2                                                                          | 06 May 2015   | 34.92 | 33.22 | 30.26 | 25.39 | 17.28 | 14.96 | 14.51 | 15.40 | 14.59 | 14.54 | 14.68 | 14.41 | 1441.26       |

The screenshot displays the Microsoft Excel 2013 interface. The title bar shows the file name '180418 Ass 2 - File 3 - Swansea Business School - Half Hourly Data [Read-Only] - Excel'. The ribbon is set to the 'Home' tab, showing options for Font, Paragraph, Styles, Cells, and Editing. The formula bar indicates the active cell contains the formula '=MAX(B263:AV263)'. The worksheet grid shows a table with columns labeled A through U, representing months from April to May. The data includes various financial metrics, with some cells highlighted in orange. The status bar at the bottom shows 'Ready', 'Circular References: A4', and the date '19/04/2018'.

The screenshot displays the Microsoft Excel 2013 application window. The title bar indicates the file is '30018 Ass 2 - File 3 - Swanssea University School - Half Hourly Data (Read-Only) - Excel'. The ribbon is set to the 'Home' tab, which is divided into several groups: 'Font' (containing options for font face, size, bold, italic, underline, color, and background color), 'Paragraph' (containing options for text alignment, bullet points, and numbering), 'Styles' (containing options for conditional formatting, table styles, and cell styles), and 'Cells' (containing options for inserting, deleting, and formatting cells). The spreadsheet area shows a grid with columns labeled A through AF and rows numbered 1 through 32. The data in the spreadsheet includes dates from 05-Aug-2017 to 12-Aug-2017 and various numerical values. The status bar at the bottom shows 'Ready', 'Circular References: 4', and '19/04/2018'.

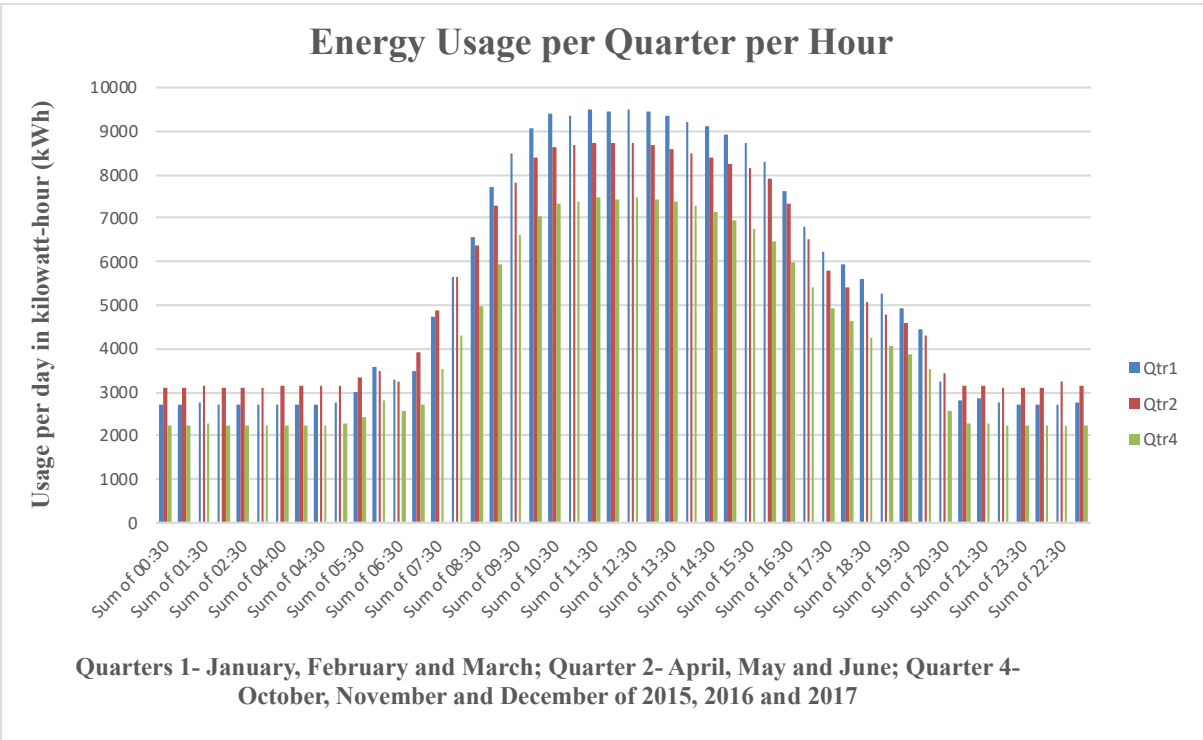
## Appendix-5g top10 Energy consumption in the whole period

|                                                                                    |   |                                                                               |       |       |       |       |                |       |       |       |       |                      |       |                              |               |                 |                                     |       |     |    |  |                                                                       |  |  |  |  |         |  |  |  |  |
|------------------------------------------------------------------------------------|---|-------------------------------------------------------------------------------|-------|-------|-------|-------|----------------|-------|-------|-------|-------|----------------------|-------|------------------------------|---------------|-----------------|-------------------------------------|-------|-----|----|--|-----------------------------------------------------------------------|--|--|--|--|---------|--|--|--|--|
| 180418 Ass 2 - File 3 - Swansea Business School - Half Hourly Data - Excel         |   |                                                                               |       |       |       |       |                |       |       |       |       |                      |       | Oluwayemisi Sobola (1601824) |               |                 |                                     |       |     |    |  |                                                                       |  |  |  |  |         |  |  |  |  |
| File Home Insert Page Layout Formulas Data Review View Tell me what you want to do |   |                                                                               |       |       |       |       |                |       |       |       |       |                      |       |                              |               |                 |                                     |       |     |    |  |                                                                       |  |  |  |  |         |  |  |  |  |
| Clipboard                                                                          |   | Font                                                                          |       |       |       |       | Alignment      |       |       |       |       | Number               |       |                              |               |                 | Styles                              |       |     |    |  | Cells                                                                 |  |  |  |  | Editing |  |  |  |  |
| Cut Copy Paste Format Painter                                                      |   | Times New Roma 14 A A B I U Bold Italic Underline Text Color Background Color |       |       |       |       | Merge & Center |       |       |       |       | Custom % , 0.00 0.00 |       |                              |               |                 | Conditional Formatting Table Styles |       |     |    |  | Insert Delete Format AutoSum Fill Sort & Find & Filter Select & Clear |  |  |  |  |         |  |  |  |  |
| AX4 Total per Day                                                                  |   |                                                                               |       |       |       |       |                |       |       |       |       |                      |       |                              |               |                 |                                     |       |     |    |  |                                                                       |  |  |  |  |         |  |  |  |  |
|                                                                                    | A | AL                                                                            | AM    | AN    | AO    | AP    | AQ             | AR    | AS    | AT    | AU    | AV                   | AW    | AX                           | AY            | AZ              | BA                                  | BB    | BC  | BD |  |                                                                       |  |  |  |  |         |  |  |  |  |
|                                                                                    |   | 00:00                                                                         | 18:30 | 19:00 | 19:30 | 20:00 | 20:30          | 21:00 | 21:30 | 22:00 | 22:30 | 23:00                | 23:30 | 00:00                        | Total per Day | Average Per Day | % Usage per Day                     | Max   | Min |    |  |                                                                       |  |  |  |  |         |  |  |  |  |
| 23 February 2015                                                                   |   | 44.55                                                                         | 39.17 | 34.31 | 29.57 | 19.43 | 15.38          | 15.46 | 14.94 | 14.81 | 14.24 | 15.08                | 14.78 | 1720.50                      | 35.84         | 0.19%           | 68.54                               | 13.19 |     |    |  |                                                                       |  |  |  |  |         |  |  |  |  |
| 24 February 2015                                                                   |   | 47.79                                                                         | 39.64 | 34.14 | 30.54 | 18.84 | 15.00          | 15.28 | 14.36 | 14.13 | 14.50 | 14.79                | 14.47 | 1718.86                      | 35.81         | 0.19%           | 64.91                               | 14.13 |     |    |  |                                                                       |  |  |  |  |         |  |  |  |  |
| 05 October 2015                                                                    |   | 41.94                                                                         | 38.19 | 36.96 | 31.29 | 19.75 | 14.70          | 13.07 | 14.21 | 14.00 | 13.23 | 12.42                | 12.60 | 1710.38                      | 35.63         | 0.19%           | 68.01                               | 12.42 |     |    |  |                                                                       |  |  |  |  |         |  |  |  |  |
| 26 February 2015                                                                   |   | 42.76                                                                         | 39.12 | 31.32 | 29.13 | 18.97 | 15.61          | 15.88 | 14.84 | 14.77 | 14.69 | 14.89                | 14.79 | 1709.57                      | 35.62         | 0.19%           | 67.05                               | 14.55 |     |    |  |                                                                       |  |  |  |  |         |  |  |  |  |
| 01 December 2015                                                                   |   | 41.76                                                                         | 39.75 | 36.64 | 26.94 | 15.16 | 14.10          | 13.82 | 13.28 | 13.33 | 13.20 | 12.97                | 13.36 | 1701.73                      | 35.45         | 0.19%           | 67.51                               | 12.66 |     |    |  |                                                                       |  |  |  |  |         |  |  |  |  |
| 03 November 2015                                                                   |   | 39.51                                                                         | 37.88 | 37.48 | 29.12 | 17.36 | 14.78          | 15.02 | 13.63 | 14.17 | 13.90 | 14.18                | 14.16 | 1689.57                      | 35.20         | 0.19%           | 69.11                               | 12.68 |     |    |  |                                                                       |  |  |  |  |         |  |  |  |  |
| 09 February 2016                                                                   |   | 46.19                                                                         | 41.67 | 37.83 | 35.52 | 22.83 | 14.75          | 14.72 | 14.52 | 13.97 | 14.05 | 13.79                | 13.70 | 1685.78                      | 35.12         | 0.18%           | 63.50                               | 13.27 |     |    |  |                                                                       |  |  |  |  |         |  |  |  |  |
| 24 November 2015                                                                   |   | 39.82                                                                         | 38.37 | 39.44 | 32.96 | 19.19 | 15.44          | 13.93 | 13.24 | 13.20 | 13.14 | 13.17                | 13.43 | 1677.06                      | 34.94         | 0.18%           | 66.98                               | 12.89 |     |    |  |                                                                       |  |  |  |  |         |  |  |  |  |
| 08 February 2016                                                                   |   | 43.27                                                                         | 41.08 | 35.80 | 35.78 | 20.09 | 19.05          | 14.70 | 14.22 | 13.80 | 14.04 | 14.06                | 13.54 | 1673.71                      | 34.87         | 0.18%           | 64.02                               | 12.78 |     |    |  |                                                                       |  |  |  |  |         |  |  |  |  |
| 26 October 2015                                                                    |   | 37.68                                                                         | 36.31 | 35.86 | 32.24 | 19.95 | 15.69          | 15.46 | 15.10 | 15.42 | 14.66 | 15.31                | 14.98 | 1666.32                      | 34.72         | 0.18%           | 65.10                               | 13.85 |     |    |  |                                                                       |  |  |  |  |         |  |  |  |  |

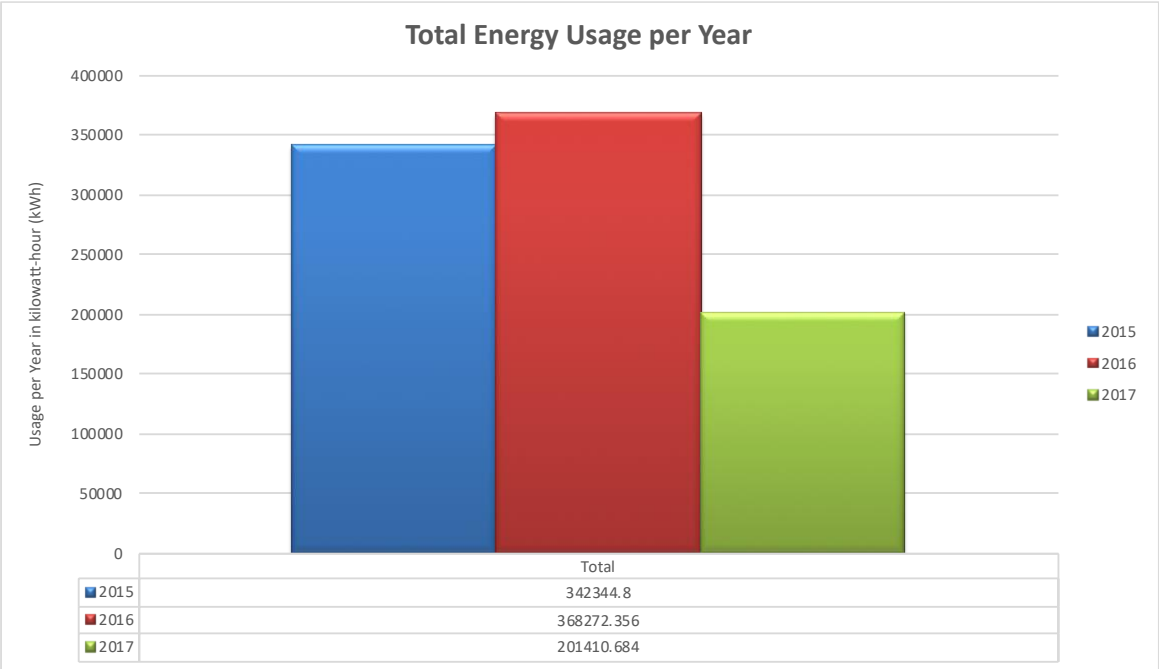
## Appendix-5h File 3

|    | 11:30 | 12:00 | 12:30 | 13:00 | 13:30 | 14:00 | 14:30 | 15:00 | 15:30 | 16:00 | 16:30 | 17:00 | 17:30 | 18:00 | 18:30 | 19:00 | 19:30 | 20:00 | 20:30 | 21:00 | 21:30 | 22:00 | 22:30 | 23:00 | 23:30 | 00:00 | Total per Day | Average Per Day | % Usage per Day | Max   | Min   |
|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|-----------------|-----------------|-------|-------|
| 1  | 64.43 | 60.88 | 66.00 | 64.62 | 63.07 | 63.05 | 61.78 | 64.27 | 60.94 | 58.06 | 55.77 | 49.35 | 40.26 | 46.93 | 44.53 | 39.17 | 34.31 | 29.57 | 19.43 | 15.38 | 15.46 | 14.94 | 14.81 | 14.24 | 15.08 | 14.78 | 1720.50       | 35.84           | 0.19%           | 68.54 | 13.19 |
| 2  | 59.35 | 62.66 | 63.30 | 62.78 | 62.72 | 60.35 | 62.82 | 61.49 | 60.89 | 59.93 | 54.70 | 52.72 | 53.08 | 49.97 | 47.88 | 39.64 | 34.14 | 30.54 | 18.84 | 15.00 | 15.28 | 14.36 | 14.13 | 14.50 | 14.79 | 14.47 | 1718.86       | 35.81           | 0.19%           | 64.91 | 14.13 |
| 3  | 63.47 | 62.62 | 64.33 | 60.63 | 60.85 | 66.79 | 66.03 | 63.62 | 63.47 | 63.83 | 57.47 | 53.18 | 50.40 | 47.18 | 41.94 | 38.19 | 36.96 | 31.29 | 19.75 | 14.70 | 13.07 | 14.21 | 14.00 | 13.23 | 12.42 | 12.60 | 1710.38       | 35.63           | 0.19%           | 68.01 | 12.42 |
| 4  | 65.94 | 67.82 | 66.01 | 66.63 | 65.33 | 69.35 | 64.65 | 64.00 | 62.05 | 61.36 | 56.83 | 52.26 | 50.10 | 46.80 | 41.76 | 39.75 | 36.64 | 26.94 | 15.16 | 14.10 | 13.82 | 13.28 | 13.33 | 13.20 | 12.97 | 13.36 | 1701.73       | 35.45           | 0.19%           | 67.51 | 12.66 |
| 5  | 64.07 | 62.47 | 66.63 | 67.07 | 69.11 | 63.65 | 65.02 | 62.19 | 60.39 | 58.55 | 54.30 | 49.49 | 48.30 | 43.99 | 39.43 | 37.88 | 37.48 | 29.12 | 17.36 | 14.78 | 15.02 | 13.63 | 14.17 | 13.90 | 14.18 | 14.16 | 1689.57       | 35.20           | 0.19%           | 69.11 | 12.68 |
| 6  | 58.90 | 60.89 | 62.33 | 63.22 | 62.62 | 63.02 | 62.28 | 63.50 | 62.31 | 57.30 | 55.09 | 51.09 | 48.51 | 47.65 | 46.19 | 41.67 | 37.83 | 35.52 | 22.83 | 14.75 | 14.72 | 14.52 | 13.97 | 14.05 | 13.79 | 13.70 | 1685.78       | 35.12           | 0.18%           | 63.50 | 13.27 |
| 7  | 62.84 | 62.70 | 64.80 | 66.38 | 66.90 | 69.50 | 64.77 | 63.51 | 61.60 | 59.41 | 53.85 | 52.30 | 49.24 | 44.84 | 39.82 | 38.37 | 39.44 | 32.96 | 19.19 | 15.44 | 13.93 | 13.24 | 13.17 | 13.14 | 13.17 | 13.43 | 1677.06       | 34.94           | 0.18%           | 66.98 | 12.89 |
| 8  | 61.35 | 62.89 | 64.02 | 63.70 | 62.52 | 59.35 | 60.49 | 60.22 | 59.20 | 55.69 | 53.61 | 49.49 | 46.85 | 46.12 | 43.47 | 41.08 | 35.80 | 35.78 | 20.09 | 19.05 | 14.70 | 14.22 | 13.80 | 14.04 | 14.06 | 13.54 | 1673.71       | 34.87           | 0.18%           | 64.02 | 12.78 |
| 9  | 65.10 | 63.37 | 62.35 | 62.57 | 60.94 | 61.40 | 60.91 | 57.60 | 61.80 | 58.83 | 54.57 | 51.01 | 45.08 | 44.72 | 37.68 | 36.31 | 35.86 | 32.24 | 19.95 | 15.69 | 15.46 | 15.10 | 15.42 | 14.66 | 15.31 | 14.98 | 1666.32       | 34.72           | 0.18%           | 65.10 | 13.85 |
| 10 | 64.73 | 65.41 | 66.54 | 67.05 | 65.94 | 61.75 | 62.26 | 61.60 | 60.76 | 56.35 | 51.72 | 52.61 | 47.67 | 45.20 | 40.76 | 38.98 | 37.44 | 32.96 | 19.19 | 15.44 | 13.93 | 13.24 | 13.17 | 13.14 | 13.17 | 13.43 | 1677.06       | 34.94           | 0.18%           | 66.98 | 12.89 |
| 11 | 62.08 | 62.75 | 64.49 | 64.44 | 62.62 | 62.95 | 63.50 | 61.43 | 58.62 | 56.30 | 52.23 | 48.11 | 44.75 | 42.19 | 42.12 | 32.56 | 29.99 | 20.00 | 19.05 | 15.53 | 15.24 | 14.42 | 14.00 | 13.80 | 14.06 | 14.00 | 1661.74       | 34.63           | 0.18%           | 64.49 | 13.94 |
| 12 | 65.80 | 62.08 | 65.66 | 64.74 | 61.79 | 60.53 | 61.69 | 59.90 | 59.61 | 56.30 | 53.94 | 48.62 | 42.70 | 40.68 | 37.70 | 35.34 | 35.82 | 31.40 | 18.91 | 13.70 | 13.51 | 12.60 | 13.23 | 13.79 | 13.11 | 12.42 | 1660.93       | 34.60           | 0.18%           | 65.80 | 12.64 |
| 13 | 62.69 | 61.49 | 62.49 | 63.38 | 61.31 | 62.07 | 60.67 | 60.44 | 60.34 | 58.52 | 53.67 | 49.66 | 47.16 | 45.50 | 43.74 | 39.97 | 35.80 | 31.00 | 18.32 | 16.06 | 15.43 | 14.00 | 14.26 | 14.02 | 14.21 | 13.85 | 1650.49       | 34.54           | 0.18%           | 63.70 | 12.64 |
| 14 | 62.53 | 63.55 | 60.34 | 60.67 | 57.68 | 61.43 | 61.99 | 59.97 | 58.62 | 57.39 | 54.51 | 49.34 | 45.28 | 43.38 | 40.73 | 37.54 | 35.70 | 34.34 | 22.62 | 15.79 | 14.44 | 13.33 | 13.30 | 14.13 | 13.70 | 13.75 | 1654.58       | 34.43           | 0.18%           | 63.21 | 12.71 |
| 15 | 64.24 | 64.74 | 64.70 | 64.41 | 62.34 | 61.26 | 62.06 | 60.45 | 61.09 | 58.84 | 54.84 | 50.79 | 44.57 | 43.69 | 38.79 | 38.70 | 38.43 | 32.10 | 18.46 | 14.34 | 14.23 | 13.30 | 13.43 | 13.80 | 13.53 | 13.59 | 1654.58       | 34.43           | 0.18%           | 63.21 | 12.71 |
| 16 | 64.24 | 59.66 | 63.40 | 64.99 | 65.23 | 63.40 | 63.90 | 60.10 | 59.51 | 58.23 | 53.25 | 50.80 | 43.77 | 40.80 | 37.44 | 36.83 | 36.43 | 33.17 | 20.70 | 15.50 | 13.69 | 13.30 | 13.43 | 13.80 | 13.53 | 13.59 | 1654.58       | 34.43           | 0.18%           | 63.21 | 12.71 |
| 17 | 62.24 | 62.36 | 61.77 | 61.59 | 62.00 | 60.02 | 58.42 | 58.44 | 59.27 | 57.46 | 53.34 | 44.87 | 45.50 | 42.01 | 43.14 | 37.11 | 33.00 | 30.29 | 19.17 | 17.01 | 15.27 | 14.90 | 13.97 | 13.92 | 14.34 | 14.30 | 1652.47       | 34.43           | 0.18%           | 63.09 | 13.47 |
| 18 | 64.80 | 60.84 | 65.34 | 62.21 | 59.93 | 61.32 | 59.14 | 60.44 | 57.66 | 56.70 | 51.07 | 46.63 | 42.75 | 42.06 | 41.44 | 33.68 | 30.00 | 29.00 | 18.47 | 13.02 | 14.92 | 14.47 | 14.18 | 13.90 | 13.94 | 14.05 | 1651.07       | 34.43           | 0.18%           | 63.09 | 13.47 |
| 19 | 61.22 | 62.76 | 65.32 | 63.84 | 63.30 | 64.55 | 64.00 | 61.00 | 61.67 | 60.77 | 55.30 | 49.43 | 45.54 | 43.30 | 38.00 | 36.20 | 35.70 | 31.31 | 19.16 | 15.12 | 14.93 | 14.57 | 13.80 | 13.86 | 13.49 | 13.75 | 1651.07       | 34.43           | 0.18%           | 63.09 | 13.47 |
| 20 | 61.21 | 59.27 | 59.20 | 61.40 | 59.33 | 61.50 | 57.80 | 57.80 | 57.80 | 56.10 | 53.89 | 47.50 | 45.08 | 41.55 | 38.92 | 38.44 | 31.91 | 29.00 | 19.42 | 15.70 | 14.87 | 13.24 | 16.52 | 13.05 | 13.26 | 13.34 | 1640.01       | 34.33           | 0.18%           | 61.40 | 13.39 |
| 21 | 57.90 | 59.28 | 59.15 | 58.85 | 59.84 | 58.50 | 57.62 | 59.50 | 58.20 | 56.14 | 51.64 | 48.90 | 45.09 | 46.20 | 41.44 | 40.10 | 35.51 | 29.00 | 18.22 | 13.70 | 14.10 | 13.44 | 14.69 | 13.14 | 13.29 | 14.27 | 1640.01       | 34.33           | 0.18%           | 61.40 | 13.39 |
| 22 | 63.66 | 60.97 | 63.13 | 62.14 | 63.70 | 63.00 | 63.90 | 62.17 | 63.07 | 61.24 | 57.04 | 52.63 | 46.75 | 44.24 | 40.06 | 38.87 | 35.96 | 31.25 | 17.40 | 13.64 | 14.40 | 14.03 | 13.70 | 13.31 | 13.31 | 13.31 | 1634.46       | 34.34           | 0.18%           | 63.66 | 12.63 |
| 23 | 61.15 | 61.99 | 62.54 | 61.93 | 60.51 | 58.67 | 60.15 | 57.61 | 52.44 | 48.50 | 40.51 | 46.50 | 43.82 | 43.79 | 44.82 | 40.20 | 40.20 | 18.41 | 28.09 | 18.80 | 14.83 | 14.20 | 13.82 | 14.38 | 14.02 | 13.99 | 1644.31       | 34.34           | 0.18%           | 62.54 | 12.63 |
| 24 | 62.47 | 61.63 | 60.14 | 64.45 | 62.70 | 61.48 | 63.53 | 60.70 | 60.24 | 57.03 | 56.70 | 51.21 | 49.13 | 45.29 | 39.43 | 38.74 | 35.61 | 28.94 | 16.10 | 12.74 | 13.84 | 12.62 | 13.29 | 12.70 | 13.34 | 13.41 | 1644.31       | 34.34           | 0.18%           | 62.47 | 12.63 |
| 25 | 60.89 | 60.62 | 60.99 | 59.68 | 58.44 | 57.42 | 58.03 | 57.32 | 60.40 | 55.83 | 52.53 | 45.50 | 45.97 | 43.79 | 40.41 | 39.64 | 37.30 | 31.00 | 23.59 | 17.15 | 16.04 | 13.02 | 16.41 | 15.12 | 15.28 | 14.89 | 1644.31       | 34.34           | 0.18%           | 60.89 | 14.28 |
| 26 | 61.41 | 62.53 | 63.62 | 62.98 | 61.33 | 60.44 | 62.71 | 60.67 | 60.06 | 53.96 | 51.49 | 47.55 | 44.12 | 39.93 | 37.91 | 36.22 | 30.19 | 21.67 | 15.51 | 13.55 | 12.62 | 12.90 | 13.12 | 12.56 | 12.63 | 12.63 | 1638.83       | 34.10           | 0.18%           | 62.98 | 11.68 |
| 27 | 58.10 | 59.67 | 61.58 | 62.58 | 61.49 | 59.23 | 56.05 | 53.96 | 55.15 | 51.96 | 47.45 | 45.09 | 43.44 | 40.75 | 38.60 | 33.56 | 30.00 | 29.11 | 21.13 | 13.86 | 14.76 | 15.12 | 15.26 | 14.83 | 15.26 | 15.27 | 1633.14       | 33.99           | 0.18%           | 61.58 | 14.04 |
| 28 | 62.52 | 61.33 | 62.54 | 62.54 | 60.53 | 60.53 | 60.53 | 60.53 | 60.53 | 58.53 | 54.53 | 50.53 | 46.53 | 42.53 | 38.53 | 34.53 | 30.53 | 26.53 | 18.53 | 14.53 | 13.53 | 12.53 | 12.53 | 12.53 | 12.53 | 12.53 | 1633.14       | 33.99           | 0.18%           | 62.52 | 12.53 |
| 29 | 60.80 | 60.66 | 60.93 | 61.70 | 61.84 | 60.62 | 60.92 | 60.81 | 58.11 | 56.34 | 52.95 | 48.14 | 45.71 | 43.56 | 39.58 | 35.99 | 33.03 | 29.67 | 16.55 | 12.84 | 12.87 | 13.13 | 13.08 | 13.54 | 12.98 | 12.97 | 1633.14       | 34.00           | 0.18%           | 60.80 | 12.97 |
| 30 | 63.12 | 62.55 | 63.74 | 64.47 | 62.71 | 62.72 | 64.17 | 61.70 | 60.98 | 58.45 | 53.33 | 47.66 | 42.71 | 40.09 | 40.49 | 37.38 | 34.00 | 27.81 | 18.95 | 14.72 | 14.27 | 12.81 | 13.14 | 13.08 | 13.62 | 14.28 | 1633.14       | 33.99           | 0.18%           | 63.12 | 12.81 |
| 31 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 61.00 | 1633.14       | 33.99           | 0.18%           | 61.00 | 61.00 |
| 32 | 63.00 | 63.02 | 64.14 | 65.09 | 64.48 | 66.02 | 63.08 | 60.10 | 60.77 | 57.57 | 52.65 | 46.25 | 46.79 | 43.24 | 39.19 | 33.35 | 33.64 | 30.19 | 15.79 | 13.76 | 13.45 | 13.36 | 13.41 | 13.00 | 12.98 | 12.99 | 1630.52       | 33.99           | 0.18%           | 66.02 | 12.91 |
| 33 | 59.72 | 60.70 | 64.55 | 61.14 | 63.31 | 62.52 | 61.00 | 59.38 | 56.79 | 56.16 | 54.44 | 51.55 | 47.46 | 44.61 | 38.96 | 41.02 | 36.12 | 32.48 | 26.62 | 20.97 | 16.68 | 14.14 | 13.76 | 14.18 | 13.25 | 13.74 | 1628.99       | 33.99           | 0.18%           | 64.55 | 12.76 |
| 34 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 1628.99       | 33.99           | 0.18%           | 60.80 | 60.80 |
| 35 | 63.34 | 64.65 | 62.59 | 63.37 | 64.55 | 64.00 | 59.28 | 57.57 | 55.22 | 55.37 | 50.46 | 46.34 | 42.50 | 38.74 | 35.73 | 34.54 | 33.82 | 17.60 | 13.60 | 13.85 | 12.90 | 12.84 | 13.17 | 13.00 | 13.14 | 13.00 | 1628.99       | 33.99           | 0.18%           | 64.65 | 12.84 |
| 36 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 1628.99       | 33.99           | 0.18%           | 60.80 | 60.80 |
| 37 | 59.98 | 60.49 | 59.28 | 60.19 | 61.32 | 62.42 | 62.40 | 59.21 | 56.80 | 54.14 | 51.55 | 47.46 | 44.61 | 43.75 | 36.70 | 36.60 | 35.05 | 29.74 | 19.16 | 15.16 | 13.80 | 13.44 | 14.29 | 13.34 | 13.25 | 12.75 | 1628.99       | 33.99           | 0.18%           | 62.42 | 12.76 |
| 38 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.80 | 60.   |       |       |       |       |       |       |       |       |       |               |                 |                 |       |       |

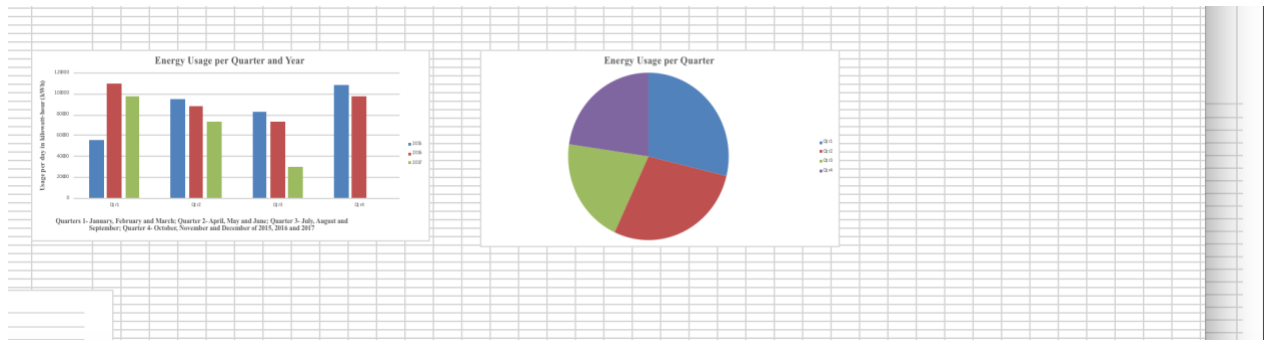
Appendix-5i File 3



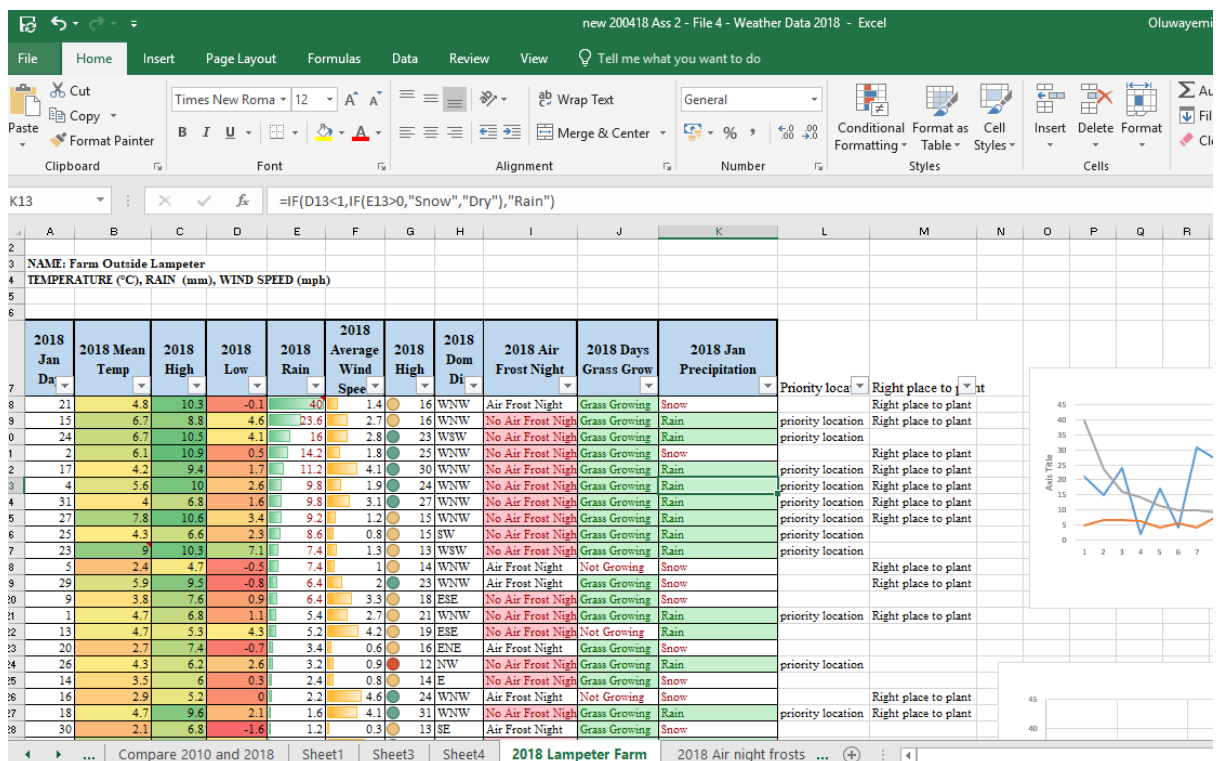
Appendix-5j File 3



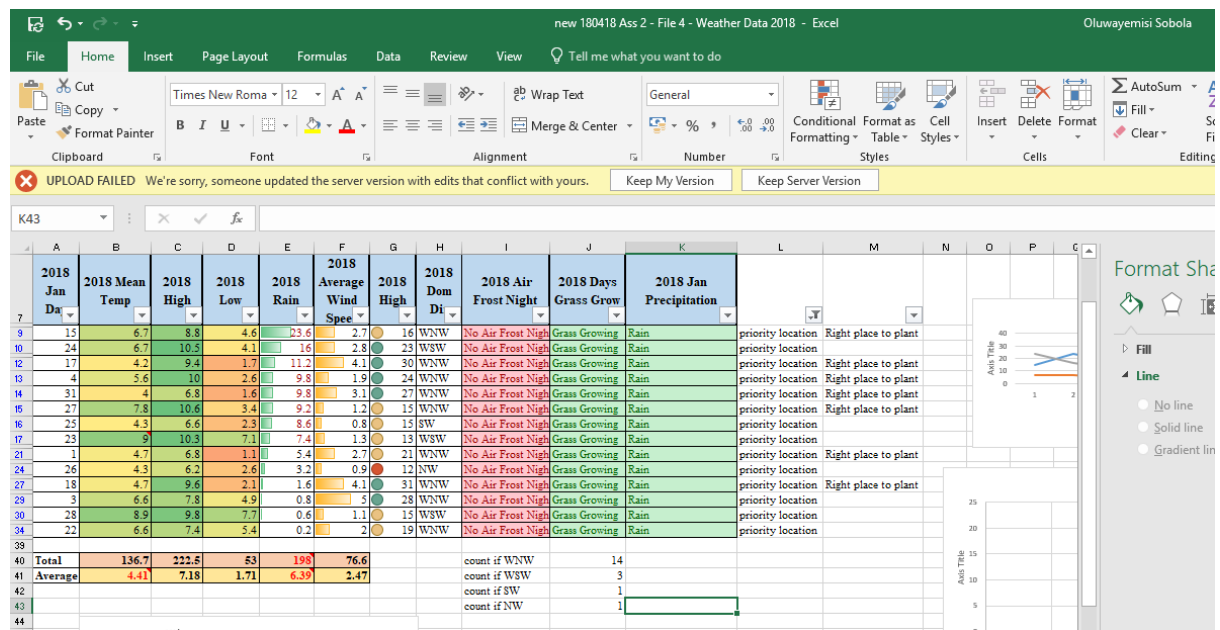
## Appendix-5I File 3



## Appendix-6a File 4 Farm Outside Lampeter



## Appendix 6b the count if



## Appendix 6c Priority location

