Carbon footprint report for the Carbon Smart® Gold Certification

Cestrian Imaging Ltd

Prepared for	**Cestrian Imaging Ltd**
Certification issued	**8th March 2017**
Prepared by	**Jack Morris**
	Jack.morris@carbonsmart.co.uk|+44(0)2070480452

Contents

1 Introduction and background

Congratulations on becoming Carbon Smart® certified. The Carbon Smart® Certification is a nationally recognised sustainability programme with over 1,000 businesses having taken part.

This report recognises that Cestrian Imaging Ltd have shown commitment to reduce their impact on the environment based on current business performance. In addition to this, your Carbon Smart® report provides the following information

- An analysis of the level you are at on the Carbon Smart® certification programme – to help position yourself against other businesses
- Your carbon footprint – we will tell you how well you are performing and provide a visualisation of this
- Guidance on how to maintain a realistic carbon reduction target
- Guidance on how to maintain Carbon Smart® certification
- Support available for implementing efficiency measures

Carbon Smart® has been provided with the following information about your organisation, which has been used as a basis for calculations and recommendations throughout the certification process.

Organisation name	Cestrian Imaging Ltd
Organisation address	Earl Road, Stanley Green Trading Estate, Cheadle Hulme, Cheadle, Cheshire, SK8 6QE
Number of staff	88
Total treated floor area (m²)	55,000 ft^2

Table 1: Organisation details

1.1 About Organisation

Cestrian Imaging are a printing company based in Manchester, the company uses the most up to date technology in their production and provides services for clients such as; JCDecaux, GAP, DFS and the Carphone Warehouse. The company has been Carbon Smart certified since 2013 and previously achieved a Silver level certification for their 2015 carbon footprint. This year due to the company's ongoing carbon reductions and their clear commitment to improving their sustainability, they have successfully achieved Gold level certification.

Some of the environmental successes achieved by Cestrian Imaging Ltd this year included the installation of the new Regianni printer, replacing five older printers and subsequently reducing the company's electricity consumption.

Cestrian have also sourced a third party to recycle their Fabrene roles. Fabrene is a woven polyester and is a difficult material to dispose of in an environmentally friendly manner. This development of a new green waste stream highlights Cestrian's commitment to researching and developing new ways to increase the company's environmental credentials.

As a whole, it is clear that sustainabililiy is an intergrated part of the business at Cestrian Imaging as it plays a part in tenders, employee ethos and business operations.

Carbon Smart Ltd, 3rd floor, 105-107 Farringdon Road, London, EC1R 3BU | Registered in England and Wales, Company number 6235381

Copyright Carbon Smart Ltd   4

2   Carbon Smart Certification features

Carbon Smart® certification recognises the practical actions and decisions that an organisation has taken to reduce its impact on the environment. Carbon Smart® certified organisations have a strong clear message to communicate – they have taken the right steps to tackle their carbon footprint. There are three levels to Carbon Smart® Certification: Carbon Smart® Blue, Carbon Smart® Silver, and Carbon Smart® Gold. Each level has differing levels of commitment and action. The table below summarises their individual features and positions you on that scale in the blue dashed box.

Features	Commitment to Act	Deliver Savings	Show Leadership
Internationally Compliant Carbon Footprint	✓	✓	✓
Action plan to deliver realistic and affordable business change	✓	✓	✓
Robust environmental policy to use in tenders and present to clients and staff	✓	✓	✓
Use of Carbon Smart logo on marketing materials	✓	✓	✓
Carbon Smart completion pack with certificate, artwork and communication guidelines	✓	✓	✓
Year on year carbon savings in line with targets		✓	✓
Review and enhancement of environmental policy documentation to ensure it is integrated into the organisation		✓	✓
Communication of results through engagement and marketing			✓
Data quality rated as 'good' by carbon smart			✓
Exceptional actions achieved			✓

Table 2: Carbon Smart certification features

Carbon Smart Ltd, 3rd floor, 105-107 Farringdon Road, London, EC1R 3BU | Registered in England and Wales, Company number 6235381

Copyright Carbon Smart Ltd   5

3   Carbon footprint and findings

The carbon footprint for Cestrian Imaging Ltd was calculated as 856.6 tonnes CO_2e for the reporting period 01/01/2016 to 31/12/2016. As expected this year has seen a significant decrease in electricity due to the installation of the new Regianni printer, however this new machine also uses natural gas and water in operation explaining the increases with regards to these emissions sources. The increases to flights, company cars and all rail travel are due to the businesses continued growth allowing them to secure new business and source new materials.

	Resource	tCO_2e 2013	tCO_2e 2014	tCO_2e 2015	tCO_2e 2016	% change from previous year	Data Quality
Scope 1	Natural Gas	149.4	107.7	120.3	132.3	10	
	Company Cars	32.3	28.2	18.3	12.3	-33	
	Fleet	30.6	40.1	35.7	22.6	-37	
	Red Diesel	N/A	N/A	N/A	0.9	N/A	
Scope 2	Electricity	895.9	935.5	880.8	653.5	-26	
Scope 3	Water	0.9	0.7	0.8	1.0	22	
	Flights	5.4	11.8	0.8	5.7	598	
	Non-Company Cars	0.5	1.4	4.3	10.5	144	
	Rail	0.9	1.4	0.9	1.9	108	
	International Rail	N/A	N/A	N/A	<0.1	N/A	
	Waste	N/A	N/A	21.5	13.3	-38	
	Paper	1.5	0.7	3.2	2.5	-24	
	Taxis	0.2	0.2	0.2	0.2	25	
	Total	**1,052.2**	**1,127.9**	**1,087.0**	**856.6**	**-21**	

Table 3: Total emissions broken down by resource

Included in the table is a data quality rating based on the accuracy of the data supplied. The rating system works on a three tiered traffic light system with green representing good quality data, orange representing average quality data and red representing poor quality data. The quality of your data is very important, as you cannot manage what you cannot properly measure. Higher quality data provides a more accurate carbon footprint and so we encourage all our clients to improve their data quality as they work through the Carbon Smart® Certification Programme. Table 4 shows the data quality rating.

	Good quality data Primary data sources have been used. Data completeness and accuracy is high
	Average data quality Mixed primary and secondary data sources. Limited extrapolation with average completeness and accuracy
	Poor data quality High levels of estimation and benchmarking. Poor completeness and accuracy

Table 4: Data quality rating system

3.1   Carbon footprint by resource

Chart 1 shows the CO_2e emissions by resource. Cestrian Imaging Ltd should focus their effort on reducing electricity consumption, this is the largest segment of the pie and contributes the most to their carbon footprint.

Cestrian Imaging (tonnes CO_2e)

Electricity 76%
Water <1%
Flights 1%
Non-Company Cars 1%
Rail <1%
International Rail <1%
Waste 2%
Paper <1%
Taxis <1%
Natural Gas 16%
Company Cars 1%
Fleet 3%
Other Fuels <1%

Chart 1:CO₂e emissions (%) by resource

Carbon Smart Ltd, 3rd floor, 105-107 Farringdon Road, London, EC1R 3BU | Registered in England and Wales, Company number 6235381
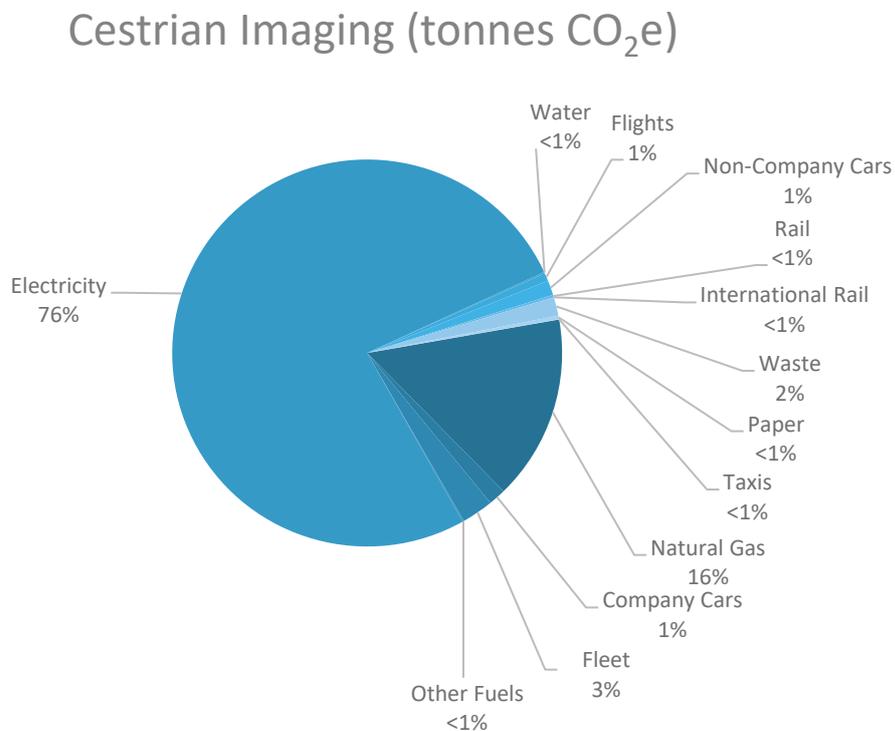
Copyright Carbon Smart Ltd   7

In order to compare the carbon efficiency of the business year-on-year as it evolves and changes metrics can be used to analyse the carbon footprint and to ensure a level of consistency is maintained to measure progress. The table below shows Cestrian's carbon reduction targets in relation to to these key business metrics.

		Year 2013	Year 2014	Year 2015	Year 2016	% change
Tonnes of CO$_2$e per	FTE employee	12.0	13.3	12.8	9.7	-24
	Unit of floor area (ft^2)	0.016	0.021	0.020	0.016	-22
	£100,000 of revenue	Not available	10.2	10.1	7.7	-24
	Total	**1,052.2**	**1,127.9**	**1,087.0**	**855.7**	**-21**

Table 5: Equivalent carbon performance based on key organisational metrics

During the four years that Cestrian Imaging Ltd have been part of the Carbon Smart® certification scheme their FTE and revenue have gradually increased, despite this growth they have still achieved relative carbon reductions in relation to these metrics. Additionally tonnes of CO$_2$e per ft^2 shows a decrease in carbon intensity this year due to the overall reduction in Cestrian's carbon footprint.

Carbon Smart Ltd, 3rd floor, 105-107 Farringdon Road, London, EC1R 3BU | Registered in England and Wales, Company number 6235381

Copyright Carbon Smart Ltd   8

3.2   Carbon footprint visualisations

In order to help Cestrian Imaging Ltd understand their carbon footprint we've produced the following visualisations:

This year Cestrian Imaging Ltd used enough electricity to leave a 100W lamp on for approximately 1,660 years! This is based on a typical 100W bulb consuming 876 kWh/yr.

If the London eye was powered on natural gas, Cestrian Imaging Ltd could have powered it for approximately 0.3 years!

Carbon Smart Ltd, 3rd floor, 105-107 Farringdon Road, London, EC1R 3BU | Registered in England and Wales, Company number 6235381

Copyright Carbon Smart Ltd   9

4 Carbon footprint reduction target

As you are no doubt aware, setting a carbon reduction target is important, as it will give something to aim for over the coming year. The target should reflect what is feasible taking into account both financial and resource constraints. Since organisations are constantly changing due to external factors such as economic climate and employee turnover, it is likely that your carbon footprint will fluctuate. Equally, the accuracy of your carbon footprint depends on the quality and scope of data provided. Therefore, your carbon reduction target should take into account the need to improve and maintain data quality.

To make your target robust, Carbon Smart® suggests you take the following steps:

- **Use a relative measure for your carbon footprint target:** To ensure you take into account business fluctuations in economic activity and employee numbers you can divide your carbon footprint by employee numbers or revenue to get a relative figure (i.e. you may want to reduce your carbon footprint by 1 tonne per employee member or 1 tonne per £100,000 turnover)

- **Choose a target that is ambitious yet achievable:** Carbon Smart® benchmark targets are 5-8% in the first year and 15% by the third year based on relative figures (NB for some companies this target proves conservative and as such we recommend businesses review their carbon footprint and reduction target annually).

Carbon Smart Ltd, 3rd floor, 105-107 Farringdon Road, London, EC1R 3BU | Registered in England and Wales, Company number 6235381

Copyright Carbon Smart Ltd   10

5   Next Steps

Integrating sustainability into your business is a process that requires both practical alterations to business operations and employee behaviour. Some actions can be made immediately within a business and produce fast results, whilst other changes to business practice require allocation of money and time that may need to take place over a number of years before results can be seen.

Your business should strive towards maintaining and improving the level of environmental data collected. Accurate and complete data sets provide the basis for developing a true picture of your carbon footprint. As a result, your company can then continue to develop an effective action plan and environmental policy that target the specific sustainability challenges that face your business.

5.1 Maintaining Gold

The next step for your company is to ensure that continuous environmental improvement and heightened carbon performance are a part of your businesses long-term plan. Becoming a sustainable business is not a single action, it is an on-going process that involves commitment to quantifying, monitoring and reducing your environmental impact throughout the business lifecycle.

With a Gold Certification you're highlighting your company as an exemplary sustainable business. In order to maintain this status year on year you should aim to further commit the organisation to the front of the UK's sustainability efforts. Cestrian Imaging Ltd could do this by instigating change in the wider community as well as getting involved in higher level sustainability projects such as decentralised energy. As discussed on site opportunities such as wind power and ground source heat pumps are an effective use of energy with low carbon emissions and should be considered by the company as a long-term objective.

Cestrian Imaging's largest source of emissions is due to the significant level of electricity consumption on site, as such to ensure cost effective measures are introduced this should be the most significant area of focus. In order to reduce the company's electricity consumption the company could investigate the following:

- LED lighting – Install LED lighting across the site, this would significantly decrease the sites electricity use as LEDs are approximately 30% more efficient than the fluorescent tubes currently in place.
- Voltage optimisation – The UK's voltage is slightly higher than most other European countries and as a result many machines are powered on a voltage higher their optimal input. By lowering the sites input voltage this could help to reduce the businesses energy costs by an average of 10%. Voltage optimisation can be installed at a relatively low cost and will also increase the operational lifespan of machines on site.
- Procure a green tariff – The company currently has a standard electricity tariff provided by Hudson energy. Some companies offer energy tariffs with a greater proportion of energy provided by renewable sources these tariffs can offer both carbon and cost reductions.

Natural gas is currently used to heat the offices using TRV controlled radiators and the warehouse using Wanson space heaters.

- The current boiler in place is an estimated 10+ years old and while it is maintained on an annual basis it would be worth investigating a newer, more efficient boiler. In addition most new boilers have a centralised control system allowing temperatures to be correctly maintained across the site.

Carbon Smart Ltd, 3rd floor, 105-107 Farringdon Road, London, EC1R 3BU | Registered in England and Wales, Company number 6235381

Copyright Carbon Smart Ltd   11

- The company could look at installing a biomass boiler to support the current natural gas heating system, the business produces a lot of wood pallets that are recycled and these could potentially be used as a feed stock.
- The building is approximately 20 years old and has had little building fabric upgrades since Cestrian Imaging began leasing the site. Installing cavity walling insulation and a 5mm roll of roofing insulation in the office areas could help to further reduce the buildings consumption of natural gas.

Other areas for improvement:

- This year's scope does not include transportation of products and materials to and from Cestrian Imaging. In future years, it would be useful to take this data into context as it will make up a significant part of the company's carbon footprint. This year an estimated £650,000 was spent on courier services.
- It's imperative that next year Cestrian Imaging look to improve their data quality with regards to car travel including taxis. Currently the data provided is in distance travelled and spend, this is considered poor quality data as it requires assumptions to derive the total emissions attributed to these forms of travel. Having an accurate carbon footprint is vital to making cost-effective carbon reductions.
- As discussed on site the installation of a half-hourly electricity meter would help to increase the detail of energy profiling on site, allowing the company to target peak times in their energy demand and make changes to adjust their consumption.
- Consider installing decentralised sources of energy on site to help offset Cestrian's electricity consumption. Options such as solar and wind typically have long payback periods but may be a worthwhile investment in the long term.

Carbon Smart Ltd, 3rd floor, 105-107 Farringdon Road, London, EC1R 3BU | Registered in England and Wales, Company number 6235381

Copyright Carbon Smart Ltd   12

6 Resources and further reading

Energy Efficiency Financing

Small or medium-sized enterprises (SME) in England that have been trading for at least 12 months could borrow from £3,000 to £100,000 (£400,000 in Northern Ireland). It is unsecured, interest free and repayable over a period of up to 4 years. There are no arrangement fees and applying is straightforward. See www.carbontrust.co.uk for more information.

Enhanced Capital Allowances

The Enhanced Capital Allowance (ECA) scheme is a key part of the Government's programme to manage climate change. It provides businesses with enhanced tax relief for investments in equipment that meets published energy-saving criteria. The website covers equipment that qualifies for the allowance and provides background information about the scheme and its benefits. See www.eca.gov.uk for more information.

Environmental Management Systems

There are two key internationally recognized standards that are designed to help businesses manage their energy use and impact on the environment. ISO 14001 provides framework for an environmental management system and ISO 50001 focuses on an energy management system and energy efficiency. Gaining certification of these standards within your business can help reduce your environmental impacts, reduce operating costs, provide legal compliance and improve your stakeholder relationships. See http://www.iso.org/iso/home/standards/ for more information.

Empower Change in your business

Making sustainable changes to your business cannot be driven by one individual. It requires a committed attitude at every level of the business to ensure that long term change occurs and is maintained. These changes can become part of the fabric of your business making achieving all the benefits associated with being environmentally friendly an easy and stress free process. See http://www.carbonsmart.co.uk/empower-change/ for more information.

Carbon Smart Ltd, 3rd floor, 105-107 Farringdon Road, London, EC1R 3BU | Registered in England and Wales, Company number 6235381

Copyright Carbon Smart Ltd   13

7 Appendix

7.1 Carbon footprint methodology

Carbon Smart® follows the Green House Gas (GHG) Protocol produced by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). This methodology provides detailed guidance on emissions reporting.

This assessment was based on the 'operational boundary' principle, i.e. the emissions associated with operations directly influenced by your company.

The classification method used to group GHG emissions, by the level of control an organisation has over them are categorised into three main types of GHG classes:

Direct emissions, scope 1: Are those which result from fossil fuels burned directly by the business, such as boiler gas, Air Conditioning refrigerant gas, or fuel in company vehicles/fleets.

Indirect emissions, scope 2: These are from imported electricity i.e. power stations to run heating, lighting, electrical equipment within the building.

Other indirect emissions, scope 3: Are from products and services such as the emissions from the consumption of water, waste, business travel, paper etc. The boundaries of this scope are agreed with the organisation and the general rule is to include what a business can quantify, monitor and influence.

7.2 Scope, boundary and data collected

The operational boundary[1] was set for the activities carried out at your business.

Where possible and relevant the following activities have been included:
- Scope 1: Natural gas, company cars, refrigerants, other fuels and fleet
- Scope 2: Electricity
- Scope 3: Waste, water, paper, national/international rail, flights, non-company cars taxis

The following were excluded from the carbon footprint calculation:
- Staff commute travel
- Non paper stationery
- Off-site staff / partner events
- Supply chain emissions

---

[1] The operational boundary includes emissions controlled by the organisation and emissions arising from their operations.

Carbon Smart Ltd, 3rd floor, 105-107 Farringdon Road, London, EC1R 3BU | Registered in England and Wales, Company number 6235381

Copyright Carbon Smart Ltd   14

7.3   Data supplied and used for carbon footprint

Emissions source	Raw data (covering period 01/01/2016-31/12/2016)	Assumption or formulae applied
Natural Gas	718,902 kWh	
Company Cars	5,268 litres	Based on 1.5-2.0L diesel and >2.0L hybrid engines
Fleet	8,639 litres	Based on a 1.5t - 3t diesel van
Red Diesel	300 litres	
Electricity	1,454,416 kWh	This carbon emissions have been calculated using both a supply factor of 0.41 and a transmission and distribution factor of 0.04
Water	1,958,000 m^3	
Waste	404,420 kg	Data has been split into four waste streams; general landfill, industrial landfill closed loop recycling and incineration with energy recovery.
Paper	349 kg	All sheets are either 80g uncoated A4 or A3
Flights	36,426 km	
Rail	38,136 km	
International Rail	14 km	
Non-Company Cars	4,706 litres	Based on the following types of vehicle: 1.5-2.0L diesel and petrol, >2.0 l petrol and a >2.0L hybrid
Taxis	1,017 litres	Data has been extrapolated from spend based on average cost per litre

Table 6: Raw data and assumptions or formulae applied

Carbon Smart Ltd, 3rd floor, 105-107 Farringdon Road, London, EC1R 3BU | Registered in England and Wales, Company number 6235381

Copyright Carbon Smart Ltd   15

7.4 Data quality by resource type

Carbon Smart® ranks the quality of the data received from the company as either Primary, Secondary or Tertiary data. This ranking systems helps attach a qualitative grading to the data based on the number of calculations and assumptions needed to reach the total Carbon emissions for that data source. Your company should strive to provide primary sources of data for all their emissions within their operational boundary as it helps us calculate an accurate and representative figure of the businesses carbon footprint.

	Emissions source	Primary data	Secondary data	Tertiary data
Scope 1	Natural Gas	Consumption (kWh, m³ or HCF)		Spend (£)
	Other Fuels	Consumption (kWh, kg, Litres)		Spend (£)
	Fleet	Consumption (litres)	Distance (Miles or Km)	Spend (£)
	Company Cars	Consumption (litres)	Distance (Miles or Km)	Spend (£)
Scope 2	Electricity	Consumption (kWh)		Spend (£)
Scope 3	Water	Consumption (m³ or litres)		Spend (£)
	Waste	Waste transfer notes (kg)	Container size (litres) and collection frequency (per week)	Number of bin bags and collection frequency
	Flights	Arrival and Departure Airport (IATA Codes) or Distance (km)	Specify Domestic, Short haul (<3,700Km), Long haul (>3,700 Km), International or Unknown	Spend (£)
	Rail	Arrival and Departure Station or Distance (km)		Spend (£)
	International Rail	Arrival and Departure Station or Distance (km)		Spend (£)
	Taxis	Distance (miles or km)		Spend (£)
	Non-Company Cars	Consumption (litres)	Distance (Miles or Km)	Spend (£)
	Paper	Quantity and Type (No. of reams, size, weight and recycled content)		Spend (£)

Table 6: Data quality classifications by resource type and their units

Carbon Smart Ltd, 3rd floor, 105-107 Farringdon Road, London, EC1R 3BU | Registered in England and Wales, Company number 6235381

Copyright Carbon Smart Ltd   16

7.5 Data Quality Criteria and Guidance

Data quality is an important part of the carbon footprint calculation process. The higher quality the data submitted, the more accurate and meaningful carbon footprint calculations can become. It is also true that resource use that cannot accurately be measured, cannot accurately be managed, so collecting robust data is very important. This is probably quite an obvious statement, but a lot of organisations do not currently collect or monitor their energy and resource consumption at all.

There are three important aspects to data quality that we take into account when we calculate your operational carbon emissions;

1. **Source –** the consumption figures you have been able to supply and where they came from, for e.g.
    - kWh consumption of electricity from meter readings or;
    - Spend on fuel from receipts for a company car

2. **Completeness –** the time period your data considers and the coverage within the business, e.g.
    - Natural gas data for one whole year, for two floors of a two storey building or;
    - Natural gas data for three months for one floor

3. **Accuracy –** the confidence you have in your data i.e. are these figures 100% accurate, estimates, or unknown?

Carbon Smart rates each individual piece of information you provide to us for the calculation of your carbon footprint. We follow a simple three tier traffic light system. The logic behind the system is that green signifies good quality data, orange indicates average data and red is poor data quality.

All pieces of data will be firstly categorised by source, as primary, secondary or spend, then by completeness, as per the definitions below:

- Primary – actual consumption of fuel / energy / or product with the appropriate units
- Secondary – a figure we can convert into fuel / energy / product consumption simply i.e. mileage, bags of waste etc
- Spend – data that we can approximate to consumption through a series of assumptions but will include a number of other factors i.e VAT, levies and other taxes.

The matrix we use to assess your data is in the table below. Each piece of data you submit will fit into this grid accordingly:

	Actual & complete (90% or more of data)	Partially complete (greater than 50% of property/asset)	Incomplete (less than 50% of property/asset)
Primary data (e.g. litreage)	🟩	🟧	🟥
Secondary data (e.g. mileage)	🟧	🟥	🟥
Tertiary data (e.g. spend)	🟧	🟥	🟥

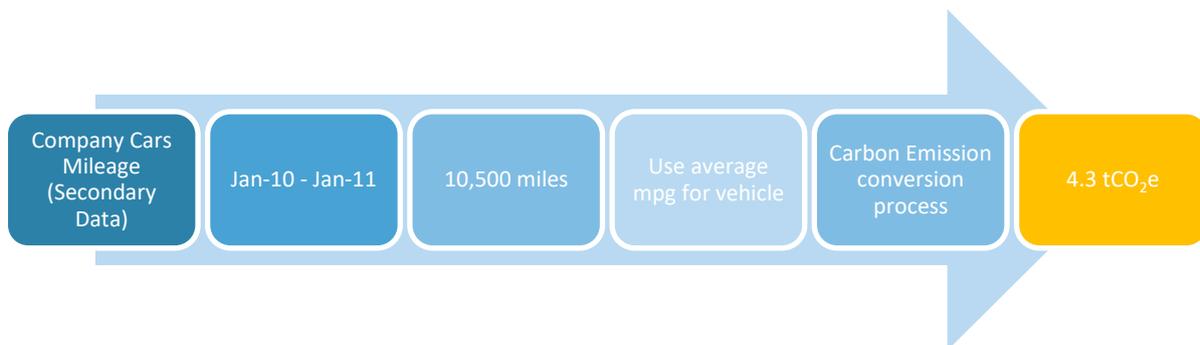*NB: Estimated, extrapolated, pro-rated or benchmarked (no information available) data are automatically incomplete, 'red' data quality.*

Carbon Smart Ltd, 3rd floor, 105-107 Farringdon Road, London, EC1R 3BU | Registered in England and Wales, Company number 6235381

Copyright Carbon Smart Ltd   17

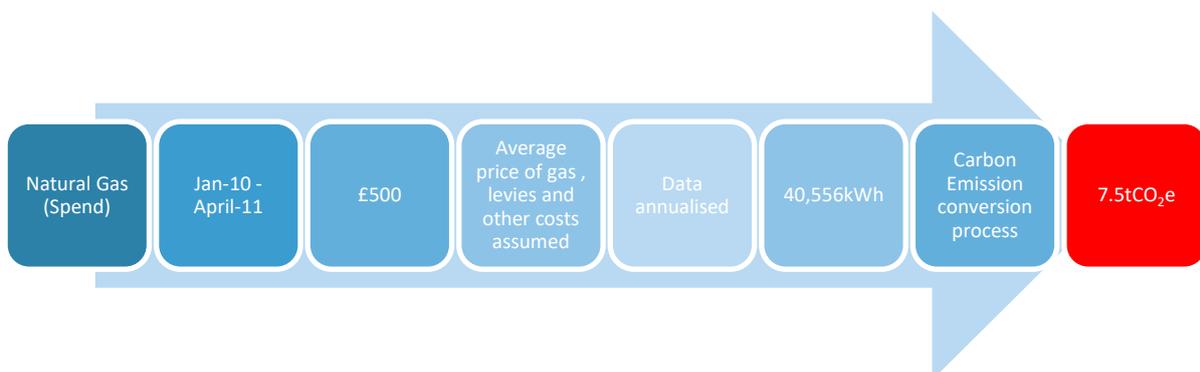To illustrate some real life examples of data quality, we have provided some examples below:

Example 1: Green Data Quality

Electricity Consumption (Primary Data)	Jan-10 - Jan-11	10,500 kWh	Carbon Emission conversion process	5.7 tCO$_2$e

Example 2: Orange Data Quality

Company Cars Mileage (Secondary Data)	Jan-10 - Jan-11	10,500 miles	Use average mpg for vehicle	Carbon Emission conversion process	4.3 tCO$_2$e

Example 3: Red Data Quality

Natural Gas (Spend)	Jan-10 - April-11	£500	Average price of gas, levies and other costs assumed	Data annualised	40,556kWh	Carbon Emission conversion process	7.5tCO$_2$e

In order to show true carbon reduction and accurately compare year-on-year performance, your overall data quality rating must meet and maintain the Carbon Smart green criteria. Continuity of source, completeness and accuracy of data will allow your organisation to retrieve the highest value from environmental reporting and therefore gain a greater degree of certainty over the magnitude of environmental and financial rewards your sustainable business actions can achieve in future.

Carbon Smart Ltd, 3rd floor, 105-107 Farringdon Road, London, EC1R 3BU | Registered in England and Wales, Company number 6235381

Copyright Carbon Smart Ltd

18

7.6 Conversion factors

Carbon Smart® use the Defra published UK conversion factors.

2016 Defra emissions factors	Unit	Conversion factor (kg CO_2e per unit) to 2 d.p.
Electricity Generation	kWh	0.46
Transmission and distribution	kWh	0.04
Water supply	m^3	0.34
Water treatment	m^3	0.71
Waste: General waste - Landfill	Tonnes	421
Waste: General waste - Industrial	Tonnes	199
Waste: Paper and board – Closed loop recycling	Tonnes	21
Waste: General waste – Incineration with energy recovery	Tonnes	21
Paper	Tonnes	2673.64
Diesel Fleet (1.5t – 3.0t)	Litres	2.61
Hybrid Large (>2.0 L)	Km	0.18
Diesel Medium (1.5-2.0L)	Km	0.18
Petrol Large (>2.0 L)	Km	0.29
Petrol Medium (1.5-2.0L)	Km	0.20
Taxis	Km	0.23
Flights, Long haul (>3,700 Km)	Km	0.15
Flights, Short haul (<3,700 Km)	Km	0.17
Rail	Km	0.05
International rail	Km	0.01
Red Diesel	Litres	2.97

Table 7: Conversion factors used in the report

Carbon Smart Ltd, 3rd floor, 105-107 Farringdon Road, London, EC1R 3BU | Registered in England and Wales, Company number 6235381

Copyright Carbon Smart Ltd   19

7.7 Terminology

Carbon dioxide (or CO$_2$) - is a gas. Carbon Dioxide is just one of the greenhouse gases which impact on our climate and the weather patterns of the planet, and has been found to contribute to global warming.

CO$_2$e - There are six main greenhouse gases which cause climate change and each one of these has a different global warming potential. For simplicity of reporting, the mass of each gas emitted is commonly translated into a carbon dioxide equivalent (CO$_2$e) amount so that the total impact from all sources can be summed to one figure. Volumes of CO$_2$e in this report are assumed to be at standard temperature and pressure (STP).

Greenhouse gases - Greenhouse gases occur naturally in the Earth's atmosphere and create a layer around the earth which keeps the planet warm. However, if too many gases are released, as with CO$_2$, the increased concentration levels prevent heat loss from the planet and cause higher temperatures. The name for this is the greenhouse effect. Carbon dioxide is the most prevalent greenhouse gas. Other greenhouse gases include methane (which is produced from the landfill or agriculture activities), and Nitrous oxide (as a result of transport and industrial processes). Greenhouse gases are natural and without them the earth could be 15-30°C colder.

World Resources Institute (WRI) - WRI published the Greenhouse Gas Protocol for Project Accounting in 2005. The protocol takes the approach of identifying emissions by 'scope' (setting out Scope 1, 2 and 3) and is widely accepted as the leading protocol for carbon footprint calculation. WRI is an environmental think tank that goes beyond research to find practical ways to protect the earth and improve people's lives. WRI have recognised climate change as a critical threat to people's lives and to the environment.

Carbon Smart Ltd, 3rd floor, 105-107 Farringdon Road, London, EC1R 3BU | Registered in England and Wales, Company number 6235381

Copyright Carbon Smart Ltd   20

3rd floor Farringdon House,

105-107 Farringdon Road

London EC1R 3BU

+44 (0)207 048 0450

Info@carbonsmart.co.uk

www.carbonsmart.co.uk

Registered in England and Wales, Company number 6235381

Registered offices Carbon Smart Ltd, 3rd Floor, Farringdon House, 105 - 107 Farringdon Road, London, England, EC1R 3BU

Copyright Carbon Smart Ltd

Carbon Smart Ltd, 3rd floor, 105-107 Farringdon Road, London, EC1R 3BU | Registered in England and Wales, Company number 6235381

Copyright Carbon Smart Ltd   21