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Summary of a carbon footprint pilot scheme of urban medical practices in Salford

V1.1

NHS Salford Clinical Commissioning Group

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Dr Matthew Sawyer
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Carbon footprint analysis of urban GP practices

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Introduction

Greenhouse gas emissions from healthcare are substantial[1], and the health sector has generally lagged most other industries in reducing its carbon footprint. A Net Zero NHS sets targets for the health service to reach net zero for emissions under our direct control by 2040. Primary care data is scant in nature. Reports published (e.g. by SDU) show the footprint of a GP consultation is 18kg CO_2e if pharmaceuticals are included based on activity[2], however, understanding the included boundaries is vital. A 2015 publication[3] demonstrates the activities included or excluded in a typical carbon footprint calculation.

Aim

Salford CCG wanted to calculate the carbon emissions footprint for eight urban general practices and use the data to identify the hotspots, compare practices of different size and offer actions and interventions to improve patient outcomes with a lowering of the carbon emitted.

[1] 'A Net Zero NHS' - available at www.england.nhs.uk/greenernhs/a-net-zero-nhs/
[2] www.sduhealth.org.uk/policy-strategy/reporting/natural-resource-footprint-2018/carbon-hotspots.aspx
[3] 'Care Pathways: Guidance on Appraising Sustainability GP Consultation Module' available at www.sduhealth.org.uk/

Methodology

To calculate a carbon footprint for a practice, each action, purchase and procurement, all travel for patients and staff, all energy use and all the activities which are involved in the running of the practice are identified and converted into an amount of carbon. Conversion factors are calculated from a variety of sources including from the UK governments database Greenhouse Gas Reporting Conversion Factors 2020[4].

- For energy use, the amount of energy (kWh of gas and electricity) used by the practice ensures conversion into kgCO_2e is straightforward.
- For staff travel, the size, type of vehicle and distance travelled each week for each member of staff[5] can be converted into an amount of emissions for an accurate footprint for the staff member individually and the practice collectively. Emissions per mile travelled for different vehicles is found in the government database.
- For patient travel, travel distances from a patient's home address to the surgery were calculated for all face-to-face appointments. Using national travel survey data (method of transport for different journey lengths and average car ownership/fuel type), these were converted into emissions.
- For professional services, databases produce an average emission (kg CO_2e) per pound (£) spent for different services. Identifying total annual spend by service enables conversion into total greenhouse emissions.
- Invoices for a 12-month period are examined and each entry is logged. These figures are combined with information from several sources to calculate their associated carbon emissions. For office and medical supplies, conversion into kg CO_2e is done for each item.

The emissions in each category are totalled up to give an overall total greenhouse gas emissions footprint by area and for the practice.

The emissions footprint attributable to prescribing pharmaceuticals is calculated from the total spend is based on expenditure data from NHSBSA and medication bought by the practice for inhouse use.

Practices were approached by Salford CCG (North West of the UK) and visits to each surgery for data gathering was undertaken in summer 2020.

[4] www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020
[5] Form available here - seesustainability.co.uk/healthcare

Boundary setting

Included

Patient travel for appointments
Staff travel to and from work

Medical consumables used in GP consultation
New Medical Equipment used in GP consultation

Office consumables used by the practice
New Office Equipment purchased

Electricity, fuel use by GP practice

Water used
Waste generation and disposal; Cleaning

Food and drink purchased by the practice

Administration activities/professional services (e.g. Training/telephony/IT/financial services/accountancy etc)

Carbon emissions from inhaler prescribing
Total emissions of pharmaceuticals based on expenditure

Excluded

Food brought in

Capital goods (e.g., building)

Health staff externally employed (e.g., health visitors, district nurses, pharmacists, physio)

Laboratory tests, diagnostics, hospital referrals

Delivery of medication by external pharmacies

Goods bought by other organisations outside of the practice invoices

Capital emissions from previously bought/currently owned equipment

Results

Analysis by practice list size based on patient number - 3,000 (small), 6,000 (medium), and 12,000 (large) took place. The total carbon footprint of (kg CO_2e per annum) is shown (Table 1).

Table 1. Total average kg CO_2e by respective area (may not add up to 100% due to rounding)

Area	Size of practice		
	Small	**Medium**	**Large**
Average list size	3,000	6,000	12,000
Total Footprint	333,000	515,000	1,075,000
Footprint Excl Medicines	**54,000**	**40,000**	**92,000**
Medicine Spend	275,000	475,000	985,000
Energy	27,000	9,000	36,000
Staff Travel	5,500	9,000	18,000
Patient Travel	4,500	4,900	15,000
Professional Services	12,000	9,000	13,000
Rest	4,500	9,000	10,000

Emissions per patient, are 18.5, 14.3 and 14.9 kg CO_2e for small, medium and large practices respectively based on an average of 6 consultations per patient per year. This is in keeping with the SDU figures[6]

Prescribing

Roughly, as a practice doubles in size, the size of the prescribing budget doubles and so the total carbon footprint also doubles.

Inhalers

The largest single contributor to the prescribing carbon footprint is from inhalers. The total annual footprint for inhalers is calculated from of the total number of maintenance inhalers and SABA inhalers prescribed multiplied by the carbon footprint per inhaler[7] (Table 2).

Table 2. Number of inhalers prescribed and their carbon footprint by practice size.

Practice size	SABA		Maintenance	
	Number prescribed per year	Carbon emissions (kg CO_2e)	Number prescribed per year	Carbon emissions (kg CO_2e)
Small	1,900	38,000	1,000	20,000
Medium	2,300	46,000	1,500	30,000
Large	5,000	100,000	1,800	36,000

[6] www.sduhealth.org.uk/policy-strategy/reporting/natural-resource-footprint-2018/carbon-hotspots.aspx
[7] Data from at greeninhaler.org, breathright, asthmaUK, NHSBSA and openprescribing.net

Operational carbon

The operational carbon footprint from the day to day running of the practice generates between 40,000 kg and 92,000 kg CO_2e depending on the size of the practice (Figure 1). Areas contributing most are energy, travel (staff and patient) and professional services. These three areas are responsible for at least 80% of the operational footprint of a practice.

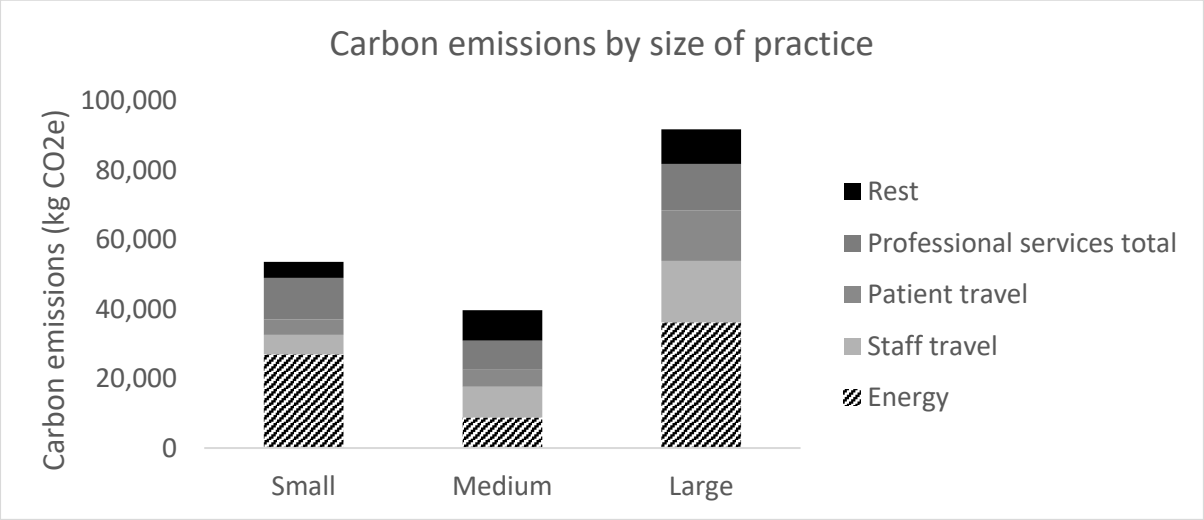
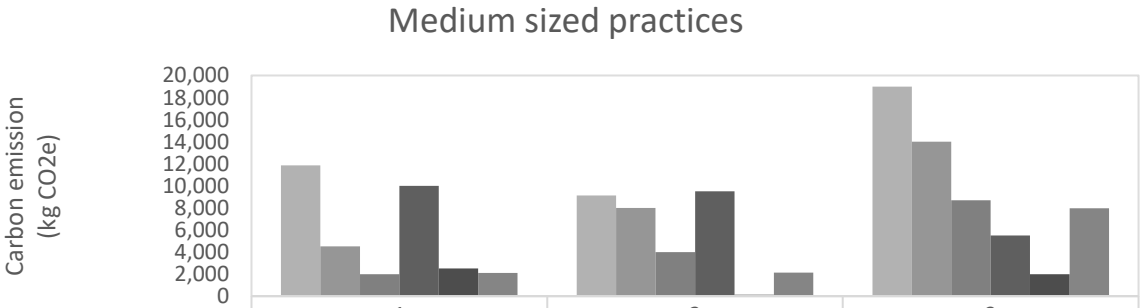


Figure 1. Total footprint for small, medium and large practices.

There is intra-practice variability of carbon emissions. For medium sized practices, Figure 2 shows the variation for example, professional services vary from 9,000 to 19,000 kg CO_2e; patient travel range from 2,000 to 8,700 kg CO_2e.



	1	2	3
Professional services	11,850	9,125	19,000
Staff travel	4,500	8,000	14,000
Patient travel	2,000	4,000	8,700
Energy	10,000	9,500	5,500
Medical supplies	2,500	125	2,000
Office supplies	2,100	2130	7,950

Figure 2. Variation in emissions from different categories for medium sized practices

Energy

Total energy use (gas and electricity) does not show a linear relationship with practice patient list size. Some practices have already installed solar panels or electricity storage batteries.

Figure 3 shows the relationship between floor space and annual energy use.

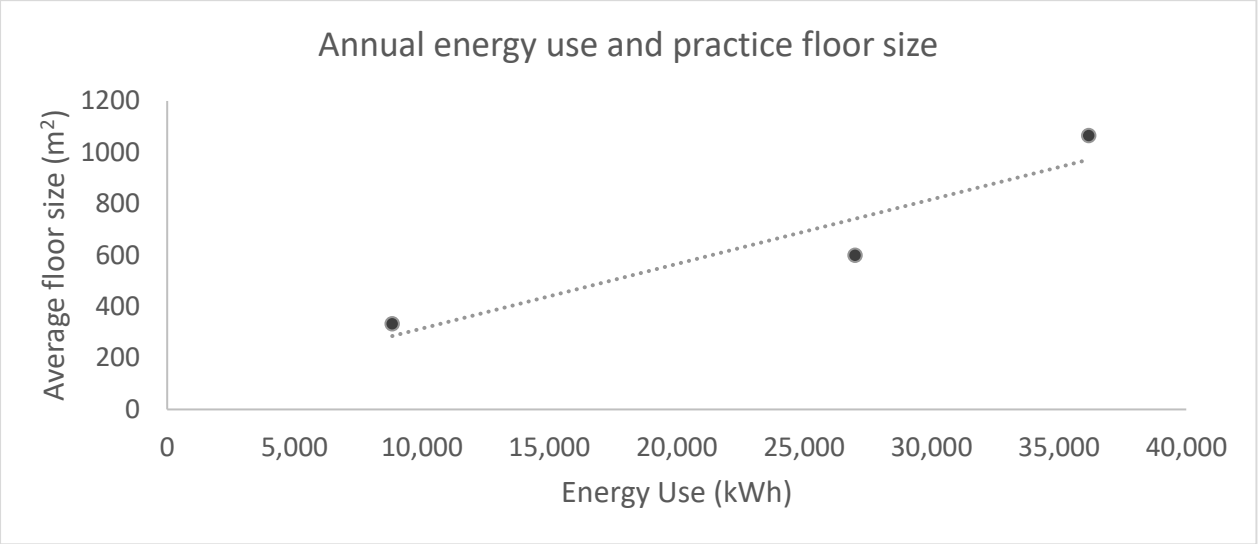


Figure 3. Relationship between energy use and practice floor space.

Figure 3 shows a positive relationship and shows floor space is a key determinant of energy use rather than patient list size.

Travel

Total travel emissions are shown in Figure 4. Total staff travel emissions are around 5,500, 9,000 and 18,000 kg CO_2e while total patient travel emissions are around 4,000, 5,000 and 14,500 kg CO_2e for small, medium and large practices respectively.

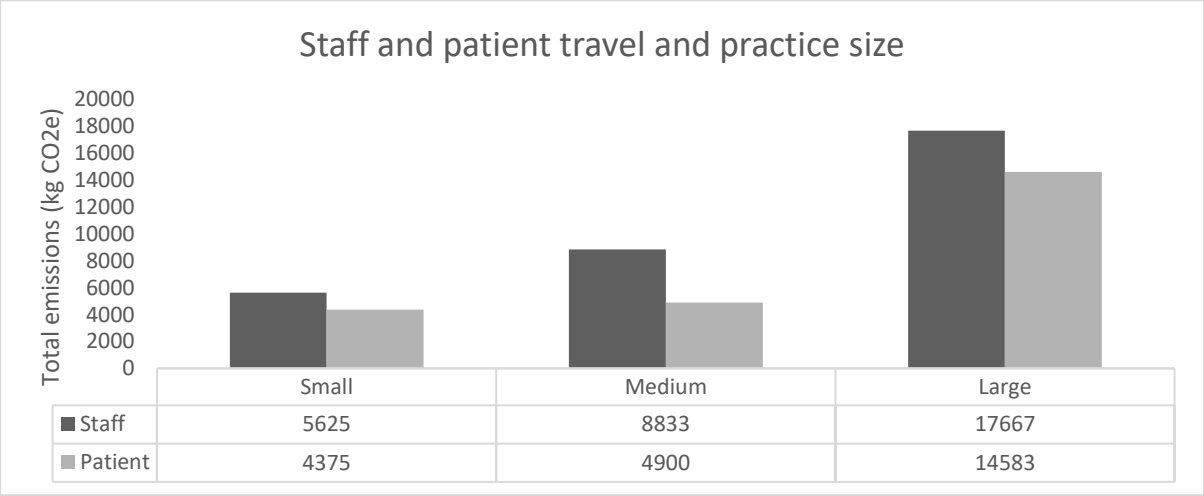


Figure 4. Carbon emissions attributable to staff and patient travel (annual, kg CO_2e)

Professional services

Each service used by the practice has a carbon footprint. It is often not possible to identify an accurate carbon footprint for tier 1 suppliers unless they have carried out a carbon audit of their own and published their findings. However, there are average conversion factors for different professions based on the amount of CO_2e per £ spent. Total professional services footprint is shown in figure 5.

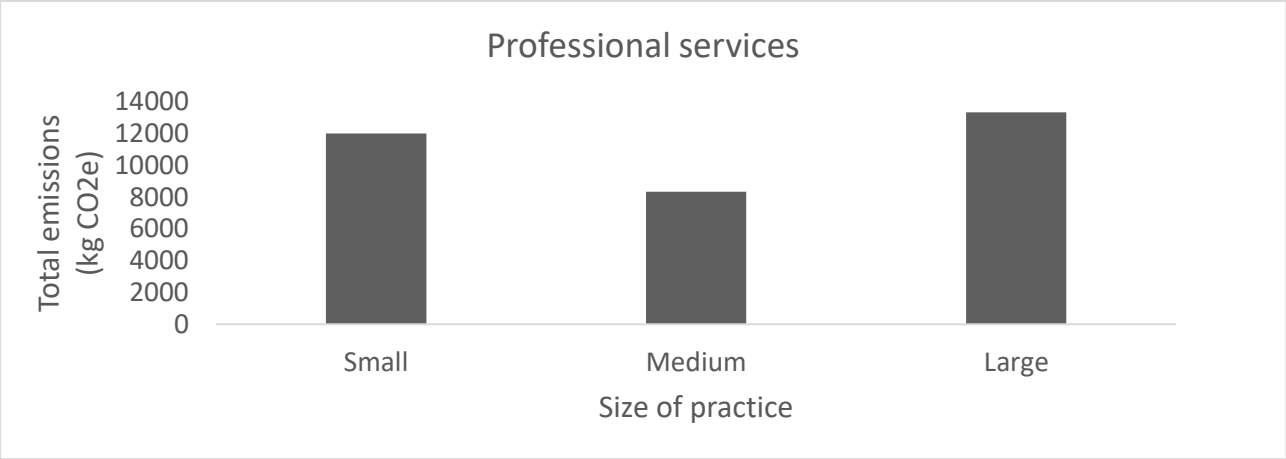


Figure 5. Contributions from professional services to the practice footprint

The rest

This includes medical consumables (e.g., rubber gloves, couch roll, PV speculums, staff uniform etc); office consumables (e.g., paper, printing and postage, pens, printer cartridges etc); food and drink (e.g., tea, coffee, milk etc); cleaning services (including cleaning staff and cleaning consumables); medical and office equipment (e.g., spirometry and BP machines, or chairs, shelving, display units etc). Total footprint from purchases etc is shown in figure 6.

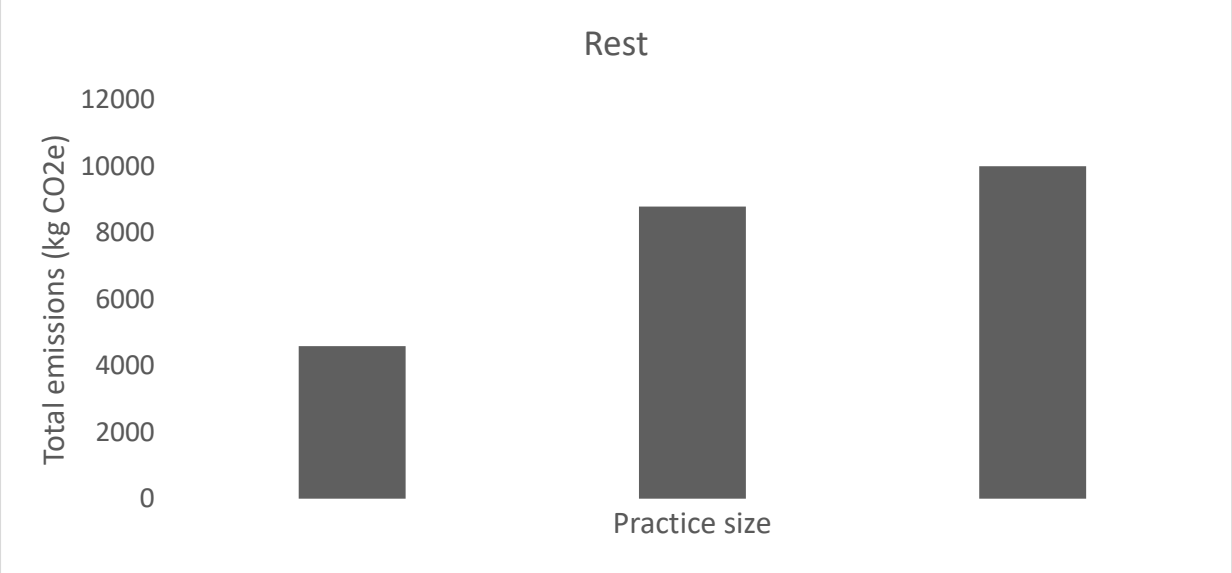


Figure 6. Greenhouse gas emissions from 'rest' of expenditure and practice list size

Discussions

Roughly, as a practice list doubles in size, the total footprint doubles. However, most of this is driven by the volume of medication prescribed. When the footprint excludes prescribing medication, there is no linear relationship between total footprint and practice list size.

The hotspots of energy, staff travel, patient travel, professional services and 'the rest' (mainly purchasing and procurement) are common themes across all practices.

Inter-practice variability between different size practices (Table 1) shows, on average, there is a degree of concordance between patient list size (e.g., prescribing footprint and patient travel) and practice floor space (energy use) with the total amount of greenhouse gas emissions.

However, the intra-practice variability makes calculating a footprint based solely on practice size inaccurate. Other factors such as availability of the public transport network, affluence of the population, illness profile of the community, practice boundary etc will affect travel.

Practice size cannot be relied upon as a proxy measure for an accurate emissions footprint.

For energy use, floor space is a key determinant rather than patient list size. The smaller the floorspace, the smaller the energy use. Design or commissioning of new premises can take this into account.

For travel, the annual contribution from staff is greater than from patients, despite a smaller number of journeys made by staff than patients. Staff travel a greater distance on their daily commute. Urban practices tend to have a relatively small practice boundary. Using data from national travel surveys have shown that 83% of journeys under 1.5 km are walked.

From Mike Berners-Lee book 'There's no Planet B', a calculation of the number of life minutes of life lost per mile driven by different vehicles in different environments was made (Figure 7). The cumulative distance travelled by car for small and medium sized practices is about 50,000 km per year, and large practices 170,000 km. For every 10,000 km (6,200 miles) in a petrol car in an urban environment, the total life lost by the community is 15 days. Worst case scenario and everyone drove a diesel, then over 250 days of life would be lost by the surrounding community *every year*. For large practices, the 'best' scenario is 255 days of life lost (if all petrol vehicles), worst would be 883 days (if all diesel) annually.

For professional services, there is not a clear pattern between size of practice and total footprint. This is not altogether surprising as some are fixed costs such as accountancy, practice management, telephony, legal fees etc. There is an economy of scale in the larger practices.

Purchasing and procurement is likely to vary from one year to the next depending on the longevity of equipment, practice requirements (e.g., new staff etc). Low figures in one year may not reflect a longer-term trend.

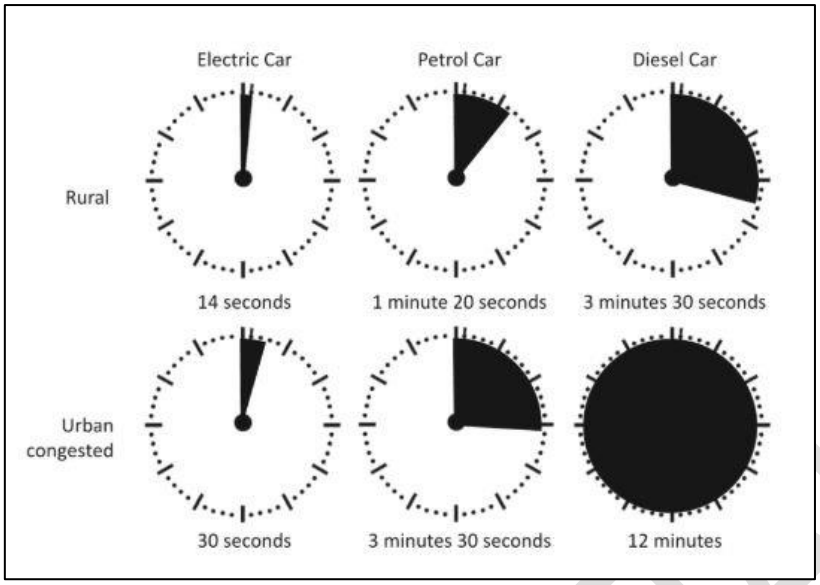


Figure 7. Number of life minutes lost per mile travelled in different settings.

Conclusions

It is possible to calculate carbon footprints for individual general practices in Salford.

Hotspots can be identified for running the practice. These are common regardless of practice size – prescribing, energy use, travel (staff and patient), professional services and the 'rest'.

CCG and PCNs can encourage practices to have bespoke carbon footprint profiles calculated. If it is not measured, it will not be changed. Having the footprint calculated is a non-judgemental exercise. It is whatever it is and can be used as a baseline to move forward. From there, setting out a 'Green Action Plan' to achieve carbon neutrality would be a natural follow on.

There is a key need to tackle the carbon footprint of medicines, either through avoiding their use by promotion of social prescribing, by seeking to reduce volume of (inappropriate) prescribing and reducing the carbon intensity of medications. Improving respiratory care by tackling prevention, reducing SABA overuse, improving inhaler technique and changing inhaler delivery devices from MDI to DPI is the clearest place to start.

To reduce the carbon emission of running a practice, practices need support (and possibly incentives) to improve their energy efficiency, reduce unnecessary use and switch to renewable suppliers.

For travel of staff and patients, promoting active transport should be a win-win in terms of health gain and reducing carbon emissions.

A surprisingly large proportion of the practice footprint is attributable to expenditure on professional services. The importance of leading by example cannot be over emphasised to lead the change in other organisations to reduce their footprints.