Environmental Sustainability Report
July 2016 - June 2017
4th biannual report

sustainability through science and innovation

Our Environmental Commitment

At **cesar** we believe healthy ecosystems are fundamental to our future. A thriving and sustainable world can be achieved when environmental concerns are properly balanced with the needs of business and the community.

Caring for the environment is what we do. We lead by example and take responsibility for the impact we have.

We will:

- Apply best practice environmental management options to our business
- Work to improve the environmental awareness of our staff, clients, suppliers and local community
- Improve efficiency of our business to minimise water and raw material use, energy consumption, waste and pollution
- Conduct regular assessments of the environmental impacts of our operations to identify potential areas for improvement. We will then implement those improvements
- Follow up to ensure the longevity, consistency and usefulness of environmental initiatives
- Continue to hold environmental sustainability as a core company value

Using these guiding principles, we will strive to continuously improve our environmental management.

This sustainability report describes how **cesar** is managing its environmental impact as a business. During this reporting period, sister company EnviroDNA was established and fits within **cesar**'s carbon footprint.

This report includes:

- Our overall commitment to the environment as a business.
- An analysis of resource consumption and waste production in the 2016-2017 Financial Year, as well as the **cesar's** overall carbon footprint for the period.
- Personal and Business Scale actions implemented within **cesar** to reduce the environmental impact of business operations over the 2016-2017 financial year as well as into the future of the company.

References:

Authors: James Twite & Frances Morell
Reviewed by: Helen Barclay
Data compilation: Helen Barclay (2010/11), Nadia Suwignio (2012/13), Nicolas Finger (2014/15) and James Twite (2016/17).

cesar pty ltd
ABN 26 123 867 587
293 Royal Parade, Parkville
Victoria 3052 Australia
+61 3 9349 4723
www.cesaraustralia.com

sustainable agriculture
biodiversity conservation

Measuring and Monitoring Emissions

Monitoring resource consumption and waste production as well as the associated emissions is the most critical step in determining the overall environmental impact of the business. It provides a quantitative understanding of cesar's operational impact as well as an easy point of comparison with regard to previous business years. At this stage the laboratory space at University of Melbourne is not included in **cesar**'s carbon footprint report.

Summary of cesar's CO_2 Emissions

In the 2010/11 financial year, **cesar** began investigating its carbon footprint to establish a benchmark for ongoing monitoring and improvement. Reviews have been undertaken bi-annually in 2010/11, 2012/13, 2014/15 and now 2016/17. During this reporting period, sister company EnviroDNA was established and fits within **cesar**'s carbon footprint.

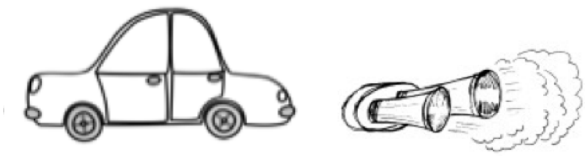
cesar's annual carbon emissions were:

Year	Total Tonnes CO2-e pre offsets	Total Tonnes CO2-e post offsets
2010/11	42.99	42.99
2012/13	55.66	46.73
2014/15	43.68	39.95
2016/17	52.61	47.69

Estimates from a report commissioned by the Victorian Employers' Chamber of Commerce & Industry suggest that Victorian businesses with 0-19 employees had an average emissions rate per person of approximately 16.3 tonnes (Carbon Down Report, 2011). **cesar** produced 4.8 tonnes per employee in the 2016/17 financial year, and therefore environmental impact per worker at **cesar** is close to a quarter of an average Victorian worker employed in a similar sized business.

cesar may have a relatively small environmental impact, but, our commitment does not stop there. **cesar** strives to lead by example. We interact with clients, suppliers and the community to further reduce both our own, and others, impact on the environment.

Overall the 2016-17 financial year has been a large success for **cesar.** Emissions were expected to rise given the large increase in staff numbers, but, despite these increases carbon emission per employee were the lowest since **cesar** began monitoring its impact. Although there are some areas that require improvement, the change required is easily within **cesar**'s reach.



The average annual use of an average car equates to approximately 4 tonnes of carbon emission (t-Co2).

cesar pty ltd
ABN 26 123 867 587
293 Royal Parade, Parkville
Victoria 3052 Australia
+61 3 9349 4723
www.cesaraustralia.com

sustainable agriculture

biodiversity conservation

Carbon Dioxide Emissions 2016/17

cesar's carbon (CO_2) emissions in 2016/17 reporting period were 52.61. Emissions came from a range of sources as outlined in Figure 1. **cesar's** carbon emissions have fluctuated over reporting periods, and most recently have increased from 43.68 tonnes in 2014/15 – see Figure 2.

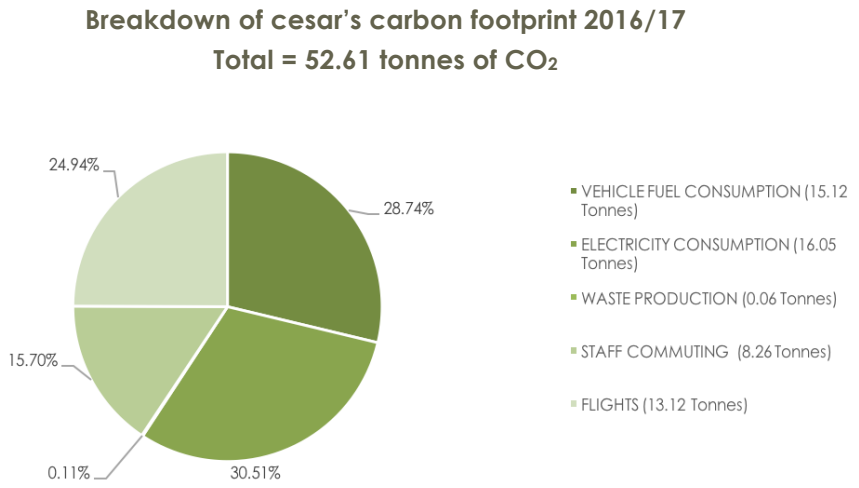


Figure .1

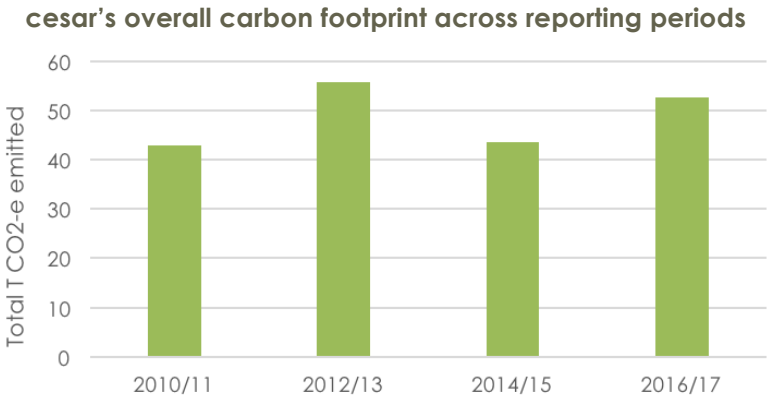


Figure 2.

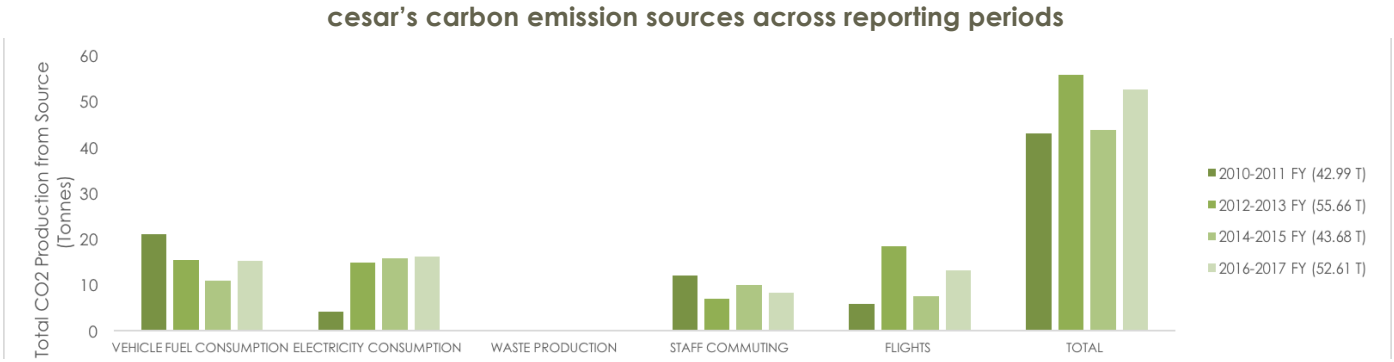


Figure 3 – (note, waste was so low proportionately it does not show on the graph.)

cesar pty ltd
ABN 26 123 867 587
293 Royal Parade, Parkville
Victoria 3052 Australia
+61 3 9349 4723
www.cesaraustralia.com

sustainable agriculture

biodiversity conservation

Interpretation of overall carbon emission footprint for 2016/17

While still lower than the 2012/13 FY, the increase in overall company carbon emissions in the 2016/17 reporting period from the 2014/15 reporting period can be mainly attributed to an increase in: flight emissions; company car emissions and waste emissions as discussed further in this report and outlined in the table below.

Percentage change in cesar's emission sources from 2014/15 to 2016/17

Vehicle Fuel Consumption Emissions (company cars)	+41%
Electricity Consumption Emissions	+3%
Waste Production Emissions	+312%
Staff Commuting Emissions	-16%
Flights Emissions	+77%

The most probable reason for the overall increase is an increase in staff base. In 2014-2015 **cesar** had only 8 main employees (excluding contractors and casual staff), while by the end of June 2017 **cesar** had grown to 13 main employees. Note: some of employees in the 2016/17 year employees were not present at **cesar** for the entirety of the year.

The overall carbon emissions from **cesar** are useful to analyse, but, given the fact that the staff base at **cesar** has increased, the overall emissions cannot be solely used to compare environmental performance from year to year. The carbon emissions per employee is a better basis for comparison. The 2016-17 reporting period was **cesar's** lowest per capita level of carbon emissions, since carbon accounting began in the 2010-11 financial year (Figure 4).

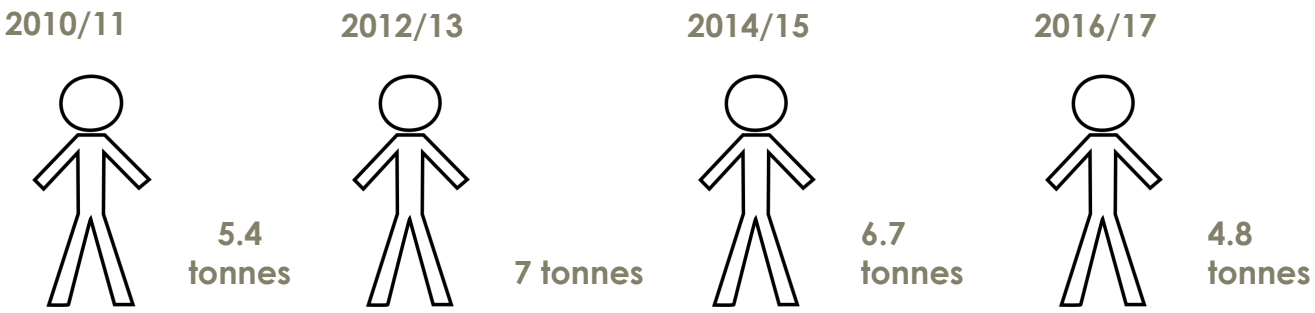


Figure 4. Carbon emissions produced per employee at ***cesar*** *for carbon accounting reporting periods.*

As noted previously, estimates from a study conducted by Victorian Employer's Chamber of Commerce and Industry suggest that Victorian businesses with 0-19 employees had an average emissions rate per person of approximately 16.3 tonnes (Carbon Down, 2011).

Interpretation of vehicle fuel consumption (company cars)

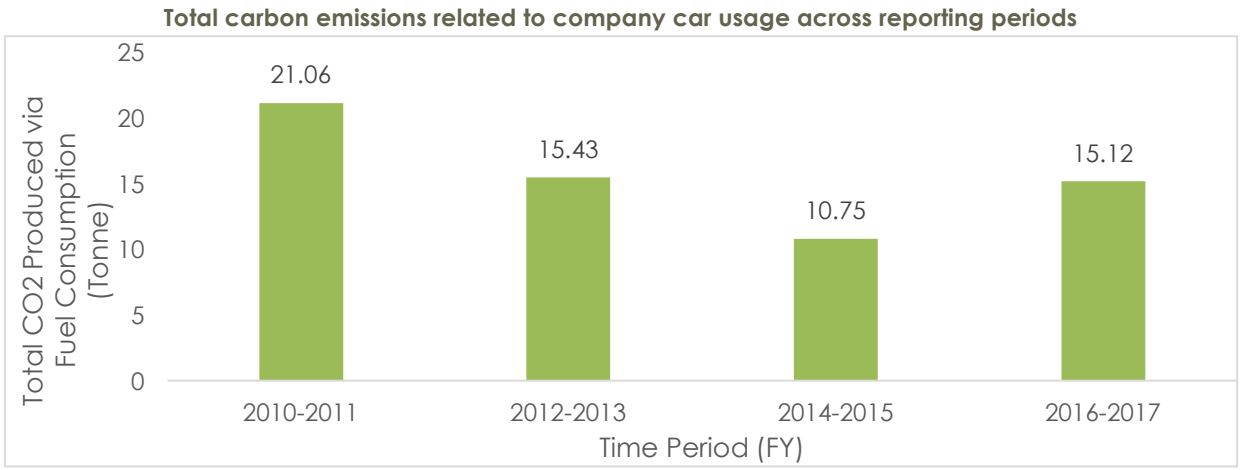


Figure 5.

Company car use related carbon emissions were the highest in the 2010/11 reporting period, which also represented nearly half of **cesar's** carbon footprint at 21.06 tonnes (total emissions: 43.0 tonnes). In the following 2012/13 reporting period company car emissions reduced by approximately 29%, and then a further 26% in 2014/15 before an increase to 15.12 tonnes of CO_2 in 2016/17.

cesar's field work relies on the use of company cars. Fluctuations in company car use and associated emissions over the years primarily reflects fluctuations in field work. In 2016/17 for example there was an increase in projects undertaken and an increase in staff numbers from the 2014/15 reporting period.

cesar staff have also made effort to avoid car usage such as through practices such as: This has reduced to:

1. Utilizing video calling as opposed to travelling for face-to-face meetings.
2. Minimising project trips via overnight or extended site visits.
3. Bicycle transport for quick trips between the **cesar** office and Bio21 lab facilities.

With the goal to reduce carbon emissions as much as possible, the following can be considered:

1. Invest in company cars that consume petrol for fuel, which possesses a lower emission factor than the currently used diesel fuelled Toyota Hilux and Mitsubishi Triton. However, this is controversial and up for debate as the emissions from petrol over diesel are better, however, diesel is more efficient and you can travel more km's per litre.
2. Invest in company cars that are hybrid in nature – possessing both battery and petrol capabilities in order to further reduce emissions. A vehicle with hybrid capabilities as well as the physical features of a 4x4 may be hard to acquire, but, it is worthy of investigation now and into the future.
3. As a final measure, once vehicle emissions are reduced as much as possible by choices in technology and behaviour, is to implement is a vehicle emission offsetting program. This would involve a carbon log of each company car being kept. **cesar** could then make payments to an Australian offsetting company such as Greenfleet, to offset the emissions being produced as a result of vehicle use. The only downside to such an option is that this is not a personal reduction strategy; **cesar** must rely on a separate company to offset the emissions. However, if monetary constraints are high, this is likely the best option for **cesar** to indirectly reduce a large component of its overall carbon footprint.

Interpretation of flight data

Carbon emissions from business flights increased 77% in 2016/17 (13.12 tonnes) from 2014/15 (7.41 tonnes).
*After carbon offsets factored in, increase of 123% (2016/17 8.20 tonnes and 2014/15 3.68 tonnes).

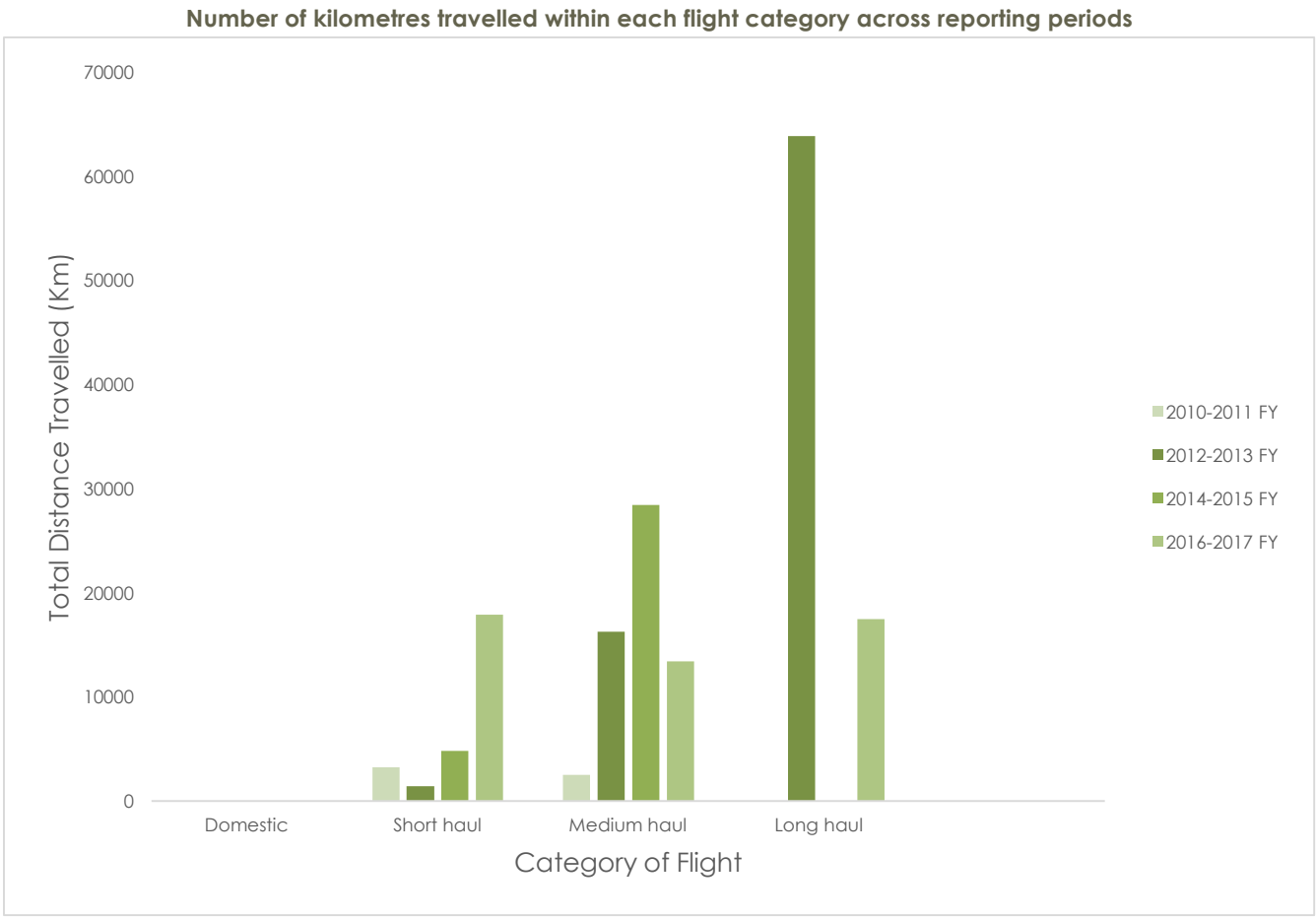


Figure 7

This is likely due to an increase in short haul flights (4804 km in 2014/15 to 17,878 km in 2016/17) and long haul flights (Figure 7). The number of long haul flights increased in 2016/17 to 17,440 km from 0 km in 2014-2015 (note: no flights taken in 2010/11 and 63,287 kms recoded in 2012/13). **cesar** conducted an international project with field work undertaken in Bali, whereas no long-haul flights were taken in the 2014/15 year. It should be noted that carbon offsets were purchased for these flights. Furthermore, the number of medium haul flights decreased from 2014/15 to 2016/17, meaning that the majority of emissions associated with **cesar** business flights were generated from close, domestic travel, such as flights from Melbourne to Sydney and Canberra.

cesar staff have made effort to reduce the number of flights taken, encouraging the use of video conference and phone calls as opposed to interstate meetings. Along with such efforts to reduce flights taken, it's recognised that **cesar** could consider a greater level of flight carbon offsetting. **cesar** has increased the purchase of carbon offsetting with regards to business flights. There were 4.92 tonnes offset in 2016/17, which doesn't offset all flights. There is opportunity to do more.

Interpretation of staff commuting data

From 2014/15 to 2016/17 reporting period, there was a 16% reduction in the CO_2 emissions associated with staff commuting to and from the **cesar** office. This is likely due to a large reduction in the staff use of trains and a large increase in staff cycling and walking at least part way to work. Train use has decreased by 42% from 2014/15 to 2016/17, while walking and cycling have increased by 30% and 56% respectively (see Figure 9). This reduction in use of carbon producing transport, coupled with an increase in emission free methods of transport have managed to heavily reduce commute emissions, despite a large increase in staff use of personal motor vehicles (See Figure 8 and Figure 9). This is a great achievement for **cesar** in terms of emissions reduction, especially given the recent increase in staff numbers. It should be noted that the increased use of emission free transport methods, is due to proximity of office to staff's residential location.

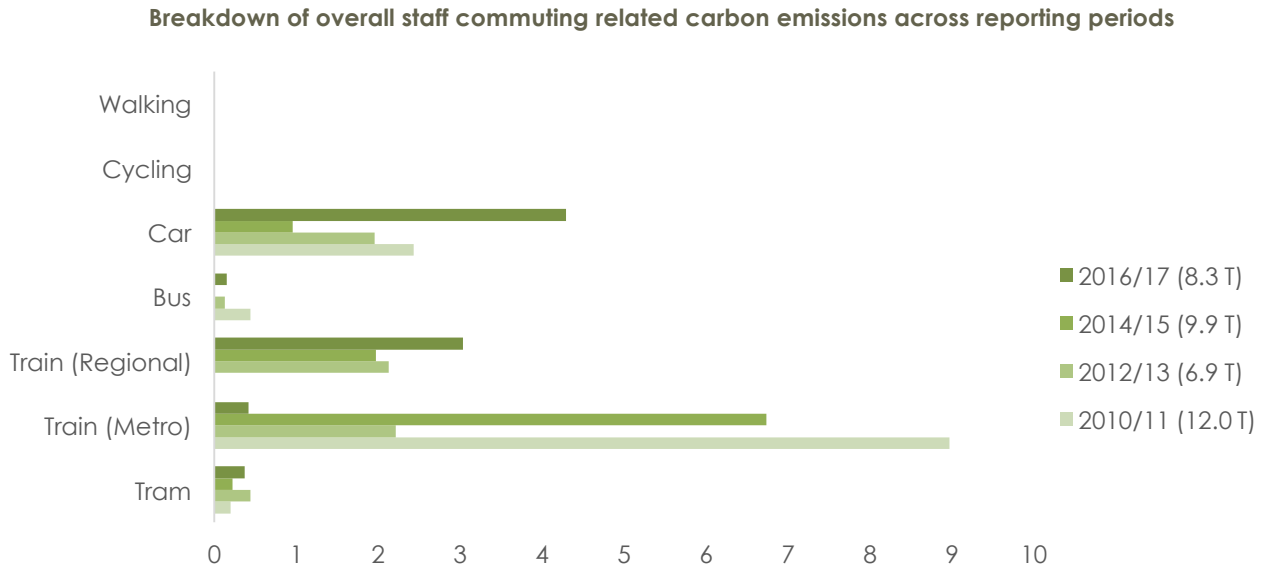


Figure 8

Calculations in Figure 8 were determined based on a staff commuting survey completed by relevant office staff members from each reporting period. Total kilometres travelled (to the nearest thousand) were 82,000 (2016/17), 85,000 (2014/15), 62,000 (2012/13) and 85,000 (2010/11).

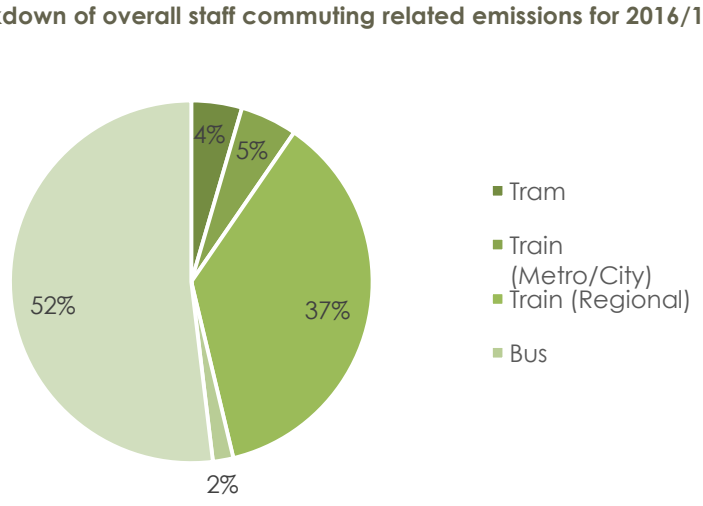


Figure 10.

It would be highly beneficial to focus on reducing staff use of personal motor vehicles, as approximately 52% of the total staff commuting emissions originated from staff cars. Given that this is a personal choice of **cesar** staff as opposed to a business choice, the emissions created by staff commuting will be difficult to regulate and reduce over time. This is because reliance on carbon emitting modes of transport will heavily depend on the personal situation of the staff, ie. proximity to the office and employment status. **cesar** will need to work directly with its staff now and into the future, possibly providing workplace incentives to utilize lower emission generating modes of transport in order to reduce total commute emissions over time.

It is also interesting to analyse the usage of different staff commuting option, particularly given a large percentage of kilometres travelled were via zero emissions sources including walking and cycling as outlined in the table and Figure below.

Mode of transport	**Total kilometres of staff commuting**
Tram	2,086
Train	38,078
Bus	880
Car	27,159
Walking	622
Cycling	13,000

Figure 9,

Interpretation of electricity data:

cesar is a tenant at 293 Royal Parade, Parkville and does not have a separate electricity meter to the rest of the building. **cesar**'s usage is based on the percentage of its office's floor area of the total building area.

Electricity related carbon emissions rose by 3% from 2014/15 to 2016/17 reporting periods (16.0 Tonnes vs. 15.6 Tonnes) and have risen 8% since 2012/13. Given the large staff increase between reporting periods, limiting emissions increase to 400kg of CO_2 is an acceptable outcome for **cesar**.

It is evident that staff within the **cesar** office are engaging in energy smart behaviors such as, switching most if not all electrical appliances off after use, as well as opting for the use of natural light over artificial sources where practical. However, minor improvements to the electricity consumption within the **cesar** office into the future could be achieved. Such improvements could be reached via the installation of all-in-one power-boards with kill switches, in which all electrical appliances could be switched off together as opposed to individually.

Given that **cesar** is a small resident within the AMA building, achieving further reductions in electricity consumption into the future will be a challenge. In order to reduce emissions associated with electricity consumption, **cesar** could further negotiate with other tenants within the building or the building owners, about selecting an energy provider that generates and supplies electricity from purely renewable sources or a mix of traditional sources and clean sources. **cesar** could also investigate the feasibility of the installation of a solar system that could provide at least a portion of the office's energy needs or the possibility of installing a separate power metre.

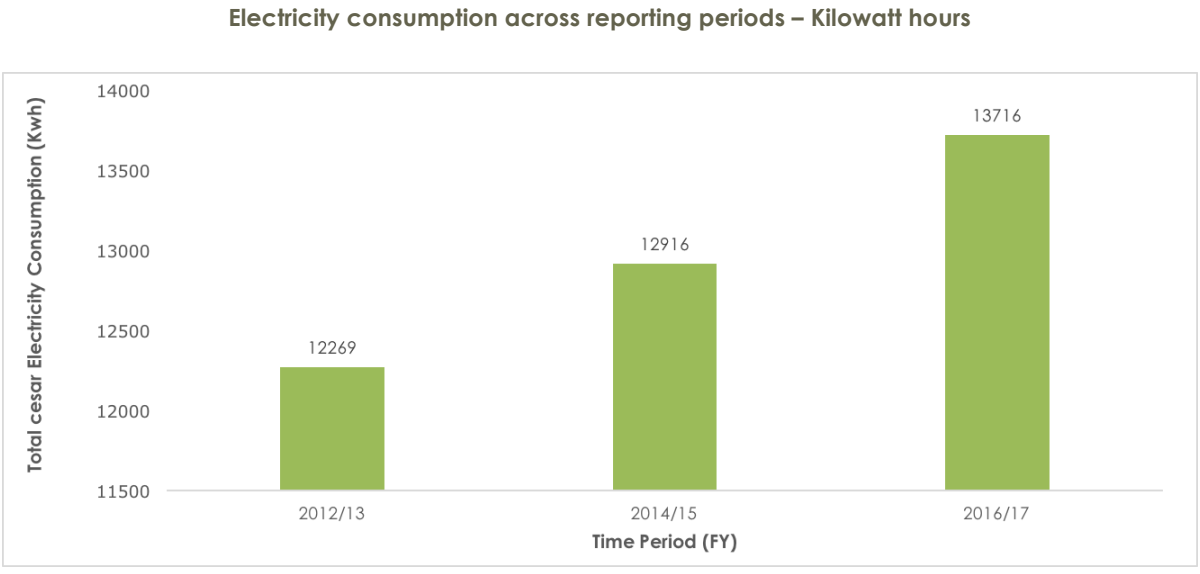


Figure 11.

Interpretation of Waste Data

The current method for calculating waste emissions is to conduct a one-week audit of office waste and extrapolate to a year (the office is open 50.5 weeks per year). Note, this is only based on office waste not on laboratory waste as it is a shared space and could not be accurately calculated. It also does not include coffee grounds form the presso machine, which are disposed of in shared building waste.

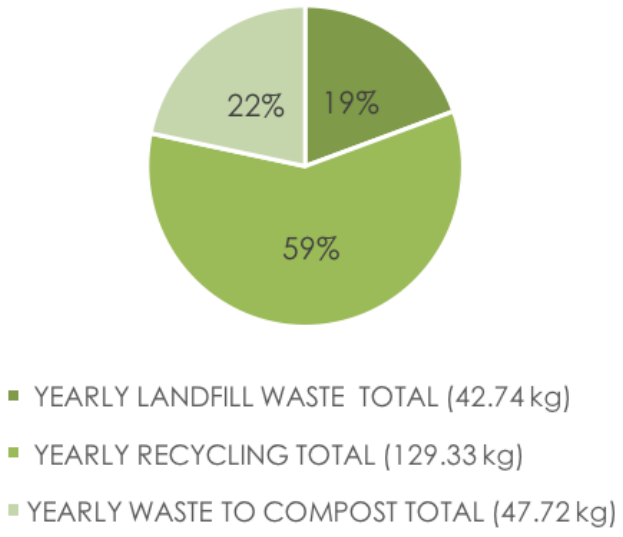
cesar's annual waste production (landfill, recycling and compost) was:

- 229.8 kg in 2011/12
- 79.8 kg in 2012/13
- 22.6 kg in 2014/15
- 219.8 kg in 2016/17

cesar's landfill waste specifically has increased by 312% since the 2014/15 waste audit, with landfill waste (kg) per employee at 5.34 vs 2.68 in 2014/15. This increase is most likely due to an increase in staff and the number of projects **cesar** is undertaking, as a large component of the landfill waste was found to be soft plastic packaging from parcels and wrapping from business supplies (see Figure 12).

A new project method of sending out Tupperware via Express Post Satchel to Agronomists for specimen collection and return has increased waste production, however, the trade-off is that staff aren't travelling for collections thereby decreasing vehicle carbon emissions. Despite this increase, the business culture at **cesar** remains conducive to low waste production. Ongoing initiatives within **cesar**, such as an office compost bin, a "Presso" coffee machine (no plastic waste production), an electronic paper free culture all assist in reducing the production of waste.

Summary composition of weekly waste at cesar for 2016/17, based on waste audit (kilograms)



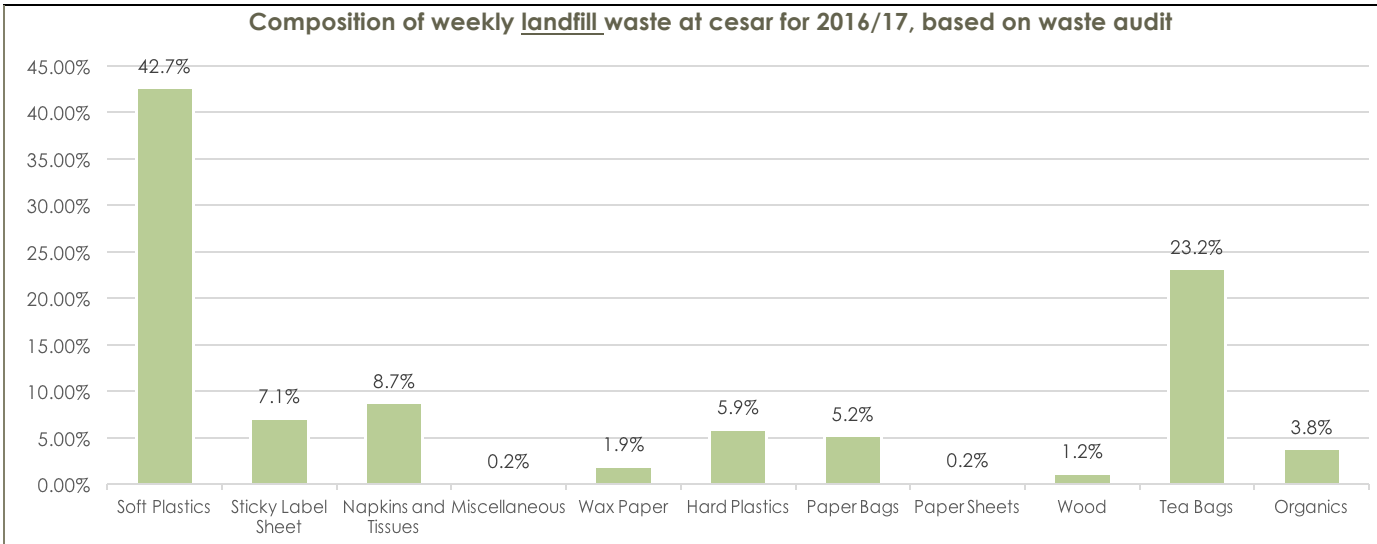


Figure 12.

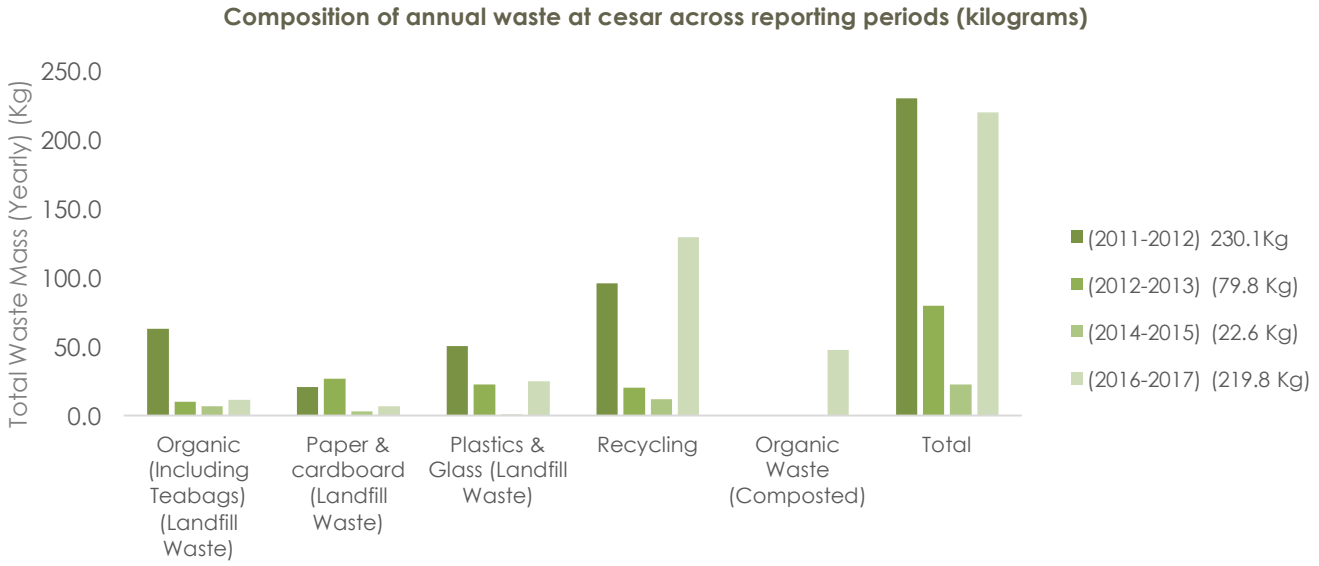


Figure 13.

Despite the fact that landfill waste production was by far the smallest contributor to **cesar's** overall carbon footprint (See Figure 1), it is most likely the easiest section to make business and personal changes. For example, as stated above soft plastics (PlanetArk defines these as any plastics that can be easily scrunched into a ball or broken when crushed by hand such as bread and pasta packets or biscuit trays) were a large component of the landfill waste (see figures 14 and 15). This plastic material can be collected within the **cesar** office and taken to a drop off point within one of the two major supermarkets for recycling via the Redcycle program. This prevents the material being disposed of in landfill waste at **cesar** and eventually producing emissions (http://www.redcycle.net.au/).

Another large component of the landfill waste observed during the 2016/17 waste audit was teabags. Teabags comprised approximately 23% of the total weekly landfill mass. Most teabags are completely compostable, meaning these could be processed within **cesar's** office compost bin. However, it would be best to check If the teabags being used within the **cesar** office do not contain polypropylene, as such bags cannot be composted, only the loose tea. Alternatively, loose leaf tea and reusable infusers could be adopted.

Figure 14. Soft Plastic collected during the 2016/17 **cesar** Pty Ltd annual waste audit
Figure 15. Total Mass (0.378 Kg) of Soft Plastic collected during the 2016/17 **cesar** Annual Waste Audit.
.

Figure 16 & Figure 17 represent a snap shot of the composition of the mixed recycling stream taken during **cesar**'s 2016/17 Waste Audit.

There was only a small level of contamination in the recycling observed during the 2016/17 audit. Bubble wrap as well as soy sauce fish were found within the mixed recycling bin during the sorting process. Although this is a relatively small volume, it can pose complications when the materials are processed at a facility.

Key Issues & Suggestions

Based on the 2016/17 Carbon Account there are many positives for **cesar**, but there a number of areas identified, that still require further action with regard to emissions reduction.

Key Issues	Suggestions
Short haul flights and emissions associated with these flights	• Consider webinar/teleconferencing options before committing to flight • Create a checklist/flow chart for staff as a guide as to whether physical presence at a meeting/presentation etc. is deemed to be necessary
Carbon offsets not being purchased for all flights	• Consider adding policy into staff induction manual that carbon offsets must always be purchased

	• In the small amount of cases where an offset cannot be purchased, purchase carbon offsets from an external provider
Emissions associated with the use of company cars	• Investigate hybrid fleet vehicles • Adoption of overnight/extended trips for site visits • Utilisation of teleconferencing for meetings • **cesar** bike for quick trips from office to lab etc. • As a last option, purchase offsets to emissions via an external provider
Soft plastics going to landfill	• Implement TerraCycle Initiative • Collect soft plastics and have a rotating roster for staff to take them to a Redcycle drop off point at one of the two major supermarkets
Teabags going to landfill	• Purchase some reusable infusers and start purchasing loose leaf tea for the office instead of teabags
Bio21 Lab Space	• Instigate and implement a Bio21/**cesar**/EnviroDNA lab green team • Liaise with stakeholders at Bio21 to implement a recycling initiative • Purchase a compost bin for the lab • Investigate if one use plastics at the genetics lab such as tips and filters etc. can be recycled through something like the TerraCycle Initiative and if yes implement
Genetics consumables packaging	• Reach out to repeat suppliers and ask for their help in regard to how orders are packed to ensure that consumables are delivered with the least amount of packaging possible and in a box appropriate to their size
Staff commuting via emission producing transportation	• Look at staff incentives for travelling to work via a form of transport with lower emissions • Work from home days
Lower electricity consumption	• Liaise with AMA regarding choice of electricity provider and voice support for moving towards a renewable provider • If 293 Royal Parade is a long term location, engage with AMA to install a solar system that could potentially even feed back into the grid

Overall in order to achieve any of the above recommendations **cesar** needs to start with the reinvigoration of the core sustainability team to implement and drive forward change initiatives.

Carbon Offsets

In 2016/17, 4.9 tonnes of carbon offsets were purchased when flights were taken for business purposes. This allowed **cesar's** overall carbon production to be lowered to 47.5 tonnes. This equates to an offset of 37.5% of total flight CO_2 emissions, a decrease relative to the 50% purchased in 2014/15 and 48% in 2012/13 (the first assessed period where this option was purchased). As stated prior it is recommended that **cesar** either reduce the number of yearly flights or offset a greater number of flights into the future, as the size of the company continues to grow. Offsets could also be investigated to indirectly reduce its emissions associated from other sources that make up the overall carbon footprint.

Actions Below is a list of initiatives and processes that staff members are currently undertaking to help **cesar** manage its impact.	Reducing demand on	Reducing **cesar**'s emissions	Offsetting emissions	Staff engagement
Leadership				
Sustainability team - internal group of people who lead our environmental sustainability, devise strategies and implement actions				✔
Transport				
Skype and conference calling facilities to reduce travel for meetings		✔		
Supporting working from home arrangements		✔		
Encourage public transport commuting e.g. staff functions		✔		✔
Business bike for staff errands and commuting between locations		✔		✔
Reduce work km where possible e.g. staying overnight, planning ahead		✔		
Offset business flights through airline programs			✔	
Office supplies				
Shared stationery in office	✔			✔
Encouraging a paper free office culture	✔			✔
Providing large screens for easy document reading *Double sided printing & scrap paper supply* *Client reports provided electronically*				
Generic group wide business cards	✔			
Reusing old branded stationery	✔			
Purchasing				
Stationery orders made in bulk and with recycled products where possible	✔			
Recycled or bamboo paper reams	✔			
Printing supplier – veg based inks and recycled stock	✔			
Compostable plastic for laboratory supplies where possible		✔		
Mindfulness of supplier's green credentials	✔			
Energy				
All electronics (where possible) switched off every night & weekends		✔		✔
All lights switched off at night & weekends		✔		✔
Waste				
6 month waste strategy implemented Feb 2012	✔	✔		✔
Office compost initiated April 2012		✔		✔
Replaced coffee machine – no longer use "pods" in April 2012.	✔	✔		✔
E-waste collection in 2013	✔	✔		✔
Enviro week initiative – personal staff sustainability commitment	✔	✔		✔
Recycling paper, cardboard, bottles etc. and improve bin signage		✔		✔
Communal reusable takeaway cups	✔	✔		✔
Rechargeable batteries used for field & office equipment	✔	✔		✔
Reuse and maintain field and laboratory supplies e.g. pitfalls, vials	✔			
TerraRack! micropipette tip racks used at Bio21 implemented 2015	✔			✔
Office environment				
Plants to help naturally clean air		✔		✔

cesar pty ltd
ABN 26 123 867 587
293 Royal Parade, Parkville
Victoria 3052 Australia
+61 3 9349 4723
www.cesaraustralia.com