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A Greenhouse Gas Emissions Assessment for SESLHD

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A Greenhouse Gas Emissions Assessment for SESLHD

for the financial years 2011-12 to 2016-17

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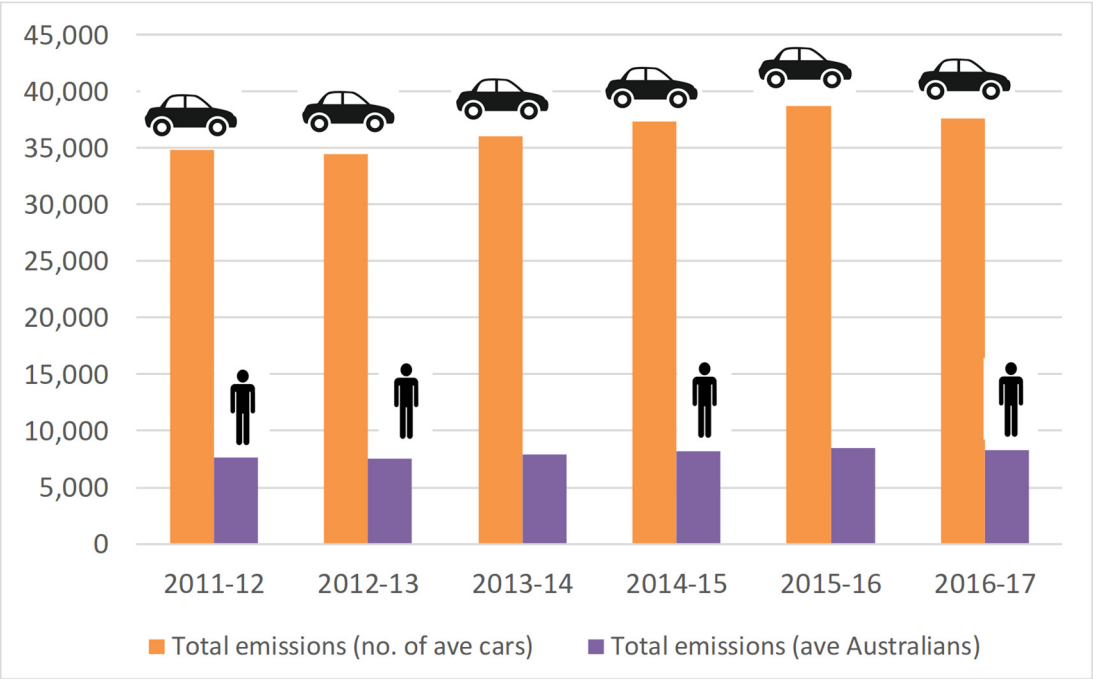
Executive Summary

This report presents a complete assessment of SESLHD's greenhouse gas emissions for six financial years (2011-12 to 2016-17), covering emission Scopes 1, 2 and 3 as defined by the Greenhouse Gas Protocol. The assessments for each year include the following main components:

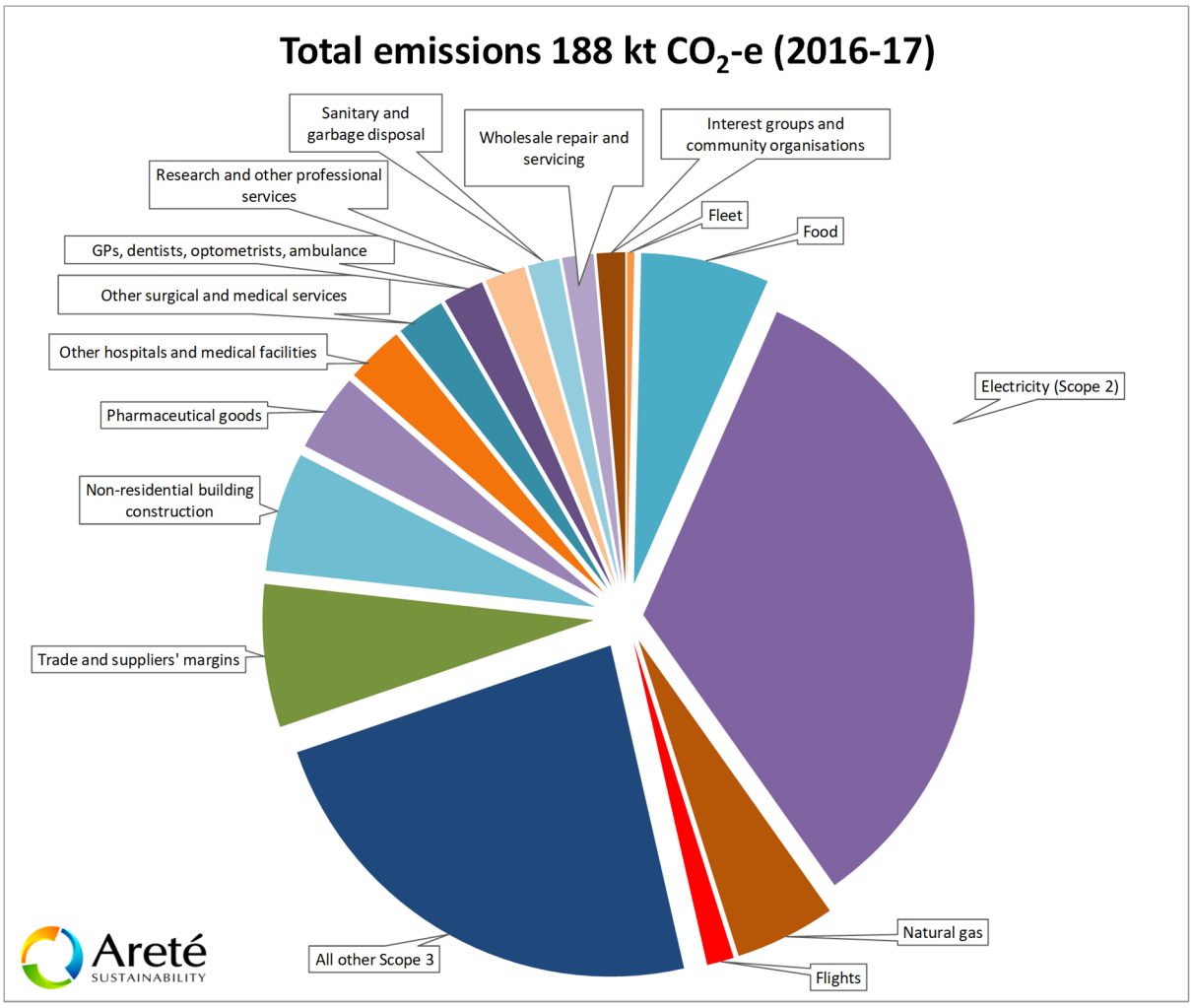
- Direct/on-site emissions (Scope 1 emissions) due to fuel combustion (gasoline, diesel, and natural gas);
- Emissions associated with the generation of purchased electricity (Scope 2 emissions);
- Supply chain emissions associated with operational expenditure (part of Scope 3 emissions), such as from waste, employee travel, pharmaceutical purchases, outsourced medical services, consumables, food provision, cleaning and laundry services, and all other purchased goods and services; and
- Supply chain emissions associated with the deemed capital expenditure (part of Scope 3 emissions) as measured by the components of the financial depreciation schedule. These include nominal expenditure on buildings, new and replacement medical equipment, vehicles, and infrastructure etc.

Combined, the above emissions sources represent a full *carbon footprint* for SESLHD. The inclusion of all supply chain emissions (Scope 3), estimated using the innovative input-output based methodology, effectively removes any issues associated with the choice of a reporting boundary. Conventional audit-based estimations of Scope 3 emissions commonly miss many contributions to the full carbon footprint. The expenditures of the SESLHD parent entity effectively define the boundary for the carbon footprint.

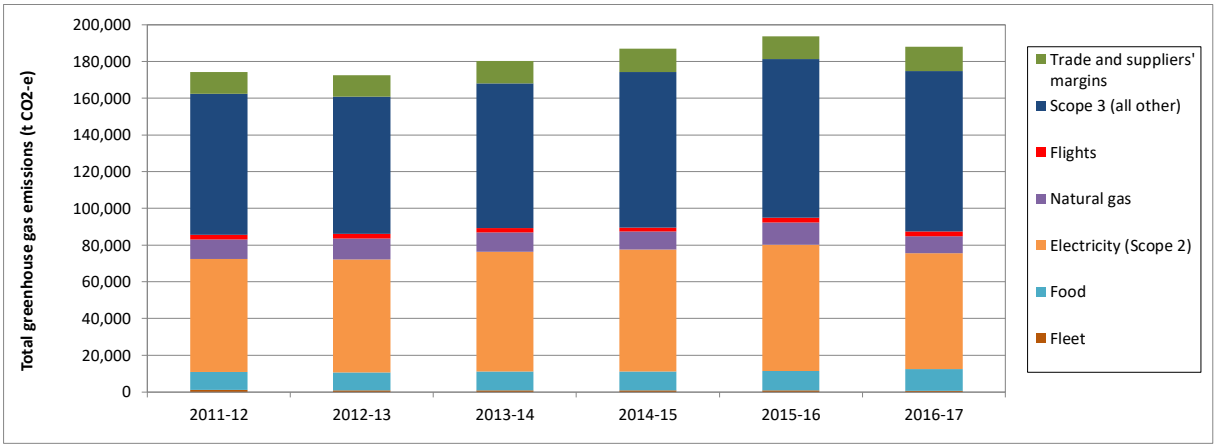
In 2016-17, total emissions were 188,000 tonnes of CO_2-equivalent (CO_2-e), a 3% decrease over the previous year, which had the highest emissions for all previous years. Total emissions are equivalent to the annual emissions of nearly 38,000 family cars, or the average per capital emissions of about 8,000 Australians (see graph below). Total SESLHD emissions are equivalent to about 0.15% of all NSW territorial emissions.



The first graph below shows a breakdown of 2016-17 emissions. Total emissions are dominated by electricity (38%), supply chain emissions (Scope 3) (47%), food-related emissions (6%) and combustion emissions from on-site natural gas use (5%). Emissions from air travel are about 1.3%, while those relating to the vehicle fleet are about 0.4%.



The profiles of the annual carbon footprints are fairly similar over the six financial years' of data. The main reason for the increase in the total footprint is the increase in the overall expenditure profile for the SESLHD. The general change in expenditure was an increase of approximately $140M (actual dollars) in total goods and services purchased by SESLHD between 2011-12 and 2016-17. This expenditure increase leads to a general increase in the Scope 3 (all other) footprint component until 2016-17. Electricity emissions rose then fell over the period, but not significantly between the first two years. There was a significant drop in electricity emissions from 2015-16 to 2016-17.



As is typical with many full footprint analyses of service-based organisations, electricity-related emissions are usually significant (commonly 30-40%), following by general Scope 3 emissions relating to the operational expenditure, the latter comprising many individual contributions from an often complex supplier list. That both these major emissions sources generally increased over the analysis period is primarily due to the increased overall activity of SESLHD.

The table below shows the top ten ranking contributions to the overall SESLHD carbon footprint in 2016-17. The results in terms of economic sector classifications (from the national economy) often contain many single expenditure line items, and amount to 77% of the total footprint. Due to the lack of detailed waste data (ranked 11th) there is relatively greater uncertainty for waste emissions (~2,880 t) than the other components in this list.

Greenhouse gas emissions by major commodity (top 10)		**2016-17 GHG (t CO_2-e)**
1	Electricity supply (including Scope 3)	74,014
2	Wholesale trade and supplier margins	13,121
3	Food provision	11,775
4	Non-residential building construction	10,976
5	SESLHD direct (natural gas + vehicles)	9,903
6	Pharmaceutical goods	7,168
7	Other hospitals and medical facilities	5,330
8	Surgical and medical services	4,442
9	GPs, dentists, optometrists, ambulance	3,740
10	Research and other professional services	3,717

Main results and recommendations from this work:

- **Fuel use in vehicles is a small** component of the overall emissions and has already been the target of successful emissions reduction strategies, mainly through reducing both the numbers of vehicles in the SESLHD and increasing their fuel efficiency. There does not appear to be many further opportunities for further reducing these emissions.
- **General SESLHD electricity usage is high**, mainly due to the nature of the health care activities requiring high quality conditioned spaces which often contain critical equipment that is needed with a high level of availability. Prince of Wales Hospital (45%), St George Hospital (30%) and The Sutherland Hospital (16%) comprise 90% of all Scope 2 electricity-related emissions (~63,000 t CO_2-e). Notably, emissions from electricity use at St George Hospital fell by approximately 4,000 t CO_2-e between 2015-16 and 2016-17.
- Although emissions from on-site combustion of **natural gas** are approximately six times smaller than electricity emissions, they still represent a significant emission source (~10 kt CO_2-e) that could be reduced with attention to the mainly winter heating aspect of the gas use.
- It is recommended that an **inventory of heating, ventilation and air conditioning equipment** (HVAC) be established, if it is not in place at present. Further, it is recommended that energy use be examined in relation to facility, activity and function of the SESLHD (some of this has been undertaken in the preparation of this report and is intended to form part of a follow-up study). It would also be revealing to connect energy use characteristics with building asset and equipment records.
- **Aggressive targeting of operational energy efficiency is recommended** to reduce the general electricity usage. Further detailed energy auditing (preferably including selective sub-metering), targeting of major electricity uses (HVAC being the most likely) and possible behaviour change (such as reducing cooling loads) could yield considerable savings in electricity and emissions.
- Experience with other large service-based organisations, such as universities, has shown that **simple behavioural changes** from increased **staff awareness** can lead to electricity savings, very conservatively of the order of 5%, with little additional cost. Such a 5% saving amounts to approximately 3,500 t CO_2-e and $500,000. For such changes to be implemented, and more importantly sustained to become standard practice, they do need to be supported by high quality communication campaigns.
- In terms of **supply chain emissions (Scope 3),** there are good opportunities for savings. **Food** provision is a major single component of total emissions (~6%). Engagement with HealthShare is currently occurring to better understand their supply chain emissions.
- The buildings component (~$35M) of the **deemed expenditure on maintenance**, which is calculated from the approximately $50M total allocated to depreciation, involves Scope 3 emissions of about ~11,000 t CO_2-e.

- **Pharmaceutical expenditures** are estimated to involve about ~7,200 t CO_2-e of emissions, with outsourced and associated medical, health and other professional services calculated to involve nearly 17,300 t CO_2-e.
- Supplier engagement activities (**green procurement**) and financial efficiencies can lead to very useful Scope 3 emissions reductions. It would be worthwhile surveying or directly interacting with major suppliers (such as maintenance, cleaning, pharmaceuticals, outsourced health activities and surgical / medical equipment suppliers) in a hybrid study to improve the estimate of electricity use by these suppliers attributable to SESLHD.
- In terms of normalising the yearly results for comparison, **emissions per unit of total allocated expenditure** (in actual dollars, and which does not include wages and salary expenditure) dropped from about 400 t CO_2-e per million dollars in 2011-12 to 330 t CO_2-e / $M in 2016-17 (see left scale of the graph below). This reduction in intensity is due to the lower electricity usage and the relatively lower intensity of outsourced services, which are the primary reason for the general trend in increased expenditure.
- In terms of other activity measurements**, emissions per total bed days** rose to 2015-16 and then fell slightly over the analysis period to 0.29 t CO_2-e / tbd in 2016-17.