Environment Centre NT

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COOLmob E-waste Education Project Report

COOLmob

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The Environment Centre and COOLmob acknowledges the funding received from the NT Environment Protection Authority to complete the E-waste project.

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Acknowledgements and Thanks

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Organisations:

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Individuals:

Sam Frederick

Dr Joe Pickin Director of Blue Environment Pty Ltd

Daphne Rodrigeuz

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1. Executive Summary

E-waste is now the fastest growing waste stream in Australia. As Northern Territory organisations concerned with environmental sustainability and a role to educate the Territorian community on sustainable living, COOLmob and the Environment Centre NT embarked on the E-Waste Education Project with a keen interest to investigate the current state of e-waste in Darwin.

Findings from the COOLmob E-waste Education Project demonstrate an overall lack of cohesive strategy from the Northern Territory Government, which is needed ensure strong diversion from landfill and recycling targets are implemented and accounted for. Without such legislation in place, local governments, industry stakeholders, businesses, schools and the community have a decreased capacity and incentive to self-sort and recycle.

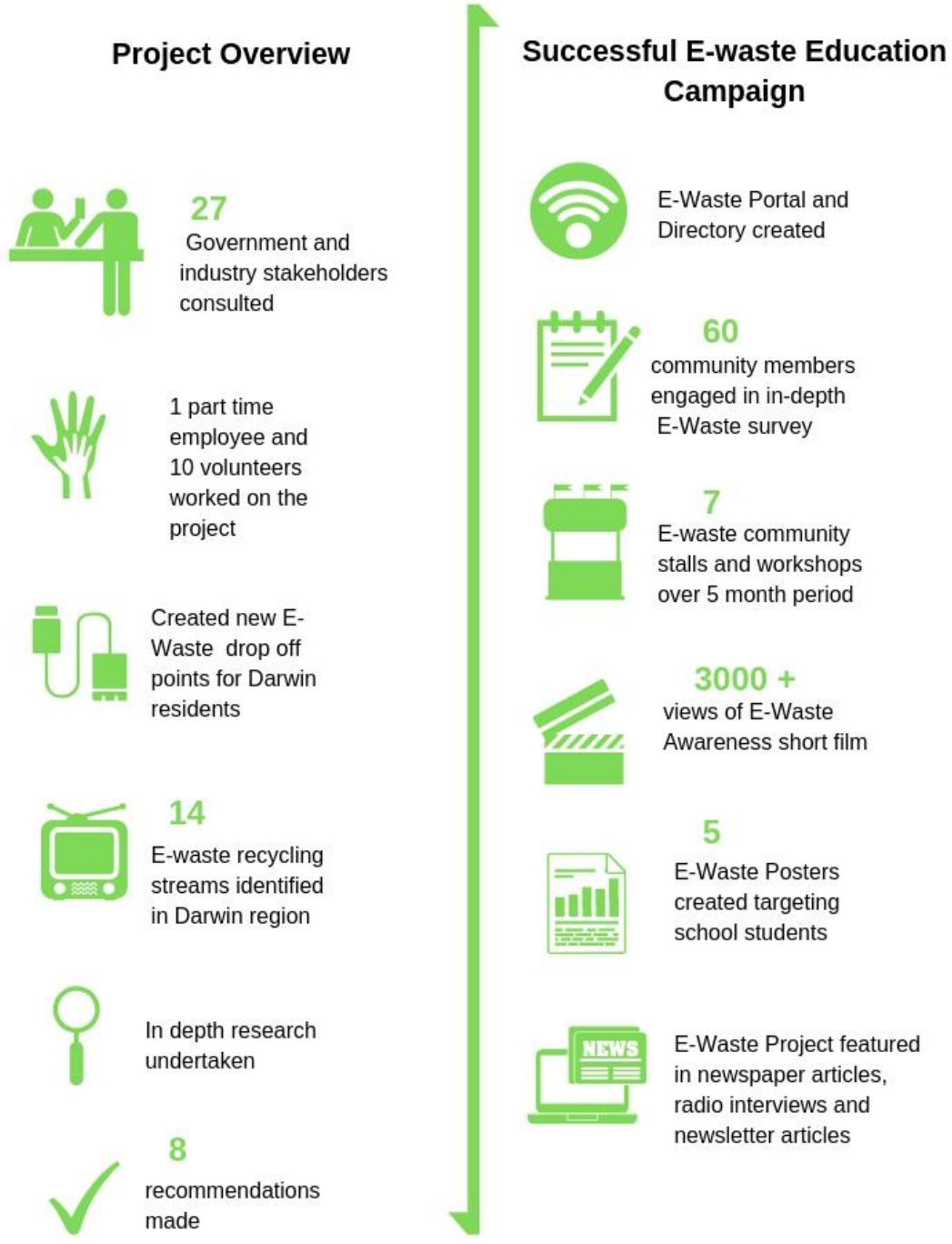
This report identifies the various challenges encountered throughout the project, including those concerned with the limited baseline data available, the ad hoc arrangement of e-waste management, with many different streams operating with limited coordination with each other as well as a lack of cohesive strategy and communication amongst key stakeholders. Recommendations have been made to enable the Northern Territory to reach a higher standard of e-waste to landfill diversion that has been proven possible by other States and Territories in Australia, as well as overseas.

A positive outcome of the project was the extensive and wide reaching community education and raised awareness and understanding of issues relating to e-waste, so vital to ultimately reducing the amount of e-waste going to landfill.

2. Project Aim

In 2017 COOLmob and the Environment Centre NT undertook the ***COOLmob E-waste Education Project*** ('the E-Waste Project'). This project aimed to liaise with government and industry stakeholders to understand how e-waste is currently being managed in Darwin and identify options for it to be recycled. We also aimed to create greater community awareness and understanding of issues relating to e-waste, along with increasing knowledge of recycling options in Darwin and ultimately to encourage the reduction of the amount of e-waste going to landfill.

3. Project snapshot



4. Project Background

4.1 What is E-Waste?

In our research there was no one clear agreed definition of e-waste across the states and Territories. For our report purposes we have adopted the definition used by Victoria in their *Managing e-waste in Victoria, Starting the conversation 2015* report, which defines e-waste as:

> ***Electrical or electronic equipment with a power cord or battery and its parts that have been discarded by the owner as waste without the intention of re-use[1].***

E-waste can include electronic equipment such as televisions, computers, mobile phones, kitchen appliances and white goods but this is not an inclusive list and can also include less obvious items such as batteries, light globes and smoke detectors.

4.2 What are the problems associated with E-Waste?

The rate at which we purchase and discard electronic devices is having a serious impact on the environment. E-Waste sent to landfill contains hazardous materials, which can lead to environmental and human health issues. Some of these toxic contents include lead, mercury, cadmium and arsenic.

E-waste in landfill also represents a loss and depletion of valuable and dwindling non-renewable resources, as electronic devices require inputs of energy and raw materials to make, store and transport them. Furthermore, the 'embodied energy' within e-waste represents the generation of greenhouse gas emissions that contribute to climate change.

In light of these impacts, there is a very strong imperative to reduce the amount of e-waste entering the waste stream.

4.3 What is the extent of the problem?

The rate of e-waste in Australia is growing up to three times faster than general municipal waste in Australia. In 2016, Australia generated 23.6 kg of e-waste per capita[1]. Every year in Australia over 1.5 million TVs alone are discarded[2]. While there has been increase in the number of organisations and the range of programs and policies that support the recycling

[1] Baldé, C.P., Forti V., Gray, V., Kuehr, R., Stegmann,P. : The Global E-waste Monitor – 2017, United Nations University (UNU), International Telecommunication Union (ITU) & International Solid Waste Association (ISWA), Bonn/Geneva/Vienna.

[2] Sustainability Victoria, 2018, 'Take your e-waste to a better place', https://www.sustainability.vic.gov.au/Campaigns/eWaste

of e-waste, recycling rates still remain low for e-waste in Australia. It is estimated that less than 10% of the e-waste generated in Australia in 2016 was collected and recycled[3].

Reliable information on e-waste collection and recycling specific to Darwin is more difficult to find, however, given the Northern Territory has the country's lowest levels of recycling (across all types of recycling) [just 28% of waste being recycled, 30% lower than the national average] it is very reasonable to assume the rates for e-waste collection and recycling are considerably lower than the national average[4]. Furthermore, as part of the National Television and Computer Recycling Scheme in 2013 only 4.4 tonnes of e-waste was collected in the Northern Territory compared to 31,186 tonnes collected for the whole of Australia[5].

4.4 What are the driving forces behind the growth of E-Waste?

While e-waste is not a new phenomenon, it is certainly a rapidly growing waste stream in Australia and Darwin is no exception. Some of the reasons for the increase in e-waste in general include[6]:

- **The constant availability of newer technology and design,** resulting in consumers buying more electronic devices and upgrading to the 'latest' product even when their current model is still functioning
- **The increasing practice of planned obsolescence**. Planned obsolescence can be described as the practice of building a life span into a product. The shorter built-in lifespan results in consumers replacing their devices more rapidly.
- **The increasing complexity in product design** that makes repair and recovery more difficult, and more expensive, meaning consumers are choosing to replace their broken products with newer items rather than have them repaired.
- **The declining price of electronics** means products are becoming accessible to more people and it also prompts consumers to purchase new products rather than repair their existing products.

4.5 Current E-waste management in Australia

Australia's e-waste management system is guided by the National Waste Policy and at its core is the Product Stewardship Act 2011[7]. The Act acknowledges that those involved in producing, selling, using and disposing of products have a shared responsibility to ensure

[3] The State of Victoria Department of Environment, Land, Water and Planning, 2015, '*Managing e-waste in Victoria, Starting the conversation', https://www.environment.vic.gov.au/__data/assets/pdf_file/0031/49729/E-waste-ban-discussion-paper_online_R.pdf*

[4] Pickin, J., Randell, P., 'Australian National Waste Report', Department of Environment and Energy and Blue Environment Pty Ltd 2016, p44

[5] Northern Territory Environment Protection Authority, 2015, *Waste Management Strategy for the Northern Territory 2015-2022*

[6] The State of Victoria Department of Environment, Land, Water and Planning, August 2015, *Managing e-waste in Victoria, Starting the conversation*

[7] The Australian Government, Product Stewardship Act 2011*,* http://www.environment.gov.au/protection/waste-resource-recovery/product-stewardship

those products are managed in a way that reduces their impact on the environment and on human health and safety.

National Television and Computer Recycling Scheme

The most significant producer responsibility scheme under the Product Stewardship Act is the National Television and Computer Recycling Scheme. The National Television and Computer Recycling Scheme provides Australian households and small businesses with access to free industry-funded collection and recycling services for televisions and computers, including printers, computer parts and peripherals[8].

The scheme uses a co-regulatory approach which involves a combination of government regulation and industry action, where the Australian Government sets the outcomes to be met, and industry funds and implements specified activities.

Essentially, companies who manufacture or import television and computer products over certain thresholds are required to participate in the scheme by funding the collection and recycling of a set percentage of these items each year. Liable companies must meet these obligations by joining an approved co-regulatory arrangement (Producer Responsibility Organisation). These arrangements are responsible for day-to-day operation of the scheme, including organising collection and recycling of e-waste on behalf of the television and computer companies.

The four Co regulatory arrangements in operation are:

- MRI (Dropzone)
- Ecycle Solutions
- Electronics Products Stewardships Australasia (EPSA)
- Australia and New Zealand Recycling Platform (ANZRP) (Techcollect)

The recycling target set for the scheme in 2017-18 was set at 62% and will increase to 80% by 2025-2026[9].

In addition to the co-regulatory arrangements operating under the NTCRS, there are several voluntary Product Stewardship Schemes for the recovery of certain types of E-waste.

Mobilemuster

Mobilemuster is the voluntary product stewardship program of the mobile phone industry that is accredited under the Product Stewardship Act 2011 but not regulated by the government. The scheme is voluntarily funded by mobile phone industry groups to provide free recycling of all mobile phones, plus their batteries, chargers and accessories via over

[8] The Australian Government, National Television and Computer Recycling Scheme, http://www.environment.gov.au/protection/waste-resource-recovery/television-and-computer-recycling-scheme

[9] The Australian Government, National Television and Computer Recycling Scheme, http://www.environment.gov.au/protection/waste-resource-recovery/television-and-computer-recycling-scheme

3,500 public drop off points across the country and free post-back satchels. Since its inception in 1998, Mobilemuster has recycled over 13 million handsets and batteries[10].

Cartridges 4 Planet Ark

A volunteer product stewardship program that provides Australians with a free way to recycle used printer cartridges. The program is funded by 6 leading printer cartridge manufacturers and promoted by Planet Ark. Collections, recycling and materials recovery is all undertaken by Close the Loop. Since starting in 2003, Cartridges 4 Planet Ark has recycled 40 million printer cartridges via collection across Australia[11].

FluoroCycle

FluoroCycle is a Government accredited voluntary product stewardship scheme that aims to increase the recycling rate of mercury containing lamps such as Fluorescent tubes, compact fluoros (CFLs), HIDs and metal halides. The scheme targets the commercial and industrial sectors where the bulk of waste lamps are generated[12]. FluoroCycle is administered by the Lighting Council Australia, the peak body for Australia's lighting industry. Operations are fully funded by members of Lighting Council Australia. Council, commercial and community drop off sites are provided throughout Australia with some states being more active than others. Although the scheme aims to increase recycling rates of lamps it has been documented that 95 per cent of mercury-containing lighting waste is still ending up in landfill [13].

Australian Battery Recycling Initiative

Currently there is no compulsory or voluntary national stewardship program for the management of end-of-life handheld batteries. The main organisation promoting the collection and recycling of batteries at end of life is Australian Battery Recycling Initiative (ABRI), a not-for-profit association of battery manufacturers, recyclers, retailers and government bodies. ABRI, industry and governments are currently working towards a product stewardship scheme for the management of end-of-life handheld batteries[14].

Permanent battery drop-off sites throughout Australia include major retailers Battery World, ALDI, IKEA and Officeworks, Mobilemuster (mobile phone batteries) and local council facilities. Generally these collection services are provided free of charge if you are disposing of small quantities. For larger quantities of batteries, like those a business or organisation

[10] MobileMuster, 2017, https://www.mobilemuster.com.au/

[11] Planet Ark, https://cartridges.planetark.org/

[12] FluoroCycle, Lighting Council Australia, https://www.fluorocycle.org.au/

[13] CMA Ecocycle (2016) *How Fluorocycle and CMA Ecocycle are recycling mercury lights in Australia* accessed via http://www.cmaecocycle.net/lightingand-electrical/fluorocycle-cma-ecocycle-recycling-mercury-lights-australia/

[14] Australian Battery Recycling Initiative, http://www.batteryrecycling.org.au/about/about-abri

might produce, there are commercial battery recyclers that provide a fee-for-service for the collection of used batteries.

In contrast to household batteries, there are a multitude of streams for recycling lead-acid car batteries. Many councils, as well as car workshops, scrap metal dealers and a number of retailers including Battery World, Repco Auto Parts, Super Cheap Auto that provide free collection points for car batteries recycling. For larger quantities of lead-acid car batteries there are commercial battery recyclers that provide a fee-for-service for the collection of used batteries.

Metal recycling programs

The recovery of whitegoods are driven by strong market value of the recoverable components of the goods and are generally dealt with through collection in metal recycling programs that keeps them out of landfill. Local government supports the collection and recycling of white goods via both hard waste collection services and its transfer stations Common whitegoods include fridges, freezers, microwaves, stoves, dishwashers, washing machines, clothes dryer and air conditioners.

Although most of these schemes exist in Darwin they are not well implemented or promoted and there is little community awareness nor are they readily accessible (not many drop off points). This will be elaborated further in the report.

Bans on e-waste going to landfill

In addition to these schemes working towards increasing the recycling rates of e-waste, South Australia has a ban on e-waste going to landfill which has been in existence since 2011 and the Victorian government have recently committed to imposing a ban on e-waste going to landfill from 2019. The Northern Territory has no such ban in place.

5. Project Overview

The E-waste Project undertaken by COOLmob and the Environment Centre NT provides an opportunity for Darwin to review its management of electronic waste and to work towards a strategy to create the necessary infrastructure and mechanisms to support sustainable and environmentally friendly e-waste management. It also provides an opportunity for greater community awareness and understanding around the issues of e-waste and the necessity to improve recycling of electronic items.

COOLmob and ECNT employed one staff member one day a week over eight months to conduct this project.

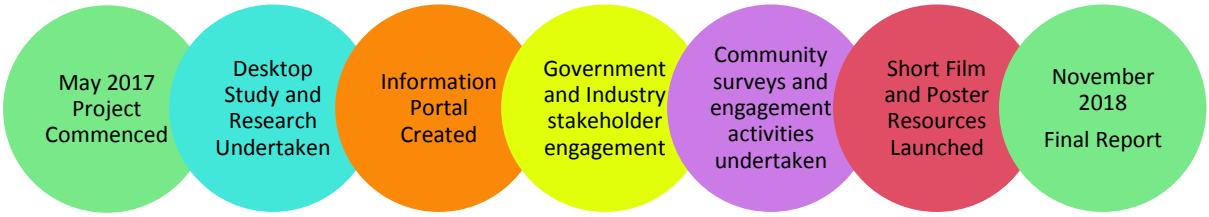
The project was provided with in-kind support from ECNT, which included supervision from the Executive Officer and IT support. We were assisted by a volunteer who provided graphic design support.

We also were fortunate to receive in kind support from local filmmaker Sam Frederick who produced the E-waste short film on a pro bono basis.

In undertaking this project we achieved the following objectives:

- Conducted research and created an **information portal and directory** of e-waste recycling options with a focus on Darwin.
- Designed and delivered a **public education campaign** to make people aware of the environmental impacts of e-waste, and motivate them to make use of Darwin's current e-waste recycling options.
- Consulted with key stakeholders to **identify current e-waste streams and strategies** which aim to reduce the amount of e-waste going to landfill and to increase the amount of e-waste items that are recycled.
- Undertook research of the existing data relating to **the amount of e-waste currently being recycled** in the Territory with the aim of setting a benchmark against which to measure future changes.
- Engaged with **Planet Ark** to provide a copy of our findings in this report for their website.

6. Project Timeline



7. Project Methodology

7.1 E-waste website information portal and directory

Our E-waste website and information portal was an important tool that we developed which greatly assisted us in our engagement with community on this project.

The portal aims to:

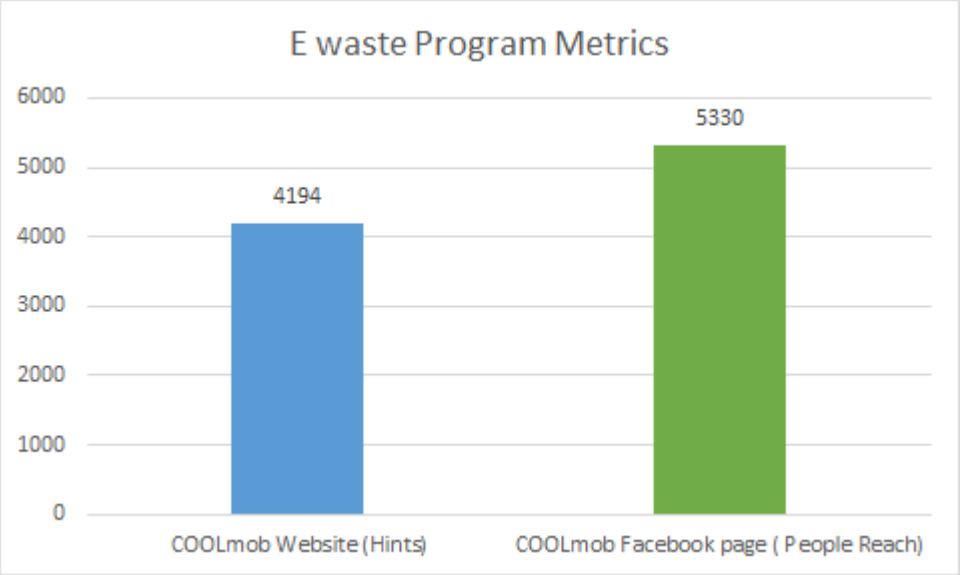
- increase awareness around what e-waste is and what the impacts of e-waste are on our environment
- provide some statistics and links to other websites and resources along with providing a directory of existing avenues for recycling e-waste in Darwin
- host our e-waste community survey which was a vital tool for us to understand current community awareness and attitudes towards e-waste

- be the main repository of information on e-waste in Darwin and also provides a platform for other e-waste education resources such as the short film, the E-waste posters and newspaper articles
- provide an option to list relevant events related to e-waste and recycling in Drawin.

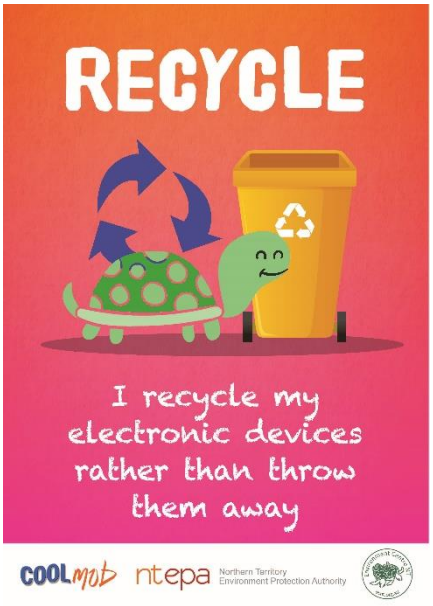
Over time the portal has evolved in response to consultation with community and continues to be a relevant resource for people wanting to know more about what to do with e-waste.

To access the information portal please visit this link: http://coolmob.org/ewaste/

The COOLmob Website received 4,194 Hits from 16 pages and posts. COOLmob Facebook Page reached 5,330 people from 13 Facebook posts.



7.2 E-waste community awareness and education campaign



A key component of the E-waste Project was the community education and awareness campaign which was conducted over a period of eight months. Our education campaign targeted a variety of groups in community and used a number of different tools including: stalls at community events, curating film festival events, facilitating school workshops, in depth local media coverage both on radio, online and in the local NT news and developing a poster series for young people.

As the project evolved we understood the importance of broadening our community awareness campaign to other mediums including short film. The benefits of

developing a short film on e-waste included the ability to easily distribute to a much broader audience, increased effectiveness of key messages communicated through entertainment, and the importance of giving a resource local context through using well known Darwin sites. We were fortunate to obtain in kind support from local filmmaker Sam Frederick who directed, shot and edited the film over a three month period. Our *"E-waste Turtle*" short film premiered at the 2018 Transition Film festival which coincided with World Environment Day.

A key aspect of our successful education campaign involved engaging with Planet Ark and Mobile Muster to become a Darwin drop off point for people's mobile phones and printer cartridges. This enabled us to have greater engagement with community members as it allowed people to drop off their e-waste directly to us at our stalls, events and our office whilst also allowing us to provide information directly to them on this project.

For a detailed analysis and breakdown of our campaign see Section 8.

7.3 Consultation with key stakeholders on current e-waste streams and strategies

Our project received strong engagement from Darwin City Council and we were provided information on current council practices in relation to e-waste. We also engaged with a wide range of waste management service providers and retail outlets to attempt to understand current practices. For a full list of organisations and stakeholders we consulted with please see Appendix 1.

As part of our consultation we conducted two in depth interviews with representatives from the waste management sector and the local council. Key observations from our interviews conducted can be found in section 8.4 of the Key Findings.

Our research and review of literature also informed our understanding of the current streams and strategies that are implemented for e-waste in Darwin and also nationally.

A challenge to our research on current streams for recycling e-waste was a lack of cohesive strategy and communication amongst key stakeholders.

7.4 Research and data on current e-waste management in Darwin

Baseline data on amount of e-waste generated and recycled in Darwin

Throughout the course of this project we consulted with a range of key stakeholders both in NT government, local council, not for profit, waste management industry, electronic retail outlets, and the wider Darwin community.

Our data aims were to ascertain the amount of e-waste that was being generated in the Darwin region and also the amount of e-waste that was being recycled either through the waste transfer station or through the waste management providers.

Significant lack of data available

A common theme that arose out of our consultations with this diverse group of stakeholders was the significant lack of coordinated and available data on e-waste. This was pointed out and emphasised by both local council and waste management services. From our literature review and research it is clear that while this challenge is faced by other states and Territories in Australia, the lack of accessible data is much more acute in the Territory.

While we were able to obtain some baseline data relating to the Northern Territory from the National Television and Computer Recycling Scheme Annual Reports, and from Darwin City Council about amounts of e-waste collected from hard rubbish collection, the significant lack of e-waste data for the Darwin region seriously impacts on our ability to create any baseline data to measure change.

Because of the lack of quantitative data, we decided to collect our own qualitative data from community members about their e-waste practices along with in depth interviews with the waste management sector about why there is a significant lack of data. Although our surveys and interviews provided very valuable data to use in the context of this project, the sample size captured was too narrow to provide a sound basis for data analysis.

Due to the lack of data available in the Darwin region we researched other models of statistical analysis from other states in Australia which could potentially be applied to the NT.

Consultations with interstate experts

We consulted with an interstate waste management expert who was involved in the modelling and statistical analysis of the amounts of e-waste generated across Australia for the purposes of the Victorian Department of Environment Land, Water and Planning's - *Managing E-waste in Victoria – Policy Impact Assessment* 2017. A key analytical tool that the Victorian study used was a Material Flow Analysis which estimates current and projected future e-waste generation.

Material Flow Analysis modelling

This modelling involves "extracting data on imports and exports of each type of electrical good, and then estimating historical, current and future consumption of those goods.

Current and projected Australian and Victorian e-waste generation was then estimated based on life spans of each type"[15] of e-waste. Population numbers were then utilised to determine on average how many kilograms of e-waste is generated per person per year.

This modelling was very generously shared by Dr Joe Pickin Director of Blue Environment Pty Ltd, who were contracted by the Victorian government to provide this modelling for their e-waste report. Dr Pickin provided the estimates to COOLmob pro bono and indicated he had capacity to undertake a more detailed evaluation of e-waste generation in the Darwin region subject to funding and time.

Community survey conducted

We conducted our research online via Google Docs that asked a series of 29 questions around e-waste practices. Only key findings are reported within this document. The questions were informed by other standard questions used in similar industry based surveys. Please see Appendix 9 for a complete copy of the survey. Results of survey can be viewed in section 8.3 of the key findings.

In depth interviews with waste management sector

We conducted two in depth interviews with representatives from the waste management sector and the local council. Please see Appendix 2 and 3 for an outline of questions used in interviews.

These interviews were informed by our consultation with a wide variety of stakeholders as discussed above.

Consultation with waste management on available data for Darwin

Our project spoke with a number of key waste management providers to try and ascertain their data management records in an attempt to gather local data. We were informed by waste management providers that this data was private information and was not made for the public. For organisations that we consulted during the course of this project please refer to Appendix 1.

Literature review

Our research also involved an extensive web based review of literature and reports available on the amount of e-waste being recycled in the NT and across Australia more broadly. For a list of the reports that we reviewed during the course of this project please refer to Appendix 4.

[15] State of Victoria Department of Environment, Land, Water and Planning, 2017, *Managing E-Waste in Victoria –Policy Impact Assessment*

It should be noted that as discussed above there was a significant lack of data available in relation to specific e-waste statistics for Darwin and the NT. The only specific NT data available for e-waste was through the *National Television and Computer Recycling Scheme – National Waste* Report. Data gathered related to general rates of recycling without detailed breakdowns of e-waste items, with an exception being TVs and computers.

8. Key Findings

8.1 Baseline data of E-waste quantity currently produced and recycled in Darwin

Significant lack of data available

As mentioned in the challenges, one major obstacle for this project was the significant lack of publicly available data concerning e-waste production and management in the Darwin region. This was consistently mentioned by industry and government stakeholders as a challenge when examining this area of waste management. As discussed above we were informed by waste management services that the data relating to e-waste recycling was private and not available to the public.

Our data collection was also impacted by the ad hoc arrangement of e-waste management, with many different streams operating with limited coordination with each other.

The e-waste generated is collected in various ways including through formal collection activities such as the national tv and computer recycling schemes, MobileMuster drop-off points, cartridges4 planet ark, and through informal collection channels such as scrap metal dealers and scrap plastic dealers. E-waste can also end up in waste bins. Therefore, obtaining the amount of e-waste collected through these various channels is very difficult, which means estimations have to be made.

NT Specific Results from the National Television and Computer Recycling Scheme 2016-2107

Co-regulatory Arrangements	Darwin 2015-2016	Darwin 2016-2017	Darwin 2017-2018	Northern Territory 2015-2016	Northern Territory 2016-2017
Australia and New Zealand Recycling Platform (ANZRP) (Techcollect)	Data not available	Data not available	Data not available	39,045 kg e-waste collected for recycling	48,981 kg e-waste collected for recycling
Ecycle Solutions	Data not available	Data not available	232.6 kg e-waste collected for recycling	1,417 kg e-waste collected for recycling	2,048 kg e-waste collected for recycling
MRI (Dropzone)	Data not available	0	11,256 kg e-waste collected for recycling	366 kg e-waste collected for recycling	0
Electronics Products Stewardships	Data not available	Data not available	Data not available	1,596 kg e-waste collected	Data not available

Australasia (EPSA)				for recycling	
TOTAL	Data not available	Data not available	**11,486.6 kg**	**41,424 kg**	**51,029 kg**

Data sourced from Co-regulatory arrangements Annual Reports 2016-2016, 2016-2017 and direct contact with the four co—regulatory arrangements

Material Flow Analysis modelling for Darwin region

Modelling very generously provided to COOLmob pro bono by Dr Pickin from Blue Environment Pty Ltd demonstrates the ability to calculate on average how many kilograms of e-waste is generated per person per year. Details of this modelling can be found at Appendix 6

In 2017, the population of Australia was **24.6 million people** and the total amount of e-waste generated was **485 kilotons**. This equates to **19.7 kilograms of e-waste generated per person** for the year of 2017. This amount is projected to increase by nearly a kilo for 2018.

If we apply this modelling to Darwin we obtain the following data showing amounts for 2017[16]:

In 2017 the population of Greater Darwin was **136,828**. When multiplied by **19.7 kilograms** per person the annual amount of overall e-waste generated is **2.7 kilotons, which is 0.5 %** of overall amount generated in Australia**.**

While this modelling is useful for generating estimates of how many kilograms of e-waste is generated per person per year there are limitations of this modelling that may skew the findings (such as remoteness, indigenous population, climate and transient population) and we would recommend that further statistical analysis taking into account these be factors be undertaken.

Information provided by Darwin City Council

We consulted with Darwin City Council about the amount of e-waste the organisation collected. The only data that was provided was from 2016 Pre-Cyclone Clean Up which outlined that:

Council collected 9.37 tonne of E waste during the Pre-Cyclone Clean-Up in 2016. This was then sent for recycling via a contractor.

[16] We note that the most up to date population data we could obtain in relation to Darwin was from 2016 Census - http://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/7GDAR

This data is does not provide a sound basis to undertake any kind of statistical analysis and we recommend further work be done in ensuring that strong data management systems are put in place to help create an evidence base on amounts of e-waste generated and recycled in Darwin.

8.2 Community Awareness campaign

Highlights from our comprehensive and multi-faceted e-waste education campaign included:

- **Facilitating a number of community engagement E-waste stalls over the campaign period**
    - **May 2017 Sea Breeze Festival in Nightcliff** – our stall encouraged community members to bring along their e-waste for recycling (in particular mobile phones, batteries and printer cartridges) and provided important information about what e-waste is, the environmental impacts of e-waste, and where community members can recycle electronic waste. We were able to collect in excess of 30 e-waste items that could have otherwise gone to landfill. We engaged with over 100 people across the day and provided E-waste Project flyers with further information for the public.

    - **May 2017 ECNT fundraiser at the Deckchair Cinema -** this event provided an opportunity to engage with a large number of Darwin residents at the well-attended film fundraiser event with special guest speaker Tim Flannery. We provided an opportunity for community members to drop off their e-waste along with providing important information about our project.

    - **July 2017 joint stall at Nightcliff market over three weekends in partnership with Australian Marine Conservation Foundation** – We provided key information on the project to community and drop off point for people to provide us with their e-waste and give information on other drop off points available for people to utilise for e-waste.

    - **July 2017 as part of Transition film festival**- stall providing information and opportunity for community to drop off e-waste and learn about the project.

    - **August 2017 Sustainable House Day** – collaborated with Sustainable House day and hosted an E-waste stall at one of the participating showcased houses.

- **Events and workshops**
    - **July 2017 Transition Film Festival** - curated a film as part of the Transition film festival which featured the film *Reuse! Because You Can't Recycle The*

Planet. The film was chosen specifically because of the recycling message and addressed the issues of e-waste on a more global scale. The event also featured a planned talk by project staff on the E-waste project.

- **September 2017 E-waste workshop with Marrara Christian College –** developed and presented a workshop on recycling and e-waste with grade 3 and 4 students. This workshop recognised the importance of getting the key messages around e-waste to young people so that education on this important topic starts in early years. The workshop also included an e-waste sorting activity which involved kids' workshopping ways of recycling e-waste.

- **Media**
  - **June/ July/ August/September 2017 - ENCT Newsletter Turtle Times E-Waste Articles –** as part of this project we wrote a series of articles on the e-waste project which was circulated to the ECNT newsletter email group which contains over 1000 community members. The articles encouraged participation in the survey along with information about the issues of e-waste, the drop off points in Darwin and strategies to reduce e-waste.

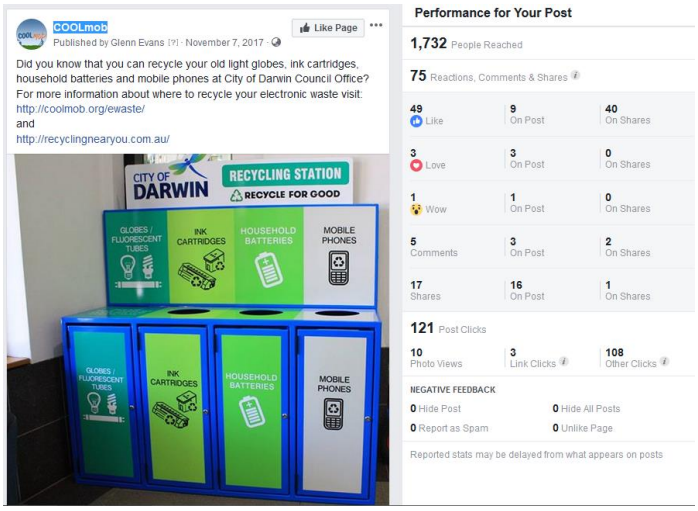
  - **October and November 2017 - Radio interviews with ABC Darwin** – we utilised radio as an important avenue for community awareness round the E-waste project and we provided three interviews with ABC Radio on the project including: providing information about community drop off points for e-waste, encouraging listeners to complete our community E-waste survey, and directing people to our information portal on e-waste. Listeners demonstrated a keen interest in the project including calling in and asking questions live on air about different types of e-waste and where they could recycle items.

What's inside your mobile phone and why you may want to recycle them

ABC Radio Darwin
By Jesse Thompson
Updated 24 Nov 2017, 12:20pm

What happens when you recycle an old phone? Why should you bother? As e-waste collection bins spring up throughout Australia, there's a good reason why you may want to fill them. An estimated 23 million unused mobile phones are gathering dust around the

- **October and November 2017 - Social media campaign via COOLmob and ECNT Facebook pages** – the project ran a coordinated "Rethink, Reduce, Reuse, Repair, Recycle" social media campaign focusing on the war on e-waste. Our campaign included information on e-waste drop off points in Darwin and tips on repairing items and links to community e-waste survey.



Key statistics: 22 facebook posts, 10,413 people reached and 301 engagements on posts

- **November 2017- Interviewed for ABC Darwin online news article *What's inside your mobile phone and why you may want to recycle them*** – the project was featured on the ABC news website and focused on mobile phones as e-waste and the importance of recycling them. A copy of the article can be found here: https://www.abc.net.au/news/2017-11-17/what-happens-when-you-recycle-an-old-mobile-phone/9156944

- **20 November 2017 – NT News Article - Impact *of e-waste is Just Not Cool"***- featuring e-waste project and information on community survey, information portal, types of e-waste and drop off points in Darwin (see Appendix 7).

- **Community engagement resources developed**
  - **June 2017 – developed the E-waste Web portal and directory –** refer to above for further information.

  - **June 2018 - Premiered the E-Waste Turtle short film for World Environment day at the Transition Film Festival** - as part of this project we created a short film with the in kind support of local Darwin filmmaker Sam Frederick shot over October and November 2017. The film has been a successful community engagement tool, which aims to raise awareness of the types of e-waste, the environmental impacts, and a link to our project website. The film features

well known locations around Darwin and has already gained over 3000 views on Facebook. We have received very positive feedback on the resource such as "*Brilliantly done, engaging and extremely pertinent.... thankyou"*

- To view our e-waste short film please follow this link: http://coolmob.org/ewaste/

- **December 2017 published a series of posters on E-Waste targeting young people –** the posters focused on "Rethink, Reduce, Reuse, Repair, Recycle" key messages and are made available via the e-waste information portal and will be distributed directly to schools and via social media. See appendix 8.

8.3 Community Survey Results

We received a total of 59 responses, approximately 85% of respondents were female, ages was categorised according to the following (< 19, 20 – 29, 30-39, 40 – 49 and 50+), the majority of respondents (70%) were in the 40 – 50 + age brackets. Only 5% of respondents were aged 29 years or younger. Approximately 90% of respondents were aware of e-waste prior to taking part in the survey. Seventy-one percent of respondents purchased between 1-3 electronic products annually with 22% of respondents purchasing between 4-6 products annually. Seventy-eight respondents disposed of 1-3 products annually.

Frequency of disposal electronic disposal/replacement were categorized according to the following time epochs; 0-6 months, 6-12 months, 1- 2 years, 2-3 years, 5-10 years, 10 years of more, I don't own this item. Electronic devices enquired about within survey included; mobile phone, laptop, desktop computer, television, microwave, fridge, washing machine, dishwasher, tablet or ipad, coffee machine, DVD player, batteries, printer cartridges, and light globes.

Respondents were asked to select amongst the following behavioural options for their broken electronic products; repair it, put in rubbish bin/take to rubbish, put out to cyclone clean up, take to a recycle centre, put into storage, re-use for another use, strip for spare parts, give to a friend/charity.

Mobile phones were typically recycled. Laptops were equally likely to be recycled, put into storage, repaired or taken to the tip. Desktop computers were equally likely to be repaired, taken to the tip or recycled. Almost one half of the respondents reported that televisions were taken to the tip, with a further one fifth identified either repairing or recycling their televisions respectively. Of the respondents that owned microwaves almost half took this item to the tip or rubbish. Similarly, of the respondents that owned printers almost half of the respondents took this item to the tip. Fridges were equally likely to be repaired, taken to the tip, put out for cyclone clean up or recycled. Washing machines were also equally likely to be repaired, taken to the tip, put out for cyclone clean up or recycled.

Close to half of the respondents did not own a dishwasher, however of the respondents that owned a dishwasher, the two most common means of disposal were taking the item to the tip or as cyclone clean up. Approximatley one quarter of respondents didn't own an ipad / tablet. Respondents owning this item were equally likely to repair, take to the tip, and recycle. Close to half the respondents did not own a coffee machine, and for those that did, disposing of the item at the tip was most common. Approximatley one quarter of respondents didn't own a DVD player. Respondents owning this item were most likely to dispose of it at the tip. Over half of respondents reporting disposing of light globes at the tip. Respondents were equally likely to recycle or dispose of batteries in the tip. Finally, printer cartridges were largely reported as being recycled.

Respondents were asked questions about their views on the problems of e-waste and whether or not it was a serious problem. Ninety-six percent of respondents indicated that e-waste is a serious problem with 98% feel that it is hazardous for the environment because it contains toxic materials.

Forty-six percent of respondents indicated that they do not recycle their e-waste. The main reasons given was that they don't know where to take them to be recycled and confusion about which electronic items can be recycled. Other reasons include it is too much hassle to take them to a drop-off site and privacy concerns about personal data on the devices.

When questioned how aware respondents are about free e-waste recycling options in Darwin, 41% of respondents indicated they were unaware of recycling options. Of those respondents who were aware of free e-waste recycling options in Darwin, the majority reported recycling at Shoal Bay Transfer Station followed by Battery World, Mobilemuster drop-off sites and Plant Ark. Respondents were equally likely to be aware of Harvey Norman and Darwin City Council facilities, however this constituted only one fifth of the awareness of Shoal Bay Transfer Station.

In response to a query about which factors prevented respondents from repairing their electronic products the major reasons mentioned were the price of repair vs price of new item, availability of spare parts, skills needed to repair item, and availability of someone to repair item.

In response to who should pay for the collection and treatment of e-waste, 63% of respondents indicated that producers and manufacturers should pay for the collection and treatment of e-waste, 17% indicated they would be willing to pay for the cost and 5% believe government take financial responsibility for the cost of collection and treatment of e-waste.

Respondents were also surveyed about legislative regimes, specifically whether e-waste should be banned from landfill. Overwhelmingly, 90% of respondents reported that e-waste should be banned from landfill.

Comments made by respondents

"Not enough accessible places to recycle at short notice (eg cyclone prep, moving house chaos). Also I would need a tag to enter the electronic recycling section of the city tip and I do not own a home and pay rates, I do not own that tag."

"Not enough publicity about the problem of e-waste and where to recycle them. Need to educate and advise."

"They usually need to be taken somewhere and I don't have a car."

"I have no idea where to take the e-waste other than the tip. "

"I did ask the electrician who did a job at our house recently about the waste they collect. They pretty much bundle it all together (cardboard, paper, cable, metal, soft + hard plastic, electronic devices) and dump it. No real awareness of the hazards."

"Pressure should be placed on manufacturers to take responsibility for the collection and recycling of e-waste, as in other countries."

"I don't know how to repair my electronic devices and I can't find anyone else to repair items."

"Most local retailers discourage repair saying it is cheaper to just buy a new one than it is to send the item interstate or overseas to repair."

"I'd love to see big companies be put on the line for planned obsolesce, also that repairs are cheaper than buying new. I'd also love a really comprehensive guide of what can be recycled in Darwin and where."

"There is a lack of good and honest repair businesses in Darwin."

"I'm storing my broken cell phones and laptops at home until I find out where to take them."

"When I've looked it up there are no recycling options in Darwin for many electronic products."

8.4 Knowledge gained from government and industry stakeholders

The main findings from engaging with a range of government and industry stakeholders, either via informal discussions or more formal focused interviews are summarised below.

A common theme that came through the discussions is that there is a general apathy from Darwin residents about what happens to their e-waste. The reason for this apathy was suggested to be influenced by the transient nature of Darwin's population and a lack of awareness about what e-waste is, the impacts of e-waste and knowledge where to take it. A

majority of the stakeholders engaged believe this is linked to inadequate awareness and education campaigns around e-waste and that the campaigns have been very simplistic or very muddy to date with no clear message. The campaigns have focused on looking after the environment and increased recycling rather than how to do it as an individual. A common finding among stakeholders was that the campaigns need to be more focused, with real engagement and interaction such as workshops. One suggestion put forward as an approach to deal with this issue was for Darwin Council to employ a Waste Education Officer to co-ordinate an education and awareness campaign.

With respect to data management systems for e-waste, there is a general consensus that it is inadequate in Darwin and that there is an absence of good, reliable, consistent, accurate and publicly available data. One person commented that "No one has had a clear vision or idea about what data management should be, it's a mixed data set".

When questioned about the feasibility of building an e-waste recycling plant in Darwin the opinions were varied. Some stakeholders felt the population is too small to generate the quantities of e-waste to make it a viable investment, whilst others suggested the idea of a preliminary dismantling facility or an e-waste micro-processing plant facility may be viable for Darwin. Darwin City Council is currently looking into developing compost recycling industry in Darwin and it is keen to expand this to other Looking at other markets like e-waste.

Stakeholders were asked what they think are the most important challenges to facilitating the re-use and recycling of used electronics in Darwin and the main responses included:

- Socio-economic factors and low population density impedes the development of resource recovery systems due to logistics, costs and weak economies of scale.
- Inadequate communication and cooperation between key government and industry stakeholders handling e-waste.
- Inadequate support and funding
- The National Television and Computer Recycling Scheme recycling target is applied to the whole of Australia and not on a on a state by state basis. Targets are therefore met in more populated parts of Australia and getting token efforts in remote areas such as Darwin
- Lack of collection systems for most e-waste items
- Inadequate awareness and education campaigns around e-waste
- Difficulty for residents to access collection systems where they do exist for example renters don't have a tip pass tag to access free drop off services for certain types of e-waste at the Shoal Bay Resource and Recovery Station.
- Relative ease for residents to dispose of items to landfill rather than seek out a recycling option
- Cost of recycling/processing vs. disposal to landfill
- The Product Stewardship Act 2011 does not allow for the Territory government to unilaterally introduce a product stewardship scheme for the NT.
- Current storage facilities at Shoal aBay Resource Recovery Station are inadequate to properly separate, store and repair e-waste.

When the stakeholders were asked if they believe the NT government should put a ban on e-waste going to landfill a majority of people said yes, whilst others were a little more concerned that it would just cause e-waste to be dumped or shipped down south to other States or overseas. One stakeholder said “yes, whilst a ban is needed it is not the be all and end all, you also need to make sure you have the right people managing resource recovery services and you need to have it monitored”. Another stakeholder commented that “Shoal bay Resource Recovery Station is currently a landfill site and not a diversion site so any waste going there is destined for landfill. What needs to happen is a proper sorting and processing plant needs to be established to thoroughly sort and pull out items that are deemed recyclable”. Another stakeholder said “Yes, but there needs to be a proper review of current e-waste management, including a cost benefit analysis”

The stakeholders were asked what they believe could be done to increase e-waste recovery and recycling in Darwin. Here’s a list of some of the main suggestions;

- Implement a recyclables to landfill charge on e-waste based on volume
- Improve the e-waste storage and processing facilities at Shoal Bay Transfer Station and others across the NT.
- Australian government to expand existing product stewardship schemes to encompass a broader array of e-waste and establish new schemes
- A collaborative approach between National Television and Computer Recycling Scheme co-regulators in Darwin and the NT that ensures more equitable access to services.
- Increase support and funding for e-waste management
- Set up an e-waste working group composed of government and industry stakeholders
- Set mandatory e-waste recycling targets for Darwin
- The cooperation of all levels of government is necessary
- Move towards banning e-waste going to landfill.
- Government to lead the way with their own internal policy and strategies for managing e-waste in their offices and buildings
- Invest in an education and communication campaign aimed at preventing e-waste ending up in landfill
- Improve collection systems for e-waste across Darwin and the NT so that it is convenient for people to drop off e-waste.
- Provide renters with tip passes so they are able to access free drop off services for e-waste at Shoal Bay Transfer Station.

8.5 Desktop Research results

As demonstrated by the tables in Appendix 4 and 5, we undertook comprehensive web based research, including looking at other jurisdictions and how e-waste is dealt with internationally.

The key reports that we relied upon in preparing this report were:

Managing E-waste in Victoria – Policy Impact Assessment	State of Victoria Department of Environment, Land, Water and Planning	2017
The Global E-waste Monitor 2017 Quantities, Flows and Resources	Balde, CP, Forti V, Gray V, Kuehr R, Stegmann P, United Nations University	2017
Global E-waste Systems – Insights for Australia from other developed countries	Economist Intelligence Unit	2015
National Television and Computer Recycling Scheme – Outcomes 2014-2015	Australian Government, Department of Environment and Energy	2016
Australian National Waste Report	Dr Joe Pickin and Paul Randell, Department of Environment and Energy and Blue Environment Pty Ltd	2016

8.6 Strategies developed to increase e-waste recycling in Darwin

The project had an incredibly limited budget so strategies to increase recycling have been limited by the budget of this project. In particular, there was no budget allocated to evaluation of strategies employed which is a key component to understanding the success of any project and its campaigns. If any future work is undertaken on a similar project evaluation should be undertaken to ascertain effectiveness of strategies. The main strategies developed to increase e-waste recycling in Darwin included:

- Increased number of e-waste drop off points by registering COOLmob with Planet Ark and Mobilemuster as a drop off location for the collection of mobile phones and printer cartridges. Other drop off points were provided for the collection of certain e-waste items at various events during our education campaign.
- Engaged with community around their understanding of e-waste and current practices through our in depth online survey – strategy to be developed to get higher rate of participation
- Increased public awareness of e-waste through our e-waste education campaign
- Project created dialogue amongst stakeholders – and also created momentum in local council to take action on e-waste management.

8.7 Current E-waste recycling options in Darwin area

From our consultations and research we identified the following current strategies that are in place for e-waste in the Darwin region:

Type of E-Waste	National legislated scheme (compulsory)	Industry led program (voluntary)	Local recycling option	Recycling strategy details for Darwin Region
Computers, laptops, tablets and accessories	√			National Television and Computer recycling scheme legislated and overseen by NT EPA. Drop off points located across Darwin at Office Works, Harvey Norman, Shoal Bay Transfer Station and NTRS
			√	Rapid Creek Market electronic repair stall holder - a stall which seeks to repair and resell used electronic products
Televisions	√			National Television and Computer recycling scheme legislated and overseen by NT EPA. Drop off points located across Darwin at Office Works, Harvey Norman, Shoal Bay Transfer Station and NTRS
Mobile phones		√		Mobile Muster Drop off points for mobile phones located at 33 locations across the Darwin region
Household batteries		√		Battery World Coconut Grove, drop off point
			√	Shoal Bay Transfer station

			√	Darwin City Council e-waste drop off point located at Darwin City Council office
Car batteries		√		Battery World Coconut Grove, drop off point
			√	Shoal Bay Transfer station
			√	Scrap Metal businesses
		√		Repco Auto in Winellie, Casuarina and Palmerston, recycling drop off points for car batteries.
			√	Darwin Recycling Pty Ltd located Woolner
			√	Other private waste service providers – fee for service program (such as Veolia, Clean Away)
Printers and printer cartridges		√		Planet Ark Drop off points for printer cartridges located at 14 locations across the Darwin region.
Whitegoods			√	Shoal Bay Transfer station
			√	Scrap Metal businesses located in Darwin region
			√	Environmental Recyclers NT
			√	Other private waste service providers – fee for service program (such as Veolia, Clean Away)
Light globes			√	Darwin City Council e-waste drop off point located at Darwin City Council office in the city
			√	Shoal Bay Transfer station
			√	Berrimah Second Hand Building Supplies
			√	Northern Territory Recycling Solutions

			√	Other private waste service providers – fee for service program (such as Veolia, Clean Away, NTRS)

As can be seen, whilst there is at least one option in Darwin for each stream of e-waste, higher engagement from local businesses, Council and Government would lead to an increased number of local designations for consumers to easily dispose of their e-waste.

9. Challenges

Below are a list of the challenges encountered whilst endeavouring to achieve the aims of the Project. We found that due to Darwin's remote context, there are specific financial barriers that prevent the NT from reaching the same levels of e-waste diversion as other parts of Australia. Australia's e-waste diversion and recycling needs to increase dramatically to ensure optimum resource recovery, and the NT has the potential to make this possible in their own way with proper Government guidance and legislation, industry and government cohesion as well as education and innovation.

The main challenges we found facing the NT's current e-waste recycling status can be divided into financial, commercial, market, government, lack of consensus between all stakeholders as well as lack of education.

<u>Commercial and market forces</u>

- There is a resistance from commercial sector to partner for e-waste collection service
- Lack of consensus between different organisation in waste management industry – no unity or overarching working group to deal with e-waste. In Victoria, an e-waste industry and stakeholder working group has been set up, and this is demonstrating successful outcomes for diversion
- Inadequate support and funding for the establishment and on-going provision of collection systems improving e-waste management limits the capacity of commercial operators. This coupled with inadequate communication and cooperation between key government and industry stakeholders handling e-waste as well as minimal government incentives for business and industry to move away from linear economy towards a circular economy means NT is falling behind.

<u>Government</u>

- There is no uniform definition of e-waste across states and territories, and this creates confusion amongst stakeholders and community about what constitutes e-waste and what can be recycled.
- E-waste has not been made a priority in NT waste management strategies. No targets have been set and e-waste is under represented in the strategy.

- From consultations with local government stakeholders and businesses, there seems to be a lack of internal policies for own management of e-waste. Government is not leading the way with its own e-waste practices in Government offices and buildings.
- There is minimal focus on higher levels of the waste hierarchy for managing e-waste (reduce, think, repair, reuse) and emphasis is on recycling which is towards the bottom of the waste hierarchy. Without incentives for innovation around reusing e-waste, a market cannot efficiently emerge. As Darwin is a remote area, there would be opportunity to create a market and jobs around innovative e-waste solutions.
- The National Television and Computer Scheme recycling target is applied to the whole of Australia and not on a on a state by state basis. Targets are therefore met in more populated parts of Australia, with limited efforts being made in remote areas such as Darwin, as transport costs are deemed too expensive.
- A lack of consistent or ongoing e-waste education campaign from Council or NT Government creates poor levels understating about e-waste in the community. This is particularly important given the transient nature of the population in Darwin. NT Government needs to place more importance on waste diversion, including e-waste diversion, and provide appropriate funding for behaviour change and education programs around the waste hierocracy. The Victorian Government have allocated The Victorian Government is investing $16.5 million to upgrade e-waste collection and storage facilities across the state and deliver an education campaign to support the ban on e-waste in landfills[17].

  There is poor promotion of existing e-waste recycling services in Darwin, leaving the public unaware of how to deal with their products at the end of their lifespan. This coupled with a lack of collection systems makes it difficult for residents to access collection systems where they do exist. Low car ownership rates for residents was one challenge raised via the community survey. And when those who did have a car, were renters, they do not have a tip pass tag to access free drop off services for certain types of e-waste at the Shoal Bay Transfer Station.

- In Australia, the Australian Government retains the power to regulate companies under the Product Stewardship Act. The Product Stewardship Act 2011 does not allow for the Territory government to unilaterally introduce a product stewardship scheme for the NT. Currently there are no mandatory schemes covering electrical devices under the act and only one co-regulatory scheme for televisions and computers and a couple of voluntary schemes.

- Absence of good, reliable, consistent, accurate and publicly available data impacted ability to collect baseline data. Under-reporting of e-waste data means it is difficult to ascertain what is happening with e-waste and to measure any regulatory or non-regulatory change impacts. Without clear and mandatory reporting for the waste management industry, the NT is unable to accurately assess its current status.

<u>Financial</u>

[17] The State of Victoria Department of Environment, Land, Water and Planning, 2018, *Managing e-waste in Victoria*, https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.vic-engage.files/2515/2505/0506/e-waste_update.pdf

- The cost of recycling/processing vs disposal to landfill in due to the remoteness of Darwin unfortunately means that there is a decreased incentive to properly divert from landfill as the cost of transporting e-waste to other states down south with recycling facilities can sometimes be prohibitive. There is no dedicated e-waste recycling plant in Darwin, although we will touch on how this could be innovated in the recommendations section.

10. Recommendations

<u>Ban e-waste going to landfill</u>

- Create a uniform definition of e-waste and a list of items deemed to be e-waste that can be used by government and all stakeholders to reduce confusion as to what constitutes e-waste. A proposed definition is the one used by the Victorian government. "All Electrical or electronic equipment with a power cord or battery and its parts that have been discarded by the owner as waste"[18] .

- The NT Government should move towards banning e-waste going to landfill. The initial step towards this would be to undertake a comprehensive assessment of e-waste management in the NT and an in depth review of current policies, a similar review to the one recently carried out in Victoria[19][20]. In Victoria, this e-waste ban will be enforced by The Environment Protection Authority (EPA). While small volumes of e-waste may filter through to landfill, measures should be in place to safely manage e-waste and prevent large quantities of e-waste entering the landfill cell. A key component of this would be to perform a cost benefit analysis to approximate costs for handling and sorting of e-waste and transportation of e-waste to recyclers.

<u>Increase stakeholder cohesion</u>

- Set up a working group comprising of Local and Territory Government and key stakeholders with a role to help guide the review process of e-waste management in Darwin and the NT. This would strengthen communication and cooperation between government and industry stakeholders, and lead to a holistic and multidisciplinary approach.

- Strengthen advocacy to the Australian government to expand existing product stewardship schemes to encompass a broader array of e-waste and establish new

[18] The State of Victoria Department of Environment, Land, Water and Planning, 2015, *Managing e-waste in Victoria, Starting the conversation*

[19] The State of Victoria Department of Environment, Land, Water and Planning, 2015, *Managing e-waste in Victoria, Starting the conversation*

[20] State of Victoria Department of Environment, Land, Water and Planning, 2017, *Managing E-waste in Victoria – Policy Impact Assessment*

schemes so that it places more responsibility for recycling end-of-life electrical goods on producers or importers. This should also include advocacy for better design standards at start of life for all products, made, imported and sold in Australia. Standards should address durability, repair and/or remanufacture to extend product life. This is a prime and very timely opportunity for the NT government to advocate for a more comprehensive suite of e-waste product stewardship programs because the Federal government is currently reviewing the Product Stewardship Act 2011.

- A collaborative approach between National Television and Computer Recycling Scheme co-regulators in Darwin and the NT that ensures more equitable access to services. This could be achieved through joint funding of services by the scheme co-regulators to provide a centrally coordinated approach to raising community awareness and educating the community about the Scheme using uniform messaging. A mandatory minimum annual collection level (weight) based on population also needs to be set and the arrangements must collect a minimum amount of material annually from each collection

<u>Develop local markets</u>

- Develop the e-waste recycling industry in Darwin. Research the feasibility of investing in a preliminary dismantling facility or an e-waste micro-processing plant facility for Darwin. Visit the UNSW's Centre for Sustainable Materials Research and Technology for more information about the micro-processing plant[21] . A case study is Axis Worx in Horsham, Victoria (a regional town with a small population like Darwin) where through their E-Worx program they dismantle end-of-life televisions, computers and other electrical products and then sort the recyclable components including circuit boards, copper wiring, other metals, glass and plastic[22]. One Darwin organisation that is well placed to run a similar enterprise would be Helping People Achieve and its Kokoda Industries initiative whom are already operating the recycle shop at the Shoal Bay Transfer Station.

- Funding or other incentives to be made available to businesses and individuals to support and help them set up initiatives and social enterprises that help move away from a linear economy towards a circular economy. For example, in Sweden those who hire repair people to fix household appliances are able to claim a partial tax refund for the bill. The idea behind these tax incentives is to jump start a home repairs industry in Sweden[23].

- Funding to support a repair café in Darwin similar to other initiatives that exist throughout other parts of Australia[24]. Repair cafés are held at a fixed location where

[21] Sustainable Materials Research & Technology, The University of New South Wales, 2018, http://smart.unsw.edu.au/

[22] Community AXIS Enterprises Inc, https://www.caei.com.au/index.php/services/e-worx

[23] Reduced taxation to support re-use and repair, 2017. RReuse. http://www.rreuse.org/wp-content/uploads/RREUSE-position-on-VAT-2017-Final-website_1.pdf

[24] Sanctuary Magazine, May 2017, Reviving the art of repair, https://renew.org.au/sanctuary-magazine/in-focus/reviving-the-art-of-repair/

tools are available for people to fix their broken goods with the help of skilled volunteers[25]. One of many successful repair cafés is the Mount Hawthorn repair café in Perth[26].

Increase Monitoring and Reporting

- Set up a uniform system of monitoring and collating data around e-waste collection across government and industry sectors NT wide. This will help ensure developments can be tracked and evaluated, targets can be set and monitored and policy impacts measured. Ultimately, better e-waste data will help to minimize its generation. A part of this improved data system should include a universal classification system of e-waste based on UNU-KEYS used in the EU WEEE Directive in Europe[27] [28]. A classification system for e-waste statistics should categorise products by similar function, comparable material composition (in terms of hazardous substances and valuable materials) and related end-of-life attributes. In addition, products within the same category should have a homogeneous average weight and life-time distribution, which can simplify quantitative assessment for similar products [29].

- Government to lead the way with their own internal policy and strategies for managing e-waste in their offices and buildings such as a green purchasing policy for electronic devices. This will help set standards for local businesses and industry to follow the governments lead.

Increase e-waste education

- NT government to increase support and funding to Councils for the establishment and on-going provision of collection systems and education aimed at improving e-waste management.

- Invest in an education and communication campaigns aimed at preventing e-waste ending up in landfill. Educating the community about how and why it is important to reduce the amount of e-waste being generated is a critical part of driving greater diversion of e-waste from landfill. The campaign needs to be well funded, coordinated and with consistent messaging. The campaign also needs to be ongoing to ensure that behavioural change is not short lived.

  As a guide to what amount of funding would be needed to run a successful education campaign The Victorian Government has recently invested $1.5 million for an e-waste education campaign in Victoria. An example of a successful education campaign is

[25] Repair Café, https://repaircafe.org/en/start/

[26] Repair Café Perth, https://repaircafeperth.org.au/

[27] Forti V., Baldé C.P., Kuehr R., 2018, E-waste Statistics Guidelines on Classification, Reporting and Indicators, Second edition

[28] Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE) (2012)

[29] Forti V., Baldé C.P., Kuehr R., 2018, E-waste Statistics Guidelines on Classification, Reporting and Indicators, Second edition

MobileMuster. MobileMuster relies heavily on its communication campaign and has found that effective advertising and promotion have a direct impact on awareness and engagement. More people are aware of how, why and where to recycle mobiles than ten years ago, and MobileMuster reports that this has seen recycling grow from 42 tonnes in 2005 to 1323 tonnes in 2017[30].

- Education and awareness campaigns need to focus not just on recycling as a tool to decrease e-waste going to landfill but also the importance of other methods from the waste hierarchy, including reuse, rethink, reduce, and repair.

- Government could consider funding a separate group to Council to run such an education campaign, including a schools education program and provide a series of educational and hands on capacity building skills workshops to the community. COOLmob sees itself as a highly skilled and capable organisation to run such a program. We have excellent knowledge on the area and have proven success at community education on sustainability topics. Darwin is home to a multicultural group of citizens and there are definite opportunities from people with all kinds of skills to educate each other on areas such as repair and repurposing.

<u>Improve e-waste separation logistics</u>

- Improve collection systems for e-waste across Darwin and the NT so that it is convenient for people to drop off e-waste. Some options that could potentially be used are as follows:
    - encourage all major retailers/supermarket chains to establish drop-off points
    - establish drop-off bins at schools and libraries
    - establish public drop-boxes similar to charity drop-off bins
    - Install specialised e-waste bins within each high rise apartment building. A trial could be undertaken similar to the one performed in Victoria where the City of Yarra council establishing a trial of e-waste collections from 10 high-rise apartment buildings.
    - Use existing recycling bins for larger e-waste items on specified dates throughout the year (such as the 'day after collection' model used by Moonee Valley City Council's Renew program[31]).
    - Many of these collection options would require funding support for their establishment and on-going implementation.

- Improve the e-waste storage facilities at Shoal Bay Transfer Station and others across the NT. At Shoal Bay this would mean upgrading the existing recycle shop shed as it was not purpose built for e-waste. The upgrade would involve construction to allow e-waste to be separated and stored, and for the repair and resale of usable items materials to be sold back to the community.

[30] The Gadget Guy, 2017, '79 tonnes of phones recycled by MobileMuster this year', https://www.gadgetguy.com.au/79-tonnes-phones-recycled-mobilemuster-year/

[31]City of Moonee Valley, 2018, https://www.mvcc.vic.gov.au/renew

- Provide renters with tip passes so they are able to access free drop off services for e-waste at Shoal Bay Transfer Station.

- Incentivise households to reduce e-waste by creating a differential landfill levy for e-waste – user pays model. Currently all users pay the same municipal tax rates regardless of how much waste they present for pickup so there is no incentive to reduce waste (including e-waste) produced. This model is used in Holland and has led to a reduction in the proportion of e-waste in overall household waste.

11. Appendices

Appendix 1

Table of organisations/stakeholders we consulted with:

Organisation	Contact Details
Darwin City Council	Civic Centre Harry Chan Avenue Darwin NT 0800
NT Recycling Solutions (NTRS)	19 Pruen Rd, Berrimah NT 0828
Battery World	Unit 1/273 Bagot Rd, Coconut Grove NT 0810
Harvey Norman	644 Stuart Hwy, Berrimah NT 0828
Shoal Bay Transfer Station	Shoal Bay, Access Road, Karama NT 0812
The Recycle Shop Shoal Bay	Shoal Bay, Access Road, Karama NT 0812
Helping People Achieve	22 Albatross St, Winnellie NT 0820
Ecycle Solutions	http://www.ecyclesolutions.net.au/
MRI PSO	https://mri.com.au/
Tech collect	https://techcollect.com.au/
Electronics Product Stewardship Australasia	https://epsaewaste.com.au/
Cleanaway	875 Stuart Hwy, Holtze NT 0829
Arid Lands Environment Centre	90 Gap Rd, The Gap NT 0870
Repco Auto	35 Stuart Hwy, Stuart Park NT 0820
Mobile Muster	https://www.mobilemuster.com.au/
Planet Ark	https://cartridges.planetark.org/
Officeworks	44/46 Stuart Hwy, Stuart Park NT 0820
Blue Environment Pty Ltd	209/838 Collins St, Docklands VIC 3008
Marrara Christian College	Cnr of McMillans Rd & Amy Johnson Ave, Marrara NT 0812
Waste Solution NT (Toxfree)	84 Pruen Rd, Berrimah NT 0828
Veolia Environmental Services	13 Beaton Rd, Berrimah NT 0828
Century Yuasa	2/32 Benison Rd, Winnellie NT 0820

Environmental Recyclers NT	Russ Road Tumbling Waters NT 0822
Sims Metal Management	35 McKinnon Rd, Pinelands NT 0829
Palmerston City Council	Civic Plaza, 1 Chung Wah Terrace, Palmerston City NT 0830
Darwin Recycling	9 Jolly St, Woolner NT 0820
Sell and Parker	55/61 McKinnon Rd, Pinelands NT 0828

Appendix 2

Table of e-waste interview questions for Darwin City Council:

E-waste Interview Questions for Darwin City Council
The purpose of this survey is to measure awareness, attitudes and opinions about disposal of electronic devices. We're asking your help in answering this short survey. Your honest perspectives and insights will help fuel this important discussion on a topic that impacts the environment. Please know that this study is for research purposes and your responses will not be connected to your identity. Thank you. **Name:** **Organisation:** **Job title:** **Contact details:**
1. In general, how aware do you feel the public is of the recycling options for e-waste?
2. What is the Council's interest and role in managing e-waste?
3. Does the Council have a policy or strategy relating to e-waste (either formal or informal)? Please describe them.
4. What current promotional activities does the council undertake to promote e-waste recovery and recycling?
5. What services or facilities for e-waste collection/dropoff for residents and businesses does the council (or council contractors) currently provide?
6. What quantity of e-waste within domestic and commercial waste is currently produced in your area?
7. What quantity of e-waste within domestic and commercial waste is currently being recycled in your area?
8. What are the most important challenges to facilitating the re-use and recycling of used electronics?

9. What are the most important challenges to facilitating the collection of used electronics facing the council's collections infrastructure?
10. How do you think community could be supported to increase e-waste recovery and recycling?
11. What changes, if any, will need to occur in your region before e-waste can be banned from landfill and managed appropriately?
12. Are you aware of any policy developments or reviews, both interstate and nationally, that may be useful in the design and implementation of an e-waste recovery and recycling strategy for the NT?
13. What tools do you think the government should consider when designing the NT's approach to reducing e-waste from landfill?
14. Should state or federal legislation be enacted to overcome the factors which currently discourage recycling of e-waste? Why or why not?

Appendix 3

Table of e-waste interview questions for industry stakeholders:

E-waste Interview Questions for Industry Stakeholders
E-waste Survey The purpose of this survey is to measure awareness, attitudes and opinions about disposal of electronic devices. We're asking your help in answering this short survey. Your honest perspectives and insights will help fuel this important discussion on a topic that impacts the environment. Please know that this study is for research purposes and your responses will not be connected to your identity. Thank you. **Name:** **Organisation:** **Job title:** **Contact details:**
1. In general, how aware do you feel the public is of the recycling options for e-waste?
2. What is your interest and role in managing e-waste?
3. What current promotional activities do you undertake to promote e-waste recovery and recycling?
4. What services or facilities for e-waste collection/dropoff for residents and businesses do you currently provide?

5. What quantity of e-waste within domestic and commercial waste is currently produced in Darwin?
6. What quantity of e-waste within domestic and commercial waste is currently being recycled in Darwin?
7. What are the most important challenges to facilitating the re-use and recycling of used electronics?
8. How do you think community could be supported to increase e-waste recovery and recycling?
9. What changes, if any, will need to occur in your region before e-waste can be banned from landfill and managed appropriately?
10. Are you aware of any policy developments or reviews, both interstate and nationally, that may be useful in the design and implementation of an e-waste recovery and recycling strategy for the NT?
11. What tools do you think the government should consider when designing the NT's approach to reducing e-waste from landfill?
12. Should state or federal legislation be enacted to overcome the factors which currently discourage recycling of e-waste? Why or why not?

Appendix 4

Table of reports and articles reviewed:

Name of Report/Article	Authored by	Published
Waste Management Strategy for the Northern Territory 2015-2022	Northern Territory Environment Protection Authority	2015
Opportunities and Constraints for Developing a Sustainable E-waste Management System at Local Government Level in Australia	G. Davis and S. Herat, Griffith School of Engineering	2010
E-waste Management in the VET Environment	Virginia Waite, North Coast TAFE, National Vocational Education and Training Research and Evaluation Program, Occasional Paper	2009
E-waste Statistics Guidelines on Classification Reporting and Indicators 2nd Edition	Forti V, Balde C P, Kuehr R, United National University	2018

The Global E-waste Monitor 2017 Quantities, Flows and Resources	Balde, CP, Forti V, Gray V, Kuehr R, Stegmann P, United Nations University	2017
Global E-waste Systems – Insights for Australia from other developed countries	Economist Intelligence Unit	2015
Managing E-waste in Victoria – Policy Impact Assessment	State of Victoria Department of Environment, Land, Water and Planning	2017
National Television and Computer Recycling Scheme – Outcomes 2014-2015	Australian Government, Department of Environment and Energy	2016
Australian National Waste Report	Dr Joe Pickin and Paul Randell, Department of Environment and Energy and Blue Environment Pty Ltd	2016
Computer E-waste in Schools… Are there solutions?	Stephen Clune, Centre for Design RMIT	2010
Solving the E-waste Problem (Step) Green Paper - E-waste Prevention, Take Back System Design and Policy Approaches	Duncan McCann and Annelaure Wittmann	2015
Television and Computer Recycling in NSW – A Guide for Councils, social enterprises, e-waste recyclers and collection partners	NSW Environment Protection Authority	2011
Unlocking Hidden Value – Electronic Reuse and Recycling Strategy (2016 – 2020)	Telstra	2016
The Global E-waste Monitor 2014 – Quantities, Flows and Resources	Balde, CP Wang, F Kuehr, R Huisman, United Nations University	2015
Australia New Zealand Recycling Platform Annual Report	Australia New Zealand Recycling Platform	2017
E-cycle – Co-regulatory Arrangement – National Television and Computer Recycling Scheme, Annual Report	Ecycle Solutions	2017

Product Stewardship Television and Computers Scheme, Annual Report	EPSA, Sims Recycling Solutions	2017
Guide to Better Practice at Resource Recovery Centres	State of Victoria, Sustainability Victoria	2017
Improving National Waste Data and Reporting	Dr Joe Pickin and Paul Randell, and Geoff Latimer, Department of Environment and Energy and Blue Environment Pty Ltd	2018
MRI PSO Product Stewardship Arrangement 2016-2017 Annual Report	Dropzone, MRI	2017
Victorian E-waste Infrastructure Network Assessment Report	Matt Genever, Paul Randell, Brock Baker, Randell Environmental Consulting Pty Ltd, Sustainability Victoria	2018
Waste and Recycling in Australia – Incorporating A Revised Method for Compiling Waste and Recycling Data	Department of Sustainability, Environment, Water, Population and Communities	2011
WEEE Directive in Sweden - Evaluation with Future Study	Swedish Environmental Protection Agency	2009

Appendix 5

Table of websites reviewed:

Government Websites
http://www.environment.gov.au/protection/waste-resource-recovery/television-and-computer-recycling-scheme http://www.environment.gov.au/protection/waste-resource-recovery/national-waste-policy https://www.darwin.nt.gov.au/live/waste-recycling https://ntepa.nt.gov.au/waste-pollution https://www.sustainability.vic.gov.au/Campaigns/eWaste/ https://outlookvic.org.au/environmental/e-waste/
National Television and Computer Recycling Scheme Websites
http://www.environment.gov.au/protection/waste-resource-recovery/television-and-computer-recycling-scheme https://mri.com.au/dropzone/ http://www.ecyclesolutions.net.au/ https://epsaewaste.com.au/ https://techcollect.com.au/

Other Websites
https://www.ifixit.com/Guide http://www.ethical.org.au/3.4.2/get-informed/shop-ethical-electronics/ https://www.recyclingnearyou.com.au/ https://www.greenpeace.org/archive-international/en/campaigns/climate-change/cool-it/Campaign-analysis/Guide-to-Greener-Electronics/ https://bower.org.au/ https://repaircafe.org/en/start/ https://renew.org.au/sanctuary-magazine/in-focus/reviving-the-art-of-repair/ https://www.abc.net.au/news/2017-10-13/repair-cafe-in-perth-builds-community-while-preventing-waste/9044892?pfmredir=sm https://www.gq.com.au/lifestyle/what-australia-can-learn-from-swedens-new-fixit-laws/news-story/76d2f14c49359e87bc52a58b668c76ca https://workventures.com.au/services/my-organisation-has-technology-to-donate/ https://www.ewasteconnection.com/ https://www.warrnambool.vic.gov.au/e-waste-recycling https://ecoactiv.com.au/solutions/recycling-stations/ http://ecoactiv.com.au/ewastebox/ https://www.zoo.org.au/get-involved/act-for-wildlife/theyre-calling-on-you https://www.mvcc.vic.gov.au/for-residents/waste-and-recycling/collections/renew.aspx http://kidsoffthekerb.org/whitegoods-refurbishment-recycling-project/ https://www.earthcarers.org.au/schools/schools-battery-recycling-program/ https://biggreenbox.com/ https://www.closetheloop.com.au/ http://www.batteryrecycling.org.au/storage-king-e-waste-recycling-box-launched http://www.fluorocycle.org.au/ https://cartridges.planetark.org/ https://www.mobilemuster.com.au/ https://iview.abc.net.au/show/war-on-waste https://helpingpeopleachieve.com.au/ https://workventures.com.au/services/my-organisation-has-technology-to-donate/ *www.batteryrecycling.org.au* https://www.samedayrubbishremoval.com.au/War-On-Waste-Statistics.php#BattleContinues1

Appendix 6

Table of data from Material Flows Analysis provided by Dr Pickin from Blue Environment Pty Ltd:

Projected generation of e-waste in Australia from all UNU codes

Best estimate Go to where I can choose a different projection

NTCRS?

E-waste generated in Australia (kt)

	Population	*(millions)*	*kg/person*	*Total (kt)*	*NTCRS (kt)*
2006	20,627,547	20.6	13.0	**269**	**73**
2007	21,016,121	21.0	13.4	**282**	**76**
2008	21,475,625	21.5	13.9	**298**	**79**
2009	21,865,623	21.9	14.5	**317**	**83**
2010	22,172,469	22.2	15.1	**336**	**87**
2011	22,527,401	22.5	15.7	**354**	**92**
2012	22,942,164	22.9	16.4	**377**	**98**
2013	23,321,715	23.3	17.1	**400**	**104**
2014	23,672,621	23.7	17.9	**423**	**109**
2015	24,012,830	24.0	18.5	**445**	**113**
2016	24,385,635	24.4	19.1	**466**	**116**
2017	24,570,441	24.6	19.7	**485**	**117**
2018	24,991,219	25.0	20.2	**504**	**119**
2019	25,410,606	25.4	20.6	**523**	**119**
2020	25,828,626	25.8	21.0	**543**	**120**

Appendix 7

Media coverage in NT News

MONDAY NOVEMBER 20 2017

COOLmob's Glenn Evans is raising awareness of the impact of e-waste

Picture: JUSTIN KENNEDY

Impact of e-waste is just not cool

ISABELLA HOOD

THE Northern Territory is the worst in the nation for recycling outdated electronics, with a rate of just 28 per cent.

COOLmob and the Environment Centre NT are hoping to raise awareness of e-waste's environmental impact and are running a survey on attitudes in Darwin.

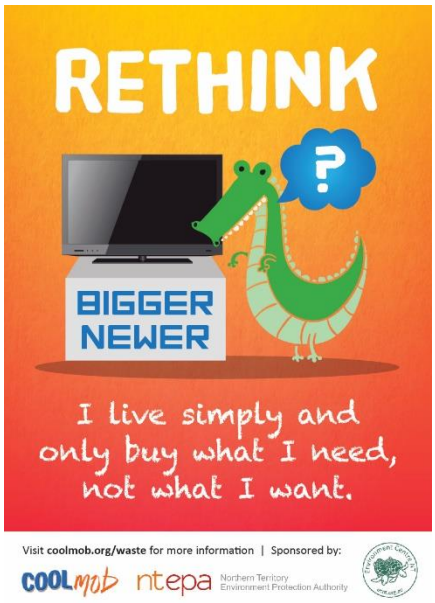
"As well as helping contribute to an increased uptake of e-waste recycling, we're hoping to motivate people to become more responsible, less wasteful consumers and to consider the end-of-life phase of electronic products," COOLmob project manager Glenn Evans said.

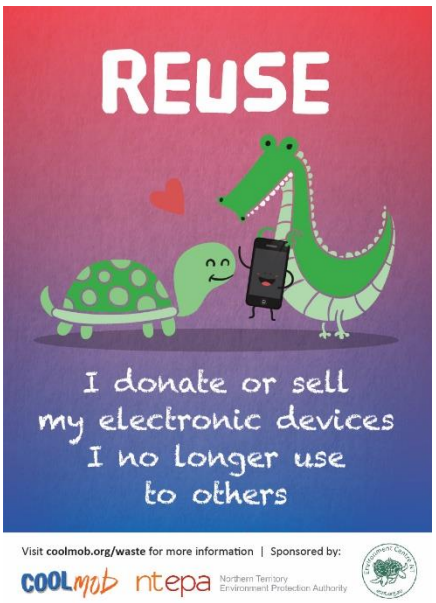
Mr Evans said mobile phones, batteries, light globes, laptops and computers were just some of the items that could be recycled free.

Darwinites can drop off their e-waste at the City of Darwin, Casuarina Library or the Shoal Bay Waste Management Facility. Visit coolmob.org/ewaste to find out more information about the e-waste project or to take part in the survey.

Appendix 8

E-Waste Education Poster series for school students





Appendix 9

Table of Community e-waste survey questions

Community E-waste Survey
The purpose of this survey is to measure awareness, attitudes and opinions about disposal of electronic devices. We're asking your help in answering this short survey. Your honest perspectives will help fuel this important discussion on an important topic. Please know that this study is for research purposes and your responses will not be connected to your identity in any way. Thank you.
What is E-waste? Electronic waste, or e-waste, is a term for electronic products that have become unwanted, non-working or obsolete, and have essentially reached the end of their useful life. E-waste is now the fastest growing waste stream in Australia. E-waste includes: Computers, laptops and tablets Mobile phones and cameras TV's, DVD players and stereos Light globes and batteries Printers and printer cartridges Kettles, toasters, microwaves and coffee machines Power tools Dishwashers, fridges and washing machines
1. What is your gender? o Female o Male o Other:
2. What is your age? o 19 or younger o 20 to 29 o 30 to 39 o 40 to 49 o 50 or older
2. What suburb do you live in?
4. Did you know what e-waste is before reading the information above? o Yes o No
5. How many electronic products do you purchase a year? Mark only one oval. o 0 o 1 - 3

- 4 - 6
- 7 - 9
- 10 or more

6. How much do you spend on purchasing electronic products in a year? Mark only one oval.

- Less than $500
- $500-$1000
- $1000-$1500
- $1500-$2000
- $2000-$2500
- More than $2500

Please specify the amount if more than $2500.

7. How many electronic products do you dispose of in a year?

- 0
- 1-3
- 4-6
- 7-9
- 10 or more

8. How long do you expect the following electronic products to last?

	6 months or less	1 year	2 years	3 years	5 years	5 -10 years	more than 10 years
Mobile Phone							
Laptop							
Desktop Computer							
Television							
Microwave							
Fridge							
Washing Machine							
Dishwasher							
Tablet or ipad							
Coffee machine							

DVD player

9. How frequently have you needed to dispose of/replace old electronic products in the past?

	Every 0-6 months	Every 6-12 months	Every 1-2 years	Every 2-3 years	Every 3-5years	Every 5-10 years	Every 10 or more years	I don't own this item
Mobile phone								
Laptop								
Desktop computer								
Television								
Microwave								
Fridge								
Washing machine								
Dishwasher								
Tablet or ipad								
Coffee machine								
DVD player								

10. What do you most often do with broken electronic products?

	Repair it	Put in rubbish bin or take to rubbish tip	Put out for cyclone clean up	Take to a recycle centre	Put into storage	Re-use for another use	Strip for spare parts	Give to friend, charity etc	N/A
Mobile phone									
laptop									
Desktop computer									
Television									
Microwave									
Printer									

Fridge

Washing machine

Dishwasher

Tablet or ipad

Coffee machine

DVD player

Light globe

Power tool

Battery

Printer cartridge

11. What do you most often do with working electronic products that you no longer use?

	Sell on as second-hand	Put in rubbish bin or take to rubbish tip	Put out for cyclone clean up	Take to recycle centre	Put into storage	Re-use for another use	Strip for spare parts	Give to friend, charity etc	N/A
Mobile phone									
laptop									
Desktop computer									
Television									
Microwave									
Printer									
Fridge									
Washing machine									
Dishwasher									
Tablet or ipad									
Coffee machine									
DVD player									
Light globe									

Power tool

Battery

Printer cartridge

12. Do you view e-waste as a serious problem? Please rate on scale of 1 to 10

1 2 3 4 5 6 7 8 9 10

Not Serious Extremely Serious

13. Electronic waste can be hazardous for the environment because it contains toxic materials.

- True
- False

14. How often do you engage in the following practices and activities?

	Always	Sometimes	Never
I recycle electronic products			
I buy new electronic products even if the older ones are still working			
I buy products with brands that are durable & have a long life over other brands			
I buy second-hand products			
I trade or sell my used electronic products			
I repair or get my broken electronic products repaired			

15. What was your most important reason for purchasing new cell phones and/or computers?

- Physical damage
- Loss of function (slowed down, battery life reduced etc)
- Need for greater functionality (faster, more memory, longer battery life etc)
- Desire for newest technology
- Lost or stolen

- Other

Any comments on your reasons for purchasing new cell phones and or/ computers?

16. Do you recycle most of your e-waste?

- Yes
- No

17. If no, why don't you recycle your e-waste ?

	Extremely unlikely	Unlikely	Somewhat unlikely	Neutral	Somewhat likely	Likely	Extremely likely
I don't know where to take them							
I don't know which electronic products can be recycled							
It's too much hassle to take them to be recycled							
I don't care							
Emotional attachment to the product							
Privacy concern about personal data on device							
It costs too much							

Any other reasons or comments?

18. Are you aware of any free e-waste recycling drop off stations in Darwin?

- Yes
- No

19. Which ones are you aware of?

20. Do you use any of the following free e-waste recycling drop off stations in Darwin?

- Darwin City council office (household batteries, light globes, printer cartridges, mobile phones)
- Battery world (household batteries and car batteries)
- Planet Ark (Printers and printer cartridges)
- MobileMuster (mobile phones and accessories)
- Shoal Bay Resource and recovery facility (TV's, computers and computer monitors, laptops)
- Harvey Norman (TV's, computers, computer monitors, laptops)
- Cartridge World (printers, printer cartridges)
- Environment Centre NT (household batteries, mobile phones & accessories, printers & cartridges)

Other:

21. How well do you look after and maintain your electronic products?

1 2 3 4 5

I don't Extremely well

22. On average, how many electronic products do you choose to repair in a year?

- 0
- 1-3
- 4-6
- 7-9
- 10 or more

23. Which factors would prevent you from repairing your electronic products?

	Extremely unlikely	Unlikely	Somewhat unlikely	Neutral	Somewhat likely	Likely	Extremely likely
Price of repair vs price of new item							
Availability of spare parts							
Need to disassemble product							
Knowledge of skills needed to repair the item							
Warranty of the product							

Availability of someone to repair the item

Logistics of getting the product to the repairer

Privacy concerns about personal data on device

Any other reasons or comments?

24. Which factors would prevent you selling your old electronic products for cash?

	Extrenmely unlikely	Unlikely	Somewhat unlikely	Neutral	Somewhat likely	Likely	Extremely likely
Emotional attachment to the product							
Initial cost of the product							
The repairability of the product							
Trade in value							
Condition of the product							
Logistics of the selling process							
Privacy concerns about personal data on device							

Any other reasons or comments?

25. Which factors would prevent you donating your old electronic products to a friend or charity?

	Extremely unlikely	Unlikely	Somewhat unlikely	Neutral	Somewhat likely	Likely	Extremel likely
Emotional attachment to the product							
Initial cost of the product							
The repairability of the product							
Trade in value							
Condition of the product							
Logistics and hassle of donating process							
Which friend or charity it was going to							
Privacy concerns about personal data on device							

Any other reasons or comments?

26. Do you know what your rights are as a consumer when you need to return an electronic device or appliance to a store or manufacturer?

- Yes
- No

27. Who should pay for the collection and treatment of e-waste?

- You the consumer
- Government
- Producers and manufacturers
- E-waste recyclers
- Other:

28. Do you believe e-waste should be banned from landfill?

- Yes
- No

29. Please feel free to leave any other comments in the space below. Thank you for your time. Kind regards from COOLmob.