

UNSW



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School of Mechanical & Manufacturing Engineering

MMAN3000
Professional Engineering & Communication

Individual Report Assessment
F13-SG-Group2

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1 Individual Work

My MMAN3000 workflow centred around Microsoft Office Powerpoint due to its powerful diagram and shape tools which allowed me to draft and present ideas quickly. All the work done have been screenshotted and included in the appendices as visualisation of the work but will be discussed in this section. The individual work is outlined in a weekly timeline in Figure 1 below.

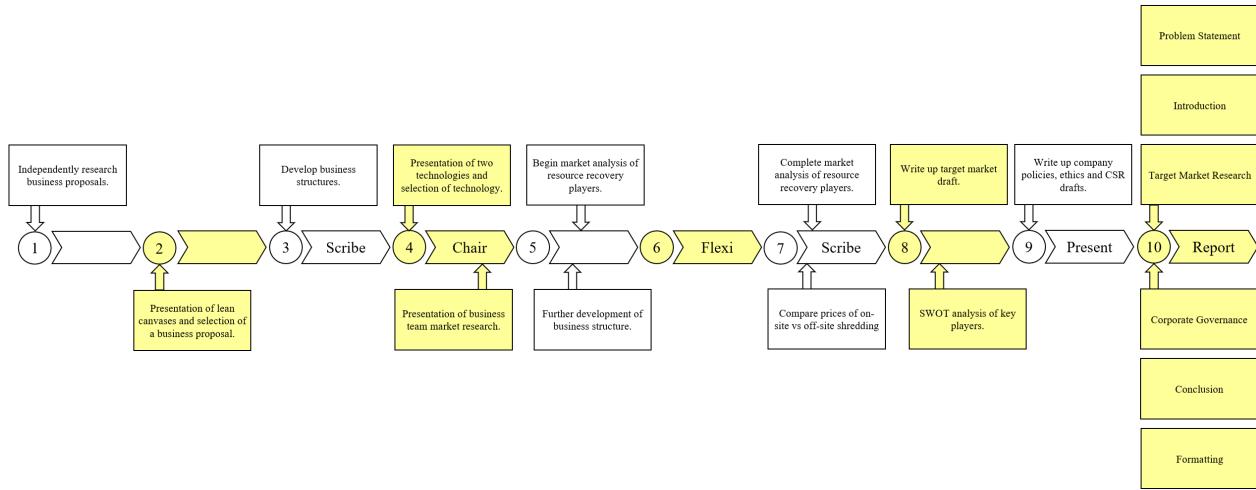


Figure 1: Weekly Timeline of Tasks

1.1 Week 1

The first team meeting tasked everyone with individual research into a potential business idea. I first proposed a business in designing, manufacturing and retailing firefighting UGVs to firefighting services, organisations or individuals in response to the recent 2020 Australian bushfires where manpower was lacking and would require firefighters to put their lives in direct danger. My second business proposal is a machining workshop which would provide a service to machining students, engineers, and hobbyists for access to machining tools (e.g. lathe, mill). This solves the customer's difficulty in access to such machines, lack of money to purchase the machines, or non-suitable environment to house the machines.

These business proposals were formatted onto lean canvases (see Appendix A) which covered the important aspects to consider for starting up a business i.e. problem statement, solution, key metrics, unique value proposition, advantages in the market, public relationship channels, customer segments, cost structure and revenue streams.

1.2 Week 2

The two business proposals were presented on the Monday of week two and were well-received.

The week two meeting assigned everyone with the task of developing a business structure for the group's selected business proposal i.e. Michael's automated recycling. I proposed several business

structures (proprietary, public, start-up) as the operations of the business had not been finalised (see Appendix C). I had also included an exploded business structure which described job responsibilities.

1.3 Week 3

I had the responsibility of scribing for week 3 (see Appendix B).

As required from the week 2 meeting, I have researched into business structures and responsibilities to cover various operations of the business (see Appendix C). There was difficulty however in finalising the business structure as the business operations had not been finalised. Therefore I developed multiple potential business structures (e.g. proprietary, public, start-up).

1.4 Week 4

I had the responsibility for chairing for week 4 for which I planned and uploaded agendas for two meetings (see Appendix D). The first (Monday) meeting agenda required each person to present two technologies. In the agenda, I outlined the problem statement, market summary from the previous meeting, and potential questions to answer in aiding the technology research. I also planned the course of action for discussion of technologies and listed expected outcomes for the end of the meeting.

My own presentation of the two technologies focused on the kerbside recycling phase of the plastic waste cycle (see Appendix E) - ensuring waste is properly sorted before it is collected. These technologies were: BinBot!, an automated rubbish sorter; and Bin Buddy, a phone app which scans rubbish and highlights the kerbside bin the rubbish belongs in. I presented the technologies with the general designs, processes, and estimated cost.

A challenge arose however where each proposed technology solved a different problem (tackled different aspects of the waste lifecycle). The challenge and its resolution will be outlined in Table 1 in Section 2.

I prepared a second agenda for the next (Friday) meeting which included each team's objectives for the week, action plan for the meeting and expected outcomes.

My contribution for the business team involved the waste management and resource recovery market research (Appendix F). These two markets can be subcategorised by type of material where I did further research into the paper & cardboard, glass, plastics, and rubber market. With each of these markets, I included market trends, future/current events affecting the market, stakeholders, competitors, and resources used.

At the end of the Friday meeting, I strongly pushed for the selection of a technology as delaying the selection would have timely consequences.

1.5 Week 5

Began market share research into resource recovery players.

1.6 Week 6

No work.

1.7 Week 7

I scribed for week 7 meetings in Michael's absence (Appendix G).

I took up the task of comparing on-site verse off-site shredding prices (Appendix H). Research for off-site plastic shredders was difficult as there is no demand for such services and do not list their prices without consulting. I calculated the initial cost from a gross market value from cheap to expensive shredders and calculated the operational cost for a gross electricity bill and labour wages.

I completed the market share analysis into major resource recovery players (Appendix I). The market value of proprietary companies is difficult to obtain. Therefore, their estimate revenue value is obtained to correlate the company size. A pie graph was created to visualise this information. Other information obtained was the amount of plastic processed per year, types of waste plastic accepted, and types of plastic manufactured.

1.8 Week 8

Drafted up target market research for the report. The draft included the target market, stakeholders, direct competitors, waste levy, and waste export bans (see Figure 21 in Appendix J).

A SWOT analysis of competitors was also completed for the largest and relevant players from the target market such as Visy, Replas, and Licella (see Appendix K). SWOT is an acronym for strengths, weaknesses, opportunities, threats - where strengths and weaknesses are internal attributes, and opportunities and threats are external influences. This analysis is methodical for identifying opportunities for our company and raises awareness of strengths and weaknesses inherent to the market [2].

1.9 Week 9

Drafted up ethics, corporate governance, and company policies for the report and presentation (see Figure 22 in Appendix J).

1.10 Week 10

My contribution to the final report covered writing up the problem statement, introduction, parts of the target market research, corporate governance, some contribution to ethics, conclusion, editing and formatting the report (Figure 24 of Appendix L). Yellow highlights in the figures in Appendix L are my own words, and green highlights are contributions to other people's works.

In target market research section (Figure 24 of Appendix L), I provided a tabulated summary (Table 1 from the Final Report [1]) for ease of understanding of the context of the crude oil and waste management markets that Aww Mman were participating in. This table included risks, opportunities, relevant stakeholders, and competitors. The target market research section was outlined like so: crude oil and waste management. With each of these markets discussed in detail with respect to its opportunities. The section was discussed with statistics and referencing to fully justify Aww Mman's position and interests in the market.

As a side note, no research had been performed on the crude oil market throughout the term. Therefore, Jeff laid out some research in the report but I expanded on the work with further correct research, referencing and analysis of the trends of the market.

I wrote the competitor analysis section (Figure 24 of Appendix L), however only one company was included from the SWOT analysis i.e. Licella. This is due to the lack of direct competitiveness of Visy and Replas, and difficulty of performing SWOT analyses on more players due to lack of free information. Direct competitors in the crude oil market were not named due to the large number of global players, it was not worth performing a SWOT analysis on key players.

I wrote the corporate governance section of the report (Figure 25 of Appendix L) to justify the workforce structure, as well as how corporate governance will influence the operations of the business through a summary of a subset of corporate policies in Table 3 of the Final Report [1].

My more minor contributions (Figure 26 of Appendix L) is passing the drafted work on ethics and CSR to the final report which Lucy expanded on. I had written up most of the conclusion to summarise each section of the report. I provided a skeleton for the technology paragraph in the conclusion for which Neil wrote.

My contributions for the report are supported by the compilation of waste levy rates in Appendix A of the Final Report [1], analysis of produced vs imported crude oil trends in Appendix B of the Final Report [1], SWOT analysis of Licella in Appendix D of the Final Report [1], and summary of company policies in Appendix G of the Final Report [1]. These contributions are in Figures 27 and 28 of Appendix L.

Further contributions are editing and formatting the report where I:

- standardised the spelling of words (e.g. bio-fuel and biocrude);
- standardised the use of mathematical symbols, numbers, and units;
- corrected grammar;
- enforced consistent referencing;

- removed of non-informative text;
- formatted page numbering for roman numerals before the introduction and arabic numerals afterwards;
- cleaned up IEEE references to be neat and correct; and
- cleaned up appendices to be neat.

2 Project Evaluation

2.1 Challenges

There were numerous challenges that arose as a result of the action plan the team had taken early in the project. The challenges and the team's resolutions are tabulated in Table 1.

Table 1: Project Challenges

Date	Challenge	Date	Resolution
Friday, Week 2	Incorrect use of lean canvases lead to selection of business proposal that was not fully defined.	-	This challenge was not identified.
Monday, Week 3	Non-confirmation of problem statement misguided market research.	-	This challenge was not identified.
Friday, Week 3	Business structures could not be finalised as technology had not been selected.	Monday, Week 4	Research and present two technologies for selection before progression.
Monday, Week 4	Proposed technologies did not solve a common problem statement or tackled the same market.	Monday, Week 4	Defined the waste lifecycle, selected a more specific market, confirmation of problem statement and narrowed list of technologies for further evaluation.
		Friday, Week 4	Splitting the group into technology team to research viability of narrowed technologies and business team to research profitability of markets in waste lifecycle.
Monday, Week 5	Lack of chairing responsibility led to uncertainty in week 5 and snowballed with the loss in seriousness of the responsibility.	-	This challenge was not addressed.

There was also no team conflicts.

2.2 Redoing the Project

If I redid the MMAN3000 business proposal assignment, I would suggest each person in the team to present their business proposals in lean canvases in week 1. However, these lean canvases must be filled out properly with clear problem statements and a list of proposed solutions. Therefore, it is best to set expectations by providing an example lean canvas to the team.

The lean canvases when filled out will create a skeleton for the business model where a technology team and operations team can flesh out the categories of the lean canvas in detail. The new set of weekly deliverables are in Table 2 below.

Table 2: Deliverables

Week	General	Technology	Operations
1	-	-	-
2	Lean canvases & problem statement	Technology research	Target market research
3	Technology selection	System overview	Marketing strategy
4	-	Component research	Revenue streams
5	-	Component research	Workforce structure
6	-	Component research	Cost structure
7	-	Plant setup	Regulations
8	-	Australian standards	Business ethics
9	Presentation	-	-
10	Report	-	-

General deliverables requires work from both technology and operations teams. Each member will contribute lean canvases, finalise the problem statement, select a technology, and work on the presentation and report.

The order of deliverables for the technology team is technology research, technology selection (with input from operations team), system overview, component research, plant setup, and Australian standards. All purchases and workforce requirements need to be communicated to the operations team to account for the workforce and cost structure. The order of deliverables for the operations team is target market research, marketing strategy, revenue streams, workforce structure, cost structure, regulations, and business ethics.

3 Team Evaluation

In a general evaluation, this group is so far the best group I have been in for an academic assignment. It is a group of highly motivated people with histories of excellence in academia and extra-curricular activities. An evaluation for each member including myself will be based off the marking criteria in Appendix M. The appendix will have details to the distribution and justification of marks.

For my rationale on the marking criteria, there is a total of twenty marks which is accumulated from each criterion. The amount of contribution and quality of contribution each have a five marks where each mark is given on a qualitative assessment. I have assigned a mark of three for chairing responsibility and two for scribing responsibility - where I consider chairing more important. This is because (from my understanding) the course had a strong expectation of sharing the chairing and scribing responsibility each week, so that each member of the team had a chance to prove their administration skills. Morale has two marks, which covered the team member's impressions. Discussion has three marks, which covers the team member's initiative to participate in team discussion.

Table 3 outlines the scores for each criterion for each team member.

Table 3: Team Member Evaluation Scores

Team Member	Amount (5 marks)	Quality (5 marks)	Chair (3 marks)	Scribe (2 marks)	Morale (2 marks)	Discussion (3 marks)	Overall (20 marks)
Lucy	5	5	3	0	2	3	18
Dunya	5	5	3	2	2	3	20
Michael	5	4	0	2	2	2	15
Neil	4	4	2	2	1	2	15
Jeff	3	3	2	2	2	2	14
Felix	1	2	0	1	0	0	4
Arfin	5	5	3	0	2	3	18
Dan	4	3	3	2	1	2	15

3.1 Lucy Birdsey

Lucy started off the term very strongly as chairperson, with uploaded agenda for week 2, and clear organisation and direction of meetings. Lucy also organised the week 6 meetings. Lucy earned three marks for chairing responsibility. Unfortunately, Lucy did not get a chance to scribe (or I could not find the relevant minutes). Therefore earning zero marks for scribing responsibility.

Lucy's contribution covered aspects of technology (for which I do not have full knowledge of), and presentation and report writing of ethics & CSR. The amount of work put into the presentation and report writing which I saw was of excellent quality and required no editing or revision. Therefore, earning a mark of five for both amount and quality of contributions.

Lucy is very empathetic and often shows appreciation of the work and effort people put in which consequently boosts team morale. Therefore, Lucy earned two marks for morale. She is also extremely active in discussions (e.g. suggesting an ideal situation in the problem statement of the Final Report [1] and proposing the research of two technologies when the business structures challenge arose) and will attempt to open dialogue when there is a pause in discussions. Therefore, Lucy earned three marks for discussion.

3.2 Dunya Vasic

I found Dunya to be the strongest character in the team. She is extremely driven which is best demonstrated when she tried to contact Licella and various resource recovery companies to obtain information to support her technical findings. She succeeded in organising a meeting with a Licella employee. Dunya had written the majority of the technology section in the report to very good quality with minimal edits. I believe Dunya is deserving of five marks for amount and quality of contribution.

Despite the fallout of chairing responsibility in week 5. Dunya maintained her responsibility with the uploading of agendas and management of meetings in week 7. Dunya also scribed in week 6 of good quality. Therefore, Dunya earned three marks for chairing and two marks for scribing.

Dunya had high enthusiasm, actively participated in team discussions and quick to critically analyse topics in discussion. She also consistently encouraged communication (e.g. expressing concern when

not enough dialogue was opened). Therefore, Dunya earned two marks for morale and three marks for discussion.

3.3 Michael Currie

Michael has contributed a lot of work into the research and write up of regulations for the final report as well as technology work through the term. His work required minimal revision as I had to edit some of the regulations to make it more relevant to Aww Mman's operations. Therefore, Michael receives a mark of five for the amount and mark of four for the quality of contribution.

Unfortunately, I could not find meetings that Michael had facilitated therefore, giving him a mark of zero for chairing responsibility. Michael had initiative to accept scribing responsibility for Monday Week 4 (in Felix' absence) but was unfortunately unavailable to scribe in his specified week due to unforeseen circumstances. Therefore, Michael receives an adjusted mark of two for scribing.

Michael was enthusiastic and always had his camera on (despite being the only person in the team to do so). He had moderate participation in discussion as he became noticeably less active in the latter half of the term. Therefore he received a mark of two for moral and two for discussion.

3.4 Neil Yang

Neil is reliable in that he completes the tasks that he is assigned. The quality of his work is also very good, requiring no need for revision. Therefore, he received a mark of four for both amount and quality of contribution.

Neil uploaded agenda and had clear goals for meetings (week 9). Neil had excellent initiative taking up scribe responsibility for weeks 6, 8, and 9 meetings. Therefore, receiving a mark of two for both responsibilities.

Neil does not have a strong active voice, but knows when to raise his voice. As such, he displayed moderate enthusiasm and moderate participation to discussion - earning him one mark for morale and two marks for discussion.

3.5 Jeff Chang

Jeff completed most of his tasks. The task that he did not complete was the business market research of week 3 and the business structure was completed too late (completed at time of report writing). The quality of contribution was good but required me to edit to add more detail or reword for easier understanding (e.g. in the crude oil market section of the Final Report [1]). This justifies Jeff's mark of three for both amount and quality of contribution.

Jeff had some organisation in his chairing responsibility in week 3. He had a late upload of the agenda and tried to take charge of the meeting when dialogue had died. Jeff was on top of his

scribing responsibility, delivering concise minutes for week 2 and offered to scribe for Friday week (covering for Felix). Therefore, Jeff earned a mark of two for both chairing and scribing.

Jeff is easy to socialise with but did not provide strong enthusiasm for the project. Therefore, earning a mark of two marks for morale.

Jeff had moderately participated to discussions whether it be asking a question for assurance or providing an opinion on a topic. Jeff earned a mark of two for the discussion.

3.6 Hao Jin (Felix)

Felix had poor, irregular attendance for which I had to email and message him to ensure his attendance. His absence had no impact on team morale and did not allow him to participate in discussions. Therefore, Felix receives a zero mark for morale and discussion.

Felix had the responsibility to scribe for week 4 however was only present to scribe for the Friday meeting. He also scribed the Friday week 4 meeting but incorrectly identified me as facilitator. With the scribe responsibility partially fulfilled, Felix earns a mark of one.

Felix had the responsibility to chair for week 5. He uploaded an agenda for the Friday meeting and was present but did not communicate at all during the meeting therefore failing to act as chairperson. For this, Felix received a mark of zero.

I am unaware of Felix contributing any work throughout the term. His only contribution is in the final report, therefore earning him a mark of one for the amount of contribution for minimal effort.

During my review of the final report, Felix had made references to wikipedia and YouTube. I had to research the topics and change the references to more reliable sources to ensure the quality of the report was not compromised. This poor quality of referencing makes me question the quality of his report work (in its authenticity). Reviewing his written section of the report, it contained some relevant information and a concise table of technologies. Therefore, Felix' work is limited to a fair quality grade, giving him a mark of two for quality of contribution.

Some unusual behaviour from Felix was discovered upon my comparison between new and old versions of my team's minutes. Felix had added his name to the present list (when absent) to week 2 official and week 7 official minutes after they had been uploaded to Teams.

3.7 Muhammad Arfin

Arfin has excellent initiative and contributed a large amount of work into the project overall, mainly business and operations. Arfin produced excellent quality work with great attention to detail. His work required no revision or editing. Therefore, he earned a mark of five for both amount and quality of contribution.

Unfortunately, I am not aware of Arfin having taken chairing and scribing responsibility (as I could not find the minutes). However, he has proven his administration skill through the organisation of splitting the team into subteams of technology and business, and the responsibilities of each subteam. Arfin had also written a sequence of tasks for the business team to complete which showed his holistic understanding of business operations. Therefore, I gave Arfin an adjusted chairing mark of three and scribing mark of zero.

Arfin had high enthusiasm and encouraged the early completion of the project. He has good social impressions and was very active in discussions especially concerning business and operations. Therefore, Arfin received a mark of two for morale and three for discussion.

3.8 Dan Nguyen

The amount and quality of contribution I had put in was decent. In the business work, I often felt stuck, in that I did not know what I was doing as I had no guidance or good resources. This is best demonstrated in the market share analysis work which took me two weeks to complete as most information about competitors and the market had to be bought. Therefore, I had to complete the market analysis using the company's revenue value to correlate the business size and therefore its market value. This revenue value is thanks to various news media sources and ZoomInfo [3]. The notion of purchasing information is also true for SWOT analyses, where it was difficult to obtain sensitive information about companies - I wish I could explore more competitors in the final report. I felt as though the introduction that I had written for the final report was lacking in showing the framework of the report. My quality of work can shine e.g. in the Licella SWOT analysis (Figure 24), corporate governance write-up (Figure 25), crude oil market research (Figures 24 and 27), and company policy write-up 28. I felt as though my work here is highly justified and supported by thorough research and analysis. Therefore, I feel four marks for amount of contribution and three marks for quality of contribution is justified.

In my chairing responsibility, I thoroughly organised my agendas and uploaded them with haste. I also tried my best to take charge of meetings and come to conclusions. I was on top of my scribing responsibility, ensuring, I did not miss any information and asking questions in case I did. I uploaded these minutes immediately after the conclusion of the meetings. Therefore, I feel three marks for chairing and two marks for scribing is justified.

I showed moderate enthusiasm and moderate participation to team discussion. The times when my participation had dropped are during meetings which were technology-heavy, as I had no opinions as my work was focused on business. My showcase of enthusiasm may not be very high because I felt as though my team already had too many highly enthusiastic people (it is difficult to stand-out especially online). I believe I would have no trouble with participation, if meetings were done in person. I feel that one mark for morale and two marks for discussion is justified.

References

- [1] M. Arfin, et al., "Team Project Report," UNSW, School of Mechanical & Manufacturing Engineering, Aug. 2020.
- [2] C. White, *What's a Competitive Analysis & How Do You Conduct One?*, Nov, 13, 2019.
<https://blog.hubspot.com/marketing/competitive-analysis-kit>.
- [3] ZoomInfo. Accessed on: Nov. 17, 2020. [Online]. Available: <https://www.zoominfo.com/>.

Appendix A Lean Canvas

Lean canvas business proposals for firefighting UGV (Figure 2) and machining workshop (Figure 3).

PROBLEM <i>List your top 1-3 problems.</i> Firefighters risk their lives in bushfires from falling trees, vehicle accidents. Securing a bushfire perimeter requires manpower and large work. Work is required to move equipment closer to the fire line.	SOLUTION <i>Outline a possible solution for each problem.</i> Firefighting UGVs employ control lines, direct and indirect tactics.	UNIQUE VALUE PROPOSITION <i>Single, clear, compelling message that states why you are different and worth paying attention.</i> Our firefighting UGVs are specifically designed for Australian bush firefighting and will minimise the risks firefighters have to take and control bushfires. Our UGVs are designed to be cheap, expendable, and reliable.	UNFAIR ADVANTAGE <i>Something that cannot be easily be bought or copied.</i> Particularly designed for bushfire fighting where existing solutions target urban environments.	CUSTOMER SEGMENTS <i>List your target customers and users.</i> Firefighting services. Rural homeowners wishing to protect their property.
EXISTING ALTERNATIVES <i>List how these problems are solved today.</i> Aerial combat does not put firefighters directly in fire danger, however low flying has risks. TAF 20 which began service in 2015 with NSW Fire + Rescue is expensive at \$310,000 (not sure if still in service – was not present in 2020 bushfires).	KEY METRICS <i>List the key numbers that tell you how your business is doing.</i> Number of sales of UGVs. Media/public response to UGVs. Firefighting services satisfaction with product.	HIGH-LEVEL CONCEPT <i>List your X for Y analogy e.g. Youtube = Flickr for videos.</i> A tank that shoots water.	CHANNELS <i>List your path to customers (inbound or outbound).</i> PR with state governments. PR with rural fire services: NSW Rural Fire Services, Country Fire Authority (Vic), Rural Fire Service Queensland, SA Country Fire Service, NT Fire and Rescue Service, Department of Fire & Emergency Services (WA).	EARLY ADOPTERS <i>List the characteristics of your ideal customers.</i> Do not have the manpower to control large fires.
COST STRUCTURE <i>List your fixed and variable costs.</i> Sourcing UGV parts. Labour to manufacture/assemble UGV or outsource labour to a manufacturing facility. Machining tools if we are manufacturing ourselves.	REVENUE STREAMS <i>List your sources of revenue.</i> Seeking private/public investors. Sales of firefighting UGVs. Fee for repair/maintenance of UGVs. State grants/funding.			

Figure 2: Firefighting UGV Lean Canvas

PROBLEM <i>List your top 1-3 problems.</i> There is a lack of services for manufacturers without a machining workshop.	SOLUTION <i>Outline a possible solution for each problem.</i> Provide public workshops with memberships.	UNIQUE VALUE PROPOSITION <i>Single, clear, compelling message that states why you are different and worth paying attention.</i> We will fill a niche in the market for demand to access to machines without needing to personally own such machines. We can manufacture parts in small volume orders. We can expand to hosting a school and machining classes.	UNFAIR ADVANTAGE <i>Something that cannot be easily be bought or copied.</i> Service does not exist for public.	CUSTOMER SEGMENTS <i>List your target customers and users.</i> Hobbyists, students, machinists, engineers.
EXISTING ALTERNATIVES <i>List how these problems are solved today.</i> Buying and importing the workshop tools for personal use. Going to a friend's if they have friends. Using their school's workshop if they are attending a school. Hiring a factory to manufacture the product for you (not good for small volumes of manufacture). TAFE facility hire.	KEY METRICS <i>List the key numbers that tell you how your business is doing.</i> Number of active subscriptions. Number of periodic (daily/weekly) visits. Number of part orders.	HIGH-LEVEL CONCEPT <i>List your X for Y analogy e.g. Youtube = Flickr for videos.</i> UNSW makerspace but it is open to the public and you pay for it. Like a centre for swimming but with machining tools instead of a pool. Like an internet café but with machining tools instead of computers. Like a TAFE facility hire but easier to get to a machine as an individual (and we do not give diplomas).	CHANNELS <i>List your path to customers (inbound or outbound).</i> Word of mouth. PR with engineering/machining schools. PR with high school technology students.	EARLY ADOPTERS <i>List the characteristics of your ideal customers.</i> Early adopters who do not have the resources (time, money, space) to own their personal machines.
COST STRUCTURE <i>List your fixed and variable costs.</i> Purchase and movement of various machines: lathe, mill, drill press, 3D printer. Purchase of hand tools and raw materials (metals, woods, plastics). Maintenance of machines: labour, spare parts. Labour: administration, makerspace supervisors. Leasing property space. Marketing, insurance, legal stuff.	REVENUE STREAMS <i>List your sources of revenue.</i> User subscription for access to the workshop (hourly/weekly/monthly). Can expand to hosting a school – students enrolled in tutorial/classes. Manufacturing, 3D-printing parts as a service.			

Figure 3: Machining Workshop Lean Canvas

Appendix B Week 3 Scribing

Week 3 minutes (Figure 4).

MEETING MINUTES			
Subject	MMAN3000 Meeting 3	Date	19/06/2020
Facilitator	Jeff Chang	Start Time	1pm – 3pm
Location	Microsoft Teams	Scribe	Dan Nguyen
Attendees	Michael, Lucy, Neil, Felix, Jeff, Arfin, Dan Absentees – Dunya (present from 2:20pm)		
Key Points Discussed			
No	Topic	Highlights	
1	What is our business about?	<ul style="list-style-type: none"> Are we developing a product? Are we solving existing solutions? We want to design and sell a product. Do we have infinite resources? Pick a reasonable scale of resources. We are developing a product that can differentiate types of waste to increase recyclability efficiency. 	
2	What can we do?	<ul style="list-style-type: none"> Cost issue of recycling => our product reduces cost of waste. Waste collection companies do not have means to keep waste clean. Therefore, waste processing companies do not receive sorted waste. 	
3	Types of businesses	<ul style="list-style-type: none"> Company is its own legal liability therefore partners are not liable. Require larger capital. Partnerships are suitable for high-value partners (lower taxes). Start-up can be any type of business structure. It is flexible, more suitable for companies with smaller capital and high-risk products/services. 	
4	Market research	<ul style="list-style-type: none"> Half of NSW waste is recycled. Packaging and plastics were majority of type of waste. Construction and offices are largest users of recycled goods. 	
Action Plan			
No	Item	Person in Charge (PIC)	Target Date
1	Research 2 pieces of technology that solves the recycling issue (e.g. robotic arms, software solutions, whatever). 2.5 minutes to present.	Everyone	22/06/2020
2			
3			
Next Meeting			
Date	22/06/2020		
Topic	Present Research on Engineering Technology & Splitting into Teams		

Figure 4: Week 3 Minutes

Appendix C Business Structures

Business structure research from week 3 in Figure 5.

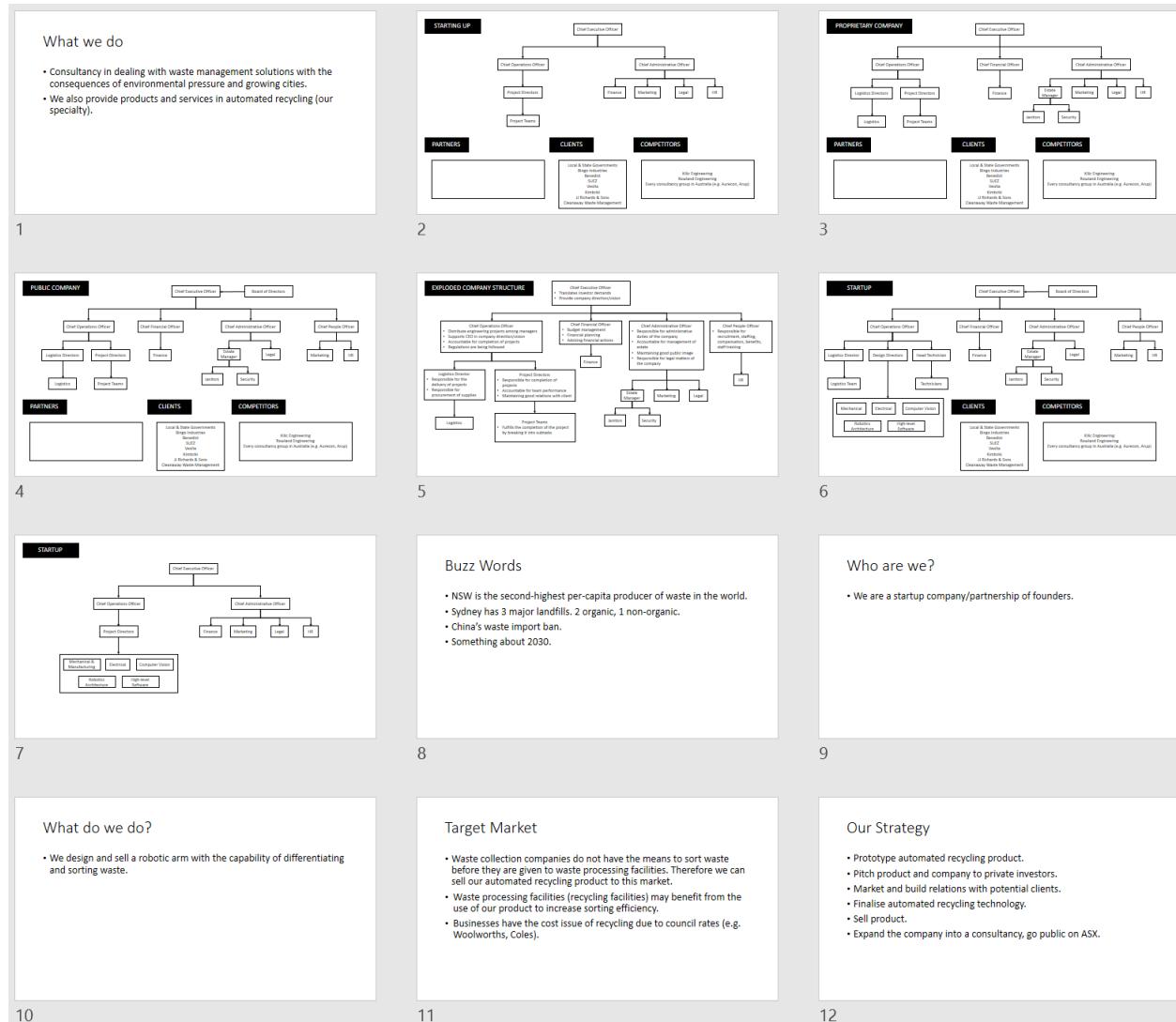


Figure 5: Business Structure Work

Appendix D Week 4 Chairing

Week 4 chairing Monday agenda (Figure 6) and Friday agenda (Figure 7).

Agenda

Friday, June 19, 2020 2:35 PM

1. Research 2 pieces of technology that solves the following issue:
 - a. ***Improve the efficiency of current recycling practices that often have high rejection rate that leads waste to landfills.***
 - b. Market research summary:
 - i. Half of NSW waste is recycled.
 - ii. Packaging and plastics were majority of type of waste.
 - iii. Construction and offices are largest users of recycled goods.
 - iv. Manufacturing (30%), accommodation (30%), food services, retail are large generators of waste (most of it is packaging).
 - c. Some questions to think about:
 - i. How does the tech work?
 - ii. Costs
 - iii. Can the tech compete in the market?
 - iv. What makes the tech unique?
2. Present ideas to group (2.5 minutes each)
 - a. To facilitate presentation, no ideas are bad ideas! Keep comments until discussion or at the least after the idea is presented.
3. Discuss all presented ideas (20 minutes)
 - a. Select 1 piece of technology on the following criteria (but not limited to):
 - i. Answers the issue.
 - ii. Viable to implement.
 - iii. Perhaps easy to write a report about.
 - b. Weigh pros and cons of each piece of technology:

Tech	Pro	Con

Outcomes:

- Engineering solution for our specified problem that is viable as a business.

Other stuff to consider if we have time, else leave it for next meeting:

- Finalise business structure after selection of technology solution.
- Splitting into teams (advised by [Arfin](#)) to delegate research and report work.

Figure 6: Week 4 Monday Agenda

Agenda for 26/06/2020

Friday, June 19, 2020 2:35 PM

Both teams are researching into and comparing two aspects of the recycling chain:

- End refinement
- Waste processing (sorting)

Business Team:

- Members: Arfin, Dan
- Task: Identify viable markets, greatest revenue streams, incentives

Tech Team:

- Members: Michael, Dunya, Lucy, Neil
- Task: Identify technologies, processes, by-products, net energy requirements

Agenda at meeting:

- Teams present findings and recommendations.
- Discussion on part of recycling chain we want to focus (cost of technology, incentive to potential buyers).

Outcome:

- Selection of part of recycling chain we want to focus on.
- Maybe: Selection of technology as well.

Figure 7: Week 4 Friday Agenda

Appendix E Technology Research

Technology research conducted in week 4 in Figure 8.

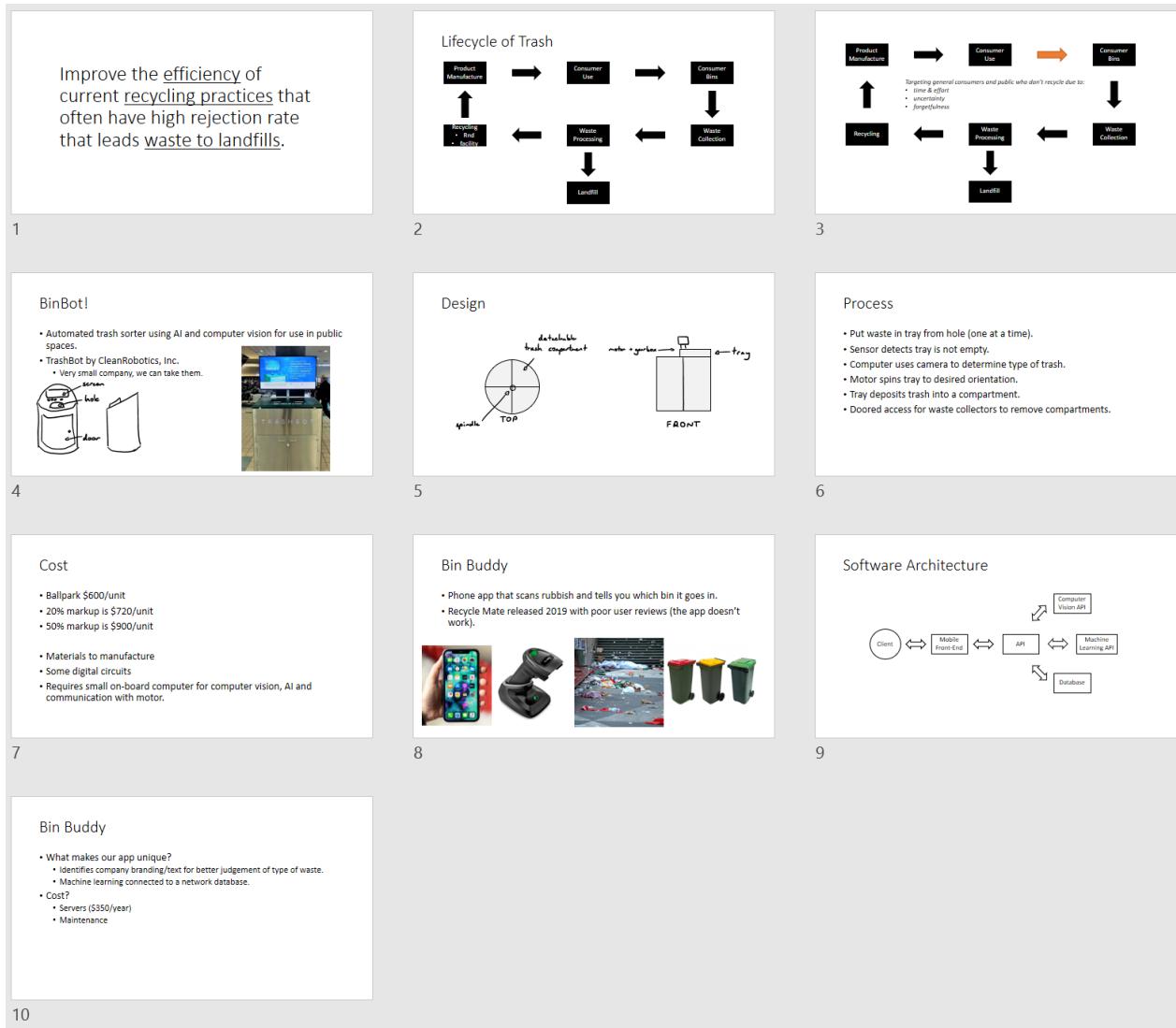


Figure 8: Technology Research

Appendix F Market Research

Market research conducted in week 4 in Figures 9, 10, 11, 12, 13, 14, 15.

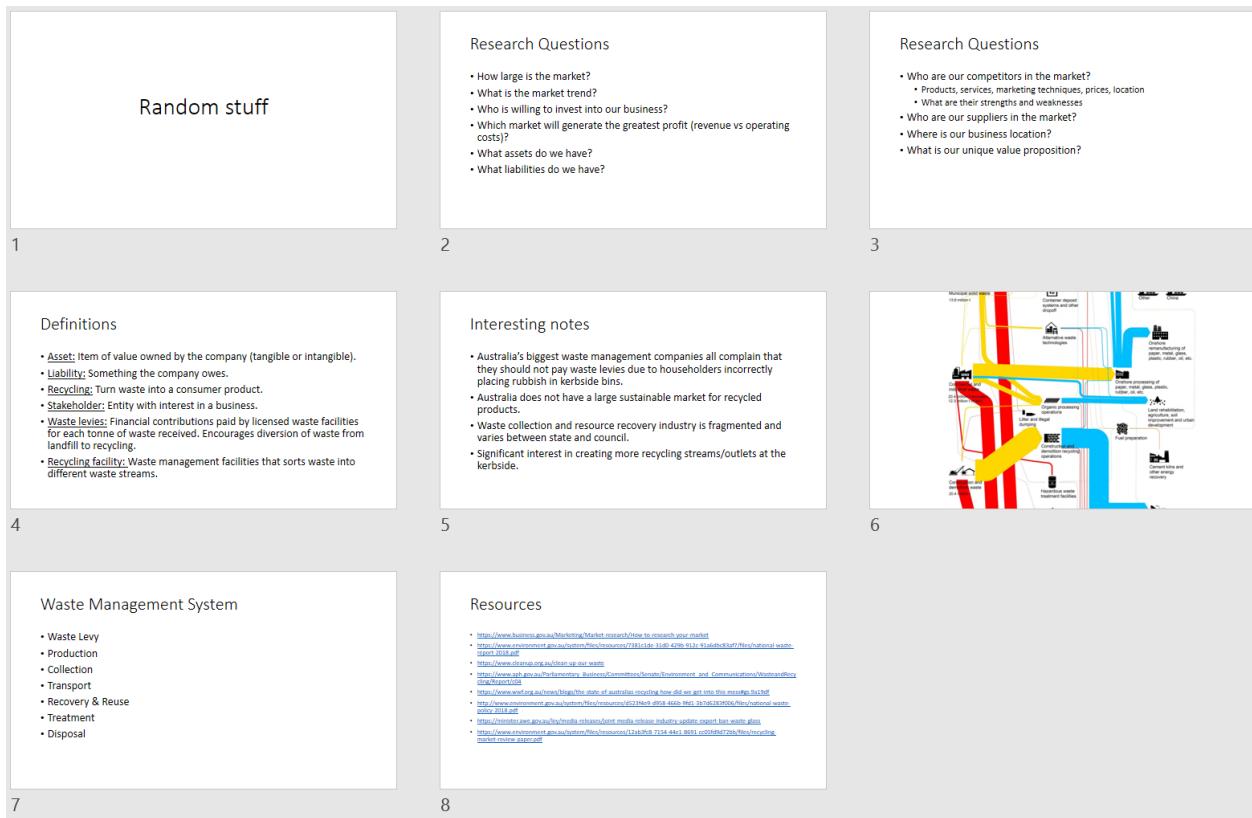


Figure 9: Market Research Questions

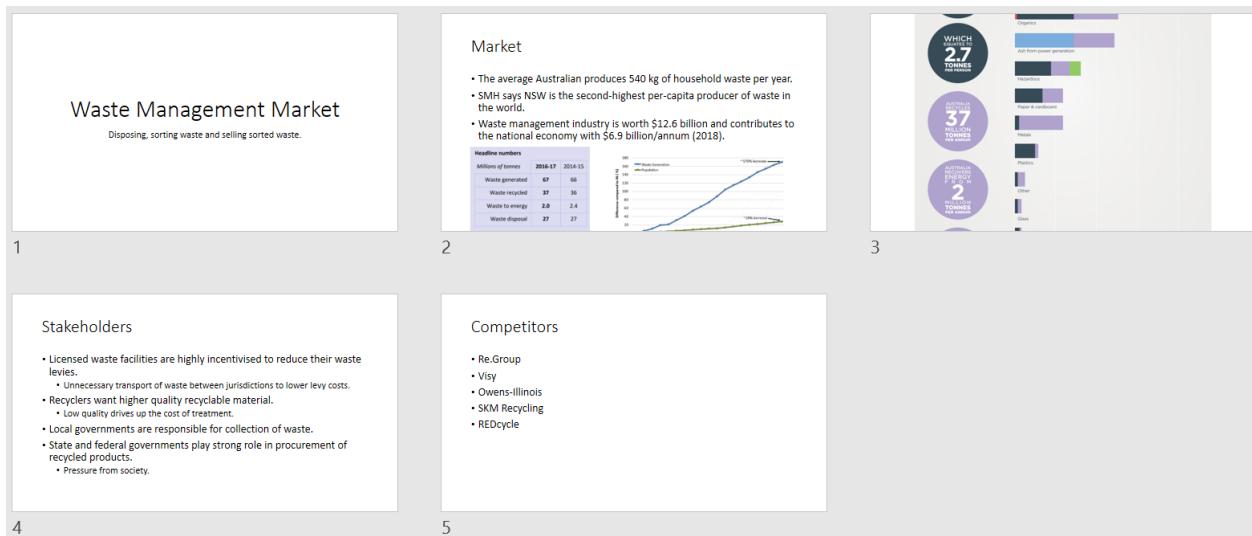


Figure 10: Waste Management Market Research

Appendix G Week 7 Scribing

Week 7 minutes (Figure 16).

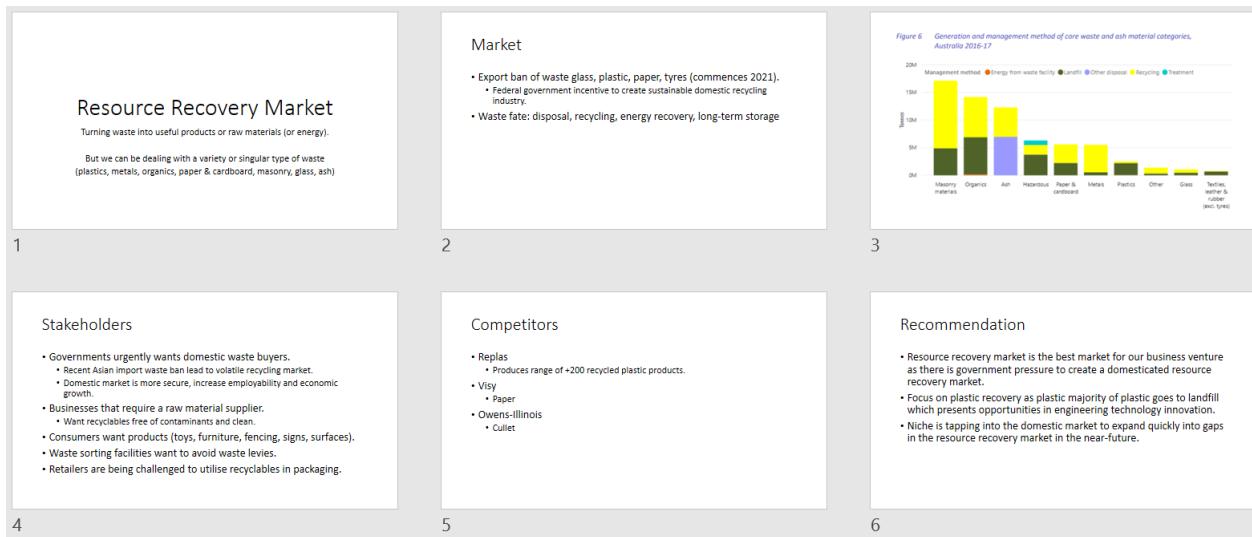


Figure 11: Resource Recovery Market Research

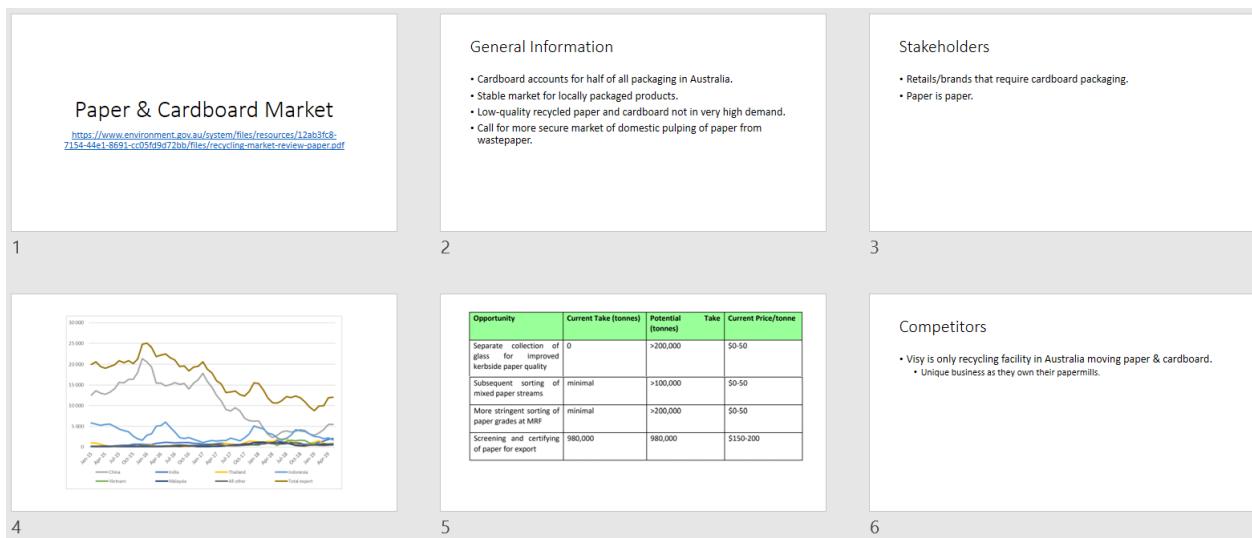


Figure 12: Paper Market Research

Appendix H Shredding Prices

On-site shredding cost from week 7 in Figure 17.

Comparison between granulator and shredder in Figure 18.

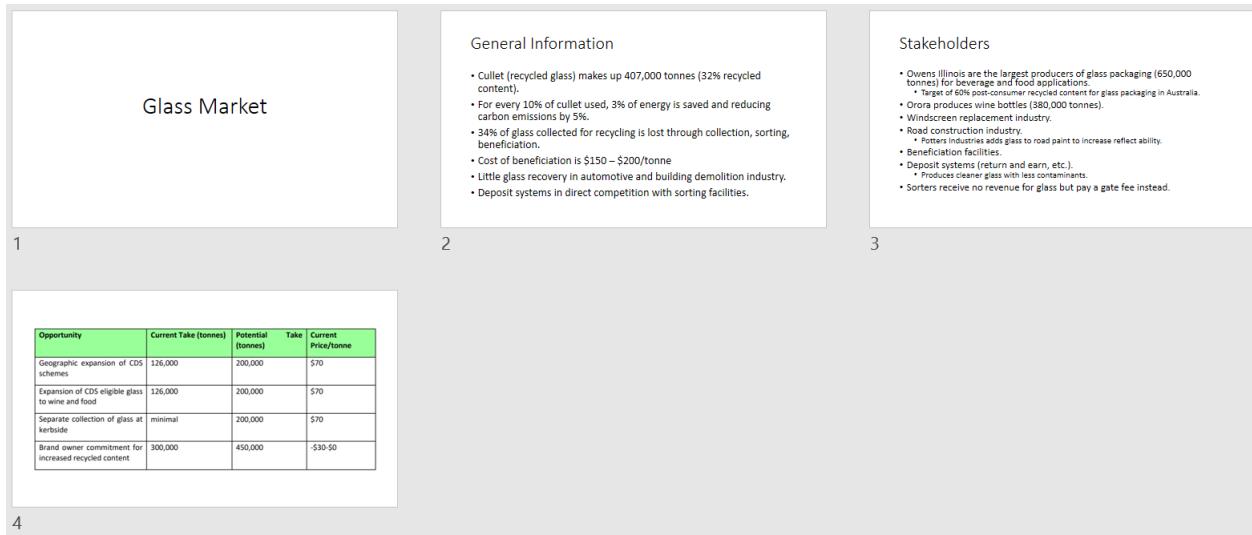


Figure 13: Glass Market Research

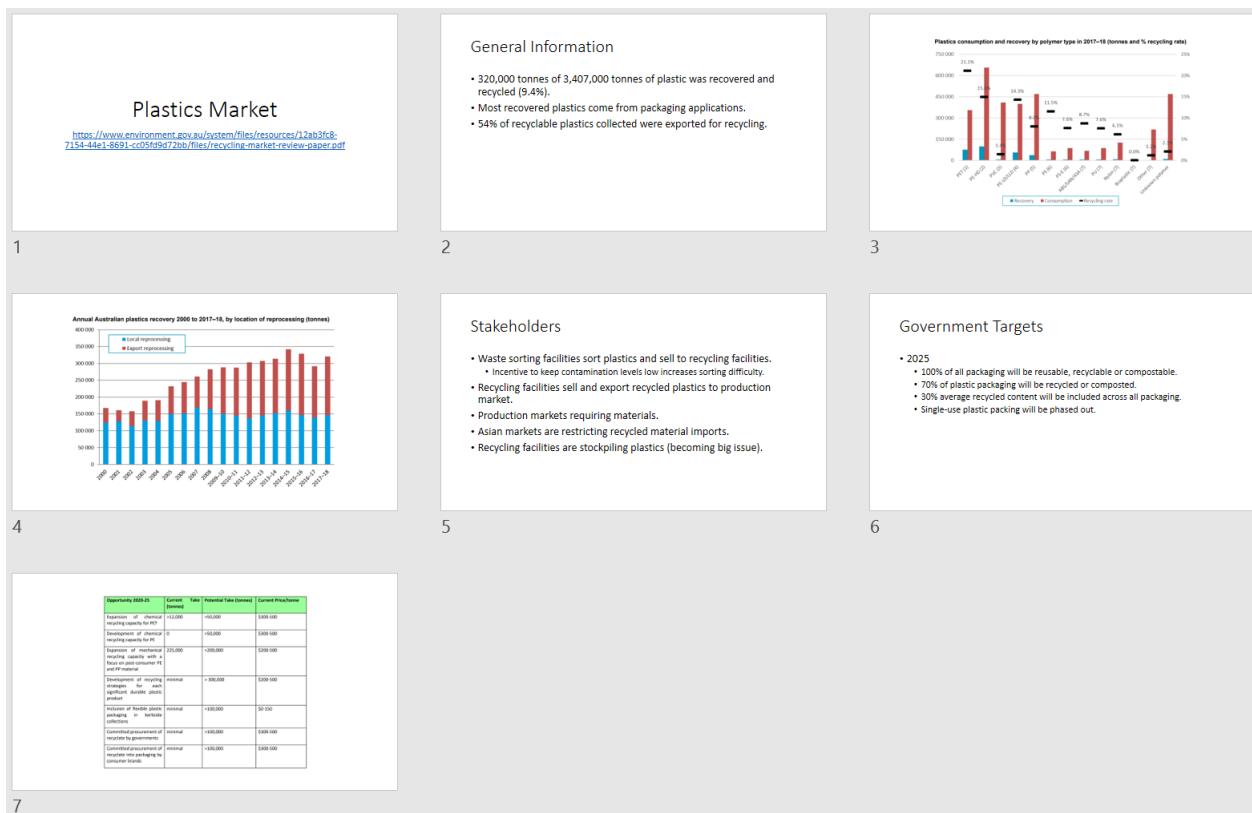


Figure 14: Plastic Market Research

Appendix I Market Share Analysis

Market share analysis into major domestic plastic resource recovery companies (Figures 19 and 20).

1	<p>Rubber Market</p>	<p>General Information</p> <ul style="list-style-type: none"> Rubber commonly in form of tyres. Recyclability of tyres is difficult with end of life tyres going into landfill (63%), exported (27%), locally recycled (10%). Exported tyre forms were baled tyres(81%) and shredded tyres (19%). Local recycling limited by lack of market for tyre-derived products and stronger international demand for tyre-derived fuels. Some tyre-derived products: tile adhesives, spray seals, playgrounds, sports surfaces, steel making. Australia does not recover tyres for energy. 	2	3																		
4	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Opportunity</th><th>Potential Take (tonnes)</th></tr> </thead> <tbody> <tr><td>Tyre derived aggregate</td><td>>50,000</td></tr> <tr><td>Pyrolysis</td><td>>35,000</td></tr> <tr><td>Spray seals</td><td>>25,000</td></tr> <tr><td>Adhesives</td><td>>25,000</td></tr> <tr><td>Explosives</td><td>>25,000</td></tr> <tr><td>Playgrounds</td><td>>20,000</td></tr> <tr><td>Asphalt</td><td>>10,000</td></tr> <tr><td>others</td><td>>50,000</td></tr> </tbody> </table>	Opportunity	Potential Take (tonnes)	Tyre derived aggregate	>50,000	Pyrolysis	>35,000	Spray seals	>25,000	Adhesives	>25,000	Explosives	>25,000	Playgrounds	>20,000	Asphalt	>10,000	others	>50,000			
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Asphalt	>10,000																					
others	>50,000																					

Figure 15: Rubber Market Research

MEETING MINUTES			
Subject	MMAN3000 Meeting 7	Date	17/07/2020
Facilitator	Dunya Vasic	Start Time	1:25pm – 2:20pm
Location	Microsoft Teams	Scribe	Dan Nguyen
Attendees	Lucy, Neil, <u>Dunya</u> , Jeff, <u>Arfin</u> , Dan		
Key Points Discussed			
No	Topic	Highlights	
1	Decide type of reactor	<ul style="list-style-type: none"> Subcritical water with catalyst. 	
2	Shredding	<ul style="list-style-type: none"> Are we shredding off-site or on-site? Should compare prices of shredding. 	
3	Energy consumption method	<ul style="list-style-type: none"> Forecast that solar becomes major source of energy by 2023. Solar is very possible. 	
4	Australian standards	<ul style="list-style-type: none"> Grades of quality of crude oil. Standards on manufacturing plants. 	
5	Business structure	<ul style="list-style-type: none"> Company. List of various routes and rough draft of positions required. Initial plant costs can be funded by investors. Proposal to assume we are an off shoot of an existing company for secure funding. 	
Action Plan			
No	Item	Person In Charge (PIC)	Target Date
1	Compare prices of shredding off-site (someone else does it) vs on-site (we do it).	Dan	
2	Assumption if we can be an off shoot of an existing company.	<u>Dunya</u>	
3	Give rough startup cost and required positions to business team	Technical team	
Next Meeting			
Date	Tuesday 3:30pm		
Topic	Progress Check		

Figure 16: Week 7 Minutes

On-site:	Shredder	Initial Cost (\$)	Labour Cost (\$/hr)	Output Cap. (tonne/h)	Energy (kW)	DMO for Energy (\$/kWh)	Op. Cost (\$/tonne/h)	Total (\$)	HOURS	1
	SS-600 (Single-Shaft)	38000	1	0.3	15	0.36855	18.4275	38019.43	WAGE	1
	EvaShred EV65E (Single-Shaft)	75000	1	3	15	0.36855	1.84275	75002.84		
	GE Series Europe (Single-Shaft)	100000	1	20	400	0.36855	7.371	100008.4	TONNE	1

Figure 17: On-site Shredding Cost

Appendix J Draft Report

Draft report of target market work in Figure 21. Highlighted sections are my own words.

	Granulator	vs	Shredder
Output Size	6-12mm		20-100mm
Feed Rate	415-1460rpm		3.6-83rpm
Torque	Low		High
Shredder	Single-Shaft	vs	Dual-Shaft
Application	Thick solids		Low-density solids

Figure 18: Granulator vs Shredder

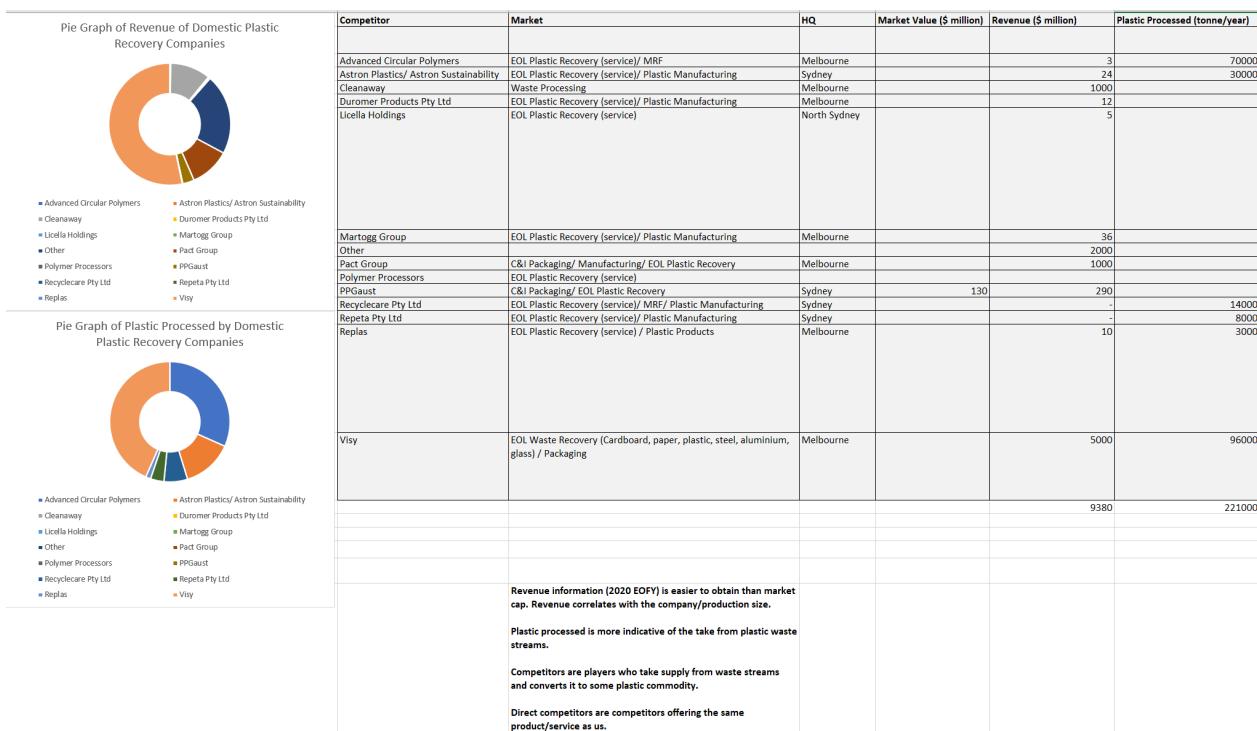


Figure 19: Market Share Analysis

Draft report of ethics in Figure 22.

Competitor	Accepted Materials													Recycled Products							
	PET	HDPE	LDPE	LLDPE	PA	PP	PS	PC	ABS	HIPS	PVC	PE	Other	Unknown	Flakes	Granules/Pellets	Synthetic Oil	Construction	Furniture, Decks, Fences	Pipes	Packaging
Advanced Circular Polymers	1	1				1									1						
Astron Plastics/ Astron Sustainability		1	1			1											1				
Cleanaway																					
Duromer Products Pty Ltd	1	1			1	1	1	1									1				
Licella Holdings	1	1	1	1	1	1	1	1	1	1	1	1	1				1				
Martogg Group		1	1	1	1												1				
Other																					
Pact Group																	1				1
Polymer Processors	1	1	1	1		1											1				
PPGauß																					1
Recyclecare Pty Ltd		1														1	1		1		1
Repetta Pty Ltd		1	1		1											1		1			
Replas																			1		
Visy																					1

Figure 20: Accepted Products

Report Writeups

- Introduction: Arlin, Dan
- Target Market: Dan, Jeff
- Company Setup:
- Technology: Danya
- Budget: Arlin
- Regulations: Michael, Jeff
- Ethics: Dan, Lucy
- CSR: Dan

Technology team: technology

Write information underneath subheading/dot point.

Goal of Report

- Proposition of a business model to a potential client.

Problem Statement

- Resource recovery – plastics
- https://www.aph.gov.au/Parliament/Business/Committees/Senate/Environment_and_Communications/WasteAndRecycling/Report/
- Financial feasibility.

Introduction / Context

- The flow of waste may be conceptualised as:
 - Source streams
 - Generators of waste (municipal solid waste, commercial & industrial waste, construction & demolition waste)
 - Waste infrastructure
 - Collectors of waste streams
 - Sorters of waste streams
 - The fates of waste are typically:
 - Landfill disposal
 - Recycling
 - Energy-recovery
 - Long-term storage
 - Resource recovery
 - Recovering sorted or mixed waste streams for energy or recycling into reusable products
 - Markets
 - Consumers of recycled/recovered waste streams
 - The flow of waste throughout this whole chain is called recycling.
- The problem statement was answered through a two-prong approach:
 - Market research of flow of waste sectors;
 - Research into existing technical problems/inefficiencies and proposition of technologies.

Target Market

- In 2017 – 2018, Australia generated 3.4 megatonnes of plastic waste of which 9.4% was recycled. This recycling rate is one of the lowest recycling rates compared to other types of waste in Australia, and 54% of recycled plastics had been exported and processed overseas. Waste plastics that do not get recycled are instead diverted to landfill due to its difficulty in recovery.

<https://www.environment.gov.au/protection/waste-resource-recovery/publications/australian-plastics-recycling-survey-report-2017-18>

• Some context about the Asian bans on waste imports

• Government intervention and the incentives of stakeholders in the waste management market has created a gap in the domestic resource recovery market. There is potentially ___ calculate some numbers for our take.

• The impact of the resource recovery market is the diversion of waste from landfills to reusable products for a more sustainable domestic economy (circular economy).

Stakeholders

- Government wants domestic waste buyers.
- Manufacturing businesses require raw materials free of contaminants and clean.
- Waste sorting facilities want to avoid waste levies.
- Retailers and commercial market are challenged to use recycled packaging.
- Community is more environmentally conscious about use of plastics.

Direct Competitors:

- Licella will be a direct competitor due to their development of their Cat-HTR technology which breaks down plastics into crude oil. Licella's strengths are primarily derived from the innovation of their technology which can recycle more than 85% of plastics and mixed plastics. As a result, they receive large media attention, have few competitors, and receive large grants and subsidies from the Australian government (\$75 million for development and \$1 million for commercialisation). Licella also has private ownership of IQBRA, new which is a recycling company with access to MRFs, giving Licella access to waste plastic streams. Licella has clear strategies to expand their operations as they have established various domestic and international relationships. However, these partnerships are typically with small companies, non-profit organisations or piloting the technology for commercialisation. Licella's expected primary revenue stream is the retail of their technology to existing waste management companies. Licella's weaknesses are the lack of competitiveness due to their primarily ESG private investments and early stages in commercialisation. Licella is threatened by the development of more efficient sorting technology for MRFs, large existing crude oil companies, and currently low prices in crude oil due to the recent 2020 oil price war.
- Replas is a large manufacturer of plastic products drawing their supply from their MRF assets. Replas' strengths come from their vertically integrated business model which allows them to be defensive against threats and easily scale up production. Replas offers a large variety of plastic products (specialising in outdoor products). Their other strengths are their strong marketing strategies, a well-defined position in industry, good relationships with customers and stakeholders.

Replas has solidified their partnership with large retailers Coles and Woolworths to effectively divert their plastic waste into Replas' MRFs.

• Visy

Waste Levy:

- The waste levy is a tax imposed on waste facilities that wish to dispose their waste by landfill. This levy was implemented to encourage the diversion of waste from landfills, therefore encouraging recycling initiatives.
- MRFs are incentivised to minimise their waste levies with some transporting their waste across jurisdictions.
- The levy varies by state and is a rate per tonne.

State	Waste Stream	Levy (per tonne)
NSW	Municipal Solid Waste	\$0.35
NSW	Commercial & Industrial	\$0.20
NSW	Mixed C&I (>50% Recyclable)	\$0.20
NSW	Household	\$0.20
NSW	Regional	\$0.20
Victoria	Particular Materials	\$1
Victoria	Domestic	\$1
Victoria	Commercial & Industrial	\$1
WA	Metropolitan	\$1
WA	Non-Metropolitan	\$1
WA	Plastic Waste	\$1
WA	Metropolitan	\$0 per cubic metre

https://www.aph.gov.au/Parliament/Business/Committees/Senate/Environment_and_Communications/WasteAndRecycling/Report/

Waste Export Bans:

- Australian waste export bans start on 1 Jan 2021. The waste export ban is driven by three factors: self-reliance from volatility of Asian waste import bans, transform the waste industry into a sustainable industry as well as boost domestic economy with the creation of jobs and export of higher-value commodities, and handle concerns raised by the community to reduce negative environmental impacts.
- Total \$167 million Australian Recycling Investment Plan for distribution to initiatives focused on recycling.
- The waste export ban are expected to generate \$1.5 billion over the next 20 years and create more than 2000 jobs.
- This is an act as part of the National Waste Policy.

<https://www.environment.gov.au/protection/waste-resource-recovery/waste-export-ban>

<https://www.cowc.gov.au/sites/default/files/compliance/giving-out-waste-ports-response-strategy.pdf>

Indirect Competitors:

- Current available technologies
- Practicality

Downstream: Who do we supply our products to:

- Our biocrude product can be blended with conventional crude at existing oil refineries
- Mobil – Melbourne
- Viva Energy – Victoria
- Caltex – Brisbane
- GP – WA
- National volumetric demand of crude oil is at 75 million litres a day.
- Biocrude is assumed to be the same chemical potency as conventional crude
- <https://ajp.com.au/sites/default/files/download-files/2017-09/A%20%20%20Glance%20Australian%20Oil%20Refineries.pdf>

Figure 21: Draft Target Market

Appendix K SWOT Analysis

SWOT analysis of key and relevant players in domestic plastic resource recovery market in Figure 23.

<ul style="list-style-type: none"> o https://www.industry.gov.au/regulations-and-standards/buying-and-selling-goods-and-services-by-weight-and-other-measurements/selling-liquid-fuels <p>- Servicing license to test and verify measurement instruments used for trade</p> <p>- Reducing technical barriers to trade, mutual recognition agreements with other states and countries</p> <p>- Australia's standards and conformance infrastructure, involved with inspection and certification of goods and services</p> <p>- Building and constructing</p> <p>- Australian and industry participation, our project needs to give jobs to people if there is government funding of \$20 million or more</p> <p>- Pattern approval, an impartial body examines the design of the instrument, checks for environmental and operational conditions</p> <p>- Regulating Australian fuel quality, fuel inspectors can visit to check</p>	<p>Corporate Social Responsibility:</p> <p>Corporate social responsibility is the duty of a company to be socially accountable i.e. there is responsibility in managing the company's relationships internally, to its stakeholders and the public. These responsibilities are administered by a corporate governance which put into effect company policies that are influenced by business ethics. The policies and corporate model are both derived from the ethical standards established above.</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: left;">protected characteristics and discriminatory actions:</th> <th></th> </tr> </thead> <tbody> <tr> <td style="width: 33.33%;">Employee Wellness</td> <td style="width: 33.33%;">Disability</td> <td style="width: 33.33%;">Discrimination of actions:</td> </tr> <tr> <td>Health and safety programs and employee rights</td> <td>From work disability</td> <td>Harm or threat to physical or mental condition</td> </tr> <tr> <td colspan="2">Controlling</td> <td>Discrimination can be inferred/direct</td> </tr> <tr> <td colspan="2">Employees are controlled</td> <td>Discrimination based on task based discrimination</td> </tr> <tr> <td colspan="2">Employees benefits</td> <td>Health</td> </tr> <tr> <td colspan="2">The public good/benefits and perks available for employees and the equality of such</td> <td>Giving employees longer or day off are entitled to compensation for workplace accidents</td> </tr> <tr> <td colspan="2">Exploit</td> <td>Workplace reward/recognition</td> </tr> <tr> <td colspan="2">Exploiting employees</td> <td>Applies of rewards or work from home at another company office</td> </tr> <tr> <td colspan="2">Workplace</td> <td>Financial gain</td> </tr> <tr> <td colspan="2">Financial gain</td> <td>Instrument to leech money from trading, owning competitor stock, insider trading, or connections to personal advantage</td> </tr> <tr> <td colspan="2">Conflict of interest</td> <td>Compromising</td> </tr> <tr> <td colspan="2">Employees with conflicting interests with the company and their discrimination action plan</td> <td>Compromising others</td> </tr> <tr> <td colspan="2"></td> <td>Compromising company health</td> </tr> <tr> <td colspan="2"></td> <td>Actions benefiting the competitor</td> </tr> </tbody> </table>	protected characteristics and discriminatory actions:			Employee Wellness	Disability	Discrimination of actions:	Health and safety programs and employee rights	From work disability	Harm or threat to physical or mental condition	Controlling		Discrimination can be inferred/direct	Employees are controlled		Discrimination based on task based discrimination	Employees benefits		Health	The public good/benefits and perks available for employees and the equality of such		Giving employees longer or day off are entitled to compensation for workplace accidents	Exploit		Workplace reward/recognition	Exploiting employees		Applies of rewards or work from home at another company office	Workplace		Financial gain	Financial gain		Instrument to leech money from trading, owning competitor stock, insider trading, or connections to personal advantage	Conflict of interest		Compromising	Employees with conflicting interests with the company and their discrimination action plan		Compromising others			Compromising company health			Actions benefiting the competitor									
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<p>Ethics</p> <p>Business ethics are the moral principles that govern a business's behaviour, decision-making and activities. Externally, businesses are motivated by ethics to gain public approval which would attract investors and consumers and develop trust with stakeholders. Internally, ethics improve productivity by promoting worker happiness, a non-discriminative work culture, and elimination of corruption. The following values were identified as key to the ethical framework of our business model:</p> <ul style="list-style-type: none"> - Environmentally friendly material sourcing and recovery - Ethical business conduct, including integration in local communities <p>Environmentally friendly material sourcing and recovery is founded in our business model. In chemically recycling plastics, waste that would otherwise be sent to landfill is redirected through the proposed system, to responsibly create new products that can be reused. In this, the aim is to create a sustainable solution to the growing problem of plastic pollution and landfills.</p> <p>An essential focus is in ethical business conduct, supported by ethical supply of plastic materials. The products produced by the proposed system can act as a replacement for several virgin materials, thus allowing companies to manufacture with more sustainable materials. In the spread of this technology, the supply chain for the materials produced will shorten, thus preventing reliance on other less sustainable businesses. A focus for the business is also to supply to local industry, to support the development of communities around a more sustainable use of resources.</p> <p>In integrating with local communities, the company will lessen the chance of corruption or immoral actions by shortening the supply chain. As the technology proposed requires a plant, locations can be carefully chosen to employ a local workforce. This is significant as it supports the local and domestic economy and in turn provides strong company loyalty. Further, the community can act more sustainably on behalf of the company with support from local councils. Hiring locals provides jobs within the community.</p> <p>Facilitating local recycling directly targets the issues of recycling which also provides educational opportunities to minimise waste to landfill. This also has the operational benefit of reducing transportation costs.</p> <p>https://www.investopedia.com/terms/b/business-ethics.asp</p>	<p>The first element of the corporate hierarchy is the workforce structure. Employees have a manager to whom they report: they are the first contact in any ethical concern. Issues can be escalated along the chain as required. Within this element is a separate internal department, Human Resources, which can handle many workplace conflicts that arise.</p> <p>The second element is a reliable, anonymous reporting tool that can be used by employees at any time that can manage any potential issues where employees do not feel able to report to a manager. This tool can be managed by a third party to reconcile any potential conflicts of interest. Such examples are anonymous hotlines where employees can report any potential unethical activities which are investigated further.</p>	 																																																						
<p>Policies:</p> <p>Policies should address as many possible scenarios and issues of ethical concerns internally and externally. The policies thus adopted are as follows:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33.33%;">Policy</th> <th style="width: 33.33%;">Reason</th> <th style="width: 33.33%;">Actionable</th> </tr> </thead> <tbody> <tr> <td>Employees Conduct</td> <td>Code</td> <td>Response to the uniform and behaviour in the office</td> </tr> <tr> <td>This policy outlines the expectations of the employee in the workplace and relates to the company and company systems</td> <td>Working hours & vacation</td> <td>Expected work hours, overtime, required</td> </tr> <tr> <td></td> <td>Discrimination & Harassment</td> <td>Discriminatory actions, identification of acts of discrimination/harassment</td> </tr> <tr> <td></td> <td>Relationships</td> <td>Other employees, managerial conflicts, discrimination, family, appropriate behaviour</td> </tr> <tr> <td></td> <td>Cyber security</td> <td>Corporate email, illegal internet usage</td> </tr> <tr> <td></td> <td>Social media</td> <td>Online behaviour, sharing confidential information</td> </tr> <tr> <td></td> <td>Confidentiality</td> <td>Restriction of sensitive information, non-disclosure agreements</td> </tr> <tr> <td>Workplace</td> <td>Visitors</td> <td>Allow visitors to enter the workplace</td> </tr> <tr> <td>This policy outlines the expectations of the visitor and the employee</td> <td>Smoking</td> <td>No smoking in the workplace</td> </tr> <tr> <td></td> <td>Drinking</td> <td>No alcohol in the workplace</td> </tr> <tr> <td></td> <td>Accommodation</td> <td>Emergency, medical, family, facilitated</td> </tr> <tr> <td>Workplace Health and Safety</td> <td>Operating</td> <td>Operating machines, tools that are of risk to the health and safety of the user and others</td> </tr> <tr> <td>This policy outlines the health and safety of employees in the workplace</td> <td>Preventative action</td> <td>Protective wear, induction</td> </tr> <tr> <td></td> <td>Risk management</td> <td>First aid, procedures in event of emergency</td> </tr> <tr> <td>Equal Opportunities</td> <td>Hiring</td> <td>Recruitment</td> </tr> <tr> <td>This policy outlines equal opportunity, discrimination against</td> <td>Promotion</td> <td>Recruitment</td> </tr> <tr> <td></td> <td>Termination</td> <td>Recruitment</td> </tr> </tbody> </table>	Policy	Reason	Actionable	Employees Conduct	Code	Response to the uniform and behaviour in the office	This policy outlines the expectations of the employee in the workplace and relates to the company and company systems	Working hours & vacation	Expected work hours, overtime, required		Discrimination & Harassment	Discriminatory actions, identification of acts of discrimination/harassment		Relationships	Other employees, managerial conflicts, discrimination, family, appropriate behaviour		Cyber security	Corporate email, illegal internet usage		Social media	Online behaviour, sharing confidential information		Confidentiality	Restriction of sensitive information, non-disclosure agreements	Workplace	Visitors	Allow visitors to enter the workplace	This policy outlines the expectations of the visitor and the employee	Smoking	No smoking in the workplace		Drinking	No alcohol in the workplace		Accommodation	Emergency, medical, family, facilitated	Workplace Health and Safety	Operating	Operating machines, tools that are of risk to the health and safety of the user and others	This policy outlines the health and safety of employees in the workplace	Preventative action	Protective wear, induction		Risk management	First aid, procedures in event of emergency	Equal Opportunities	Hiring	Recruitment	This policy outlines equal opportunity, discrimination against	Promotion	Recruitment		Termination	Recruitment		
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This policy outlines the expectations of the employee in the workplace and relates to the company and company systems	Working hours & vacation	Expected work hours, overtime, required																																																						
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	Relationships	Other employees, managerial conflicts, discrimination, family, appropriate behaviour																																																						
	Cyber security	Corporate email, illegal internet usage																																																						
	Social media	Online behaviour, sharing confidential information																																																						
	Confidentiality	Restriction of sensitive information, non-disclosure agreements																																																						
Workplace	Visitors	Allow visitors to enter the workplace																																																						
This policy outlines the expectations of the visitor and the employee	Smoking	No smoking in the workplace																																																						
	Drinking	No alcohol in the workplace																																																						
	Accommodation	Emergency, medical, family, facilitated																																																						
Workplace Health and Safety	Operating	Operating machines, tools that are of risk to the health and safety of the user and others																																																						
This policy outlines the health and safety of employees in the workplace	Preventative action	Protective wear, induction																																																						
	Risk management	First aid, procedures in event of emergency																																																						
Equal Opportunities	Hiring	Recruitment																																																						
This policy outlines equal opportunity, discrimination against	Promotion	Recruitment																																																						
	Termination	Recruitment																																																						

Figure 22: Draft Ethics

Competitor	Strengths	Weaknesses	Opportunities	Threats
Advanced Circular Polymers				
Astron Plastics/ Astron Sustainability				
Cleanaway				
Duromer Products Pty Ltd				
Licella Holdings	Can recycle more than 85% of plastics and mixed plastics. Variety of partnerships and international relations with clear strategies. Private ownership of iRnew (recycling company) giving access to waste plastic streams (sorts more than 100,000 tonnes/year). Partnership with sustainable feedstock providers.	Technology requires low levels of sorting. Only retailers of the technology. Not competitive enough: ESG private investment, partnership with small companies, nations, non-profits, relying on grants and subsidies. Not commercialised - currently piloting	Large media attention. Few competitors. Recognised need for technology. Received \$75 million fund from Australian government for tech dev. Received \$1 million grant for commercialisation.	Development of efficient sorting technology. Large oil and plastic companies are a threat. Direct competition with crude oil market and recent crude oil war of 2020.
Martogg Group				
Other				
Pact Group				
Polymer Processors				
PPG aust				
Recyclecare Pty Ltd				
Replas	Partnership with large retailers Coles and Woolworths effectively diverts plastic waste. Unique market in producing outdoor products: plastic furniture, bollards, decking, etc. Large variety of products. Clear strategy, position in industry, relationship with customers, stakeholders. Strong marketing strategies		Large media attention. Replas is a large company that can quickly expand into gaps of the market identified in the near-future.	Not yet seen to be defensive against disruptions from small, similar companies
Visy	Many revenue streams (manufacturing cardboard, paper, glass, plastic, metal packages). Vertically Integrated business model with paper mill assets that are extremely efficient relative to their competitors.	Relatively recent controversies with relationships to a supplier managed by a Bikie.	Acquisitions of O-I Glass (Largest glass manufacturer in the world) for \$1 billion.	

Figure 23: SWOT Analysis

Appendix L Final Report

Text highlighted in yellow are my own words and in green are collaborated work or contributions to other work.

Problem statement, introduction, target market research work in Figure 24.

AWW MAN																		
1. Problem Statement																		
<p>According to the Australian Plastic Recycling Survey Report in 2017 – 2018 [1], only 8.4% of all instances of plastic waste was recycled with the rest diverted to landfill. This extremely low recycling rate can be attributed to the lack of innovation and effectiveness in current plastic resource recovery technologies. Landfills raise many environmental and ethical concerns, with the importance of landfill only increasing due to recent AAS waste import bans [2]. As a response, government intervention insists on waste export bans and waste levies on material recycling facilities (MRFs) which have effectively created a gap in the domestic resource recovery market.</p> <p>The recycling of plastic ideally would recover 100% of input resources, though currently only 9.4% contributes to the circular economy. As a result of recent bans on exports of waste, the practice of landfilling continues to present as an issue, and is not a long-term solution to waste management. Aww Man believes this can be solved by creating a new technology to turn waste into valuable products.</p>																		
2. Introduction																		
<p>The lifecycle of plastics begins with the extraction of crude oil, its refinement into fractions then polymerisation of these fractions into plastic products. The consumer purchases these items while manufacturers then source these items to produce goods or services. The consumer then uses these items in sufficient quantities to demand to MRFs which are then waste by-products. The fate of these sorted wastes is dependent on existing waste infrastructure where it can be sent to landfill, recycled into consumer products, reused as energy, or stored long term [3].</p> <p>Aww Man Ltd is an oilfield related technology company, of the Royal Dutch Shell P.L.C. concerning the resource recovery market as a major player with the commercial rights in the Circular Hydrocarbon Recovery (CHIR) CHIR is a hydrocarbon process which decomposes plastic waste of all grades into two sub-products, crude oil (mined bitumen oil) which is ready to be refined and the crude oil commodity market. Thus, Aww Man is the bridge that completes the circular economy as an ethical company with highly profitable incentives.</p>																		
3. Target Market Research																		
<p>The top of the CHIR process are plastic waste streams where the waste management market is considered as Aww Man's supply chain, and the output of the CHIR process is primarily oil derived from setting a target market for crude oil refiners. The analysis of these markets (summarised in Table 1 below) outline Aww Man's risks, opportunities, stakeholders, and competitors; market opportunities are further discussed.</p>																		
<table border="1"> <tr> <th>Market</th> <th>Risks</th> <th>Opportunities</th> <th>Relevant Stakeholders</th> <th>Competitors</th> </tr> <tr> <td>Waste Management</td> <td>Market import ban Environmental risks to landfill</td> <td>Domestic waste buyers Waste export Local waste to avoid the market</td> <td>Commercial market is Community is more conscious about plastic</td> <td>Plastics refiners focus on recycled packaging</td> </tr> <tr> <td>Crude Oil</td> <td>Volatile global events</td> <td>Enhanced domestic supply</td> <td>Petroleum refines focus high quality crude oil desire high quality crude</td> <td>Vegan crude oil producers</td> </tr> </table>				Market	Risks	Opportunities	Relevant Stakeholders	Competitors	Waste Management	Market import ban Environmental risks to landfill	Domestic waste buyers Waste export Local waste to avoid the market	Commercial market is Community is more conscious about plastic	Plastics refiners focus on recycled packaging	Crude Oil	Volatile global events	Enhanced domestic supply	Petroleum refines focus high quality crude oil desire high quality crude	Vegan crude oil producers
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3.1. Waste Management <p>The waste management industry was worth \$12.6 billion and generated \$2.9 billion through resource recovery revenues in 2018/19.</p> <p>Waste Levy</p> <p>Landfills pose significant environmental risks and are not sustainable [5] and the community's opinions has been driving demand for more ethical products. Therefore, government intervention encourages the diversion of plastic waste from landfill to recycling initiatives through reduction of the waste levy - a tax imposed on MRFs for each tonne of waste disposed at a landfill and varies by state and type of waste (see Appendix A). However, a review of the levy by the Environment and Communications References Committee [6] discovered that MRFs are unable to profit as they compete their waste to landfills with lower waste levies, minimise their waste, and participate in illegal dumping. MRFs are highly encouraged to avoid waste levies but are significant stakeholders as they hold the supply of waste resources of which Aww Man will offer for a discount undercutting the waste levy and further discussed in Section 4.6.</p> <p>Waste Export Ban</p> <p>From the 2018/19 financial year, the waste export ban has become increasingly volatile as Asian countries ban waste imports [7]. This creates uncertainty in Australia's recycling industry which has the effect of increasing waste stockpiling, influencing landfill, and reduced recycling infrastructure investment. In response to the Asian waste import ban</p>																		
<p>MMAN3000 F13-SG Group 2</p> <p>iii</p>																		
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<p>AWW MAN</p> <p>The Council of Australian Governments, as the market's most influential stakeholders, have ratified a ban on the export of Australian waste commencing on 1 July 2021 [7]. This policy will achieve three strategic outcomes: 6.6% of the volume of AAS waste imports, including a circular economy [8] with the creation of jobs and export of higher-value commodities and addressing growing societal consciousness on environmental effects. Aww Man aims to secure a large portion of the plastic waste supply that had been designated for overseas recycling through rapid commercialisation.</p> <p>3.2. Crude Oil</p> <p>The Australian crude oil market requires approximately 1.7 billion litres of crude oil domestically produced & 3.7 million tonnes of oil imports [9]. From an analysis of the crude oil market in the past decade (see Appendix 4), crude oil imports have increased by 2.5% compared to annual growth rate of 0.4% [10] and domestic crude oil production has increased by 11.4% [10]. Oil is extracted Australia-wide from 800 fields.</p> <p>3.3. Competitor Analysis</p> <p>Aww Man's current domain is shared with a competitor developing similar technology: Leticia. A SWOT analysis of Leticia (Appendix 5) is conducted to determine the competitiveness of Aww Man's commercialisation strategy. Leticia has shown weaknesses which can be exploited.</p>																		
<p>MMAN3000 F13-SG Group 2</p> <p>Page 3 of 25</p>																		
<p>MMAN3000 F13-SG Group 2</p> <p>Page 4 of 25</p>																		
<p>MMAN3000 F13-SG Group 2</p> <p>Page 5 of 25</p>																		

Figure 24: Problem Statement, Introduction, Target Market Report Work

Corporate governance work in Figure 25.

AWW MAN																		
4.2. Workforce Structure																		
<p>Aww Man has experienced staff who formed this start-up as a spin-off from Aww Industrial. The subsections below are the hierarchical breakdown of each department and its main functions to the company. The specific roles required for the whole company and its associated wage, qualification, and descriptions are presented in Table 2.</p> <p>The chief executive officer (CEO) is the bridge of communication between the board of directors and the corporate department managers. The CEO maximises directs the company from shareholder input. The individual department's roles and responsibilities is detailed below:</p> <p>Marketing & Communications</p> <p>The marketing and communications department handles most forms of external communication with public audiences, suppliers, and customers. This includes increasing publicity and managing social media.</p> <p>Human Resources</p> <p>The HR department is responsible for managing employee performance, training, and development.</p> <p>Engineering</p> <p>The engineering department is responsible for designing and integrating oil technical aspects of the facility, subsequently managing the facility and assessing the quality of the products up to industry standards. Eventually, it will construct a construction company to build the facility and maintain it after its completion.</p> <p>Finance</p> <p>The finance department is responsible for managing and advising oil purchases and income, while managing the financials of the company and documenting the flow of these funds. They also advise and plan future projected income and expenses, as well as raising money from banks and investors.</p> <p>Legal</p> <p>The legal department is responsible for the protection of intellectual property and ensuring compliance with relevant laws.</p> <p>Business Development</p> <p>The business development department maintain existing business contracts and partnerships. It is also actively seeking for business opportunities that would benefit the company through analysing trends of the market.</p>																		
<p>MMAN3000 F13-SG Group 2</p> <p>Page 6 of 25</p>																		
AWW MAN																		
<p>4.3. Corporate Governance</p> <p>Corporate governance refers to the administration of company policies which are applied by bodies of power. The function of these policies correlate with the workforce structure and sets an expectation of subordinate behaviour and work culture i.e. employees have a responsibility to whom they report to and employees have a responsibility to whom they delegate tasks. This allows for an efficient transfer of information up and down the workforce structure and enables company policies through a hierarchy of accountability. Aww Man's corporate governance is responsible for a number of the company policies from Appendix 6 which is summarised in Table 3 below.</p>																		
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<p>MMAN3000 F13-SG Group 2</p> <p>Page 7 of 25</p>																		
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Figure 25: Corporate Governance Report Work

Ethics and conclusion work in Figure 26.

<p>7.2.2. Sale of Goods Act (1923)</p> <p>The NSW Sale of Goods Act provides requirements for the drafting and execution of contracts between Aww Manan, and its clients. Common terms present in all Aww Manan contracts will include the price, quantity, and period of sale for all sold products. If sold products are required to transition through a third party before reaching the end client, contracts will stipulate that required fuel quality is not the responsibility of Aww Manan. This clause is in accordance with the Fuel Quality Standards Act 2000, Section 12(2) [39].</p> <p>7.2.3. Competition and Consumer Act (2010)</p> <p>The Competition and Consumer Act harmonised across Australia and demands transparency across all Aww Manan standard operating procedures. This includes the prohibition of price-fixing or other cartel-like behaviour with competitors such as Lincetta, and the method of advertising to consumers. Additionally, any published specifications or minimum fuel qualities advertised by Aww Manan must be genuine, and not be misleading.</p> <p>7.2.4. Petroleum and Other Fuels Reporting Act (2010)</p> <p>Aww Manan has legal obligations to report on data as produced within a specific period, as outlined in the Petroleum and Other Fuels Reporting Act. Fiduciary responsibilities are held by the Australian Government Department of Industry, Science and Energy Resources [40]. Aww Manan has established standard operating procedures as part of its reporting obligations. These guidelines include reporting volumetric quantities of all produced crude oil, at temperatures and pressures in accordance with the International Standard Atmosphere (ISA) datum. Reports must be submitted 15 days after the preceding calendar month.</p> <p>7.3. Social Regulations</p> <p>7.3.1. Work, Health and Safety Act (2011)</p> <p>In the interest of a safe workplace, Aww Manan also follows relevant legislation from the Work, Health and Safety Act (WHS). This act identifies that both the employer and company employees have responsibilities to promote a safe workplace, and Aww Manan will provide all relevant training and equipment to ensure this outcome.</p> <p>8. Ethics & Corporate Social Responsibility</p> <p>As a company, Aww Manan is focused on the triple bottom line, the ethical framework that determines that there should be a social, environmental, and financial benefit to a business model. In this, there is a consistent focus on the impacts of the work done, which then informs policies and approach to business. Further, along the triple bottom line allows the company to evaluate and increase activity consistently – as often as financial benefits are considered, the social and environmental impacts of the business are built upon and improved.</p>	<p>8.1. Ethics</p> <p>Company ethics are the moral principles that govern and places constraints on a company's behaviour, decision-making and activities which in turns protect the company's image and legacy. This generates public approval among investors and consumers, and develops trust with stakeholders. Essentially, ethics can be translated into values which can produce proactivity by promoting worker happiness, a non-discriminatory work culture, and elimination of corruption.</p> <p>Values complement the commanding nature of ethics by providing motivation for higher standards of action. As such, the establishment of company values is vital to the image and operations of the company. The following values were identified as excellent concepts upon which Aww Manan can structure corporate actions according to the triple bottom line:</p> <ul style="list-style-type: none"> • Ethical business conduct, including integration at local communities <p>Environmentally friendly source reduction and recovery is founded in our business model. In chemically recycling plastics, waste that would otherwise be sent to landfill is reduced through the proposed system, to potentially create new products that can be reused. In this, the aim is to create a sustainable solution in the growing problem of plastic pollution and landfill. Thus, Aww Manan focuses on creating a net environmental benefit through operations. The focus on reducing waste sent to landfill and resource recovery means that the problem of waste plastics can be reduced through technology. Further, a more sustainable alternative is provided to consumers in replacement of less ethically sourced products, such as mined virgin crude oil.</p> <p>An essential focus is ethical business conduct, supported by ethical supply of plastic products. In the spread of this technology, the supply chain for the materials produced will shorten, thus preventing reliance on other less sustainable businesses. A focus for the business is to supply to local industry, to support the development of communities around a more sustainable use of resources.</p> <p>In integrating with local communities, the company will lessen the chance of corruption or immoral actions by shortening the supply chain. As a company, having strong ties to the local area allows for greater integrity in actions, and allows Aww Manan Ltd to be closely tied into community development.</p> <p>8.2. Corporate Social Responsibility</p> <p>Corporate social responsibility is the duty of a company to be socially accountable. This is strongly motivated by ethics and generally concerns the company's relationship internally, to its stakeholders and to the public.</p>	<p>Aww Manan Ltd accepts several responsibilities that allow the company to focus on the goals of social and environmental benefit. The basis for these responsibilities is outlined in the company's ethics. In creating both internal and external policies and actions, the company can ensure that these values are being met.</p> <p>8.2.1. External Policies and Actions</p> <p>Aww Manan must interact with several stakeholders to operate. This includes government bodies, external companies, and individual stakeholders such as consumers. All interactions must be conducted with care to build good relationships that provide benefit both to the business and to its partners.</p> <p>External actions have a great impact on the social communities Aww Manan aims to generate. A major company value is a good business conduct, which can be achieved through proper communication integration. In interacting with external groups, it is important for Aww Manan to take care in ensuring that a priority group is the local area. This can involve adequate actions surrounding business management. The disturbance to local community and environment should be minimal – ensuring that any feedstock and by-products are carefully handled in transportation to prevent pollution, creating connections with local businesses to support their waste management and adhering to any regulations affecting delivery of oil and gas.</p> <p>In terms of environmental action, Aww Manan expects to conduct business with due diligence towards waste collection. As an aim for the company is to integrate within the local community, this goal can be reached through building relationships with local businesses and councils. In this, waste can be sourced locally – waste collections from the council, for example, can be recovered after initial recycling in partnership with local waste recovery systems. Further, businesses that operate nearby can recycle raw mixed waste generated in the area. An example of this are businesses who solely produce plastic waste or have easily separated plastic waste that does not require prior sorting. Hence, Aww Manan is positively impacting environmental causes through the external connections it builds with other businesses and groups.</p> <p>8.2.2. Internal Policies and Actions</p> <p>The internal management of people and resources is critical in Aww Manan's ethical responsibilities. In ensuring operations run smoothly, the company is then able to function with integrity and motivation in the production of sustainable products.</p> <p>The strong corporate governance outlined underneath the workforce structure is imperative in managing the social aspect of good business conduct. In this, there are several policies which outline internal actions and the corporate hierarchy under which every employee can act. Most importantly, policies addressing equal opportunities, employee wellness and employee benefits are emphasised. All policies are contained in Appendix G for the policy's description, addressable items, and actionables. Having a robust set of policies to govern internal actions means that</p>
<p>MDMAN3000 F13-SG Group 2</p> <p>Page 21 of 25</p> <p>AWW MANAN</p> <p>every employee can act with integrity and knowledge of their rights and responsibilities. Further, the policies indicate a dedication from Aww Manan to hire locally and from a diverse range of backgrounds; in this, Aww Manan Ltd can provide opportunities for people to local areas to work with the company in improving the community. Hiring locally also means that Aww Manan Ltd can maintain trust with its workers and provide specialised support with specific knowledge of the needs of the region.</p> <p>Internal operations are also focused on the chemical recycling of end-of-life plastics. In focusing business operations on the goal to reduce these resources, Aww Manan Ltd is focused on creating environmental change from the ground up. Environmental causes are built into the foundation of the business, thus creating a culture of excellence within waste management. In doing so, the company is setting a standard within environmentally friendly production of secondary oil. Further, Aww Manan Ltd is focused on oil seeps of the company to extend this idea. Examination of renewable energy, for example, shows a strong internal commitment to environmental causes.</p> <p>9. Conclusion</p> <p>Aww Manan Ltd is Australia's ethical solution to completing the circular economy, capitalising on the opportunity that key stakeholders such as the Australian government, MAFRA, and Shell provide through mutually beneficial relationships. The Australian government has implemented the waste levy and waste export has increased recycling initiatives, Australia's performance, and protection of the environment.</p> <p>Aww Manan acts as a CHP plant, which is a sustainable energy source for heating domestic homes. The company is focused on creating a sustainable energy source for the future. The company will add to Australia's reference for processing raw plastic, petrochemical products, and fuels, in conjunction with improved costs. It gives the local area opportunities to become a leader in producing the waste products. The CHP plant will take the waste products from the local area, process them further, which is a positive for the environment and it will reduce oil imports. Renewable energy, oil, and ethanol will assist the transition of the planet. The actions are planned to be developed. Environmental factors will be tested and presented to assist the environmental process, which occurs in 10 minutes. Once the actions have been developed, it is crucial for the local area to receive the energy and products that are required to support the local area. This will result in the production of energy and products that are required to support the local area. 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In each of these departments, the workforce structure was defined, identifying the responsibilities to allow the business to operate efficiently and in compliance with corporate governance policies.</p> <p>The budget discussion forecasted the next seven years to determine the commercial viability of the business with an expected start-up cost of \$12.5 million, yearly fixed costs of \$2.2 million, yearly variable costs of \$180.7 million, breakeven point in the third year, and IRR of 20.38%. Aww Manan's revenue comes from the selling of crude oil for \$45 per barrel and accepting waste plastic for \$37 per tonne.</p> <p>Regulations concerning the operations of the business were outlined and categorised as environmental, economic, and social. The ethical framework based upon the triple bottom line was defined, and the corporate social responsibilities taken by Aww Manan were explained.</p> <p>In achieving the above milestones, Aww Manan seeks to disrupt the local resource recovery industry and become a leader in the coming circular economy.</p>	<p>MDMAN3000 F13-SG Group 2</p> <p>Page 23 of 25</p> <p>AWW MANAN</p> <p>10. References</p> <p>[1] K. O'Farrell, "2017-18 Australian Plastics Recycling Survey," 2019.</p> <p>[2] M. Ranche, "China's National Sword is cutting deep in the recycling sector," InsideClimate, p. 17, February 2018.</p> <p>[3] J. Pocka, P. Randell, J. Trish and B. Grant, "National Waste Report 2018," 2018.</p> <p>[4] Australian Government, "National Waste Policy," 2018.</p> <p>[5] Environment Victoria, "The problem with landfill," Environment Victoria, 14 June 2013 [Online]. Available: http://environment.victoria.org.au/resource/problem-with-landfill [Accessed 5 August 2020].</p> <p>[6] P. White-Wilson, J. Domian, L. Reynolds, A. Chisholm, K. Keelely and A. Uaghart, "Environment and Communications Reference Committee," Commonwealth of Australia, Canberra, 2018.</p> <p>[7] Council of Australian Governments, "Phasing out exports of waste plastic, paper, glass and tyres," 2020.</p> <p>[8] Parliament of Victoria, "The Circular Economy - An Explainer," 2020.</p> <p>[9] Australian Government, "Department of Industry, Science, Energy and Resources," Australian Petroleum Statistics," 2020.</p> <p>[10] BBC News, "Is Australia running out of oil? PM orders supply review," BBC News, 7 May 2018 [Online]. Available: http://www.bbc.com/news/business-44021792 [Accessed 6 August 2020].</p> <p>[11] Index Mundis, "Crude Oil (petroleum) - Australia Dollar per Barrel," Index Mundis, 2020. [Online]. Available: http://www.indexmundi.com/commodities/commodity-crude-oil.html#crudeoil60&chart [Accessed 6 August 2020].</p> <p>[12] K. Amadeo, "Crude Oil: Price, Types, Uses, and Impact," The Balance, 3 May 2020. [Online]. Available: http://www.dubashun.com/crude-oil-prices-trends-and-impact-on-the-economy-and-you-3395738 [Accessed 6 August 2020].</p>
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It gives the local area opportunities to become a leader in producing the waste products. The CHP plant will take the waste products from the local area, process them further, which is a positive for the environment and it will reduce oil imports. Renewable energy, oil, and ethanol will assist the transition of the planet. The actions are planned to be developed. Environmental factors will be tested and presented to assist the environmental process, which occurs in 10 minutes. Once the actions have been developed, it is crucial for the local area to receive the energy and products that are required to support the local area. This will result in the production of energy and products that are required to support the local area. This will result in the production of energy and products that are required to support the local area.</p> <p>Aww Manan's business model was discussed in terms of its organisation, budget, regulations, and ethics. The organisation of Aww Manan is broken into six departments, responsible for the technical details and operation of the plant. Finance is responsible for obtaining funding and managing income, legal ensures the operation in terms of legality, human resources manage the workforce, internal, market & communications</p>	<p>MDMAN3000 F13-SG Group 3</p> <p>Page 25 of 25</p> <p>AWW MANAN</p> <p>handles public communications, and business development maintains partnerships and business opportunities. In each of these departments, the workforce structure was defined, identifying the responsibilities to allow the business to operate efficiently and in compliance with corporate governance policies.</p> <p>The budget discussion forecasted the next seven years to determine the commercial viability of the business with an expected start-up cost of \$12.5 million, yearly fixed costs of \$2.2 million, yearly variable costs of \$180.7 million, breakeven point in the third year, and IRR of 20.38%. Aww Manan's revenue comes from the selling of crude oil for \$45 per barrel and accepting waste plastic for \$37 per tonne.</p> <p>Regulations concerning the operations of the business were outlined and categorised as environmental, economic, and social. The ethical framework based upon the triple bottom line was defined, and the corporate social responsibilities taken by Aww Manan were explained.</p> <p>In achieving the above milestones, Aww Manan seeks to disrupt the local resource recovery industry and become a leader in the coming circular economy.</p>	<p>MDMAN3000 F13-SG Group 3</p> <p>Page 26 of 25</p> <p>AWW MANAN</p> <p>10. References</p> <p>[1] K. O'Farrell, "2017-18 Australian Plastics Recycling Survey," 2019.</p> <p>[2] M. Ranche, "China's National Sword is cutting deep in the recycling sector," InsideClimate, p. 17, February 2018.</p> <p>[3] J. Pocka, P. Randell, J. Trish and B. Grant, "National Waste Report 2018," 2018.</p> <p>[4] Australian Government, "National Waste Policy," 2018.</p> <p>[5] Environment Victoria, "The problem with landfill," Environment Victoria, 14 June 2013 [Online]. Available: http://environment.victoria.org.au/resource/problem-with-landfill [Accessed 5 August 2020].</p> <p>[6] P. White-Wilson, J. Domian, L. Reynolds, A. Chisholm, K. Keelely and A. Uaghart, "Environment and Communications Reference Committee," Commonwealth of Australia, Canberra, 2018.</p> <p>[7] Council of Australian Governments, "Phasing out exports of waste plastic, paper, glass and tyres," 2020.</p> <p>[8] Parliament of Victoria, "The Circular Economy - An Explainer," 2020.</p> <p>[9] Australian Government, "Department of Industry, Science, Energy and Resources," Australian Petroleum Statistics," 2020.</p> <p>[10] BBC News, "Is Australia running out of oil? PM orders supply review," BBC News, 7 May 2018 [Online]. Available: http://www.bbc.com/news/business-44021792 [Accessed 6 August 2020].</p> <p>[11] Index Mundis, "Crude Oil (petroleum) - Australia Dollar per Barrel," Index Mundis, 2020. [Online]. Available: http://www.indexmundi.com/commodities/commodity-crude-oil.html#crudeoil60&chart [Accessed 6 August 2020].</p> <p>[12] K. Amadeo, "Crude Oil: Price, Types, Uses, and Impact," The Balance, 3 May 2020. [Online]. Available: http://www.dubashun.com/crude-oil-prices-trends-and-impact-on-the-economy-and-you-3395738 [Accessed 6 August 2020].</p>

Figure 26: Ethics. Conclusion Report Work

Appendix work in Figures 27 and 28

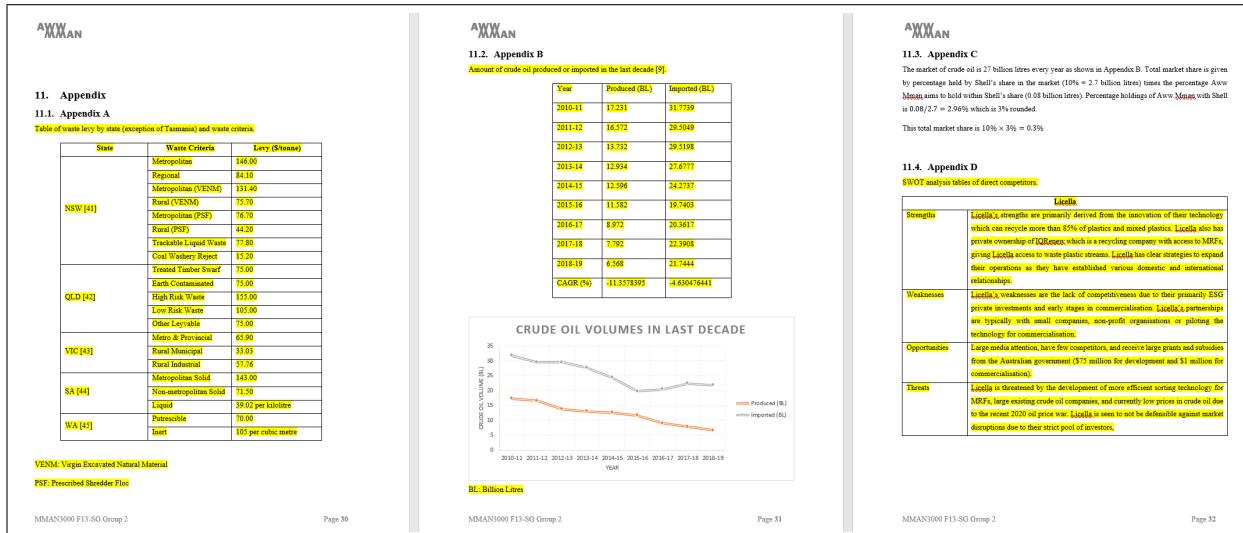


Figure 27: Appendix A, B, C Work

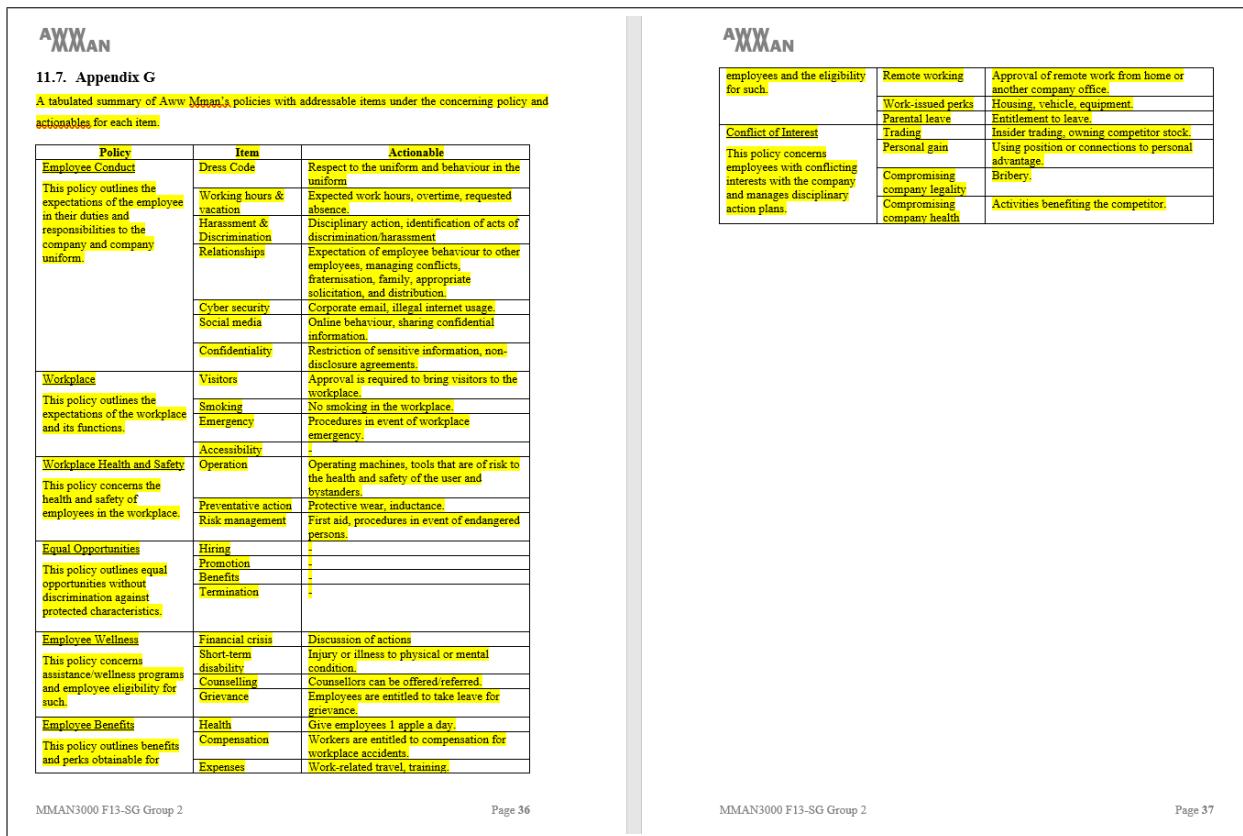


Figure 28: Appendix G Work

Appendix M Marking Criteria

Marking criteria used for self-evaluation and group evaluation (Table 4). Each grade is worth one mark starting from zero, where grades are accumulated to give the total mark specified in the criterion.

Table 4: Marking Criteria

Criterion	Grade					
	0 mark	1 mark	2 marks	3 marks	4 marks	5 marks
Amount of Contribution (5 marks)	No effort.	Minimal effort.	Did not take up many tasks or completed few tasks.	Completed most tasks.	Completed all tasks.	Excellent initiative and completed all tasks.
Quality of Contribution (5 marks)	No effort.	Poor quality with no attention to detail.	Fair quality with some attention to detail.	Good quality with few mistakes.	Very good quality with few minor mistakes.	Excellent quality and attention to detail.
Chair Responsibility (3 marks)	Did not take responsibility.	Did not organise agendas and tried to take charge of meetings.	Organised agendas and tried to take charge of meetings.	Organised high-quality agendas and took charge of meetings.	-	-
Scribe Responsibility (2 marks)	Did not take responsibility.	Took poor-quality minutes.	Took high-quality minutes.	-	-	-
Morale (2 marks)	No enthusiasm or negative impressions.	Moderate enthusiasm.	High enthusiasm and encouragement.	-	-	-
Discussion (3 marks)	No effort or discouraged discussion.	Present but did not contribute to discussions.	Moderately participated to discussions	Actively participated to discussions. and opened dialogue.	-	-