

HIGH PERFORMANCE PYROLYSIS REACTOR FOR RESOURCE RECOVERY FROM COMINGLED MUNICIPAL WASTE

Dennis Orford (QUT Research Student)

Centre for Tropical Crops and Biocommodities

Principal Supervisor: Prof. William Doherty

Assistant Supervisor: Prof. Kameron Dunn

PRESENTATION OUTLINE



**Acknowledgement
to Country**



**Our current waste
management
situation**



**A Brave New Plan
for clean and
effective Waste
Management**



**The current project
position**

The Queensland University of Technology (QUT) acknowledges the Turrbal and Yugara, as the First Nations owners of the lands where QUT now stands. We pay respect to their Elders, lores, customs and creation spirits. We recognise that these lands have always been places of teaching, research and learning.



OUR CURRENT WASTE MANAGEMENT SITUATION



OBSERVATIONS FROM CRAIG'S VIDEO

- Australia's strategy of Reduce-Reuse-Recycle has been operating for 50 years but we are losing the "War on Waste".
- Supermarkets and politicians seem reluctant to own this problem or to change the status quo.
- Craig admonishes people to sort through their garbage and do better at Reducing-Reusing-Recycling.
- Craig's confrontational approach does not win him any friends in the government or big business and ultimately does not achieve any substantial improvement.
- It's madness to keep doing the same things and expecting a different result.
- The road to destruction is pathed with good intentions.



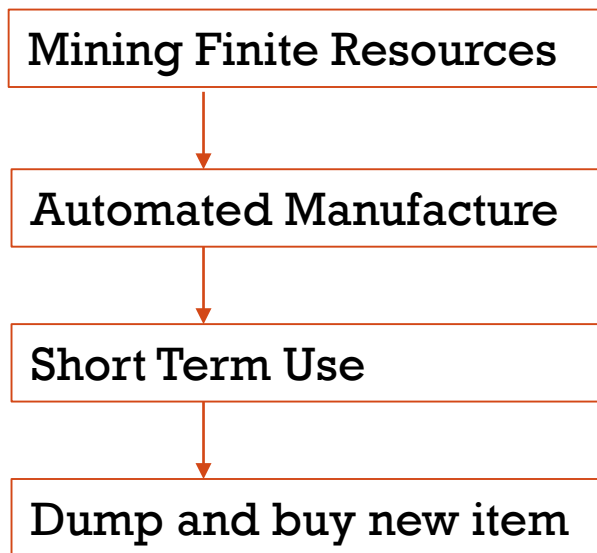
FACING FACTS

- Australia has a highly urbanized population with more than 90% of people living in urban environments.
- Urban populations generate lots of “Non-Recyclable” waste.
- Urban dwellers have very little opportunity or choice to Reduce-Reuse-Recycle.
- Australia uses a linear economy which relentlessly generates waste and consumes natural resources.
- Australia’s urban waste problem is rapidly getting worse and action is urgently required to save our country.
- Politicians, lawyers, economists and comedians do not have answers to this challenge.
- Legal and educational approaches waste management are weak and insufficient to resist dominant economic pressure.

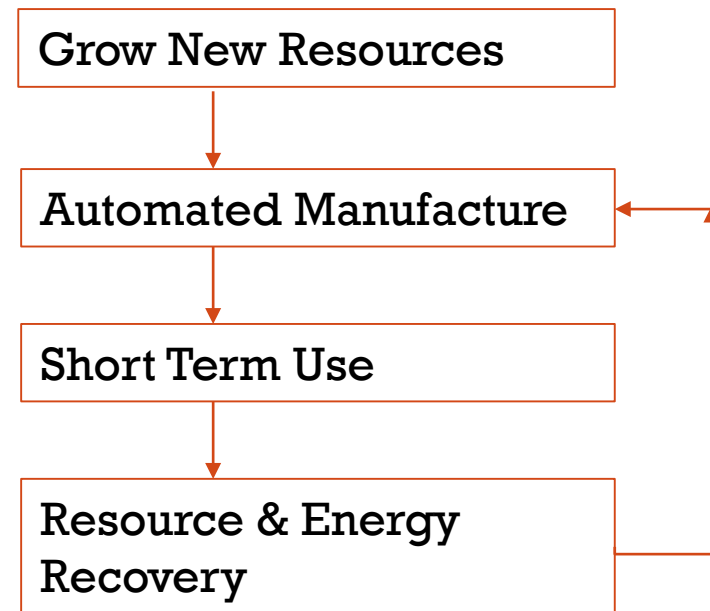


LINEAR AND CIRCULAR ECONOMIES

Linear Model



Circular Model



A BRAVE NEW PLAN

Enclosed pyrolysis waste management technology has the potential to totally replace landfill dumping and support industrial scale bio-energy production.



Reduce the environmental impact of urban populations by:

Eliminating pollution from untreated and fugitive urban waste.

Recovering re-usable resources to reduce the demand on virgin natural resources.

Providing sustainable bio-energy supplies to reduce the demand for fossil fuel electricity.





**Environmentally
Responsible
Science and
Technology**

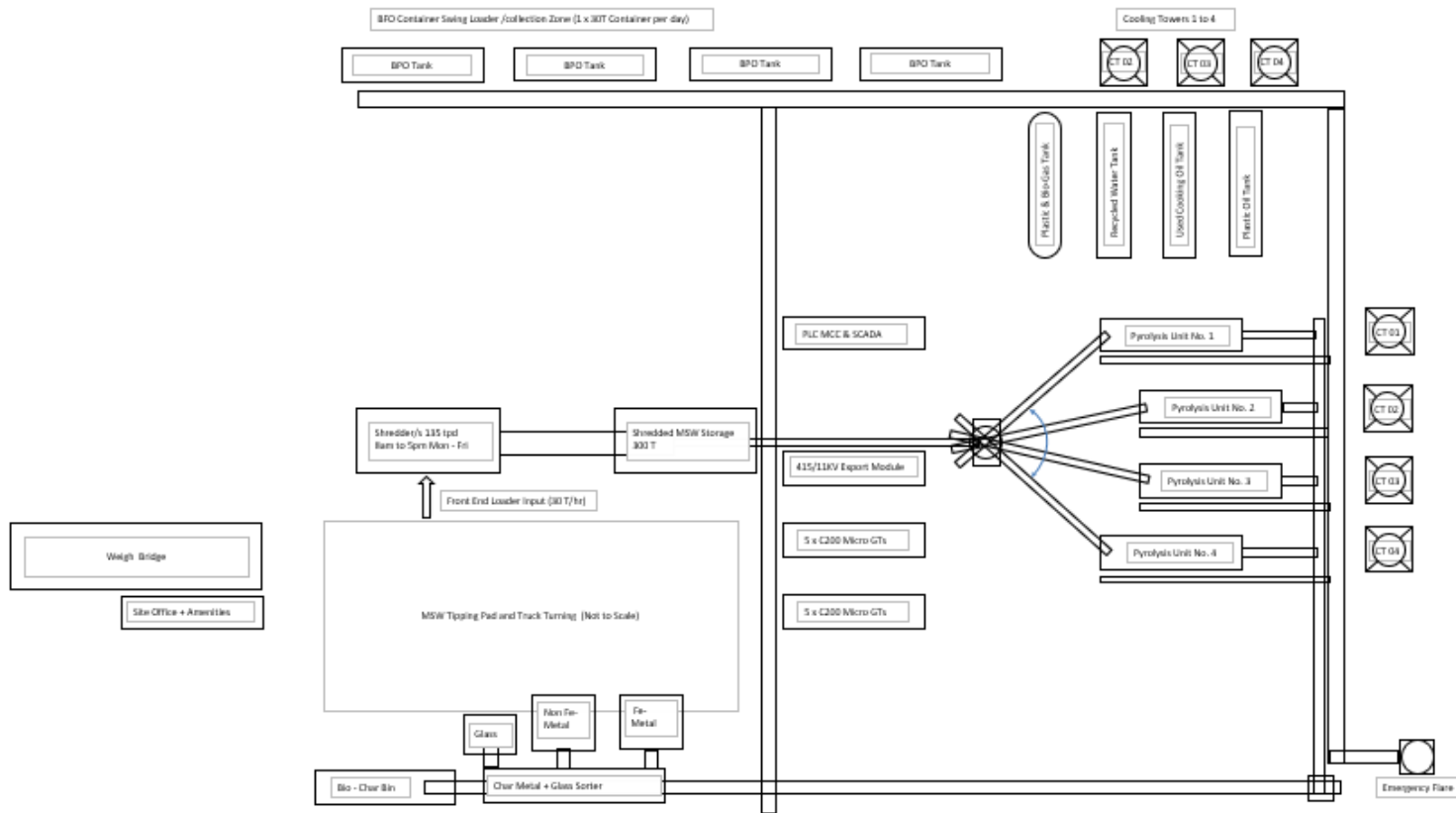
**Solid and Realistic
Economics to
Support
Commercial
Investment**

ROLL OUT OF THE NEW TECHNOLOGY

- A new waste management company will be established to design own and operate the new thermal waste treatment plants.
- New waste treatment equipment will not be sold but kept as a trade secret to generate jobs for Australians all over the world.
- Thermal Waste Treatment Plants will be:
 - Prefabricated and precommissioned as “plug and play” portable contained process modules.
 - Deployed to existing landfill sites to process incoming waste and then start emptying the landfill to decontaminate and rehabilitate existing and historical landfill sites.



Concept Layout for Thermal Waste Treatment Plant



ENVIRONMENTALLY RESPONSIBLE SCIENCE & TECHNOLOGY

- Most items of plant are “Off the Shelf” proprietary items
- No suitable enclosed pyrolysis equipment available so had to invent a custom made enclosed pyrolysiser.
- Revolutionary enclosed pyrolysis uses 100% Australian ideas to deliver high grade environmental performance as well as being fast, simple, cheap and tough.
- Modular plant design to cater for a small town to a mega city.
- Waste processed locally to avoid excessive trucking around.

SOLID REALISTIC ECONOMICS

- Roll out of the new waste management technology requires large scale commercial investment.
- Unless the science, engineering and economics are rock solid, funding will not be forthcoming.
- Must be able to consistently and continually deliver on promises.



- Extensive literature review completed
- Comprehensive review of available technology completed
- Worldwide review of commercial performance of pyrolysis plants completed.
- Laboratory scale testing to verify scientific basis of thermal waste treatment and the pyrolysis reactor design well under way.
- Some novel process design strategies are delivering encouraging results that are significantly better than expected.
- Several spin off technologies may come from the lab work.
- Testing of reactor's materials handling design about to commence.

WHAT TO DO IN THE MEANTIME

Be	Be personally responsible in waste management by putting rubbish in the bin and picking up litter.
Avoid	Avoid putting food scraps in the bin as these cause methane production in the landfill. Consider feeding food scraps to chickens, composting or a worm farm.
Burn	Never burn plastic rubbish. Plastic smoke and fumes are toxic.
Buy	Buy Australian made, Australian grown whenever possible.
Work and play	Live, work and play locally to reduce transport pollution.
Use	Use a cardboard box or fabric bag to carry your groceries.
Stop	Stop using drinking straws altogether.
Buy	Never buy “Bio-degradable” Plastic bags. Causes micro-plastic pollution which is very difficult to clean up.
Lobby	Lobby your local politicians to discourage landfill disposal.



SUMMARY

We need to do more to protect and preserve our land sea and air for future generations.

Existing waste management practices are not up to the task and it is time to rethink our approach.

We have a definite plan to win the “War on Waste” using Indigenous Australian technology.

Early results are encouraging and boosting confidence and expectations of a successful outcome.

It's time to demonstrate leadership as the custodians of the land, sea and sky.



REFERENCES

- Reucassel, C (2017). *"War On Waste - Series 1 Ep 1 : ABC iview"*. *iview.abc.net.au*. Retrieved 2019-06-17.

