



Plastic Repurpose

Plastic re-Purpose RMIT

A project proposal to help communities recycle plastic

www.plasticrepurpose.org

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RMIT University; College of Business

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An interplay of

RESOURCE-CONSTRAINED INNOVATION

SUSTAINABLE SOCIAL ENTREPRENEURSHIP

CORPORATE SOCIAL RESPONSIBILITY

Executive Summary

Precious Plastic (PP) is a project that was started in 2013 by social entrepreneur Dave Hakkens at the Design Academy Eindhoven in the Netherlands. His vision is to provide *“A plan that will allow people, anywhere in the world to transform plastic waste into valuable things.”* To this end Dave and his team have developed simple machines, made from second-hand and easy-to-find locally-sourced components, to recycle plastic waste. This includes a plastic shredder, extruder, injection moulder and rotation moulder, which are all based on industrial machines but modified to be less complex and more flexible. They are now providing the complete blueprint for producing these machines as open source to anybody who is keen to start his/her own little plastic recycling workshop/business.

While Dave and his team have made it very easy for some people to follow their detailed instructions to produce these machines, people who live in resource-constrained environments as typically experienced in the developing world, may not be in a position to capitalise on the opportunity in its present format. Several obstacles that include the lack of technical know-how, unavailability of components and workshop facilities, and lack of funding to purchase the required componentry all contribute to this dilemma.

This proposal broadly outlines an exciting and ambitious project, branded Plastic re-Purpose (PrP) RMIT, which builds on the initiatives of the original PP project of Dave Hakkens. PrP RMIT combines aspects of sustainable social entrepreneurship with resource-constrained innovation and corporate social responsibility. It involves RMIT student teams that will obtain corporate sponsorship to fund turnkey mini factories and training, all of which will be provided free of charge to participating necessity entrepreneurs within their local communities. RMIT mentors will be made available to guide student teams to ensure every chance of success.

This project has a low-perceived risk of failure and promises to deliver substantial benefits to all stakeholders. To mention a few: necessity entrepreneurs in the developing world stand to gain the knowledge and infrastructure to operate mini plastic recycling & manufacturing businesses that will benefit their communities; RMIT students will learn the principles of entrepreneurial and innovative behaviour first-hand in real-life situations; corporate Australia will find in it a meaningful vehicle to work with and develop the country's future leaders; RMIT will demonstrate its active contribution to support innovative solutions for a cleaner and healthier global environment.

Through the dedication of enthusiastic RMIT students and staff, in conjunction with Precious Plastic and key partners, we have the resources and capabilities to make this project a success.

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1. Introduction

In this document we provide a brief outline of a community project that we hope to implement in four phases. The project is based on the initiative of a group of social entrepreneurs who call themselves Precious Plastic (PP) at <http://preciousplastic.com/en/>. They have established the blueprint for setting up a small plastic recycling business (PRB) that is detailed in section 2 below. PP is now looking for interested parties, such as RMIT, to help them implement their project in as many places as possible. At RMIT, the four phases of the proposed project are:

Phase 1 – Proof of concept: Building and testing the machines (pilot plant) on campus

Phase 2 – Business Model Innovation: Developing a sustainable business model

Phase 3 – Pilot run: Trialling the first PRB within a developing country of choice

Phase 4 – Scaling the business: Rolling out PRBs in a number of target countries, owned and operated by local entrepreneurs

2. Background to the Precious Plastic project

The authors first became aware of the Precious Plastic project when they watched the promotional video on YouTube (<https://www.youtube.com/watch?v=8J7JZcsoHyA>). Worldwide, plastic waste poses a huge problem to the environment. Since commercial plastic recycling plants are very expensive to build and operate, PP decided to design and develop simple machines that can be built very cheaply and perform the task on a small scale. PP provide a complete blueprint and training videos, free of charge, to any entrepreneur who wants to start his/her own small PRB. As such it is the ideal opportunity for entrepreneurs, anywhere, but especially in the developing and undeveloped worlds, to start their own little eco-businesses. The benefits are 1) cleaning up the environment; 2) self-employment; 3) job creation; 4) value-add through the production of new products using self-generated raw material in the form of recycled plastic.

2.1 What PP provide

After having gone through a lengthy development and testing process, PP have succeeded in making available a set of machines that anybody with moderate technical skills can reproduce from locally-sourced materials. Their noble vision is to provide *“A plan that will allow people, anywhere in the world to transform plastic waste into valuable things.”* In summary, this is what they provide and wish to establish (sourced from their Web site):

a) **Develop machines** (see front cover image)

For the past three years Dave Hakkens and his team have been developing machines to recycle plastic waste, locally. This includes a plastic shredder, extruder, injection moulder and rotation moulder, which are all based on industrial machines but modified to be less complex and more flexible.

b) Share, for free

The machines are developed using basic tools and materials. PP share all of their blueprints as open source, online. This way, people around the world can build them.

c) Spread the know-how

In order to build these machines people need to know that the blueprints are available. PP put out the call to help them spread the know-how to every corner of the world.

d) Create

Once the machines are build people can start experimenting, creating and producing new products from their local plastic waste.

e) Clean up

The primary goal is to recycle as much plastic as we possibly can. This would clean up our shared environment, improve living conditions and possibly create financial value!

f) Community

An important aspect of the project is to create a world-wide community of like-minded plastic savers. People working for a cleaner future, sharing knowledge, helping each other, and collaborating.

2.2 The problem behind Precious Plastic's technical solution

While PP's vision and implementation blueprints, complete with online training, are noble and by itself an enormous contribution to making this world a better place, in our view there are a number of implementation obstacles:

1. To build a basic set of plastic recycling machines one requires between 3,000 and AUD5,000 – even if the raw materials are sourced second hand. Necessity entrepreneurs living in third-world countries do not have this kind of money.
2. Most necessity entrepreneurs won't possess the required technical skills to manufacture the set of basic machines, even if they were able to obtain all of the componentry.
3. Most necessity entrepreneurs won't have easy access to the type of workshop and tools where they can manufacture the set of basic machines.
4. Most necessity entrepreneurs won't be able to afford the simplest of 3D printers and scanners (and desktop computer to program these devices – valued at approximately \$4k), which will severely limit their production ability.
5. Without one-on-one, face-to-face training, many necessity entrepreneurs will find it hard to master the technical skills required to perform the recycling and operate the 3D printers and scanners, as well as the business knowledge to successfully operate a business.

3. The RMIT Solution

The RMIT team's objective is to find solutions to all five of the identified problems. In short, we intend to recruit a team of RMIT students to join this project – branded Plastic re-Purpose (PrP) RMIT - and work on it for at least one year while they are conducting their studies. Each member will have a specific role to fulfil within the not-for-profit startup, which will ideally be housed within RMIT's student Activator. Each year new members will join the team while some existing members may move on after graduation, so there will always be a succession of people in key roles for as long as the project exists. The project will always rely on sponsorship from RMIT and external bodies or individuals, including government and industry grants, to remain sustainable.

A brief description of the four phases of implementation follows:

3.1 Phase 1 – Proof of concept

PP's blueprints are accurate and their machines work unquestionably, but still the project team at RMIT must go through the complete process of building their own machines to ensure complete understanding of what's required to set up the technical infrastructure. They need to verify the training materials and gain experience in working with different kinds of plastics. They need to demonstrate the ability to produce new products from the raw materials that they produced themselves.

Funding for this phase may accrue from a number of sources. RMIT might provide seed funding of approximately \$10,000 just to get the project off the ground, while the team of students may complement this with grant or sponsorship funding that they will apply for.

The main outcome of Phase 1 is a fully functional mini factory – a so-called Pilot Plant - consisting of a basic set of plastic recycling machines, together with a 3D printer and scanner for producing new plastic products. A secondary outcome includes detailed documentation of Phase 1.

3.2 Phase 2 – Business Model Innovation

Phase 2 could possibly be carried out concurrently with Phase 1. Students will work closely with a team of mentors within and outside of RMIT to develop a detailed business model for their non-profit startup. Some student teams in the course Global Entrepreneurship will work towards this objective as part of their coursework during the 2nd semester of 2017. During this process they shall draw on the principles of the Lean Startup methodology to validate the main assumptions. The baseline business model is described next, but students will only use it as a starting point for further refinement through iteration, trial and error.

- **Value proposition:** Students will provide turn-key operations to necessity entrepreneurs in third-world countries, free of charge, but obtaining some form of buy-in. This will be possible because of donations received from Australian firms. In addition they will provide sufficient technical and business training to ensure entrepreneurs have the necessary skills and knowledge to run their businesses by themselves.
- **Customer segments:** Students will identify and justify which countries and communities they would like to help through this project. Very specifically, they will identify who the first beneficiary will be where the pilot project will be carried out.

- **Revenue streams:** This project will rely entirely on funding through grants (Phases 1 to 3) and sponsorships (Phase 4). Students will be responsible for identifying and applying for such sources of funding. Once the pilot is completed, it is foreseen that private companies would sponsor or co-sponsor the roll-out of one PRB in a country of their choice, perhaps through the contribution of \$10k or less. Students may be able to generate revenue through selling their own designed products on campus, using the Pilot Plant on campus.
- **Key activities:** Proof of concept; Development and validation of business model; Development of technical and business training modules; Fundraising; Finding suitable hardware producers in target counties; Establishing turn-key operations including training of necessity entrepreneurs; Providing on-going online support.
- **Key partners:** Precious Plastic; RMIT; Victoria State Government; Australian firms (sponsors); Local government in target countries; Industry groups in Australia and target countries.
- **Key resources:** The project team needs a dedicated working space at RMIT – hopefully within the Activator; They need approximately \$10k to get started; They need access to mentors from different areas including business, education and engineering; Ideally participating students will get permission to link project tasks to summative assessment items of their RMIT courses.
- **Cost structure, Customer relationships and Channels:** To be completed by first student team.

3.3 Phase 3 – Pilot Project

The student team will have all the machine hardware manufactured at suppliers in close proximity to the first target community or entrepreneur, somewhere in a third-world country. This is done in line with the principle of achieving local sustainability, to avoid international shipping costs; to support local business; to establish a local supply chain and local after-sales support. Once the machines are ready the student team will travel to the country and deploy the mini factory, including the setup of a 3D printer, scanner and computer. The student team will provide initial technical training in the use of the equipment and deliver a few basic business training modules on how to operate a sustainable PRB. They will document the entire process and find ways to overcome encountered problems.

3.4 Phase 4 – Scaling the Business

PrP RMIT teams will learn from the pilot project how to improve their business models, and be ready to deliver more turnkey mini factories in the same area as the pilot, or elsewhere in the world. Depending on how successful it is, more project teams can be established to repeat the business model and scale the business.

4. Governance

One of the main objectives of this project is to provide students with the opportunity of real-life learning in as many ways as possible, including experience in launching and running a startup venture. Students should therefore run this startup and be responsible for its governance, under guidance of an RMIT project manager. Typical roles will be established such as CEO and managers in charge of strategy, finance, operations, fundraising, training, engineering, product development,

marketing and HR. The startup will be supported by an advisory board and will have access to high-quality mentors from a variety of disciplines inside of and external to RMIT.

To date our team consists of three academics from the School of Management, seven students from the College of Business, and at least five Business Model teams (of four members each) from the course Global Entrepreneurship. We are in the process of recruiting students from other RMIT colleges.

5. Project Outcomes and Benefits

If this project is successful, it could have a life cycle of between five to ten years. During this period of time one can expect to see the following outcomes and benefits (in no particular sequence):

- Several qualitative research papers by participating academics (this project fits in nicely under the Resource-constrained Innovation research project within the newly established Enabling Capability Platform (ECP) for Global Business Innovation (GBI) ;
- An excellent vehicle for delivering experiential learning, real-life training and collaboration opportunities for students from a variety of study disciplines (in line with RMIT's Strategic Plan 2016);
- Increased industry engagement (in line with the College of Business Strategic Plan);
- Greater collaboration among RMIT staff from different discipline areas;
- A great opportunity for Australian firms to sponsor third-world community projects (exercising corporate social responsibility);
- A small but meaningful contribution to the economic betterment of third-world societies;
- A small but meaningful impact on the environment because of a reduction in plastic pollution;
- Overseas work experience for participating students;
- A great promotional tool for RMIT's entrepreneurship program.

6. Key Success Factors

- A project champion or champions (RMIT staff members).
- Enthusiastic and dedicated RMIT support staff (providing great mentorship).
- Effective networking and contacts with key players in target countries.
- Initial seed funding from RMIT.
- RMIT management support.
- The ability to link project activities to course learning outcomes.
- The ability to attract external project funding.

7. Risk Assessment

The overall perceived risk of this project is low. Technical feasibility has already been established by PP. In the worst case the pilot project might reveal too many insurmountable problems and Phase 4 might be cancelled, but even so, it will still serve as a valuable learning experience.

8. Conclusion

This proposal broadly outlines an exciting and ambitious project that combines aspects of sustainable social entrepreneurship with resource-constrained innovation and corporate social responsibility. The baseline business model shows how the problems identified in section 2.2 could potentially be overcome. If we can pull it off successfully future students will compete for a place to participate in the project. Participation will give them invaluable discipline-specific, as well as life, experience. It will prepare them well for life after study. In a small way we can make a huge impact on the lives of many necessity entrepreneurs and participating students. The next step is to obtain formal approval for this project and to resource it accordingly.