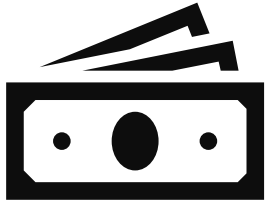


# An Introduction to Solu

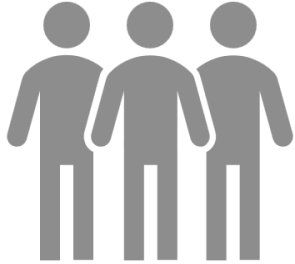
Harnessing technology to improve MSW management in developing nations.

August 2018

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A fairer price at a grassroots level.



Solu connects all actors.



Solu reduces street waste and ocean plastics.



Improved feedstock for treatment facilities.

So, what's the problem  
with waste?

**Let's take a look...**







Asia will generate 50% of **global solid waste** by 2030 and lower income cities will **double** their solid waste generation within 15–20 years.

**Asian Development Bank (2017)**







The cost of inaction to society far exceeds the cost of proper waste management by a factor of **up to 10**.

The potential impact of improved waste management is **15–20%** across the economy.

**Asian Development Bank (2017)**







Approximately **81%** of the **daily 6,500,000kg** of Filipino plastic waste is being mismanaged and ends up in the ocean.

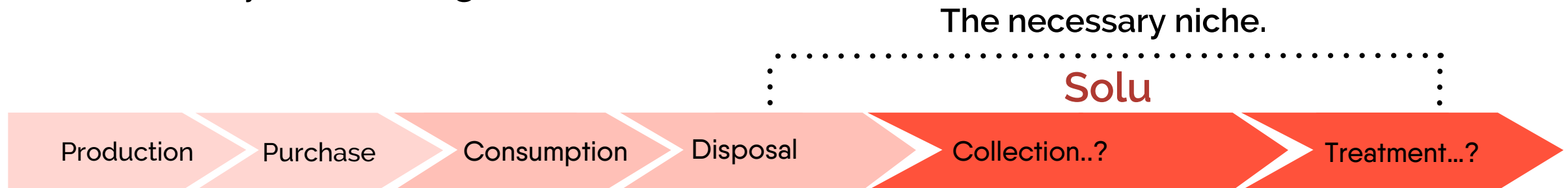
**Ocean Conservancy (2016)**



# The current system is broken...

*"Door to door collection doesn't work in developing nations"*

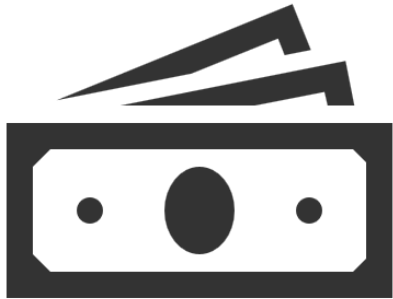
- Expensive... yet ineffective
- Collection rates hover at ~70%
- Unreliable collection schedule
- Segregation? A waste of time as everything's taken to landfill
- Society and local government both suffer



The miserable life-cycle of waste.



**Solution:** a connected platform that enables citizens to sell their segregated materials.



**Make Money**  
from your  
waste



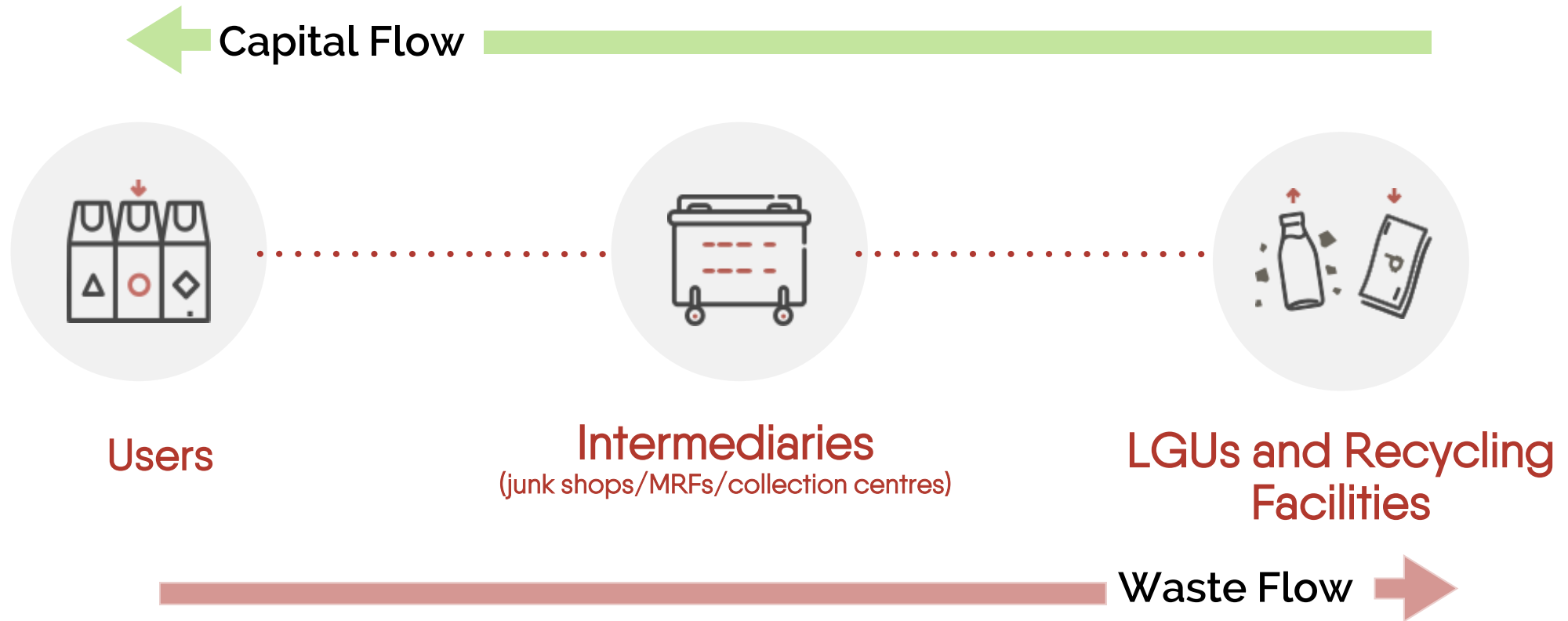
**Help the Environment**  
through sustainable  
disposal



**Quick and Easy**  
four taps and ten  
minutes



# How Solu Works



**Solu** streamlines the process to provide significantly more value to users and intermediaries.



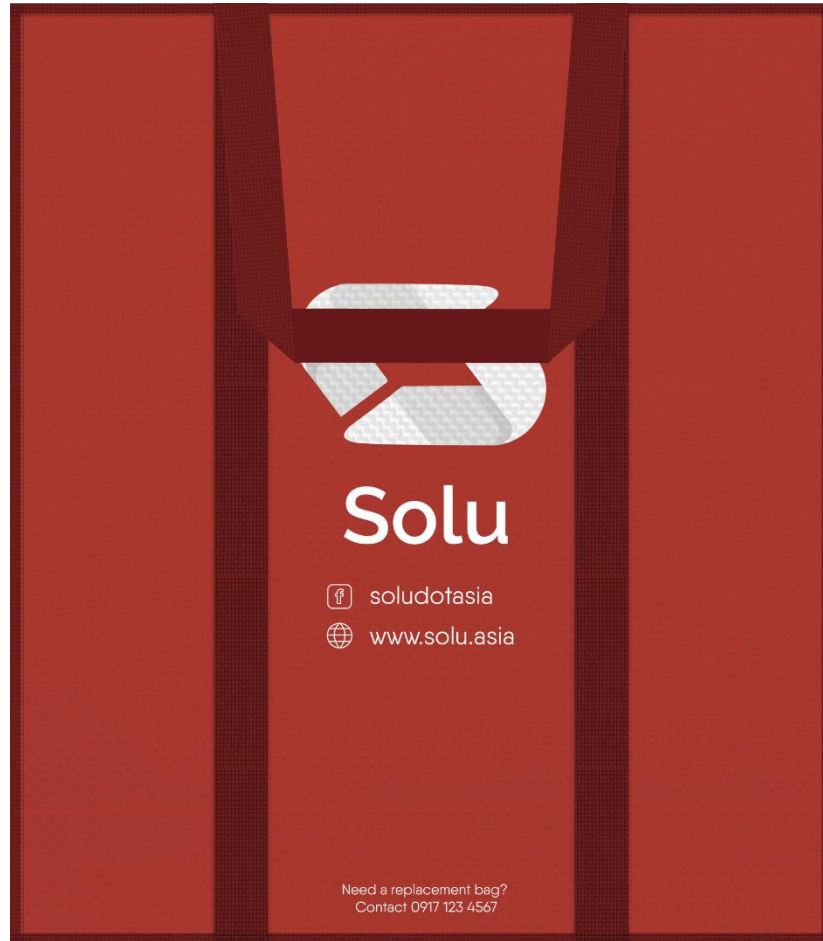
# Product

let me give you a demo

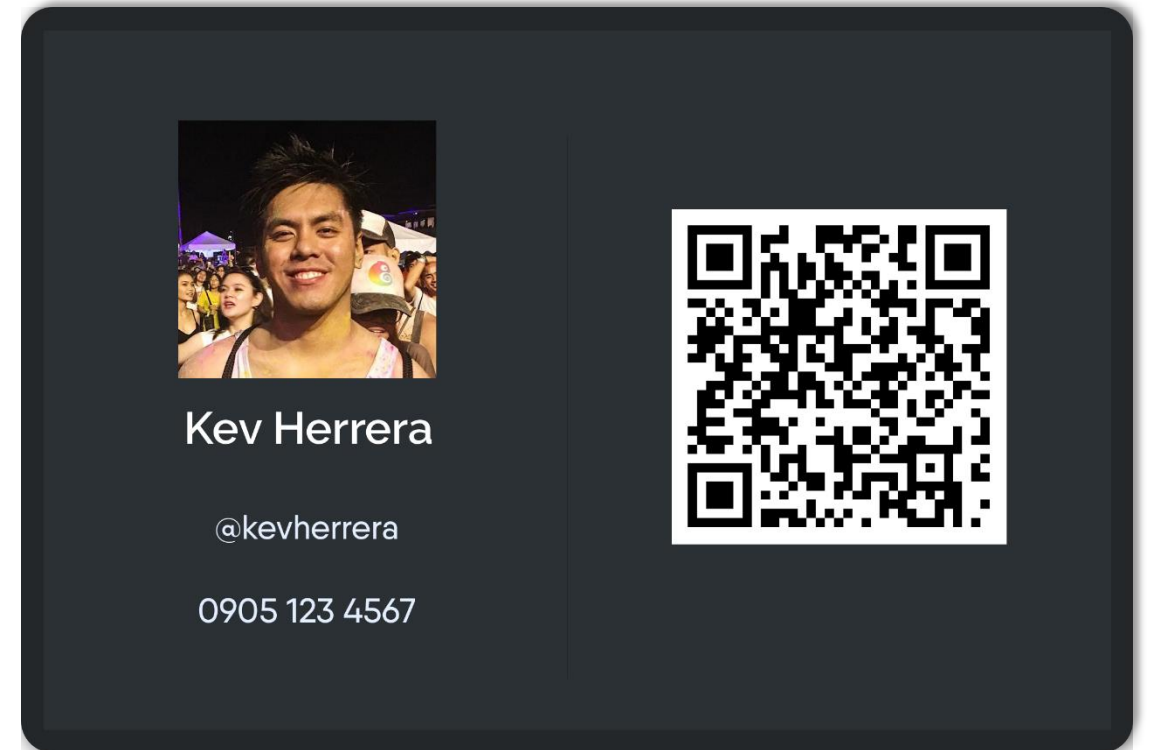




# the Solu bag



the Solu card (for users without mobile connectivity)





# Solu's Technology

the underlying magic



## Automation

- Automated peer-to-peer, Solu priced, digital payments.
- Continuous integration for rapid product iteration.
- Smart utilization of transaction data to automate auction commencement.



## Optimization

- Solu connects all actors in the ecosystem to derive greater value of materials at grass-roots level.
- Auction model for sale of materials to capitalize on real-time supply & demand functions.
- Haulage route optimization with partner (Routific or Flightmap).



## Big Data & Machine Learning

- Genetic pricing algorithm that evolves over time and integrates new variables to reflect 'real' material value.
- Predictive analytics to improve algorithms & processes and reduce human assumption bias.

# Nice idea right... **Does it work?**

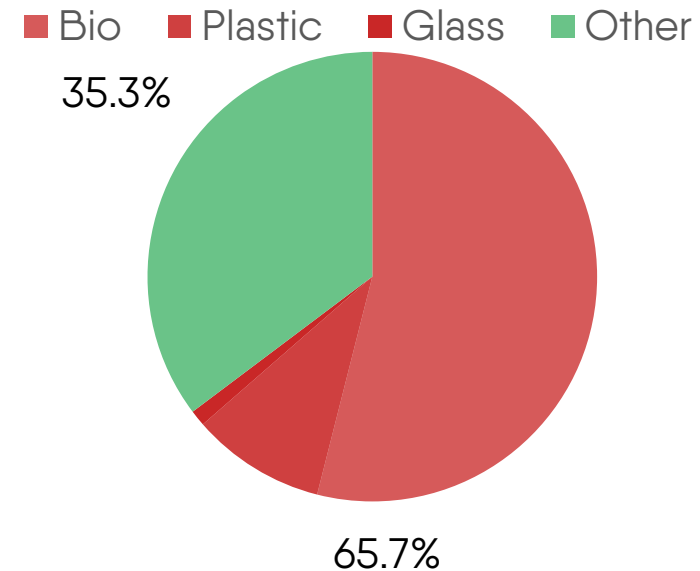
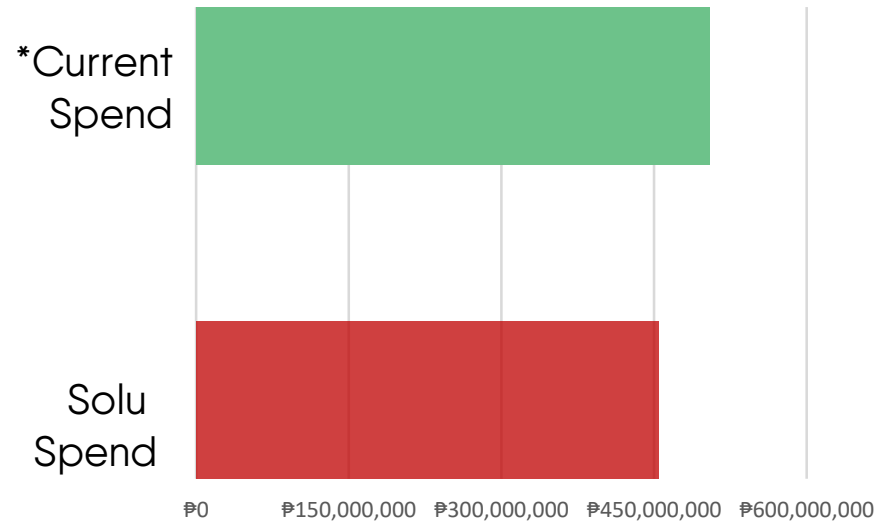


## Case Study: **Quezon City**

- 2.9m population
- 42% waste diversion rate
- Approx. spend P850m (up to – P1.7bn)

## Solu delivers

- 90%+ diversion rate from current ~45%.
- Solu. spend ~P455m on 65.7% of total waste
- Reduced staff costs, haulage costs, tipping fees
- Accurate data for better budgeting and forecasting.
- Burden transferred to Solu and citizens.



**Solu could save **Quezon City****  
**₱50.2 million a year**  
**a 9.94% SAVING**

*\* Data from Quezon City 2013*



# Traction



Four incubators → AIM-Dado Banatao, makesense. Idea2Scale and KMC x Impact Hub's 'Space for the Ingenious'.

Two competitions won with ~\$10,000 in winnings.

September launch.



**Eco Waste Coalition** **make\_sense**

# Team

A young, driven and intelligent team focused on creating the best product possible to maximise our social impact.

We've fostered a culture of rapid iteration, integrity, adaptability and self-improvement and we'll keep this at our core as we grow.

...and we're currently building an advisory team.



**Matthew Barrie**  
**CEO & Founder**

British born, worked in three continents by 23. Holds a BA(Hons) in Politics, Philosophy & Economics.



**Arbie Pagdanganan**  
**Design Lead & Co-Founder**

Filipina, 8+ years in User Interface and Experience Design. Holds a BFA in Advertising.



**Dorothy Moreno**  
Customer Acquisition Lead



**Rene Calunsag**  
Cloud Developer



**Angelo Lesano**  
iOS Developer



**Jeico Malabanan**  
Android Developer



**Rose Manago**  
Front-End Developer



# How can the ADB get involved?


## Collaboration


Data share & Project participation


## Financing


Fundraising ongoing...

# Get in Touch

 soludotasia


 soludotasia

 solu.asia

 solu.asia

 matt@solu.asia

 COMING SOON TO  
Google play

 Coming Soon  
App Store

[www.solu.asia](http://www.solu.asia)



# Waste is a growing issue in developing nations

Ocean plastics are a **more immediate threat** to the global ecosystem than global warming.

*World Bank (2018)*

Asia will generate 50% of **global solid waste** by 2030 and lower income cities will **double** their solid waste generation within 15-20 years.

*Asian Development Bank (2017)*

Approximately **81%** of the **daily 6,500,000kg** of Filipino plastic waste is being mismanaged and ends up into the ocean.

*Ocean Conservancy (2016)*

The cost of inaction to society far exceeds the cost of proper waste management by a factor of **up to 10**. The potential impact of improved waste management is **15-20%** across the economy.

*Asian Development Bank (2017)*

Methane has **25x the global warming potential** of CO<sub>2</sub>. Open dumping and landfill are the **3rd largest** source of CH<sub>4</sub> emissions (18%).

*Asian Development Bank (2017)*

It's clear that help is needed...  
and that's where **Solu** comes to play.



# Market Adoption

## B2G

target municipalities aggressively (pop)

- Quezon City (2.9m)
- Valenzuela (650k)
- Malabon (365k)
- Cainta (322k)
- Las Piñas (589k)

## CAMPAIGN

led by Dorothy Moreno

- w/ FMCGs
- Community building
- Dual referral
- Utilize digital
- Guerrilla stunts

## PARTNERSHIPS

many Solu supporters out there

- NGOs
- Senators
- Brand ambassadors
- 'Cash out' facilities
- Route optimization

# Business Model

we take between 3-6% of each transaction.  
(compounded to 5.6-11% per unit of material)

\$23.7

million

**Waste sold w/Solu**

10% of Metro Manila  
market p.a.

₱35

average fee

**Per bag of material**

based on initial  
assumptions

\$12.5

million

**Revenue**

projected by Q2 2020

+ Freemium model for the private sector  
coming once Solu is firmly established.

+ Solu for Business initially targeting the hospitality sector  
(monthly SaaS) and coming to each municipality 1 month after Solu  
launch.

4 hour auction

3 hours 40  
free to bid

last 20 mins  
premium only

# Market Size



191

Urban areas in the  
Philippines with over  
**100k+ population.**  
Domestic Serviceable Market

130

**Million (\$) +**  
The cost of waste  
mgmt. in Metro Manila\*  
Initial Launch Market

23.7

**Million (\$) +**  
Revenue at 10% Metro  
Manila's waste sold  
**w/Solu.**  
Share of Market

\* source: National Solid Waste Mgmt Report (2016)

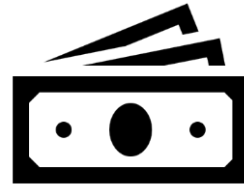


# Competitive Advantage



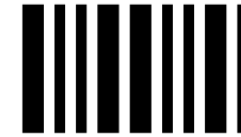
## First to Market

for technology based valorisation of waste.



## Monetary Incentive

a material value prescribed to waste.



## QR Transactions

simple peer to peer mobile payments.



## Democratize the Marketplace

user can decide by price, location or rating.



## Ease of Use

four mobile taps and ten minutes = an easy process.



## Gamification

social incentives and a weekly lottery to reinforce the \$\$\$.

# Financial

We are raising 14 months financing to reach 3,000,000 transactions and launch throughout Metro Manila.

**\$250k**

**Angel Round**

initial investment opportunity

**3m**

**Transactions**

avg. ₱35 fee\*

**\$2.1m**

**Revenue**

over 14 months

\*from core revenue stream, higher elsewhere

# The solution

...let me give you a demand.  
Rather than rely on underfunded, inefficient bureaucracies to solve the global waste problem, **incentivise citizens to behave in a societally beneficial way.**

...and we attach a significant monetary value to waste to do this.

**Solu** is a mobile application that provides a platform and marketplace for individuals to sell collected, segregated waste that they've accumulated.

Beneficial for **every** stakeholder

**Yesterday's trash is today's resource.**

*'Governments need to improve waste management practices and introduce financial incentives to change the habits of consumers'*

*'Incentives are the only way to modify behaviour'*

Richard Thaler.



# The Market Opportunity

191 cities in Ph with  
100k+

Waste management in Metro Manila was a \$130m market (in 2016 at ~80% of waste collected).

26 cities in Indo with  
500k+

But this is a pandemic across developing nations. They all have the same problem.

And waste generation is only going to increase in urban, developing regions - especially in Africa.

... the TAM is huge.

We additionally foresee the value of waste increasing in the medium term as demand for materials grow.

But don't just take my word for it - according to [a study](#) from Report Buyer, the global waste management industry was valued at \$285 billion in 2016 and will reach \$435 billion by 2023 (CAGR of 6.2%). [Another report](#) from Navigant Research shows that the global market for smart waste collection technologies will expand from \$57.6 million in 2016 to over \$223 million in 2025.

*"Due to population growth and urbanization, the amount of municipal waste generated throughout the world continues to accelerate," says Christina Jung, research associate with [Navigant Research](#). "Asia-Pacific is expected to emerge as a lucrative area with maximum growth potential, due to rise in urbanization and increase in disposable income."*



# Why now for Solu?

- **The spread of mobile connectivity** - improves the commercial viability of technological solutions. 75% of Filipinos now have access to a smart-phone, a number that's closer to 90% in urban areas.
- **A huge political, societal and business tailwind** – the problem is evident, very little education is needed. With ocean plastics, greenhouse gases, Boracay's closure, 'war on waste', social media and the rise of the global citizen.
- **A receptive audience** - receptivity from government, business and citizens to new ideas in this space borne out of a desperation that something needs to be done. Layered on top of this is a general shift in the Philippines towards embracing new ideas and start-ups to drive progress.



- **Improved treatment technologies** – exist but now need a better quantity of

# ...and the competition?

## the Status Quo

a powerful force that shouldn't be underestimated... but with societal trends pushing people our way and Solu providing real benefit to all via direct monetary reward, we hope that we can overcome this notion to motivate people to segregate and then sell their waste.

When launched, Solu will be working with government and their waste collection partners so Solu won't be in 'direct competition' with the status quo – but will be supported by the status quo.

*Gargeon.com* in Malaysia – uses basic tech to provide 'on demand' optionality for (typically) business waste collection with a few limited optimizations for haulage companies.

*I Got Garbage* in India – uses technology to legitimize informal waste pickers. A good solution that seems to have difficulty scaling.

*RTS* in New York – the original *Gargeon.com*. Founders are insufferable with hubris but RTS seems to be doing well, have raised \$17m with a team of 50+

*Rubicon Global* – the first mover in waste-tech. A unicorn that's dominating the mid-west US waste market and is seriously threatening the incumbents.

*Big Belly, Enevo, Trux* all in the USA raised \$5-\$10m and seem to be expanding fast.





# Customer Acquisition

Led by Dorothy Moreno

## Who Uses Solu?

We're initially focusing on 16–30 year olds, that earn <P5000 a week for whom supplementing their earnings with Solu is an attractive proposition.

These citizens typically have smartphones, are very familiar with mobile apps and have a growing awareness of global issues thanks to the spread of engaging and informative material on social networks.

## The Steps

- Leveraging social media, content curation and digital marketing for community creation.
- In-community launch events with FMCG partners.
- Brand ambassadors and influencers.
- Dual referral system.
- One centralized campaign with Solu, NGOs, FMCGs & Govt.



# Appendix



## A Solution to Pollution: Tackling Waste in the Philippines.

*"a York graduate's innovative effort to tackle waste in the Philippines."*

<https://wildmag.co.uk/2018/07/13/a-solution-to-pollution-a-york-graduates-innovative-effort-to-tackle-waste-in-the-philippines/>

## Graduate's Take on International Waste

*"a York graduate has won a competition for his start-up business which targets plastic waste management in developing nations."*

<http://www.yorkpress.co.uk/business/news/16300667.graduates-take-on-international-waste/?ref=mac>

## A Philippine based Start-up Company for Managing Solid Waste

*"today our guest is the founder of this very relevant problem solver. When it comes to waste on Earth perhaps his name will ring a bell."*

<https://www.facebook.com/PinoyScientistShow/videos/2093091077373927/>





## Partnerships

Solu plugs into Dragonpay to provide our peer-to-peer payments architecture

Solu working with GCash, PayMaya, banks and physical cash out points such as remittance stores and (hopefully) convenience stores.



# Key Assumptions

What will this go towards?

- Approx. 14 months runway
- Staff costs – bring team on full time, bring on data scientist and community/operations manager. Continue to bulk up team on needs basis e.g. account managers for Solu for Business clients, social media/content marketing etc.
- Premium software required.
- Outsource QA costs.
- Team machine costs.
- Legal costs – business set up, memorandums of agreements and asset protection.



# Tech Stack

Led by Rene Calunsag

Reverse Proxy: NGINX

Application Server: NodeJS

- High Availability Process Manager: PM2
- API Framework: Express 4
- Web Socket: Socket.io

Database: MongoDB with sharding and replication sets

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DevOps stack:

Environment Virtualization: Docker

Continuous Integration: Jenkins

Configuration Management: Ansible

-----

Amazon Web Services infrastructure:

- EC2 instances with encrypted Elastic Block Store (EBS) volumes
- Route 53 (DNS)
- Virtual Private Cloud with private subnet (provides security through a bastion host)

We'll utilize all the data that we collect for future machine learning analysis to provide us with better algorithms and assumptions.



# Concerns & Mitigations

1. Data usage costs – ongoing conversations with GSMA to become a part of their mobile for development programme, which would allow free/discounted usage. Freenet have agreed to add Solu to their network and a conversation is to be had with Globe.
2. Customer acquisition – B2C on a budget is always difficult. Dorothy Moreno a proven and capable *growth hacker* with a strong data analysis background that'll be used to optimize marketing decision making. Multiple strategies will be tested and we'll be very active in communities if we're finding digital marketing to be ineffective.
3. Scaling difficulties – scaling is always tricky and whilst we're not at that stage, we're aware that the step from 20 employees to 50 and the step from \$100,000 in revenue to \$1 million is the most difficult.

