

# FOOD TO FOOD PROGRAMME

## POSITIVE IMPACTS ON THE ENVIRONMENT



**BIO-REGEN**



**IMAGINE.....**

A world without food waste

# Imagine.....

If we can have a process

Uses **no energy**

Accepts **all types** of food

Leaves **no carbon** footprint

Requires **NO special skills**

Leaves **no odour**

Leaves a final product that **is consistent,**

**no pathogens,**

and is **effective**

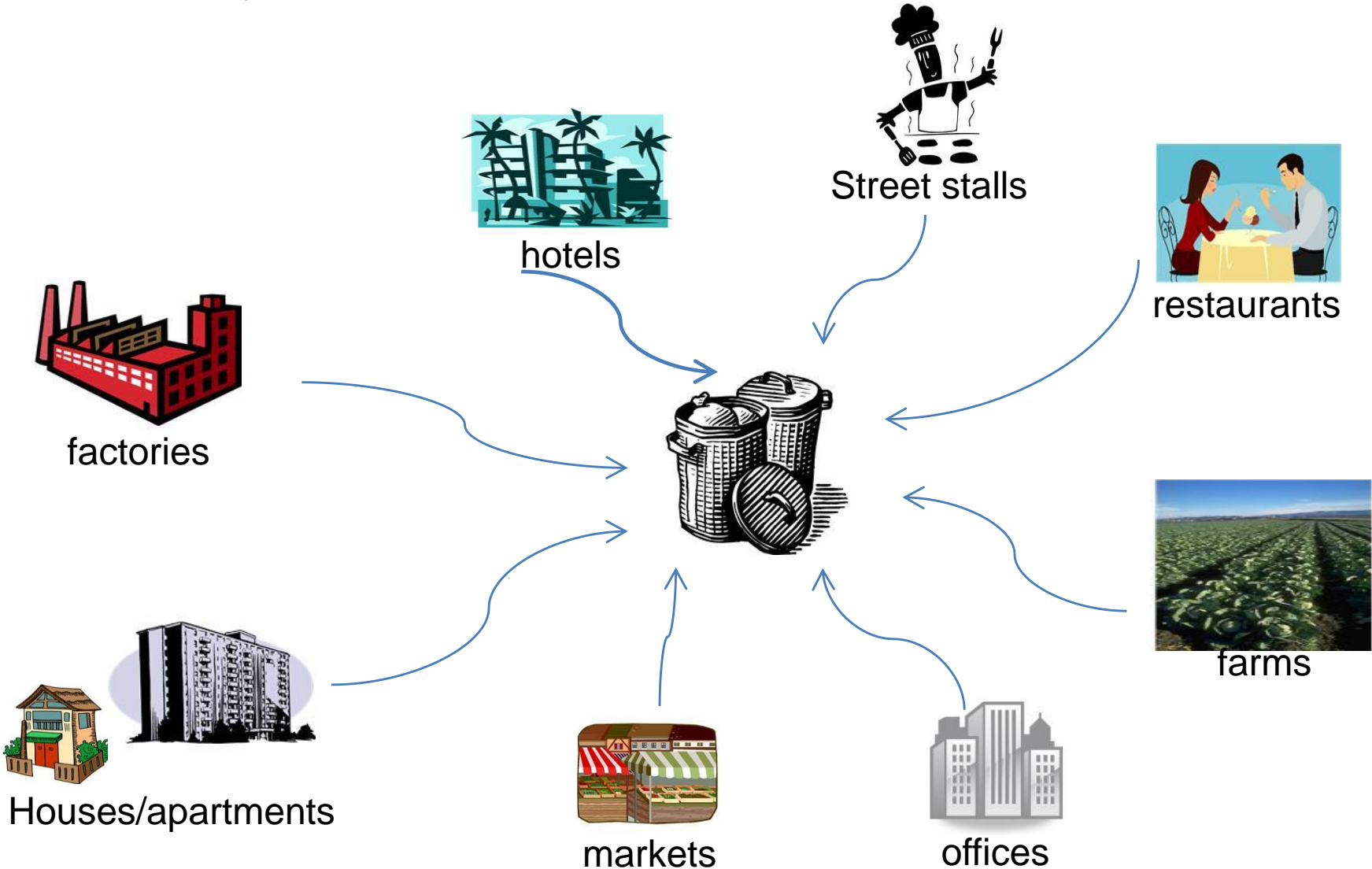
Imagine no more!!!!

# Introducing the Bio Regen



# Current system of handling food waste

Firstly waste from various sources are put into a central area within the vicinity



Then the garbage trucks come to collect them

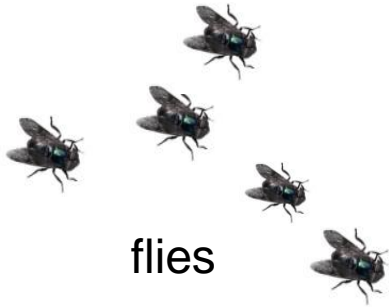


The trucks then take them to either landfill, incinerators or composting site





Before the food waste is being collected you will have....



flies



Dogs and other animals

And of course.....



bird  
s



Rodent  
s

Cockroaches  
and other  
bugs



Foul smell

From the current system, we will have...



**CO<sub>2</sub>/methane/leachate**

A GREENHOUSE GAS 21 TIMES MORE TOXIC TO THE ENVIRONMENT THAN CO<sub>2</sub>

In the narrow environmental context leachate is any liquid material that drains from land or stockpiled material and contains significantly elevated concentrations of undesirable material derived from the material that it has passed through.



What if we can complete the cycle???



**FOOD to FOOD**



**Bio Regen**

**Bio Soil Enhancers**

**COMPLETE CYCLE**

Composting Technique elements	windrow	In-basket (Takakura Method)	In Vessel	Vermi Composting	Bio Regen
Investment	Low-medium <small>(small scale:labourer,land;large scale:labourer, land, tractor)</small>	Low-medium <small>(small scale:Labourer,land, microbial;large scale:labourer,land, tractor, microbial)</small>	High (machines, land)	Low-medium (land,earthworms)	Very Low
Labour Input	High (turnover composting pile)	High (turnover composting pile)	Low Most work done by machinery	Low No requirement to turn over composting pile	Low
Land requirement	high	medium	low	medium	Very Low
Time requirement	3 months	2-3 weeks for fermentation And 2-3 weeks for maturation	8-12 hours for in vessel And 40 days for maturation	2 months	28 Days
Technical requirement	<b>Low</b> Moisture and temperature control	Medium (moisture and temperature control and microbial inoculation)	High (machine operation)	Medium Earthworm care	Very Low Easy operation of machine
Environmental impact	CH4 Emission when aeration is low	CH4 Emission when aeration is low	<b>CH4</b> emission when energy is used and CH4 emission when aeration is low	NOX	<b>Takes in CO2 instead</b>

# What does this mean?

- It means that we can now change the entire **concept** of food waste management
- It means that we can now treat food waste as and when it becomes available in a **continuous flow** instead of batch by batch
- It means that we can now **treat food waste at source on a mass scale**
- It means that food waste can now truly be a **resource**
- It means that it is now **within the means** of private/public sector to handle their own food waste

# The Benefits to the Environment

- Reduction of **Transportation**
- Reduction of **Input To Landfill**
- Reduction of **CO2 & Methane Gas** Emission )
- Reduction of **Leachate**
- Reduce **contamination** of recyclable products
- Promotes **carbon sequestration**
- Reduction of **Compost & Fertilizer cost**
- Support **consistent crop** growth

# What it means to the Owner

- 1. More efficient management of food waste
- 2. Clean and hygienic (reduce rats, flies, cockroaches and other pest)
- 3. Eliminate odor from having to store food waste before and after being collected
- 4. Reduce cost of disposal
- 5. CSR
- 6. Earning Carbon Credits?

# What it means to the farmers

- A bio soil enhancer that enhances natural nutrients to the ground
- A bio soil enhancer that can improve carbon in the soil
- consistent yields
- Cheaper production costs



# What we Provide

- Outright purchase
- Lease and operated by Owner
- Rent and managed by Supplier
- Free collection of “processed Food waste”
- Mobile units
- After sales service

Only Theoretical?

*We in Penang are already doing it!!!!*



and also in Australia, Scotland, Wales and Papua New Guinea

# At the Bayan Baru Market Hawker Complex



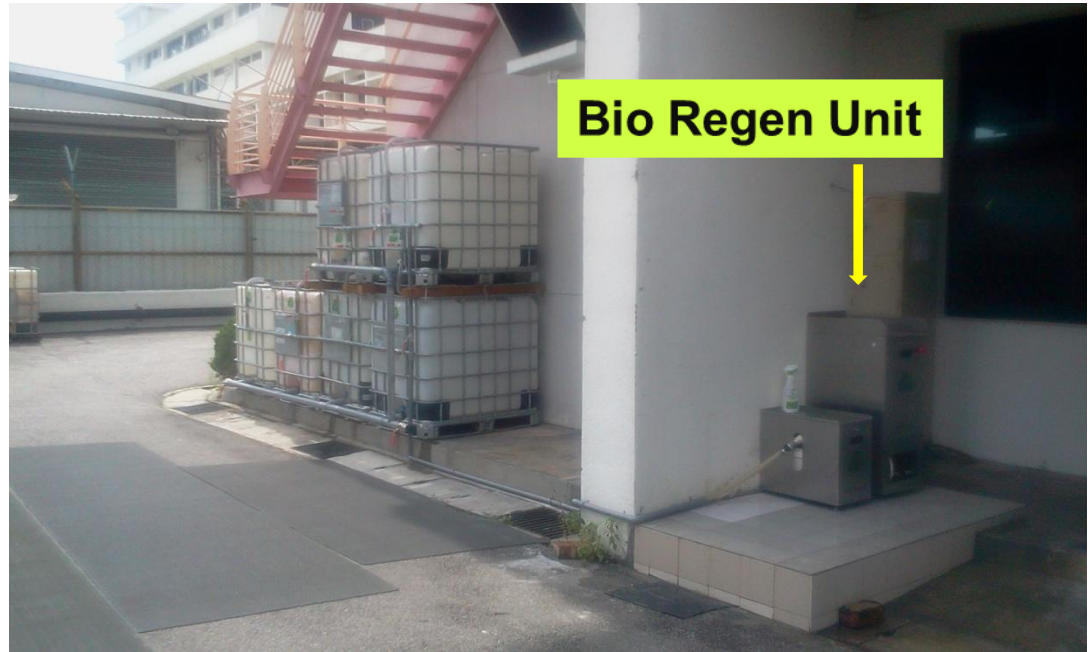
   
PROGRAM MAJLIS PERBANDARAN PULAU PINANG  
"MAKANAN MENJADI BALIK MAKANAN"  
PUSAT PENJAJA BAYAN BARU  
Projek Untuk Menukar Sisa Makanan Kepada Baja Bio-Cecair  
PENANG ISLAND MUNICIPAL COUNCIL "FOOD TO FOOD" PROGRAMME  
BAYAN BARU HAWKER CENTRE  
 A Project to Convert Food Waste into Liquid Bio-Fertiliser 

DILARANG  
MELETAK  
KENDERAAN



Bulan ini (This month) :  
kg  
Sehingga kini (To date):  
kg (mulai \_\_\_\_\_)

# at the Penang Skills Development Corporation



# At the Bukit Jawi Golf Resort



# At Robert Bosch Penang





# At Sekolah Menengah Jenis Kebangsaan Heng Ee



Plus 3500 households when plans by the school to get all the schoolchildren to bring their household food waste to the school

# At Convent Green Lane



# Union High School



# Thumbs up at Sekolah Menengah Sains Syed



# Escape Theme Park, Teluk Bahang





**Mobile Unit**



COLLABORATING WITH MPPP AND SAMPAH MASYRAKAT @ THAIPUSAM FESTIVAL 27Jan 2013



# Hermit Park State School, Townsville , Au stralia







**JAMES COOK  
UNIVERSITY**  
AUSTRALIA



# Stirling, Scotland



# Cardiff, Wales



# Figures & Facts Of Bayan Baru Hawker Complex (August 2011 – November 2012)

● <b>Month</b>	<b>KGs</b>	
● Aug-11	790	
● Sep-11		2610
● Oct-11	2675.5	
● Nov-11	2840.5	
● Dec-11	3355.5	
● Jan-12		2425.5
● Feb-12	2646.5	
● Mar-12	2832.5	
● Apr-12	2931	
● May-12	3195	
● Jun-12		3023
● Jul-12		2675
● Aug-12	3128	
● Sep-12	2651.5	
● Oct-12	3405	
● Nov-12	3071	
		<b>Total : 44,255.5 Kgs</b>

COSTs ???

# Running Costs (less BR Bokashi & VRM Power Clean)

<b>Estimate running cost for Sep-Dec 2011 (122 days for 11,481.5kg of food waste)</b>	<b>Total (RM)</b>	<b>Expenses per day (RM)</b>
Bio-Regen Bokashi	-	-
VRM Power Clean	-	-
Electric	121.00	0.99
Water	417.00	5.24
<b>Total</b>	<b>538.00</b>	<b>6.23</b>
<b>Total cost per kilo of food waste</b>		<b>0.047</b>

\* For every 1000liter of “slurry” collected MPPP gets either 2liters of Bokashi or 15 liter of Bio-Fertilizer

## Estimated - If we manage to treat only 30% of food waste

	<b>Total Per Year</b>
MPPP Total waste to landfill per year (1,200 x 365) metric ton	438,000
40 % food waste (438,000x40%x30%)	52,560
Collection cost (RM83), Transportation (RM29), Tipping Fees (RM17) per metric ton(Total RM129per metric ton)	RM 129.00per MT
<b>Potential savings for MPPP per year (2011)</b>	<b>6,780,240</b>

# The Technology behind

“The Bio-Regen process uses what we believe is the best **combination of bacterial photosynthesis and multi-culture microbial digestion** available and is designed to specifically incubate this special photosynthesis within the process. The main idea of the Bio-Regen is to **use unused nutrients to recreate and foster the process** which collected nutrients and energy in the first place.” .....Mr. Ken Bellamy



- However, we have found that by incubating photosynthetic bacteria in our “soup” we are able to **perpetuate the manufacture of sugar almost indefinitely**. This means we can continue to ferment -- and continue to **create a barrier for pathogens -- almost indefinitely in the process of the Bio-Regen**. This is a very special discovery and it means we can safely store and handle the unused food without fear of infection or contamination for long periods -- even though the material is stored in the sunshine!

- Some **other key benefits** for us in this process are:

a. we don't have to be concerned about differences in the quality or nutrient levels in the feedstocks. Where we can incubate bacterial photosynthesis, minerals are farmed from the air -- this means Carbon and Nitrogen and many other substances are actually sequestered (or pulled out) of the atmosphere by the organisms we are growing (just like trees and other bacteria do that).

This means that even though we have a **mixed -- and uncontrolled -- input** of feedstock, we can have a very **uniform output** material because the bacteria make up any shortfall themselves -- something absolutely critical if we are to produce a **commercially viable end product**.

b. bacterial photosynthesis has an effect on **carbon sequestration** where it can be fostered. The UN Food and Agriculture committee suggests that 20% of all carbon sequestered from the atmosphere is due to bacterial photosynthesis. So to whatever extent we can foster this reaction -- either in the Bio-Regen process or later in the soil where the organisms come to live -- we can **improve on**

c. These **bacteria perform photosynthesis using different bands of light than plants** -- and can do it at virtually all times and in all sorts of places. This means we can have a virtually constant energy capture and carbon capture process going on in the Bio-Regen regardless of cloudy days, rainy days, night time, shade in a building, etc etc. These **organisms use UV and Infra Red Light to make their own food** -- quite remarkable.

d. When these organisms can be grown up in soil, they have a couple of incredible benefits for soil including: The **ability to capture carbon**

This means that all in all, there is the ability to use unused food to re-generate the processes which underpin the growing of food.

Of course there are all sorts of things which may impact on this -- human error, farming systems which are unfavourable, incorrect use of the system, etc etc -- but we are confident that the friendly nature of the Bio-Regen process and the fact that it lets people become connected with their food -- where it comes from and where it goes to -- rather than being disconnected in the way we often are, will help overcome these impediments.

**ANALYSIS REPORT ~ COMPOSTED MATERIAL**  
 Laboratory approved by the Association for Organics Recycling

**Customer Information**

Composting site  
 Grade (particle size range) Slurry  
 Grade type  
 Certification code  
 Date sampled  
 Batch age when sampled  
 Producer's sample code Liquid Bokashii Sample 1

**Laboratory Information**

Received at lab 08/10/2012  
 Lab sample number 12J006  
 Lab batch number  
 Lab report code  
 Report by S Davies  
 Report date 18/10/2012  
 Report number

**SUMMARY ~ PAS 100 "PASS" OR "FAIL"**

Parameter	Result	PAS 100 upper limit	Unit	Pass or Fail	Method Reference
<i>E. coli</i>	5	1000	CFU/g	Pass	BS ISO 16649-2
<i>Salmonella</i> spp	Absent	Absent	Absent or Present in 125 g	Pass	ABPR 142/2011. Annex X
Cadmium as Cd		1.50	mg/kg		BS EN 13850
Chromium as Cr		100.00	mg/kg		BS EN 13850
Copper as Cu		200.00	mg/kg		BS EN 13850
Lead as Pb		200.00	mg/kg		BS EN 13850
Mercury as Hg		1.00	mg/kg		BS EN 13850
Nickel as Ni		50.00	mg/kg		BS EN 13850
Zinc as Zn		400.00	mg/kg		BS EN 13850
CO <sub>2</sub> (stability)		16.0	mg CO <sub>2</sub> /g OM/d		ORG0020
Weed plants <sup>1</sup>		0.0	number/l compost as received		OFW004-006
Glass, metal, plastic & other <sup>2,3</sup>		0.25	% of 'air-dry' sample		AFOR MT PC&S
Plastic <sup>3</sup>		0.12	> 2 mm		
Sharps <sup>3</sup>		R			
Stones in "mulch" <sup>3</sup>		10.0	% of 'air-dry' sample		
Stones in other than "mulch" <sup>3</sup>		#REF!	> 4 mm		

<sup>1</sup> If negative value, weed(s) present in control only, or if in test mix are attributable to its peat content.

<sup>2</sup> Excluding stones.

<sup>3</sup> Please see 'N.B.:' note near the bottom of the Physical Contaminants report sheet.

<sup>R</sup> Refer to composter's quality policy for upper limit allocated to the compost grade and intended market / end use, and evaluate sharps result against that limit.

**Plant response test**

Parameter	Result	PAS 100 min.	Unit	Pass or Fail	Method Reference
Tomato plants germinated		80.00	no. of plants, tests as % of controls		OFW004-006
Tomato plant top growth		80.00	average g / plant, tests as % of controls		
Tomato plant abnormalities		Absent	abnormal tomato plants in test trays		

**Validity of the plant response test**

Parameter	Result	Validity criterion	Outcome
Germination of tomato seeds sown in control trays		≥ 27 tomato seeds germinated in control trays by 14 days after sowing	
Tomato plant top growth in control trays		≥ 1.50 g per tomato plant in control trays	
Abnormal tomato plants in control trays		No abnormal tomato plants in control trays	

ND = Not Determined, N/A = Not Applicable

# Important point to note

The entire process is simple enough that the amount of food waste processed can be easily monitored and verified for implementation for a future **carbon offset** program

**Thank you  
for  
listening**

