

COMMUNITY BASED WASTE MANAGEMENT & ORGANIC FARMING SYSTEM IN BALI

“To be Smart Communities Managing the Environment for Sustainable Living”



SCOPE ASIA



UDAYANA
COMMUNITY
DEVELOPMENT
PROGRAM



THE PROBLEMS

Urban household' waste in centralized sites generates multiple problems.

- Traffic congestion.
- Scattering garbage on the collection sites.
- Centralized dump sites scatters blown create unpleasant smells, change biodiversity, create toxic liquid pollution and gasses.

High costs to manage centralised dump site is high.

- Costs for transportation vehicles.
- Costs of labor for waste collection and to manage the dump sites.



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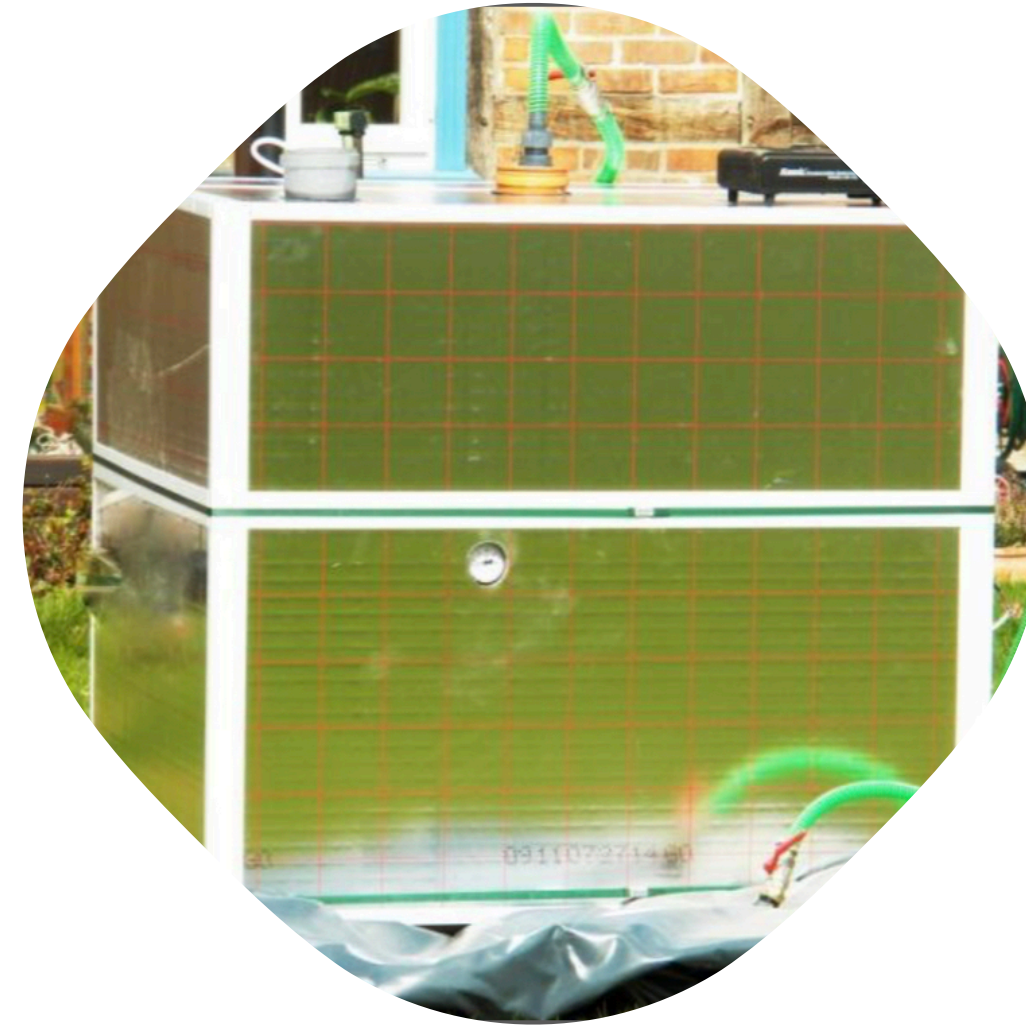


**“TO CHANGE SOMETHING BIG,
YOU NEED A SMALL STEP TO
BEGIN WITH. WE STARTED WITH
SMART COMMUNITIES”**

THE OBJECTIVES OF SMART COMMUNITIES



To develop a new decentralized - community based waste management system which is more efficient than the centralized system that is currently managed by the local government.



To develop economic value to generate incomes for communities by selling products from the waste; Biogas, Bio-fertilizer, Plastics Recycling, and Developing Urban Organic Farming System leveraging the bio-fertilizer.



To use water purification machine to introducing water machine to produce high quality and healthy drinking water as additional economic value for the community; an integral part of the waste management system.



To replace the use of non bio-degradable plastic bags in collecting household waste with biodegradable plastic bags made from cassava starch to protect the environment; this is integrated in the waste management system.

BENEFITS FOR THE GOVERNMENT

- Green community brings a good impact on the environment and people's health.
- Smart community and clean environment can attract tourists and increase the benefits of the tourism sector.
- Reduce the cost of waste management.
- Reduce traffic congestion caused by un-managed urban waste.
- Good government reputation and recognition.
- Have a chance to win Adipura, an award for the most beautiful and cleanest city.



BENEFITS FOR THE COMMUNITIES

- Community-based waste management and the organic farming system can help the community to produce useful and valuable recycled products. They can use or sell the products to generate incomes for their daily life.

- A healthy environment brings health to people and community.

- Installing water purification machine can help the community to have high-quality drinking water which beneficial for the people.

- Bio-Fertilizer produced from Biobox can be used for the organic farming system by the communities creating a healthy and green environment.

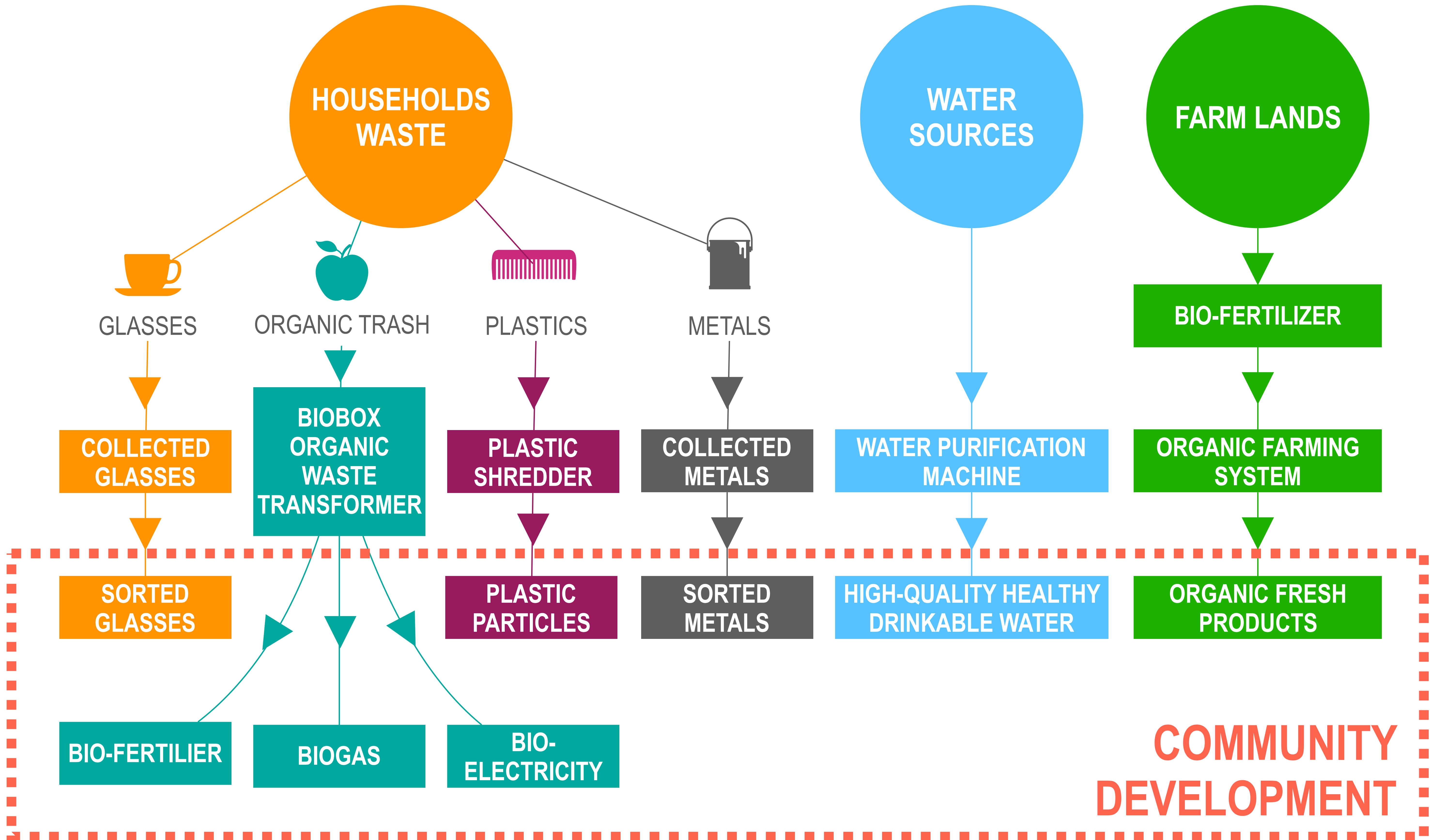


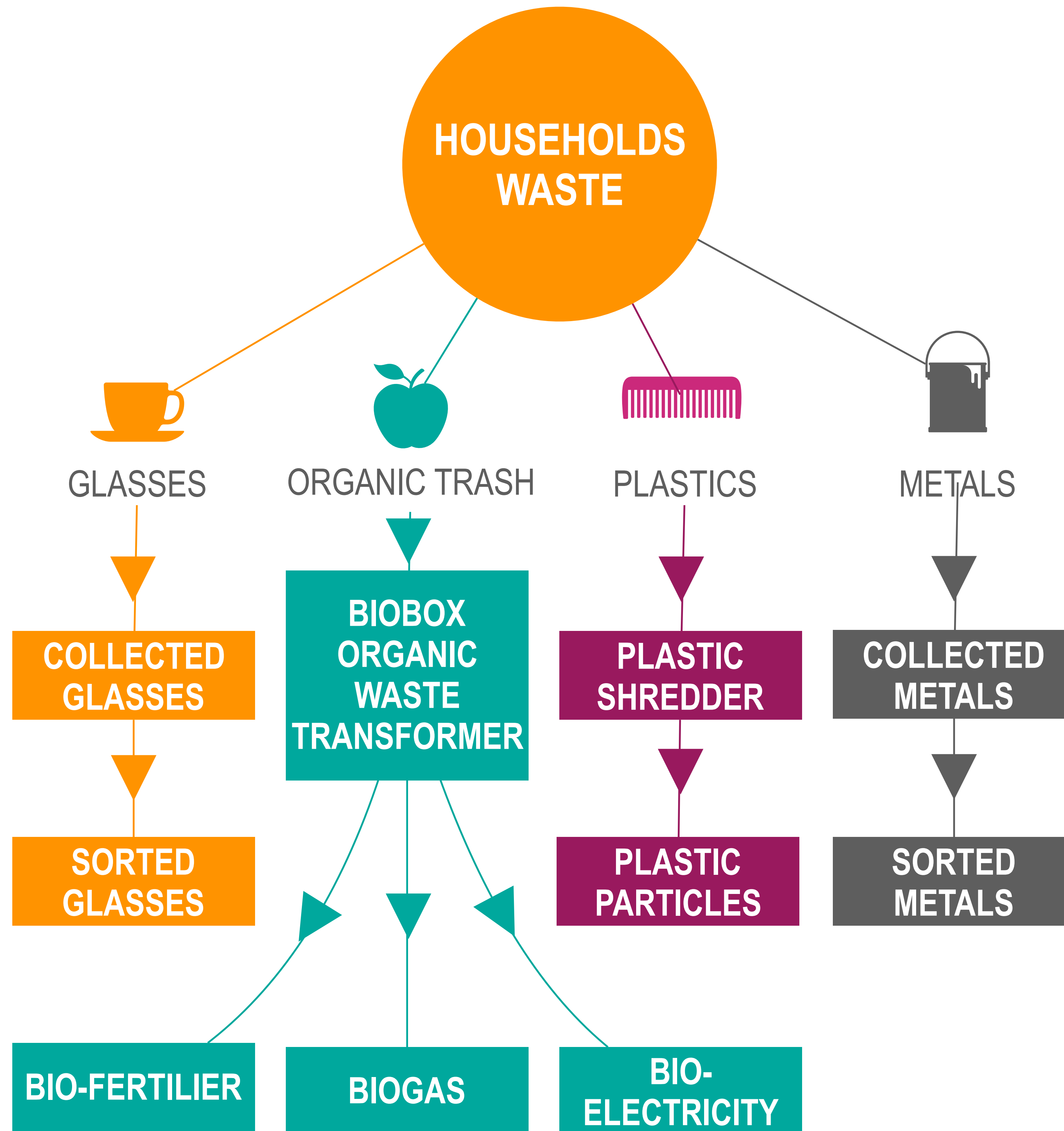
BENEFITS FOR THE UNIVERSITY

- Community based waste management and organic farming system is a good learning experience for students.
- Involving the students in the project can give them a good learning experience.
- Research collaboration.
- Government supports can be beneficial for the community and the students. They can use this as an opportunity to learn business management and development system for the community.
- Good institutional reputation and recognition.
- To be known as a green campus.



THE COMMUNITY BASED WASTE MANAGEMENT CONCEPT





MAKING THE WASTE NOT WASTED

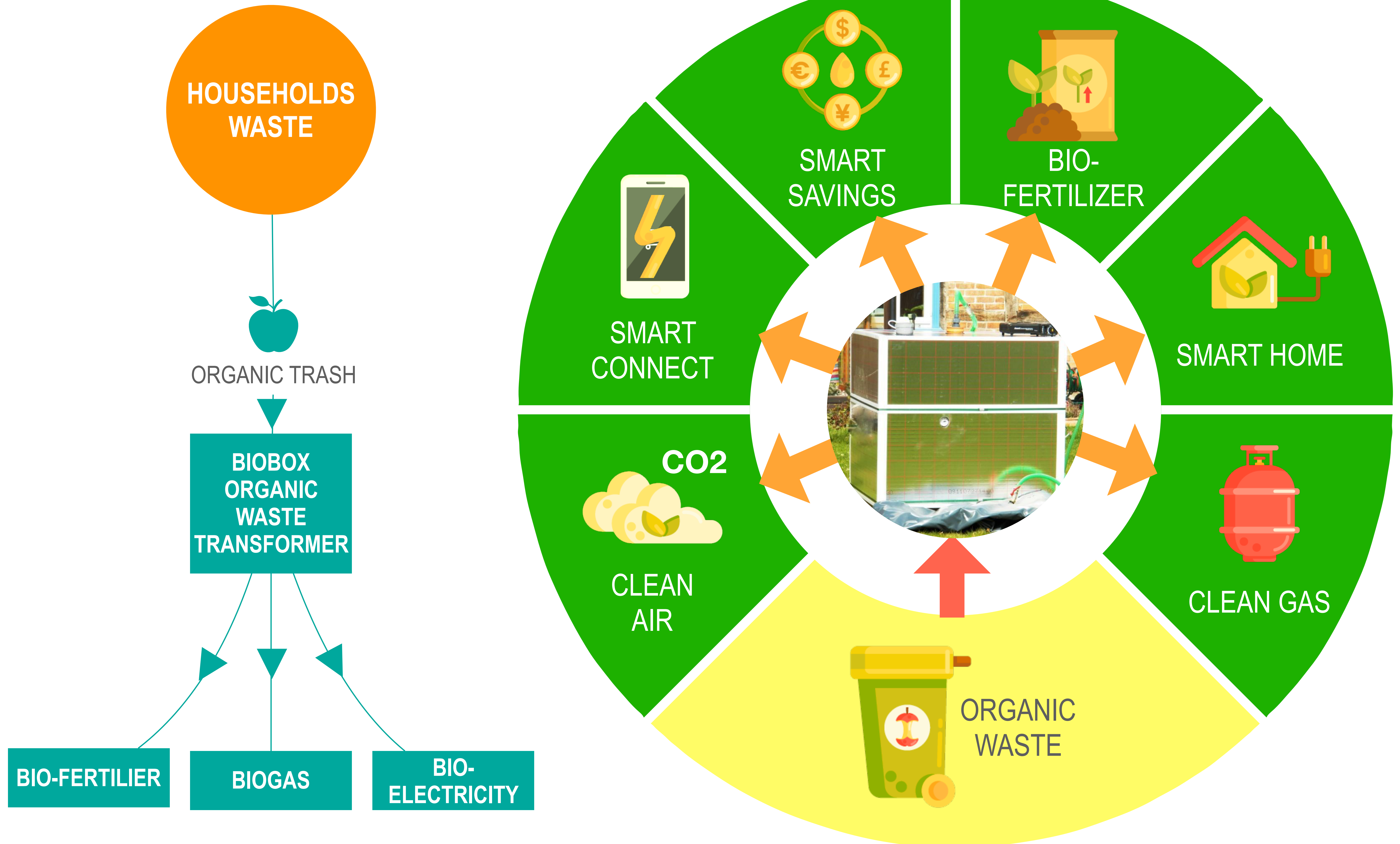
There are **4.281 tonnes** of waste per day in Bali and 52% of them is not being managed.

To reduce the amount of waste in Bali day by day, the Community Based Waste Management System can be the solution to this challenge.

STEPS:

1. Separate the waste by its form, such as plastic, glass, metals, or organic trashes.
2. Install smart biobox to transform the organic trash into energy (biogas) and bio-fertiliser.
3. Install plastic shredder machine to transform plastic to plastic particles and re-shape the plastic into usable tools.
4. The sorted metals and glasses can be recycled or sold.

ORGANIC WASTE MANAGEMENT



SMART BIOBOX WASTE TO ENERGY

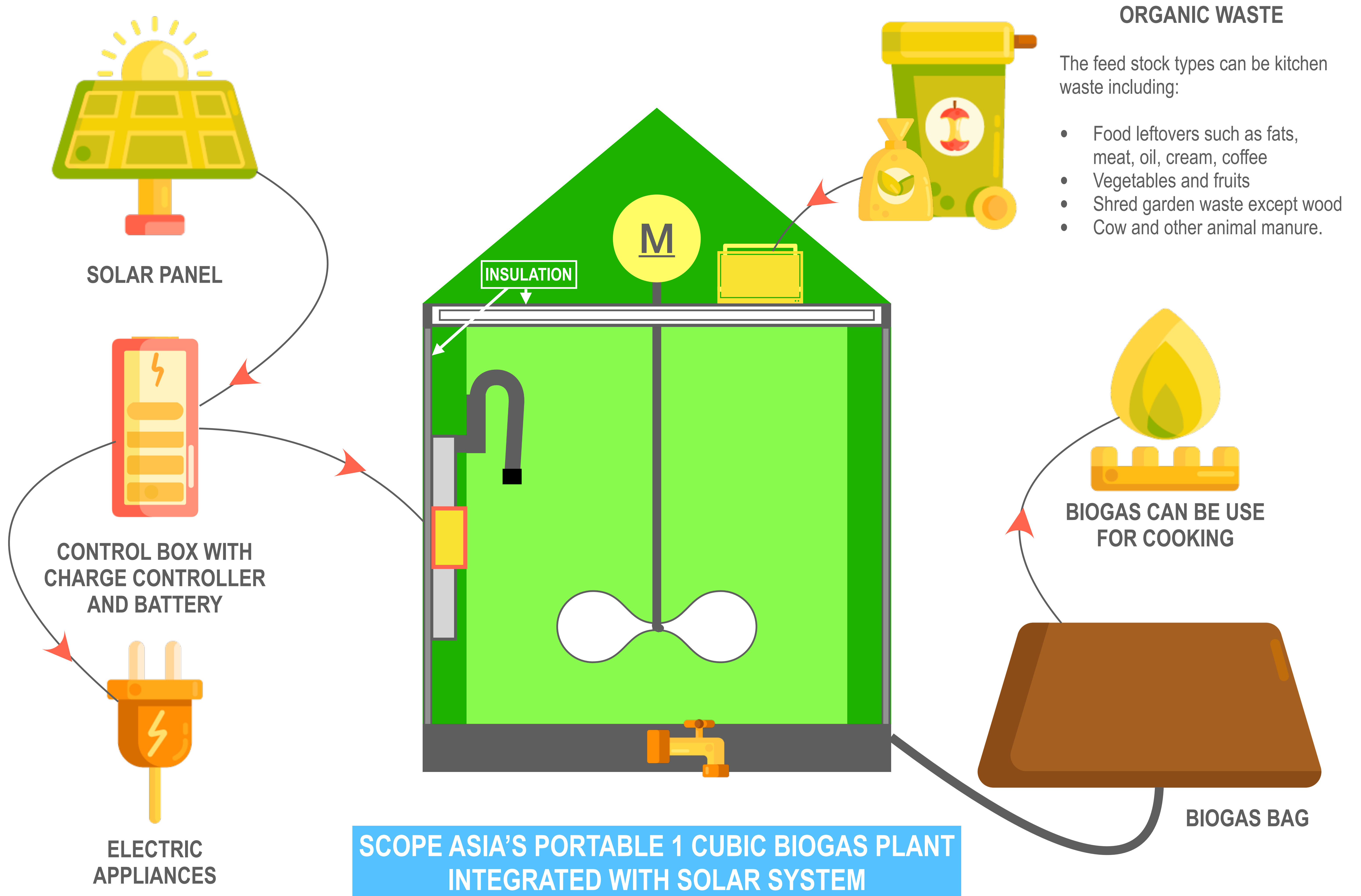
WHY IS IT SMART?

- ✓ Portable, easy to carry, easy to assemble and long life.
- ✓ Suitable for kitchen waste and animal waste.
- ✓ Solar powered stirring and heating system for higher efficiency.
- ✓ Cooking gas for 3 - 5 family members.
- ✓ 40% more gas compared to conventional stationary dome or bucket systems in developing countries.
- ✓ Organic fertilizer for organic farming and land reclamation (including semi-arid regions, former mining).

WHAT CAN BE PROCESSED?

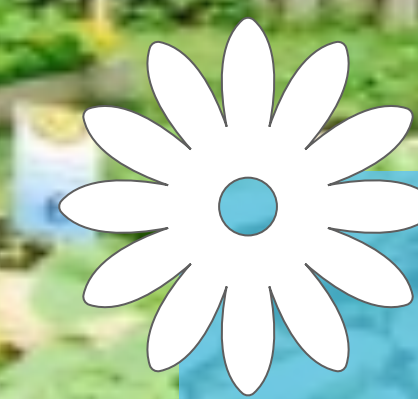
- ✓ Kitchen waste/food waste including fats, meat, oil, cream, vegetable & fruit waste/leftovers (from household, vegetable market, and restaurants), etc.
- ✓ Coffee waste from the coffee shop.
- ✓ Palm oil mill wastewater (POME).
- ✓ Oil mill press cake (eg rapeseed press cake).
- ✓ Brewery filtrate with yeast from the brewery factory.
- ✓ Cow and other organic fertilizers.





ORGANIC FARMING SYSTEM

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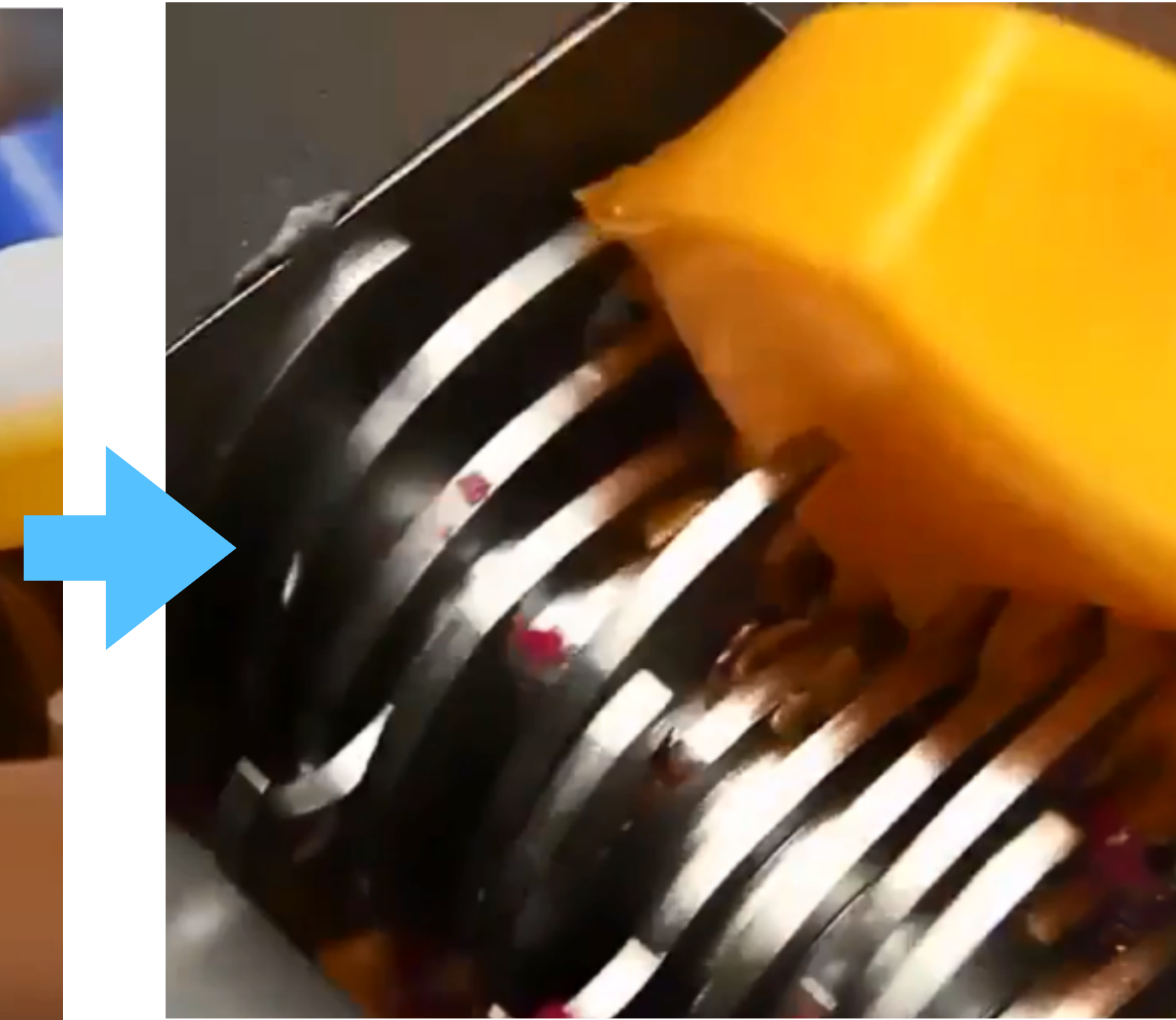


You can grow organic fruits, vegetables, flowers, ornamental plants, herbs, etc by using the bio-fertiliser from the Biobox

Example of Plastic waste recycling to develop value products as part of value economic activities



SORTED PLASTIC WASTE



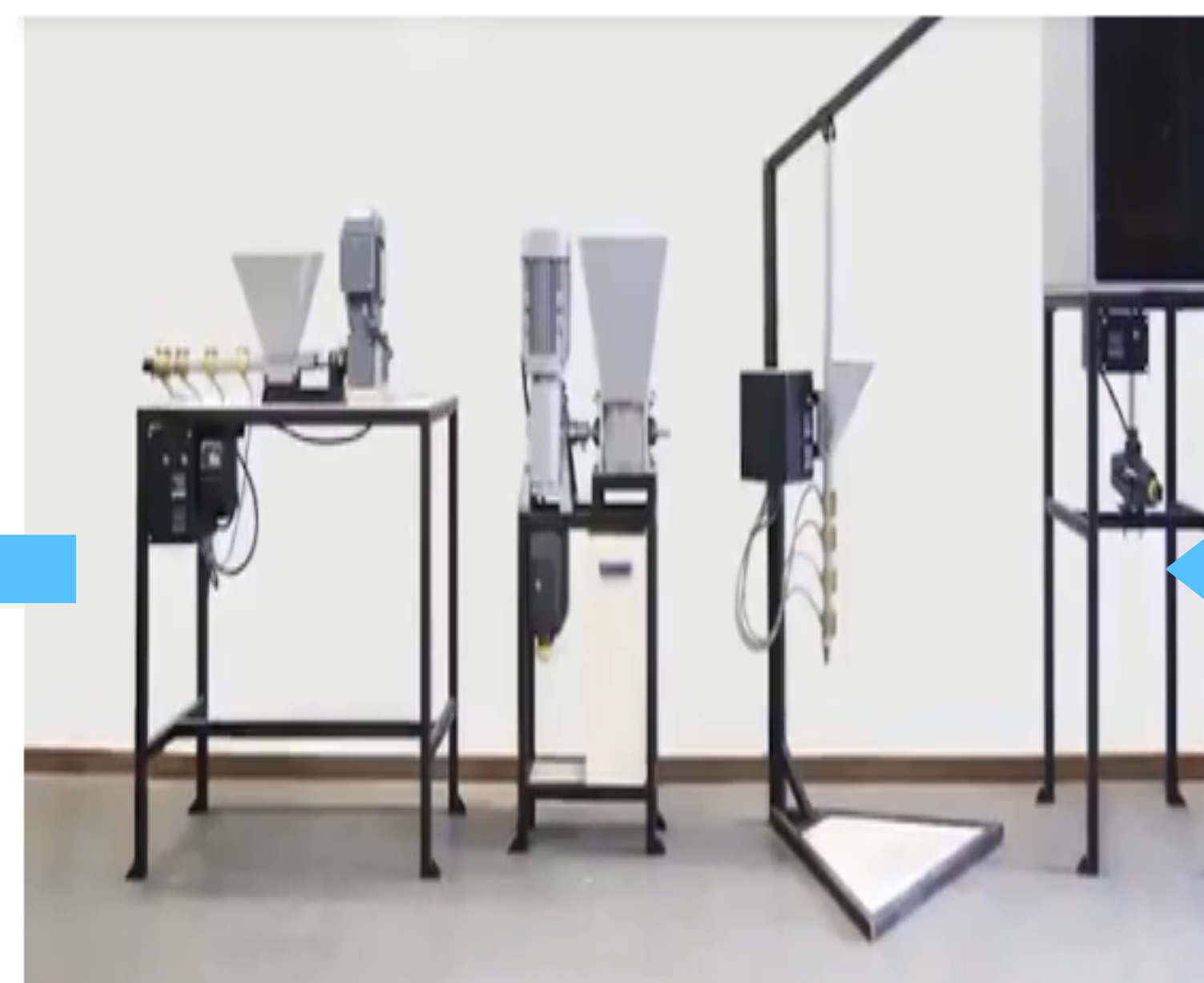
PUT THE PLASTIC WASTE INTO THE PLASTIC SHREDDER MACHINE



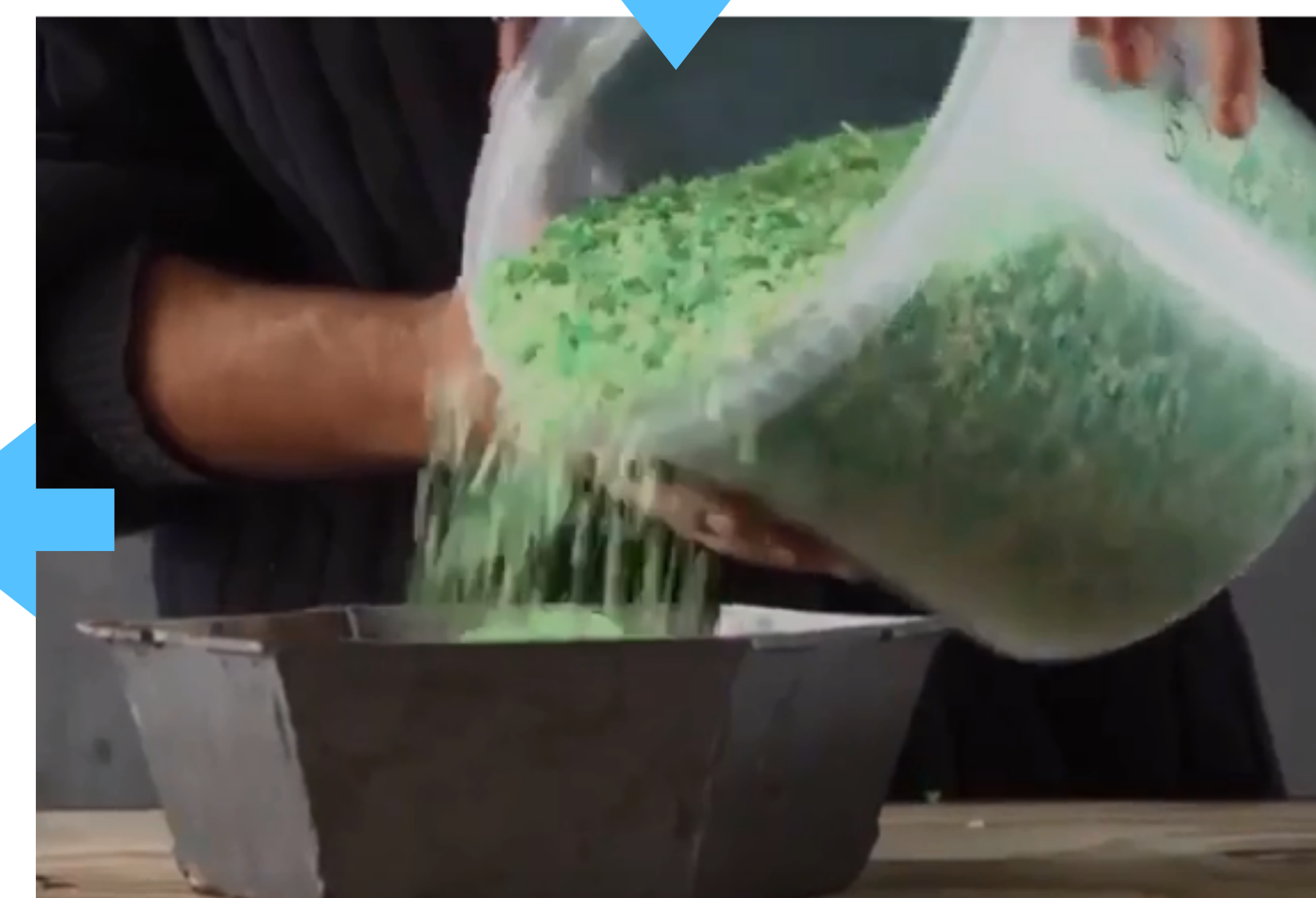
PLASTIC PARTICLES



READY TO USE PRODUCTS



CREATING THE USEFUL PRODUCTS



TURN THE PLASTIC TO RAW MATERIAL

WATER DISTRIBUTION USING BAG IN BOX

Baginbox is a solution to decrease the utilisation of plastic bottle for drinking water.

Baginbox is already implemented in Timor Leste and helped the community to distribute clean water with less plastic.

Baginbox is 80% less plastics than normal plastic bag. This product is proved by BDA & FDA (Food and Drug Administration), a federal agency of the United States Department of Health and Human Service



WATER DISTRIBUTION USING BAG IN BOX



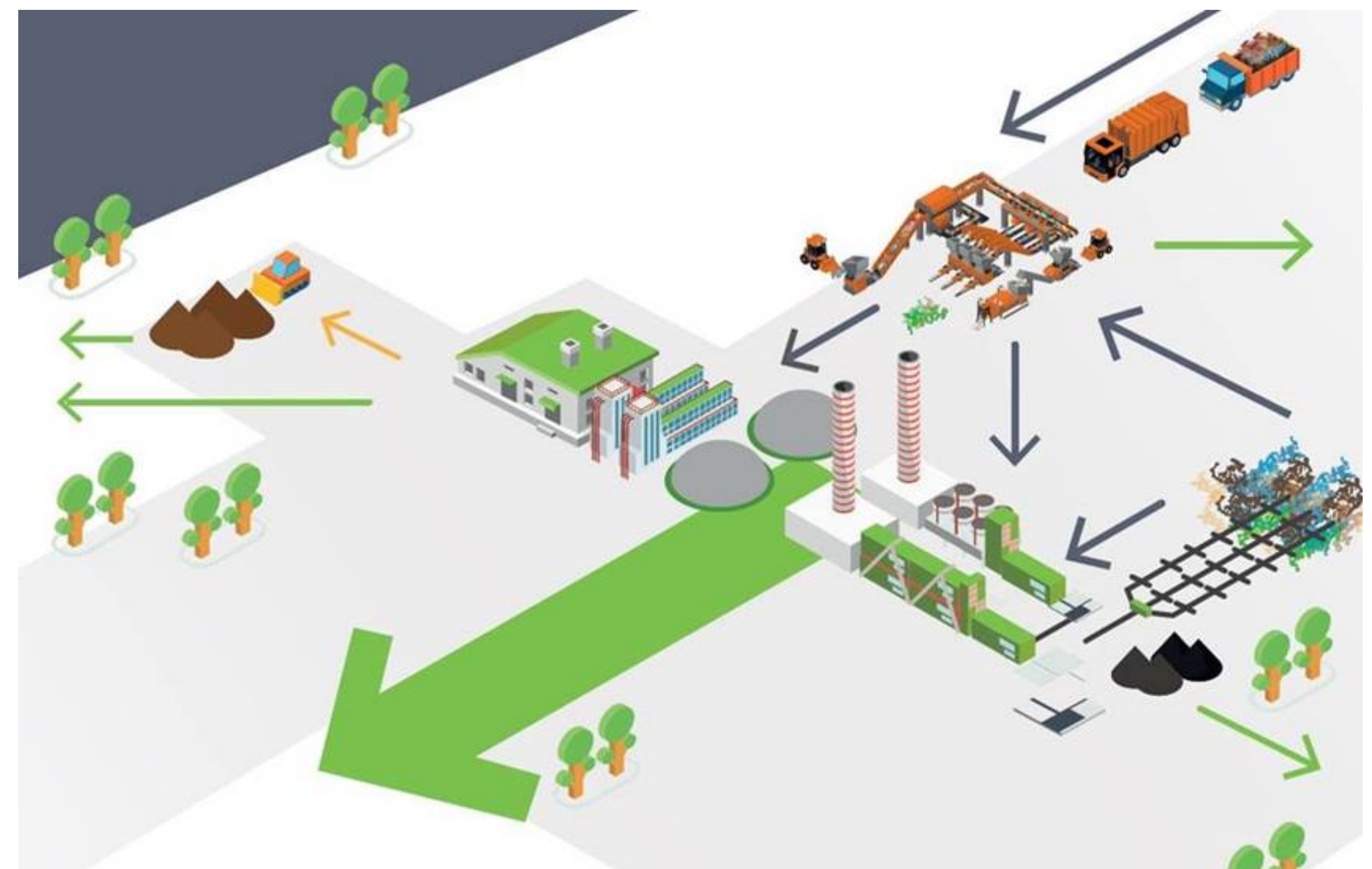
MUNICIPAL SOLID WASTE INTO ELECTRICITY

WHAT IS MUNICIPAL SOLID WASTE?

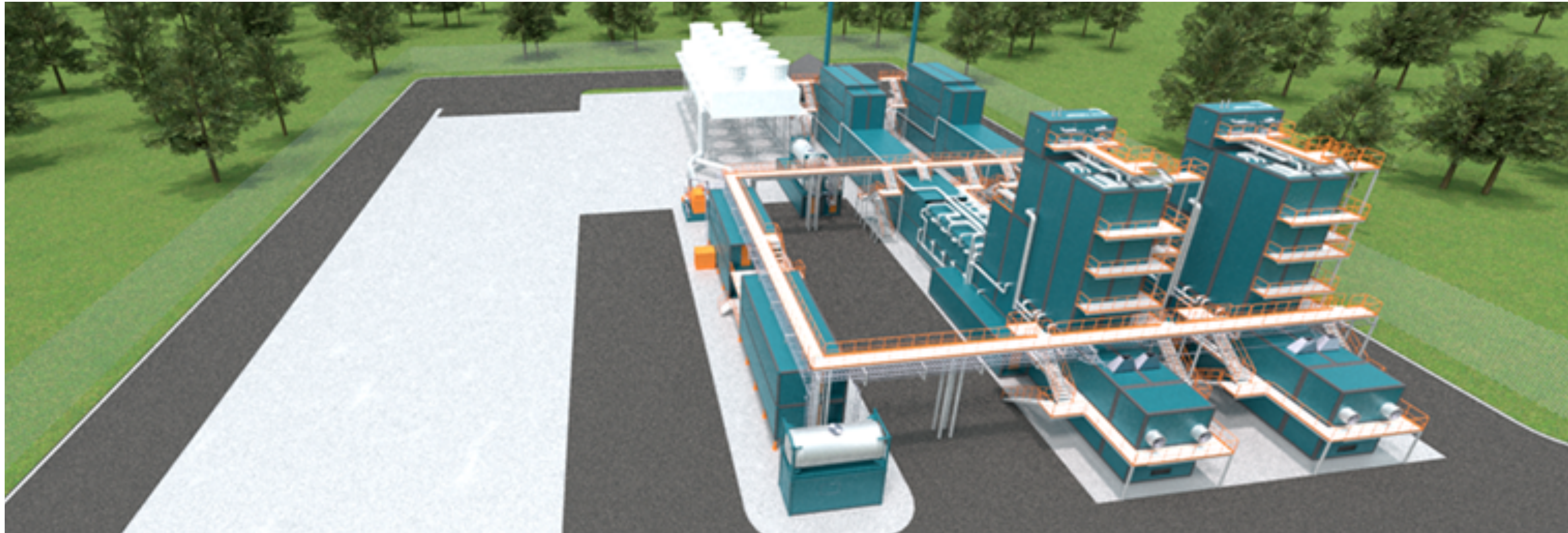
Municipal solid waste refers to any non-liquid waste that is created by a person, household, small business, or institution, such as a school or hospital. Municipal Solid Waste (MSW) is a challenging fuel for power generation due to its heterogeneous nature, low calorific value, high moisture content and potentially harmful emissions.

HOW IT CAN PRODUCE ELECTRICITY?

By installing a waste-based power generation solutions to turn the municipal solid waste into electricity, Community Based Waste Management Community will be able to produce zero waste. All the 'refuse waste' will be collected and distributed to the power plant which then processed to producing electricity.



MUNICIPAL SOLID WASTE INTO ELECTRICITY



The power plant is suitable for any waste quantity. A single unit can incinerate the MSW of about 200,000 people, while a decentralized solution can serve cities with millions of inhabitants. Locating the smaller size units close to the origin of the waste creates huge savings potential in waste management and logistics. Localized power generation also creates local jobs, supports local SMEs and saves power distribution infrastructure investments.

The proven technology and modular structure ensure that the plant has

- simple and robust structure
- high pre-fabrication rate
- quick roll-out
- long lifespan
- high-efficiency rate
- flexible production scheme
- low operating and maintenance cost
- strict emission controls
- relocation option

THE IMPORTANCE OF WATER SOLUTIONS IN BALI

! THE JAKARTA POST - 13/4/2017

- When torrential rain fell on a daily basis and triggered floods in Bali, more than 50,000 homes in Denpasar found themselves without any clean water for days.
- Lack of water has been Bali's "**pink elephant in the room**" for decades.
- As early as 2009, research by the Japan International Cooperation Agency (JICA) warned that the southern part of the island would suffer from a water deficit by 2015. It projected a deficit of up to 2,500 liters per second.

! POLITEKNIK BALI WITH IDEP FOUNDATION

- Number of areas in Bali are facing crisis of healthy drinkable water due to the intrusion of sea water (400 m of land from the sea shore has been interuded).
- Some regency will face water crisis : Badung, Denpasar, Buleleng, Tabanan and Jemberana.

! INDOSURFLIFE .COM - 21/7/2016

- Dr. Stroma Cole, a senior lecturer in Geography and Environmental Management from the University of The West of England, said on Tuesday, April 14, 2015 at a seminar on Bali's water crisis that "Tourism is Killing People."
- Water, is recognized as one of the most critical and scarce resources for tourism, an industry renowned for its overuse of water. In Bali, she said, tourism absorbed 65 percent of the island's total water supply.

THE IMPORTANCE OF WATER SOLUTIONS IN BALI

● TOURISM

Development up to 2016

- ✓ Tourists : 12.8 mln (foreigners: 4.9 mln, domestics : 7.9 mln)
- ✓ 323 Star Hotels; 1798 Non-stars hotels
- ✓ 2223 restaurants

Consequences

- ✓ Need more land for infrastructures and facilities
- ✓ Need more food and water
- ✓ Need more labor

Significant Changes

- ✓ Conversion of agriculture land increases (3,617 Ha / year during 2003-2013)
- ✓ Change in Life styles - Consumer habits
- ✓ Cost of living increases

● AGRICULTURE

Opportunities

- ✓ Increase market demands
- ✓ More alternative markets and value crops
- ✓ Encourage farmers more productive

Consequences

- ✓ Increase needs of water
- ✓ Hybrid crops dominated

Problems

- ✓ Intensive use of agrochemicals
- ✓ Loss of Local varieties
- ✓ Inefficient and ineffective agribusiness supply chains
- ✓ Less value oriented

Number of Customers, Production, and Consumption of Water (2015)

Regency/ Municipality	Description		
	Total of Customers (Units)	Capacity of Water Supply (Liter/ sec)	Consumption of Water Supply (000 m ³)
Jembrana	22 275	245	4 526
Tabanan	53 929	579	13 071
Badung	67 796	1 251	24 571
Gianyar	54 079	713	11 546
Klungkung	28 587	284	6 261
Bangli	14 733	132	2 957
Karangasem	30 196	316	6 751
Buleleng	55 005	926	12 951
Denpasar	80 359	3 623	25 056
Jumlah / Total :	406 959	8 070	107 691

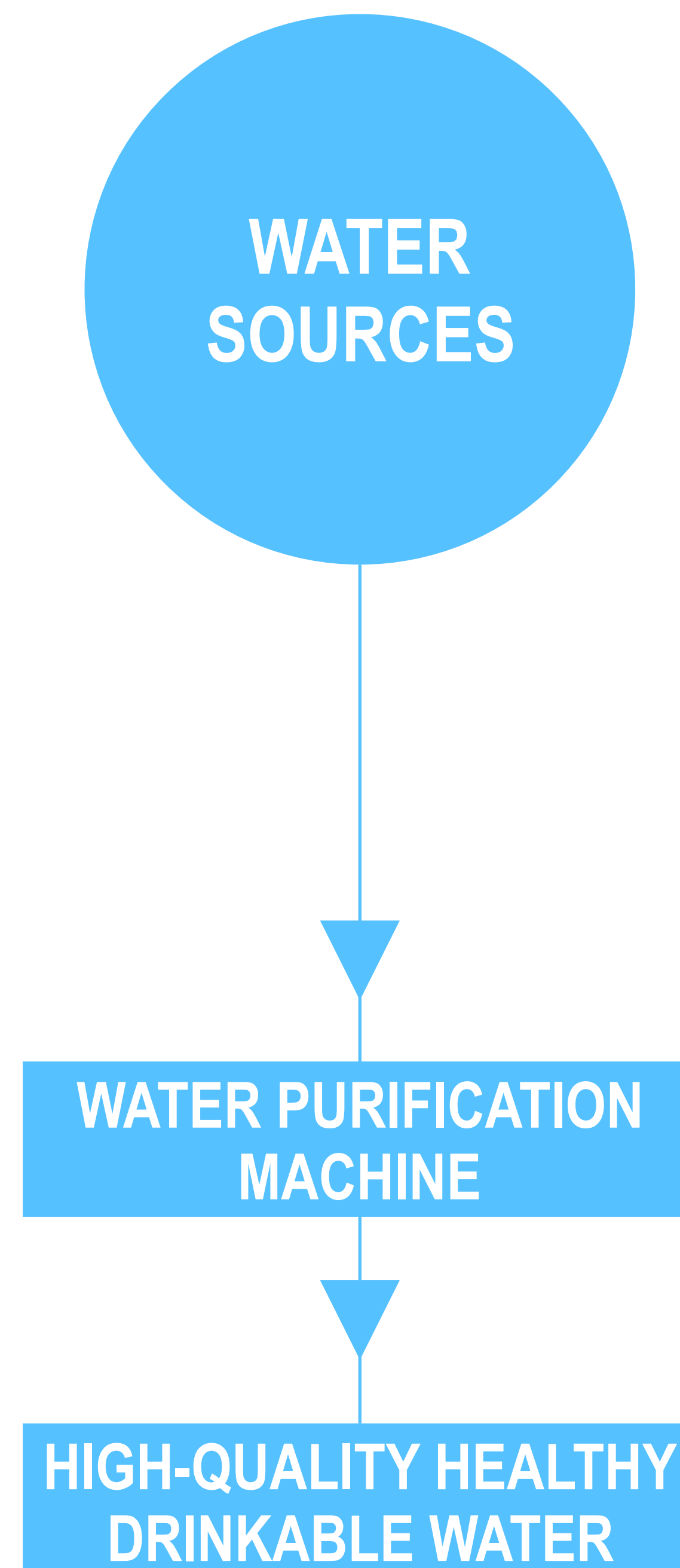
Source : BPS - Statistics of Bali Province

CONSUMPTION OF WATER

Kabupaten/Kota	Consumption Classification						
	Social / Public	Households	Government Institutions	Trade Company	Industry	Others	Total
Jembrana	73	3 841	408	178	9	15	4 526
Tabanan	356	8 665	351	3 181	62	457	13 071
Badung	565	15 771	89	2 224	3 750	2 172	24 571
Gianyar	405	9 721	120	856	407	37	11 546
Klungkung	326	4 902	551	403	18	62	6 261
Bangli	178	2 418	64	294	2	0	2 957
Karangasem	169	5 604	140	639	120	80	6 751
Buleleng	560	9 865	1 052	1 456	19	0	12 951
Denpasar	257	19 980	1 103	2 874	651	191	25 056
Jumlah/Total :	2 889	80 767	3 878	12 106	5 039	3 013	107 691

Source : BPS - Statistics of Bali Province

2 HIGH-QUALITY CLEAN DRINKING WATER



SAFE CLEAN DRINKING WATER

Bali is facing a serious water crisis. Some 60% of Bali's water catchment are drying up, threatening freshwater resources making the clean drinking water is rather hard to get.

Installing water purification machine is the solution to this challenge. There are ultrafiltration machines, reverse osmosis for fresh and brackish water machines, and also reverse osmosis for salinated and seawater machines.

To be even more eco-friendly, the water purification is using solar power which can save energy.

INNOVATIVE WATER PURIFICATION SYSTEM

- Modular and compact design for the operation in mobile or permanent applications.
- Removes all viruses, bacteria, chemical contaminants (arsenic, fluoride, nitrates, etc.) and salts without requiring toxic chemical treatment.
- Technology produces clean drinking water from contaminated fresh, brackish and sea water with solar and/or wind energy (with the option to use diesel or grid power).
- Rugged design for application under harsh conditions.
- Capacities from 300 l/d to 100'000 l/d.



INNOVATIVE WATER PURIFICATION SYSTEM

Sustainable:

- Solar power reduces the carbon footprint. 100% solar powered – 100% less emissions.

Cost-efficient:

- In many cases the running costs of RO systems are considered too expensive especially in developing countries. Using solar power the running costs are close to zero.

Off-grid locations:

- Stand-alone units are able to produce drinking water in remote areas with solar power (back-up with batteries or generator).



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