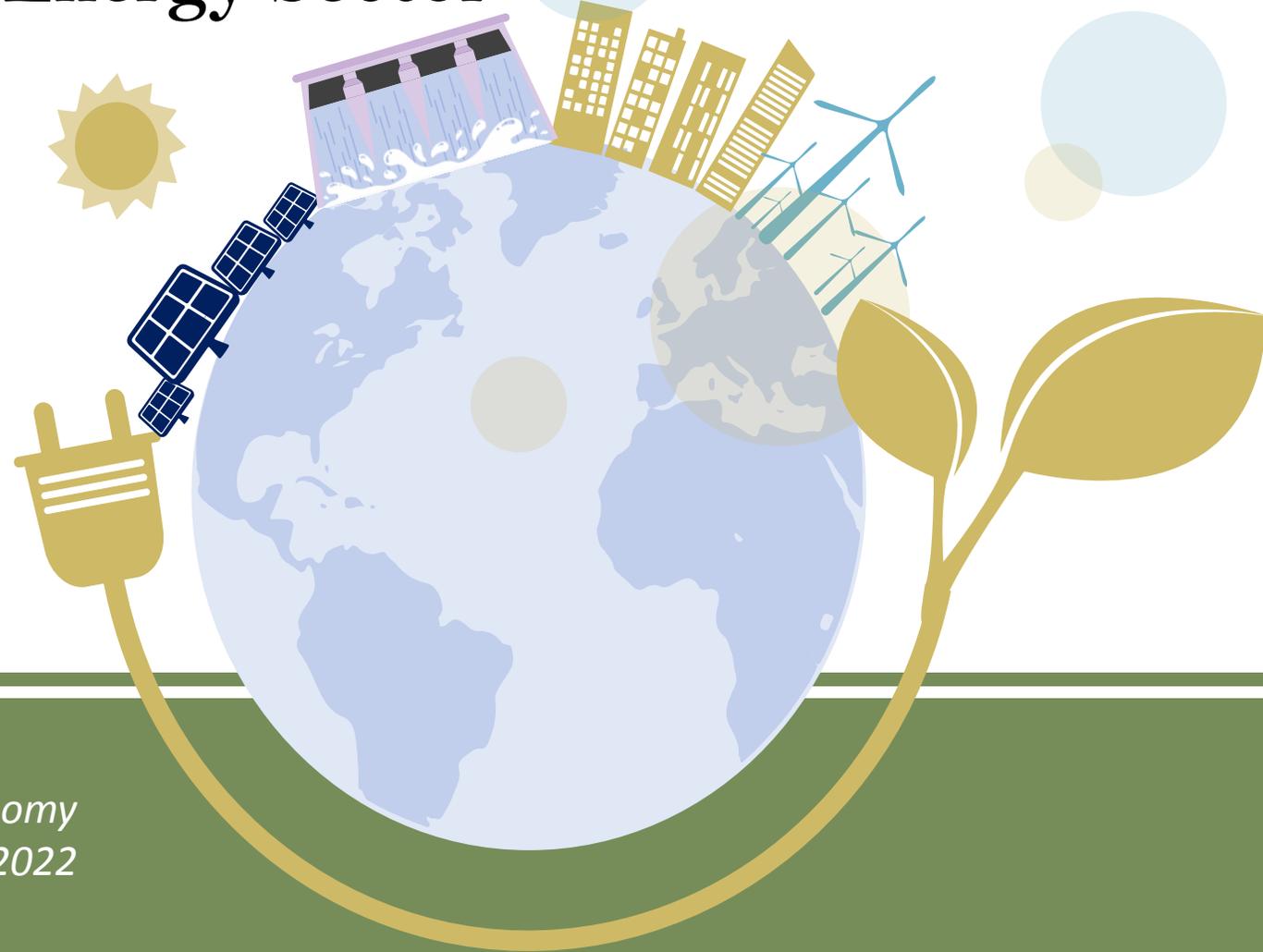


# Renewable Energy from Waste – Circular Economy Perspective in the Energy Sector

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**Mauritius Renewable Energy Agency**



*National Conference on Circular Economy  
26 May 2022*

## **OUTLINE OF PRESENTATION**

**STARK REALITY OF WASTE IN MAURITIUS**

**SOURCES OF WASTE**

**DEMYSTIFYING CIRCULAR ECONOMY**

**POTENTIAL ECONOMIC IMPACTS OF CIRCULAR ECONOMY**

**CLIMATE BENEFITS OF CIRCULAR ECONOMY**

**RENEWABLE ENERGY – AN INTRINSIC PART OF CIRCULAR ECONOMY**

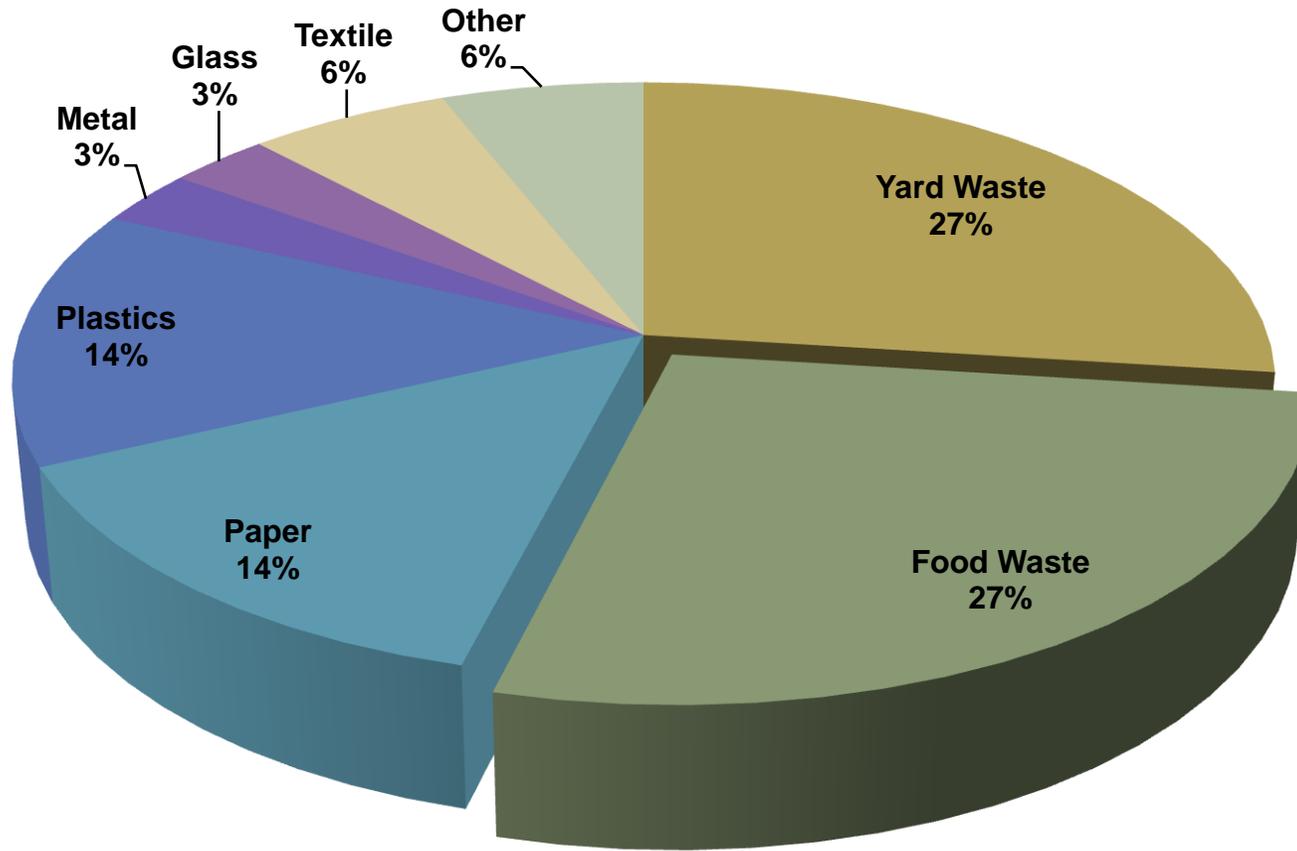
**LIFE CYCLE ANALYSIS - SOLAR PANELS AND BATTERIES**

**SOLAR PV RECYCLING PROCESS**

**RENEWABLE ENERGY FROM WASTES v/s OTHER ENERGY SOURCES**

# STARK REALITY OF WASTE IN MAURITIUS

COMPOSITION OF WASTE (2020)<sup>1</sup>



## Climate Change and Waste Management



Important Societal Challenges recognized by:

- Paris Climate Change Agreement 2015
- NDC Action Plan

Source<sup>1</sup>: Digest of Environment Statistics 2020 (Statistics Mauritius)

## SOURCES OF WASTE



The Government Annual Budget on Waste Management<sup>2</sup>

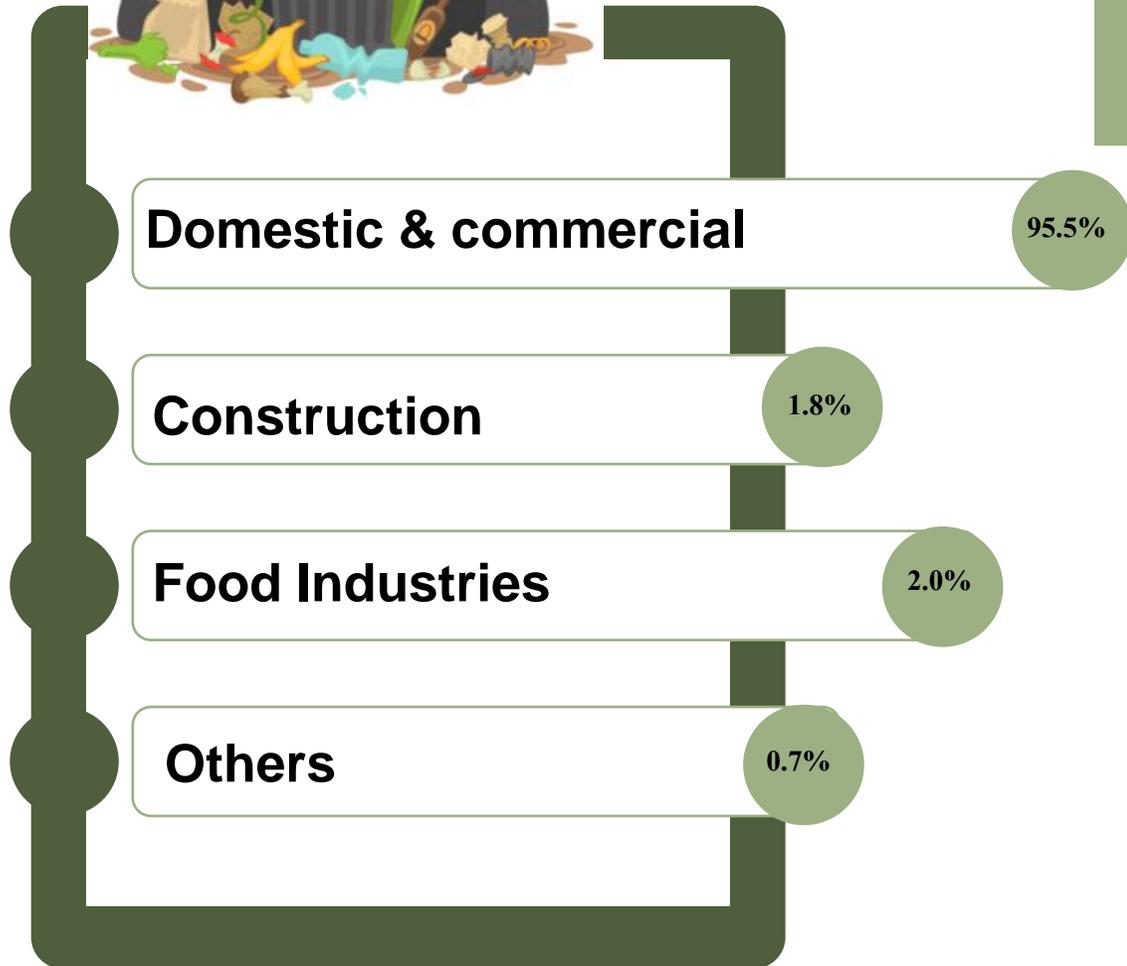
↓

Rs 1.5 Billion per annum



2% increase on average yearly over last 10 years<sup>2</sup>

Total wastes generated by 2030 – approximately **684,000 Tonnes**



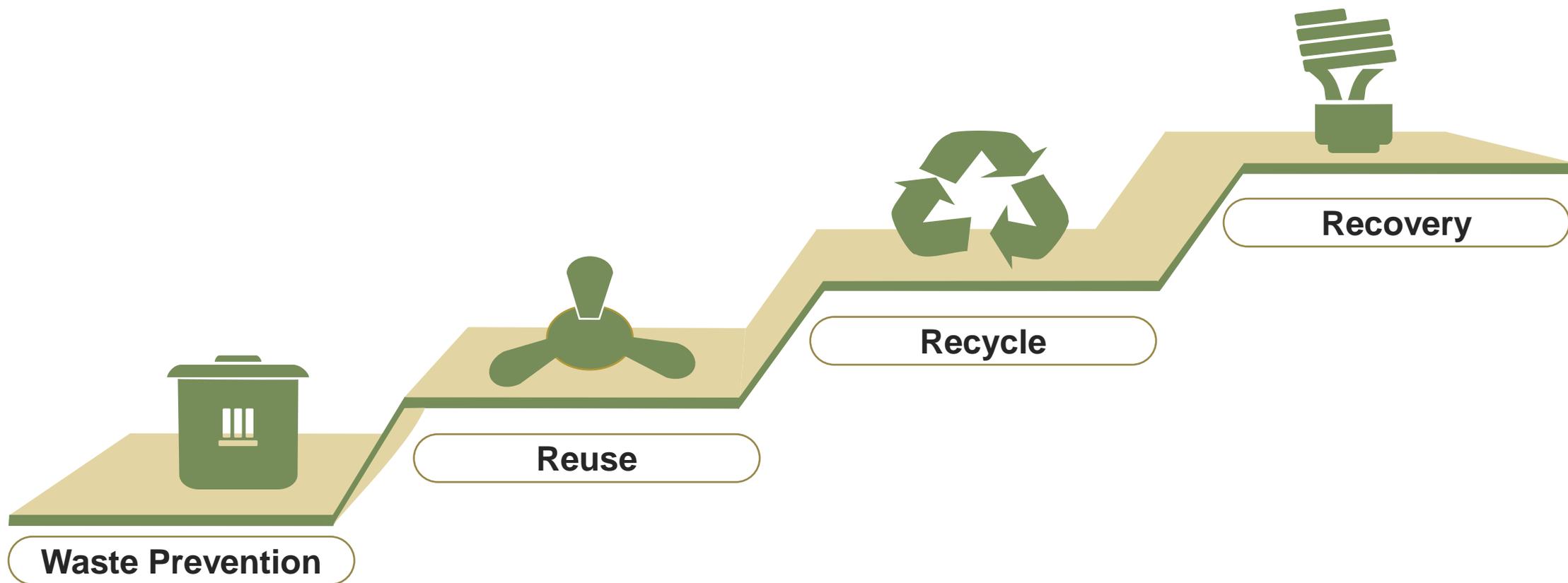
Wastes Landfilled - 2021<sup>2</sup>



507,992.42 Tonnes

Source<sup>1</sup>: Digest of Environment Statistics 2020 (Statistics Mauritius)  
Source<sup>2</sup>: Annual report financial year 2020-2021 (Min of Env)

# DEMYSTIFYING CIRCULAR ECONOMY



# POTENTIAL ECONOMIC IMPACTS OF CIRCULAR ECONOMY

## Environment

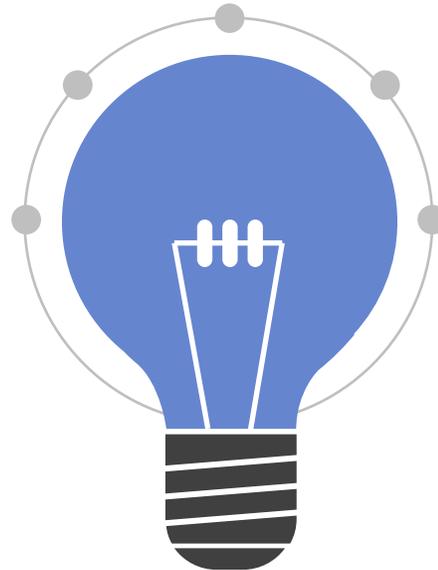
Reducing Pollution And Pressure On The Environment

## Economy

Boosting GDP  
Up To 0.5%

## Innovation

Improving The Security  
Of Supply Of Raw  
Materials



## New Industry

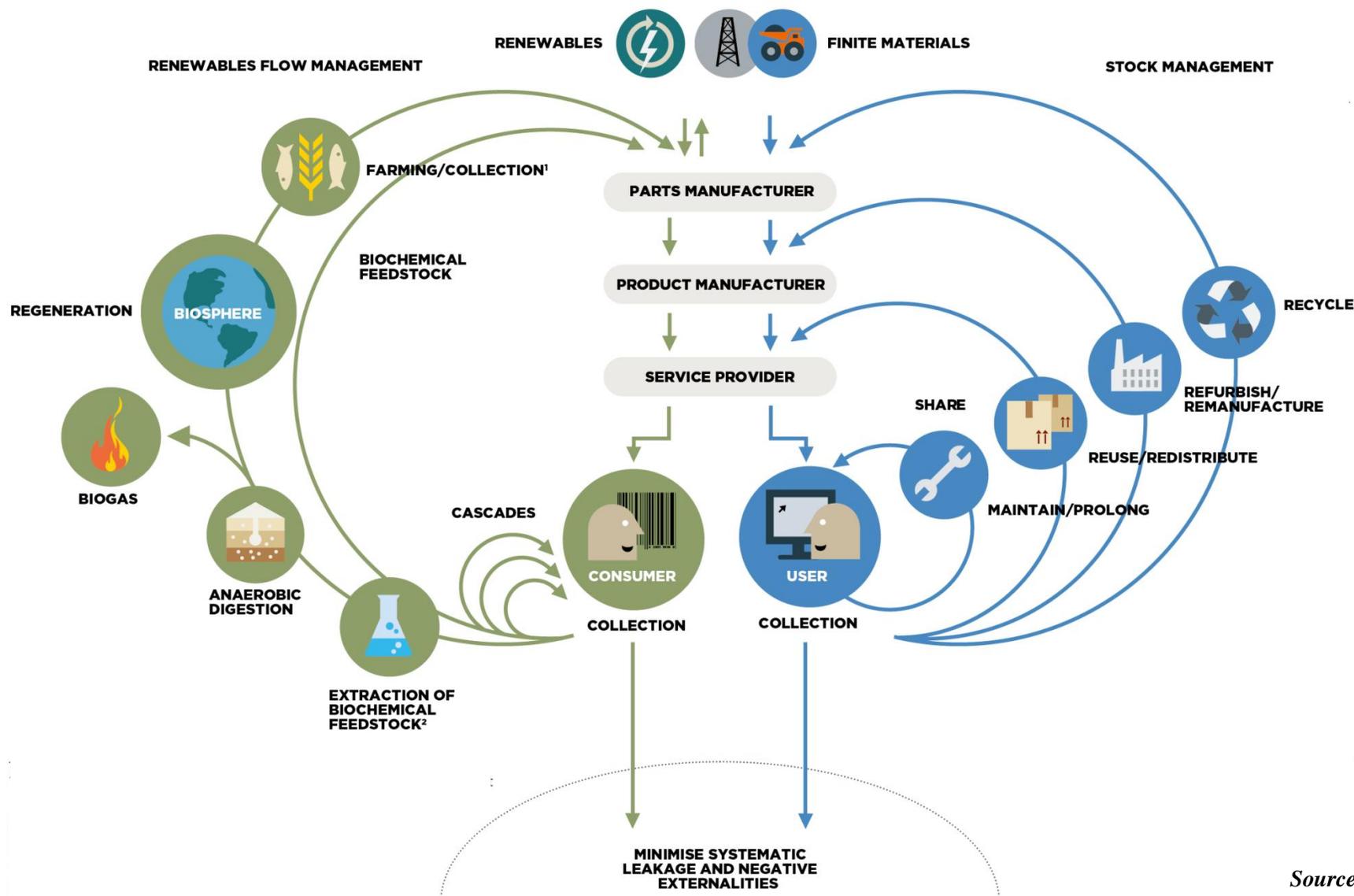
Promotes Competition And  
Boost Economy Activity

## Employment

Creation Of Jobs



# CLIMATE BENEFITS OF CIRCULAR ECONOMY



- 7 AFFORDABLE AND CLEAN ENERGY
- 8 DECENT WORK AND ECONOMIC GROWTH
- 11 SUSTAINABLE CITIES AND COMMUNITIES
- 12 RESPONSIBLE CONSUMPTION AND PRODUCTION
- 13 CLIMATE ACTION
- 14 LIFE BELOW WATER
- 15 LIFE ON LAND



# RENEWABLE ENERGY – AN INTRINSIC PART OF CIRCULAR ECONOMY



## RENEWABLE ENERGY FROM WASTE TO ENERGY METHODS TO GENERATE ENERGY

### Thermal Technologies

### Non-thermal Technology

60 % RE target

Phase out Coal

Biomass Framework



#### INCINERATION

- ✓ Burn solid at high temperature
- ✓ Heat converted to energy
- ✓ Steam drives turbine



#### PYROLYSIS

- ✓ Break chemical bonds in material
- ✓ Fragments unite to form smaller molecules
- ✓ Char, tar and gases are by-products



#### GASIFICATION

- ✓ Turns biomass into gases without burning by steam adjustment
- ✓ Syngas is the product



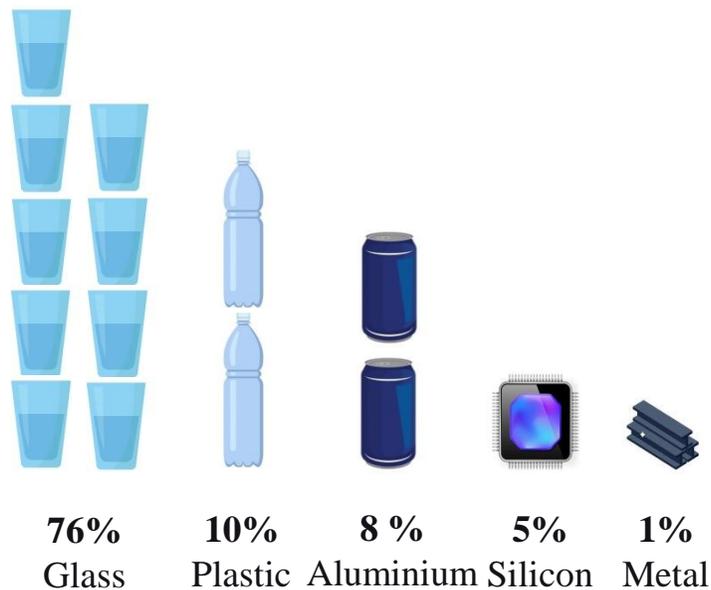
#### ANAEROBIC DIGESTION

- ✓ Microorganisms break down materials & Absence of oxygen
- ✓ Waste is fed into a digestion tank
- ✓ Biogas and Carbon Dioxide are products

✓ **Compost is a by-product**

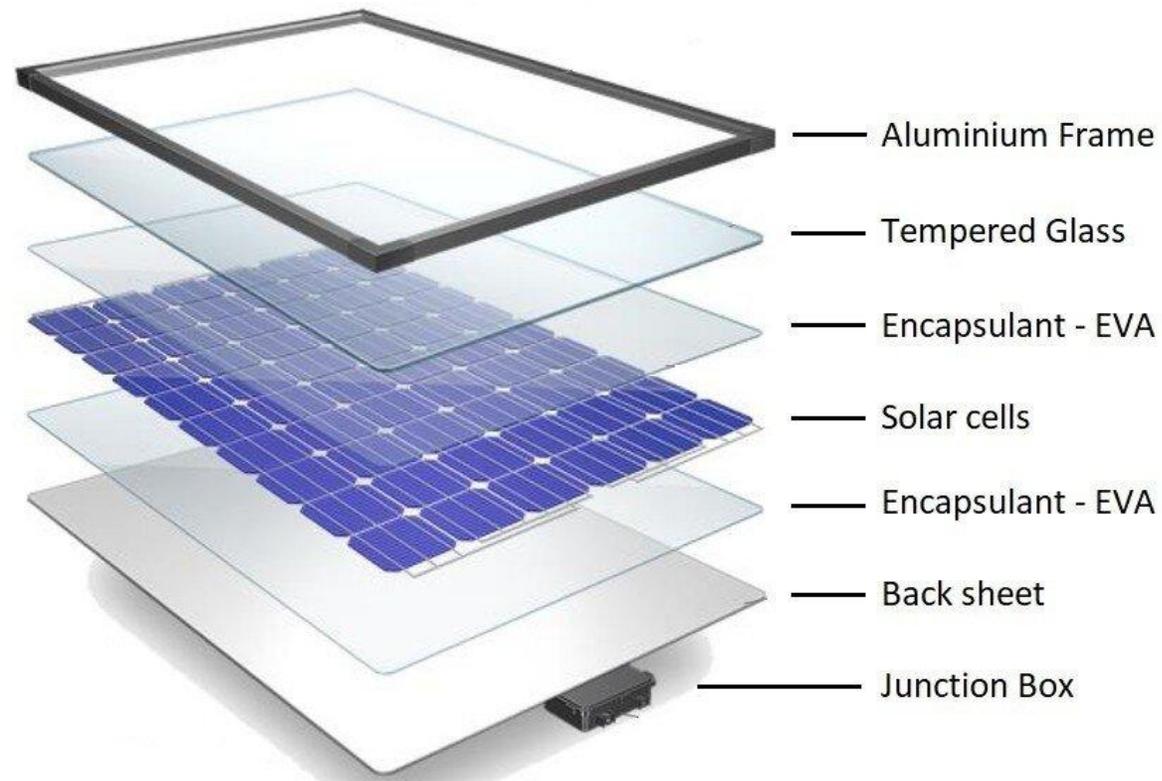


## LIFE CYCLE ANALYSIS - SOLAR PANELS AND BATTERIES



### WHAT IF?

Wastes of Renewable Energy are used to generate energy



**1.5 million tonnes of glass, metals & Silicon**  
95 % can be recovered



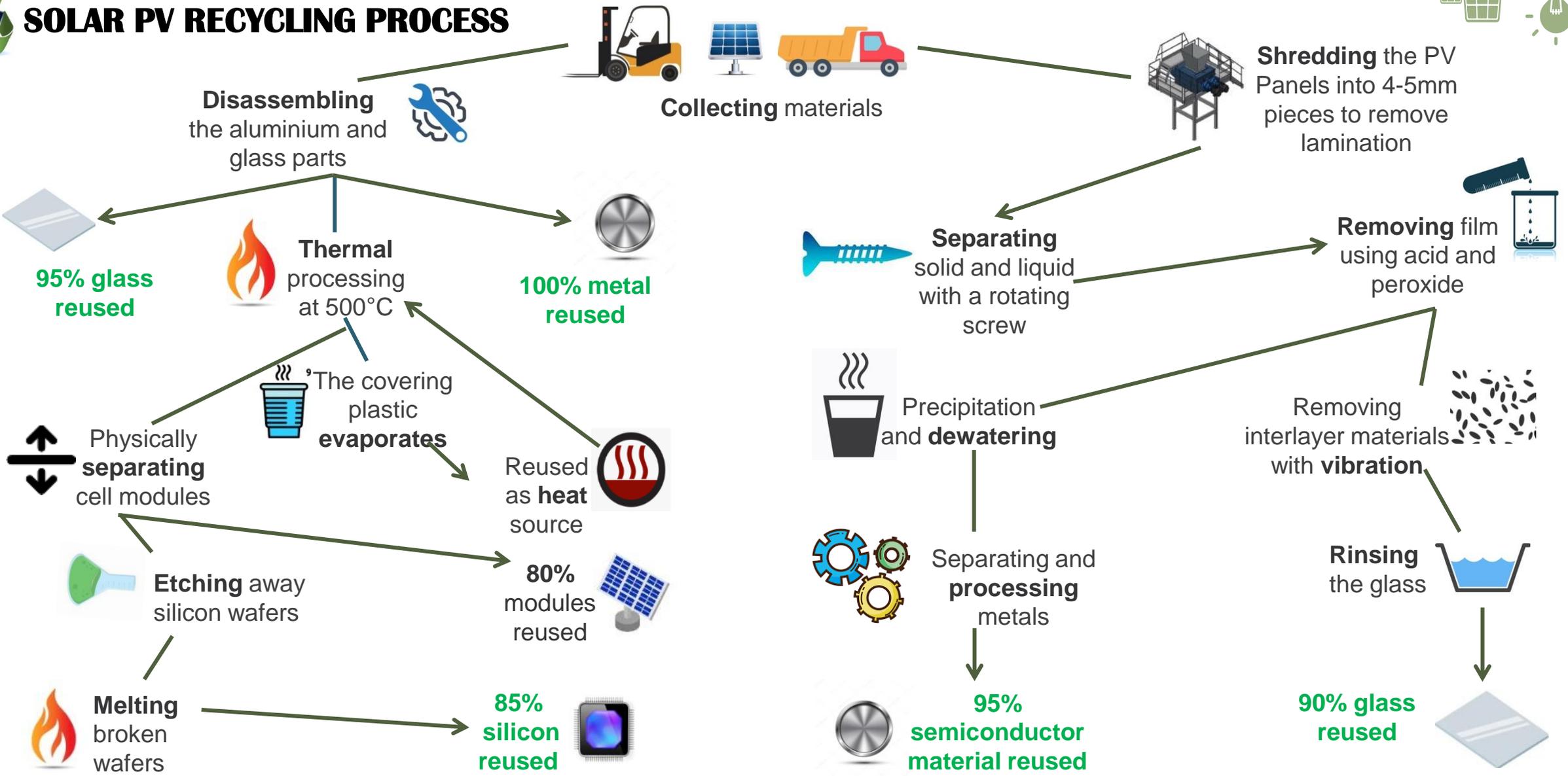
**4.75 million tonnes of concrete, metals and composites**  
90 % can be recovered

**240000 tonnes of lithium ion batteries**  
100 % can be recovered





# SOLAR PV RECYCLING PROCESS





# RENEWABLE ENERGY FROM WASTES v/s OTHER ENERGY SOURCES

SOURCE OF ENERGY	ADVANTAGES	DISADVANTAGES
<b>SOLAR PV</b>	<ul style="list-style-type: none"> <li>• Cost effective</li> <li>• Easy to deploy</li> <li>• Around 50g of CO<sub>2</sub>/kWh</li> </ul>	<ul style="list-style-type: none"> <li>• High space occupancy(1 MW/1 ha)</li> <li>• Intermittency issues</li> </ul>
<b>WIND</b>	<ul style="list-style-type: none"> <li>• Low maintenance</li> <li>• Low in space requirement</li> <li>• Around 11g of CO<sub>2</sub>/kWh</li> </ul>	<ul style="list-style-type: none"> <li>• High CAPEX</li> <li>• Visual and noise pollution</li> <li>• Prone to damage in cyclonic conditions</li> </ul>
<b>LNG</b>	<ul style="list-style-type: none"> <li>• Environmentally clean</li> <li>• High Efficiency</li> <li>• Economical</li> </ul>	<ul style="list-style-type: none"> <li>• Highly combustible</li> <li>• High requirements for storage</li> <li>• High CAPEX</li> </ul>
<b>COAL</b>	<ul style="list-style-type: none"> <li>• Established energy source</li> <li>• Ensure firm power</li> </ul>	<ul style="list-style-type: none"> <li>• High GHG emissions – 978 g / CO<sub>2</sub>/kWh</li> </ul>
<b>RENEWABLE ENERGY FROM WASTES</b>	<ul style="list-style-type: none"> <li>• Reduces landfill wastes</li> <li>• Land efficient power plants</li> <li>• Sustainable process</li> </ul>	<ul style="list-style-type: none"> <li>• High CAPEX</li> <li>• Destruction of useful materials</li> <li>• Sorting and collection of waste</li> </ul>



# THANK YOU FOR YOUR ATTENTION

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