# Reducing Carbon footprint in production of Currency

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SPEAKER

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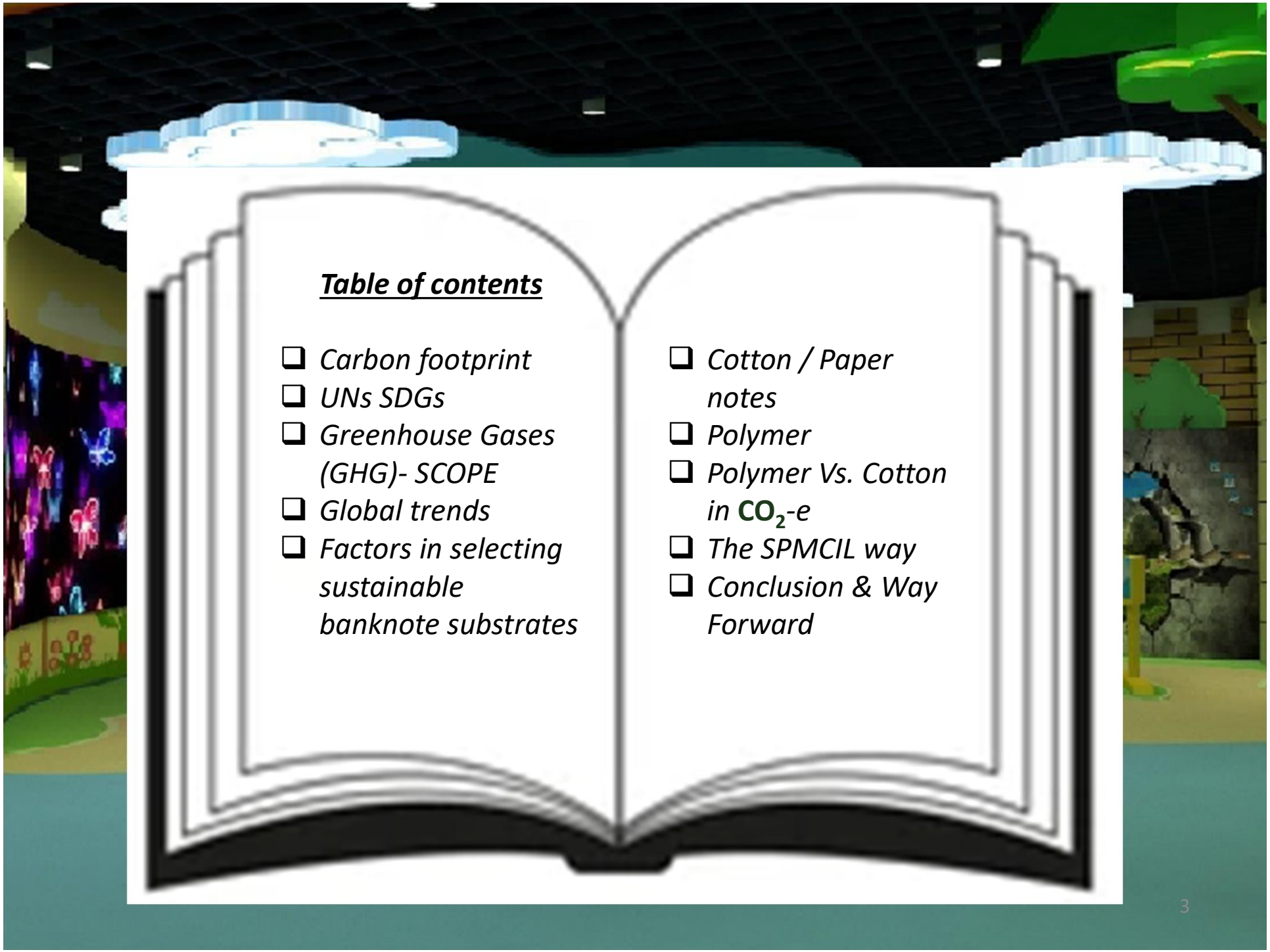


***Table of contents***

- *Carbon footprint*
- *UNs SDGs*
- *Greenhouse Gases (GHG)- SCOPE*
- *Global trends*
- *Factors in selecting sustainable banknote substrates*
- *Cotton / Paper notes*
- *Polymer*
- *Polymer Vs. Cotton in $CO_2$-e*
- *The SPMCIL way*
- *Conclusion & Way Forward*

# Carbon Footprint

Carbon Footprint is the measure of the impact of **human activities** on the environment in terms of the amount of greenhouse gases (GHG) produced, measured in units of carbon dioxide (**$CO_2$**) or carbon dioxide equivalent (**$CO_2$-e**). It is typically used to assess the emission of individual, business, or products, and is often used as a way to encourage individuals and organizations to reduce their emission and promote **sustainable practices**.

# Importance of reduction of Carbon Footprint

**Effect on the Environment** –

Rising temperatures, year-long rain showers, tropical storms, wildfires, melting ice caps, and other unusual climate changes are a result of increasing $CO_2$ emissions.

**Impact on Human Beings** –

Climate change and droughts interfere with crop growth, compromise access to safe drinking water, cause diarrheal diseases, and lead to compromised air quality index

**Wildlife Extinction** –

Climate change has led to shifts in vegetation, and the increasingly shifting temperature and weather patterns, in turn, threaten various wildlife species into extinction.

**Retards Economic growth** –

Countries that depend on their land for agricultural and natural resources, experience a significant threat to their respective economy due to the climate change.

# United Nations Sustainability Development Goals (SDGs)

- The United Nation member states adopted the 2030 Agenda for Sustainable Development in 2015, by providing a shared blueprint for peace and prosperity for people and the planet, now and into the future. This goal led to the development of **17 Sustainable Development Goals** with the aim to achieve a better and more sustainable future for all. The SDGs emphasize the **interconnected** environmental, social, and economic aspects of sustainable development by putting **sustainability at their center**.
- The SGD13: Climate Change, directly addresses the detrimental effects of increasing carbon footprint. such as threat to coral reef, rise in sea levels, droughts, unprecedented disasters. The goal is to reduce $CO_2$ emissions by **45% by 2030** from 2010 levels and reach **net-zero emissions** by 2050.

# Scope of Greenhouse Gases (GHG)

**Scope 1** – These are **direct** greenhouse (GHG) emissions that occur from sources that are controlled or owned by an organization (e.g., emissions associated with fuel combustion in boilers, furnaces, vehicles)

**Scope 2** – These are **indirect** GHG emissions associated with the purchase of electricity, steam, heat, or cooling. These emissions are a result of the organization's energy use.

**Scope 3** – These are all indirect emissions (not included in scope 2) that occur in the **value chain of the reporting company**, such as purchased goods and services, business logistics, use of sold products, processing of waste etc.

# Global trends on reduction of Carbon Footprint in Currency

- **Green Bank Notes**
- **Carbon Offsetting Services** – Using carbon footprint model (**score card**) to reduce the embedded carbon in the products.
- **Recycling –** Plastics used in packaging products is reduced/ removed where possible. It is also ensured that any plastic that is used is recyclable at the end destination.
- **Clean Energy** - Using 100% renewable electrical power. Commissioning the solar panel installation in units.
- **Biodiversity** – Natural habitat and biodiversity are also considered for development of any new facility. For every one tree that is removed, two or more may be planted.

# Global trends on reduction of Carbon Footprint in Currency

- **Onsite Renewable Energy Production** – Onsite plants are developed for producing renewable energy.
- **Better cotton initiatives –** Substitute cotton by alternative fibers such as abaca fibers. Other alternative plants, such as eucalyptus, alfa, hemp, jute, kapok, sisal are under study.
- **Installation of biological purification plant for Water –** Plant installed in the facility to clean and reuse process water. The water is used not only for paper production but also for cooling the factory and generating renewable power.
- **Monitoring of the carbon footprint used to produce banknotes - from Cash to compost -** Analysis of key factors, from the raw material to customer delivery, to optimize the carbon footprint.

# Global trends on reduction of Carbon Footprint in Currency

- **Recycle and Reuse of Waste -** 80% of the waste is recycled through treatment processes, such as
  - **(i) Cellulose acetate from Shredded paper waste;**
  - **(ii) Cotton waste as brick material**
  - **(iii) Cotton waste Pyrolysis project**
  - **(iv) Incineration of banknotes for cement production**
  - **(v) Asphalt production from unfit banknotes**

SEM image of fibres networking on paper surface

# Factors controlling the selection of sustainable banknote substrates

**Fewer reprints, lower costs, less environmental impact**

- ✓ Durability is an important aspect in the sustainability debate and a determining factor of sustainability in the cash cycle.
- ✓ With sophisticated technologies, highly durable cotton based banknotes can be produced.
- ✓ Cotton banknotes offer a whole range of possibilities for recycling after their life cycle.
- ✓ In terms of water and carbon footprint, the advantages of fibre-based notes can be improved even further if fibres, e.g. eucalyptus, jute, kapok, sisal, hemp, abaca, or flax, are used.
- ✓ Climate impact also plays a role in selecting the most suitable banknote solution.
- ✓ Circulation velocity also including energy consumption for banknote service system

# Alternate fibres

Flax

Sisal

Kapok

Jute

Eucalyptus

Hemp

## Why Cotton Comber?

- ✓ Durability
- ✓ Easily available textile industry by-product
- ✓ High intrinsic cellulose fibre strength
- ✓ Easy Fibre processing (pulping & bleaching)
- ✓ The raw material for new banknotes simply grows back.

## Current status of cotton production

**India – 6,000,000 metric tonnes / year**
**USA – 4,000,000 metric tonnes / year**
**China – 4,000,000 metric tonnes / year**

# POLYMER NOTES

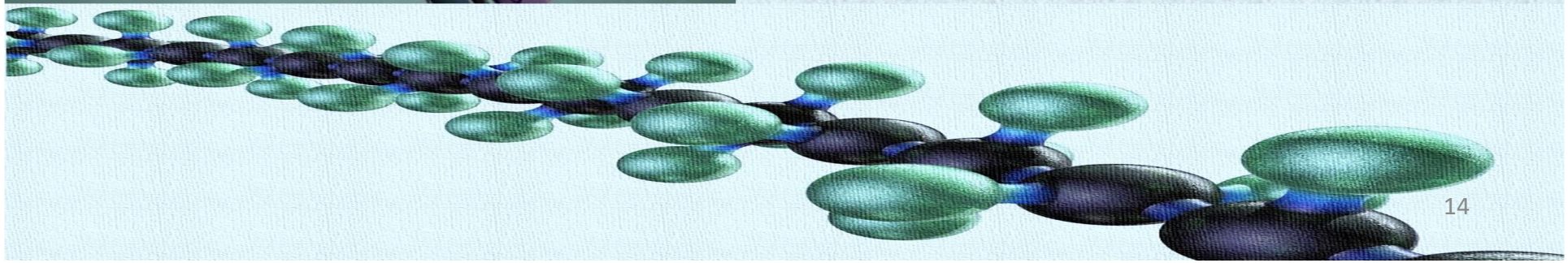
***Nearly 75 countries have introduced polymer notes.***

**Pros**

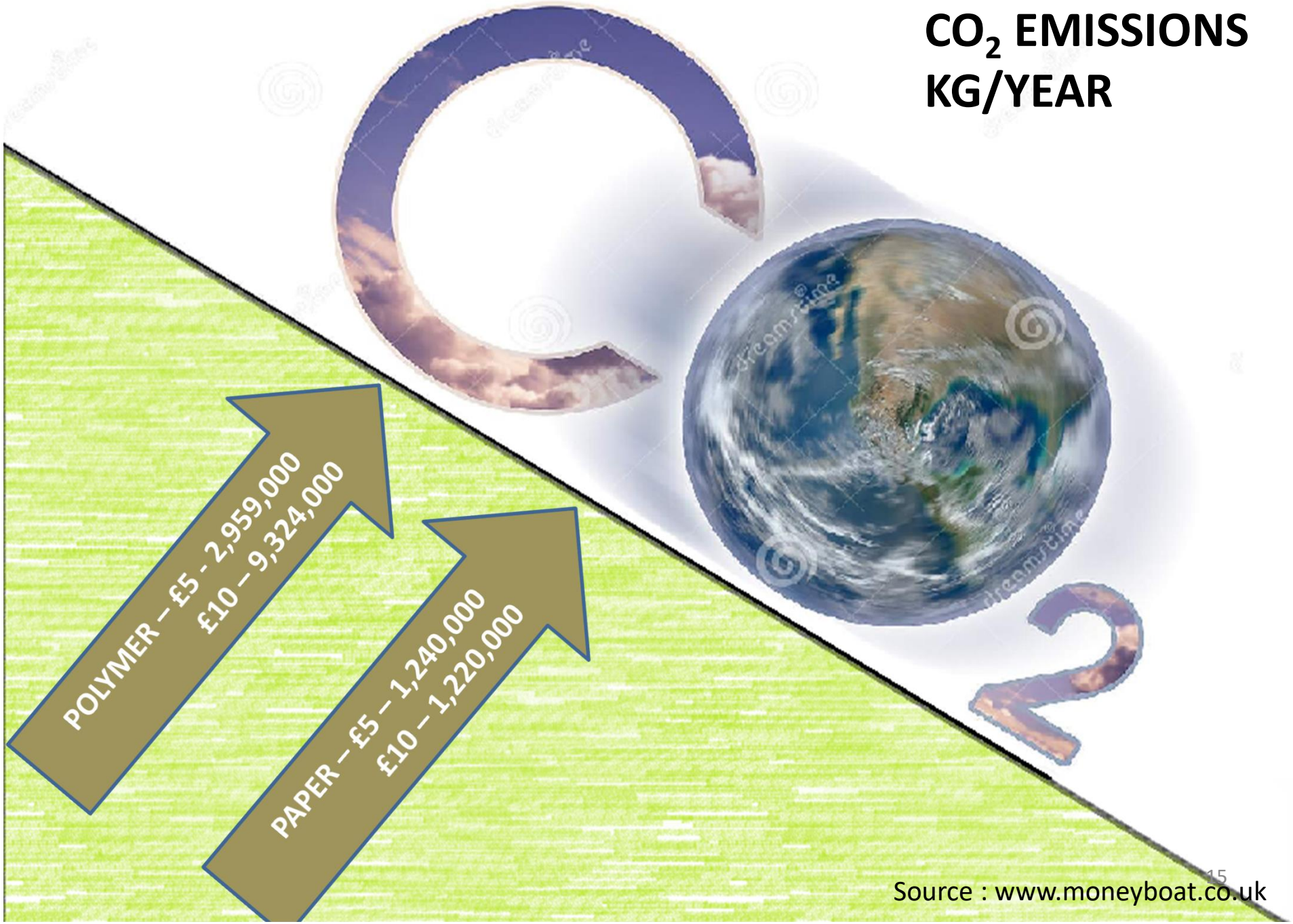
- ✓ Durable, life is 2.5 times more than paper note.
- ✓ Water proof, resistant to microorganisms and dust.
- ✓ Difficult to counterfeit; enhanced security features like hologram
- ✓ High Circulation velocity

**Cons**

- ✓ Hard to fold, slippery to touch, sticky when wet, risk of fading, use of animal fat, does not decompose, reacts to high temperature.
- ✓ Pose challenges for large circulation in cash oriented economies like India.
- ✓ Higher GHG emissions than their paper equivalent.



# $CO_2$ EMISSIONS KG/YEAR




Source : www.moneyboat.co.uk

# Total manufacturing carbon footprint (kg $CO_2$-e) for respective lifetimes

**PAPER**

| | | |
|---|---|---|
| £5 - |  | 1.8 kg $CO_2$-e |
| £10 - |  | 2.92 kg $CO_2$-e |

**POLYMER**

| | | |
|---|---|---|
| £5 - |  | 4.97 kg $CO_2$-e |
| £10 - |  | 8.77 kg $CO_2$-e |

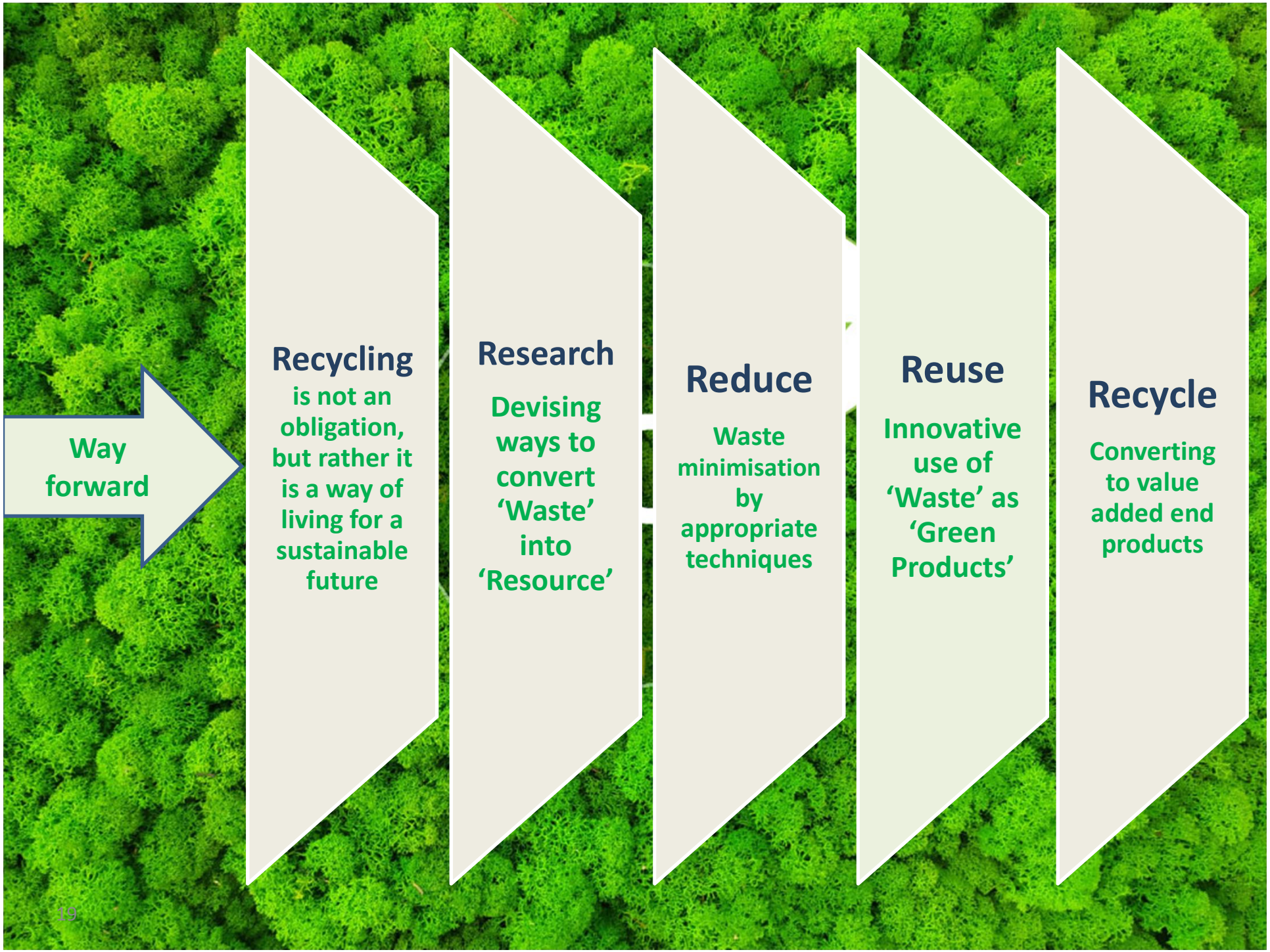
Source : www.moneyboat.co.uk

# The SPMCIL way

- Microbial study of paper machine back water system, recycled water of effluent treatment plant (ETP), pulp and broke system
- Installation of WSRTP units
- Oil based heaters replaced by Solar water heaters for AC Plant
- Usage of LPG gas instead of furnace oil for boiler at Paper mill
- Energy efficient motors installed at production units
- 0% Effluent Discharge at Paper Mill
- Reusing of Ink Drums / Tins / Cans at Production units
- Installation of RO plants at units & reduced packaged water consumption
- Annual mass tree plantation on Environment day
- Conduct of regular Energy audits at units
- Educating employees on behavioural aspects for reducing carbon footprint

# The SPMCIL way

- Briquetting of paper waste, board making
- Shredding & disposal of used blankets instead of burning
- Nylon plate burning discontinued. Now chopped to small pieces & diluted in water
- Used M/c oil is recycled
- All fluorescent lamps replaced with energy efficient lights & LED lamps
- All Street lights of SPMCIL units run on Solar power
- Improvement in the quality of cotton comber by minimizing the trash content.
- Print management software & virtual meetings to reduce printing materials
- Green procurement & certification – in progress
- Usage of only railway wagons for Banknote transport


Way forward
Recycling
is not an obligation, but rather it is a way of living for a sustainable future
Research
Devising ways to convert 'Waste' into 'Resource'
Reduce
Waste minimisation by appropriate techniques
Reuse
Innovative use of 'Waste' as 'Green Products'
Recycle
Converting to value added end products


SAVE EARTH.
Planet over Profit
Our earth needs us right now, more than ever.