EU-REI

Creating a Resource Efficient India

Increasing Resource Efficiency in Construction & Buildings
EPR in Plastics & E-waste

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RE Regional Workshop – Goa

EU Resource Efficiency Initiative (REI)

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Creating a Resource Efficient India

Background

- India's material demand in 2010 was the largest in the world, after that of China and the United States, with a consumption of about 7.2% of globally extracted raw materials in that year.
- Consumption rates in India in 2015 may have already overtaken those of the USA (UNEP, 2016).

RE Strategy for implementation of interventions in India Niti Aayog, MoEFCC & EU Delegation

Project Information

- REI project commissioned by the EU to an international consortium composed of GIZ, TERI, CII and adelphi
- Mode of cooperation: EU-Partnership Instrument (PI)
- Project duration: 3.5 years (01/2017 – 7/2020)
- Overall budget: 2.5 Mio € budget

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Background: EU- REI studies

Two studies on resource efficiency in India – working titles:

- Enhancing Resource Efficiency through Extended Producer Responsibility: Sector Study on Plastics, Packaging and E-waste Management in India
- Fostering Resource Efficiency in the Indian Buildings and Construction Sector: An Evaluation of Interventions in the Built Environment

Key components

- Research on historical development and future trends of resource consumption and efficiency
- Identification of concerns, priorities and opportunities and of improvement potentials (business models, technologies, policies and codes)
- Provision of recommendations to policy makers, industry and civil society
- Development of an action plan for policy reforms and identification of capacity building measures as well as potential pilot projects

Preliminary Findings: Enhancing RE through EPR

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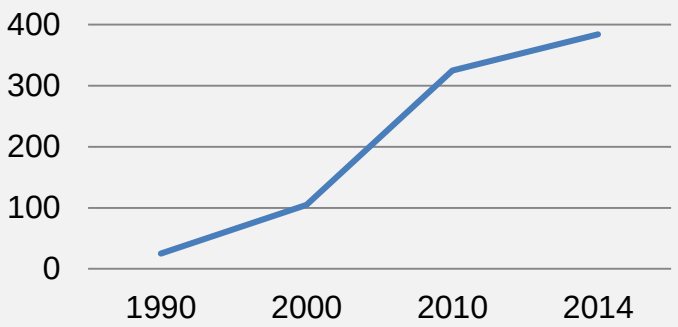
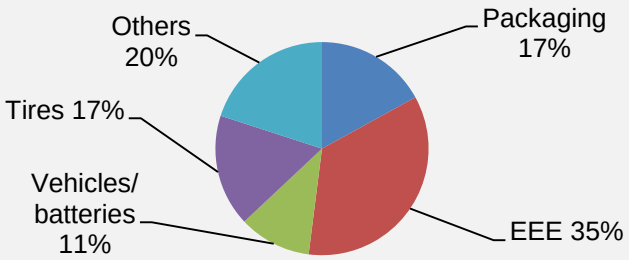
Extended Producer Responsibility (EPR)

- Policy principle to decrease the total impact from a product, by making producers responsible for the entire life-cycle (Lindhqvist 1992)
- Dual objective of EPR is to improve upstream processes, i.e. Design for Environment (DfE), and downstream processes, i.e. waste management (Tojo 2004)
- Since the 1990s, adoption of 384 EPR policies worldwide (Kaffine & O'Reilly 2015), fuelling the creation of waste management industries with a revenue of 335 billion EUR by 2019 (UNEP 2011)

Global cumulative adoption of EPR schemes



Global application of EPR schemes by product type



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Options for Enhancing RE: Plastic Packaging

Support shift towards closed-loop production and consumption systems through continuous development of standards (e.g. ISO, EN) and use of codes (e.g. Cradle to Cradle) for plastic packaging on the market

EN Standards

- The Directive defines Essential Requirements as qualities to be attained and the risks to be dealt with for packaging placed on the market; elaboration of standards mandated by Article 10
- EN standards on packaging weight and volume as well as suitability for energy recovery, composting, recycling, or reuse (EN 13427 - EN13431) available
- Standards reverse the burden of proof in favour of market participants and can contribute to free movement across economic area to optimise closed-loop systems
- Issued by the European Standardisation Committee (CEN)

Options for Enhancing RE: Plastic Packaging

Standard	Application
EN13428:2004 - Prevention	Requires processes to foster reduction by source (i.e. minimising weight/volume) and pollutant reduction and (i.e. minimising presence of noxious and hazardous materials)
EN13429:2004 – Reusable packaging	Requires to obtain confirmation from suppliers that the packaging is capable of reuse and from their customers that they intend to place the packaging into a reuse circuit
EN13430:2004 - Material recycling	Procedure by which design, production and use of packaging can be checked against the requirements of various material recycling systems; user can calculate the % by weight of the pack which is recyclable
EN13431:2004 - Energy recovery	Defines and specifies the thermodynamic requirements for packaging to allow the incineration with energy recovery of packaging waste
EN13432:2000 – Organic recovery	Requirements for packaging to be considered as recoverable trough composting and biodegradartion

Options for Enhancing RE: Plastic Packaging

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Codes – Cradle2Cradle certification

- Guides designers and manufacturers through a continual improvement process that looks at a product through five quality categories (EPEA 2018)
- A product receives an achievement level in each category - Basic, Bronze, Silver, Gold, or Platinum - with the lowest achievement level representing the product's overall mark (cross-reference to application of c2c in buildings and construction sector)

CERTIFIED™ cradle to cradle
PRODUCTS PROGRAM

CRADLE TO CRADLE CERTIFIED PRODUCT SCORECARD

QUALITY CATEGORY	BASIC	BRONZE	SILVER	GOLD	PLATINUM
MATERIAL HEALTH			✔		
MATERIAL REUTILIZATION			✔		
RENEWABLE ENERGY & CARBON MANAGEMENT				✔	
WATER STEWARDSHIP			✔		
SOCIAL FAIRNESS					✔
OVERALL CERTIFICATION LEVEL			✔		

Options for Enhancing RE: Plastic Packaging

Ellen MacArthur Foundation – A New Plastics Economy

- “11 leading brands, retailers, and packaging companies to work towards 100% reusable, recyclable or compostable packaging by 2025 or earlier” (Ellen MacArthur Foundation 2018)

Options for Enhancing RE: Plastic Packaging

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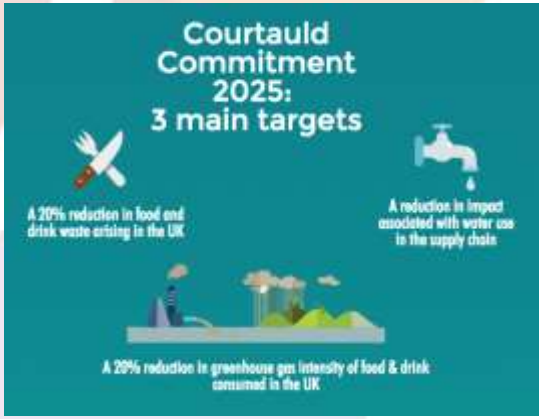
Courtauld Commitment (UK)

- Voluntary agreement between major UK supermarkets (92% of market share) and the Waste & Resources Action Programme (WRAP)
- Reduction of household waste by redesigning packaging
- Focus on:
  - Biopolymers and compostable packaging
  - Information for consumers
  - Household food waste reduction initiatives
  - Company specific targets
  - Best practise sharing through case studies



Options for Enhancing RE: E-waste

Encourage sectoral collaboration along for downstream processes to enhance including collection, dismanlting and recycling on a pan-Indian scale

WEEE forum

- European association of e-waste take back systems with 34 not- for-profit members
- 31.016 producer represented by PROs in the WEEE Forum (2016), operating over 114.000 collection points
- Actively engaging in policy dialogue on behalf of its members, initiating various pan-European platforms which stimulate collaboration

Options for Enhancing RE: E-waste

ProSUM – Prospecting Secondary raw materials in the Urban mine and mining wastes

- ProSUM from Latin: *„I am valuable“*
- First urban mining knowledge data platform, co-developed by WEEE Forum and funded by the European Union (Jan 2015- Dec 2017)
- Functions as a centralised database for material stocks, flows and treatment of WEEE, ELVS, batteries and mining wastes
- Web-portal easily accessible; database which helps identify opportunities for e-waste recycling and extraction of precious metals fit to end- user requirements

ProSUM
Prospecting Secondary raw materials in the Urban mine and Mining wastes

Urban Mine Platform

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Options for Enhancing RE: E-waste

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I4R – Information for Recyclers

- Hosted by the **WEEE Forum,** platform that provides information and guidance on how to handle e-waste, presence and location of materials and components that need separate treatment
- Specifically designed for recyclers, i.e. addressing treatment and recycling facilities and preparation for re-use operators; information at product category level
- in line with **the requirements of WEEE Directive (2012/19/EU)** which stipulates that producer are required to provide information regarding e-waste disposal

APPLiA Home Appliance Europe
DIGITALEUROPE
weeeforum
I4R-platform

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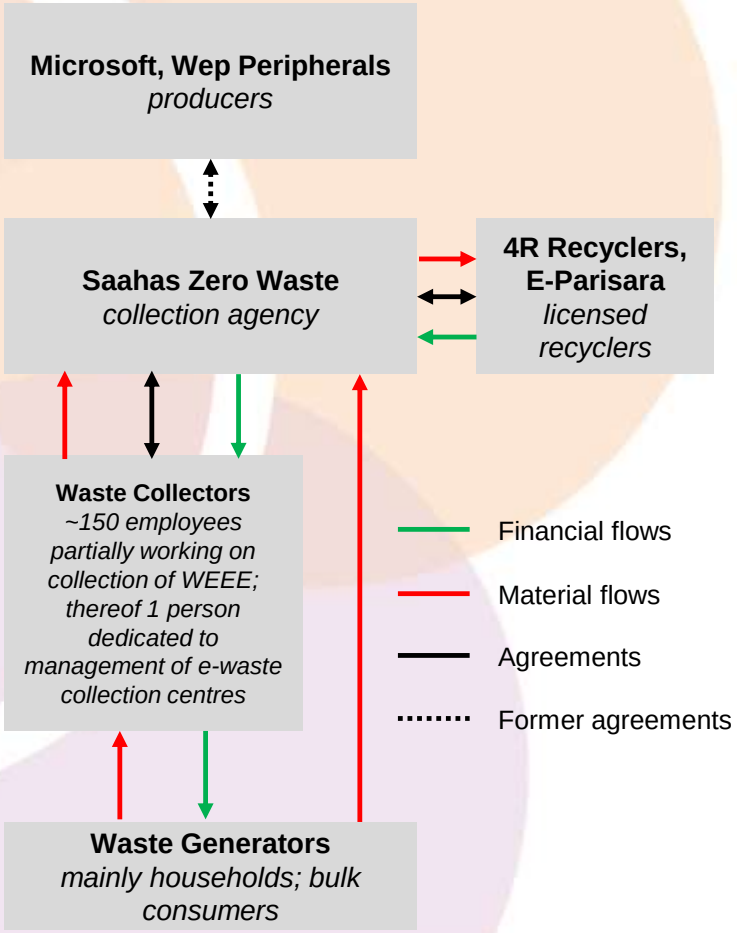
Options for Enhancing RE: E-waste

Acknowledge the importance of the informal sector and promote creation of producer-led formal-informal partnerships via designated interfact agencies or PROs

Saahas Zero Waste

- Offers integrated waste management services, i.e. collection and PRO-like consultancy services to meet EPR plans
- Pays fixed monthly salaries for workers; provides protective gear and social benefits (healthcare, insurance, pension, knowledge and skill training)
- Respect for entrepreneurial thinking of waste collectors is key to increase the economic viability



Options for Enhancing RE: E-waste

Mandate creation and continous development of standards (e.g. ISO, EN) for the entire e-waste value chain to ensure level playing field amongst all actors

WEEE Label of Excellence (WEEELABEX)

- Developed as part of a multi-stakeholder project by the WEEE Forum, supported by the LIFE committee
- WEEELABEX operates as an independent platform which defines normative requirements for collection, storage and treatment
- Services offered include:
  - Training program for auditors
  - Certified operators are listed on webpage
  - Support to implementation of standards

Preliminary findings (EPR study)

WEEELABEX standards

- In 2017, WEEELABEX standards were successfully transposed into CENELEC standards EN 50625-1 and CLC/TS 50625-3-1
- European Committee for Electronical Standartization (CENELEC) approves standards in a multi-stakeholder process based on a consensus among 34 member countries represented through National Committees (NCs)
- EN standards may become mandatory in all member states; can also be implemented by treatment facilities in other countries to certify that recycling takes place under „equivalent conditions“

CENELEC
EUROPEAN COMMITTEE
FOR ELECTROTECHNICAL STANDARDIZATION

Preliminary findings: Buildings & Construction

- Accounting for **20% of all material demand**, 30% of national electricity consumption, and 23.6% of national greenhouse gas emissions, the **construction sector is very resource and energy intensive**. Huge volumes of materials will be required to meet the **expected growth** of 8% within the next 10 years.
- **Sand** (concrete and mortar), **soil** (bricks), **stone** (aggregates), **limestone** (cement) and **iron and steel** (bars and rods) are the **most intensively used** materials for building and construction purposes.





- Being the main component of various construction materials, **sand** represents the **highest volume of raw material used** on earth after fresh water. Current consumption in India is estimated to be 751m tons/annum with demand expected to more than double by 2020, reaching 1.4bn tons/annum.

Preliminary findings: Buildings & Construction

- **Soil** is most utilized in **brick production and road construction**. Being the **world's second largest brick producer**, the Indian brick industry consumes an estimated 884m tons/annum of brick earth to meet the increasing demand.
- **Stones as coarse aggregates** are mostly used for **making concrete and road laying**. As concrete remains the mainstay of construction, the demand for coarse aggregates is expected to increase to more than 2bn tons/annum by 2020.
- Due to its **importance to the cement industry**, **limestone** is **one of the most extracted resources in India** with 95% of total production being used for cement manufacturing. Fueled by growing cement production, limestone demand is projected to reach about 600m tons/annum by 2020.
- The **construction industry consumes 55% of finished steel in India** which translates into a total of 30m tons/annum. According to the 2017 New Steel Policy, it is envisioned that accelerating domestic demand will result in an increase in total steel production to 300m tons/annum by 2030.

Options for Increasing RE: Buildings & Construction

A first option of how resource efficiency in the B&C sector can be strengthened in India is through **promoting transparency and holistic lifecycle considerations** of construction materials and buildings. Policymakers can drive this via

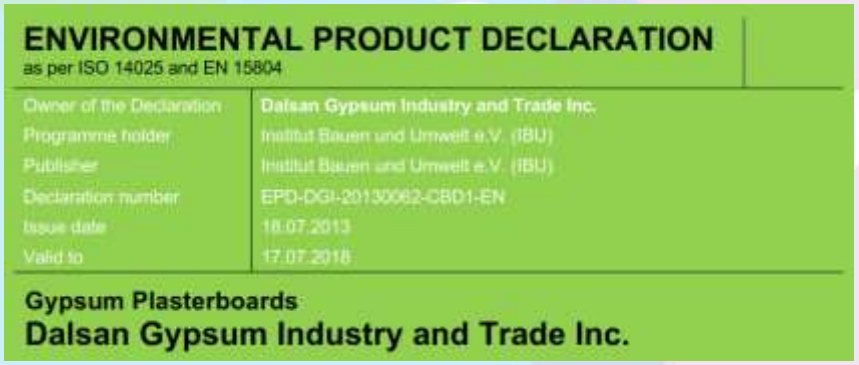
I. **Obligatory requirements** in public tenders;
II. **Leading by example** ;
III. **Creating incentives and special funding** models that encourage firms to become frontrunners and trigger change in **market dynamics** through replication & competition

Tools for increased transparency are **Environmental Product Declarations** (EPDs) and **Norms and Standards**

- **EPDs** are **environmental disclosure tools** which provide **information on lifecycle impacts** of different products; in Europe, they are applied extensively to compare construction components
- Beyond the options above, the adoption of EPDs can be driven via voluntary integration of EPDs in assessment schemes (GRIHA/IGBC) as instruments for life cycle analyses
- **Sector EPDs** can provide **rough estimations on life cycle impacts** of product groups at **low cost**, however, individual EPDs are considered as more reliable

Options for Increasing RE: Buildings & Construction

- A **product-specific approach** for EPDs should initially focus on **components with the largest material throughput**, e.g. concrete or steel (the first EPD for steel in India was published by IBU Germany together with JSW Steel in 2016)
- Classified as ISO Type III labels under ISO, **EPDs are based on LCAs** in accordance with ISO 14040 as well as created and verified in line with ISO 14025; based on this, CEN has published EN 15804 which provides common **Product Category Rules for the application of EPDs in the buildings and construction sector**
- **10 national EPD platform operators provide databases** for a vast range of construction components; examples include EPD International AB (Sweden), Bau-EPD(Austria) ICMQ (Italy); unified under ECO Platform (EU umbrella organization)



Options for Increasing RE: Buildings & Construction

A further option for improving resource efficiency could be promoting the use of **innovative and sustainable resources as building materials**. In this regard it is crucial to primarily consider what materials are **available locally**, easily **degradable/recyclable**, and ensure resource efficiency in **maintaining the building.** In order to drive such developments forward, public and private investors need to be

I. **encouraged** to not only look at construction costs but also **holistically consider maintenance, utility and deconstruction costs** when selecting a building concept
II. **fully informed** about **cost implications** and **(dis-)advantages** of different materials

Materials to be considered in the Indian context could be **solid wood** or **cross-laminated timber (CLT)**:
Building with **<u>100% solid wood</u>** can help to implement circular economy principles in the Indian construction sector with a wide range of benefits:

- Excellent **insulation** material for **buffering heat peaks** without the use of ACs
- Full **deconstructability and recyclability** at the end of life
- **Fire protection and earthquake resistance** in accordance with highest standards (ISO 12470/EN 13501)

Options for Increasing RE: Buildings & Construction

- Use of solid wood **in (sub-)tropical regions with high humidity and termites is possible** when the right **types of wood**, **harvesting techniques** and **construction methods** are applied - applicable types of wood are assumed to be **available locally in India**.

Best practice example: ***Thoma*** is an internationally awarded Austrian company specialized in building with wood. Its patented Thoma Holz100 construction is entirely made out of pure, solid wood without using any chemicals and metals.

- Thoma has built >1000 solid wood buildings globally in various climatic zones and latitudes
- Currently founding ***Thoma Eurasia*** to implement solid wood techniques and build up local production capacities in Asian target markets, possibly India

Cross-laminated timber (CLT) consists of 3 to 7 layers of softwood boards bonded together crosswise; As it is based on wood, CLT is a **renewable resource**, has **excellent thermal properties** and can function as a **carbon sink.**

- CLT can be used as a structual material; a **24-story building** is currently being finalised in Vienna, Austria (“HochHolzHaus” or "timber high-rise")
- Compared to solid wood, CLT is less degradable due to additionally applied materials

Options for Increasing RE: Buildings & Construction

A third option for driving resource efficiency in the Indian construction sector could be through the **establishment** and **promotion** of **indicator frameworks** for monitoring **ecological building performance**. As for the previous options, policymakers can foster such developments through:

I. **Mandatory requirements** in public tenders
II. **Positive incentives** and funding options

One such option is the **Cradle to Cradle Certification (C2C)** which is considered the **most advanced scheme** in the context of **circular economy**.

- The C2C certification **assesses circularity performance** for a **wide range of products**, including construction components
- Across EU member states, C2C is most coveted in the Netherlands, examples are the C2C inspired city hall and sports center in Venlo (see next slide)

CRADLE TO CRADLE CERTIFIED PRODUCT SCORECARD

QUALITY CATEGORY	BASIC	BRONZE	SILVER	GOLD	PLATINUM
MATERIAL HEALTH			✓		
MATERIAL REUTILIZATION			✓		
RENEWABLE ENERGY & CARBON MANAGEMENT				✓	
WATER STEWARDSHIP			✓		
SOCIAL FAIRNESS					✓
OVERALL CERTIFICATION LEVEL			✓		

Options for Increasing RE: Buildings & Construction

Another option related to indicator frameworks is the **integration of Circular Economy aspects into Green Rating Schemes.** This creates transparency and comparability and can therefore be a main driver to promote sustainable construction practices in India. Collaboration with practitioners, experts and auditors from the construction industry is crucial to the long-term success of rating schemes.

Best practice example: The ***German Sustainable Building Council (DNGB)*** was founded in 2007 by 16 initiators from various subject areas within the construction and real-estate sectors.

- To promote sustainable building practices, DGNB offers building certifications with labels ranging from bronze to platinum. The certification system follows a **scoreboard approach** and assesses the performance of buildings over categories and qualifications.
- As of 2008, topics related to resource efficiency and **circular economy** have been **anchored within the certification**. If CE aspects are considered during construction, **additional bonus points** can be awarded in the evaluation.

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Thanks for your attention

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