



The circular economy in Tropical building sector: issues and perspectives

Why Building sector choice ?

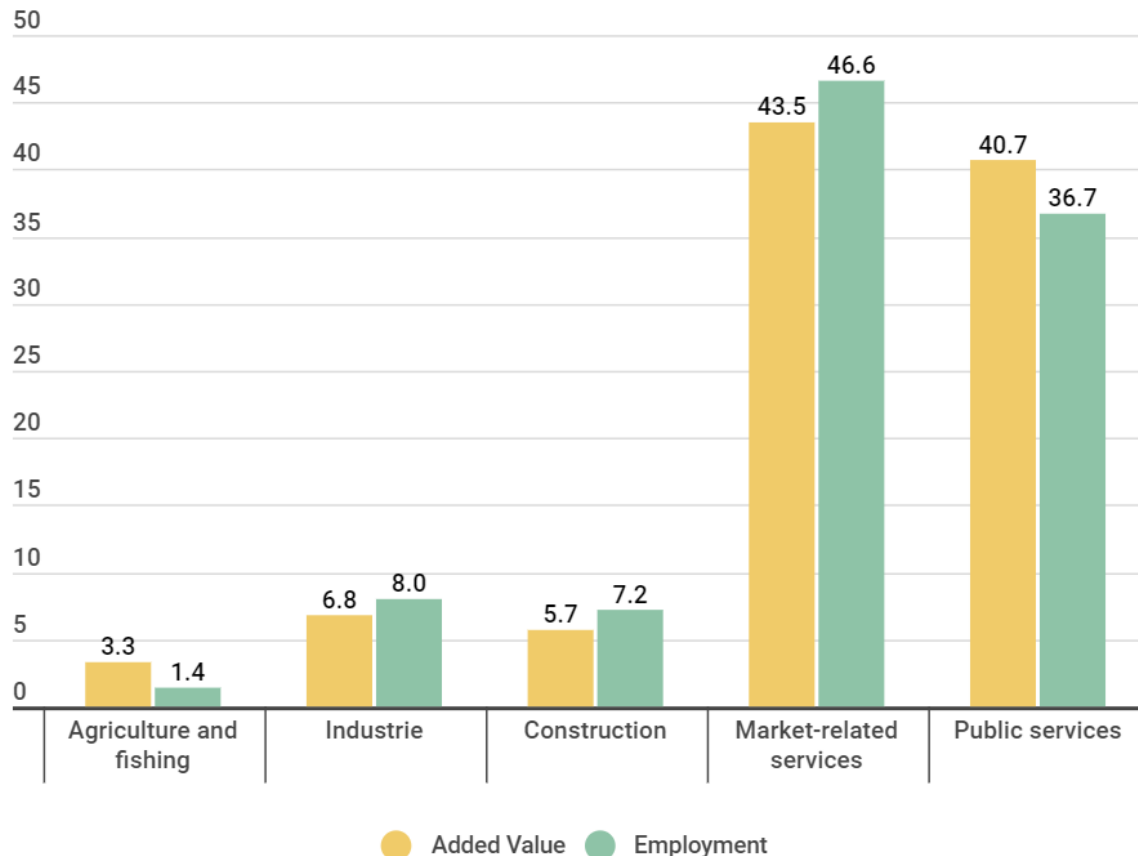
A sector economically important

REPLACE
Interreg Europe



European Union
European Regional
Development Fund

Sectorial distribution of added values and employment % (Reunion Island)



**1,25
Md€
CA
4%**

**6 %
GDP**

**3044
employers**

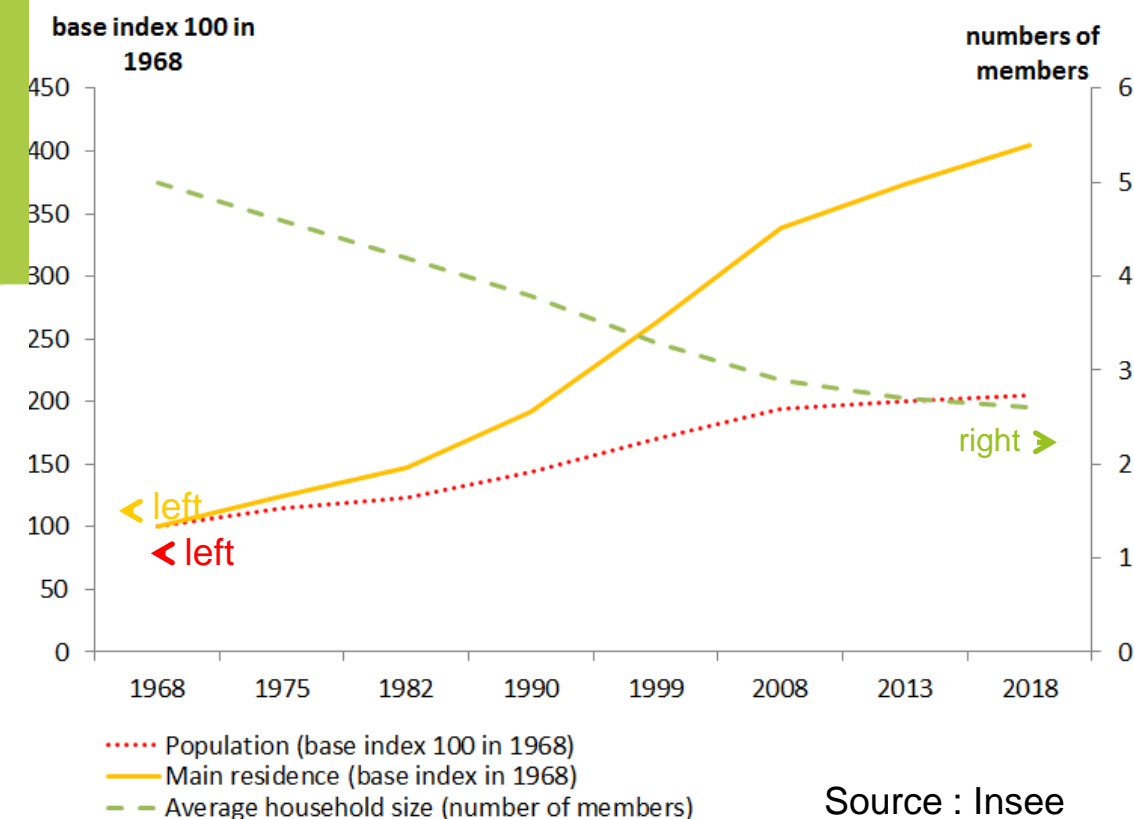
**17653
Employees**

Why Building sector choice ?

A sector driven by demography



Evolution of the number of main residences, population and household size between 1968 and 2018 in Réunion



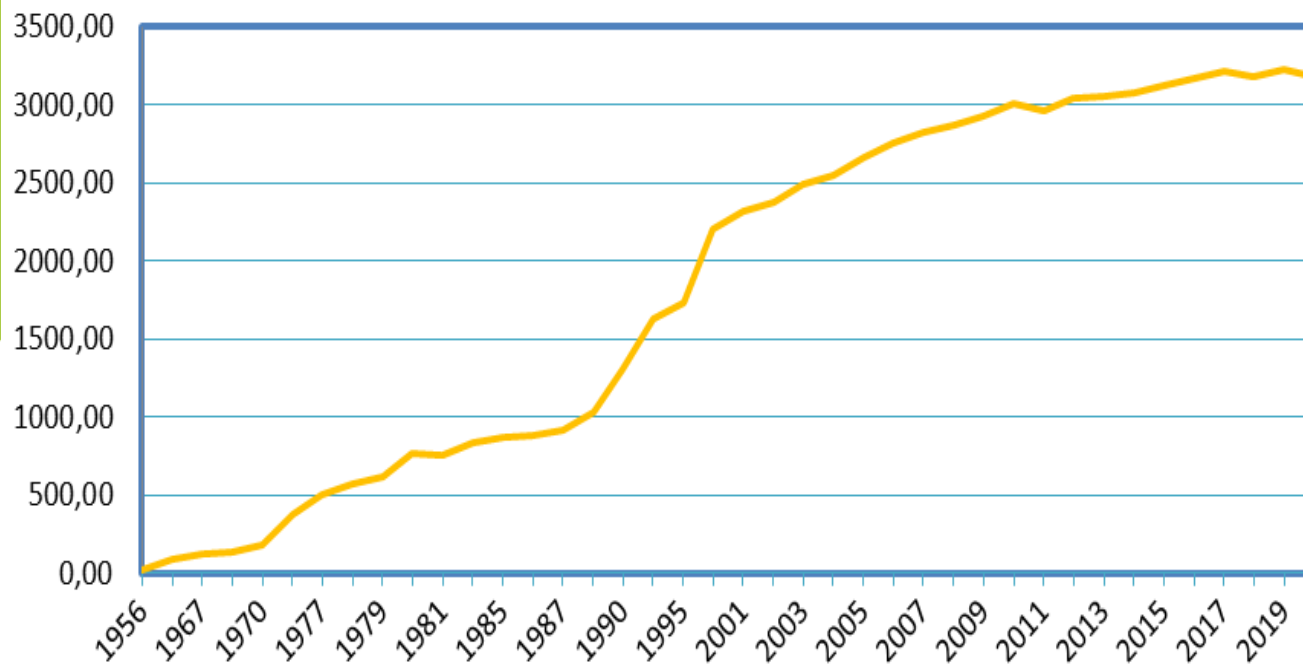
Source : Insee

The island's population is growing at a higher rate (x4) than mainland France and there is need of 7,800 to 8,500 new housing each year

Why Building sector choice ?

An energy consuming sector

Electricity consumption per capita (kWh)



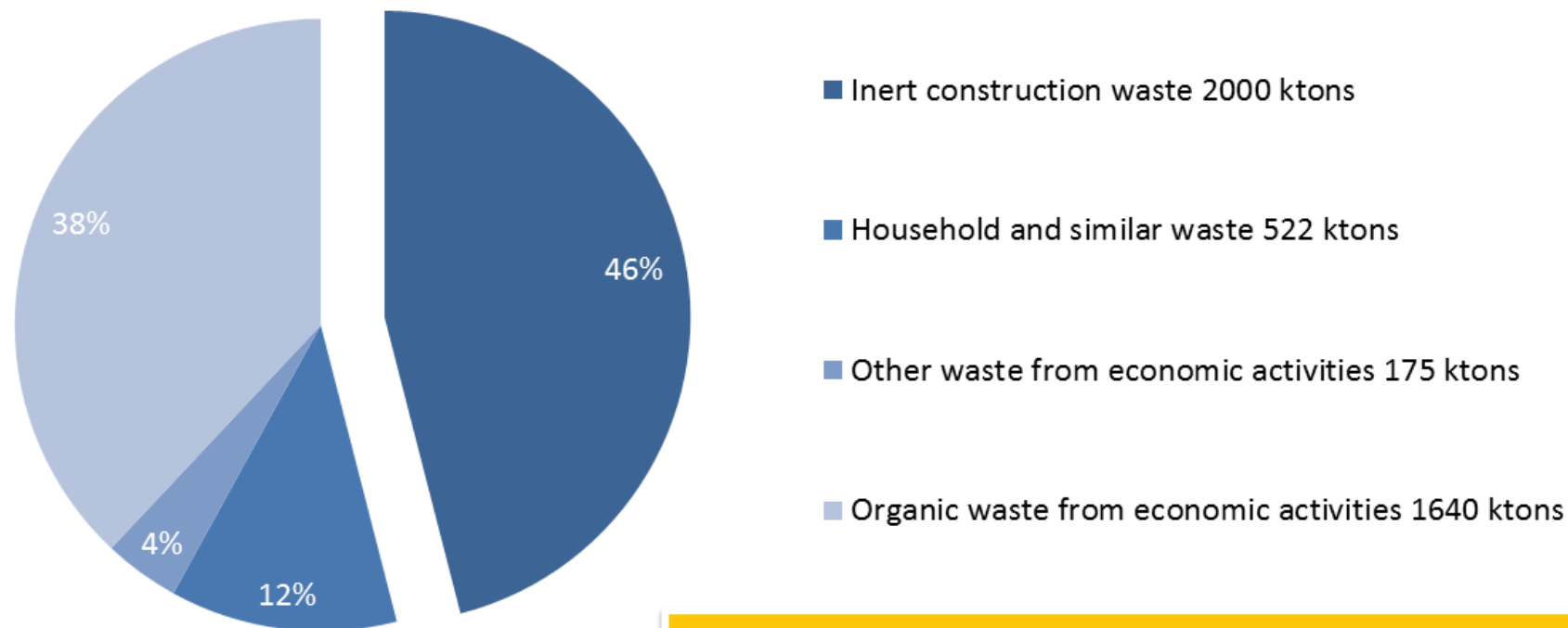
Source : Observatoire de l'Energie

- Electrical energy consumption in residential building is 45%
- Tertiary small businesses energetically aging
- Significant use of air conditioning

Why Building sector choice ?

> A polluting sector

Waste categories in Reunion Island



La Réunion is heavily reliant on imports of construction materials and near 50% of the territory's waste come from the construction sector.

Strengths of the sector

A consensual regional ambition

- The Smart Specialisation Strategy (S3)
- Green Book of Tropical Building
- The Regional Action Plan for Circular Economy (PRAEC)

R&D facilities

- University laboratories (PIMENT, LE2P, LIM)
- CIRBAT (Centre for innovation and research on Tropical Building)
 - Local bio-based insulation materials (ISOBIODOM)
 - Standardization of cryptomeria wood for construction
- Quality insurance bodies : Cerqual, Qualitel
- Engineering office: LEU Réunion, Intégrale ingénierie, etc.

Strengths of the sector

Human capacities

- Higher education : IUT, ENSAM
- PIA CMQ training program : “Building improvement in a Digital and Tropical Environment”

Supporting structures

- CERBTP (Economical chamber for Construction development)
- Technopole
- ADEME
- DEAL
- Etc...

Construction companies

EPR (Extended Producer Responsibility) organizations

- Valdelia, Ecominero Unicem

Good Practices

> *Dismanteled materials recovery*



12000 hectares



- Deconstruction of 144 vacant social housing units in the Herbert Spencer residential building
- Professional and social integration: 5 local associations involved (3,372 hours of work)

- 30 tons of materials were collected and reused :

275 glass doors (7 tons) ➔ 160 m2 of greenhouse

40 doors (680 kg) ➔ painted by 20 artists

11 tons of wood ➔ furnitures

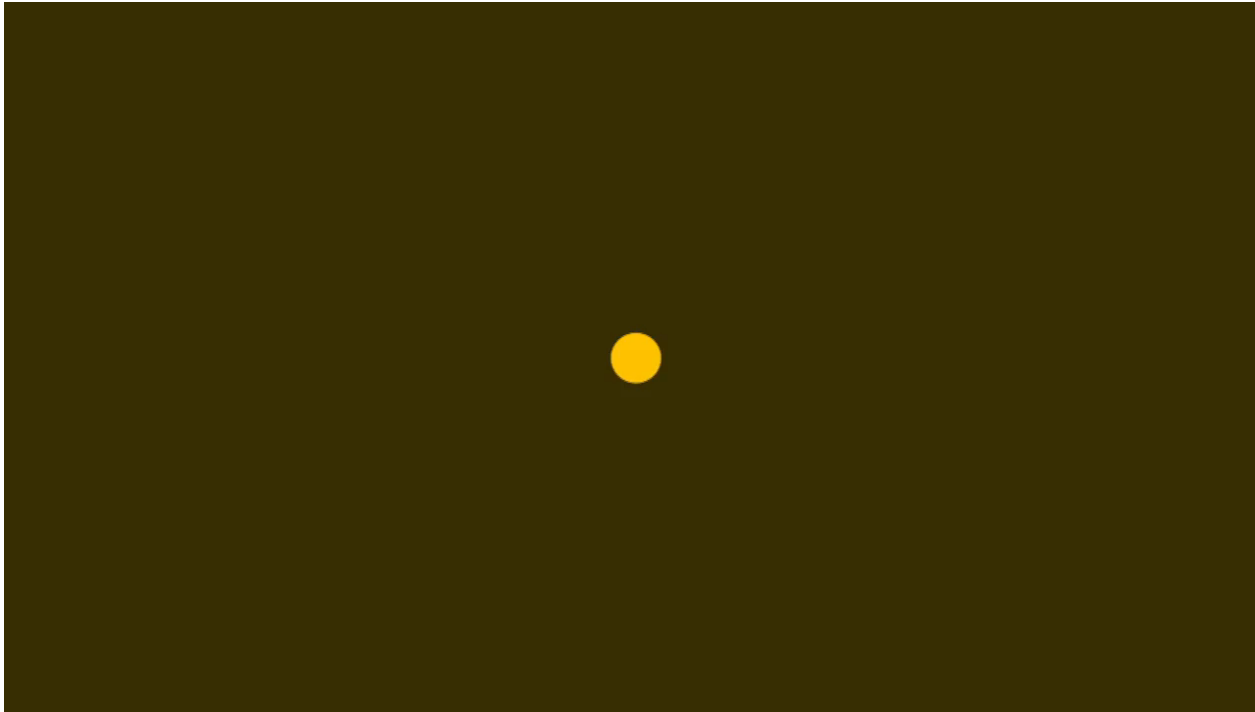
- 99% (19,691 tons) of the inert and non-hazardous waste was recovered



Good Practices

> *Dismanteled materials recovery*

REPLACE
Interreg Europe

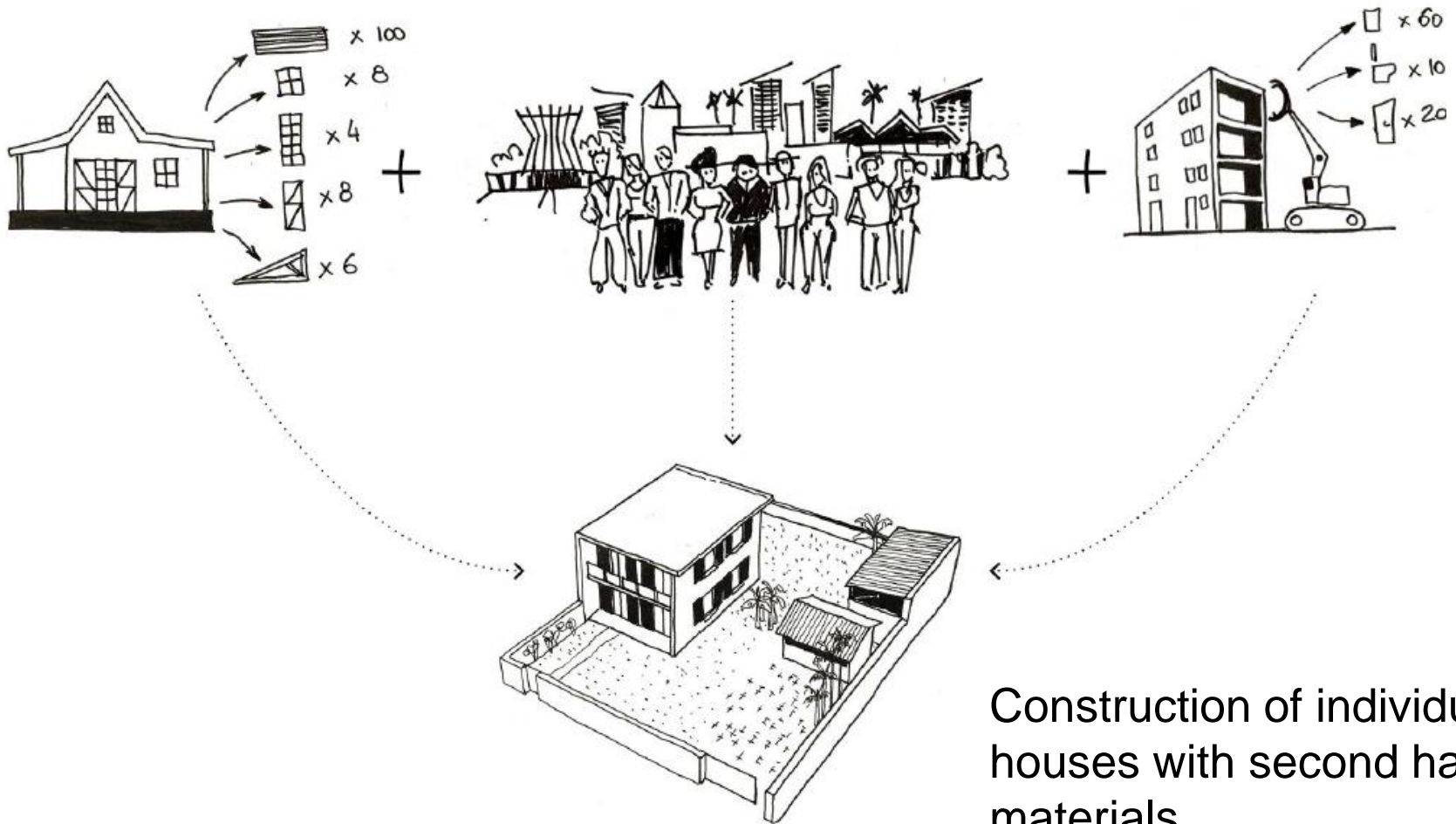


<https://fb.watch/bwm0zrHVCx/>



Good Practices

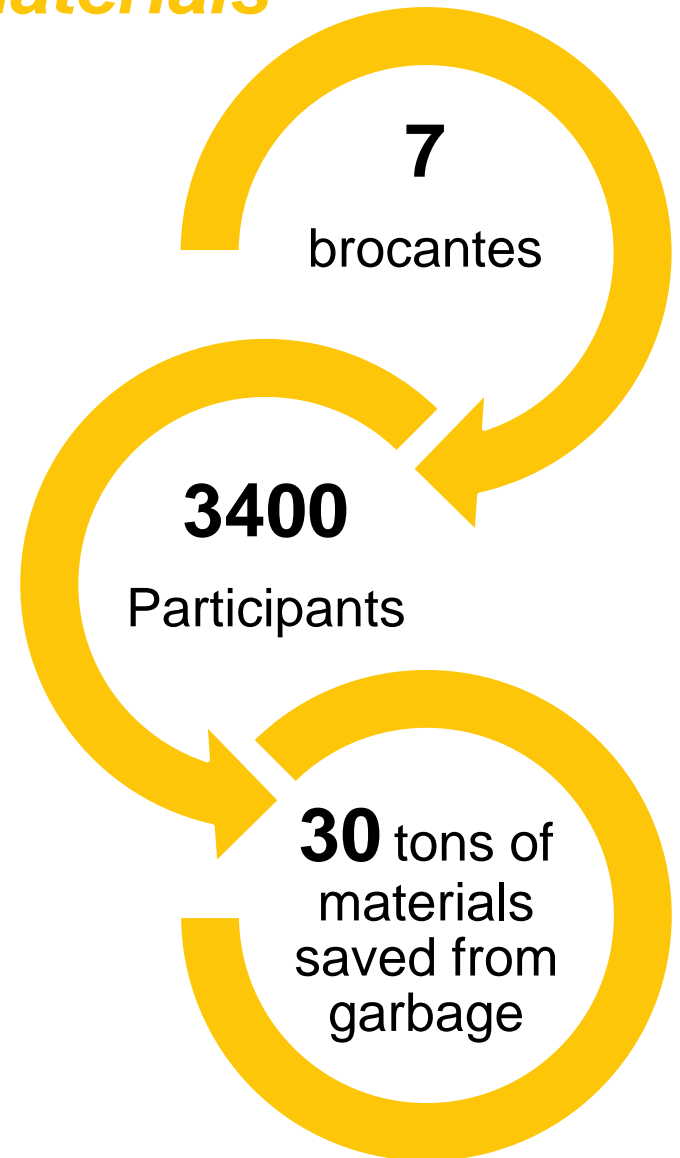
> A pilot project for re-use



Construction of individual houses with second hand materials

Good Practices

> *New market for recovered materials*



Good Practices

➤ “Bringing Eco-Construction within Reach”



Ekologik prototype test



<https://www.ekohome.app/>



<https://ekohome.re/>

1. Structure du projet



Container

3 700,00 €/unité



Maçonnerie Tradi.

8 347,50 €/unité



Bois

8 347,50 €/unité



Modulaire

6 000,00 €/unité

Bilan carbone 0.1kg CO2

Pollution de l'eau 0.1m3

Utilisation de l'énergie 0.1MJ PCI

Épuisement des ressources 1e-9kg Sb

Bilan carbone 48.4kg CO2

Pollution de l'eau 393m3

Utilisation de l'énergie 824MJ PCI

Épuisement des ressources 0.000213kg Sb

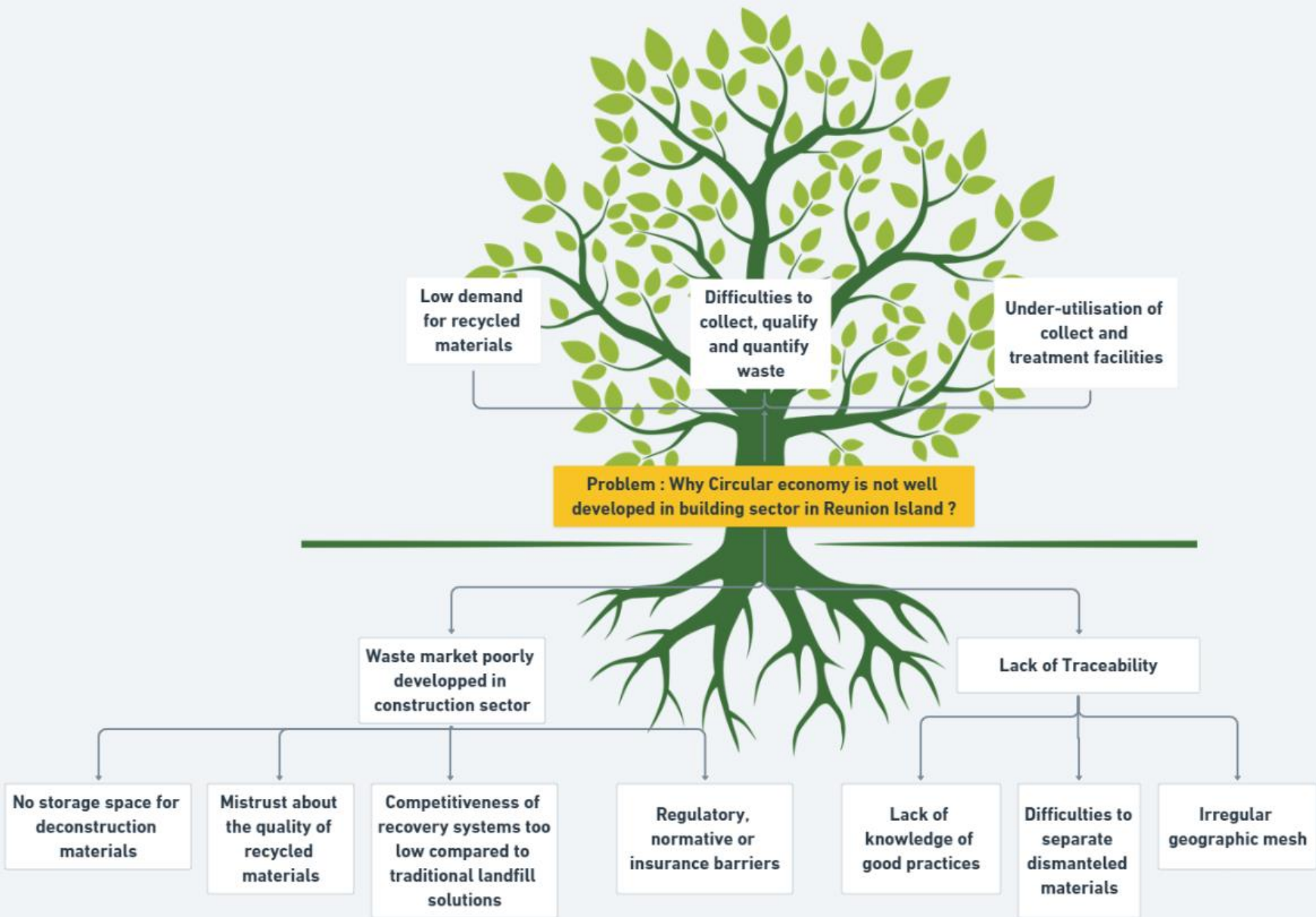
Bilan carbone 51.5kg CO2

Pollution de l'eau 51.3m3

Utilisation de l'énergie 5270MJ PCI

Épuisement des ressources 0.0000913kg Sb

EKOLOGIK : a digital application to calculate environment footprint when customers design their house





AGENCE RÉGIONALE DE DÉVELOPPEMENT
D'INVESTISSEMENT ET D'INNOVATION

REPLACE

Interreg Europe



European Union
European Regional
Development Fund

martin.picard@nexa.re
jose.benedicto@nexa.re



http://www.innovonslareunion.com/fileadmin/user_upload/innovons/Evenements/REPLACE_Regional_analysis.pdf



AGENCE RÉGIONALE DE DÉVELOPPEMENT
D'INVESTISSEMENT ET D'INNOVATION



REPLACE

Interreg Europe



European Union
European Regional
Development Fund

<https://www.interregeurope.eu/replace/>

Questions welcome



Project smedia

Initiatives to reduce the carbon impact of buildings

- Green walls, roof (developed by Aquakarma)
- TROPICLIM Project Energy Carbon : improvement of air conditioning in the tertiary sector
- TEC-TEC Project (Tropical Energy Carbon – Reduction) : improvement of carbon footprint of construction sites
- ENERPOS building : positive energy building

Initiatives to reduce waste impact of buildings

- Memento for the management of construction waste (CERBTP)
- Materials exchange digital platform (CERBTP, ADIR)
- Brocante of materials (Synergy péi)
- Observatory of waste and recycled materials in the construction industry (CERBTP)
- Reconditioning of solar water heaters (Zenith Solar)
- Recycling of tile waste (Innov'Carrelage)
- Recycling gypsum waste into animal bedding (2M2N)
- The TROPICACV project : Life Cycle Analysis approach on pilot projects of collective residential buildings (PIMENT, CSTB, Intégrale ingénierie)
- PVM project by STS company : sustainable use of recycled glass powder as cement replacement in concrete
- Recynsul project by (IUT) : improvement of waste diagnosis on construction sites
- Urban renovation projects integrating selective deconstruction and re-use of waste: Herbert Spencer residence in Le Port, Prunel project in Saint-Denis