Circular economy and regeneration of building stock in the Italian context: policies, partnerships and tools

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analysis of Italian traditional buildings’ renovation process

 Existing obstacles and the levers towards circular and sustainable practices

- Italian policies improvement
- Environmental - economic life cycle assessment tools to support decision
- Strategic partnerships for circular networks
Direct interviews to operators

Questions:
- Which are the decision steps in requalification process?
- Which are the decision steps in waste management?
- Which are the legislative obstacles for reuse/recycling?
- Which are the policies in the Italian context?
- Are there incentives on requalification or reuse/recycling?
- Where can you identify potential avoidable waste during the regeneration process?
- Is your company interested in new business models, such as supply a service rather than sell a product?

Results

Operators relationships and the decision-making steps
Obstacles for reuse/recycling of materials
Levers for reuse / recycling of materials
Potential avoidable waste
Operators’ interest to new Business models
Operators relationships and the decision-making steps

OBSTACLES:

relationships are not continuative
difficult information sharing

den can grow between +7% or +11%, with an increase of only +1% of construction cost

key-operator and decision steps fundamental to evaluate the sustainability
Operators relationships and the decision-making steps

OBSTACLES:

relationships are not continuative
difficult information sharing

- how to obtain the certification
- materials choice
- building’s image and utility spaces
Operators relationships and the decision-making steps

**OBSTACLES:**

- relationships are not continuative
- difficult information sharing

**how to obtain the certification.**
- materials choice
- building’s image and utility spaces

- demolition techniques (selective demolition or deconstruction)
- the demolition-yard
- waste destination

investor

sustainability certification

designer

- how to obtain the certification.
- materials choice
- building’s image and utility spaces

waste manager

collects the demolition waste

transports the waste to landfill or sorting plant

demolisher
Operators relationships and the decision-making steps

OBSTACLES:

- relationships are not continuative
- difficult information sharing
- decision are not based on sustainability

Investor → Sustainability certification → Designer → Constructor → Manufacturer → Waste manager → Waste treatment → Demolisher
Operators' relationships and the decision-making steps

Strategic partnerships

- Investor
- Sustainability certification
- Demolisher
- Waste manager
- Waste treatment
- Designer
- Constructor
- Manufacturer
Operators relationships and the decision-making steps

**Tools**

- **LCA**
- **LCC**

- **Investor**
- **Designer**
- **Constructor**
- **Manufacturer**

• **Design process**

• **Waste management process**

- **Demolisher**
- **Waste manager**
- **Waste treatment**
OBSTACLES FOR REUSE:

- lack of expert operators
- economic aspects
- aesthetic aspects
- logistic barriers
- responsibility

only decorative component reuse
Obstacles for reuse/recycling of materials

OBSTACLES FOR RECYCLING:

**economic barrier**

- main problem: recycling of inert aggregates

**Italian price of natural aggregate**
- natural sand: 15 €/ton (0.015 €/kg)
- natural gravel: 10 €/ton (0.010 €/kg)
- transport costs 6 €/ton until 50 km

Italy, 2016:
- 54.4 million ton of CDW was generated
- 75-85% of Italian CDW is inert aggregates
Obstacles for reuse/recycling of materials

OBSTACLES FOR RECYCLING:

- **economic barrier**
- **logistic barriers**

STATISTICS:
- 76% of CWD (soil excluded) is recycling

plant of waste treatment:
- gains to withdraw the waste:
  - 7 €/ton of mixed inert
- gain to sell for road substratum:
  - 3-7€/ton of secondary inert aggregate

but often aggregate remains unsold
Obstacles for reuse/recycling of materials

OBSTACLES FOR RECYCLING:

- economic barrier
- logistic barriers
- technical barriers

Subdivision of the aggregates among different waste codes is very difficult

170102 BRICKS
170203 PLASTICS
170101 CEMENT
Obstacles for reuse/recycling of materials

Policies improvements

- clarify policy regarding reuse
- create a market demand

- new operators
- value raw materials
- increase the cost to landfill

- conformity declaration
- sustainability certification

<table>
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<tr>
<th>TODAY</th>
<th>TOMORROW</th>
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<td>5 €/ton</td>
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Obstacles for reuse/recycling of materials

Strategic partnerships

• to define expert operators
  - new operator for disassembling
  - new operator for reassembling
  - new operator for reconditioning

• to define space to collect waste
  - sorting plant
  - collect
  - waste
  - landfill
LEVERS FOR REUSE/RECYCLING:

- There are not economic incentives
- Green Public Procurement (D.Lgs. 50/2016)

- By weight of demolition non-hazardous waste, must be prepared for re-use and recycling.
- 15% by weight of the total materials used, must contain recycled or recovered raw material.
- 50% of the building components have to be selective demolished at the end-of-life.
- 60% by weight of demolition non-hazardous waste must be prepared for re-use and recycling.
Levers for reuse / recycling of materials

Policies improvements

• economics incentives or building square meters bonus

• implementation of GPP requirements

+ m²

investor

designer

manufacturer
Potential avoidable waste

WASTE OF NEW MATERIALS:

fit-out substitution stage

Necessary:

- certification of “end of works”
- to rent or sell the building
Potential avoidable waste

WASTE OF NEW MATERIALS:

fit-out stage

construction stage

off-site construction techniques are not present in the “price list of construction works”: economic benchmark for defining and verifying the public tenders cost.
Potential avoidable waste

Strategic partnerships and Policies improvements

- to create disassemble and reusable fit-out elements
- to introduce off-site techniques in the “price list of construction works”

Reused in other fit-out building

 investor

 manufacturer

 constructor
Operators’ interest to new Business models

BARRIERS TO NEW BUSINESS MODELS (BASED ON SERVICE):

- long lifespan
- market system based on properties

Now regards only:

- systems (heating water, air conditioning, lighting etc.)
- lack of ‘operator’ and agreements for managing the product at the end of its service life, supplying a substitution of it (as a service).
Potential avoidable waste

Strategic partnership

• to promotes a supply service chain in order to activate new business of reused and remanufactured products

new business
new operators

+ reuse
+ remanufacturing
+ maintainace

of materials’ value

towards long life span component and the whole building

starting from short life span component
Thanks

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