WHOLE LIFE COSTING OF A FRENCH SINGLE FAMILY HOUSE REFURBISHMENT : THE BAT ECO² CASE STUDY

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CONTEXT

Call to Regional Projects – November 2014 « Life Cycle Assessment and New Economical Models »

Bat eco2
Environmental and Economical Strategy through building eco-efficiency
French Building Stock (30 million dwellings)

- Before 1975: 35%
- After 1975: 65%

Average energy consumption of 300 kWh_{PE}/m^2.yr

Building Sector: 20% of GHG emission in France

Energetic transition for green development French law
→ Decrease in 75% GHG between 1990 and 2050.
PROJECT APPROACH

- Environmental & Economical Indicators
- Simplified tool for decision making
- Case study LCA & WLC
PROJECT GOAL

**Compute economical results along life cycle**

**Tool economical specifications**

**Sensitivity analysis**

Life cycle period of analysis: 50 years
THE CASE STUDY & WLC PARAMETERS

Construction

Operation

Maintenance

End of life

~59 m²

ISO 15686-5

$X_{NPV} = \sum_{n=1}^{p} \frac{C_n}{(1 + d)^n}$

Reference year : 2016

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PROJECT WLC PARAMETERS

Real Value or Nominal Value

Discount Rate:

- Replacements
- Maintenances
- Property tax
- Rent
RELATIVE NET PRESENT VALUE

Initial Investment Share

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SENSITIVITY: PERIOD OF ANALYSIS
SENSITIVITY: UNPAID RATE AND VACANCY RATE

VARIATION DUE TO +/- 0.5% ON RATES ARE +/- 5% ON NET PRESENT VALUE

THERE IS A LITTLE DIFFERENCE IN PAYBACK TIME (LESS THAN 1 YR)
CONCLUSIONS

Hotspots

- Refurbishment Investment
  - Structure
  - Façade
  - Plastering
  - Exterior
  - Demolition

- Rent

- Replacements and Property Tax

Sensitivity Results

- Best Period of Analysis: 80 years

- Loan discount rate decrease by 2% achieves 180% of reference NPV

- Most important NPV variation due to rent rates
First version of a simplified tool:

- LCA and WLC results crossed
- Eco-efficiency

Ready for the associated social landlord next November
THANK YOU!

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