MAKING NON-ENERGY BENEFITS A REAL ASSET AND CHANGING PROFESSIONAL'S HABITS:

Renew the partnership approach through the DECADIESE method

EDF RECHERCHE & DÉVELOPPEMENT
Stanislas Nösperger
Jean Luc Mazoyer
MINES PARISTECH
Estelle Vitt

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ECONOMIC ASSESSMENT TOOLS DO NOT SUIT THE CHALLENGE OF REDUCING THE IMPACT OF BUILDING STOCK ON GLOBAL WARNING

- **The European 2030 Energy & climate policy target:**
  - -40% GHG/1990
  - 27% consumed energy from renewable resources
  - 27% improvement in Energy Efficiency
- **The challenge of the Building stock refurbishment in Europe:**
  - 40% Final energy consumption
  - 25% CO_2 emissions
  - Potential macroeconomic impacts : local employment, learning processes…
- **The flaws of today's economic assessment tools for building retrofit projects:**
  - Life Cycle Costing (LCC) approach : energy savings do not usually make up for related investments
  - Non-energy benefits (health, productivity…) are ignored
  - Cost-benefits analysis does not fit the case in private actors are mainly involved→ needs for innovative economic models
  - Building : neither an « object » nor just a « financial » asset but a complete value creation system

THE DECADIESE APPROACH FOR COMMERCIAL & PUBLIC BUILDINGS : A CROSS-USE OF FUNCTIONAL ECONOMY AND VALUE ENGINEERING (1)

- **A functional economy is based on the production and sale of a solution seen as a consistent set of product and services in order to meet a functional need (mobility, housing, health…):**
  - **Incorporation of externalities** (resources for local economic development…)
  - Value creation is more independent from objects production (and related energy consumption)→**breaking the link between economic and resource consumption growth**
  - **High level of interaction** with the economic development of the local area
- **Buildings are considered as a system meeting 7 specific functional needs depending on hosted activities:**
  - Providing **Space**
  - Providing **Comfort**
  - Providing **Protection**
  - Providing suitable **Goods and tools** (for the hosted activities)
  - Managing the **Relationship** with outside & inside people
  - Interacting with the **Site**, using its resource and minimising any negative impact
  - Carrying a message and an image : **Semiotics**

THE DECADIESE APPROACH : A CROSS-USE OF FUNCTIONAL ECONOMY AND VALUE ENGINEERING (2)

- **Life Cycle Analysis is applied to the 7 functions:**
  - How are they implemented?
  - How are they used during the operating life stage?
  - What are their economic, environmental and social impact? Who are the concerned stakeholders?
  - How can a financial value be given to these environmental & social impacts (externalities)?

Impact categories	Building functions generating the impact	Impact description	Stakeholder
Health	Comfort	Occupant health improvement tanks to better comfort	Occupant Occupying company Social insurance
Productivity	Comfort	Productivity improvement tanks to better comfort	Occupying company
Asset Value improvement	Semiotics	Reduced vacancy period thanks to advanced energy& environment labelling	Owner

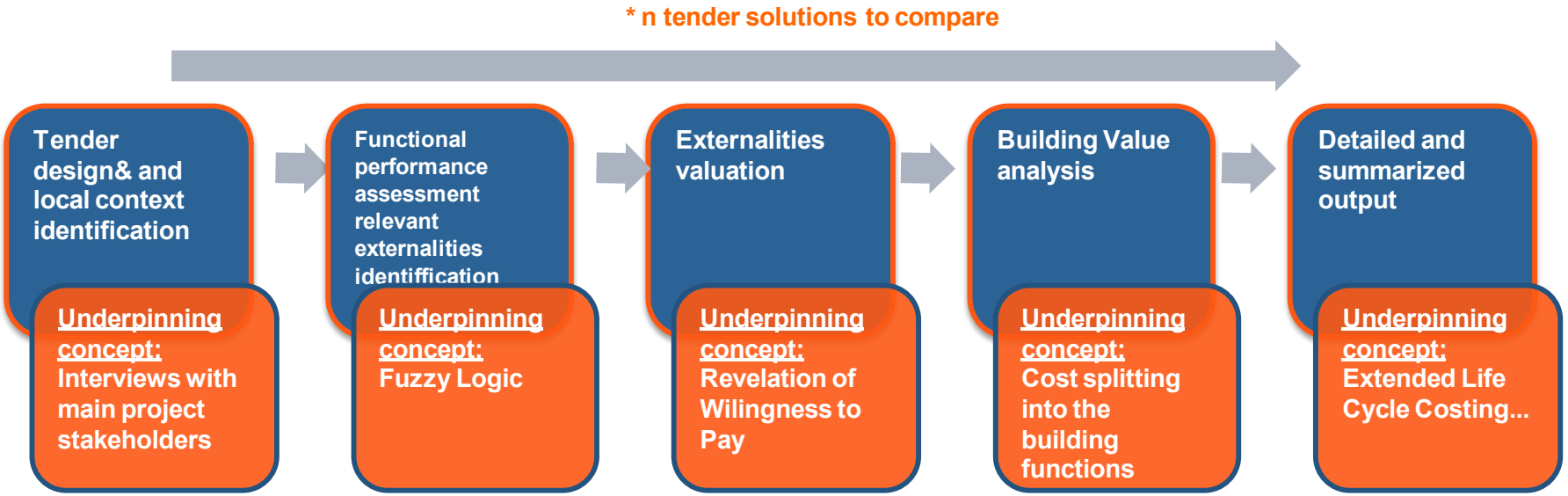
TARGETED DECADIESE USER'S COMMUNITY

- **Targeted DECADIESE users' community over the b**

Design stage especially (but not exclusively) concerned by DECADIESE

	Design stage	Work stage	Use stage
Client	XXX	XXX	XXX
Occupying organisations	XXX	X	XXX
Building users	XX		XXX
Contractors	XXX	XXX	
Local authorities	XXX	XX	XX
Consultants (eg BREAM)	XXX	X	X
Commissioners	XXX	XXX	XX
Exploitation& maintenance companies	XX	X	XXX
Neighbouring inhabtitants	XXX	XX	X
Financing bodies	XXX	X	XX
Associations	XX		XXX

OVERVIEW OF THE DECADIESE ASSESSMENT PROCESS: A FOCUS ON INTERVIEWS AND MUTUAL DESIGN



A DECADIESE CASE STUDY: A SCHOOL ENERGY RETROFIT PROJECT

Chosen « raw » Energy Performance Contracting project → Focus on Energy

	Reference	EPC Solution	Alternative Solution
Investment cost €/m²	0	87	131
Energy consuption (grade)	208 (D)	131 (C)	126 (C)
CO_2 emissions (grade)	26 (D)	17 (C)	16 (C)
LCC €/m².yr	15,8	18,1	20,1
Overall functional performance (Score/10)	4,0	4,2	5,4
Externality valuation (€/m².yr)	0,2 CO_2	0,1 CO_2	(7,9) CO_2 + Improved educational efficiency + Extra facilities use
Extended LCC €/m².yr	16,0	18,2	12,2
Extended LCC/Performance mark	16,0/4,0=4,0	4,3	2,3

Energy savings do not pay off!

Best option according to the DECADIESE assessment! (the lower, the better)

Alternative project with marginal energy impact & significant functional impact

PERCEIVED DECADIESE ADDED-VALUE (OWING TO INTERVIEWED PROFESSIONALS) (1)

- **Reinforcing the cooperation between actors:**
  - Sharing common challenge (owner and tenant)
  - Working early with maintainers
  - Cooperation(working together with a shared, objective) instead of coordination (organisation of historically split tasks)

PERCEIVED DECADIESE ADDED-VALUE (OWING TO INTERVIEWED PROFESSIONALS) (2)

- **Supporting the design process thanks to the functional approach by**
  - Challenging (and helping to write) building specification briefs depending on hosted activities
  - Relevant functional assessment of alternative bids
- **Ensuring decisions driven by long-term considerations**
  - Structured comprehensive decision-support tools (technical, financial, environmental, social and economic criteria)
  - Iterative use along the complete building project
- **Overcoming economic barriers of ambitious building projects with innovative and sustainable business models**
  - Overcoming the opposition between choosing the “lowest bid” and the “best offer”
  - In line with a growing concern for intangible asset value of building
  - Identifying potential new project contributors within innovative business models integrating externalities and related stakeholders

IDENTIFIED BARRIERS TO A WIDE-USE OF THE DECADIESE METHOD

- **Getting familiar with DECADIESE underpinning concepts and its output form:**
  - Items need re-wording depending on target user (« building functional performance » OK for engineers, not for architects…)
- **Smoothening the DECADIESE use-related change in professional practices:**
  - Only suitable when actors want to start a cooperation process (company location change for instance)
  - Must be aligned with global management process change making “strategic” the selection of a sustainable building
    - (for instance the consideration of building-related impact on employees 'health or productivity)
  - Preparing stakeholder’s “Readiness To Pay” their expressed “Willingness To Pay”…
  - Presenting this time-consuming DECADIESE approach as an investment
- **A need for favourable legal context:**
  - Non standard Public Purchase (anonymous) process such as Private Finance Initiative
  - Purchase process stressing on competitive dialogue

PERSPECTIVES

- **DECADIESE combines three time-scale visions:**
  - **Short term** (investment cost-based decisions) with a “value engineering approach”
  - **Mid-term** (integrating risks) with a standard “Cost Benefits Analysis” look
  - **Long-term** (integrating uncertainty e.g. climate change impacts) by raising mutual understanding and cooperation leading to change professional practices towards more sustainability

- **To reach this ideal objective, significant further work must be undertaken:**
  - Confirming (and completing) the first identified barriers (organising a “Serious Game”)
  - Removing barriers thanks to software design related with further investigation on existing processional practices (sociology research)
  - …that is : “Identifying the most relevant transition path”