

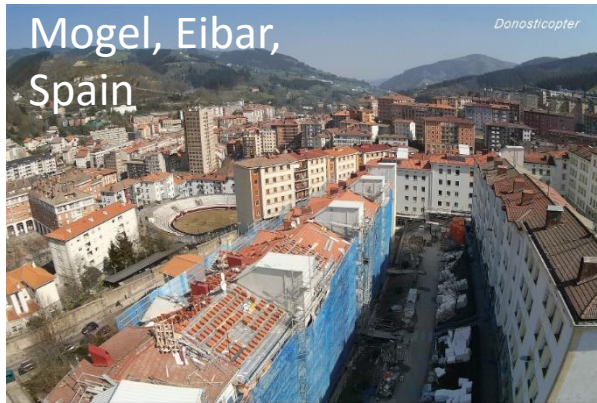
Toolkit for Nearly Zero Energy Neighborhoods

Dynamic capabilities approach for knowledge
integration in ZEB renovation

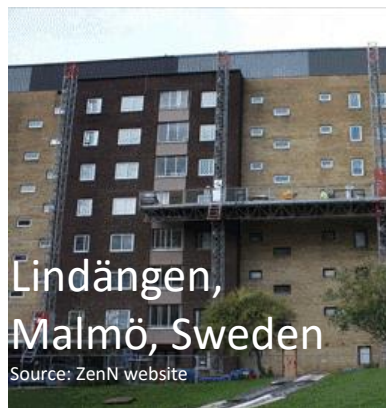
Carmel Lindkvist

carmel.lindkvist@ntnu.no

Nearly Zero Energy Neighborhoods (ZenN)



Realising energy reduction on a neighborhood scale



Holistic design kit for nZEB renovation



- Main aim:
 - **Benchmarks added-value, robust and multifunctional synergies** between **architectural, social, economic and policy** measures
 - that can provide “globally optimised, locally designed” (Ad-Hoc Industrial Advisory Group 2010) nZEB housing renovation on district level,
 - and help speed up its implementation into the European market.



Non-technical drivers



Architecture
NTNU

Social
NTNU

Economic
ASM

Policy
IVL

WP4.5 Holistic Design Kit

WP4.1
Architectural
and cultural
heritage

WP4.2
Stakeholder
Awareness
and Behaviour

WP4.3
Economic and
ownership
structures

WP4.4
Legislation,
governance
and policy



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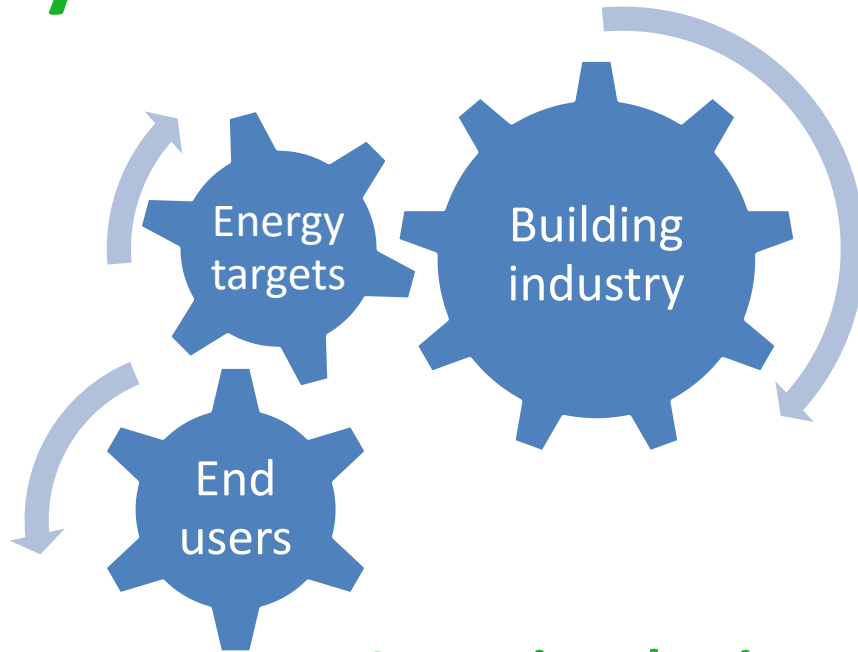
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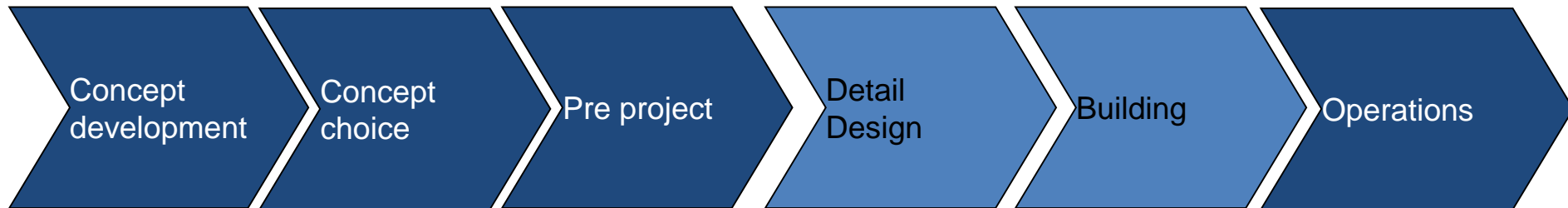
WP4.4
Legislation,
governance
and policy

Dynamic environment



Stakeholders, disconnected agendas

Long time horizon where change happens



Knowledge as a dynamic capability within a collective



Collectivity of practice

A mix of individuals with highly specialized competences where knowledge is activated and exchanged at the point it is needed (Lars Lindkvist 2005)

Dynamic capabilities

Activities which are *done* in projects as part of an embedded process of innovation and learning

What are the capabilities in activating and exchanging knowledge for ZenN?

Collectivity of practices



	Økern	Lindangen	Mogel	Grenoble	Total
Residents	3	5	3	0	11
Housing association	1	0	2		3
Building owner	(Municipal owner)	1 (Private real estate company)	(Residents were owners)	(Municipal owner)	1
Municipal	2		1	2	5
Contractors	1	5	1	7	14
Architects	1		1	1	3
Engineers	1				1
Professional consultants	1	1		1	3
Building manager		1			1
Janitors		2			2
Facility managers	4	1			5
Total	14	16	8	11	49



Dynamic capabilities for knowledge integration in energy efficiency residential renovation - (Draft version – still in development)

Aligning energy efficiency to renovation goals	<ul style="list-style-type: none"> Optimising renovation needs with energy efficient measures Balancing energy efficiency objectives with function of residence Avoiding increased cost due to energy efficiency measures
Linking design to use	<ul style="list-style-type: none"> Linking through informing stakeholders Designing energy efficiency measures with user functionality Residents involvement in renovation development
Strategic management of decision-making	<ul style="list-style-type: none"> Building momentum for support Appeasing cultural diversity Project champion
Accessing appropriate knowledge	<ul style="list-style-type: none"> Linking building expertise to expertise on energy efficiency Alleviating risk through testing and researching Technical knowledge to meet energy efficiency targets
Managing misconceptions	<ul style="list-style-type: none"> Explaining new concepts Managing negative attitudes Clear expectations for contractors
Realizing of energy efficiency measures	<ul style="list-style-type: none"> Test for full operation not partial operation before Handover documents prepared and complete at point of handover Adjustment period

What is link between capabilities and toolkit?



- Dynamic capabilities are identified in a reflective process
- Toolkit aim to achieve a pro-active way of achieving capabilities

Scenarios



- Aligning energy efficiency to renovation goals
- Grenoble:
 - Challenge:
 - Increasing energy ambitions to a project with established goals and mitigating concerns of disruption to project progress
 - Solution:
 - New energy objectives did not change overall concepts established in the project but enhanced ongoing plans through design details

Indicator and questions



Indicator	Stakeholder group	Define indicator with supporting questions
Aligning energy efficiency to renovation goals	Project team, building owner, residents	<p>Energy efficiency goals need to fit the broad concept of the project and can be initiated after the project starts. The below questions identify important areas which should be considered to manage this.</p> <ul style="list-style-type: none">- What are the logistical/budget issues of integrating energy efficiency measures?- How does energy efficiency intervention impact resident's requirements?- What design/detail changes, if any, need to be considered to the overall project to integrate new energy efficiency measures?



Next steps



- Toolkit still in develop
- Need to integrate other non-technical drivers
- Wider literature on indicators on energy efficiency building and human factor
- Smart cities information system – Social Monitoring Guide
- Assessing feasibility of toolkit in ZenN workshop