Carbon net-zero urban area developments in the Netherlands

A **framework** *for* **developers** *to influence* **carbon offsets**

P5 Presentation by Daphne Bedeaux

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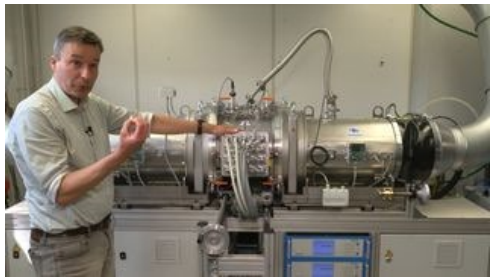
WHO JUST STARTED WORKING?
OR
WILL SOON START WORKING?

2050

CLIMATE AGREEMENT

AND WE HAVE TO COMPLY WITH THIS AGREEMENT
- REDUCE CARBON EMISSIONS WITH 95% -

Climate is changing



The Netherlands cannot escape removing carbon from the air, but options limited

(NOS, 2023)

New research: world even closer to 1.5 degrees global warming

'Next few years crucial'

(NOS, 2023)

Climate researchers: 1.5-degree target quickly getting out of sight, quick action is needed

(NOS, 2023)

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BUILT ENVIRONMENT

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ACTIONS NO NEGATIVE EFFECTS ON THE CLIMATE

NOT CONTRIBUTE TO GLOBAL CARBON EMISSIONS

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BUILDING AND CONSTRUCTION INDUSTRY 15% OF ALL DIRECT CARBON EMISSIONS

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LACKING CARBON
NET-ZERO REGULATIONS

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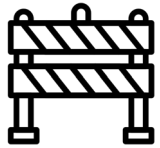

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1. ENERGY NEUTRAL

2. CLIMATE FRIENDLY

3. MINIMISED AND COMPENSATED

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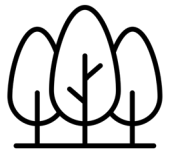
CARBON NET-ZERO



CARBON OFFSETTING

RESPONSIBILITY OTHER PARTIES

REQUIRES OFFSETTING

DEVELOPMENT AREA ITSELF?

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PLANS GLOBAL WARMING STILL INADEQUATE

PRIVATE PARTIES

Problem statement

Currently, achieving carbon net-zero is only considered at the building level. If offsetting is required for carbon emissions, suggestions are made to offset it far outside the planning area while the planning area itself is often disregarded. Furthermore, it is known that developers influence sustainable urban area developments under which carbon net-zero can be placed, but their influence specifically on this issue is unknown.

Main research question

What can developers do to influence carbon offsets in the development areas in the Netherlands?

02.

RESEARCH METHOD

Sub research questions

What can developers do to influence carbon offsets in the development areas in the Netherlands?

THEORETICAL RESEARCH

01 // How could **carbon net-zero urban area development** be described?
02 // How are **carbon emissions** currently **offset** in the building and construction sector?
03 // How can the **developers' role** be defined within sustainable urban area developments?
04 // What are the current **barriers** and **drivers** for carbon net-zero urban area developments?

EMPIRICAL RESEARCH

05 // What **components** are **essential** for developers to influence carbon offsets in the development areas in the Netherlands?
06 // What **opportunities** do developers see to use the urban areas as a solution for achieving carbon net-zero in the Netherlands?

SYNTHESIS

07 // How can a **framework** be designed for developers to achieve carbon net-zero urban area developments in the Netherlands?

Sub research questions

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Research design

Research design

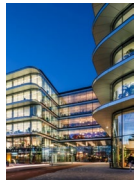
RESEARCH

CASE 1

INTERVIEWS

FINDINGS

CASE 2



INTERVIEWS

FINDINGS

CASE 3

INTERVIEWS

FINDINGS

CROSS-CASE ANALYSIS

DESIGNING

VALIDATE

THEORETICAL RESEARCH

EMPIRICAL RESEARCH

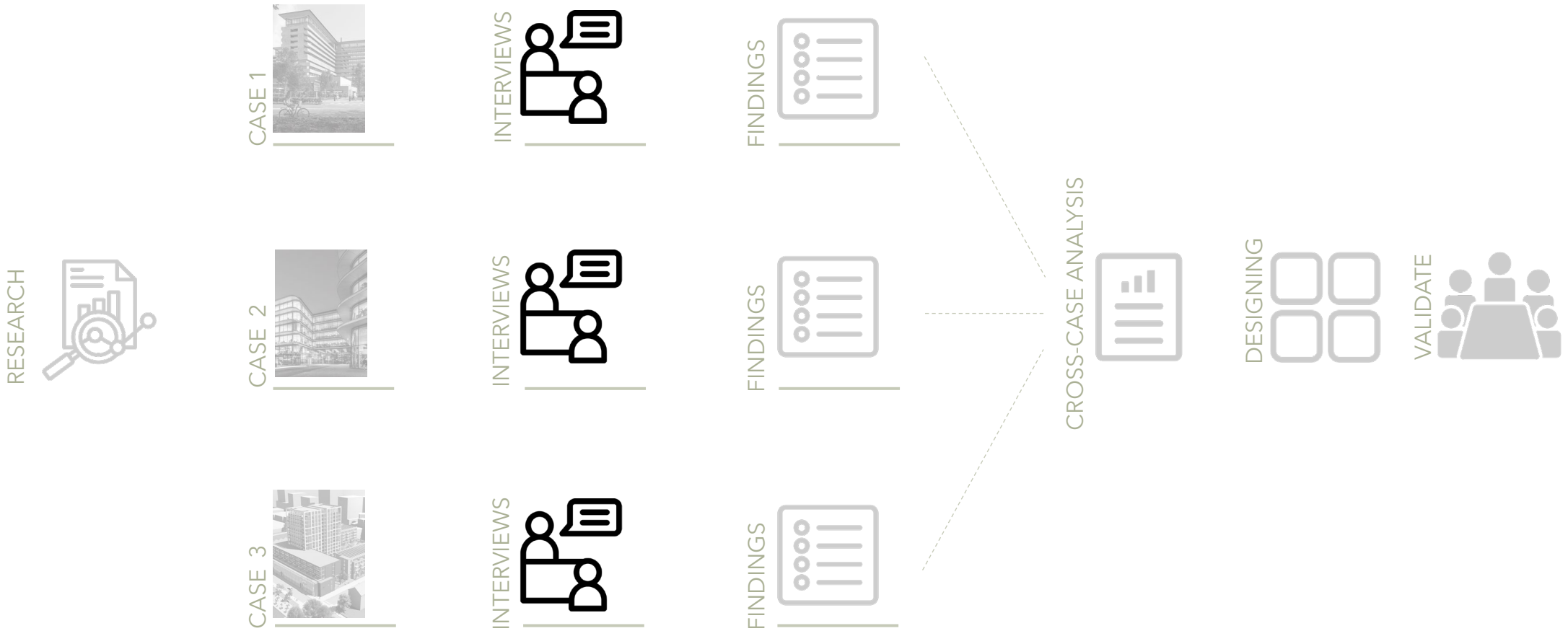
SYNTHESIS

Slotervaart CVZ
Amsterdam Nieuw-West

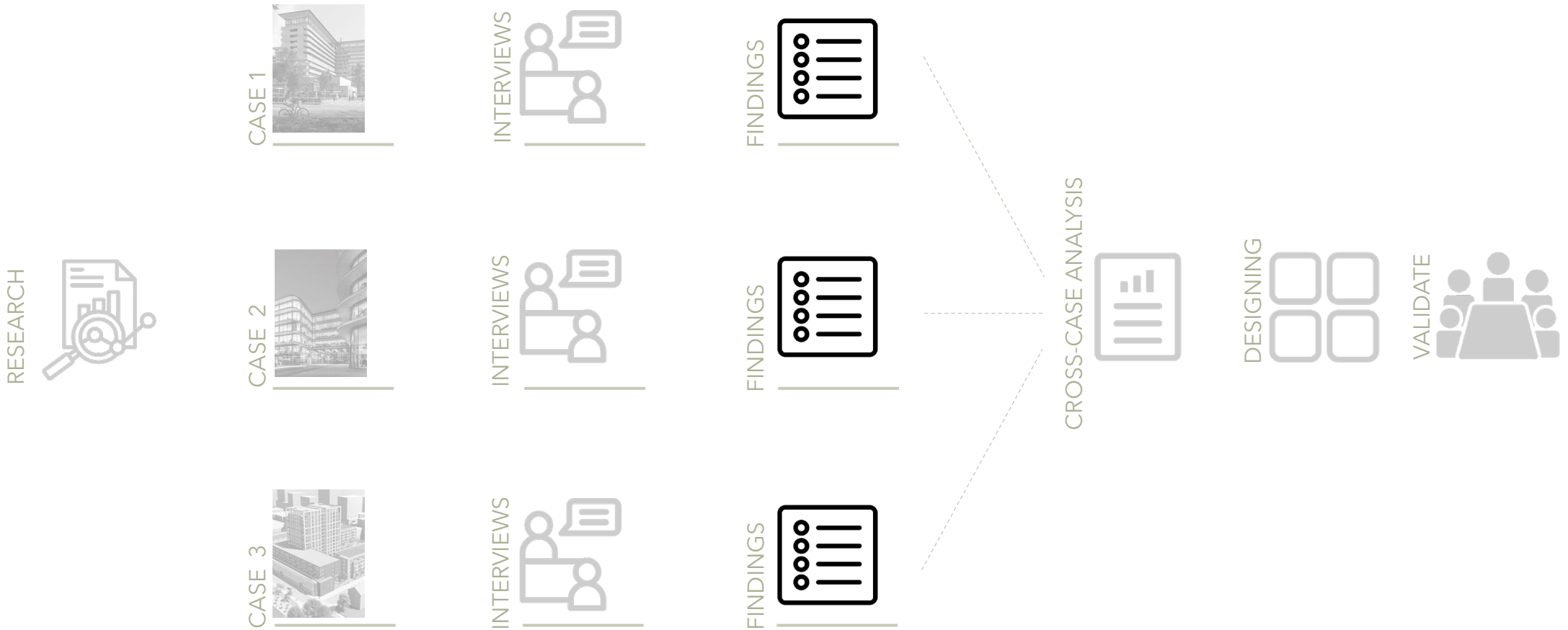
Cedar Office
Amsterdam Zuidoost

Harbour Park
Rijswijk

Research design



Research design



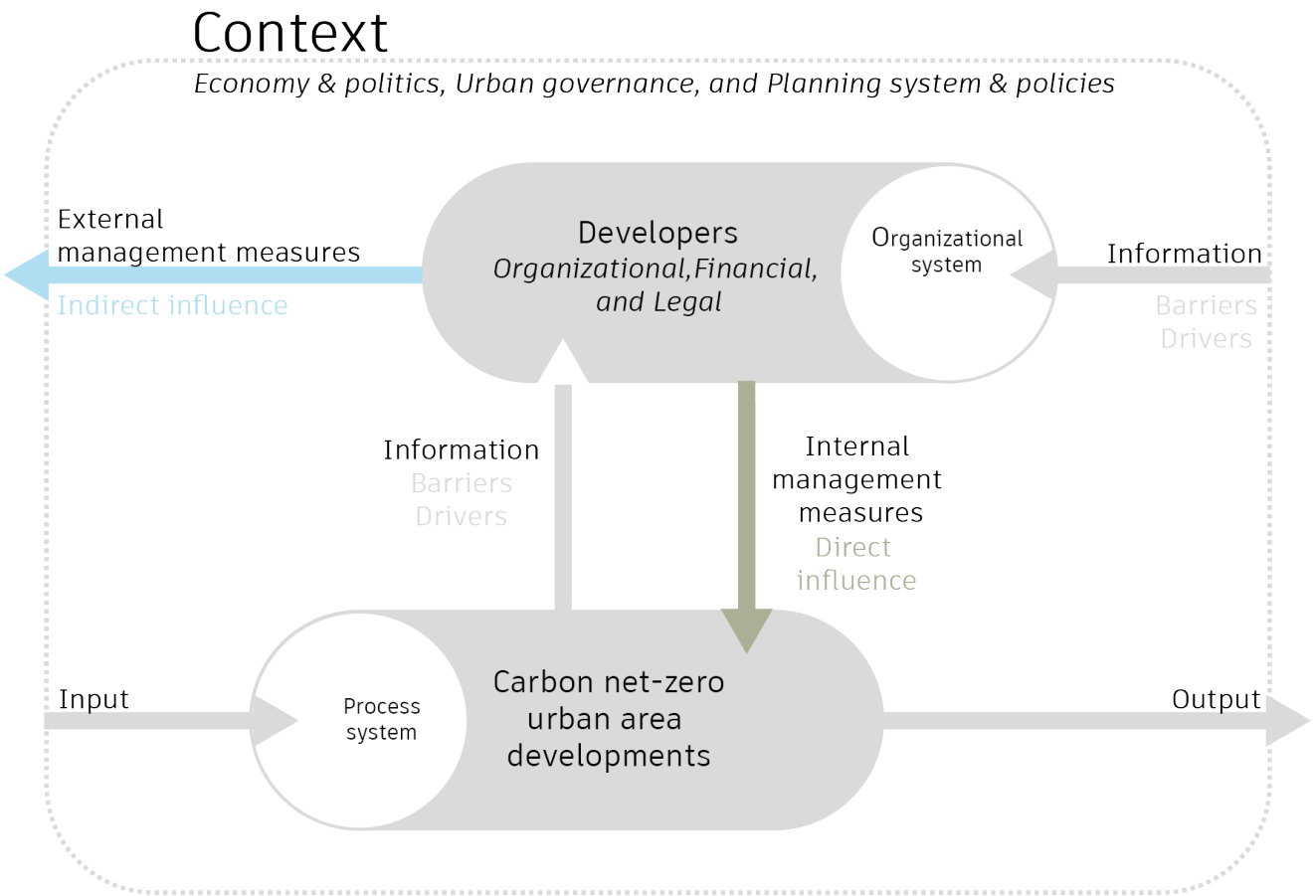
Research design

Research design

Research design

03.
THEORY

Conceptual steering model



Conceptual steering model (Own figure, based on Heurkens, 2012)

SQ1 // How could carbon net-zero urban area development be described?

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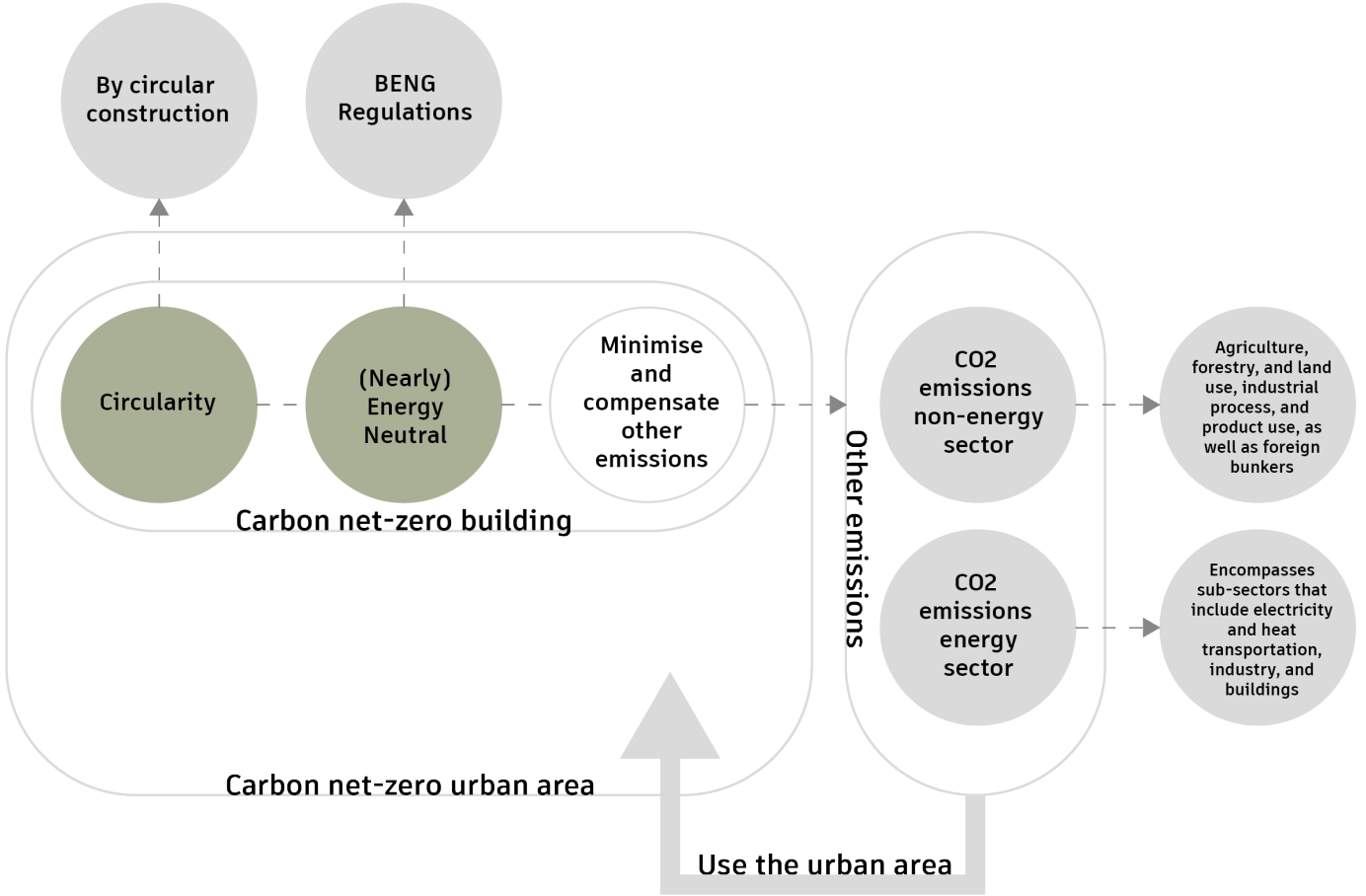

SQ2 // How are carbon emissions currently offset in the building and construction sector?

CARBON EMISSIONS
1. MANAGED BY ORGANISATION
2. PURCHASED ENERGY
3. SUPPLY CHAIN

CARBON OFFSETTING
PLANTING TREES
BUILDING MATERIALS
FUNDS

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1. MANAGED BY ORGANISATION
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CARBON OFFSETTING
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FUNDS

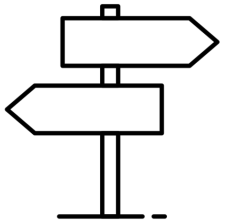
SQ3 // How can the developers' role be defined within sustainable urban area developments?

MANAGING & COORDINATING

MULTIPLE STEERING ROLE
STRATEGIC AND PROJECT-BASED
HARD AND SOFT STEERING

SQ3 // How can the developers' role be defined within sustainable urban area developments?

MANAGING & COORDINATING



MULTIPLE STEERING ROLE
STRATEGIC AND PROJECT-BASED
HARD AND SOFT STEERING

SQ4 // What are the current barriers and drivers for carbon net-zero developments?

BARRIER
STOPS YOU FROM DOING SOMETHING

DRIVER
MOTIVATES YOU TO DO SOMETHING

SQ4 // What are the current barriers and drivers for carbon net-zero developments?

BARRIER
STOPS YOU FROM DOING SOMETHING

DRIVER
MOTIVATES YOU TO DO SOMETHING

SQ4 // What are the current barriers and drivers for carbon net-zero developments?

P E S T E L

BARRIERS	LACK OF SUBSIDIES UNCLEAR DEFINITIONS	HIGH COSTS INSUFFICIENT DEMAND	KNOWLEDGE EXPERIENCE AWARENESS	COSTS NEW TECHNOLOGY NOT ENOUGH RESEARCH	USER CONCERN ABOUT THERMAL COMFORT	LAWS AND REGULATIONS
DRIVERS		BUSINESS MODEL CUSTOMER DEMAND	RESPONSIBILITY BUSINESS GOAL			REGULATIONS

04.

EMPIRICAL RESEARCH

Slotervaart CVZ
Amsterdam Nieuw-West

Cedar Office
Amsterdam Zuidoost

Harbour Park
Rijswijk

Cross-case analysis

P E S T E L

Example

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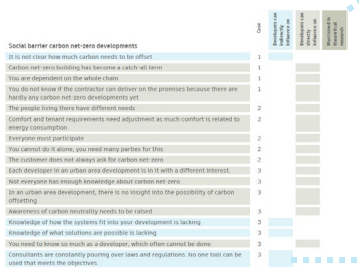

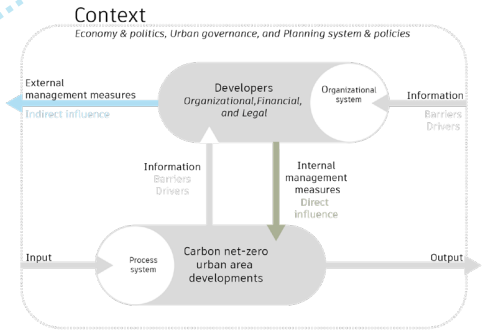

Social barrier carbon net-zero developments	Case	Developers can indirectly influence on	Developers can directly influence on	Mentioned in theoretical research
It is not clear how much carbon needs to be offset	1			
Carbon net-zero building has become a catch-all term	1			
You are dependent on the whole chain	1			
You do not know if the contractor can deliver on the promises because there are hardly any carbon net-zero developments yet	1			
The people living there have different needs	2			
Comfort and tenant requirements need adjustment as much comfort is related to energy consumption	2			
Everyone must participate	2			
You cannot do it alone, you need many parties for this	2			
The customer does not always ask for carbon net-zero	2			
Each developer in an urban area development is in it with a different interest.	3			
Not everyone has enough knowledge about carbon net-zero	3			
In an urban area development, there is no insight into the possibility of carbon offsetting	3			
Awareness of carbon neutrality needs to be raised	3			
Knowledge of how the systems fit into your development is lacking	3			
Knowledge of what solutions are possible is lacking	3			
You need to know so much as a developer, which often cannot be done.	3			
Consultants are constantly pouring over laws and regulations. No one tool can be used that meets the objectives.	3			

INDIRECT INFLUENCE

DIRECT INFLUENCE

NO INFLUENCE

Categorisation

KNOWLEDGE

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Barriers cross-case analysis

	P	E	S	T	E	L
INDIRECT INFLUENCE	ACCUMULATION OF REQUIREMENTS AND RULES	NOT ALWAYS FIT WITHIN THE BUSINESS CASE MATERIALS AND EQUIPMENT	KNOWLEDGE	AVAILABILITY MATERIALS		LAWS AND REGULATIONS
DIRECT INFLUENCE	PROJECT CHOICES FROM THE MUNICIPALITY		KNOWLEDGE DEPENDENCY USER PREFERENCES	COLLABORATION	SITES ARE NOT SUITABLE PROJECT LEVEL	

Barriers cross-case analysis

P

INDIRECT INFLUENCE

ACCUMULATION OF REQUIREMENTS AND RULES

*"**The moment there are materials that are said to be carbon neutral, it does not mean that they also have all the certificates**. And you have to have these before you can get a permit. And rightly so, because of course you also want your building to be fire-safe and to meet all safety requirements, but yes, if you don't have that check mark, it is also difficult to apply and that process can also take a very long time."*

- INTERVIEWEE 2

DIRECT INFLUENCE

PROJECT CHOICES FROM THE MUNICIPALITY

Barriers cross-case analysis

E

INDIRECT INFLUENCE

DIRECT INFLUENCE

NOT ALWAYS FIT WITHIN THE BUSINESS CASE

MATERIALS AND EQUIPMENT

*"It is **often much more expensive**, if you look at carbon neutral concrete, for example, you pay twice as much for this because it takes twice as long the moment you use carbon neutral cement because your hardening time takes longer, so then you have your schedule and the cost."*

- INTERVIEWEE 2

Barriers cross-case analysis

KNOWLEDGE

INDIRECT INFLUENCE

DIRECT INFLUENCE

KNOWLEDGE

DEPENDENCY

USER PREFERENCES

*"**You have to be prepared to adjust your program of requirements**. This means that your comfort, the requirements you have as a tenant, also have to be adjusted slightly. So you have to instead of waiting four seconds for the elevator now a waiting time for six or seven seconds, and you do have to include everyone in that."*

- INTERVIEWEE 3

Barriers cross-case analysis

*"There is significant **uncertainty surrounding the availability of recycled materials at the start of the construction process**, particularly for projects beginning in a few years. This presents a considerable challenge, as it is difficult to anticipate what materials will be available and in what quantities. Additionally, there are potential cost implications, as these materials may be more expensive than traditional alternatives."*

- INTERVIEWEE 1

T

AVAILABILITY

MATERIALS

COLLABORATION

INDIRECT INFLUENCE

DIRECT INFLUENCE

Barriers cross-case analysis

INDIRECT INFLUENCE

DIRECT INFLUENCE

*"The extent of **what can be achieved in a particular location is highly dependent on the geographical and regulatory constraints of that area**. Thus, it is essential to carefully consider these limitations when implementing sustainability initiatives. This calls for improved communication and trust-building between government and market players to facilitate effective collaboration and decision-making."*

- INTERVIEWEE 4

E

SITES ARE NOT SUITABLE

PROJECT LEVEL

Barriers cross-case analysis

INDIRECT INFLUENCE

DIRECT INFLUENCE

*"As a developer, you should be able to assume that **if you meet the requirements that are set, that means you also meet the regulations**."*

- INTERVIEWEE 7

L

LAWS AND REGULATIONS

Drivers

COMPETITIVE POSITION

INTRINSIC MOTIVATION

FINANCIAL SUPPORT

A BETTER WORLD

Drivers

COMPETITIVE POSITION

INTRINSIC MOTIVATION

FINANCIAL SUPPORT

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COMPETITIVE POSITION

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FINANCIAL SUPPORT

A BETTER WORLD

Influence of developers

DESIGN PHASE
SELECT PARTIES
DEFINE GOALS
CHECK AT EVERY PHASE

COLLABORATION
ENTIRE CHAIN
INVESTORS
FUTURE RESIDENTS

Influence of developers

DESIGN PHASE
SELECT PARTIES
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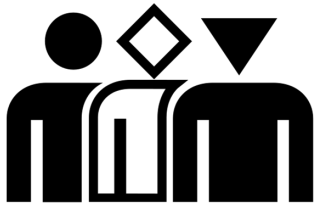
CHECK AT EVERY PHASE



COLLABORATION
ENTIRE CHAIN
INVESTORS
FUTURE RESIDENTS

Opportunities in urban areas

REUSING BUILDINGS

SUSTAINABLE MATERIALS

PLANTING TREES

PICKING FORESTS

ALGAE FARMS

MOBILITY PLAN

FUNDS

Opportunities in urban areas

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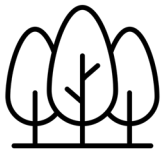

PLANTING TREES

PICKING FORESTS

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MOBILITY PLAN

FUNDS

Opportunities in urban areas

REUSING BUILDINGS

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PLANTING TREES

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Opportunities in urban areas

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SUSTAINABLE MATERIALS

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Opportunities in urban areas

REUSING BUILDINGS

SUSTAINABLE MATERIALS

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PICKING FORESTS

ALGAE FARMS

MOBILITY PLAN

FUNDS

05.
SYNTHESIS

Designing the framework

BARRIERS → **OPPORTUNITIES**

CROSS CASE ANALYSIS

FOR DEVELOPERS

Designing the framework

→ **OPPORTUNITIES**

FOR DEVELOPERS

Designing the framework

→

OPPORTUNITIES

FOR DEVELOPERS

↓

INFLUENCE
PHASE
COLLABORATION
ACTION DEVELOPER

Designing the framework

Social barriers

Knowledge

Influence	Direct
Collaboration	Municipality
Action developer	Dialogue
Phase	Initiation

Explanation

What developers can do is engage with the municipality to look together at the beginning of the project to see where in the area carbon can be offset and in what way that could be done so that it is included in the design.

Start for the conceptual framework

DRIVERS
COMPETITIVE POSITION
INTRINSIC MOTIVATION
FINANCIAL SUPPORT
A BETTER WORLD

Final conceptual framework

INDIRECT INFLUENCE

DIRECT INFLUENCE

Final conceptual framework

INDIRECT INFLUENCE

1. Dialogue with the municipality about regulations and subsidies

Start a conversation about the view of the accumulation of laws and regulations and where their focus lies. It is also important to know how they deal with sustainable materials not yet included in laws and regulations.

Talk about softening regulations for offsetting just outside the plot.

Start a dialogue with incentives such as subsidies for a carbon net-zero building.

2. Dialogue with the government about regulations

Indicate to the government that it is difficult to apply sustainable materials in development because they are not officially compliant.

3. Dialogue with sustainability experts about tools and instruments

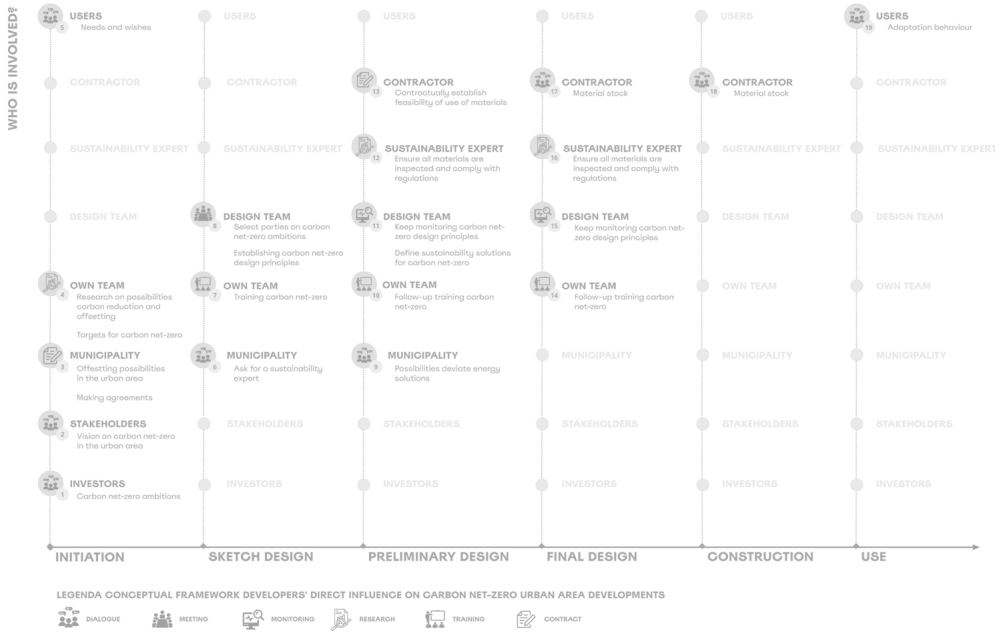
Create awareness for the need for factsheets and indicate that it is difficult to work with so many tools at once and that the preference is for an integrated tool to work with.

There is a need for a tool where you can immediately see how much carbon offsetting is required for certain design choices.

4. Dialogue with investors about the demand for sustainable materials

Indicate a demand for affordable tested sustainable materials, so they dare to take risks to invest in scaling up production of these kinds of materials which ensures lower prices of the products.

DIRECT INFLUENCE



Final conceptual framework

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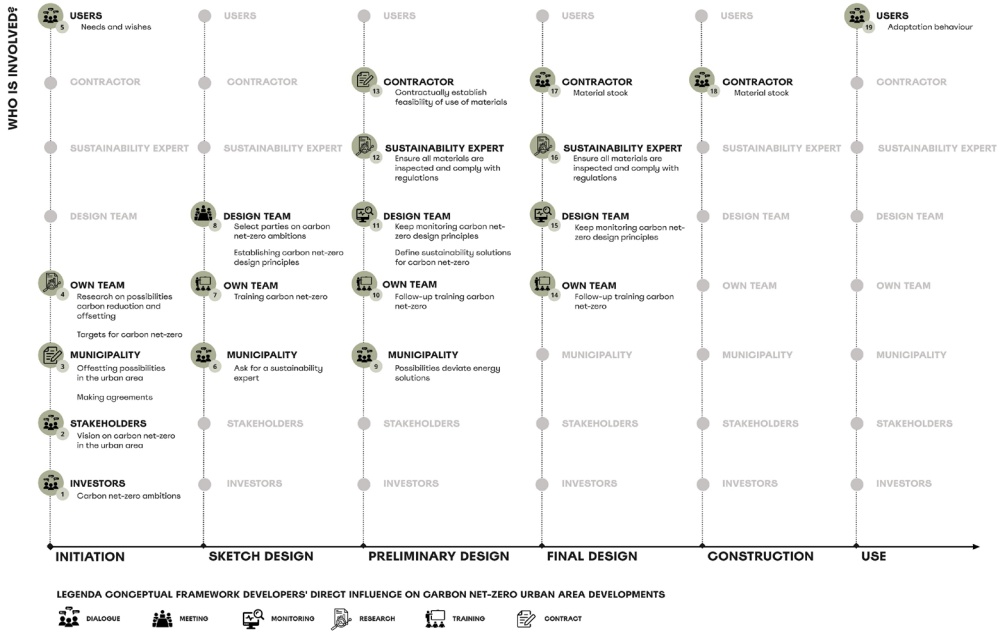
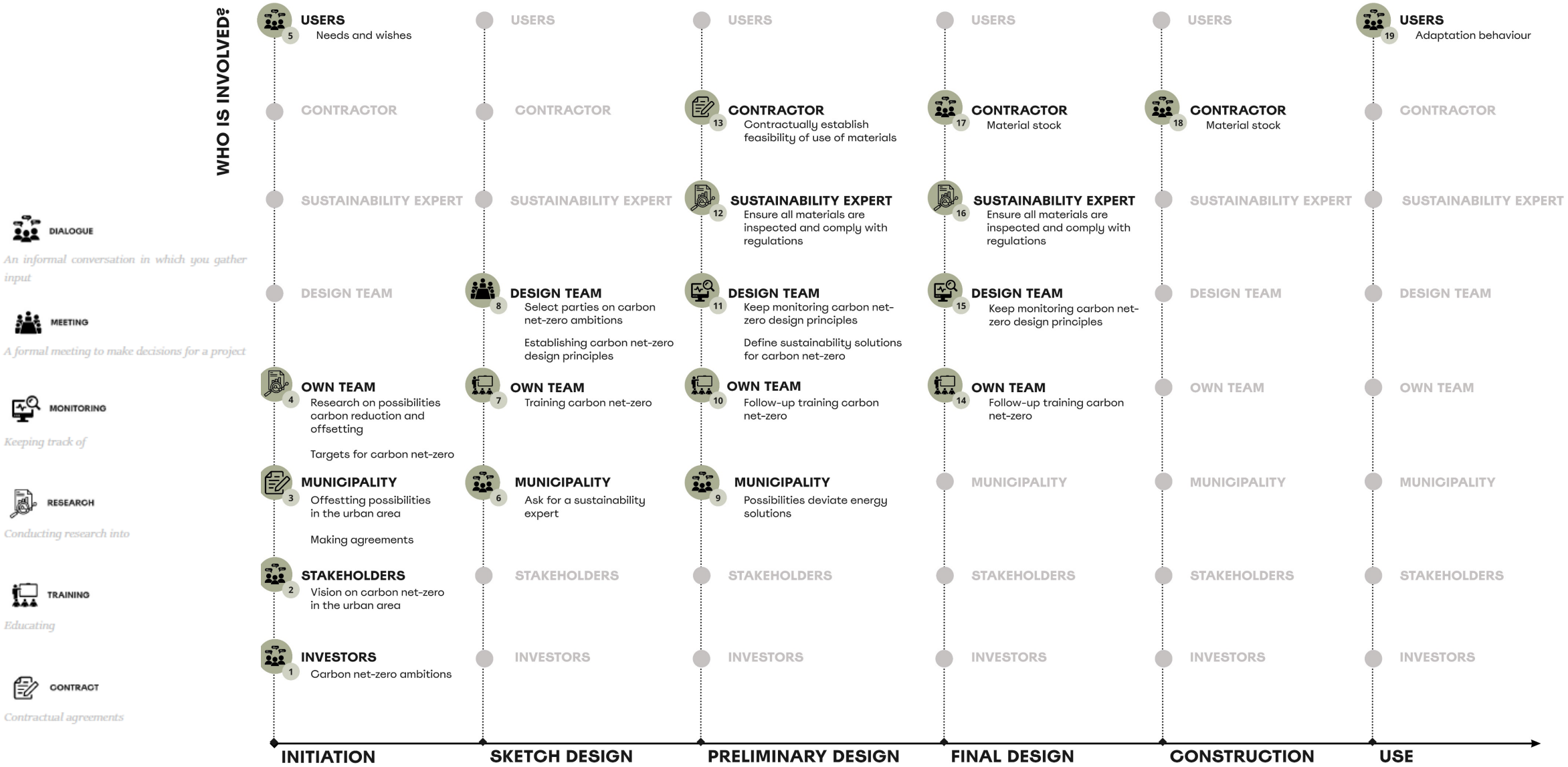
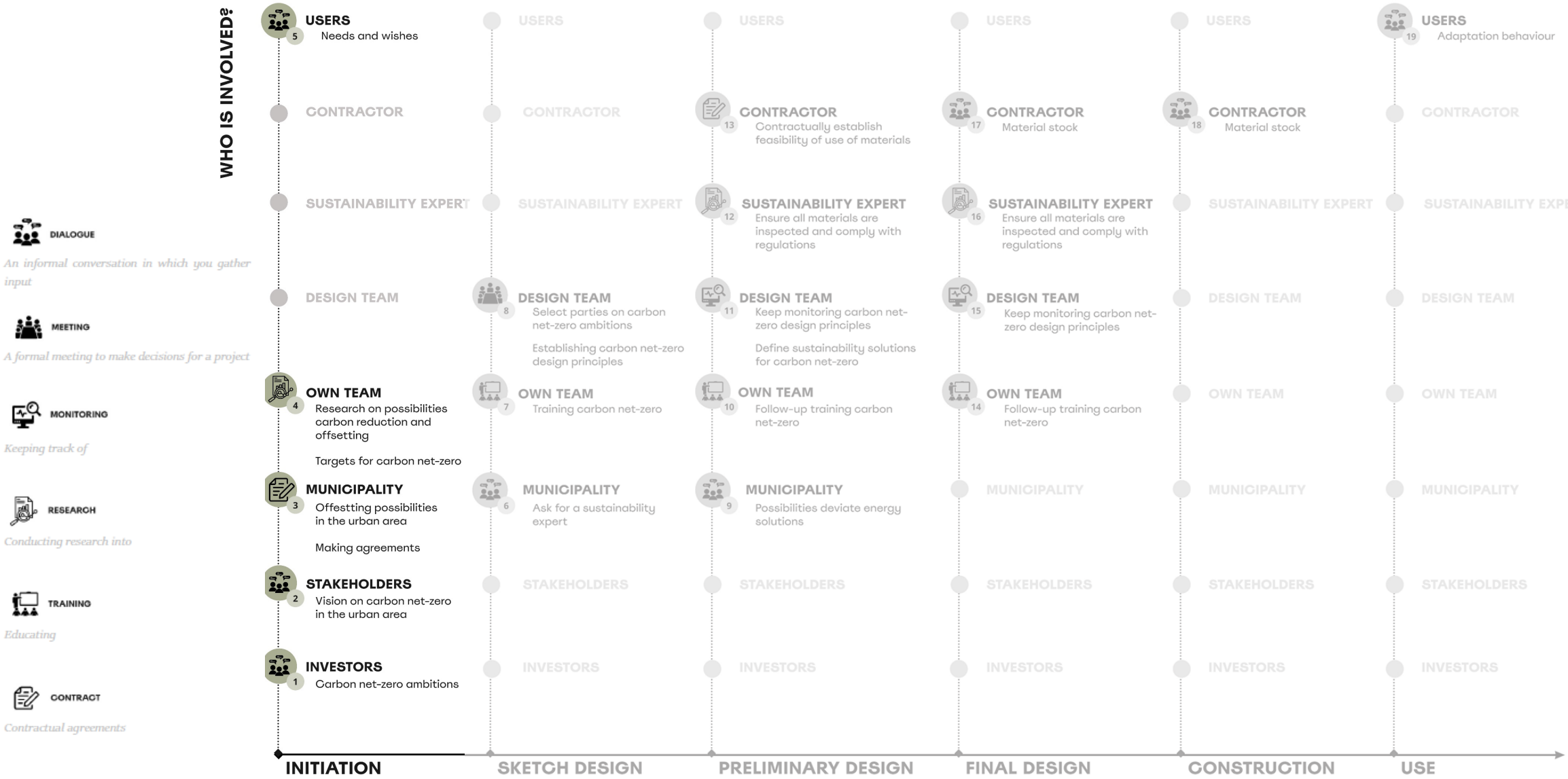




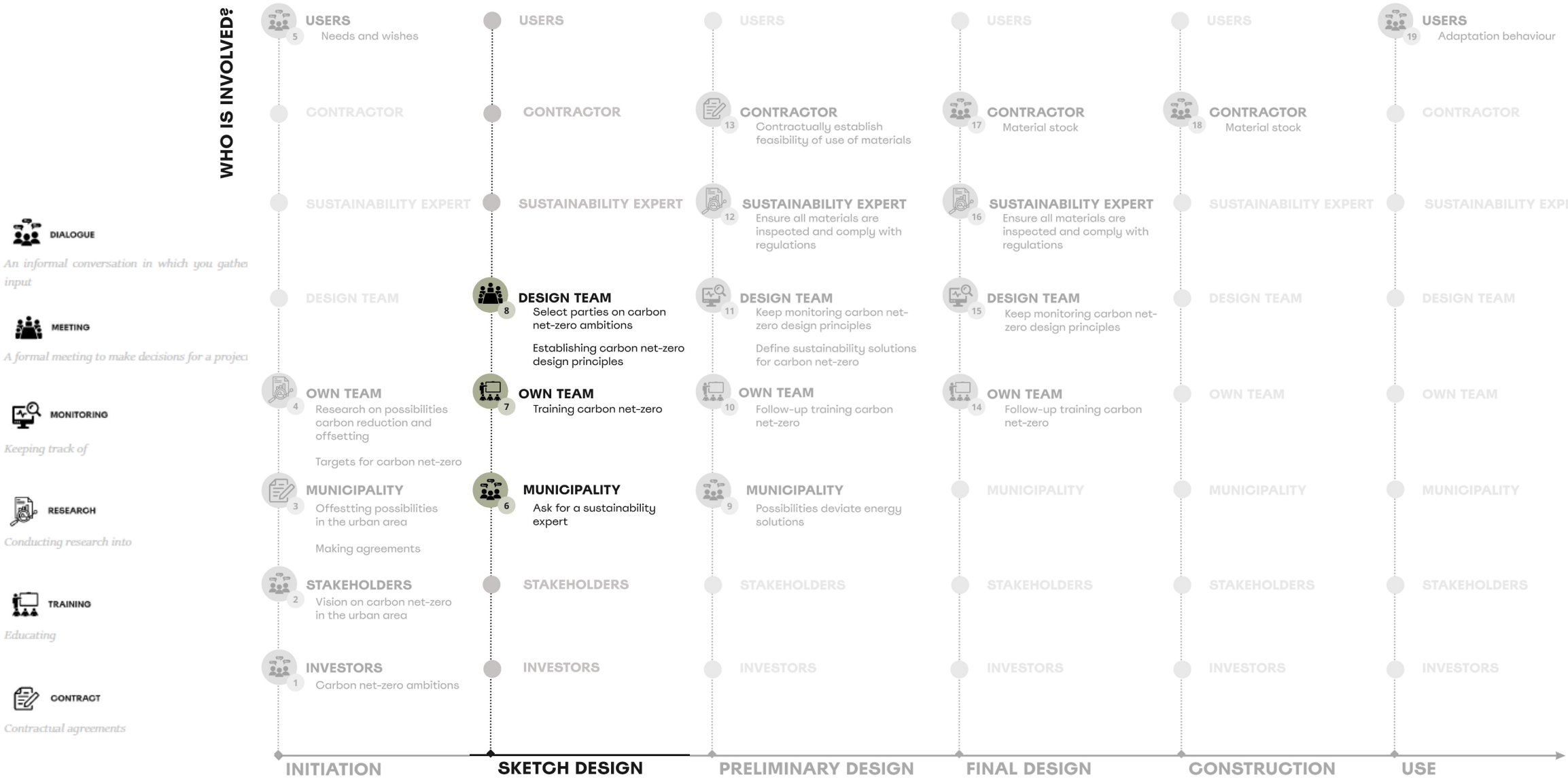
LEGENDA CONCEPTUAL FRAMEWORK DEVELOPERS' DIRECT INFLUENCE ON CARBON NET-ZERO URBAN AREA DEVELOPMENTS

DIALOGUE · MEETING · MONITORING · RESEARCH · TRAINING · CONTRACT



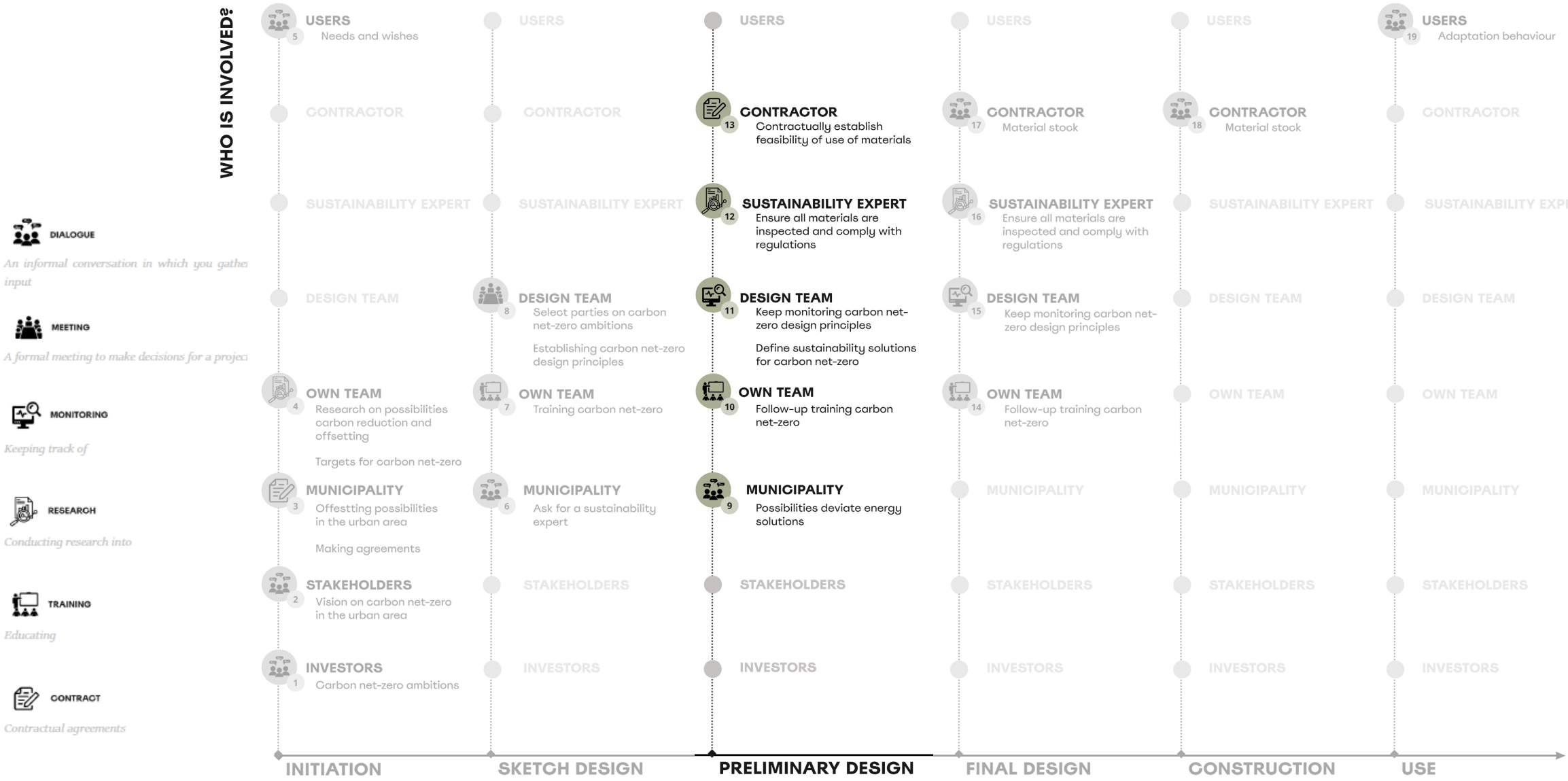
LEGENDA CONCEPTUAL FRAMEWORK DEVELOPERS' DIRECT INFLUENCE ON CARBON NET-ZERO URBAN AREA DEVELOPMENTS

DIALOGUE MEETING MONITORING RESEARCH TRAINING CONTRACT



LEGENDA CONCEPTUAL FRAMEWORK DEVELOPERS' DIRECT INFLUENCE ON CARBON NET-ZERO URBAN AREA DEVELOPMENTS

DIALOGUE MEETING MONITORING RESEARCH TRAINING CONTRACT



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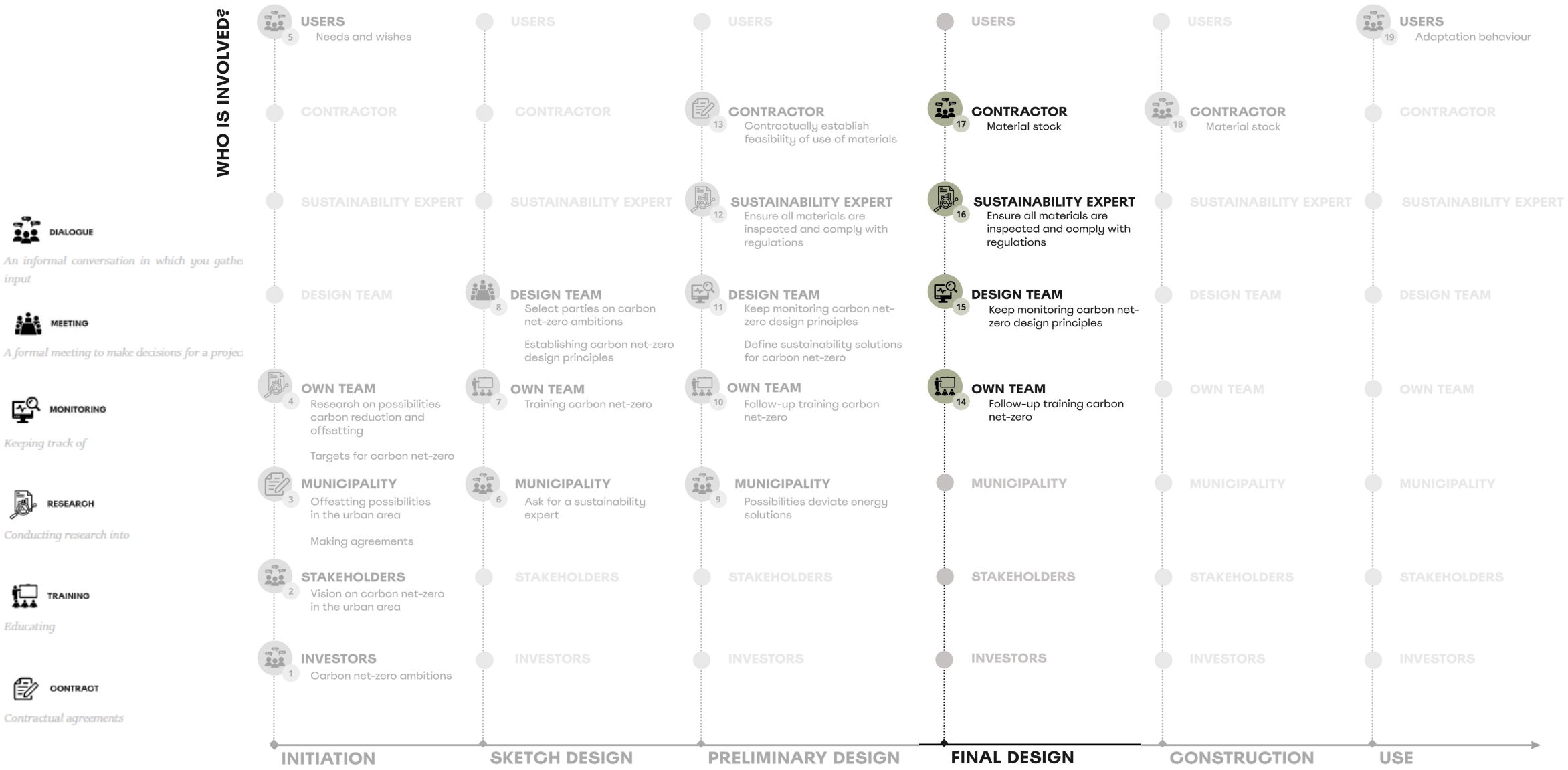

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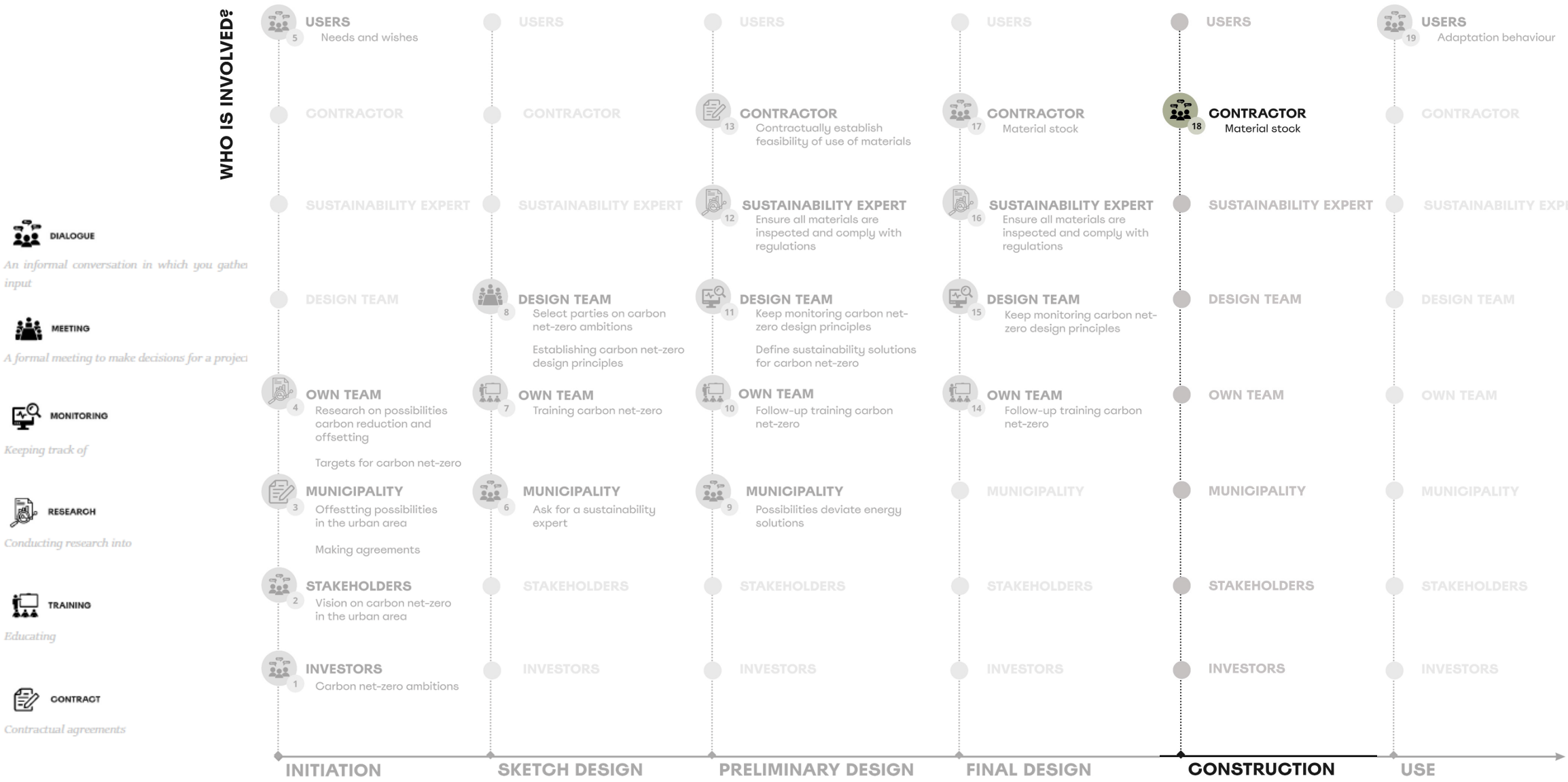

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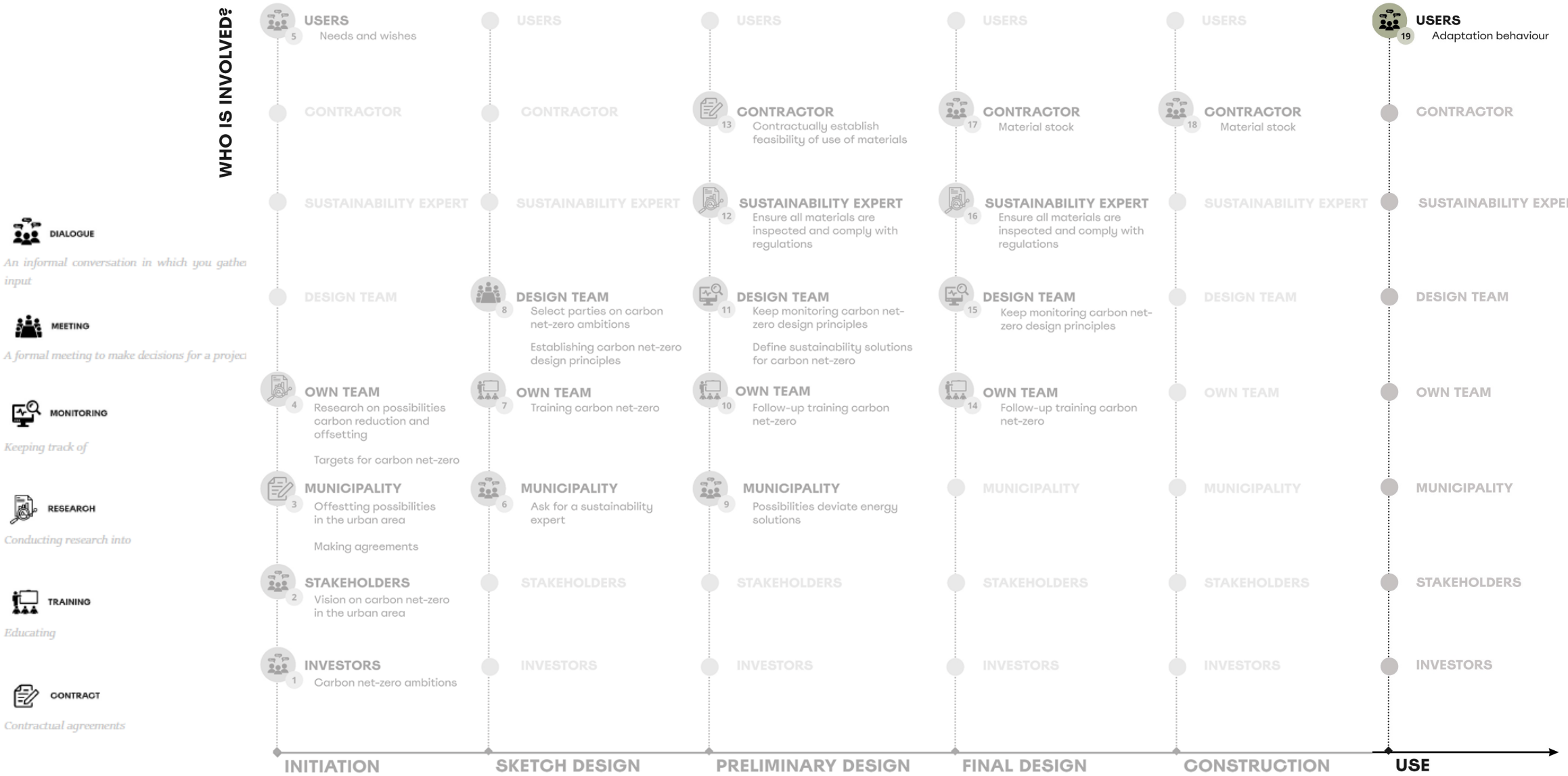


LEGENDA CONCEPTUAL FRAMEWORK DEVELOPERS' DIRECT INFLUENCE ON CARBON NET-ZERO URBAN AREA DEVELOPMENTS

DIALOGUE MEETING MONITORING RESEARCH TRAINING CONTRACT

Initiation phase

1. Dialogue with other developers for an area vision regarding carbon net-zero

As a developer, it is important to discuss with all developers in the area to look at an area vision or strategy.

2. Dialogue with the municipality

Engage with the municipality to look together at the beginning of the project to see where in the area, as a location, carbon can be offset and in what way that could be done so that it is included into the design. Examples offsetting and reduction possibilities:

- Greenery and trees
- Picking forest
- Algae farm
- Mobility plan
- Funds for locals/farmers/renovating other buildings

3. Research with the own development team

Look for possible ways for carbon reduction in the development and carbon offsetting in the urban area.

Define targets for the carbon net-zero urban area development

Sketch design

4. Dialogue with the municipality

Ask for a sustainability expert from the municipality joining the design team from the area vision.

5. Training own development team

Ensure that the developers are trained in carbon net-zero developments and have enough knowledge about it.

6. Design team selection and meeting

Include carbon net-zero ambitions in the party selection criteria. The following parties are essential:

- Municipality (incl. sustainability expert)
- Architect
- Contractor
- Structural engineer
- Installation consultant
- Sustainability expert
- Landscape architect
- Construction cost expert

Establishing carbon net-zero design principles

- Create awareness of carbon net-zero by all parties.
- Focus on large scale during the design process to look at carbon offsets.
- Ensure that space, time and design freedom are also set up during the process to possibly apply other systems or sustainable materials in the project.

Preliminary design

7. Dialogue with the municipality

Enter the conversation as to whether they are willing to deviate from standard energy solutions in the area and create awareness that alternatives might be more sustainable.

8. Own team

Organize follow-up trainings for employees to update their knowledge about carbon net-zero.

9. Design team

Keep monitoring carbon net-zero design principles

- Create awareness of carbon net-zero by all parties.
- Focus on large scale during the design process to look at carbon offsets.
- Ensure that space, time and design freedom are also set up during the process to possibly apply other systems or sustainable materials in the project.

Define what kind of sustainability solutions will possibly be used to design the area and building in a way all carbon net-zero solutions will fit.

10. Sustainability expert

Ensure that all materials that will be used are inspected and properly recorded in a database to avoid concerns.

11. Contractor

Add a 'feasibility' section in the contractor selection process and contractually define the agreements well.

Final design

12. Own team

Organize follow-up trainings for employees to update their knowledge about carbon net-zero.

13. Design team

Keep monitoring carbon net-zero design principles

- Create awareness of carbon net-zero by all parties.
- Focus on large scale during the design process to look at carbon offsets.
- Ensure that space, time and design freedom are also set up during the process to possibly apply other systems or sustainable materials in the project.

14. Sustainability expert

Ensure that all materials that will be used are inspected and properly recorded in a database to avoid concerns.

15. Contractor

Talk about the material stock in advance and involving them early on in the design process to avoid a shortage of sustainable materials.

Construction

16. Contractor

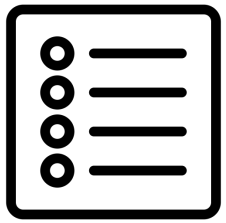
Keep talking about the material stock to avoid a shortage of sustainable materials.

Monitoring

17. Users

It is important to involve the users in the project and include them in the sustainability story. That they also have to adapt their behaviour to meet the climate targets.

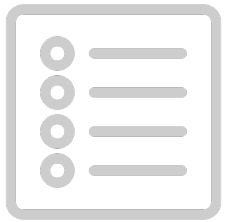
Concrete actions for developers



AGENDA ITEM
EVERY MEETING

DETERMINE KPI'S
AT THE START OF THE PROJECT

Concrete actions for developers



AGENDA ITEM
EVERY MEETING

DETERMINE KPI'S
AT THE START OF THE PROJECT

06.

DISCUSSION & CONCLUSION

Discussion barriers

	P	E	S	T	E	L
THEORY	LACK OF SUBSIDIES UNCLEAR DEFINITIONS	**HIGH COSTS** INSUFFICIENT DEMAND	**KNOWLEDGE** EXPERIENCE AWARENESS	COSTS NEW TECHNOLOGY NOT ENOUGH RESEARCH	USER CONCERN ABOUT THERMAL COMFORT	**LAWS AND REGULATIONS**
PRACTISE	ACCUMULATION OF REQUIREMENTS AND RULES PROJECT CHOICES FROM THE MUNICIPALITY	**NOT ALWAYS FIT WITHIN THE BUSINESS CASE** MATERIALS AND EQUIPMENT	**KNOWLEDGE** DEPENDENCY USER PREFERENCES	AVAILABILITY MATERIALS COLLABORATION	SITES ARE NOT SUITABLE PROJECT LEVEL	**LAWS AND REGULATIONS**

Discussion barriers

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Discussion drivers

COMPETITIVE POSITION
THEORY AND PRACTISE

INTRINSIC MOTIVATION
THEORY AND PRACTISE

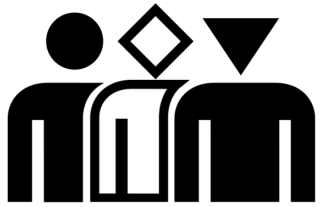
FINANCIAL SUPPORT
PRACTISE

A BETTER WORLD
THEORY AND PRACTISE

Discussion influence of developers

MANAGING AND COORDINATING
THEORY AND PRACTISE

DECISION-MAKING POWER IN THE DESIGN PHASE
PRACTISE



COLLABORATION
PRACTISE

Discussion offsetting possibilities

REUSING BUILDINGS
THEORY AND PRACTISE

SUSTAINABLE MATERIALS
THEORY AND PRACTISE

PLANTING TREES
THEORY AND PRACTISE

PICKING FORESTS
PRACTISE

ALGAE FARMS
PRACTISE

MOBILITY PLAN
PRACTISE

FUNDS
THEORY AND PRACTISE

Limitations

DEFINITION OF CARBON NET-ZERO URBAN AREA DEVELOPMENTS

CASE STUDIES
DEVELOPERS' POINT OF VIEW
LOCATIONS

AVAILABILITY AND TIME OF PARTICIPANTS

Limitations

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DEVELOPERS' POINT OF VIEW
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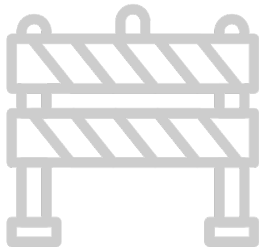
AVAILABILITY AND TIME OF PARTICIPANTS

What can developers do to influence carbon offsets in the development areas in the Netherlands?

DRIVERS
COMPETITIVE POSITION
INTRINSIC MOTIVATION
FINANCIAL SUPPORT
A BETTER WORLD

DESIGN PHASE
SELECT PARTIES
DEFINE GOALS
CHECK AT EVERY PHASE

COLLABORATION
ENTIRE CHAIN
INVESTORS
FUTURE RESIDENTS



TRANSLATE INDIRECT AND DIRECT INFLUENCEABLE BARRIERS INTO OPPORTUNITIES
AND THEREBY INFLUENCE EACH PHASE WITH THE NECESSARY PARTIES AND THE NECESSARY TOOL

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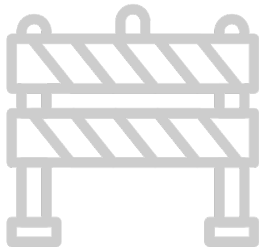

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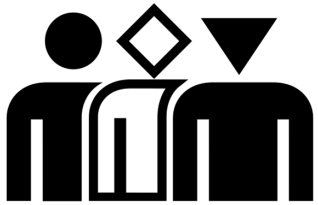

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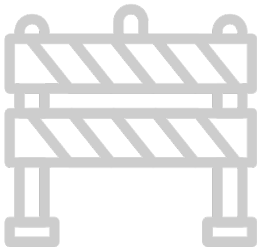

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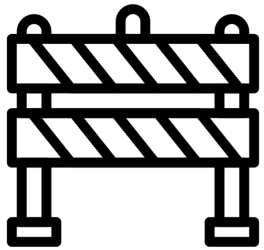

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Recommendations for practise

SHARING KNOWLEDGE

LACK OF KNOWLEDGE ABOUT SUSTAINABILITY

INVOLVING AN URBAN PLANNER

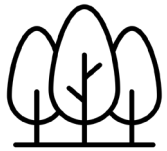
INVOLVE THE MUNICIPALITY

ADVICE FROM A SUSTAINABILITY EXPERT

CHANGE MANAGER

Recommendations for practise

SHARING KNOWLEDGE



INVOLVING AN URBAN PLANNER

URBAN AREA IMPORTANT FOR OFFSETTING

INVOLVE THE MUNICIPALITY

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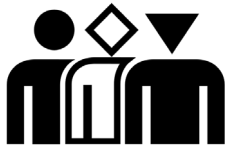

INVOLVE THE MUNICIPALITY

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CARBON NET-ZERO
OFFSETTING POSSIBILITIES

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ENSURE AWARENESS OF NEW SUSTAINABILITY GOALS

Recommendations for research

CASE SELECTION BASED ON LOCATION

OFFSETTING LINKED TO AVAILABLE SPACE IN DEVELOPMENT AREAS

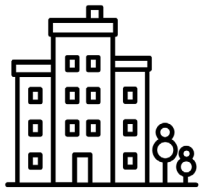
CARBON NET-ZERO BUILDING AS A BASELING

RESEARCH WORLDWIDE

INFLUENCE ECONOMIC BARRIERS

Recommendations for research

CASE SELECTION BASED ON LOCATION



CARBON NET-ZERO BUILDING AS A BASELING

EXACT NUMBERS OF OFFSETTING NEEDED

RESEARCH WORLDWIDE

INFLUENCE ECONOMIC BARRIERS

Recommendations for research

CASE SELECTION BASED ON LOCATION

CARBON NET-ZERO BUILDING AS A BASELING

RESEARCH WORLDWIDE

OTHER HIGH EMITTERS SUCH AS GERMANY AND ENGLAND

INFLUENCE ECONOMIC BARRIERS

Recommendations for research

CASE SELECTION BASED ON LOCATION

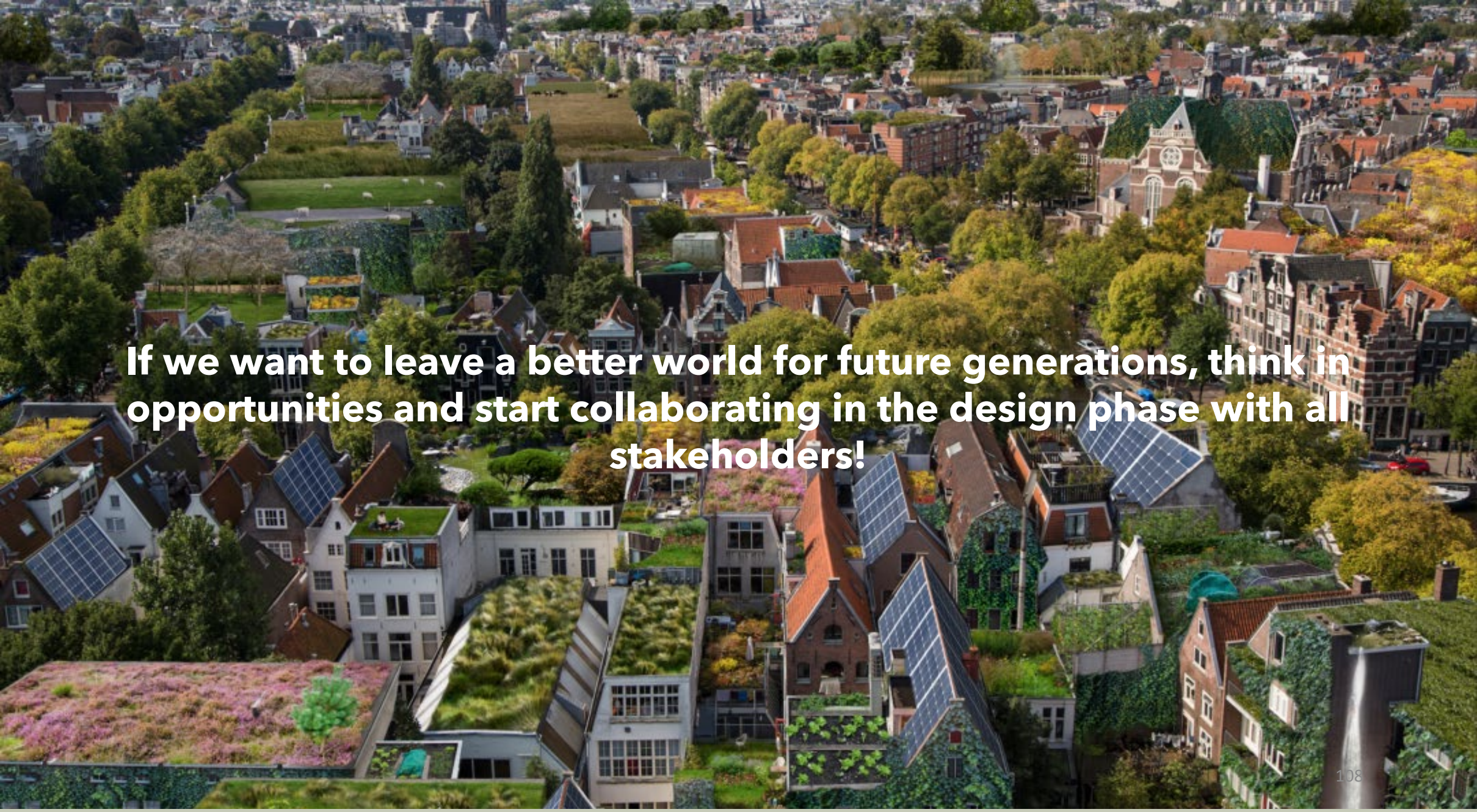
CARBON NET-ZERO BUILDING AS A BASELING

RESEARCH WORLDWIDE

INFLUENCE ECONOMIC BARRIERS

ECONOMIC BARRIERS CAN INFLUENCE THE DESIGN

INDIRECT VS DIRECT


If we want to leave a better world for future generations, think in opportunities and start collaborating in the design phase with all stakeholders!

Questions?
Questions?
Questions?

A **framework** *for* **developers**
to influence **carbon offsets**

P5 presentation by Daphne Bedeaux