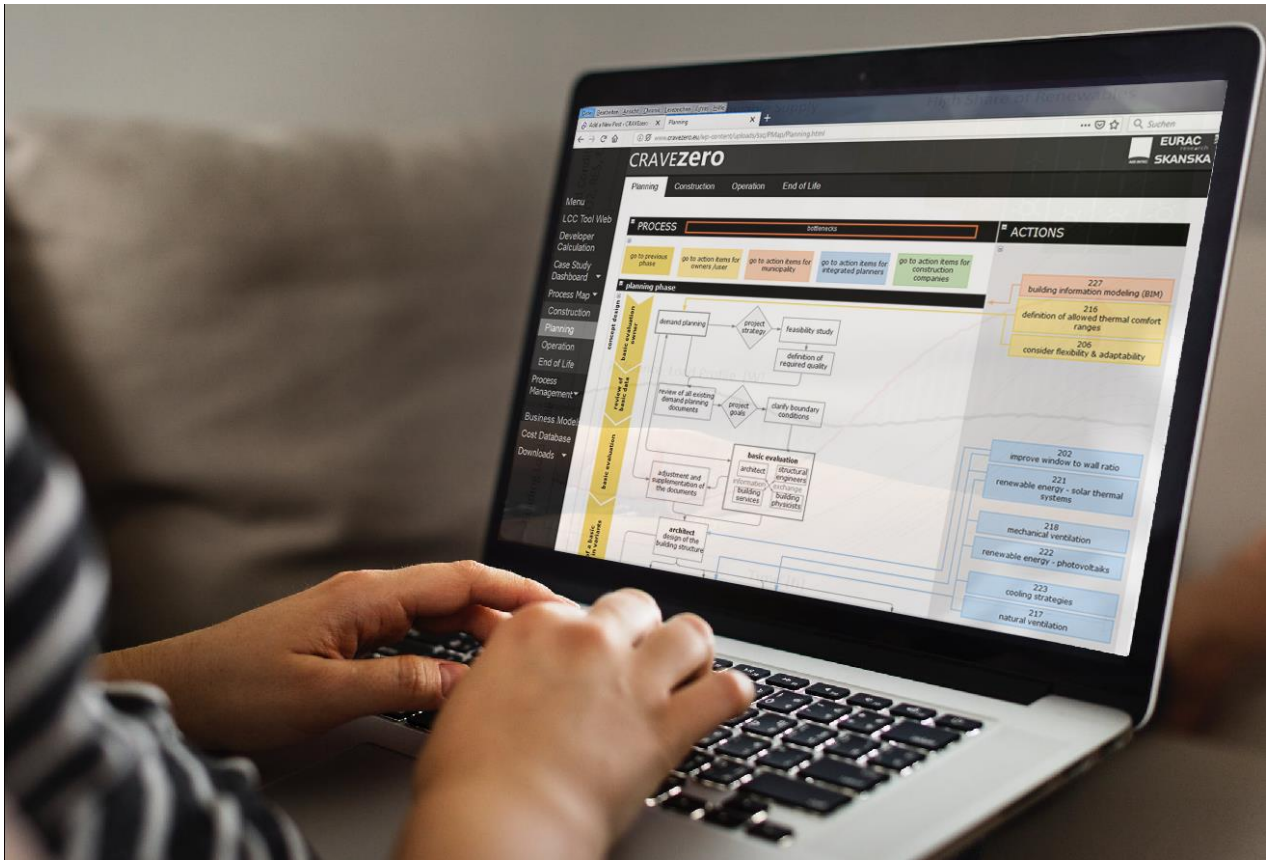
D3.2: Optimized nZEB - process map

"A manual for the interactive life cycle process map"



COST REDUCTION AND MARKET ACCELERATION FOR VIABLE NEARLY ZERO-ENERGY BUILDINGS

Effective processes, robust solutions, new business models and reliable life cycle costs, supporting user engagement and investors' confidence towards net zero balance.

CRAVEzero - Grant Agreement No. 741223

WWW.CRAVEZERO.EU

Co-funded by the Horizon 2020 Framework Programme of the European

D3.2: Optimized nZEB - process map

"A manual for the interactive life cycle process map"

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FOREWORD

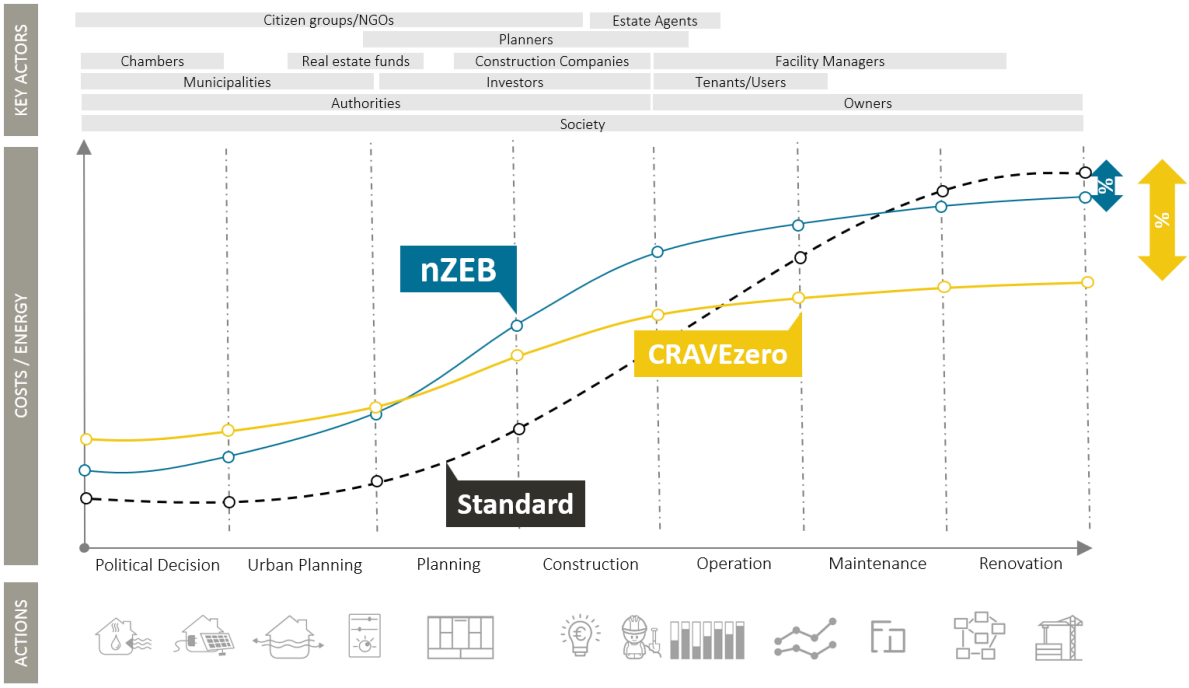

Figure 1: CRAVEzero approach for cost reductions in the lifecycle of nZEBs.

Cost optimal and nearly zero energy performance levels are principles initiated by the European Union's (EU) Energy Performance of Buildings Directive, which was recast in 2010 and amended 2018. These will be significant drivers in the construction sector in the next few years because all new buildings in the EU from 2021 onwards are expected to be nearly zero-energy buildings (nZEB). While realised nZEBs have clearly shown that nearly-zero energy target could be achieved using existing technologies and practices, most experts agree that a broad scale shift towards nearly-zero energy buildings requires significant adjustments to prevailing building market structures. Cost-effective integration of efficient solution sets and renewable energy systems, in a form that fits with the development, manufacturing and construction industry processes, as well as with planning, design, and procurement procedures, are the major challenges.

The report presents a manual for the "CRAVEzero Process Map". The report accompanies and "Interactive Life Cycle Process Map" (LCPM) and a "Life Cycle Process-Tracker" that can be downloaded via the CRAVEzero website:
http://www.cravezero.eu/pinboard/PinboardMain/PinboardMain.htm
The deliverable provides a short manual of how to use the tools ensuring the process quality of the new nZEBs. Key actions, bottlenecks, stakeholders needed to ensure the achievement of energy and cost-related goals are structured in an overall process over the whole life cycle of a building. The focus of the described "CRAVEzero process", is to promote a shared, interdisciplinary understanding of the complexity of nZEB planning processes for all involved stakeholders. A well organised and transparent process is a key issue of achieving the goal of cost-optimal and sustainable nZEBs throughout the entire life cycle phase.

The deliverable presents a manual of the "Interactive Life Cycle Process Map" (LCPM) developed within the CRAVEzero project. The process map connects all phases for the entire project lifecycle from the urban planning to design, operation and end of life phase. As a main result, this report also comes along with a downloadable "life cycle tracker tool", an easy-to-use Excel file with VBA macros that combines project roles, actions, and design responsibility matrix. It is based on the experience of the whole consortium in the area of holistic project management with a focus on integral building planning of nZEBs. It gives support on how key performance parameters to achieve successful nZEBs should be prioritized and can be tracked along the whole life cycle process. It can be downloaded here:

Pinboard: http://www.cravezero.eu/pinboard/PinboardMain/PinboardMain.htm
Process Tracker Tool: http://www.cravezero.eu/pinboard/Downloads/CRAVEzero_ProcessTracker.zip
Process Map: http://www.cravezero.eu/pinboard/LCTurban/LCTurban.htm

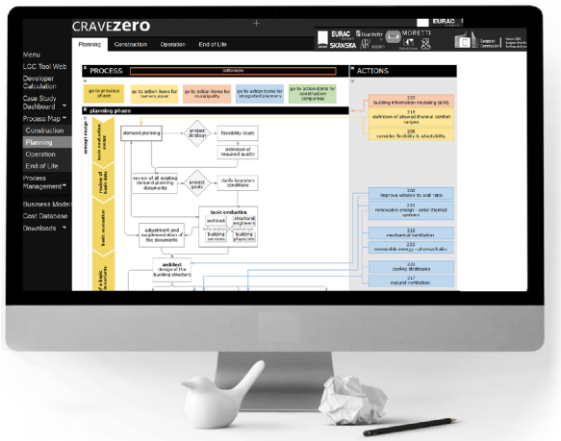

Figure 2: Interactive life cycle process map

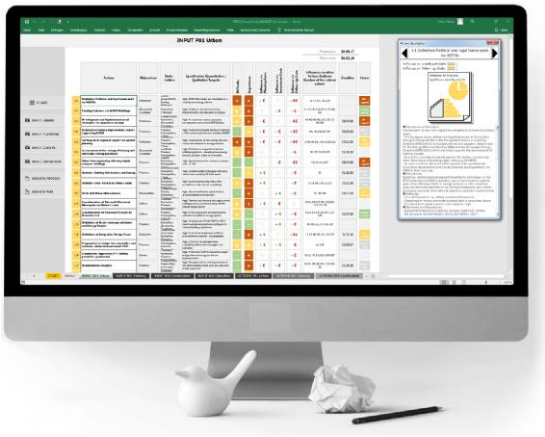
Figure 3: Life cycle tracker tool

Actions, stakeholder-relations, pitfalls and bottlenecks, as well as the required goals, are pointed out in detail. Considering the importance and the complexity to reach nZEB-standard in a cost-optimal way for all the different stakeholders, multiple actions are required. These are, however missing in the standard planning process. This report provides a practical methodology to achieve the best conditions towards cost-optimal nZEBs in the whole planning, construction and operation process considering all relevant decisions, co-benefits, involved players as well as related cost reduction potentials. A process map that connects the entire project lifecycle for design, planning, operation and end of life phase accompanies this report. This process map is a workflow that points out cost reduction potentials through all the stages of the process where all the different parts are linked to providing summaries and reports to the decision-makers in leadership roles.

The main additional advantages of integrating the "CRAVEzero process" into standardized building processes are listed as follows:

- Reduce risks
- Speed-up construction and delivery
- Control costs and energy performance
- Foster integrative design and make optimal use of team members' expertise
- Establish measurable success criteria

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CHAPTER 1

Introduction

1.INTRODUCTION

Achieving the nZEB goal with reduced costs requires additional strategies as well as refinements of an existing design, construction, operation, and maintenance practice.
Based on the results from Deliverable 3.1 an operative methodology to achieve the best conditions towards cost-optimal nZEBs have been summarized and structured in an "interactive process map" and "lean management protocol" the so-called "life cycle tracker tool". They include key actions needed to ensure the achievement of energy and cost-related goals using replicable planning, design, construction, and operation process. The development of a clear and comprehensive life cycle process that includes specific and measurable actions (both cost savings and energy) is critical to ensure that goals are met cost-effectively. Both tools cover the whole life cycle process of nZEBs from urban planning, planning, construction and operation until the end of life.

The life cycle process of nZEB is structured as follows:

- **Existing process:** A process map describing the overall process and steps to be taken for all related stakeholders for all phases of a project's lifecycle
- **Pitfalls and bottlenecks:** Pitfalls and bottlenecks are listed that can endanger deadlines, budgets and quality of the nZEB project
- **Actions:** Various actions that can be allocated in the specific phase to promote nZEBs are presented
- **Process evaluation results:** Actions are assigned to the main drivers and other stakeholders in order to clarify the question of responsibility. In addition, the various dependencies of the actions and possible cost saving potentials are listed.

As a main result, this report comes along with the downloadable "life cycle tracker tool", an easy-to-use Excel file with VBA macros that combines project roles, actions, and design responsibility matrix. It is based on the experience of the whole consortium in the area of holistic project management with a focus on integral building planning of nZEBs. It gives support on how key performance parameters to achieve successful nZEBs should be prioritized and can be tracked along the whole life cycle-process. A manual for the tool is presented in chapter 3.

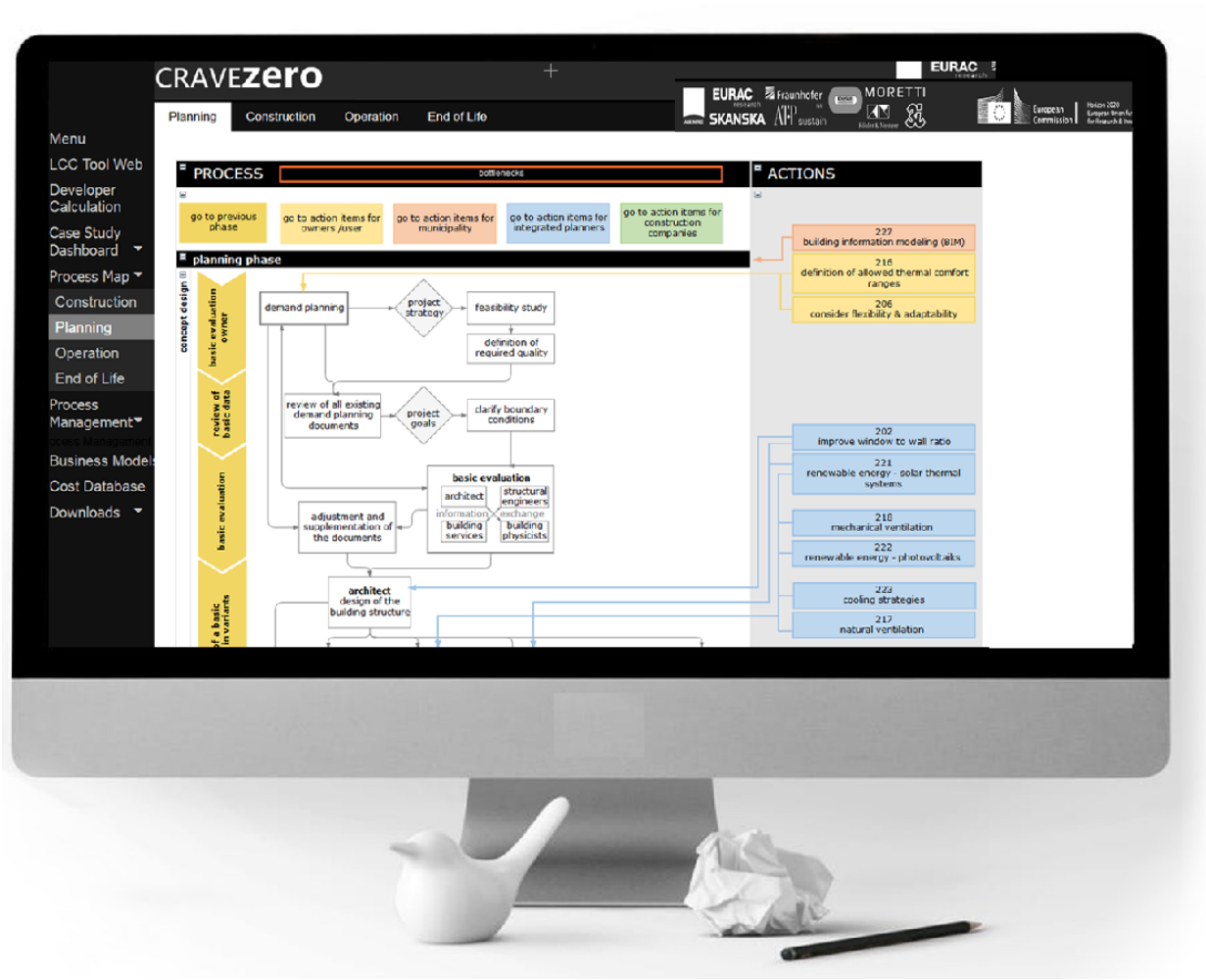
Furthermore, an overall "interactive process map" based on the results of Deliverable 3.1 was implemented in the CRAVEzero website. It helps stakeholders in different phases of the life cycle to view the whole planning, construction and operation process in a framework ensuring a high process quality of new nZEBs. A manual for the interactive map is presented in chapter 2.

The process map and the life cycle tracker tool can be downloaded here:

Pinboard: http://www.cravezero.eu/pinboard/PinboardMain/PinboardMain.htm
Process Tracker Tool: http://www.cravezero.eu/pinboard/Downloads/CRAVEzero_ProcessTracker.zip
Process Map: http://www.cravezero.eu/pinboard/LCTurban/LCTurban.htm

CHAPTER 2

Optimized nZEB- process map

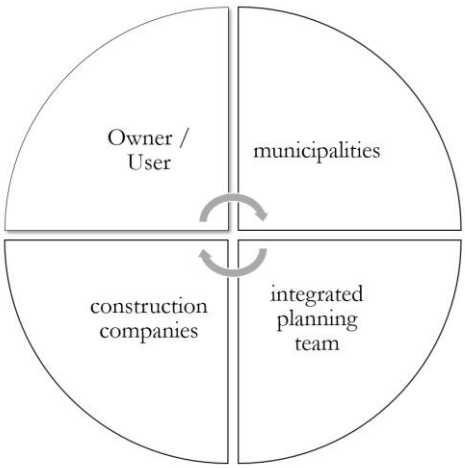


2.OPTIMIZED NZEB PROCESS MAP – USER MANUAL

The following chapter presents a manual on how to use the CRAVEzero interactive process map on the CRAVEzero website (http://www.cravezero.eu/pinboard/PinboardMain/PinboardMain.htm) accompanying the report. We advise to read this subchapter while having a look at the interactive process map on the website.

2.1. ABOUT

Within the framework of CRAVEzero, a fundamental process was developed whose design corresponds to the planning processes of the partner countries Germany, Austria, Italy, Sweden and France. For this planning and construction process, "Actions" were defined in workshops, through which it becomes possible to design and construct buildings with an nZEB standard. The "Actions" are assigned to different user groups shown below:



So called "Bottlenecks" were also defined in the planning and construction process of an nZEB. These describe critical points in the planning and construction process that can result in missing the nZEB standard.

THE MAP:

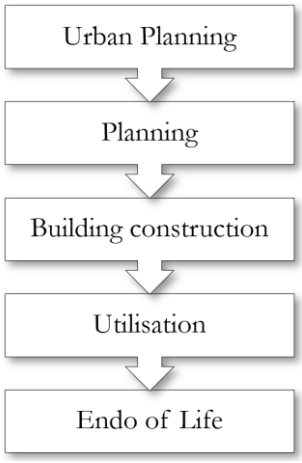
- Contains a flow chart of a standard planning and construction process.
- Contains more than 50 action items
- Contains different project parties and their nZEB-specific tasks in the planning and construction process.
- Contains detailed descriptions of the individual action items.
- Contains critical points in the planning and construction process that can prevent/ complicate the achievement of the nZEB standard.

AIMS OF THE MAP:

The aim of the "CRAVEzero Process Map" is to assign the action items to an already known process step of a planning and construction process. By this configuration, it is possible to structure the To Do's temporally and spatially and integrate them into already existing office internal processes.

PHASES:

In the "Process Map" the following process phases are addressed:



These five main phases are subdivided into subphases in order to enable a clear assignment of actions and bottlenecks to already known process steps.

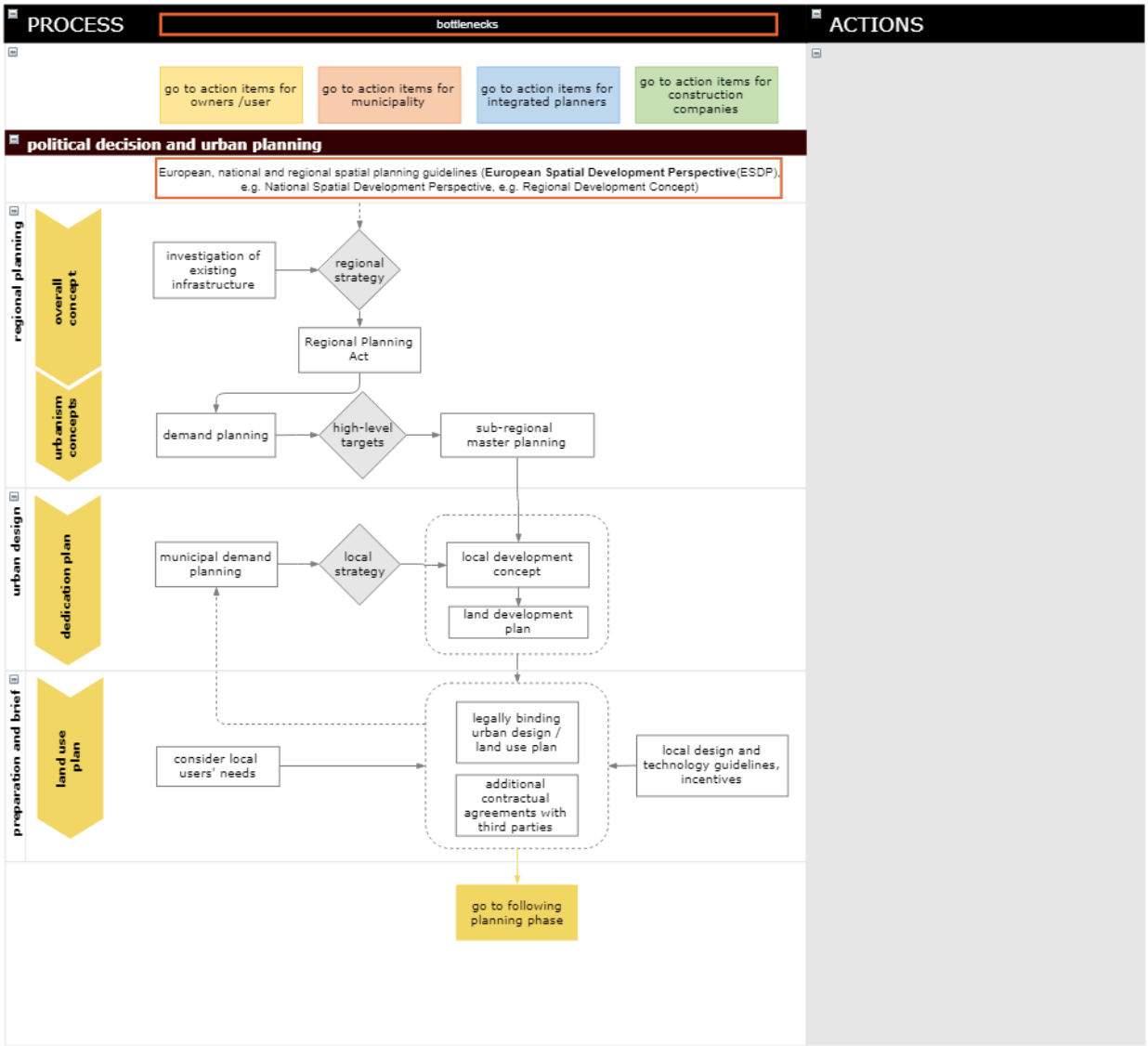


Figure 4: Screenshot of the standard planning process of an urban planning concept development

2.2. USER INTERFACE

The "CRAVEzero Process Map" is a process tool that enables the project team to integrate additional tasks and actions for achieving the nZEB building standard into their own planning, construction and execution routine. In the interactive process map, stakeholders are able to display individual "nZEB specific action items" (To Do's) or alternatively to see which tasks other project participants have in order to achieve an nZEB. General information, such as the timeline in the process, and detailed information on selected action items can be accessed. The information can be displayed or hidden by clicking on the interactive process graphic.

The process is divided into the following planning and construction process steps:

- Urban Planning
- Planning
- Building construction
- Utilisation
- End of Life

In addition, action items and bottlenecks can be displayed for the following stakeholders

- Owner / User
- Municipalities
- Integrated planning team
- Construction companies

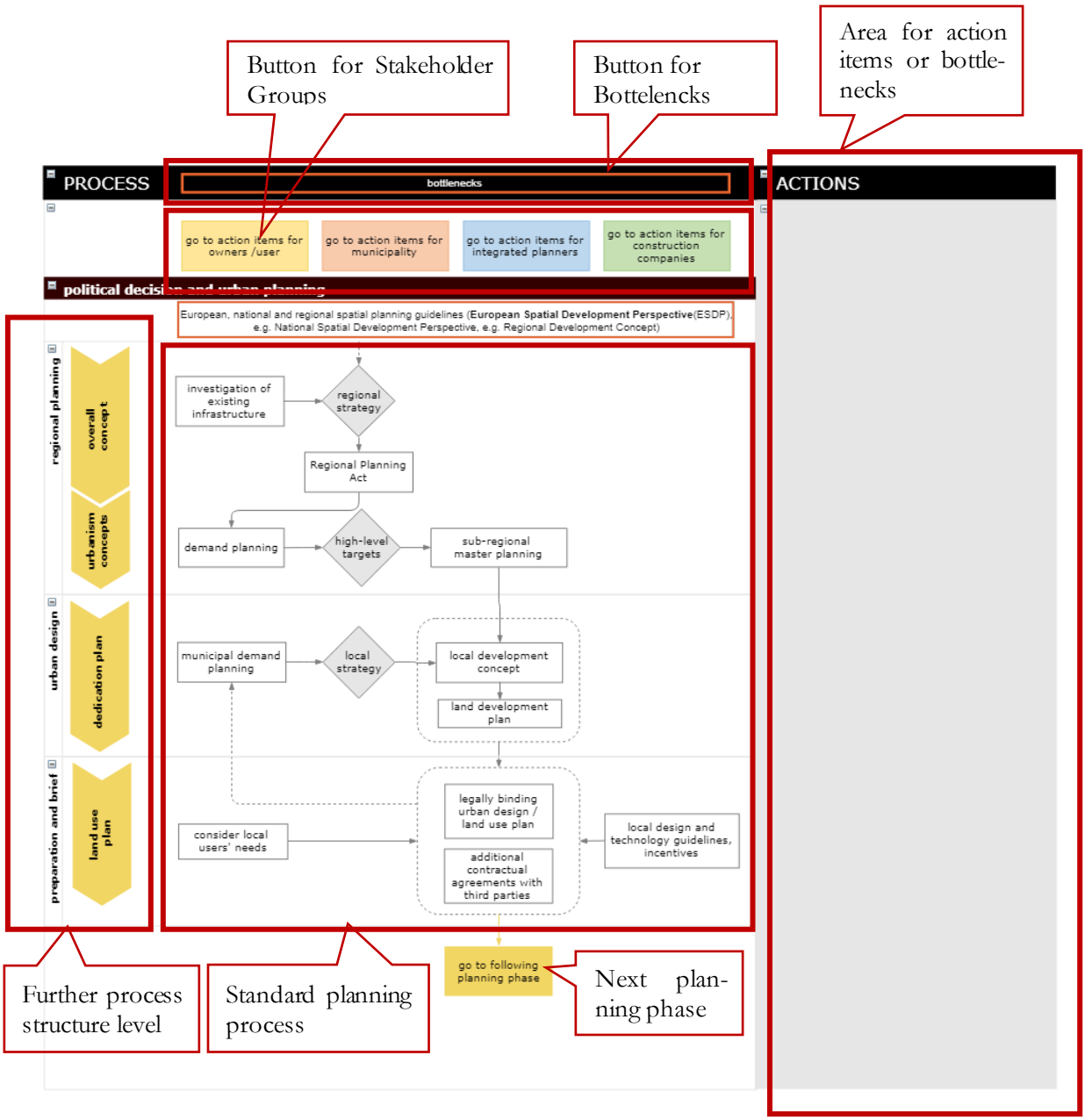


Figure 5: Outline of the CRAVEzero Process Map

The "interactive process map" gives an initial overview of the complexity and the possibilities of influencing the planning and construction process in order to develop an nZEB. For a project-specific adaptation of the process the life cycle tracker tool can be downloaded (see chapter 3).

2.3. PROCESS MAP

All process phases were designed to be as general as possible so that it is applicable to typical life-cycle processes of buildings all over Europe. The structure itself was developed as detailed as possible. The structure of the standard planning process without the integration of nZEB actions can be seen in Figure 6.

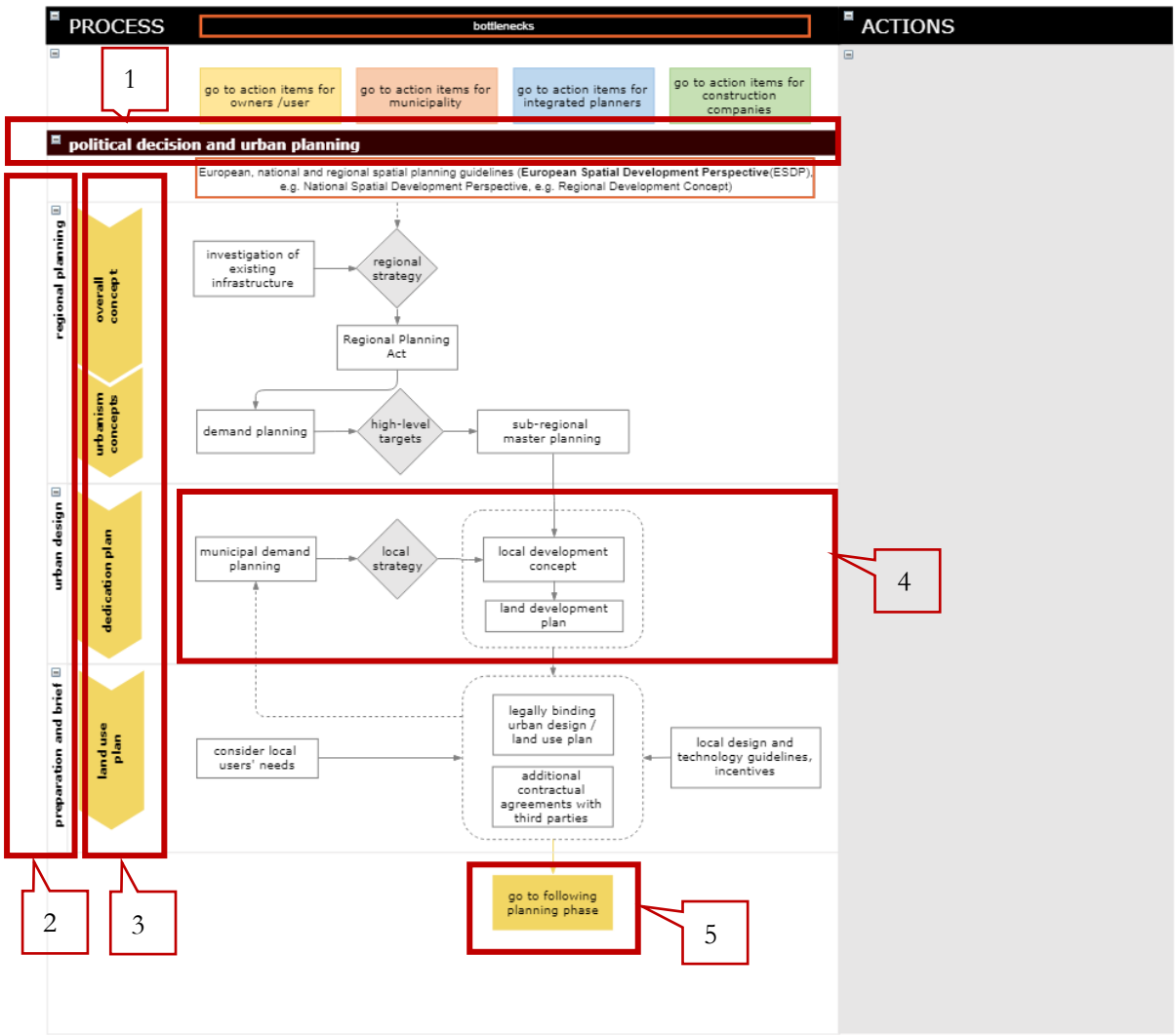


Figure 6: Structure of the standard planning process

1. First level of the standard planning process (Urban Planning, Planning, Building construction, Utilisation, End of Life).
2. Second level of detail into more specific process steps of the individual main points of the standard planning process.
3. Third level of detail of the planning process into individual main task packages within the framework of the main process steps.
4. Visualization of the workflow chart of the individual tasks in the standard planning process.
5. Buttons for forwarding to the following planning process step of the 1st outline level.

2.4. BOTTLENECKS

Further information about possible bottlenecks in specific process steps can be accessed interactively as specified in Figure 7. Once the red outlined button called "bottlenecks" in the top menu is selected, information about possible bottlenecks is highlighted on the right side and linked directly to the appropriate process step in orange.

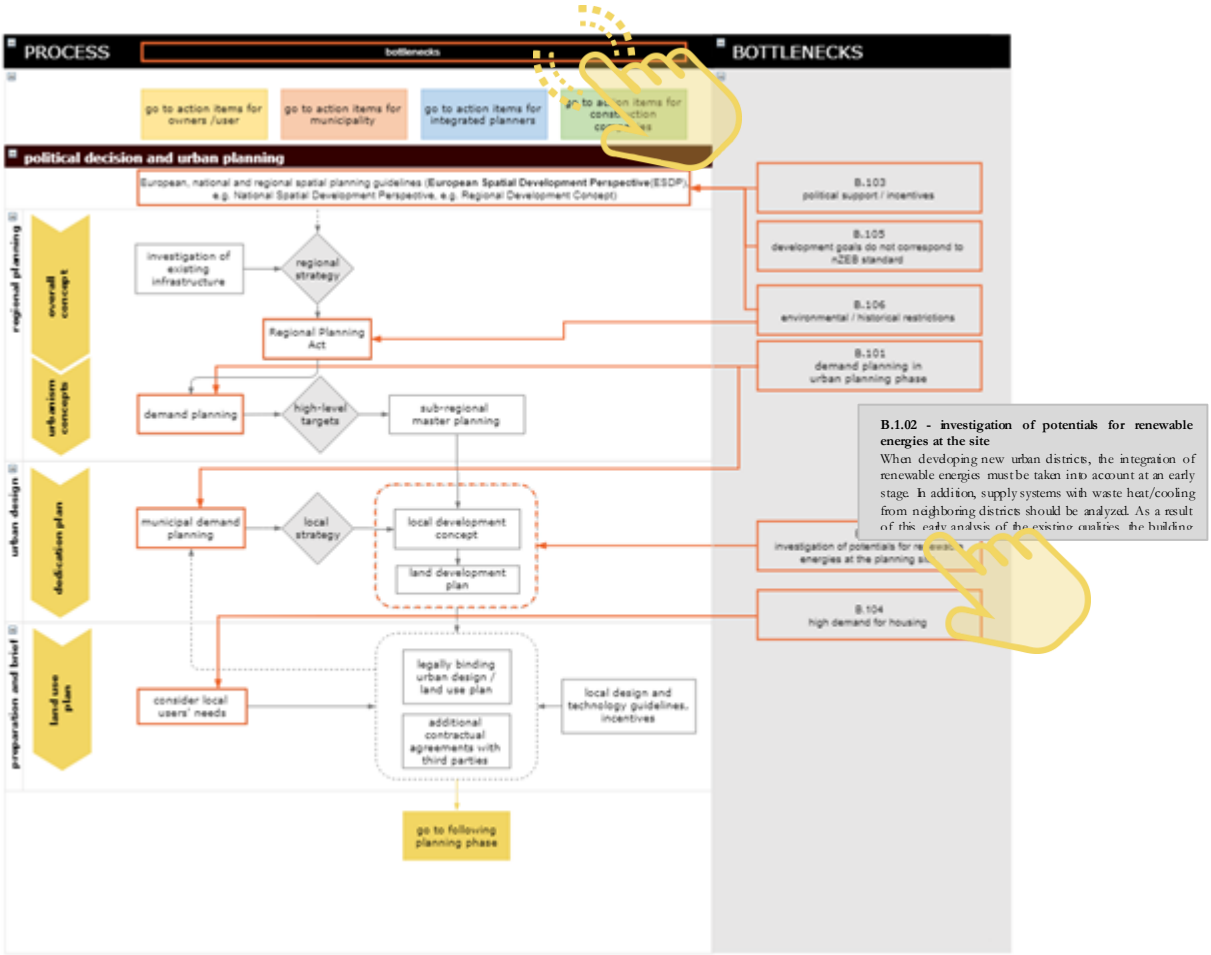


Figure 7: CRAVEzero Bottlenecks in a planning process for nZEB's

To get information about the bottlenecks the information can be interactively displayed or hidden by a cursor click.

By moving the cursor over the individual bottlenecks, further information on the individual bottleneck is displayed.

2.5. ACTION ITEMS

The "action items" developed within the framework of WP3 of the research project CRAVEzero Deliverable 3.1 are integrated into the interactive process map. Through this temporal and spatial classification of the action items, it becomes clear to each project participant at which point in the project timeline a specific action is required to achieve the nZEB standard. The action items are assigned to the individual process steps. Furthermore, all action items are colored and assigned to the stakeholders.

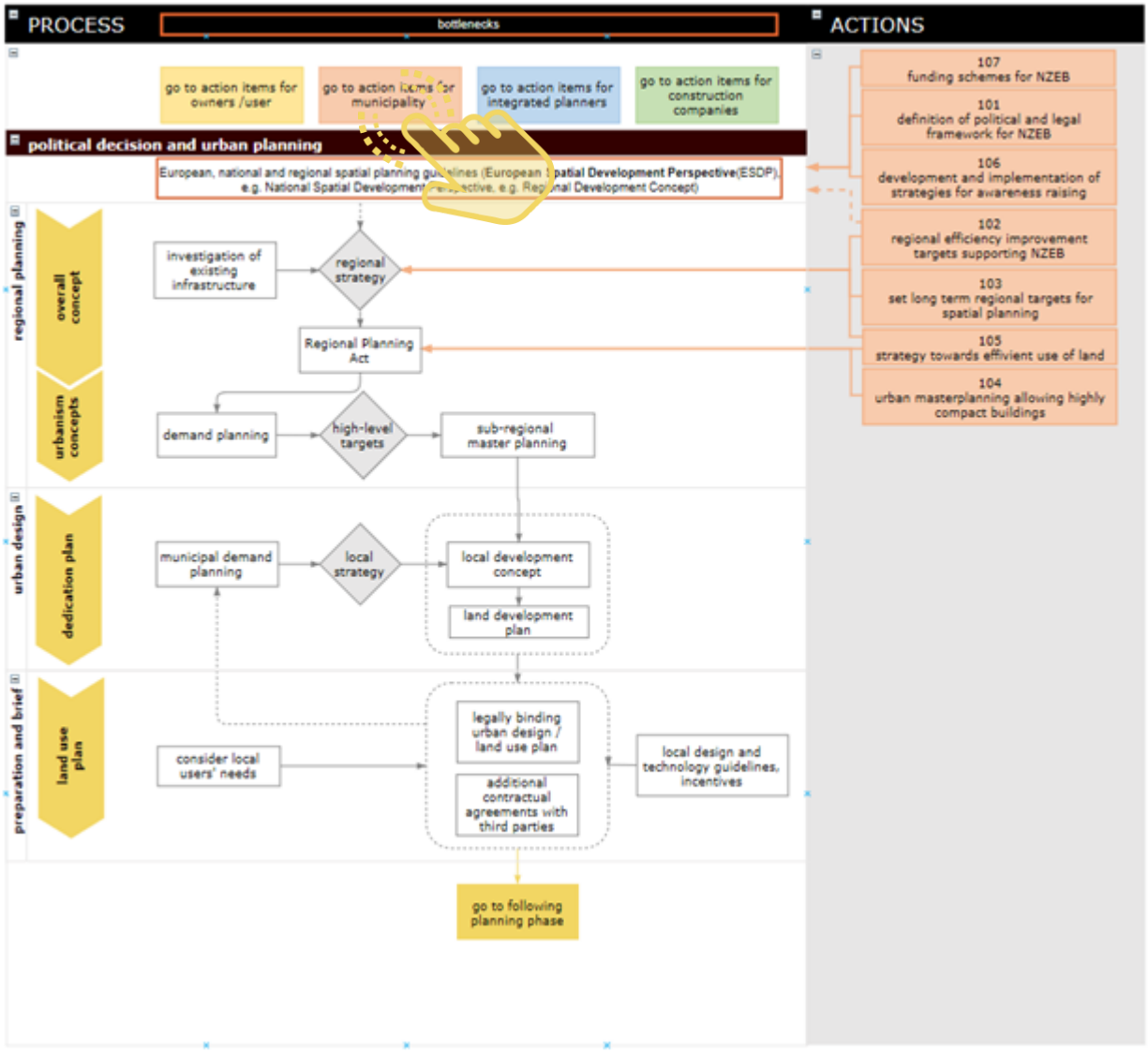


Figure 8: CRAVEzero Action items in a planning process for nZEBs

In order to display the action items for the different stakeholders, these can be selected in the top menu, as seen in Figure 8. This allows for displaying all possible action items for the selected stakeholder groups.

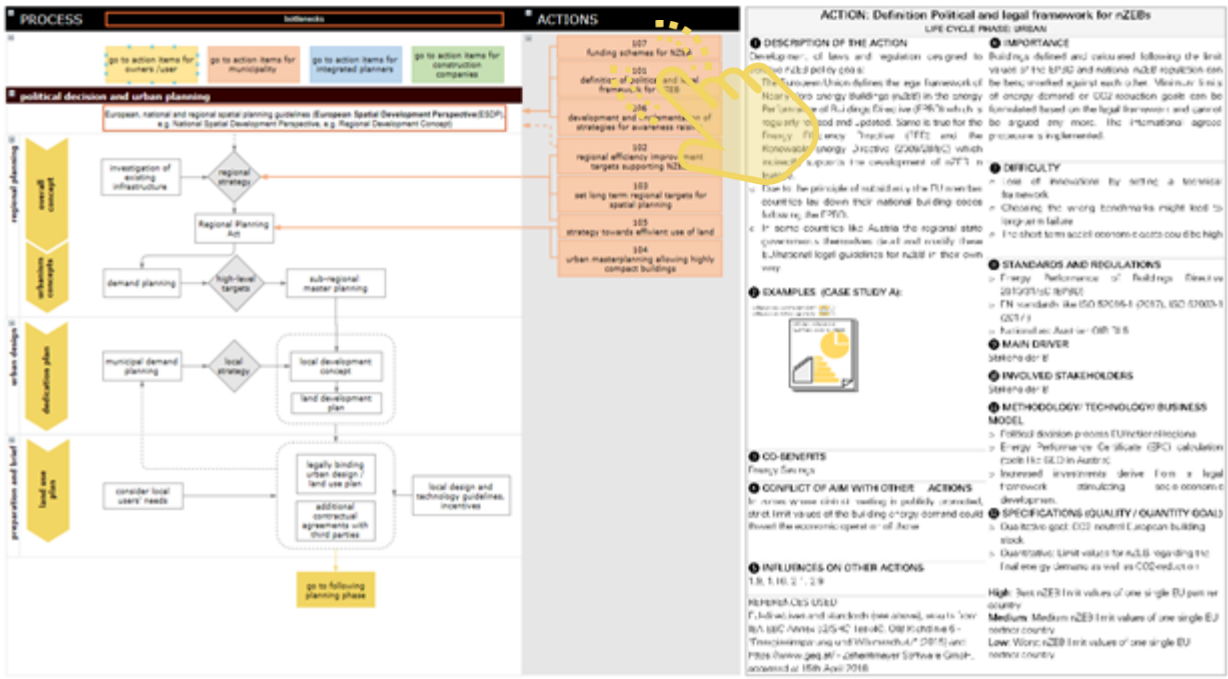


Figure 9: Visualization of the detailed "Action Item" description in the CRAVEzero process map

If an action item is selected, detailed information about the action item is given in PDF format by a new popup window or downloaded as a PDF depending on the browser settings.

The detailed description of the action item contains information on the topics listed below:

- Description of the action
- Examples
- Co-benefits
- Conflict of Aim With other Actions
- Influences on other actions
- Importance
- Difficulty
- Standards and Regulations
- Main driver
- Involved stakeholders
- Methodology / technology / business model
- Specifications (quality/quantity goal)

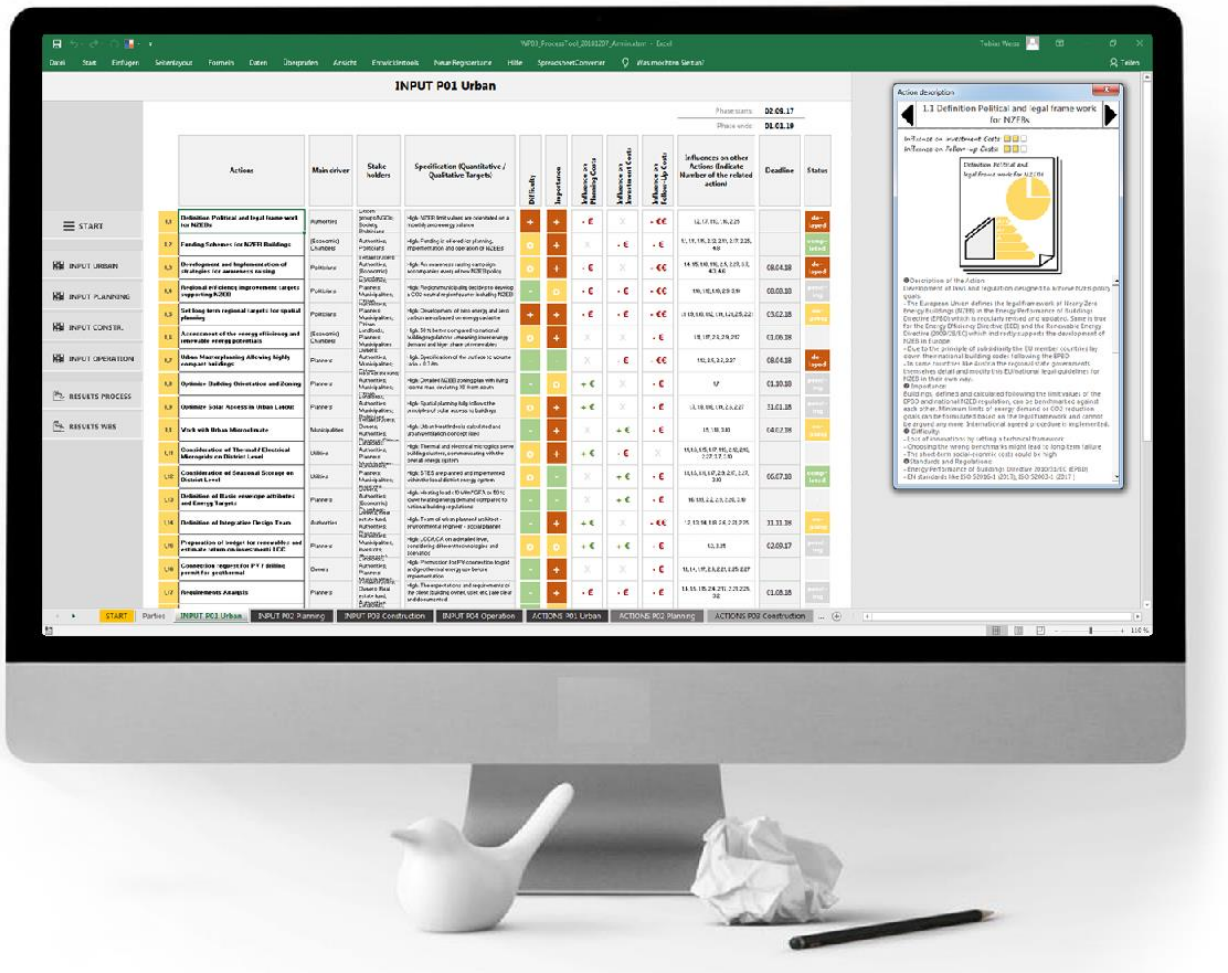
The interactive process map can be accessed via the website:

http://www.cravezero.eu/pinboard/PMap/Planning.html

The overview of the process map is also included in Annex I of the deliverable.

CHAPTER 3

LIFE CYCLE PROCESS TRACKER



3.LIFE CYCLE PROCESS TRACKER

3.1. ABOUT

The following chapter presents a short manual on how to use the CRAVEzero-life-cycle-tracker accompanying the report.
The tool can be downloaded from the CRAVEzero website:
http://www.cravezero.eu/pinboard/Downloads/CRAVEzero_ProcessTracker.zip
In the following, the use of the "CRAVEzero-life-cycle-tracker" for an individual nZEB planning process is described. We advise to read this subchapter in combination with the tool since it presents a manual of the tool.

The "CRAVEzero-life-cycle-tracker" accompanying this report is a shared interdisciplinary tool for all stakeholders in the life cycle of nZEBs. It provides a shared framework for the organization and management of nZEB projects.
It can be used for both as an editable process map and a management tool, providing necessary actions that need to be taken to reach the goal and best practice guidance from the CRAVEzero consortium. It reflects the actions in nZEB project management and provides strategic leadership. It incorporates nZEB design principles, promotes integrated working between project team members, and provides the flexibility to match project-specific challenges. "CRAVEzero-life-cycle-tracker" is an easy to customize electronic document that can be adapted to the specific needs of any practice, team or project. It organises the process of briefing, designing, constructing, maintaining, operating and using building projects into a number of key stages. It gives details of the tasks and outputs required at each stage, which may vary or overlap to suit specific project requirements. It is a downloadable spreadsheet, in Microsoft Excel format, containing customizable tables allowing easy creation of the project roles, design responsibility matrix and multidisciplinary schedules of services. It is part of the mindset of stakeholders involved in the construction industry and is woven into their processes. It can be downloaded here:
http://www.cravezero.eu/pinboard/Downloads/CRAVEzero_ProcessTracker.zip

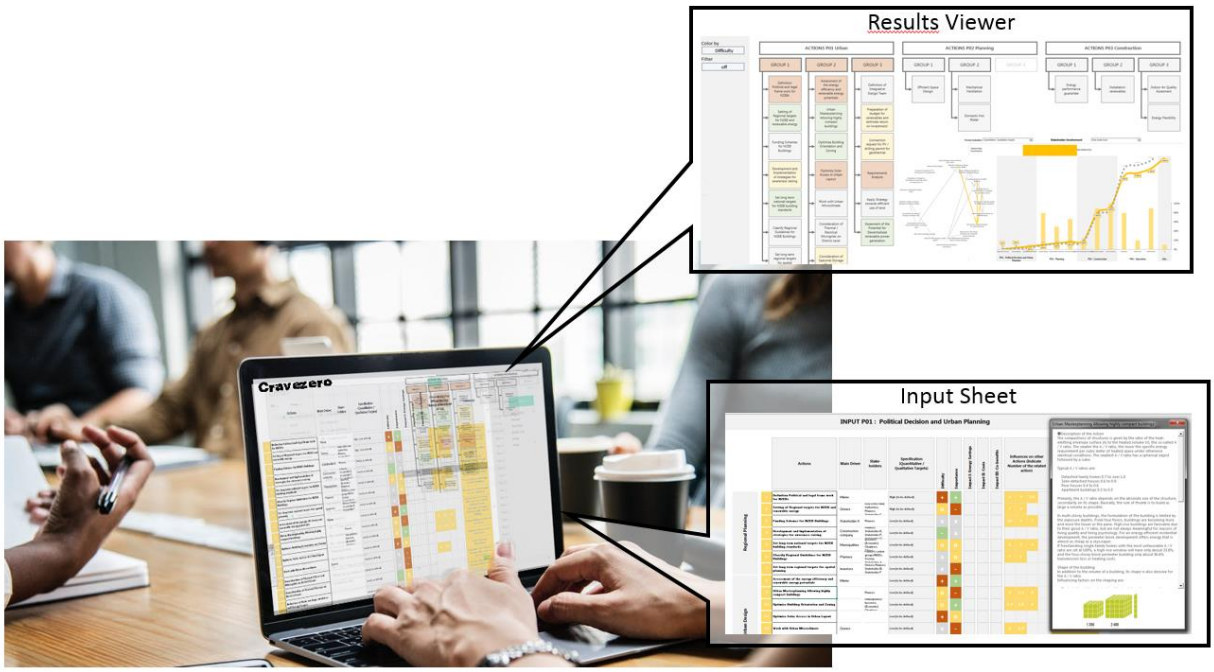


Figure 10: Visualisation of the CRAVEzero-life-cycle-tracker tool

3.2. USER INTERFACE

Within the Horizon 2020 project CRAVEzero an Excel tool was developed, which is intended to provide assistance to consider the relevant aspects and actions of individual planning phases in the realisation of nZEBs. The tool "CRAVEzero-life-cycle-tracker" consists of four phases from urban planning to operation to renovation and more than 50 key actions along the entire process. All measures necessary for a specific project to achieve the nZEB standard were defined and systematically selected with the interest groups involved. The actions are freely selectable (can be switched on and off).

The defined process phases ensure the consistency of the entire CRAVEzero methodology.

The ability to turn specific actions on or off and vary the content of others provides a modular structure to create a targeted and tailor-made practice or project-specific version.

THE TOOL:

- Contains numerous key actions, which can be switched on and off
- Shows correlations between the individual actions in chronological order.
- Gives an overview of the individual implementation phases and which actions should be taken and when.

AIMS OF THE TOOL:

- To give an overview especially for project management
- Create awareness of the interdependencies of different stakeholders
- Show definitions of individual actions

PHASES:

- Urban Planning
- Planning
- Operation
- Renovation

Figure 11: Screenshots of the "CRAVEzero-life-cycle-tracker" tool in order to select and define project-specific actions

3.3. WORKSHEETS

The Life cycle process tracker is an Excel-based tool, which provides a cost-efficient, economical approach to the planning and implementation of nZEBs.

The workbook created for this purpose comprises several worksheets:

- Start
- Parties
- INPUT P01 Urban
- INPUT P02 Planning
- INPUT P03 Construction
- INPUT P04 Operation
- ACTION P01 Urban
- ACTION P02 Planning
- ACTION P03 Construction
- ACTION P04 Operation
- Action view
- Timeline & Relations

The first two of these worksheets include the selection of actions and stakeholders which serve as a basis for further actions.
In worksheets 3 to 6, the selected actions are listed and ready for further processing. The actions are listed and explained again in sheets 7 to 10. - These worksheets are only visible if a checkmark has been placed on "Sheet 1 – Start" if expert features are enabled via the checkbox. The worksheet "Action view" gives a repetition of the selected actions and where to assign them. At the last sheet – "Timeline & relations" - the dependencies are shown, which can be entered in the enable expert features, as well as the chronological order of the actions. Also, this sheet is only visible if the checkbox is selected on the first page.

3.3.1.WORKSHEET 1 – START

At the beginning of the management tool, a checkbox can be selected on the right side if expert features are desired. This activation allows more functions on the main worksheets 3 - 6. In addition to the level of difficulty and importance, the various cost influences and dependencies of the various selected actions can also be shown. In addition, selecting this checkbox makes worksheets 7 - 10 visible. These worksheets show the individual actions that can also be edited if expert features are enabled.

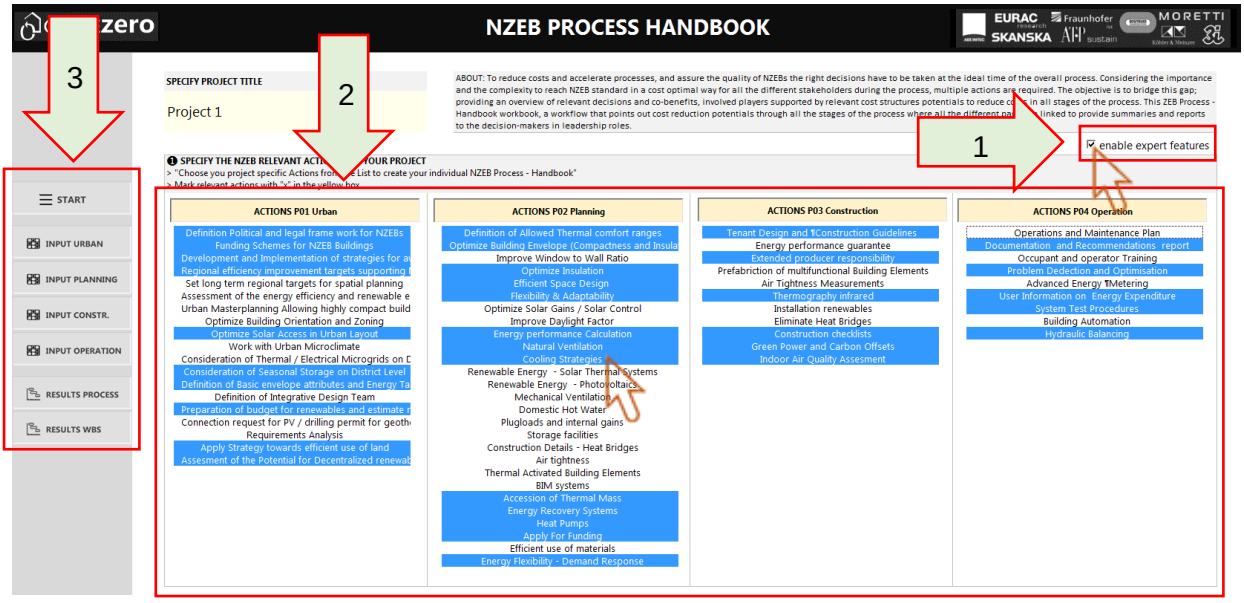


Figure 12: Screenshot: Life cycle tracker tool – Worksheet 1- start

1 > Set checkbox for expert view **2 >** Selection of Actions **3 >** Navigation to other worksheets

Furthermore, the individual actions for the project can be selected in this sheet to create an individual nZEB process. On the side menu on the left, it is possible to navigate to the other worksheets. This side menu is also displayed on all following sheets (except sheets 6-10).

3.3.2.WORKSHEET 2 - PARTIES

"Worksheet 2 – Parties" shows the different stakeholders, which can be selected in the following worksheets. The stakeholders can individually be renamed by entering alternative names, as seen in Figure 13.

Function / default name	Alternative/specific name
Tenants/Users	
Owners	
Landlords	
Real estate fund	
Construction company	
Authorities	
Planners	
Municipalities	
Investors	
(Economic) Chambers	
Citizen groups/NGOs	
Society	
Politicians	
Utilities	
Stakeholder C	
Stakeholder D	
Stakeholder E	
Stakeholder F	
Stakeholder G	
Stakeholder H	
Stakeholder I	
Stakeholder J	

Figure 13: Screenshot: Life cycle tracker tool – List of stakeholders and main drivers

3.3.3.WORKSHEET 3 - 6 INPUT

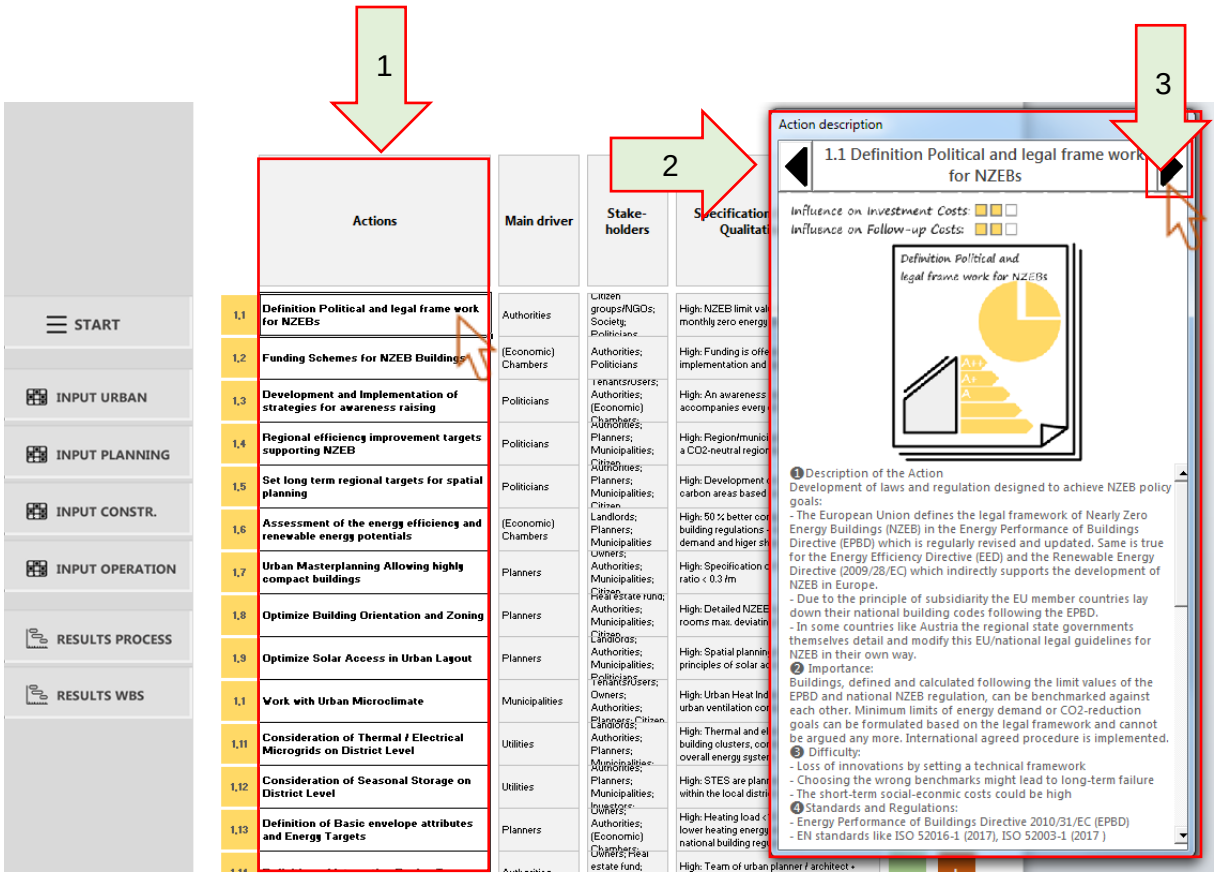


Figure 14: Screenshot: Life cycle tracker tool – Action description

1 → Click on Actions
2 → Appearing of the action description
3 → Click to go to the next definition

As can be seen in Figure 14 on the left side of the "Input-Worksheets" for the selected life cycle phase, there is the side menu, which can be used to select the worksheets. In the column *Actions* (1) all actions that have previously been selected on "worksheet 1 – Start" are displayed. If more detailed information about the actions is required, a pop-up information field (2) appears by clicking the left mouse button on the action. By right-clicking with the mouse on the black arrow in the information field, it is possible to jump to the description of the next action.

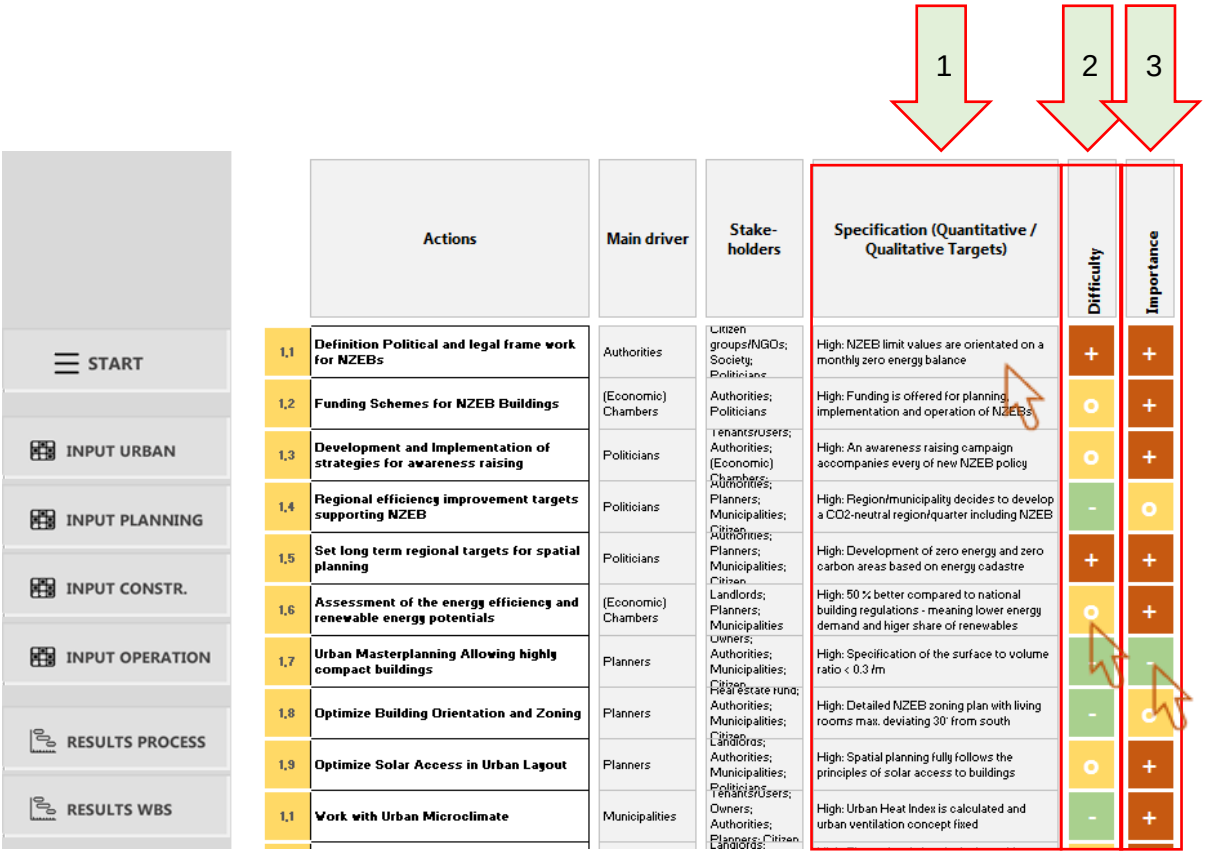


Figure 15: Screenshot: Life cycle tracker tool – Definition of the difficulties and importance of each action

1 → Selection of targets
2 → Determining the difficulty of implementation
3 → Determining the importance of each action

In the column with the heading "Main driver", the main stakeholder responsible for the action can be assigned as presented in Figure 15. In the next column called "stakeholders", stakeholders should be selected who are associated with the action but are not primarily responsible for its implementation. In the tool, a preselection off typical stakeholders for the respective action is given, this can be changed.

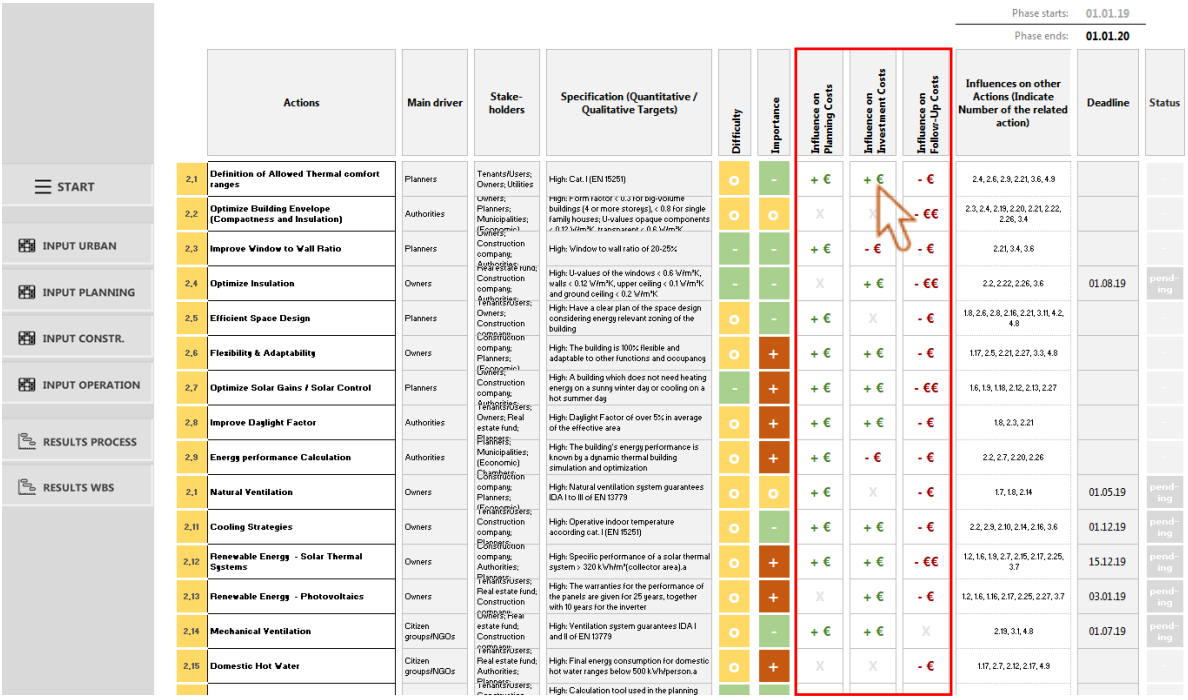
In the fourth column Specification (1), the qualitative requirements for the actions can be set by clicking with the left mouse button – and selecting high, medium, low goals.

The column "Difficulty" (2) estimates how difficult the implementation is in relation to the individual requirements of the actions. In addition, the priority of the implementation can be specified in the column "Importance" (3). Also, for these two estimations, the input can be controlled by clicking the left mouse button on the input field.

Expert view:

If the expert view has been activated on the first worksheet, additional entries can be made in addition to the functions already described in the basic view (more input fields appear on the right).

In the columns "Influence on Planning Costs", "Influence on Investment Costs" and "Influence on Follow-Up Costs", expected cost changes can be entered. "+€" represents a cost increase in the respective planning step and "-€" indicates a cost-saving. This input can be changed with the right mouse click.



	Actions	Main driver	Stake-holders	Specification (Quantitative / Qualitative Targets)	Difficulty	Importance	Influence on Planning Costs	Influence on Investment Costs	Influence on Follow-Up Costs	Influences on other Actions (Indicate Number of the related action)	Deadline	Status
2,1	Definition of Allowed Thermal comfort ranges	Planners	Tenants/Users; Owners; Utilities	High: Cat. I (EN 15251)	o	-	+ €	+ €	- €	2.4, 2.6, 2.8, 2.21, 3.6, 4.9		-
2,2	Optimize Building Envelope (Compactness and Insulation)	Authorities	Owners; Planners; Municipalities; (Economic)	High: Form factor < 0.3 for big-volume buildings (4 or more storeys), < 0.8 for single family houses; U-values opaque components < 0.12 W/m²K, transparent < 0.6 W/m²K	o	o	X	X	- €€	2.3, 2.4, 2.19, 2.20, 2.21, 2.22, 2.26, 3.4		-
2,3	Improve Window to Wall Ratio	Planners	Owners; Construction company; Authorities; Real estate fund;	High: Window to wall ratio of 20-25%	-	-	+ €	- €	- €	2.21, 3.4, 3.6		-
2,4	Optimize Insulation	Owners	Construction company; Authorities;	High: U-values of the windows < 0.6 W/m²K, walls < 0.12 W/m²K, upper ceiling < 0.1 W/m²K and ground ceiling < 0.2 W/m²K	-	-	X	+ €	- €€	2.2, 2.22, 2.26, 3.6	01.08.19	pend-ing
2,5	Efficient Space Design	Planners	Tenants/Users; Owners; Construction	High: Have a clear plan of the space design considering energy relevant zoning of the building	o	-	+ €	X	- €	1.8, 2.6, 2.8, 2.16, 2.21, 3.11, 4.2, 4.8		-
2,6	Flexibility & Adaptability	Owners	Construction company; Planners; (Economic)	High: The building is 100% flexible and adaptable to other functions and occupancy	o	+	+ €	+ €	- €	1.17, 2.5, 2.21, 2.27, 3.3, 4.8		-
2,7	Optimize Solar Gains / Solar Control	Planners	Owners; Construction company; Authorities;	High: A building which does not need heating energy on a sunny winter day or cooling on a hot summer day	-	+	+ €	+ €	- €€	1.6, 1.9, 1.18, 2.12, 2.13, 2.27		-
2,8	Improve Daylight Factor	Authorities	Tenants/Users; Owners; Real estate fund; Planners;	High: Daylight Factor of over 5% in average of the effective area	o	+	+ €	+ €	- €	1.8, 2.3, 2.21		-
2,9	Energy performance Calculation	Authorities	Planners; Municipalities; (Economic)	High: The building's energy performance is known by a dynamic thermal building simulation and optimization	o	+	+ €	- €	- €	2.2, 2.7, 2.20, 2.26		-
2,1	Natural Ventilation	Owners	Construction company; Planners; (Economic)	High: Natural ventilation system guarantees IDA I to III of EN 13779	o	o	+ €	X	- €	1.7, 1.8, 2.14	01.05.19	pend-ing
2,11	Cooling Strategies	Owners	Tenants/Users; Construction company; Planners;	High: Operative indoor temperature according cat. I (EN 15251)	o	-	+ €	+ €	- €	2.2, 2.9, 2.10, 2.14, 2.16, 3.6	01.12.19	pend-ing
2,12	Renewable Energy - Solar Thermal Systems	Owners	Construction company; Authorities; Planners;	High: Specific performance of a solar thermal system > 320 kWh/m²(collector area).a	o	+	+ €	+ €	- €€	1.2, 1.6, 1.9, 2.7, 2.15, 2.17, 2.25, 3.7	15.12.19	pend-ing
2,13	Renewable Energy - Photovoltaics	Owners	Tenants/Users; Real estate fund; Construction	High: The warranties for the performance of the panels are given for 25 years, together with 10 years for the inverter	o	+	X	+ €	- €	1.2, 1.6, 1.16, 2.17, 2.25, 2.27, 3.7	03.01.19	pend-ing
2,14	Mechanical Ventilation	Citizen groups/NGOs	Owners; Real estate fund; Construction	High: Ventilation system guarantees IDA I and II of EN 13779	o	-	+ €	+ €	X	2.19, 3.1, 4.8	01.07.19	pend-ing
2,15	Domestic Hot Water	Citizen groups/NGOs	Tenants/Users; Real estate fund; Authorities; Planners;	High: Final energy consumption for domestic hot water ranges below 500 kWh/person.a	o	+	X	X	- €	1.17, 2.7, 2.12, 2.17, 4.9		-
			Tenants/Users;	High: Calculation tool used in the planning								

Figure 16: Screenshot: Life cycle tracker tool – cost changes

In the column "Influences on other Actions" (1), actions are to be selected which have a correlation to other actions and interact with each other. To do this, right-click on the corresponding action (1). This opens another window in which all actions selected in the Start worksheet appear (2). By holding the Shift button, all actions can be selected that might have a correlation to the selected action. If the OK button is clicked, the window will close again.

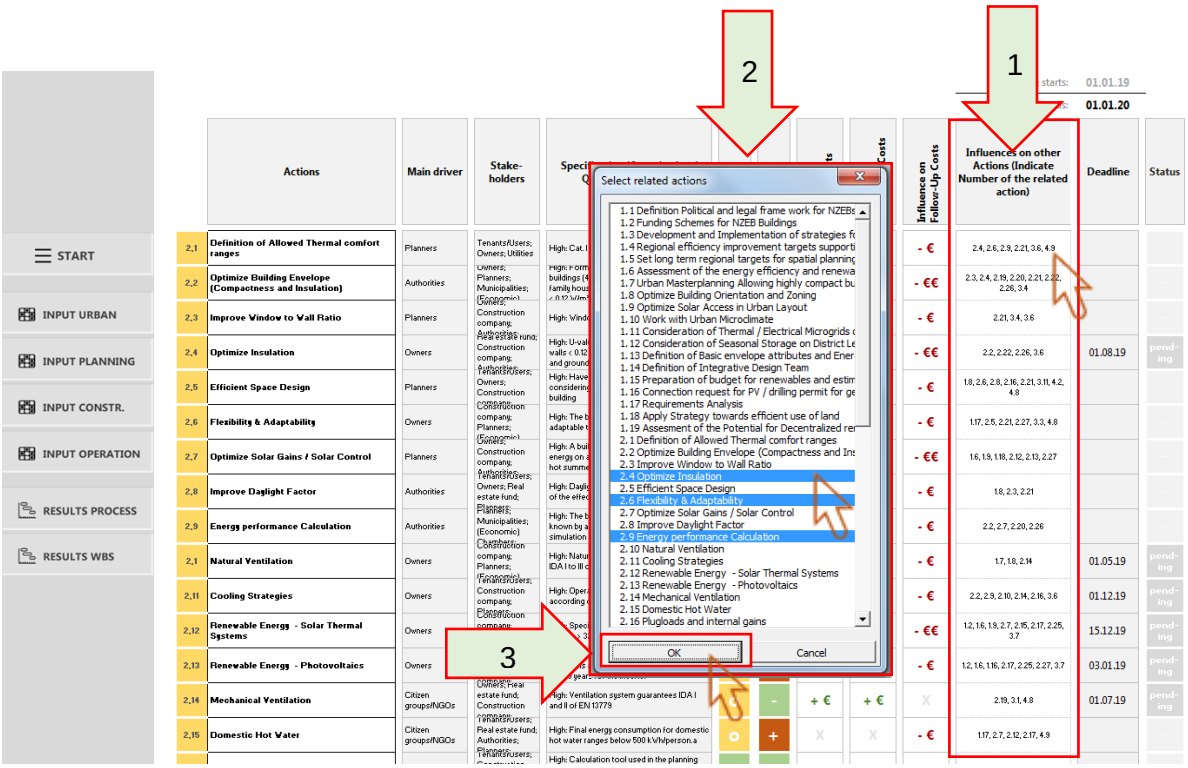


Figure 17: Screenshot: Life cycle tracker tool – Dependencies between actions

1 → Click on the corresponding column to open
2 → Select actions with correlation
3 → Click OK to save your selections

In the column “Deadline”, a date for each action can be defined in order to specify by when the action must be completed. Also in the upper right corner of the sheet, the beginning and end of the phase need to be entered as can be seen in Figure 18.

The column “Status” provides an overview of the status of the respective action. This setting can also be adjusted by clicking the right mouse button. Here the status can be changed to “pending”, “ongoing”, “completed” or “delayed”.

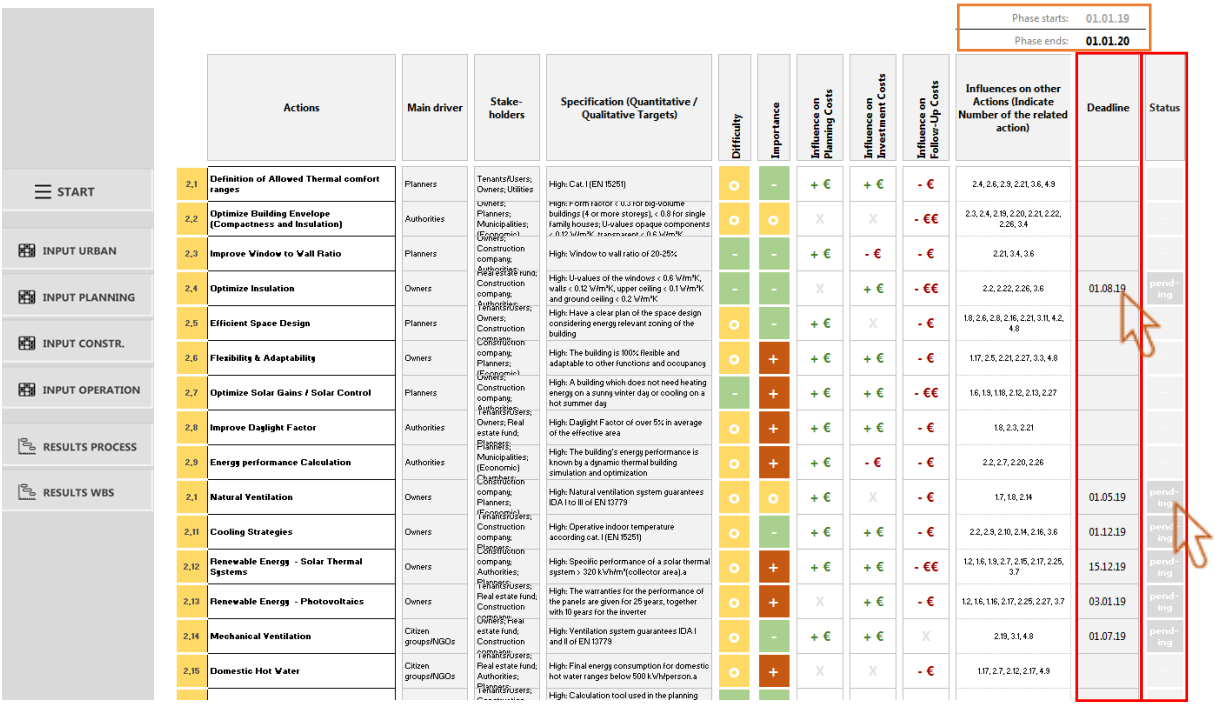


Figure 18: Screenshot: Life cycle tracker tool – Deadline and the Status of the action

3.3.4.WORKSHEET 7 - 10 ACTIONS

Worksheets 7 to 10 are only displayed if the expert view was selected on Sheet 1 - Start. They show a detailed description of the actions. In this view, it is possible to revise these definitions by clicking on the respective text fields.

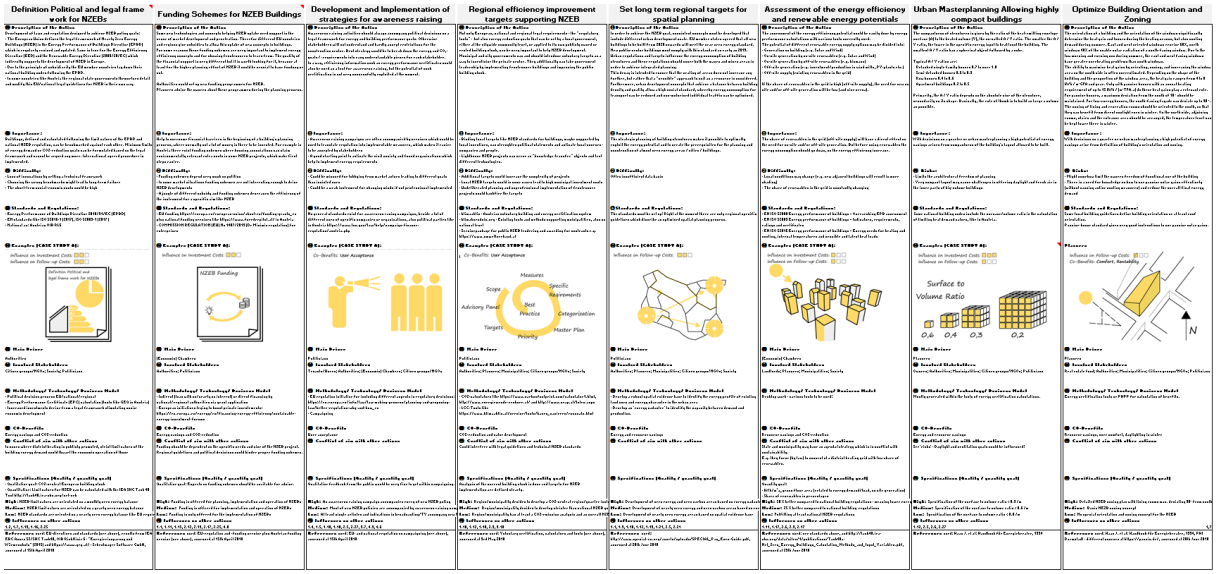


Figure 19: Screenshot: Life cycle tracker tool – Editable descriptions of the actions

3.3.5.WORKSHEET 11 - ACTION VIEW

This worksheet shows the results of the entries previously made in worksheets 3 to 6 as a work-breakdown structure. The four phases are again split into three categories to allow a more precise classification.

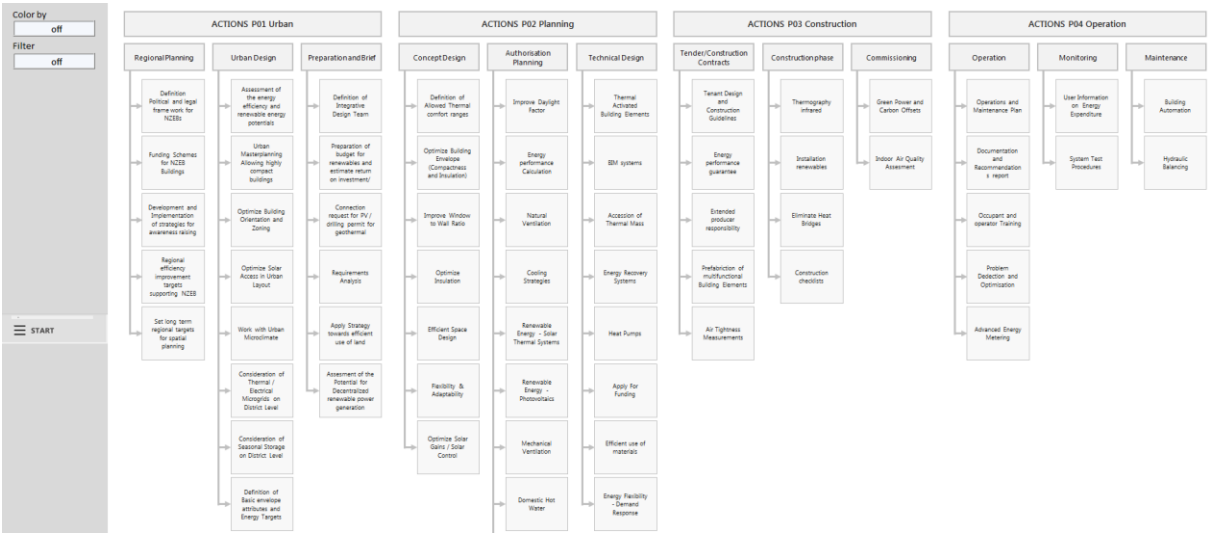


Figure 20: Screenshot: Life cycle tracker tool – Automatically generated work-break-down-structure (WBS)

Additional filters in the navigation column on the left can be set. This allows the "importance", "difficulties" and "status" of the previous selection to be displayed in colour. By clicking the right mouse button actions according to "Importance", "Difficulty" and "Status" can be filtered as displayed in Figure 21.

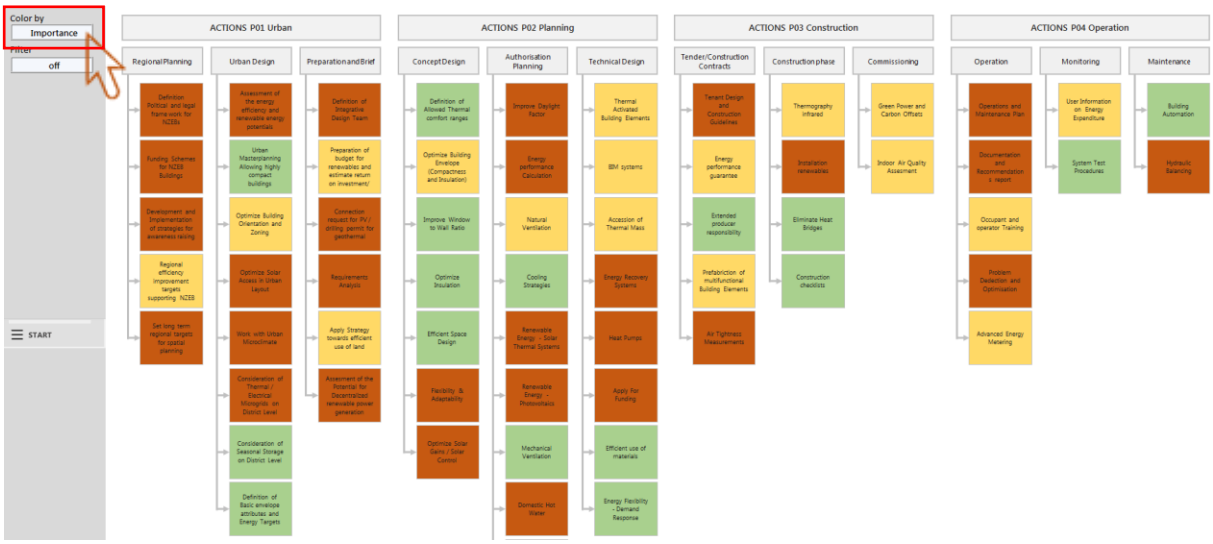


Figure 21: Screenshot: Life cycle tracker tool – Automatically generated work-break-down-structure (WBS), different colours addressing different prioritized actions to be taken in a specific predefined process

Additional filters can be set to make the overview more specific. All actions assigned to the different stakeholders can be filtered.

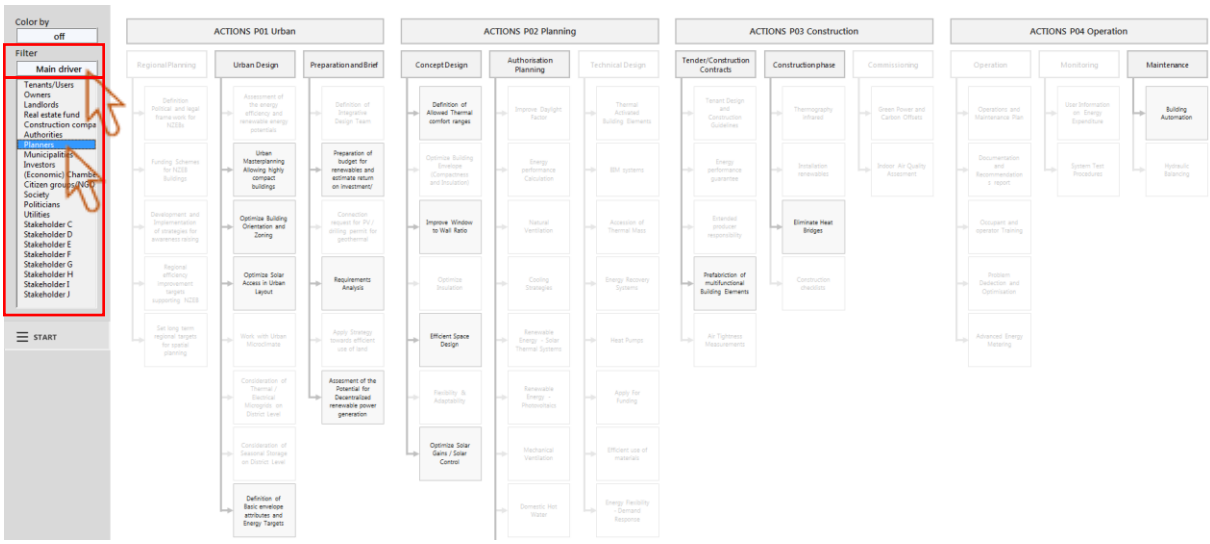


Figure 22: Screenshot: Life cycle tracker tool – Work-break-down-structure filtered by stakeholder

3.3.6. WORKSHEET 12 - TIMELINE & RELATIONS

This worksheet is only visible if the "expert view" in "worksheet 1" has been selected.

It graphically displays the individual timeline based on the entries in sheets 3 to 6 and shows the correlations between the actions again as can be seen in Figure 23. A legend appears below the diagram to facilitate navigation.

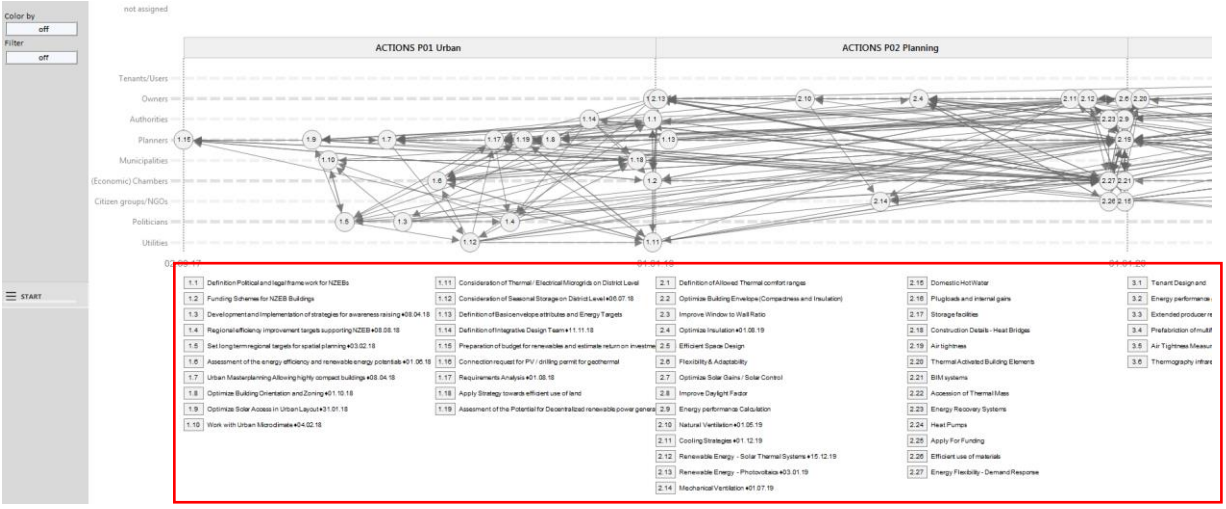


Figure 23: Screenshot: Life cycle tracker tool – Correlation of actions

Using the navigation bar at the top left, the colours can be changed based on the entries in sheets 3 to 6 according to "Difficulty", "Importance" and "Status" or "main drivers" and "stakeholders" (see Figure 24).

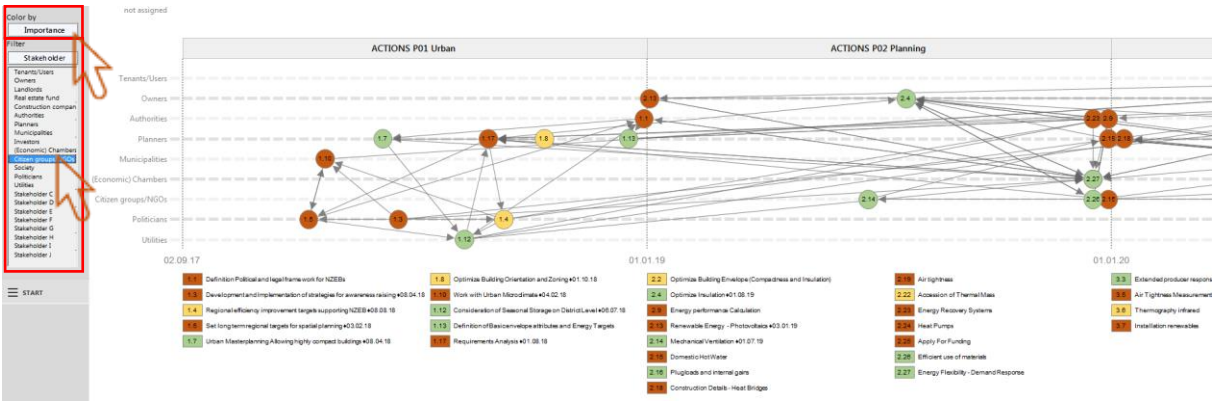


Figure 24: Screenshot: Life cycle tracker tool – Correlation of actions– different colors address different prioritized actions

3.4. ONLINE VERSION OF THE LIFE CYCLE TRACKER TOOL

A simplified version of the life cycle tracker tool can be used on the homepage http://www.cravezero.eu/pinboard/LCTurban/LCTurban.htm under "Process Management".

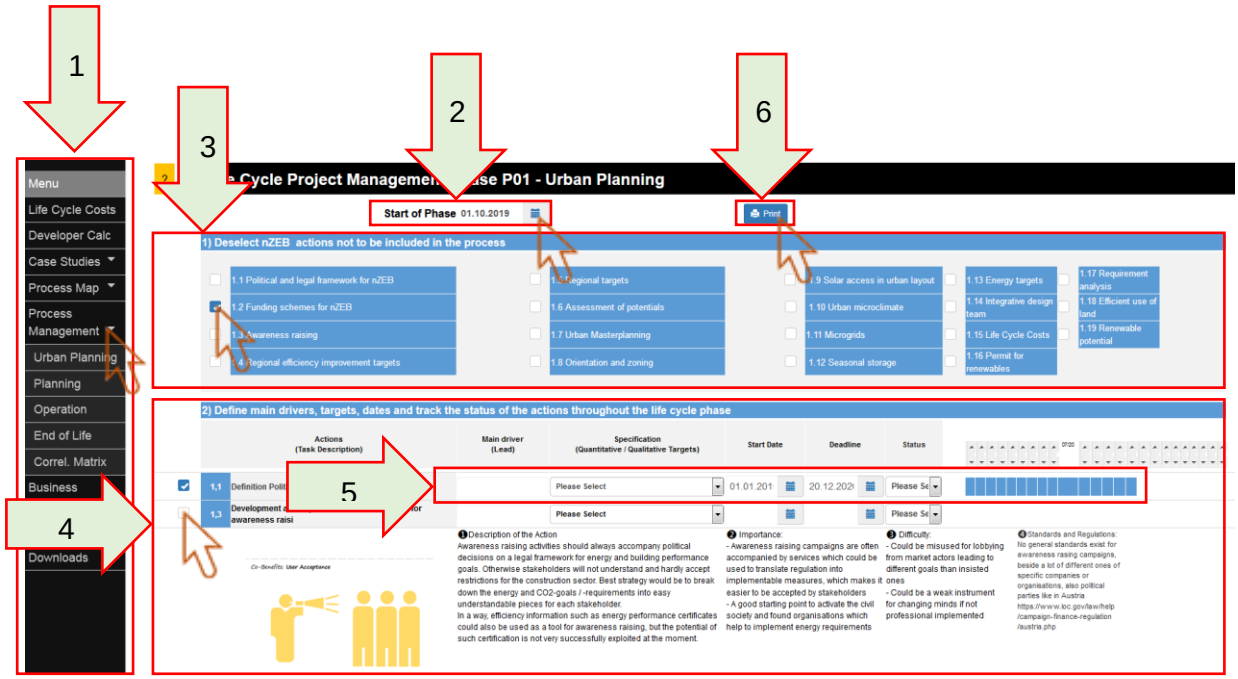


Figure 25: Screenshot: Online Life Cycle Tracker Tool

1 → Select Process Management" at the side menu in the left to go to the life cycle project management and choose a phase
2 → Select a date to choose the start of the phase
3 → Deselect actions which "should not" be included in the process
4 → Deselect an action to get specific information about the action ´
5 → Enter further information about the project
6 → Click print to save your entries

As shown in Figure 25, the phase to be processed can be selected in the side menu on the left under "Process Management".

If you click on "Urban Planning", the page shown in Figure 25 appears.
At the beginning of a project, a start date can be specified under "Start of Phase".
The "Deselect nZEB" function can be used to set by a mouse click which actions in the following process should not be considered and thus switched off.

More detailed information on the individual actions can be retrieved by clicking on the checkbox to the left of the action. In addition, project-specific information can be entered here:

- Main driver: The main stakeholder responsible for the action
- Specification: High, medium and low targets can be selected depending on the goal you want to achieve
- Start Date: Enter the start date of the respective action.
- Deadline: Enter the end date/ deadline of the respective action (Subsequently, the timeline as "a bar" is displayed a the right side.
- Status: A selection between delayed, completed, pending and ongoing helps to track the status of the actions throughout the phase over time

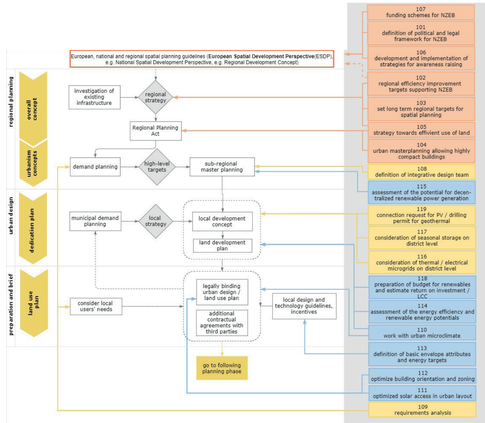
ANNEX: OVERALL PROCESS MAP - FORMAT A0

nZEB Life Cycle Process Map

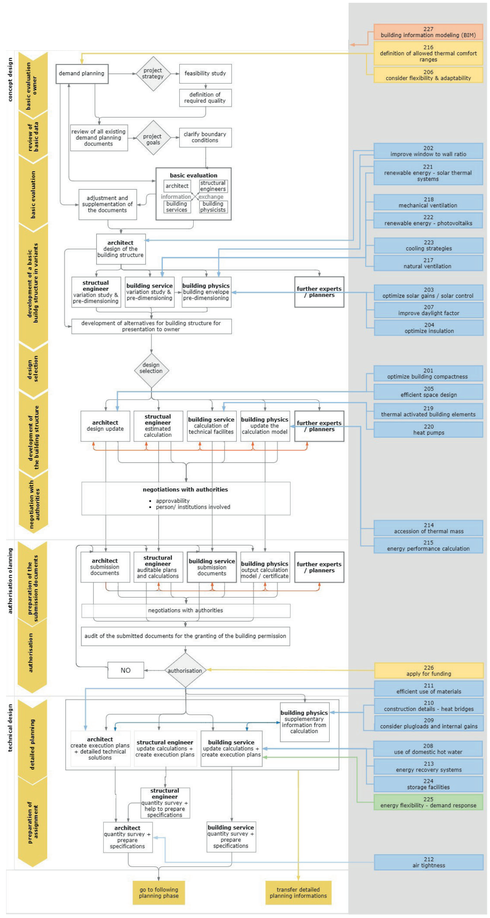
CRAVEzero | www.cravezero.eu | Poster Format: A0

Process and related Actions

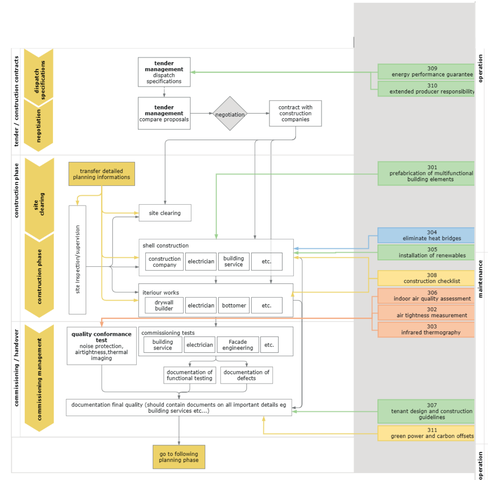
P01: Urban Planning Phase



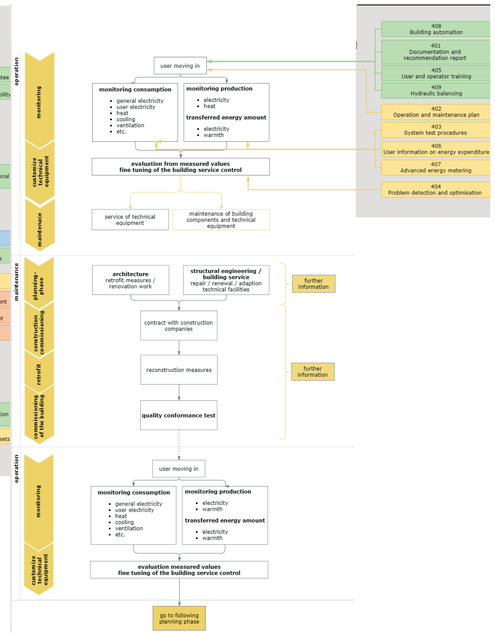
P02: Planning Phase



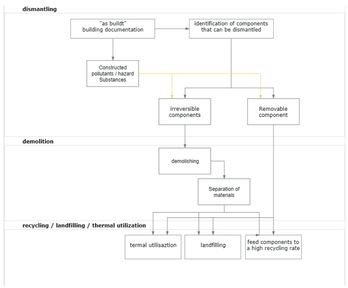
P03: Construction Phase



P04: Operation Phase

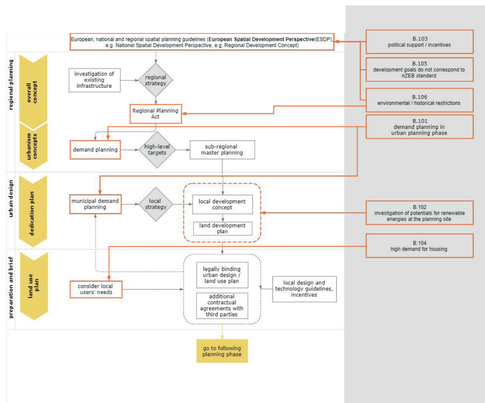


P05: End of Life

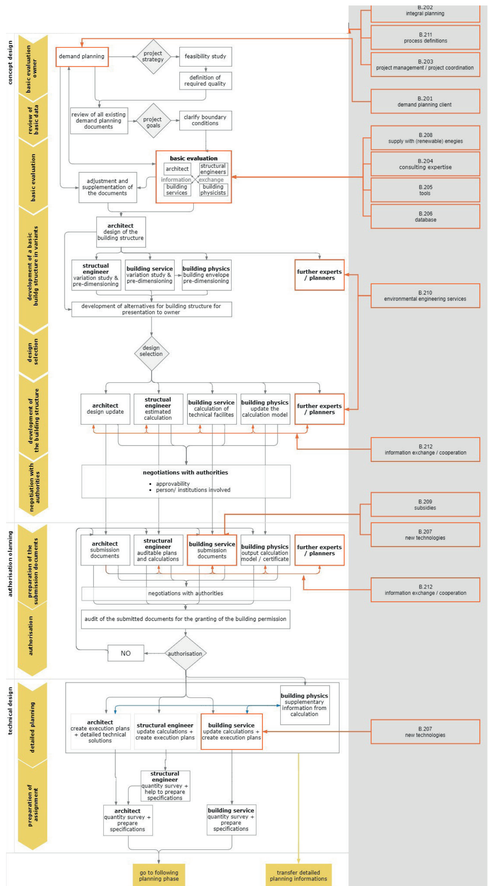


Process and Bottlenecks

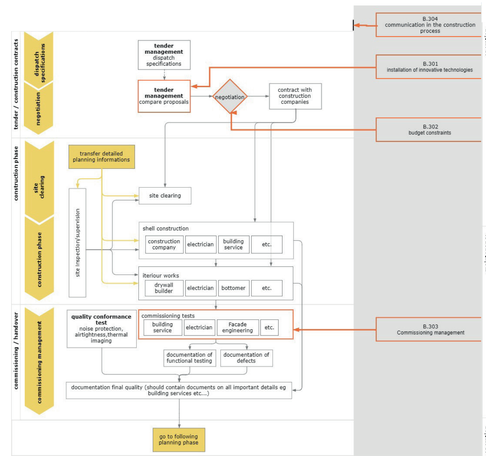
P01: Urban Planning Phase



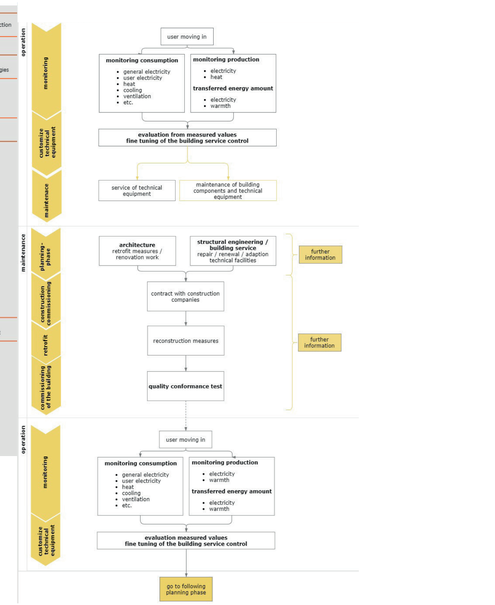
P02: Planning Phase



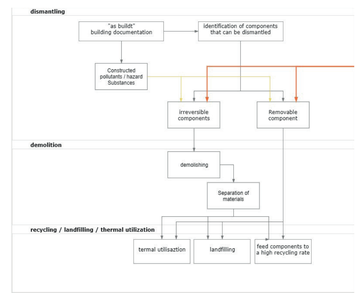
P03: Construction Phase



P04: Operation Phase



P05: End of Life



Legend

go to action items for owners /user | go to action items for municipality | go to action items for integrated planners | go to action items for construction companies

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