

# Report

Session: hiEEYSeiiI, Date: 2025-09-17 19:05

*This is the report of your FCM experiment with the PoMM platform.*

*The report directly shows all the choices you made in your simulation, the notes you entered and the resulting images (graphs or maps).*

## Unity of Analysis, NBS and CEC

*This section contains the geographical area, the Natural Based Solution (NBS) and the Contaminant of emerging concern (CEC) selected for your experiment.*

### Selected Region

Name: Fyn

ID: DK031

### Selected LAU

Name: Odense

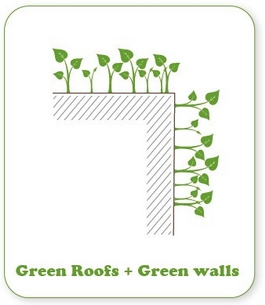
Code: 461

### Selected Natural Based Solution

ID: Green Roofs and Facades

Name: Green Roofs and Facades

Description: Green roofs refer to the external upper covering of a building which the main objective is to favor the growth of vegetation keeping the habitability conditions in the rooms below. Similarly, green facades (also called green walls) are vegetated coverages for external building walls.



### Selected Contaminant of emerging concern

Compound Name: Not applicable

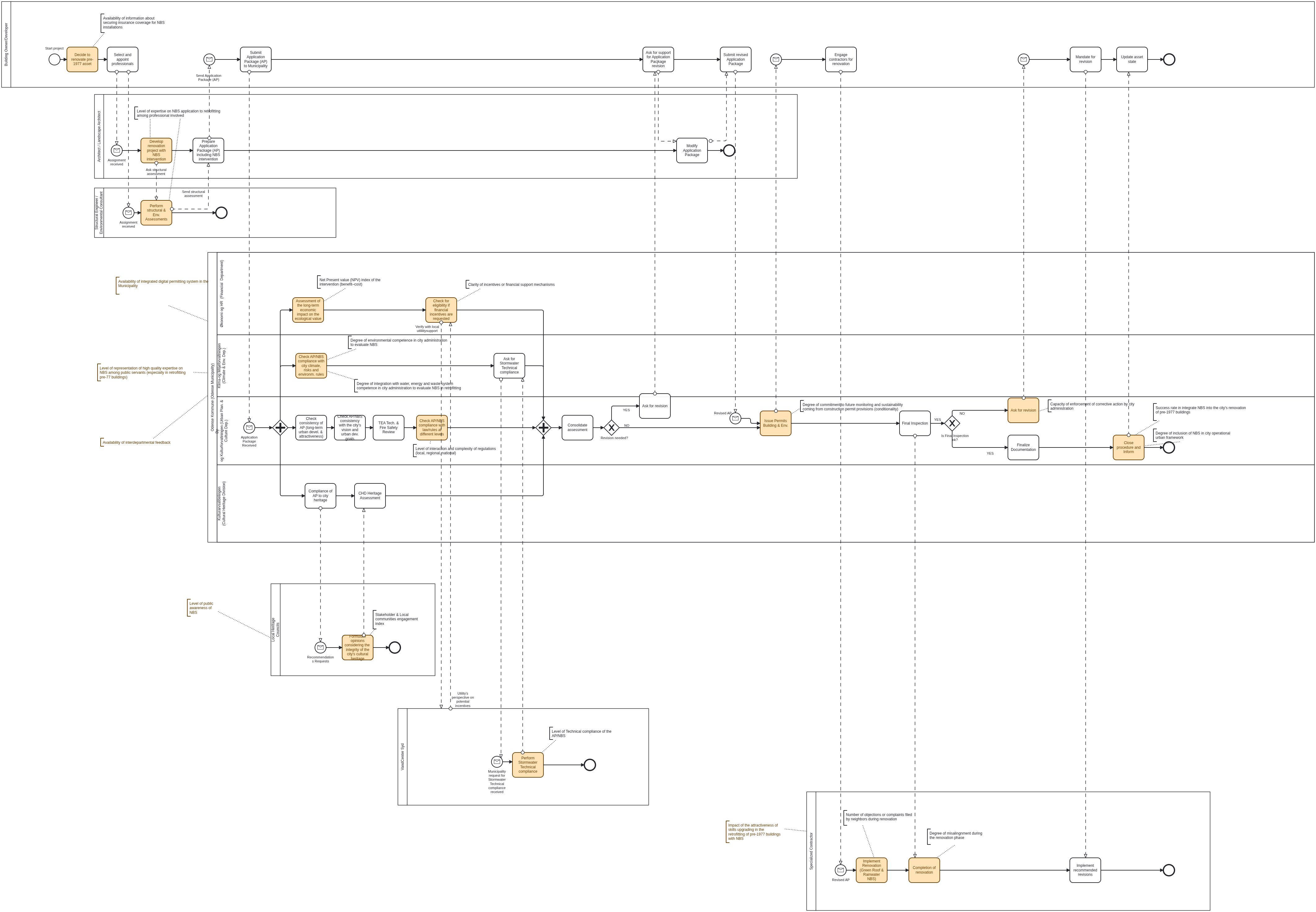
Family: Not applicable

Compound: Not applicable

CAS: Not applicable

## Decision process flow (represented in BPMN)

*This is the decision flow you choose, modify or create for your experiment.*



## Identification of most important entities

*This section reports the variables you selected for your experiment.*

* Net Present value (NPV) index of the intervention (benefit–cost)
* Success rate in integrate NBS into the city's renovation of pre-1977 buildings
* Degree of commitment to future monitoring and sustainability coming from construction permit provisions (conditionality)
* Level of Technical compliance of the AP/NBS
* Degree of integration with water, energy and waste system competence in city administration to evaluate NBS in retrofitting
* Availability of interdepartmental feedback
* Availability of information about securing insurance coverage for NBS installations
* Degree of environmental competence in city administration to evaluate NBS
* Availability of integrated digital permitting system in the Municipality
* Level of public awareness of NBS
* Number of objections or complaints filed by neighbors during renovation
* Level of representation of high quality expertise on NBS among public servants (especially in retrofitting pre-77 buildings)
* Degree of inclusion of NBS in city operational urban framework
* Impact of the attractiveness of skills upgrading in the retrofitting of pre-1977 buildings with NBS
* Capacity of enforcement of corrective action by city administration
* Level of expertise on NBS application to retrofitting among professional involved
* Degree of misalingnment during the renovation phase
* Clarity of incentives or financial support mechanisms
* Stakeholder & Local communities engagement index
* Level of interaction and complexity of regulations (local, regional, national)

## Intermediate Notes

*Below are the notes you entered to document the first phase of your experiment. If you did not add any comments, only the titles are displayed in this section.*

### Unity of analysis (NUTS, NBS & CEC)

The selected code corresponds to the geographical area concerned by the evaluation, according to the European statistical nomenclature NUTS/LAU. The NBS and CECs chosen for the evaluation were previously selected from the libraries of the D4Runoff platform using the criteria provided.  
  
  
  
The area of the analysis is the Municipality of ODENSE.  
  
  
  
The focus in on NBS related to pre-1977 building retrofitting.

### Decision process flow

The diagram describes the process examined according to the BPMN standard with session shared with the Odense Municipality.

### Entities selection

The annotations refer to the variables considered important or critical for the issue of policy making / decision making under consideration.  
  
  
  
The variables have been chosen referring to the notes of the Odense Municipality shared with an initial questionnaire about the case under analysis.

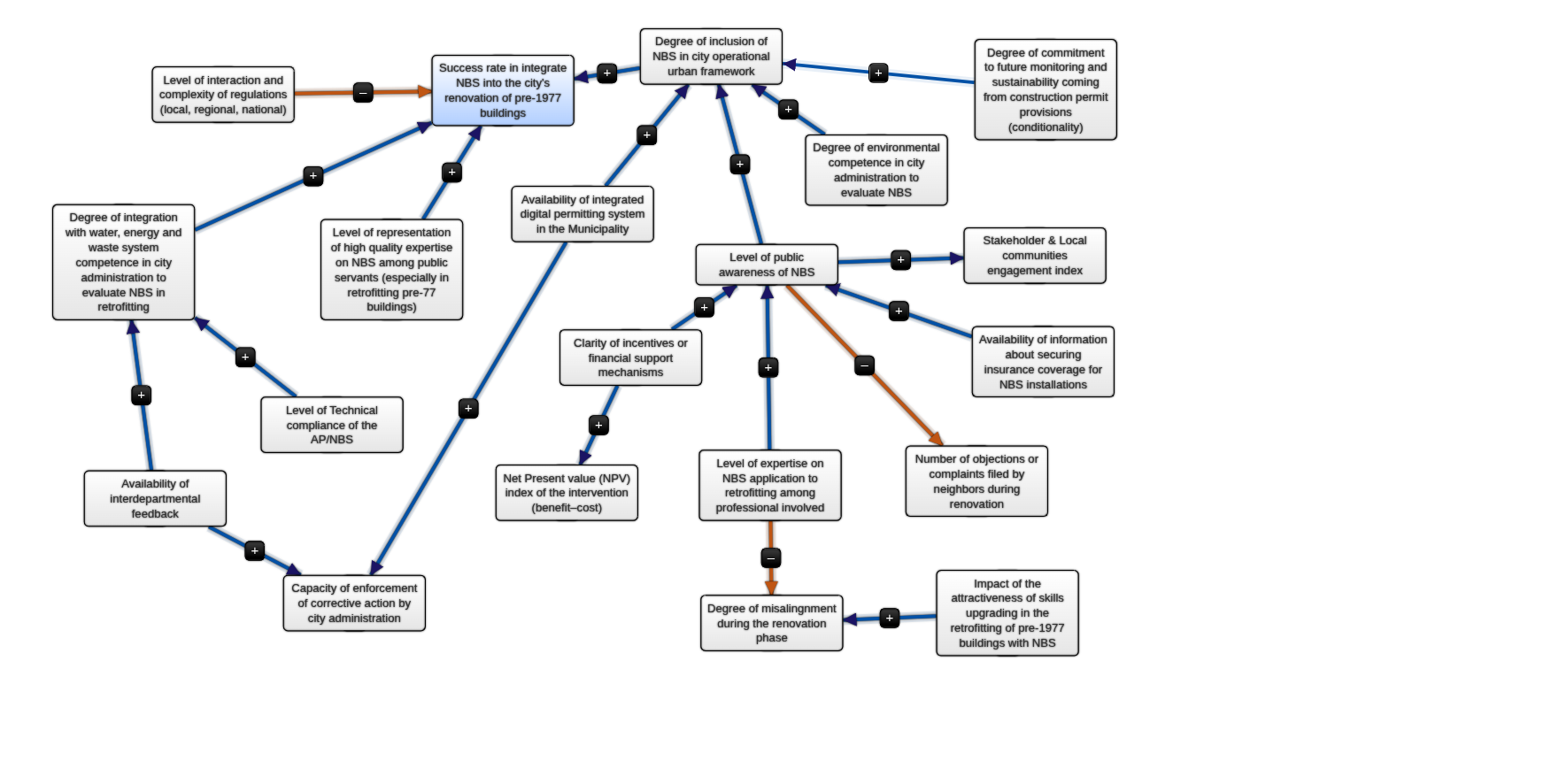
# Cognitive Map Information

*This section presents the most important information contained in your Fuzzy Cognitive Mapping. All concepts in the FCM are listed, but if you did not enter notes, assign units or groups during the experiment, some data will not be available. For the best use of the tool, we suggest that you take this into account when defining the map.*

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Notes** | **Units** | **Group** |
| Net Present value (NPV) index of the intervention (benefit–cost) |  |  | N/A |
| Success rate in integrate NBS into the city's renovation of pre-1977 buildings |  |  |  |
| Degree of commitment to future monitoring and sustainability coming from construction permit provisions (conditionality) |  |  | N/A |
| Level of Technical compliance of the AP/NBS |  |  | N/A |
| Degree of integration with water, energy and waste system competence in city administration to evaluate NBS in retrofitting |  |  | N/A |
| Availability of interdepartmental feedback |  |  | N/A |
| Availability of information about securing insurance coverage for NBS installations |  |  | N/A |
| Degree of environmental competence in city administration to evaluate NBS |  |  | N/A |
| Availability of integrated digital permitting system in the Municipality |  |  | N/A |
| Level of public awareness of NBS |  |  | N/A |
| Number of objections or complaints filed by neighbors during renovation |  |  | N/A |
| Level of representation of high quality expertise on NBS among public servants (especially in retrofitting pre-77 buildings) |  |  | N/A |
| Degree of inclusion of NBS in city operational urban framework |  |  | N/A |
| Impact of the attractiveness of skills upgrading in the retrofitting of pre-1977 buildings with NBS |  |  | N/A |
| Capacity of enforcement of corrective action by city administration |  |  | N/A |
| Level of expertise on NBS application to retrofitting among professional involved |  |  | N/A |
| Degree of misalingnment during the renovation phase |  |  | N/A |
| Clarity of incentives or financial support mechanisms |  |  | N/A |
| Stakeholder & Local communities engagement index |  |  | N/A |
| Level of interaction and complexity of regulations (local, regional, national) |  |  | N/A |

# Cognitive Map Design

*This image represents the cognitive map that you designed for your experiment.*



# Cognitive Map relationships between entities

*This table displays the information related to your FCM, including the source and target concepts, the levels of influence and confidence you assigned during your experiment.*

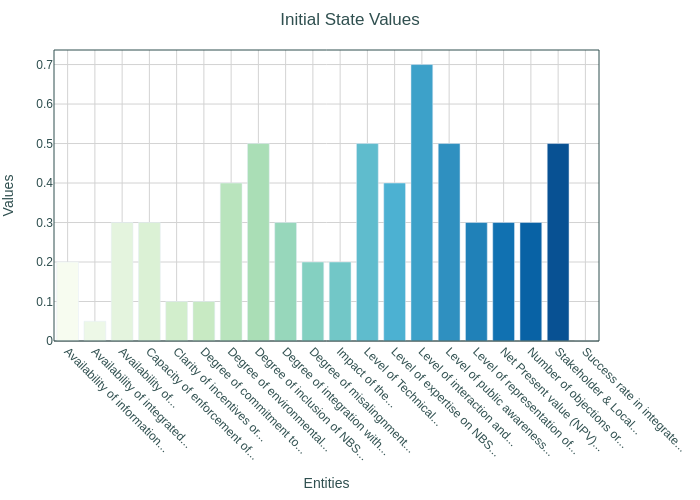
|  |  |  |  |
| --- | --- | --- | --- |
| **Source** | **Target** | **Influence** | **Confidence** |
| Degree of commitment to future monitoring and sustainability coming from construction permit provisions (conditionality) | Degree of inclusion of NBS in city operational urban framework | 1 | 0 |
| Level of Technical compliance of the AP/NBS | Degree of integration with water, energy and waste system competence in city administration to evaluate NBS in retrofitting | 1 | 0 |
| Degree of integration with water, energy and waste system competence in city administration to evaluate NBS in retrofitting | Success rate in integrate NBS into the city's renovation of pre-1977 buildings | 1 | 0 |
| Availability of interdepartmental feedback | Capacity of enforcement of corrective action by city administration | 1 | 0 |
| Availability of interdepartmental feedback | Degree of integration with water, energy and waste system competence in city administration to evaluate NBS in retrofitting | 1 | 0 |
| Availability of information about securing insurance coverage for NBS installations | Level of public awareness of NBS | 1 | 0 |
| Degree of environmental competence in city administration to evaluate NBS | Degree of inclusion of NBS in city operational urban framework | 1 | 0 |
| Availability of integrated digital permitting system in the Municipality | Degree of inclusion of NBS in city operational urban framework | 1 | 0 |
| Availability of integrated digital permitting system in the Municipality | Capacity of enforcement of corrective action by city administration | 1 | 0 |
| Level of public awareness of NBS | Number of objections or complaints filed by neighbors during renovation | -1 | 0 |
| Level of public awareness of NBS | Stakeholder & Local communities engagement index | 1 | 0 |
| Level of public awareness of NBS | Degree of inclusion of NBS in city operational urban framework | 1 | 0 |
| Level of representation of high quality expertise on NBS among public servants (especially in retrofitting pre-77 buildings) | Success rate in integrate NBS into the city's renovation of pre-1977 buildings | 1 | 0 |
| Degree of inclusion of NBS in city operational urban framework | Success rate in integrate NBS into the city's renovation of pre-1977 buildings | 1 | 0 |
| Impact of the attractiveness of skills upgrading in the retrofitting of pre-1977 buildings with NBS | Degree of misalingnment during the renovation phase | 1 | 0 |
| Level of expertise on NBS application to retrofitting among professional involved | Level of public awareness of NBS | 1 | 0 |
| Level of expertise on NBS application to retrofitting among professional involved | Degree of misalingnment during the renovation phase | -1 | 0 |
| Clarity of incentives or financial support mechanisms | Net Present value (NPV) index of the intervention (benefit–cost) | 1 | 0 |
| Clarity of incentives or financial support mechanisms | Level of public awareness of NBS | 1 | 0 |
| Level of interaction and complexity of regulations (local, regional, national) | Success rate in integrate NBS into the city's renovation of pre-1977 buildings | -1 | 0 |

# Initial States

*This section documents, in graphical and tabular form, the values you have assigned to each entity in your FCM and represents the initial state of your configuration.*

## Initial States Configuration 1

### Initial States Plot



### Initial State Values

|  |  |
| --- | --- |
| **Entity** | **Initial Value** |
| Availability of information about securing insurance coverage for NBS installations | 0.20 |
| Availability of integrated digital permitting system in the Municipality | 0.05 |
| Availability of interdepartmental feedback | 0.30 |
| Capacity of enforcement of corrective action by city administration | 0.30 |
| Clarity of incentives or financial support mechanisms | 0.10 |
| Degree of commitment to future monitoring and sustainability coming from construction permit provisions (conditionality) | 0.10 |
| Degree of environmental competence in city administration to evaluate NBS | 0.40 |
| Degree of inclusion of NBS in city operational urban framework | 0.50 |
| Degree of integration with water, energy and waste system competence in city administration to evaluate NBS in retrofitting | 0.30 |
| Degree of misalingnment during the renovation phase | 0.20 |
| Impact of the attractiveness of skills upgrading in the retrofitting of pre-1977 buildings with NBS | 0.20 |
| Level of Technical compliance of the AP/NBS | 0.50 |
| Level of expertise on NBS application to retrofitting among professional involved | 0.40 |
| Level of interaction and complexity of regulations (local, regional, national) | 0.70 |
| Level of public awareness of NBS | 0.50 |
| Level of representation of high quality expertise on NBS among public servants (especially in retrofitting pre-77 buildings) | 0.30 |
| Net Present value (NPV) index of the intervention (benefit–cost) | 0.30 |
| Number of objections or complaints filed by neighbors during renovation | 0.30 |
| Stakeholder & Local communities engagement index | 0.50 |
| Success rate in integrate NBS into the city's renovation of pre-1977 buildings | 0.00 |

# Simulation Results

*This section documents, in graphical and tabular form, the results of your simulation runs.*

## Simulation Run 1

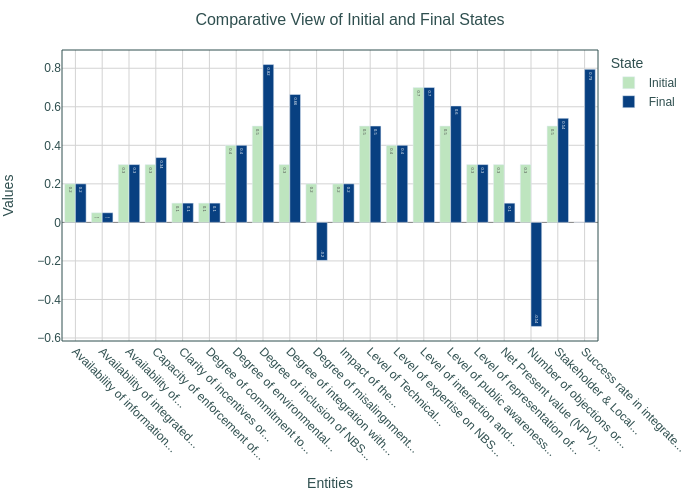
### Simulation Table

*This table shows the evolution of state variables during the simulation.*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Concept** | **Availability of information about securing insurance coverage for NBS installations** | **Availability of integrated digital permitting system in the Municipality** | **Availability of interdepartmental feedback** | **Capacity of enforcement of corrective action by city administration** | **Clarity of incentives or financial support mechanisms** | **Degree of commitment to future monitoring and sustainability coming from construction permit provisions (conditionality)** | **Degree of environmental competence in city administration to evaluate NBS** | **Degree of inclusion of NBS in city operational urban framework** | **Degree of integration with water, energy and waste system competence in city administration to evaluate NBS in retrofitting** | **Degree of misalingnment during the renovation phase** | **Impact of the attractiveness of skills upgrading in the retrofitting of pre-1977 buildings with NBS** | **Level of Technical compliance of the AP/NBS** | **Level of expertise on NBS application to retrofitting among professional involved** | **Level of interaction and complexity of regulations (local, regional, national)** | **Level of public awareness of NBS** | **Level of representation of high quality expertise on NBS among public servants (especially in retrofitting pre-77 buildings)** | **Net Present value (NPV) index of the intervention (benefit–cost)** | **Number of objections or complaints filed by neighbors during renovation** | **Stakeholder & Local communities engagement index** | **Success rate in integrate NBS into the city's renovation of pre-1977 buildings** |
| 0 | 0.2 | 0.05 | 0.3 | 0.3 | 0.1 | 0.1 | 0.4 | 0.5 | 0.3 | 0.2 | 0.2 | 0.5 | 0.4 | 0.7 | 0.5 | 0.3 | 0.3 | 0.3 | 0.5 | 0.0 |
| 1 | 0.2 | 0.05 | 0.3 | 0.336 | 0.1 | 0.1 | 0.4 | 0.782 | 0.664 | -0.197 | 0.2 | 0.5 | 0.4 | 0.7 | 0.604 | 0.3 | 0.1 | -0.462 | 0.462 | 0.38 |
| 2 | 0.2 | 0.05 | 0.3 | 0.336 | 0.1 | 0.1 | 0.4 | 0.819 | 0.664 | -0.197 | 0.2 | 0.5 | 0.4 | 0.7 | 0.604 | 0.3 | 0.1 | -0.54 | 0.54 | 0.78 |
| 3 | 0.2 | 0.05 | 0.3 | 0.336 | 0.1 | 0.1 | 0.4 | 0.819 | 0.664 | -0.197 | 0.2 | 0.5 | 0.4 | 0.7 | 0.604 | 0.3 | 0.1 | -0.54 | 0.54 | 0.794 |
| 4 | 0.2 | 0.05 | 0.3 | 0.336 | 0.1 | 0.1 | 0.4 | 0.819 | 0.664 | -0.197 | 0.2 | 0.5 | 0.4 | 0.7 | 0.604 | 0.3 | 0.1 | -0.54 | 0.54 | 0.794 |

### Simulation Plot

*This graph compares the initial and final states of the observable variables in a do-nothing scenario.*



# Intervention Results

*This section documents, in graphical and tabular form, the results of your interventions simulations.*

## Intervention Test 1

### Intervention Details

*This table shows the details of your intevention(s).*

|  |  |  |  |
| --- | --- | --- | --- |
| **Intervention Entity** | **Target Entity** | **Impact Value** | **Effectiveness** |
| Strategy A – Political leadership commitment to NBS | Degree of inclusion of NBS in city operational urban framework | 1.00 | 0.89 |
| Strategy A – Political leadership commitment to NBS | Availability of integrated digital permitting system in the Municipality | 1.00 | 0.89 |
| Strategy A – Political leadership commitment to NBS | Level of interaction and complexity of regulations (local, regional, national) | 0.50 | 0.89 |
| Strategy A – Political leadership commitment to NBS | Capacity of enforcement of corrective action by city administration | 1.00 | 0.89 |
| Strategy A – Political leadership commitment to NBS | Clarity of incentives or financial support mechanisms | 1.00 | 0.89 |
| Strategy B – Odense Green Retrofit Outreach with NBS solutions | Level of public awareness of NBS | 1.00 | 0.88 |
| Strategy B – Odense Green Retrofit Outreach with NBS solutions | Availability of interdepartmental feedback | 1.00 | 0.88 |
| Strategy B – Odense Green Retrofit Outreach with NBS solutions | Success rate in integrate NBS into the city's renovation of pre-1977 buildings | 1.00 | 0.88 |
| Strategy B – Odense Green Retrofit Outreach with NBS solutions | Impact of the attractiveness of skills upgrading in the retrofitting of pre-1977 buildings with NBS | 0.50 | 0.88 |

### Equilibrium Table

*This table shows the equilibrium values of state variables at baseline and intervention(s).*

|  |  |  |  |
| --- | --- | --- | --- |
| **Concept** | **baseline** | **Strategy A – Political leadership commitment to NBS** | **Strategy B – Odense Green Retrofit Outreach with NBS solutions** |
| Availability of information about securing insurance coverage for NBS installations | 0.2 | 0.2 | 0.2 |
| Availability of integrated digital permitting system in the Municipality | 0.05 | 0.712 | 0.05 |
| Availability of interdepartmental feedback | 0.3 | 0.3 | 0.704 |
| Capacity of enforcement of corrective action by city administration | 0.336 | 0.957 | 0.637 |
| Clarity of incentives or financial support mechanisms | 0.1 | 0.712 | 0.1 |
| Degree of commitment to future monitoring and sustainability coming from construction permit provisions (conditionality) | 0.1 | 0.1 | 0.1 |
| Degree of environmental competence in city administration to evaluate NBS | 0.4 | 0.4 | 0.4 |
| Degree of inclusion of NBS in city operational urban framework | 0.819 | 0.995 | 0.899 |
| Degree of integration with water, energy and waste system competence in city administration to evaluate NBS in retrofitting | 0.664 | 0.664 | 0.835 |
| Degree of misalingnment during the renovation phase | -0.197 | -0.197 | 0.012 |
| Impact of the attractiveness of skills upgrading in the retrofitting of pre-1977 buildings with NBS | 0.2 | 0.2 | 0.412 |
| Level of Technical compliance of the AP/NBS | 0.5 | 0.5 | 0.5 |
| Level of expertise on NBS application to retrofitting among professional involved | 0.4 | 0.4 | 0.4 |
| Level of interaction and complexity of regulations (local, regional, national) | 0.7 | 0.419 | 0.7 |
| Level of public awareness of NBS | 0.604 | 0.865 | 0.918 |
| Level of representation of high quality expertise on NBS among public servants (especially in retrofitting pre-77 buildings) | 0.3 | 0.3 | 0.3 |
| Net Present value (NPV) index of the intervention (benefit–cost) | 0.1 | 0.612 | 0.1 |
| Number of objections or complaints filed by neighbors during renovation | -0.54 | -0.699 | -0.725 |
| Stakeholder & Local communities engagement index | 0.54 | 0.699 | 0.725 |
| Success rate in integrate NBS into the city's renovation of pre-1977 buildings | 0.794 | 0.912 | 0.976 |

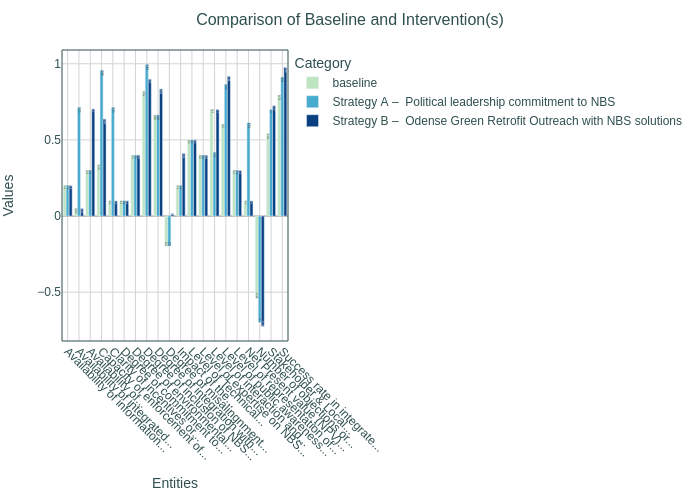
### Comparison Table

*This table shows the differences between the intervention(s) in relative terms (i.e., % increase or decrease) compared to the baseline.*

|  |  |  |  |
| --- | --- | --- | --- |
| **Concept** | **baseline** | **Strategy A – Political leadership commitment to NBS** | **Strategy B – Odense Green Retrofit Outreach with NBS solutions** |
| Availability of information about securing insurance coverage for NBS installations | 0.00% | 0.00% | 0.00% |
| Availability of integrated digital permitting system in the Municipality | 0.00% | 1324.76% | 0.00% |
| Availability of interdepartmental feedback | 0.00% | 0.00% | 134.64% |
| Capacity of enforcement of corrective action by city administration | 0.00% | 184.39% | 89.51% |
| Clarity of incentives or financial support mechanisms | 0.00% | 612.38% | 0.00% |
| Degree of commitment to future monitoring and sustainability coming from construction permit provisions (conditionality) | 0.00% | 0.00% | 0.00% |
| Degree of environmental competence in city administration to evaluate NBS | 0.00% | 0.00% | 0.00% |
| Degree of inclusion of NBS in city operational urban framework | 0.00% | 21.43% | 9.76% |
| Degree of integration with water, energy and waste system competence in city administration to evaluate NBS in retrofitting | 0.00% | 0.00% | 25.72% |
| Degree of misalingnment during the renovation phase | -0.00% | -0.00% | -105.86% |
| Impact of the attractiveness of skills upgrading in the retrofitting of pre-1977 buildings with NBS | 0.00% | 0.00% | 105.79% |
| Level of Technical compliance of the AP/NBS | 0.00% | 0.00% | 0.00% |
| Level of expertise on NBS application to retrofitting among professional involved | 0.00% | 0.00% | 0.00% |
| Level of interaction and complexity of regulations (local, regional, national) | 0.00% | -40.20% | 0.00% |
| Level of public awareness of NBS | 0.00% | 43.10% | 51.86% |
| Level of representation of high quality expertise on NBS among public servants (especially in retrofitting pre-77 buildings) | 0.00% | 0.00% | 0.00% |
| Net Present value (NPV) index of the intervention (benefit–cost) | 0.00% | 514.21% | 0.00% |
| Number of objections or complaints filed by neighbors during renovation | -0.00% | 29.36% | 34.20% |
| Stakeholder & Local communities engagement index | 0.00% | 29.36% | 34.20% |
| Success rate in integrate NBS into the city's renovation of pre-1977 buildings | 0.00% | 14.82% | 22.88% |

### Intervention Plot

*This graph compares the baseline and final states of the observable variables after your intervention(s).*



### Final Notes

*Below are the notes you entered to document the second phase of your experiment (FCM modelling, simulation and intervention). If you have not add any comments, only the titles (or predefined texts/suggestions) will be displayed in this section.*

### Cognitive map

The cognitive map was constructed using all the nodes identified in the process.  
  
The key connections between entities were established through clusters that first concerned administrative and institutional capacity, then the regulatory and governance context, followed by financial and economic dynamics, and finally social awareness and acceptability.

### Simulation

In mapping the initial state, the level of success in integrating NBS solutions into the retrofitting of pre-1977 buildings is considered an observable variable.  
  
An initial weight was then assigned to each variable based also on responses provided by the municipal administration itself (barriers, limitations, shortcomings or existing capabilities).  
  
In the as-is state, we see that even without intervention, the level of success in integrating NBS solutions into the retrofitting of pre-1977 buildings is quite high.

### Intervention

Two strategies are compared for the intervention: one aimed at the administration and the other more directly at “external” stakeholders.  
  
Strategy A is aimed at the local administration of Odense Municipality but involved also other stakeholders  
  
Although NBS are already well known and practised in Odense, particularly in public works, strengthening political commitment could lead to improved adoption of NBS, including in the retrofitting of buildings constructed before 1977.  
  
In practical terms, this strategy could take the form of an explicit mandate for the bureaucratic structure, the definition of potential budget lines, shared strategies, or the adoption of specific guidelines within existing procedures.  
  
Strategy A targets different variables:  
  
- Degree of inclusion of NBS in city operational urban framework  
  
- Availability of integrated digital permitting system in the Municipality  
  
- Level of interaction and complexity of regulations (local, regional, national)  
  
- Capacity of enforcement of corrective action by city administration  
  
- Clarity of incentives or financial support mechanisms  
  
  
  
Strategy B is mainly aimed “outside” the bureaucracy and offices of Odense City Council.  
  
It is in fact designed to influence both public awareness and the awareness of other parties involved in retrofitting (professionals, builders, etc.) or in the enhancement of historic buildings, including through the use of NBS.  
  
However, it does not rule out the possibility of a closer co-creation relationship between these stakeholders and the municipal administration; on the contrary, it takes this into close consideration.  
  
Strategy B targets different variables:  
  
- Level of public awareness of NBS  
  
- Availability of interdepartmental feedback  
  
- Success rate in integrate NBS into the city's renovation of pre-1977 buildings  
  
- Impact of the attractiveness of skills upgrading in the retrofitting of pre-1977 buildings with NBS

# Disclaimer and concluding remarks

*This report has been automatically generated to track your experiment and contains only the information you have provided and its processing by PoMM according to the rules defined in the User’s Manual (https://d4rpomm.ufuture.eu/mediawiki/index.php/Main\_Page)*

*PoMM and its authors are not responsible for how you use these notes.*

*However, documenting your experiments is essential to have all the information you need to share your results with your stakeholders.*