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Mechelen: Intelligent City Transformation Overview

ICC Final Deliverable

European Commission | The Intelligent Cities Challenge is funded by COSME, the EU programme for Competitiveness of Enterprises and SMEs

Executive summary

The city of Mechelen aims at developing a previously undeveloped part of the city: the district called 'Ragheno'. In order to ensure that this new district will be designed as durable as possible, both for the citizens who will live there, the entrepreneurs who will work there and the building and utilities companies who will be responsible for developing the district, the city wishes to create a Digital Twin of the district. The Digital Twin has multiple goals:

- Support policy makers on the complex decisions of urban livability;
- Provide an up to date view of the situation of the district;
- Allows for impact of planned measures to be simulated and tested.

The Ragheno district will function as a test bed for this Digital Twin, with the potential of scaling up to the rest of the city. After assessing several possible use cases, **Energy transition** are the **main focus** as this is a challenge where **innovative technology** on the one hand and **data-driven policy** on the other can provide strong leverage for the upscaling of good practices. During the ICC trajectory, the city of Mechelen conducted a **feasibility study** and examined the "in's & out's" of buying, developing and implementing such a Digital Twin tool, in close collaboration with **experts from the local ecosystem**. Furthermore, the city explored several **funding opportunities** to finance the investments in the Digital Twin, yet failed in securing the necessary funding throughout the course of the ICC. The **search for funding – which was the biggest roadblock we encountered during the ICC project -** is still ongoing nonetheless, since the city hopes to develop the Digital Twin over the course of the next months and years.

Mayor Foreword

In Ragheno, an new district of Mechelen, major developments are foreseen over the next 20 to 30 years. A smart water and energy concept is currently being developed to cope with the major challenges facing this district. Therefore Mechelen explored the potential of digital twin on water and energy with guidance from the Intelligent City Challenge initiative. The city strongly believes in the strengths of the digital transformation and the value of smart data to develop future-proofed solutions.

ICC has given us knowledge on best practices and state of the art projects in Europe. We hope to continue these contacts and want to set up cooperation in European projects to develop pilots that can be building blocks of our climate goals.

<Alexander Vandersmissen, Mayor Mechelen>

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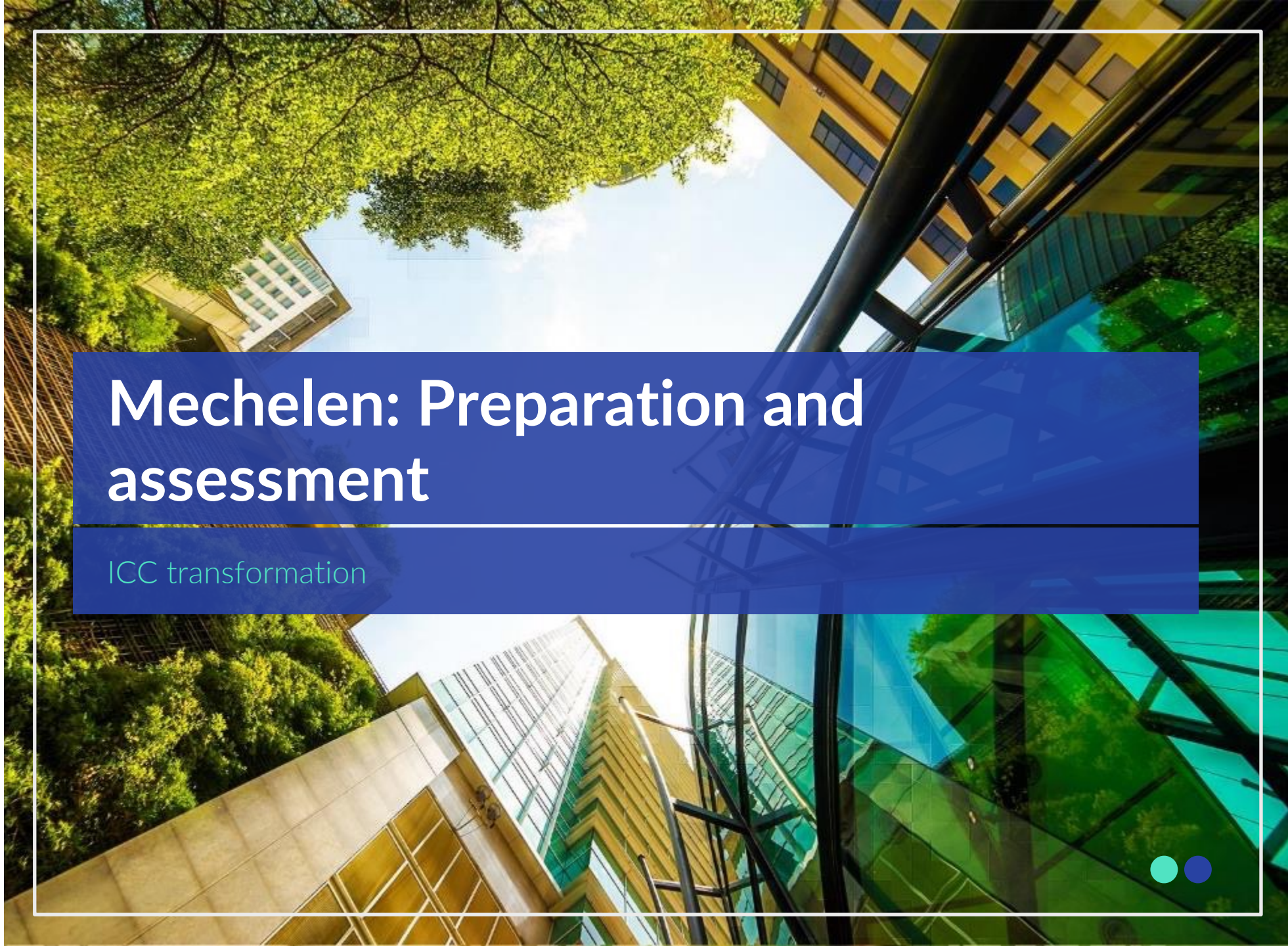
Section

1

Mechelen: Preparation and assessment

ICC transformation



September 2020 to January 2021

European Commission | The Intelligent Cities Challenge is funded by COSME, the EU programme for Competitiveness of Enterprises and SMEs

Introduction

Contextual information

Overall Long Term City Goals

City goal 1:

Scaling up renewable energy solutions and energy-efficiency

City goal 2:

Efficient management of water and water systems

City goal 3:

Waste management and circular economy

City goal 4:

Enhancing citizen participation, connectivity and community

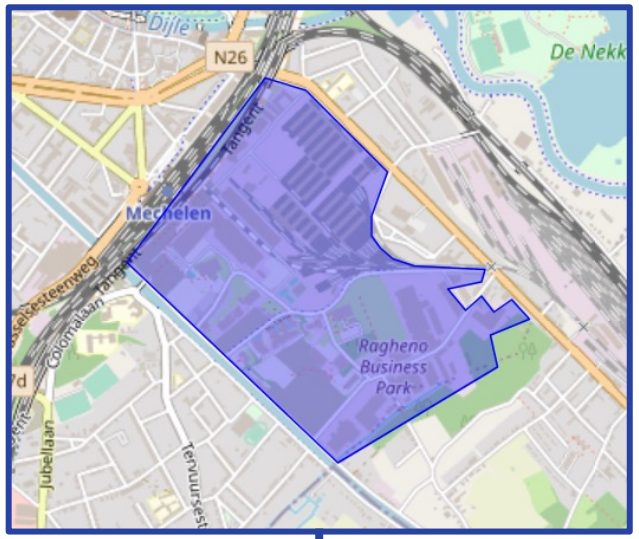
Additional City Goals

Creation of an open data ecosystem through which vertical Smart City initiatives are connected.

HOW?

By creating a Digital Twin

- Support policy makers on the complex decisions of urban livability
- Provide an up to date view of the situation of the city
- Allows for impact of planned measures to be simulated and tested



By using the Ragheno site in Mechelen as a test run site for the digital twin

City needs: State of the city overview

The state of Mechelen today

1. Mechelen is growing

Mechelen has about 87,000 inhabitants and by 2030 Mechelen will approach the milestone of 100,000 inhabitants. The number of companies and visitors to visit the city also continues to increase. However, a further increase in the population also implies a thoughtful and innovative approach to sustainable growth to guarantee the quality of life in the city.

2. Ragheno sustainable growth

A new urban district "Ragheno", will have to cope with this urban growth. Over the next twenty years, the 78-hectare area needs to be developed into a sustainable urban district for at least 6,000 inhabitants, with 140,000 square meters of business space and a 2.5-hectare city park including a marina. It will also comprise everyday facilities such as convenience stores, catering establishments, childcare, sports facilities and a primary school. The city puts forward ambitious sustainability principles and we see the opportunity to develop Ragheno into a really smart neighborhood. The city is also investigating which collective or public systems in the field of energy and water management can be developed on site. We realize that external stakeholders are key actors to reach these ambitions.

3. Ragheno focuses on smart energy and water management

Energy transition and water management are a main focus as they are both challenges where innovative technology on the one hand and data-driven policy on the other can provide strong leverage for the upscaling of good practices. On these topics, a lower performance is observed.

Key insights from city performance analysis

Higher performance observed

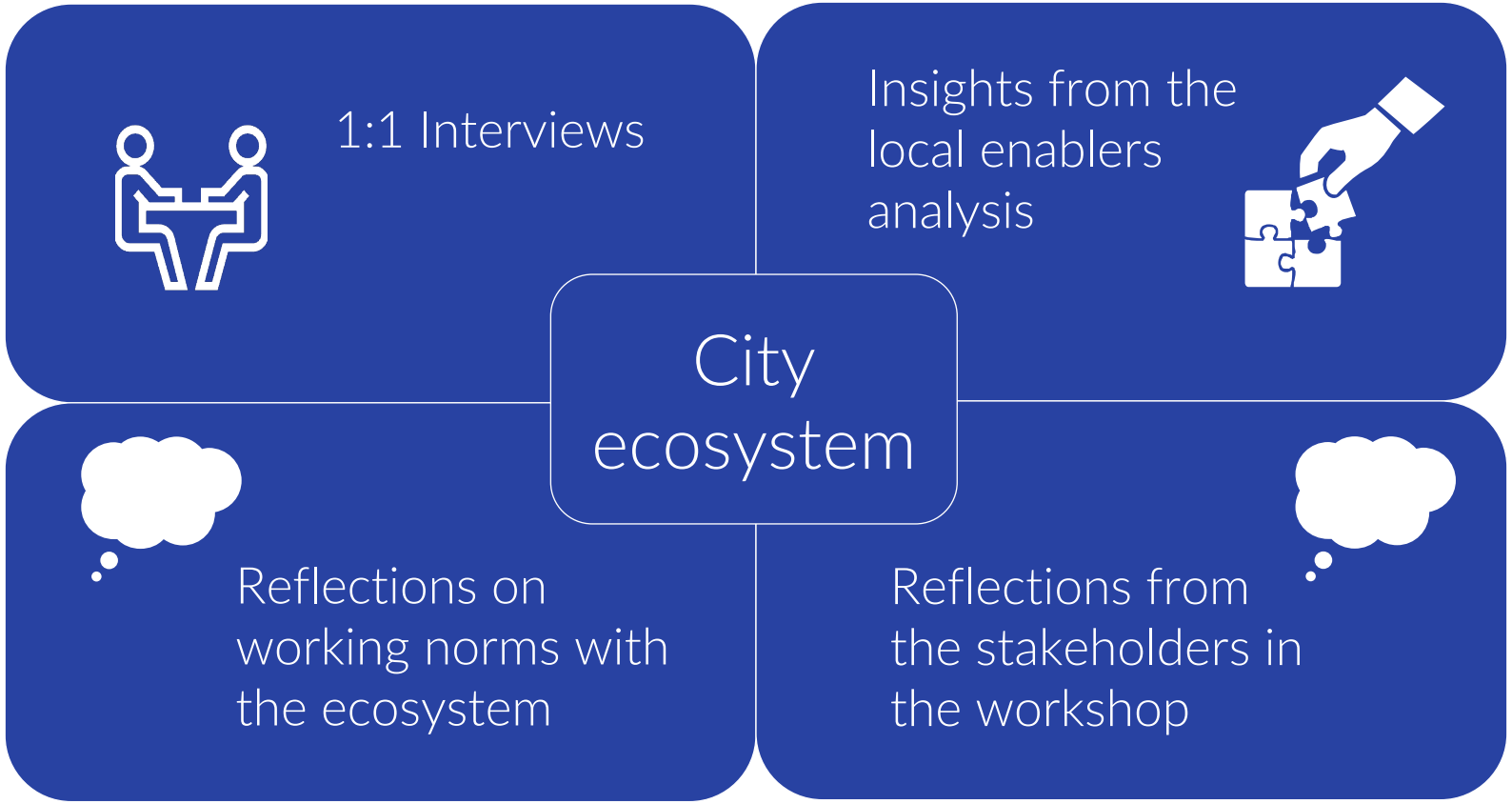
1. The city not only excels in waste water collection and treatment, but efficiently manages its changing water supplies
2. Within its plans and strategies, Mechelen provides a clear direction for strengthening its network of green and blue spaces.
3. Public water usage in Mechelen is low (80 liters/ inhabitant /day. However, the city is tirelessly seeking to reduce this even further in order to secure its future water supply
4. Clear and ambitious strategy for transitioning to a circular economy.
5. Strategic approach for sustainable heating strategies

Lower performance observed

1. lack of public private partnerships in exploring innovative technologies
2. Limited availability of accurate and fine-grained/realtime data ref smart city solutions and monitoring
3. Tackling heat stress
4. Implementation of solutions for a transition to sustainable heating
- ...

City Ecosystem

This section will be interpreting the content of the deliverable from the Stakeholder workshop, i.e. :

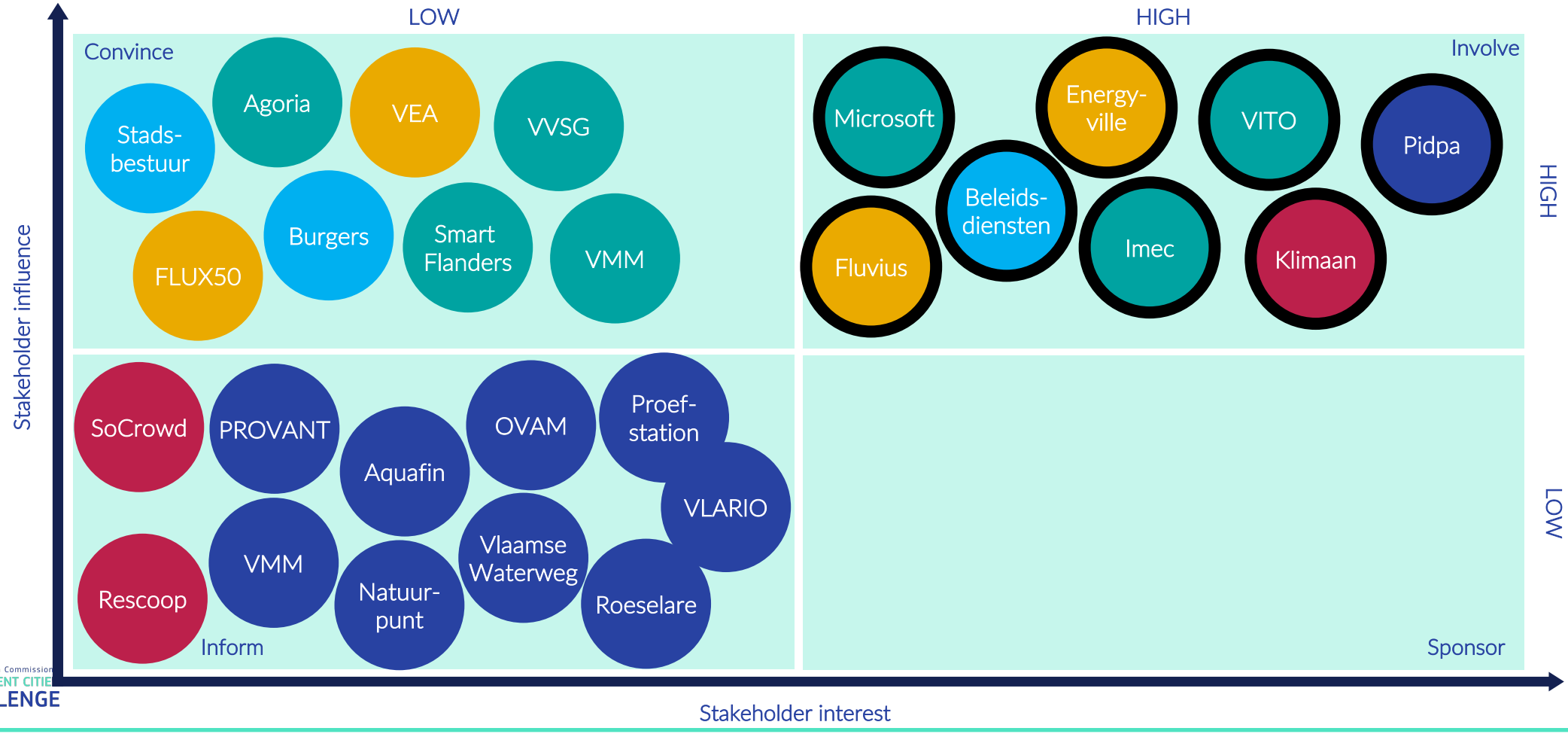


1:1 interviews: method & planning

Stakeholder mapping tool: used to assess which people or groups of people are most important to the city.

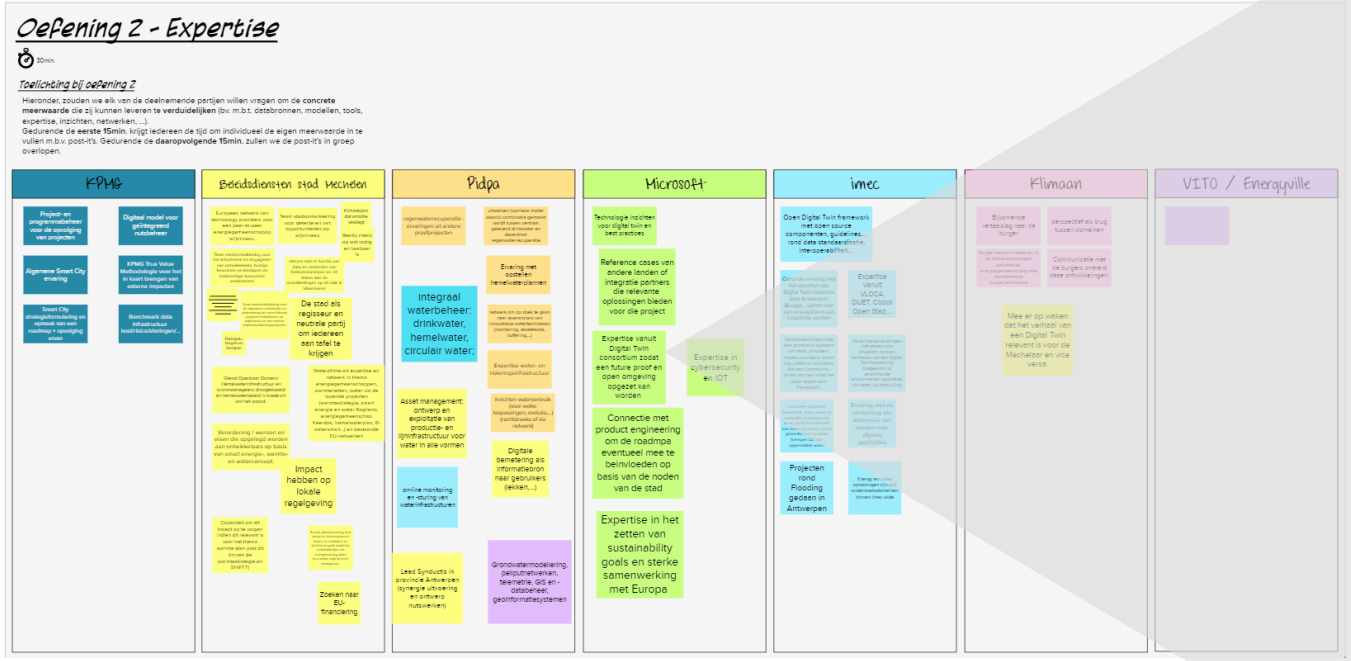
1:1 interviews: method & planning

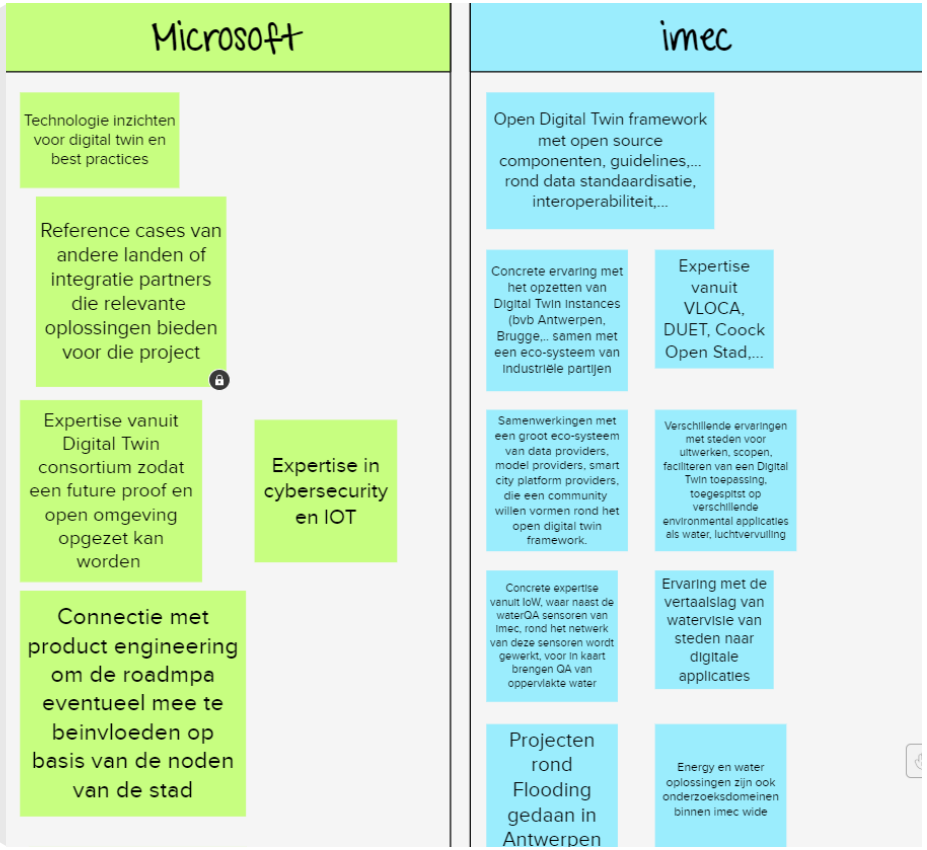
Step 2: Plot the significance of each stakeholder on a matrix



Stakeholder Workshop: output

Zoom-in on the output of the Stakeholder Workshop

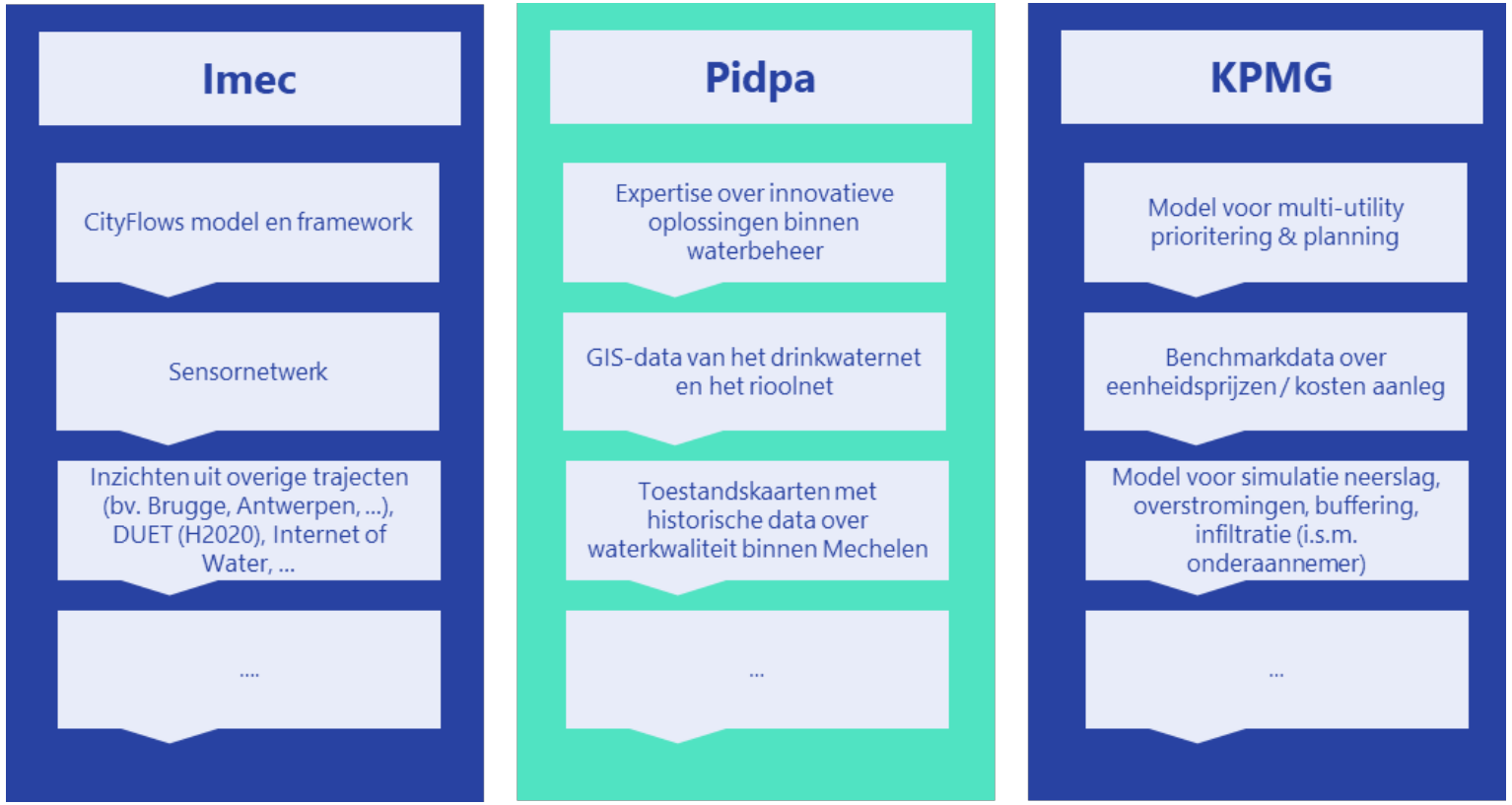




Each organization was assigned a color, in order to display more targeted results in the processing phase

Stakeholder Workshop: output

Zoom-in on the output of the Stakeholder Workshop



Mapping the added value of each of the stakeholders allows us to know very clearly, which stakeholder will be able to vouch for a specific step in the process of the development of the Digital Twin.

Mapping these added values will also help us in clearly defining our roadmap later in the process.

Reflections from the stakeholders

- Several stakeholders pointed out the complexity of a Digital Twin implementation project.
- Some stakeholders were curious to know the financial budget of Mechelen for this project, which wasn't yet clear at this point.
- Several participating city reps pointed out the necessity of involving other city departments, city domain experts and politicians in the process of use case selection, which we will do later on.

Reflections on working norms

- After having consulted the city ecosystem during the Needs & Stakeholder workshop, the members of the ecosystem asked to remain informed and involved during the next steps of the project.

- To accommodate their demand over the next months and especially during the Roadmap phase, we will individually consult several members of the ecosystem and keep the lesser involved members sufficiently informed.

ICC strategy: Vision and ambition statements

The city of Mechelen wants to be a Smart City where technology and data are used to make life more pleasant for the inhabitants. More specifically, Mechelen wants to develop a Digital Twin in the field of energy and/or water for the Ragheno site.

Ambition statement 1:

Developing a digital infrastructure that enables data/information to be offered to various (internal/external) user target groups for the purpose of developing data services and fostering innovations.

Ambition statement 2:

Technology and data-driven policies to leverage 'smart and climate resilient urban planning', focusing on 2 domains within the ICC: 'energy neutral district' and 'water neutral development'.

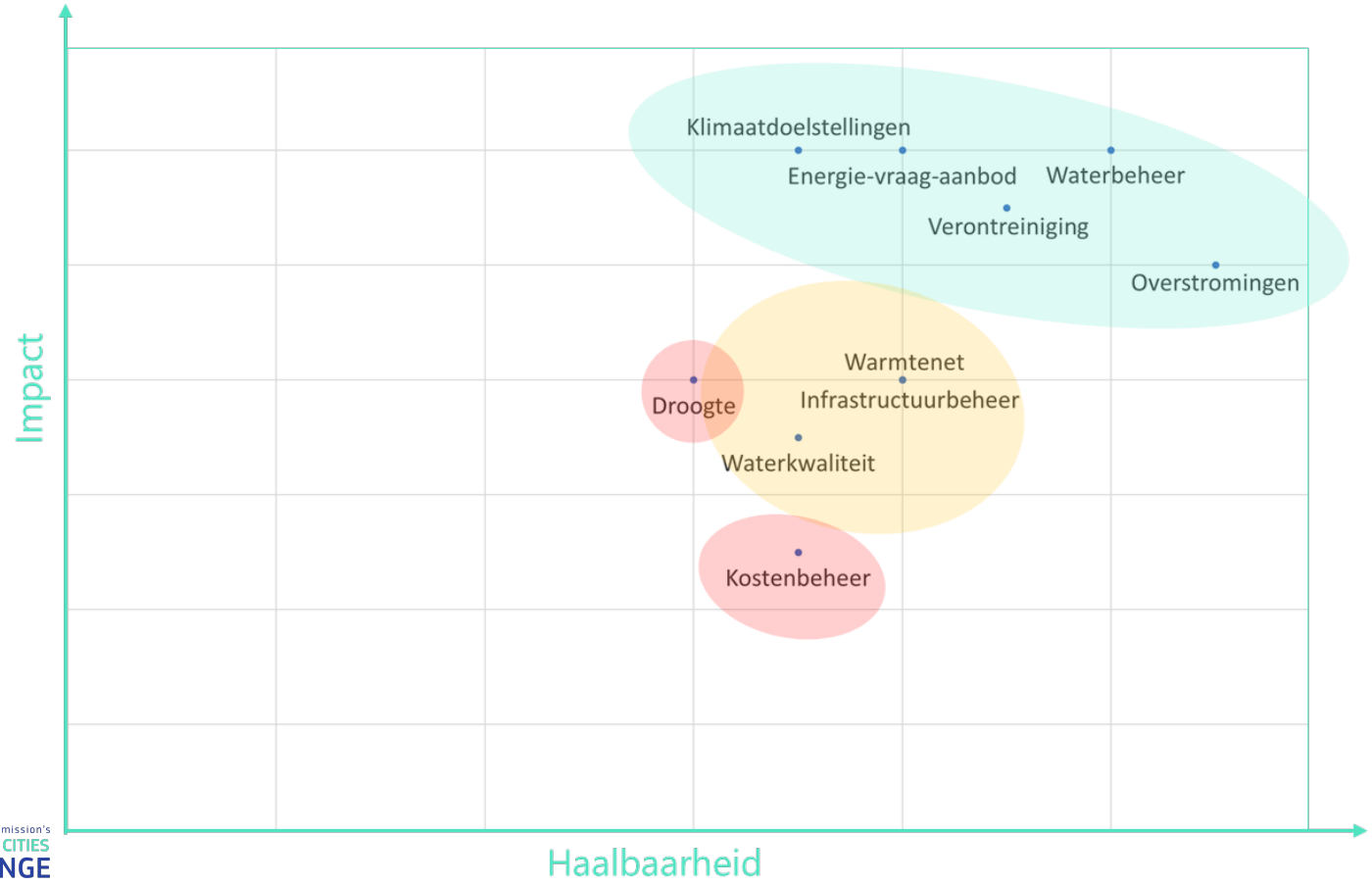
Ambition statement 3:

To develop Ragheno as the city district of the future and to have it function as a smaller scale attempt to a Smart City, in which decision-making and policies are based on data-driven insights, predictions and simulations, via a Digital Twin tool.

City strategy: justification

Processing: illustration

From the 10 categories, we identified the **5 most feasible and impactful options / use cases** by assessing each category for **impact** (y-axis) and **feasibility** (x-axis)



Meest prioritaire opties

Opties met een gemiddelde impact en haalbaarheid

Opties met de laagste haalbaarheid en impact

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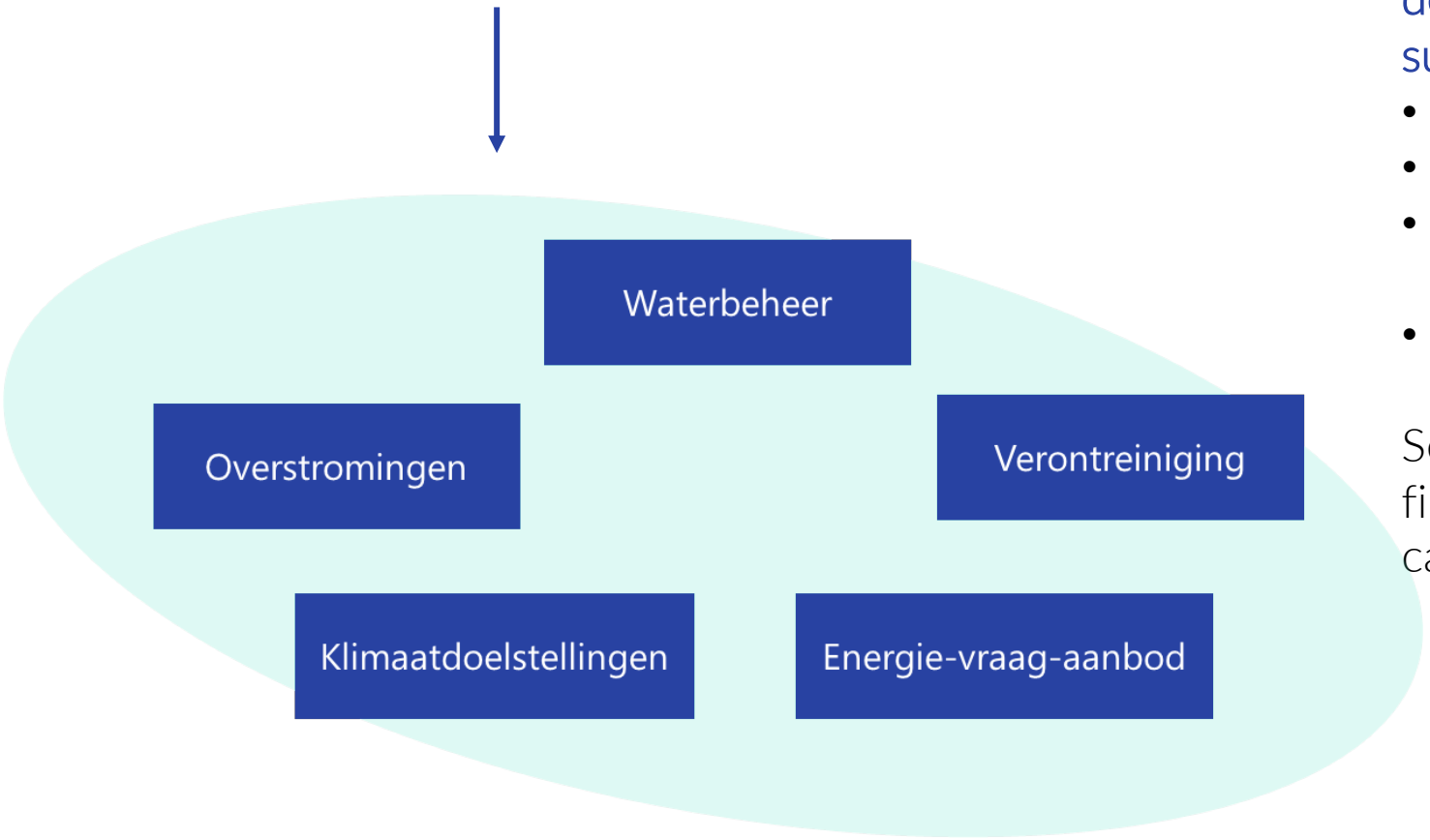
City strategy: justification

Processing: illustration

The **5 most feasible and impactful options**



For each of these options, we then described several functional requirements, such as:

- The required inputs;
- The required data sources;
- The variables that can be 'played with' or simulated;
- The expected outputs

See next slides for an overview of how we filled in these 4 categories for each of the 5 cases.

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Section

2

Mechelen: Ambition and roadmap

ICC Transformation

February 2021 to May 2021

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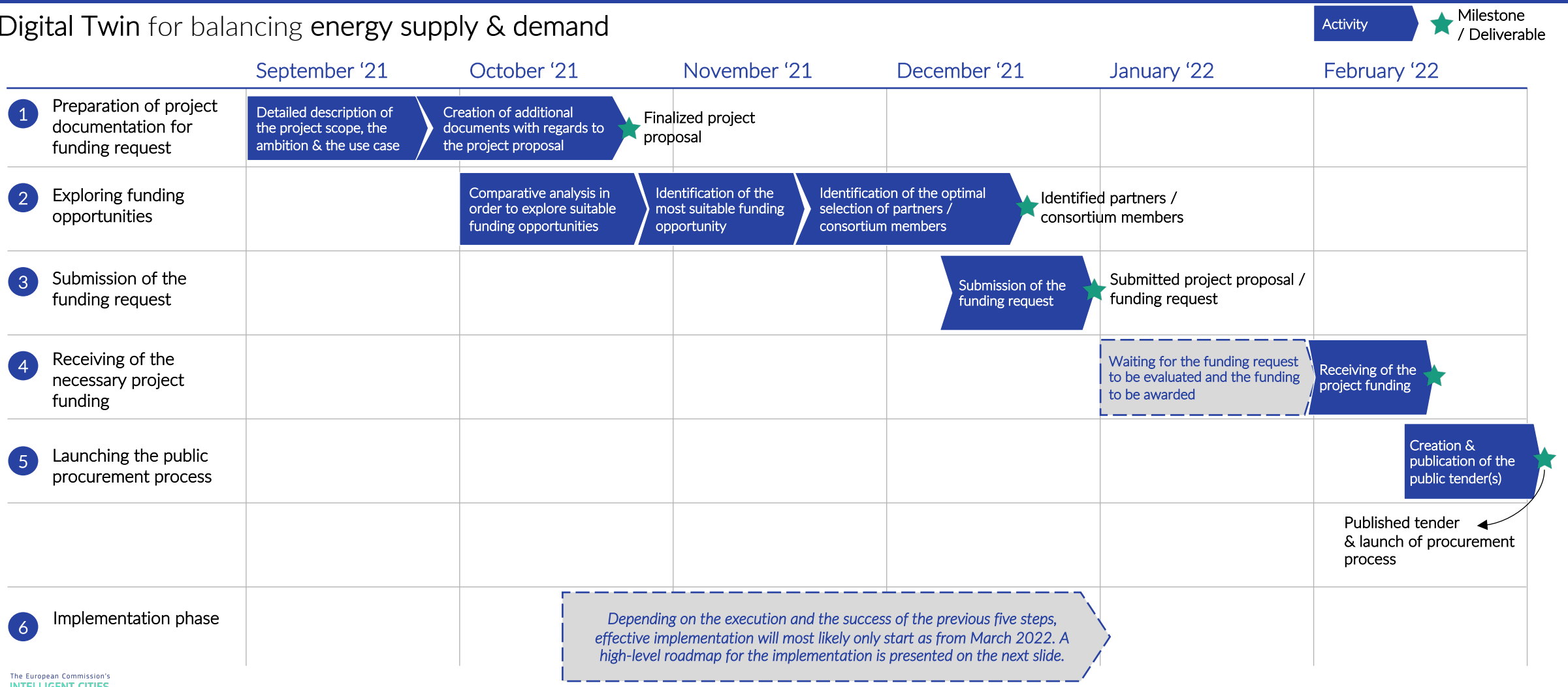
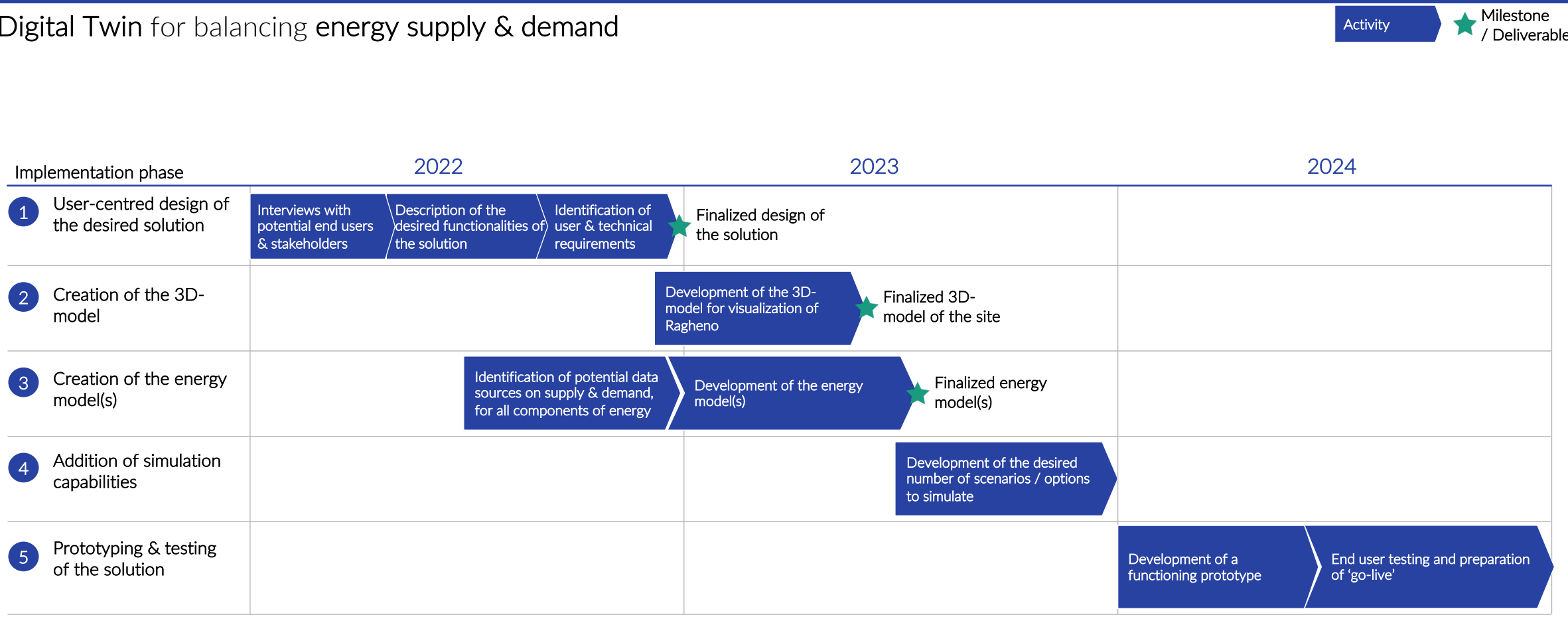
High level implementation roadmap (“10000m plan”)

Digital Twin for balancing energy supply & demand



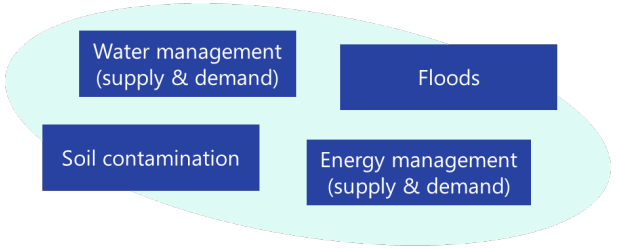
High level implementation roadmap (“10000m plan”)

Digital Twin for balancing energy supply & demand



Rationale to road map

As explained to the ICC Helpdesk and as described in the Phase 1 Strategy Deliverable, we retained **4 potential use cases in scope** at the end of Phase 1 (see image to the right). Since we needed more input to objectify the city's final decision on which use case would be selected and developed into the Digital Twin solution, it seemed more valuable to us to **conduct a feasibility study** on **each of the 4 potential use cases**, in order to refine the conditions and define the **business case** for each of the 4 use cases.



These interviews allowed us to **describe** and **analyze** the **feasibility** and ultimately the **business case** for each of these 4 potential cases. During these interviews, we focused on elements such as:

- The **complexity** of the case: has it been successfully implemented somewhere before?;
- The **estimated implementation time** (ranging from 1 year to 3 years);
- The **cost** and **necessary budget**;
- The **necessary partners** for implementation;
- The **necessary datasources** and **inputs** for the Digital Twin;
- The **variables** or **policy options** to play with / simulate;
- The **possible outputs** from the Digital Twin;
- The **benefits** for policymakers and civilians.

So in fact, during this series of interviews, we've actually been gathering the input necessary to develop 4 different roadmaps, one for each case. Instead of developing these 4 different roadmaps, we'll use this input to **substantiate the final decision** and **select the best case**, in light of the ambitions of the city. We aim to finalize this decision by the end of June, so that we can **develop a roadmap for our single selected use case** and submit it timely, before the 9th of July. On the next slide, we treat the 4 different use cases as if they were 'potential initiatives' for the final Roadmap Deliverable.

Rationale to KPI approach

- With regards to KPI's on the activities (inputs & outputs), we chose to focus on KPI's that display the progress made on the different steps and phases of the roadmap. Ideally, these progress tracking KPI's should be readily available and easily measurable.
- With regards to the KPI's on the solution maturity (outputs), we focused on several enabling / facilitating conditions that could accelerate the implementation of the tool, such as the availability of data (which could be a limiting factor if not available), as well as the penetration of smart meter usage, which capture data that can be used as inputs for the Digital Twin model.
- With regards to the KPI's on city performance (outcomes & impacts), we chose the final end goal the city of Mechelen has envisaged for the development of the district: as durable as possible, with a high level of energy self-sufficiency, a high degree of renewable energy sources as compared to the total energy usage in the district, and an increase in the availability of energy data, which can benefit the different stakeholders present at the site, such as citizens, suppliers and city officials & decision makers.

Initiative charter Digital Twin

By the end of **June '21**, we selected the '**Energy Management' case** as the **most suitable** use case to further **develop over the next months.**

	1. Floods	2. Soil Contamination	3. Water Management	4. Energy Management
Link to vision	✓	✓	✓	✓
Link to ambition statement	✓	✓	✓	✓
Description	Digital Twin for flood control, planning and design	Digital Twin for managing and improving soil contamination	Digital Twin for balancing water supply & demand	Digital Twin for balancing energy supply & demand
Estimated cost and source of funding	• Low • Funding TBD	• Medium • Funding TBD	• High • Funding TBD	• High • Funding TBD
Initiative lead	Smart City team Mechelen	Smart City team Mechelen	Smart City team Mechelen	Smart City team Mechelen
Initiative working team (core team)	Smart City team Mechelen	Smart City team Mechelen	Smart City team Mechelen	Smart City team Mechelen
Contributors (stakeholders contributing)	• Esri, Microsoft & Bentley • VMM & Pidpa	• Esri, Microsoft & Bentley • OVAM	• Esri, Microsoft & Bentley • VMM & Pidpa	• Esri, Microsoft & Bentley • Ingenium
Ultimate goal and scope of this initiative	Reducing Ragheno's vulnerability to floods	Reducing the potential impact of Ragheno's contaminated soil	Balancing the supply & demand of water at Ragheno, to make the district more sustainable	Balancing the supply & demand of energy at Ragheno, to make the district more sustainable
Major milestones	TBD	TBD	TBD	TBD
Dependencies	TBD	TBD	TBD	TBD
Key stakeholders	Esri, Microsoft & Bentley VMM & Pidpa	Esri, Microsoft & Bentley OVAM	Esri, Microsoft & Bentley VMM & Pidpa	Esri, Microsoft & Bentley Ingenium
Impact and timing	TBD	TBD	TBD	TBD
Risks	TBD	TBD	TBD	TBD
Support needed	TBD	TBD	TBD	TBD

Key Performance indicators - overview

Solutions	Activities – Inputs and actions	Solution Maturity - outputs	City performance – outcomes and impacts
Use case 1 - Floods		Availability of data on floods Density of water sensors	Reduction of return period of floods
Use case 2 – Soil contamination		Availability of data on soil contamination	Reduction of the impact of contaminated soil
Use case 3 – Water Management		Availability of data on water supply and demand	Increasing self-sufficiency in water
		Penetration of smart water meters	Increase of water re-use
Use case 4 – Energy Management	Installation of smart meters	Penetration of smart energy meters throughout the city	Increase in data available for energy users, suppliers and city officials / employees
	Data gathering on energy supply & demand	Availability of data on energy supply and demand	Clear view on % of renewable energy
	Ecosystem / partnership building	Number of partners interested	Ecosystem collaboration
	Fund raising	Amount of funds raised	Amount of funds available

Governance structure for roadmap implementation

Steering Committee
- Political decisionmakers
- City employees

Reviews overall progress, acts as a sounding board, takes key decisions and sponsors overall roadmap

Core team (incl. PMO)
- City team
- KPMG

IT platform providers
- Microsoft, Esri

Data providers
- OVAM, Pidpa, VMM, VITO / Energyville

Model providers
- Ingenium, Sumaqua, Bentley, Energyville

Other thematic stakeholders
- Klimaan, imec, Fluvius, …

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Section

3+4

Mechelen: Impact

ICC Transformation

February 2021 to May 2021

European Commission | The Intelligent Cities Challenge is funded by COSME, the EU programme for Competitiveness of Enterprises and SMEs

Impact executive summary

The city of Mechelen aims at developing a previously undeveloped part of the city: the district called 'Ragheno'. In order to ensure that this new district will be designed as durable as possible, both for the citizens who will live there, the entrepreneurs who will work there and the building and utilities companies who will be responsible for developing the district, the city wishes to create a Digital Twin of the district. The Digital Twin has multiple goals:

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The Ragheno district will function as a test bed for this Digital Twin, with the potential of scaling up to the rest of the city. After assessing several possible use cases, Energy transition are the main focus as this is a challenge where innovative technology on the one hand and data-driven policy on the other can provide strong leverage for the upscaling of good practices. During the ICC trajectory, the city of Mechelen conducted a feasibility study and examined the "in's & out's" of buying, developing and implementing such a Digital Twin tool, in close collaboration with experts from the local ecosystem. Furthermore, the city explored several funding opportunities to finance the investments in the Digital Twin, yet failed in securing the necessary funding throughout the course of the ICC. The search for funding – which was the biggest roadblock we encountered during the ICC project - is still ongoing nonetheless, since the city hopes to develop the Digital Twin over the course of the next months and years. Progress on KPI's during the ICC was limited, due to the fact that we never really kickstarted developing and implementing the tool. We did conduct all the necessary studies and created a technical description of the tool to be used in an RfP. The only key missing right now to start implementation, is the necessary funding.

The biggest lesson learned is that – to implement the solution over the next years – more funding will be necessary. Ideally, a combination of EU and regional / Belgian funds should be collected. This will be the main to do for the next years to achieve the goal that has been set during the ICC project.

Assessment of city performance - discussion

The major factor that influenced our KPI's which we did not foresee before implementing our Digital Twin tool, was the difficulty of obtaining funding. The implementation of a Digital Twin requires large financing (estimated 2 – 3 Million). Furthermore, keeping the tool up and running, and executing updates also requires lots of funding for the future.

Gathering the necessary funding will be the big to do for the city for the next years.

Assessment of solution maturity - progress against KPIs

	Where we started	Midway through the challenge	Final results
Solution 1 – Digital twin			
1 KPI 1 – Availability of data on energy supply and demand	10%	30%	40%
2 KPI 2 – Penetration of smart energy meter throughout the city	5%	10%	15%
3 KPI 3			
4 KPI 4			
5 KPI 5			
Solution 2			
1 KPI 1			
2 KPI 2			
3 KPI 3			
4 KPI 4			
5 KPI 5			

Assessment of solution maturity - discussion

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Gathering the necessary funding will be the big to do for the city for the next years.

Assessment of city ecosystem and activities - progress against KPIs

	Where we started	Midway through the challenge	Final results
Ecosystem			
1 KPI 1			
2 KPI 2			
3 KPI 3			
4 KPI 4			
5 KPI 5			
Activity			
1 KPI 1 – Amount of funds received (in €)	0%	0%	0%
2 KPI 2 – Number of suitable potential funding opportunities spotted	0%	50%	50%
3 KPI 3 – Number of funding requests submitted	0	0	1
4 KPI 4 - % of roadmap activities completed on time	10%	20%	30%
5 KPI 5 – Number of public tenders successfully published	0	0	0

Assessment of city ecosystem and activities - discussion

The major factor that influenced our KPI's which we did not foresee before implementing our Digital Twin tool, was the difficulty of obtaining funding. The implementation of a Digital Twin requires large financing (estimated 2 – 3 Million). Furthermore, keeping the tool up and running, and executing updates also requires lots of funding for the future.

Gathering the necessary funding will be the big to do for the city for the next years.

5 key lessons

Lesson	Reflections
1	The first key lesson that the city has learnt from the ICC is that **obtaining funding** can be very **challenging** and that it is not easily obtained. Obtaining funding is critical to the success of the project.
2	Another key lesson of this project was the added value generated by involving the **local ecosystem of experts and partner organizations**. This ecosystem can be reactivated in the future.
3	A third key lesson, was the **limited funding received throughout the ICC**. Combining all the different City Labs, Peer Review Sessions and deliverables, it wasn't easy to keep the necessary budget for really adding value for the city.
4	Another insight from during the ICC trajectory, was that a lot of **other European cities** are aiming at developing similar Digital Twin tools. Over the upcoming years, it can be expected that many funding programs will be launched, aimed at fostering the development of Urban Digital Twins.
5	A fifth key lesson was learning how to interact with very different cities and solutions during the Peer Reviews (organized by the ICC) and to exchange knowledge, best practices & learn from other cities and solutions.

Reflections on city collaborations

The lessons learned on working with other EU cities are:

- A first lesson was that there's a lot of knowledge and expertise in the local ecosystem of partners, which can be leveraged for future projects and goals. In more recent projects, some of the members of the ecosystem have already been involved.
- Another lesson is that it is hard to keep the ecosystem engaged, while there isn't much progress to update them with.
- A big lesson, is that EU projects cost a lot of overhead and the reporting duties are very heavy. The reporting duties exceeded the available budget for this project heavily.
- A final lesson, is that there are a lot of other European cities trying to do similar things. It might be interesting over the next months & years to stay in touch with several of these European cities, to share knowledge and expertise, to exchange best practices and experiences and to learn together.

Commitments

Commitments to on-going resources	Commitments to on-going collaboration	Commitments to on-going KPIs

1) Together with innovation partners, the city of Mechelen will continue to explore the possibilities of EU funding programmes.
2) the regional ecosystem around smart solutions, energy and water management will continue to join forces based on common goals.
3) the city of Mechelen will continue to support the importance of open data on energy transition, not only at a local level but also within Flanders.
4) A last commitment is the commitment to continue leveraging the ecosystem that has been built. No other KPIs will remain for the future.

3 Year plan - ambitions

1. improve the collection of qualitative and necessary datasources and inputs for the Digital Twin (KPI 1)
2. create private public partnerships to accelerate the implementation of smartclimate solutions (KPI 2)
3. increase knowledge in the field of digital twin technology

3 Year plan - targets

KPI	Category	What commitments will the city make to this end?
1	City Performance, Solution maturity or activities & ecosystem	Mechelen makes a concrete commitment to emit at least 40% less CO2 by 2030 and to prepare the territory for the consequences of climate change. In 2011, Mechelen emitted 428 ktonnes of CO2. This means that the emissions from 2025 may still amount to a maximum of 302 ktonnes of CO2.
2	City Performance, Solution maturity or activities & ecosystem	By 2025, the city of Mechelen, together with its smart city consortium, will have developed a business model to accelerate, from an open ecosystem, the implementation of data-driven solutions.
3	City Performance, Solution maturity or activities & ecosystem	The city of Mechelen has developed at least 1 smart grid on its territory by 2025.
4	City Performance, Solution maturity or activities & ecosystem	The city of Mechelen participates in at least 3 European projects related to climate smart city .
5	City Performance, Solution maturity or activities & ecosystem	<There is currently no heat network in Mechelen, but it is included as an option in the district development plans of Ragheno. The feasibility study and implementation plans will be delivered before 2025

1:1 interviews: method & planning

Step 3: Make a list of identified stakeholders to interview

Based on the stakeholder mapping tool, we identified the following stakeholders for our 1:1 interviews:

Actor	Contact person	Status
Pidpa	Erwin Van San	Interview conducted ☑
Imec	Joris Vanderschrick, Philippe Michiels & Koen Triangle	Interview conducted ☑
Klimaan	Elise Steyaert & Steven Laurijssen	Interview conducted ☑
Microsoft	Johan Torfs & Koen Van Tolhuyzen	Interview conducted ☑
Fluvius	Benny Janssens	Interview not conducted due to time constraints on the stakeholder's part
VITO / Energyville	Dorien Aerts	Interview conducted ☑
Beleidsdienst(en) Mechelen	TBD	Interview not conducted due to time constraints on the stakeholder's part

1:1 interviews: method & planning

Key elements we considered before the interviews:

We used the stakeholder mapping tool to identify who to interview.
We prioritized those stakeholders that could become ambassadors and unlock access to key stakeholders.

We adapted our interviews to be conducted through MS Teams, in order to adhere to the Covid-19 regulation.

We prepared all questions in advance making usage of the ICC toolbox. Our focus here was threefold:

1. Get to know the stakeholders, introduce ourselves
2. Motivate the stakeholders to participate in the ICC trajectory with Stad Mechelen
3. Get a high level sense of what the stakeholders will be able to contribute to the ICC trajectory (which will be further explored in the stakeholder workshop later on through a co-creation exercise)

1:1 interviews: method & planning

The interview questions we used (a selection):

1. Introduction
   - Explaining the Intelligent Cities Challenge's purpose and what that means for Stad Mechelen.
   - Elucidate the plans/ambitions of Stad Mechelen
2. Questions zooming-in on the stakeholders
   - General questions
     - What is the stakeholder's background
     - What is the stakeholder's relationship to Stad Mechelen?
     - Is there a history of collaboration between the stakeholder and Stad Mechelen?
   - What are the expectations of the stakeholder, what is the motivation?
     - Would the stakeholder be interested in participating in the ICC-trajectory?
     - What can the stakeholder bring to the party? What is in it for the stakeholder?
     - What does the stakeholder know about current city initiatives?
     - ....

Overview of the stakeholders we interviewed:

imec

KLIMAAN VZW

Microsoft

Pidpa

1:1 interviews: insights

imec

Participants:

- Joris Vanderschrick (imec)
- Koen Triangle (imec)
- Philippe Michiels (imec)
- Mieke Van Cauwenberghe (Mechelen)
- Nicole La Iacona (Mechelen)
- Gilles De Roo (support Lead Expert)

Interested in participating in the Digital Twin project: ☑

Insights from the interview:

- Imec is a world-renowned research center for nanoelectronics and digital technology. It is also a Flemish organization that maintains strong ties with local stakeholders/players
- Imec is considered to be a renowned reference when it comes to the development of Digital (City) Twins
- Modularity and interoperability are two things that imec considers to be strongly evolving within the landscape
- Imec has interest in/shows readiness to contribute to the development the Digital Twin for Mechelen

1:1 interviews: insights

KLIMAAN VZW

Participants:

- Steven Laurijssen (Klimaan)
- Elise Steyaert (Klimaan)
- Gilles De Roo (support Lead Expert)

Interested in participating in the Digital Twin project: ☑

Insights from the interview:

- Klimaan is a citizens' movement that strives for a sustainable and climate neutral society, with a special focus on the social aspect
- Klimaan has collaborated with the City of Mechelen in the past on projects such as 'Always Mechelen climate neutral', the joint purchasing of LED lighting under the denominator 'LED up', etc.
- Klimaan is very close to the citizens of Mechelen and states that they are considered to be a neutral organization, meaning without political (or other / commercial) motives
- Klimaan wants to involve citizens, communicate about the milestones of the ICC project, facilitate citizen participation and brainstorm on concrete solutions where necessary

1:1 interviews: insights

Microsoft

Participants:

- Johan Torfs (Microsoft),
- Koen Van Tolhuyzen (Microsoft)
- Mieke Van Cauwenberghe (Mechelen)
- Nicole La Iacona (Mechelen)
- Gilles De Roo (support Lead Expert)

Interested in participating in the Digital Twin project: ☑

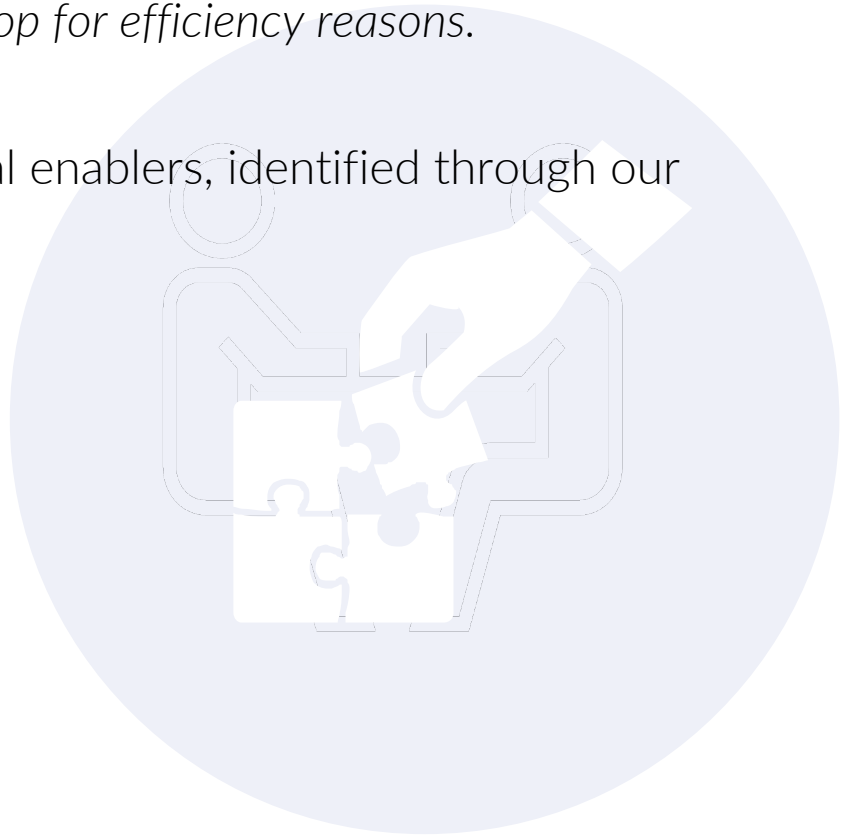
Insights from the interview:

- Microsoft is a technology company that develops, manufactures, licenses, supports and sells software, consumer electronics, computers and related services
- Microsoft is considered to be a renowned reference when it comes to the development of Digital Twins. They believe that the true strength of a Digital Twin lies in the predictive nature of the tool
- Microsoft is interested in potentially sharing their initiatives in regard to climate change objectives
- Microsoft is also interested in exploring the idea of a shared datahub to tie the whole 'Digital Twin' ecosystem together

Stakeholder workshop

Now that we have identified our stakeholders, introduced ourselves to them and got to know them better through the 1:1 interviews, we took it a step further and invited them to the Stakeholder Workshop. *As previously mentioned, this workshop was merged with the Needs Workshop for efficiency reasons.*

In this section, we will take a deep dive into the insights from the local enablers, identified through our Stakeholder Workshop. We will discuss our:



Method & planning

- Medium, participants, method, schedule

Output

- Zoom-in on the output of the Stakeholder Workshop

Stakeholder workshop

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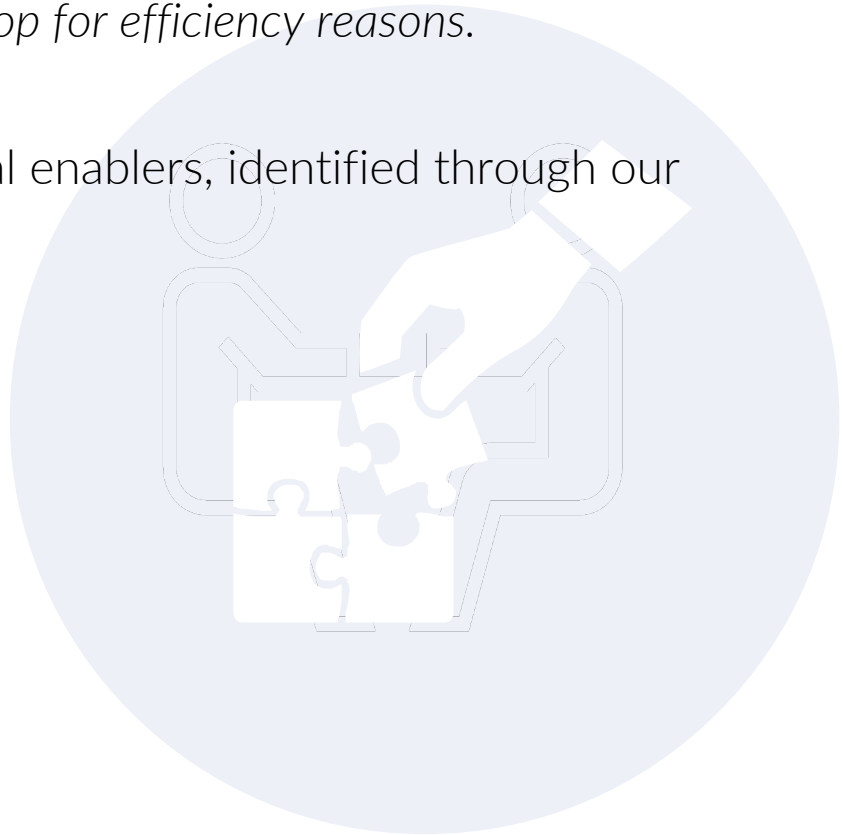

Method & planning

- Medium, participants, method, schedule

Output

- Zoom-in on the output of the Stakeholder Workshop

Stakeholder workshop: method & planning

Medium, participants, method

Medium

For the Stakeholder Workshop we once again used Mural, a digital workspace of visual collaboration

Participants

- KPMG
- Beleidsdiensten stad Mechelen
- Pidpa
- Microsoft
- imec
- Klimaan

Method

Step 1:
Each stakeholder was asked to identify their added value in regard to the development of a Digital Twin at the Ragheno Site and add these as a 'post-it' note on our digital whiteboard

Step 2:
The post-its were commented on and clarified during a group discussion

Stakeholder workshop: method & planning

RUN TIME
~30min.

OUTPUT
A clear overview of the **specific added value** (and potential role) for each participating stakeholder

OBJECTIVE
To clarify the added value that each participating party can provide, with respect to data sources, models, tools, expertise, insights, networks, ...

INSTRUCTIONS
- **15 min:** individually fill in your own expertise and the potential role you can play.
- **15 min:** group discussion to comment on all the post-its

City strategy: justification

Processing of the persona exercise output

We have applied filter 1 and 2 in the previous section. In this section we will illustrate how we processed the output gathered in the city needs workshop.

	INPUT	OUTPUT	Illustrated in
Persona exercise part 1 & 2	Co-creation session with the Mechelen ecosystem to collect ideas. This led to a set of 84 post-its.	84 ideas (post-its)	PART B Section 2: City needs workshop
FILTER 1	Every post-it generated by the co-creation session was assessed based on whether a Digital Twin is required (i.e. the possibility of creating simulations and making predictions) to realize the idea/activity depicted on the post-it. To this purpose a column 'Raw Ideas' was created in our Excel workbook and an estimate was formulated for each post-it. After this practice, 43 ideas remained.	43 ideas (post-its)	
FILTER 2	We grouped the remaining 43 ideas within 10 categories or possibilities, making usage of some intermediate steps. We went through each idea in our Excel workbook column 'Raw Ideas' and assigned them to a certain category. At the end of the exercise, overlap between categories was eliminated.	10 categories	
FILTER 3 (applied later on in section 4 of this presentation)	Finally, Mieke (Mechelen), Nicole (Mechelen), Kobe (thematic expert) and Gilles (support lead expert) formulated an estimate of the impact and feasibility. Based on this assessment, we were able to highlight the 5 most feasible and impactful options. For these options, we then described (i) the required inputs, (ii) the required data sources, (iii) the variables that can be 'played with' and (iv) the expected outputs.	5 most feasible and impactful options	PART B Section 4: Solution and strategy

City strategy: justification

Processing of the persona exercise output

Categorie	Waterkwaliteit Het afwegen van verschillende mogelijke maatregelen *(bv. ontdubbelen van regenwater en droogweerafvoer, verhogen van de rioleringsgraad in de stad, het aanpakken van verontreiniging, etc.)* om de waterkwaliteit van oppervlaktewater en grondwater te optimaliseren.								Overstromingen Het simuleren van het overstromingsrisico om proactief actie te kunnen ondernemen en wateroverlast te vermijden.							
	Gilles		Kobe		Mieke		Nicole		Gilles		Kobe		Mieke		Nicole	
Vote	H	I	H	I	H	I	H	I	H	I	H	I	H	I	H	I
	Medium	Low	Low	Medium	Medium	Medium	Medium	Medium	Medium	High	High	High	High	Medium	High	Medium
Punt	2	1	1	2	2	2	2	2	2	3	3	3	3	2	3	2
Avg	1,75	1,75			2	2			2,75	2,5			3	2		
	Actief informatie kunnen raadplegen over de waterkwaliteit in de stad om de impact van het beleid toe te lichten en om kwaliteit te garanderen aan de burger								Anticiperen op overstromingen om pro-actief burgers/bedrijven te informeren							
	Als burger wil ik proactieve informatie real-time inzicht krijgen in de kwaliteit van mijn drinkwater/water en over het effectief voorzien van groene energie.								Als Pidpa willen wij het effect van het weer op rioleringsinfrastructuur simuleren om pro-actief actie te ondernemen en overlast te vermijden.							
	Als Pidpa willen we waterkwaliteit en beschikbaarheid kunnen garaderen door ten allen tijde te monitoren en deze te gebruiken voor de juiste toepassing om de toekomstige beschikbaarheid van drinkwater veilig te stellen								Als Pidpa willen we real time systemen kunnen opvolgen om tijdig watereservoirs bij te vullen bij tekort of leeg te laten in het vooruitzicht van zware neerslag. Inteligent rain leveler system							
	Als Pidpa willen wij de juiste waterkwaliteit leveren voor de juiste toepassing om beschikbaarheid veilig te stellen								Ik wens inzicht over de effecten van verschillende bronmaatregelen alvorens ze te implementeren							

Mieke (Mechelen), Nicole (Mechelen), Kobe (Thematic Expert) and Gilles (support Lead Expert) formulated an estimate of the impact (I) and feasibility (H) of each potential use case.

Based on this assessment, we can highlight the 5 most feasible and impactful options.

Find an illustration of this process on the next slide.

City strategy: justification

Simuleren wat het benodigde aanbod van energie is op basis van de (toekomstige) energiebehoefte, rekening houdend met de ambities inzake groene energie. Op basis van deze voorspelling van de benodigde energievraag, kunnen ook de kostprijs, de benodigde investeringen, de hoeveelheid duurzame energie, de energie benodigd voor charging stations, … ingeschat worden.

Actuele data m.b.t. beschikbaarheid/duurzaamheid van energie voor een specifiek stadsdeel

Altijd voldoende groene energie voorradig voor de smart laadinfrastructuur

Uitwerking van een energiegemeenschap op gebouwenniveau op grote schaal uitgewerkt zien in de Ragheno site

Als bedrijf wil ik graag zekerheid inzake energie. Daarnaast is een lage/en of voorspelbare kost belangrijk

Input Mechelen: De ontwikkeling van Ragheno verloop over een fase van decennia, de energie-transitie en beschikbare technologieën zijn in volle ontwikkeling. Dit maakt dat de impact van een digital twin voor deze ambitie heel groot kan zijn zodat er doorheen de tijd met scenario's kan gewerkt worden en ontwerpen zich in de toekomst kunnen aanpassen o.b.v. deze digitale replica. De haalbaarheid is misschien complexer o.w.v de nog "niet bestaande context"? Ook de tool als participatietool kunnen inzetten kan grote impact hebben. Haalbaarheid en impact eventueel wel hoger omdat dit kan gelinkt worden aan de studie die zal uitgevoerd worden door Ingenium i.f.v warmte en energie ontwerp voor Ragheno.

INTELLIGENT CITIES CHALLENGE

Zoom-in: energie vraag-aanbod

Gilles		Kobe		Mieke		Nicole	
H	I	H	I	H	I	H	I
Medium	High	Medium	High	Medium	High	Medium	High
2	3	2	3	2	3	2	3

Input	• Scenario's Energie studie Ragheno • Gemiddelde energievraag per functie gebouw/terrein doorheen het jaar (huishoudens, kantoorruimte, industrie, landbouw, …) • Gemiddelde energieaanbod van specifieke infrastructuur doorheen het jaar
Data-bronnen	• Ingenium • Fluvius • Leveranciers voorzieningen (zonnepanelen, …); literatuur
Variabelen	• Bestemming en aantal gebouwen op de site • Investeringen collectief of privaat energieaanbod: zonnepanelen, windmolen, batterijen, … • Scenario's evoluties energieverbruik: elektrische voertuigen, energieverbruik huishoudens (airco, …)
Output	• Simuleren van het evenwicht energievraag en energie-aanbod (tijdsafhankelijk: seizoenen + doorheen de dag) op basis van de variabelen • Inzicht in de duurzaamheid / mate van zelfvoorziening van de energie in Ragheno. • Inzicht in kost van investeringen en eventueel verdienmodel/besparingen/…