

Scenario analysis for planning sustainable cities in a multi-stakeholder decision making environment

Tygron Geodesic platform



By Noémie Guigue

Learning goals

This workshop brings together all the knowledge that you have developed during the past month (smart and sustainable cities, ecosystems services, climate change mitigation and adaptation, ICT-based and nature-based solutions, resilience).

Tygron platform is a 3D tool for decision-making analysis and planning; you can simulate climate change effects, the economic value of ecosystem services and think how to make a city resilient to various shocks and stresses.



Source: policyoption.irpp.org

Examples of the use of Tygron

- For making climate resilient and greener buildings (Utrecht)
- For developing nature inclusive designs in planning (BioTwin creation by Primum and Aveco de Bondt)
- For developing a new more holistic approach of urban planning and set up new regulations (Environment Act of the Netherlands)
- For assessing the active-friendly features of a city

You can find other use cases and news through:

<https://www.tygron.com/nl/news/>

SCHEDULE

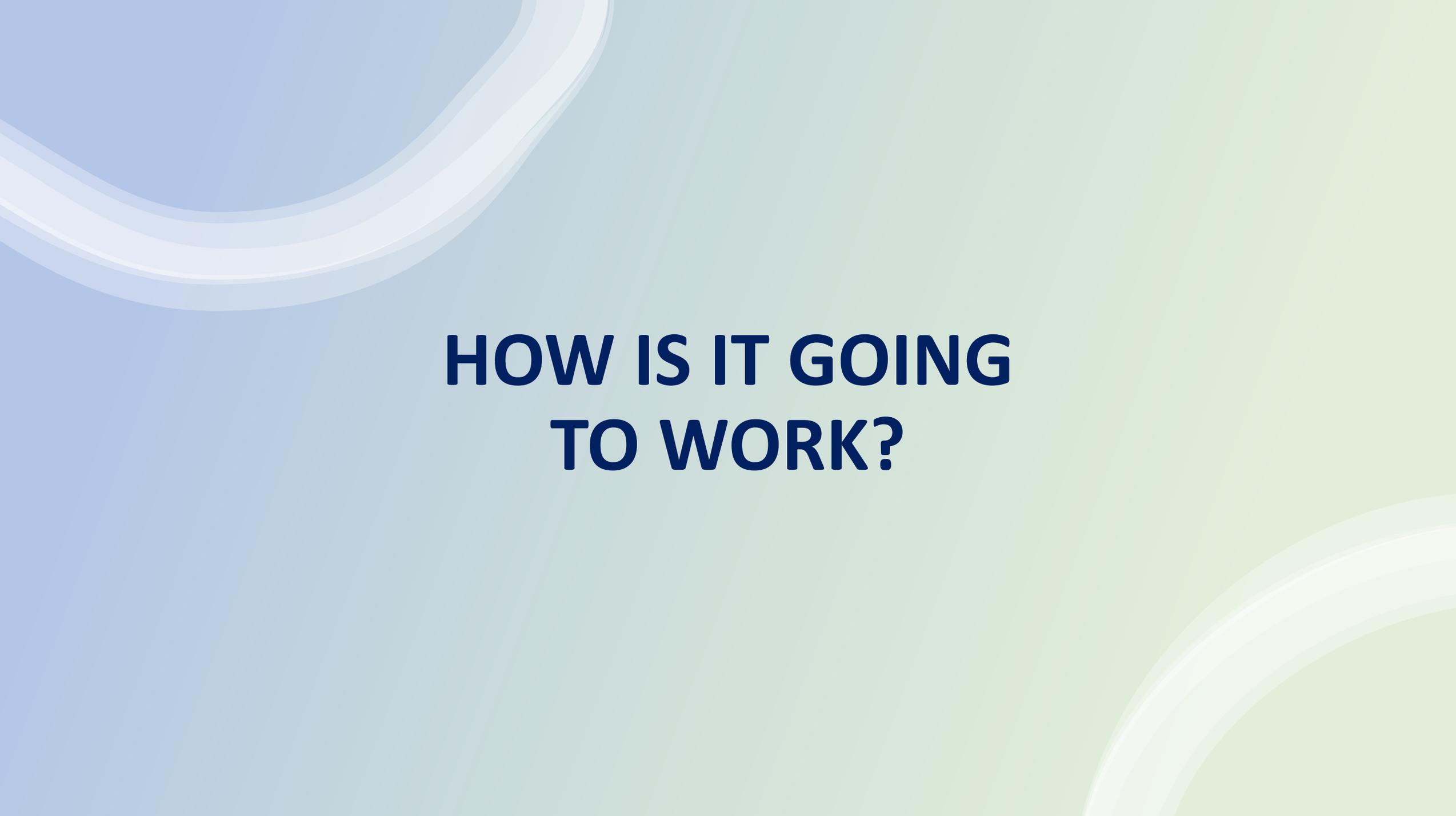
Overview of the 4 sessions

Day	TASKS	Team and/or individual task
Thursday 11th		
13:30	LESSON: LEARNING THE BASICS	Team & individual task
14:15	Getting started with individual stakeholder editing in a common project	
14:15		
15:00		
Monday 15th		
13:30	Complete your stakeholder (indicators weight, functions, actions)	Individual task
14:30	Get together & look if the role (actions, indicators) of your stakeholders make sense	Team task
14:30		
15:00	BREAK	
15:00		
15:30	Define overlays, ownership, zoning, assignment, description of the game and then price of the land	Team & individual task
17:00	Define the budget of each stakeholder (if necessary) by testing your set up <i>Optional: Create levels and timeline</i>	Individual task
		Team task
Tuesday 16th		
09:00	Complete the previous tasks	Team & individual task
10:00	LESSON: HOSTING A GAME & INTERPRETING THE RESULTS	
10:00		
10:15	BREAK	
10:15		
10:45	Play and host the Paris game and/or Climate game	Team task
12:00	Finalize your set up	Team task
12:00		
12:30		
Thursday 18th		
09:00	DISCUSSION ON THE GAMES	
10:00	Run your own set up and interpret the results	
10:00		Team task
11:00	BREAK	
11:00		
11:30	FINAL DISCUSSION	
11:30		
12:30		

Today's session

- Day 1: Getting started with individual stakeholder editing (actions, descriptions, measures, indicators, targets) in a common project based on the Paris set up

TASKS	DETAILS/STEPS	Computers involved
Task I	Start to create the team set up	
	1 Create a new project in Tygron 2 Name your project "Paris set up - Team n° [X]" 3 Decide the stakeholders to involve and which stakeholder you want to play as a team 4 Create the stakeholder (only the names) Make the project visible to other team members: File -> Edit rights-> Select "WRITE" for 5 other users in domain	only one computer (a windows computer)
Task II	Edit the project all together	
	1 Other computers join the project: Login -> Join -> Click on "Paris set up- Team n°[X]" Pick your stakeholder and edit its features (description, pictures, actions, indicators, 2 indicators weight)	all other computers of the team each computer of the team
Task III	Team discussion	
	Come together and think together about your stakeholders (are functions realistic? Did you miss anything? What is the link between your stakeholders and how can you translate it through actions?)	



**HOW IS IT GOING
TO WORK?**

Our support

- This scenario analysis workshop will be run **online**.
 - Our support:
 - during the timetable hours: through Zoom
 - after official hours: through specific channels on Teams
- (GRP-HIS: Sustainable scenario analysis –UESC)**



GRP-IHS: Sustainable s...

Général

Team 1 

Team 2 

Team 3 

Team 4 

Team 5 

Team 6 

Team 7 

Important links

Wiki page:

https://support.tygron.com/wiki/Main_Page

Community forum:

<https://community.tygron.com/forum/search?Search=export+results>

PARIS SET UP



Paris set up
Champs-Élysées area redevelopment plan

What is the scenario?

The Champs-Élysées redevelopment scheme is inspired from an existing redevelopment plan with additional features. The initial plan of Paris municipality is aimed at:

- reducing traffic and pollution by giving back car space to pedestrians and bicycles
- making the area a more livable and attractive place by greening open public space

The fictional Paris set up enlarges this initial plan by focusing on all the area around the Champs-Élysées. The goals are:

- widening the streets
- greening streets and buildings
- redesigning the layout
- giving back space to pedestrians and bicycles

Sources:

<https://www.bloomberg.com/news/features/2021-01-14/paris-dreams-of-a-calmer-greener-champs-elyses>

<https://www.cbsnews.com/news/paris-mayor-pushes-ahead-with-plan-to-give-champs-elysees-a-305-million-green-makeover/>

Project Wizard

Welcome to the Project Wizard, please type in a name to identify your new project:

Paris set up - Team n° [1 .. 2 .. 3 ... 4... 5... 6...7]

Please select empty project or choose a template, which is preconfigured to help you get started.

Create empty project

This will create an empty project not based on any templates.

Select language:

EN

Currency:

Euro

Unit system:

International

Empty Project

Public Templates (Shared by other Users)

Climategame 5 2 Template

Select language:

EN

Use Climategame 5 2

Back to Menu

Select Area

Please select on the map below where your Project is located. Navigate over the map by holding the right mouse button. With the mouse wheel you can zoom in and out of the map. When you have selected the 3D world area, you can change its size on the right side of the map. If you just want to create an empty map, you can select "Empty map".

Champs-Elysées



Area Size: 1,000 m x 1,000 m

Refresh map Square Map

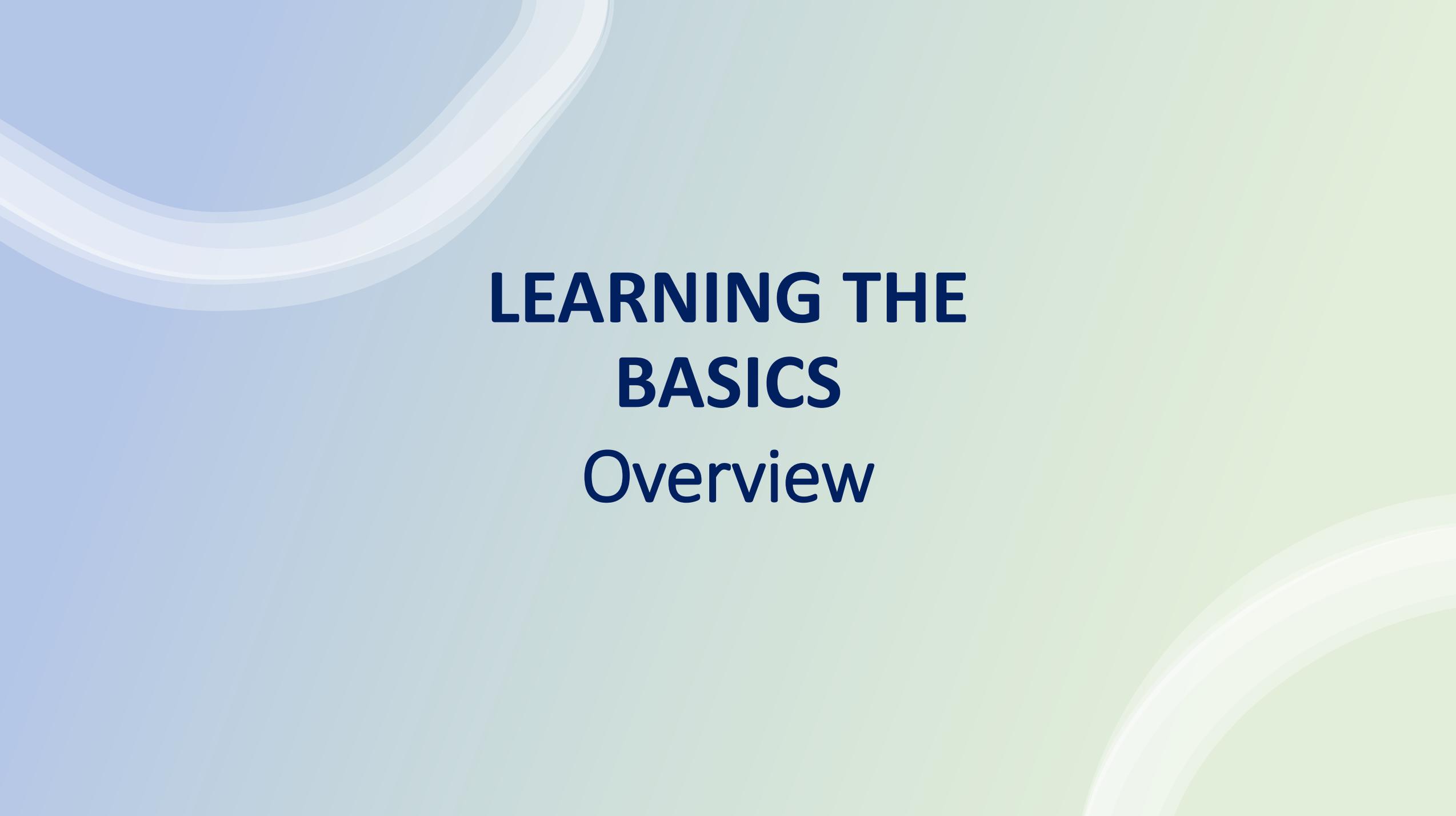
Available data

World Dataset available for this selection, based on OpenStreetMap, Elevation and Satellite Imagery.

Advanced Options

Selecti... Empty ...

Generate Map



LEARNING THE BASICS

Overview

Overview of the main tasks

Within your group, you will have to determine:

- **The stakeholders** in charge of redeveloping the area

Here we have 5 stakeholders for a team of 5. So, in a team of 4, you should have 4 stakeholders.

- **The indicators for these stakeholders and their weight** (the focus each stakeholder should have in this project and the importance of this indicator)

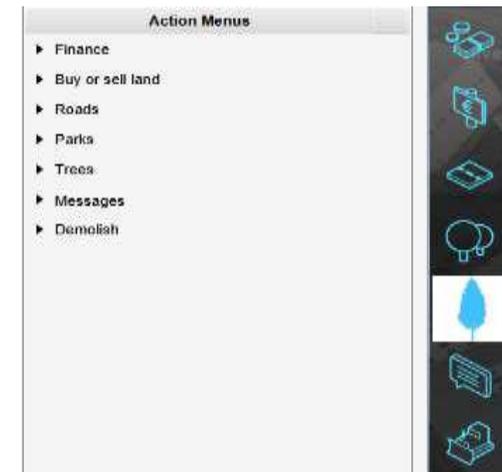
Here the municipality has 3 indicators (3 objectives to reach) that have a different % of importance.

- **The actions for these stakeholders**

Here the municipality has 7 distinct actions: Finance, Buy or sell land, Roads, Parks, Trees, Messages, Demolish.



Budget Municipality
Livability
Traffic Nitrogen Dioxide



Within your group, you will have to determine:

- **The ownership of the area:** Who possesses the land?
- **The price of the land:** for Paris, is it more 500 € or 10.000 € /m² ?
- **The zoning:** to ask a building permit to the municipality (the pemitter)
- **The assignments of each stakeholder**
According to the role of each stakeholder, their actions and linkages, you will determine their assignment.
- **The budget of each stakeholder** (if necessary)

Not all stakeholders should have a budget. It only depends on the associated actions. If the municipality must buy some land, it is required to have an initial adapted budget. Reversely, if a stakeholder can only send messages, there is no need for a budget. It is also possible to have additional budget during the game, by receiving subsidy or grant, which is done only through the host computer.



Within your group, you will have to determine:

- **The description of the game:** What is the story behind the game? What are the objectives for this stakeholder assignment?

Use Satellite Image Project description (intro text)



The most famous avenue of Paris is not only well-known for being a touristic attraction but also for being the most congested and ungreen area of the capital. The recent crises such as the yellow vests protests and covid-19 have left the area deserted while losing its charm. The Champs-Élysées committee, comprising the area's shopkeepers, has raised the alarm by pointing at the lack of attractiveness and livability. Residents agree that the area is mostly dedicated to cars more than pedestrians and lacks open green spaces. Both groups concerns have resonated with the Paris municipality that has decided to act through a new redevelopment plan. The goal is to give space back to pedestrians, widen open public spaces, greening streets and buildings so that air pollution can be minimized and quality of life maximized.

Optional:

- **Levels:** create different levels of difficulties in your game (ex: different budgets, different actions)
- **Timeline:** determine the simulation type of your game (planning, timeline)

Simulation start date:
05 Feb 2021

Simulation duration: forever

Session duration: forever

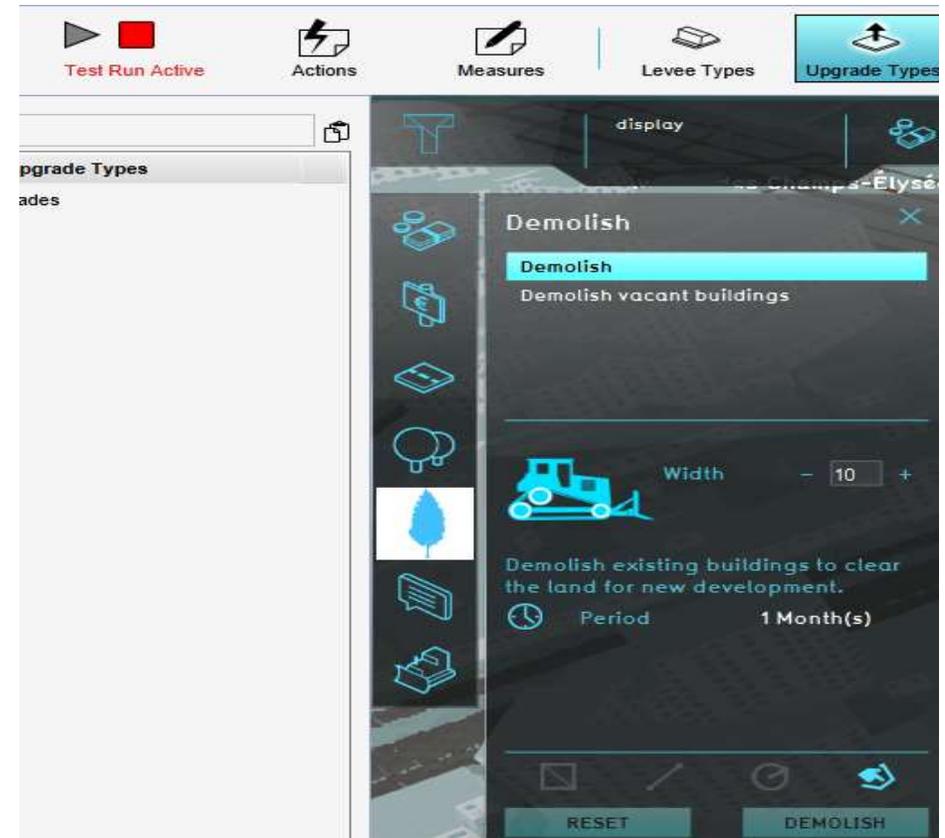
Automatic pause moments: 0

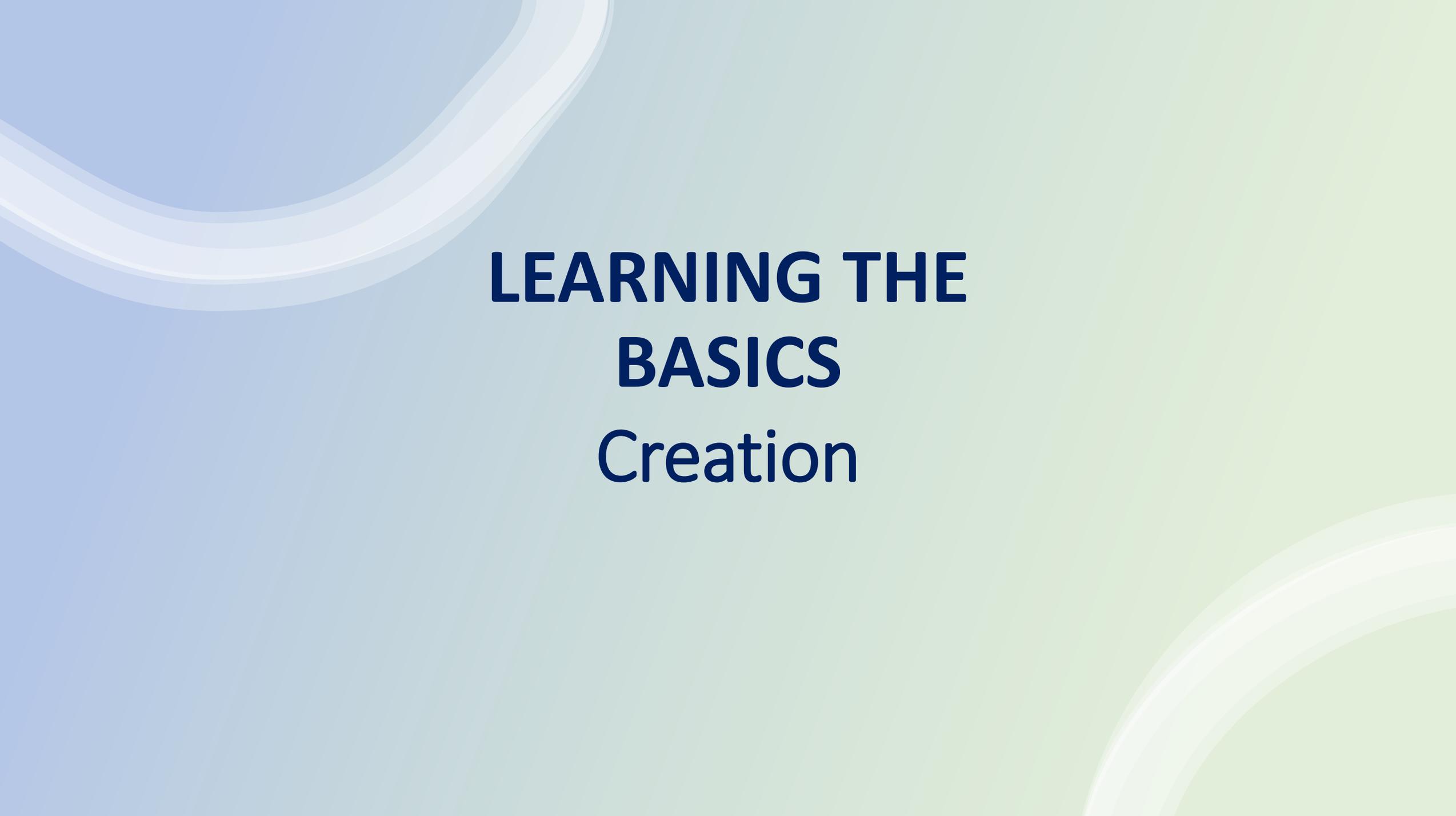
No end date has been set.

While you can agree on some parameters at the beginning, you will have to experiment/play your set up to improve it and test your parameters.

To test your environment, you go in future design -> then do an action (example: demolish a building or buy a plot of land) -> the Test Run will be active (▶ => ■)

To stop the test, click on ■





**LEARNING THE
BASICS**
Creation

Define your stakeholders

Multistakeholder -> Stakeholders -> Add

You can modify the name, description, image, budget in the right panel (see next slide).

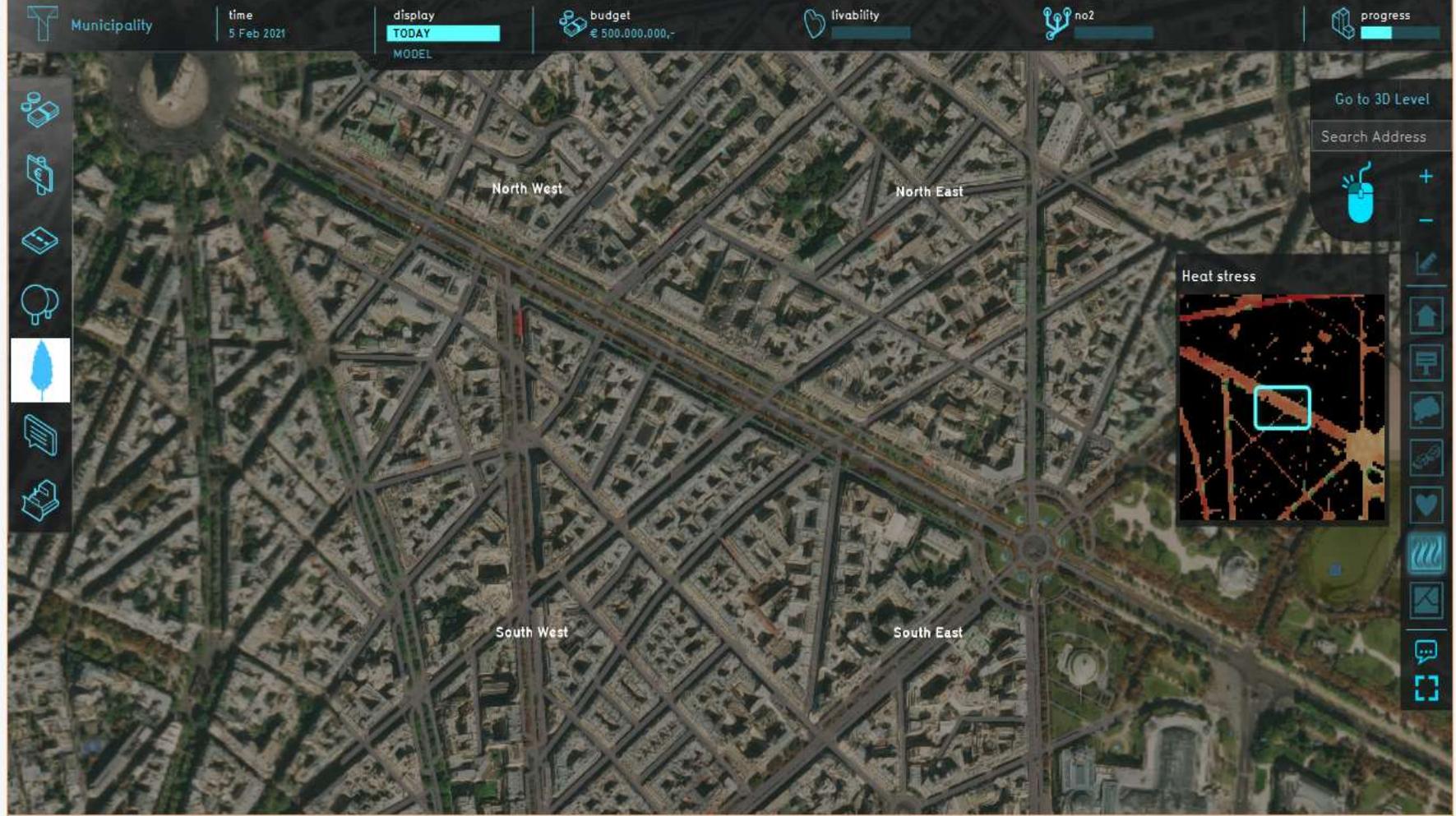
For more information see:

Wiki:

- <https://previewsupport.tygron.com/wiki/Stakeholder> (type of stakeholder and role, how to add a stakeholder and associated parameters)

Search

- Stakeholders**
- Architect agency
 - Levels Info
 - Level
 - Municipality**
 - Levels Info
 - Level
 - Project developer
 - Residents association
 - Shopkeepers association



Name: Municipality

Short name: Municipality

Type: Municipality

Start Budget: 500.000.000

Image:

Color: #cccccc

Playable

Description:

The municipality is the stakeholder with the main responsibility for the building permits. The municipality is also in charge of ensuring the livability of the Champs-Élysées area and maintaining a good air quality. In addition, they manage public spaces like roads, streets and parks.

Draw Ownership

Define the indicators for each stakeholder

Current situation -> Indicators -> Select “Show only my stakeholder”-> add the indicators for the stakeholder

You can see the stakeholder you pick in the Multistakeholder section.

For more information see:

Wiki:

- <https://previewsupport.tygron.com/wiki/Indicator>
- <https://previewsupport.tygron.com/wiki/Stakeholder>

Tutorial:

<https://www.tygron.com/nl/2018/08/28/indicators/>

Search

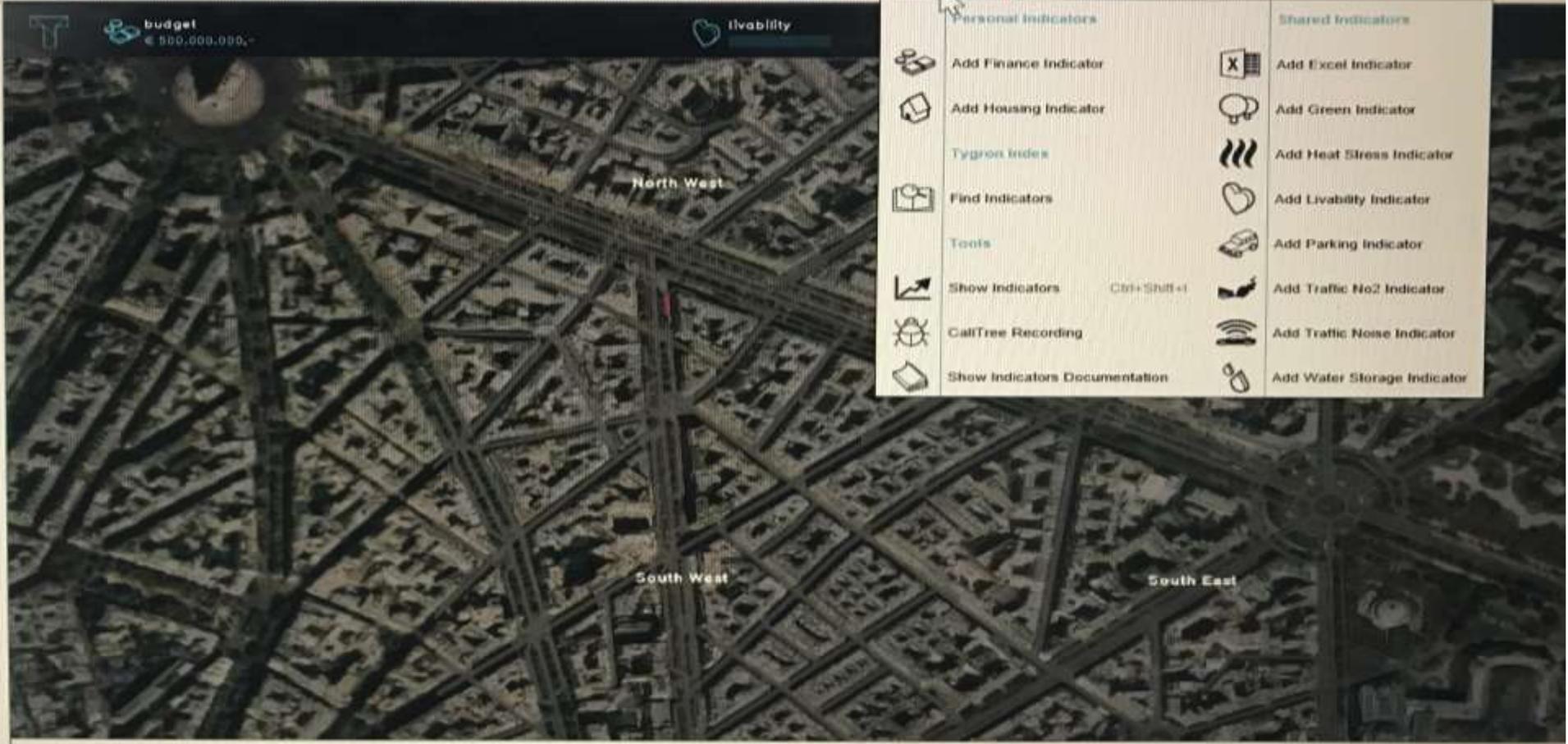
Show only my stakeholder

Indicators

- Budget Municipality
- Livability
- Traffic Nitrogen Dioxide

Type:

Stakeholder:



Indicators

Personal Indicators

- Add Finance Indicator
- Add Housing Indicator
- Tygron Index
- Find Indicators
- Tools
- Show Indicators Ctrl+Shift+I
- CallTree Recording
- Show Indicators Documentation

Shared Indicators

- Add Excel Indicator
- Add Green Indicator
- Add Heat Stress Indicator
- Add Livability Indicator
- Add Parking Indicator
- Add Traffic No2 Indicator
- Add Traffic Noise Indicator
- Add Water Storage Indicator

Define the indicators weights for each stakeholder

Multistakeholder -> Stakeholders -> Select "Show only my stakeholder" -> Click on your stakeholder -> Click on levels -> Change the weight of indicators in the right panel

For more information see:

Wiki:

- https://support.tygron.com/wiki/Stakeholders#Adjusting_Indicator_Weight
- https://support.tygron.com/wiki/Indicator_Weights

0,1 ↔ 25%

X? ↔ 67%

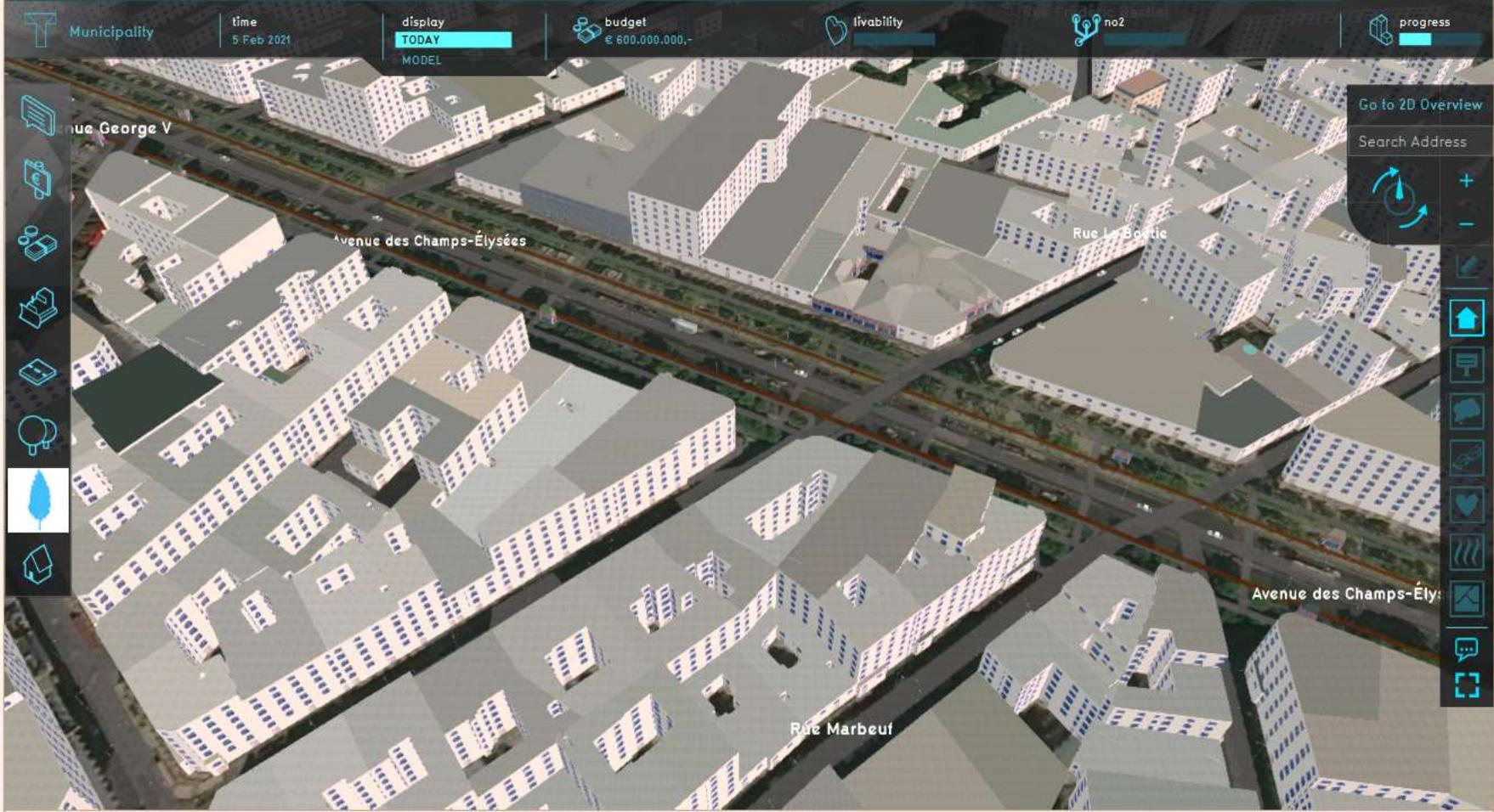
Multi Test Run Level: Level Stakeholders

Levels Timeline Messages Intro Texts Interface

Municipality Architect Shopkeepers Residents Project develop

Search Stakeholders

- Architect agency
- Municipality
 - Levels Info
 - Level**
 - Project developer
 - Residents association
 - Shopkeepers association



Level: Level

Additional Budget gained in this Level (€): 1.000.000

Assignment for this Level

In this redevelopment plan, the municipality is in charge of widening open public spaces , which can be done by destroying some buildings around the avenue and in narrow streets as well as renovating buildings. The goal is to build more green spaces, gathering places like parks and bicycle lanes and improve buildings energy efficiency. Therefore, some streets can become only dedicated to bicycle or pedestrians. Before destroying a building, the municipality will have to buy the land from the main owners

Indicator Weights:

NAME	Value
Budget Municipality	0,14
Livability	0,16
Traffic Nitrogen Dioxide	0,06

Add Remove

Define a housing target

If your stakeholder is a project developer/real estate company, you can define a housing target like 4000 m2 of market housing or parks or offices etc.

Current situation -> Indicator -> Select “Show only my stakeholder” -> Building Project Developer -> Modify the value of the housing target in the bottom panel (see next slide)

For more information see:

Wiki:

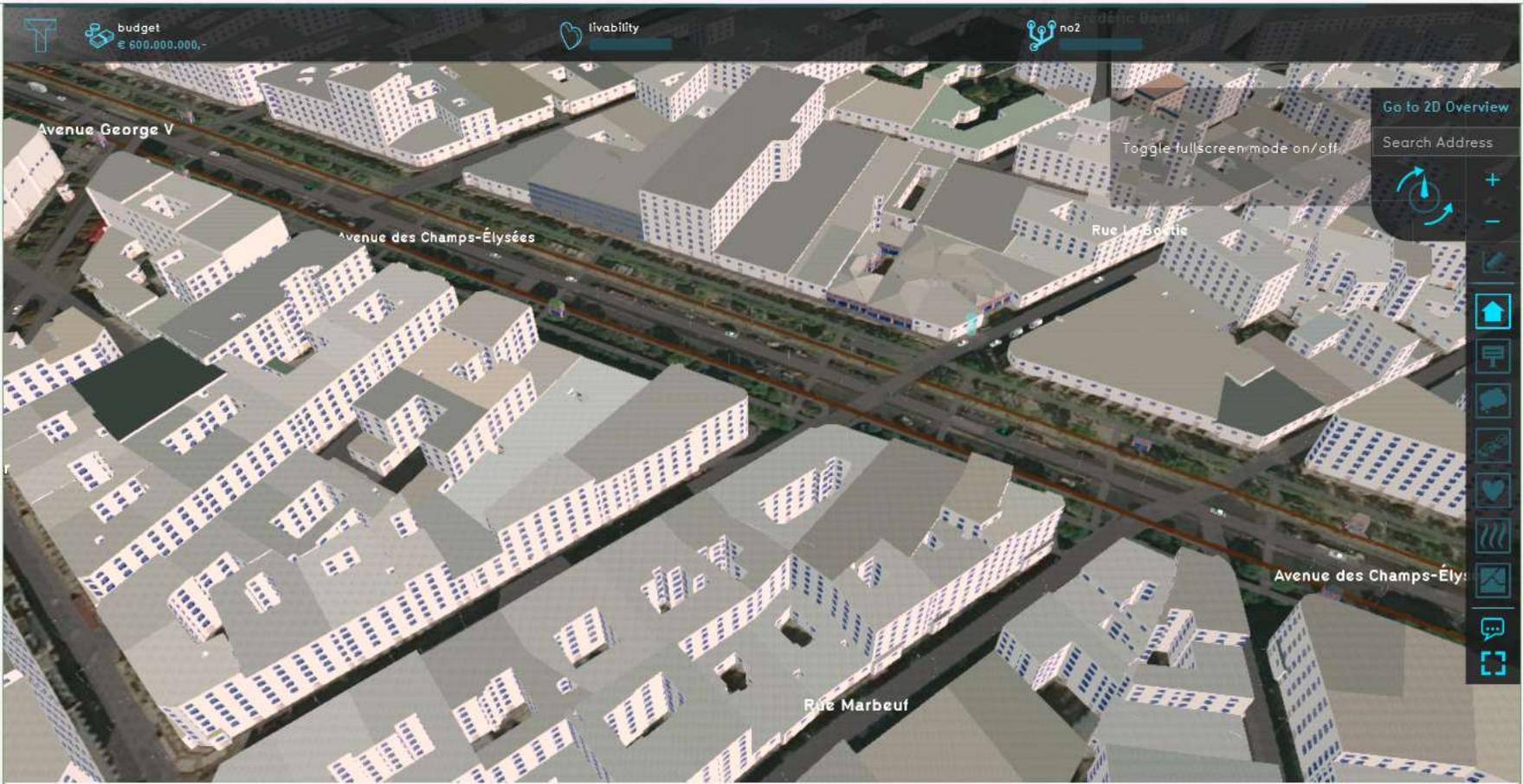
- [https://previewsupport.tygron.com/wiki/Housing_target_\(Indicator\)](https://previewsupport.tygron.com/wiki/Housing_target_(Indicator))

Search

Show only my stakeholder

Indicators

- Budget Architect agency
- Budget Municipality
- Budget Project developer
- Budget Residents association
- Budget Shopkeepers association (Champs-Elysés committee)
- Building Project developer**
- Livability
- Traffic Nitrogen Dioxide



Go to 2D Overview

Search Address

Toggle fullscreen mode on/off

Home, Refresh, and other navigation icons

General Attributes

ID: 7 Calc Time: 17 ms

Personal (linked to Stakeholder)

Project developer

Name: Building Project developer

Short Name: Building

Score: 0% (Absolute value: 0%)

Use Absolute calculated Score

Show Score graph

Color: Red

Active

Image:

Excelsheet: housing.xlsx

Select Excelsheet

[Debug Excelsheet](#)

[Download CallTree Recording](#)

[Open in Web Browser](#)

Description:

The building indicator represents the amount of new buildings that have been realized. In addition, when you build more buildings than required, your score will go down.

Level: 1: Level

Value	Description	Min value	Max value
0	Amount of houses that need to be build for type: Affordable housing	-Infinity	Infinity
8.000	Amount of houses that need to be build for type: Market Housing	-Infinity	Infinity
0	Amount of houses that need to be build for type: Top Market Housing	-Infinity	Infinity
0	Amount of floorspace that needs to be build for type: Roads	-Infinity	Infinity
0	Amount of floorspace that needs to be build for type: Squares	-Infinity	Infinity

Type: Excel

Stakeholder: Architect agency

Add Duplicate Remove

Define stakeholder actions

Future Design-> Actions -> Select “Show only my stakeholder” -> Add -> Click on the new action menu and modify in the right panel (Image & name in General and sub-actions in Actions)

For more information see:

Wiki:

- <https://previewsupport.tygron.com/wiki/Action>

Tutorial:

<https://www.tygron.com/nl/2018/08/24/actions/>

Test Run
Actions
Measures
Levee Types
Upgrade Types
Event Bundles
Municipality
Architect
Shopkeepers
Residents
Project developer

Search

Show only my stakeholder

Action Menus

- Messages
- Buy or sell land
- Finance
- Demolish
- Roads
- Parks
- Trees
- Upgrades
- New action menu**
 - Convenience store

Move up
Move down
Add
Duplicate
Remove



General Actions

Name

Actions:

- Functions
 - Affordable housing
 - Agriculture
 - Bridge
 - Education
 - Gardens
 - Healthcare
 - Industry
 - Intersection
 - Leisure
 - Market Housing
 - Nature
 - Offices
 - Other
 - Parks
 - Roads
 - Senior housing
- Shops and restaurants
 - Convenience store
 - Intel Hotel Zaandam
 - Mid-Century offices (with shops)
 - Office building with glass facades a
 - Restaurant
 - Shops
 - Shops with Houses
 - Warehouse
- Squares
- Student Housing
- Top Market Housing
- Underground
- Special Options
- Measures

Region: Northwestern Europe

Define general overlays

Current situation -> Overlays -> Click on the overlays for your set up

For more information see:

Wiki:

- <https://previewsupport.tygron.com/wiki/Overlay>

- Tutorial:

<https://www.tygron.com/nl/2018/12/07/overlay-in-de-editor/>

Define ownership per stakeholder

Multistakeholder -> Stakeholder -> Click on your stakeholder -> Draw ownership

For more information see:

Wiki:

- <https://previewsupport.tygron.com/wiki/Ownership>

Define zoning for the game

Current situation -> Zoning -> Show zoning -> Add zoning with categories -> Modify the parameters in the right panel (categories, draw zoning area)

For more information see:

Wiki:

- <https://previewsupport.tygron.com/wiki/Zoning>

Define assignments for stakeholders

These assignments are essential to define the linkages between stakeholders and the role of each stakeholder.

Multistakeholder->Stakeholders -> Select your stakeholder -> Click on Level -> Define the assignment of your stakeholder in the right panel (see next slide)

Define the description of your game

Multistakeholder -> Intro texts -> Change Introduction text -> Define the introduction in the bottom panel

The screenshot displays a complex game interface for a city redevelopment project. The central focus is a 3D aerial view of a city block, showing buildings, streets, and green spaces. Key streets labeled include Avenue des Champs-Élysées, Rue Marbeuf, and Avenue George V. The interface is divided into several panels:

- Top Panel:** Contains navigation icons for 'Multi Test Run', 'Level Level', 'Stakeholders', 'Levels', 'Timeline', 'Messages', 'Info Tools', and 'Interface'. On the right, there are icons for 'Municipality', 'Architect', 'Shopkeepers', 'Residents', and 'Project developer'.
- Left Panel:** A 'Stakeholders' sidebar with a search bar and a tree view showing 'Architect agency', 'Levels Info', 'Level', 'Municipality', 'Project developer', 'Residents association', and 'Shopkeepers association'.
- Right Panel:** A control panel for the 'Level' with a 'Level' dropdown, 'Additional Budget gained in this Level (€)' set to '888,000', and 'Assignment for this Level' section. Below this is a text box containing the instruction: 'The architect will have to work alongside the project developer to make sure its plans in terms of buildings are followed. With the project developer, they will be communicating via the inbox. So basically, the architect will send its proposal to the project developer and the latter will have to implement it if it is technically feasible.' At the bottom right, there is an 'Indicator Weights' table with columns for 'NAME' and 'Value', showing 'Budget Architect agency' with a value of '84'. There are also 'Add', 'Linkability', and 'Remove' buttons.
- Bottom Panel:** A 'Project description (intro text)' section with a 'Use Satellite Image' checkbox and a small satellite image. The text reads: 'The most famous avenue of Paris is not only well-known for being a touristic attraction but also for being the most congested and ungreen area of the capital. The recent crises such as the yellow vests protests and covid-19 have left the area deserted while losing its charm. The Champs-Élysées committee, comprising the area's shopkeepers, has raised the alarm by pointing at the lack of attractiveness and livability. Residents agree that the area is mostly dedicated to cars more than pedestrians and lacks open green spaces. Both groups concerns have resonated with the Paris municipality that has decided to act through a new redevelopment plan. The goal is to give space back to pedestrians, widen open public spaces, greening streets and buildings so that air pollution can be minimized and quality of life maximized.'

Define the price of the land

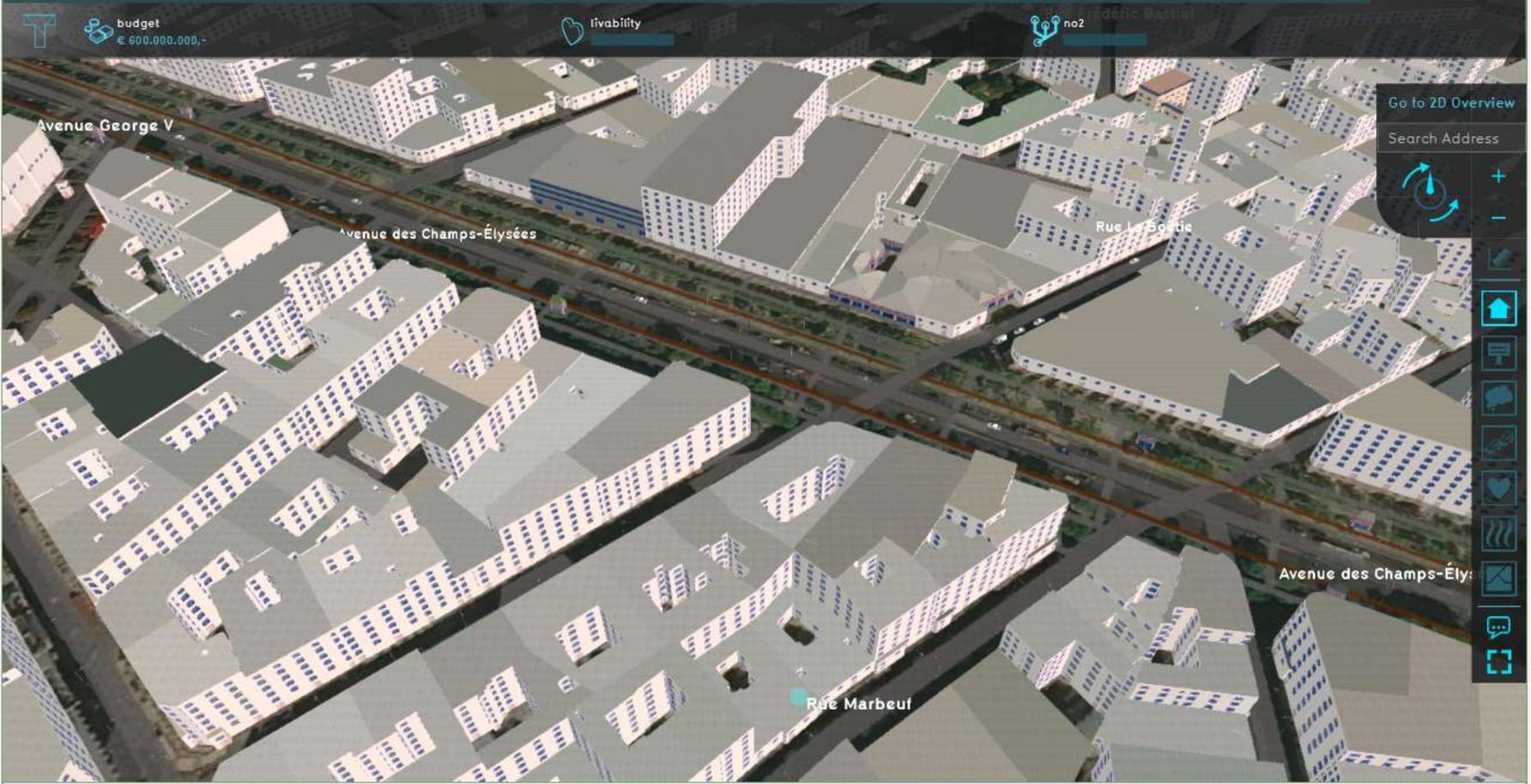
The maximum ground price is limited to 10,000 euros/m².

Current situation -> Terrain -> Change Ground Prices

For more information see:

Wiki:

- [https://previewsupport.tygron.com/wiki/Ground Price](https://previewsupport.tygron.com/wiki/Ground_Price)



Go to 2D Overview

Search Address

+

-

Home

Layers

Tools

Heart

Wind

Map

Chat

Fullscreen

Adjust prices for Actions

Default Land buy/sell price (€ / m2):

Price to lower land (€ / m3):

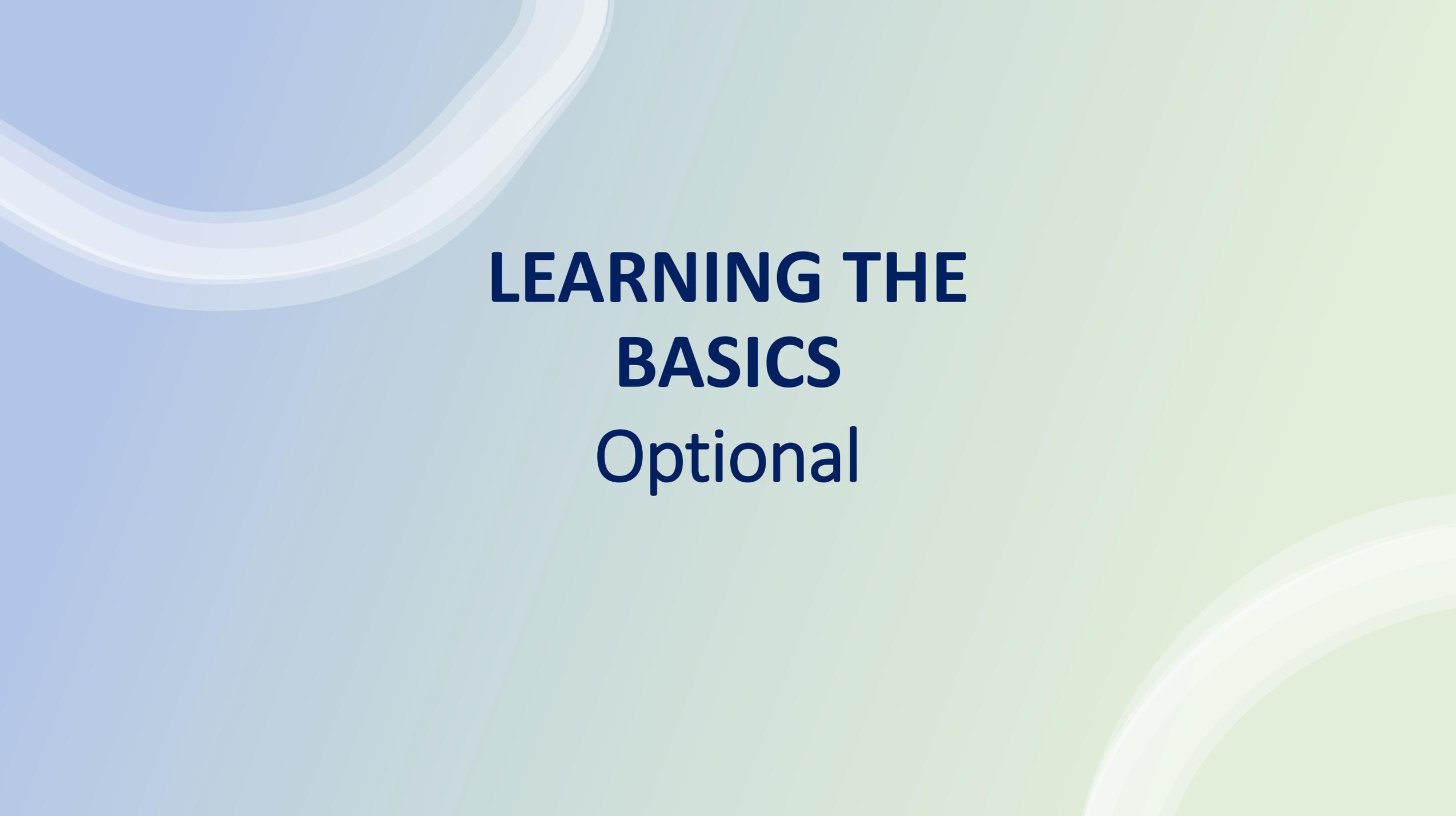
Price to raise land (€ / m3):

Define the budget of stakeholders

Multistakeholder -> Stakeholder -> Select your stakeholder -> Modify the budget in the right panel

To determine the budget, test your set up:

Future design -> Do several actions as a stakeholder and see what it costs



**LEARNING THE
BASICS**
Optional

Define levels of the game

Defining different levels can help to simulate an increasing level of difficulty (ex: from an infinite budget to a small one, for which you will have to rely on subsidies or bank loans / from a few actions to a wide range of actions).

Multistakeholder -> Levels -> Add new level

For more information see:

Wiki:

<https://previewsupport.tygron.com/wiki/Level>

Define the simulation time

Mutlistakeholder -> Click to switch to default planning mode -> Select Planning or Timeline in simulation type and adjust parameters

For more information see:

Wiki:

- https://previewsupport.tygron.com/wiki/Simulation_Type