Learning through Serious Games

A game for understanding the water-energy-food-land-climate nexus interactions

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People contributing to the SIM4NEXUS Serious Game for the Netherlands

https://youtu.be/mFnOaSW82Bw

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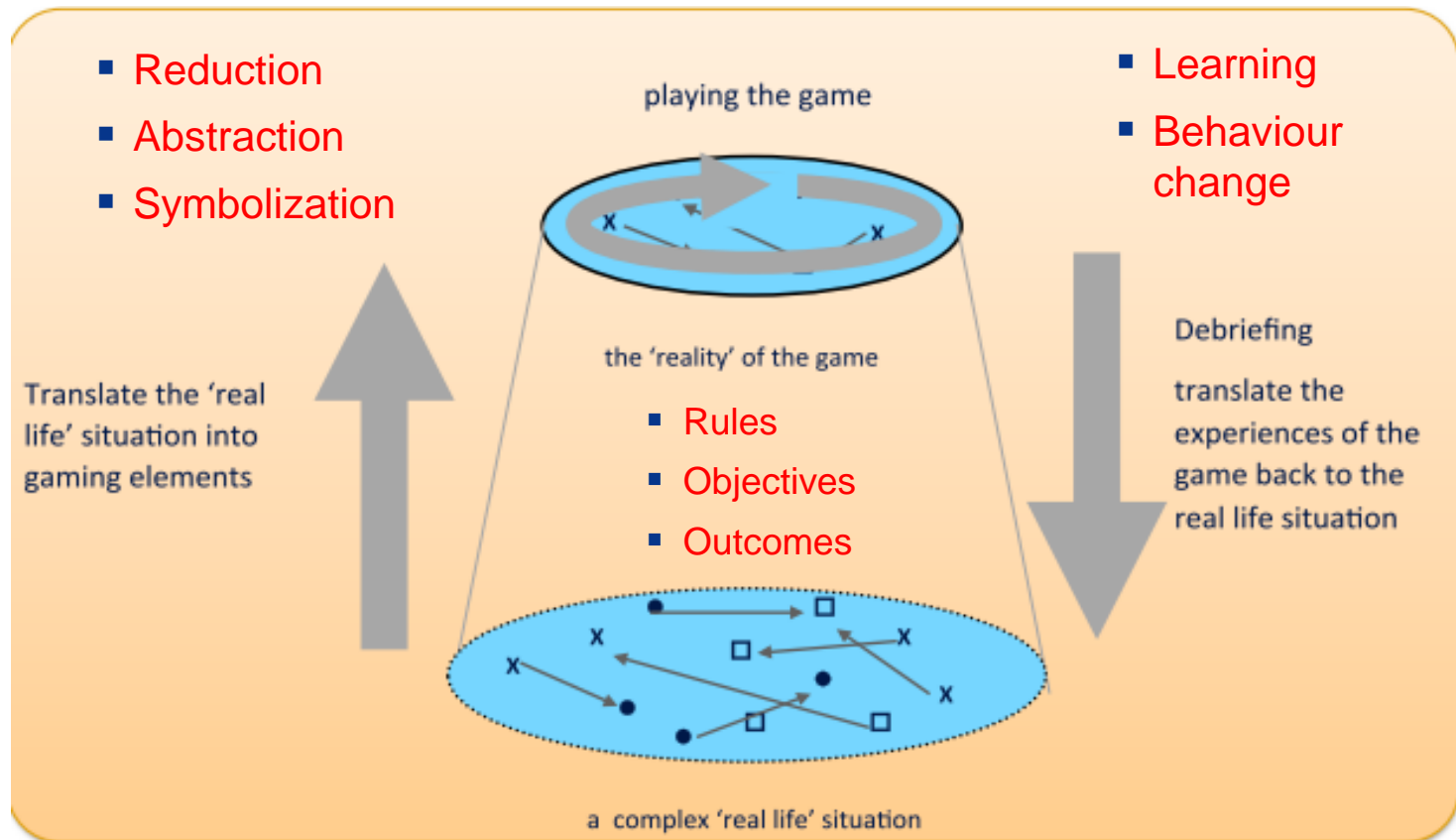**Netherlands Environmental Assessment Agency (PBL)**
Maria Witmer

A serious game is …

Rule-based, interactive environment where players *learn* by taking *actions* and by *experiencing* their effects through realistic *feedback* mechanisms that are deliberately built into the game

- Reduction
- Abstraction
- Symbolization

playing the game

- Learning
- Behaviour change

the 'reality' of the game

Translate the 'real life' situation into gaming elements

- Rules
- Objectives
- Outcomes

Debriefing

translate the experiences of the game back to the real life situation

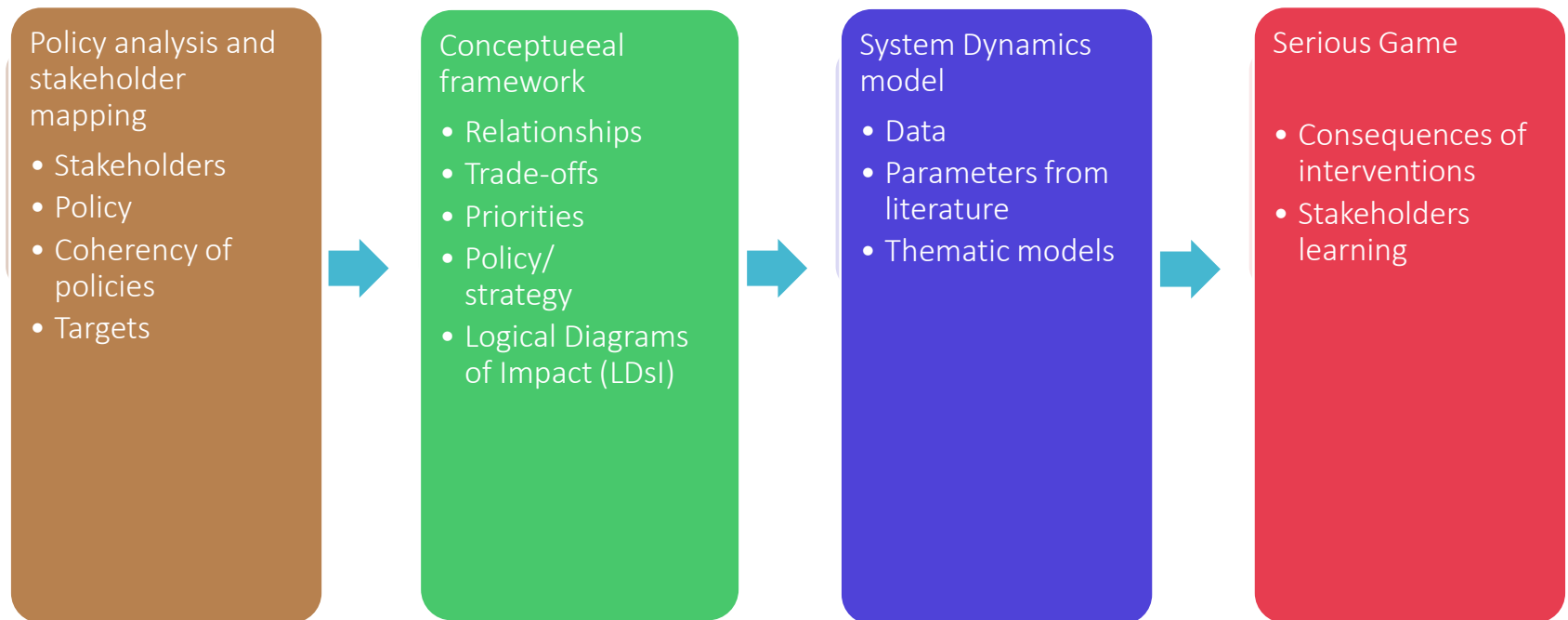a complex 'real life' situation

Why a serious game?

- **S**ustainable **I**ntegrated **M**anagement **FOR** the **Nexus** of water-land-food-energy-climate for a resource-efficient Europe: **SIM4NEXUS**, a Horizon 2020-project 2016-2020

- Explore **trade-offs between biomass for renewable energy and (food and non-food) resource efficiency** through a **cloud-based serious game** built around a complex system of **data**, **thematic models** and **system dynamic model**

SIM4NEXUS-NL: process

Policy analysis and stakeholder mapping

- Stakeholders
- Policy
- Coherency of policies
- Targets

Conceptueeal framework

- Relationships
- Trade-offs
- Priorities
- Policy/ strategy
- Logical Diagrams of Impact (LDsI)

System Dynamics model

- Data
- Parameters from literature
- Thematic models

Serious Game

- Consequences of interventions
- Stakeholders learning

Understand the Dutch case study

- **Objective of the nexus health score (2020-2050)**

  - Climate: reduce greenhouse gas emissions with 80%

  - Energy: increase renewable energy to 90%

  - Land use: increase share of sustainable land use to 60% i.e. less intensive use of land

  - Water: reduce agricultural water use by 50% and reduce emissions from agriculture to water
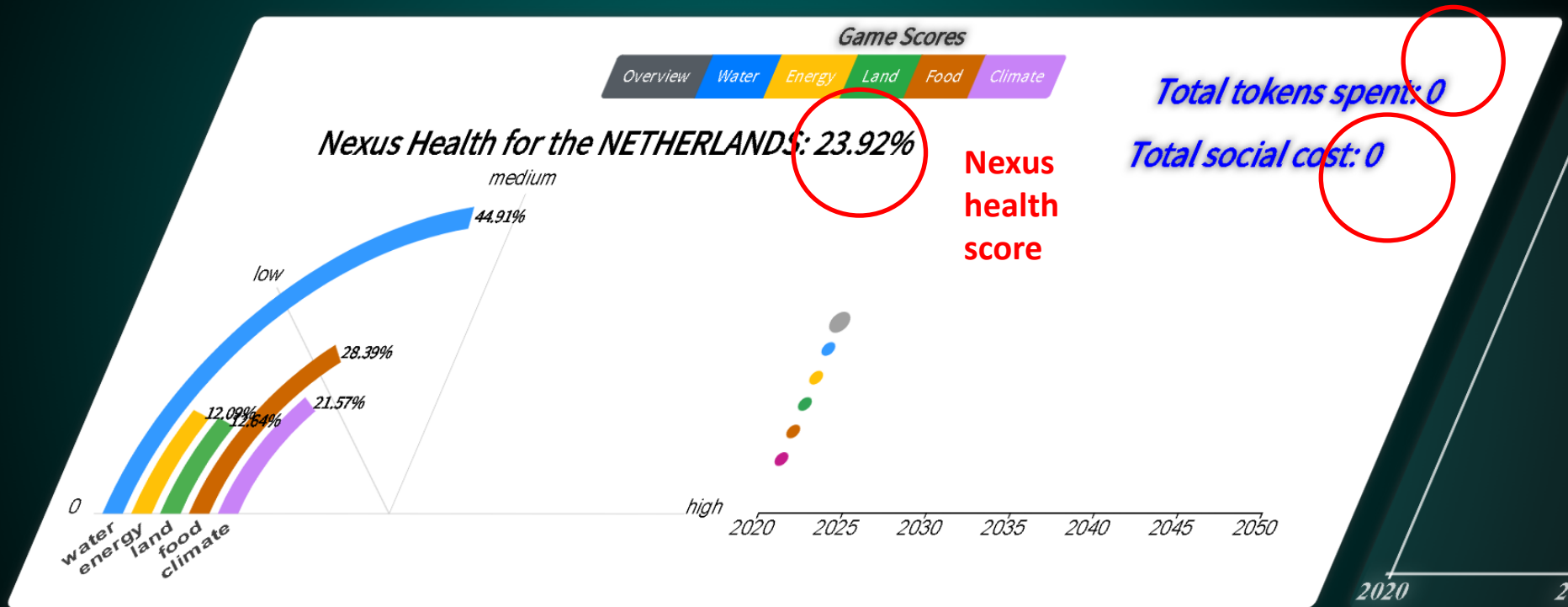
  - Food: increase plant-based food share in diets

SIM4NEXUS

The game space!

Goal of the game for players

Maximise **nexus health score** while minimising **financial (**expressed in tokens) and **social costs**
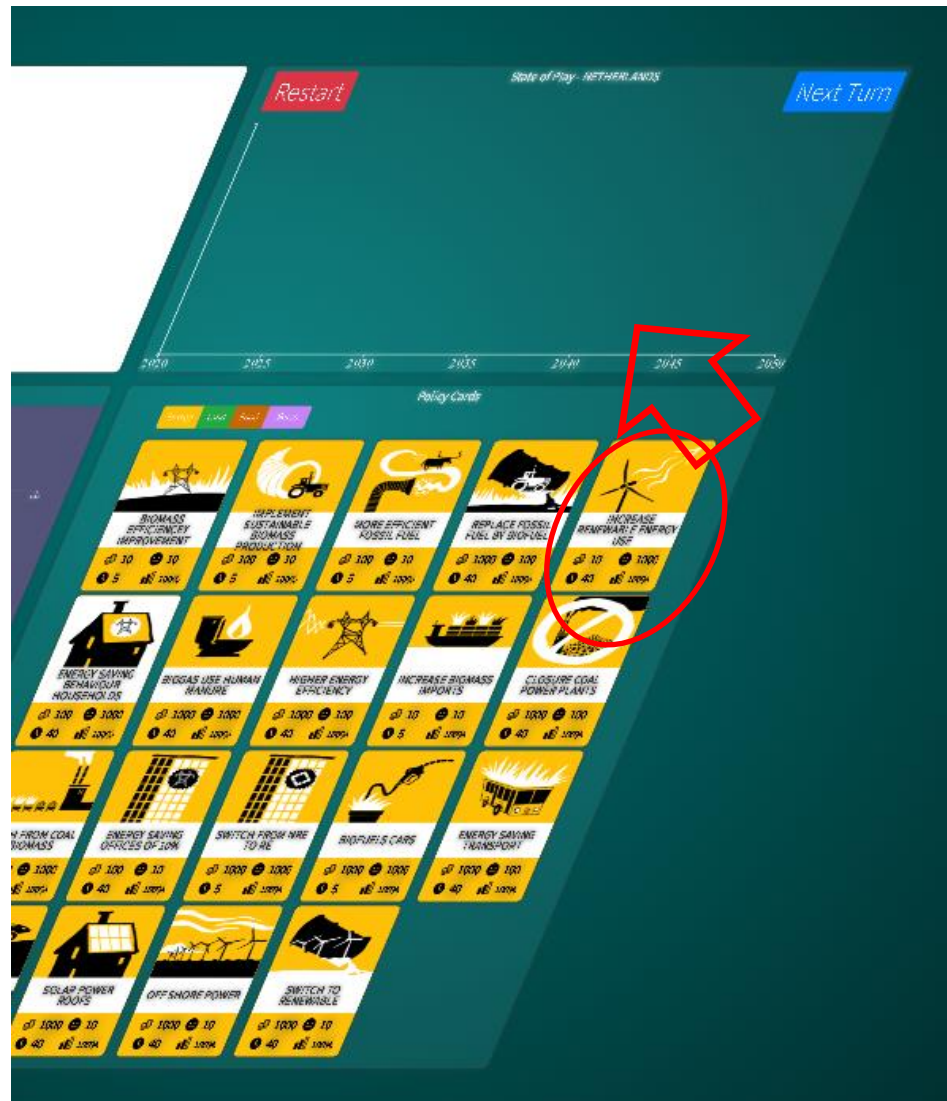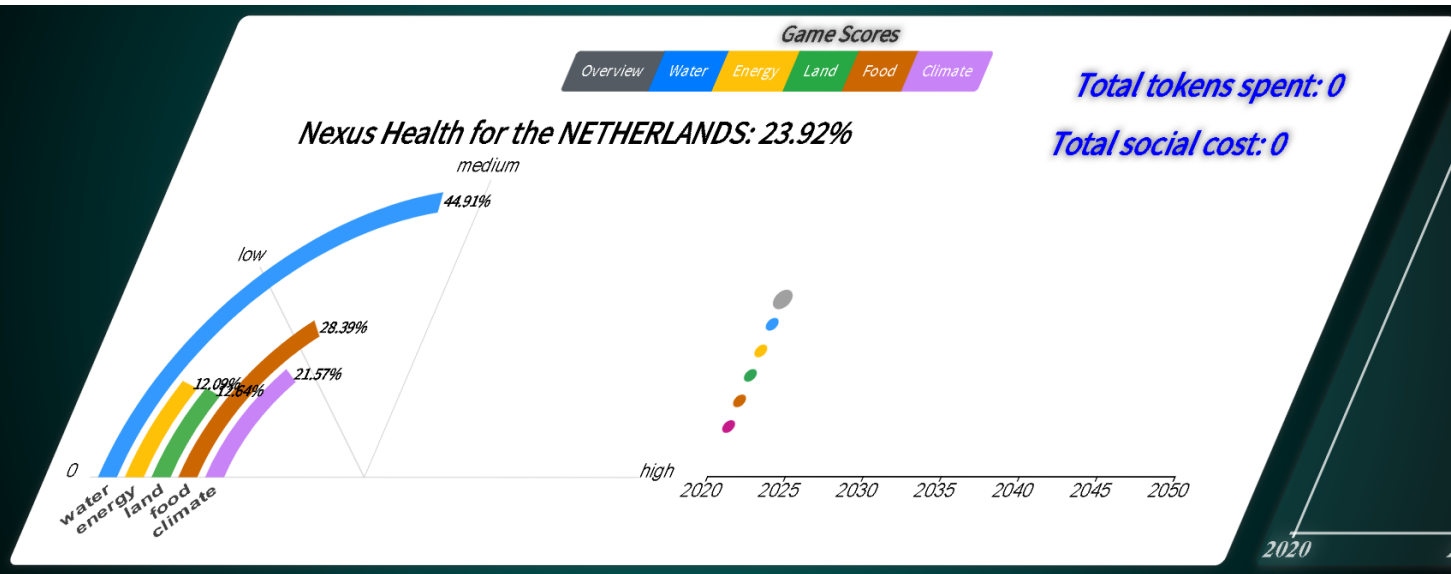
How to improve nexus health?

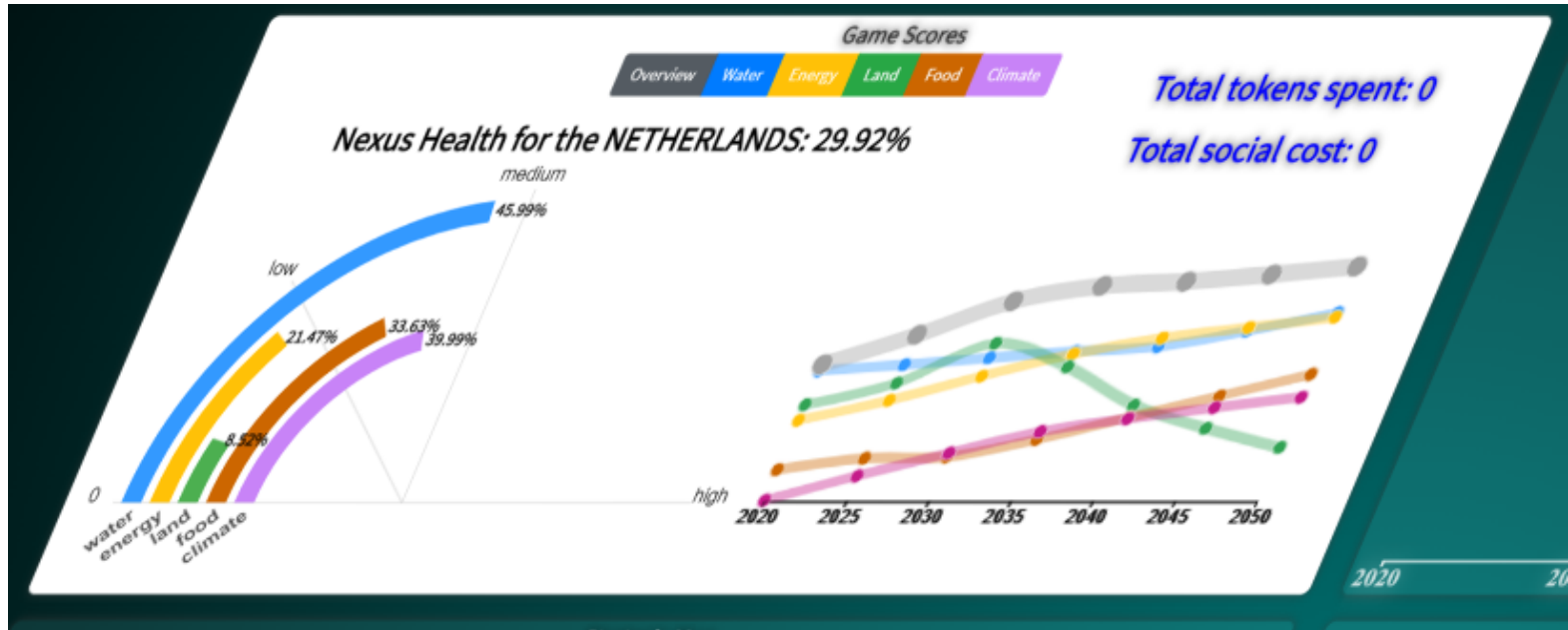By **implementing policies** at national and regional levels across multiple sectors
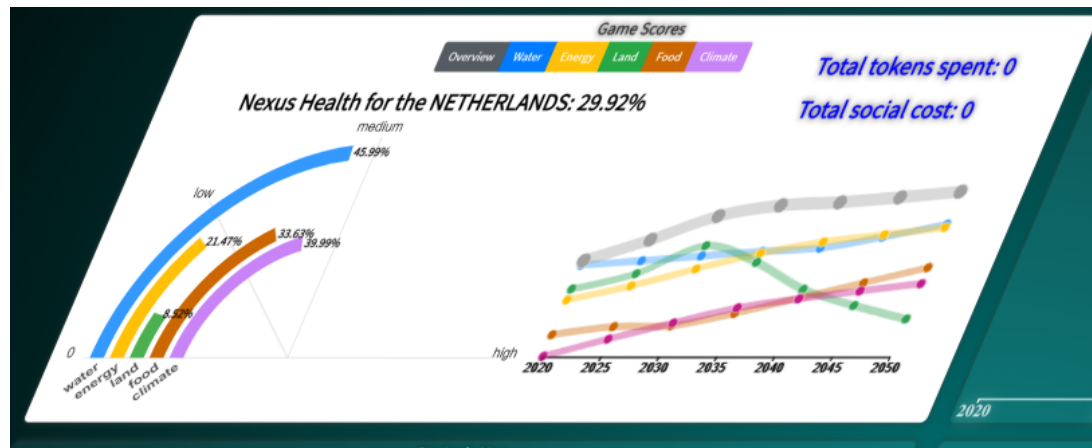
Base year: situation 2020

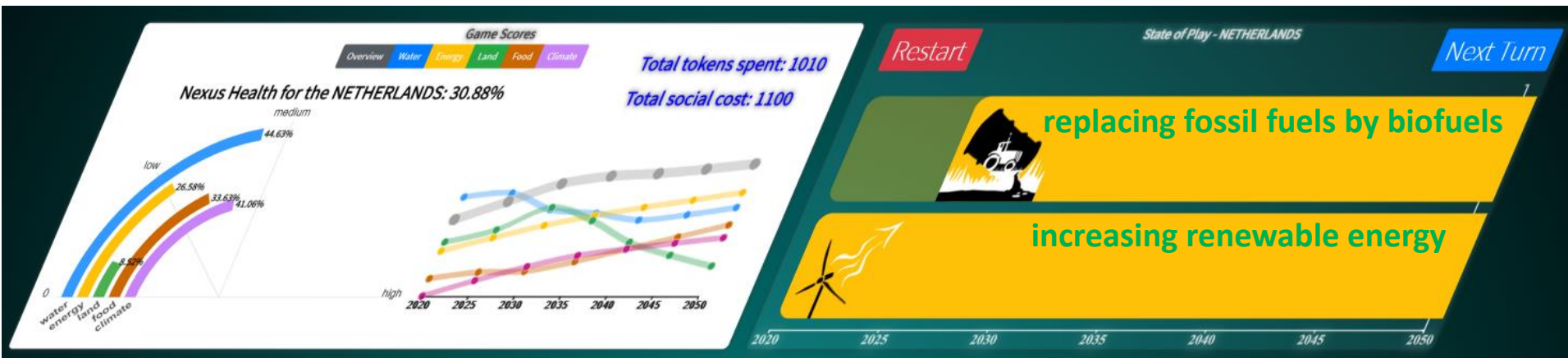## Baseline: situations 2020-2050 without any policy cards/interventions

When playing 2 lifetime policy cards to improve on the energy objective

Situation 2050 without any policy cards/interventions

Situation 2050 with replacing fossil fuels by biofuels and increasing renewable energy

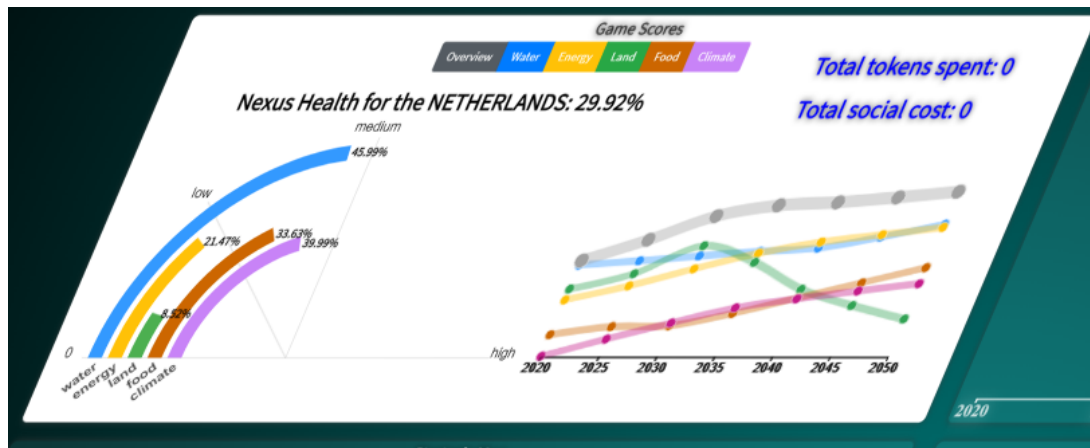This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 689150 SIM4NEXUS

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When playing temporal policy cards to improve on all objectives

Situation 2050 without any policy cards/interventions

Situation 2050 with importig biomass (yellow) and sustainable farming

Union's Horizon 2020 research and innovation programme under grant agreement No 689150 SIM4NEXUS

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Like to enter the game space yourself!

2-minute video: https://www.sim4nexus.eu/

http://seriousgame.sim4nexus.eu/

Or through the website: https://www.sim4nexus.eu/
Select "SERIOUS GAME" under the button "OUTPUTS"
Click on the link: http://seriousgame.sim4nexus.eu/

Then,
Select if you want to login (you need to be registered) or to play as a guest
Select the case study by clicking on the map.
Select the game mode, and you are ready to play!

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Thanks for your attention!

For further information please consult
www.sim4nexus.eu,
follow us at @SIM4NEXUS

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