

Want to become a hydrogen valley? Decarbonize your neighborhood or production site?

Let's give it a try: Experience alternative hydrogen infrastructure settings in your region, learn about system performance and resilience to start the change today!

Select a region

H2SCOUT FOR REGIONS

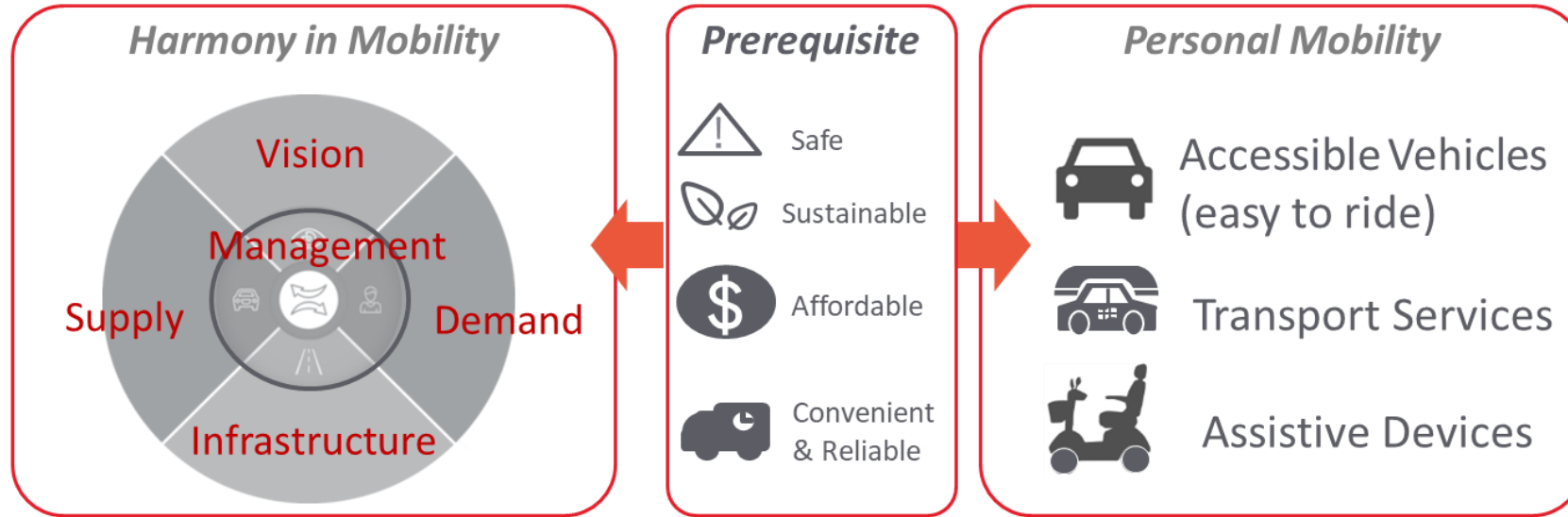
Berlin, 06.07.2023

Andy Fuchs Toyota Mobility Foundation

TOYOTA MOBILITY FOUNDATION

To enable more people to go more places

by collaborating with Toyota worldwide, sharing know-how with external partners, and using our innovative spirit



What we do

- Social Implementation
- Open Innovation
- Research · Proposal
Leading Practices & Technologies
- Networking with Partners
(Non-profits, Research Institutes)

TOYOTA MOBILITY FOUNDATION

Key Focus Areas

Based on its mission, Toyota Mobility Foundation is working to solve various mobility issues around the world, such as traffic congestion and safety, maintaining local transportation options, assisting basic hydrogen research, supporting those with mobility difficulties, farming village assistance in Africa, and pursuing initiatives that bring fun and joy to mobility.



Traffic Safety



Measures to mitigate traffic congestion



Support for people with mobility challenges



Hydrogen/Energy



Mobility support for local communities



Contests/Open calls



SUSTAINABLE
CITIES
CHALLENGE

sustainablecitieschallenge.org

CONTENT

- 01** Why a scenario calculator?
- 02** Structure of the energy system modeling
- 03** Configuration of the tool
- 04** Results and functionalities

WHY A SCENARIO CALCULATOR?

INITIAL SITUATION AND AIMS OF THE PROJECT



Decision to have hydrogen play a role in the regional energy transition

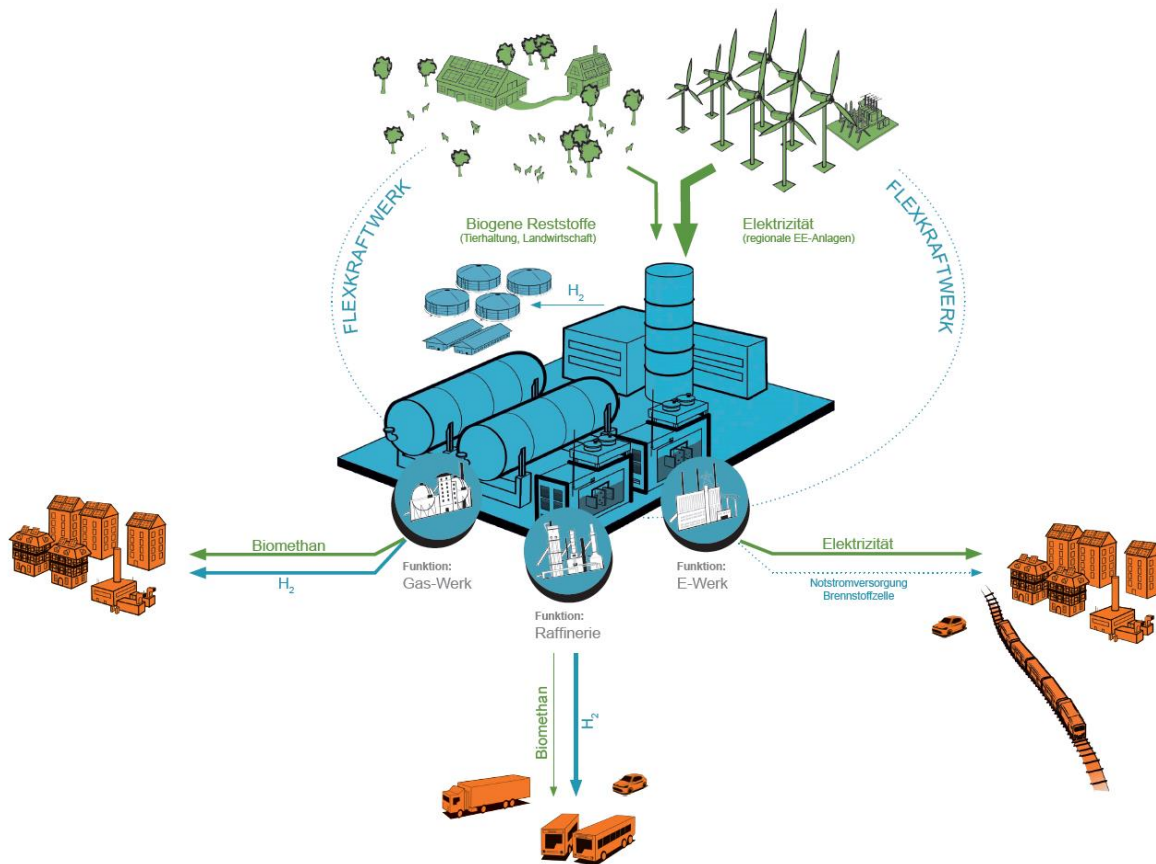
- How is the setup of the system that we need to implement?
=> security of supply, regional energy resources, regional energy demand, political context
- What if system framework changes?
=> during the lifetime of the installed technology system (20 years)
- How to influence economic viability?
=> Parameters' target values to reach break-even / a defined profit

DECISION SUPPORT **UNDERSTANDING OF SYSTEM SETUP AND PERFORMANCE**

SUPPORT OF COMMUNICATION PROCESSES **TRANSPARENCY**

WHY A SCENARIO CALCULATOR?

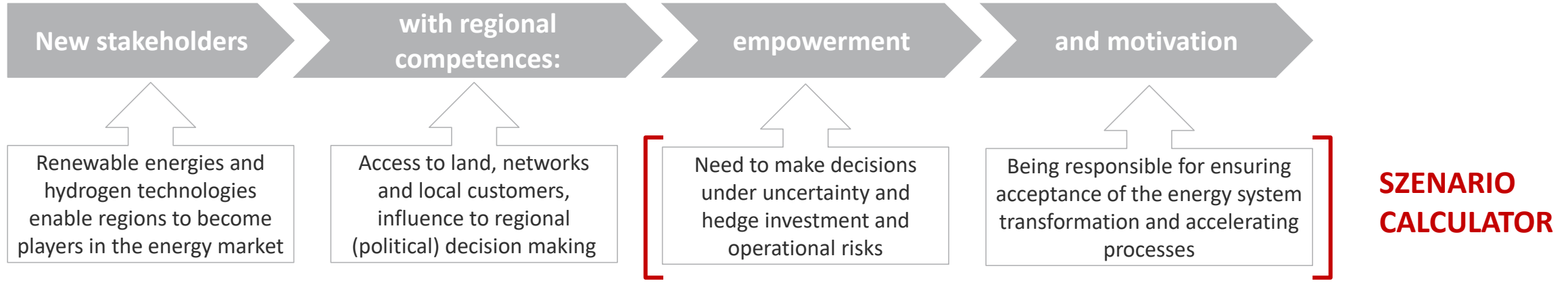
A SHIFT OF PERSPECTIVE



- (1) Focus on **security of energy supply** instead of disposal of electricity into the grid in times of high electricity production times (resulting in price dumping at the stock exchange)
- (2) Use and **combine all regional resources** to produce hydrogen (circular economy)
- (3) No focus on hydrogen production only, integration of **by-product revenues** to increase viability

WHY A SCENARIO CALCULATOR?

SUPPORTING PEOPLE AND DISCUSSIONS

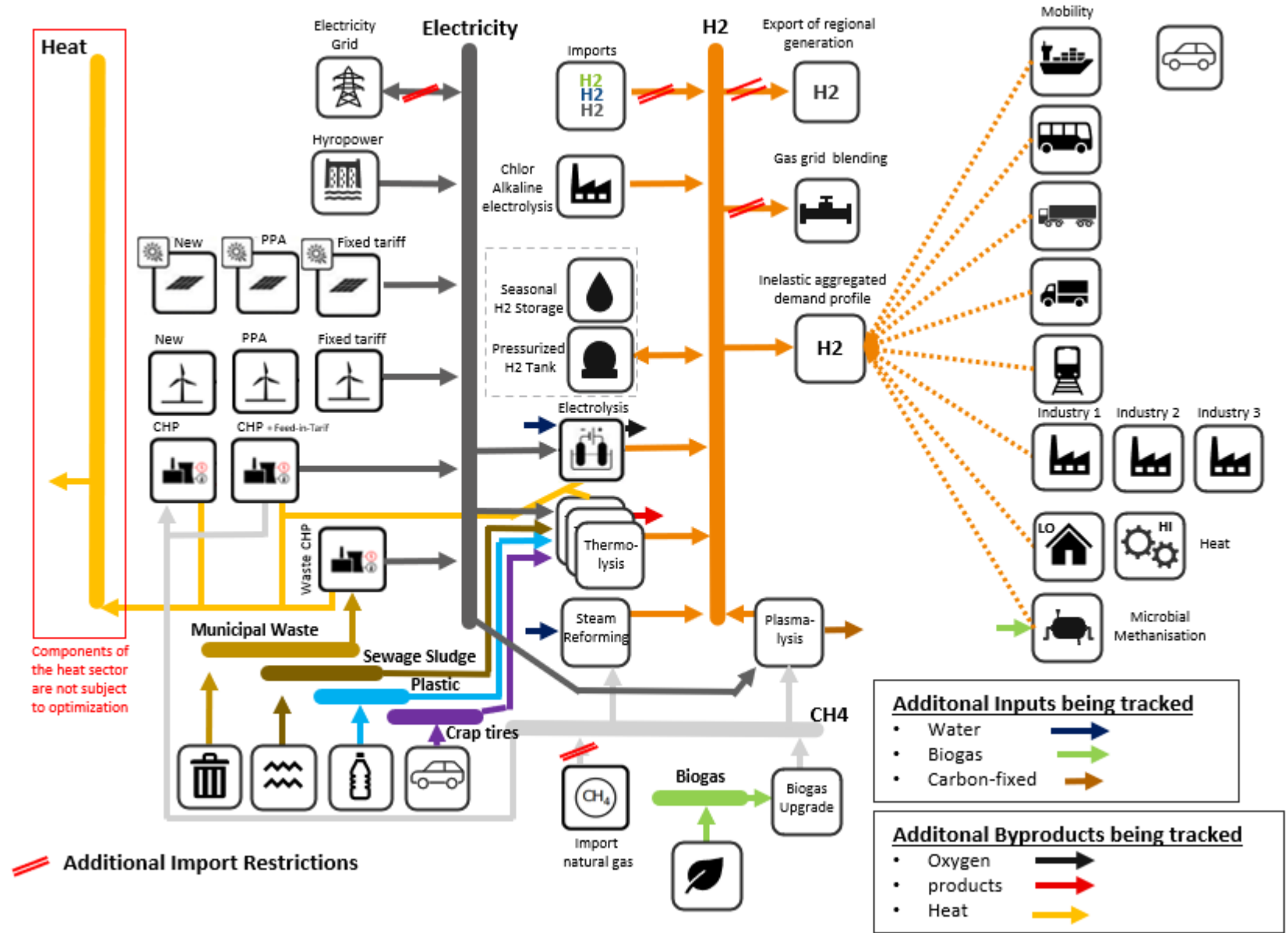


	Technical feasibility		Energy efficiency		Economic viability			
	Time	<ul style="list-style-type: none"> • Time to restructure infrastructures and market models of energy production, distribution / storage and use • Time for learnings (missing blueprints) 					Identification of a cost-optimized target system for Flexkraftwerke that guarantees regional supply security if the set targets and framework conditions are met	
	Resilience	<ul style="list-style-type: none"> • Security of energy supply: Resilience of energy supply systems to failures, sabotage, fluctuations in supply and demand • Cost stability: Resilience towards developments in resource policy or economic policy 						Understanding of system resilience and risks of changing conditions
	Motivation	<ul style="list-style-type: none"> • Motivation of investors to leave established paths and to forego short-term returns (business models) • Motivation of energy consumers to change their behaviour and to engage in "new" pricing models (acceptance) • Motivation of politicians to set regulatory framework conditions and secure political support 						Understanding and communication of options for action and scope for design

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Energy system model



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FIRST STEPS - LOGIN

HTTPS://DEMO.H2COMPASS.EU/

demo.h2compass.eu

Diese Website fordert Sie auf, sich anzumelden.

Benutzername

Passwort

Anmelden

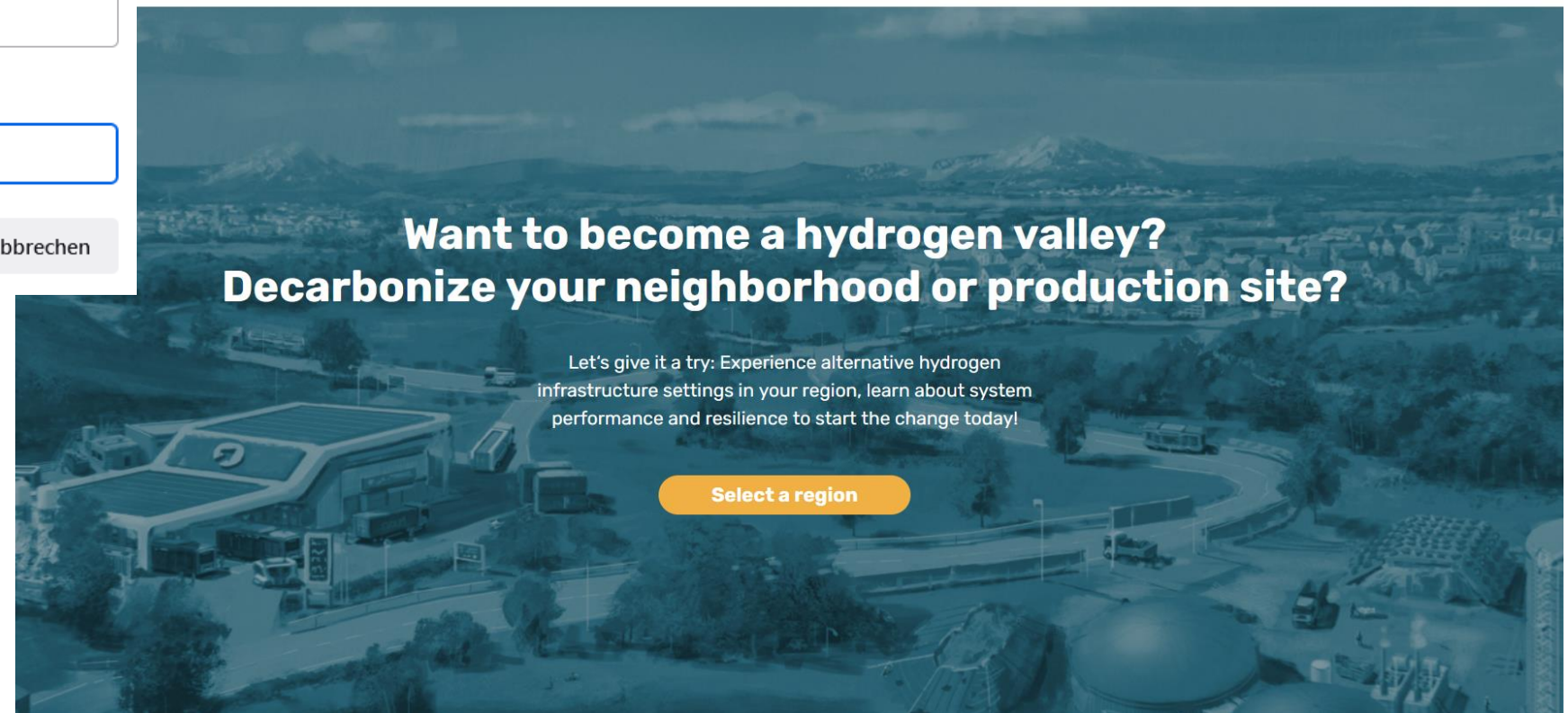
Abbrechen

1



Access the demo site

H₂ COMPASS FOR REGIONS



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Let's give it a try: Experience alternative hydrogen infrastructure settings in your region, learn about system performance and resilience to start the change today!

Select a region

Choose your language

2



Example Scenario Contact

3



Login

Login

FIRST STEPS – ACCESS OR DEFINE NEW SCENARIOS



 Example Scenario Contact nadine.ho... ▾

Scenario overview

Filter available regions (optional)

2

Search by name, region or creator

all regions ▾

show only my scenarios









Define a new scenario

3

[+ New scenario](#)

All scenarios you are allowed to access (public, shared, own)

1

Name	Region	Reference Year	Creator	Status	Actions
▾ Trend (2030)	(template)	2030	tomas.bayer@enda.eu	✓	  
• Trend	 Steinfurt	2030	tomas.bayer@enda.eu	✓	   

Adapt an existing scenario

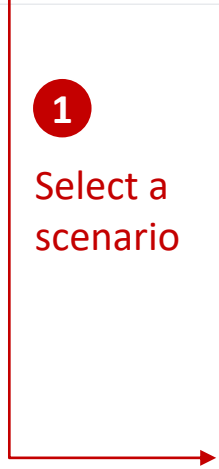
4

FIRST STEPS - ACCESS RESULTS OF AN EXISTING SCENARIO

[+ New scenario](#)

Name	Region	Reference Year	Creator	Status	Actions
∨ Trend (2030)	(template)	2030	tomas.bayer@enda.eu	✓	✎ 🗑️ +
• Trend	Steinfurt	2030	tomas.bayer@enda.eu	✓	✎ 🗑️ 🔗 +

1
Select a scenario



Scenario Detail

Trend (Steinfurt, 2030)

[← Back to overview](#)

Region	Steinfurt
Creator	tomas.bayer@enda.eu
Created at	July 6, 2021
Access level	public
Scenario type	baseline scenario
Adapted from	Trend (2030) (template for 2030) by tomas.bayer@enda.eu
Actions	✎ Edit 🗑️ Delete 🔗 Share + Adapt

Scenario calculation: success ✓

The scenario has been successfully calculated.

[📈 Show results](#)

← Access results **2**

DEFINE A NEW BASELINE SCENARIO

PLEASE USE THE „MIT DEMO REGION“ TO DEFINE A NEW BASELINE SCENARIO



Example Scenario Contact nadine.ho... ▾

Create a new baseline scenario based on Trend (2030) (template for 2030)

All available technologies and resources are activated as default. Please check and deactivate if not available in your region

← Cancel

Hydrogen Production

- Water Electrolysis
- Thermolysis
- Plasmalysis
- Steam Reforming

Renewable Electricity Production

- Wind Power
- Solar Power
- Hydropower

Name your baseline scenario here

General

Title

Access level

Description

Choose the right access level

Describe the main characteristics of your scenario

+ define max. capacities /potential per technology and resources
+ upload time series¹

load profile:

Status: ⊗ missing

This time series contains information about how much of the peak power is available at each given hour. The entries are expected to be relative values between 0 and 1.

(1) if you want to see an example for time series data, please see the Steinfurt baseline scenario

CUSTOMIZE A SCENARIO

VARIATION OF A REGIONAL BASELINE SCENARIO

Step 1: Change of available technologies and resources

Hydrogen Production

- Water Electrolysis
- Thermolysis
- Plastic Waste
- Sewage Sludge
- Scrap Tires
- Plasmalysis
- Steam Reforming

Renewable Electricity Production

- Wind Power
- Solar Power
- Hydropower

Other Electricity Production

- Gas CHP
- Waste Incineration

Deactivate technologies and / or resources by click

Grayed out fonts indicate that this option is not available for the region (needs to be changed in the underlying baseline scenario)

Step 2: Adapt name, access, description and parameters

General

Title
Adaption of Trend

1

Access level
private

2

Description

The base scenario represents a realistic development in the Steinfurt region. In the target year 2030, the technology costs have decreased as expected and the expansion potentials for renewable energies are oriented to the current framework conditions. 30 % of the demanded energy volume of the regional transport sector and 6 % of that of the regional heating market is served by hydrogen.

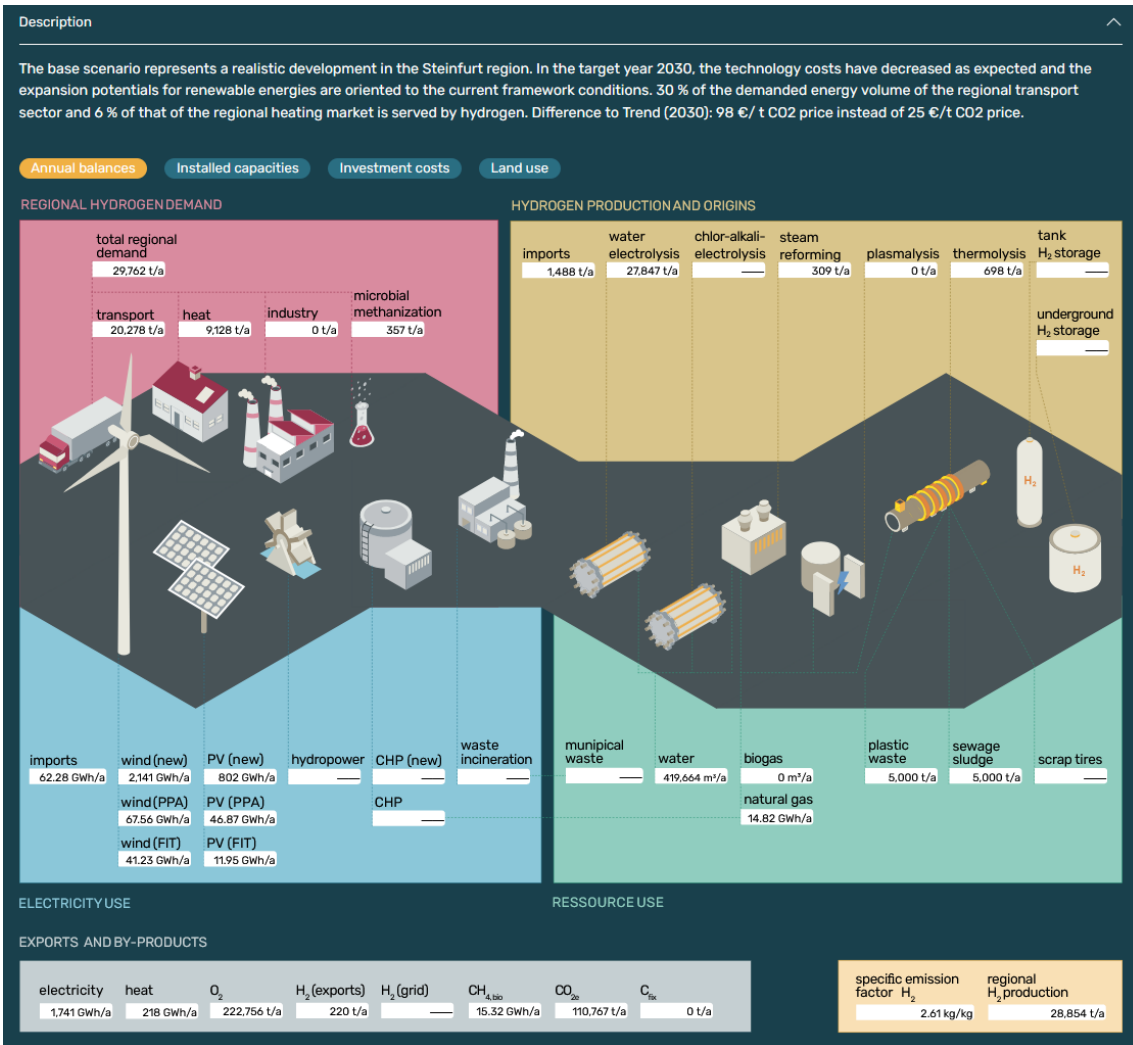
3

- Limit plant capacities, energy ex- and imports
- Define role for hydrogen
- Adapt willingness to pay (positive values indicate higher WTP)
- Define carbon price
- Define external cost of CO2 and NOx

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RESULT LEVEL 1: COST-OPTIMIZED INFRASTRUCTURE SETUP



← Description of the scenario

← Menu to switch between balances, capacities, cost and land use

← Cost-optimized infrastructure setup (categories)

← Exports and by-products

Possibility to switch units to ease understanding of some parameters

Switch units: **energy** | mass & volume

RESULT LEVEL 2: INFRASTRUCTURE SYSTEM PERFORMANCE

OVERVIEW OF KEY PERFORMANCE INDICATORS ATTACHED TO THE INFRASTRUCTURE SETUP AND THE DEFINED CONTEXT

▼

System key figures: KPIs

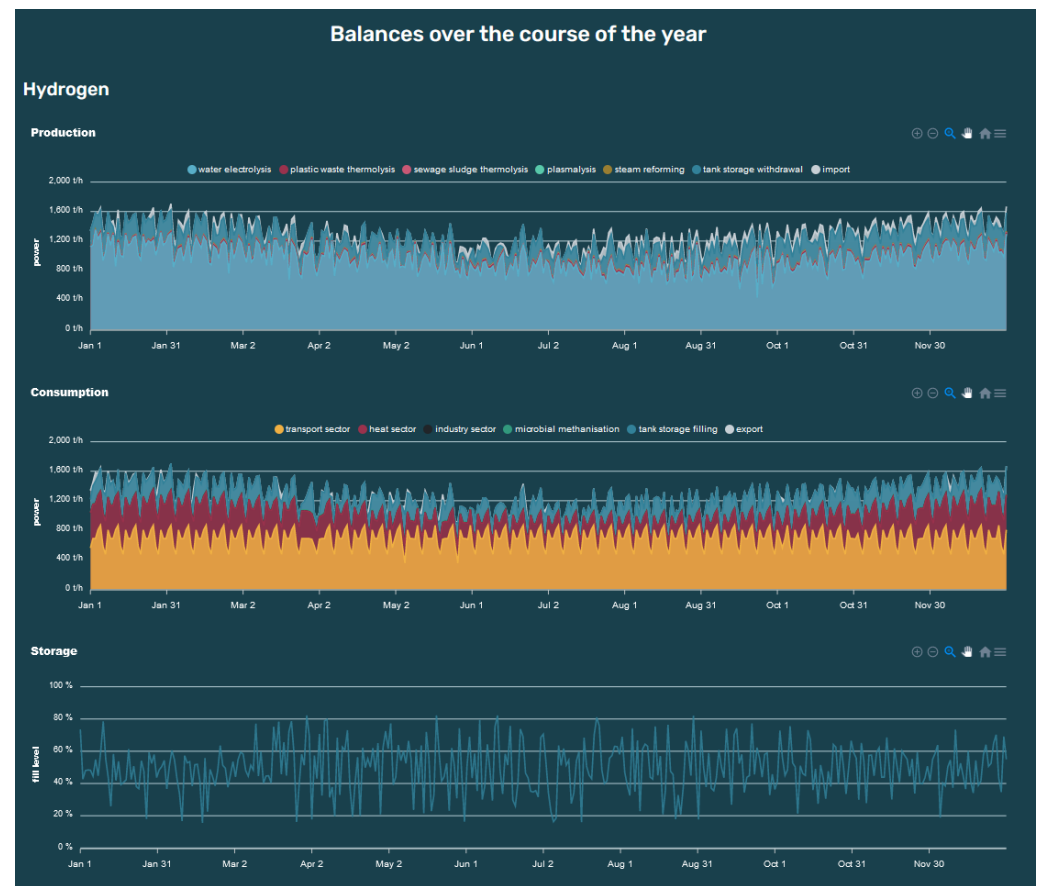
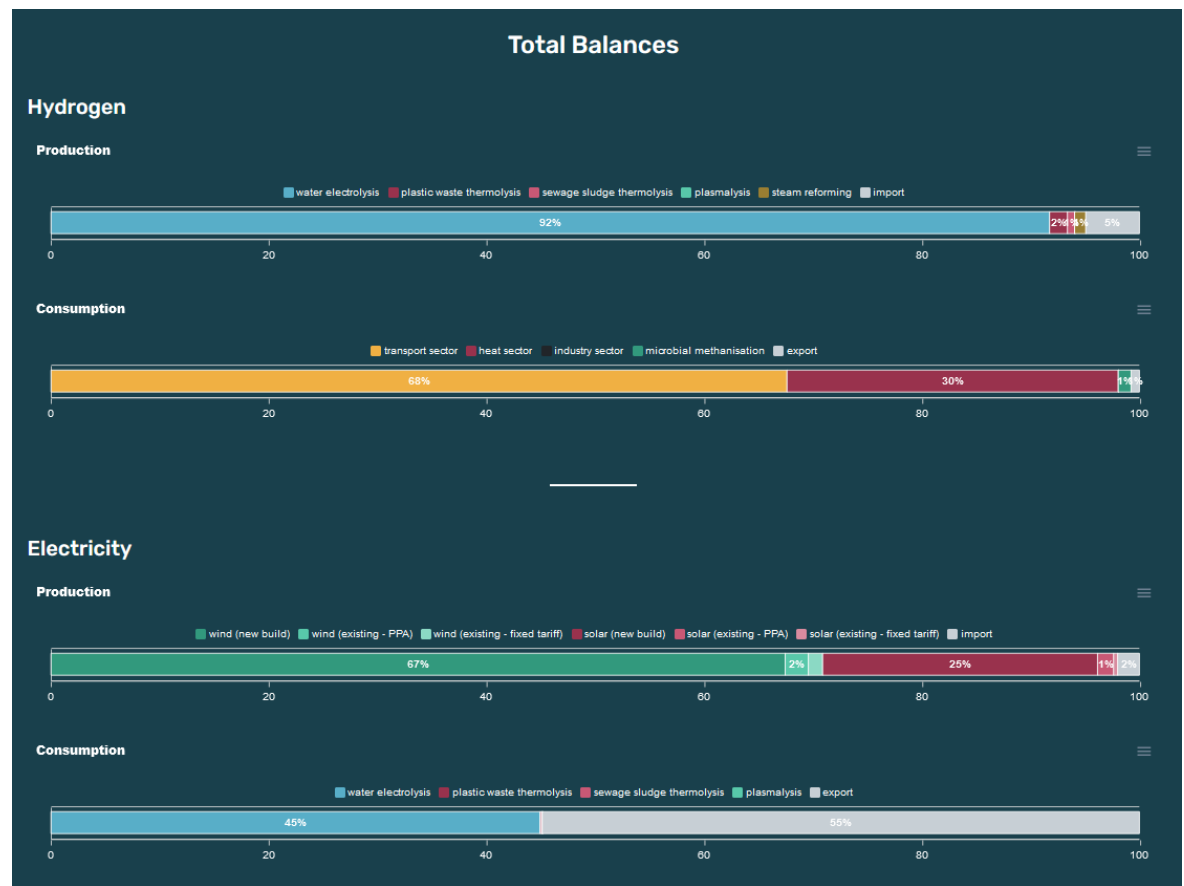
28,473 t/a hydrogen demand ⓘ	2.13 €/kg hydrogen supply costs ⓘ	187,701,066 €/a earnings before taxes ⓘ	338,171 t/a avoided CO ₂ emissions ⓘ	72,989,313 €/a avoided external costs ⓘ
89.2 % degree of self-sufficiency ⓘ	8.58 €/kg willingness to pay for hydrogen ⓘ	18.8 % return on investment ⓘ	-428.84 €/t CO ₂ abatement costs ⓘ	234,831,066 €/a direct regional added value ⓘ

← Set of 10 key performance indicators (overview)

← Access to detailed results

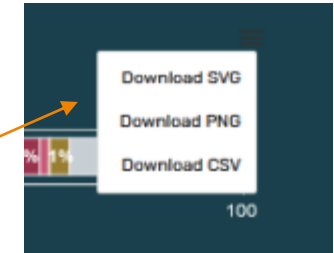
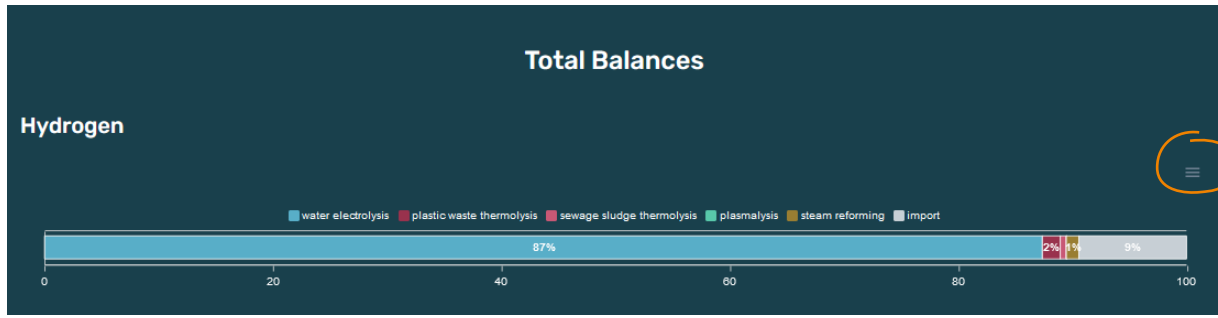
RESULT LEVEL 2: INFRASTRUCTURE SYSTEM PERFORMANCE

DETAILED INFORMATION ON ENERGY AND MASS BALANCES

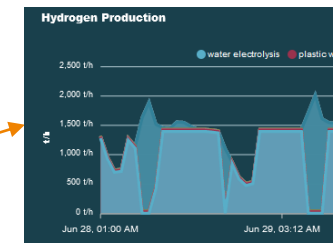
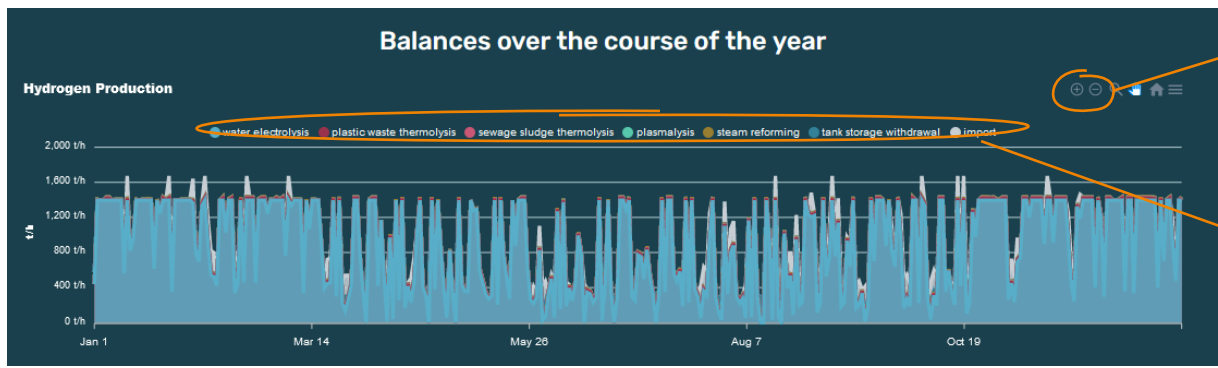


RESULT LEVEL 2: FEATURES FOR FURTHER ANALYSES

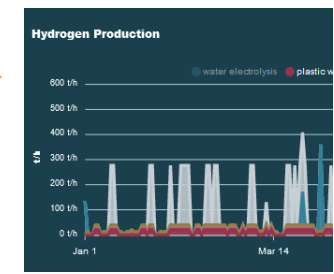
APPLIES TO ALL DETAILED ANALYSES



Possibility to download results



Possibility to change time period



Possibility to activate / deactivate technologies

ADDITIONAL OFFER – IF INTERESTED?

Technical workshop with live demonstration:

Date: Wednesday, 26th of July

Time: 13:00 – 15:00 CET

Please reply by mail to:

andy.fuchs@toyota-europe.com

to get dial in details.

THANK YOU FOR YOUR ATTENTION!