

An isometric illustration of a hydrogen value chain. It shows a coastal area with wind turbines, solar panels, and a ship. A road with cars and trucks leads to a hydrogen station (H2) and a factory. A pipeline system connects these areas, with a residential neighborhood and a train line also shown. The scene is set against a blue background with a stylized white cloud.

Clean Hydrogen
Partnership

Technology evaluation framework – H₂ value chain assessment

Hydrogen Valley Facility

2025

Roland
Berger

The H2V Facility delivers dedicated support to hydrogen practitioners via PDA services, the H2V Knowledge Centre and the H2V Platform

The Hydrogen Valleys Facility

h2v.eu

Dedicated support via the **Hydrogen Valleys Facility** by



1 Project Development Assistance

Provision of dedicated Project Development Assistance (PDA) for Hydrogen Valleys projects towards Final Investment Decision



2 H2V Knowledge Centre

Sharing & dissemination of knowledge and provision of capacity building for the broader hydrogen community

3

H2V Platform



Maintenance & extension of the Hydrogen Valley Platform to enhance its positioning as the global one-stop-shop for hydrogen flagship projects

Delivery partners

Roland Berger



worley

Inycom

Aspirational target

2030

50

Hydrogen Valleys operational/under construction

within the EU



This document is part of the H2V Knowledge Centre that offers hydrogen practitioners knowledge material in written and interactive formats

The H2V Knowledge Centre



Structure and scope of the H2V Knowledge Centre

Self-service Knowledge Material

Commercial



Technical



Regulatory



Valley governance



- Knowledge material specifically developed as part of the H2V Facility project
- Links and information to other third-party resources and material

Interactive Formats

- Webinars with content experts (Roland Berger, Worley and external speakers)
- Project Development Assistance experience sessions with Hydrogen Valley practitioners

Target audience



Hydrogen Valleys



Project developers



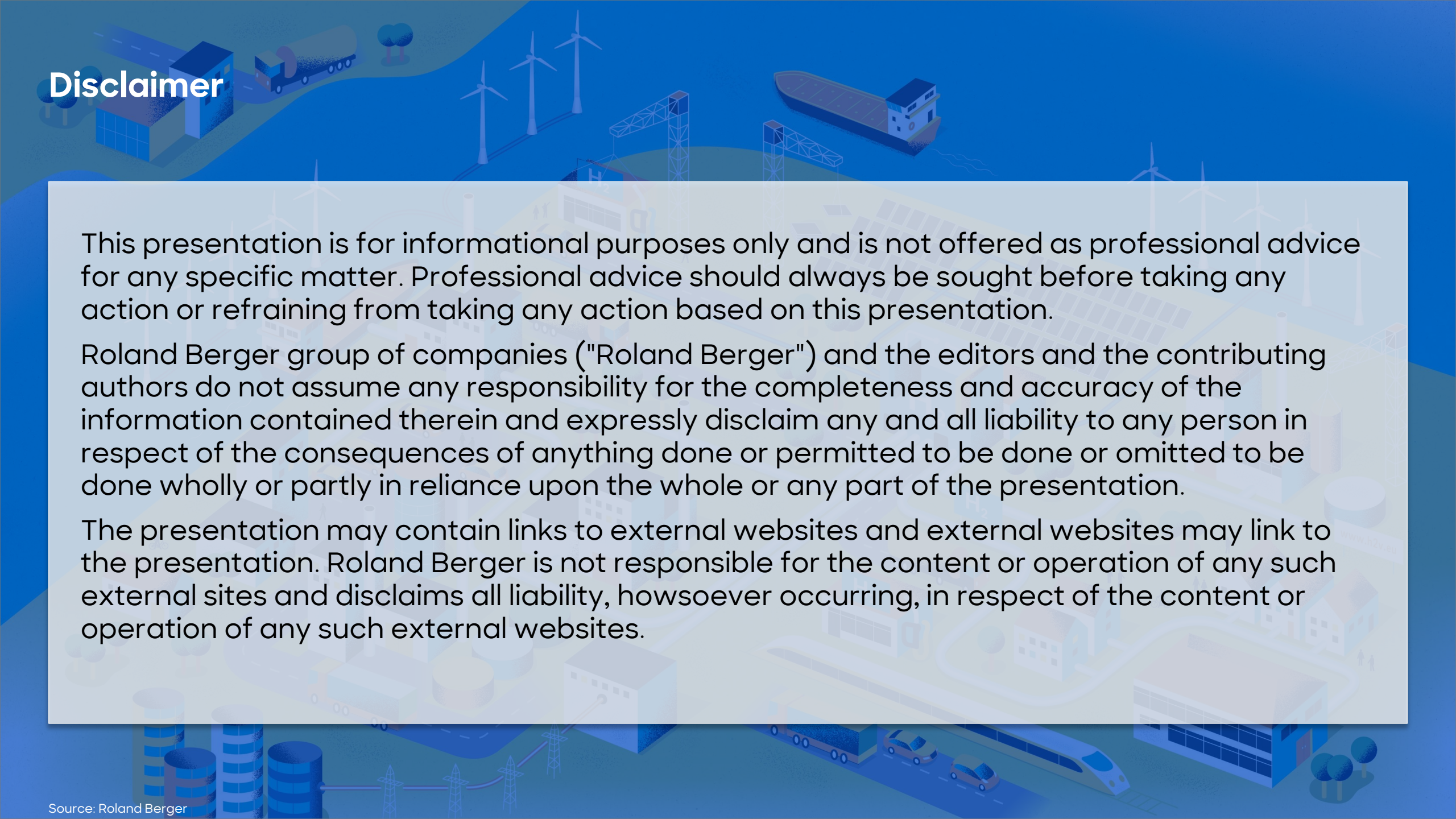
National, regional and local authorities



Investors



Other hydrogen practitioners



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Key objective of this document is to support Hydrogen Valleys in their technology assessment along the H₂ value chain considering strategic relevance

Key objectives and content of this document

Key objectives



Conduct a **technology assessment of relevant technologies** for all major components of the Hydrogen Valley project

Key content

1

H₂ value chain assessment

Structured approach to evaluate and prioritize all relevant value chain steps based on their strategic relevance for the Hydrogen Valley and other potentials

2

Technology scouting

Comprehensive approach to prioritize focus technologies based on a detailed technology analysis considering aspects such as cost reduction and innovation potentials

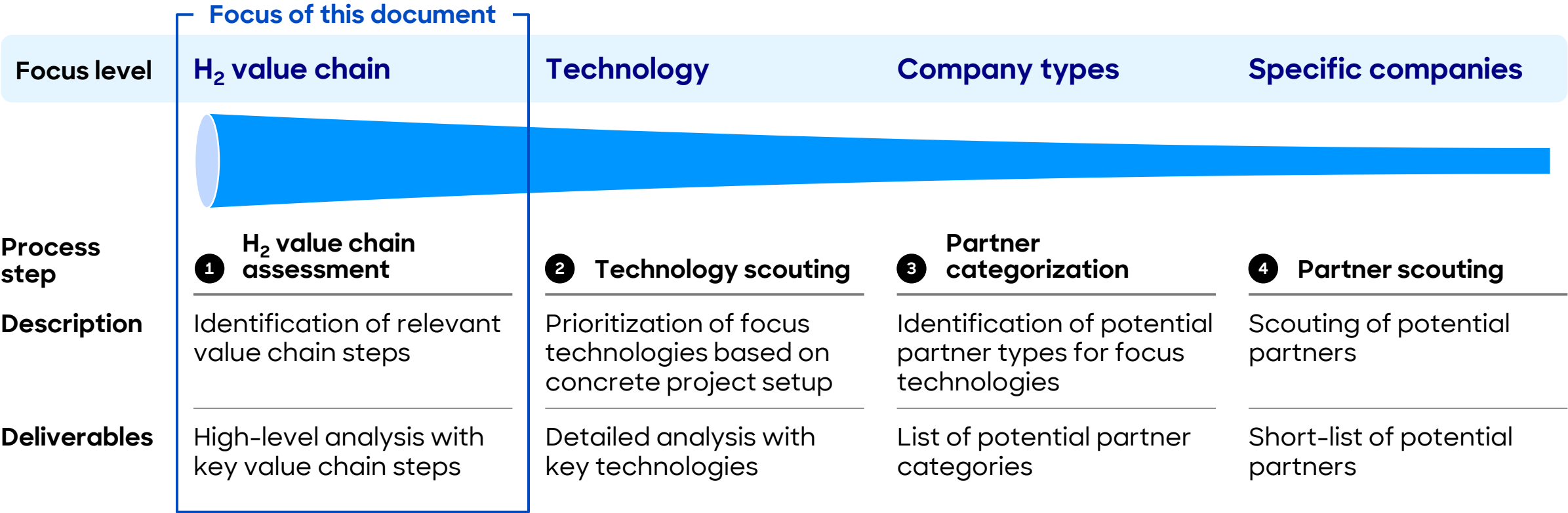
3

Partner categorization and partner scouting

Guidance on the identification of potential partner types for focus technologies and on the scouting of potential partners

To select suitable technologies for key components along the Hydrogen Valley value chain, a thorough 4-step technology assessment is recommended

Technology assessment – overview



 It is recommended to repeat the technology assessment in regular intervals

The H₂ value chain assessment is the first step of the technology assessment and focuses on a high-level analysis of key value chain steps

Objectives, outcome and framework of the H₂ value chain assessment

Objective



Preliminary prioritization of key focus areas based on:

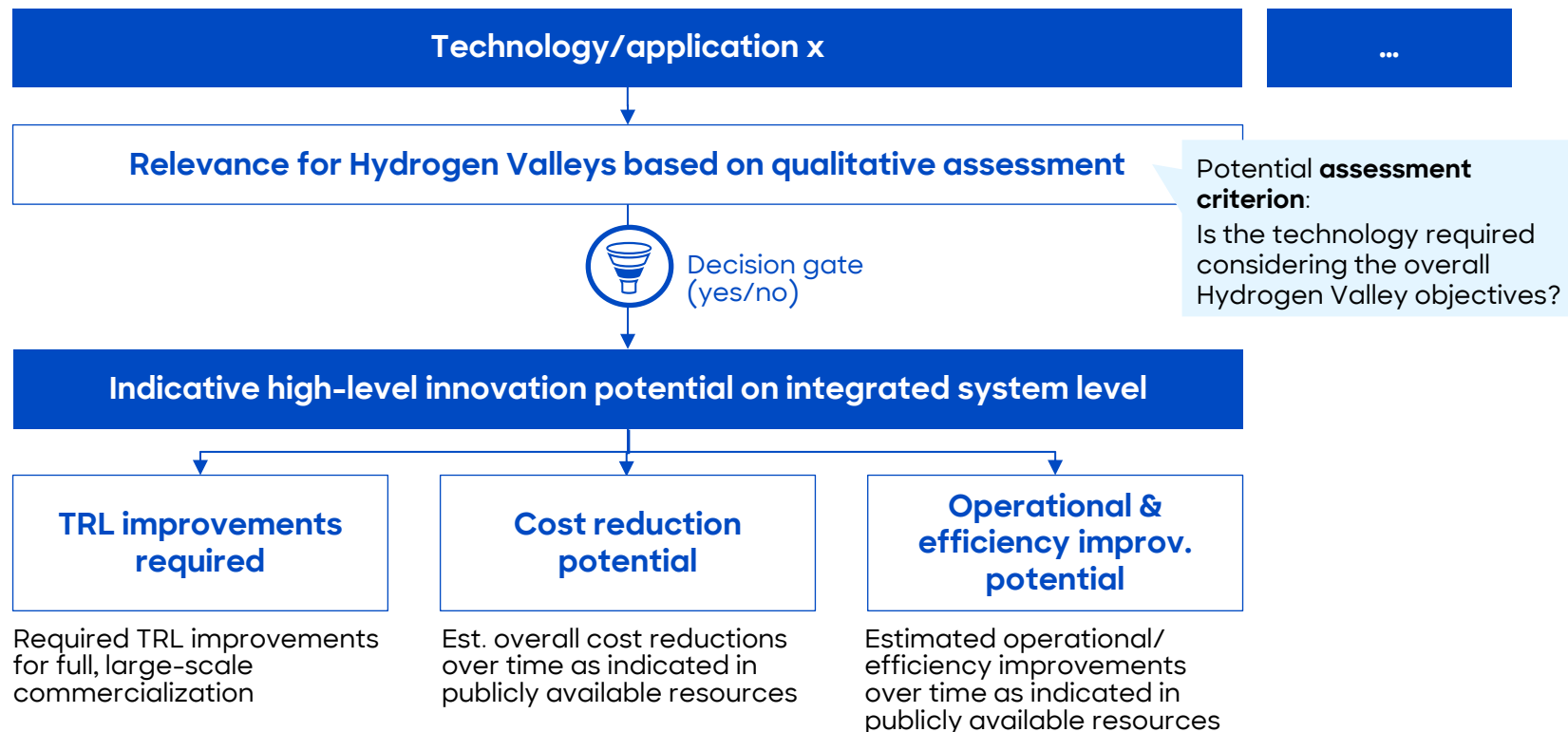
- Hydrogen Valley's **strategy relevance**
- High-level **innovation potential** on integrated technology level

Outcome



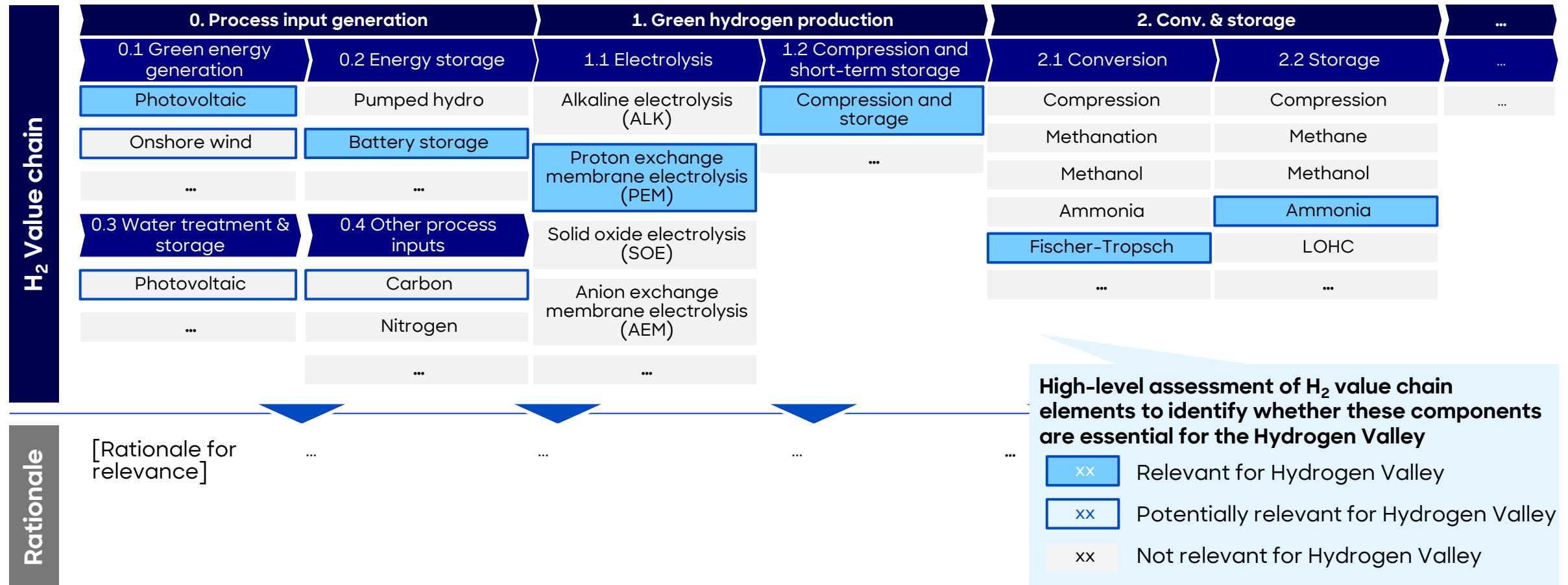
- ✓ **Matrix/heat map** of relevant value chain steps and potential deprioritization
- ✓ **High-level assessment** of potentials on an integrated system level and potential deprioritization

Framework



The H₂ value chain can be analyzed to identify the steps and technologies which are relevant for the Hydrogen Valley's strategic objectives

High-level assessment of technology relevance along the H₂ value chain



Thereafter, each of the strategically relevant value chain steps can be assessed with regards to its innovation potential

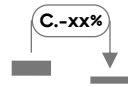
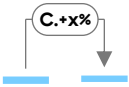
Assessment of innovation potential for all identified relevant technology options

Value chain step	0. Process input generation	1. Green hydrogen production		...
Sub-step	0.1 Process inputs	1.1 Electrolysis	1.2 Compression and short-term storage	...
Innovation potential	Low High Great innovation potential could result in reduction/improvement of...	Low High ...	Low High ...	Low High ...
Strategic relevance incl. rationale for Hydrogen Valley	H₂ production Technology manufacturing H₂ ecosystem for end-applications High strategic relevance for ...	H₂ production Technology manufacturing H₂ ecosystem for end-applications ...	H₂ production Technology manufacturing H₂ ecosystem for end-applications ...	H₂ production Technology manufacturing H₂ ecosystem for end-applications ...

Relevant for strategic cluster
 Not relevant for strategic cluster

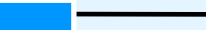
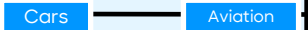
The high-level fit assessment of each relevant technology is based on its TRL, cost reduction and efficiency improvement potential

High-level technological fit assessment for each technology

Value chain step	Sub-step	Technology	Technological readiness (TRL)	Cost reduction potential	Efficiency improvement potential	Innovation potential
0. Process input generation	1. Green hydrogen production	Alkaline	9	[EUR/kW]  Year 1 Year X Cost reduction of c.-xx%, e.g. by ..	[% LHV]  Year 1 Year X Limited potential for efficiency improvement, e.g., by ...	High  Low
1. Green hydrogen production		PEM	8-9	• ...	• ...	High  Low
2. Conv. & storage		Analysis of technology as a whole , not of its components (e.g., analysis of electrolyzers instead of components of electrolyzers)		• ...	• ...	High  Low
...				• ...	• ...	High  Low
	1.2 Compression and short-term storage	...	...			

The innovation potential can be mapped to the strategic clusters and pillars of the Hydrogen Valley on an aggregated level

Heat map of relevant H₂ value chain steps and corresponding technologies

Strategic cluster	Hydrogen production 		Technology manufacturing 	H ₂ ecosystem for end use 	
Strategic pillar	H ₂ production & backbone	H ₂ export	Electrolyzer manufacturing	Sustainable fuel bunkering	Hydrogen mobility (cars & aviation)
Innovation potential	Low  High	Low  High	Low  High	Low  High	Low  High Cars Aviation
Value chain steps	0. Process input generation 1. Green hydrogen production 2. Conversion & storage ...	2. Conversion & storage 3. Transportation ...	1. Green hydrogen production ...	2. Conversion & storage 5. Local distribution ...	6. End use ...
Key technologies (non-exhaustive)	- Electrolyzers (operation) - Conversion technologies ...	(Re-) Conversion technologies ...	- Electrolyzers (manufacturing) ...	- Conversion technologies ...	- Fuel cell technology (applicable to both land mobility and aviation) ...

