

# RENEWABLE HYDROGEN ROADMAP IN CASTILLA - LA MANCHA



Castilla-La Mancha

Consejería de Desarrollo Sostenible

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# Context and the need for a Roadmap

→ Castilla-La Mancha has a great potential in the renewable energy sector, presenting different **competitive advantages** that make the region an **ideal place** for economic development in this area:



## Geographical advantages

Central location and rural areas ideal for energy projects



## Climatic advantages

Abundant wind and sun for renewable energy.



## Strategic advantages

Ambition in the energy field. Strategic Plan for Energy Development 2030



## Technological advantages

Third autonomous community in renewable energy generation



## Industrial advantages

Industrial plants promote employment and emissions reduction.



## Infrastructural advantages

Infrastructure and investment attract projects and foster growth.

In this context, there is a need for a **detailed roadmap** to **develop and implement renewable hydrogen** as a **key solution** to move towards industrial decarbonisation and foster sustainable growth in the region.

# Methodology for the elaboration of the Roadmap

## Phase 1

**Context** of the situation and main **trends** in renewable hydrogen at European, national and regional level.

**Regulatory analysis** and evaluation of national and European **funding programmes** for the sector.

Characterisation **of the Value Chain**, definition of the links and identification of key actors.

**SWOT** analysis of renewable hydrogen in Castilla-La Mancha

## Phase 2

Definition of Roadmap **objectives**

Definition of **Axes and Lines of Action**, evaluation of available technologies in the sector in C-LM.

**Validation** of the objectives, axes and lines of action defined.

**Working Groups and Key Actors**

Alignment with **regional** industrialisation and energy **policies**

## Phase 3

Adjustment to **Vision 2030 and 2050**

Defining a timeline and **partial milestones**

Definition of a **Governance Model and Roadmap Assessment**

**Road Map**



# Main conclusions

 Weaknesses	 Threats	 Strengths	 Opportunities
<ul style="list-style-type: none"><li>▪ <b>Technical challenges</b> of the sector and <b>high costs</b>.</li><li>▪ <b>Adaptation to regulations</b>.</li><li>▪ <b>High energy demand</b>.</li><li>▪ <b>Water limitation</b>.</li><li>▪ <b>Little diversification</b> in electricity distribution.</li><li>▪ <b>Insufficient</b> installed <b>power</b> for large projects.</li><li>▪ <b>Projects</b> concentrated in <b>a few areas</b>.</li><li>▪ Logistics centres <b>far from</b> key projects.</li><li>▪ <b>Poor planning</b> of storage projects.</li><li>▪ <b>Deficit</b> in <b>technological</b> development.</li><li>▪ <b>Slow processing</b></li></ul>	<ul style="list-style-type: none"><li>▪ <b>High competition</b> in the sector.</li><li>▪ <b>Unstable regulations and regulation</b>.</li><li>▪ <b>Limited availability</b> of industrial land and major projects outside the community.</li><li>▪ <b>High investments</b> required.</li><li>▪ <b>Lack of knowledge</b> about the sector.</li><li>▪ <b>Difficulty</b> in generating sufficient demand.</li><li>▪ <b>Competition of technological alternatives</b>.</li></ul>	<ul style="list-style-type: none"><li>▪ <b>Prominent past in power generation</b>.</li><li>▪ <b>European leader</b> in renewable hydrogen.</li><li>▪ <b>Government support</b>.</li><li>▪ <b>Strategic location</b> with plenty of sun and wind.</li><li>▪ <b>Main renewable generators</b> in the country.</li><li>▪ <b>Presence of 7 river basins</b>.</li><li>▪ <b>Specialised training</b>.</li><li>▪ <b>Headquarters</b> of the National Hydrogen Centre.</li><li>▪ <b>Development of the chemical and petrochemical industry</b>.</li><li>▪ <b>Projects</b> for the manufacture of <b>electrolysers</b>.</li></ul>	<ul style="list-style-type: none"><li>▪ <b>Sector growth</b> potential and annual <b>PV</b> generation <b>growth</b>.</li><li>▪ Attracting <b>investors, financing and aid</b>.</li><li>▪ <b>Research</b> from the National Hydrogen Centre and hydrogen <b>cluster</b> under constant <b>development</b>.</li><li>▪ <b>Industrial growth</b>.</li><li>▪ Annual <b>job creation</b> and new <b>intermodal logistics centres</b>.</li><li>▪ Renewable hydrogen production projects in the <b>short to medium term</b>.</li><li>▪ Connection to hydrogen <b>transport corridors</b>.</li></ul>

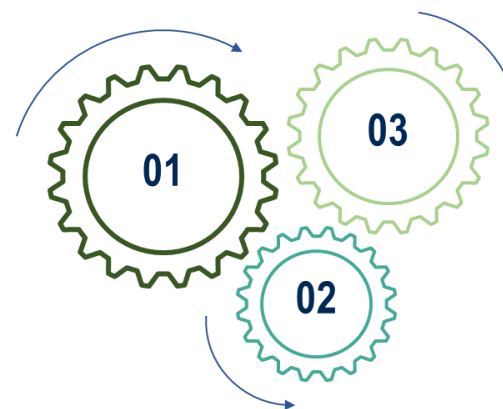
# Objectives, Axes and Lines of Action



→ Firstly, **6 objectives** have been defined, the achievement of which will be addressed by means of **3 main axes of work**:

- 1 Positioning C-LM as a **leader in renewable H<sub>2</sub>**.
- 2 **Consolidating the renewable H<sub>2</sub> value chain** in C-LM
- 3 Encourage public-private **partnerships** in new projects.
- 4 **Increase** industrial and energy **demand for** renewable H<sub>2</sub>.
- 5 Promote the use of renewable H<sub>2</sub>, facilitating **sectoral integration**.
- 6 **Promote research and development** in renewable H<sub>2</sub> by taking advantage of the location in the CNH2 region.

**Axis 1.** Consolidation, promotion and attraction of renewable H<sub>2</sub> projects



**Axis 3.** Regulation and incentives for value chain development.

**Axis 2.** Promoting knowledge and awareness of renewable H<sub>2</sub>.

# Axes

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→ These 3 axes **bring together** a series of **lines of action and specific measures**:

## Axis 1.

Consolidation, promotion and attraction of renewable hydrogen projects.



## Axis 2.

Promoting knowledge and awareness of renewable hydrogen.



## Axis 3.

Regulation and incentives for value chain development.



# Axes

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→ These 3 axes **bring together** a series of **lines of action and specific measures**:

## Axis 1.

Consolidation, promotion and attraction of renewable hydrogen projects.



This first axis includes **three lines of action** focused on the study, attraction, promotion and deployment of projects and infrastructures related to the hydrogen sector. Each of the lines of action is defined by several measures that share among their expected results the increase in hydrogen production and the improvement of efficiency in the different processes involved in the hydrogen value chain.



# Axes

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→ These 3 axes **bring together** a series of **lines of action** and specific **measures**:

## Axis 2.

Promoting knowledge and awareness of renewable hydrogen.



Axis number two consists of **two lines of action** and two measures within each line, all of which share the aim of promoting training on renewable hydrogen and raising awareness about it among the population, institutions and private companies, fostering transversal knowledge about these new technologies and achieving a general awareness and interest that will boost the sector in Castilla-La Mancha.

# Axes

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→ These 3 axes **bring together** a series of **lines of action and specific measures**:

## Axis 3.

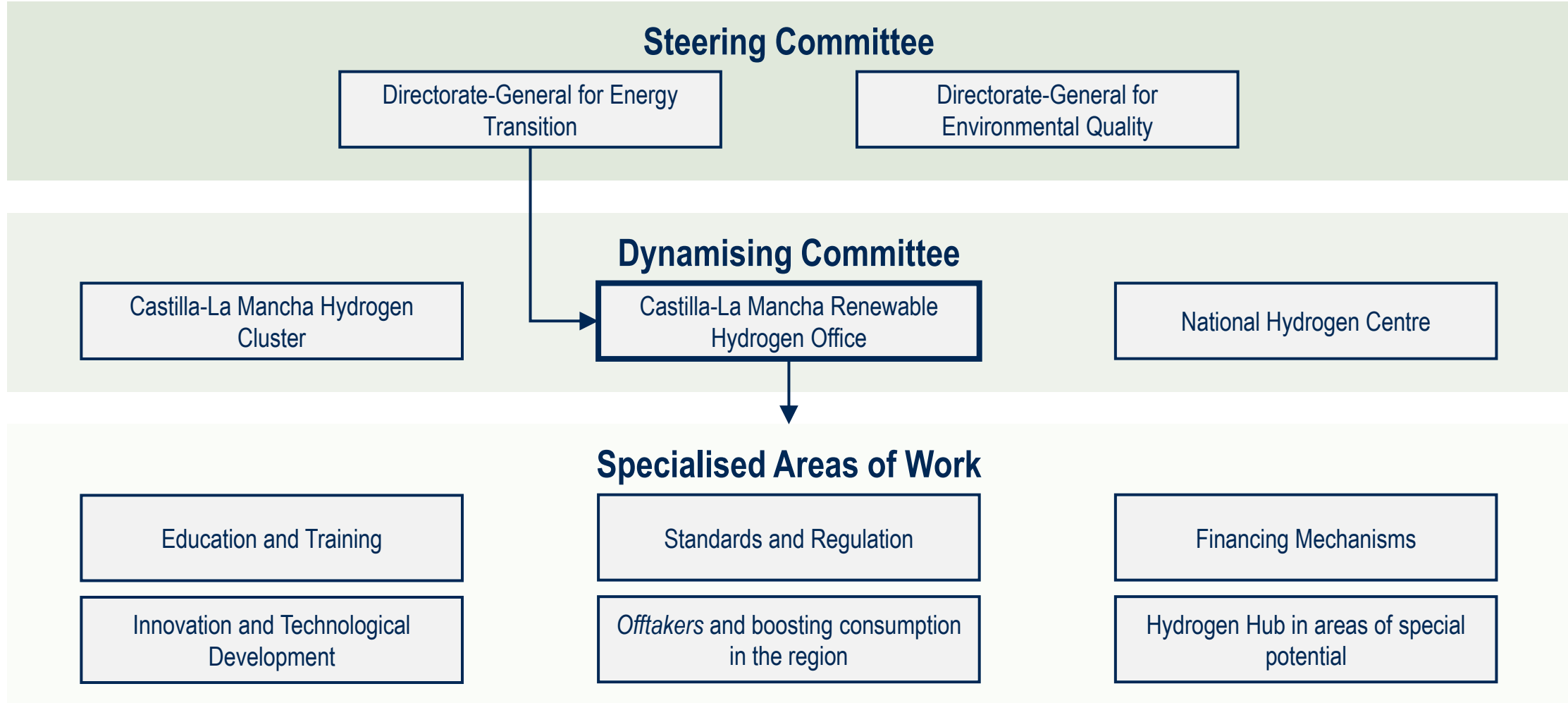
Consolidation, promotion and attraction of renewable hydrogen projects.



Finally, the third axis is divided into **two lines of action** and focuses on boosting the sector through incentives, institutional aid and regulatory developments, encouraging the attraction of investment and new projects in the region.

# Governance

→ To ensure compliance with these lines and axes, a **governance model based on 3 dimensions** has been established. Where the cluster and CNH2 will have a relevant position, assisted by the **H2R Office**:



# Vision 2030 and 2050

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→ In line with European and national perspectives, taking into account the lines and measures defined for this Roadmap, **different development scenarios** have been established for the region, showing the **commitment and ambition** for the development of this sector:

**The 2030 commitments are summarised in a development ambition on the following variables:**



**Commitments for 2050 are based on long-term planning initiatives to guide and shape the continued development path:**





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