TOPSECTOR
HORTICULTURE & STARTING MATERIALS

H2-Impulse in greenhouse horticulture

Fruit Logistica
10 februari 2023

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The Top Sector for Horticulture & Starting Materials)

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The Top Sector Horticulture & Starting Materials

The Top Sector Horticulture & Starting Materials (in Dutch: Topsector Tuinbouw & Uitgansmaterialen, abbreviated as Topsector T&U) is one of ten top sectors in which the Netherlands excels worldwide. The manufacturing industry, universities, research centres, government bodies and civil society organisations collaborate on research and innovation, internationalisation, human capital and the reduction of regulatory pressure to further strengthen this position.

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The organization

- Executive policy making body for the primary production sector in The Netherlands
- Non-dilutive funding of RDI-projects & PPPs in the sector
- Focus on societal challenges & solutions through customized impact 2025 program
- Liaison to broad network of companies (LEs & SMEs), research performers and governmental institutions in the sector in the Netherlands

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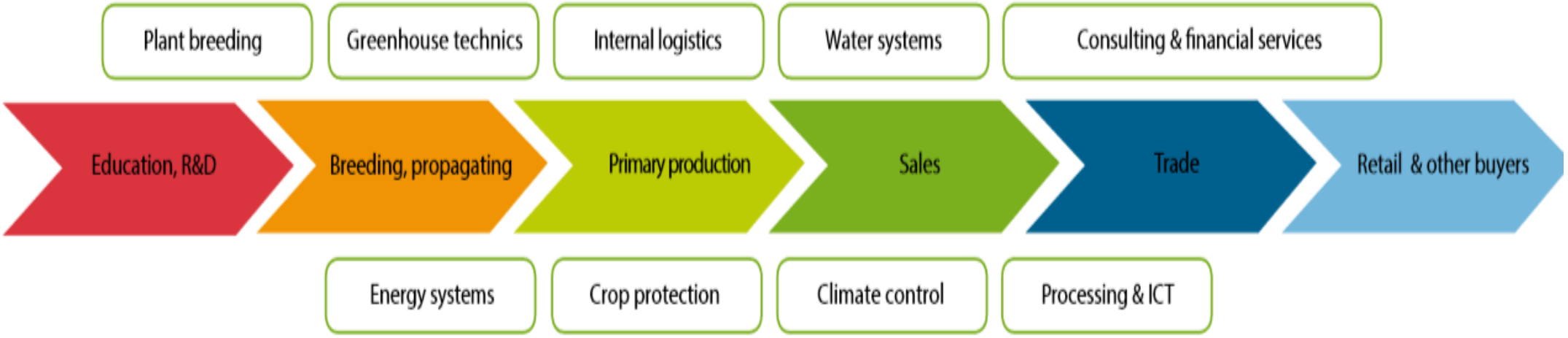
About us

Greenport chain



In figures

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	Horticulture & Starting Materials complex – Statistics Netherlands/LEI 2019					
Key figures						
	Production value chain, Horticulture & Starting Materials	**Added value**	**Number of companies** (primary horticulture*)	**Workforce** (annual work units)	**Export value NL**	**R&D expenditure in NL**
Size (in € billion)	**27,9**	**21,1**	**23.7K**	**254K**	**24,5**	**0,76**
Share of the Netherlands (%)	**2,7**	**2,7**	**1,6**	**3,4**	**4,7**	**4,9**

* Top Sector Monitor, Statistics Netherlands

Our ambition

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WORLD CHALLENGES

Population growth & aging

Climate change

Economic & social inequality

Urbanisation

WORLD SOLUTIONS

MORE WITH LESS

WORLDLEADER

#1 Added value

#1 Knowledge & Innovation

#1-2 Marketshares & exportposition

#1 Productivity

#1 Sustainability

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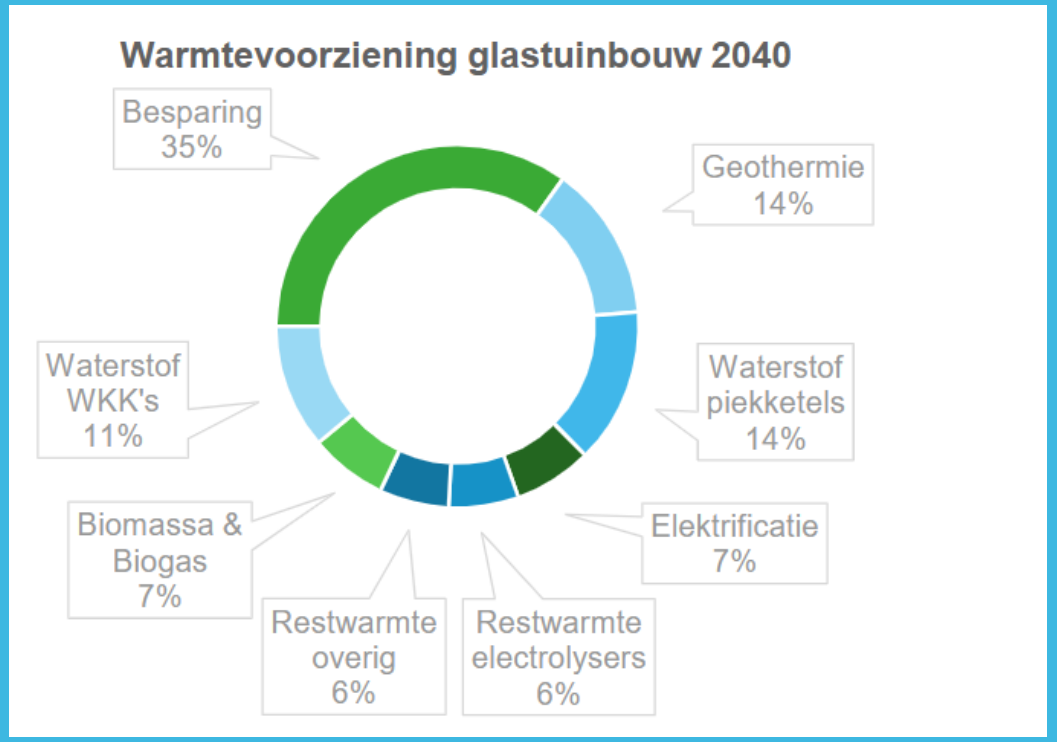
- Horticulture wants to push ahead with its ambitions for climate-neutral production by 2040
- Existing sustainability pathways not sufficient to achieve these ambitions →need for hydrogen
- Position paper: ca 1/3 of future heat supply from hydrogen
- This corresponds to 0.5bn m3 of natural gas savings and 1 Mton of CO2 reduction



Source: position paper H2 in de glastuinbouw, TKI T&U april '22

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New opportunities in hydrogen chains(1)

- Adding greenhouse horticulture clusters to hydrogen chains is of interest to all parties in the chain:
  - Balancing supply and demand of hydrogen, heat and electricity
    - no baseload purchase but flexible purchase and deployment
    - reducing risks for producers and transporters
  - Setup of ecosystems possible
    - in-house production of hydrogen,
    - utilization of heat from the electrolyser,
    - production and use of (sustainable) CO2
    - greenhouse horticulture is a very innovative sector
    - willingness to deploy new technology
    - willingness to invest
  - Role of decentralized, high-efficiency power generation can continue
    - without CO2 emissions and possibly also without NOx emissions.

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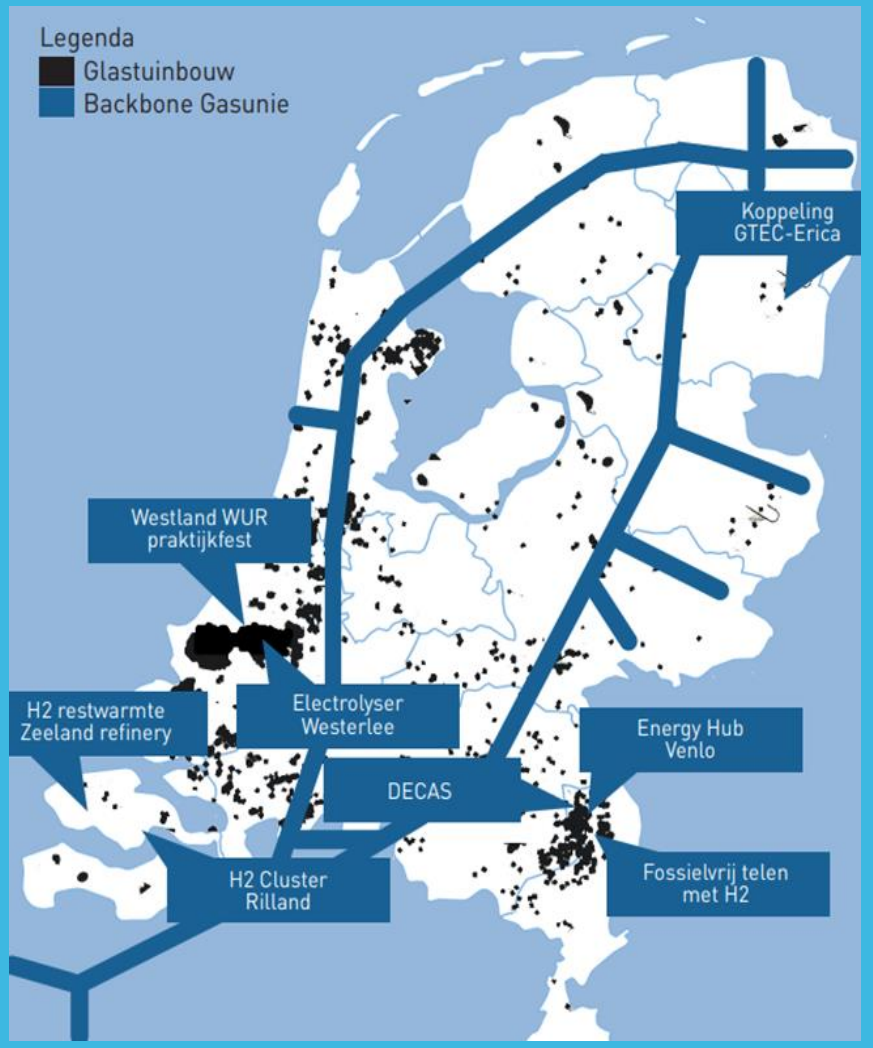
New opportunities in hydrogen chains (2)

- But also:
  - Hydrogen will - directly or indirectly - always be part of the solution
  - Return on investment, risk mitigation and security of supply guiding investment decisions.
  - Scale is critical. Clusters can only be developed from local preconditions subject to:
    - Availability of H2 and CO2
    - Availability of geothermal energy
    - Deployment of 'residual' heat
    - Opportunities to connect to the H2 backbone
    - Grid capacity
    - Spatial planning
    - Coalition building
    - Regulation



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Entrepreneurs highly motivated to get started

Stakeholders and horticultural entrepreneurs have a great interest in jointly addressing energy supply challenges, despite the long lead time and uncertainties

- There are many ideas surrounding
  - integrated horticultural clusters
  - production, storage and deployment of H2, O2 and CO2 and heat
  - innovative electricity buffering and storage concepts
- There is motivation and especially momentum to move on to major local projects

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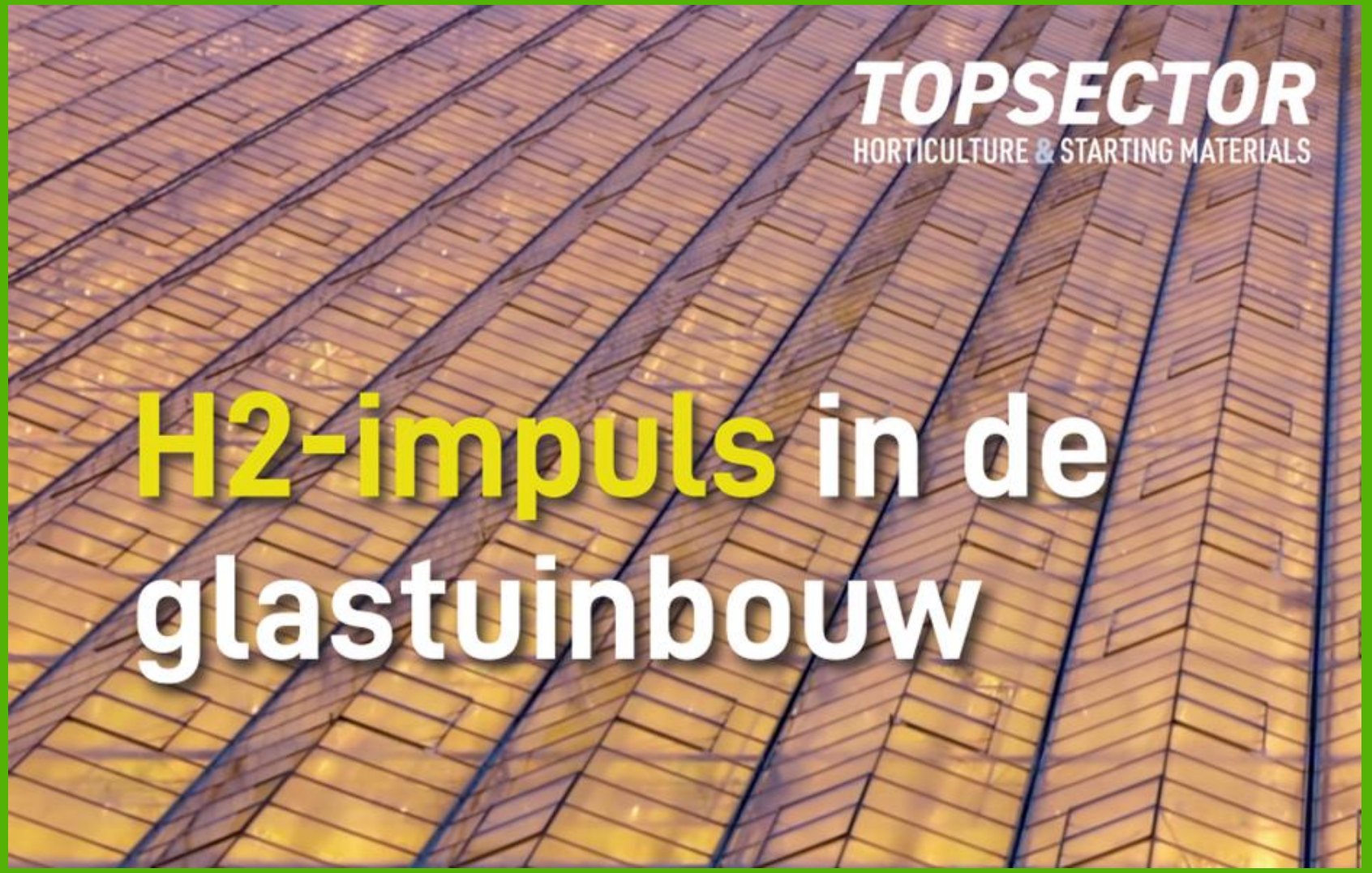
Keeping up the momentum!



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H2 Impulse in greenhouse horticulture

The H2 Impulse in greenhouse horticulture program will contribute to the application of hydrogen in the energy transition by helping to make the energy market and energy infrastructure of the future robust, affordable, safe and sustainable from the perspective of greenhouse horticulture.

- The H2 Impulse in greenhouse horticulture program includes:
  - Pilot projects arising from a local demand or initiative to develop a local solution for hydrogen application;
  - The pilot projects will be integrated, in part, substantively into a central program.

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Centralized approach needed

- Management;
- Risks and uncertainties are too high for stakeholders in general and individual entrepreneurs in particular;
- Bringing together, evaluating and validating technical, regulatory, policy and legal aspects and solutions emerging from local pilot projects;
- Coordination to connect with initiatives on (inter)national hydrogen chains;
- Scaling up knowledge and experience so that the greenhouse horticulture sector makes a direct contribution to strengthening hydrogen chains (inter)national.

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Added value

Implementation of H2 impulse in glasshouse horticulture creates added value for both greenhouse horticulture and the government:

- Coalition building between public and private stakeholders
- Understanding what the future energy supply and energy market will look like.
- Understanding the possibilities-and impossibilities-in applying technological and infrastructure solutions, as well as the associated costs.
- Prevent market failure by being able to quickly apply knowledge and experience in business and policy development.

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H-2 impuls in de glastuinbouw samengevat

Toepassing van waterstof in de glastuinbouwsector is noodzakelijk om klimaatneutraal te zijn in 2040.

Ondernemers staan klaar om te investeren in waterstof-ontwikkeling.

Zonder regie en collectieve inspanning zijn de risico's voor ondernemers te groot en bestaat het risico dat waterstofclusters niet van de grond komen.

Multiplier op investeringen in waterstofclusters glastuinbouw.

Gevraagde programma-financiering: € 10 miljoen.

Een H2-impulsprogramma leidt tot een versterking van de concurrentiepositie van de Nederlandse glastuinbouw, borging van voedselzekerheid en een significante impact op energietransitie in Nederland.

Verwachte CO_2-besparing: 1 Mton in 2040 ten opzichte van 1990.

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Thank you for your attention!