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European Union Study Mission

Innovation Systems in Action

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Executive Summary

The Melbourne Sustainable Society Institute and the LH Martin Institute at the University of Melbourne and RMIT University's European Union Centre of Excellence for Smart Specialisation and Regional Policy are working in partnership with the Latrobe Valley Authority to develop a Smart Specialisation Strategy for the Gippsland region in Victoria, Australia.

The approach adopted has been modelled on the European approach to regional development, with a focus on place-based innovation systems centered around a specific set of (knowledge) assets that provide a region with a competitive advantage at both the regional, national and global level.

The purpose of the study mission to the Netherlands and Germany in June 2019 was to experience how these approaches to place-based innovation play out in reality, and what lessons our European colleagues have learned from their ongoing engagement with regional innovation systems.

The mission focused on a group of distinctive regional innovation systems that each have their own strengths, specialisations, and unique characteristics. In the Netherlands these regions were Groningen (New Energy), Gelderland (Food Valley), Zuid Holland (Westland) and Limburg (Freshpark and Greenport Venlo; Brightlands Campus). In Germany the region of Weser-Ems was chosen for its energy transition experience.

To learn about how these regional innovation systems were initiated and developed over time, provides valuable lessons for the development of regional innovation systems in Gippsland. Undoubtedly, the Dutch and German regions differ from Gippsland and its socio-economic contexts. However, the closer look at the two sectors 'food and fibre', and 'energy' and their embeddedness in place-based regional innovation systems, helps to identify a number of crucial aspects. The insights in the European examples demonstrate that the creation, facilitation, and the evolution of regional innovation systems, adjusted to the 21st century realities of globally connected knowledge-based societies, are based on five essential pre-conditions:

- 1** A culture of collaboration
- 2** The role of the **tertiary education and research sector** in regional innovation systems
- 3** An **integrated policy framework** that sits within a **long-term vision**
- 4** The **consistency and coherence of actions** that flow from this in terms of **industry-led and government supported and facilitated innovation activities**
- 5** A culture of learning

Both the Netherlands and Germany demonstrate that such systems can only thrive through sustained nurturing, trial and error, an acceptance of mutual dependency, and a recognition that each and every actor in the system has a particular role to play. For Gippsland, this means that the current policy initiatives initiated by the Latrobe Valley Authority should not be seen as a magic bullet that will change everything for the better next year.

It does mean that while there should be ambition to achieve fundamental change, realistically a culture of collaboration, trust and sharing of knowledge and experiences need to be developed by continuing to bring stakeholders to the table, with acceptance that building a culture takes time. Without a strong basis in collaboration and partnerships it will be a very hard task to create a truly Gippsland-based innovation system.





The prominent presence of tertiary education and research can be seen as crucial to effective regional innovation systems. While Gippsland has some challenges to overcome in this regard, Victoria as a state is blessed with a world-class tertiary education and research system. At a conceptual level, we can envisage this resource to work for Gippsland, its industries and communities. Practically, this is an entirely different challenge given the track record of collaboration and connectedness of university and college engagement with industry, in particular with the SME sector, and communities.

There is clearly opportunity in Gippsland. The processes currently set in motion through a combination of government initiatives such as the various precinct projects, the support for place-based regional development, the emergence of industry clusters, and a series of policy settings at the State level, such as aggressive climate targets and the concepts of a circular economy, provide impetus for inclusive change.

Appropriate and long-term governance and funding arrangements, however, will need to be put in place. Place-based innovation requires some form of decentralized governance authority to co-ordinate and monitor the development of and progress towards a truly regional innovation system. Funding commitments beyond electoral cycles can be an enormous stimulus, with the appropriate governance arrangements in place, to enable regional innovation systems to thrive. Capacity building in this respect is essential, related to the concept of a culture of learning.

The drive towards effective regional innovation systems entails moving away from 'business as usual' and moving into uncharted and risk-prone territory. Our insights and experiences from visiting the Netherlands and Germany have shown what can be possible. We know we have the ingredients in Gippsland and Victoria to make it work, and together with the right process of co-creation involving all stakeholders, there indeed are ample signs in our current environment that we are up for the challenge.

Introduction

For the better part of a year, The Melbourne Sustainable Society Institute and the LH Martin Institute at the University of Melbourne and RMIT University's European Union Centre have together with the Latrobe Valley Authority been working to develop a Smart Specialisation Strategy for the Gippsland region, in Victoria, Australia.

Whilst all involved have realised this is a complex process that requires significant time, the understanding has grown that there is value in the approach and significant outcomes for Gippsland in the years to come. The approach adopted has been modelled on the European approach to regional development, realizing that Gippsland is not Europe and that there are significant economic and socio-cultural differences.

Common however is the focus on place-based innovation systems centered around a specific set of (knowledge) assets that provide a region with a competitive advantage at both the regional, national and global level.

The purpose of the study mission to the Netherlands and Germany in June 2019 was to experience how these approaches to place-based innovation play out in 'real life', how reality differs from theory, and what lessons our European colleagues have learned from their ongoing engagement with regional innovation systems. Given our work undertaken in Gippsland to date, the mission in particular focused on the agriculture/horticulture and new energy sectors.

To guide us on our journey of discovery through the Netherlands and Germany, we drew on a number of experts from the European Union's Smart Specialisation Platform and its Joint Research Centre as well as an extensive network of our research colleagues from both countries involved in regional development and innovation studies.

The Netherlands is an outstanding example for both sectors. It is a world leader in the agri-food sector and extremely strong in socio-technical innovation. Like Gippsland it also is experiencing a transition from fossil fuel dependency to renewables. It is one of the lower performers in the EU in this transition process, in part because its economy still is quite heavily dependent on fossil fuel, imported coal in particular, and its natural gas operations in the Northern part of the country.

Nevertheless, the Dutch government has decided to speed up the closure of its coal-fired power plants and to stop the exploitation of its natural gas resources. The latter as a result of over-exploitation resulting in earthquakes in the Northern region and the subsequent loss of social license. The province of Groningen is now positioned to change from the gas provider of the country to the renewable energy provider of the country, with a particular focus on hydrogen. In contrast, neighbouring Germany appears far more advanced in the development and exploitation of new energy, particularly in the areas of bio-energy, hydrogen and smart grids, areas that also have been identified as strong potentials for Gippsland.



At the start of the mission, in addition to our EU colleagues and our innovation specialists, Dutch government representatives and former leaders of its peak bodies discussed with us how they have tackled the innovation challenge and what makes the “Dutch model” work in terms of the actual collaboration between governments, industry, the education and research sector and civil society. Following the general discussion and scene setting, our mission split in two groups: Food and Fibre and New Energy.

The Food and Fibre group embarked on studying Food Valley in Wageningen, Fresh Park, the Food Innovation and Logistics precinct in Venlo, and the Westland region around The Hague, world famous for its concentration of glass houses and horticulture innovation. The New Energy group traveled to Groningen (in the north of the Netherlands) to investigate its energy transition process including the rapid emergence of the community energy sector, the evolution of the Northern Netherlands Smart Specialisation Strategy, and the strong connections with the tertiary education sector in that region. Following this, the group crossed into the adjacent region of Weser-Ems in Germany with a strong focus on wind energy and hydrogen.

At the end of the mission the two groups joined up again to share their experiences, insights and takeaways for the ongoing work in Gippsland connecting government, industry, the education, training and research sector and civil society to further the creation of a regional innovation system.

This report summarises the main findings from the study mission, with Section 3 providing succinct descriptions of the regional innovation systems that were visited. Section 4 provides a reflection on the key learnings taken from the mission by the participants. Section 5 then explores their implications for the further development of a place-based innovation system in Gippsland.

More detailed descriptions of the sites visited in the different regions are presented in the Appendices.

The Appendices also provide further statistical information on the regional innovation systems as per the European Union’s 2019 Regional Innovation Scoreboard, the profile of the participants on the mission and a summary program with presenters.

Regional Innovation Systems: A Brief Characterisation

Innovation is at the heart of socio-economic growth and development. Among students of innovation there is strong agreement that innovation occurs through fruitful interaction between knowledge institutions, i.e. universities and research institutes, and industry, actively supported by governments and local communities. It is in this sense that innovation is seen as being place-based and conceptualized as a regional system.

The EU study mission focused on a group of distinctive regional innovation systems that each have their own strengths and specialisations, and unique characteristics. In the Netherlands these regions were Groningen (New Energy), Gelderland (Food Valley), Zuid Holland (Westland) and Limburg (Freshpark and Greenport Venlo; Brightlands Campus). In Germany the region of Weser-Ems was chosen for its energy transition experience. We believe that the way in which these regional innovation systems have developed can provide significant lessons for how the development of a regional innovation system in Gippsland can be supported. This will be elaborated in the next sections of this report.

As can be seen from Appendix 1, the Dutch regional innovation systems are characterized as strong innovators in the European Union's 2019 Regional Innovation Scoreboard. Although this is less the case for the Weser-Ems region overall, it does have spots of innovation excellence, in particular around the Oldenburg area, as is elaborated on in the later part of this report.

Geography of course plays a role, with the Netherlands having more concentrated regional systems than Germany given its smaller scale. A brief characterization is presented for each of the regions visited by the Food & Fibre and the New Energy groups during the mission.



Food and Fibre

Food Valley Gelderland

Gelderland is located in the central eastern part of the Netherlands. By landmass, it is the largest province of the Netherlands, enclosing an area of 4,968 km², or 14.7% of the Netherlands' land surface. The province had 2,047,901 inhabitants as of 2016, accounting for 12.0% of the national population (Eurostat, 2018).

Gelderland focuses its research, technological development and innovation (RTDI) efforts on food and health with the addition of Energy themes, justified by a strong energy-related portfolio of companies and research institutions in Arnhem. [Source: <https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/gelderland>].

Food Valley is the primary knowledge-intensive agrifood ecosystem in the Netherlands, concentrated around the Wageningen University and Research campus. This ecosystem is characterized by many world class innovative agrifood and food-related businesses and by the cooperation between companies, knowledge and educational institutions and governments. It offers a platform of resources and opportunities to an (inter)national

business network to accelerate innovation and market introduction. It also supports the attraction of potential partners and investors, thereby stimulating the economy and realizing ambitions in the region and far beyond. Since its establishment in 2004, Food Valley NL has built up a deep insight into the challenges of the (ag)food industry and a vast network of companies and knowledge institutions that can help tackle these challenges effectively.

Close to Food Valley is the World Food Centre in Ede (WFC), which is the food meeting place for consumers, businesses, knowledge institutions and governments. The WFC helps consumers to become aware of food issues and how they can contribute to a healthier and more sustainable future for themselves and their environment. In addition, the WFC is an innovation district for food and agriculture, a place where development and exchange of knowledge between companies, knowledge institutions and consumers is stimulated. It recently received a Euro 17 million grant to develop the WFC Experience.

The WFC Experience has as its goals to provide a balanced insight into the certainties and uncertainties in food and the food chain; to have an (inter) national appearance

where the importance of nutrition and the functioning of the food chain can be seen, and experienced in a transparent, challenging, inspiring and interactive way; to develop into a generally recognized meeting center and positive symbol for the food sector in and outside the Netherlands; to provide a place where Dutch companies and knowledge institutions meet and inspire each other and thus show the role the Netherlands plays in tackling the major global challenges; and to offer an international showcase for the excellent Dutch agrifood sector. It also provides space for a research program that links science and industry and that facilitates and stimulates open innovation.



Food Valley Gelderland

Greenport Venlo Limburg

Limburg is the most southern province of the Netherlands. Its area is 2,209.5km². With 1,117,546 inhabitants as of 2016, it makes up 6.6% of the Dutch population (Eurostat, 2018). The healthcare sector is relatively large, as is the industry, trade and logistics sector. With the province squeezed between the borders of Belgium and Germany, a lot of activity in Limburg has a foreign outlook. The current regional strategy emphasizes a focus on strengthening the regional 'top sectors', most notably logistics, agriculture, high-tech manufacturing and smart industry.

Venlo is a hotspot for the agro- and food sector as well as logistics and manufacturing. Examples are Fresh Park Venlo with over a hundred specialised companies, Greenport Venlo, which is the 2nd largest horticulture area in the Netherlands and the Smart Logistics Centre Venlo, which is a key European logistics hub with about 200 participating stakeholders. The Brightlands Centre, a combined effort to create synergies and knowledge transfer between local/ regional players through the development of several campuses, furthermore is at the centre of the regional economic strategy. [Source: <https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/limburg>]

Greenport Venlo is a rapidly developing agribusiness innovation region with a unique combination of transport hubs, business parks, knowledge institutes and a large fruit and vegetable cooperative (Fresh Park Venlo). It operates on a strong environmental and sustainability philosophy, with 40% of its energy requirements produced and supplied in a sustainable manner. Greenport has the largest solar roof in the Netherlands, comprising 28,000 solar panels. Geothermal energy is used to heat the greenhouses in the "California" horticultural area. A further windmill park is in preparation.

Its strategic position in relation to the international harbours of Rotterdam and Antwerpen, Schiphol and Eindhoven airports and the dense motorway, waterway and railway networks make it both a gateway into Europe and a logistics hotspot (Trade Port Noord).

The strong interaction of businesses (Greenport Business Park; Agri Business Park) with education and research (Brightlands Campus Greenport) has resulted in a deep focus on food security and healthy food and nutrition, future farming and bio-based economy. The Brightlands

Campus is described as "one big experimental environment with a range of impressive facilities: laboratories in the broadest possible sense, experimental fields for open cultivation, greenhouses for research, workshops, pilot facilities and communal areas for meeting as well as sharing information". [Source: *Grow your business in Greenport Venlo – Greenport Venlo Ontwikkelbedrijf*].



Westland – Zuid Holland

Zuid-Holland is one of the most populous and industrialised areas in the world. It is located in the western part of the Netherlands. The area of Zuid-Holland is 2,805 km² (8.3% of the total surface of The Netherlands), the seventh largest province of the Netherlands.

The west of Zuid-Holland has an extensive horticultural sector (vegetables, flowers) and is very important for the Dutch economy because of its exports. Southeast Zuid-Holland stands out in transport and distribution due to its favourable position in relation to the hinterland.

[Source: <https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/zuid-holland>]

The Westland, located around the political capital of The Hague, is the heart of the Dutch greenhouse industry which through its continuous emphasis on technological innovation has made the country the world's second food exporter after the US, measured in value. The Westland also hosts the World Horti Centre which is the international knowledge and innovation center in the world of commercial horticulture. It is located just across from the largest flower auction in the world. Research is an integrated feature across the horticulture industry in the Westland, primarily driven by the industry and supported through the co-location of education providers.



New Energy

Groningen

Groningen is the most northern province of the Netherlands and relatively sparsely populated. It has a surface of 2,960 km², which is roughly 9% of the total Dutch area, and has one city, its capital Groningen. The province has 583,581 inhabitants (Eurostat, 2018), which is 3.4% of total Dutch population. Provincial strengths are energy and life sciences. [Source: <https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/province-groningen>]

Groningen currently is transitioning from the country's gas provider to its renewable energy provider. As such the provincial government has developed an energy transition plan that has remarkable similarity with that of the Victorian government in Australia with a net-zero emission target by 2050 and a 60% renewables target by 2035.

It is home to 100 energy co-operatives providing 100% green energy and reinvesting profits made in community projects and innovation. The city of Groningen is home to one of the oldest universities in the country, which has energy as one of its three societal research areas, as well as a university of applied sciences focusing on knowledge transfer and innovation through, amongst others, its energy transition centre of expertise.

Since 2013 the Northern Netherlands region – the Provinces of Groningen, Friesland and Drenthe – has embarked on its Smart Specialisation Strategy through a bottom up process engaging government, industry, the tertiary and communities sector. The region is characterized by a strong presence of small and medium sized enterprises. Its innovation strategy centred around societal challenges, identifying safe water, clean energy, food security and healthy ageing as the core pillars.

Weser-Ems Lower Saxony

Lower Saxony (Niedersachsen) is one of the 16 German federal states, located in the North-East of Germany. The state is surrounded by North Rhine-Westphalia, Hamburg, Schleswig-Holstein, Saxony-Anhalt, Thuringia and Hessen and it encircles the State of Bremen. It has an international border with The Netherlands.

In 2017, Lower Saxony had 7.9m inhabitants, 9.6% of the German total. It is the second largest federal state (47,641km²) and sparsely populated by German standards (166 inhabitants per km² versus 229 inhabitants/km² at the national level). The regional capital city is Hanover (Eurostat, 2017). [Source: <https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/base-profile/lower-saxony>].

Oldenburg is an independent city in the district of Oldenburg within Lower Saxony, Germany. The city is officially named Oldenburg (Oldb) (Oldenburg in Oldenburg) to distinguish it from Oldenburg in Holstein. The city is the place of origin of the House of Oldenburg. Before the end of the German Empire (1918), it was the administrative centre and residence of the monarchs of Oldenburg.

Regional development and innovation in Weser-Ems are primarily determined by its broad and multifaceted basis of SME and three dominant fields of expertise: the agricultural sector, the energy economy and the maritime economy. In all three fields, the region is characterized by a wide spectrum of enterprises, networks, educational facilities and research institutions with the latter working very application-oriented. Its S3 strategy has been an exemplar of participative decision-making with highly effective outcomes. It is recognised for its expertise in the energy sector in terms of: Bioenergy, Wind energy, Gas, Storage technology, Photovoltaics, and Smart grids. Its key areas in bio-energy are: Plant production, Animal production, Fodder, Agricultural engineering, Food industry, and Bioenergy sources/ bio-based products.

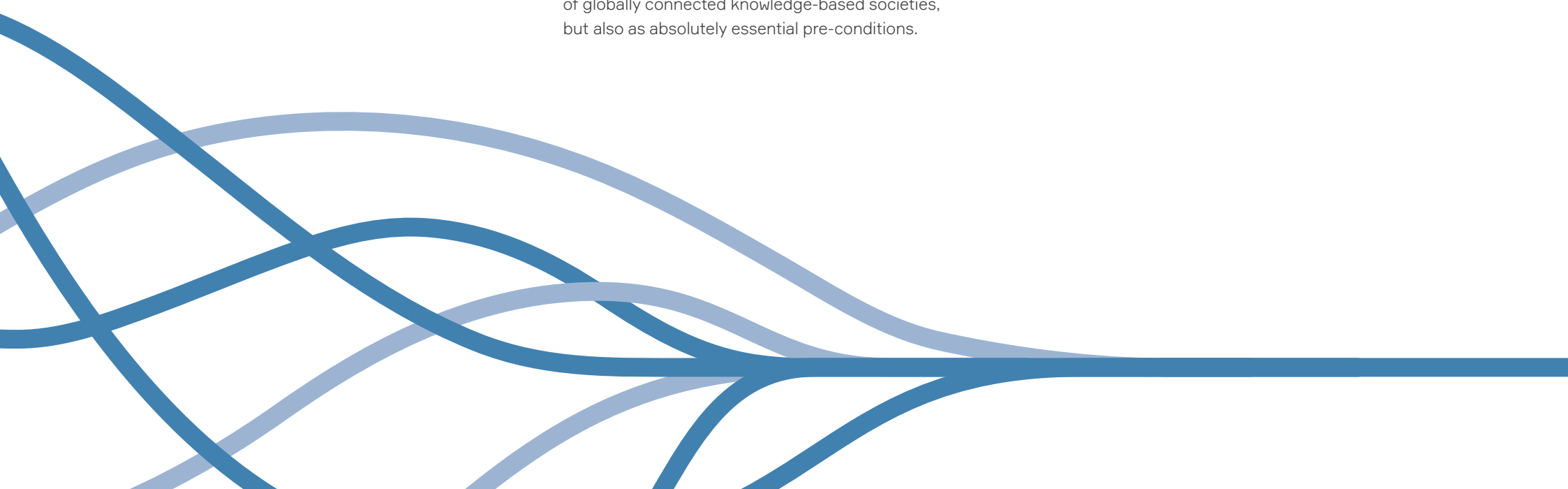


Learnings

Over the next few pages a summary of the key learnings that came out of the study mission is presented. Obviously, it is impossible to incorporate all the nuances that the group has been privileged to experience throughout the visits.

As stated in the Introduction, the Netherlands and Germany are not Australia and the regions and industries visited are not Gippsland and its Food & Fibre and Energy industries. But within the broader context of place-based regional innovation systems there are a number of aspects that stand out as not only facilitating the creation and evolution of regional innovation systems, adjusted to the 21st century realities of globally connected knowledge-based societies, but also as absolutely essential pre-conditions.

They are: a culture of collaboration, the role of the tertiary education and research sector in regional innovation systems, an integrated policy framework that sits within a long-term vision, the consistency and coherence of actions that flow from this in terms of industry-led and government supported and facilitated innovation activities, and a culture of learning. These are elaborated upon below.





Study Mission Delegates

Culture of collaboration

The most striking feature of the study mission has been the realization that at the heart of the successful regional innovation systems and the development strategies embedded within them is a culture of collaboration. Different actors really do work together, be they government, industry, education and research institutions or community organisations. In part, this is the case because collaboration has been necessary for survival, particularly in the Netherlands. Given that about half of the country lies beneath sea level, the fight against water for many centuries has brought people together in collective action as it is impossible to fight water alone. As such, collaboration has become part of the “Dutch DNA”. This has been further supported by a fragmented political system based on a multi-party design that can only function through compromise and coalitions – no one political party has ever been able to govern alone. It is further supported by an industrial system in which government, employers and employees nationally sit together in the so-called Socio-Economic Council to collectively discuss and agree on key policies and processes. This system is replicated at the lower levels of government in the regions. It is colloquially known as “Polderen” – a Dutch word reflecting reclaiming land from water and the time and energy involved in that.



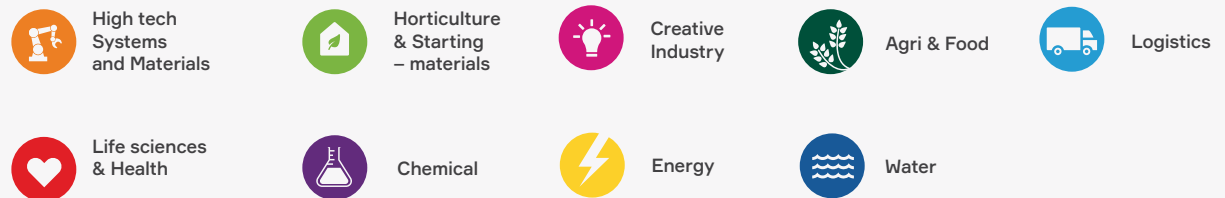
In terms of industry sectors, this culture of collaboration is reflected in formal structures to bring the different stakeholder groups – government, industry, education and research, and community – together. Dutch industry policy is structured around so-called Top Sectors, areas of excellence for the country. In the true spirit of collective decision making and collaboration, this means that almost all socio-economic activity of the country is captured in Top Sectors, including Agriculture, Horticulture and Energy (see Box 1).

What is the Dutch Top Sector Approach?

The Netherlands is a global leader in trade and industry. We generate much of our income in the international arena, but our leader position is not a given.

We will have to do everything we can to remain competitive. For it is only then that we will be able to maintain sustainable economic growth. At the same time, we must take a firm approach to societal challenges such as an ageing population and climate change. These issues are at the very core of the top sector approach, where industry, science and government work together to tackle them. This unique form of collaboration (golden triangle/triple helix) is designed to promote innovation, to attract talent (human capital) and to ensure a solid position for the sectors in the international context.

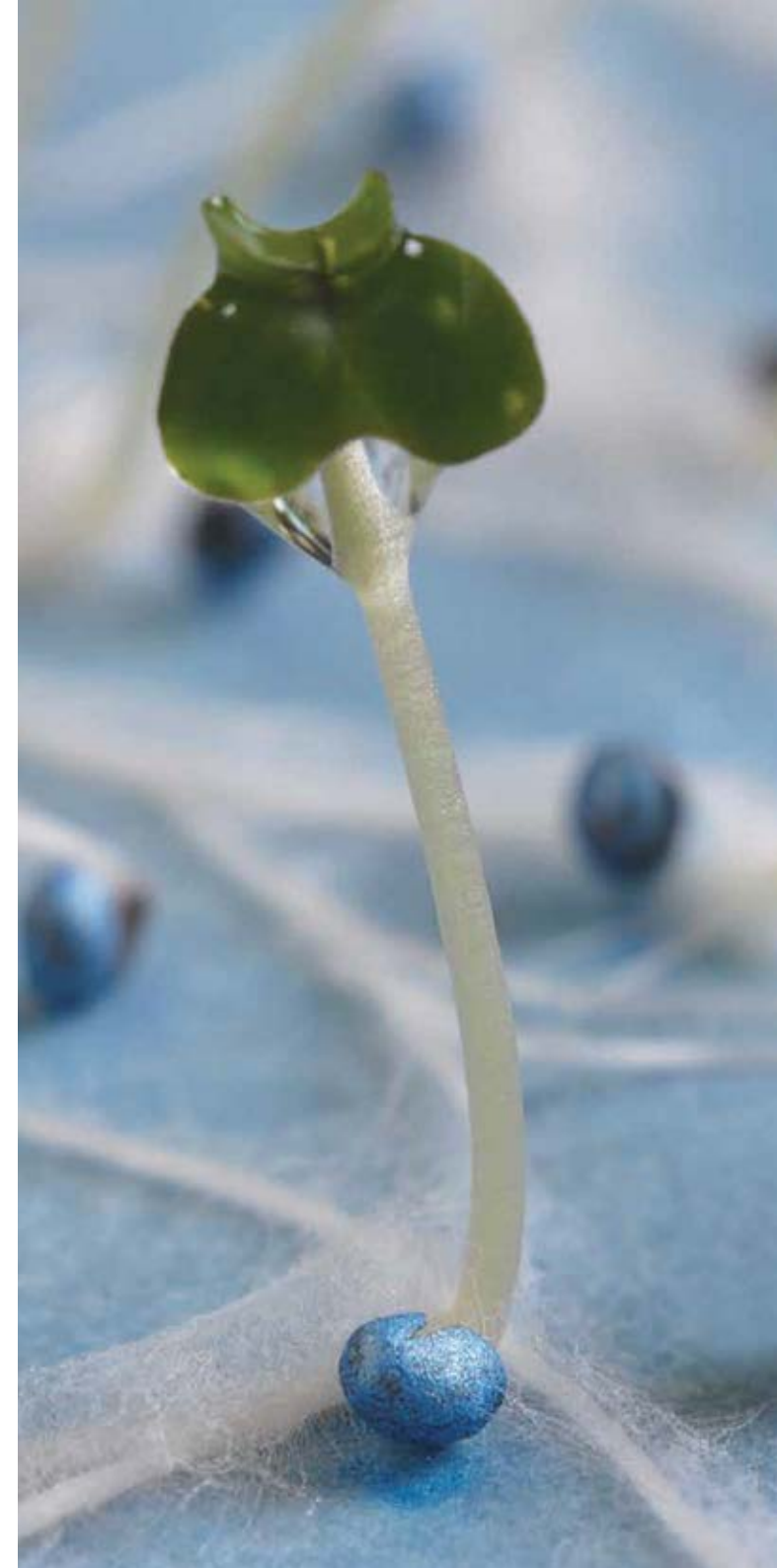
Our approach is focussed on the nine sectors in which we are global leaders: our top sectors. The instruments we use include investments, fiscal incentives, guarantees and cutting down on bureaucracy and red tape.



Box 1: The Dutch Top Sector approach

Collaboration and partnerships in the Dutch context are more than just rhetoric. They translate into integrated industry sectors, such as Agriculture and Horticulture, that take a prominent place on the world stage, as is highlighted in Boxes 2 and 3. Box 2 shows the leading position of the sector in agricultural production in Europe. As argued by the Dutch government:

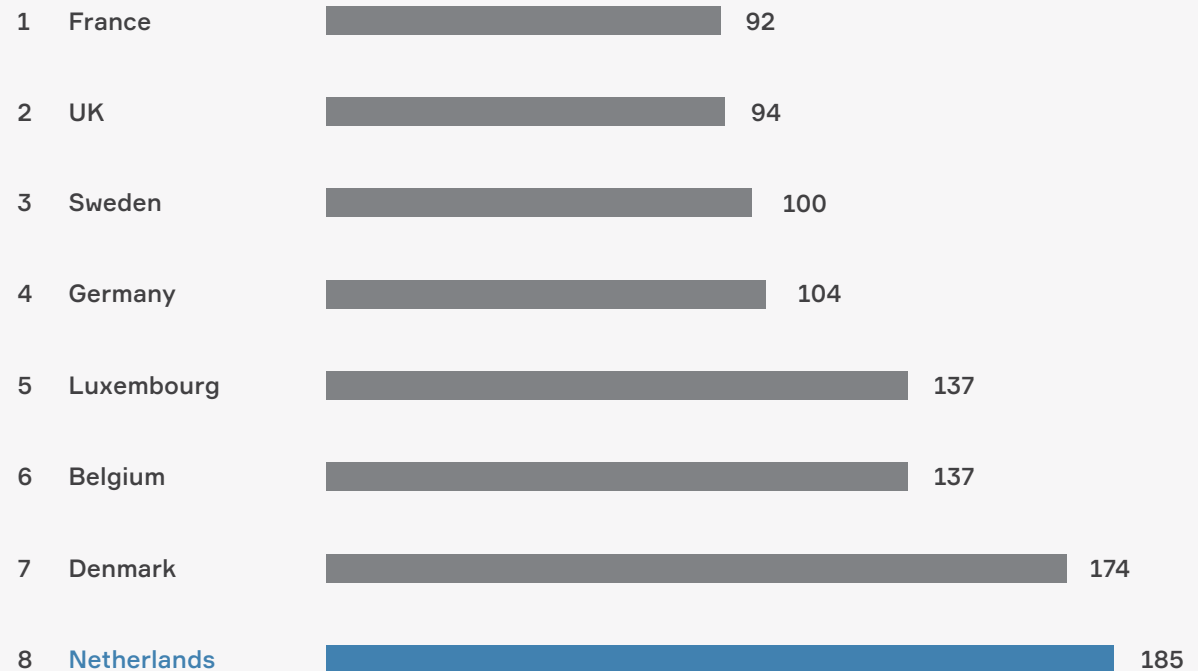
“A wealth of agricultural knowledge, fertile soil, intensive farming, and trading expertise, enables the Netherlands to grow and export high quality produce (€185bn per year). This includes plant-based produce and animal products such as livestock, poultry, meat, and eggs. The horticulture sector is ranked 3rd, worldwide, in nutritional horticultural products – healthy, sustainable food production is a main priority. About 40% of vegetable seeds come from the Netherlands. It also is the largest exporter of fresh vegetables in the world. From animal welfare and food safety to state-of-the-art greenhouse technology and new breeds of plants, government, knowledge institutes, farming and business are working together to come to a circular economy by reducing greenhouse gas emissions and establishing healthy chains.” [Source: *The Netherlands Compared: facts and Figures 2018* – Netherlands Ministry of Foreign Affairs].



Box 3 (next page) provides a snapshot of the agricultural sector, which clearly highlights its importance for the country. The sector is structured around a world leading research industry:

“The Netherlands is a hotbed of agri-food research. Some 12 out of the 40 largest Food & Beverage companies worldwide have R&D facilities in the Netherlands. The government strongly supports agri-food related initiatives by means of public-private partnerships, innovation programmes and clusters. Key R&D centres include Wageningen University and Research Centre (WUR), which is the leading university in the world in the area of agriculture. Regional initiatives like FoodValley or Brainport Foodtech support small and medium enterprises with the valorization of promising innovations. There are many innovative companies specializing in nutrients (such as Nutrilieads and Koppert), keeping foods fresh (Avure), packaging (AlPIA) and optimal logistics. The Netherlands is one of the world’s largest exporter of seeds. Companies like Enza, Incotec, Rijk Zwaan and Bejo improve the lives of farmers around the world by delivering high tech solutions that increase yields while working with nature. Working together with local partners, the right vegetable varieties are developed for every type of region in the world, including saline or arid soils. Methods include traditional and organic breeding methods.” [Source: *The Netherlands Compared: facts and Figures 2018 – Netherlands Ministry of Foreign Affairs*].

Production volume agriculture in 1000€ per labour year (2016)

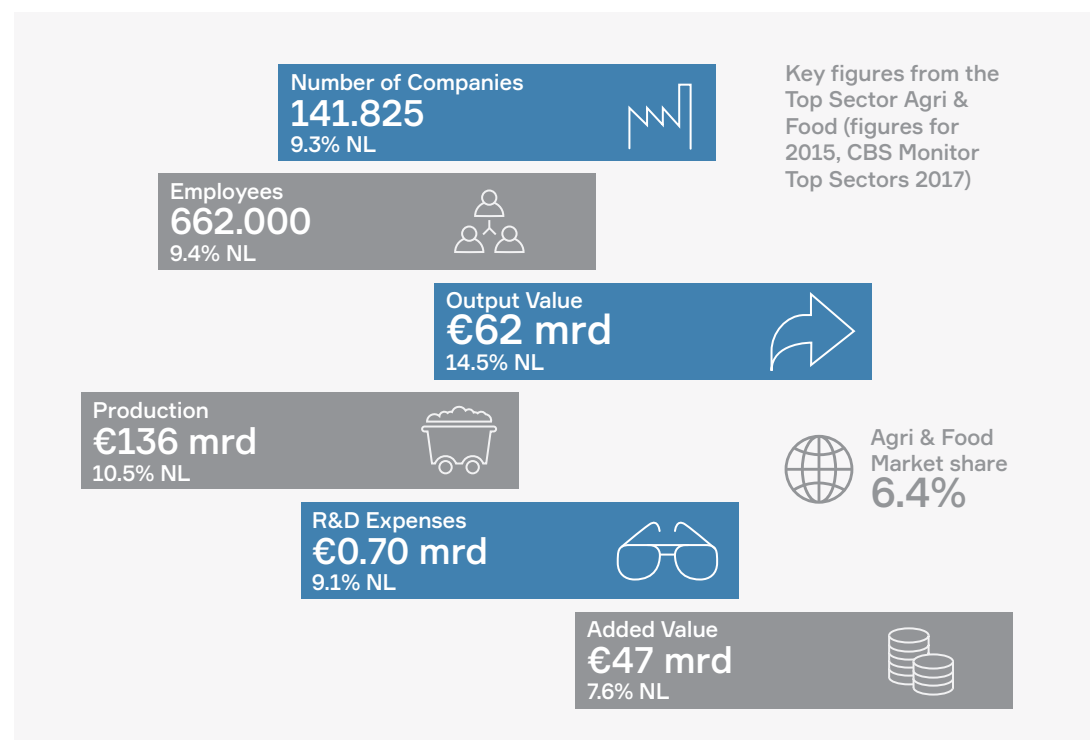


Box 2: Agricultural Production Volume within EU

[Source: *The Netherlands Compared: facts and Figures 2018 – Netherlands Ministry of Foreign Affairs, p.7*].

The Role of the Tertiary Education and Research Sector – Key Component of Regional Innovation Systems

Collaboration also is at the heart of the Dutch tertiary education sector, in particular with respect to partnering with industry. Comparative data shows that Dutch companies fund (or co-fund) a relatively large proportion of the research performed by higher education institutions compared with other countries; and out of all the countries in the comparison, Dutch companies provide the largest share of the funding of research performed by research institutes (such as TNO and the 4 Large Technological Institutes (TO2)). For research performed by Higher Education institutions, the proportion of private funding is stable relative to 2015 (both years 7.8%). The proportion of private funding has increased for research institutes (from 13.6% to 16.1%).
Source: Rathenau Institute: <https://www.rathenau.nl/en/science-figures/process/collaboration/collaboration-rd>.



Box 3: Agriculture sector snapshot
[Source: Knowledge and Innovation Agenda 2018-2021, Top Sector Agri & Food].

The campus is working as a magnet to attract new businesses and economic activity.

During the study mission we saw abundant examples of university – industry partnerships and collaboration that are discussed in more detail later on. But standout examples for agriculture and horticulture are Food Valley Wageningen and Greenport Venlo. For New Energy the standout examples were the New Energy Coalition and the Energy Academy in Groningen, and ForWind in Oldenburg: classic partnership models involving universities in and across regions, regional colleges, major and minor energy companies and local and provincial/state governments.

A recent report by Buck Consultants International analysed the role and impact of university campuses across the Netherlands. As demonstrated in Figure 1 below, the campuses we visited in Groningen and Wageningen are amongst the top 3 mature campuses, with Greenport Venlo still being in the development stage: Groningen #1, Wageningen #3 and Venlo #35. Given the importance placed on precinct development around Morwell (High Tech Precinct, Food Manufacturing Precinct, Aerospace Precinct and Logistics Precinct), performance data on both Groningen and Wageningen is of relevance in the context of knowledge-intensive precincts.

In terms of 'attractor value' – the campus working as a magnet to attract new businesses and economic activity – the Buck report shows that for Groningen the total number of businesses over the period 2014-2018 grew from 114 to 198, with a labour market impact from 2,017 to 3,234 FTEs. For Wageningen, the comparable figures are 90 to 140 businesses employing 1,800 to 2,600 FTEs. The study also shows that employment growth on the university campuses has far outstripped employment growth in the cities in which they are located: Groningen campus 60% increase over the period 2014-18 versus 6% for the city, and Wageningen 44% versus 2% for the city. The majority of these jobs are linked to the education and research institutes, further highlighting the importance of knowledge-intensive innovation. The Buck report concludes that for the Netherlands there is irrefutable evidence that tertiary-based campuses are strong attractors for innovative industries and an

engine for business development. Key drivers in this respect are open innovation through joint R&D and the sharing of knowledge, in particular through public-private partnerships (universities and industries), with the campus acting as a facilitator. But the study also shows that it is not only the campus itself that is a driver for innovation, but also the cluster of economic activities that surrounds it, creating the regional innovation ecosystem. This has been particularly noticeable in the sites visited in both the Netherlands and Germany (see site visit reports in Appendix 1). Sharing of facilities has proven to be an important support for start-ups and spin-offs on the campuses. In particular for campuses outside of the key cities in the Netherlands, the role of regional socio-economic driver for innovation and growth has been shown to be very significant (*Source: Buck Consultants International (2018) Inventarisatie en meerwaarde van campussen in Nederland [Inventory and Added Value of Campuses in the Netherlands]*).

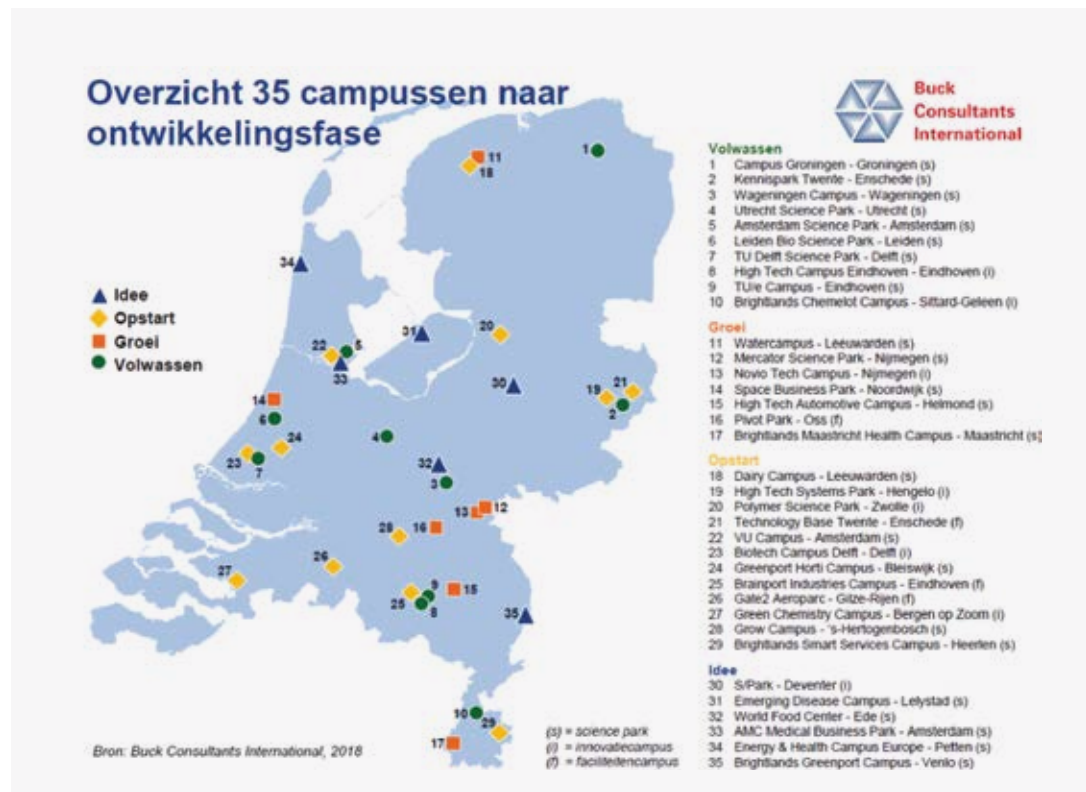


Figure 1: An overview of Dutch campuses and their development stage
Translation: Volwassen=Mature, Groei=Growth, Opstart=Start-up, Idee=Idea

Weser Ems

As is the case for the Dutch regional innovation systems that were visited during the study mission, collaboration also was at the heart of the innovation drive in Weser-Ems: collaboration and networks were central to innovation in the New Energy sector. We will return to this a little later in this section, but it is important to highlight the importance of the presence of universities, colleges and research institutes that both initiate research with and respond to demand from industry, and translate this into up-to-date and relevant training programs.

German universities traditionally may have been portrayed as being fairly aloof from society and dominated by the 'God-Professor', but modern history paints a very different picture. Partly as the result of a diversity of traditional research universities and universities of applied sciences – a situation very comparable to that in the Netherlands – the German universities take a world leading position when it comes to engagement with industry. It has resulted in mixed career trajectories for academics with many in the technical universities having significant industry experience and dual appointments are not being frowned upon, and being the rule in universities of applied sciences.

Benefits are considered to be four-fold:

- Researchers benefit: Access to actual industrial research problems, access to industrial research infrastructure;
- Universities benefit: Research funding, shared professorships;
- Students benefit: Internships and BA or MA theses with companies, diversified career options in academia, industry or administration;
- Companies benefit: Enhancement of innovative strength and access to the university's research capacity, human resources.

[Source: Hippler, 2018 – German Rectors' Conference presentation].

Innovation Network

The city of Oldenburg can be seen as an important knowledge hub of the region's renewable energy industry and information technology. Start-ups and innovative spin-offs find office, laboratory and workshop space on around 10,000sqm in the 'Technology and Start-up Centre Oldenburg' (TGO) on Marie-Curie-Strasse, which opened in 2003 and expanded in 2010, located directly at the University of Oldenburg.

Many of the region's actors in the innovation system for renewable energy are linked to OLEC, a regional-wide innovation network in the energy context.

OLEC
(Regional Energy Innovation Network Organization)



'Innovation and knowledge management for the energy system of the future'

- The Oldenburg energy cluster OLEC e.V. is the largest cross-technology energy network in northwest Germany.
- Small and large companies as well as universities, regional authorities and educational/training institutions are part of the network.
- The members have extensive know-how and excellent skills in the energy sector and focus on renewable energies and their efficient integration into future energy systems.
- OLEC brings together important players from the region and sees itself as a dialogue platform for the energy turnaround in state of Lower Saxony.

Goals of the organization

- Integration of renewable energies into the future energy systems
- Driving the transfer of knowledge and technology from research to industry
- Initiation of joint cooperation and research and development projects
- Location marketing for the Energy State of Lower Saxony and the Northwest Region
- Lobbying for the energy sector
- Promotion and strengthening of the education and training sector as well as securing and retaining skilled workers
- Development of cross-border and international cooperation projects

More information: www.energiecluster.de/de

Integrated Policy Frameworks with Long Term Vision

The second aspect that was identified as a key driver for innovation success and an essential pillar for the successful development of a regional innovation system was the existence of an integrated policy framework that at the minimum had a time horizon that was longer than four years and at best set the course for a long term vision for the region well beyond current election cycles.

Within a Smart Specialisation Strategy (S3) context, the mid-term time framework is a given as the standard funding framework is a 7 year horizon. But given the European Commission's adoption of the S3 framework for the next Framework period – Horizon Europe, 2021-2027 – and the nature of the S3 strategy as building on, adapting and/or extending the developed S3 priorities, this approach can de facto be seen as a long-term, place-based innovation system strategy. This integrated and long-term nature was very evident in the regions that were visited and had developed and implemented S3: Weser Ems and Groningen/North Netherlands.

Case Study of Smart Specialisation

A key objective of smart specialization in the Weser Ems region has been driving innovation through knowledge networks, cooperation, research, training and education. This resonates with the ideas for a 3S strategy developed by the government of Lower Saxony. 'Professionalizing' innovation and the transfer of knowledge at the interface between academia and industry were seen as a key element of smart specialization (3S Lower Saxony 2014).

Understanding of Innovation

The government of Lower Saxony suggests that innovation needs to be understood in new and diverse ways. Innovation is not only related to new products (product innovations), it also includes changes in processes (process innovations), new forms of work and organisation and, in connection with this, new types of management systems (organisational innovations), as well as the development of new business models, new market structures or market entries (business model innovations). Furthermore, highlighted were the increasingly important roles of environmental and social innovations (3S Lower Saxony 2014).

Lower Saxony seeks to improve the framework conditions for innovation by:

- expansion of business start-ups and wider development of an entrepreneurial culture
- strengthening the innovation potentials in rural areas
- promoting ecological responsible structural change
- the use of diversity and equal opportunities
- further development of cross-border and international knowledge networks

The Role of Knowledge Networks

The identified regional economic focus areas in the Weser Ems region are based on complex value chains, and the regional specific knowledge systems. An important part of this system is the regional knowledge infrastructure (universities, research institutions, competence centers, training and further education institutions), which are strongly linked to the bioeconomy/agricultural system technology, energy and maritime sciences, as well as related industries (3S Weser Ems 2013).

Knowledge and capabilities are important to overcome challenges today, but also to prepare for the future. Close cooperation with the region's universities will play an important role in the success of knowledge networking. In order to use knowledge and capabilities in the best way possible, the existing knowledge infrastructure needs to be further connected and expanded on the basis of the regional cooperation culture (see previous section). The knowledge networks must be supported by all regional actors involved in the generation, diffusion and protecting of knowledge. Knowledge networking - across industries, clusters and fields of expertise – is key for achieving sustainable and resilient development scenarios and viable concepts for the region (3S Weser Ems 2013).

Vocational Training and Dual/Integrated Study

A field of action in the region is knowledge networking for vocational training - starting with (pre-)school education. Developing human capital through vocational training is seen as important to continually develop skills to innovate. Potential lies in the dual/integrated study that has been established in the region. Their further profiling, expansion and promotion are highlighted. The concept of the 'open university' provides further opportunity to foster practice-oriented capability within the region's knowledge and innovation systems. The expansion of the regional knowledge base needs to be supported through active professional and regional marketing by regionally existing associations. Future-oriented professional and interdisciplinary training needs to expand (3S Weser Ems 2013).

Inter-company Learning Through Cooperation

Further inter-company cooperation, particular between SMEs, is seen as an opportunity for producing and sharing knowledge. Innovations around new key technologies could be a result of sharing knowledge or technical infrastructure between companies.

Knowledge Exchange

Strengthening networking and knowledge exchange at 'technology transfer points' and closer relationships between municipal innovation agencies, the existing competence centers, networks and clusters as well as regional R&D institutions.

Professionalization of Innovation

The support and transfer of innovation are cross-sectional tasks. The introduction of 'knowledge managers' and therefore the 'professionalization of innovation' in the region are sought to be strengthening the knowledge transfer between a variety of stakeholders. New structures of competences and cooperation between industries, as well as the cross-disciplinary knowledge networking are seen as crucial in triggering innovation.



Research as Driver of Innovation

Without any bigger manufacturing industry and dominating service sector, the region seeks to establish itself as a location for research and science. The Carl von Ossietzky University Oldenburg plays a key role in achieving this goal. With constantly increasing numbers, the university has more than 15,500 students and 2,500 employees. In 2009, the ambitious goals of the city were awarded with Germany's 'City of Science' prize in 2009. A key focus of the University is the renewable energy sector, particularly wind energy.

Inter-regional Cooperation

More recently, to diversify the university foci areas and drive inter-regional exchange, the University established the 'European Medical School Oldenburg Groningen', a medical faculty in close cooperation with the Rijksuniversiteit Groningen in the Netherlands. The model study course was initiated in 2012 in accordance with the requirements of the medical licensing regulations. Students from Groningen can complete parts of their studies in Oldenburg; students from Oldenburg spend at least one year of their studies in Groningen. The European Medical School also offers a Dutch Master of Science in Genetics from the Rijksuniversiteit Groningen, which entitles students to practice medicine in all countries of the European Union under European law. *More information:* <https://www.weser-ems.eu/wissensregion/de/>

The S3 approach in the North Netherlands – a cooperative effort of the three Northern Provinces Groningen, Friesland and Drenthe – is structured around the same model and characteristics, although obviously having somewhat different priority areas given the place-based nature of regional innovation systems. The co-ordinating body running the S3 process is the North Netherlands Alliance (SNN) a collaborative body spanning the three Provinces with a key focus on

networking and connecting actors and actions, which it sees as the unifying force that keeps the project on track. The Alliance was built on a long tradition of collaboration in the North and was formalized in 1992. It presents itself as: "We stimulate, facilitate and connect".

Key focal areas in the region that consists of 96% SMEs are:

- Agriculture (potatoes and dairy)
- Energy (natural gas)
- Health care
- Water technology

The S3 was formalized in 2013, using extensive consultation with a broad stakeholder group. As identified above, it could build on and benefit from an existing culture of collaboration. The bottom up process, facilitated through SNN, resulted in S3 getting a 'foothold' on the 'ground floor', resulting in a mix of initiatives and activities such as innovation environments, living labs, test beds and joint research initiatives. The joint initiatives involved industry and the tertiary sector, supported and facilitated by the public authorities across the North. The common denominator of these activities was the

search for new opportunities: new areas of specialization that would result in competitive advantage. A quadruple helix approach for the governance of the strategy was devised with the establishment of an Innovation Board, but it is recognized that there still are governing issues and this is a learning and long-term approach. Ownership remains an issue, despite improvements over time.

During the Entrepreneurial Discovery Process realization dawned that there was not sufficient relevant regional data to underpin sharp choices. This resulted in opting for four grand societal challenges:

- Safe water
- Clean energy
- Secure food
- Healthy ageing

on the assumption that further sharp choices in these domains could be made over time. Again, this has proven to be a little ambitious, but the actual S3 process has been very helpful. It has allowed for the creation of favourable conditions for collaboration, fostering continuity in those processes, narrowing priorities down by trying and doing (trial and error), and allowing to be "not too early" in making final choices. In the North of the Netherlands building a place-based regional

innovation system clearly is seen as something that takes time, case and a 'softly-softly' approach. Currently preparations are underway for a new S3 submission, incorporating the learnings from the first 7 years.

Whilst there are clear similarities and learnings from the two S3 case studies, it has also become clear that S3 is not the only answer to place-based innovation. Across the Agriculture and Horticulture sectors in the Netherlands, a far more sectoral focused approach has been taken with strong linkages to the Top Sectors. Knowledge and innovation agenda's have been developed through the various Top Sector governing bodies, aligned with the countries innovation and science agenda.

Whilst the Agriculture and Horticulture sectors have a long history of collaborating and operating as a strong sector, the time horizon for the current Top Sector initiatives has a shorter time span than the S3 programs discussed earlier. This is primarily the case because they are linked to the national government and its election cycle. It should be noted, in line with the previous section, that the government, private sector, universities and

research centres are working together in the Top Sector Alliance for Knowledge and Innovation (TKI) to further strengthen top sectors. Innovative products and services development take centre stage in this, supported by a strong international linkages programs through the ministries of Economic and Foreign Affairs, supported by an extensive network of overseas trade missions.

The trade aspect was particularly noteworthy to the participants in the mission, exemplified by the concerted commercial sector approach underpinning the World Horti Centre in the Westland. In this sense, it also became clear that longer-term industry interests are translated into longer term national policy frameworks. This will also be elaborated upon in the next section.



Industry-led and Government Supported and Facilitated Innovation Activities – A Nuanced Perspective

What we experienced in our travels across the various innovation ecosystems in the Netherlands and Germany was a far more nuanced approach to regional innovation than the traditional linear or 'closed' innovation story. In fact, we witnessed "open innovation" in real-time and real-life.

Whilst the concept of innovation always has received significant attention in both the policy and the research literature, in the wake of the rise of the digital revolution and associated changes the concept of open innovation has risen to the fore. Traditionally, innovation has been defined as "the implementation of a new or significantly improved product (good or service), a new marketing method, or a new organisational method in business practices, workplace organisation or external relations" (OECD, 2005). Although this definition still is in common use throughout much of the developed world, in a way it is a limited view of innovation. It does not have much to say on the processes through which innovation is created. To get a better understanding of the latter, it is useful to distinguish between closed and open innovation.

Table 1 summarizes the different conceptualisations of the innovation process as captured under the labels open

and closed (Chesbrough, 2003), based on the argument that our world is increasingly becoming more and more complex, with advances in knowledge increasing rapidly, and knowledge also becoming increasingly distributed globally. As a consequence, the traditional closed

approach to innovation is no longer fit for purpose as the costs of research and innovation projects grow exponentially; the generation of new knowledge occurs through cross-fertilization across disciplines; the life cycles of new technologies are increasingly shorter; and knowledge leaks happen more and more frequently.

Closed Innovation Principles	Open Innovation Principles
The smart people in our field work for us.	Not all of the smart people work for us* so we must find and tap into the knowledge and expertise of bright individuals outside our company.
To profit from R&D, we must discover, develop and ship it ourselves.	External R&D can create significant value: internal R&D is needed to claim some portion of that value.
If we discover it ourselves, we will get it to market first.	We don't have to originate the research in order to profit from it.
If we are the first to commercialize an innovation, we will win.	Building a better business model is better than getting to market first.
If we create the most and best ideas in the industry, we will win.	If we make the best use of internal and external ideas, we will win.
We should control our intellectual property (IP) so that our competitors don't profit from our ideas.	We should profit from others' use of our IP, and we should buy others' IP whenever it advances our own business model.

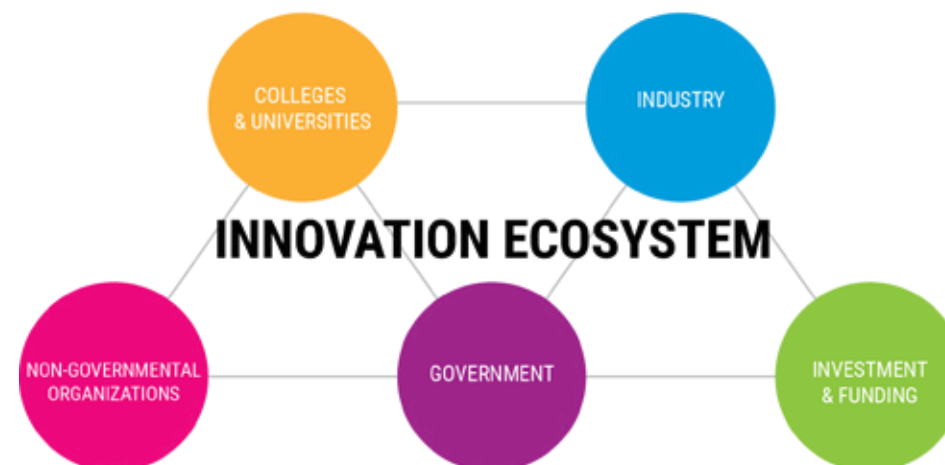
Table 1: Closed and Open Innovation Principles
[Source: Chesbrough, 2003]

As global trends outlined above make “control” over the innovation process increasingly unproductive and impossible, a far more open and connected approach to innovation has emerged, based on cooperation, complementarity and sharing of knowledge and resources. The principles underpinning this approach are that learning and knowledge rest in the productive diversity of opinion; that learning is a process of connecting specialised nodes or information sources and that the capacity to know more is more critical than relying on what is currently known.

In this process nurturing and maintaining connections are needed to facilitate continuous learning and that consequently the ability to see connections between fields, ideas and concepts becomes a core skill; and that currency (accurate, up to date knowledge) is at the core of all connected learning activities (Fratinni, 2017). In this evolved conceptualisation of innovation, the classic know-how increasingly is being replaced by know-where. This is clearly articulated in the notion of innovation as ecosystems.

The most striking cases of this open innovation approach were found in Food Valley Wageningen, Greenport Venlo, EnTranCe Groningen and Oldenburg, Weser Ems. This is not to say the ‘traditional’ industry-led approaches to innovation were absent. Certainly many of the horticulture industries in the Westland would in some form or fashion resemble at least parts of this modality. Seed firm Rijk Zwaan would be a classic example of doing the majority of its research in-house and the way it reached out to Phillips Lighting for introducing led lighting for sophisticated plant growth processes a true case in point.

But overall, what we have experienced was a fairly fluid and interactive process between industry, universities and specialized research institutes exploring the boundaries of product and process innovation. What has been a constant across all regional innovation systems visited has been the supportive, facilitative and at times long term partnership roles played by local, provincial/state and national governments, very much in line with the principles underpinning the concept of the “entrepreneurial state” to which we will return in the next section. This again highlights the collaborative and partnership concepts discussed before.





A Culture of Learning

The final aspects of the learnings we have taken away from our regional case studies on innovation has been the continued emphasis on learning. This starts with the basic notion that in order to be able to compete in a globally competitive world, a well-trained workforce is an absolute prerequisite. It is highlighted in some of the regional innovation profiles in Appendix 1 in terms of both levels of educational attainment and lifelong learning. There is no denying that for a regional innovation system to flourish, high levels of educational attainment are a key factor.

But a culture of learning is far more than 'mere' educational attainment. It reflects an attitude that is a second inherent feature of any innovation system, namely that failure is part of the process and that we can seriously learn from failure rather than perceive it as a negative. Success by no means is guaranteed when it comes to innovation activities, and this is as true for firms as it is for universities, colleges, governments and community organisations.

What we have seen is an embracing of calculated risk, an acceptance of the possibility of failure, and the absolute willingness to learn from past processes to improve future performance. In particular this was accepted by a variety of government agencies that were not averse to policy experimentation and new ways of 'doing business' with a view of being an active partner in a process of open innovation as identified before.

This has been the case across the board, and most likely sums up our lessons learned quite well: yes, it is all about collaboration, a well-established and functioning tertiary education and research enterprise is an absolute must, long term integrated policy frameworks are crucially important, and accepting the new modality of open innovation is essential. But at the heart of the dynamics of regional innovation systems is the acceptance and willingness to learn from each other as partners within the ecosystem.

We have seen how these building blocks can work together and produce amazing results. The challenge now is to take this further in an Australian, Victorian and Gippsland context. We will discuss this in the next section.

Conclusions

Implications for the further development of a place-based innovation system in Gippsland:

It is clear from all the previous sections that regional innovation systems are not built overnight. Both the Netherlands and Germany demonstrate that such systems can only thrive through sustained nurturing, trial and error, an acceptance of mutual dependency, and a recognition that each and every actor in the system has a particular role to play. So what does that mean for Gippsland?

1

First and foremost, it means that the current policy initiatives initiated by the Latrobe Valley Authority should not be seen as a magic bullet that will change everything for the better next year. This does not mean there should be no ambition to achieve major and fundamental change, but expectations should be realistic. Our past experiences with S3 have shown that we have a way to go to develop a culture of collaboration, trust and sharing of knowledge and experiences, as this is not in Gippsland's DNA as it is in the regions we have visited. This means we must continue to bring stakeholders to the table, accept that at times it will be two steps forward, one step backwards, and even occasionally two or three steps backwards. Building a culture takes time, but without a strong basis in collaboration and partnerships it will be a very hard task indeed to create a truly Gippsland-based innovation system.

2

Second, we have seen that the prominent presence of tertiary education and research is crucial to effective regional innovation systems. We know that Gippsland has some challenges to overcome and that we cannot ignore these. We also know that Victoria as a state is blessed with a world-class tertiary education and research system. Thus, at a conceptual level it is a no-brainer to make this resource work for Gippsland, its industries and communities. Practically, this is an entirely different challenge given our lack of collaboration and connectedness and our relatively poor track record in university and college engagement with both industry, in particular with the SME sector, and communities. Yet, we cannot take the ostrich approach and will need to tackle this issue head on.

3

Third, we do not have a lack of opportunity. The processes currently set in motion through a combination of government initiatives such as the various precinct projects, the support for place-based regional development, the emergence of industry clusters, and a series of policy settings at the State level, such as aggressive climate targets and the concepts of a circular economy, provide impetus for inclusive change. But capitalizing on this opportunity is dependent on the first two conditions being met.

4

Fourth, appropriate and long-term governance and funding arrangements need to be put in place. Place-based innovation requires some form of decentralized governance authority to co-ordinate and monitor the development of and progress towards a truly regional innovation system. As our overseas examples have shown, funding commitments beyond electoral cycles can be an enormous stimulus. But equally, governance is one of the Achilles heels for effective regional innovation systems to thrive. Capacity building in this respect is essential which comes back to the concept of a culture of learning discussed in the previous section. The drive towards effective regional innovation systems entails moving away from 'business as usual' and moving into uncharted and risk-prone territory. This is not something governments and businesses in Australia, Victoria or Gippsland are accustomed to. Again, the necessary culture shift to accommodate this is not easy nor straightforward, but there are sufficient signs in our current environment that we are up for the challenge.

Our insights and experiences from visiting the Netherlands and Germany have shown what can be possible. We know we have the ingredients in Gippsland and Victoria to make it work. It is 'just' a matter of the right process of co-creation involving all stakeholders. The next section will provide more detailed information on how this has been handled in the sites that were part of the study mission. We hope they provide inspiration and food for thought. Yet our key messages are contained in the preceding ten pages of this report.

Appendix 1:

Site Visits/Profiles

Food and Fibre Site Visits

The Netherlands is a major global producer of vegetables and fruit, with the horticulture sector being the third pillar of the Dutch economy. In the European Union, as the fifth largest producer of vegetables, the Netherlands has a unique hub function in the import and export of vegetables and fruit - it exports fresh vegetables and fruit to approximately 150 countries across the world and it imports from 107 countries, of which about three quarters is exported again.

- Part of Hanseatic League, trading milk, cheese, meat, wood, cereals since the 14th century, with economic development based on water transport
- Flanders river delta has 35m inhabitants in over 5 countries, providing a strong economic base with major metropolitan centres, with most products exported within the surrounding 200 km region.
- Region is 2nd largest national domestic producer after Westland of pork (40%), chicken (50%) and 2nd largest greenhouse area and producing mushrooms and ornamental trees, spinach and asparagus.
- Multi-modal logistics underpin the development of the agrifood sector in the region - through Freshpark Venlo distribution to west Germany, with a consumer base of 20m people.



Province of Gelderland – Arnhem – Nijmegen region

Agropark Bergerden: Sweet Pepper Greenhouse - Van der Harg and van Winden

The greenhouse company van der Harg and van Winden started production in 2004 at Agropark Bergerden, producing red sweet peppers in a 8.6 ha greenhouse with a productivity of 32kg/m².

- Using artificial lighting and biological pest control, peppers are sorted, graded and packed on the premises, using robotics for packing, enabling the company to directly deliver to supermarkets.
- Greenhouse product is sold to a co-operative 'The Greenery' to handle sales and distribution for over 1,000 members, with the co-operative setting prices and negotiating deals.
- Gas is used to produce electricity during periods of high demand and prices, at other times power is stored and sold to the grid when prices are high, which makes the cluster profitable. Energy retailers purchase power from the greenhouses at periods of peak demand

www.verseoogst.nl/telers/van-der-harg



Freshpark Venlo – Greenport Venlo

Greenport Venlo is one of six Greenports in the Netherlands, Consisting of working landscapes and knowledge landscapes, with soil systems, closed water balance systems and renewable energy (solar and geothermal) generation.

- Greenport Venlo is the main distribution hub in the south eastern part of the Netherlands, with multi-modal connections through road, rail and water to the main harbours of Rotterdam and Antwerp and the large urban centres in the north-western European delta.
- Freshpark Venlo is the consolidation centre for fruits and vegetables at the Greenport, with logistics and processing companies on site providing storage, distribution functions, processing, and export and import trade and services.
- Per day, 1,500 trucks transport 5,000 products, each with specific temperature and handling requirements. Started more than 50 years ago as a co-operative auction of the fruit and vegetable growers in the region and is still owned by around 350 farmers
- On site is a cash and carry for small traders to supply wholesalers and restaurants, who order online for distribution from the Freshpark.

www.greenportvenlo.eu



Frankort + Koning

An international organization that globally sources fresh fruit and vegetable product (South America, Africa, Asia) and handles logistics and distribution to end customers.

- F+K work along the whole food/supply chain, from breeding/production/trade to wholesale/retail and food service, enabling them to source new products and exchange knowledge and market information with their customers for new innovations.
- Collaboration with Wageningen University and Research (WUR) on research informs business decisions and provides practical solutions for eg: quality and technology, warehouse design etc.
- F+K are part of a consortium of 42 SME partners which funds pre-competitive projects for fundamental and applied research eg: on harvest, logistics issues, with each member paying a fee and in-kind support of EUR20k per year. F+K have invested EUR40K in cash and EUR40K in kind over the last 3-4 years. The fund has a total of EUR5m in funds.
- This is linked to the NL government Top Sector Strategy, where grants for project proposals developed by industry are provided to knowledge institutions such as WUR

www.frankort.nl



Brightlands Campus Greenport

The 'Brightlands' campus co-locates knowledge institutes and innovation start-ups to create new value propositions in agriculture and food, on the former site of the 2012 world flower exhibition.

- Entrepreneurs, large enterprises, start-ups, scientists and students work together at innovations for healthy and safe food, the farming of the future and the bio-circular economy.
- Cross-sectoral linkages are made with manufacturing industry, information and communication technology, logistics and the other three Brightlands campuses across the Netherlands.
- Onsite laboratories monitor and analyse the journey of food through the body to assess the impact of food and products on health eg: from how we experience taste, scent, or texture to simulations of metabolic processes.
- Innovations in future farming and the bio-circular economy have resulted in higher nutritional values and yield to produce healthier and safer products.
- The Biotreat Centre on campus - a partnership between companies, the Province of Limburg, and knowledge and education partners in the Southern Netherlands - creates connections between raw biomass and high-quality product applications, leading to new businesses.

www.brightlands.com



Vreba Dairy

Vreba Dairy (Vreba Melkvee b.v.) is the biggest and most innovative dairy farm in the Netherlands with 2300 milking cows and 1500 young stock.

- Operate a closed dairy stable with full air conditioning developed in collaboration with Wageningen University and Research, and support by local and regional government and private investors.
- The farm reaches an average productivity of 11,300 kg milk per cow per year and an average of 4.3 lactations per cow.
- Vreba Dairy delivers dairy farm equipment and machinery throughout the world with advanced solutions for feeding, milking and managing cows.
- In collaboration with neighbouring livestock farms, the company develops advanced innovative solutions in manure processing and mineral management for the export of fertiliser pellets to the Middle East.
- Vreba Dairy is the home base for a large development project in Brasil, developing fully integrated chains for the production of soy, corn and roughage, milk production and milk processing.

www.melkvee.nl



Kipster

Kipster is a chicken farm designed to meet the chicken's natural needs, developed to the highest standards of animal welfare and sustainability - to achieve the production of carbon neutral eggs.

The chicken farm operates as a transparent and open farm open to the public, with the farm site developed over four years with consumer input.

- Animal welfare and sustainability actions include closed loop farming, no wasting of roosters and spent hens, no emission (almost) of fine particles and the setting of a forest edge with tree stumps and natural soil outdoors as part of the chickens' living area.
- Another sustainable chicken farm in the region, WitweldVeg has developed an innovative approach to the chicken's life cycle - chickens are moved slowly on a conveyor belt over a two week period, which reduces stress during harvesting and transportation requirements. Hatching takes place on site. Chicken manure is further processed to extract chemicals.

www.kipster.farm

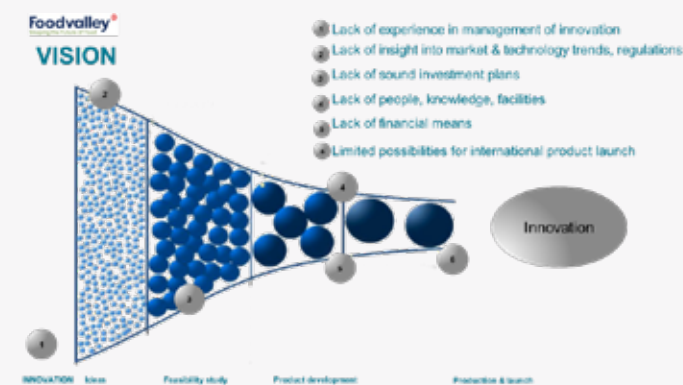


Food Valley NL

FV was established in 2004 to enhance and apply existing knowledge and provide the support infrastructure to optimize knowledge networks with a focus on innovation.

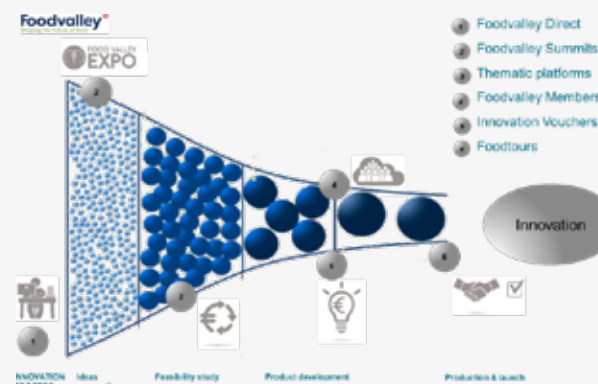
- Established with the support of the Province of Gelderland, funds are provided by partners in the cluster including WUR.
- FV has Membership of 160 companies - both European and international food producers, including large corporates such as Heinz, Unilever; Suntory, Kikkoman, and SME's.
- FV acts as a connection point for local and international collaboration, with a focus on agricultural and food innovation within an ecosystem connected with high tech knowledge. Start-life - Plus Ultra is an onsite early stage accelerator program for entrepreneurs.
- Societal challenges and SDGs drive the approach to food innovation, such as waste, population nutrition, health and consumer trust issues. Thematic consortia are formed as public private partnerships are linked to Top Sector themes agriculture, food and feed domains.
- FV focus themes include: bio-based economy, green proteins, precision agriculture, packaging design and material flows.
- FV is a knowledge hub with 8,000 scientists, support for start-ups, and investors on site, and collaborations with WUR and other agri-food clusters.

Industry Innovation challenges:



- FV activities build capacity in the innovation funnel through summits, platforms, vouchers, food tours with programs for idea generation, feasibility studies, product development and product launch. Support for SME international market entry and trade is provided through tours and trade shows.

FV Innovation ecosystem:

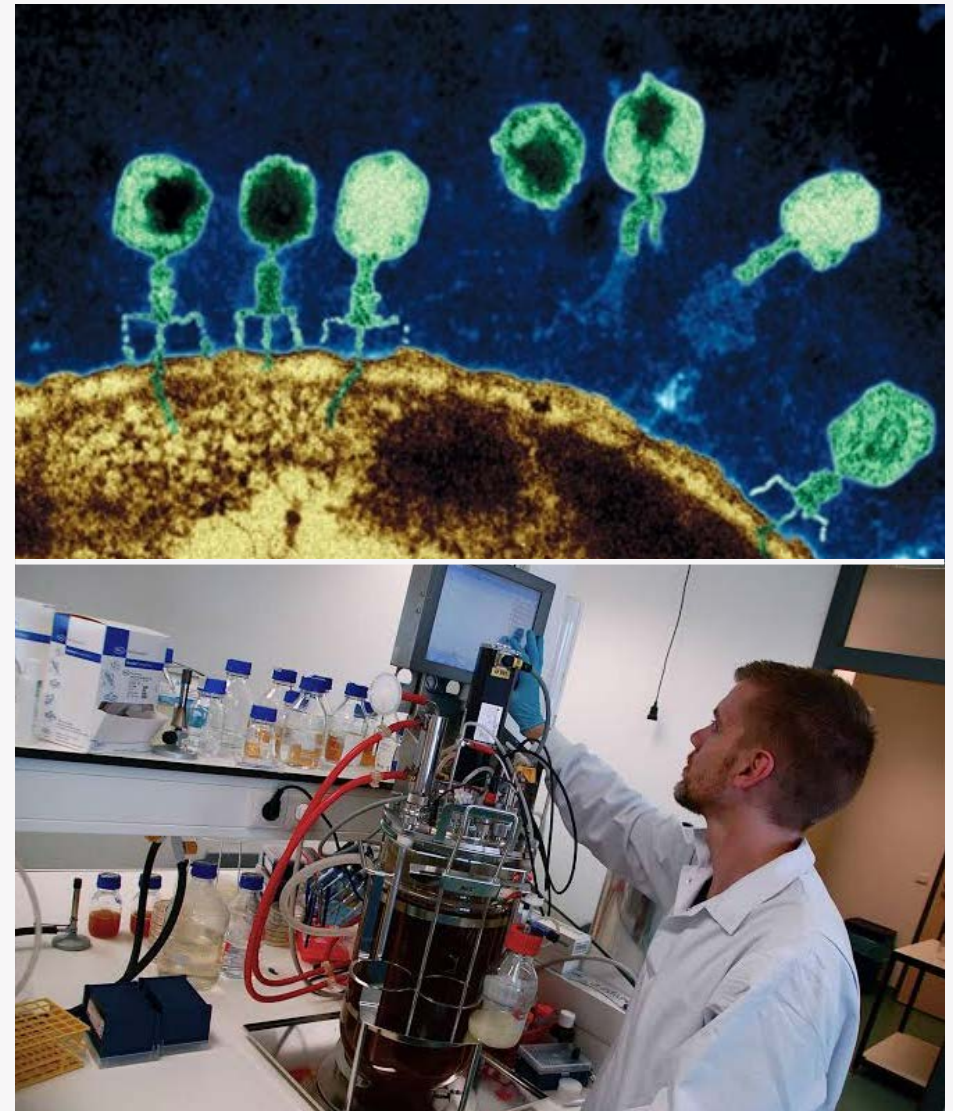


Micreos

Micreos develops the world's first targeted antibacterial products, set to replace antibiotics, to kill only the unwanted bacteria - including antibiotic resistant strains - while preserving the beneficial bacteria, essential for human health.

- Under the 'Phageguard' brand, Micreos has developed a 'green' alternative to antibiotics in the food chain, reducing the risk of transfer of multi-resistant bacteria from animals to humans.
- These FDA approved food safety products against *Salmonella* and *Listeria monocytogenes*, offer a natural and organic way to safeguard food products during processing which target the pathogenic bacteria and have no effect on taste, colour, texture or odour of the final product.
- These food safety tools are easy to apply on cooked meat, poultry, fish, dairy, cheese, and other produce, with labelling of use of phages optional when used as a food processing aid.
- Micreos' innovation pipeline also includes R&D projects in agriculture, tree- and plant disease and crop protection.

www.micreos.com

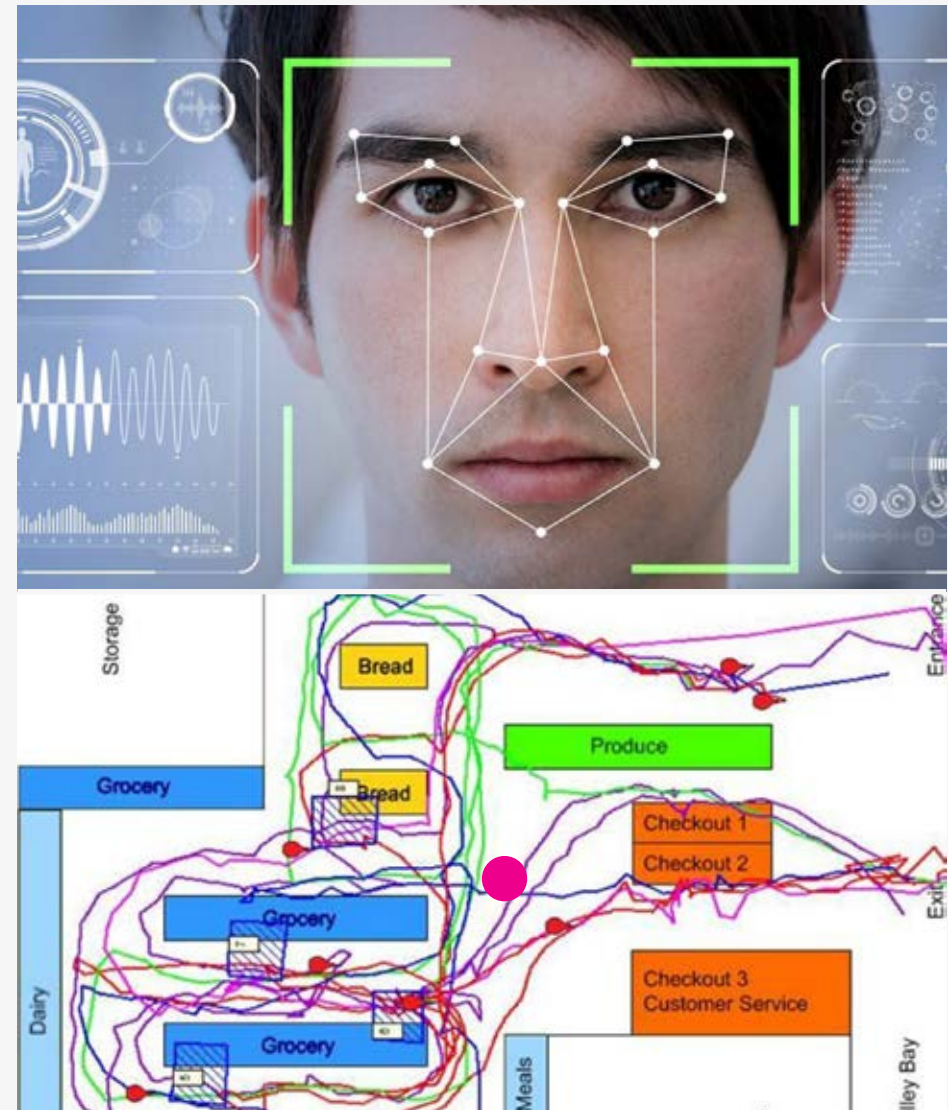


Noldus

Noldus creates business to business solutions for market and other researchers to uncover animal or human behaviour patterns to inform the development of products and solutions.

- Solutions are customized to each project to include direct observation, data integration, ethnographic research, emotionality, data analysis and insights.
- Clients include universities, research organisations, and corporate R +D departments across the value chain ranging from animal feed, production, retailers to restaurants eg: Mars, Sapporo.
- Noldus innovation ecosystem includes labs, technology, knowledge provides and end users for co-design, collaboration, R+D, system integration and technical validation.
- Noldus have developed a range of tools developed for behavioural and psychological monitoring and animal tracking through video tracking, heatmaps, posture, social behaviours and health indicators, sound and gait analysis.

www.noldus.com



FrieslandCampina R&D Centre, Wageningen

- FrieslandCampina is one of the world's largest dairy companies with a cooperative tradition stretching back more than 140 years, and one of the 6th largest globally after Danone, Fonterra, and Nestle.
- Its 18,261 member independent dairy farmers in the Netherlands, Germany and Belgium own 100 percent of Royal FrieslandCampina N.V. (FC)
- FC has set up an Innovation Centre in WUR combining various disciplines such as research & development, marketing, sales, and supply chain working together, using university equipment and analytical tools, internships for students and collaboration with start-ups.
- The annual milk price paid to member dairy farmers comprises a guaranteed price, an annual performance payment, an outdoor grazing premium, a special milk flows premium and distribution of member bonds. The price paid for milk is based on the value of the supplied kilograms of protein, fat and lactose in the ratio 10:5:1.
- Friesland Campina controls the entire dairy chain, and focusses on innovation - starting on the farm - for the revalorisation of milk. Their operations develop products for competitor companies and the pharmaceutical sector.
- Sustainability activities developed with farmers include renewable energy, emission reductions, methane reduction in stables, and a manure fermentation program. Member farmers access technology with incentives through government subsidies.
- Responding to the vegan movement, the industry had launched a 'protein story' for young and ageing people, emphasising the need for complete animal proteins.

www.frieslandcampina.com/en/innovation/innovation-centres/innovation-centrewageningen



GreenFood50

GreenFood50 is a start-up producing innovative quinoa ingredients which works with companies to find the functional properties to meet their needs eg: texture, high protein, colour, emulsification.

- The special low saponin (bitterness) quinoa breed was developed at WUR and is locally cultivated in the Netherlands, and contains all essential amino acids (of up to 24% which are the highest in the market).
- Quinoa ingredients (flours, flakes, crisps) produced from the locally cultivated quinoa seeds are used in sports nutrition, bakery products, pastas, sauces, beverages, infant nutrition, healthy bars, snacks, vegetarian, vegan and gluten free products.
- GF 50 works B2B and in cooperation with WUR and other leading universities and international research organizations, for access to the latest technologies and know-how
- The company originated through the WUR Start-Life student incubator program.

www.greenfood50.com



The Westland Region:

Westland is one of the most important regions in the world of greenhouse horticulture. With a concentration of production, delivery, trade, distribution and processing companies, the location links companies to an EU market of 500 million consumers through multi-modal logistics.



The World Horti Centre - Westland

World Horti Centre is a knowledge and innovation centre for international greenhouse horticulture, where business, research, demonstration, teaching and education converge.

- Opened in March 2018 in collaboration with the local municipality, over 100 leading companies in horticulture are co-located with 40 individual research greenhouses.
- WHC also provides a learning environment for 1200 senior secondary and higher vocational education students, where companies work together with students,
- The site operates as a modern research centre for technology, cultivation systems, crop protection and breeding, with a year-round exhibition of horticulture businesses.
- With a focus on SDGs and climate challenges, the WHC functions as an open innovation and technical demonstration space, and facilitation for business tourism and international trade missions

www.worldhorticenter.nl/en/home



Tomatoworld

Tomatoworld provides multi-dimensional experiences of the Dutch greenhouse horticulture sector, with a greenhouse facility with 80 different species of tomatoes, tours and educational programs which profile the challenges of the global food system and solutions developed in the Netherlands.

- Global issues and challenges for the food sector are highlighted ie: carbon emissions reduction, water scarcity, feeding mega-cities, the fact that 70% of food produced is by small holders with 1ha lands and that 50% of world does not have reliable access to food.
- TW offer tours for a range of visitors including growers and producers, school and university students, national and international delegations, retail and the hospitality sector, providing a place for dialogue and information exchange.
- TW works together with companies and organisations on themes such as sustainability, healthy food, taste, innovation and cultivation methods
- With many students not aware of the source of food, TW demonstrates production processes and as well as promoting of future career options.
- Renewable wind and solar energy are used to reduce emissions on the site, other sustainability initiatives include re-cycling of rockwall and plastics, climate control systems, CO₂ use for photosynthesis, bees for pollination and artificial light including LED.
- A Fresh Produce Centre demonstrates NL expertise with seeds and increases in productivity through better technology, demonstrating the innovation that takes place at supply chain level
- Most tomato growers are part of co-operatives and clusters, that fostered collaboration and sharing.

www.tomatoworld.nl/nl



Trias Westland

The Trias Westland Geothermal Project is the first geothermal project in the Netherlands to drill as deep as the 'Trias' layer situated at a depth of 4 kilometres, to make greenhouse horticulture in Westland more sustainable.

- In 2017, 49 Westland greenhouse horticulture entrepreneurs joined in a partnership with Flora Holland, the Municipality of Westland, Capturam to develop the innovative project.
- An initial geological study for the Municipality of Westland had shown the deeper situated Trias sandstone layer had the heat potential able to provide for 80% of heat demand in the Westland area. The water temperature of more than 200 million years old layer is around 130 to 150 °C.
- The first drilling performed near the auction site of Flora Holland, was supported by a comprehensive research program with geological advisors and knowledge institutes testing the suitability and productivity of the Trias layer.
- It was however found the Triassic layer, would not to be suitable for the cost-effective heat recovery. Rather the layer above – the Lower Cretaceous layer, was more suitable for the production of hot water, so Trias will now realize the project at that layer from which other geothermal projects extract their heat.
- After two years of operation, 26 affiliated participants now receive geothermal heat. The project payback is estimated over 15yrs, with financing structured so that greenhouses become the owners, with a 30 year lifecycle.

www.triaswestland.nl



Rijk Zwaan

Rijk Zwaan develops vegetable varieties for the agri-food sector, with a focus on seeking solutions for germination challenges and plant diseases, and to develop innovative seed sorting methods in collaboration with a worldwide network of research institutes and universities.

- Rijk Zwaan is ranked 5th of the largest breeders in the global vegetable seed market, with a direct customer focus and an international network of dealers, retailers and processing companies to ensure product lines are aligned with market need. Their focus is on sustainable development goals and social responsibility, through the building of long-standing partnerships.
- RZ is an independent family owned company established in 1924, with 3,000 employees owning 10%, which re-invest 25% of its annual turnover per year ie: EUR 100m in R+D.
- R and D involves biotechnology, seed technology, phytopathology, consumer research and increasingly data. Consumer research is undertaken in Berlin, with a fake supermarket, which tracks preferences of potential customers. Aiming for 100kg per plant per 1sqm per year yield.
- Operating across the whole value chain from breeder to grower, trader processor, retailer and consumer, RZ develops varieties to meet quality, health, convenience, shelf life, sustainability, disease resistance objectives to align with local climate, consumer trends, and demographics.
- Genetics is seen as the software used by all parts of the chain, with RZ mostly doing its own research in collaboration with other HEI's globally. RZ undertakes GMO research, but does not produce vegetables as banned by EU law, to ensure that if this changes, they have the knowledge base as a competitive advantage.
- Their major clients are large producers demanding high quality product, so QA is managed in one place. RZ have sales and marketing in 21 global locations, to develop local partnerships and knowledge in different climates, including research, production and sales offices in Australia.

www.rijkszwaan.com

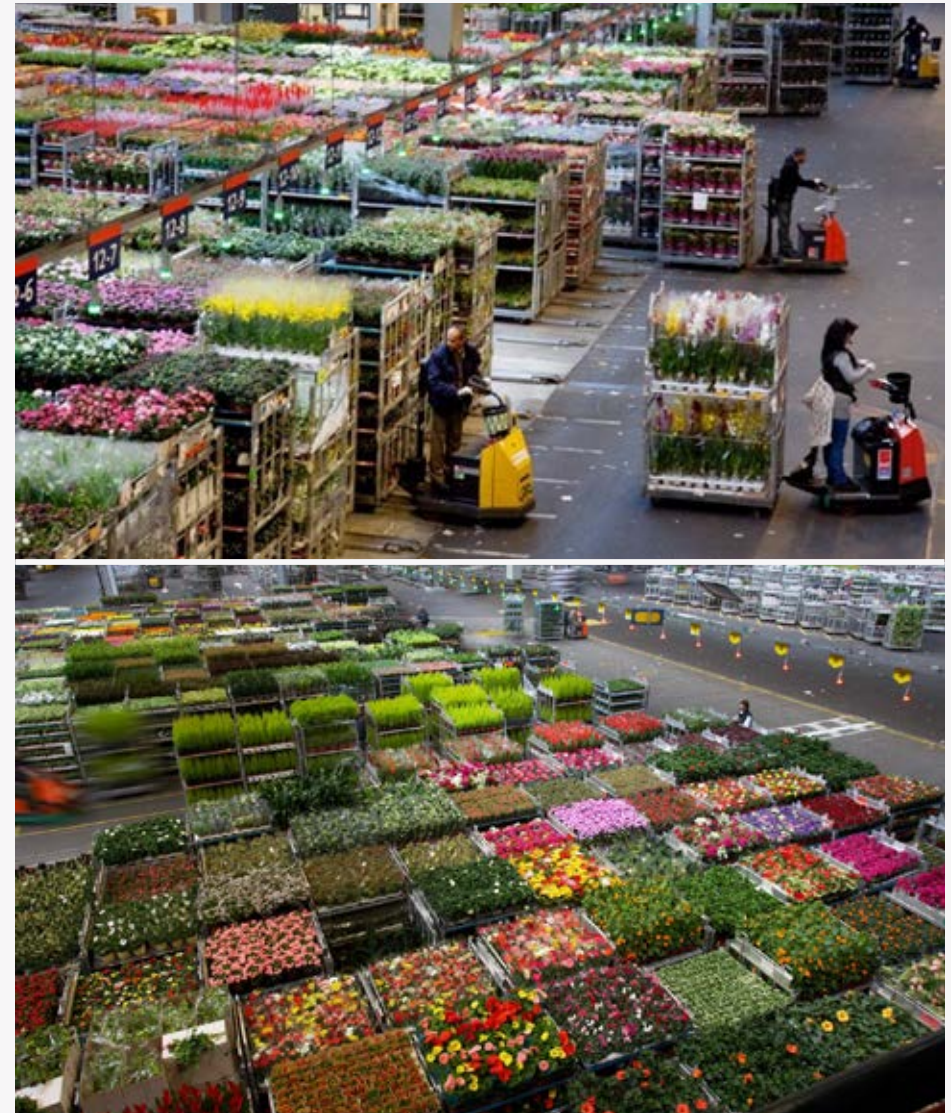


Flower Auction Royal Flora Holland

Royal Flora Holland is the largest flower auction in the world at which millions of flowers and plants are sold and distributed on a daily basis. It is a co-operative of 2600 growers with an annual turnover of EUR4.6bn and EUR 12m daily.

- The Dutch Flower Group sets sustainability standards as have growers to meet the SDG's of retailers and consumers eg: for plastics reduction, waste, chemicals, greenhouse construction.
- The Auction is conducted online, with payment guaranteed through the co-operative. This financial guarantee creates less incentive for organisational innovation and marketing development.
- Growers also deliver up to 50% directly to the retailers, and are provided with lists of buyers to develop further relations and work on innovation together.
- The co-operative supports smaller growers with special services eg: marketing to traders. There are currently 35 auction halls, some being gradually closed down, due to the impact of online trading.
- An example of a disruptive player and innovation in flowers is 'bloomon', applying logistic fresh food logistics processes to an annual flower subscription service, raising EUR 25m in equity.

www.royalfloraholland.com

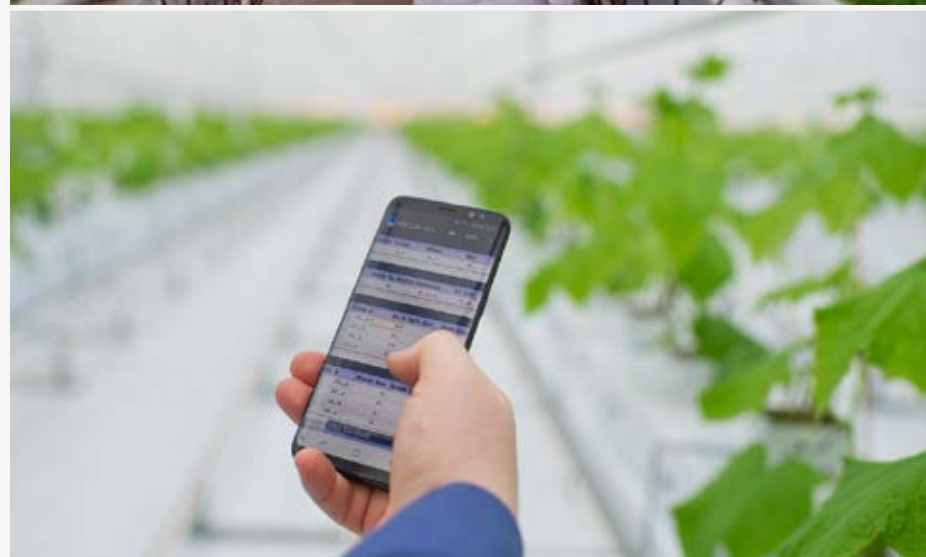


Priva

Priva develops hardware, software and services for climate control, energy saving and optimal reuse of water for industry sectors such as horticulture, indoor and city farming, and utility buildings such as offices, retail, hotels and hospitals.

- A global company with 450 employees, 15 local offices in 13 countries and over 400 international installation partners, it delivers sustainable solutions and services in more than 100 countries including Australia.
- Customers use PRIVA technology to meet sustainability goals and to manage all processes in greenhouses eg: sensors for climate in-out, optimal climate and irrigation including nutrients.
- Priva produce the equipment or if need to scale, in collaboration with partners. Equipment is developed to standardised specifications, with modular units built for each customer, which allows growers to expand and integrate older products. Innovations in agriculture include robotics, AI for greenhouses, data optimisation.
- An online academy for growers and suppliers has been set up by Priva to build capacity and knowledge in the ecosystem around their products and services, and a source of customer feedback for product improvement.
- Priva engages in pre-competitive cooperation with others in the supply chain eg: breeders such as Rijk Zwaan to do varietal tests and use data obtained. They work in cooperation with suppliers across the value chain, with each benefiting from the innovations developed.

www.priva.com/au



ABC Westland

ABC Westland is an industrial park in the heart of the Westland, close to the port of Rotterdam and Schiphol airport, with over 100 businesses across the value chain in the agriculture and food sectors.

- Fostering cooperation and connection, co-location includes access to shared renewable energy for tenants to lower the carbon footprint for the horticulture sector.
- As the Netherlands most sustainable logistics and industrial hub, spread over 55 hectares, with vertical farming and 50 EV charging stations on site. Solar provides 35% of energy use, with projects for wind turbines, geothermal, and biogas from waste developed.
- Connectivity and synergies between tenants provides for products to be processed, traded, cooled, packaged, stored and ripened on the site. The cluster of 116 tenants are all active in fruit and vegetables sector. Some 16 foreign companies import into the park eg: China, US and South America, with 2,500 truck movement each day and a total turnover of EUR 1bn.
- The site offers a logistics gateway to Europe, with deliveries possible within 18 hours across the EU along whole food chain. A food centre enables smaller producers to sell to restaurants and smaller retailers. R and D is through individual companies and growers or suppliers. WUR active in Rotterdam doing pilots for industry clients.
- ABC Westland is privately owned site which undertakes real estate development through the rental/sale of land, flexible park management and 24/7 operations.

www.abcwestland.nl/en



Boal Systems

BOAL Systems is one of the founders of the modern greenhouse, specialising in developing, manufacturing and selling aluminium roof and sidewall systems for both glass and poly greenhouses.

- With a long tradition as a family business, Boal's focus is on maintaining and developing long-term relationships with a large number of different partners across the value chain (growers, greenhouse builders, system suppliers, knowledge institutes etc.) to develop new opportunities for growers and greenhouse builders.
- Designs are tailored to the local context eg: climate or specific crops etc for optimal configuration. Most projects are around 5,000 sqm, but can go up to 400,000 sqm
- Boal Systems design and manufacture around 400ha of greenhouse per year, as well as doing their own research and development. Testing facilities of WUR are utilised, together with a network of partnerships with other knowledge institutions such as TU Delft and TNO.
- With over 49 years of expertise, glasshouse designs developed are carbon neutral using solar energy, glass, and plastics. Greenhouse roofs are used as energy systems to heat water in pipes, with energy stored underground and pumped up to heat greenhouses at night.
- The manufacturing process involves form work for their own customers, as well as horticulture components for other companies. Components are fully assembled, and only need installation - like LEGO pieces for glasshouses.
- An example of industrial symbiosis on the site is the use of the scrap waste produced by Boal being by a co-located metals recycling company.

www.boalsystems.com/nl-nl



Groningen Site Visit: Smart Specialisation and Energy Transition



Smart Specialisation in the
Northern Netherlands (N-NLs S3)

Research and Innovation Strategy
for Smart Specialization (RIS3)
Northern Netherlands



INVESTMENT AGENDA HYDROGEN NORTHERN NETHERLANDS

Heading for emission-free hydrogen at commercial scale



Introduction

The Northern Netherlands, which combines the three Provinces of Groningen, Friesland and Drenthe, has a Smart Specialisation Strategy in place since 2013. The Strategy development was coordinated by SNN, the Northern Netherlands Alliance – the formalized collaboration organization for the three provinces – together with the EU's Joint Research Centre. Having been in place for six years, the SNN currently is preparing the renewal proposal for the 2020-2027 period.

S3 process

N-NLs S3 has been developed through a bottom up quadruple helix consultative process that was open to all actors wanting to be involved, and included an extensive Entrepreneurial Discovery Process with numerous workshops and design sessions. In going through this process, it was realized that not enough hard data and information existed in the region to allow for evidence-based decision making leading to sharp choices. Therefore, the choice was made not to select specific areas or topics as the cornerstones for S3 but to focus on four broad societal challenges that had the support of all stakeholders involved.

Initial focus

The four challenges are: Safe Water, Clean Energy, Secure Food and Healthy Ageing. The underlying assumption was that by exploring these four challenges through collaborative projects across governments, industries, tertiary education and research institutions and communities, further knowledge and insights would be generated that over time would allow for sharper choices to be made.

Outcomes

This approach in part appears to have worked. The N-NLs S3 initiative received enthusiastic support from a wide range of stakeholders, and a range of living laboratories, test beds, innovation environments and joint research activities. Behind this was the idea of developing niche areas that would provide strategic competitive advantage to the region. The process adopted was an Open Innovation Call where consortia could define innovation topics/areas.



Lessons learned

Yet the N-NLs S3 also lost some momentum over the years through a not fully effective governance structure. Although an Innovation Board, drawn from the quadruple helix, was established, this did not take/gain full responsibility for governing the process. Ownership of the process remains an issue. As identified by SNN: "A factor in this might have been an oversimplified presentation of the concept, or at least an oversimplified interpretation of the concept, in the sense that: "RIS3 is about getting together at the beginning of a programming period, reach a common conclusion about what sectors to prioritize and direct your money to these sectors." It seems that it's necessary to emphasize that S3 contains much more than 'just' priority choices. S3 is as well, or as much, about creating favorable conditions for collaborative innovation processes, and about creating continuity in those processes. That innovation processes should not be directed too much at the start. That a process of refinement, reaching new specialisations, might be complex, will take time and should leave sufficient space for 'trial and error'." [SNN Internal Document]

A key element of S3 is creating favourable conditions for collaborative discovery processes, and to foster continuity in those processes. It very clearly is not a 'quick fix' but a complex, iterative process in a search for niche development and refinement. As such it is a journey towards specialization for which bringing actors to 'the dance floor' is crucial.

Some specific take aways

- To deal with the relative lack of relevant regional innovation data a Regional Innovation Monitor was developed together with the University of Groningen; a further Complexity and Relatedness Analysis has been commissioned (Boschma/Ballan, University of Utrecht)
- SSN currently (2019) is participating in a JRC research project on the role of tertiary education institutions in smart specialization and innovation (Higher Education for Smart Specialisation (HESS)); N-NLs S3 is the sixth case study in this project
- The results of the HESS case study will be used as input for the development of the next iteration of N-NLs S3

- A key role to date in the N-NLs S3 process has been played by the tertiary education institutions in the region, both in terms of fundamental and applied research and through their capacity building initiatives and activities
- N-NLs S3 could build on a foundation of existing collaborations across the region
- Risk aversion, especially by government actors, and vested interests have hindered a fuller roll out of N-NLs S3

Energy Transition in Action

Groningen Province is a stand out example of an energy region in transition. Having been a rich source for natural gas, the region over the years has grown to generate about 1/3 of all Dutch electricity. However, over-ambitious exploration of the gas resource has resulted in a serious number of small-scale earth quakes across the province, resulting in serious property damage and a loss of the social license to continue with gas exploration. This has set in motion a massive energy transition program combining wind and solar energy (see further when we elaborate on 'Grunniger Power') and an ambitious program to further develop hydrogen and green chemistry industries. Core to this is the notion of the circular economy which extends into the agricultural sector via bio-energy. As illustrated in the graphic below, the transition program is underpinned by a strong research & development program across the province.

The ambitions underlying the energy transition program are to create a competitive business climate for green energy, to strengthen the regional economic structure through growth in green industry employment and the associated service industries, aiming at zero CO₂ emissions by 2050, supported by a strong innovation and entrepreneurship program, illustrated below. Key to this is an integrated, collaborative approach across the triple helix of government, industry and the education and research sector.



Community Energy: Grunneger Power

A striking feature of the Northern Netherlands and Groningen is the rapid development of the community energy sector. Based on the concept of a co-operative society the region has changed from the traditional government-market/industry dichotomous relationship to a tri-partite dynamic in which citizens play an equal role through an energy co-operative that started out as 'Grunneger Power' and now has morphed into the Northern Netherlands Local Sustainability Energy Company, comprising some 60+ energy co-operatives across the three Northern Provinces as illustrated below. The company is founded on the principles of the circular economy providing green energy through solar (29%) and wind (71%).

The co-operative operates across the full value chain and includes green energy from rental properties as well as owner-occupied, and advises for all its members from obtaining financing through to licensing, exploitation and taxation. The collective co-operative operates under the labels of "Energy from Us" (Energie van Ons – the energy generation component) and "Sources from Us" (Bronnen van Ons – the full distribution and support component) as a full-blown social enterprise, centred around the principles of: Social, Local Economics and Sustainable.



The Education Component:

The New Energy Coalition and the Energy Academy

A unique feature of Groningen is the existence of a dedicated education and training organization for energy transition and sustainability. Under the label of the New Energy Coalition, a range of energy education initiatives have been bundled, from schools to vocational through to academic. At the schools level students from elementary- and high schools are challenged to campaign however they see fit for energy saving and sustainability in their school. Through playful learning, youths discover their talents and get acquainted with the wondrous world of sustainability, energy and technology (see: <https://www.energychallenges.nl/en/>).

At the vocational level, the Energy College has been established – a public private partnership aimed at creating an innovative workforce for the renewable and sustainable energy sector across the Northern Netherlands (see: <https://energycollege.org/> [in Dutch]).

At the academic level, the Energy Academy is a collaborative venture between the University of Groningen and the Hanze University of Applied Sciences (see: <https://www.energyacademy.org>). The Energy Academy brings together all the research programs of the two universities, basic and applied, and provides formal and informal education programs for all students, irrespective of their chosen disciplines. The programs are designed from the T-shaped professional principle, combining a deep functional area of specialization with the broad ability to work across areas. They combine academic, industry and government perspectives and range across bachelor, master and PhD levels. The main topics for the programs are the North Sea as an Energy Region, the Green Hydrogen Economy, the Industrial Transformation Process, Local Energy Systems and the Greening of the Gas System.





Energy Academy Building – Zernicke Campus, Groningen

Energy Transition – The Research Component

Since 2015 a specialist research centre located at the Hanze University of Applied Sciences has been operating to both support and research the energy transition process in Groningen from both a technical and social science perspective. EnTranCe, the Energy Transition Centre, located on the Zernicke Campus and part of the New Energy Coalition, is a public-private partnership that offers room for open knowledge-sharing. Here, the concept of open innovation is being put into practice. Innovative ideas are exchanged with companies, governments and social institutions. Through stimulating innovation, EnTranCe speeds up the energy transition and strengthens the knowledge economy in the north of the Netherlands.

Through applied research EnTranCe aims to answer the most pressing questions and develop new solutions and ideas for the energy transition. In its testing facilities – from advanced measuring setups to the Ameland 'living lab' (see further) – researchers look at what really works. And through their training programs they are educating tomorrow's creative,



multidisciplinary accelerators. The energy consumer is the protagonist in everything EnTranCe does; accordingly, its motto is 'People in Power'.

The Centre combines research, education, entrepreneurship and the testing of energy innovations. In terms of research, the energy research carried out by EnTranCe is mainly on the level of villages, districts, neighbourhoods or companies. This is where large-scale energy suppliers and infrastructure meet small-scale, local energy initiatives. And this is where the main breakthroughs will be needed to ensure a successful transition to a reliable renewable energy supply. The applied research is about developing smart energy networks and studying the potential applications of alternative gases such as biogas, LPG and hydrogen. The focus is also on the economic and legislative changes that are needed within the energy transition and the labour market effects

of the transition. This is combined with looking at how effective communication can influence the public's behaviour and involvement in the energy transition. The aim of the applied research is to contribute directly to the development of a clean, reliable and affordable energy supply.

In EnTranCe's Living Lab Energy Transition, students in different years of a bachelor's or master's programme or upper secondary vocational education learn about energy transition. They meet with managers, consultants, researchers and entrepreneurs and frequently go on excursions, for instance to seaport Eemshaven or a biomass power plant. In their projects, students examine practical problems and work on potential solutions, for which they can use EnTranCe's testing facilities (see below). In the Living Lab Energy Transition students are in close contact with the very organisations that are at the forefront of the energy transition.

In terms of testing, anyone who wants to test a product, service or process in a controlled, realistic environment can make use of EnTranCe's energy testing ground. This ranges from start-ups with a new energy service or companies with a product prototype to (international) consortia seeking to change the energy system. A wide variety of experiments take place: experiments to create biofuel from plastic, for example, or to fly on LNG. Others have investigated opportunities for balancing the supply and demand of renewable energy in a closed network, or have looked at what happens if you get 200 smart energy management systems to cooperate. In the solar energy test facility the ideal setup was determined for the solar panels on the roof of the Energy Academy (see before), the most energy-efficient education building of the Netherlands.



EnTranCe has also been the home of the TopDutch Solar Racing Team that for the first time participated in the World Solar Challenge in Australia. The 27 person strong team performed outstandingly, winning poll position for the start of the race through a new track record and ending up fourth place in what best can be described as very challenging circumstances throughout the race. It took the team two years to build Green Lightning, their solar car and take it from Groningen to Darwin, from where they crossed 3020 km to reach Adelaide in 15 hrs and 30 minutes.

An example of an applied research project is the case of Ameland, one of the islands in the Dutch Waddenzee, north of Groningen. Ameland wants to be ahead of the rest of the Netherlands by some 15 years where the energy transition is concerned. Ultimately, this Wadden island wants to be able to meet most of its energy requirements itself, with power and heat generated by sustainable sources. The fact that this ambition is supported by the municipality and many companies and residents makes Ameland the ideal testing ground for implementation of the sustainable energy supply of the future. EnTranCe gratefully use this testing ground, together with the partners of the Sustainable Ameland

convention: the municipality of Ameland, Gasterra, Signify, Eneco, NAM, Liander and TNO, as a living lab. In line with the EnTranCe motto – ‘People in Power’ – the residents of Ameland are playing an important role in the development of a vision for the future too. The ultimate aim is for the scenarios and consultation with residents to result in one story and one outlook for the future that will enable Ameland to lead the way in the energy transition.

For a more detailed overview of EnTranCe, see:
<https://www.en-tran-ce.org/en/>

In the impressive Energy Academy Europe building Ruud Paap of the New Energy Coalition gave a talk about green gas (biomethane) in the Netherlands.

He first introduced the three main methods currently used to produce methane: Fermentation (Digestion); Gasification and Supercritical Gasification.

- Fermentation is the conventional anaerobic digestion process whereby foodwastes, sewage sludges, grass and animal manure are converted into methane (CH₄) and carbon dioxide (CO₂). This is a biological process
- Gasification generally starts with dry biomass such as forestry waste and wood waste. The biomass is dried (120-150Deg). After which it is Pyrolyzed in the absence

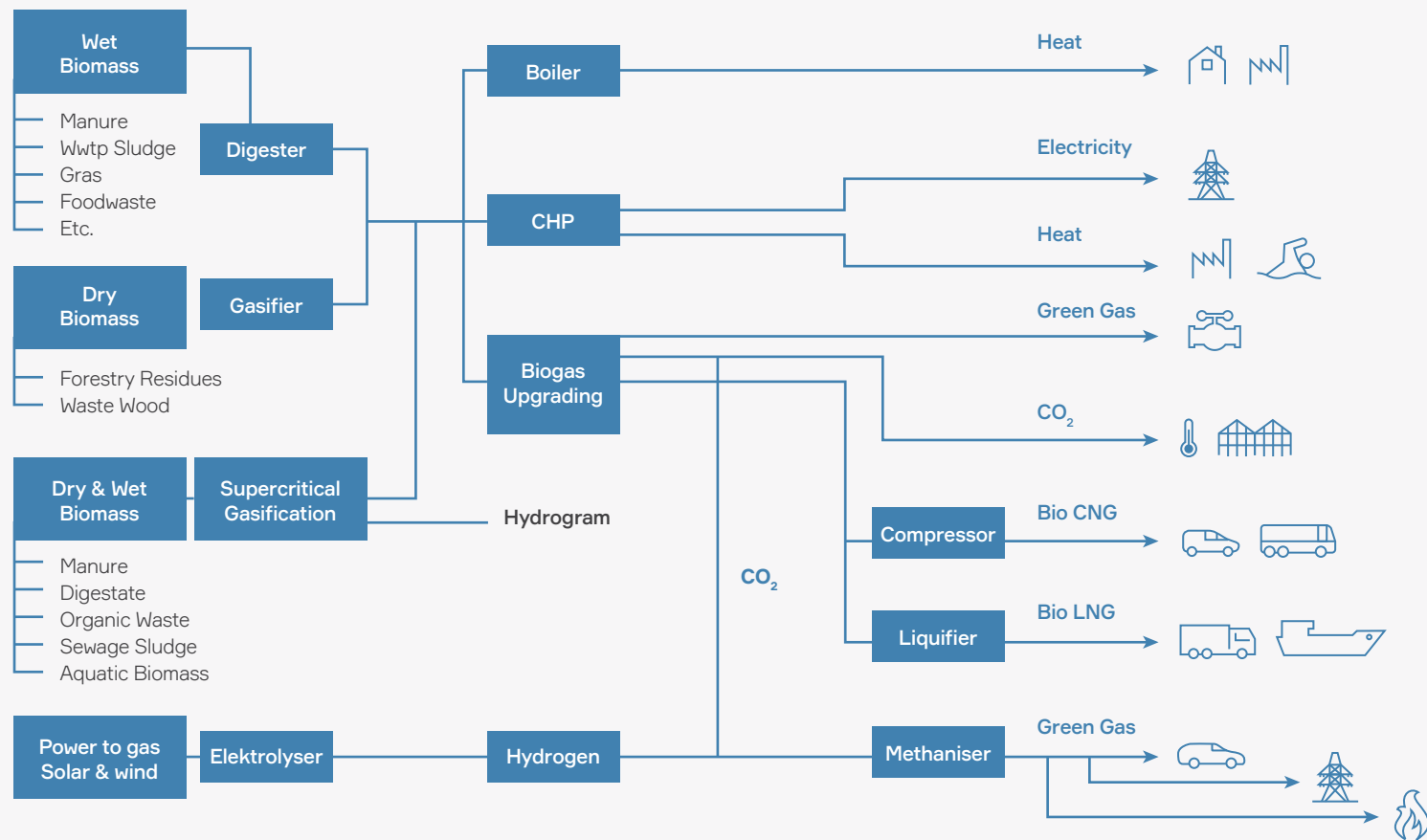
of oxygen (500-600DegC) to produce methane, carbon dioxide, carbon monoxide and hydrogen. This process also produces charcoal, and a volatile portion which can be further reacted in the final stage of Methanisation (900 -1100DegC). This stage requires oxygen.

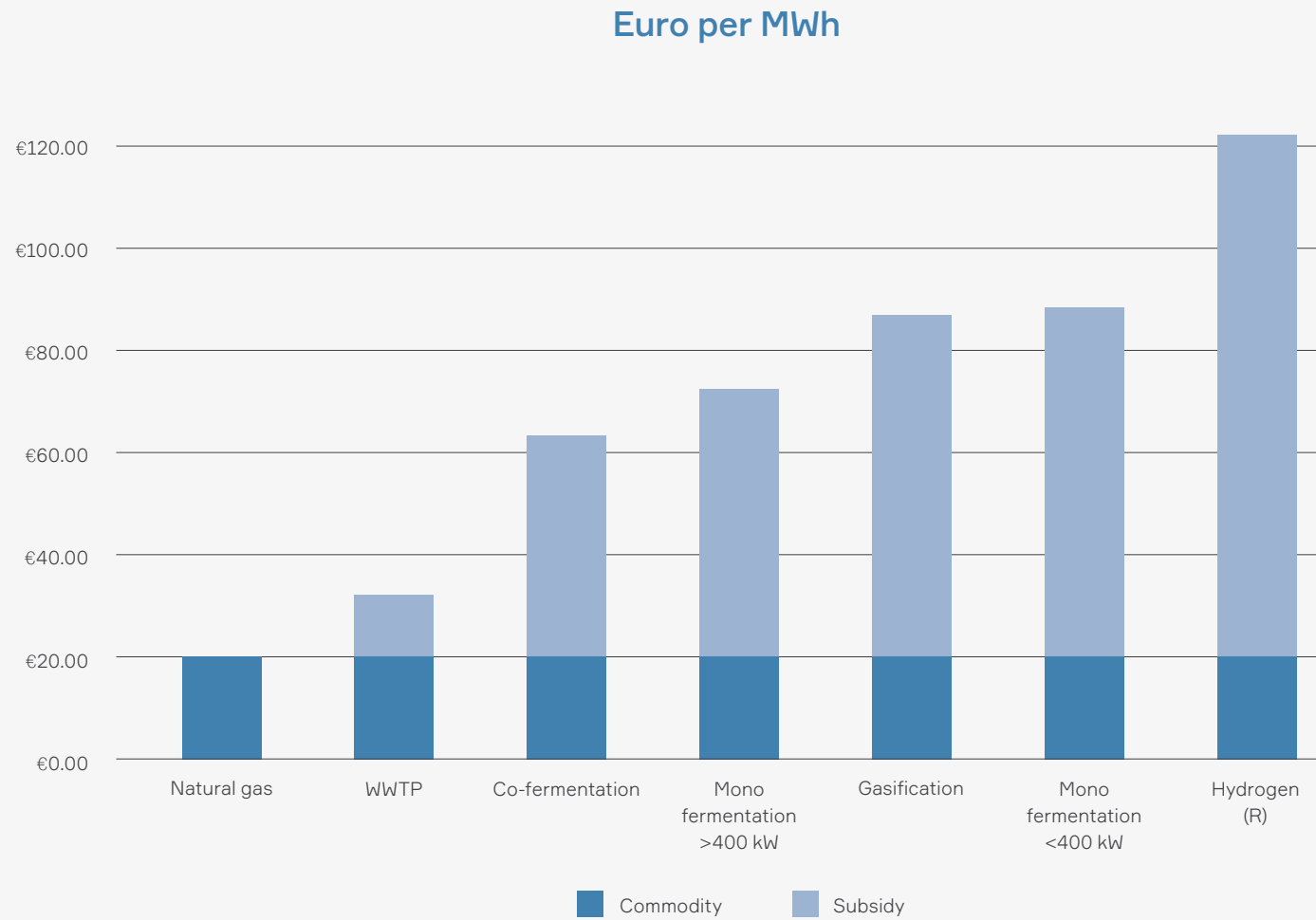
The final product is methane.

- Supercritical Gasification requires high pressure (300bar) during the reactions of heating (600DegC), gasification and methanisation.

The ways in which green gas can be utilised in the Netherlands are covered in the diagram on the next page. Many options utilise the heat from burning the gas. This option of communal heat or heat for industrial applications or heating swimming pools is not common in Australia.

The current cost of biomethane is higher than conventional natural gas, however the area is committed to phasing out the use of their natural gas. The cost of biogas is lowest when the facility is located on a wastewater treatment plant. The extra cost of production (given in diagram on page 65) is subsidised by the government. This is key to enabling development of the sector and will eventually result in higher uptake which will reduce the cost.





Weser-Ems Region Site Visits: New Energy

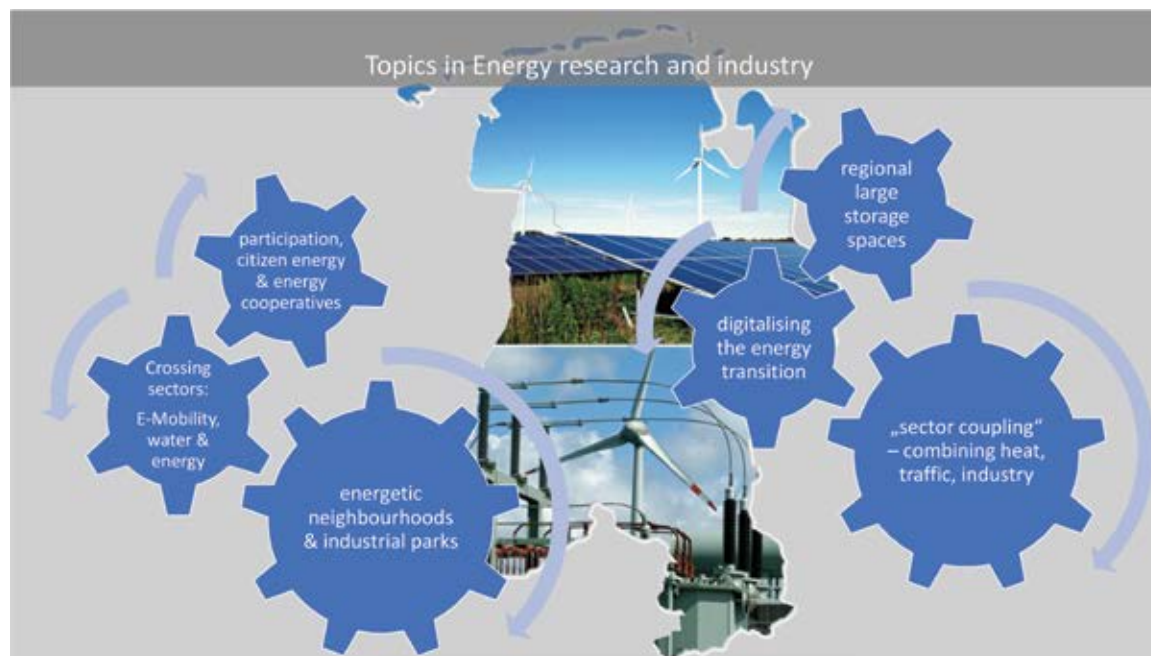
Many of the region's actors in the innovation system for renewable energy are linked to OLEC, a regional-wide innovation network in the energy context.



OLEC
(Regional Energy Innovation Network Organization)

'Innovation and knowledge management
for the energy system of the future'

More information: www.energiecluster.de/de



OLEC unites 63 members from industry, science, education and administration
with special focus on SMEs and start-ups



Applied and industry-oriented research

ForWind is a leading wind energy research network in Germany based on an inter-regional cooperation and national-wide recognition. ForWind brings together wind energy research of northwest Germany by connecting 30 institutes and working groups from the universities of Oldenburg, Hanover and Bremen. ForWind forms a nationwide research network that covers a broad spectrum of scientific topics with focuses on engineering sciences, physics and meteorology, computer science and economics.

Together with the German Aerospace Center (DLR) and the Fraunhofer Institute for Wind Energy Systems (IWES), ForWind forms the Wind Energy Research Network (FVWE).

Cooperation and further training

Through application-oriented projects, ForWind transfers findings from basic research to industry. In addition to the scientific support of industrially oriented projects, ForWind offers the first nationwide academic further education program specifically for the wind energy industry with the further education course in wind energy technology and management.

Centre for Wind Energy Research



- Network between Universities of Oldenburg, Hanover and Bremen
- Founded in 2003 with the support of the Lower Saxony Ministry of Science and Culture (MWK)
- Combines scientific know-how with industry-oriented research
- Four research areas: Resource wind, machine and rotor of wind turbines, the supporting structures of the turbines and the integration of wind power into the electrical grid.

More information: <https://www.forwind.de>

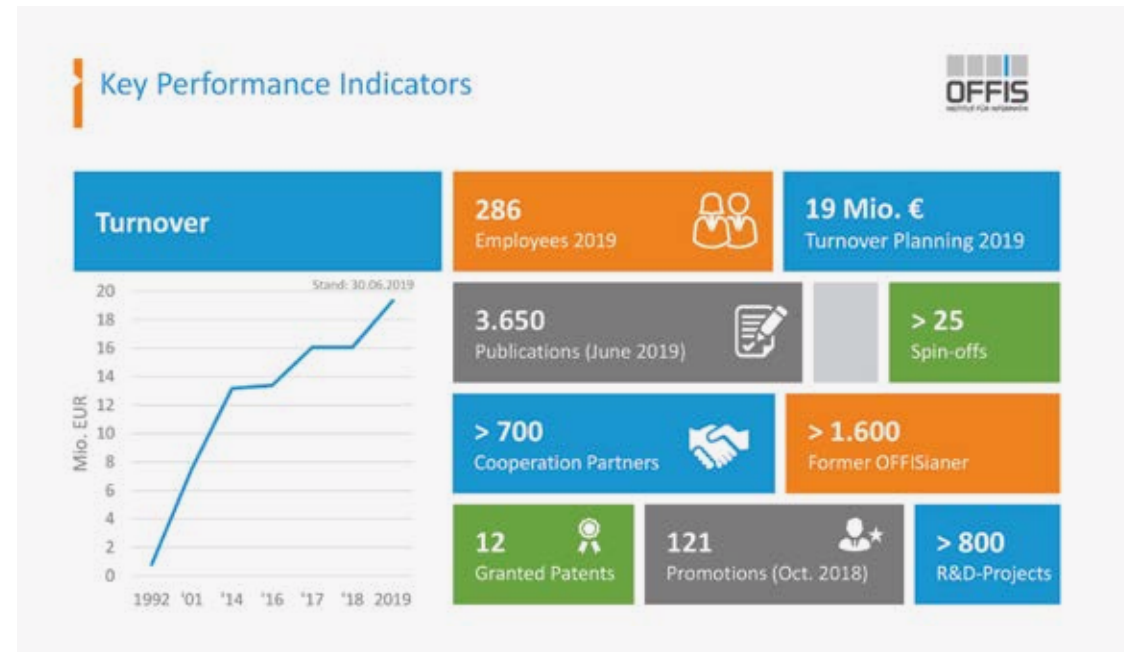


OFFIS – Institute for Information Technology

Another inter-disciplinary institute located at the University of Oldenburg is OFFIS - 'Institut für Informatik' (Institute for Information Technology). The institute was founded 1991 and works closely together with the Carl von Ossietzky University of Oldenburg. OFFIS is an applied-oriented research institute and a centre of excellence for selected areas of information technology.

Alongside the four application oriented departments the institute established six technology-focussed competence clusters:

- Architecture Frameworks (AF)
- Cyber Resilient Architectures and Security (CRAS)
- Deep Learning (DL)
- Embedded System Design (ESD)
- Human Machine Cooperation (HMC)
- Multi-Scale Multi-Rate Simulation (MS²)
- Safety Relevant Cyber Physical Systems (SRCPS)



A flagship project of OFFIS is ENAQ, a transdisciplinary project that seeks to apply and test new ways of neighbourhood development with a focus on energy efficiency and smart-grid systems.

ENAQ - Energetic Neighborhood



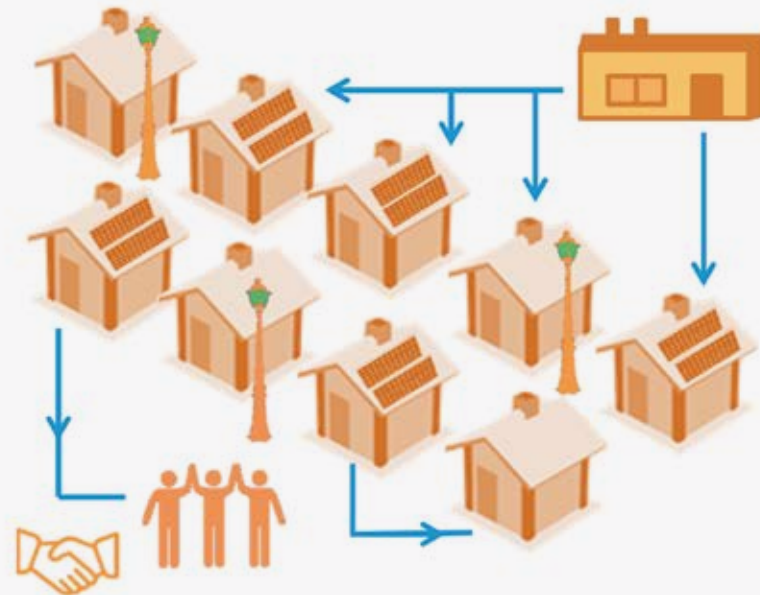
The concept aims to increase energy efficiency by avoiding 'waste energy' and maximising local consumption of neighbourhood generated energy through:

- A network of producers and consumers who interact directly with each other
- Excess energy can be converted into other forms of energy and stored
- A supply network, which supports the coupling of electricity, heat/cooling and mobility
- Local residents will be involved via a community portal as energy producers and consumers
- Formation of local energy cooperatives
- Business models for service providers, for the construction and operation of other energy neighbourhoods

Goal: Community, experimental neighbourhood with local energy supply

Step:

- > **1. Technology**
 - > CHP
 - > Photovoltaik
 - > hydrogen plant
- > **2. Citizen**
 - > Participation
 - > Awareness for energy
- > **3. Platform**
 - > Linking Technology & Citizens
 - > District Aggregator
 - > Energy trading



Production of wind turbines

The region is home of one of the biggest wind turbine producers in the world, ENERCON. First wind turbines were developed by the company's founder Aloys Wobben in 1984. He is an German electrical engineer and entrepreneur reknown worldwide as a pioneer in the field of wind energy. He studied electrical engineering at the Osnabrück University of Applied Sciences and later at the Technical University of Braunschweig. In cooperation with a colleague he built the first wind turbine with a rated output of 22 kW in 1975. First rotor blade production facilities were openend in the late 1980s.



Enercon GmbH

Headquarter in City of Aurich, Lower-Saxony, Germany



- Founded in 1984
- Employees worldwide: 13.000
- One of the largest wind turbine manufacturers in the world
- As of December 2017, Enercon had installed more than 26,300 wind turbines, with a power generating capacity exceeding 43 GW.
- Market leader in Germany since the mid-nineties.
- Production facilities and suppliers in Germany (Aurich, Emden and Magdeburg) and internationally: Sweden, Brazil, India, Canada, Turkey and Portugal.
- All the main components of Enercon wind turbines - including ring generators, inverters, rotor blades, cast components, towers and nacelles - are produced in factories that operate exclusively for Enercon.
- Onsite R&D including state-of-the-art innovation centre offers space for 700 engineers. The annexed test centre includes highly sophisticated test equipment and labs for rotor blade technology, acoustics, power electronics, generator technology and turbine engineering as a whole.
- Due to its close proximity to the surrounding Enercon production plants, numerous synergy effects can be used sensibly and technology and innovation development at ENERCON can be promoted further.

Sources and further information:

www.enercon.de/en/company/performance-portfolio/



Researching the Acceptance of Wind Energy in the Weser Ems Region and Other Regions in Germany

Apart from the focus on technological innovations, the University of Oldenburg supports research at the interface of science and social science. As research on sustainability transitions has shown over the last couple of years, transformational change needs to be driven by technological and social innovations. The acceptance of renewable energy is crucial for further establishing of wind energy. Therefore, research is needed to understand processes of resistance and the underlying narratives.



Hydrogen

Hydrogen production and storage in the state of Lower Saxony

- The innovative idea is to generate hydrogen by using wind energy from large wind parks in the North Sea
- Generated from wind and sun, hydrogen has the potential to play a key role for an emission-free future in Germany and Europe. In particular, the possible conversion of renewable electricity into hydrogen is of importance.
- Renewable primary energy sources such as wind and sun will thus be made available for long-term storage, transport and use in all sectors.
- Regional electricity providers such as EWE are involved in the entire hydrogen value chain, from production, storage and transport to consumption.
- In the context of the event, the participants signed a declaration of intent to found a Lower Saxony H2 Alliance

Hydrogen-powered fuel cells

- Two hydrogen-powered fuel cell trains have been running on the Cuxhaven-Buxtehude railway line since September 2018. In June 2019 another train was launched in Oldenburg.
- Alstom presented the Coradia Lint for the first time in 2016.
- CO₂-emission-free regional train represents an alternative to diesel powered trains
- Alstom was first railway manufacturer in the world to develop a passenger train based on hydrogen technology.



Event 'Wasserstoff Treibt Uns An' (Hydrogen Drives Us)

Launch of the first hydrogen-powered regional train in the Weser-Ems.

Steven Chapple, Mike Timpano and Olaf Lies (Lower Saxony's Minister for Environment, Energy, Construction and Climate Protection) [Source: OLEC]



Key Statements of the Event

"We must achieve the climate protection targets of 2030 and 2050. To achieve this, we need a consistent approach for all sectors, including industry, heating and mobility. This will not succeed based on electricity alone. We need green hydrogen for successful sector coupling. The high proportion of renewable energies as well as a high expansion potential for solar and wind energy, the existence of cavern fields for gas storage and a well-developed gas network infrastructure for the transport of hydrogen fulfil all the prerequisites for the development of a green hydrogen economy in Lower Saxony".

Olaf Lies, Lower Saxony's Minister for Environment, Energy, Construction and Climate Protection

"The heavy goods traffic with trains, buses and commercial vehicles on rail and road is currently the most interesting field of application for hydrogen-based electromobility for us, as hydrogen is competitive with diesel engines here. In the Weser-Ems region, several railway lines could be considered for hydrogen trains, including Oldenburg - Osnabrück. Sometimes hydrogen can also help to shape the transition to completed electrification - after all, rail infrastructure projects regularly take 15 years or longer. In any case, EWE would very much welcome the investment security associated with such applications for the planned multifunctional filling station near Oldenburg railway station".

Stefan Dohler, Chairman of EWE's Board of Management

"The northwest is already an excellent testing ground for the energy revolution. The sustainable mobility turnaround is now picking up and green hydrogen will become a milestone in the sector coupling of energy and mobility in the Northwest".

"Hydrogen creates new value chains from production to storage, distribution and use. The focus will soon be on marketability. In addition to the public transport sector, logistics and the maritime industry will benefit most"

Roland Hentschel, CEO of OLEC

Regional Innovation Profiles

Source: EU Regional Innovation Scoreboard 2019

https://ec.europa.eu/Growth/Industry/Innovation/Facts-Figures/Regional_en

Regional Innovation Scoreboard 2019

Gelderland (NL22)

	Data	Normalised score	Relative to	
			NL	EU
Tertiary education	42.0	0.497	82	108
Lifelong learning	19.2	0.563	101	181
International scientific co-publications	2485	0.889	111	155
Most-cited scientific publications	0.151	0.736	104	136
R&D expenditures public sector	1.10	0.741	116	130
R&D expenditures business sector	1.15	0.545	99	92
Non-R&D innovation expenditures	#	0.383	#	#
Product/process innovations	#	0.518	#	#
Marketing/ org. innovations	#	0.349	#	#
SMEs innovating in-house	#	0.437	#	#
Innovative SMEs collaborating	#	0.478	#	#
Public-private co-publications	65.7	0.517	81	127
PCT patent applications	4.28	0.417	70	98
Trademark applications	7.22	0.511	97	115
Design applications	4.24	0.483	98	99
Employment MHT manuf./KIS services	13.3	0.419	84	84
Sales new-to-market/firm innovations	#	0.620	#	#
Average score	--	0.556	--	--
Country FIS-RIS correction factor	--	1.038	--	--
Regional Innovation Index 2019	--	0.577	--	--
RII 2019 (same year)	--	--	95.8	118.8
RII 2019 (cf. to EU 2011)	--	--	--	124.4
Regional Innovation Index 2011	--	0.535	--	--
RII 2011 (same year)	--	--	97.0	115.3
RII - change between 2011 and 2019	--	9.0	--	--

Relative-to-EU scores are not shown as these would allow recalculating confidential regional CIS data.

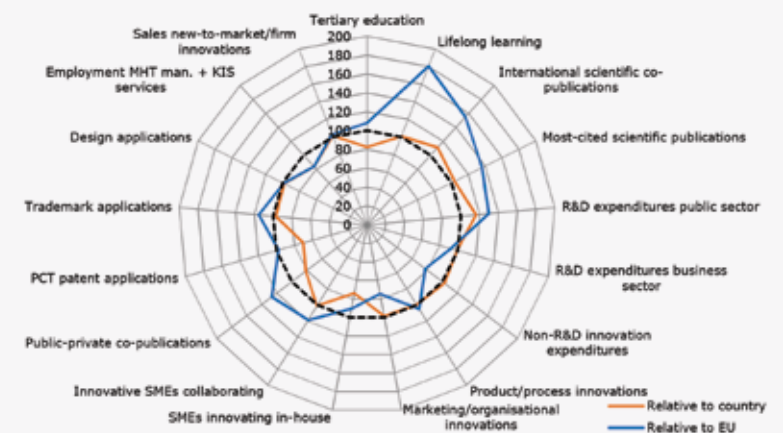
Gelderland (NL22) is a Strong + Innovator; innovation performance has increased over time (9%).

The table on the left shows the normalised scores per indicator and relative results compared to the Netherlands and the EU. The table also shows the Regional Innovation Index (RII) in 2019 compared to that of the Netherlands and the EU in 2019, the RII in 2019 compared to that of the EU in 2011, and performance change over time between 2011 and 2019.

The radar graph shows relative strengths compared to the Netherlands (orange line) and the EU (blue line), showing relative strengths (e.g. Lifelong learning) and weaknesses (e.g. Marketing/organisational innovations).

The table below shows data highlighting possible structural differences, e.g. Urbanisation (above average) and Employment in Public administration (below average).

	NL22	NL	EU28
Share of employment in:			
Agriculture & Mining (A-B)	2.5	2.2	4.6
Manufacturing (C)	10.1	9.4	15.4
Utilities & Construction (D-F)	5.9	5.5	8.2
Services (G-N)	67.7	68.5	64.1
Public administration (O-U)	5.6	5.8	7.0
Average employed persons per enterprise (firm size), 2015-2016	5.1	5.1	5.5
GDP per capita (PPS), 2017	32,300	38,400	30,000
GDP per capita growth (PPS), 2013-2017	1.42	0.79	2.86
Population density, 2017	411	501	118
Urbanisation, 2018	92.0	90.4	76.0
Population size, 2018 (000s)	2,060	17,180	512,380



Regional Innovation Scoreboard 2019

Groningen (NL11)

	Data	Normalised score	Relative to	
			NL	EU
Tertiary education	47.4	0.594	99	129
Lifelong learning	21.5	0.633	113	203
International scientific co-publications	3146	1.000	125	174
Most-cited scientific publications	0.143	0.693	98	128
R&D expenditures public sector	1.43	0.857	134	150
R&D expenditures business sector	0.43	0.316	58	54
Non-R&D innovation expenditures	±	0.400	±	±
Product/process innovations	±	0.568	±	±
Marketing/ org. innovations	±	0.388	±	±
SMEs innovating in-house	±	0.437	±	±
Innovative SMEs collaborating	±	0.530	±	±
Public-private co-publications	43.1	0.419	66	103
PCT patent applications	3.25	0.321	54	75
Trademark applications	3.43	0.239	45	54
Design applications	0.98	0.221	45	45
Employment MHT manuf./KIS services	12.9	0.403	80	80
Sales new-to-market/firm innovations	±	0.655	±	±
Average score	--	0.530	--	--
Country EIS-RIS correction factor	--	1.038	--	--
Regional Innovation Index 2019	--	0.551	--	--
RII 2019 (same year)	--	--	91.4	113.3
RII 2019 (cf. to EU 2011)	--	--	--	118.7
Regional Innovation Index 2011	--	0.498	--	--
RII 2011 (same year)	--	--	90.2	107.3
RII - change between 2011 and 2019	--	11.4	--	--

± Relative-to-EU scores are not shown as these would allow recalculating confidential regional CIS data.

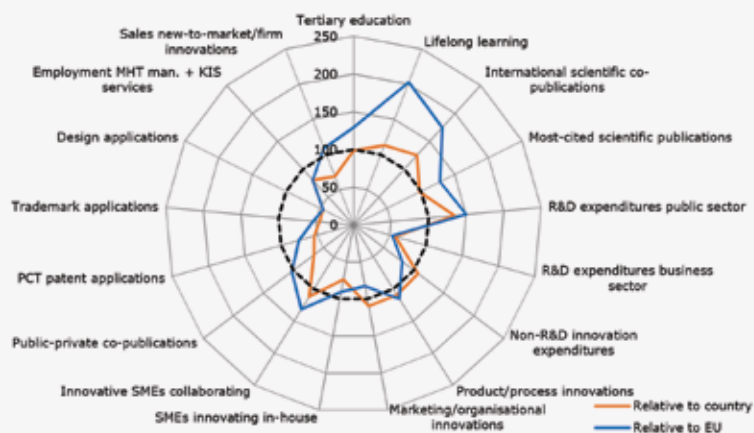
Groningen (NL11) is a Strong + Innovator; innovation performance has increased over time (11.4%).

The table on the left shows the normalised scores per indicator and relative results compared to the Netherlands and the EU. The table also shows the Regional Innovation Index (RII) in 2019 compared to that of the Netherlands and the EU in 2019, the RII in 2019 compared to that of the EU in 2011, and performance change over time between 2011 and 2019.

The radar graph shows relative strengths compared to the Netherlands (orange line) and the EU (blue line), showing relative strengths (e.g. Lifelong learning) and weaknesses (e.g. Design applications).

The table below shows data highlighting possible structural differences, e.g. Employment in Public administration (above average) and GDP per capita growth (below average).

	NL11	NL	EU28
Share of employment in:			
Agriculture & Mining (A-B)	2.5	2.2	4.6
Manufacturing (C)	9.7	9.4	15.4
Utilities & Construction (D-F)	5.6	5.5	8.2
Services (G-N)	66.9	68.5	64.1
Public administration (O-U)	6.4	5.8	7.0
Average employed persons per enterprise (firm size), 2015-2016	5.1	5.1	5.5
GDP per capita (PPS), 2017	36,500	38,400	30,000
GDP per capita growth (PPS), 2013-2017	-4.11	0.79	2.86
Population density, 2017	247	501	118
Urbanisation, 2018	83.1	90.4	76.0
Population size, 2018 (000s)	580	17,180	512,380



Non-R&D innovation expenditures

Zuid-Holland (NL33)

	Data	Normalised score	Relative to	
			NL	EU
Tertiary education	47.9	0.603	100	131
Lifelong learning	19.8	0.581	104	186
International scientific co-publications	2239	0.844	105	147
Most-cited scientific publications	0.141	0.687	97	127
R&D expenditures public sector	1.08	0.736	115	129
R&D expenditures business sector	1.13	0.540	99	92
Non-R&D innovation expenditures	±	0.382	±	±
Product/process innovations	±	0.528	±	±
Marketing/ org. innovations	±	0.360	±	±
SMEs innovating in-house	±	0.437	±	±
Innovative SMEs collaborating	±	0.487	±	±
Public-private co-publications	119.1	0.696	109	171
PCT patent applications	4.53	0.438	74	103
Trademark applications	6.74	0.476	91	108
Design applications	2.57	0.371	76	76
Employment MHT manuf./KIS services	16.3	0.542	108	108
Sales new-to-market/firm innovations	±	0.613	±	±
Average score	--	0.569	--	--
Country EIS-RIS correction factor	--	1.038	--	--
Regional Innovation Index 2019	--	0.590	--	--
RII 2019 (same year)	--	--	97.9	121.5
RII 2019 (cf. to EU 2011)	--	--	--	127.2
Regional Innovation Index 2011	--	0.543	--	--
RII 2011 (same year)	--	--	98.5	117.0
RII - change between 2011 and 2019	--	10.2	--	--

± Relative-to-EU scores are not shown as these would allow recalculating confidential regional CIS data.

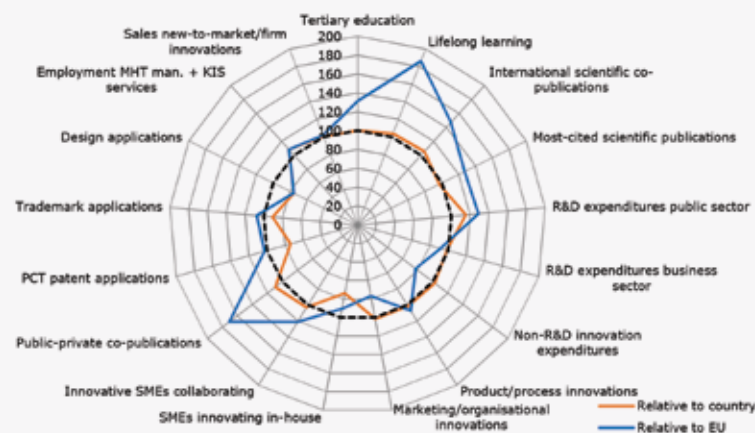
Zuid-Holland (NL33) is an Innovation Leader -; innovation performance has increased over time (10.2%).

The table on the left shows the normalised scores per indicator and relative results compared to the Netherlands and the EU. The table also shows the Regional Innovation Index (RII) in 2019 compared to that of the Netherlands and the EU in 2019, the RII in 2019 compared to that of the EU in 2011, and performance change over time between 2011 and 2019.

The radar graph shows relative strengths compared to the Netherlands (orange line) and the EU (blue line), showing relative strengths (e.g. Lifelong learning) and weaknesses (e.g. Design applications).

The table below shows data highlighting possible structural differences, e.g. Population density (above average) and GDP per capita growth (below average).

	NL33	NL	EU28
Share of employment in:			
Agriculture & Mining (A-B)	2.0	2.2	4.6
Manufacturing (C)	6.9	9.4	15.4
Utilities & Construction (D-F)	5.5	5.5	8.2
Services (G-N)	69.5	68.5	64.1
Public administration (O-U)	7.2	5.8	7.0
Average employed persons per enterprise (firm size), 2015-2016	5.1	5.1	5.5
GDP per capita (PPS), 2017	38,400	38,400	30,000
GDP per capita growth (PPS), 2013-2017	0.39	0.79	2.86
Population density, 2017	1271	501	118
Urbanisation, 2018	95.7	90.4	76.0
Population size, 2018 (000s)	3,680	17,180	512,380



Regional Innovation Scoreboard 2019

Limburg (NL42)

	Data	Normalised score	Relative to	
			NL	EU
Tertiary education	42.8	0.512	85	111
Lifelong learning	17.0	0.497	89	159
International scientific co-publications	1957	0.789	99	138
Most-cited scientific publications	0.135	0.654	92	121
R&D expenditures public sector	0.71	0.579	91	101
R&D expenditures business sector	1.56	0.644	117	109
Non-R&D innovation expenditures	±	0.357	±	±
Product/process innovations	±	0.494	±	±
Marketing/ org. innovations	±	0.330	±	±
SMEs innovating in-house	±	0.437	±	±
Innovative SMEs collaborating	±	0.467	±	±
Public-private co-publications	72.8	0.544	86	133
PCT patent applications	8.46	0.719	121	168
Trademark applications	6.26	0.442	84	100
Design applications	6.42	0.600	122	122
Employment MHT manuf./KIS services	13.2	0.415	83	83
Sales new-to-market/firm innovations	±	0.590	±	±
Average score	--	0.553	--	--
Country EIS-RIS correction factor	--	1.038	--	--
Regional Innovation Index 2019	--	0.574	--	--
RII 2019 (same year)	--	--	95.3	118.2
RII 2019 (cf. to EU 2011)	--	--	--	123.7
Regional Innovation Index 2011	--	0.519	--	--
RII 2011 (same year)	--	--	94.1	111.9
RII - change between 2011 and 2019	--	11.8	--	--

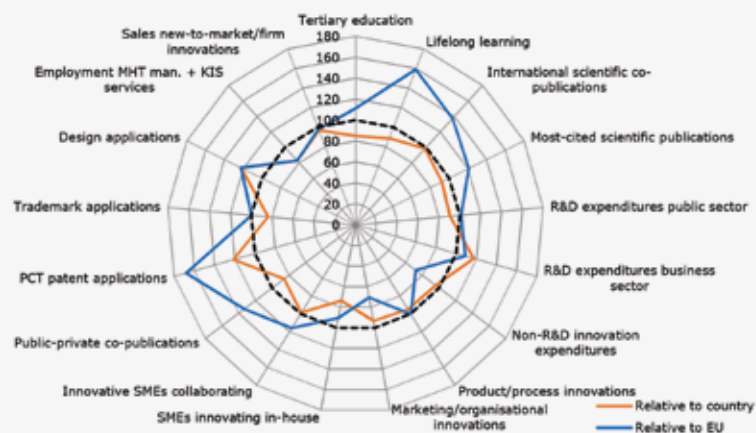
± Relative-to-EU scores are not shown as these would allow recalculating confidential regional CIS data.

Limburg (NL42) is a Strong + Innovator; innovation performance has increased over time (11.8%). The table on the left shows the normalised scores per indicator and relative results compared to the Netherlands and the EU. The table also shows the Regional Innovation Index (RII) in 2019 compared to that of the Netherlands and the EU in 2019, the RII in 2019 compared to that of the EU in 2011, and performance change over time between 2011 and 2019.

The radar graph shows relative strengths compared to the Netherlands (orange line) and the EU (blue line), showing relative strengths (e.g. PCT patent applications) and weaknesses (e.g. Marketing/organisational innovations).

The table below shows data highlighting possible structural differences, e.g. Population density (above average) and Employment in Utilities & Construction (below average).

	NL42	NL	EU28
Share of employment in:			
Agriculture & Mining (A-B)	2.1	2.2	4.6
Manufacturing (C)	13.7	9.4	15.4
Utilities & Construction (D-F)	4.9	5.5	8.2
Services (G-N)	66.0	68.5	64.1
Public administration (O-U)	5.2	5.8	7.0
Average employed persons per enterprise (firm size), 2015-2016	5.1	5.1	5.5
GDP per capita (PPS), 2017	34,000	38,400	30,000
GDP per capita growth (PPS), 2013-2017	2.44	0.79	2.86
Population density, 2017	518	501	118
Urbanisation, 2018	86.1	90.4	76.0
Population size, 2018 (000s)	1,120	17,180	512,380



Regional Innovation Scoreboard 2019

Weser-Ems (DE94)

	Data	Normalised score	Relative to	
			DE	EU
Tertiary education	23.5	0.165	47	36
Lifelong learning	6.1	0.167	71	53
International scientific co-publications	298	0.308	52	54
Most-cited scientific publications	0.085	0.414	75	77
R&D expenditures public sector	0.37	0.397	59	70
R&D expenditures business sector	0.60	0.380	52	64
Non-R&D innovation expenditures	±	0.516	±	±
Product/process innovations	±	0.404	±	±
Marketing/ org. innovations	±	0.572	±	±
SMEs innovating in-house	±	0.377	±	±
Innovative SMEs collaborating	±	0.139	±	±
Public-private co-publications	4.2	0.131	26	32
PCT patent applications	3.56	0.352	58	82
Trademark applications	5.18	0.364	72	82
Design applications	2.92	0.397	64	81
Employment MHT manuf./KIS services	13.5	0.428	70	85
Sales new-to-market/firm innovations	±	0.458	±	±
Average score	--	0.351	--	--
Country EIS-RIS correction factor	--	1.050	--	--
Regional Innovation Index 2019	--	0.369	--	--
RII 2019 (same year)	--	--	65.1	75.9
RII 2019 (cf. to EU 2011)	--	--	--	79.5
Regional Innovation Index 2011	--	0.435	--	--
RII 2011 (same year)	--	--	73.4	93.8
RII - change between 2011 and 2019	--	-14.3	--	--

± Relative-to-EU scores are not shown as these would allow recalculating confidential regional CIS data.

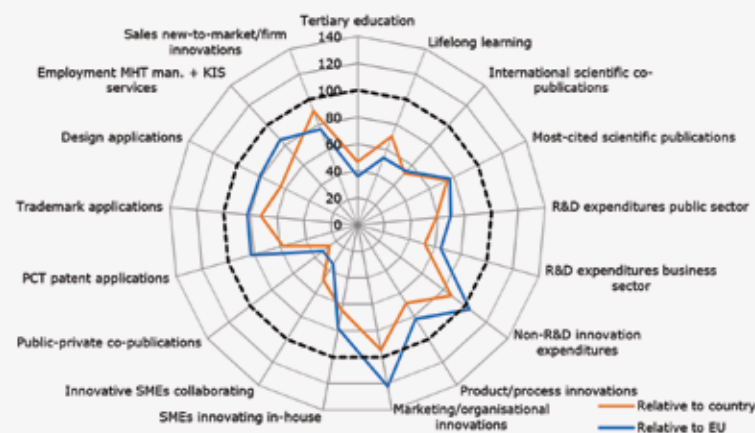
Weser-Ems (DE94) is a Moderate + Innovator; innovation performance has decreased over time (-14.3%).

The table on the left shows the normalised scores per indicator and relative results compared to Germany and the EU. The table also shows the Regional Innovation Index (RII) in 2019 compared to that of Germany and the EU in 2019, the RII in 2019 compared to that of the EU in 2011, and performance change over time between 2011 and 2019.

The radar graph shows relative strengths compared to Germany (orange line) and the EU (blue line), showing relative strengths (e.g. Marketing/organisational innovations) and weaknesses (e.g. Public-private co-publications).

The table below shows data highlighting possible structural differences, e.g. Employment in Utilities & Construction (above average) and Urbanisation (below average).

	DE94	DE	EU28
Share of employment in:			
Agriculture & Mining (A-B)	3.5	1.5	4.6
Manufacturing (C)	19.0	19.3	15.4
Utilities & Construction (D-F)	9.9	8.2	8.2
Services (G-N)	60.5	64.1	64.1
Public administration (O-U)	7.1	7.0	7.0
Average employed persons per enterprise (firm size), 2015-2016	10.1	10.1	5.5
GDP per capita (PPS), 2017	33,200	37,100	30,000
GDP per capita growth (PPS), 2013-2017	2.91	2.82	2.86
Population density, 2017	169	234	118
Urbanisation, 2018	64.6	79.3	76.0
Population size, 2018 (000s)	2,520	82,790	512,380



Comparison of Regional Profiles

	Weser-Ems	Groningen	Gelderland	Zuid-Holland	Limburg
Trademark applications	100.52	65.82	141	131.49	121.97
Scientific co-publications	73.71	239.49	212.82	202.01	188.85
Sales of new-to-market and new-to-firm innovations	77.66	110.97	105.06	103.87	100.02
SMEs innovating in-house	78.32	90.71	90.71	90.71	90.71
R&D expenditure public sector	71.35	153.93	133.03	132.12	103.94
R&D expenditure business sector	69.35	57.68	99.3	98.52	117.38
Public-private co-publications	33.7	107.46	132.72	178.68	139.67
Product or process innovators	82.51	115.83	105.71	107.7	100.88
Population with tertiary education	38.82	139.66	116.88	141.77	120.25
Non-R&D innovation expenditures	102.32	79.26	75.84	75.7	70.72
Most-cited publications	80.95	135.49	143.89	134.19	127.79
Marketing or organisational innovators	110.97	75.24	67.75	69.74	64.03
Lifelong learning	54.46	206.93	184.16	190.1	162.38
Innovative SMEs collaborating with others	36.61	139.86	126.21	128.56	123.22
Innovation Index	79.52	118.68	124.38	127.2	123.73
Employment medium and high tech manufacturing & knowledge-intensive services	95.44	89.97	93.61	120.98	92.7
EPO patent applications	77.62	70.87	92	96.78	158.79
Design application	78.3	43.58	95.29	73.14	118.29

Appendix 2:

Mission Delegates Profiles

Mission Leaders



Professor
Leo Goedegebuure

Director at the LH Martin Institute, Professor Leo Goedegebuure is active in the field of higher education policy research and management. Prior to his move to Australia in 2005 (University of New England, Centre for Higher Education Management and Policy), Leo was Executive Director of the Center for Higher Education Policy Studies (CHEPS), at the University of Twente, Netherlands, Europe's largest research centre in this field.

Leo's research interests are in the areas of governance and management, both at the systems and institutional level, system dynamics including large scale restructuring policies, university-industry relationships, and institutional mergers. Most of his work has a comparative focus, both within and outside of Europe, which has resulted in a strong international network. He is an auditor for the Hong Kong Quality Assurance Council and has been a member and rapporteur for the OECD tertiary education review of New Zealand. He has worked as an expert on governance and management in Central and Eastern Europe, the Russian Federation, Africa, South East Asia and South America on projects initiated by the European Commission, the World Bank and UNESCO.



Ms Marian Schoen

Project Lead, Stakeholder Relations and Governance, Gippsland Smart Specialisation Strategy (G S-3), Marian brings to the role executive management and stakeholder relations experience in the higher education sector having held positions as Executive Director of the University of Melbourne European Union Centre for Shared Complex Challenges, Deputy Director of the LH Martin Institute for Tertiary Education Leadership and Management, General Manager of the Melbourne School of Engineering, Executive Director of the Melbourne Law School, and as a member of the Council of the University of Melbourne.

As Director of the Australia Centre Europe established by the Australian Group of Eight Universities in Berlin to foster collaboration with European universities, research organizations and networks, she represented Go8 institutions and established relationships with Australian, European government and European agencies and diplomatic representatives for trade, higher education and science.



Dr Sebastian Fastenrath

Research Fellow in Resilient Cities, Sebastian Fastenrath joined the Melbourne Sustainable Society Institute (MSSI) at the University of Melbourne in 2017. As postdoctoral researcher, he works alongside the 'City of Melbourne Chair of Resilient Cities, Professor Lars Coenen.

By generating knowledge and expertise through collaborative research and engagement within Resilient Melbourne, Sebastian helps to develop urban innovations, resilience research and policy making.

Coming from an interdisciplinary background, Sebastian's work is focused on questions at the interface of economic and urban geography, innovation and transition studies. He is particularly interested in sustainability transitions, resilient urban and regional development, governance, and interactive knowledge generation between actors from public, private and academic sectors. A special focus of Sebastian's work has been on urban sustainability transitions and innovation in the building and construction sector. He gained extensive research experience in Australian and German city contexts through his PhD in Human Geography at the University of Cologne, Germany. Sebastian's work has been published in renowned international journals, such as Applied Geography, Journal of Cleaner Production and Professional Geographer.

With a focus on applicable solutions and recommendations for urban and regional development, Sebastian's core research questions are: How are resilience and sustainability strategies translated into practice? What drives processes of change and innovation in urban and regional contexts? What are barriers and challenges? To what extent does political decision-making play a role?

Delegate Profiles



Benjamin Gebert

Partnership Broker | Gippsland Resilience
Strategy TAFE Gippsland

Ben originally hails from Wimmera-Mallee agricultural region of Victoria's north-west, where he was raised on his family's cropping and sheep farm. Following completion of secondary education, he gained experience working in agricultural engineering, broad acre agricultural production and corporate agribusiness. Ben completed his tertiary studies in Business (HR Management) at La Trobe University in Melbourne, before being employed as a finance graduate within an agribusiness bank. After a stint in Bendigo, Ben moved to Gippsland where he took on a role as a specialist banker overseeing a lending portfolio spanning the region. Ben departed the finance industry to work within the TAFE / higher education sector in late 2018, where he is currently engaged as a Partnership Broker. Ben's current role aims to build pathways for employment through strategic engagement across a range of organisations and communities, where he operates as a "bridge builder" and "dot connector" between stakeholders. Outside work, Ben has trained as a leadership coach and delivered transformational leadership courses to groups across Australia throughout the last 7 years. He has worked with philanthropic organisations to develop their own leadership programs, and acted as a formal mentor to country students transitioning to university/careers. Ben lived in Germany for a stint as a teenager, speaks the language, and has inherited a love for good beer as a result. He enjoys a range of sports, fabricating furniture and sculptures, restoring early machinery, and spending time with his partner, Cass, and fur child, Bossco the German Wirehaired Pointer dog.



Fiona Forster

Manager | Gippsland Resilience Strategy
TAFE Gippsland

Fiona is originally from Queensland, having completed her schooling in Brisbane. She studied a Bachelor of Music (Violin) at the Queensland Conservatorium of Music and worked as both a violin teacher and orchestral performer before undertaking a Diploma of Aviation (Air Traffic Control) with Airservices Australia in Melbourne. After working as an Air Traffic Controller in Mackay, Fiona decided to leave the industry and relocated back to Melbourne. She took on a variety of Communications and Engagement roles and Program roles within the Victorian Public Sector, including in the Higher Education and Skills Group of the Department of Education and Training as a Communications Manager. In late 2018, Fiona relocated to Paynesville to accept a role with TAFE Gippsland as the Manager, Gippsland Resilience Strategy, where she manages a team of Partnership Brokers. The role of the team is to build pathways to employment through strategic engagement. Outside of work, Fiona continues to play violin and in 2018 performed with the Melbourne Symphony Orchestra. She has travelled extensively and spent time living in England and now enjoys sewing, cooking and exploring all that Gippsland has to offer, particularly the quality fresh produce available locally, and likes spending time at home with her cat, Sibelius.

**TAFE
GIPPSLAND**

TAFE Gippsland is a vocational education and technical training institute that has supported the Gippsland region and its businesses through the provision of education programs and social initiatives for 85 years. The TAFE has a mix of both multi-purpose and specialised campuses in 9 regional centres. The mix of facilities operated by the TAFE allows for the tailoring of educational offerings to suit specific needs within Gippsland's distinct sub-regions, along with the option for organisations to contract the TAFE to supply bespoke training offerings onsite. TAFE Gippsland has recently undergone a significant shift from its previous branding, "Federation Training", following a considerable period of community consultation. In addition to the rebranding, the TAFE has been the beneficiary of Government investment to bolster industry and community engagement in order to build strong employment pathways across the region. This investment has facilitated the implementation of a team of Partnership Brokers and their leader who work to forge mutually beneficial relationships between industry, peak bodies, Government organisations and the TAFE; and the revamping of the region's Skills and Jobs Centres, which offer direct support services to job seekers and those requiring a helping hand in gaining employment.



Moragh Mackay

Chair and Director
Energy Innovation Co-operative

Dr Moragh Mackay has worked in community-based organisations for over 30 years in the areas of ecological restoration, climate adaptation, renewable energy and emissions reduction with Landcare and the Energy Innovation Co-operative, environmental and economic development with Victorian Traditional Owner groups, and environmental governance with Port Phillip and Westernport Catchment Management Authority. Moragh has developed specialist knowledge and skills in collaboration amongst partners and stakeholders to co-design and co-deliver agreed outcomes for common purpose. Her work history of collaborating across the community-government-industry interface has enabled her skills to evolve in practice. From 2002 to 2011 Moragh co-designed two regional scale projects in South Gippsland region with government, industry and community (i) the Western Port Agricultural Emissions Project undertaking emissions audits, emissions reduction and renewable energy projects with 50 farmers and (ii) the Western Port Land Stewardship Program involving over 100 farmers in providing and being paid for ecosystem services. Her PhD research enabled her to deepen knowledge and skills by connecting the theory of systems thinking with the practice of collaboration, and she is now putting these skills to use in the area of environmental and economic development with Traditional Owners across Victoria, in partnership with government and industry and in facilitating initiatives such as Totally Renewable Phillip Island and the Renewable Energy Roadmap for Bass Coast and South Gippsland Shires, in southern Victoria.



The Energy Innovation Co-operative is a non-trading co-operative with over 350 shareholders based in the Bass Coast and South Gippsland region of southern Victoria. It began in 2009 with a mission of 'Working together towards a zero emissions community'. It has made many contributions towards this mission since then, including facilitating installation of over 650kW of solar PV through the Southern Solar Hubs Project, installing a community owned 92 kW solar and 41 kWh battery array and engaging over 4000 people in more than 120 public meetings, workshops, information sessions and house and farm tours learning about renewable energy and emissions reduction in action. The efforts of the EICo-op to make significant and long-lasting contribution to reducing emissions and facilitating the uptake of renewables have intensified in the last few years with a Renewable Energy Revolving fund that provides no-interest loans to community groups undertaking energy efficiency or installing renewable energy and the Totally Renewable Phillip Island, an initiative that employs the Collective Impact Framework to pool expertise and resources across groups that have a common issue or problem to solve, in this case Climate Change.



Emily Scholes

Chief Executive Officer and
Founding Director EnviroMicroBio

Emily Scholes is the CEO and founding director of EnviroMicroBio. She has 15 years of experience in anaerobic digestion and has a background in wastewater operations. She obtained a BA (journalism) and a BSc from Monash University. She worked for CH2MHill Australia for 5 years, mostly as the laboratory manager for the Gippsland Water Factory project. She is currently procrastinating about writing up her PhD thesis on 'The causes of CST increase in the MBR treatment of pulp and paper wastewater'.



EnviroMicroBio is a Gippsland based start-up providing scientific advice and analysis on matters including water, wastewater, anaerobic digestion and biological systems. They have recently established a laboratory in Building E of TAFE Gippsland in Newborough / Yallourn. EnviroMicroBio is positioned to provide the industrial and agricultural sectors with analysis of their waste and the suitability of various waste organics management technologies including anaerobic digestion. EnviroMicroBio specialises in hands on biochemical process problem solving. They enable client's access to powerful technology such as DNA sequencing of microbial populations and ATP monitoring. EnviroMicroBio are currently exploring the viability of portable DNA sequencing technology and other rapid response detection systems. Businesses which are interested in exploring the potential of these technologies are encouraged to engage with EnviroMicroBio. Possible applications include: Same day pathogen confirmation, biosecurity monitoring, invasive species detection, antimicrobial resistance gene tracking.



Jessie Horton

Economic Development & Investment – Agriculture
Latrobe Valley Authority

Jessie Horton's passion for agriculture and rural communities was established in her childhood - raised and educated in Gippsland (Victoria, Australia) she was surrounded by the area's reclaimed swamp organic- and clay- rich black soils used for mainly dairy and asparagus production. Carrying this into her career, Jessie completed a Bachelor of Science (Environment) Honours thesis on the impact of agriculture on the black soil at Koo Wee Rup, followed by a Doctor of Philosophy (PhD) in soil science. Since 2007, Jessie has worked for the Victorian Government as an agriculture scientist, first managing the Ellinbank laboratory and projects relating to nutrient movement through soil, then later working as a dairy extension officer, providing her opportunity to have direct impact on the productivity and sustainability of rural communities. Since taking up the role of Regional Manager of Gippsland's dairy extension team, Jessie has built leadership and management skills to add to her extensive network, technical and communication skills, and practical understanding of farming. It is from this background that Jessie now leads the development of the Smart Specialisation Strategy for Gippsland, taking a place-based approach to innovation and sustainable regional development by working with and for the local community as part of a two-year secondment with the Latrobe Valley Authority. Jessie welcomed twin daughters in 2015 and continues to live in Gippsland. Her passion for sport, the environment and travel is ongoing. In 2018, Jessie completed the Advanced Leadership Program run by Women and Leadership Australia.



Mike Timpano

Director- Economic Development & Investment
Latrobe Valley Authority

Mike Timpano is the Director of Economic Development and Investment for the Latrobe Valley Authority (LVA). Mike is strongly embedded in the local Gippsland community, having worked in state Government within Gippsland, across multiple departments for almost 30 years. Mike will work to further strengthen the economic development of the Latrobe Valley to achieve long term sustainable outcomes for the region. With previous leadership roles including;

- Board of the East Gippsland Catchment Management Authority,
- Gippsland Coastal Board,
- Member of the Gippsland Regional Plan Leadership Group and;
- Gippsland Lakes Ministerial Advisory Committee.

Mike has extensive stakeholder relationships and experience across a wide range of industry sectors. Mike studied a Bachelor of Science at LaTrobe University. Mike is also a graduate of the Gippsland Community Leadership program and has completed a Company Directors Course. Mike's vision for the region is to leave a legacy of economic sustainability, for our communities and people to feel safe, confident, skilled up and have all the support they need to carry out their roles successfully.



The Latrobe Valley Authority (LVA) is working to ensure a strong future for the Latrobe Valley region as it transitions to a sustainable and diversified economy. The LVA was established by the Victorian Government on the 3 November 2016 in response to the decision to close the Hazelwood Power Station and Mine. The LVA is taking a genuine place-based, holistic approach to addressing the issues and opportunities in the region, coordinating action across all levels of government and partnering with the community and businesses to improve outcomes for everyone in the Latrobe Valley.

Latrobe Valley Authority's mission is to work with
and for the people of Latrobe Valley to:

- Build on community strengths and capability for the future
- Lead collaboration and innovation
- Draw on and use the best ideas for what works
- Support opportunity for all

As a priority, LVA is focussed on activities that will:

- Create jobs now and in the future in the Latrobe Valley
- Support people in the Latrobe Valley to develop and succeed
- Ensure Latrobe Valley communities are resilient
- Create a liveable, connected and vibrant Latrobe Valley



Sallie Jones

Co-Founder and CEO
Gippsland Jersey

Sallie Jones is Co-Founder and CEO of Gippsland Jersey, an independent, farmer-owned premium milk brand based in country Victoria, Australia. Her focus is on marketing, sales, and networking. Established in September 2016, the mission of Gippsland Jersey is to look after dairy farmers, ensuring they are paid a fair price for their milk. Sallie leverages the Gippsland Jersey brand to help break down the stigma associated with health and wellbeing mental in agriculture. She sits on the panel of National Enterprise for Rural Community Wellbeing and the Food & Fibre Gippsland board. Her love for rural Victoria and her local community knows no bounds, and she thrives on bringing ideas, events and activities to life that will deliver benefit, joy, and that good dose of kindness to any tribe they touch.



Gippsland Jersey was born in September 2016 when we saw an opportunity in the market with no Gippsland farmer owned milk readily available for consumers to buy and support that also paid a responsible price to farmers. Gippsland Jersey initially launched a Full Cream and Light Milk variants in 2 litre bottles. Through a significant effort via social media channels and conventional media channels we have been intentionally disruptive in a positive way. We have tried to provide real time education and transparency on the dairy industry and show the highs and lows as the journey progresses. Before Gippsland Jersey started we wanted to make a difference to the farming community and to bring other jersey farmers on board to supply milk to Gippsland Jersey. We also wanted to make a significant difference to as many farmers as possible by putting money aside from each bottle to allow us to do "Random acts of Kindness". This is through partnering with other businesses or on our own to help farmers in real time, in their darkest times. Gippsland Jersey is all about smashing the stigma on mental health and farm suicide. We have partnered with "The Ripple Effect" to help create awareness and assistance where we can through this platform.



Stephen Chapple

Regional Director
Port Phillip Region Forest, Fire and Regions
Department of Environment, Land,
Water and Planning

Stephen Chapple has over 20 years executive local and state government experience, either as a CEO or Regional Director in both metropolitan and regional Victoria. He is the immediate past National Chairman of Economic Development Australia (EDA), and former member of Regional Development Australia (RDA) Southern Melbourne committee. Steve has presented widely at numerous International and Australian economic development conferences, including in the United States of America, New Zealand and Asia Pacific. Steve has led successful economic development trade and investment delegations across China. He has worked with many state and federal government ministers, elected mayors, local government councillors, the private sector and diverse communities. Throughout his career, he has contributed to over \$1Billion of economic development investment activity in Victoria. Steve has extensive experience leading large, complex and diverse teams. He has a passion for developing high performing leadership teams and culture, driving innovation and performance, achieving results and strong levels of accountability. Steve holds four Degrees, including two Business Masters Degrees (Business and e-Business & Communication). He is a 2009 Williamson Community Leadership Program Fellow and a 2016 ANZSOG (Australian and New Zealand School of government) Executive Fellows Graduate with the University of Melbourne Business School. Steve enjoys family and friends, has travelled extensively around the world and Australia, enjoys daily meditation, good food and wine, and makes Shiraz to share with family and friends. He is currently Regional Director, Port Phillip Region and has a statewide Energy portfolio responsibility for the Department of Environment, Land, Water and Planning, Victorian State Government.



The Department of Environment, Land, Water & Planning (DELWP) is tasked with creating liveable, inclusive and sustainable communities. The organisation focuses on caring for and protecting the environment, and helping to respond to climate change through risk mitigation and adaptation strategies. DELWP recognises the link between the built and natural environment in the quality of our lives, and work to accommodate population growth while maintaining world class liveability and protecting our heritage for future generations. The organisation assists local governments to support people, communities and growth at the local level.



Dr. Nicola Watts

Interim Chief Executive Officer
Food and Fibre Gippsland

Nicola has responsibility for the strategic project activities of Food & Fibre Gippsland. A passionate East Gippslander who has extensive international and national experience as a senior manager, project manager, consultant, and board member in the sectors of Agrifood, Telecommunications, Natural Resource Management and Education.



Shayne Hyman

Industry Development Officer – Vegetable industry
Food and Fibre Gippsland

Shayne is engaged in capacity building for the region's vegetable industry. Born in East Gippsland, Shayne returned to the region in 2011 and has been applying her considerable skills, knowledge and experience to develop ideas, people, business and organisations. Shayne's role is focussed on assisting vegetable growers across Gippsland, from Cowes to Mallacoota, to improve productivity and profitability through the adoption of current research and development.



Food & Fibre Gippsland was formed in March 2019, a result of the amalgamation of Agribusiness Gippsland and the East Gippsland Food Cluster which created a united, collaborative powerhouse. Our mission is to lead capacity building, innovation and knowledge sharing for the greater good of the sector across the whole of Gippsland. Our members, industry partners and stakeholders are at the core of everything we do – their success and prosperity is what drives us every day. We are listening, and we are engaging. We want to understand and respond to the challenges and ideas across the region.

Appendix 3:

Study Mission Program

Sunday, 16th June 2019 – Haarlem

Program Time	Activity
Travel - In transit Day	Participants arrive in the Netherlands (Schiphol Airport, Amsterdam)
6:30pm	Delegates Welcome Dinner

Monday, 17th June 2019 – Haarlem

Program Time	Activity	Facilitators
09:00	Welcome Overview and Introductions	Professor Leo Goedegebuure and Marian Schoen, University of Melbourne
09:30 – 10:45	EU S3 State of Play: Promising initiatives; progress made; specific highlights in the Food & Fibre and New Energy sectors; lessons to be learned	Dr. Manuel Palazuelos Martinez DG Joint Research Centre - S3 Team Leader
10:45 – 11:15	Morning Tea	
11:15 – 12:15	EU S3 State of Play cont'd – Session Wrap	Dr. Manuel Palazuelos Martinez
12:15 – 13:00	Lunch Break	
13:00	Smart Specialisation in the East of the Netherlands – Perspectives on regional development and innovation: key takeaways from the EU experiences	Professor Frans van Vught, Professor of Higher Education Policy, University of Twente
14:30	Afternoon Tea	
15:00	Perspectives: Smart Specialization Principles – the operationalisation and diversification of smart specialisation policy	Associate Professor Pierre-Alexandre Balland, Economic Geography, Faculty of Geosciences, Utrecht University.
16:30	Day 1 concludes	

Tuesday, 18th June 2019 – Haarlem

Program Time	Activity	Facilitators
09:30 – 10:45	The Dutch approach to innovation – Representatives from the Dutch government will provide participants with key takeaways on innovation and regional development from the EU experience	Jock Geselschap , Netherlands Ministry of Foreign Affairs.
10:45 – 11:15	Morning Tea	
11:15 – 13:00	The Dutch approach to innovation – Session continued	
13:00	Lunch Break	
14:00	Developing the site visits – Participants to develop core objectives and key questions for the site visits, and the division of delegates tasks and responsibilities.	
15:00	Afternoon Tea	
15:30	Wrap Up–Reflections and key messages from first part of program and confirming travel plans for following day	
16:30	Day 1 concludes	

Wednesday, 19th June 2019

Group A: New Energy	Group B: Food and Fibre
Transit Day: Travel to Groningen	Transit Day: Travel to Wageningen

Thursday, 20th June 2019

Group A: New Energy (Groningen)		Group B: Food and Fibre (Wageningen)	
Time	Activity	Time	Activity
12:00 – 14:00	Lunch meeting - SNN – Christien Bronda, Director and Luc Hulsman Program Manager Samenwerkingsverband Noord Nederland (SNN)	07:30	Departure from Hotel - transfer to Agropark Bergerden Site tour hosts: Dr Peter Smeets, Agroparks and Food Clusters, Wageningen University and Research. Dr. Joost Snels, Senior Scientists, Supply Chain Management, WUR; and Peter Ravensbergen, Business Development WUR.
14:30 – 15:30	Grunneger Power – Marcel Koenis, Board Member, Grunneger Power, Province of Groningen.	08:10	Sweet Pepper Greenhouse - Sweet Pepper production and processing in 8ha high-tech Greenhouse
16:00 – 17:30	Province of Groningen - Gerwin Wiersma, Policy Advisor Industry and Energy Transition, Thijs van Wonderen, Policy Officer Hydrogen, Provincie Groningen	09:20	Agropark Bergerden – Energy and water management. Industrial Ecology. Real estate development
		10:40	Freshpark Venlo – International trade and processing of fruits and vegetables: Frankort and Koningen - Con Storm, Commerce
		12:30	Lunch at Villa Flora, part of Campus Greenport Venlo
		13:40	Site Visit Witveldweg: New Mixed Farm – Hightech production and processing of poultry. Manure refinery
		14:30	Site Visit Kipster – Layer Hen farm approved by animal rights and environmental NGO's and direct communication with consumer
		16:00	VrebaDairy – Hightech production and processing of milk. Manure refinery. Reduced Methane emission
		18:10	Dinner at Restaurant Plasmolense Hof
		20:50	Return to hotel

Friday, 21th June 2019

Group A: New Energy (Groningen)		Group B: Food and Fibre (Wageningen)	
Time	Activity	Time	Activity
09:00 – 11:00	Visit New Energy Coalition – Sjoerd Ammerlaan Project Manager International Affairs and External Relations and Marije Tempel, Project Manager, Energy Education New Energy Coalition,	08:45	Pick up hotel
11:00 – 11:30	Walk to EnTranCe , Groningen	09:00	Foodvalley NL Office Agrobusiness Park Wageningen
11:30 – 12:30	Welcome and tour of EnTranCe – Tjerk Jansma Plant Program and Project Manager	09:00 – 10:00	Foodvalley NL Agrobusiness Park Wageningen University and Research “Where food ideas grow” – Jeroen Wouters, Director International
12:30 – 14:00	Lunch with presentations – Jan-jaap Aué, Dean Centre of Expertise Energy, Marcel Koenis, Business Development Director, and Tjerk Jansma	10:00 – 11:00	Cluster development by Food Valley NL – Roger van Hoesel, Managing Director, Food Valley
14:00 – 14:30	Visit to TopDutch Solar Racing team who are competing in the Bridgestone World Solar Challenge 2019	11:00 – 12:00	Microcos: start-up in food safety strategies based on antimicrobial products and phage strategies
14:30 – 15:30	Presentation about project Ameland – Steven de Boer, Lecturer and Researcher	12:00 – 12:30	Noldus Information Technology: scale up company delivering innovative solutions in behavioural research - Lucas Noldus, CEO and Marie-Anne Francken, Channel Manager, AUS
15:30 – 16:00	Wrap up – Jan-jaap Aué, and Marcel Koenis	12:30 – 14:30	Transfer to Wageningen Campus, lunch at Friesland Campina
		14:30 – 15:30	FrieslandCampina R&D Centre, Wageningen Gerard Robijn, Director Innovation Excellence.
		15:30 – 15:45	Transfer to Plus Ultra incubator building
		15:45 – 17:00	Plus Ultra and GreenFood50 Start up company in quinoa ingredients. Pien van Streun, Market Developer
		15:15	Wrap up – return to hotel

Saturday, 22 June 2019

Group A: New Energy (Groningen)	Group B: Food and Fibre (Wageningen)
Optional Cultural Activity and transit	Optional Cultural Activity and transit

Sunday, 23 June 2019

Group A: New Energy (Groningen)	Group B: Food and Fibre (Wageningen)
Travel to Oldenburg via Leer by bus	Travel to Delft by train via Utrecht

Monday, 24 June 2019

Group A: New Energy (Oldenburg)		Group B: Food and Fibre (Wageningen)	
Time	Activity	Time	Activity
9:00am	Transfer to Technology and start-up centre.	8:45	Departure Hotel to Tomatoworld
9:15am	Arriving and welcome by OLEC e.V.	9:30 -11:30	Tour of Tomatoworld: An overview of greenhouse horticulture, the challenges and developments to face these challenges - Miranda van der Ende, Director
9:30am	Presentations and Q&A on 'Energierregion Nordwest' and 'Oldenburger Energiecluster OLEC e.V.', Presenter: Roland Hentschel, CEO of OLEC e.V.	11:30	Departure to World Horti Center
10:10am	Presentation on energetic neighbourhood project and introduction of OFFIS e.V. (Institute for energy and ICT).	11:45-14:30	World Horti Center: Innovation and Inspiration Centre - a new concept where business, education, research and government are co-located under one roof. General Tour - Jan Enthoven Lunch and meeting with NL companies with links to Australia and interest in Gippsland

Monday, 24 June 2019 (continued)

Group A: New Energy (Oldenburg)		Group B: Food and Fibre (Wageningen)	
Time	Activity	Time	Activity
10:45am	'ForWind' (wind energy research institute) – Guided tour to wind tunnel and overview of projects Presenter: Dr. Hendrik Heißelmann	14:45	Trias Westland/ Geothermie Geothermal heat source for greenhouses and World Horti Center. Tour and Presentation: Han van Gorp, Project Manager, Trias Westland - Ingens Imec BV
12:00am	Lunch at 'Curie', Café, Technology and start-up centre	16:15	Departure to Rijk Zwaan
12:45pm	Transfer to City of Aurich, Energy, Education and Discovery Centre (EEZ)	16:30-17:30	Rijk Zwaan Trial Center Tomato [TCT] - Rijk Zwaan is ranked 3 rd of the largest breeders in vegetables. The Demonstration Centre in Kwintsheul is where new varieties are developed and tested. - Leo van Meurs, Manager TCT and Steven Paassen, Specialist Communication
2:00pm	Welcome by company Enercon GmbH	17:45	Departure to restaurant
2:15pm	Site visit ENERCON visitor center and production site, rotor blade manufacturing, KTA (Kunststofftechnologie Aurich)	18:00	Dinner : Wollebrand
4:30pm	Refreshment/coffee break	21:00	Departure to hotel
4:45pm	Exhibition EEZ		
5:30pm	Transfer (1h) back to hotel		
7:20pm	Group Dinner		

Tuesday, 25 June 2019

Group A: New Energy (Oldenburg)		Group B: Food and Fibre (Wageningen)	
Time	Activity	Time	Activity
8:50am	Transfer to Technology and start-up centre, Marie-Curie-Straße 1, 26129 Oldenburg 9:11, bus line 310, Bus station Julius-Mosen-Platz C to station Pophankenweg (10 min drive)	6:15	Departure from hotel to Flower Auction Royal Flora Holland
9:30am-11:30am	Presentations and discussion, research projects Dr. Camilla Chlebna and Sebastian Rohe, University of Oldenburg, Technologie- und Gründerzentrum	7:00 – 8:00	Tour Flower Auction Royal Flora: The largest flower auction in the world where millions of flowers and plants are sold and distributed on a daily basis - Mark Zwinkels, Director World Horti Center
12:00pm	Lunch, Mensa/cafeteria, University of Oldenburg	8:00	Departure to Priva Campus
12:40pm	Transfer to train station Oldenburg Hauptbahnhof Sued	8:30- 9:45	Breakfast and Tour of Priva Campus Priva provides solutions for the optimization of environmental conditions and process management in greenhouses and buildings - Dennis de Wit, Marketing Manager
1:00pm	Welcome event 'Hydrogen drives us', potential of hydrogen and non-electrified railways in Lower Saxony regions. Oldenburg Hauptbahnhof (main station) tunnel and overview of projects	10:00 – 11:30	Tour at ABC Westland: The most sustainable logistic and industrial hub in horticulture, spreading over 55 hectares and 24/7 activities - Herwi Rijsdijk, Director.
1:30pm	Train ride. Lead by Rainer Don, Product- and Project Director Coradia Lint, Alstom	11:30	Departure to BOAL Systems
2:30pm	Coffee break, 'Kulturetage', Bahnhofstrasse 11, Oldenburg and Discovery Centre (EEZ)	11:45- 13:30	Lunch & Tour at BOAL Systems Fred Tanke, Sales Manager
2:45pm	Talks (in German) Olaf Lies, State Minister for Environment, Energy, Building and Climate Protection Jürgen Krogmann, Lord Mayor of City of Oldenburg Stefan Dohler, CEO, EWE AG	13:30	Departure for Delft station. Travel to Haarlem
3:15pm	Roundtable discussions 'Wasserstoff' (hydrogen) with representatives of the state of Niedersachsen (Lower Saxony), City of Oldenburg, Alstom, Oldenburger Energiecluster OLEC, EWE and DLR-Institut, Signing Memorandum of Understanding, state initiative 'H2-Allianz'		

Wednesday, 26th June 2019 – Haarlem

Program Time	Activity
10:00	Wrap Up – reflections and key messages, comparing what we have learned from each location
11:30	Morning Tea
12:00	Going home – Preparing to adapt what we've learnt to our own regions, industries and workplaces.
14:00	Mission Ends – Delegates onward travel

Delegates presented program speakers with 'Bindi Bindi' pots and boxes, which are hand thrown and painted by Koori artists, reflecting the deep relationship between Aboriginal culture and the land. Based in the Latrobe Valley, Bnym Indigenous Designs produces the pottery and ceramics and showcases the wealth of Gippsland indigenous culture to national and international audiences.

bnymindigenousdesigns.com.au



On Tour

