

# Cluster development in Friesland: the role of Wetsus as a European water hub

**Partner** City of Leeuwarden

**City** Leeuwarden

**Region** Friesland

**Country** Netherlands

**Further Information**

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## Challenge

The emergent role of networks and hubs is a good example of Triple Helix development in the Dutch economy. Stakeholders now expect well balanced roles between government, companies and research institutes to improve local and national productivity, and to drive innovation and stimulate business development. A success factor in cluster development is the engagement of these multiple stakeholders in reaching win-win managerial solutions for patent technology and innovation, by combining their complementary skills, for the benefit of entire communities.

Today, 1.1 billion people in the world still have no access to safe drinking water and 2.5 billion have no access to sanitary water facilities at all. Agriculture is also facing water shortages for irrigation. Within this context, the Netherlands are ahead of countries like Japan and the USA, not only with regard to delta technology, but also water technology, patent development and multidisciplinary research on water quality. Friesland has a well deserved reputation in cluster development in the water sector.

The Friesland water sector comprises of many R&D oriented companies who collaborate in association with research centres, universities and local governments, such as the province of Friesland and the municipality of Leeuwarden, (the capital of the province). A niche player in this domain is Wetsus, Centre of Excellence for Sustainable Water Technology, located in the centre of Leeuwarden.

Wetsus acts as an intermediary to facilitate cutting edge know-how development. It promotes innovation and research activities in water technology to improve quality.

This unique centre was designed in 2007 as a Technological Top Institute for water technology and is part of the Dutch Innovation Program established by the Ministry of Economic Affairs. Wetsus performs the challenging role of attracting companies, universities and institutions to work together in consortia. The brokerage role performed by Wetsus since its inception in 2003 seeks to boost creativity through multidisciplinary collaboration for the development of state of the art water treatment technology. The aim of such vibrant collaboration in cluster development is to make Wetsus (and its region) the European hub in water technology.

## Stakeholders involved

In its quest to become a European water hub, Wetsus benefits from the support of several parties with a stake in the development of the water cluster. All players contribute to the realisation of a common objective: to stimulate and facilitate regional economic development. The following are some of the most important stakeholders.

Foremost is the role of the Northern Netherlands Provinces (or Samenwerkingsverband Noord Nederland - SNN), the Province of Friesland, the municipality of Leeuwarden and the Dutch Ministry of Economic Affairs. They respectively hold funds and responsibilities for the development of inland waterways, of human capital and of small businesses to contribute to the value of water technology. These are important financial providers for the many ventures and research centres wishing to set up and grow in the Northern Netherlands. As well as providing subsidies and financial resources, these organisations support the water cluster in Friesland through: the provision of infrastructure and facilities (housing and offices); help with rental and other administrative costs; coaching and consulting services for entrepreneurs; awareness and sensitising of civil society; direct involvement in company acquisition and organisation of fairs and conferences to build a sustainable network.

The Water Alliance, a partnership of companies, competence centres and government agencies, functions to strengthen the position of the Northern Netherlands in the global market for water technology, with the objective to establish networks and pilot projects locally. The Friesland Chamber of Commerce (KvK) is also involved in the water cluster to facilitate and promote innovation in water technology among Frisian businesses. Sharing the same intent is the NOM N.V. (investerings en ontwikkelingsmaatschappij voor Noord-Nederland), an independent entity that participates with risk bearing capital in companies located in the Northern Netherlands and supports them with investment advice, subsidies, location selection and employment opportunities. Additionally, the Rabobank of Friesland, regional investment funds and other supporters like Bison or Business Development Friesland, complete the full line up of stakeholders deeply involved in scouting business opportunities in water technology.

Increasingly important within the financial framework of the Frisian water cluster is Westt, a business angel which acts as a facilitator in the process of translating innovations into successful applications.

With more than 40 years of experience, Westt identifies and manages the further development of start ups by investing for the medium-long term in their organisation and market development, in fund raising and in all activities related to product development and launch of customer networks. Westt participates in activities in Leeuwarden, together with Wetsus and with the municipality, such as the development of a Watercampus in the vicinity of Johannes de Doper church. The campus will be home to current and future start-ups willing to relocate in Leeuwarden and will entail a total investment of 3m euros. Although only at its developmental stage now, the total turnover of this project, once completed, is expected to be around 0.3m euros. The campus will host Wetsus in its premises, as well as other companies now located in the re-designed church.

Very close to Wetsus, the Johannes de Doper church, an old religious building converted to a 2000 m<sup>2</sup> office space, is the head office of several start ups and companies expert in water technology, such as Westt, the NOM N.V. and the Water Alliance. This centre works as an incubator for breakthrough technology developers, including Berghof Membrane, the Dutch Rainmaker, Aqua Explorer, Capilix, and many more. The incubator is a project realised with the help of OBL (Ontwikkelingsbedrijf Leeuwarden), a foundation that often works in collaboration with the municipality to offer attractive and modern office space to organisations, companies and institutions willing to relocate in the area of Leeuwarden.

Last, but not least, is the Stichting Well, also located in the church. The Well foundation aims to support innovation, to stimulate and facilitate entrepreneurship in the sectors of water, energy and life science; sectors in which the province of Friesland undeniably has a well established reputation and long standing expertise. Another goal of Well is to bridge stronger connections between the business and educational sides of water technology, with the ambition to bring value to the research efforts of knowledge institutes in the direction of business development. With the same ethos as the water cluster, Well acts as an interactive meeting place for (young) technology development companies who seek synergies in the fields of organisational development, market creation and testing of applications.

## **Financial framework**

Wetsus' ambition to become a European hub for water technology, in the fields of (among others) blue energy (i.e. energy production through the compounding of fresh and salt water), capacitive deionisation-technology and bio-fuel cells (production of energy from algae), is backed by an array of small and large, private and public organisations.

Wetsus today counts more than 80 company members (Shell, Philips, Vitens, DHV, Evides, Norit, Paques, Unilever, DSM, Dutch Rainmaker, NOM N.V. and Dow Chemicals to name a few) - of which more than 50% are SMEs - and more than 14 knowledge institutes (some representatives being Wageningen University, TU Delft, University of

Twente, KWR, University of Groningen). All of them, together with other government institutes, bring benefit to Wetsus in the shape of strong financial support. The Northern Netherlands Provinces, for example, are leading in the field of subsidies for water. Other financial players at Wetsus and within the water cluster are the European Regional Development Fund, the municipality of Leeuwarden, the Province of Friesland and the Dutch Ministry of Economic Affairs.

Since the start of its research agenda, Wetsus has received a total budget of more than 12m euros (including EU funds for Regional Development and the Samenwerkingsverband Noord Nederland – Kompas subsidy) for the period 2003-2008. A new grant has been awarded for the period 2008 – 2013 from the Northern Netherlands Provinces of approximately 1.2m euros per year. The objective of this grant is to further enhance the activities in the field of business support, the Wetsus platform and Wetsus education (both academic and executive). In 2007 Wetsus' ambitious program was taken over by the Dutch Ministry of Economic Affairs, in order to make it a top technology institute. Wetsus' financial structure consists today of 35m euros (half of overall resources) given by the Dutch Ministry of Economic Affairs, while the other half is proportionally provided by Wetsus' participating companies and universities, each pooling in 25% (or 17.5m euros) of the operating budget.

To conclude the financial and stakeholder framework analysis, it is worth mentioning a few other players and their contribution. Vitens has its drinking water laboratory in Leeuwarden. It is one of the most advanced in Europe. The Van Hall Larenstein Institute and the Cartesius Institute agendas consist of disseminating knowledge for sustainable innovation respectively in agriculture and environmental management and in water, energy and spatial quality. These institutes share their facilities for applied scientific research, in the same way that companies like Philips, with its high tech centre in Drachten, and the water companies of Groningen and Drenthe do.

## Process

Wetsus focuses on the research and development of water technologies by integrating various knowledge disciplines. The actual research is performed by Wetsus, under the scientific responsibility of the universities and research institutes which participate in Wetsus. In contrast the companies who are members of Wetsus, and by and large those who constitute the water cluster, work as commercial entities and are involved in the definition and guidance of the research programme. Their role is mainly to identify and ensure the commercial viability of out-coming developments in the areas of waste water technology, clean water technology, sensor technology and interaction natural systems.

### **Research areas and scientific focus: Quadruple Helix aspects**

The world requires solutions to new and growing existing problems in the availability and quality of water for personal, agriculture, industrial use and the environment.

At the same time the focus must be on sustainable solutions for these problems, requiring less energy, re-use of valuable minerals and metals and low or no production of greenhouse gases.

It is obvious that traditional civil engineering solutions will not be able to provide solutions for these challenges that our society faces now and in the future. New water process technology will be necessary to develop new concepts to treat waste water and to produce clean water from alternative sources like salt (sea) water, waste water or humid air to minimise the burden on precious groundwater.

Societal problems inspire research institutes to gain new insights. In defining the Wetsus research programme interaction with society takes place. Wetsus follows the strategy that the research must be demand-driven. For instance, it becomes clear that hospital waste water is becoming a growing problem because of the use of antibiotics and other medicines. At this very moment a hospital is involved in defining the research project aimed at solutions. NGOs are involved in defining research projects in third world countries. It can be expected that in the years to come civil society will play a growing role in defining the Wetsus research program. Although this role will extend to the way research results will be implemented, entrepreneurship will be crucial in the introduction of these technologies into society. In the Wetsus vision entrepreneurs will be able to do that in the most efficient way.

The research goal of Wetsus is to develop innovative and sustainable water technology. The combination of biological and chemical conversion technology with separation technology and new materials has high potential to develop important innovations in water technology, especially if researchers work in close collaboration, preferably at a single location.

The scattered scientific expertise in different knowledge institutes in Europe will be combined leading to a bundling of monodisciplinary science into a world leading multidisciplinary research programme on water technology.

The programme, as defined by the industrial participants, will focus on five main research areas in clean water production and waste water treatment:

1. New water sources from air, sea and waste water
2. Sustainable production of healthy and tasty drinking water
3. Safe and cost effective discharge of waste water into the environment
4. Reuse and production of components and energy from water
5. Detection of pathogens and micro/nano pollutants

The research programme involves more than 15 scientific disciplines ranging from environmental technology through process technology to nanotechnology.

Activities at Wetsus are divided between three main segments:

- boosting the spirit of entrepreneurship through the attraction of SMEs into innovation projects, the development of a venture capital expert centre and the establishment of demonstration sites where companies can test their technologies
- setting up of education programmes, oriented to MSc students, bachelor students and business talent. In addition to this, Wetsus has established talent programmes, workshops for secondary and high school to attract young students, and several get-together events
- research excellence: Wetsus is involved in gathering universities and research institutes (25+) and PhDs (250) for joint research projects

To stimulate entrepreneurship Wetsus business support activities include the exploration, together with relevant stakeholders, of the opportunities presented by attending national and international events and recruiting candidates for competition games and workshops organised by Wetsus (namely the Wetsus Rabobank Water Business Challenge, the Wetsus Aquatech Executive Masterclass, the Wetsus Matchmaking Weekend and the Wetsus RSM Executive MBA on water technology sector).

Wetsus also intends to set up an investment fund in the near future of between 50 and 100m euros, with a focus on pure water-technology-driven companies that have the potential to create new market segments or to displace current market offerings. In line with the perspective of cluster development, this fund will seek the financial support of banks and other investment entities to pool resources into opportunities which show a clear path to commercialisation and profitability.

The activities above described fall into three main projects:

- Wetsus as a European Water Hub (supported by SNN within the programme line Koers Noord – Pieken in de Delta)
- Inner Circle Noord, a human capital roadmap for human capital development (supported as well by SNN)
- Wetsus Water Entrepreneurship Education Programme (WWEPP). This project was recently awarded a subsidy from SNN for the development of an Executive MBA in the water technology sector. The project is in line with the aim of Wetsus to expand its business development activities and to extend its outstanding reputation in business education.

## Outcome

The main results achieved by strengthening the relationships within the Frisian water cluster relate to:

- the development of state of the art technologies for water treatment
- the stimulation of relevant entrepreneurship and education

- the importance of the water cluster for the economic development of the region
- the increase in profile for Wetsus to become the European Water Hub

More specifically, the cluster has accomplished:

- Access to relevant publications and studies in the fields of technology and life science
- Knowledge sharing and development of new technologies
- Financial and management support; R&D advice
- Increased support, housing and relocation
- Synergies in research, finances and internationalisation strategies
- Increased network
- Human capital development, job creation and wealth
- Valorisation of technologies and growth acceleration of local industries
- Identification of and increase in potential spin-off business opportunities

## Critical Success Factors

In analysing those factors which contribute to the sustainability and flourishing of the water cluster in Friesland, the following are worth mentioning:

- long term cooperation between know-how developers and commercial parties
- the brokerage role of Wetsus as a top technology institute and as facilitator in know-how trend setting development; this role enables human capital growth and dissemination/transfer of knowledge. Wetsus has an authoritative position in membrane technology, a leading position in bio-technology and a strong international reach
- pooling of resources brought by all members of the cluster. Product and technology development often requires diverse resources, such as finances, test sites, laboratories, people expertise, raw materials. The collaboration of different stakeholders in the water cluster ensures that each of them contributes with a special resource: businesses are fundamental for bringing in the market perspective and the practical relevance of a technology; research institutes and universities are important to retain academic rigour and to bring in the 'inside out' aspects of technology development. Government help facilitates innovation through the provision of infrastructures and regional facilities, setting of regulations and taxes which are more favourable to business relocation, and the provision of the necessary funding for start ups
- multidisciplinary approach of biotechnology and separation technology in the development of sustainable water treatment and water production technology
- heritage: Friesland, and the Netherlands as a whole, is known for lakes, dikes and connection to water, water quality and efforts in water technology research. Given water as an abundant and natural resource for the people living in Friesland, lots of attention on the topic has favoured the creation of the water technology cluster
- leadership and management: the collaboration of many parties has led to the establishment of relevant expertise among their management, which consists of scientific minds and business people who have the reputation and adequate knowledge

to spot new areas of interest in the topic of water, with regards to consumer needs, market trends, sustainability enhancement, technology advancement and life science progress

- infrastructure: purchase and rental prices, together with support from the province and from the municipality of Leeuwarden, make Friesland a competitive region to find commercial accommodation, in spite of the peripheral location within the Netherlands. There is, for example, still plenty of space for building offices and test sites in Leeuwarden. Regarding the use of test facilities, Wetsus is very active in expanding the network by acquiring new centres for bench scale testing and to conduct further research. At present, there are several demonstration sites for testing technology in a radius of about 50 km from Leeuwarden, including the waste water treatment plant in Leeuwarden, the hospital waste water plant in Sneek and the Wetsalt project in Harlingen

## Difficulties encountered

Disadvantages in the further development of the water cluster in Friesland include:

- physical accessibility of the region for both national and international players. Leeuwarden is located at about 150 km from Amsterdam airport (Schiphol), the closest to the region. Business companies may therefore be reluctant to move to a region of the Netherlands considered to be peripheral. This factor restricts mobility. Efforts are being made to facilitate transport to and from Friesland.
- competition with, and disconnection from, other water related networks located in the so called Randstad area (between The Hague, Rotterdam and Utrecht); an example are EVD International and Agentschap NL, part of the Dutch Ministry of Economic Affairs, who are located in The Hague and often work in isolation from Wetsus and the water cluster of Friesland

## Impact

**Wetsus' significant contribution to the water cluster and to participation in several education/research programs (Eureka, Interreg and other framework programmes) has a global impact in the creation of synergies at regional, national and international (European) level. Indeed Wetsus helps to homogenise and integrate the playing field by strengthening cooperation among (international) players. By working strategically the entire water cluster in Leeuwarden and the region can overcome the limits posed by connectivity and lead the technological progress. As a result of this ambitious vision, an important employment goal has been attained in attracting more than 2000 highly educated workers with a technical background in the area of water technology. Wetsus leads the cluster to success.**

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