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Sharing solutions for better regional policies

iWATERMAP
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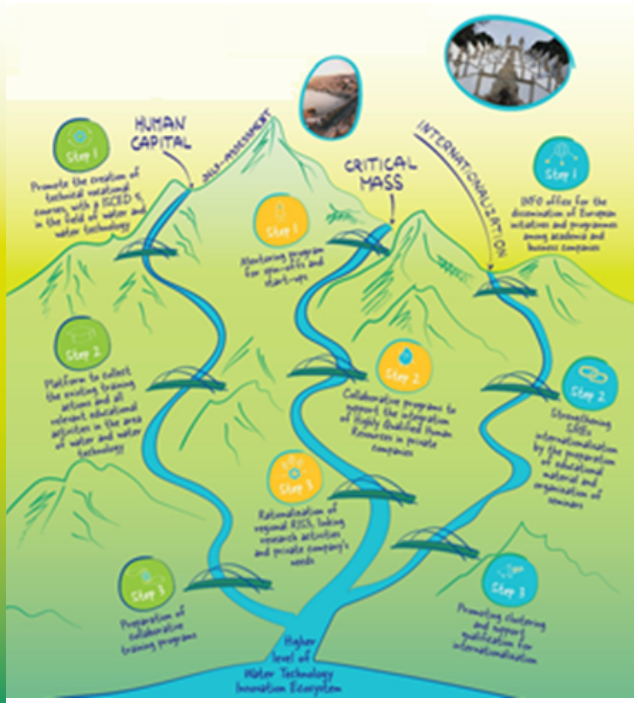
Water Technology Innovation Roadmaps



Action plan for the province of Fryslân

To be implemented and monitored from June 1st 2021 – May 31st 2023

provinsje fryslân
provincie fryslân

wetsus

Action plan

Part I – General information

Interreg Europe Project: iWATERMAP

Partner coordinator: Wetsus (Partner 1), project partner province of Fryslân (Partner 2)

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Part II – Policy context

The Action Plan aims to impact:

- ■ Investment for Growth and Jobs programme
- □ European Territorial Cooperation programme
- □ Other regional development policy instrument

Name of the policy instrument addressed: June 1st 2018 iWATERMAP started out by addressing RIS3 Northern Netherlands and Operational Programme ERDF 2014-2020. In the course of the programme the need to support a policy change during the ERDF2014-2020 programme period became evident by a zero success rate of WaterCampus in project applications. In 2016 the initial idea for an Interreg Europe project was born. iWATERMAP was approved on June 1st 2018. By that time the ERDF programme was nearing its end. Northern Netherlands management authority SNN outlined that changes requested by the WaterCampus were hard to implement, given the prior approval of the ERDF programme on national level. It was deemed better to focus on the upcoming programming period. In addition, as a result of COVID, Next Generation EU was launched, which provided opportunities to provide input to calls early on in 2021, concerning React-EU. In addition RIS3 Northern Netherlands now not only focused on ERDF, but also included novel European funding programmes, such as the Just Transition Fund. Therefore, efforts focused on the 2021-2027 funding period.

The RIS3 2021-2027 forms the framework for the deployment of European funds in the Northern Netherlands. These include ERDF, REACT EU and JTF. The action plan will focus on these, as well as on Interreg.

Background to iWATERMAP project:

iWATERMAP was initiated by Wetsus in the province of Fryslân in the Northern Netherlands. ERDF was fundamental in the development of the WaterCampus. The first project supporting the water technology sector was an ERDF project developed by the province of Fryslân in 2000. Since then, ERDF has supported the development and expansion of the WaterCampus. Between 2000 and 2013 this formed an important pillar in a funding synergy with regional public funding, national public funding and private sector contributions. The investment priorities for The Netherlands changed in 2014, with a very narrow focus on SME support and away from the innovation ecosystems and research infrastructures. For the SMEs active in the Water Technology sector collaborating at the WaterCampus, these research and innovation supporting infrastructures are vital for their future competitiveness.

The combination of the Wetsus laboratory and lab facilities, the Water Application Centre, the demonstration sites and the quadruple helix involved in the WaterCampus living lab constitutes much more than the sum of its parts, it forms the technology infrastructure for the Water Technology sector in The Netherlands and to a large extend Europe. In 2019 DG RTD published a working document defining technology infrastructures: “Technology infrastructures are understood as facilities, equipment, capabilities and support services required to develop, test and upscale technology to advance from validation in a laboratory up to higher TRLs prior to competitive market entry. They can have public, semi-public or private status. Their users are mainly industrial players, including SMEs, which seek support to develop and integrate innovative technologies towards commercialisation of new products, processes and services, whilst ensuring feasibility and regulatory compliance.”

By excluding investments in maintenance and upgrades of this technology infrastructure from the ERDF programme a vital piece was removed from the investment puzzle. Traditional university cities have stated the importance of funding for technology infrastructures. For Leeuwarden, which does not have a university of its own, this funding gap poses an even higher challenge.

Not surprisingly, the first half of the ERDF2014-2020 coincided with a sharp decline of ERDF allocated to water technology. Within that period WaterCampus did not manage to participate in the ERDF programme, partly also because of the required high co-funding rates, while core institutional funding was already the Achilles heel. Therefore, the Interreg Europe project iWATERMAP was initiated to build bridges with regional stakeholders, facilitate policy learning and better align the need from the sector with the regional funding programmes.

For the next programming period (ERDF 2021-2027) the challenge for Wetsus and WaterCampus is to make better use of the European regional funds. The updated RIS3 is a good starting point for this. In the period 2018-2021 there have been frequent meetings with the province of Fryslân and the regional management authority SNN. The regional stakeholder engagement through iWATERMAP has highly contributed to a more shared view about needs and possibilities. It allowed for a proactive engagement in policy development and sharing of insights about regional, national and European policies and programmes, as well as methods to enhance the synergies between them.

The RIS3 2021-2027 is an update of the RIS3 for the period 2014-2020. The Northern Netherlands has already characterized itself as one of the first regions to benefit from innovation in addition to economic and social benefits. To this end, the region formulated four social challenges that formed the basis for the RIS3. In recent years, the discussion about economic growth worldwide has increasingly broadened to broad-based prosperity. In 2015, all members of the United Nations signed an ambitious package of 17 sustainable development goals or Sustainable Development Goals, hereinafter: SDGs.

In the 2021-2027 period, the Northern Netherland continues its' chosen path and make more profound links with the SDGs. On the basis of social and economic trends and developments, this resulted in four major transition tasks for the region:

1) Transition from Linear to Circular Economy
2) Transition from fossil to sustainable energy
3) Transition in Healthcare
4) Transition from Analog to Digital

Water technology can offer unique contributions to these transitions.

Since water is the most commonly used solvent in the world, Water Technology is a key technology to unlock the Circular Economy. It facilitates the recovery of metals, minerals, salts, nutrients and energy from (waste) water. Bio-based feedstocks can be produced from (waste) water and organic waste, resulting in new value chains based on green chemicals such as bio-degradable bioplastics (PHA), a natural gum (KAUMERA) and natural flocculants (replacing plastics).

Water Technology also makes a major contribution to the transition to Sustainable Energy for instance in optimising process industries, it can facilitate energy recovery (heat, biogas) from wastewater, produce renewable energy (blue energy), store electricity without metals or rare earth minerals (acid-base battery), produce ultrapure water which is needed for hydrogen production.

Water sanitation itself plays a major role in prevention of water related illnesses related to SDG6. In well-developed countries water technology can help to reduce the negative impact of pharmaceuticals on the environment and help to reduce anti-microbial resistance (AMR). Proliferation of AMR is of increasing concern and could itself pose a mayor threat to global healthcare. Treating wastewater close to the source and at waste water treatment plants can help to reduce this threat.

The water industry can highly benefit from more digitisation for forecasting, optimization of networks and energy efficiency, real-time monitoring and operational efficiency. By developing and implementing sensor technology and developing low energy consuming and data efficient monitoring systems digitisation can increase the sustainability of the water sector and water intensive industries.

Start of WaterCampus Leeuwarden (2000-2017)

At the end of the 1990s, the time was ripe to fully focus on the water sector. Policymakers saw opportunities at national, regional and provincial level. The government memorandum on Economy and the Environment (1997) emphasized the international potential of the Dutch water sector, which was under-utilized due to, among other things, fragmentation and a lack of (international) cooperation and networks.

At the same time the province of Fryslân saw plenty of opportunities to turn the water sector into an economic spearhead. Not only because water is in the Frisian DNA - after all, the province has been crafted from and risen itself above water, it is rich in water and lies in a Delta - but also because of the presence of leading players in both the private (including Paques and Landustrie) and public water sectors (NUON water and Waterbedrijf Friesland, which later merged into Vitens).

The province of Fryslân also took the initiative to allow to succeed on a provincial level what was not pulled of a Northern Netherlands regional scale: the establishment of a club in which Frisian authorities, knowledge institutions and companies in the water sector would join forces. Initially, this was done reluctantly under the name 'Friese Watersociëteit' (1998). And from the end of 1999, less non-committal, and stimulated by the memorandum 'Waterspores' under the name Frisian Water Alliance. In March 2000 the Frisian Water Alliance started to work on the following objectives:

- Bringing continuity to water technology and knowledge development in Friesland;
- Give a major boost to the export of Frisian water-related business activities;
- To realize approximately ten sustainable, innovative water projects within 5 years;
- Address the most important environmental aspects in the Frisian water chain.

Spearhead

In the meantime, the province had also formally appointed 'water technology' as an economic spearhead in its 1999-2003 council programme. That it did not stop at words is apparent from the fact that she played an important, stimulating and facilitating role in the establishment of the sector-wide cooperation and the chosen, programmatic approach along three tracks; knowledge development, market development and pilot development. Due to the programmatic approach, with the clear ambition of 'becoming one of the top of the international water sector', various interests were bridged and essential, European (subsidy) funds could be claimed.

Tide favourable

The province itself had the courage to make development money available without preconditions. The political tide was favourable, provincial deputy Siem Jansen and mayor Margreet de Boer (former Minister of Housing, Spatial Planning and the Environment) were warm advocates of the water sector and personally contributed to the Frisian Water Alliance. At the same time, the regional innovation program Fryslân Fernijt started at the beginning of this century, which also contributed its share and resources to the innovation drive and strength in the province. Another catalyst was the regional incentive program 'Compass of the North', which pumped €1 billion worth of national and European incentives into the region between 2000 and 2012, particularly in the energy, water and sensor technology, agribusiness and healthy ageing clusters.

The start of Wetsus and WaterCampus

Where Friesland intended to go; a leading water sector and institute for water technology gradually took shape. The former individual projects appeared to reinforce each other. They also stood out beyond the national borders, strengthened by the contacts and networks that important international players such as Paques, Landustrie and Vitens tapped into with its water lab. The arrival and growth of Wetsus certainly contributed to where the province would stand in 2019, with a water sector that had a turnover of just under €500 million.

Wetsus started within Van Hall Larenstein on a modest scale in 2003, with initially 4 participating companies, 3 universities and 2 PhD students. In 2010 Wetsus obtained its first European recognition by coordinating the CAPMIX project, which was part of the FP7 FET programme. Participation in EU programmes has grown ever since. The Center of excellence for sustainable water technology had grown into a leading international player in its field within fifteen years. With ditto housing in a futuristic building on the edge of the center of Leeuwarden.

In 2019, WaterCampus Leeuwarden was home to Wetsus (research) organizations such as Water Alliance (business), CEW (applied research), CIV Water (vocational education) and WAC (Water Application Center, a location for demonstration and upscaling projects). To give an indication of the impact of the campus. In 2018, there were 129 research projects, 128 international collaboration projects, the network had 284 unique participants (knowledge institutes and companies), the 100th PhD student received his diploma and the 634th scientific article from the institute was published.

The impact of the water sector on the Frisian economy in 2018 was already considerable. For example, the sector accounted for about 2,200 FTEs, of which the number of higher educated is more than half. It comprises about a hundred private companies, ten sectoral (knowledge) institutions and two public water companies. The turnover of the water technology sector in 2017 was between €450 and €480 million. In the same year, the number of jobs grew by twenty percent compared to 2012.

Can the province say that the investment was worth it? It all started with an initial budget of €10,000…

WaterCampus ERDF challenges

WaterCampus is an excellent example how a region can punch above its weight through RIS3. The WaterCampus has organically grown with Wetsus, cluster organisation Water Alliance (established in 2009), Centre of Expertise Water Technology (CEW, 2011) and Centre of Innovative Craftsmanship (CIV-Water, 2012). Together these organisations cover the entire innovation pipeline, from fresh idea to market introduction, and the entire education portfolio, from VET-student to PHD, as well as primary and secondary education and lifelong learning.

In 2016 DG Regio and JRC were organising a series of national events of the Stairway to Excellence (S2E) project to inspire regions in Widening countries in their RIS3 development and entrepreneurial discovery process. WaterCampus was invited to present the water technology innovation ecosystem at several of these national events. By participating in these events and subsequent invitations from other member states WaterCampus was able to present its approach in: Latvia, Lithuania, Poland, Slovakia, Czech Republic, Slovenia, Croatia, Romania, Portugal, Luxemburg and Greece. Building forward on these contact the iWATERMAP project was born.

The participation in these events also helped to define a conceptual model about innovation ecosystem development. This was described in detail in the Critical Mass Development Model (CMDM), which was presented in 2017 at the ERRIN RIS3 policy working group and at internal meetings at DG Regio and DG RTD. It essentially is a blueprint for the establishment of a fully-fledged European Innovation Ecosystems or ERA Hubs. It addresses a step-by-step approach for the organic growth phase of each actor in the triple helix and indicates possible funding synergies. The funding synergies of the WaterCampus in 2017 can be found in figure 1.

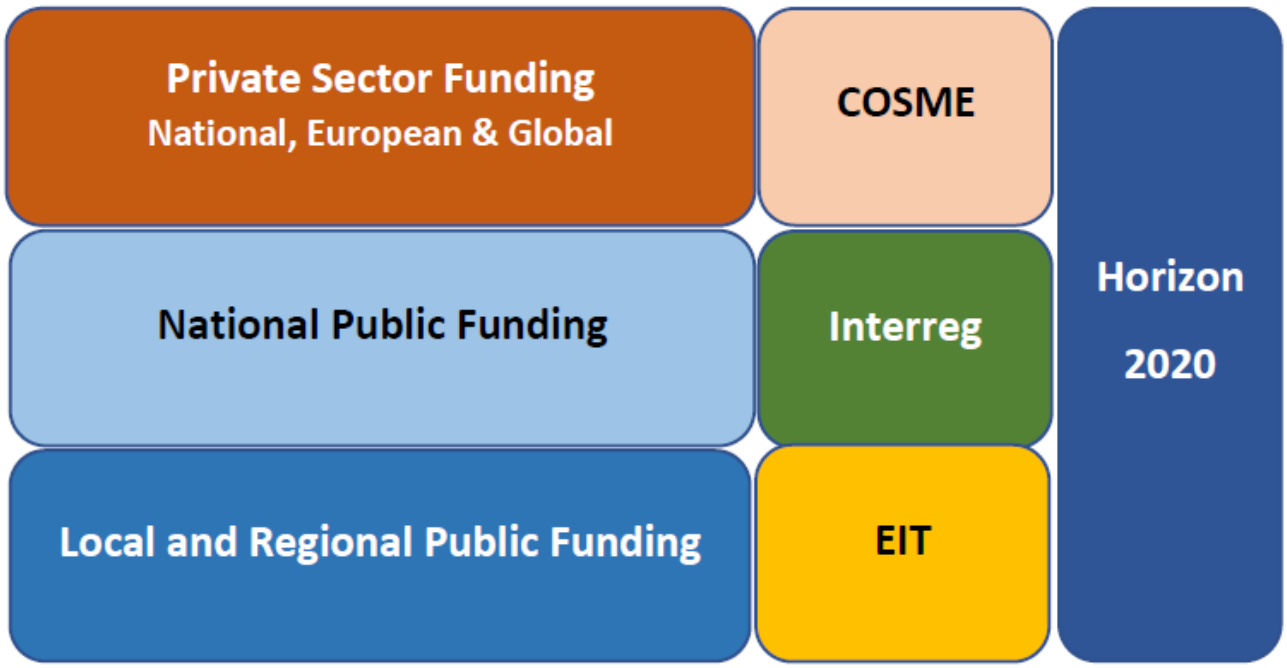
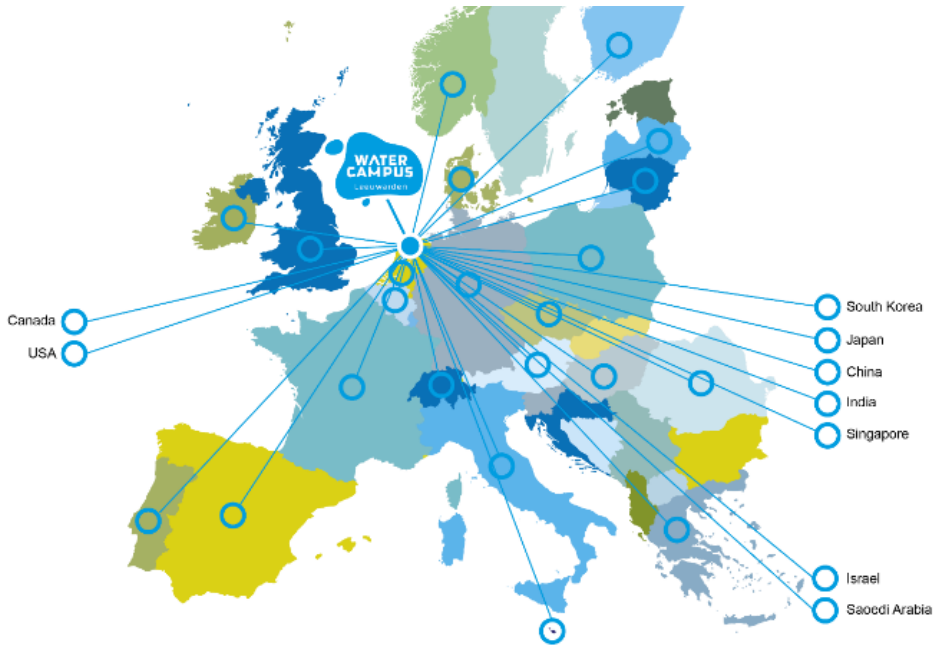


Figure 1. Funding Synergies at WaterCampus Leeuwarden in 2017.

In 2020 a detailed description of WaterCampus Leeuwarden was published on the JRC Smart Specialisation Platform (S2P) in the section Smart Stories.



Policy learning and funding synergies through iWATERMAP

CMDM was used as a theoretical support for policy development in iWATERMAP. iWATERMAP was launched in 2018 with partner regions Murcia, Northern-Portugal, Southern-Moravia, Latvia, North-East Romania, Crete and the province of Fryslân. Together they assessed their regional support for innovation ecosystems for water technology. A snapshot of the state of play and a sketch of next steps can be found the 3 iWATERMAP Roadmaps:

1) Establishing **Critical Mass** for innovation ecosystem in water technology;
2) Developing a Roadmap for **Human Capital** Development;
3) Developing a roadmap for **Interregional Collaboration.**

During the assessment of the participating regions it was clear from the start that each partner region had specific strengths and expertise. The project works with 2 universities, 2 cluster organisations and 2 regional authorities as regional core partner. This of course also has its own impact on the specific in-house regional expertise that was brought to the table. Through regional stakeholder events the entire triple helix (research, business and government) has been participating in policy development.

Through iWATERMAP partner meetings and study visits more insights in the specific regional strengths and needs for their ecosystem development was developed. In some cases this has resulted in applications for additional EU projects in parallel with the ongoing collaboration through the Interreg Europe project. This is definitely one of the main strengths of the wider synergy and serendipity which this project has facilitated. Because of the European added value of these results they will be listed here:

In support of the Roadmap Human Capital Development:

1) During the first project meeting in Semester 1, WaterCampus institutions presented their role in the innovation ecosystem. Participating partner regions were especially charmed by the hands-on approach to Vocational Education and Training as developed by CIV-Water. It became clear that this approach is missing in the iWATERMAP partner regions. A dedicated policy for VET students related to water technology then became an item on the policy agenda of the iWATERMAP partner regions. It was one of the main policy learning outcomes of this partner meeting. Luckily CIV-Water was able to continue exploring potential additional collaboration through the Erasmus pilot project Platform of Centres of Vocational Excellence Water (PoVE-Water). CIV-Water from the WaterCampus is the coordinator. From Latvia RTU and Oliane College of Technology and from Southern-Moravia Crea and Mendel University participate. Pilot PoVE Water is a transnational project that draws on existing and emerging vocational competences and skills needs in the water sector, translating them into an approach of vocational excellence. This ensures upward convergence of VET with (EU) knowledge triangles and a strong engagement with the regional economic and social ecosystems. The project intends to create the infrastructure necessary to embed vocational excellence in the water sector in Europe, thus laying the grounds for vocational curriculum development and consequently competence development of VET students.
2) During various online meetings with Latvia it became clear that PhD students are often missing entrepreneurial skills. Within their academic environment they are limited in their exposure to business needs. Within Wetsus many companies are participating and defining the research focus. RTU invited Water Alliance to participate in the EIT pilot project EIT HEI Initiative: Innovation Capacity Building for Higher Education. The Inno-EUt+ project is coordinated from Cyprus and aims to enhance the innovation and entrepreneurial capacity of a new European university alliance, the European University of Technology (EUt+).

In support of the Roadmap Interregional Cooperation:

3) The iWATERMAP partner regions North-East Romania, Latvia, Friesland, Norte, Southern-Moravia and Crete joined the S3 Industrial Modernisation thematic partnership on Water. The goal of the JRC thematic partnerships was to enable interregional collaboration through ERDF. Unfortunately, in the 2014-2020 period the European instruments did not support such collaboration yet. In 2021-2027 this might be possible through Interregional Innovation Investments (I3). In practice the S3 collaboration resulted in a series of policy learning workshops in which regions presented their regional water challenges and also a series of brokerage events was organised under the name "winning days" to facilitate B2B meetings to overcome the static world due to COVID-19 travel restrictions.
4) Several iWATERMAP regions have expressed their interest to participate in European Partnership Water4All. This Horizon Europe partnership proposal was submitted on October 6th. From Friesland included in the final application are: the province of Fryslân, the city of Leeuwarden, Wetsus, Water Alliance, CEW and CIV-Water. In addition, RTU, CREA and Mendelu University are participating. Regions were invited to contribute ERDF for the implementation of Water4All (co-funded by Horizon Europe). For most interested regions, including the province of Fryslân the time-scales proved challenging to organise a formalised ERDF commitment. The call was published on June 22nd and submitted on Octobre 6th2021. Whereas the ERDF Operational Programmes had to be finalised by December 2021. In addition, the European Commission promised a detailed outline on allocating ERDF to Horizon Europe partnerships. By the end of 2021 this detailed description was still missing. Commitment of regular regional public funding also requires a lengthier process to obtain approval. Especially in case of coinciding regional elections or change of regional ministers. Other regions were waiting for practical examples from other regions to follow. Therefore, in Grant Agreement 1 (2022-2023) the role of participating regions is limited, but within Grant Agreement 2 (2024-2025) and 3 (2026-2027) this could still be increased. This might also include ERDF.
5) During various partner meetings and policy learning sessions, the WaterCampus connected well with the Agrofood sector of Murcia and learned in great detail about the importance of water in the region, especially within the food processing industries. This resulted in the invitation of WaterCampus to contribute to the Horizon2020 Green Deal proposal by Murcia region. This resulted in a successful project application: the AGRI2CIRCULAR project. In this project AgroFood Murcia (Partner 6 in iWATERMAP) is a key partner. From the WaterCampus both Wetsus and CEW are part of the the consortium to support the development of solutions for the production of biodegradable bioplastics from waste water and organic waste, obtaining valuable circular resources which can support a further improvement of the sustainability of the regional food (processing) industry.

The above are 5 examples on how collaboration and policy learning through Interreg Europe can have positive spill over in other European programme areas. Currently this is not an explicit deliverable from Horizon Europe. Given the explicit focus of the European Commission on funding synergies it would be helpful if this type of spontaneous by-catch would become a central pillar of Interreg Europe in the 2021-2027 programming period. The relatively long duration of Interreg Europe projects provides an excellent structure for policy exchange, mutual learning and the development of functional spill-overs into other policy areas and programmes.

Through iWATERMAP the various partner regions have all been able to address specific challenges and needs within their regions. In some cases, this was about introducing the Water topic for the first time in the regional innovation policy and RIS3 strategy. In other regions, it was important to increase the urgency of the topic. In most regions it was important to learn from each other about what works, what does not work and how to advance the sector on a structural basis. Specific needs and intervention mechanisms of the other partner regions will be described within their own regional action plan.

WaterCampus Leeuwarden Today (2017-2021)

WaterCampus Leeuwarden works with Open innovation communities. These communities comprise Knowledge institutes, technology companies, and public and private end-users. This ensures the rapid exchange of knowhow and ideas, to define the common challenge and develop a solution that will work for all. Innovative SMEs are key in these communities; they make up over 50% of the members and have typically a leading role.

Over 60 innovative SMEs participate in the research and innovation programs at the WaterCampus. For them, the WaterCampus is a continuous source of knowhow and partners. On top of that, the research and innovation programs resulted in 24 novel technologies fully conceived, developed and scaled up at the WaterCampus, 38 new companies, and 40 valorised patents.

Furthermore, the WaterCampus gave an enormous boost to the human capital needed for a competitive and sustainable economy. Many WaterCampus graduates are now employed at regional SMEs.

WaterCampus Leeuwarden, created an effective and efficient innovation ecosystem by having a number of elements in place:

- Firstly, multidisciplinary research facilities where fundamental sciences, key enabling technologies, engineering sciences and environmental sciences are applied in an integrated way.
- Secondly, the combination of research with facilities to demonstrate technology at higher TRL. For WaterCampus Leeuwarden, these include demo sites for drinking water, municipal wastewater, industrial water, decentralised-collected wastewater, and hospital water.
- Thirdly, a meeting place where SMEs, researchers and end-users frequently meet, but also where the international water technology sector annually convenes.
- And finally, the combination of innovation, with human capital development at all levels. At the WaterCampus, programs are in place for PhD, MSc, BSc, vocational education, and primary & secondary school education.

The WaterCampus participates in European partnerships and programs to exchange ideas and best-practices on innovation, education and sustainability. WaterCampus regularly receives delegations from other EU-members states that are in the process of setting-up innovation ecosystems themselves.

Furthermore, the WaterCampus facilitates the mobility of students and researchers, for example through the Erasmus and Marie Curie programs.

The individual WaterCampus programs received European recognition. The primary school program, the vocational education program, the PhD program, the program to support SMEs with technical validation, and the business development program, each received support from one of the European funding programmes. Furthermore, the WaterCampus is frequently invited to participate in research and innovation projects. In total, WaterCampus today collaborates actively with 114 non-Dutch partners form 21 EU member states.

WaterCampus also managed to advance into phase of stage 5 of the Critical Mass Report. Figure 2 is based on the 2017 report, it was meant to show a possible growth scenario, by 2021 most of the objectives have been achieved.

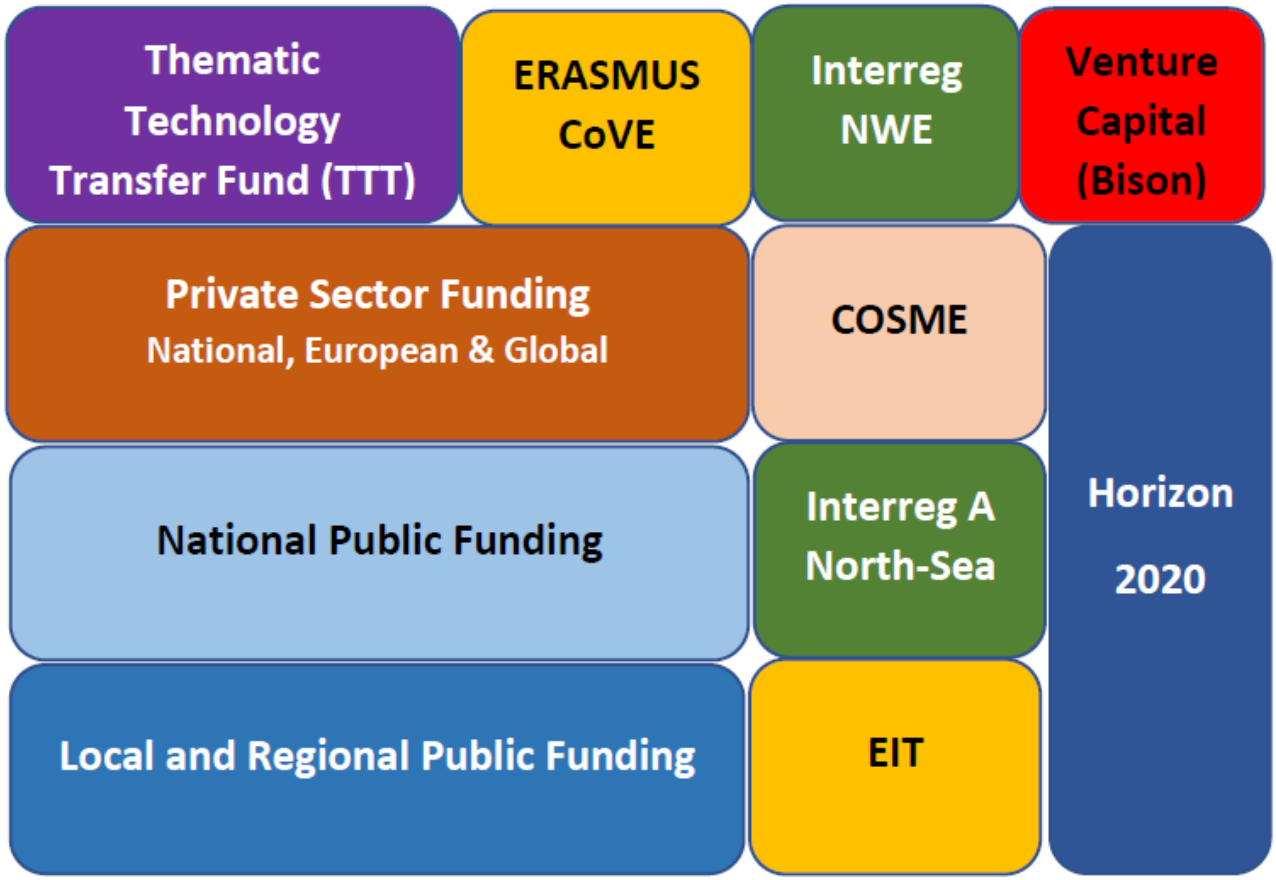


Figure 2, funding synergies at WaterCampus Leeuwarden in 2021

In addition to this, other milestones have been achieved. The city of Leeuwarden made it to the top12 applicants for the European 2020 iCAPITAL Award and to the final 7 for the "European Rising Innovative City category" 2021.

WaterCampus Leeuwarden also became a member of European Network of Living Labs (ENoLL), which makes it the first officially recognized European water technology living lab. Another landmark moment for the regional innovation strategy transforming into reality.

Currently the WaterCampus is active in 18 different European research and innovation projects, predominantly Horizon2020 projects and mostly as coordinator. In parallel there are Interreg A, B, C, Life, COSME, ERASMUS, MSCA-Co-Fund, EIT Raw Materials, H2020 Green Deal call and other H2020 projects being executed.

During the iWATERMAP project period, Wetsus was invited to share the development of the WaterCampus in Interreg Europe policy learning events. The development of the WaterCampus itself is seen as a Good Practice. The regional innovation smart specialisation strategy has clearly resulted in an inspiring example for other European regions, no matter which topic they specialise in. This action plan builds forward on further strengthening and deepening this approach, also in line with the new European Research Area policy developments regarding place-based innovation ecosystems and ERA-Hubs.

New EU policy objectives

Water technology provides an answer to challenges in several of the key European policy objectives, such as the Green Deal, Circular Economy Action Plan, Zero Pollution, Anti-Microbial Resistance, Sustainable Energy Production, Energy Storage, European Missions Adaptation to Climate Change; Restore our Ocean and Waters by 2030; and, A soil deal for Europe. In addition a whole range of the Global Sustainable Development Goals, most notably SDG6: Clean Water and Sanitation for All, and SDG12: responsible production and consumption.

Given this situation, it is even more important to make efficient use of available regional funding and maximise the funding synergies with local and national public funding, private sector funding and European cofunding. This will enhance regional competitiveness, supporting start-ups and scale-ups, attracting global talent, and retaining regional talent by creating interesting jobs.

According to a study performed by ERAC, WaterCampus Leeuwarden in 2014-2018 attracted over 80% of the competitive EU funding in the province of Fryslân. It was therefore the single most important innovation growth engine within the province. During this timeframe the Water Technology sector also grew considerably. Maximising funding synergies can further boost the WaterCampus as economic powerhouse of the region.

Leading up to the new programming period the European Commission (DG RTD and DG Regio) have once again promoted the agenda of funding synergies in between ERDF and Horizon. Either in consecutive fashion, or as a true synergy. For instance, by counting ERDF towards the national contribution in Horizon Europe Partnerships. The Northern-Netherlands draft Operational Programme already addresses many synergies, although these mostly concern regionally available funding, such as ERDF with ESF or POP (agricultural funds). The ultimate synergy: between ERDF and Horizon Europe still needs to be included.

iWATERMAP Key Actions

Technological solutions for regional transitions

In 2021 the Northern Netherlands is recovering from the effects of the COVID-19 pandemic and preparing for regional transitions. The RIS3 2021-2027 forms the framework for the deployment of European funds in the Northern Netherlands. Including ERDF, REACT EU and JTF.

Within the RIS3 the region already described 4 transitions:

1) Transition from Linear to Circular Economy
2) Transition from fossil to sustainable energy
3) Transition in Healthcare
4) Transition from Analog to Digital

Water technology can offer unique contributions to these transitions, here are some examples:

1) Since water is the most used solvent in the world, Water Technology is a key technology to unlock the Circular Economy. It facilitates the recovery of metals, minerals, salts, nutrients and energy from (waste) water. Bio-based feedstocks can

be produced from (waste) water and organic waste, resulting in new value chains based on green chemicals such as bio-degradable bioplastics (PHA), a natural gum (KAUMERA) and natural flocculants (replacing plastics). Water itself is of course also a resource of increasing importance and water reuse is of increasing importance in the region. Some of these solutions already have a high TRL, others are more recently being developed.

2) Water technology can support energy transition by energy recovery from waste water (heat), production of biogas from waste water, by optimising the efficiency of process industries, by renewable energy generation (Blue Energy), through electricity storage solutions (Aquabattery) and through CO2 capture and reuse (ConsenCUS). All of these solutions are at low or intermediate technology readiness levels.
3) In the recent pandemic the fragility of the global Healthcare system has been revealed. A topic of emerging concern with potentially similar impacts as COVID is the spread of Antibiotic Resistant Bacteria (AMR), these are bacteria that are not controlled or killed by antibiotics. This is caused by proliferation of antibiotics in the environment, including antibiotics of last resort. In addition, an accumulation of pharmaceuticals in the environment also poses severe ecological and health risks, threatening our broad prosperity. Administering antibiotics and other pharmaceuticals eventually leads to a release of substances by patients in the waste water system. Removing these at the source (hospitals, or district level), or at the waste water treatment site is something that Water Technology can provide. This way harmful effects are prevented or reduced. Some solutions are already available today, others still need to be developed.
4) The water sector and process industries use vast amounts of water. Transition from an analog to a digital economy could offer huge benefits to the sector. From remote control to forecasting, from process optimization to reutilization of waste water. For this transition efficient sensors, data harvesting systems and process operation and control systems will need to be developed, refined and optimized.

Smart specialisation is about finding new economic opportunities for the region. The four transitions in the fields of circularity, energy, health and digitisation are not goals in themselves, but rather 'guardrails, or mission areas' within which the region can develop a lot of innovation because there is a strong knowledge base for them.

Water technology is pre-eminently a strong knowledge position in the Northern Netherlands. The innovation ecosystem around the Water Campus can therefore make a major contribution to developing new economic opportunities within the RIS3 transitions.

The Action Plan aims to recognise, discover and utilise these contributions and opportunities. By financing these opportunities via the new ERDF programme and in synergy with other European funds.

One of the aims is to also make research activities an integral part of projects. Transitions are also dependent on breakthrough solutions and novel technologies. The development covers the entire innovation pipeline from new idea to market application.

Particular attention should be paid to the synergy between the ERDF and the new Horizon programme.

Part III – Details of the actions envisaged

ACTION 1 –Successfully influencing RIS3 Northern Netherlands for the benefit of water technology

1. **The background** (please describe the lessons learnt from the project that constitute the basis for the development of the present Action Plan)

During partner meetings is became evident that the WaterCampus is a unique technology infrastructure within Europe. Wetsus learned from ARD-NE how a region can support their upcoming water sector through targeted ERDF projects. In parallel with regular meetings Wetsus learned from the new JRC report "A Exploring Synergies between EU Cohesion Policy and Horizon 2020 Funding across European Regions" by Mathieu Doussineau and Julia Bachtrogler (Report: JRC123485), which mentions: "Indeed, an important element of smart specialisation is the concentration of ERDF funding on specific domains chosen according to place-based assets and opportunities (Foray et al 2009), which should be complemented with other sources of funding, in particular Horizon 2020. The concept of synergies between funding, as assumed and investigated in this report, aims at ensuring a critical mass of funding in specific promising technological and policy fields and appears to be not straightforward to implement. While regional managing authorities select projects to be funded by the ERDF based on regional RIS3 and regional policy programmes, the quality and excellence of the project proposal and the consortium matter for the successful application for Horizon 2020 funds."

The report details that regions which concentrate ERDF funding on a specific RIS3 topic do not necessarily excel in participation in Horizon2020 projects. It could be that the excellence in the region still needs to be further enhanced so the institutions can participate in Horizon projects. Or they simply chose the wrong topic for their region.

In Friesland it is the other way around for Water Technology. This topic was chosen and included in the RIS3 strategy and was extremely successful in all EU funding programmes (Horizon, EIT, COSME, Life Interreg A, B, C), especially in Horizon2020, with the big exception of ERDF2014-2020. Whereas, during ERDF 2000 – 2006 and ERDF 2007 – 2013 the WaterCampus was successfully supported through ERDF. To a large extend this was due to generic national Operational Programme for ERDF, which did not pay attention to specific regional needs, as described above. iWATERMAP has been instrumental in better aligning the WaterCampus needs with the future programme portfolio.

WaterCampus institutions have used iWATERMAP and policy learning outcomes to develop a new approach for policy development with the province of Fryslân and the management authority SNN, in which more mutual learning and understanding was applied. This for instance also includes the desire for projects with a lower TRL as compared to the ERDF2014-2020 period.

This started by enhanced and pro-active involvement in the establishment of the RIS3 for the Northern Netherlands. Due to COVID-19 and Next Generation EU additional funding opportunities have been created which did not exist in the former MFF and which are also coordinated through RIS3 N-NL.

RIS3 N-NL 2021-2027 includes amongst others ERDF, React-EU and JTF. These are linked to the 4 regional transitions. Water Technology, as enabling technology, can play a key role in many of all of these transitions.

By investing in the whole innovation pipeline the funding can be used effectively to provide a highly needed regional economic impulse, generating future economic growth through breakthrough research, novel technologies, patents, solutions, spin-offs and talent development, while contributing to regional challenges and SDGs.

In the ERA-LEARN workshop on March 4th 2021, the European Commission highlighted the use of Cohesion Policy Funds (ERDF) as co-funding for European Partnerships. Thanks to a new provision in Article 15 (3) of Horizon Europe, Member States can use resources co-financed from ERDF, ESF+, European Maritime and Fisheries Fund (EMFF) and European Agricultural Fund for Rural Development (EAFRD) as national contribution to the participation in Co-Funded and Institutionalised European Partnerships, provided it complies with Common Provisions and fund-specific regulations.

The ERDF programme has set a deadline on Operational Programmes and RIS3 strategies by the end of 2021 (December). The Horizon Europe programme has been published on June 22nd, 2021. Some of the initial Horizon Europe calls have already closed, such as the application for the European Partnership Water4All, which had a deadline on October 6th, 2021. Funding synergies with ERDF could therefore not be described in detail in the project application. European Co-Funded Partnerships have underlying 3 Grant Agreements, for Water4All Grant Agreement 1 coincides with 2022 and 2023. This was an integral part of the application process and is therefore already concluded. Grant Agreement 2 concerns 2024-2025. ERDF funding synergies could therefore be included within Grant Agreement 2 and onwards.

In Water4All ERDF could be used for cascade funding for demonstration projects, for co-funding of research and innovation projects that are in line with the strategic research and innovation agenda (SRIA) and to support business development and start-ups in water technology through a voucher system. These would all be very interesting areas for the WaterCampus.

If the policy learning during the iWATERMAP has resulted in successful integration into RIS3 and related regional funding programmes ERDF, React-EU and JTF will be monitored by Action 1. **The proof of the pudding is in the eating!**

2. **Action**

➔ Develop and submit water technology research and innovation project proposals for ERDF, React-EU and JTF, which contribute to regional challenges in the field of circularity, energy, health and digitisation. These could be:

- Projects with low TRL by Wetsus
- Demonstration projects with intermediate TRL by Wetsus or CEW
- Projects with high TRL involving end-users by CEW.

The Just Transition Fund in The Northern Netherlands is to a large extend dedicated to the province of Groningen and the city of Emmen. The combination of the climate transition with the cessation of gas extraction in Groningen in 2022 makes it necessary to achieve a transition of the economic and social structure in Groningen and the municipality of Emmen. This is an urgent, much extensive and extensive task in which the region wants to invest with JTF in collaboration with central government and Europe. One of the main pillars of new economic opportunities in Groningen is the development of green hydrogen. The planning and development of large-scale renewable energy production through for instance wind parks at sea is already in advanced stage. Also Gigawatt electrolysers have been planned. The next essential step is the sourcing and production of a sustainable supply of pure water. Wetsus can for instance develop breakthrough water technologies which can transform waste water effluent into pure water in an efficient and ecological way. These projects would be with core partners from Groningen and Emmen, the project would support the development of Green Hydrogen within the JTF programme area.

Scaling up research outcomes through pilot projects or demonstration projects is an essential step in the innovation pipeline. It is essential for to bring solutions closer to the market and reduce risks and uncertainties for upscaling and application in real life conditions. This helps to boost investor confidence and bankability, For this intervention projects of around 10-30k are foreseen. This would be possible through React-EU or ERDF programme.

Bringing successful innovations towards market application can benefit greatly from demonstration projects at end-users. This could be supported by innovation vouchers given to start-ups or SME. Some of the costs these companies make in their demonstration projects can be covered through vouchers of around 10-15k. These could be included in the ERDF programme.

3. **Players involved**

First players to be involved are the Province of Fryslân and SNN, develop, manage, coordinate and execute the ERDF, React-EU and JTF programmes.

All partner organisations from the WaterCampus Leeuwarden provide input through RIS3 and ERDF stakeholder meetings, the continuous entrepreneurial discovery process (CEDP). Wetsus and CEW will take the lead within the WaterCampus in the submission of project proposals for ERDF, React EU and JTF. Water Alliance, CIV-Water, company members or university members can also be involved in the actions and interventions. These stakeholders have also been consulted in the development phase of the programmes and the CEDP.

4. Timeframe

The React – EU programme mainly runs in 2021 and 2022. Which is ideal for iWATERMAP, since the total outcome can be included in the Phase 2 reporting period. The timeframe for measuring success is June 1st 2021– December 31st 2022.

The final Just Transition Fund application will be send by The Netherlands to the European Commission on March 22nd. The first call will open in September 2022 and run for several years. From iWATERMAP the success of WaterCampus to develop sustainable pure water solutions will be measured during the entire Phase 2. JTF will continue beyond the iWATERMAP project duration. Monitoring will be from September 2022 to May 2023.

The ERDF programme will run from 2021-2027, which will be 4 years longer than the monitoring period of iWATERMAP Phase 2. The monitoring of success within Phase 2 will be from September 2022 until May 2023. Additional positive outcomes can still be obtained until December 2027, but these will not be included in the Phase 2 reporting period.

5. **Costs** (if relevant)

Development of breakthrough water technologies for sustainable supply of pure water for green hydrogen production will require at least 1 million euros from the Just Transition Fund.

Scaling up research outcomes through research pilots or demonstration projects, supported by React-EU or ERDF programme. For this support a minimum of 100.000 euros is foreseen.

For a voucher scheme, with individual vouchers of 10-15k, we minimal investment of 200.000 euros would be foreseen from the ERDF programme.

Date:_____

Signature: _____

Stamp of the organisation (if available): _____