



Toolbox for Matchmakers

Innovation Support Measures 3.0

Table of content

1. How to use the toolbox	1
2. Matchmaking & Innovation	2
3. General Considerations	4
4. Ten good advices	7
5. Living Lab Tools	8
6. Living Labs - <i>Defining of the concept</i>	16
Living Lab - Syd Energi (DK)	19
Living Lab - Økern Sentrum (N)	23
Living Lab - HOPPET (S)	28
Living Lab - Billebogen & Flensburg Fjord Region (D)	32
Living Lab - Hoogeveen & Alkmaar (N)	38
Living Lab - Blue Gate Antwerp & Green Energy Park (B)	48
Living Lab - Grangemouth, Falkirk & Acorn CCS (GB)	56

1. How to use the toolbox

This toolbox is a product of concrete experiences from the Northern Connections project. A collection of practical tools conducted to create successful events aimed at unlocking the potential for transregional - and national collaborations.

The catalogue is aimed at experienced matchmakers as well as someone planning their first matchmaking event, initiating and facilitating innovative collaborations among SMEs and the public sector through the Living Lab Event concept developed in the Northern Connections.

In the first part of the catalogue, the individual tools are described followed by a description of on how these were utilised through the coordination process; before, during and after the Living Lab Events held in Denmark, Norway, Sweden, Germany, The Netherlands, Beligum and Scotland. The descriptions focus on the thematic challenges defined by the Living Lab owners in collaboration with local cluster representatives from the Northern Connections partnership.

The catalogue has been developed with inspiration from and in collaboration with Cluster Excellence Denmark. If you are interested in learning more about a method or tool, we invite you to contact the partnership behind the Northern Connections Interreg project - or learn more on www.northsearegion.eu/northern-connections

We hope you enjoy!

On behalf of the Northern Connections partnership,

Leon Aahave Uhd, Head of Development CLEAN

2. Matchmaking & Innovation

Through their services, projects and matchmaking activities, the networks make a great effort to create frameworks which encourage and strengthen cooperation between industry and knowledge institutions. The networks act as bridge builders and contribute to coordinate research and development efforts between research institutions, technological services and companies, in areas that are crucial for Danish business.

MATCHMAKING – A CORE SERVICE

The pan-European benchmark study of 2011 shows that active network secretariats which offer a wide range of services, including matchmaking, are very effective. Matchmaking is a core service among the networks. Matchmaking is an umbrella which covers the actual match, whereby two or more parties who are in need of each other's expertise are brought together to build up relationships.

The term also covers ideation, which is considered part of, or the result of, matchmaking. Knowledge sharing is also to be found under this umbrella. In networks knowledge is shared between the companies and knowledge institutions or among the companies themselves. As a result, knowledge can flow both ways.

Matchmaking can take place at many levels and with many methods, and actually includes the processes which constantly arise during interaction among people. However, there is often a need to make it more organized and structured. What defines a good match is individual, as it is based on the specific task and on the resources, that are available. For each service supplied, it is important how the matchmaker plans, carries out and follows up on the activity.

THE ROLE OF THE MATCHMAKER

The role of a matchmaker is to help to find the right collaboration partners and create the framework so that they can meet, understand each other and have a good chance of initiating the cooperation.

It requires a variety of competences to fill this role. It is essential to possess empathy and to be able to understand and engage in others' projects and ideas. A matchmaker must be outgoing, have significant knowledge of the sector and preferably have an extensive network. At the same time, a matchmaker must be able to coordinate, structure and plan events or long-term initiatives in detail. Facilitation is also described as core competence of a good matchmaker.

It can be a challenge for a matchmaker to find the right collaboration partners, identify them using the correct competence, and facilitate a match. Some of the key words for matchmaking success are good chemistry and mutual trust, and in addition a good deal of patience is essential.

Altogether, a good matchmaker must possess a variety of skills. For this reason, most networks share out the tasks, giving some to an expert within the specific field, and some to a good coordinator.

3. General Considerations

Before selecting a method and before planning anything, it can be very helpful to begin with some general considerations.

DEFINE THE TARGET GROUP

It is important to be clear about who you want to match. Be aware that both the companies and the knowledge institutions should benefit from participating, and they must be able to see the immediate value of the input. Furthermore, you need to look at the target group before deciding whether to arrange a broad technical event or course, or whether to choose one which is more narrow and specific.

CHOOSE THE TOPIC AND THE PURPOSE

Even if your focus is on the matchmaking part, your event or course must be combined with something which is relevant for the sector. It takes technical content and relevant headlines to attract people, and it also helps in justifying the participation to the manager or the company. A striking title, a relevant theme and a specific topic often help to attract attention in invitations and headlines.

It is recommended that you ask the target group about their wishes and needs, and plan events accordingly. This could be done through a media group such as LinkedIn or by preparing questionnaires or evaluation forms, etc.

TIME FOR NETWORKING

The professional focus for the participants and your focus on matchmaking can be combined by arranging workshops which have technical relevance, dating sessions, etc. in connection with an event. Icebreakers which interrupt the events are also welcomed warmly, as they give the participants a chance to talk to each other. Always remember to set aside plenty of time for breaks between the planned activities, and also over lunch or other meals.

THE RIGHT SETTING

Choosing the physical environment for an event should support the theme and title of the event. It can be an unexpected site, with some edge to it, but it should still match the activities which will take place. If you are arranging a big event with workshops, café meetings and lectures, you need to look for a venue with a common café area, small rooms for group work, and a lecture hall. It is important that there is space and a set-up for informal chatting outside of the program. Direct meetings between companies and universities can be held where the companies wish this, giving consideration to their time or wish for discretion.

Generally, it is important that you ensure that both the planned meetings and the informal talks take place in settings which encourage talk and networking.

COLLABORATORS

It is worth considering whether your matchmaking event or course could become even better, be endorsed or perhaps have a better success rate, if you carry it out in collaboration with others. These could be another network, a trade organization, a foreign network or a public authority.

TIME AND RESOURCES

The time you have available for the actual matchmaking naturally influences which methods you can apply, and whether you will combine several of them. The resources you have available before and after the event also have an impact on your choice of method. The number of participants influences the time consumption of a matchmaking method. While individual talks typically take a lot of your time, big events require more of the participants' time. It is important to understand that if you are planning on having a large number of participants, even a small and relatively simple setup can become complicated and require many resources.

FOLLOW-UP

Before starting up, it is recommended that you consider whether you want to evaluate the process on an ongoing basis or whether you want to do it at the end. An evaluation can give you an indication of what went well, what should be changed and whether the process had the intended effect.

In addition to evaluation, you should also follow up on whether your participants met potential partners or and whether they need further matchmaking efforts or follow-up meetings to get the collaboration started. This way you will find out whether a match has been made and whether it can become a success story.

4. Ten good advices

1. Visit your members with the outset in a list of priorities. An example of this: Core members (Priority 1), potential members (Priority 2), and 'hang arounds' (Priority 3).

2. Be focused on the target group: An advantage for you and the participants is to stay focused on the target group. In relation to any invitations, it is an advantage to be concrete and specific.

3. The CRM-system is indispensable! The knowledge of the members is stored, saved and shared in the CRM-system. It is also here you draw down lists, search on professional qualifications, interests etc.

4. Use existing enrollment/dating systems. This makes the administrative work and matchmaking more simple.

5. Never neglect provision. Remember to locate it at a place, which supports the creation of network.

6. Breaks are essential. Even though, there might be important and interesting subjects on the agenda, always remember to add in breaks for the informal networking.

7. Networking dinners and morning meetings should not be underestimated. Specially a morning meeting can reduce the amount of a "no-show". Just make sure that there is coffee for everyone and the outline for the matchmaking is ready before the meeting starts.

8. Mark your participants to the meetings and events. You can mark your participants with name tags in different colors or with colored stickers, so other people can see, who they are representing.

9. Remember to place the participants strategically to events. Additionally, seating arrangements can be created with help from numbers on the tables written on the name tags.

10. Always evaluate meetings, events, projects etc. This gives you an overview if any matches were created – and a perception of which ones should be followed up on. This can be seen as a service to help them, while it also can function as a good story about the output of the matchmaking.

5. Living Lab Tools

1. Tool: Innovator matchmaking workshop

A method for matchmaking, where 6-12 innovators are in the same room for 30-60 minutes depending on the number of participants (8-10 minutes per participant). The goal of the session is to create a setting for matching innovators based on their needs in relation to potential collaborators. The group is put together based on their product range, where there is an obvious thematic overlap.

The innovators are asked to pitch their project, what they offer, what type of collaboration or challenge they are facing and what sort of collaboration they are looking for. The format needs to be facilitated extremely strictly. When the innovator has described their needs and offer, the other innovators can ask a maximum of 2 questions and in the end the others are asked to show a number (handed out when the session starts), where they indicate their interest in further talks during the networking session.

The facilitator notes potential interest on a whiteboard, where it is easy for the participants to see, who is interested in their solutions or partnership opportunities. The follow up by the facilitator is two fold:

- 1) Ask the innovators to actively look for each other after the workshop and continue their dialogue
- 2) Contact the innovators after the workshop with the contact information of the the other innovators, that showed interest.

2. Tool: One-to-one meeting with challenge owner

One-to-one meetings serve as a possibility for the challenge owner and the innovator to enter a more in-depth dialogue about the possibilities to find a collaboration - e.g. joint research, collaborations or demo projects.

This tool is based on the learnings from The SCALE-UP project funded by the Interreg North Sea Region, who has successfully been using the concept for the last 5 years. The Meet the Buyer events bring large customers with cleantech innovation needs together with SMEs with innovative cleantech products, services and solutions. In the Northern Connections, we have decided to apply this approach to the public and public-private sectors instead.

The duration of the meeting should be a minimum of 20 minutes in order for the innovator or solution provider to give an in depth presentation of their technology, product or method. It is possible to have more than one challenge owner per event and it is recommended to not have more than 15 meetings per challenge responsible / challenge owner due to fatigue.

3. Tool: Reverse pitching

Instead of letting start-ups/SMEs pitch for potential large corporations, it is performed the other way around. Large corporations are invited on stage to present, in a short pitch format, the value and offerings that they present for start-ups/SMEs to address the customer base of large corporations needs and challenges.

This can be applied to the public and public-private sector as well, where a city can pitch their offer of collaboration based on challenges identified for new projects. It can be combined with matchmaking sessions and prize award where start-ups/SMEs vote for best pitch/offering.

4. Tool: Seminars by research institutions

During the Living Lab Event, you can use the knowledge of researchers and teachers from the research institutions in your network in order to pave the road for collaboration and discussion.

Use a very charismatic and opinionated researcher, who is an expert in his/her field and make sure to underline the opportunities for collaborations. It is essential that the seminar is followed by a setting that gives the participants the possibility to reflect and discuss the ideas and research, presented - e.g. networking session, break or lunch.

5. Tool: The B2Match organiser tool

The B2Match is a platform designed to connect people at events with efficient and goal-oriented networking. With the B2Match tool you can set up a dedicated page for your matchmaking event quick and easy. Furthermore, with B2Match companies arrange their own one-to-one business meetings based on their profiles containing offers and requests relating to business, technology and research.

6. Tool: Webinar and video presentations

Closing the gap, when working across border and over far distances, in a project like Northern Connections, is key. Webinars and video presentations have made it possible to improve on the interpersonal relations between the partners in the project.

As such, introductory videos of challenges and Political Tools, as well as video interviews and promotion videos from our Living Lab events have made it easier to relate to the output of the project, while improving on the speed of trust between project members and organisations.

7. Tool: Booklet

A booklet showing all the information about the participants of the Living Lab Event, which makes it easy for the participants to find information about participating innovators, presenting solutions to the challenge owner. Additional information from meetings between the different stakeholders can easily be added as a reminder for future potential business dialogues. Furthermore, the booklet should also be found on the event organisers homepage after the event.

8. Tool: Podio platform for Living Labs process

By employing a collaboration space like the project management and social collaboration tool, Podio (by Citrix) for handling the challenge owners and potential Innovators, the process of matching innovators to challenges, is made simple and easy. The innovators are asked to fill out a comprehensive application form for the specific challenges, where they indicate their competencies and product ranges and/or services. This information, which is sent by the applying innovator, makes it easier for the challenge owner, in collaboration with the cluster representatives, to screen for potential matches. The partnership has made their own based on the Podio platform - led by CLEAN.

9. Tool: Pitching

In the following context of this toolbox, pitching means presenting an idea which needs further development. The participants are then invited to share ideas, give suggestions and ask questions. Pitching works well as a part of an open event, or as a part of an event with a specific theme, where entrepreneurs and established companies pitch their ideas in front of an expert panel and the other participants.

10. Tool: Challenge driven innovation

Demand driven innovation denotes finding a suitable match for an innovation network target group with big public investments. Thus, the method consists of a thorough analysis of interested parties, a one-day event and follow-up projects.

First, the project must have the right preparation. Begin six months beforehand by carrying out a screening and analysis of public bodies and funds. Then, carry out a target-oriented screening and contact the public players directly to identify needs and give information about the role of the network. To finish off the preparation, complete a program and the invitations based on the above mentioned analysis.

Second, the implementation part begins with arranging a one-day event with various talks, international video presentations, workshops and sector-related case studies. Followed by selecting and grouping the participants beforehand, and making sure to manage the day carefully. Hence, be sure to have a team of helpers to facilitate the day. Then, the tasks are defined by the innovation network and they can help manage the creativity of the workshops. Third, hand out a contact sheet that allows the participants to indicate their interest in participating in later development, including possible projects.

Lastly, the post implementation should consist of a follow up on declarations of interest and contact those waiting to participate in activities and projects. The way ahead requires involving the network secretariat and partner organizations to ensure that the ideas are converted into actual projects.

11. Tool: Business Matching Platform

A digital business matching site is a powerful tool for ensuring that your challenge owners and innovators can be matched in an effective and co-creative way. Platforms, where the participating actors can have a profile, and define what they are offering or looking for. In the case of Living Lab events it is a great tool for matchmaking between the participating innovators.

By having calendar functionality and enabling the companies to actively screen, the participant lists for potential collaborators, thereby releasing resources for the organisers to focus on other things.

12. Tool: Speed Dating

The advantage of arranging an organized matchmaking in shape of speed dating in relation to a larger arrangement is, that there are gathered a variety of people in advanced at the same time. The matchmaking should be a professional and relevant supplement, which can be an add on in relation to e.g. the scientific part.

13. Tool: Exclusive network meetings

Closed, exclusive network meetings for a chosen group of decision-makers from the business life and institutions of knowledge, which gives the participants the opportunity to meet under professional, but also informal circumstances.

As an example, it could be an event in the evening with a joint dinner followed by a presentation from a keynote speaker.

14. Tool: Innovation cup with students

The method is a concentrated innovation process in which companies and knowledge institutions are matched, based on the companies' need for new knowledge or product portfolio.

For instance, the company draws up a theme, which is related to its product strategy. The students are then divided into teams which have to solve the given task through an intensive innovation process. The project is held at the educational institution in question.

15. Tool: International Study Tour or Business delegation

An international study tour to a larger organisation in foreign countries, who may have the interest to enter contracts with Danish SMEs and maybe even larger companies, that creates profitable contacts and matches. Based on the Danish companies own description and homepages, they are the ones, who should get the organisation's buyers and technicians to want the individual meetings.

The meeting will give the Danish SME's the opportunity to present their competencies and acquire knowledge of the opponent's needs. Then the door is open: This often clears the way for inquiries and subsequently a potential contract and a subcontractor deal.

6. Living Labs - *Defining the concept*

A Living Lab is a research concept. A Living Lab is a user-centred, open innovation ecosystem, operating in a territorial context, integrating concurrent research and innovation processes within a public-private-people partnership. The concept is based on a systematic user co-creation approach integrating research and innovation processes. These are integrated through the co-creation, exploration, experimentation and evaluation of innovative ideas, scenarios, concepts and related technological artefacts in real life use cases. Such use, cases involve user communities, not only as observed subjects but also as a source of creation.

This approach allows all involved stakeholders to concurrently consider both the global performance of a product or service and its potential adoption by users.

How does it work?

The Living Lab process, which integrates both user-centred research and open innovation, is based on a maturity spiral concurrently involving a multidisciplinary team in the following four main activities:

Co-creation: Bring together technology push and application pull (i.e. crowd-sourcing, crowd casting) into a diversity of views, constraints and knowledge sharing that sustains the ideation of new scenarios, concepts and related artefacts.

Exploration: Engage all stakeholders, especially user communities, at the earlier stage of the co-creation process for discovering emerging scenarios, usages and behaviours through live scenarios in real or virtual environments.

Experimentation: Implement the proper level of technological artefacts to experience live scenarios with a large number of users, while collecting data which will be analysed in their context during the evaluation activity.

Organised Living Lab Events:

- 07/09 2018 : Living Lab Event - Syd Energi (DK)
- 29/11 2018: Living Lab Event - Økern Sentrum (N)
- 08/05 2019: Living Lab Event - Hoppet (S)
- 13-14/06 2019: Living Lab Event - Billebogen & Flensburg Fjord Region (G)
- 12-13/09 2019: Living Lab Event - Hoogeveen & Alkmaar (N)
- 20-21/11 2019: Living Lab Event - Blue Gate Antwerp & Green Energy Park (NL)
- 30-31/01 2020: Living Lab Event - Grangemouth, Falkirk & Acorn CCS (GB)





"We were looking forward to get an outside-in perspective on our business and for new partnerships. We were simply thrilled that so many innovative companies wanted to attend, and the outcome of the event have exceeded our expectations."

- Lisbeth Valther
CEO SE Next Step Challenge

Living Lab Event - Syd Energi (DK)

Syd Energi is one of Denmark's largest modern energy and telecommunications companies. With high environmental ambitions and engagement in innovation, the SE company focus on long-term and societal challenges. The aim of the internal initiatives is to create more diversity and strengthen the company's sustainability. The strategic external initiatives aim at creating more diversity by focusing on disruptive business models and creating societal impact by collaborating and supporting innovative entrepreneurship.

In order to identify new partnerships, Syd Energi was in the search for new ideas, technologies or methodologies. SE was looking for partnerships that could help the company reach the strategic goals; to create more sustainable energy and better digital communication. The SE company was looking for innovation solutions within the field of Smart home, Sensor technology or more green behaviour.

Smart home

- Optimising home activities
- Infrastructure monitoring
- Early warning systems
- Infrastructure level solutions
- Usage data and smart home, environment data

Sensor technology

- Solutions and sensors for households
- Optimization of the electric grid
- Hardware designed for the living room
- Intelligence across units
- Simple self-learning system

More green behaviour

- Nudging consumers
- Empowering consumers
- Making green behaviour
- Greener business models

Solution providers:

Neogrid Technologies, RAYBASED, UNS UNSTUDIO, KMC, FISCHER LIGHTING, ReMoni, arbnco, Carbon Cash & dLaboratory.

Tools used for

Living Lab – Syd Energi (DK)

Tool: Podio Platform for Living Lab process

The Podio platform (Project Management and Collaboration Software) was a central tool in the coordination and planning process, giving the project managers responsible the chance to share documents, produce webforms for registration of applicants and selecting innovators. The processes - and so called 'apps' - has since been used, updated and tweaked, by coordinators of the following Living Lab Events.

Tool: Webinar and video presentations

In order to give the communication a more personal character, and draw the potential applicants closer to the Living Lab representative, we took the presentation of the challenges of the Living Lab further than only text. Lisbeth Valther, CEO of SE Next Step & Blue Labs, presented the three challenge areas: More Green Behavior, Sensor Technology and Smart Home. Links for the aforementioned challenges was then implemented into the digital version of the invitational material.

Tool: Reverse pitching

A central part of the setup of the Danish Living Lab was the efforts made in order to present an agenda with an obvious value add for innovators, hereby giving potential applicants a clear sentiment for participation. As such, Reverse pitching was an important tool, used when presenting secondary project opportunities, related to the Innovators technological knowledge areas during the event. Additionally, the session was followed by a networking session, giving people a chance to reflect on the presentation given.

Tool: Seminars by research institutions

Cutting edge research and provocative ideas can fuel inspiring conversation. This was the idea behind inviting Steffen Petersen, Associate Professor at Aarhus University, to present his take on *“Smart Homes of the future - Barriers and possibilities”*.

However, it is essential that the invited researcher knows both context (agenda) as well as the technology of the selected applicants participating at the Living Lab, as this provides him with an opportunity to touch upon burning questions, and areas easily relatable for the innovator.

Tool: One-to-one meeting with challenge owner

While, simple by concept, the idea behind adding value to the event by letting innovators present their selected technology to the challenge owner, in a closed setting, gave both parties the chance to move closer to each others, than when using pitches in a larger setting. In this case, we gave every selected innovator 25 minutes to pitch their technology and build on the presented material, introduced in their application form.

As the Danish Living Lab owner had already analyzed, the basic aspects of their innovative tech or service, the meeting made it possible to make an important leap in relation to trust and the professional relationship between the innovator and challenge owner. The meetings were facilitated as a parallel track, alongside the plenary session.



Living Lab Event – Økern Sentrum (N)

The city of Oslo aims to cut emissions by 50% by 2020 to be carbon neutral by 2050. Oslo has introduced a range of integrated measures to achieve these ambitious targets. An unique ‘Climate Budget’ is one of the main initiatives. Innovation and the promotion of new jobs in the circular economy is a priority for Oslo and the city is at the forefront of circular use of available resources. Making The Oslo Region attractive for innovation and transforming it into the world’s most sustainable, smart and innovative region will require collaboration efforts. That is one of the reasons why City of Oslo is partner in North Sea Region EU project Northern Connections. Main output is building capacity and transnational relations of sustainable energy clusters to provide demand-led innovation support. This creates the foundation for involving more SMEs and startups in innovation.

Økern Sentrum is situated in the heart of Hovinbyen, one of Oslo’s newest and most ambitious city development areas. Hovinbyen has a potential growth of 30-40,000 new residents and will accommodate a total of 100,000 people in addition to its 2.5 million m2 area for industry and trade. Økern Sentrum will be the central hub of Hovinbyen and will form and change Oslo in accordance with the growth strategies of Oslo Municipality. From 2020 the developers, Steen & Strøm and Storebrand will create an urban, sustainable and innovative 163,000 m2 urban centre including an indoor aquapark, a cinema, a substantial amount of housing facilities, cultural venues, offices, hotels and a leading commercial centre in Økern Sentrum. We started the search for companies and partners to help Økern Centre to develop high-tech, sustainable and shaped with tomorrows solutions as possible.

We were looking for companies, clusters and innovations, who could deliver to Økern Sentrum. The innovation challenges were circular and holistic waste management, sustainable energy solutions, green mobility & infrastructure for sustainable transport and construction period / execution.

The innovation challenges

Circular and holistic waste management

Waste management - Underground waste management opportunity

- Vacuum systems
- Central systems for waste management
- Smart handling of public waste
- Food waste programs and circular waste management

Construction period / execution

- On site circularity & re-use of materials
- Co2 mission free construction site
- Energy consumption & usage during construction period
- Re-use & circularity of materials – cradle 2 cradle

Solution providers:

6CST AS, arbnco, Asak Miljøstein AS, BiomimicryNorway, Catch Solar AS, CityQ, Clean Motion AB, DesaH BV, E.ON Sverige AB, Enjay AS, Envac Norge AS, Fortum Oslo Varme AS, FUSen AS, Hydraloop Systems BV, Hystorsys AS, ISSOL Solar Glass, Kraft Engineering, ML System, MyEnergy APS, Nabolagshager AS, Nårgesol, Nedenfra Ideelt AS, Orbital Systems AB, Photocat A/S, Pivotic Consulting AS, Pixii AS, PowUnit AS, ROAF IKS, Schneider Electric AS, SEG Holdings AS, Velove Bikes AB and wheel.me AS

Sustainable energy solutions

Heating & cooling

- Energy wells
- Battery/storage technology

Electrical production

- Solar panels on all surfaces
- Wind power, wind trees, movement etc.
- Hydroelectric plants in the sewage system etc.

Green mobility & infrastructure for sustainable transport

- Smart transport of goods
- Fossil free private car, cycle parking & pooling
- Car/Ridesharing

"Økern Sentrum is a living laboratory against becoming Europe's most environmentally friendly urban development project. With the goal of becoming Europe's most sustainable urban development project, Økern Sentrum - The Living Lab Event in OREEC and Oslo municipality is now its Interregional European network for the future urban development.

Norway's renewable technology suppliers have had access to the Living Lab throughout Northern Europe through Northern Connection. This gave them the opportunity to establish themselves in new markets and to get new contracts, while participating in the development projects in Oslo. The goal was been to establish a North-European network of actors, who, in cooperation, lower the threshold for deliveries of renewable technology across national borders. This contributes to the growth of companies that offer this type of technology, growth throughout the region and smarter, cleaner North European cities.

The project makes the big cities in Northern Europe showcases for sustainable technology solutions. Økern Sentrum, owned by Steen & Strøm and Storebrand, is Oslo's Living Lab in Northern Connections. Renewable energy and sustainable technology suppliers from all over Northern Europe were invited to Oslo to show that they can offer services, technology and new innovations in this construction project."

- Pål Samuelsen
Project Manager Steen & Strøm Storebrand



Tools used for

Living Lab – Økern Sentrum (N)

Tool: Booklet

A booklet was handed to each participant at the event. Besides practical information such as the event programme and schedule for the one-to-one meetings, the booklet also included information on the Northern Connections project, the two Living Labs as well as profiles and contact persons of the participating innovators. Short information about participating companies, both presenting solutions to the challenge owner and created a platform for B2B networking and cooperation. The booklet is a reminder for future potential business dialogues.

Tool: Pitching

The plenary session of the Living Lab Event in Oslo included both a pitch session and a session for reverse pitching. In the pitch session, the innovators had the opportunity to present their concepts and ideas towards the audience but also the challenge owners. The pitch consisted of a short presentation with a limited amount of time (5-minutes) and a short Q&A with the host and moderator of the event. This tool was useful to give interested parties the chance to learn about the company and its concept without straining the audience. However, many pitches in a short time is a challenge both for the innovators, challenge owners and organisers.

Tool: One-to-one meeting with challenge owner

After the pitch session, several one-to-one meetings between the innovators and challenge owners were scheduled parallel to a plenary session. Since the challenge owners received initial information on the innovators and its concepts during the pitch session, the length of each meeting was kept short. For the innovators, the one-to-one meetings were an opportunity to provide the challenge owners with more in-depth information and exchange contact details. Despite the preceding pitch session, the innovator's feedback was that the time of each meeting could still have been longer to discuss more details.

Tool: Seminars by research institutions

During the Living Lab Event we used researchers from the research institutions in our network in order to pave the road for collaboration and discussion. We had success with using very charismatic researcher who underlined the opportunities for collaborations. The networking time after the Living Lab gave the participants the possibility to discuss the ideas and research presented.

Living Lab Event - Hoppet (S)

Gothenburg, the second largest city in Sweden, is undertaking it's greatest development in modern history and will grow by nearly a third by 2035. The City of Gothenburg plans to invest €600 million a year in new schools and housing projects, all of which must meet strict sustainability criteria. The Hoppet preschool is a pilot project for these future developments and will be built using fossil-free materials and processes. This cutting-edge project will set the standard for future urban development in the city and will open up a thriving market for sustainable suppliers. Hoppet was seeking solutions and products that was, or have the potential to become, fossil-free through the whole construction process and the operation of the building. Recycled and re-used products was also of interest. Selected suppliers had the opportunity to see their solutions implemented after the event. The construction phase started in 2019 and the goal is to complete the project by December 2021. The innovation challenges were the following:

Fossil-free and climate-neutral building materials for:

- Electrical installations
- Heating, ventilation and air conditioning products
- Sealants and waterproofing
- Foundation
- Insulation
- Wall constructions
- Paints and adhesives

Construction phase:

- Transport
- Work vehicles
- Dehumidifiers
- Energy consumption
- Temporary facilities

Solution providers:

PLOCKHUGGET, ISSOL, HOUSE HEMP, Kebony, Altered, Hunton, Fischer Lighting, Ramirent, Øko-tømreren, CS - Rv & Håltagning, Green Furniture Concept, Climate Recovery, Nature Impact, Forbo, One Reality, Repur, IT NOCK - Massiva Trähus, Deutsche Amphibolin-Werke Von Robert Murjahn, Hemp in a box, Kenoteq, Zostera, Nordiska Hamp Kompaniet, Tarkett, KALK and Juteborg.

"It was very worthwhile, and we are simply beyond happy! The event has been vital in connecting us with suppliers who can help us transition to fossil-free construction. We are interested in pursuing further discussions with all of the suppliers we met during the day."

**- Anders Hall
Project Manager HOPPET**



Tools used for Living Lab – Hoppet (S)

Tool: Podio Platform for Living Lab process

The Podio platform (Project Management and Collaboration Software) was a central tool in the coordination and planning process, giving the project managers responsible the chance to share documents, produce webforms for registration of applicants and selecting Innovators.

Tool: Webinar and video presentations

In order to give the communication a more personal character, draw the potential applicants closer to the Living Lab representative and make the challenges easier to understand for the applicants, we took the presentation of the challenges of the Living Lab further than only text. Anders Hall, project leader for the preschool Hoppet presented the challenges in a short film which was enclosed in the invitation.

Tool: Business matching tool

When going into the screening process to find companies matching the communicated challenges the tool EEN Match was one of the tools used. Unfortunately, the matches we got were not exactly in line with the challenge owner's needs.

Tool: Booklet

The booklet was an item produced for the participants at the Living Lab, containing a short presentation of the selected participating innovators with contact information, making it easy to remember their specific products and an opportunity of contacting them. Information about Northern Connections and contact details to project members responsible for Living Labs were also included.

Tool: Exclusive network meetings

As a preparation for the Living Lab and a possibility for the Living Lab owner to meet with the innovators and Northern Connection partners on a more informal basis a dinner was arranged the evening before the Living Lab.

Tool: Pitching

Pitching is a very attractive tool for companies reaching out with their products to an audience, independent of size. By delivering clear guidelines and objectives to the solution suppliers beforehand the pitching had a consistent format.

Tool: Reverse pitching

A main goal was to give the innovators a view of the large market potential. Therefore, representatives for larger real estate projects were invited to conduct reversed pitches, hereby providing additional business opportunities for the selected innovators.

Tool: One-to-one meetings

For the solution suppliers to get a fair chance to, more in-depth, present their solutions, one-to-one meetings with the challenge owner were conducted parallel to the plenary session. The meetings lasted approximately 20-30 minutes which was sufficient time for both parties to receive relevant information.

Living Lab Event - Billebogen (D)

The North of Germany is the leading region for renewable and sustainable energy as well as mobility solutions in Germany. Within the Northern Connections project, the City of Hamburg and State of Schleswig-Holstein jointly invited companies to present their innovative ideas regarding an intelligent energy supply and smart mobility solutions for cities as well as a for rural areas.

The City of Hamburg is the second largest city in Germany with approximately 1.8 million inhabitants and an annual influx of around 20,000 new inhabitants. The city is therefore committed to building more than 10,000 new houses each year as well as realizing new industry and office spaces. One of the new districts that are currently developed in Hamburg is the project “Billebogen”. It is realized by the HafenCity GmbH, who is planning to mix new-build offices with multi-layered commercial, industrial and manufacturing spaces on a total area of 230,000 square meters in the coming years. The challenges of the Living Lab “Billebogen” was focusing on an integrated and efficient energy supply system and to provide a full e-mobility infrastructure. The innovation challenges were the following:

District Energy Solutions

- Intelligent connection of power, heat and cooling grids and systems
- Efficient inclusion of energy storage and demand side management
- Connect office with industrial and commercial energy consumption patterns

Further/Optional

- Improve the life-cycle impact of “Billebogen” by using Cradle-to-Cradle design principles

Solution providers:

H2Tec, Energy Ville, Plan Energi, Hysopt, Wagner Solar, Desah, Skoon, Fraunhofer, KTC, Averdung and Dezera.

Sustainable Mobility Solutions

- Develop charging infrastructure for a range of e-mobility vehicles and distribution ranges
- Include charging infrastructure capacities in overall energy supply system

“The Living Lab event has been essential in connecting us with companies from Europe showcasing their innovations that we otherwise might not have gotten in touch with. We would highly appreciate if some of these companies would accompany the further development of Billebogen as the future inner city destination for urban production in Hamburg.”

– Hape Schneider
Senior Project Manager Billebogen HafenCity GmbH

“Being the challenge owner of the Living Lab Billebogen gave us the opportunity to approach new technologies and see what is feasible. This encouraged us to increase the requirements for potential bidders in the future on a maximum flexibility concept for Billebogen and to set more ambitious targets and an even stronger focus on connecting the power, heating, cooling and mobility sectors.”

– Jürgen Desler
Senior Project Manager HafenCity GmbH



Living Lab Event - Flensburg Fjord Region (D)

Located in the north of Germany directly on the Danish border, the “Flensburg Fjord Region” consists of the City of Flensburg with 95,000 inhabitants and the surrounding rural region Eggebek, consisting of 34 municipalities with another 67,000 inhabitants. Together, they form a national model region with the common ambitious goals of reducing their greenhouse gas emissions by 100 percent until 2050 and also cutting their total energy consumption in half during the same time period. For the City of Flensburg and the local utility company Stadtwerke Flensburg GmbH, two of the three challenge owners of the living lab “Flensburg Fjord Region”, the focus was to find innovative ways of improving their urban district heating system. The Amt Eggebek, the third challenge owner of this Living Lab, was focused on sustainable solutions for combined renewable energy and glass fibre solutions including small-scale power-to-X technologies (sector coupling). The innovation challenges were the following:

District Energy Solutions

- Large scale heat pumps (0.5 MWth to 1 MWth) using energy from sea water for district heating
- Low temperature district heating (LowEx) solutions
- Inclusion of solar thermal heating in district heating
- Load management system for renewable electricity system including battery storage and bus charging
- Smart regional energy systems on renewable energies, power-to-X and glass fibre (sector coupling)

Sustainable Mobility Solutions

- Complete e-bus charging infrastructure for City of Flensburg
- Flexible, shared, supplemental, zero-emission “last mile” mobility solutions for rural areas

Solution providers:

H2Tec, Energy Ville, Plan Energi, Hysopt, Wagner Solar, Desah, Skoon, Fraunhofer, KTC, Averdung and Dezera

"It is impressive to see how many people from different countries and backgrounds are interested in and concerned with sustainable energy solutions."

Northern Connection provides an outstanding opportunity for sharing experience and expertise in this field."

– Lars Fischer
Amt Eggebek and Amtswerke Eggebek



Tools used for

Living Labs - Billebogen & Flensburg Fjord Region (D)

Tool: Pitching

The plenary session of the Living Lab Event in Hamburg included four pitch session. In each pitch session two to three innovators had the opportunity to present their concepts and ideas towards the audience but also the challenge owners. The pitch consisted of a short presentation with a limited amount of time (3-minutes) and a short Q&A with the host and moderator of the event. This tool was useful to give interested parties the chance to learn about the company and its concept without straining the audience.

Tool: One-to-One Meeting with Challenge Owner

After the pitch session, several one-to-one meetings between the innovators and challenge owners were scheduled parallel to a plenary session. Since the challenge owners received initial information on the innovators and its concepts during the pitch session, the length of each meeting was kept short (10 minutes). The short meetings allowed the topical separation of the challenge owners, so that in total three different one-to-one meetings were happening simultaneously. For the innovators the one-to-one meetings were an opportunity to provide the challenge owners with more in-depth information and exchange contact details. Despite the preceding pitch session the innovator's feedback was that the time of each meeting could still have been longer to discuss more details.

Podio Platform for Living Labs Process

The Podio Platform (Project Management and Collaboration Software) was the central tool to manage the registration of innovators and participants. Within Podio, a web form for registration was created, published and disseminated. On the backend, provided information from the innovators could be managed and exported. The data within Podio was used to create documents, such as registration lists or company profiles. Further details and information was provided in a public BOX folder that was continuously updated. After the event, a second web form was created within Podio to evaluate the Living Lab event, its organisation and outcome. All presentations that were held during the event were saved centrally and disseminated among the participants via a public BOX folder.

Tool: Booklet

After registering on the day of the event, a 32-page booklet was handed to each participant. Besides practical information such as the event programme and schedule for the one-to-one meetings, the booklet also included information on the Northern Connections project, the two Living Labs as well as profiles and contact persons of the participating innovators.

Living Lab Event - Alkmaar (NL)

InVesta: Biomass and gasification technologies

The Energy Innovation Park is a business park with a focus on businesses (start-ups, SME's and international players) in innovative and existing energy technology. It is an attractive location for companies from both inside and outside the region, especially due to the clustering of energy-related companies and projects. The park offers an excellent energy infrastructure for high-quality heating, connection to the national gas grid and a high-voltage grid (150 kV).

InVesta: The future for renewable gases is now!

Prominently located at the park is InVesta, an expertise center for biomass and gasification technology. Entrepreneurs, researchers and government work together on sustainable and innovative renewable gas initiatives. The focus is on technological developments in the field of biomass gasification and broad application of the gases produced with the aim to ensure structural reinforcement of the biomass gasification chain in the Netherlands. InVesta promotes, facilitates and connects parties to develop and market innovations in the biomass gasification chain. InVesta is of interest to parties wishing to test and demonstrate techniques in the chain. InVesta makes facilities available where pilots and demos can be tested and presented. InVesta is looking for new cost-efficient technologies to accelerate the development towards large-scale commercial application of 'syngas' or 'product gas'. This applies to the complete chain from biomass to end product - and includes the preparation of (new) biomass feedstocks, all technologies for gasification and the use of syngas to all kinds of renewable products.

The innovation challenges

InVesta was looking for companies with economic viable technologies (or part of technologies) that lead to a lower cost of sustainable syngas and their applications. Besides that InVesta was interested in companies that wanted to test and demonstrate their new innovations and products.

- Pre-treatment techniques (sorting, grinding, drying, torrefaction, pyrolysis, etc.)
- Gasification technology (conventional gasification, supercritical gasification, etc.)
- Gas cleaning (sulfur and chlorine removal, etc.)
- Synthesis technology: from syngas to application (biofuels, green gas, green chemicals, hydrogen)

Liquid hydrogen: the next step in the hydrogen economy

The company HYGRO will operate the first hydrogen wind turbine in the world in the North of the province Noord-Holland in 2020. The Energy Innovation Park will be one of the following production sites. Various potential customers of HYGRO indicated that they prefer liquefied (cryogenic) hydrogen.

High-pressure hydrogen is today's standard for storage and transport of hydrogen, from production to end-user. The disadvantages are the high costs of the storage and the relative low energy density. The – much higher – energy density of liquefied hydrogen could offer significant benefits for the use of hydrogen for heavy duty users such as vessels and trucks, and saves costs in transport and storage. If the challenges of the high costs of liquefying hydrogen could be solved (cryogenic, -253°C), liquefied hydrogen will be the next step in the hydrogen economy. For HYGRO, liquefied hydrogen could mean lower costs for storage and transport, making hydrogen as a fuel even more attractive. In making this transition possible, HYGRO was looking for parties, who were able to liquefy hydrogen cost-effective with small scale liquefaction plants of capacities around 40kg/hour. Besides that, HYGRO was looking for parties that could offer all the required equipment for storage, filling infrastructure and techniques for the application of liquefied hydrogen in vessels and trucks.

The innovation challenges

The aim of this part of the project is to make decentralized liquifaction of hydrogen costs efficient.

We were therefore looking for several technologies related to liquefied hydrogen:

- Liquefied hydrogen production
- Pipe systems
- Storage and transport systems
- Liquefied hydrogen systems for vessels and trucks (fuel cells technology)
- Safety techniques



Solution providers:

Alles Over Waterstof, Ampulz, APS BV, Bahcesehir University, D4, Deodrive Fuel Cell Energy Consultants, Dutch Boosting Group
 DWG, Elugie, Encon Clean Energy BV, H2planet, H2Tec Ltd. & BV, Howden Compressors, ICAMCYL, IGES, INB HYNOCa, Kiwa
 Multimetaal, Nprox, PowUnit AS, Pro-Control Process Automation, STERCORE BV, Swedish Exergy AB, TDE BV io, Total Nederland N.V.,
 UMOE ADVANCED COMPOSITES AS, Van Campen Ecotechniek BV and Yokogawa Europe BV

"The purpose of the event was to get in touch with parties you have never met before. In my case, that was certainly successful. In projects involving renewable gases, several parties from different disciplines work together. For example, I myself talked to a party such as NAM about the future hydrogen infrastructure."

– Peter Simões
Director of Expertise Centre InVesta

"We have just started theTaskforce Dutch Energy. We were given every opportunity to connect and pitch our concept. Major players in the field were approachable and open to working with us. We talked to GP Groot and New Energy Coalition about our Swiss partner Greenlina, who is working on retracting plastic into oil, and we talked to Investa about housing within the region. All in all an instructive and fruitful day!"

– Arjan Gottmer
CEO of Arpe BV and co-owner
of Taskforce Dutch Energy



Living Lab Event - Hoogeveen (NL)

Techno-economic blueprint for the heat supply in Nijstad Oost on 100% hydrogen

The Dutch municipality of Hoogeveen is developing a new location with 80 houses at the west side of the city of Hoogeveen; Nijstad-Oost. With this development, the municipality wants to contribute to the energy transition in the Netherlands, especially focused on building new houses which do not require natural gas as its main resource for heating.

The goal of this project is to deliver a (techno-economic) blueprint and corresponding technology concept for the heat supply of the 80 houses in Nijstad-Oost on 100% hydrogen (H₂), based on operating with a hydrogen central heating boiler. Finally, this blueprint and technology must be transferable and scalable for existing residential areas in the Netherlands. Besides the nationwide reduction of natural gas use, market opportunities are being created for the involved parties. There are also other topics and aspects included in the blueprint besides the technological developments, such as the social business case, sourcing strategy and the support amongst the residents. This approach will be set off with other hydrogen related solutions (fuel cells, local heat network, etc.), in order to gain insight on the pros and cons of the blueprint and accompanying solutions.

This project does not stand on its own, Nijstad-Oost is a demonstration project which serves as a pilot and an accelerant for the application of hydrogen in the built environment. The reason the project does not immediately start with converting and retrofitting existing buildings, is because of the fact that it wants to begin from a green meadow in order to create an organized and controlled environment which is comparable with the already existing built environment (in terms of infrastructure and equipment). From this controlled environment, we want to create a sense of security and acceptance which is the starting point to existing buildings, the adjacent district Erflanden, for which 2000 houses are aimed to be heated through Hydrogen.

The key challenge of the project is focused on creating new residential areas without having the need for natural gas as the key energy carrier to supply heating and to make urban areas more sustainable. Experiences from this project are also used to work on retrofit hydrogen CV boiler solutions for the existing residential areas. Subsequently, step-by-step blending tests shall be executed with the final goal: 100% hydrogen.

The innovation challenges

For the development of the techno-economic blueprint for heat supply by means of hydrogen in the Nijstad Oost residential area in Hoogeveen, the project developers was looking for technological and non-technological solutions and aspects related but not limited to the following:

- A hydrogen gas flow meter or monitoring system which is suitable for usage in residential environments taking into account retrofit possibilities
- Retrofit household appliances (like e.g. furnace, stove, boilers etc.) for which hydrogen can be used to operate/power them
- Cost-efficient hydrogen compression and storage solutions
- Cost-efficient electrolyser with smart power system
- Odour suitable to be mixed with hydrogen which is either divergent (or with equal smell) from the odour applied to/mixed with natural gas
- Regulatory and legal issues dealing with hydrogen in the built environment
- Safety and hazard issues related to hydrogen production, distribution and in particular utilisation within the houses

Solution providers:

Alles Over Waterstof, Ampulz, APS BV, Bahcesehir University, D4, Deodrive Fuel Cell Energy Consultants, Dutch Boosting Group DWG, Elugie, Encon Clean Energy BV, H2planet, H2Tec Ltd. & BV, Howden Compressors, ICAMCYL, IGES, INB HYNOC, Kiwa Multimetaal, Nproxx, PowUnit AS, Pro-Control Process Automation, STERCORE BV, Swedish Exergy AB, TDE BV io, Total Nederland N.V., UMOE ADVANCED COMPOSITES AS, Van Campen Ecotechniek BV and Yokogawa Europe BV



"The main idea behind the setup and outline for the programme used at this Living Lab event was about funnelling.

From a broad perspective through inspirational speeches; to introductions on the Living Lab cases by ways of the presentations; followed by more in depth workshops where the innovation challenges could be further detailed and there was room for interaction; onto having pitches for the specific cases and room for questions; ending the day with one-on-one meetings at the matchmaking sessions.

At the matchmaking sessions, The Living Lab challenge owners had fixed tables and the ability to request meetings with all participants whilst initially only solution providers could request meetings with them."

– Jannes Kalfsbeek
EU Project Manager New Energy Coalition



Tools used for

Living Labs - Alkmaar & Hoogeveen (N)

Tool: B2Match matchmaking and event organisation tool

The key tool used was the B2Match tool to organise both the B2B matchmaking meetings as well as the overall organisation of the event's programme. Advantages of utilising this tool are that: all information regarding the event can be found in one central place and if details in content or programme change this does not need to be communicated with all invited parties; easy communication to (filtered) participants via standard messages including action buttons; possibility to set up and work together on the website and settings; organise pre-arranged B2B meetings; share presentations etc. afterwards with all participants; gather feedback from participants both about the event in general as well as on each individual meetings that took place to keep track of possible new collaborations; etc. For the development agency it was the first time they made use of the tool whilst Energy Valley had experience with it but it was very easy to learn.

Tool: Pitching

Pitches by solution providers were given at the individual workshop rounds. For each workshop we reserved three slots which means in total 9 slots per parallel workshops round and with two rounds we had the possibility to have 18 pitches. In practice, after selection by the challenge owners, there were 13 pitches provided.

Tool: One-to-one meetings with the challenge owners

After the workshops all participants could participate in the matchmaking sessions and request and plan meetings via the B2Match tool. Each participant received a personalised agenda detailing their participation and schedule of B2B meetings. On the day itself, the possibility for requesting meetings was also still open by using the free B2match app. On the app participants could also find their personal agenda.

Tool: Booklet

For the event, we also made a booklet with all key info relevant for the day including the Living Labs, the Northern Connections project, location and floor plan, solution providers, all participating organisations etc.

Living Lab Event - Blue Gate Antwerp (B)

Smart mobility hub: how to connect Blue Gate Antwerp with the city

Blue Gate Antwerp (BGA) is the climate neutral business park reserved for innovative companies with a well-defined ambition: linear growth through circular operations.

Together with like-minded businesses, they will activate circular flows at the micro and macro levels. This delivers cost efficient collaborations both on and off site. Businesses located on the park are committed to the eco-effective industry, in which they will produce the same qualitative end product while reducing the use of raw materials.

The site is located just next to Antwerp and it holds unique opportunities in terms of logistics and accessibility. The park can be reached by water, public transport and the road network. It is BGA's ambition to develop a mobility hub on the site, that supports an evolution to fossil free and shared mobility services for the site as well as towards the city. This entails sustainable and shared logistics between the companies, thereby reducing empty shipments, optimizing routes and creating central loading and parking spaces. The shared logistics will be used for on-site transports, as well as towards the city.

Additionally, shared vehicles can be used on site and in the city, not only by the companies but also by Antwerp residents and tourists. The flexible mobility hub on BGA will continually seek synergies between its available infrastructure and future mobility needs in the city of Antwerp. The central parking site for privately owned vehicles, might for example evolve to a night-time loading and parking bay for shared autonomous vehicles, thus alleviating parking problems in the city.

Solution providers:

Skoon, Insplorion, Autodelen.net, Solenco, E-Trucks, EnergyVille (Polfliet), Off grid testing, Ectogrid, Collectric, Hysopt, Taskforce Dutch Energy, FluidTech, Posetron, SunOyster, UAntwerpen, Blue Heat, Nuvve, Vaasa U, Encon, Johanneberg Science Park and CoolDH.

The innovation challenges

Sustainable fossil free mobility

- Infrastructure requirements for new alternative fuels (electrical, hydrogen, methanol)
 - Connected grid for fuel distribution for several users (use and produce), loading point and storage solutions
 - Infrastructure needed for own fuel generation
 - Safety solutions
 - Future proof: flexible, circular construction methods for mobility infrastructure

- Fossil free fuelled vehicles - logistics: trucks, forklifts, tow trucks (for own maintenance), transport drones and cars
- Solutions to upgrade the mobility hub to autonomous transport

Organising mobility hub

- App or platform for company owners: sharing information to identify synergies and optimising routes and stimulating synergies between companies, some examples

- 3 companies loading 1 truck for transport to the city
- On-site exchanges by loading and unloading in the same transport
- App or platform for city of Antwerp: sharing information to inform/help travellers and reserving/calling a car

- Organising autonomous transports in future
- Construction: how to make buildings and infrastructure on BGA adaptable for future changes in mobility

Living Lab Event - Green Energy Park (B)

Green Energy Park with event partner Matexi

Green Energy Park is the result of the collaboration between the Vrije Universiteit Brussel (VUB - Free University of Brussels), the Universitair Ziekenhuis Brussel (UZ Brussel - University Hospital of Brussels), the Energy Cluster Flux50, the municipality of Asse, the Flemish Government and several companies. The park is a centre of expertise in sustainable energy systems, mobility, smart regions and healthcare technology. It offers facilities for research, development, pilot studies, showcases, education and trainings. An on-site green datacentre offers sufficient capacity to support calculations by research institutes and companies. Green Energy Park aims to stimulate strategic partnerships to develop solutions for the future. One of their research domains is sustainable energy and mobility. The park will be equipped with a low-temperature thermal grid and a large electric grid.

All buildings in the park can partake in the “CO2 neutral smart multi energy grid” by supplying and utilising energy. Excess heat from the data-centre, heat pumps, cogenerations and different renewable energy sources will be added to the grid. Energy will be stored in multiple batteries, electrical cars, heat buffers and underground storage. Due to the park’s location nearby a residential area, the thermal part of the grid will be extended to the residential development, in collaboration with Matexi.

The multi energy grid will consist of a (mainly) low temperature thermal grid and an electric grid. On the business park of Green Energy Park solar and wind energy are generated and will be injected in the electric grid. All companies located at the park are connected and can inject to or consume from the electrical and the thermal grid. The thermal grid will be extended from the business park to the adjacent existing business area and to the nearby newly built residential area. Also here, users can inject or consume heat. This creates a bi-directional interaction between the business park and the residential area.

Solution providers:

Skoon, Insplorion, Autodelen.net, Solenco, E-Trucks, EnergyVille (Polfliet), Off grid testing, Ectogrid, Collectric, Hysopt, Taskforce Dutch Energy, FluidTech, Posetron, SunOyster, UAntwerpen, Blue Heat, Nuvve, Vaasa U, Encon, Johanneberg Science Park and CoolDH.

The innovation challenges

Techno-economic blueprint for a CO2 neutral multi energy grid in Green Energy Park:

- **Technical set-up of the thermal grid**

- Infrastructure for thermal grids
- Heat recovery solutions in the datacentre
- Bi-directional interaction with different end-users (professional and residential)
- Bi-directional heat pumps (user as suppliers and purchaser), fuel cells, booster pumps
- Heat storage solutions

- **Technical set-up of the park’s electric grid**

- Bi-directional interaction between GEP’s electric grid and the national electric grid
- ICT solutions for connection between electric and thermal grid

- **Economical set-up of the CO2 neutral grid to develop well-balanced tariff structures with respect to the different stakeholders*, considering the bi-directional interaction with different end-users and the national electrical grid**

- **Communication protocols:** managing and steering of the grid, development of self-learning algorithms and cybersecurity solutions

- **Set up of a legal and regulatory framework:** Currently, the regulation of heat production and exchange is limited. A well-balanced framework describing the responsibilities of different stakeholders, will promote the development of thermal grids



Testimonials by solution providers

"Blue Gate Antwerp is a strong supporter of the Sustainable Development Goals of the UN. That's why the matchmaking event, set up by Cleantech Flanders, was a great opportunity for meeting new partners to facilitate the achievement of these sustainable goals we are facing."

- Dimitri Torfs, Bopro, BGA

"The Living Lab Event has just been a start for some possible good matches and a further business process. We also had some really positive talk with some interesting contacts from Sweden. We had a good talk about sharing experiences and knowledge across our two countries."

- Jimmy Van Moer, Green Energy Park

"We would definitely recommend other people to attend an event like this, because it is a great opportunity for your business"

- Mario Javier Pérez from FluidTech

"I can see the potential in a collaboration, I also think they can. We can work together and create an energy mobility hub and sustainable shipping and distribution. I can only say it was a meeting with big potential. And furthermore, I have really expanded my network and our network at Skoon."

It was so great to be a part of."

- Iori van den Doel, Skoon

Tools used for

Living Labs - Blue Gate Antwerp & Green Energy Park (B)

Tool: One-to-one meeting with challenge owners

We used one-to-one meetings between the living lab owner (represented by 2 persons) and innovators of 20 min.

Tool: Seminars by research institutions

Some research institutes were invited as a speaker during the plenary session, but also researchers were invited as innovators, which could pitch on stage (plenary).

Tool: Webinar and video presentations

We did not organize a webinar, but we aimed to have the same outcome as this tool. We did this by calling the partners individually to talk and discuss the challenges. On one hand to make sure they understood our living lab profile, and on the other hand to start the discussion on possible solutions to the challenges. With the discussion we were able to identify interesting innovators and speakers.

Tool: Booklet

We made a booklet containing the schedule, innovator information and names of attendees. This booklet was made in order to gather all information about the event - but also, so the solution providers could get in touch with each other later on after the event.



Living Lab Event - Grangemouth, Falkirk (GB)

The UK government declared a climate change emergency in 2019 with a commitment to transitioning to Net Zero carbon economy by 2050. The Living Lab Event was a response to climate change and to rise of new industry in Scotland. The Grangemouth Industrial Complex comprises petrochemical refinery, chemicals industry hub and Scotland's busiest port. The CCU development action plan for Scotland, highlighted key opportunities for valorised CO₂ as commodity chemicals, biofuels and niche products such as small-scale opportunities in the food, horticulture, feed and construction industries. Falkirk Council was seeking partnerships with which to collaborate in the informing of the future CCU business case and to directly participate in development of its strategic direction. They invited companies and institutions, solution providers of innovative and technical solutions to demonstrate the ability and expertise of their innovative products. The opportunity was for companies to collaborate with Falkirk Council and partners, at this critical development stage of their Investment Zone Growth Deal business case, to Scottish and UK Governments.

The innovation challenges

- Generation of renewable energy and/or models for provision of green energy to Grangemouth for CCU activity
- Hydrogen solutions and models for integrating hydrogen with CCU activity (at multi-megawatt scale)
- Solutions for direct uses of CO₂ and uses of captured CO₂ (including chemical, bio, horticultural)
- Ideas and models for infrastructure and service models required for collaborative CCU activity

Solution providers and stakeholders:

ABB, Aeon Geoscience Systems, Agile Energy Recovery (Inverurie) Ltd, Aker Solutions, Alma Hydrokultur, Baker Hughes - Turbomachinery & Process Solution, CalaChem Limited, Cambridge Carbon Capture Ltd, Celtic Renewables Limited, Cullum Ltd, Deep Branch, Biotechnology, Doosan Babcock, Eco3 Partnership Ltd, Edinburgh University, Edrington. Facilitating Change, FCC Environment, GFD Ltd, Greenskill Environmental Technology Ltd, H2Tec Ltd. & BV IBioIC. INEOS FPS, INEOS Grangemouth, InVesta, Living Water Ecosystems, Limited, Maalie, NCIMB, New Energy Coalition, NiTech Solutions Ltd, Opus 12, Scottish Carbon Capture & Storage, Seawater Solutions, Sustainable Thinking Scotland CIC TWEFDA Ltd, University of Edinburgh, UrbanTide Limited and Weatherproofing Advisors Ltd.



Living Lab Event - Acorn CCS (GB)

As the UK government declared to commit to transitioning to Net Zero carbon economy by 2050. The Acorn Carbon Capture and Storage Project is taking action. The matchmaking event was conducted in order to discuss technologies, innovations and ideas that can capture and valorise CO₂, reduce emissions and develop new income streams. The Acorn Carbon Capture and Storage Project is well progressed and currently midway through the completion of Front End Engineering Design (FEED) ahead of the Final Investment Decision in 2020. The first phase of Acorn will be operational in 2024 with the capacity to handle and sequester up to 2mtpa of CO₂. Subsequent planned phases would see Acorn expand to handle 16mtpa of CO₂. Most of the innovation / technical aspects of the project have already been resolved. As capacity increases Acorn plans to link captured CO₂ to future utilisation points in Peterhead and Grangemouth Industrial Complex. For Acorn to secure ongoing development and increase CO₂ handling capacity, they have had several innovation challenges:

The innovation challenges

- **Supply of CO₂:** The recent progress on resolving the London Protocol means that captured CO₂ can now be supplied in bulk across the North Sea. A key aspect of Acorn is the importation of liquid CO₂ via ship into Peterhead Port, where it will be offloaded and piped to St Fergus, compressed further, piped offshore and then sequestered into the Acorn CO₂ Storage Area.
- **Revenue Model:** Upon successful completion of FEED, the Acorn project will need to secure further capital investment for the first phase of the project by the first quarter of 2021. To justify the required scale of investment, the business models (including financial mechanisms with Government) for industrial capture and CO₂ transport and storage are needed. The Acorn project is working with relevant Government agencies to accomplish this in the right time frame, but would welcome ideas on financial models that could be applied.
- **Collaboration Partners:** To implement the company's ambitions, Acorn requires to identify enterprises with interest in CO₂ capture, and the road, pipeline and ship transportation of CO₂. Alongside interest, innovative solutions and technology are sought, regarding both CO₂ capture and CO₂ transportation via the various channels.

Exchanging knowledge

The main idea behind the setup and outline for the programme used at this Living Lab event was to engage companies and academia - local & international participants to exchange knowledge and explore collaboration opportunities. This event combined contextual presentations relating to the challenges and opportunities derived from CCU in Scotland.

Alongside these, the innovation challenges were presented and further explored in workshop sessions attended by stakeholder companies/academia/government agencies. Subsequently, there were opportunities for informal networking as well as one-to-one meetings booked through the event matchmaking tool. At the matchmaking sessions, Living Lab challenge owners had fixed tables and the ability to request meetings with all participants, and vice versa. In addition, bi-lateral conversations between event participants could be booked.

Solution providers and stakeholders:

ABB, Aeon Geoscience Systems, Agile Energy Recovery (Inverurie) Ltd, Aker Solutions, Alma Hydrokultur, Baker Hughes - Turbomachinery & Process Solution, CalaChem Limited, Cambridge Carbon Capture Ltd, Celtic Renewables Limited, Cullum Ltd, Deep Branch, Biotechnology, Doosan Babcock, Eco3 Partnership Ltd, Edinburgh University, Edrington. Facilitating Change, FCC Environment, GFD Ltd, Greenskill Environmental Technology Ltd, H2Tec Ltd. & BV IBioIC. INEOS FPS, INEOS Grangemouth, InVesta, Living Water Ecosystems, Limited, Maalie, NCIMB, New Energy Coalition, NiTech Solutions Ltd, Opus 12, Scottish Carbon Capture & Storage, Seawater Solutions, Sustainable Thinking Scotland CIC TWEFDA Ltd, University of Edinburgh, UrbanTide Limited and Weatherproofing Advisors Ltd.

Tools used for

Living Labs - Grangemouth, Falkirk & Acorn CCS (GB)

Tool: B2Match matchmaking and event organisation tool

B2Match Programme was the key tool utilised to organise this event, from pre-registration of this event to feedback from delegates, this tool effectively allowed for proper tracking, efficient changes/edits and easy navigation. User-friendly and intuitive, this tool enabled organisers to update the website & settings accordingly and allowed for better team-work with event managers.

Centrally located information made for easy changes in terms of agendas, content, etc. Changes and/or information were communicated easily to participants (filtered or otherwise) and the 'action' buttons made for easy navigation to the pages needing attention from delegates. Pre-arranged B2B meetings could be determined efficiently + tool allowed for easy sharing of presentations with all delegates. The B2 match phone app (available via download) made it simple for delegates to check meetings/agendas.

Apart from delegates' feedback on the event and meetings that we attended, organisers will be able to keep track of possible new collaborations via this app.

Tool: Pitching

Pitches by solution providers were given at the individual workshop rounds. We provided a total of 14 pitches for the three workshops and with two rounds we had 28 pitches.

Tool: One-on-one meetings with the challenge owners

After the workshops all participants could participate in the matchmaking sessions and request and plan meetings via the B2Match tool. Each participant received a personalised agenda detailing their participation and schedule of B2B meetings.

On the day itself, the possibility for requesting meetings was also still open by using the free B2match app.

On the app participants could also find their personal agenda.

Tool: Booklet

For the event, we also made a booklet with all key info relevant for the day including the Living Labs, the Northern Connections project, location and floor plan, solution providers, all participating organisations etc.



Northern Connections

We are a partnership of 22 clusters, cities, regions and knowledge institutions, and we work together to create innovation connections between our enterprises and clusters in the energy sector.

The joint challenge is to test the use of domestic innovation support measures transnationally and address barriers to competition which exist between clusters and regions. Our objective is to get more enterprises to participate in transnational innovation collaboration via strengthening transnational cluster and city/ region cooperation. Main output is building capacity and transnational relations of sustainable energy clusters to provide demand-led innovation support. Our approach is to provide a bridge between private and public sector on transnational innovation support.



Read more on our webpage:

www.northsearegion.eu/northern-connections



Follow us on Twitter:

[@NorthseaConnect](https://twitter.com/NorthseaConnect)