Case #7

Residual Heat to Urban Food

The More the Merrier: Accelerating change through large partnerships

START DATE	2016
LOCATION	Malmö, Bjuv, Lund and Oskarshamn in Sweden
THEME	Sustainable Production Systems
LEAD CONTACT	Bengt Persson, External Collaboration Specialist, The Swedish University of Agricultural Sciences
STAKEHOLDERS	Private, Civil Society, Public & Third Sector

Case Study Overview

In 2016, Climate-KIC Nordic, together with four Swedish municipalities (Malmo, Lund, Oskarshamn and Bjuv) and large corporate companies (e.g., E.ON, ICA Fastigheter and Veolia) created a consortium and announced a joint 'Open Innovation Competition' to identify solutions to overcome a wide range of the technical challenges associated with residual heat reuse[1]. The competition explored how residual heat, low temperature heated water, could be used in the production of food or other biological products within the urban environment. Residual heat is often emitted as clean warm water is currently regarded as a waste of both energy and resources and is ultimately detrimental to the environment. Waste residual heat can be used to create environmental benefits for cities but this requires changes in supply chains, patterns of use, consumption of energy and regulatory frameworks.

The Open Innovation process will provide technical solutions for urban food production units located in a highly developed urban environment and create a number of societal co-benefits for the community

The consortium sought to address these challenges and use residual heat to produce fish, vegetables and other biological goods in production units located in their respective urban areas. By addressing these challenges, it was hoped that the competition would identify positive socio-economic benefits within each respective city, (e.g., employment, education and urban gentrification). The consortium were looking for solutions that incorporated concepts of sustainability, the circular economy and a zero waste ethos. The Open Innovation Competition was a means for the consortium to identify solutions that could be integrated into a regional Residual Heat project.

Obtaining: Technical solutions for Residual Heat challenges

The Open Innovation Competition invited businesses, academics and local residents to propose ideas and technical solutions that could be assessed, tested and implemented in each respective city region. The winning solutions from the Challenge would then be incorporated into a regional Residual Heat project. Bengt Persson, an External Collaboration Specialist at The Swedish University of Agricultural Sciences, who coordinated the Open Innovation Competition, explained how the project was created:

'The four municipalities identified residual warm water as an opportunity to combine waste reduction and sustainability with enterprise, job creation and social function … [By] establishing a number of real life applications in small scale showing how to combine loops of residual goods. Many of the different parts of the solution is known but no one has put them together in a real life.'

The solutions for urban food production units would be located in highly developed urban environments, offering residents various societal benefits. Persson elaborated:

[1] Climate-KIC, Events, www.climate-kic.org/events/open-innovation-urban-food-from-residual-heat/ – Accessed December 2017

'With interest in sustainability and the circular economy increasing worldwide, our partners are hopeful that success in these projects can lay out a template for future projects worldwide, thereby inspiring a lasting positive effect on the environment whilst further motivating the citizens to reflect on their own behaviour and waste.'

In response to the Open Innovation Competition, proposals were submitted by businesses, academics and local residents and were assessed by a panel of industry experts. All proposals focused on three challenges that were deemed necessary to address:

1. The technical challenges – identification and capture of waste heat; maintaining temperature between source and site; overcoming supply fluctuations, and, storing the heat for future use.

2. The biological production challenges – identification of optimal temperature, lighting, ventilation, soil and PH values; obtaining optimal mix of cultivated plants, and identifying appropriate and sustainable agriculture.

3. The business challenges – the production volume of price elasticity for consumers; with potential for job creation, and, social benefits.

Integrating: Supporting the transition to a sustainable city

The 'Open Innovation Competition' enabled stakeholders within the consortium to support and guide the participants as they developed their ideas for market. Support included: professional advice and assistance on how best to progress with turning their idea into a reality and the opportunity to collaborate with world leading companies and prize money (approx up to EUR 210,000) funded by Vinnova, Sweden's Innovation Agency[2]. Awards were made to those participating at each stage of the competition from the second round onwards – though a significant amount was reserved for the winner. The winner would also have the opportunity to develop their idea and be involved in the

[2] SLU, www.slu.se/en/ew-news/2017/3/open-innovation--urban-food-from-residual-heat/ – Accessed December 2017

final regional Residual Heat project. The Open Innovation Competition was structured in three distinct stages, each of which would shortlist participants. It was intentionally designed to be more than a traditional competition, by incorporating the principles of Open Innovation into the DNA of the process; it acted as a platform for innovative participants to collaborate and co-develop their ideas within a community of driven, like-minded people. Bengt commented on the usefulness of the Open Innovation process when selecting the best ideas for the project:

'With our wide-range consortium stretching from municipalities to energy companies, grocery stores and researchers and together with Climate-KIC Nordic we expect a big impact from the Open Innovation process leading to widespread solutions. The real-life applications in our municipalities will be important starting points for the dissemination.'

Implementing: Innovative solutions bringing benefits for all

The main objective of the Open Innovation Competition was to demonstrate how food production can be increased in urban areas where arable land is currently being used for development. The Competition aimed to showcase how new production facilities can enhance economic growth in the region by providing jobs and fostering knowledge exchange – enabling the replication of the technology across Europe. Utilising the residual heat from industrial waste as a way to supply vegetable and fish farming in closed land based systems is an effective solution for ensuring the sustainable supply of food within urban regions. Persson explained that the Open Innovation process will be used again to identify innovation solutions to low carbon challenges within cities:

'We look forward to develop, experiment and build in the coming years.'

The Competition is still in progress, with the successful proposals from the first stage having pitched their ideas at a Pitch Event and Workshop on 2nd October 2017 in Alnarp, Sweden. The best ideas will progress to Stage 2 and receive support and aim to refine their solution and pitch for Stage 3 in September 2018[3].

[3] Pitching Eventbrite, www.eventbrite.com/e/urban-food-from-residual-heat-open-innovation-pitch-event-tickets-37839161952# – Accessed December 2017

Case Study Summary

The shift from a traditional competition towards an Open Innovation Competition afforded the opportunity for municipalities to engage, not only with world leading companies, but also students, professionals, local residents and SMEs. Instead of the municipality solely designing and implementing a Residual Heat project, it was provided insight into alternative approaches as well as the buy-in from the local Swedish community to develop solutions that cater for everybody.

Challenges:

The shift from traditional competitions can bring challenges – the traditional stakeholder roles can become blurred, as the municipalities collaborate with stakeholders on challenges and are thus more engaged in the solution co-development than previously. This can create challenges as each stakeholder has a different way of working and it is often not clear who is leading the project as there are various stakeholders involved.

Results:

- Over 13 diverse stakeholders joined the Open Innovation Competition consortium from municipalities to world leading companies.
- In the first round for proposals in March 2017, there were 46 submissions from 21 different countries. From this, the competition narrowed down the pool to 28 proposals whose representatives then attended a pitch and workshop event in Alnarp, Sweden.
- Over EUR 210,000 worth of prize money was funded by Vinnova, Sweden's Innovation Agency.