

# **Building Resilience to Climate Change**

## **Why is cross-disciplinary collaboration necessary when we adapt to climate changes?**

*By Dorte Selmer*

### **Water knows no boundaries – that is the reason why the challenges must be solved in cross-disciplinary collaborations!**

It sounds like a matter of course. Nevertheless, there is no legislation or authority in Denmark that coordinates across e.g. municipal boundaries. Central Denmark Region has taken on the role to facilitate collaboration across boundaries, in order to endeavor creating a more holistic and sustainable climate adaptation. The results are so convincing that they may serve as inspiration for future legislation within climate adaptation.

### **A cross-disciplinary initiative prepares society for a changed climate**

Seen in isolation, the Danish climate challenge is not even that complicated. We can describe it in three words, water, wind and weather.

Water, in the shapes of precipitation, rising groundwater and sea levels. Wind as strong wind or storm. And unstable and shifting weather, offers more precipitation and more windy weather, especially during winter.

Technical solutions have been developed to the problems that the three elements create, both separately, as well as together. The challenge is to accommodate these solutions to society. It may sound simple, but necessarily it is not.

When a city, situated inland, has problems with rising groundwater and flooding in low-lying areas, it is reasonable to drain the soil and channel the water to the nearest creek. Perhaps, it only forwards the problem to the cities, where the same stream already and frequently overflows its banks, and creates inundation. Or providing the farmer with further problems, who has difficulties already, draining his fields sufficiently.

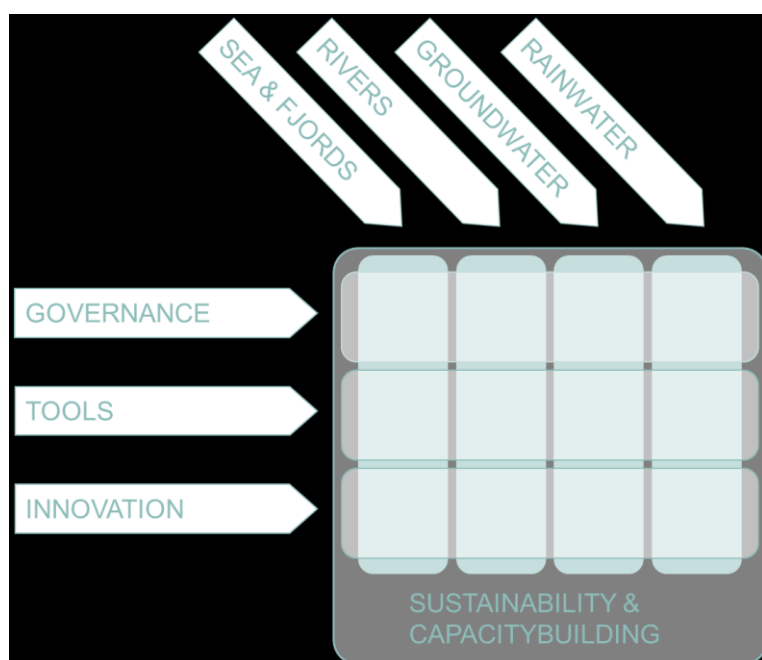
It is precisely the joint issues that are the perspective in Central Denmark Region's project Coast to Coast Climate Challenge. Finding solutions, which are both responsible climate solutions, and at the same time secures all the involved stakeholders' interests, and on top add increased values. Adapting society to the climate changes is certainly not only a question of safeguarding against unstable weather and rising sea level.

### **Coast to Coast Climate Challenge**

Today, Central Denmark Region, manages the project Coast to Coast Climate Challenge, also known as C2C CC, which is co-created with those who are affected by the water challenges including municipalities, utility companies, professional organisations, companies and also universities, think tanks and knowledge institutions. The project is implemented in a partnership with 31 partners. Add to this 20 supporting participants who participate actively in the project activities. Below the overall project umbrella, 24 sub projects are implemented. Thus several stakeholders are brought into play. This is also important if we are to develop holistic and sustainable solutions!

The overall purpose of the collaboration is to create climate resilient cities in a climate resilient region. This happens by developing a joint strategy for adaptation, providing the best possible and consistent basis for decision to the relevant decision makers, by getting the latest and best international knowledge brought into play and also by raising the competence level among authorities, companies and citizens.

The project has obtained approval of 52m DKK from the EU's LIFE IP programme which is a so-called integrated project. The requirement is specifically integration across administrative borders and legislation. The project has a total budget of approx. 90m DKK, and runs 6 years forward until 31st December 2022.



**Figure 1. This matrix illustrates that C2C CC works in the entire water circuit and with three cross-disciplinary themes. The 24 sub projects cover various parts of the matrix which all in all is covered several times by project activities.**

In the project, we work on the entire water circuit and with three cross-disciplinary themes, Innovation, Tools and Governance. The 24 sub projects are implemented by the partners in broader or smaller sub projects.

### **24 sub projects are woven together by common objectives**

The core in Coast to Coast Climate Challenge is the 24 autonomous projects within climate adaptation. The projects are spread in Central Denmark Region and in a few municipalities in the North Denmark Region. The projects are entrenched where the challenges are situated, namely in the municipalities and the utilities.

Each project is levelled at current issues, from local challenges to more overall and recurring themes. In practice, the projects are woven into one another, and to a great extent work as one big network. We collaborate crisscross where knowledge and experiences are shared, and fundamental tasks are solved together.

This wide support contributes to underline an important punch line, climate adaptation is not a task that can be implemented by a single operator and also not once and for all. The climate changes and the consequences are evident. However, no one knows the magnitude or the compiled consequences in the longer run. The adaptation must occur continuously, and it makes joint efforts absolutely crucial.

### **The Increased Values are a Contributory Cause of Decision Making**

Seen in isolation, adapting to a more wet warm and wild weather is expensive. Safeguarding society towards events that statistically happen every 20 years, the event may eventually happen at any time from now on and in 20 year's time. Such an investment may prove difficult to decide upon as you never know when you will get value for money. Often, more challenges can be addressed simultaneously, creating increased values. Thus, decision making for investments is well underway.

In Denmark, there are many fine examples on how increased values have been made in climate adaptation. Very often it is about recreational purposes, more biodiversity and climate adaption that go hand in hand.

I C2C CC, the Climate Road is a new kind of climate adaptation with increased values. The Climate Road is one of the 24 sub projects in C2C CC.

### **The Climate Road – a Road with a lot of Increased Values**

Sustainable draining system, handling of precipitation and geothermal heat – all this is incorporated in 50 metres of Dalbyvej i Hedensted.



**Figure 2. The water quickly disappears down the permeable asphalt of the climate road**

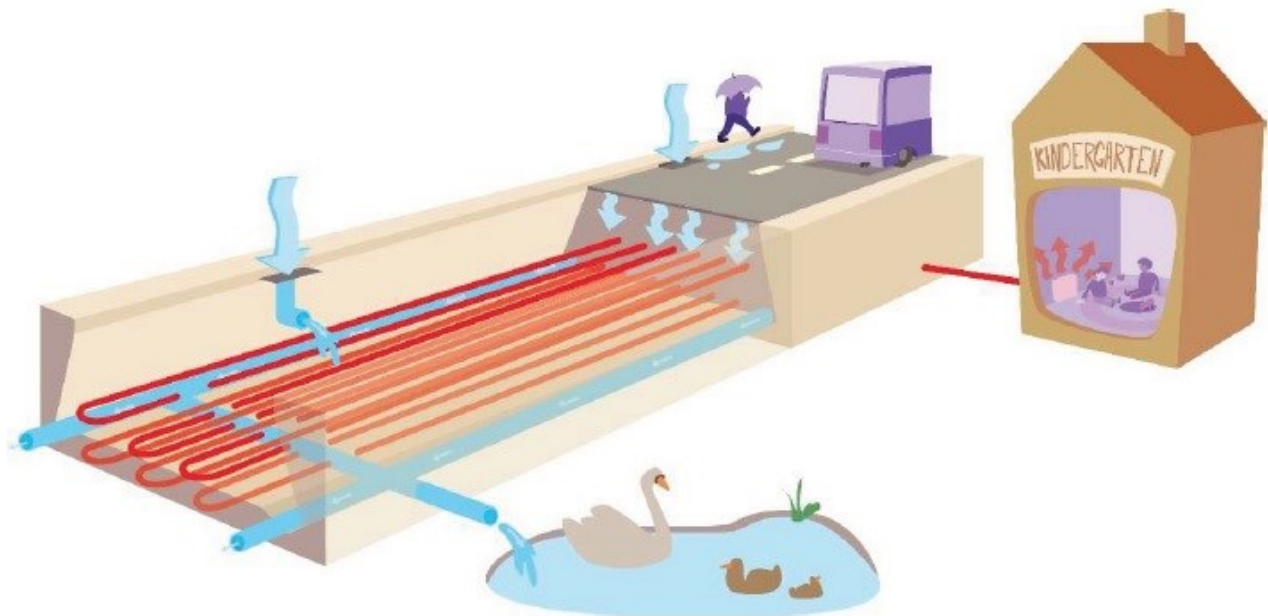
The piece of road looks like any other road. But that impression does not last, because the road has other features than leading traffic forth and back. The asphalt is permeable, meaning that water can penetrate into the road and disappear. There are never puddles on the road, leaving no risk for aqua planning. And this is in spite of the fact that run-off is allowed from the surrounding roads. The piece of road is part of a small network of roads leading surplus surface water to the climate road.

Below the road surface, there is a layer of porous materials which can retain the water without the road losing its load-carrying capacity. All in all the 50 metres of road can contain 120,000 litres of water. The scientists behind the project are involved in the further development of the

road. The intention is to create a sand filter where bacteria and micro organisms can decompose the various undesirable substances which the run-off from the road contains.

In the road, two layers of pipes are laid, in which a cold fluid is pumped around. While the fluid runs, it is heated partly by the rain water that seeps through the road, and partly by the surrounding soil. In combination with a heat pump, the first trials show that the road can generate the majority of the heat which a nearby kindergarten consumes. A climate solution with increased values is created which in addition generates heat, and that in the long term purifies the water both mechanically as well as biologically before it is discharged into the receiving water body.

The road came into being in collaboration between Hedensted Municipality and VIA University College - a unique example of interaction between practitioners in the municipalities, and students and researchers from an institution of higher education. Extra increased values of the climate road are that students are involved in the monitoring and further development of the road, providing them with an education of great interest at the moment and practical experience. They become super applicable on the job market.



**Figure 3. The composition of the climate road**

We find rather important increased values of this solution which is met by great interest at home and abroad. Employment and export potentials are to be harvested. Klimatorium which is another of the 24 sub projects, has taken on the task to impart the project idea which is now well underway to New Zealand.

## **Klimatorium – one of two Exhibition Platforms in C2C CC**

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**Figure 4. Klimatorium – a project visualisation**

In C2C CC we work innovatively and develop a flood of solutions, and provide a lot of important knowledge that others may benefit from. The aim is to get as much knowledge as possible entrenched by others – thus dissemination is a high priority. For that purpose we have two exhibition platforms, the AquaGlobe in Skanderborg and the Klimatorium in Lemvig. In addition to dissemination of the innovative solutions, the two beacons also function as exhibition platforms for the cross-disciplinary collaboration between the involved stakeholders – and will continue as a collaborative platform for the involved participants after the termination of the EU supported project.

Klimatorium is in the making, and the international climate centre will be opened to the public in the summer 2020. However, already now activities are working to a great extent. Klimatorium is a melting pot for the green transition. People gather here to develop and implement the right solutions. It is a real quadruple helix business model implemented in practice – a model for innovation with a focus on the relationship between academia, industry, authorities and citizens.

As mentioned before, the Klimatorium has contributed making the Climate Road known abroad. Another activity to be mentioned is that every year, they make a Climate Challenge event for one week in collaboration with the international student house at Aarhus University. Here students can get inspiration to engage themselves in green transition. Several research projects are run at Klimatorium. Besides generating important new knowledge, the research projects also contribute to the implementation in municipalities and utilities.

Read more

- Klimatorium - <https://www.klimatorium.dk/lemvig/lemvig-klimatorium>
- AquaGlobe - <https://www.aquaglobe.dk/>
- Coast to Coast Climate Challenge - [www.c2ccc.eu](http://www.c2ccc.eu). Here you can also sign up for our newsletter issued every two weeks. In the newsletter you will a.o. find invitations for many of our events.

- At our [StoryMap](#) (link incoreporated) you will get an overview of the sub projects – later, you can book visits (for companies, schools and citizens)

## **Cross-disciplinary Collaboration is Necessary for Climate Adaptation to Succeed**

An efficient climate adaptation is a precondition that society still can perform when conditions change. The adaptation must be part of a long row of very different themes like, construction, development of cities, future farming, health and leisure activities for citizens, nature conservation, creation of new jobs and new business opportunities. Stakeholder involvement is crucial in order to secure the development and implementation of durable and long term solutions.

We are talking about efforts with a great potential, and the parallel to Denmark's green transition is adjacent, a societal request for energy efficiencies and cost savings and also a transfer to green, sustainable energy generated a development in business and society that made us one of the world's leading nations in this field.

Coast to Coast Climate Challenge is a contribution to making public investments in climate adaptation a lever for a comparable development.

### **Author**

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**Figure 5. Dorthe Selmer**