

# Putting the Principles of Climate Change Adaptation into Practice

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After six years of intensive capacity building and knowledge creation, the EU funded Life integrated project Coast to Coast Climate Challenge (C2C CC) is approaching the end, although the journey to develop a resilient region continues.

## Facts

Project ID:	LIFE15 IPC/DK/000006-C2C CC
Subprojects:	24
Partners:	31 partners and 25 supporting actors
Budget:	12 million EUR
LIFE funding:	7 million EUR
Duration:	1 November 2016 to 31 December 2022 (6 years and two months)
Learn more:	<a href="http://www.c2ccc.eu/english/">www.c2ccc.eu/english/</a>

A major achievement of the C2C CC project was the development of a set of rules that will guide the 31 partners' future climate change adaptation efforts. The so-called 'Principles of Climate Change Adaptation' take their point of departure in the ambitious co-operation among the partners within the Central Denmark Region during the six years of the project.

The region, which lies in the central part of Jutland, Denmark, is challenged by rising sea levels at two sides, a landscape characterised by an intricate network of streams and lakes, rising groundwater levels and an increasing number of cloudburst events. Recently, periods of drought and heatwaves that stress food production and human well-being are becoming more recurrent. Thus, the Central Denmark Region can be considered a microcosmos for adaptation initiatives with most water challenges represented.

In 2015–16, the C2C CC partnership was formed by 18 municipalities, eight water utilities, three knowledge institutions, the Central Denmark EU Office, and the Central Denmark Region. The seriousness of the challenges motivated them to demonstrate how holistic and integrated approaches to adaptation could drive innovation and support the development of novel solutions with new potentials for export and trade. Soon, another 25 supporting partners across Denmark endorsed the work, thus boosting the formation of an ambitious partnership for improved climate adaptation in Denmark.

The project's overall purpose was to create climate-resilient cities in a climate-resilient region. From the start, the partnership chose to use holistic solutions to adaptation challenges, working across the whole water cycle, building on cross-cutting collaboration among all relevant stakeholders and working on multiple levels of governance. C2C CC is organised into 24 subprojects, many of which are collaborating across municipal borders.

On a regional level, the project is developing shared tools and innovative solutions to common challenges. Furthermore, the partnership constitutes a strong voice in advocating for systemic regulatory changes to support a resilient governance framework that supports holistic solutions. On a national level and at the EU level, C2C CC has shared its lessons learned to support the development of integrated responses to climate change.

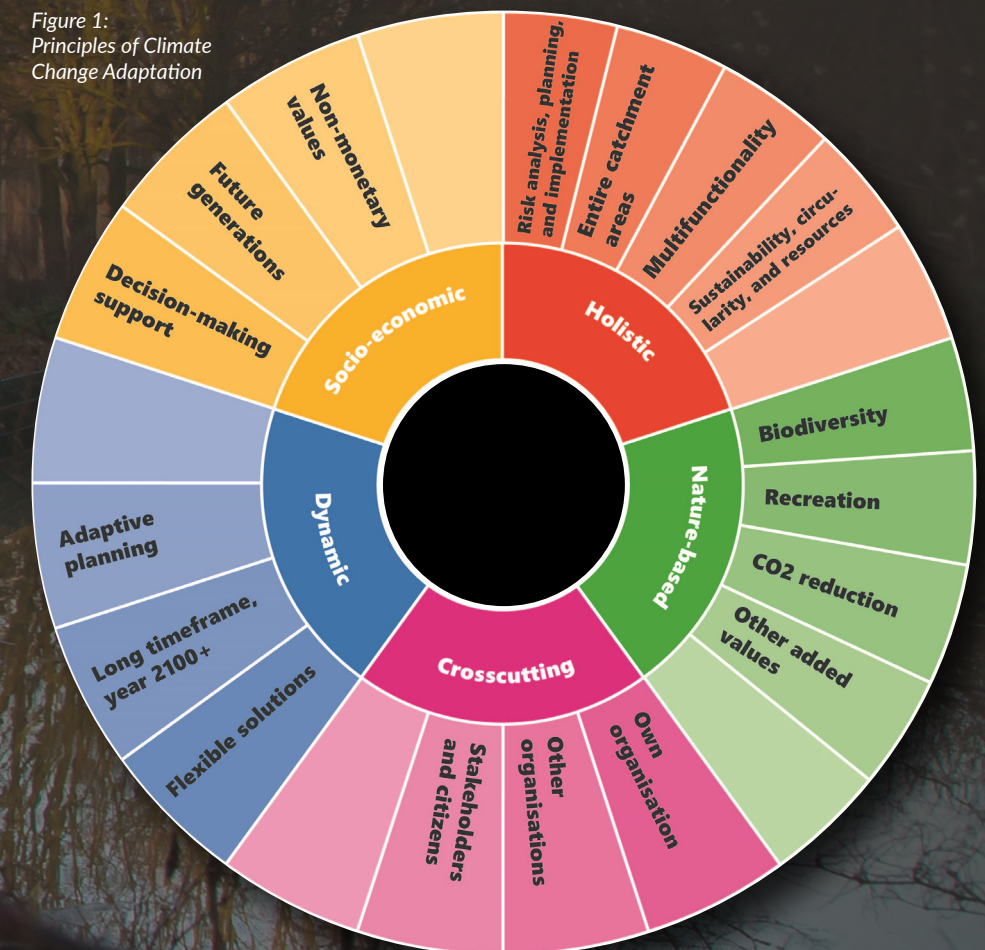
## In search of the guiding principles for future climate change adaptation

Based on the ongoing work of the 24 subprojects, the capacity building and the knowledge creation, the C2C CC partnership started to develop the principles that would guide their future work.

During the six years, the climate agenda has changed: the attention paid to the mitigation of climate change has been significantly strengthened, but the scope needs to be broadened to include adaptation as well. The C2C CC partnership is proposing to combine initiatives to support a multisectoral approach and strengthen the efforts towards a secure and resilient future.

Furthermore, as climate adaptation means protecting communities from the extremes in weather exacerbated by climate change, the C2C CC partnership is proposing that adaptation initiatives are dealt with nationally, regionally and locally because the integrated solutions call for strong collaboration, resolute political determination, large investments and capacity building on all levels to secure resilient implementation.

Figure 1:  
Principles of Climate  
Change Adaptation





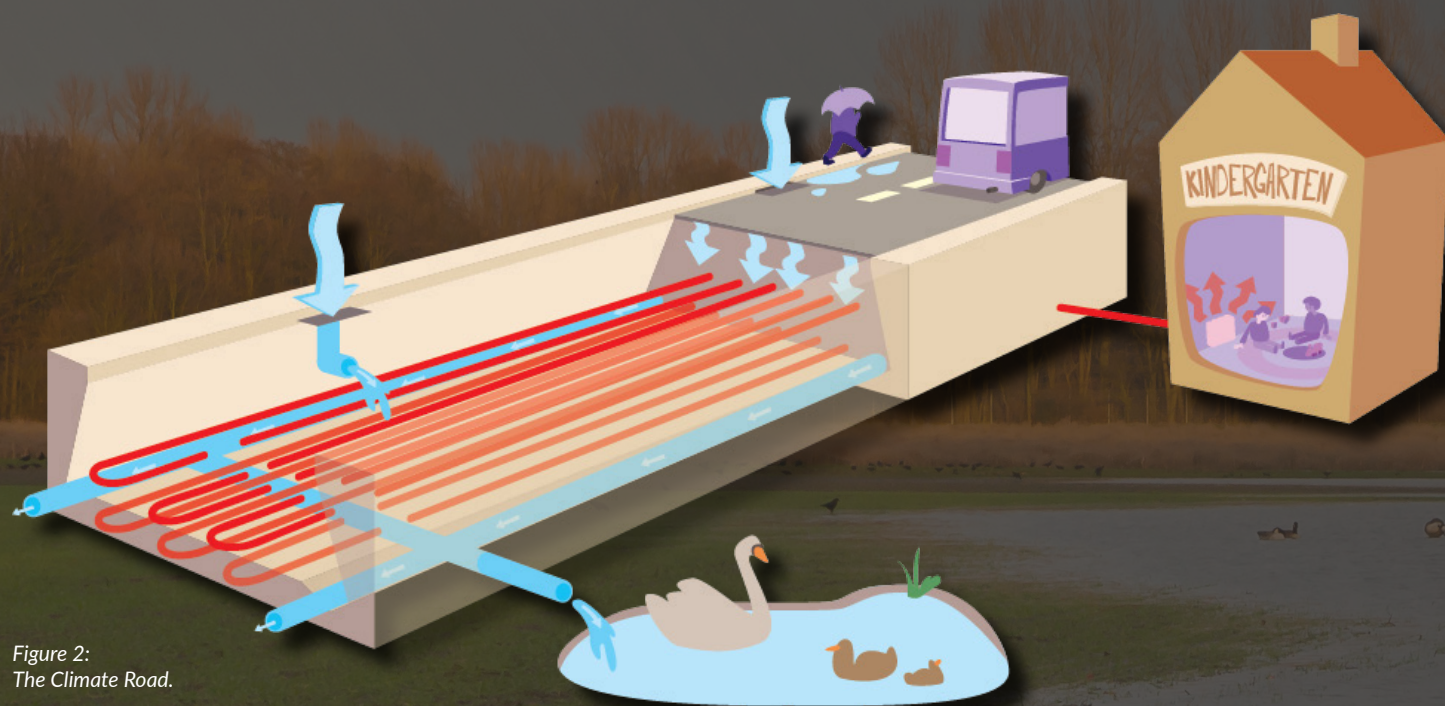


Figure 2:  
The Climate Road.

A coordinated response will require collaboration that disrupts the silos that characterise management today. The C2C CC partnership set out to facilitate a strong network to tackle the complex challenges of climate change by formulating the principles to guide future efforts, stating that climate adaptation must be:

- holistic
- nature-based
- cross-cutting
- dynamic
- socio-economic.

### Climate adaption must be holistic

Strengthening the holistic approach to climate adaptation has been at the core of the C2C CC project from the beginning. Based on the entire water cycle, the majority of the project actions are based on whole catchment areas to find solutions that cross-cut municipal borders and fulfil multiple purposes. This way, the solutions are designed to not only deal with water when it rains but also combine numerous objectives to add value also when it does not rain.

One innovative way to apply the holistic approach is the Climate Road,

where rainwater is seeped through the permeable asphalt surface and used to generate geothermal heat for a local kindergarten. The multipurpose system allows the project to consider water as a resource. Periods of increased rain followed by drought and heatwaves are becoming increasingly frequent, stressing the importance of developing systems to store, clean and reuse water.

"The Climate Road allows us to tie students, teachers and research areas much closer together," says Theis Raaschou Andersen, Head of Research at VIA University College. The full-scale implementation of the road not only links the sectors of mitigation and adaptation but equally provides the students with the opportunity to collaborate closely with the municipality of Hedensted and a local kindergarten. According to Mr Andersen, the strong link between theory and practice also increases the applicability and quality for the students.

A major challenge in securing the sustainability of holistic solutions is maintaining political attention. Whereas technical solutions are already better designed when technicians and experts collaborate across borders and silos, a continued political engagement in promoting holistic, cross-border solutions is lacking.

Figure 3: Action cards from the Climate Game.



C2C CC developed a board game targeted at local politicians and municipal technical officials to raise awareness of adaptation at the political level. The game is based on different flood events, and the scenarios combine urban design with the financing of different solutions with synergies to biodiversity, liveability and CO<sub>2</sub>. A total of 30 local and regional politicians participated in the first event, and now the game is being played in local city councils across the region.

C2C CC outcomes have improved the knowledge base, resulting in the co-creation of technical tools to map flood risks and damages in the region. Taking the point of departure in the knowledge production and the assessment of risks of the project, the next step is to bring the technical knowledge on holistic solutions to the political level.

### Climate adaptation must be nature-based

European cities are primarily made up of closed surfaces, concrete slabs and tarmac roads. And the Central Denmark

Region is no exception to this rule—when it rains, the water runs on the closed surfaces, unable to infiltrate into the ground, and rainwater is collected in pipes and sewer systems to be transported long distances in order to be treated and discharged into streams and lakes. Therefore, a focus of C2C CC has been the benefits of managing rainwater locally by infiltrating the water where it falls. This is generally cheaper than redirecting the water in pipes underground. However, to be successful, the method requires the involvement of the local community in the design and planning phases.

By combining water planning with urban greening, rainwater management can benefit cities and neighbourhoods by improving soil and water quality, biodiversity and overall well-being. However, that means rethinking how to design urban spaces and the materials used. Building with nature means working with natural processes to increase the resilience of an area, for example, by planting trees to reduce risks of erosion. The C2C CC partnership

recognises that a nature-based approach may not be possible in all instances; however, an overall goal can be to take nature as the starting point for solutions and not as a pretty add-on. This can only be done by challenging existing modes of construction and reimagining what a road, a parking lot and a park can do.

### Climate adaptation must be based on cross-cutting collaboration

The DNA of C2C CC is the collaboration across all relevant stakeholders ranging from authorities, universities and companies to interest organisations and citizens. To make a lasting impact, adaptation initiatives must engage stakeholders from different fields and backgrounds. Throughout the project, incorporating perspectives across natural science, technology, social science and humanities has added value and strengthened the durability of project designs.

Collaborative work must be based on a common understanding of a problem in which all parties are invested to find a shared solution. Consequently, the partnership finds that a productive collaboration builds on a shared notion of the issue at stake, a clear division of roles and the building of mutual trust between the stakeholders. The method applied in C2C CC is based on connective negotiation, which seeks to facilitate a common understanding of an issue and to identify the added values in a project.

"The main ambition of the project has been to put climate adaptation on the agenda and build the capacity of the different stakeholders involved. In the municipalities and the water utilities, only one or two employees are usually engaged in the complex field of water management and climate adaptation. The project has become a strong network where experiences and learnings are shared across organisations," highlights Dorthe Selmer, Project Manager of Coast to Coast Climate Challenge.



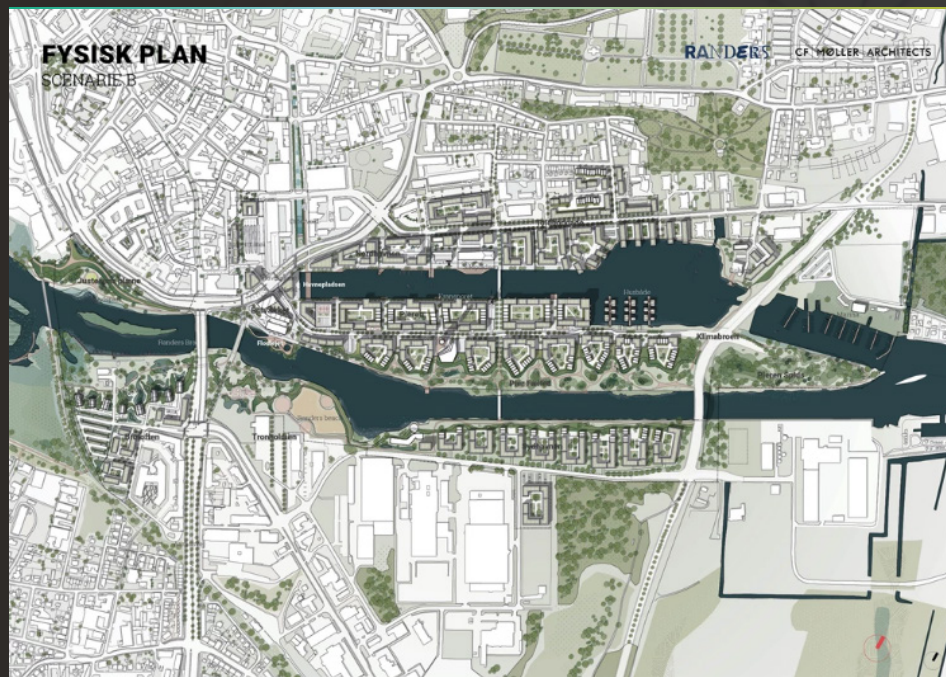


Figure 4: The Climate Ribbon.

Taking the process of multi-stakeholder involvement seriously—horizontally and vertically—has resulted in a continual push, until the end, for integrated solutions to complex challenges.

One of the project actions took place in Hedensted Municipality in a town with a particularly high risk of flooding. The challenge was to devise a plan for the area to deal with the increasing risks of sea level rise. The municipality had prepared three potential plans for the area to discuss with the local inhabitants. During the collaborative process, a fourth plan was developed, which included a broad range of added values from local energy supply and outdoor tourism to the promotion of biodiversity and development of the local area. Based on the inputs from the local community, the municipality initiated a broad collaboration within the municipal organisation to support the holistic local development plan.

### Climate adaptation solutions must be dynamic and scalable over time

The C2C CC partnership discovered that time turned out to be a significant

phenomenon when discussing specific adaptation solutions: the solutions are based on projected climate scenarios, but only the future will tell the impact of climate change. Hence, some investments for adaptation solutions are so large that time considerations must be built into their design.

The projected time frame for climate adaptation in Denmark is often the year 2050 or 2100, although the urban environment designed and constructed today is likely to remain long after. The Climate Ribbon, also a C2C CC subproject, is part of the urban development project, 'Our River City' in Randers Municipality, where the vision is to improve the connection between the city and the river. The project exemplifies dynamic urban planning where scalable solutions can reduce construction costs here and now while extending the lifespan of a facility.

As part of the subproject for the River Gudenå, the longest river in Denmark, the partnership extensively mapped the various stakeholders, who live along the river, and their interests. When asked how climate change had affected the river's landscape, the stakeholders' answers varied widely depending on

their knowledge of history, their familial affiliation and their personal stories. But when asked about the river basin's future and development, the responses were remarkably similar. Miriam Jensen, industrial PhD candidate at Aalborg University, Skanderborg Water Utility, and WSP Consulting, found that when asking about the future of the river, the stakeholders, from farmers to nature organisations, generally agreed on the development. This shows that when seeking common ground among different interests along a river basin, a focus beyond the present can contribute to a shared vision.

### Climate adaptation must incorporate socio-economy and non-monetary values

The non-monetary values of liveability, robust ecosystems and clean air and water are generally not included in current project impacts, as these cannot be measured and weighed to the same extent as assets and services. As a consequence, neither public nor private organisations are able to base their investments on measures other than tangible economic values.

To include non-monetary values in project monitoring and assessments, a socio-economic screening tool, to evaluate damage costs compared to investment costs for heavy rains developed in C2C CC, will be developed further to include the whole water cycle and added values of liveability and biodiversity.

Going forward, the C2C CC partnership wants to take up the challenge of incorporating monitoring and evaluation of ecosystem services, despite its intangible nature. The MAES (Mapping and Assessment of Ecosystems and their Services) initiative is a part of the [EU Biodiversity Strategy](#) and a tool to ensure that ecosystems and their services play a key role in future planning and development processes. The integration of an ecosystem-based approach has not been sufficiently explored in the C2C CC project and requires further attention in the future.

In summary, the C2C CC partnership call for a response to climate change that is holistic and collaborative. That solutions integrate nature's ingenuity alongside a dynamic approach to design and scale. That all levels of government and private organisations allow for equal representation of values beyond the monetary and incorporate an overarching determination to long-term scopes that transcend our lifetime. The C2C CC partners have formulated a joint strategy for the road ahead. The strategy is based on the Principles of Climate Change Adaptation to guide future efforts as well as a portfolio of projects to be initiated and scaled up.

"Having collaborated closely with C2C CC throughout the project period, the National Network for Climate Adaptation is looking forward to inspire our members to develop new initiatives guided by the Principles of Climate Change Adaptation," says Steffen Vestergaard, Head of Secretariat of the [National Network for Climate Adaptation \(DNNK\)](#). The network will promote and disseminate the principles on a national scale.

The work towards a climate-resilient region continues, and herein lies an ambition for a C2C CC vol. 2.0 that will bring together all national stakeholders for joint action on climate change.

Read about the numerous results and lessons learned in the recently published [layman's report for the C2C CC 24 subproject actions](#).

### PROJECT SUMMARY

Coast to Coast Climate Challenge is the first LIFE IP project on climate adaptation. The project aims to create climate-resilient cities in a climate-resilient region. We do this based on the local climate adaptation plans the municipalities made back in 2014. The efforts in the project must be made more coherent and holistic, with added value and long-term sustainability.

### PROJECT PARTNERS

Central Denmark Region is the lead partner. We took the initiative to create the project in co-creation with all the relevant stakeholders. In the project, we are a total of 31 partners, including three universities, 18 municipalities, eight utilities and our Central Denmark EU Office. The project has 25 supporting stakeholders who participate in events, etc., but are not financially involved in the project.

### PROJECT LEAD PROFILE

Dorthe Selmer (Project Manager) is a trained urban planning architect and has worked with strategic development projects at all administrative levels since 1985. Dorthe has held positions from municipal planner, over team leader, office manager and head of administration to municipal director. Dorthe creates sustainable results in equal co-creation processes, where all relevant actors are invited to collaborate.

### PROJECT CONTACTS

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