LIFE Integrated projects 2015

Climate Action

LIFE15 IPC/DK/000006 – EU LIFE IP C2C CC

Part A – B

LIFE 2015	FOR ADMINISTRATION USE ONLY **LIFE15 IPC/**

PROJECT

Project title (*max. 120 characters*): Coast to Coast Climate Challenge
Project acronym (*max. 25 characters*): EU LIFE IP C2C CC
The project will be implemented in the following Country(s) and/or Administrative region(s):
The project takes place in Central Denmark Region (CDR) and North Denmark Region (NDR). Denmark is administratively divided in five regions of which CDR administrates the central part of the Jutland peninsular. The project is a multi-city/regional project as it involves 15 municipalities from the Central Denmark Region (plus 3 signing a Letter of Support) and 3 municipalities from the North Denmark Region. It thus complies with the criterion of covering a large territorial area.

Expected start date: 01/01/2017 Expected end date: 31/12/2022

PROJECT POLICY AREA

You can only tick one of the following options:

Climate Change Adaptation LIFE Integrated Project: Integrated project contributing to the implementation of a transnational, national, regional or local specific adaptation strategy or action plan	☐
Climate Change Mitigation LIFE Integrated Project: Integrated project contributing to the implementation of a transnational, national, regional or industry/sector specific greenhouse gas mitigation strategy, action plan or low carbon economy roadmap	☐
Urban Climate Change Mitigation and/or Adaptation LIFE Integrated Project: Integrated project contributing to the implementation of an urban action plan pioneering the transition to a low carbon and/or climate resilient society	■

The IP will implement the following action plan/strategy/roadmap (*full copy is to be provided if modified since Concept Note submission*):
The below list of plans are the climate change adaptation (CCA) plans of 21 municipalities from the two regions and the 4 Flood Risk Management Plans (derived from the EU Floods Directive) located in Central Denmark Region.
The municipal CCA plans build on the Danish Government's recommendations[1], but vary in practice among municipalities in relation to the level of ambition and level of details. According

[1] http://klimatilpasning.dk/media/670126/klimatilpasningsvejledning_webV2.pdf

to an agreement between the Government and Local Government Denmark (LGDK), CCA plans must contain the following themes: background, risk assessment (flooding and values), general CCA targets, and proposed concrete actions. All plans must be presented for public approval and – later – integrated into spatial planning. All plans are politically approved.
An overview of the content of the plans is given in Figure 1. The themes of the content of the plans shown in Figure 1 is the origin of the structure of C2C CC which was further developed in illustrated in Figure 2. In Denmark, most plans are digitised and do not exist as hard copy. The attached copies (on the CDrom) are thus from pdf. printouts of the digital plans. A few of the plans have been updated with new data after the submission date of the concept note. The below links have been updated.

Climate Change Adaptation Plans from associated beneficiaries in C2C CC:

1. Favrskov Kommune, 2014. *Klimatilpasningsplan.* Favrskov Kommune, 51 pages - http://favrskov.viewer.dkplan.niras.dk/dkplan/dkplan.aspx?pageId=392
2. Hedensted Kommune, 2013. *Kommuneplan 2013, Hovedstruktur.* Hedensted Kommune, 28 pages - http://www.hedensted.dk/borger/natur,-miljoe-og-energi/oversvoemmelser/klimatilpasningshandleplan (CCA plan integrated with the municipal spatial plan)
3. Herning Kommune, 2014. *Klimatilpasningsplan, Tillæg nr. 13 til Herning Kommuneplan 2013-2024.* Herning Kommune, 31 pages - http://kommuneplan.herning.dk/planer-for-hele-kommunen/miljoe-og-klima/klima-og-energi/klimatilpasning (CCA plan integrated with the municipal spatial plan)
4. Holstebro Kommune, 2014. *Klimatilpasningsplan for Holstebro Kommune 2014. Kommuneplantillæg 2009:32*. Teknik og Miljø, 29 pages - http://www.holstebro.dk/Klimatilpasningsplan-9717.aspx
5. Horsens Kommune, 2014. *Kommuneplantillæg 1 – 2013 Klimatilpasningsplan. Vind med vandet.* Horsens Byråd, 89 pages - http://kommuneplan.horsens.dk/download/kommuneplantillaeg/tillaeg_1_klimatilpasning/tilaeg_1_til_kommuneplan_2013_pdf.pdf
6. Lemvig Kommune. 2014. *Klimatilpasningsplan 2014 – 2017.* Lemvig Kommune, 29 pages - http://www.lemvig.dk/Planer-og-projekter/Klimatilpasningsplan.aspx
7. Morsø Kommune, 2013. Klimatilpasningsplan 2013, Morsø Kommune. 35 pages - http://morsoe.viewer.dkplan.niras.dk/DKplan/dkplan.aspx?pageId=343
8. Norddjurs Kommune, 2015. *PLANPORTAL Norddjurs Kommune. Beskrivelse af indsatser i udpegede risikoområder.* Norddjurs Kommune, 23 pages - http://norddjurs-planer.cowi.webhouse.dk/dk/klimatilpasningsplan/klimatilpasningsplan_02.htm
9. Randers Kommune, 2014. *Forslag til Tillæg nr. 6 til kommuneplan 2013.* Randers Kommune, 45 pages - http://sektorplaner.randers.dk/dk/klimatilpasningsplan/klimatilpasningsplan.htm
10. Samsø Kommune, 2013. *Klimatilpasning.* Samsø Kommune, 4 pages - http://planer.samsoe.dk/dk/kommuneplan/redegoerelse_hovedstruktur_og_retningslinjer/miljoe_og_klima/klimatilpasning.htm
11. Silkeborg Kommune, 2014. *Klimatilpasningsplan 2014 for Silkeborg Kommune*. Silkeborg Kommune, 66 pages - http://silkeborgsektorplaner.viewer.dkplan.niras.dk/plan/17#/
12. Skanderborg Kommune, 2014. Klimatilpasningsplan. Kommuneplan 13. 13-09. Skanderborg Kommune, 50 pages - https://www.skanderborg.dk/Borger/Natur-og-miljoe/Klimatilpasning-og-oversvoemmelse.aspx
13. Skive Kommune, 2015. *Klimatilpasningsplan 2014 – 2017.* Skive Kommune, 87 pages - http://skive.viewer.dkplan.niras.dk/DKplan/dkplan.aspx?pageId=1205
14. Struer Kommune, 2015. *Struer Kommune arbejder på Klimatilpasningsplanen, notat.* Struer Kommune, 1 p – http://kommuneplan.struer.dk/webtop/site.aspx?p=20844 (The CCA plan proposal will be politically presented 7th May 2016)
15. Syddjurs Kommune, 2014. *Syddjurs Klimatilpasningsplan 2014. Tillæg nr. 7 til Syddjurs Kommuneplan.* Syddjurs Kommune, 30 pages - http://www.syddjurs.dk/borger/natur-miljoe-og-klima/klima-og-energi/klimatilpasning
16. Thisted Kommune, 2014. Forslag til kommuneplantillæg nr.13. Klimatilpasning. Thisted Kommune, 53 pages - http://www.thisted.dk/OmKommunen/KommuneplanLokalplaner/~/media/OM_KOMMUNEN/KommuneplanLokalplaner/Sektorplaner/Klimatilpasningplan.ashx

17. Vesthimmerland Kommune, 2013. – Klimatilpasningsplan, Handleplan. Vesthimmerland Kommune, 13 pages - http://polweb.nethotel.dk/Produkt/PolWeb/default.asp?p=vesthimmerlands07&page=document&docId=20365&ItemId=20412
18. Viborg Kommune, 2014. *Klimatilpasningsplan Tillæg nr. 19 til Kommuneplan 2013-2025*. Viborg Kommune, 28 pages - http://kommune.viborg.dk/Borger/Natur,-miljoe-og-affald/Klima-og-energi/Klimaplaner/Klimatilpasningsplan

Climate Change Adaptation Plans from supporting municipalities:

19. Ikast-Brande Kommune, 2014. *Klimatilpasningsplan 2013. Tillæg nr. 2 til Ikast-Brande Kommuneplan 2013-2025.* Ikast-Brande Kommune, 56 pages - http://www.ikast-brande.dk/media/6071662/klimatilpasningsplan_2013_endelig.pdf
20. Odder Kommune, 2014. *Klimatilpasningsplan Odder Kommune 2014.* Odder Kommune, 50 pages - http://www.oddernettet.dk/site.aspx?MenuID=141&Langref=75&Area=&topID=&ArticleID=4634&expandID=1374&moduleID=&ParentID=4454&UndersideID=2178
21. Ringkøbing-Skjern Kommune, 2012. *Handleplan 2011-2015 for klimatilpasning.* Ringkøbing-Skjern Kommune, 49 pages – No link

Risk Management Plans:

22. Hedensted Kommune, 2014. *Risikostyringsplan 2015 for Juelsminde*. Hedensted Kommune, 28 pages - http://www.hedensted.dk/politik/offentliggoerelser/risikostyringsplaner
23. Holstebro Kommune, 2014. *Risikostyringsplan 2015-2021 Forslag til offentliggørelse 2015*. Holstebro Kommune, 11 pages - http://www.holstebro.dk/Risikostyringsplan-9718.aspx
24. Norddjurs Kommune, 2014. *Risikostyringsplan.* Norddjurs Kommune, 27 pages - http://norddjurs-planer.cowi.webhouse.dk/dk/risikostyringsplan_for_oversvoemmelse_randers_fjord_-_2015-2021/risikostyringsplan_for_oversvoemmelse_randers_fjord_-_2015-2021.htm
25. Randers Kommune, 2014. *Risikostyringsplan*. Randers Kommune, 71 pages - http://sektorplaner.randers.dk/dk/risikostyringsplan/planen/planen.htm

Climate Change Adaption Plan Municipality	Sea and fjords	Lakes and rivers	Groundwater	Rainwater	Tools	Cooperation
Favrskov		p. 16b	p. 47	p. 18m p. 39b	p. 44b	p. 15t p. 16b
Hedensted	p. 21m p. 23m		p. 22t + m	p. 23b		p. 25b
Herning		p. 22	p. 9t + m p. 20	p. 25n p. 28m		p. 7t p. 22
Holstebro	p. 12	p. 10 p. 14 p. 15 no. 1-9	p. 13	p. 15 no 6	p. 15 no 10-11	p. 16m
Horsens	p. 10m p. 34 P. 35m	p. 35t+b	p. 22t	p. 7m	p. 35t + b	p. 84m
Ikast-Brande		p. 27m	p. 13t+m	p. 13 m p. 14 b		p. 27 b
Lemvig	p. 15m+b		p. 8b		p. 26 m	p. 20t+m p. 26m
Morsø	p. 25, no. 7, 9 + 10	p. 25, no. 8		p. 24, no. 2+3 p. 31b	p. 26m	p. 24, no.1 p. 25, no. 8 p. 29 b p. 31 m
Norddjurs	p. 1-2		p. 3m p. 13b	p. 3-5		in nearly all mentioned projects
Odder	p. 21 p. 40	p. 19	p. 24	p. 18 p. 24		
Randers	p. 13 p. 20-21 p. 24 p. 35-38	p. 14 p. 21 p. 25-28m p. 35-38	p. 18 p. 23 p. 35-38	p. 15-16 p. 22 p. 28m p. 35-38		p. 6b-7t p. 35-38
Ringkøbing-Skjern	p. 20-25 p. 40	p. 20-25 p. 40	p. 20-25	p. 20-25		p. 21, (Skjern Å) p. 45m
Samsø	p. 3m p. 4t		2b	3m-b		
Silkeborg	p. 32m (Gudenåen)		p. 32 (Alderslyst/Gødvad)	p. 32t (Ans) p. 32m (Knudlund) p. 32b (Thaaning)	p. 32t (Alderslyst/Hvinningdal	p. 13
Skanderborg	p. 41		p. 41	p. 30m p. 41	p. 41	p. 32b p. 41
Skive	p. 31b		p. 22	p. 36 p. 39-40	p. 22b p.66	
Struer*						
Syddjurs			p. 24t	p. 12m p. 16, no 2-3	(p. 24t)	p. 5b p. 7
Thisted			p. 32-33	p. 30b		
Vesthimmerland	p. 12, no 2-6			p. 12, no 1 (Halkær Å + Aars By)		
Viborg	p. 22m p. 23m		p. 23b-p. 24	p. 23m	p. 23m	

***Note:** The municipality of Struer has not yet any CCA-plan. Their main target is the challenges from Sea and Fjords.

Risk Management Plan	Sea and fjords	Lakes and rivers	Groundwater	Rainwater	Tools	Cooperation
Hedensted	p. 9 p. 16-17					p. 26t
Holstebro	p. 2-4					p. 2m
Norddjurs	p. 21-22					
Randers	p. 68-71			p. 68-71		p. 65-66

t – top (or left, when there are three columns)
m – middle
b – bottom (or right, when there are three columns)
no – number

Figure 1: Overview of the content of the municipal CCA plans.

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BENEFICIARIES

Name of the **coordinating** beneficiary (1): Central Denmark Region (CDR)

Name of the associated beneficiary (2): Favrskov Kommune (FK)

Name of the associated beneficiary (3): Hedensted Kommune (HEDKOM)

Name of the associated beneficiary (4): Herning Kommune (HK)

Name of the associated beneficiary (5): Holstebro Kommune (HbK)

Name of the associated beneficiary (6): Horsens Kommune (Horsens)

Name of the associated beneficiary (7): Lemvig Kommune (LK)

Name of the associated beneficiary (8): Lemvig Vand & Spildevand A/S (LVS)

Name of the associated beneficiary (9): Morsø Forsyning A/S (MF)

Name of the associated beneficiary (10): Morsø Kommune (MK)

Name of the associated beneficiary (11): Norddjurs Kommune (NDK)

Name of the associated beneficiary (12): Randers Kommune (RK)

Name of the associated beneficiary (13): Samsø Kommune (SAK)

Name of the associated beneficiary (14): Silkeborg Kommune (SIK)

Name of the associated beneficiary (15): Skanderborg Forsyningsvirksomhed A/S (SFV)

Name of the associated beneficiary (16): Skanderborg Kommune (SK-KOM)

Name of the associated beneficiary (17): Skive Kommune (SKK)

Name of the associated beneficiary (18): Skive Vand A/S (SKV)

Name of the associated beneficiary (19): Struer Forsyning Spildevand A/S (STF)

Name of the associated beneficiary (20): Struer Kommune (STK)

Name of the associated beneficiary (21): Syddjurs Kommune (SDK)

Name of the associated beneficiary (22): Thisted Kommune (TK)

Name of the associated beneficiary (23): Thisted spildevand transport A/S (TV)

Name of the associated beneficiary (24): Vestforsyning Erhverv A/S (VESTF)

Name of the associated beneficiary (25): Vesthimmerlands commune (VHK)

Name of the associated beneficiary (26): Vesthimmerlands Vand A/S (VV)

Name of the associated beneficiary (27): Via University College (VIA)

Name of the associated beneficiary (28): Viborg Kommune (VK)

Name of the associated beneficiary (29): Aalborg Universitet (AAU)

Name of the associated beneficiary (30): Aarhus Universitet (AU)

Name of the associated beneficiary (31): Central Denmark EU Office (CDEU)

PROJECT BUDGET AND REQUESTED EC FUNDING	
Total integrated project budget:	11,690,148€
Total LIFE eligible project budget:	11,683,156€
EC LIFE financial contribution requested:	7,009,893€ (= 60 % of total eligible budget)

Coordinating Beneficiary Profile Information					
Short Name	CDR			**Beneficiary n°**	1
Legal information on the Coordinating Beneficiary					
Legal Name	Central Denmark Region		**Legal Status**		
VAT No	29190925		**Public body**	X	
Legal Registration No	29190925		**Private commercial**		
Registration Date	01/01/2007		**Private non- commercial**		
PIC No.	**997381452**		**VAT reimbursement**	Y	N
Legal address of the Coordinating Beneficiary					
Street Name and No	Central Denmark Region Emil Møllers Gade 41		**PO Box**	N/A	
Post Code	8700	**Town/City**	Horsens		
Country Code	DK	**Country Name**	Denmark		
Coordinating Beneficiary contact person information					
Function	Chief Consultant				
Surname	Johnsen		**First Name**	Rolf	
E-mail address	rolf.johnsen@ru.rm.dk				
Department / Service	Regional Development/Regional Udvikling				
Street Name and No	Skottenborg 26		**PO Box**	N/A	
Post Code	8800	**Town/City**	Viborg		
Country	Denmark				
Telephone No	T: +45 78411944 M: +45 29620830	**Fax No**	+45 78410001		
Coordinating Beneficiary details					
Website	www.rm.dk and specific for climate change adaptation: http://www.rm.dk/regional-udvikling/klimatilpasning/				

Brief description of the Coordinating Beneficiary's activities and experience in the area of the proposal

CDR is the 2nd largest regional administrative unit in Denmark covering 19 municipalities, of which 15 are associated beneficiaries in the C2C CC project. Besides health care, CDR ensures and coordinates regional development within nature, environment, business and tourism. CDR is the authority and has particular professional expertise in the field of soil pollution, but is not an authority as such on CCA vis-a-vis the municipalities.

Since 2007, CDR has increasingly cooperated with the municipalities on CCA and water related issues. In a process of co-creation, cooperation has focused on providing data on flood risks, debating CCA plans, and ensuring good business development based on the market pull effect of the water sector in particular and the public sector in general. Thus, CDR has already created a strong link with water authorities and businesses. To strengthen business development and innovation within the water sector, CDR adopted 'Challenge:Water' in 2012 supported by ERDF. In order to export Danish water solutions, the Danish Water Technology House was inaugurated in Singapore.

Apart from its active engagement in the FINNOWATER action group within the EIP on Water, CDR has a long experience with managing EU development projects within the water and CCA sector. To mention a few supported by ERDF InterReg IVB NSR: CLIWAT, WaterCAP, WaterCAP-Taskforce, WaterCAP-Communication Hub – and lately - TOPSOIL and WaterCOG. CDR is also the coordinator of a large ELENA project on energy savings in cooperation with 11 municipalities (CeDEPI).

As concerns the Life programme, within environment and groundwater protection, the CDR has carried out the NorthPestClean project as an innovative way of combating contamination, which is part of CDR responsibility.

As of now, the consortium of the C2C CC project includes the following stakeholders having signed Letters of Intent (LoI): municipalities, river basin cooperation fora, national agencies, academia, companies, the Danish Confederation of Industry, and water utilities.

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LIFE Integrated projects 2015

Climate Action

Stage 2 – FULL PROPOSAL

Technical application forms

Part B – technical summary and overall context of the project

SUMMARY DESCRIPTION OF THE PROJECT

1. Overall context/background/geographical scope

Coast to Coast Climate Challenge (C2C CC) supports the implementation of 21 municipal climate change adaptation (CCA) plans (18 associated beneficiaries plus 3 primary stakeholders) and 4 risk management plans under the flood directive in the Central Denmark Region (CDR). It provides decision-makers with a framework for sustainable and integrative climate change adaptation (CCA) planning, mainstreams CCA into local planning and integrates other policy areas. Concrete actions cover capacity-building within all themes in the hydrological cycle, improve multi-level management structures, and carry a total of 24 concrete implementation actions. The CCA plans deal with cities as well as the countryside and coastlines, and include solutions in the hinterlands to prevent flooding in the cities.

Costs of inactions are substantial – on a European level[2] as well as in Denmark[3]. Consequently, the national government made it mandatory in 2013 for municipalities to prepare CCA plans. It also encouraged that the CCA action plans be integrated into the municipal spatial planning covering all spatial areas including cities and countryside, simultaneously complying with the EU Water Framework Directive and the Floods Directive. To date, the CCA plans have been adopted but implementation of actions are yet to be initiated. The C2C CC project will provide a comprehensive base for this implementation, evaluate the results and the process as well as give local authorities the tools for better integrated planning, taking into account the uncertainties of future climate change.

CCA in the region generally deals with challenges related to managing more water[4], touching upon all aspects of the hydrological cycle: sea and fjords, rivers and lakes, groundwater and rainwater. Rainwater is an issue for the whole region due to an increase in the amount and intensity of rain and cloudbursts. In the western part, the interconnectivity of the elements of the hydrological cycle means that more precipitation causes rising groundwater table and intrusion into houses. Cloudbursts cause flashfloods in many cities, and the increase in rainwater and more incidents with heavy rains cause watercourse floods and damages on infrastructure and urban areas. In the coastal areas, storm surges are increasing causing floods in the cities at the Limfjord in the north and on the east coast. When future storm surges occur simultaneously with heavy rain, most notably cities, but also other areas along the river banks, are in high risk of severe flooding.

On an administrative level, Denmark has implemented a municipal structural reform in 2007 and a company formation of the wastewater utility sector in 2009. 271 small municipalities were merged into 98 larger municipalities, and 14 counties merged into five regions having no legal responsibilities for water and spatial planning[5,6]. Alongside, new CCA regulations require that the municipalities prepare individual CCA action plans in relation to the

[2] European Environment Agency (EEA), 2015, EEA Signals 2015: Living in a changing climate. EEA.

[3] Danish Meteorological Institute (DMI), 2014, Fremtidige klimaforandringer i Danmark – Danmarks klimacenter rapport nr. 6 2014. Klima-, Energi- og Bygningsministeriet.

[4] DMI (2014) finds that: observed precipitation has increased the latest 150 years with 100 mm, and is expected to further increase with 4,6-6,1 % in year 2100; observed sea level rise since year 1900 has increased 1,7-2,2 mm/year, and is expected to further increase with 0,34-0,61 m.

[5] Ministry of the Interior and Health, 2006, *The Local Government Reform: In Brief.* Ministry of the Interior and Health, CPH

[6] Andersen H T, 2008, "The emerging Danish Government reform – centralised decentralisation", *Urban Research and Practice,* 1(1) 3-17.

municipal spatial plans leaving coordination of CCA across administrative borders in an 'institutional void'. As a result, these reforms have decentralized and increased the fragmentation of authorities hampering integrative CCA planning and coordination between local authorities. Since 2007, CDR has aimed at filling this institutional void by initiating and facilitating climate change measures and projects on a voluntary basis, e.g. CCA network-building activities creating a forum for knowledge sharing, collaboration and capacity building. Wastewater utilities and industries have supported collaboration and development of new holistic solutions to benefit the society and new clean-tech businesses. Municipalities within the region have welcomed and supported these CDR initiatives – in many ways preparing local stakeholders to engage in future CCA[7].

1.1. Present gaps or shortcomings that hinder effective implementation

CCA is cross-sectoral in nature and demands new forms of governance involving citizens at the local level as well as the national government. One major shortcoming hindering effective implementation of the CCA plans relates to the structural reform and the company formation of the water utilities. Since 2007, no single governmental body has the responsibility to coordinate CCA among the municipalities, increasing the risk of suboptimal solutions (e.g. one municipality leading water downstream with eventual damage to others). In addition, the company formation of the wastewater utilities has entailed that CCA in practice is regarded as a wastewater issue to be solved traditionally by gray infrastructure such as sewer pipes and basins. The synergies of green infrastructure, e.g. biodiversity and urban livability, are often not taken into account, as it increases the potential costs in areas outside the responsibilities of the utilities. The Danish government has tried to accommodate the use of e.g. Sustainable Urban Drainage System (SUDS) by making amendments to the water sector law. Amendments, that evaluated by Deloitte[8], do not fully meet the needs.

Another shortcoming is a lack of knowledge, knowledge sharing and capacity building on commonly shared issues and solutions among local authorities. The region possesses many water clean-tech companies (55 of 219 in Denmark[9]), but due to a lack of coordination, the presence of the newest knowledge and best available technologies (BAT) is not utilized. According to the Confederation of Danish Industry (DI), Danish BAT within water could double by 2025 compared to the present level. There is thus an unused potential for capacity building and innovation within the region among the municipalities, the utilities, water companies and research institutions.

A third gap is the difference in level of ambition and implementation between the prosperous and less prosperous municipalities within the region. The less prosperous, especially in the western part of the region, lack the resources and the capacity to carry out the necessary analyses and implement the CCA plans. In some instances, this gap reflects insufficient political and societal awareness in the municipalities – a gap which proves unjustified and therefore leaves the municipalities unprepared when a major, sudden, and unpredictable flood occurs. These municipalities will not only benefit economically, but also highly in terms of experience sharing from the C2C CC.

C2C CC will help overcome these shortcomings by providing decision-makers and local

[7] Documented in several publications at CDR Webpage: http://www.rm.dk/regional-udvikling/klimatilpasning/publikationer/
[8] Deloitte, 2013, "Evaluering af Vandsektorloven" LETT, DHI. (in Danish).
[9] Corresponding to 27%, and is only surpassed by the Capital Region with 35% of the water companies. The water companies within the region export 68% and has the highest share of the water clean-tech production in Denmark. Sourse: Brøndum and Fliess, 2013, "Kortlægning af vand i Region Midtjylland" (in Danish).

communities with multi-level and public-private cooperation forums, tools, shared capacities to implement their CCA plans and further develop their work on CCA. Furthermore, a number of concrete actions and demonstration projects will provide municipalities with best practice examples, synergies and data for further development, increasing the number of cities making use of integrated CCA planning.

1.2. Why the proposal falls under the IP definition

This proposal falls under the IP definition, as it implements CCA plans on a large territorial scale using a multi-city approach. The Central Denmark Region covers 13,142 km^2, of which about 10% is vulnerable to cloudbursts, has 1.000 km coastline, and 1.282.750 inhabitants. More than 50% live in cities larger than 10.000 inhabitants – with the eastern part of the region experiencing rapid urbanisation[10]. The three municipalities from the North Denmark Region cover 2,213 km^2, has 491 km of coastline, and 103,839 inhabitants.

The proposal deals with CCA projects laid out in the municipal CCA action plans required by the Danish government while at the same time including other EU (legislative) objectives. Designed to last longer than traditional projects, C2C CC consists of several actions, some developed more than others; some ripe to be implemented during a first phase, others at later stages. The experiences and results from these early actions will feed into later ones, making C2C CC a truly adaptive project.

C2C CC project consists of the following 3 phases:

- Phase 1: 2017-2018
- Pahse 2 and beyond: 2019-2022 (Phase 2: 2019-2020, Phase 3: 2021-2022 and beyond)

The C2C CC fulfills the following European Union legislation:

- The 'Life Regulation'[11] and An EU Strategy on adaptation to climate change[12] since it directly deals with extreme weather conditions leading to floods and rising sea levels, helping the cities, the municipalities, and the region to become more resilient. The CCA plans cover cities, their surroundings, as well as rivers, vulnerable coastal areas, etc. in an integrated, coordinated way.
- The Floods Directive[13]: Three cities appointed to be risk-prone areas and their local communities participate in C2C CC, creating more resilience in the cities and the region.
- The Water Framework Directive[14]: The CCA plans are by the law required to comply with the Directive and encouraged to use synergies with CCA to improve water ecology e.g. through establishment of wetlands.
- The overall objective of the Marine Strategy Framework Directive[15]: The C2C CC project revolves around the hydrological cycle and thus higher quality inland water will discharge in to the seas creating a positive effect on the marine environment, thereby

[10] 80.000 citizens are expected to move to the eastern part of Jutland within the coming 10 years
[11] REGULATION (EU) No 1293/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2013 on the establishment of a Programme for the Environment and Climate Action (LIFE) and repealing Regulation (EC) No 614/2007
[12] COM(2013), 216 of 16/4/2013. An EU Strategy on adaptation to climate change.
[13] DIRECTIVE 2007/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2007 on the assessment and management of flood risks
[14] DIRECTIVE 2000/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2000 establishing a framework for Community action in the field of water policy
[15] DIRECTIVE 2008/56/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)

ensuring clean, healthy and productive seas in order to protect the ecosystems[16].

- The targets of the EU Biodiversity Strategy and the EU Habitats Directive[17]: Biodiversity is an issue in a number of CCA cases, primarily when dealing with fjords, rivers and lakes and providing species with better living conditions through green infrastructure[18] and nature-based solutions[19], and increasingly when carrying out SUDS in cities, enhancing urban liveability.
- C2C CC also integrates and furthers a number of supplementary objectives: Business development, as it is firmly anchored within a strong regional emphasis on business development and public-private cooperation in general and in the water sector. It also promotes the development of sustainable and high-quality coastal, nature and business tourism[20].

1.3. Similar brief information on the complementary actions

By nature, complementary actions fall under Life IP, as they reflect the complexity of the Life IP, support all themes of C2C CC actions, and will be coordinated by the C2C CC consortium. The future complementary projects are adaptive by the IP generated knowledge and raised awareness, and many will continue after the IP finishes. Complementary actions are, first and foremost, construction works financed by local authorities, wastewater utilities, as well as private funds; second, research projects and developing training material support; third, EU interregional projects.

2. Project objectives:

The overall objective of C2C CC is: *To create climate resilient cities in a climate resilient region through the formulation of a common long-term strategy among local stakeholders, implementing in a targeted way the local CCA plans, coordinating the CCA analyses and activities, and identifying and improving the resources and adaptive capacities of citizens, municipalities, utilities and companies within the water sector.*

The objective covers the IP itself, complimentary projects and projects initiated after the IP. It is based on the concept of resilience, which deals with both ecological and social resilience. Vulnerability and adaptive capacity are important elements in the concept of resilience[21]. Vulnerability may weaken both the ecological and social systems' ability to respond to change, and adaptive capacity is the systems' ability to cope with change. Within adaptive capacity lies an understanding of resilience as a process, where capacity to cope with change can be developed and strengthened, and where change can be used as a possibility to innovate.

C2C CC approaches the CCA plans as a cross-boundary challenge where coordination, knowledge sharing and capacity-building are necessary for improved governance and development of tools and innovation. The IP consists of four themes related to the hydrological cycle: sea and fjords, rivers, groundwater and rainwater. These are

[16] European Commission (EC), 2011, Seas for life, pages 1-32, p. 12.
[17] THE COUNCIL OF THE EUROPEAN COMMUNITIES (1992), Council Directive 92/43/EEC of 21 May 1992. The conservation of natural habitats and of wild fauna and flora
[18] COM(2013), 249 of 6/5/2013. Green Infrastructure (GI) — Enhancing Europe's Natural Capital
[19] EC (2015). Nature-based solutions. Defining Nature-Based Solutions. DG Research & Innovation. Web: https://ec.europa.eu/research/environment/index_en.cfm?pg=nature-based-solutions
[20] COM(2010), 352 of 30/6/2010. The world's No 1 tourist destination – a new political framework for tourism in Europe
[21] Folke, C. 2006. Resilience: the emergence of a perspective for social-ecological systems analyses. *Global Environmental Change,* 16: 253-67.

supplemented with three crosscutting themes: governance, tools, and innovation cf. Figure 2.

As this IP deals equally with the hydrological cycle as a whole and with the coordination of activities within an integrative CCA planning approach, the following objectives are of equal importance. The objectives of the hydrological cycle related to the challenges documented in the CCA plans are:

- *Sea and fjords:* To increase coastal resilience taking into consideration the environmental state and marine biodiversity and to enhance urban resilience.
- *Rivers:* To increase the resilience of land alongside river banks taking into consideration the environmental state and biodiversity and to enhance urban resilience.
- *Groundwater:* To increase resilience towards rising near-surface groundwater optimizing the use of surplus groundwater.
- *Rainwater:* To increase urban resilience taking into consideration the synergies with green infrastructure and urban livability.
- *Governance:* To increase the resilience through capacity-building, strengthened network governance and cross-border coordinated planning.
- *Tools:* To increase resilience through enhanced decision-making processes.
- *Innovation:* To increase resilience by generating jobs and green investments.

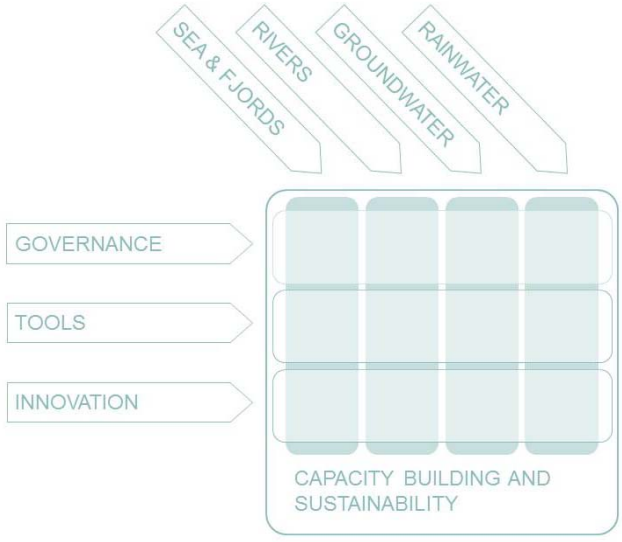


Figure 2: The 7 cross-cutting themes of C2C CC.

2.1. Similar brief information on the complementary actions

Complementary actions are designed to support core activities of the Life IP project, in some cases reflecting, continuing, and integrating prior commitment of the region to water-related issues, in some cases expanding on activities within future phases of the C2C CC project. The complementary actions thus support the objectives of the IP itself.

3. Actions and means involved:

The background of the C2C CC actions has its origin in the CCA plans, where an initial review highlighted challenges and actions across the hydrological cycle and an expressed need of cooperation with other municipalities, utilities, citizen, experts etc. cf. Figure 1. The IP design is a result hereof with its seven thematic focus areas cf. Figure 2.

The C2C CC actions come under three overall categories:

1. 5 preparatory action (A1-A5)
2. 7 thematic crosscutting capacity building actions (C1-C7) and 17 demonstration actions (C8-C24)
3. 4 monitoring actions (D1-D4), 6 dissemination actions (E1-E6) and 2 project management actions (F1-F2)

The preparatory actions identify and clarify legal as well as practical barriers for integrated CCA as a state-of-the-art with the purpose to aid the municipalities and utilities in navigating current legislation and practice. Furthermore, dialogue with national authorities about the barriers and possible solutions will be initiated.

The initial purpose of the 7 thematic capacity building actions was to create activities that supports integrative planning and coordination across the municipal borders and to benefit from the large expertise of gathering CCA professionals in one project. C1-C7 thus provide specific activities related to technical challenges related to sea and fjords (C1), rivers (C2), groundwater (C3) and rainwater (C4). The activities include workshops, seminars and courses where technical questions are discussed, experiences are exchanged and experts are brought in to contribute with defining possible solutions. Several of these activities will support neighboring municipalities with context specific knowledge related to a coordinating effort on the implementation of their CCA plans e.g. between the municipalities bordering the River Gudenå (C12), and other activities will ensure that knowledge-sharing occur across the demonstration actions e.g. that experiences of the SUDS action on Samsø Island (C19) also benefit in for example Horsens (C14). Furthermore, desk studies and two study trips bring in international experiences.

The three non-technical crosscutting capacity building actions (C5-C7) are established to further support implementation of the CCA plans. C5 deals with governance and strives for building capacity among the partners in integrative planning with many stakeholders and with competences to act as a local authority in network governance. This action involves courses, workshops, and an explicit use of the Advisory Committee's experts in network governance and planning processes. C5 produces a common CCA strategy for the region as a whole and after the end of the IP. Action C6 brings three tools already expressed needed by the C2C CC partners, these are a high-resolution groundwater model, a 3D flood visualization tool and a warning system. The two first tools are developed in Phase 1 to be applied in C8-C24. The last thematic action C7 has the aim to involve the water businesses of the region in the actual CCA challenges and needs of the local authorities and to catalyze innovation. This action involves networking and knowledge-sharing between water businesses and officials, and to support water businesses in regard to funding opportunities and training.

The 7 thematic crosscutting capacity building actions are demonstrated in the 17 demonstration actions C8-C24 that are run and managed by the C2C CC partners. Each of the 17 actions involve more than one of the 7 thematic actions and illustrates nicely the complexity of water running naturally as one hydrological system, but are administratively divided into sectors. These actions are of mainly best practice and demonstration character, and two actions involve pilot projects (C13 and C22). 12 of the actions are geographically located and deal with context specific CCA challenges, whereas 6 (C8-C13) are focused on the open land, and 6 (C14-C19) mainly are focused on urban areas. 5 actions are cross-geographical actions, where C20 and C21 are two innovation hubs

focused on water businesses, tourism and awareness rising. C22-C24 are research based, where C22 and C23 include pilot testing and tool development, and C24 contributes with historical and anthropological knowledge on the region's climate history.

3.1 Complementary actions

1. *"WaterCoG":* A project around the North Sea involving eight beneficiaries from DK, NL, SE and UK. The focus is on improved water governance in the private and public sector and includes pilots in the region. Testing and demonstrating new management tools. The WaterCoG and C2C CC will have strong synergies in relation to water management, planning and stakeholder involvement. Complements C5. [Funded by InterregVB].
2. *Citizen awareness:* Outreach and communication to strengthen citizens' awareness to act on climate change. In cooperation with researchers, teaching staff and children. Complements C5. [Funded by Regional Development Funds 10/11-2015].
3. *"TOPSOIL":* Focusing on issues related to rising groundwater levels and related climate change implications. Includes beneficiaries from DK, DE, NL, BE and UK and will add European aspects on groundwater to C2C CC. Complements C3. [Funded by InterregVB].
4. *Watercourse restauration:* Actual restauration of watercourses supplementing C2C CC by retaining water flow upstream and improving biodiversity. Complements C2. [Funded by the Danish AgriFish Agency under the EAFRD 2014-2020]
5. *Municipal and Water Utility CCA projects:* the municipalities and the region are to mobilize and invest at least 16 mill. € on CCA projects[22] within the project period. Likewise, the Danish utilities are to spend app. 135 mill. €[23] annually on climate investments[24] over the next 25 years. C2C CC will contribute with added value and influence the municipal CCA plans and waste water plans and the utilities' future construction projects. Complements C4. [Financed through taxes and water fees].
6. *CCA in coastal urban areas:* Urban development and construction project on CCA of an urban area facing the sea. Complements C1 [Funded by Realdania].
7. *City Innovation – Water and sustainable buildings*: Integrating environmental and societal challenges into business opportunities in emerging city markets for water management and water supply solutions. Complements C7. [To be funded by ERDF via Growth Forum CDR].

4. Expected results (main outputs and achievements, qualitative and quantitative):

4.1. Expected results linked to actions financed by LIFE

Preparatory actions: Identification of major barriers for implementation of CCA plans especially with regards to municipalities', wastewater utilities' and citizens' rights and obligations (A1, A4). Best practice knowledge on cross-sector cooperation and network/cluster formation, which is presented at a seminar in the first year (A2). A database, showing the information obtained from desk research and interviews (A3). Established good dialogue with relevant Danish public authorities (A5).

[22] Based on: 19 municipalities and 1 regional authority each spending approximately 135,000 EUR per year in 6 years.
[23] Approximately 27 mill. EUR per regional authority per year.
[24] Danish Association of Water Companies (DANVA) (2015). "Dansk Vand Magasin #3 juni 2015", DANVA. p. 32-34. (in Danish).

Concrete actions:

C1 (Sea and fjords) and related demonstration actions: At least 100 officials attended capacity building on coastal protection incl. combined events between rainfall and storm surge. At least 25 stakeholders attend a study trip to Germany and the Netherlands on solutions on coastal challenges. Establishment of a network on coastal CCA challenges to be continued after LIFE. Common tenders to ensure integrative solutions for neighboring municipalities. Examples from C8-C24: Climate history of CDR (C24), CCA of 400 km^2 flood prone coastal areas from 100 year event in 2050 (C9, C17, C11 and C18).

C2 (Rivers and lakes) and related demonstration actions: 1 tool (synergy with C6), a total of 250 C2C CC partners and stakeholders attended capacity building activities related to CCA of rivers. In addition 120 stakeholders attend workshop on integrative modelling of river catchments. 3 business models for incorporating city safety and compensation of farmers used by 15 municipalities, 1 ICT company have developed a warning system (synergy with C7) and at least 5 municipalities applied for wetland projects as mean for CCA. Examples from C8-C24: CCA carried out in regard to urban planning (C14, C16).

C3 (Groundwater) and related demonstration actions: 1 tool (synergy with C6), at least 50 C2C CC partners and stakeholders attend capacity building on CCA challenges related to rising groundwater levels incl. feedback on user needs for tool development (Action C6.1) and training in using the tool. At least 30 attend a study trip to learn about BAT on use of excess water from European experiences. Examples from C8-C24: 1 pilot project on methodology for infiltration potential to be used by all C2C CC partners (C22).

C4 (Rainwater) and related demonstration actions: At least 255 C2C CC partners and stakeholders attend capacity building workshops on CCA challenges related to urban areas, sustainable urban drainage systems (SUDS) and citizen involvement. Capacity building of businesses related to SUDS with at least 100 professionals. Examples from C8-C24: 1 pilot project on permeable coating (C23), SUDS as an added value means (C19), and added value related to citizen involvement (C18).

C5 (Governance) and related demonstration actions: At least 200 stakeholders and partners enrolled in C2C CC workshops on capacity building of integrative planning and multi-stakeholder management, at least 15 partners contributed to formulation of the common regional CCA strategy. A total of 560 participated in C2C CC workshops. At least 150 have attended the C2C CC courses. At least 300 participants from C8-C24 are enrolled with the Advisory Committee. Examples from C8-C24: Network governance and integrative planning of large catchments; the Limfjord (C9), River Grenaa (C10) and River Gudenaa (C12).

C6 (Tools) and related demonstration actions: 2 tools developed, 1 hydrological model on groundwater that combine surface water with rising groundwater level, 1 3D model on flooding from combined flood events between rainwater, rivers and sea. At least 2 municipalities have applied the groundwater model, and at least 15 municipalities have applied the 3D model. Best practice is investigated on warning systems. Examples from C8-C24: More integrated hydrological modelling in 9 out of the 16 actions (C8, C10, C11, C12, C14, C15, C17, C18, C19).

C7 (Innovation) and related demonstration actions: 6 triple helix workshops on real CCA challenges, best practice and innovation. At least 10 water companies advised on EU

funding possibilities, at least 6 applications for EU funding. Training of 10 start-up companies on business development within ecosystem services. Increase of export of BAT on water by at least 25% by 2022 in Central Denmark Region. Examples from C8-C24: 2 innovation hubs on freshwater and seawater (C20, C21), flexible sewer pipes (C17), and 1 warning system (C2).

Furthermore, dissemination to a total of at least 1150 attendees through 3 C2C CC conferences and 1 international conference ENCORE.

4.2. Expected results linked to complementary actions (short and long term)

WaterCoG will demonstrate new tools to improve flood resilience and water governance. The results of the *Citizen Awareness* project compliments with outreach and dissemination. *TOPSOIL'*s results on CCA and groundwater and brings in European experiences. The results of restauration of watercourses support C2C CC by increasing a stream's retention effect up-stream. Tax and water fee financed CCA projects support the overall goal by making the region more climate resilient. However, it is also the aim of C2C CC to influence these projects towards more green and flexible solutions serving more purposes. Realdania's forthcoming program focuses on coastal urban areas, and a project within the region will support the IP by making an urban area resilient towards flooding from the sea. *City innovation* with increased export of CCA solutions to emerging city markets.

5. Expected contribution of the project to the implementation of the target plan/strategy

C2C CC will support the targeted implementation of the individual municipal CCA plans and the risk management plans under the Water Framework Directive, the Floods Directive, the objectives of the Marine Strategy Framework Directive and the Habitats Directive. The IP will do this by:

1. Securing cross-border collaboration as a necessity for integrated CCA. The IPs capacity-building elements and decision tools will assist the municipalities in the transition to new governance needs of CCA, which includes involvement of many actors in the planning and implementation process.
2. Creating analyses and tools to assist integrated CCA planning and decision making processes. The IP will aid and qualify implementation by analysing water issues as part of a hydrological cycle and create modelling tools to assist the municipalities.
3. Involving water industries, research institutions and industry associations in demonstration projects and capacity development activities will push for research and development of new knowledge and technologies.

5.1. Similar brief information on the complementary actions

The complementary projects contribute to the implementation by being directly related to the C2C CC actions C1-C24 and will enrich the IP with knowledge, experiences and additional CCA implementation.

6. Main stakeholders involved in the project:

The IP is already characterised by thorough stakeholder involvement on which the project consortium is based. Following, the C2C CC partners and primary stakeholders have provided input through interviews, four one-day workshops and pursuant communication. One workshop was held 13 August 2015 concerning the formulation of the Concept Note, and three workshops were held during the formulation of Full Proposal: 18 January 2016, 25 February 2016, and 17 March 2016. All potential partners and primary stakeholders of

C2C CC were invited, and the workshops had between 30 and 65 participants, the programme and minute of the workshop can be found on the CDR website[25]. During the workshops the concrete implementation actions C8-C24 were shaped based on the CCA plans and collaboration between the partners. These actions are formulated by the partners themselves and may therefore vary in their descriptions. The C2C CC process has already begun. The following are the primary stakeholders of the IP (all have signed letters of support):

- *National governmental bodies:* Danish Emergency Management Agency, The Danish Coastal Authority and The Danish Nature Agency.
- *Municipalities*: Ikast-Brande Municipality, Odder Municipality and Ringkøbing-Skjern Municipality.
- *Associations:* Concito, Danish Export Association, Danish Industry (DI), The Danish Insurance Association (DIA) and SEGES.
- *Research institutions:* Danish Technical University (DTU), GEUS and Danish Technological Institute.
- *Networks and centres:* The Freshwater Centre (FwC), Vand i byer (Innovation network for Water in Urban Areas) and KLIKOVAND.

7. Long term sustainability (including capacity building)

7.1. How sustainability of the project's results and effects will be ensured

C2C CC intends to lead to enhanced national legislation and/or international guidelines for integrated CCA. Long-term sustainability of the project is ensured by building up efficient cooperation and coordination structures - cross-boundary as well as multi-level governance. This is done by systematic capacity building measures and by creating long lasting forums for exchanging best practices – enhancing local authorities' motivation to continue cooperation. One of the gaps related to some municipalities having more ambitious CCA objectives/plans than others, makes it difficult bringing them all together; however, C2C CC creates a common understanding and starting point, which will facilitate further cooperation on CCA in the future.

Officials from other Danish regions will participate in C2C CC's workshops and this will constitute the starting point of replicability of tools and results from C2C CC will be further developed when replicated in other parts of Denmark. Business development shall ensure long-term effects by building up capacities in the industry and underpin the pull and push effect of innovative technologies within the CCA sector. Due to the large-scale and cross-boundary elements of the IP, C2C CC will ensure that the region stays a frontrunner within water technologies. C2C CC includes 17 large demonstration actions, that will accelerate more financing for e.g. construction works during and beyond the IP's duration. Furthermore, several of the funds mentioned in the Financial Plan extends beyond 2022, and local stakeholders will continue to apply for and receive funding for CCA.

8. Expected major constraints and risks:

- **Risk 1:** *The national socio-economic environment.* The current Danish government prioritises agriculture and business development higher than environmental concerns. On the other hand, the local socio-economic environment is characterised by a large amount of water clean tech companies and proactive local governments. Furthermore, the socio-economic environment is under pressure by the need to adapt to increased experienced flood events.

[25] CDR website: http://www.rm.dk/regional-udvikling/klimatilpasning/aktiviteter/

- **Risk 2:** *The relatively weak institutional set up of CDR regarding climate change planning.* CDR is not legally obligated to take on the role as a facilitator or coordinator of CCA activities, however, the municipalities within CDR respect and appreciate CDR's role (reflected by the signed Associated Beneficiary's Declarations and Letters of Support).
- **Risk 3:** *The complexity of many stakeholders.* The IP involves many stakeholders, which is the strength of the project, but which can also constrain and delay the processes. CDR has extensive experience with network management and management of large EU projects.
- **Risk 4:** *Funding for complementary actions are not mobilised.* C2C CC project management, incl. CDR's representative office in Brussels, will assist the municipalities with applications for funding.
- **Risk 5:** *Delays related to SEA and EIA processes.* SEA is not expected to delay the IP. EIA is expected to be involved in action C20, C21 and C22, and included in the budgets.

9. a) Is your project significantly climate related?	**Yes**	■	**No**	☐
b) Is your project significantly biodiversity-related?	**Yes**	☐	**No**	■

If you consider your project to be significantly climate or biodiversity-related (you marked 'yes'), please explain why: The IP deals significantly with the implementation of municipal CCA plans and Flood Risk Management Plans. The IP is not significantly biodiversity related, however, the C2C CC does take into account Natura 2000 areas under the EU Habitats Directive and Ramsar areas into consideration where relevant (Figure 5). This involves at least the following actions: C8 (Habitat site no. 52, "Horsens Fjord, havet øst for of Endelave), C9 (The Limfjord), C11 (Randers Fjord), C12 (involves 11 Natura2000 areas in the catchement of River Gudenaa), C15 (Uldum Kær), C17 (Thyboron, Natura 2000 and Ramsar area), and C19 (Stavns Fjord).

GENERAL DESCRIPTION OF THE AREA(s) TARGETED BY THE PROJECT

Name(s)/Definition of the project area(s):

The project area consists of Central Denmark Region and three municipalities in the North Denmark Region bordering the Limfjord.

Comments:

C2C CC involves many geographical sites. An overview of names in Danish and English is provided in Table 1.

Table 1: Seas, fjords, rivers and lakes of C2C CC incl. name in English and related actions.

Danish name	English translation	Related actions
Gudenåen	The River Gudenå	C5, C6, C11, C12, C15, C16
Randers Fjord	Randers Fjord	C1, C11, C12
Klimabåndet	The Climate Ribbon	C16
Vesterhavet	The North Sea	C1, C3, C5, C6, C17
Limfjorden	The Limfjord	C1, C5, C9, C17
Harboøre Tange	Harboøre Tange	C17
Glud Håb	Glud Haab	C8, C18
Horsens Fjord	The Horsens Fjord	C8, C14
Sorte Sø	The Lake Sorte Sø	C20
Le Mur	Le Mur	C9
Klitmøller	Klitmøller	
Nationalpark Thy	Thy National Park	
Storåen	The River Storå	C6, C13
Silkeborgsøerne	The Silkeborg Lake District	C12
Gesager Å	the watercourse Gesager Å	C15
Uldum Kær	Uldum Kær	C15
Kolindsund	Kolindsund	C10
Kattegat	The Kattegat	C1, C19
Kragsø	Lake Kragsø	
Korup Å	The watercourse Korup Å	

Ryom Å	The watercourse Ryom Å	
Grenåen	The River Grenaa	C6, C10
Bygholm Å	The watercourse Bygholm Å	C14
Hansted Å	The watercourse Hansted Å	C14
Horsens yderfjord	The outer fjord, Horsens Yderfjord	
Bygholm sø	The Lake Bygholm sø	C14
Store Hansted Å		C14
Alling Å		C11
Sørenden		C19
Thyborøn Kanal	Thyboron Canal	C1, C9
Stavns Fjord		C19
Dagnæs bæk		C14

MAPS OF THE GENERAL LOCATION OF THE PROJECT AREAS

GENERAL OVERVIEW OF LOCATION(s) IN THE COUNTRY

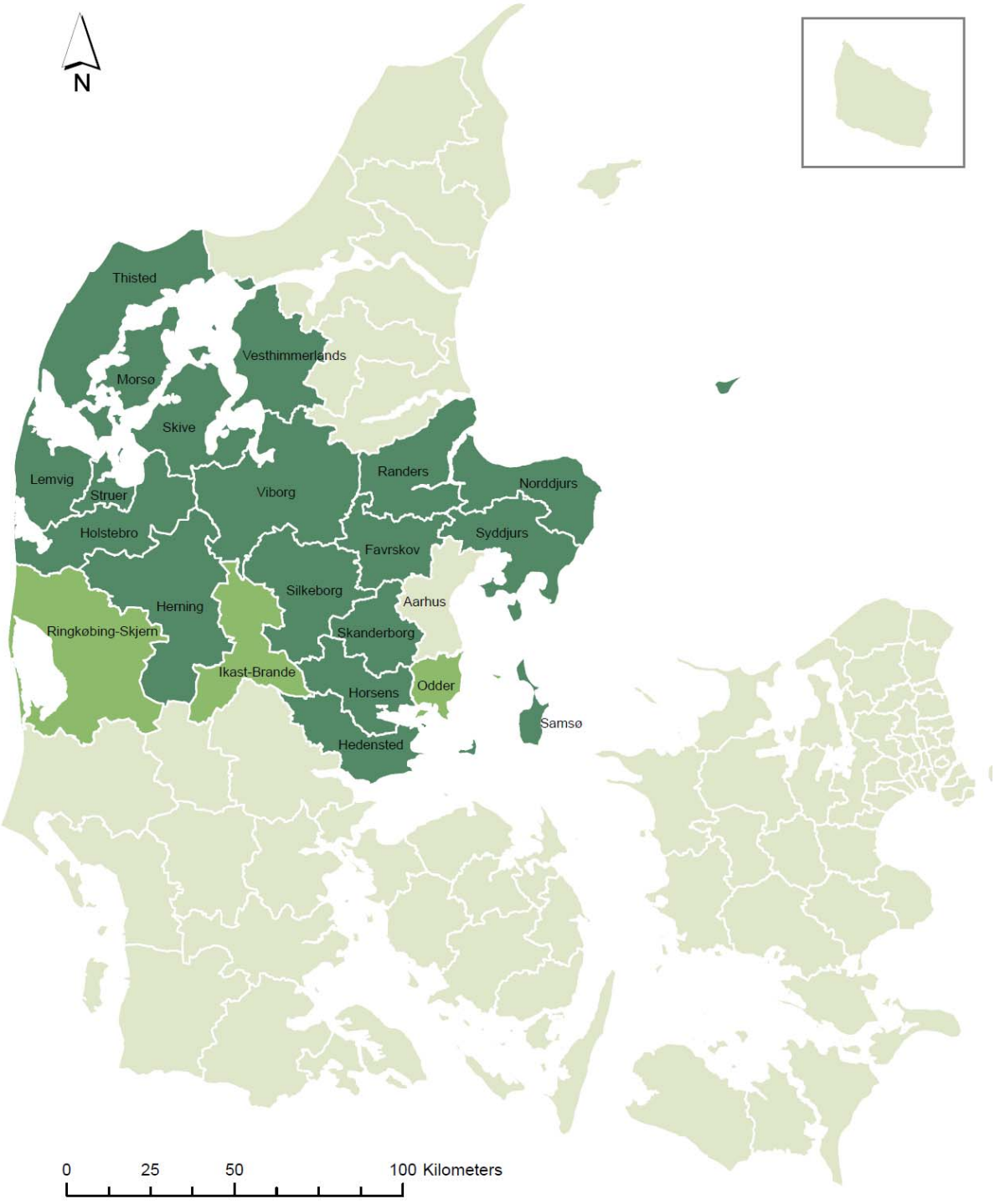


Figure 3: The region of C2C CC and the 21 municipalities, associated municipal beneficiaries (dark green) and municipal stakeholders with Letters of Support (light green).

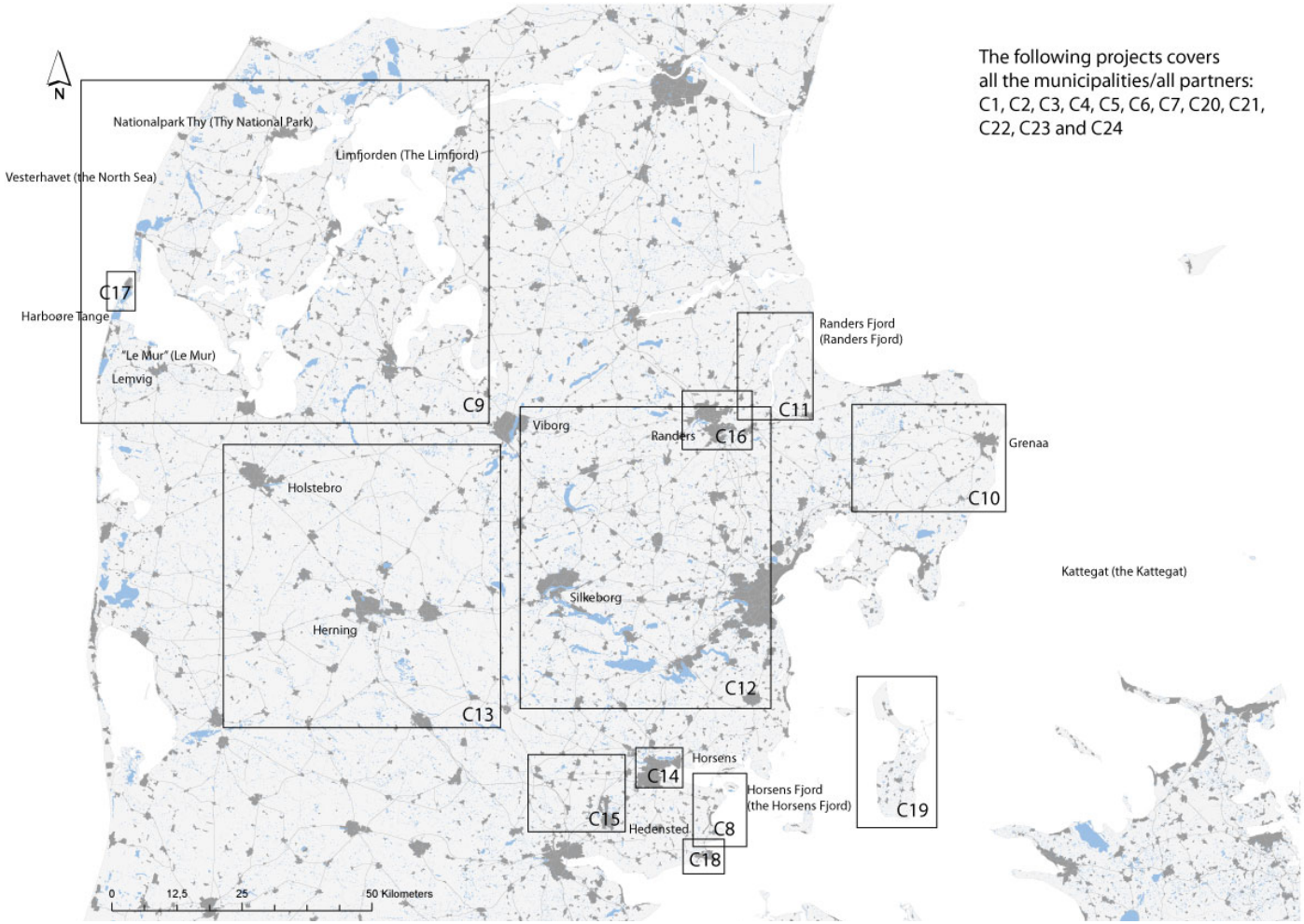


Figure 4: The location of actions C1-C24 in the Central Denmark Region. C18-C19 are geographically located throughout the region. C1-C7 and C20-C24 are cross-cutting for all municipalities.

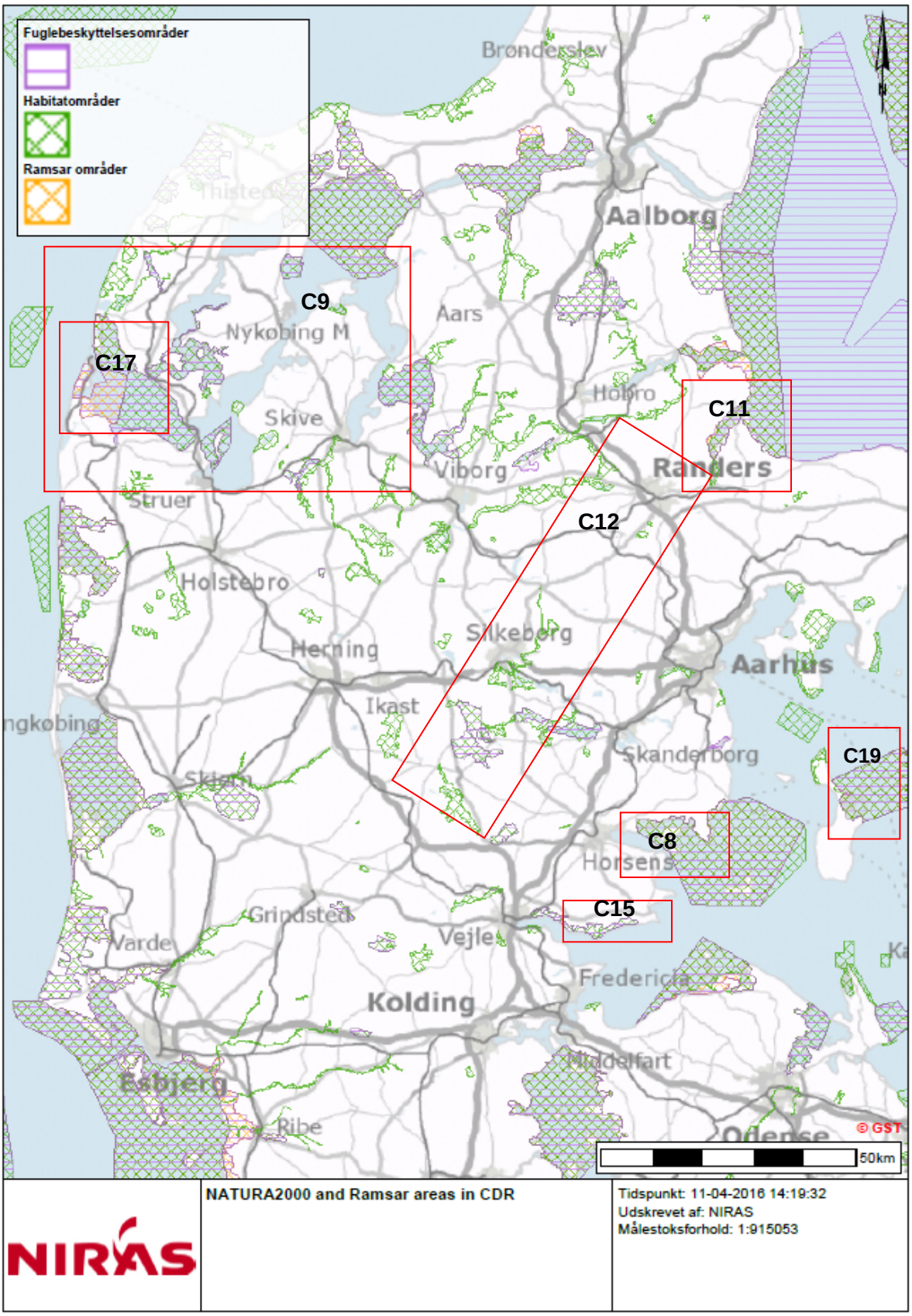


Figure 5: Natura 2000 and Ramsar areas in CDR

DESCRIPTION OF THE STRATEGY FOR THE IMPLEMENTATION OF THE OVERALL PLAN

Short term (at least first 2.5 years):

The strategy is twofold: strategies to implement the participating partners' CCA plans in general, and the C2C CC contribution to the implementation – in a short and long term.

CCA plans

The national government made it mandatory for municipalities to formulate CCA plans in 2013. After their completion, the CCA action plans were to be integrated – step by step – into the municipal spatial planning eventually covering all spatial areas including cities and countryside, simultaneously complying with the EU Water Framework Directive and the Floods Directive cf. Figure 6 (left side). Furthermore, the government encouraged the municipalities to coordinate their CCA action plans with all other relevant plans cf. Figure 6 (right side).

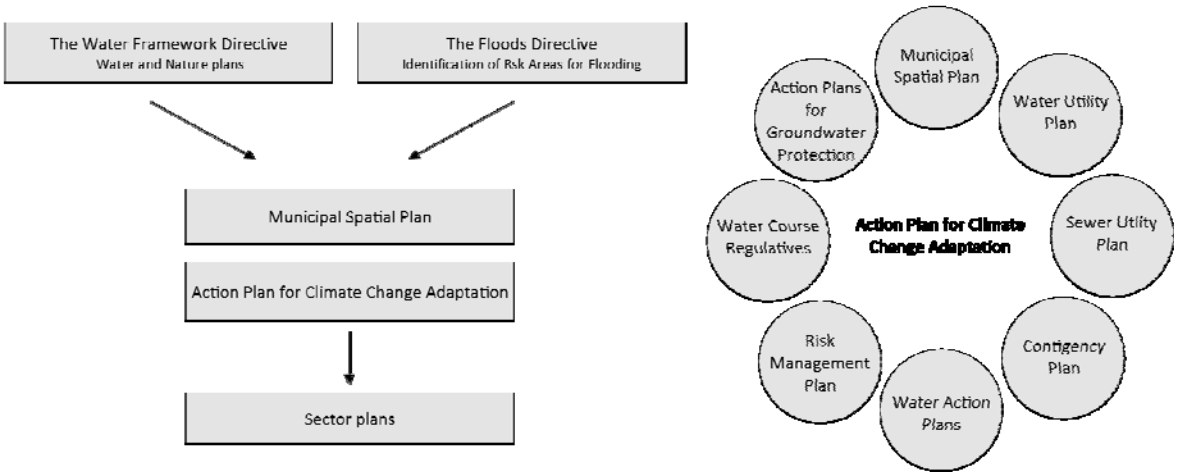


Figure 6: The Danish planning hierarchy related to the CCA plans (left side), and the related plans to the CCA plans (right side) (after Danish Nature Agency, 2013[26]).

In relation to the requirement of mandatory CCA plans, the Danish Nature Agency published guidelines on the content of the CCA plans. As a minimum, it had to include a risk assessment and a description of possible actions at municipal level. The guidelines recommended the following content of the CCA plans:

1. Background and conditions: incl. the municipality's climate challenges
2. Risk assessment: incl. flood map, value map and risk map. (mandatory)
3. Municipal Spatial Plan: incl. integration of CCA into the main structure of the municipal spatial plan and designation of risk areas (long term)
4. CCA action plan (short term)

The guidelines also included recommendations on how to deal with the cross-sectoral nature of CCA. Figure 6 (right side) and Figure 7 illustrates the Danish Nature Agency's

[26] Danish Nature Agency, 2013, "Climate Change Adaptation Plans and Climate Zoning Plans – Guideline", Danish Ministry of Environment [Naturstyrelsen, 2013, "Klimatilpasningsplaner og klimalokalplaner - Vejledning", Miljøministeriet].

recommendations on the importance of coordination of plans and stakeholders, respectively. The latter involves, besides the municipalities' themselves, the water utilities, neighbouring municipalities and utilities, citizens, businesses and other organisations cf. Figure 7.

In spite of the fact that the CDR is not an authority in this area, it offered the municipalities a template to ease their work. The aim was not only to help the municipalities, but also to motivate to strengthen the CCA plans by including sustainability and social factors in the template. The CCA template can be downloaded via the homepage of CDR[27].

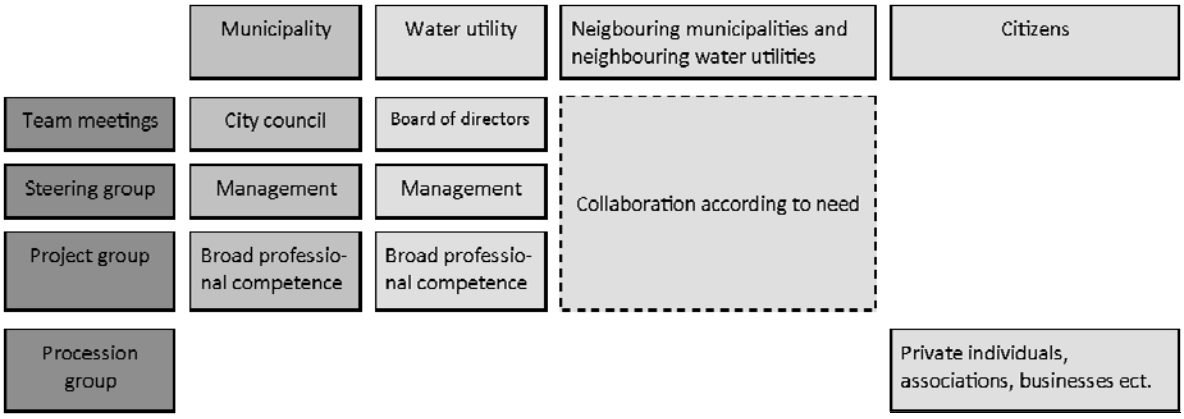


Figure 7: Stakeholders relevant in the process of the CCA planning (after Danish Nature Agency, 2013).

C2C CC

The C2C CC IP builds on the fruitful cooperation between regional initiatives to support local governments on the one hand and local governments' own measures on the other. The IP reflects this combination of local interests and regional tradition for offering capacity building and coordination on a voluntary basis. The complementary projects reflect the outreach of partners in their local community and an answer to one fundamental question: How are societal means and tax-payers money used most cost-efficiently to create sustainable CCA solutions? There is an ongoing dialogue between local governments and e.g. wastewater companies on how to enhance innovative solutions. Furthermore, there are ongoing dialogues between authorities and other stakeholders such as NGOs, companies and knowledge institutions on how to prioritize.

Thus, basing their CCA plans on a common foundation (cf. above), and though they prioritized differently according to experience and needs, local governments in the CDR expressed a wish to focus on what became the core elements of the IP – both the cross-cutting capacity building activities dealing with aspects of the hydrological circle and their related local demonstration actions. Later, and mainly because of the urgent need to handle the issues around the western Limfjord, three local governments in the North Jutland Region have joined. Together and as a totality, the 24 activities are meant to

[27] Link to CDR's CCA template: https://www.rm.dk/regional-udvikling/klimatilpasning/tidligere-initiativer/skabelon-for-klimatilpasningsplaner/

support local authorities in many ways – in particular the cross-cutting actions governance and tools.

Initially, the area of coverage was determined by the confines of the CDR. Because of previous years' cooperation and co-creation, it was natural to offer all local governments to join a project which would support them in implementing their CCA plans and manage climate change challenges, further cross-border cooperation, and boost work on CCA, which had never before been done. During the process, this procedure was endorsed, but also adjusted since a few municipalities chose not to join, and others (in a neighbouring region) chose to be part of the IP. In the end, the area of coverage is appropriate to work on cross-border CCA issues, further develop capacities and solve concrete problems. Local governments and civil cervants having signed a Letter of Support will be invited to activities such as workshops and conferences, and other secondary stakeholders will be invited on an ad hoc basis.

Being an IP dealing with CCA plans in cities and local communities, the partnership involves the local authorities, since they control CCA plans – politically and administratively. In some cases, there was a strong desire from – in particular – wastewater companies to join as well, because the project would influence their priorities. Other partners represent innovation, research and pilot projects topical in the CDR and that are of common interest. In addition, 17 organisations have formulated and signed Letters of Support to join in specific activities. Last, but not least, local secondary stakeholders take part in actions in municipalities. They are the result of a practice of involving citizens and associations in general, but this involvement needs to be re-thought, as CCA is a new area.

Apart from discussing concrete CCA challenges and finding sustainable solutions, the purpose of the IP is to enhance institutional and technical capacity of the local authorities of the project. The preparations of the proposal revealed the needs for greater knowledge of the crosscutting issues, mutual committment and exchange of best practices.

During the first 2.5 years, the activities will start up, politicians are engaged in a dialogue, citizens are made aware of CCA challenges, companies involved, national agencies included etc. as a consequence of the C2C CC IP.

Long term (beyond 2.5 years):

The municipal spatial plans are reviewed every fourth year, and most plans are to be reviewed by 2017. The Danish Ministry of Environment and Food is in collaboration with The Ministry of Business and Growth Denmark and Danish Ministry of Energy, Utilities and Climate with an evaluation of the CCA plans. According to the Danish Nature Agency, this evaluation will provide the basis for any adjustments to the framework for local CCA, including municipal planning. The evaluation is expected published in May 2016.

The implementation of The Water Framework Directive and The Floods Directive into the municipal spatial planning supports the long term implementation of the CCA plans. The mandatory risk assessments also provide as a solid knowledge base for future CCA actions.

It is the purpose of C2C CC to aid the municipalities in enhancing their capacity to deal with CCA through setting up a framework that can handle climate changes now and if/when they aggravate in the future. Not only will CCA actions be implemented, but also BAT will be used, and newest knowledge in order to add value to the many great investments and solutions implemented in the years to come will be taken up. C2C CC iis about water management in a strict sense, but it is to a large degree about CCA as a development and growth path for a more resilient society. Other core values of Life will be furthered as a consequence of the IP such as the marine strategy, biodiversity, water quality.

EU ADDED VALUE OF THE PROJECT AND ITS ACTIONS

Extent and quality of the contribution to the objectives of LIFE

Objectives	Contributing directly	Contribution on strategic level
The 'Life Regulation'[28] and An EU Strategy on adaptation to climate change[29].	Actions dealing directly with flooding: C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C22, Actions dealing with rivers: C2, C9, C10, C11, C12, C13, C16, Actions dealing with cities: C4, C14, C15, C16, C17, C18, C23 Actions dealing with vulnerable coastal areas: C1, C8, C9,	All actions increase partners' ability to sustainable contribution to Life objectives: C5, C6 and C7 contribute to enhancing partners' capability. Innovative actions such as C20 - C24 serve to spread the knowledge of CCA.
The Floods Directive	C11, C12, C13, C18.	
The Water Framework Directive	All actions dealing with watercourses are subject to WFD regulation: C9, C10, C11, C12, C13, C16.	
The overall objective of the Marine Strategy Framework Directive	C1, C8, C9, C11, C14	
The targets of EU Biodiversity Strategy and EU Habitats Directive	C8, C9, C10, C11, C13, C16, C21	On the long run, municipalities that have not included this issue in their work, can benefit from C1, C2 and C4 and other workshops, if they want to include it later.
Innovation, tourism and public-private cooperation	C7 (innovation) Nature-based tourism directly and tourism in cities: C8, C9, C11, C16, C20, C21, C24	

Extent and quality of the mobilisation of other funds

'Other funds' cover a number of sources – some requested during the writing of the Concept Note, and decisions have been made, some funding will be mobilised during the project as actions progress. In many cases, contact has been established between local utilities and project partners during spring 2016, and local utilities have shown interest in getting involved in the project, because their eventual investment will be of higher quality.

Nature of mobilised fund	Action	Name of the funding	Allocation
EU FUNDS			

[28] REGULATION (EU) No 1293/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2013 on the establishment of a Programme for the Environment and Climate Action (LIFE) and repealing Regulation (EC) No 614/2007

[29] COM(2013), 216 of 16/4/2013. An EU Strategy on adaptation to climate change.

Not yet requested	C5	ERDF	Tbd.
Requested	C7 C17	ERDF (+ CDR) Horizon2020	2.5 mio € Total budget 1.8 mio. € of which 19,000 € is for LK
Granted 10/11-2015	C3, C6	Interreg	TOPSOIL: 7.34 mio € of which 840.000 € is for CDR
NATIONAL FUNDS			
Not yet requested	C1 C2 C22 C23	Realdania Fiskerifonden MUDP MUDP	Tbd. Tbd. Tbd. (around 500.000 €) Tbd. (around 300.000 €)
Requested	C5	Velux Foundation	1.6 mio. €
LOCAL FUNDS			
Not yet requested	C4 C14 C20	Municipal funding Waste water utilities funding Horsens Waste Water Utility SVF	Estimated 16 mio. € Estimated 135 mio € pa. Tbd. Tbd.
Requested			
Granted	C8 C9 C13 C17	Hedensted Waster Water Company LVS Vestforsyning LVS	3.4 mio. € 2.9 mio. € 6 mio. € 2.9 mio. €

Two EU funded projects were submitted in June 2015 and granted earlier this year (10/11-2015 – TOPSOIL and WaterCoG. One Horizon project has been submitted (to complement C17), the prospect of is – as is well-known – around 15%. In case it passes, it will form a major part of the project, using satellite-basd measurements of land. An application has been submitted to the Growth Forum for ERDF funding (and expects to be funded) – a project which will support export of water solutions to city innovation. Another two EU funded Interreg projects will be sought to support C1 – C4: 'Climate Adaptation Measures' and 'Transition to Green Economy Cooperation with Industries'.

"The project will be in contact with and actively coordinate the implementation of the LIFE proposal with the European Regional Development Fund Operational Programme managers in the region (the Growth Forum)."

A number of national public funds will be mobilised too. C22 and C23 plan to apply the Danish Environmental Technology Development and Demonstration Program (MUDP) to support the study of how climate roads can be integrated with other SUDS solutions, and to examine how water delaying measures can be integrated with SUDS solutions. Danish Eco-Innovation Programme (MUDP) and similar national funds are potential, and accessible, sources of financing.

Among national, private funding are: Realdania and the Velux Foundation, both prioritizing CCA in various ways. Realdania's forthcoming programme focuses on coastal urban areas, and a project within the region will support the IP by making an urban area resilient towards flooding from the sea. Contact has been made, but no specific application has been elaborated yet. The Velux-foundation will be mobilised to support a project on no-till – alternative ways to do sustainable farming by adoptiong Conservation Action practices by

Aarhus University. This action supplements C5 and C14 by testing, how changed agricultural praxis can reduce flooding. This project is accepted for full application in May 2016, VELUX Foundations.

As expected, the major source to mobilise and coordinate would be wastewater utilities' investments in CCA and sewage systems and the municipal and regional investments on CCA. During the preparation of the full proposal, numerous contacts to the utilities were made, and large funds will be mobilised and integrated into projects that are to the benefit of CCA plans. As of now, five utilities have signed A8 confirmations of their engagement in the following actions: C8, C9, C13, C15, C17, and more are expected to come.

Quality of multi-purpose mechanism, synergies and integration

Due to the wide – though targeted – approach containing cross-cutting activities as well as demonstration/pilot/innovative actions involving partners, stakeholders and others, the C2C CC is a truly multi-purpose mechanism, building synergies and integrating essential aspects of the hydrological circle as well as providing sound basis for concrete decisions on CCA. To mention a few examples of this multi-purpose mechanism, the cross-cutting activities (C1-C7) serve to unite partners in networks, knowledge-sharing capacity building events, involving 16 concrete actions (C8-C24). Desk-analyses provide most actions with the background for a sound methodology for future conceptualization and for evaluation of actions. Synergies are created by partners sharing best practices with each other, thereby multiplying results through inspiration and mutual learning in a cost-effective manner.

Replicability and transferability

The project management unit has the overall responsibility for replicability and transferability. Creating awareness about the project and its results on CCA is a vital part of the project's dissemination activities (cf. E-actions); however, it is important to state that replication goes beyond dissemination.

<u>Plan at the outset for replicability and transferability</u>

In Phase 1, the most important task is to determine exactly how C2C CC can be replicated and to whom.

Firstly, a dialogue will be started with a number of relevant stakeholders/networks, which are already interested or could potentially be interested in replicating C2C CC. For example:

- Zealand Region: this region is a good location to replicate C2C CC in as it has a similar administrative structure as well as similar challenges in relation to water, e.g. Roskilde Fjord could use the results obtained at Thyborøn Kanal (cf. C9)

- North Denmark Region: as three municipalities from this region are partners in C2C CC, they can help replicate the results to their entire region

- South East and South West England: these have a similar terrain as CDR and they work similarly with issues such as integrative planning and citizen involvement.

- KLIKOVAND (20 municipalities in the Capital Region working on CCA and water): a letter of support has been signed, wherein KLIKOVAND commits to support and cooperation activities, participation in events and networking activities, and discussions on tools.

- Water in Urban Areas: 150 Danish organisations, which work with CCA and water

- Confederation of Danish Industries: can especially assist with replication of innovative elements of C2C CC

- Mayors Adapt: this network is used to inform, mobilise and support other cities in using e.g. C2C CC best practices, tools and governance.

- ENCORE: a political network of regions in Europe on the topic of environment (cf. action E3.5)

This initial outreach will clarify needs and how the results and methods can be transferred to other locations. The first two years of C2C CC will be spent on this dialogue as the consortium wants to ensure, that replication is not begun on activities, which are either not possible to replicate nor demonstrating the desired effects. During this time, Danish-speaking stakeholders (including Nordic nationals) will be invited to participate in workshops to gain first-hand experiences with the capacity building of the C2C CC.

In the following two phases, tangible results will be available from C1-C24 and thus the focus shifts to replicability and transferability of the actual solutions for each project. Especially those activities described as best practices, pilots and innovation (cf. section B3) are relevant in this regard.

Thirdly, in Phase 3, an additional element is added to the plan; namely monitoring of the effect of replication.

This plan helps to ensure that it is highly likely and anticipated that both Danish and European cities and regions can and will replicate C2C CC in their local environments.

<u>An evaluation strategy</u>

This strategy links to the monitoring section (cf. D-actions).

The evaluation strategy is divided into two parts: activities, which CDR already excels in, and C8-C24 activities, which are expected to generate long-lasting and successful results in relation to CCA.

Through previous projects and experiences, it is recognised that CDR excels in certain activities, e.g. co-creation, governance, groundwater tools and the Danish models of integrated planning and designation of risk areas, and these can therefore be replicated without excessive research (hence the activity is placed in Phase 1). However, when it comes to actions C1-C24, they need to be evaluated in order to assess, which elements can be replicated with the greatest success rate. In addition to researching which C2C CC elements could be replicated, it is also necessary to research which elements fit where, e.g. co-creation is most likely not interesting for a region in Southern Europe, but it is interesting for other Danish and Nordic regions.

As mentioned in the plan above, the execution of this strategy is scheduled for Phase 2.

<u>A capacity building strategy</u>

Skills and communication: This strategy focuses on building up skills in external parties, so that these are capable of replicating C2C CC in their local environments. They will be made aware of the various tools, techniques, models, etc. which are created within C2C CC (cf. C1-C24) by the following ways of communication:

- Holding meetings and seminars, where the project management unit and/or project owners inform about the projects and the elements, which can be replicated and motivate the participants to try this

- Inviting these external parties to join the conferences and study trips in order for them to gain a first-hand understanding of the replicable elements of C2C CC.

Funding: the project management unit works on replicability and transferability, and there is thus allocated man hours in the budget to this area.

A legacy strategy

The aim of the legacy strategy is to ensure that C2C CC will be replicated in a short and medium term perspective after the end of the project. This strategy will be drafted at the beginning of Phase 3 as all C1-C24 actions, at this point in time, will be well on their way to completion, and thus the project management unit has more resources to spend on replication.

It is expected that future complementary CDR led EU and/or national projects will incorporate C2C CC results into their work packages in relation to e.g. CCA integration, co-creation and tools. This will be the case with future Interreg projects and Water in Urban Areas.

Master Classes are workshops hosted by e.g. Durban and Amsterdam on CCA, and this forum will be used to discuss common problems and issues as well as best practices with interested stakeholders.

Transnational, green procurement, uptake of research results:

Geographically, the two regions in question do not provide easy transnational cooperation. But transnational aspects in the handling with CCA is prominent in other ways: the CDR already has a strong partnership with other EU countries on which it can base its outreach transnationally – one example are the two Interreg funded projects that have already been approved. More international projects are expected to supplement this international outlook and the replication of results will include other regions across the EU and outside.

CDR is part of a public partnership on green procurement and has committed to ensure that all procurements and tenders are delivered according to the procedures for sutainable requirements (these requirements are listet at the public partnership webpage for green procurements: grønneindkob.dk). The partnership works for developing green and binding cost-effective purchasing objectives that have an effect on the environment both globally and locally. Purchasing objectives helps to identify relevant environmental requirements and processes, and thus functions as a shortcut for public institutions that want to impose environmental requirements in their procurement and work actively for a green transition.

Three research institutions are directly involved in the IP as part of a C2C CC Advisory Committee. These three research institutions are well known for their applied science within CCA and they are very much engaged in national neworks such as Water in Urban Areas

Network (Vand I Byer). The Advisory Committee has the purpose to service the C-actions and the partners with best practice knowledge within specific areas of CCA from hydrological modelling to citizen involvement. The Advisory Committee has the purpose to raise the quality of the CCA actions and build capacity among local officials through seminars and workshops and access of best practice knowledge. Furthermore, the IP includes two business PhD projects to carry out research on the actions of C2C CC.

BEST PRACTICE / INNOVATION / DEMONSTRATION CHARACTER OF THE PROJECT

BEST PRACTICE:

The majority of the C-actions are based on best practice. C8-C24 use best practice in particular with: data loggers (C8, C18), hydrological models (C8-C12, C17-C19), economical or financial methods (C9, C11, C15, C21), and citizen- and stakeholder involvement (C8, C10, C14-C22, C24). C1-C7 supports these actions with capacity building activities and development of tools.

The best practice elements of the IP will deliver CCA improvements in CDR using cost effective and acknowledged models and approaches to analyze and address the climate challenges of the region. The main target municipalities outside CDR will be the Northern Denmark Region, Zeeland Region and the Southern Denmark Region, both facing similar challenges as CDR and havning a long tradition of collaborating across regional borders. The 15 major cities/municipalities facing climate change adaptation problems in-land ánd at the coastline, benefitting from the new integrated C2C CC approach and lessons learned during the project, wil be : Aalborg (205.000 inhabitants); Esbjerg (116.000);Vejle (112.000); Sønderborg (75.000); AAbenraa (59.000); Haderslev (56.000); Kolding (92.000); Fredericia (51.000); Billund (26.000); Faaborg-Midtfyn (51.000); Assens (41.000); Nyborg (32.000); Frederikshavn (60.000); Hjørring (65.000); Thisted (44.000).

The best practice elements in relation to hydrological models are in the majority of the C-actions based on models developed by the Danish Hydrological Institute (DHI), research institutes or engineering consultancy companies e.g. MIKE11, MIKE URBAN, MIKE FLOOD, SCALGO. These models are acknowledged and well-known from many previous projects nationally and internationally. In regard to the applicability of the use of best practice hydrological models, these models are, however, not well integrated with each other and thus finds its limits modelling all elements of the hydrological cycle, each model is developed with a specific purpose on e.g. watercourses (MIKE11) or sewer system in urban areas (MIKE URBAN). Several of the C-actions will collaborate on the possibilities of linking or integrating different models, e.g.: a) C11 and C12 in relation to modelling of the River Gudenaa with the model of Randers Fjord, C14 in relation to three watercourses and Horsens Fjord, C10 in relation to River Grenaa and Kattegat; b) C17 and C18 on modelling the interlinkage between sea level rise or stormsurge with rising groundwater level. It is likely, that the results from these actions may show demonstration character.

Citizen and stakeholder involvement is an activity included in the majority of the concrete actions, due to the novel and cross-cutting nature of CCA involving various stakeholders in order to make actual implementation possible. Stakeholder involvement in the needed extent is not custom among most municipal technical departments, however, the approaches and methods applied will be based on best practice. Best practice is secured through capacity building activities in C5, C4.3 and support from the C2C CC Advisory

Committee bringing in experts in applied science on citizen involvement from Aalborg University and Aarhus University.

Best practice outside Denmark (in particular The Netherlands, Germany and the UK) is integrated in the IP through desk research (e.g. A1.2, C1.1.7, C3.3, C4.2, C5.1), study trips to Germany, the Netherlands and the UK and participation in international conferences (E3).

The wastewater utilities will implement the wastewater plans in urban areas according to best practice within the wastewater sector. It is the aim of C2C CC to broaden the perspective of best practice to involve alternative means related to SUDS.

DEMONSTRATION:

The design of C2C CC has the core in C1-C7 that gathers knowledge and experiences within sea and fjords, rivers and lakes, groundwater, rainwater, governance, tools and innovation. C1-C7 are demonstrated geographically through C8-C24 (table 4 – Overview of the C-actions), which put into practice, test, evaluate and disseminate actions, methodologies or approaches that are new or unknown in the project's specific context, and that could be applied elsewhere in similar circumstances. Several of these actions will adapt known models and approaches to the specific context (as mentioned above).

In particular, this IP will deliver thorough demonstration of integrative planning and network governance. This counts for the IP consortium itself, and further is several of the actions of C2C CC characterized with many partners or many stakeholders e.g. The Western Part of the Limfjord (C9) consist of a partnership between 7 municipalities and 7 utilities, and The River Gudenåen (C11) consist of a partnership between 7 municipalities and 1 utility. C2C CC will demonstrate establishment of and experience with integrative planning processes incl. network governance, which is expected to benefit both the academic society as well as European CCA practice.

Capacity building activities is the backbone of the IP and is carried out throughout the concrete actions with demonstrating character. The capacity building activities involving the C2C CC partners will involve more thorough monitoring (D1).

Among more traditional IP actions with demonstration character, our action C23 and C3 can be highlighted as examples. C23 applies known methods: infiltration tests, drillings, geophysical mapping, high-precision geophysics and quantitative correlations, however, in a new context: to produce detailed infiltration potential maps for urban development areas. C3 bring in experiences from other EU countries (e.g. the Netherlands, Germany or Belgium) on management of surface-near groundwater and it also draws on the results of the complimentary project TopSoil to examine the use of excess groundwater for irrigation, heating or cooling. The methods are known in other countries, however, are new in Denmark.

PILOT (INNOVATION):

Innovative aspects are in C2C CC delivered in four ways, through: C2C CC Advisory Committee; action C7, C20 and C21; tools in action C2.2 and C6.1, and two pilot projects C13.3 and C22.

The Advisory Committee (F1.4) delivers state-of-the-art knowledge within various aspects related to the concrete actions. The contact persons of the knowledge institutions within the Advisory Committee are tasked with including relevant experts as needed.

Action C7 deals specifically with enhancing innovation among water businesses in the region, through knowledge sharing and networking between water businesses, utilities and municipalities. Specifically, Dansand, Grundfos, Kamstrup, and NCC will be involved in relevant innovation projects and cooperation fora. C7 also involves counseling of industries for EU funding and training of start-up companies on business development within ecosystem services. Furthermore, CDR has years' of experience within exporting water solutions to Asian countries through the Danish Water Technology Hub – Danish Water Technology House – which is placed in Singapore and helps Danish SME enter the south-east Asian markets. Action C7.4 is targeted to further strengthen this collaboration and opportunity for the water businesses in CDR. Lastly, C7 is demonstrated through action C20 and C21; two innovation hubs on freshwater and seawater, respectively, for business collaborations between commercial players, educational institutions, water utilities and authorities, with possibilities for test facilities, shared office spaces and seminars to promote and generate innovation through business environment.

In particular, two of the developed tools will involve innovative elements C2.2 and C6.1. C2.2 initiates the development of forecast systems with ICT businesses based on models and meteorological forecasts. C6.1. develops a groundwater tool to model the linkage between surface water and rising groundwater level, a tool that does not exist today. The complementary project TOPSOIL complements C6.1 with knowledge on the topsoil and groundwater with case studies in Herning and Horsens.

The IP involves implementation of two pilot projects, C13.3 and C22. The novelty of C13.3 examines the combination of a number of CCA means, which together with a number of other means will increase biodiversity and ultimately, improve the water environment in the sea by reducing the leaching of nutrients. Derived effects with regard to biodiversity and cultivation reliability will be monitored during the project's monitoring phase (D1). C22 implements and test a new and innovative type of SUDS through a climate road build of permeable asphalt, a new technology, which may also have the potential to purify road water before discharge to recipient. These two actions includes thorough monitoring activities (D1).

EFFORTS FOR REDUCING THE PROJECT'S "CARBON FOOTPRINT"

CDR has for every two years calculated the carbon footprint of the region in regard to CO2 emissions per capita to monitor the development of various measures. This monitoring will continue and it is expected that the major common efforts in C2C CC will contribute positively to reduce carbon emissions. Table 2 provides an overview of carbon emissions

per capita for CDR and the 19 municipalities of the region. In the beginning of the IP (primo 2017) the results of the CO2 monitoring for 2015 is available. 2015 will function as baseline for the IP[30].

Table 2: Carbon footprint of CDR and the 19 municipalities in the region

	CO_2 Ton per inhabitant (2013)
Favrskov Municipality	7,6
Hedensted Municipality	10,2
Herning Municipality	5,3
Holstebro Municipality	7,7
Horsens Municipality	8,0
Ikast-Brande Municipality	8,4
Lemvig Municipality	2,9
Norddjurs Municipality	7,1
Odder Municipality	6,4
Randers Municipality	3,6
Ringkøbing-Skjern Municipality	5,2
Samsø Municipality	-1,4
Silkeborg Municipality	8,5
Skanderborg Municipality	6,8
Skive Municipality	5,7
Struer Municipality	3,1
Syddjurs Municipality	7,2
Viborg Municipality	8,6
Aarhus Municipality	6,6
Central Denmark Region	6,7

Expectedly, the following C actions contribute to reducing the carbon footprint of CDR and the 19 municipalities. However, the actions of the IP primarily deals with initial investigations and assessments and reduction of carbon emissions will for the majority of the c-actions occur after the end of the IP, when they are physically implemented. Action C20, C21 and C22 involves physical implementation during the IP. In table 3 below, an overview is provided of how carbon emissions are reduced in each action.

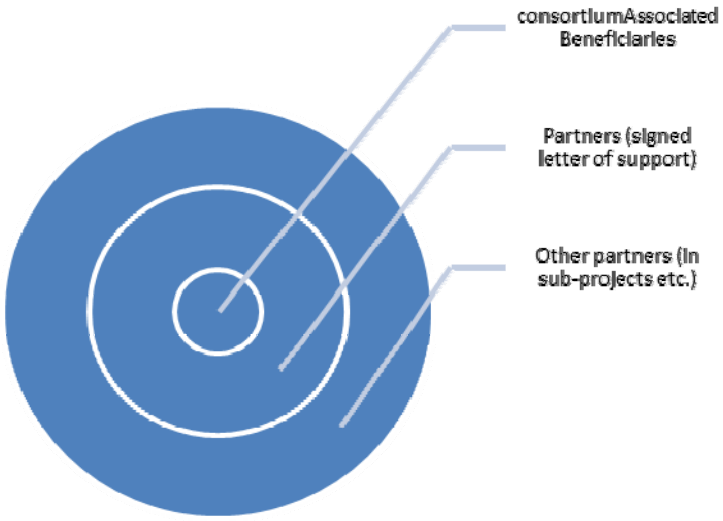
[30] CDR, 2013. *Energy accounts.* CDR (In Danish: *Energiregnskab 2013, Region Midtjylland)*

Table 3: Expected reduction of carbon emissions in the c-actions

Action	**CO_2 reduction(yes/no)**	**If yes, how?**
C8	Yes	Through wet meadows which will reduce CO2 emissions from peat land and change in land use from one year crops to multiannual crops will bind carbon.
C9	Yes	Through analysis of possibilities for production of renewable energy. most likely wind and wave energy, in connection with a future facility in Thyboron Canal.
C10	Depending on the results of analyses and decided solution	A significant part of the investigation is to assess carbon and methane potentials, these assessments will be included in the decision-making process. If the solution is to reestablish former wetlands or close a pumping association the carbon gain is tremendous. If the solutions is to establish sluices and pumps carbon emissions will be expected.
C11	Yes	Establishing wetlands (primarily on agricultural land) will decrease carbon and methane emissions, amount depending on the choice.
C12	Yes	Establishing of wetlands in low lying areas upstream will reduce CO2 emissions and change in land use from one year crops to multiannual crops will bind carbon.
C13	Yes	Through wetlands and changed landuse from agriculture to natural areas
C14	Yes	Establishing of wetlands in low lying areas upstream will reduce CO2 emissions
C15	Yes	Through land use change from from one year crops to multiannual crops will bind carbon, and some reduction of CO2 emissions through wet meadows on peat land.
C16	Yes	Through establishment of a 8.8 km lgreen corridor along the river Gudenå and Randers Fjord.
C17	Yes	Energy consumption for transportation of water in relation to drainage is a focus point in the action. It is assessed whether the energy in the pumped water can be reused in relation to recreational facilities for play and sports.
C19	Yes	Through recovery of Sørenden from a canal to a watercourse, Sørenden's water will no longer be pumped to Kattegat,and restoration of Besser Made nature area as a wet meadow will reduce carbon emissions significantly.
C21	Yes	The Climatorium building is established according to highest demands to isolation and is designed to consume a minimum of energy. Possibilities for solar cells and other energy producing means on the building is investigated.
C22	Yes	Through analysis of possibilities for production of renewable energy with the climate road. Lowering the energy consumption for transportation of surface water in relation to drainage is a focus point in the action.
C23	Yes	Lowering the energy consumption for transportation of surface water in relation to drainage is a focus point in the action.

STAKEHOLDERS INVOLVED IN THE PROJECT

The C2C project consists of a number of stakeholders: Associated Beneficiaries in the Consortium, 'primary stakeholders' having signed Letters of Support, and 'secondary stakeholders' involved in all C actions, involved by project managers.



Associated beneficiaries	Primary stakeholders (signed letter of support)	Examples of other stakeholders (C8-C24)
Central Denmark EU Office (CDEU) Central Denmark Region (CDR) Favrskov Municipality (FK) Hedensted Municipality (HEDKOM) Herning Municipality (HK) Holstebro Municipality (HbK Horsens Municipality (Horsens) Lemvig Municipality (LK) Lemvig Water Utility (LVS) Morsø Municipality (MK) Morsø Water Utility (MV) Norddjurs Municipality (NDK) Randers Municipality (RK) Samsø Municipality (SAK) Silkeborg Municipality (SIK) Skanderborg Municipality (SK-KOM) Skanderborg Wastewater Utility (SFV) Skive Municipality (SK) Skive Wastewater Utility (SKV) Struer Municipality (STK) Struer Wastewater Utility (STF) Syddjurs Municipality (SDK)	Concito Danish Emergency Managemet Agency Danish Export Association Danish Industry, DI Danish Technical University, DTU GEUS Ikast-Brande Municipality Odder Municipality Ringkøbing-Skjern Municipality SEGES Danish Technological Institute The Danish Coastal Authority The Danish Insurance Association, DIA The Danish Nature Agency The Freshwater Centre, FwC Vand i byer (Innovation network for Water in Urban Areas)	Citizens Landowners The Limfjord Council Emergency units Thyborøn Harbour Randers Port Drainage associations Farmers Danish Society for Nature Conservation Museums Investors Companies: Grundfos, Dansand, Kamstrup, NCC, etc.

Thisted Municipality (TK) Thisted Wastewater Utility (TV) Vestforsyning (utility) (VESTF) Vesthimmerland Municipality (CHK) Vesthimmerland Water Utility (VV) VIA University College (VIA)[31] Viborg Municipality (VK) Aarhus University (AU)[32] Aalborg University (AAU)		

[31] VIA has signed two A4 forms, due to its participation as both a partner and a member in the Advisory Committee

[32] AU has signed two A4 forms, due to its participation as both a partner and a member in the Advisory Committee

LIFE Integrated Projects 2015 – B6

EXPECTED CONSTRAINTS AND RISKS RELATED TO THE PROJECT IMPLEMENTATION AND MITIGATION STRATEGY

Risk 1: *The national socio-economic environment.*

The Danish government has with the financial law for 2016 is currently a liberal government with priorities within, amongst others, agriculture and business development. In this regard the government published an agricultural policy in February 2016 (in Danish: "Fødevarer og landbrugspakken"), which priorities farming to water environment e.g. by removing existing Danish requirements on 10 meters of agricultural free zones to streams and lakes. However, the government has included 'min-wetlands' as a means for nutrients removal. These wetlands may turn to be an opportunity for integrated measures between river ecology and CCA, an opportunity C2C CC will follow closely.

The Ministry of Environment and Food of Denmark is in collaboration with The Ministry of Business and Growth Denmark and Danish Ministry of Energy, Utilities and Climate with an evaluation of the CCA plans. According to the Danish Nature Agency, this evaluation will provide the basis for any adjustments to the framework for local CCA, including municipal planning. The evaluation is expected published in May 2016. It is unknown whether these adjustments will weaken the legal set up of the CCA plans, however, the implementation of The Water Framework Directive and The Floods Directive into the municipal spatial planning supports the long term implementation of the CCA plans, and also the mandatory risk assessments provide as a solid knowledge base for future CCA actions.

Should the IP be constrained by the national socio-economic environment, support is found in the local socio-economic environment within the region. It is characterised by a large amount of water clean tech companies with large interests in innovation and export possibilities. Furthermore, the IP is carried out by proactive local governments with a local need to adapt to flooding events from storm surges and cloudbursts, and increasing from rising ground water levels.

Risk 2: *The relatively weak institutional set up of CDR in regard to climate change planning.*

CDR is not legally obligated to take on the role as a facilitator or coordinator of CCA activities, and thus it has no legal mandate to undertake responsibilities on CCA. The regions though have the possibilities to include CCA in their Regional Development Strategies as a voluntary guideline for development.

CDR has since 2007 taken an ambitious role on climate challenges common for the region's 19 municipalities. Prior COP15 (UN's Conference of Parties on Climate Change) in Copenhagen in 2009 focus was on mitigation, the need for CCA has though increased accordingly to the experienced increase in flood events, and as a response to the former government's requirement on mandatory CCA plans, CDR initiated collaboration with the municipalities on conducting a template for a CCA plan. A template went further than national requirements by adding parameters of sustainability and development.

Despite the relatively weak institutional set up of CDR in regard to CCA, the municipalities

within the region respect and appreciate CDR's work and acknowledge it as a facilitating, coordinating and networking body (also reflected by the number of signed Associated Beneficiary Declarations and Letters of Intent). CDR has proven this through several projects and also created the basis for the establishment of a strong project consortium.

Risk 3: *The complexity of many stakeholders.*

The IP deals with integrated CCA among the 15 municipalities in the region and three municipalities from another region. The consortium consists of 3131 partners and 17 primary stakeholders (LoS), which is a strong and large consortium. The consortium is the strength of the project, but due to its size and the many organisations involved it may also constrain and delay the IP, as CDR has no legal mandate, significant decisions are to be taken at political level among the 18 municipalities.

The C2C CC consortium is very well aware of this weakness, and accommodate this by clear lines of responsibility (cf. F1). The consortium is anchored in a steering group which makes decisions on behalf of the IP and ease the effectiveness of the process.

Furthermore, several stakeholders are involved in the C-actions (C1-C24), these stakeholders are both primary and secondary stakeholders. Processes with many stakeholders may in general be expected to take longer time than normal processes.

The variety of stakeholders supports the cross-sectoral nature of CCA planning and illustrates the novelty of the IP as a real integrated CCA project. The C2C CC consortium expects that the IP will demand skills for extensive network management, for this reason the overall project management lies with CDR, who has the experience in managing networks as well as large EU projects.

The novelty of the IP on network management further relates to research fields within planning, where planning and related planning processes has moved from government, to governance, to network governance. The IP will function as a novel case in modern network governance, with replication relevance for local authorities all over Europe.

Risk 4: *Part of the funding for complementary actions is not mobilised.*

The IP includes several options of eventual complementary projects, and there is a risk that not all applications for complementary projects will succeed in getting funds. The CDR project management and CDEU will assist the partners with applications for funding and look for alternative fund and investment mechanisms.

Risk 5: *Delays related to SEA and EIA processes.*

As the actions are all related to the CCA plans (and thus the municipal spatial plans), there is a certain risk (or possibility) that the actions may involve an SEA screening or SEA. According to the SEA Directive, a SEA must always be carried out. Certain plans and programmes must be assessed in all cases while other plans and programmes must be assessed only when they are likely to have significant environmental consequences:

A. When a plan or programme in one of the following sectors sets a framework for projects listed under the EIA Directive (Annexes 1 and 2 of the Art. 3). The sectors are: Agriculture, Forestry, Fisheries, Energy, Industry, Transport, Waste Management, Water Management, Telecommunications, Tourism, Town and Country Planning or Land-Use.

B. When a plan or programme could impact on a habitat protected area under the Habitats Directive (92/43/EEC).

In addition, the Directive applies in cases where a screening requirement is in place based on level of significance:

C. When a plan or programme covers a small area or minor modifications to plans and programmes mentioned in Sections A and B above, SEA is required in cases where the Member State determines that they are likely to have significant environmental effects/impact.

D. An assessment is required for any plan or programme that sets a framework for development consent of projects, which are likely to have significant environmental effects (Art. 3(5)).

Several of the C-actions involve analysis related to flooding, which may following lead to planning decisions; in cases where the municipalities want to lay out areas for flooding, the plans will be mandatory to SEA even though the measure is formulated in general terms. Thus areas for flooding will be in low laying areas, which are already defined in planning due to topography. Oppositely, dikes and other coastal precautions are context specific, because the setting is not in the same way coherent and more factors are in play, e.g., 1) several options for materials and configuration, 2) location, and 3) which sea level rise scenario to prevent (Kørnøv and Wejs, 2013)[33]. As most of the C-actions mainly deal with initial analyses to aid decision making, SEA processes are not expected to delay the IP.

Three actions (C20, C21 and C22) involve “projects” that fall under the meaning of the EIA Directive and are expected to involve an EIA process prior to construction. The partners are well aware of the EIA process and all three actions includes the competent EIA authorities, which in all three actions are the respective municipalities. The partners have included the EIA process in the time schedule and budget.

[33] Kørnøv and Wejs, 2013, “SEA screening of voluntary climate change plans: A story of noncompliant discretion”, *EIA Review,* (41) 64-69.

CONTINUATION / VALORISATION AND LONG TERM SUSTAINIBILITY AFTER THE END OF THE PROJECT

How will you ensure the long term implementation of the plan and beyond?

C2C CC intends to lead to enhanced national legislation and/or international guidelines for integrated CCA – especially on future events after the end of the project. Long-term sustainability of the project is ensured by building up efficient cooperation and coordination structures - cross-boundary as well as multi-level governance. This shall be done by systematic capacity building measures and by creating various forums for exchanging information and best practices – enhancing local authorities' motivation to continue cooperation after the end of the IP.

Furthermore, one of the gaps mentioned previously is that some municipalities have more ambitious CCA objectives/plans than others, which makes it difficult bringing them all together; however, C2C CC will create a common understanding and starting point, which will facilitate further cooperation on CCA in the future.

Officials from the other Danish regions are invited to participate in C2C CC's workshops and this could constitute the starting point of replicability in the cities of their respective regions. This will entail that the methodologies and results from C2C CC will be further developed when replicated in other parts of Denmark.

Business development shall ensure long-term effects of the project by building up capacities in the industry and underpin the pull and push effect of innovative technologies within the CCA sector. Due to the large-scale and cross-boundary elements of the project, C2C CC will ensure that the region stays a frontrunner within water technologies and this will benefit the private sector.

C2C CC includes several large demonstration projects and construction works, and these will accelerate more financing for large projects during and beyond the project's duration. Furthermore, several of the funds mentioned in the Financial Plan (CNg) in relation to complementary projects extend beyond 2022, and therefore it is expected that the local stakeholders will continue to apply for and receive funding within the area of CCA.

Which actions will have to be carried out or continued after the end of the project?

The concrete implementation actions that have to be continued after the end of the IP is C20 AquaGlobe and C21 Climatorium.
Many of the local projects turn out to start by modelling, setting out scenarious, involving stakeholders, laying the ground for decision-making and implementation – i.e. the C2C CC lays the necessary ground for concensus and subsequent investment – during the project or after. This goes for C9, C10, C11, C12, C14, C16, C17, C18 and C19.
Pilot projects such as C13 and C22 testing new methods in water retention and permeable seepage road are expected to be replicated other places in the regions afterwards.

How will this be achieved? What resources will be necessary to carry out these actions and how will those capacities be ensured?

C20 and C21 are two innovation centres financed by tenants and managed by Skanderborg Utility A/S and Lemvig Waste Water Utility, respectively. C20 and C21 continues after IP by hosting businesses and research institutions and they will continue carrying out the activities included in the IP, that is awareness rising, tourism and corporate touism, show room for BAT within water technologies and with educational elements for pupils and students. The business models of the centres will secure the continuation of C20 and C21.

It is, furthermore, expected that the awareness rising and educational activities of action C22 pilot project on seepage road will continue after the IP and managed by VIA till the technology is outdated. The maintenance costs of the road falls under the authority of Hedensted Municipality.

Will the staff recruited/trained during the project continue to work on the implementation of the plan?

It is expected that the officials recruited and trained during the IP will continue after the IP.

How, where and by whom will the equipment acquired be used after the end of the project? (if relevant)

- Horsens (C14): 2 laptops
- RK (C16): equipment for showroom
- VIA (C18): monitoring equipment for urban water catchment

To what extent will the results and lessons of the project be actively disseminated after the end of the project to those persons and/or organisations that could best make use of them (please identify these persons/organisations)?

The organisations that could best make use of the C2C CC results are especially municipalities and wastewater utilities in Denmark and in countries with similar challenges such as Northern Europe.

The website and online platform will continue for a minimum of 5 years after C2C CC has finished. The consortium expects the project to continue even after 2022 and it is therefore planned to finance C2C CC in a new and/or continued version by either applying for a new LIFE funds or via other EU or national funds. However, for a continuation to be possible, it is necessary to continue the dissemination activities, and this is why it is important to ensure that at least the website and online platform works and is kept up-to-date.

Three C2C CC conferences (cf. E-actions) will be held throughout the project's lifetime, and all stakeholders – both national and international – are invited to participate. The first one will be held after the first year (2018), the second conference is held in 2020 and the third and final conference is held in year 2022. All demonstration projects will be concluded for the final conference, but as the overall objective is measuring climate change resilience in the region, it is relevant to host follow up conferences/events after e.g. 5 and 10 years of C2C CC's completion.

International dissemination and networking with other projects are also activities that will continue after C2C CC. The results and best practices from C2C CC are interesting for

other climate change adaptation projects in Europe, and therefore the partners involved (especially CDR and CDEU) will communicate and disseminate the project to all interested parties in the following years. Furthermore, if/when the region achieves climate change resilience; it will attract large numbers of people working in the energy and climate sectors as well as tourists to the region.

The results and lessons learned will actively be disseminated through C20 AquaGlobe and C21 Climatorium as national and international show rooms for the IP’s results and BAT also after the end of the IP. Furthermore, the results are disseminated at international conferences E3, where practitioners from most of Europe can attend.