

Climate adaptation in Denmark - how can we accelerate progress?

Main report

June 2026

Preface

With this report, the CIP Foundation presents conclusions and proposals for more and better climate adaptation based on strengthened organisation and financing. The report is based on several years of work with external researchers and experts, as well as a number of supporting reports.

The starting point is the climate change and massive damage from flooding that we can expect to see in the coming decades. Climate change means more water from more sources.

Rising temperatures bring more precipitation. Sea levels are rising, and the consequences of storm surges will become greater. Groundwater levels are higher, which increases the risk of flooding. We must also expect that several weather events will occur simultaneously and in a way that reinforces each other, thereby increasing flooding.

If no action is taken, flooding could cause damage amounting to DKK 400 billion over the next 100 years. And the society as a whole will be affected. The seriousness of the problem is underlined by the fact that the costs of doing nothing are high – both economically and for people and communities.

This calls for active measures. And the starting point is good, because the solutions exist.

The challenge is that progress is slow. Many climate adaptation projects take a disproportionately long time or stall completely. This is due to several factors. Among these is the fact that the regulatory, organisational, and economic approach to climate adaptation is fragmented and depends on the water source. The paths of water do not respect this division, and there is a need for a holistic approach to climate adaptation.

With a proposal for Climate Action Plan II in the spring of 2026, it was suggested that the state should take greater responsibility for managing flooding from the coasts. But a broader perspective is needed. A new government should formulate a national and multi-pronged strategy for climate

adaptation that ensures overall prioritisation, planning, and coordination of efforts, with an approach that addresses water from multiple sources.

This report provides input for a future national strategy and is also action-oriented towards others, from landowners to municipalities, utility companies, private businesses, and the financial sector. All parts of society must work together on the necessary climate adaptation. No single actor can solve this alone

A Danish strategy for managing flooding will also be relevant to the EU's upcoming climate adaptation plan. Climate change does not follow national borders.

There is a need for more clarity on who should pay for climate adaptation and how. It is a sound principle that those who benefit from protection also contribute to the financing, and still have incentives to prevent climate damage. Today, there are different principles depending on the type of flooding in question. In our view, this calls for more cross-cutting thinking, where the so-called utility principle is also simplified, but at the same time expanded, so that it reflects to a greater degree that both individual and collective values are protected.

The need for climate adaptation is the result of the sins of the past. Climate change and the accompanying damage are created by many years of global CO₂ emissions, which, in principle, the current landowner is left with the responsibility of managing. This raises ethical and legal questions about 'climate justice', which we also address in the report.

The need for climate adaptation is a large and expensive societal problem and one of several strategic areas that require significant investment from society in the coming years. Therefore, emphasis has also been placed on developing financing models that involve risk-willing private

capital, which does not burden the state's budget balance.

Successful climate adaptation requires systemic change. A sense of urgency in the form of experienced or threatened flooding can be a kick-start. But the guiding element must be a vision that everyone can buy into and see themselves in. A vision that creates security, cohesion, and paints a picture of the Denmark we want to be a part of. And a vision that sets the direction and creates common goals – without stifling private initiative and local action.

This report sets out a vision of a sustainable and resilient society with predictability and security for the individual, and is grounded in a principle that the responsibility for adapting Denmark to the climate is shared between the individual and society.

In the autumn of 2026, the CIP Foundation, together with Realdania, will follow up with a new dialogue tool, 'Vandkøbing', which provides an opportunity to discuss challenges with water from multiple sources and the possibilities of thinking more freely and holistically in solutions for the city. Climate adaptation has implications into the future and must also involve young people and future generations – we do this together with the Youth Climate Council, young employees from various companies, and the foundation's own Youth Advisory Board.

There is still much to be done in relation to climate adaptation.

Climate adaptation is a societal problem that requires collective solutions and an infrastructure to manage climate change. If climate adaptation is only the individual's problem, it undermines the cohesion of society.

Enjoy the report!



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Content

p. 2 **Preface**

p. 4 **Executive ummary**

Chapter 1: Why focus on climate adaptation?

- p. 8* 1.1. Why must we address climate adaptation?
- p. 8* 1.2. CIP Foundation's approach to climate adaptation
- p. 9* 1.3. Societal challenges from climate change
- p. 10* 1.4. Strategic approach to climate adaptation
- p. 12* 1.5. Need for a vision and a new approach to climate adaptation

Chapter 2: What does the climate weather forecast say?

- p. 14* 2.1. A warmer, wetter, and wilder Denmark
- p. 14* 2.2. What do we know now?
- p. 15* 2.3. More water and from several directions
- p. 17* 2.4. Do we understand the climate risk?
- p. 18* 2.5. From climate knowledge to planning and action

Chapter 3: Who is affected by flooding?

- p. 20* 3.1. How much damage can we expect from flooding?
- p. 21* 3.2. Who bears the consequences of flooding?
- p. 22* 3.3. Privately owned goods and societal values
- p. 23* 3.4. Consequences of storm surges for homeowners
- p. 23* 3.5. Who covers the damage from flooding?

Chapter 4: Who is responsible for climate adaptation today?

- p. 26* 4.1. Who should take care of climate adaptation?
- p. 27* 4.2. Potential actors in climate adaptation
- p. 28* 4.3. Planning and processes for collective climate adaptation
- p. 30* 4.4. Financing and payment models for climate adaptation

Chapter 5: How are dilemmas in climate adaptation handled?

- p. 35* 5.1. Nature-based dilemmas and solutions
- p. 39* 5.2. Distribution of responsibility
- p. 40* 5.3. Handling areas with high risk

Chapter 6: How is complex climate adaptation solved?

- p. 43* 6.1. Coupled events require coupled solutions
- p. 44* 6.2. Where are there complex climate adaptation projects?
- p. 45* 6.3. Payment according to climate zone model
- p. 46* 6.4. Potential organisation of complex climate adaptation
- p. 49* 6.5. What can partnerships contribute to complex climate adaptation
- p. 50* 6.6. How can we finance complex climate adaptation?

Chapter 7: Summary of proposals and perspectives

- p. 53* 7.1. Climate adaptation – what is the starting point?
- p. 54* 7.2. Where should we start, and what are the relevant strategic approaches?
- p. 56* 7.3. Political steps towards more climate adaptation
- p. 57* 7.4. Need for goals, visions, and actual implementation

p. 63 Appendix A: Behind DTU's figures

p. 65 Appendix B: Case: "Vandkøbing"

p. 70 Glossary

p. 72 Literature

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Executive Summary

THE SHORT VERSION

If we fail to act, we are looking at massive damage from flooding in the coming decades. Damage to buildings, infrastructure, production facilities, as well as to natural and cultural assets, which will increase over time. *It is therefore expensive to wait to do something*, and at the same time, it takes a long time to implement the necessary solutions.

This obviously calls for *action in the short term*, and it is surprising that so little has happened so far. This is probably due to a certain optimism bias. We overestimate the probability of positive events and underestimate the risk of negative ones.

But there are also a number of *systemic errors* that mean that securing the areas in Denmark threatened by flooding is happening too slowly. First and foremost, the regulation and organisation of climate adaptation differ depending on where the water comes from.

This creates legal grey areas with uncertainty about who is responsible for climate adaptation and who should pay the bill when the damage has occurred. That problem is reinforced by the fact that weather events in the future will occur simultaneously and in a way that they reinforce each other.

In addition, a number of the climate adaptation projects we are looking at are technically and legally complex and cross municipal boundaries, making them difficult for individual landowners and municipalities to handle.

The utility principle, where payment for climate adaptation is based on the benefit the individual landowner receives, is also a stumbling block precisely because of the size and complexity of the climate adaptation projects.

Therefore, there is a need to *adapt both the regulation, organisation, and financing* of climate adaptation.

The state must play a much more central and coordinating role, and a *state water fund* must be established that can provide grants for climate projects where societal values are at stake.

The storm surge scheme should be adapted with a higher collective basic contribution and an individual risk-based supplement. The state authorities must carry out risk assessments, assess costs and benefits of different solutions, and prepare plans for the realisation of the projects that have the greatest societal value.

Inspired by state-owned infrastructure and land development companies, a *state-owned company will be established to handle complex climate adaptation*. A kind of commissioning organisation that ensures expertise is built up in managing large, complex projects. This can advantageously be done through a public-private partnership.

Municipalities must be obliged to provide information about flood risks in their municipal and local plans. *Utility companies* will have an expanded role in contributing to climate adaptation – including through specific, solidarity-based user financing of climate adaptation and expertise.

Climate adaptation will be integrated into the *Green Tripartite agreement*, so that when land is taken out of production, consideration is given to whether the land can be utilised for water collection and temporary water storage.

A *ban* on new construction in the most exposed areas will be introduced. Otherwise, one must comply with the new protection requirements that were on the way with the planned adjustment of the Planning Act.

Inspired by the Green Tripartite and the climate partnerships, a '*Blue Tripartite*' will be established to address the major task of climate adaptation that lies ahead.

CLIMATE CHANGE IS CHANGING DENMARK

More precipitation, rising sea levels, more extreme weather, and higher groundwater levels mean more water, water from multiple sources – and more often at the same time.

What we call rare weather events today are becoming more common, and flooding is increasingly occurring as an interplay between *severe weather types that reinforce each other*. This challenges the way we have organised, regulated, and financed climate adaptation, where the rules distinguish between water types, and where responsibility for both prevention and damage coverage is fragmented.

At the centre stands the individual landowner with the primary responsibility for climate adaptation. But this sits poorly with a future where preventive climate action becomes more extensive and complex, and where there is a need to think across water types and municipal boundaries.

Climate adaptation is about managing risks and creating secure frameworks for citizens and businesses. This requires coherence between those responsible for climate adaptation, their incentives to do so, their opportunities to act, and their ability to finance the solutions. There is a need to strengthen that coherence.

LARGE LOSSES HIT BROADLY

Over the next 100 years, flooding is expected to cause damage amounting to approximately DKK 400 billion, measured in present-day value. Annual damages will more than triple over time and will affect all parts of society. Buildings are particularly affected, and damage to permanent residences accounts for 1/3 of the expected losses.

The business sector is particularly exposed and is expected to bear almost half the bill from storm surges and cloudbursts in the form of damage to buildings and production equipment, and in the form of lost production and activity. In addition, there are derived consequences. From one industry to other places in the value chain. From a delay in one place to a chain reaction of effects. From physical assets to the collateral base upon which financing is tied.



The majority of the expected losses concern privately owned assets. But *flooding also affects public goods and societal values*. This concerns public buildings such as schools and care homes, and the welfare services provided from them. This concerns infrastructure such as roads and railways, and mobility in society. And it concerns nature, recreational areas, and culture. Climate adaptation is therefore also about protecting and looking after public goods.

RISK OF IMBALANCE

Damage from flooding is distributed unevenly geographically. The greatest damage is expected in the large cities, where values are concentrated and greatest. But a number of *coastal and peripheral municipalities are hit relatively harder*. The largest losses per capita are seen in municipalities with a relatively low income base, which therefore also find it most difficult to finance prevention.

Climate change and flooding can therefore contribute to reinforcing an already ongoing development between rural and urban areas and make it more difficult to maintain activity in all parts of Denmark.

Climate adaptation is therefore also about what kind of Denmark we want, where we can live in the future, and where we can have different forms of activity.

INVESTING IN PREVENTION PAYS OFF

Early Action reduces costs. One Danish Krone invested in climate adaptation is estimated to return two to three Kroner in the form of reduced damage. If we wait to act, it comes with a price: 10 years of delay is estimated to cost approx. DKK 48 billion; in the meantime, there will be damage from flooding which is expected to affect around 139,000 permanent residences. 20 years of delay costs up to DKK 88 billion. In other words, time is money, and it is expensive to wait to act. Time spent on considerations, decisions, and processes must, in other words, be worth the wait.

WHY ISN'T MORE HAPPENING?

Even though the knowledge base is solid, the technical solutions exist, and the macroeconomy is fundamentally ready for more investment, climate adaptation is happening slowly and to an insufficient extent.

This is partly because the responsibility for climate adaptation, as a starting point, lies with the individual landowner, who does not always have the necessary knowledge and financial resources. When it comes to collective solutions, responsibility is fragmented, which is linked to siloed regulation that does not take into account that water comes from multiple sources and flows together.

The division of responsibility and labour is unclear, and no one has the ultimate responsibility and is leading the progress.

It also slows down the pace that the process for collective projects is long – often 15 years or more – and characterised by complaints and many difficult approval processes, where there can be conflicting interests for which no one has the solution.

Economically, *municipal construction budgets* are challenged when climate adaptation, as a new and large task, has to compete with schools, care homes, and day-care centres for the same financial frameworks.

The time horizon also plays a role. The large but rare weather events are perceived as something that will happen in 50 or 100 years, while decisions are a reflection of current challenges.

The result is that climate adaptation is happening more slowly than the cost picture suggests.

NEED FOR A NEW APPROACH

The report proposes a new holistic approach to climate adaptation based on a number of guiding principles:

- *Climate adaptation must be viewed as infrastructure*—a societal task on a par with roads, utilities, and other critical infrastructure. A way to organise the most complex projects. And a way to structure financing.
- Climate adaptation must be structured *based on the physical world*, where water comes from multiple sources and follows a physical cycle. Coupled weather events require coupled solutions.
- Those who benefit from climate adaptation must help pay for it. But not alone. *The utility principle must be developed* to better reflect the values protected by climate adaptation – including public goods.
- Climate adaptation is not just about protection in Denmark. We must structure, organise, and finance complex climate adaptation projects so that *learning and experience are captured*, and the underlying processes are standardised and streamlined, which can help make it cheaper and faster over time. This will build an entire industry that can also provide solutions abroad.

CLIMATE ADAPTATION REQUIRES DYNAMIC PLANNING AND THE USE OF MULTIPLE LEVERS

Climate adaptation cannot be achieved with a single solution. It requires a *multi-pronged strategy* that combines early warning and emergency preparedness with protective structures, alternative material choices that allow for water during certain periods, and changed planning and land use, so that the highest-risk areas are kept free from new activity. We must not build our way into more and greater risks.

Over time, we will see that for some of *the most vulnerable areas, it is not possible to adapt to the climate*—neither physically nor economically. They must be converted for other purposes. This means a retreat, which should preferably be planned

rather than market- or disaster-driven. This requires planning and political decisions regarding what should happen to the assets in the area.

All sub-strategies must be brought into play. They each have their own time horizon, and while one strategy is in play, planning must be done for the time after. For example, temporary emergency preparedness will often be replaced by protection solutions that keep the water out. When there is uncertainty, the strategic approach must be adaptive, so that adjustments can be made, additions built, or direction changed when new knowledge or new needs arise. By having an overlapping and coordinated approach to managing flood risks, the requirements for individual solutions can be reduced.

THE REPORT'S PROPOSALS: SEVEN THEMES

1. NATIONAL COORDINATION AND A COMMON KNOWLEDGE BASE

There is a need for a *national strategy* for climate adaptation that addresses water from multiple sources and coordinates across municipal boundaries. The starting point must be a common state data basis, a common emission scenario, and mapping of risks right down to the cadastral level. With good and clear communication, flood risk must be made concrete and action-oriented for the individual property owner, for businesses, for municipalities, and for professional actors. We must *know our risk of flooding*.

2. PLANNING WITHIN THE NATURAL WATER CYCLE AND WITH A MULTI-PRONGED STRATEGY

Climate adaptation must be planned based on *the water cycle* and not based on administrative boundaries and regulatory silos. In the real world, water converges and challenges fragmented adaptation solutions and fragmented damage coverage. Floods are increasingly occurring as combined or coupled events. And, as mentioned, coupled events require coupled solutions.

CIP FOUNDATION | Executive summary

Therefore, climate adaptation must be based on the 23 main water catchment areas. Municipalities already know them from the work with the Green Tripartite Agreement. That work must continue and not just be about taking agricultural land out of production. It must also be about how some of the *areas can be utilised for temporary water storage* and nature-based solutions rather than more solutions involving steel and concrete in the cities.

Climate risk management and adaptation plans should be expanded to include all water sources and the entire strategic palette – from temporary emergency preparedness to retreat.

3. NEED FOR A NEW ACTOR AND NEW ORGANISATION FOR COMPLEX CLIMATE ADAPTATION

No actor is currently allowed to manage water from multiple sources simultaneously. The report proposes a *new professional actor* that can solve complex climate adaptation across water sources and municipal boundaries, organised with state anchoring and legal authority via construction acts – inspired by the way main roads and other infrastructure are established.

Such a company could function as a professional commissioning organisation that establishes a subsidiary for each climate adaptation project. In this way, the company would both commission, finance, own, and be responsible for the operation of the climate adaptation solutions.

By having to manage an expected 20–25 projects, continuous experience gathering will be achieved within the company, which can be utilised to streamline, standardise, and shorten the process time.

Alternatively, the company can be established as a partnership model, where private actors are attached to the specific project companies. The advantage of a partnership model is that the risk for the specific project is transferred to another

party; this applies to both the finances and compliance with deadlines.

Since there is currently no market for establishing complex climate adaptation with organisation and financing, it may prove necessary for the state, at least for a start-up phase, to take the lead and define the market. On the execution side, there are already established contractors and consultants.

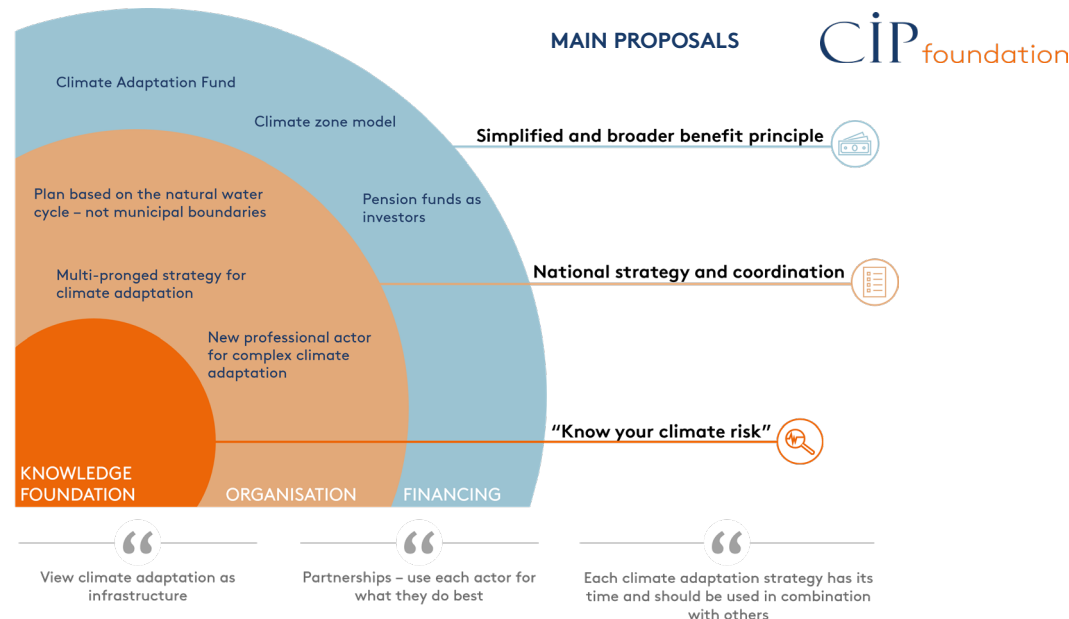
4. CLIMATE ZONE MODEL AS A NEW PAYMENT MODEL

For complex climate adaptation, a *simple, risk-based climate zone model* with three steps is proposed, where property owners in an area are classified according to overall flood risk and objective criteria such as the size of the building. The model is supplemented with public contributions that cover public goods as well as any specific considerations such as distributional policy considerations or considerations for rural areas. The payment from property owners is linked to the municipal property contribution to ensure efficient collection. This introduces an expanded utility principle that better reflects who and what is being protected, and consists of both individual and solidarity-based contributions that run over a longer period, thereby reflecting that several generations benefit from climate adaptation.

5. BROADER FINANCING BASE

Climate adaptation of public goods cannot be borne directly by individual landowners. The report proposes a *state water fund* that covers expenses for the climate adaptation of societal assets. In addition, the inclusion of private capital as a source of financing is proposed – just as in other infrastructure. Pension funds can also establish a *targeted investment fund* for long-term investments in climate adaptation – an investment type that matches the sector's need for stable, long payment streams with low risk and a green ESG profile.

The *storm surge scheme* is central to damage coverage for one of the most damaging types of



flooding. As weather events become more frequent and severe, coverage will fall over time, so it is proposed to make it more robust via a two-tier financing system with a higher solidarity-based base premium and a risk-based surcharge for the most exposed properties.

6. CLIMATE ADAPTATION IS FULL OF DILEMMAS AND REQUIRES A DEMOCRATIC CONVERSATION

Climate adaptation is not simple, but full of dilemmas and difficult choices. The relationship between nature and climate adaptation requires better guidance for municipalities so that projects are not unnecessarily delayed – and so that nature-based solutions are utilised as a partner. Utility companies should be allowed to include the value of nature in cost-benefit analyses. Today, we are building ourselves into more risk, and there is a need to *stop new construction in risk areas*, allow voluntary purchase of particularly exposed properties, and have an open conversation about how responsibility is shared between the individual and the community.

7. A “BLUE TRIPARTITE” FOR CLIMATE ADAPTATION

Climate adaptation requires many parties to move simultaneously. Inspired by the Green Tripartite and the climate partnerships, a “blue tripartite”

is proposed between the state, municipalities, and the financial sector regarding a common risk picture, division of labour, financing, and damage coverage. Together with an independent expert group that continuously advises the government on climate adaptation – as is known from Sweden and the UK – such a multi-party discussion can provide the necessary political momentum and signal that climate adaptation must be prioritised.

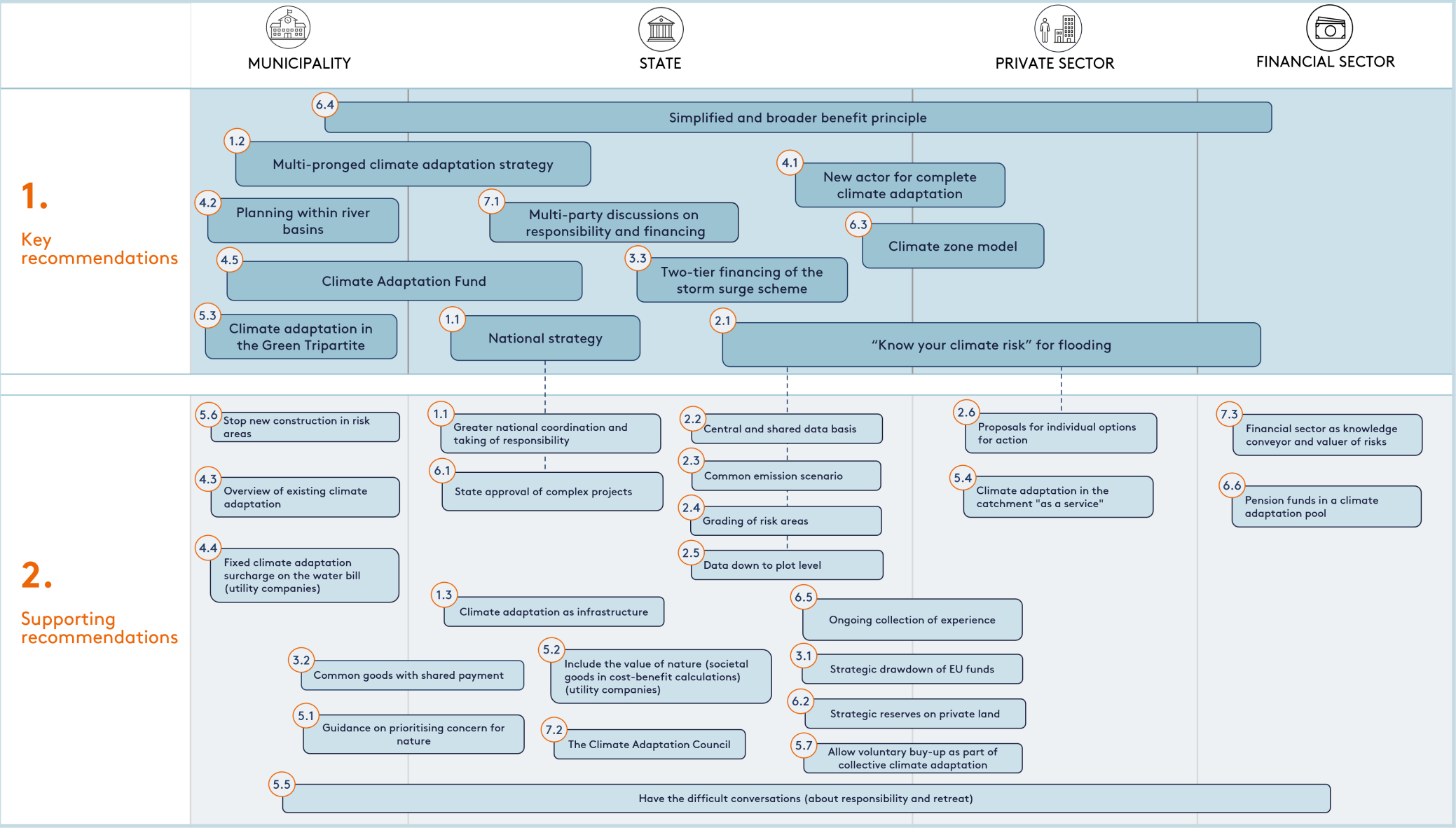
FROM REPAIRS TO PREVENTION

Climate adaptation is about security, about a robust society, and about where one can live and have activity in Denmark in the future. We must move from repairing climate damage to prevention – and we must get started and plan before the damage occurs.

The proposals in this report do not solve everything and not once and for all. But they show ways to move forward. For all parties. All levels must be activated in climate adaptation. Progress and time matter.

For the CIP Foundation, the question is not whether we should adapt to the climate. The question is how we as a society best prepare ourselves for a weather forecast with more water from multiple sources and make society more resilient. Page 6

Summary of the report's proposals



1. Why focus on climate adaptation?

This chapter introduces what climate adaptation entails, why there is a need for it, what strategic choices it requires, and what barriers and challenges exist for more climate adaptation to be implemented in society. There must be incentives for it, but also something to aim for – a vision of what kind of society we want in the future.

Key take-aways from the chapter:

- Climate adaptation is about managing risk and creating security.
- Climate adaptation is full of dilemmas, and one is never quite finished with it.
- We will not be able to build sufficient protection for all of Denmark and must instead use a range of different climate adaptation strategies to increase the robustness of society.
- Climate adaptation can be seen as a form of infrastructure for society that keeps activity and opportunities going.

1.1. Why do we have to address climate adaptation?

Climate adaptation is about risk management. About addressing the various forms of risks that arise in the wake of climate change and making active choices about how the risk should be countered.

Climate change is the consequence of past CO₂ emissions, which we now see in the form of rising temperatures and more extreme weather resulting in a number of losses and damages, sometimes also human lives. The changes also mean that we

will more often see several weather events at once (compounded events), where the effect of the individual events reinforces each other, so the floods become larger than otherwise.

Even if we were to stop all emissions tomorrow, the atmosphere is like a supertanker to turn, so it will take many hundreds of years before the temperature increases turn again, cf. The Danish Meteorological Institute (DMI).

Therefore, for a longer period, we are forced to address the consequences of climate change while we continue to work on reducing carbon emissions into the atmosphere.

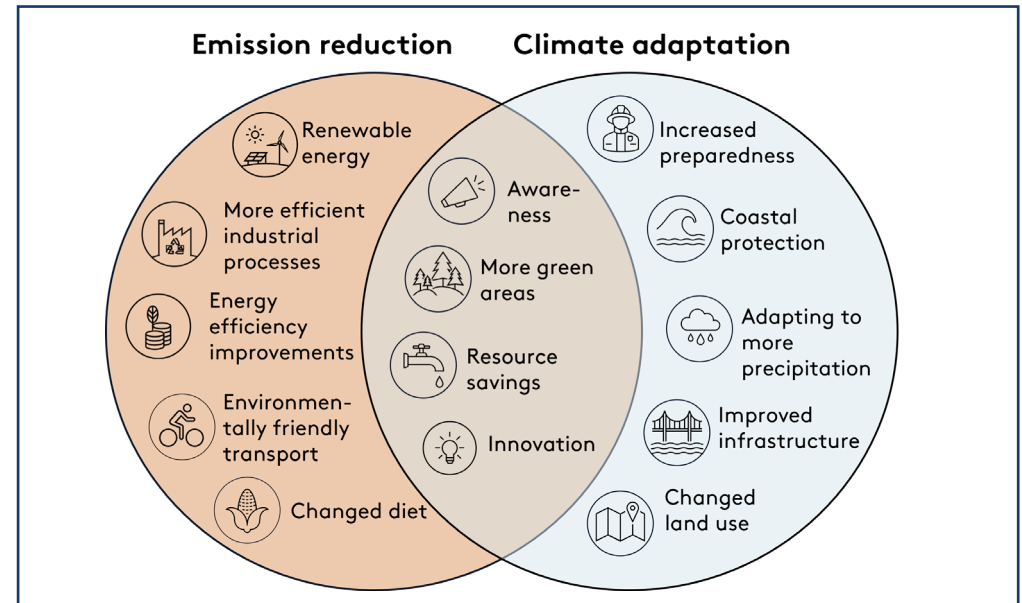
In other words, we must address both the *cause*, which is about CO₂ emissions that must be reduced and act globally (climate mitigation), and the *effect* or consequences of past CO₂ emissions, which are seen in the form of climate change that is felt locally and requires adaptation (climate adaptation).

For Denmark's part, climate change is especially about more water from multiple sources and thus about the risk of more and larger floods.

Denmark is among the countries that are expected to have the largest economic losses per citizen from climate change, partly as a result of the large coastal area of approx. 8,700 km, which is among the longest coastlines in Europe. (EEA, 2024)

Denmark also has a particular challenge with rising groundwater or shallow groundwater, cf.

Figure 1.1. Both cause and effect must be addressed



Source: CIP Foundation's own illustration

GEUS. The challenge is seen primarily in parts of Northern Europe (the Netherlands and parts of Germany and Belgium), while Southern Europe is experiencing drought problems and falling groundwater levels to a greater extent.

1.2. CIP Foundation's approach to climate adaptation

As a non-profit foundation with a focus on climate and sustainability, the CIP Foundation has so far mainly concerned itself with how we can reduce and neutralise CO₂ emissions, i.e., the green transition.

However, the foundation also wishes to address the consequences of past emissions, which are creating the climate changes we see today and in the future.

Many actors with special expertise have long been involved in climate adaptation, and it is with great respect that the foundation looks at and incorporates the knowledge and experience that has already been acquired.

Like others, we can also observe that not much is happening in the real world in terms of realising climate adaptation. Since the Bodil storm in 2013, only one new dyke has been built in Denmark. Cloudburst tunnels in Copenhagen have been in the pipeline for 15-20 years. Not because the construction itself takes so long to establish. The solutions are known. But other parts of the process take time and function sluggishly.

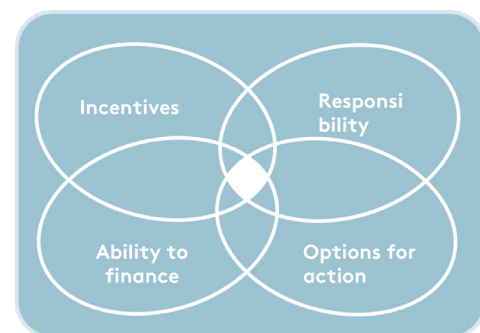
There is a great need for climate adaptation, and the CIP Foundation therefore set out to investigate:

CIP FOUNDATION | Why focus on climate adaptation?

- What do more floods mean economically for society, what are the consequences, and who bears them?
- How can new ways of organising and financing climate adaptation support the implementation of more appropriate measures?
- How best to deal with water from multiple sources in a combined water cycle, and sometimes even at the same time?
- How can the financial sector be involved as a link between the need for climate adaptation and those who have the solutions, through the sector's specialised knowledge, risk hedging, and capital?
- What can be learned by viewing climate adaptation as a form of infrastructure?

If more climate adaptation is to be implemented, there must be a good connection between who is responsible for climate adaptation, their incentives to implement it, their real opportunities for action, and their financing capacity. If these elements do not support each other, as shown in Figure 1.2, it can help to slow down climate adaptation.

Figure 1.2. Need for strengthened coherence in climate adaptation



Source: CIP Foundation's own illustration

1.3. Societal challenges from climate change

Climate change is a known and increasingly well-understood challenge. Although there are several scenarios for development, there is no doubt about the direction. We therefore have the fact-based prerequisites to be able to act. Nevertheless, climate adaptation is happening quite hesitantly. A bit like watching a traffic accident in slow motion.

WHY ISN'T MORE HAPPENING?

There are surely many reasons why there is not greater activity regarding climate adaptation. Seen from a systemic and societal perspective, there are several underlying reasons why it is challenging to implement climate adaptation.

The individual challenges and barriers are shown in more detail in Figure 1.3 and are related to, among other things:

- That *climate adaptation is initially considered an individual problem to handle.*

The need for climate adaptation, namely climate change, is otherwise created collectively, globally, and over time as an externality of emitting CO₂, and not (only) by the individual today.

In principle, the damage should therefore be covered by the emitters, e.g., through an international tax on CO₂ emissions ("polluter pays"). In practice, this is difficult, at least with retroactive effect. In the EU, revenues from the EU Emissions Trading System (ETS) are used for climate-related purposes and most often to finance the green transition.

The individual landowner can and should, of course, do something themselves to prevent damage. Sometimes collective prevention is a better answer to the challenge than individual solutions.

Figure 1.3. Challenges for climate adaptation



Source: CIP Foundation's own illustration

Some of what society wants to protect are also common values (public goods).

- That *the division of responsibility and labour is unclear*, so the responsibility for climate adaptation ends up being everyone's and no one's responsibility, where one waits for others to take initiative, and ends up with slow and complex processes where information does not flow without friction.
- That *the water cycle in the real world does not distinguish between which water source causes the flooding*. Rules and frameworks, on the other hand, do distinguish, and are not flexible enough to enable cross-cutting solutions.



PROPOSAL 1.1: Need for national coordination and strategy across water sources

The water cycle does not follow municipal boundaries and sometimes requires cross-cutting solutions. For the more complex projects, there is a need for coordination across municipalities, i.e., at a national level.

- National coordination of complex climate adaptation.
- National strategy for how different water sources are handled, how responsibility is distributed, and how the bill is covered.
- That *we have historically had a tradition of, and attach value to, living close to the water*, and that perhaps it means more to us in everyday life than the risks associated with it?

THE TIME HORIZON IS DECEPTIVE

One of the challenges with climate change is the time horizon. The changes happen gradually over time with the risk that one does not perceive them. A bit like the frog that doesn't jump out of the slowly heating water that eventually comes to the boil.

The time horizon can also be blinding in terms of when one should act. It can feel as though there is plenty of time to react. Most talk is about rare but major weather events. It can be perceived as a very long-term need. At the same time, there are always current challenges to deal with, even within the ongoing election period.

So, even if in principle one has the knowledge and can foresee that large waves are waiting far out on the horizon, the smaller waves near the coast can fill most of the decision-making space.

CONSEQUENCES

As we shall see in Chapter 3, among other places, climate change (if not countered) could lead to damage on a scale that could have implications for where people can live and conduct activities in Denmark. An increasing amount of damage must also be expected to lead to behavioural changes, in the sense that people and capital move away from the most exposed areas. However, this will not happen.

In large cities and commercial areas, there will be so many assets concentrated that the investment case for prevention is very positive. It is more difficult where there is more distance between houses. Because it is neither profitable nor physically possible to secure everything, protection is not the only answer. Other approaches must also be brought into play.

1.4. Strategic approach to climate adaptation

When people say climate adaptation, many think of protective solutions that safeguard something existing. For example, in the form of high-water walls, dams, sewers, etc. But climate adaptation also covers other actions that address climate change in various ways.

This can range from the first warnings of storms, elevated water levels, or extreme rainfall and acute but temporary emergency preparedness, to more permanent solutions that may involve protection, but also various forms of accommodating more water through material choices, building practices, and placement, as well as changed use of the most exposed areas over time, which reduces vulnerability.

Climate adaptation therefore involves several different approaches, which together provide a strategic breadth to handle different situations and at different times. Often, in an area or a city, there will be a need for different solutions at one and the same time. Or solutions that must replace one another. Something that protects in the short term, and something that reduces vulnerability to loss in the longer term.

Climate adaptation cannot be managed with one solution – there is no one-size-fits-all. Neither for the specific challenge of water nor over time. On the other hand, there are various sub-strategies that can be employed, each with its own advantages and disadvantages, and which are suitable for different times. See Figure 1.4.

Doing nothing or **letting things be** is in principle a form of taking a stance on climate change – namely, a decision not to protect or prepare for flooding for the time being.

Even though this wait-and-see approach may be the result of waiting for more knowledge and waiting to see if developments occur as expected, it has consequences for future generations' options for action. Planning land use and adjustments in how one builds, where and how, are time-consuming processes in themselves and are not quickly activated if, for example, one is waiting for a serious, climate-related weather event before taking steps.

Together, the different approaches can create a form of **multi-layer safety**¹. By having overlapping and coordinated approaches for managing flood risk, the requirements for individual solutions can also be reduced. The Netherlands was among the first to adopt this approach instead of relying solely on protection.

Figure 1.4. Climate adaptation with several sub-strategies, each having its own time



Sources: CIP Foundation's illustration based on IPCC (2022), DMI (2025), and Jørgensen et al. (2022)

¹ Tested, among others, by the Danish Coastal Authority for three pilot projects through FRAMES, an Interreg collaboration in the North Sea.

NOT PHYSICALLY POSSIBLE TO PROTECT EVERYTHING

Around 1/3 of Denmark's area is at risk of flooding from one or more water sources (CONCITO, 2024). It will neither be physically possible nor profitable to create full protection against flooding for everything.

Therefore, one must work with how much flooding one can accept, and how much one can, for example, handle through temporary protection via emergency services and one's own measures, and where one must invest in more lasting solutions that either have a protective purpose or accommodate the water in a more robust way.

There will always be a residual risk that cannot be handled through physical measures and better planning. Therefore, there are also various forms of damage coverage, which are described in more detail in Chapter 3, to address the economic loss of value, just as any re-establishment should be carried out with a view to avoiding future damage, for example through the 'Build-back-better' initiative in the UK, where homeowners may use a portion of the damage compensation for future climate adaptation (CIP Foundation, 2025).

DUTCH STRATEGIC SHIFT

Around 1/3 of the Netherlands' land area is so low-lying that it is effectively below sea level. Therefore, the Netherlands has for many years worked with climate protection against the sea as a national priority. Around the coast, there are outlets for several major rivers in a delta area.

The Netherlands has about 450 km of coastline², several rivers and watercourses, and has overall established about 22,000 km³ of dikes and flood protection along coasts and rivers over time. The task of merely maintaining these facilities is very extensive, and it is difficult to even maintain the status quo.

⁴ Own calculations based on the Danish Coastal Authority's information on the 8 projects. [The history behind the Coastal Protection Fund](#)

In line with rising sea levels and maintenance challenges, the Netherlands is also reaching the realisation that not everything can be protected, but that some of the most exposed areas should instead be converted for other purposes. I.e., one uses several sub-strategies at the same time, and works adaptively cf. box 1.1

Denmark is forced to do the same.

Denmark has approx. 8,750 km of coastline, and it will be neither physically possible nor profitable to protect it all. This can be seen, for example, by the fact that under the auspices of the Coastal Protection Fund (Kystpuljen), eight municipal projects have been completed since 2020, which collectively cover about 35 km of coastline⁴.

So even if it were profitable to establish climate adaptation with protection in many places, it is not certain that it can be done in practice. The processes take a very long time, and because it requires resources, both financial and labour, to establish the protection.

Box 1.1. Dynamic Adaptive Policy Pathways (DAPP)

DAPP (dynamic adaptive policy pathways) is a Dutch planning approach that allows for long-term planning under great uncertainty, such as climate change, and works in a way where one can choose a direction that is robust against possible shifts.

The method encourages working in stages or phases with climate adaptation, where one continuously adapts to the challenges (adaptively).

This means that one can change strategic direction as the effectiveness of some measures reaches its end. For example, there are limits to how high a protection solution can become, even if it were to be raised several times. In line with rising sea levels, there is thus also an expiry date for specific solutions.

Sources: NIRAS and the Danish Coastal Authority (2020)

PROPOSAL 1.2: Need for national coordination and strategy across water sources

Climate adaptation is not just about protection, but also requires many other sub-strategies to be brought into play, each having its own time. Climate adaptation involves a mix of:

- Warning systems, temporary emergency preparedness, and evacuation plans.
- Physical planning and use of areas and materials to better accommodate the water.
- Physical planning to avoid new risk by limiting new construction and new activity in risk zones.
- Planning and changed land use with the withdrawal of housing from the most exposed areas that cannot be secured.

EXISTING PROTECTION CAN ATTRACT MORE ACTIVITY

Protection in the short term and up to a certain level can help reduce risk awareness and potentially provide a false sense of security. Protection can also in itself attract more migration and activity ("the dike dilemma"), which increases the vulnerability behind the protection, understood as the potential assets that can be damaged.

The timing of climate adaptation with protective structures can therefore also influence settlement patterns. Climate adaptation takes a very long time, which is described in more detail in Chapter 4, so completed protection projects can have implications for where one can live and have activity in Denmark. It may even become a competitive parameter in the future for the location of homes and businesses.

²[Netherlands Coastline Length \(km\) 2025: 451 km | Geo Factbook](#)

³[Dike map | Dutch Dikes](#)

PROPOSAL 1.3: See climate adaptation as infrastructure

It is recommended that one approaches climate adaptation in the same way that we currently approach other infrastructure, where some solutions are established and have a certain technical lifespan, but where the network of infrastructure together forms the solution, and where sub-elements over time supplement and replace each other.

- Infrastructure requires coordination across sectors and long-term planning both nationally and locally with several levels of solutions
- Infrastructure connects the country and consists of several sub-elements – some critical for the function of society in the area.
- Infrastructure provides opportunities, influences settlement patterns and the location of businesses.
- Infrastructure involves long-term projects with large capital investments and the tying up of capital. But the alternative is the destruction of capital.
- Pension funds are already used today for investments in other infrastructure due to the long time horizon, and where there are relatively stable and secure income streams.

It will therefore take a very long time to establish a comprehensive protection, just as it will tie up a disproportionately large part of the construction and civil engineering industry to establish it.

Therefore, it will be necessary to work with several approaches. Sometimes also at the same time

and for the same area, to create the best climate adaptation over time.

Execution of each sub-strategy takes time, and to avoid bad investments or too much path dependency, there must also be the possibility to change sub-strategy over time.

NEED FOR A FLEXIBLE AND ADAPTIVE APPROACH

This requires a flexible and adaptive approach to climate adaptation, which allows one to act, but also to gain more knowledge over time and to think in stages instead of solutions once and for all. The step-by-step development keeps the room for manoeuvre open to adjust in line with new knowledge. The investments are not permanently locked to specific solutions

Having the option open to do something else over time has a special value when operating under great uncertainty and multiple scenarios for the development of climate change.

Climate adaptation is therefore to a greater extent about robust solutions for a certain period of time rather than optimal solutions, when it is not possible to find one optimal solution across scenarios and all time horizons.

Different protection solutions typically have a technical lifespan. The lifespan of the adaptation solution must therefore also be considered in relation to what will at some point replace the current solution.

1.5. Need for vision and a new approach to climate adaptation

The necessary climate adaptation will require something from us all. And over a long time. To be able to maintain focus over several generations, it is therefore important to know what climate adaptation is about, and what we should aim for.

A clear sense of urgency is emerging, driven by the prospect of increasing damage and substantial economic and human losses. But there is also a need for a positive vision – a direction characterised by action and opportunities to do something better.

Climate adaptation is also about the mindset we apply to it. Why should we adapt to the climate? To avoid something, yes, but also to move towards a different future, which we ourselves have the opportunity to influence.

Climate change creates fear and uncertainty. On the other hand, it is in the self-interest of virtually all stakeholders to do something about it. Private assets risk ending up as 'stranded assets' due to climate change, where the value falls before the end of their lifespan, and where one risks being stuck with loss-making assets.

Here, one must utilise what individuals can contribute. What measures citizens themselves can take on their own property, what the financial sector can contribute in terms of knowledge dissemination, risk management and financing, and what the authorities can contribute in terms of supporting frameworks and processes.

Climate adaptation cannot be solved by the individual alone. Nor by the state alone or by individual municipalities. The private market can contribute something, including new roles, but not all solutions either. Climate adaptation is therefore about shared responsibility, partnerships and using stakeholders where they contribute best.

It will require greater state coordination. And greater state co-financing, but not only that. We all benefit from climate adaptation and must contribute to it in a way that also provides incentives to do as much as one can oneself to limit potential



VISION

for climate adaptation in Denmark

Climate change is changing Denmark and challenging us with more water and more losses. But we have the opportunity to act.

"Climate adaptation preserves values and opportunities in society today and for future generations"

Climate adaptation has several strings to its bow, and several partial solutions must be brought into play simultaneously to equip us as best as possible through the time when climate change intensifies.

- Climate adaptation for the future is a **societal task** – just like the management of other critical infrastructure.
- The task is so great that everyone must contribute, from the property owner to businesses, the financial sector, and the state and municipalities.
- We must move from repairing climate damage to prevention – and we must get started before the damage occurs.

"Climate adaptation creates security and resilience in the places where we will continue to live and have activity"

damage.

And we must also remember that more water is also a resource. Which can provide new opportunities, and which can be used and distributed.

1.6. Structure of this report

This report is based on a number of studies and analyses, which have been developed under the auspices of the CIP Foundation's climate adaptation project, as well as on insights from many experienced stakeholders, researchers and practitioners who have worked in the field for years.

The purpose of this report is to provide clear and tangible recommendations on how we can promote more appropriate climate adaptation.

The proposals do not solve everything, or once and for all. But they show ways to move forward and get started. Progress and time matter.

The challenges are so great that we will need all current stakeholders to continue to undertake climate adaptation – from the individual property owner who creates solutions themselves, to homeowners' associations that create solutions on common areas, to municipalities that manage watercourses and wastewater utility companies that manage precipitation. But we will also need to supplement with some new approaches where it becomes difficult – for the complex and composite flooding challenges. Where solutions require scale, competencies, continuous learning of processes and a scope of financing that exceeds what a single municipality can be responsible for.

In other words – all hands on deck are needed for climate adaptation.

The report is structured so that in Chapter 2, one starts with an overview of what climate change means for Denmark, and what awaits in the 'climate weather forecast' as a result of changes in the physical world.

CIP FOUNDATION | Why focus on climate adaptation?

Chapter 3 describes the economic consequences of increasing flooding, with a focus on who will bear the consequences, and where in the country different forms of flooding can especially be expected. The economic consequences can be seen both in the form of damage to buildings, but also in the form of limitations on possible activity in the affected area.

Chapter 4 summarises the regulation of the different water types that can lead to flooding, and who is responsible for preventing damage, how it is organised and financed.

Chapter 5 describes dilemmas within climate adaptation. This includes delving into selected themes: The relationship between nature and climate adaptation, the distribution of responsibility, and managing the need to retreat from particularly vulnerable areas.

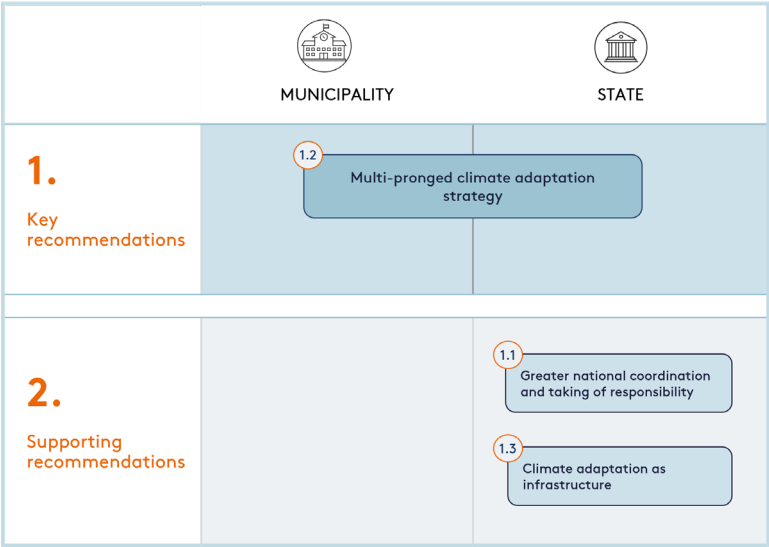
Chapter 6 unfolds possible organisational and financial approaches for complex climate adaptation projects where multiple water sources must be managed, and at the same time describes a possible strategy for where to start and how.

Chapter 7 summarises the report's recommendations and puts the need for climate adaptation in Denmark into perspective.

Appendix A briefly explains DTU's approach and model-based method for estimating national consequences of flooding from different water sources.

Appendix B contains a brief description of 'Vandkøbing', an upcoming case-based dialogue tool on how to manage water from multiple sides and combined weather events by thinking holistically and planning based on the entire water catchment area. Vandkøbing can be used as a case to look at the value of being able to plan across sectors and with more degrees of freedom for complex climate adaptation.

Summary of proposals in Chapter 1



2. What does the climate weather forecast say for Denmark?

Climate change will affect the weather in the future all over the world. In Denmark, this means more precipitation, rising sea levels and more extreme fluctuations in the weather, where flooding occurs more often and from several sources at the same time. This chapter summarises the outlook for the future climate in Denmark, and explains why flooding is a growing and different risk than we have been used to. The chapter thus serves as a foundation for the rest of the report.

Key take-aways from the chapter:

- The weather in Denmark is becoming warmer, wetter, and characterised by more extreme conditions.
- The risk of flooding is rising significantly, where what is currently seen as rare events will become more common.
- Flooding is increasingly occurring as an interplay between several weather phenomena (combined events), which increases the consequences.
- Planning and climate adaptation cannot, therefore, be based on historical experience, but must be based on forward-looking climate scenarios and a changed risk profile.

2.1. A warmer, wetter and wilder Denmark

Climate change is a global phenomenon driven by the emission of greenhouse gases (CO₂e) from human activities. The UN's Intergovernmental Panel on Climate Change (IPCC) concludes that temperature increases have already led to noticeable changes in the climate system, including altered precipitation patterns and an increase in

the frequency of extreme weather events (IPCC, 2021b).

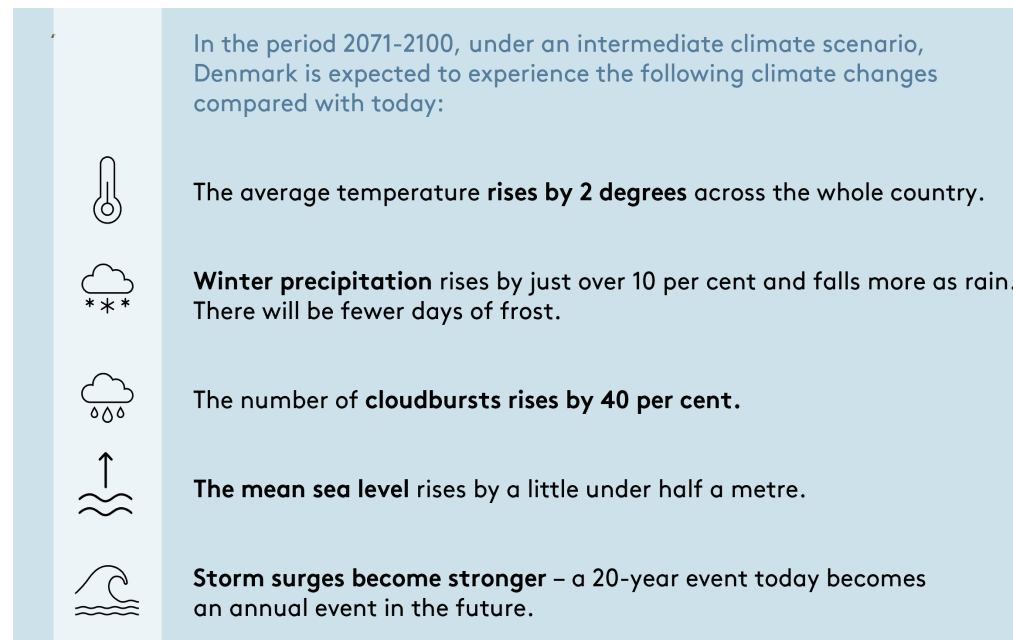
These global development trends are also clearly reflected in Europe, which is the fastest-warming continent in the world. Here, the temperature increase since the 1980s has been above the global average (C3S, 2025). This means more and more intense extreme weather events, including heatwaves, heavy precipitation, and flooding – a development we are also seeing in Denmark. While other European countries are particularly affected by heatwaves, Denmark will be relatively more challenged by flooding. Due to Denmark's very long coastline, the European Environment Agency sees Denmark as one of the economically most exposed countries per citizen (EEA, 2024).

Climate change is not just a distant, future scenario. It is already underway in Denmark, and the development is expected to continue – and in many cases accelerate – in the coming decades (Ministry of the Environment, 2023).

It is not only the average state of the climate that is changing. Climate change is also increasingly affecting the variations of extreme events. Periods of heavy rain, storms, and elevated water levels are occurring more frequently and with greater intensity than before, cf. Figure 2.1. This challenges existing buildings, infrastructure, potential land use, and society's overall resilience.

The consequence is that historical normals are increasingly losing their value as a basis for planning. Past experience can to a lesser extent be used as a guide for future climate and flood risks,

Figure 2.1 DMI's Climate Atlas shows the climate weather forecast



Note: The figures indicate the expected changes in selected climate indicators for the period 2071–2100 compared to 1981–2010
Source: DMI (2026a)

and planning should be based to a greater extent on forward-looking climate scenarios.

2.2. What do we know now?

The DMI Climate Atlas currently constitutes the central knowledge base regarding the future climate in Denmark by combining historical observations with climate models and projections (DMI, 2026a). The Climate Atlas is based on international climate scenarios prepared by the UN's Intergovernmental Panel on Climate Change, which describe different development paths for global greenhouse gas emissions. See also Box 2.1.

Although there is uncertainty associated with projections, there is broad consensus on the direction: climate change will continue to be present, and

significant changes in the climate system have already taken shape (DMI, 2026a).

PROJECTIONS BASED ON CLIMATE SCENARIOS

In several Danish analyses, the medium-high emission scenario is used as a realistic planning basis, which reflects that the world is no longer on course for the most ambitious reduction paths. Under this scenario, significant changes in temperature, precipitation, and sea level are expected, with direct implications for flood risks in Denmark, as also seen in Figure 2.1.

MORE PRECIPITATION AND RISING SEA LEVELS

One of the most significant climatic changes concerns precipitation. Total annual precipitation is expected to increase, but the increase is particularly pronounced in the winter half-year.

Box 2.1: Scenarios for climate change

The UN climate agency, the IPCC, prepares scenarios for climate change based on how much CO₂ emissions are expected. The scenarios range from low scenarios (SSP 1-2.6), where emissions are reduced significantly compared to today, for example, to comply with the Paris Agreement. This can lead to temperature increases of 1.5–2 degrees by the end of this century compared to pre-industrial levels. In addition, there is a medium-high (SSP2-4.5) and a high scenario (SSP3-7.0), where emissions either continue as they are today or continue to rise. The medium-high scenario entails global temperature increases of 2.5–3 degrees and corresponds to the development the world is currently moving towards with existing reduction commitments. The higher emission scenario can lead to increases of 3–4.5 degrees (IPCC, 2021a and Climatedata, 2026).

The Climate Atlas shows that winter precipitation in the medium-high scenario can increase by about 10 per cent (and up to 25 per cent for the higher scenarios), while a larger proportion falls as rain rather than snow. Furthermore, Denmark is looking into a future with 30 fewer frost days per year. This leads to higher soil saturation, increased runoff to watercourses, and a greater risk of flooding over longer periods.

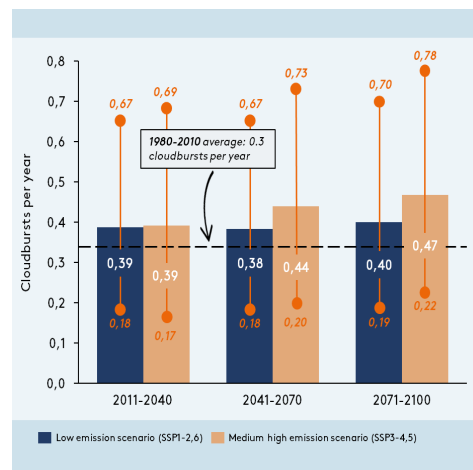
In the summer half-year, the precipitation pattern changes in a different way. The total amount of summer precipitation is expected to be roughly unchanged, but the precipitation falls more concentrated. Cloudbursts will become both more frequent and more intense, and there will simultaneously be longer periods without precipitation.

Drought periods can have significant consequences across sectors. Analyses show, among other things, a clear correlation between soil moisture

drought in the spring and summer months and a reduction in crop yields in agriculture. Prolonged drought can also lead to settlement damage to buildings, particularly in areas with clayey soils, where drying out causes the soil to contract (Klimadatastyrelsen, GEUS and DMI, 2025).

DMI defines a cloudburst as more than 15 mm of precipitation in 30 minutes, and observations already show an increasing trend in the number of cloudburst days since the beginning of the 2010s, cf. Figure 2.2. (DMI, 2025).

Figure 2.2: Expected development in annual cloudbursts



Note: The cloudbursts are based on median values. The orange markings show the 10th and 90th percentiles (lower and upper uncertainty limits).

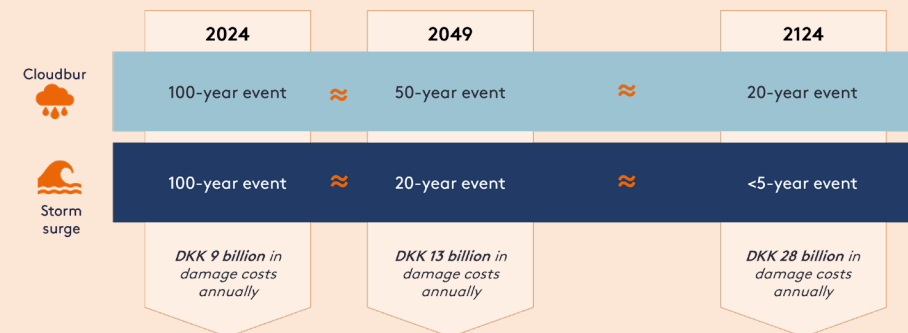
Source: CIP Foundation's own illustration based on DMI (2026a)

At the same time, the mean water level in the sea around Denmark is rising. According to DMI's Climate Atlas, the sea level is expected to rise by approx. half a metre towards the year 2100 in the medium-high emission scenario and up to 2 metres in the most challenging scenarios. When the mean water level rises, the starting point for storm surges is lifted. Therefore, storm surges of the

Box 2.2: What is an X-year event as a weather phenomenon?

An x-year event is a statistical measure of how likely it is that a specific weather event will occur. A 20-year event means that the event occurs on average once every 20 years, or that there is a 5 per cent probability each year that the event will occur in a given year. Similarly, a 100-year event has a 1 per cent probability of occurring in a given year.

Figure 2.3: When 100 years becomes 5 years...



Source: CIP Foundation's own illustration based on DTU (2026)

The term does not mean that the event only happens every 20 or 100 years. In principle, it can occur several times in a row—or not at all for long periods. The figures describe the probability, not the actual timing. When the climate changes, the probabilities also change. This means that what we call a 20- or 100-year event today may become far more frequent in the future. Today's rare events will thus become tomorrow's more common weather events.

same wind strength as today will cause greater flooding in the future and hit areas further inland. The consequence is that what are currently considered rare storm surge events will occur far more frequently in the future. 20- and 100-year events lose their character of rarity and will in the future become a far more common burden for coastal areas. See box 2.2 regarding x-year events.

2.3. More water and from multiple sources

A key characteristic of future climate risks is that the physical water cycle is being stressed in new

ways. Water continues to move through precipitation, watercourses, the sea, and groundwater, but in a changing climate, the impact occurs more frequently, more intensely, and from multiple directions simultaneously. Flooding therefore occurs no longer as a result of a single source, but from several parts of the water cycle at the same time. Heavy or prolonged precipitation can lead to surface runoff and flooding from above. Rising sea levels and storm surges push water in from the sides, both directly along the coasts and indirectly via backwater in watercourses.

Box 2.3: Tipping points that can change climate development

Tipping points are a central concept in climate research for situations where a process escalates and crosses a threshold, after which the development cannot return to its previous state – or only with great difficulty (DMI, 2019). Climate change does not only involve gradual changes, but can also trigger chain reactions that cause development to accelerate and, in the worst case, become self-reinforcing. Examples of tipping points could be the melting of the Antarctic ice sheet, the thawing of permafrost in Russia and Canada, and altered CO₂ uptake in the Amazon rainforests.

AMOC (Atlantic Meridional Overturning Circulation)

A key example is the AMOC, a large system of ocean currents in the Atlantic, including the Gulf Stream, which transports heat northwards and thus helps to keep the climate in Northern Europe relatively mild. According to DMI, the system acts as a “heat pump”, but it is vulnerable to climate change, partly because the supply of freshwater from melting ice can weaken the circulation (DMI, 2026b). A significant weakening or collapse of the AMOC could lead to lower temperatures and more unstable weather conditions in Denmark and Northern Europe, while the global climate continues to get warmer. This potential tipping point is being thoroughly analysed by the IPCC.

Melting of the Greenland Ice Cap

The Greenland Ice Cap, which is one of the world's largest ice sheets, plays a crucial role in the global climate and sea level. The ice sheet is maintained today because large parts are located at high altitudes and therefore in cold temperatures, where precipitation primarily falls as snow and contributes to building up the ice. If the temperature rises, melting increases – especially in the higher parts of the ice sheet. When the ice loses height, it is exposed to warmer air to a greater extent, which further accelerates the melting. This happens in a self-reinforcing process, which can lead to a tipping point if the ice sheet reaches below a certain height (DMI, 2019).

Armstrong McKay et al. have estimated in Science (2022) that a collapse of the Greenland Ice Cap is very likely at temperature increases of up to 3 degrees, which we are currently heading towards, while there is

At the same time, increased winter precipitation means that groundwater levels are higher in many places, which can cause flooding from below and reduce the soil and systems' buffer capacity to absorb, for example, precipitation.

DMI points out that simultaneous impact from multiple hydrological sources – so-called coupled events – is becoming increasingly widespread in a changing climate and is expected to be behind some of the largest future floods (DMI, 2025).

COUPLED EVENTS – FLOODS REINFORCE EACH OTHER

Coupled events occur when several climatic and hydrological factors happen simultaneously and reinforce each other.

The total consequences then become greater than the sum of the individual events. Examples include a storm surge combined with a cloudburst, or heavy precipitation following periods of saturated soil and high groundwater levels. With coupled events, it becomes more difficult to determine the



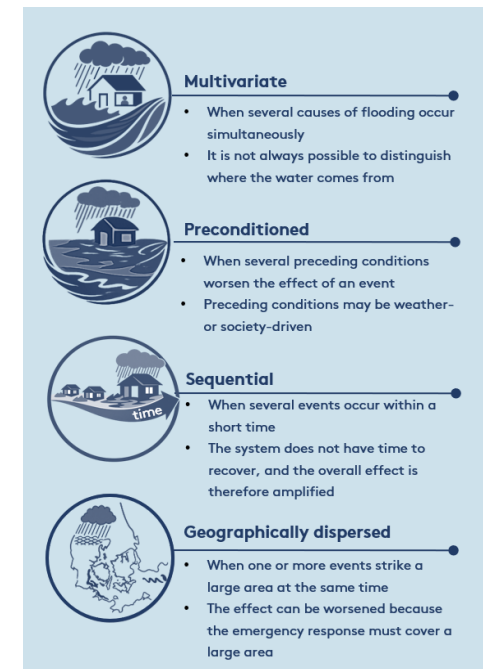
cause of the flooding and, therefore, which type of water caused the damage. This can, for example, have implications for insurance coverage. The different types of coupled events are shown in Figure 2.4.

GREATER CONSEQUENCES AND THE NEED FOR HOLISTIC PLANNING

When precipitation, the sea, watercourses, and groundwater stress society's systems simultaneously, the risk of local systems reaching critical thresholds increases (DMI, 2019). These thresholds can act as local tipping points, where even small additional stresses can trigger sudden and disproportionately large consequences. In such situations, flooding does not develop linearly, but abruptly, which both amplifies the consequences and makes them more difficult to clearly explain, predict, and manage using traditional planning tools.

Coastal flooding is almost certain to pose the greatest challenge in the future (DTU, 2026). Adaptation is complicated by the fact that

Figure 2.4: Different types of couplings that can occur in Denmark



Source: CIP Foundation's own illustration based on DMI (2025)

coastal flooding is increasingly expected to occur simultaneously with other types of flooding, which can mutually amplify the consequences. Climate adaptation is therefore about balancing opportunities, challenges, and risks across both timescales and geographical levels.

At the same time, groundwater represents a hitherto relatively overlooked challenge in the future climate landscape. Groundwater flooding develops slowly and is less visible than cloudbursts and storm surges, meaning it rarely triggers acute emergency situations. However, it can last for a long time and cause significant damage to buildings, infrastructure, and agricultural land. When groundwater levels are high, the capacity to drain water from other sources is simultaneously reduced, which amplifies the effect of heavy precipitation. DMI's analysis shows that groundwater is becoming an increasingly important part of the overall risk landscape, cf. DMI, 2025.

Which coupled events pose the greatest risk varies across Denmark. However, uncertainty about this is not an argument for delaying or reducing climate adaptation efforts; rather, it indicates that climate adaptation should increasingly be conceived and planned within water catchments rather than administrative boundaries. These ideas are explored in Chapter 4.

2.4. Do we understand climate risks?

Despite an extensive and well-documented knowledge base regarding future climate risks, analyses show that understanding remains limited among citizens, property owners, and some decision-makers. This gap between knowledge and action is central, cf. CIP Foundation and CONCITO (2026), which point out that climate risks often remain abstract and difficult to translate into concrete decisions.

For the individual property owner, this means that the risk of flooding is often either underestimated or only becomes relevant once the damage has occurred – even though the responsibility for climate adaptation often lies with the individual.

This challenge forms the basis for the 'Know your climate risk' proposal. Here, the state is the primary actor responsible for developing unified and citizen-oriented risk communication, while market actors play an important role in disseminating and applying the information. The aim is to ensure that individual property owners have a clear and usable basis for understanding and acting on their own risk.

A COMMON DATA BASIS AS A FOUNDATION FOR ACTION

A key prerequisite for individual property owners to understand their climate risk is a uniform and credible data basis. Therefore, it is proposed to establish a central and common data basis for flood risk, with the state primarily responsible for



PROPOSAL 2.1: "Know your climate risk"

It is recommended to establish a national approach to flood risk assessment, where climate risks are communicated clearly and comparably to citizens and decision-makers.

A significant challenge today is that data, scenarios, and methods vary across authorities, which makes the risk picture less uniform and difficult to translate into action.

The purpose is to make climate risks concrete and actionable for both citizens, the market, and authorities.



PROPOSAL 2.2: Central and common data basis for flooding

A common national data basis must ensure consistent and updated assessments of flood risks. The state is primarily responsible for establishment and quality assurance.

This reduces fragmented risk pictures and gives the market and the individual landowner a more credible basis for understanding climate risk.

collecting, quality-assuring, and making the data available.

Today, information about climate risks is fragmented and often developed for official use, making it difficult for individuals to use. When data is inconsistent or difficult to interpret, it effectively becomes the responsibility of the individual property owner to navigate complex information – which reduces the likelihood that the risk is factored into decisions.

At the same time, there is a need for a common national emission scenario, a kind of master



PROPOSAL 2.3: A common national emission scenario

The state should establish clear national guidelines for the choice of emission scenarios, where the scenario is differentiated according to project type. This means that, for example, the labelling of buildings is based on one set of future assumptions, while analyses of city centres are based on another.

forecast, which is also anchored within the state. A common scenario ensures that risk assessments are based on the same assumptions, making it possible for citizens, the market, and authorities to compare and understand the development of climate risks. For the individual property owner, this means that the risk becomes more transparent and thus easier to act upon.

The state has previously recommended that one chooses an emission scenario depending on which asset or type of project one is looking at (DMI, 2025b). However, this is demanding for non-specialists, and therefore there may be a need for a baseline scenario based on the most likely development for the world, while supplementing with sensitivity scenarios that reflect other emission scenarios. The individual developer can always – according to their risk aversion – choose to base themselves on other emission scenarios.

MISUNDERSTANDINGS MAKE IT DIFFICULT TO ACT

Even when data are available, they are often difficult to understand. A key example is concepts such as 20-, 50-, and 100-year events, which are often perceived as specific points in time rather than probabilities.

This misunderstanding can create a false sense of security and lead to the individual property owner underestimating the risk in the short term. In practice, the events can occur at any time, and in a changing climate, they will also occur more frequently over time (CONCITO and CIP Foundation, 2026).

For the individual, this complexity makes it difficult to assess whether and when action should be taken. This underlines the need for a more intuitive and direct communication of climate risks.

A SIMPLE GRADING MAKES THE RISK CLEARER

To make climate risks more understandable, it is



PROPOSAL 2.4: Graduation of risk areas (e.g. colour scale)

A simple graduation of risk levels must provide a quick and intuitive overview of climate risks. The state is responsible for method and classification.

The graduation makes the risk visible to the individual landowner and creates a common language for the market and authorities.

proposed to introduce a simple and intuitive grading of risk levels, e.g., based on a colour scale. Here, too, the state is primarily responsible for defining and developing a uniform method that can be used nationally.

For the individual property owner, the grading acts as a first and easily accessible signal of the magnitude of the risk. Instead of having to interpret complex datasets, the property owner gets a quick overview of whether the property is located in an area with low, medium, or high risk.

At the same time, the grading creates a common language that can also be used by market actors – e.g., banks, insurance companies, and estate agents – and thus be integrated into decisions about home purchases, financing, and climate adaptation.

FROM OVERVIEW TO CONCRETE KNOWLEDGE ABOUT THE INDIVIDUAL PROPERTY

Although an overall grading creates awareness, it is not sufficient to support action by the individual. Climate risks are both dynamic and site-specific, and two properties can have very different risk profiles, even within the same area.

Therefore, it is proposed to supplement the



PROPOSAL 2.5: Mapping of risks at cadastral level

Mapping at cadastral level makes climate risk concrete for the individual landowner. The state makes data available, while the market and landowners use it.

This supports better investment decisions and increases transparency in the housing and property market.

grading with a mapping of risks at the cadastral level. Here, too, the state is primarily responsible for making data available, while the application largely takes place among property owners and the market.

The purpose is to make the climate risk concrete for the individual property owner. When the risk is linked directly to the individual property, it becomes clear what climate change means for one's specific home, investment, or local area. This is crucial because climate adaptation is in many cases an individual responsibility.

UNCLEAR RESPONSIBILITY AND ABSTRACT RISK HINDER ACTION

Many citizens expect that the municipality has the primary responsibility for preventing flooding, even though the responsibility in practice often lies with the individual property owner.

When the risk simultaneously appears abstract and is not linked to the specific property, this misunderstanding is reinforced. The individual property owner experiences neither ownership of the risk nor an incentive to act.

By combining overall risk grading (proposal 2.4) with concrete mapping at the cadastral level

(proposal 2.5), a clearer connection between risk and responsibility is created. This can contribute to shifting the understanding from a general societal responsibility to also including an individual responsibility.

At the same time, the individual property owner's actual possibilities for action and financial capacity vary significantly depending on the type and extent of the flood risk. As illustrated in Figure 1.2, it is therefore not sufficient to clarify responsibility and risk alone – a connection between incentives, possibilities for action, and financing is required if action is to be realised.

NEED FOR A MORE CITIZEN-FRIENDLY AND ACTION-ORIENTED COMMUNICATION

Overall, the analysis points to the fact that the challenge is not primarily a lack of data, but a lack of understanding and application of knowledge by the individual property owner.

There is therefore a need for a more uniform and citizen-friendly communication, where the state has the overall responsibility for establishing the framework – through data foundations, scenarios, and methods – while the market contributes to communication and application, and the individual property owner ultimately acts on the basis of the information.

A framework for "Know your climate risk" will therefore entail:

- creating an overview through a common data foundation and scenario (proposals 2.2–2.3),
- making risk visible through a simple grading (proposal 2.4),
- and concretising the risk at the property level (proposal 2.5).

Thereby, the prerequisites for the individual property owner to understand and act on their climate risk are strengthened, supported by a catalogue that links risk level with concrete possibilities for action (cf. proposal 2.6).



PROPOSAL 2.6: Develop proposals for individual action options

The catalogue must support citizens' and landowners' opportunity for action and be included as part of the preparation of a future climate adaptation label by linking risk with possible measures (effect).

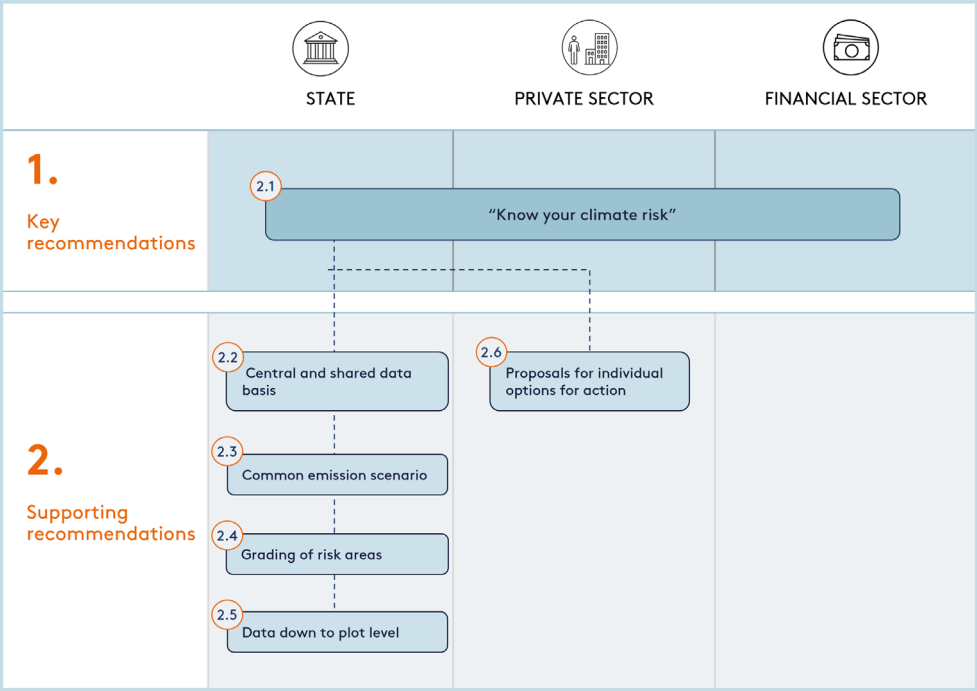
2.5. FROM CLIMATE KNOWLEDGE TO PLANNING AND ACTION

The Climate Atlas and the associated analyses provide a solid common knowledge base for understanding how climate change affects Denmark now and in the future. The central challenge is therefore not the lack of knowledge, but the translation of this knowledge into planning, prioritisation, and investment. Coupled events, where several types of flooding occur simultaneously or reinforce each other, place demands on strategy choices. When, for example, cloudbursts, storm surges, and rising groundwater occur simultaneously, a single strategy may be insufficient, and solutions can affect each other in unforeseen ways.

When climate risks become more complex and site-specific, it places new demands on how society works with climate adaptation. This requires a common data foundation, clear priorities, and an understanding that climate adaptation is not just about individual projects, but about long-term strategies across sectors and geographies.

The following chapters elaborate on the consequences of these climate changes and discuss how Denmark can organise and target climate adaptation in a landscape where more water from multiple sources is becoming a fundamental condition.

Summary of proposals in Chapter 2



3. Who is affected by flooding?

This chapter describes the economic, social, and human impacts of flooding. It looks at how losses are distributed across different types of losses and across different groups, and who bears the consequences of flooding and therefore, all else being equal, would benefit from climate adaptation.

Key take-aways from the chapter:

- Large damages to roads from flooding, which is a good investment to prevent.
- High damages per citizen in outlying areas with lower capacity for climate adaptation can increase the difference between rural and urban areas.
- If we wait to adapt, it has a high price in the form of damages in the meantime.
- Almost half of the expected damages from flooding affect the business sector with direct losses.
- The damages affect both privately owned assets of landowners, but also public goods. Therefore, we must also pay for climate adaptation both directly as landowners, but also via the common coffers.

3.1. How much damage can we expect from flooding?

When climate change leads to more water, it increases the risk of flooding. DTU (2026) has calculated that over the next 100 years, we can expect damage of around DKK 400 billion as a result of flooding from various water sources, see Figure 3.1. In addition, there is damage resulting from rising groundwater, which is also an increasing problem. The damage increases gradually over time. At the moment, we can expect annual damage of around

DKK 9 billion, primarily from precipitation. Over time, storm surges will become the dominant cause of damage as sea levels rise, but only towards the end of the century. Over the next 50 years, precipitation-related damage is expected to be the most damaging.

If the present value of the damage is calculated, storm surges are expected to cause just under half of the expected losses from flooding over the next 100 years, corresponding to a present value of DKK 175 billion.

ANNUAL LOSSES OF UP TO 28 BILLION DKK

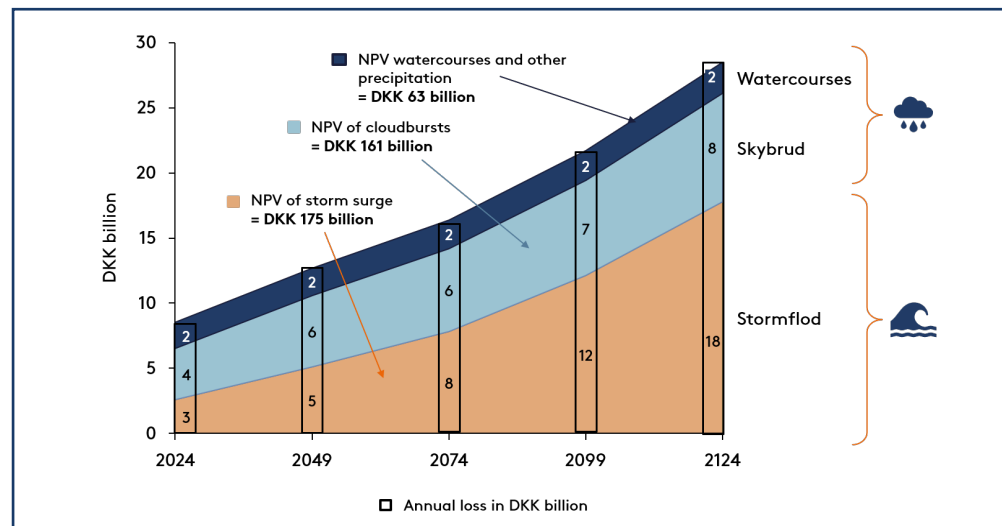
Over time, we must expect that the annual damage from flooding will more than triple to up to DKK 28 billion per year, and that damage from storm surges will increase sixfold, reaching DKK 18 billion per year¹.

A total annual loss of DKK 28 billion is more than the entire municipal construction budget for investments in 2026². The amount corresponds to the cost of building 2-3 super-hospitals – every year.

A loss of that magnitude will not topple the Danish economy or immediately affect financial stability (Berg, J. and CIP Foundation, 2026). However, the flooding entails a loss of resources and requires ongoing reconstruction, which must compete with other needs for funding and scarce labour, and in many cases, losses that could be prevented.

Flooding also has human consequences. And it can have major local consequences where it strikes. In practice, the flooding will not be as "neatly distributed" over time as in model calculations. It

Figure 3.1. DKK 400 billion in expected losses from flooding 2024-2124



Note: Damage assessment is in fixed prices (2024)

Source: CIP Foundation's own illustration based on DTU (2026a)

can happen tomorrow, in two years, ten years, or later. And several times in the same place.

LARGE SHORT-TERM LOSSES MAKE IT EXPENSIVE TO WAIT FOR CLIMATE ADAPTATION

Even though the large and currently rarer events will happen more often in the future, smaller but frequent flooding will still account for the majority of the overall damage picture. Many a little makes a mickle.

Furthermore, future events are not weighted as highly as present ones when calculating damage over such a long period. So the flooding that will occur in the coming decades accounts for a relatively large share of the calculation. This means that even relatively low levels of protection could prevent a portion of the expected damage, especially from precipitation.

If we do not implement climate adaptation, it comes at a price. The longer we wait, the more damage will occur in the meantime.

If we wait 10 years, for example, 139,000 permanent residences are expected to be hit by flooding in the meantime, especially as a result of cloudbursts. The total damage in the period is estimated at DKK 48 billion, cf. DTU (2026).

If we wait 20 years, more damage will occur in the meantime, corresponding to DKK 88 billion in total. Time spent on decisions and processes must therefore be worth any potential waiting time.

10 years wait



~ DKK 48 billion in damages

~ 139.000 permanent residences affected by flooding

¹ DTU's calculations are based on the medium-high emission scenario, which is the path the world is currently on, and which entails temperature increases of up to 3 degrees. If greenhouse gas emissions increase further to a higher scenario, the loss figures will rise accordingly.

² The construction budget in 2026 is DKK 22.3 billion, cf. KL

3.2. Who bears the consequences of flooding?

Flooding affects both physical objects such as buildings, machinery, etc., but can also have consequences for the potential activity in the affected area. Perhaps production has to stand still for a few days at companies. Travel time may be extended for commuters. And schools and kindergartens may be closed for a period due to water damage.

When thinking about damage coverage after flooding, for example from insurance, it covers damage to buildings and physical objects. The same applies to public compensation from the Natural Disaster Council (Naturskaderrådet) after a storm surge³. There is no coverage for activity that is missed.

MOST DAMAGE TO BUILDINGS

DTU's calculation shows that just under 2/3 of the expected damage after flooding relates to buildings. Especially permanent residences, which account for just under 1/3 of the total losses.

But there are also losses from affected holiday homes, commercial buildings, and public buildings. Losses on buildings of around DKK 250 billion can therefore be expected up to 2124. This affects individual building owners directly, but also the potential use of the buildings for, e.g., companies and our collective use of public institutions.

Buildings are particularly affected by cloudbursts, while prolonged rain and overflowing watercourses affect potential activity to a greater extent. Storm surges currently affect holiday homes the most, but over time will also affect an increasing number of permanent residences and commercial buildings.

Here, there is a big difference in how many are hit in the individual municipalities. There are, of course, most houses in large city municipalities, but seen in relation to the total housing stock, a 100-year event that hits today will have a different impact. For example, a 100-year cloudburst event today would affect more than 4½ per cent of the total housing stock of permanent residences in a number of municipalities surrounding Copenhagen, e.g., Hvidovre, Herlev, Gentofte, Brøndby, and Frederiksberg. If a 100-year event in the form of a storm surge hits, it would today affect up to 1½ per cent of the housing stock in Dragør, Kerteminde, Norddjurs, Kalundborg, and Frederikssund municipalities.

POTENTIAL ACTIVITY IS ALSO AFFECTED

The majority of the expected losses therefore come from buildings. The remaining 37 per cent of losses from flooding come from affected activity, especially in the form of direct limitations for various trades.

Here, production losses account for a significant portion, e.g., because machines are standing still, inputs may be damaged, or employees cannot get to work. There may also be turnover losses for service industries that cannot stay open, or where customers cannot use the facilities. Harbours that cannot be used for a period.

For agriculture, production losses concern, for example, crop losses, periods where the land cannot be worked, or impacts on their production apparatus, such as when agricultural land is affected by salt from flooding from the sea.

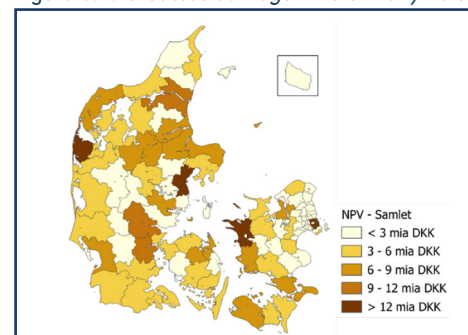
This type of production loss is particularly large for industry and service sectors. Overall, production losses are estimated to account for around 29 per cent of total losses from flooding up to 2124.

In addition, there are losses from delays when infrastructure and transport are affected. This affects people's time. People can also be affected through increased sickness absence, just as people's use of nature and culture for recreational purposes can be affected when areas are flooded.

GEOGRAPHICAL DIFFERENCES

Climate change and more frequent flooding can be expected across the whole country because water comes from multiple sources, but some places are more exposed than others. The largest losses are seen where the most values are concentrated, i.e. in the large cities. Therefore, major city municipalities such as Copenhagen, Aarhus, Vejle and Aalborg face relatively large losses, cf. figure 3.2.

Figure 3.2. *Greatest damage where many values*



Source: DTU (2026a)

But also Lemvig municipality with large, exposed areas and important harbours, and Kalundborg, which is also exposed and has large values via its harbour and business areas, face relatively high damage.

GREATEST CHALLENGE FOR PERIPHERAL MUNICIPALITIES

If you calculate the expected losses per inhabitant in the municipality, you get an impression of the relative burden. Then the picture changes. Here, it is primarily rural municipalities rather than major

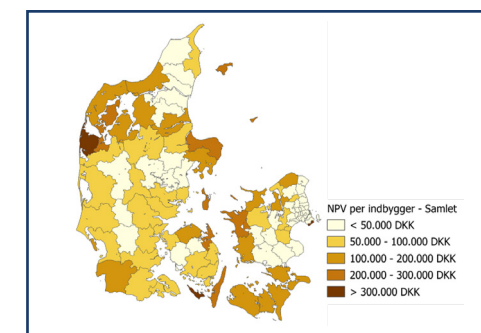
city municipalities that face the largest losses, cf. figure 3.3.

The relative damage is greatest in the western part of the Limfjord, on Norddjurs, North Funen, and on islands such as Læsø, Samsø, Langeland and Ærø, as well as West Zealand and Lolland-Falster.



The assessment per inhabitant roughly says something about how many there are to pay for climate adaptation in the municipality and thus its capacity to prevent.

Figure 3.3. *Greatest damage per citizen in rural municipalities*



Source: DTU (2026a)

If you take the income base into account, most of the municipalities with high expected losses from flooding per inhabitant also have relatively low income bases, cf. DTU (2026).

Therefore, the ability to adapt to climate change is challenged in these municipalities.

³ Storm surge is defined as flooding of a nature and scale that can only be expected every 20 years.

⁴ DKK 398 billion in losses distributed among just over 6 million Danes

CIP FOUNDATION | Who is affected by flooding?

Climate change and flooding can therefore contribute to reinforcing an already known development between rural and urban areas and make it more difficult to maintain activity in all parts of Denmark. Flooding will contribute to market-driven depopulation from areas where private values are not high enough to offset the cost of climate adaptation.

If one politically wishes to counteract this development, it will require prioritisation in the form of grants or subsidies. Here, for example, EU structural funds can come into play.



PROPOSAL 3.1: Strategic use of EU structural funds for climate adaptation

It is recommended to increase and coordinate the use of EU structural funds for climate adaptation in rural areas. After the regions' tasks in this area were suspended, this has been left to, for example, non-profit partnerships such as Gate 21 and similar to assist the municipalities with overviews and

THE MOST EXPOSED MUNICIPALITIES

Some municipalities are particularly exposed to storm surges, others more to watercourses. Cloudburst damage particularly affects the larger urban municipalities. But virtually everyone is affected. Combined events also mean that in the future, one will more often have to handle several types of water, cf. chapter 2.

If one looks at whether some municipalities are so unfortunate that they are at risk of being hit by all water sources to a significant extent, then the following municipalities are in the top-25 within each type of flooding:

- Kolding
- Slagelse
- Esbjerg
- Vordingborg

This places greater demands on climate adaptation in those areas, and on flexibility in climate adaptation to be able to handle multiple water

3.3. Privately owned assets and societal values

One can distinguish between whether the damage from flooding concerns buildings or affected activity, as shown in figure 3.4.

DTU particularly calculates affected activity for various industries as a kind of production loss. This can, for example, be from lost turnover for tourism businesses in flooded areas, for lost production in industry and other service sectors when buildings and production equipment cannot be used, and crop losses and affected soil quality for agriculture.

BUSINESSES SET TO BEAR NEARLY HALF OF THE LOSSES

The total direct losses for the business sector via damaged buildings, affected values in commercial areas, such as ports, and lost activity are estimated to have a value of around DKK 183 billion, or 46 per cent of the total losses in the period 2024-2124.

Thus, the business sector accounts for almost half of the direct economic consequences of flooding and must bear this, depending on how well insured they are.

In addition, there may be derived or dynamic effects in the form of, for example, delays in value chains, affected payment flows and increased credit risk, and potentially affected productivity,

whereby the floods have an effect on others and other things than those directly affected.

GREATEST LOSS FOR PRIVATE LANDOWNERS AND BUSINESSES

If you add the business sector's losses to the losses for private landowners, whether they have permanent residences or holiday homes, you get an expression of how many privately owned assets are affected.

Economic losses from flooding can be attributed to privately owned assets.

SOCIETAL VALUES ARE ALSO AFFECTED

Conversely, about 14 per cent relates to damage to societal values. These are, therefore, damages where you cannot send the bill to a specific landowner or a CVR number.

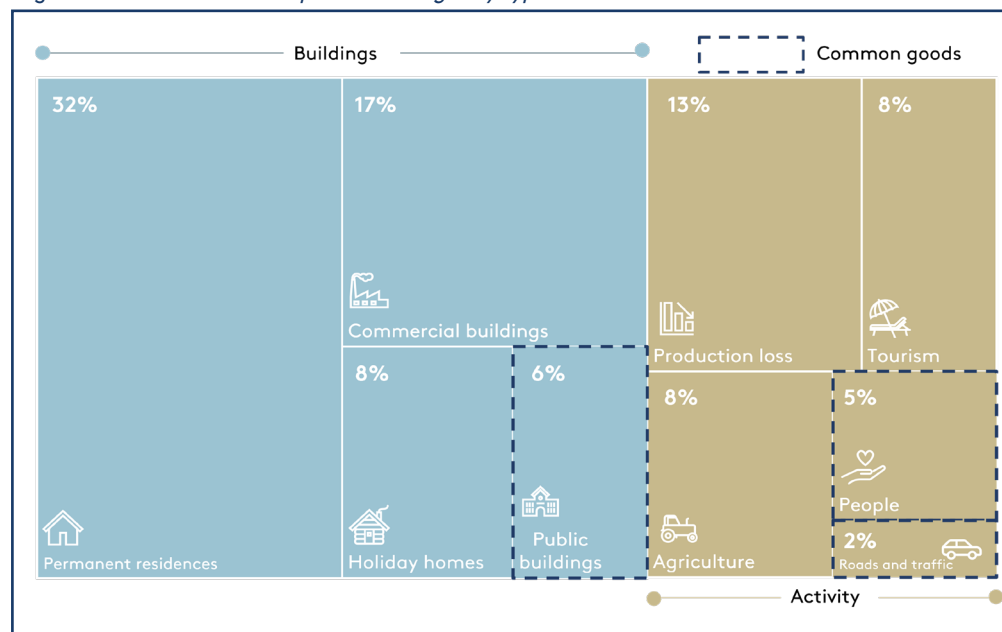


PROPOSAL 3.2: Public goods must be covered by the community

Climate adaptation not only prevents damage for private landowners, but also for Public goods, where beneficiaries are not well-defined or user payment cannot be collected.

The public sector can, on behalf of citizens (and future generations), lay out and pay for the protection of public goods - either directly, on an ongoing basis, or in the form of guarantees of the same value.

Figure 3.4. Distribution of expected damages by types of loss



Source: CIP Foundation's own illustration based on DTU (2026a)

CIP FOUNDATION | Who is affected by flooding?

The assessment of societal values includes damage to public buildings, as well as delays for people in traffic as a result of flooding, just as consequences for sick leave are included. DTU has also included the utility value or the recreational value of using public goods such as nature and culture.

Conversely, this means that the value is not included if a protected nature area, for example, is flooded and cannot be saved, or if cultural treasures and monuments are destroyed. The replacement value of such unique assets is not market-traded and calculated, but would increase the damage profile and increase the share of prevention that we all have to be responsible for and co-finance.

PROTECTION OF PUBLIC GOODS MUST BE PAID FOR BY US ALL

Here it must be a political priority to get these assets protected and thus also a joint financing via common taxes. The protection of these assets

will benefit several generations, which may argue for financing over a longer period.

Landowners are currently the starting point for who should pay for climate adaptation in the form of coastal protection and protection against flooding from public watercourses. This happens as a result of the utility principle, where that type of climate adaptation must be paid for by those who benefit from it and in proportion to how much benefit they receive.

Societal values account for relatively the most in terms of damage from storm surges compared to what it accounts for in the other water sources. However, it is still privately owned assets that are damaged most by storm surges, and thus private citizens and companies, who as landowners have the greatest benefit from climate adaptation.

3.4. What does it cost a homeowner to be hit by a storm surge?

DTU (2026b) has conducted a large survey among households that experienced a storm surge in 2023. On that basis, one can gain insight into what the costs are for the individual homeowner to be hit by a storm surge.

For even though there may be damage coverage as help to handle the direct economic consequences of flooding, it also has other, derived consequences for the individual.

On average, each permanent residence hit by a storm surge received around DKK 320,000 in compensation from the Storm Council (Naturskaderådet) for the storm surge in 2023, cf. figure 3.5.

This must be seen in relation to the fact that, on average, compensation was sought for DKK 1.1 million per permanent residence, i.e. over three times more than what ended up being compensated.

SIGNIFICANT SELF-FINANCING

In the survey, the homeowners themselves incurred expenses of DKK 120,000 after the flooding, or just under 40 per cent of the compensation. In addition to the excess, the individual therefore has significant additional expenses in the event of a storm surge. The state's solidarity-based scheme entails in practice a significant self-financing from the individual landowner.

And then it costs in time. The individual homeowner spends on average up to 300 hours or just under eight weeks of full-time work on handling cleanup, insurance claims, reconstruction and challenges with rehousing, e.g. extended travel time.

Seen from a labour market angle, the floods also have consequences. The affected people have on average three days of sick leave and use four days of holiday after the floods, cf. DTU (2026b).

Finally, those affected are also hit health-wise. About seven out of ten flooded people become more worried about the future, and approx one in four reports physical and mental ailments afterwards in the form of especially increased fatigue and stress, but also depression and insomnia, cf. DTU (2026b).

Flooding therefore has welfare consequences for the affected citizens in addition to economic consequences.

RISK OF STIGMATISATION

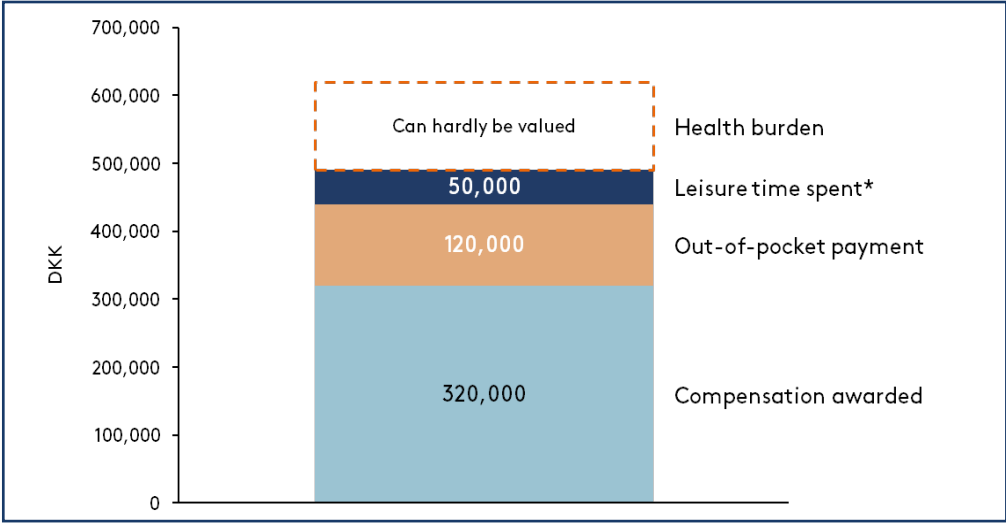
About 12 per cent, or one in eight of those affected, subsequently wish to move. Of these, about 30 per cent see themselves prevented from doing so due to insufficient demand for their home (no buyers or too low bids) or due to job-related obligations in the local area.

Floods can therefore also help to lock landowners into a specific, damaged area for a period.

The time on the market also increases in the housing market after a flood. Based on figures from Finance Denmark, the time on the market increased by about 20 per cent in the areas of Roskilde Fjord and Isefjorden that were hit by flooding after the storm Bodil in 2013, compared to others in the area. DTU has a research article under review on the same subject, which is expected to be published later in 2026.

Around eight out of ten of those affected subsequently do something active to protect themselves. Climate adaptation is therefore increasing in the wake of experienced damage. However, many express that they find it difficult to see their

Figure 3.5. What does coastal flooding cost per affected permanent residence?



Note: Avg. time used is 293 hours, corresponding to 7.9 weeks of 37 hours. Converted with an hourly value of 179.

Source: CIP Foundation's own illustration based on DTU (2026)

⁵ Own calculations based on the Housing Statistics from Finans Danmark and statements from DTU on affected postcodes.

options for action. This is linked to the fact that protection against storm surges and flooding from the coast and watercourses often requires collective solutions.

3.5. Who covers damage from flooding?

As a starting point, the individual landowner is responsible for covering the costs of being flooded (Schjødt, 2025). However, there are various possibilities for obtaining damage coverage from the private market and from the public storm surge scheme.

CAN YOU INSURE YOURSELF AGAINST FLOODING?

It seems obvious that one can insure oneself against flooding because it resembles natural disasters. And natural disasters have been insurable on global markets for many years because they happen randomly, and because one can spread the risk among many policyholders who do not wish to take it on themselves. See also Berg and CIP Foundation (2026).

But what if the flooding does not happen completely randomly? What if one knows full well where there is a high risk of being flooded again and again? Something we already see today at some coasts and watercourses. Then the events are fundamentally not that insurable.

INSURANCE MARKET FOR CLOUDBURSTS

In the Danish insurance market, you can get coverage for damage from cloudbursts via home insurance. Cloudbursts hit more randomly, and it is more demanding to estimate and communicate exactly hit. Home insurance is not mandatory, but in practice, most people have it, as almost all mortgage credit institutions and banks require fire insurance as a prerequisite for lending. Fire insurance is part of the home insurance.

Today, cloudbursts are the largest annual cause of damage via flooding, cf. previous figure 3.1.

As expenses for damage coverage rise, premiums for this type of insurance will increase in the most exposed areas. All else being equal, this increases the incentive for individual climate adaptation. The price signal can also affect the desire to buy the exposed properties.

In the long term, the risk is that there will be areas and properties that can no longer be insured. This puts the individual property owner in a difficult

Box 3.1: The storm surge scheme

Damage coverage from the Natural Disaster Council ("the storm surge scheme") covers 20-year events and above in the form of direct damage to real estate and movable property caused by storm surges or flooding from watercourses and lakes. The scheme entails an excess, which increases if one has been covered several times.

The scheme entails a taxable insurance (storm tax of approx. DKK 40 annually). The tax is mandatory for everyone who wants fire insurance, and costs the same for everyone (solidarity-based), i.e. independent of the risk of being flooded, independent of the property value and independent of whether climate adaptation has been carried out or not.

The scheme contributes where the private market is challenged with risk coverage, and can function because it is de facto mandatory.

Increasing frequency and extent of storm surges must be expected to increase the costs in the scheme and give rise to higher taxes.

Sources: Berg and CIP Foundation (2026)

situation, which can reduce the property value and make it harder to sell the property.

With climate adaptation and individual prevention, you can help influence the probability of being hit yourself. This reduces the expected damage and thus, all else being equal, also the risk premium.

It also challenges mortgage lending if collateral is conditional on insurance coverage.

Here, the financial sector has its own problem with time inconsistency, as insurance products can be cancelled or terms changed with typically one year's notice, while capital provision, e.g., in the form of mortgage loans, has a significantly longer maturity of up to 30 years. The loan's risk hedging is therefore exposed.

Finally, it of course challenges the insurance industry itself when customers have to be cancelled, due to reputational effects, but also due to market loss.

"It's in the financial sector's own interest to support more climate adaptation"

The development is expected to lead to increased innovation in financial products, e.g., by making insurance premiums dependent on what climate adaptation measures are taken. There may also be other terms that are adjusted according to behaviour and risk, e.g., the size of the excess. A development could also be that cloudburst damage is removed from home insurance and offered as supplementary insurance.

SUPPLEMENTARY INSURANCE FOR HIGH GROUNDWATER

The insurance market currently offers supplementary insurance in some places for water damage from intruding sewage water and high-standing groundwater (ground-level groundwater).

As more knowledge is gained about where there is a risk of ground-level groundwater, so that it is no longer perceived as random where damage can occur, it will become more difficult to offer and take out this form of insurance.

IMPORTANT MARKET COVERAGE

It is an international phenomenon that damage coverage for natural disasters is declining. That the "protection gap" is growing (underinsurance) and the share of uncovered losses is rising.

In the EU, the average insurance coverage against climate-related losses (market-based and public compensation schemes) was around 20 per cent for the period 1980-2024 (EEA, 2025).

By comparison, the coverage rate in Denmark was 61 per cent, only surpassed by Norway. Damage coverage is therefore relatively high in Denmark, which must be seen in relation to the fact that some of the largest economic losses per citizen as a result of climate change and damage from flooding are also expected in Denmark.

The Danish coverage rate reflects partly the market-based insurance, and partly the solidarity-based, public disaster scheme linked to storm surges (The Natural Disaster Scheme or "storm surge scheme").

SOLIDARITY-BASED COVERAGE FOR STORM SURGES

A storm surge occurs when strong winds push water over the coasts and into watercourses, where it causes flooding.

It is not entirely random where the flooding hits, and therefore it is not possible in Denmark to take out private insurance against this type of flooding. Therefore, Denmark has a mandatory and solidarity-based compensation scheme ("storm surge scheme"), which in certain cases covers flooding from the coast and watercourses, cf. box 3.1.

The scheme pays out compensation when the Natural Disaster Council (Naturskaderådet) has determined that a storm surge has occurred. The compensation or damage coverage includes repair costs that are based on list prices and are therefore nationwide. Property prices therefore do not directly affect the amount of compensation, although the choice of materials may reflect it.

Due to the solidarity element, the scheme entails a redistribution from property owners who do not live near coasts and watercourses to property

owners who do. Properties close to the coast have, on average, higher property prices. The latest major storm surge from October 2023 hit 27 South Danish municipalities, cf. The Ministry of the Environment⁶.

Historically, the most compensation for storm surge damage has been paid out in municipalities such as Frederikssund, Roskilde, Slagelse, Odsherred, Kerteminde, Kalundborg, Holbæk and Guldborgsund, cf. The damage statistics from the Natural Disaster Council for the period 1991-2017⁷.

Although the scheme is state-run, it is in practice administered by private insurance companies, which handle contact and claims processing together with the affected landowners.

The storm surge scheme is therefore often perceived as an insurance scheme, but is in reality a mandatory, state-run compensation scheme linked to specific cases of natural disasters.

There is a risk that landowners believe they are better covered by the storm surge scheme than they actually are. Partly because applications are made for significantly higher amounts than compensation is awarded for (DTU, 2026), and partly because landowners may not have understood the climate concepts and projections, whereby larger floods will be required in the future to trigger compensation. In other words – the level of flooding that would trigger compensation today will have to be covered by the landowners themselves in the future, when floods occur more frequently than today.

Then the damage coverage will fall further. The residual risk left to the landowner increases.

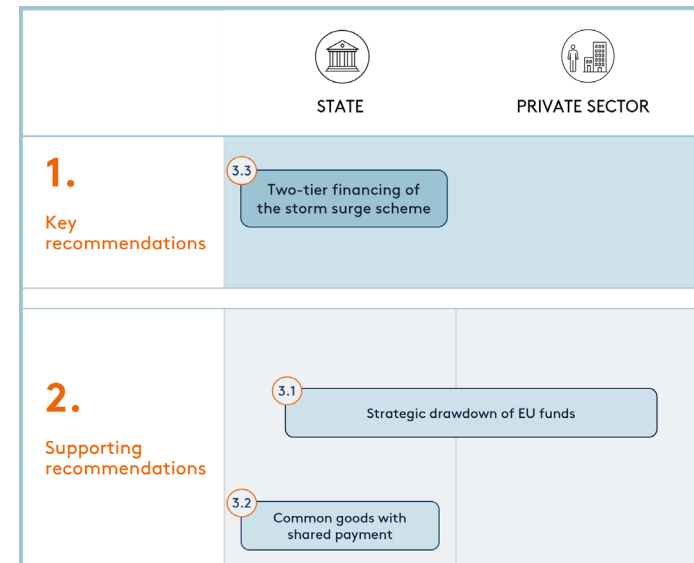
To make the storm surge scheme more robust to handle the expected increased claims payments

over time, a two-part financing is proposed.

Given the nature of the storm surge scheme with damage coverage where the market falls short, it is not considered appropriate to make the premiums in the scheme fully risk-based, as this – based on American experience⁸ – would increase premiums very significantly and to an extent where some can no longer afford them.

The current, uniform annual premium is DKK 40 per household. Insurance & Pension (2025) has previously calculated that an increase to DKK 100 per year will raise the revenue in the scheme from 200 to 500 million DKK and thus more than double it. At the same time, the excess can be raised if the scheme is to be made more robust. How great the need for annual payments is depends on whether the scheme should in the future only cover 20-year events and above.

Summary of proposals in chapter 3



PROPOSAL 3.3: Two-tier financing of the storm surge scheme

It is proposed to supplement the current, solidarity-based storm surge tax with a risk-based surcharge for the most exposed properties. In this way, greater co-financing is introduced from the areas that are most exposed.

Solidarity-based base based on an annual contribution of e.g. DKK 100 per household.

Risk-based surcharge for the most exposed, e.g. based on risk areas or climate zones (cf. chapter 6), which over time is adjusted according to implemented climate adaptation.

⁶125 million DKK in new storm surge fund helps the hardest hit municipalities - Ministry of the Environment and Equality

⁷The Storm Council's damage statistics at municipal level from 1991-2017

⁸Cost of Flood Insurance for Single-Family Homes under NFIP's Pricing Approach

4. Who is responsible for climate adaptation today?

This chapter provides an overview of who is responsible for damage coverage and prevention in relation to flooding from various water sources, and describes the regulatory framework for the organisation and financing of climate adaptation.

Key take-aways from the chapter:

- The weather in Denmark is becoming warmer, wetter and characterised by more extreme conditions.
- The flood risk is rising significantly, where what is seen today as rare events will become more common.
- Floods are increasingly occurring as an interplay between several weather phenomena (combined events), which increases the consequences.
- Planning and climate adaptation can therefore not be based on historical experience, but must be based on forward-looking climate scenarios and a changed risk profile.

4.1. WHO SHOULD TAKE CARE OF CLIMATE ADAPTATION?

Handling water is today regulated in many different pieces of legislation and based on many different, sometimes contradictory considerations. The Ministry of the Environment and Equality has the overall, coordinating responsibility for climate adaptation, but tasks and roles are spread across seven different ministries and a number of different authorities, cf. Schjødt (2025).

PLANNING AND APPROVALS: The municipalities are the central authorities for approvals, planning and designation of specific danger areas, and when there is a need to balance different considerations, it will most often be up to the municipality to decide.

RESPONSIBILITY: Across regulations and across water sources, the primary responsibility for climate adaptation in Denmark is currently, as a starting point, anchored with the individual property owner, cf. Figure 4.1. This means that climate adaptation is, as a starting point, viewed as an individual problem. Even though the individual property owner has the responsibility, including the financial responsibility, the property owner does not always have relevant options for action.

RESPONSIBILITY FOR COLLECTIVE ADAPTATION DEPENDS ON THE WATER SOURCE

Not all water management is best handled individually. For example, there are major synergies in joint water drainage via sewers, and in joint protection against water from the coast and from watercourses.

Depending on the type of water in question, different actors are responsible for collective climate adaptation solutions.

In the case of flooding *from the coast*, it is, as a starting point, private associations of property owners (dike associations) that are responsible for establishing climate adaptation. The municipality can contribute and also take charge of it, but is not required to. The state can also contribute and

Figure 4.1: Who is responsible for preventing flood damage?

Who participates in prevention?	Water from the side 			Water from above 		Water from below 
	HIGHER SEA LEVEL AND EROSION	STORM SURGE	WATERCOURSES	CLOUDBURST	RAINWATER	NEAR-SURFACE GROUNDWATER
PROPERTY OWNER	✓	✓	✓	✓	✓	✓
PROPERTY OWNER ASSOCIATIONS	✗	(✓)	(✓)	✗	(✓)	✗
MUNICIPALITIES	(✓)	(✓)	✓	(✓)	(✓)	(✓)
THE STATE	(✓)	(✓)	✗	✗	✗	✗
UTILITY COMPANIES	✗	✗	✗	(✓)	✓	(✓)

Note: Tick = must take responsibility. (Tick) = can take responsibility. Cross = no responsibility.
Source: CIP Foundation's illustration based on Schjødt (2025)

does so in concrete terms, for example, by being responsible for sand nourishment of the Jutland west coast.

Flooding from *public watercourses* is the municipality's responsibility to prevent. For private watercourses, it is the responsibility of the property owners.

Water from precipitation is, as a starting point, handled by wastewater utility companies, which are typically municipally owned companies that operate as natural monopolies. Their responsibility is the precipitation that hits roofs and paved surfaces such as roads and squares, but not that which hits unpaved terrain, for example, lawns, parks, etc. That is the property owner's responsibility. In the real world, that type of water (precipitation) runs together.

From 1 July 2025, wastewater companies have been given responsibility for collective solutions for high-standing groundwater or *near-surface groundwater*, which was previously solely the

responsibility of the individual property owner. The solutions must be socially beneficial and work where there is a risk of flooding of infrastructure and buildings or unwanted infiltration into wastewater facilities, i.e., within sewered areas. Each actor for collective climate adaptation has its strengths and its challenges and is responsible for

different types of climate adaptation projects, which are further elaborated in KPMG (2026).

MUNICIPALITIES AS PLANNERS AND APPROVERS

Municipalities are the most pervasive potential actor today in collective climate adaptation, cf. Figure 4.1, but primarily on their own initiative and not based on a duty to be responsible for climate adaptation.

Regardless of who is responsible for the climate adaptation, however, municipalities play a very significant role in climate adaptation via their planning duty and via their climate adaptation plans, cf. later section 4.3.

¹ACT no. 742 of 20 June 2025.

The municipality is simultaneously responsible for by far the majority of the permits and approvals that are necessary for climate adaptation projects.

FRAGMENTED RESPONSIBILITY, WHERE NO ONE IS ALLOWED TO HANDLE WATER ACROSS BOUNDARIES

The responsibility for collective climate adaptation is fragmented, and no actor has, as a starting point, the possibility under current rules to handle water from multiple sides and thus create comprehensive solutions that can handle both water coming from the coast and from, for example, watercourses when it is, for example, storming and raining at the same time.

Therefore, the current organisation of collective climate adaptation is not geared towards the development of the climate in the future and the solutions it will require.

4.2. ACTORS THAT CAN BE BEHIND CLIMATE ADAPTATION

Figure 4.2 shows climate adaptation in different organisations depending on which type of water needs to be handled, and where the main actors today are:

- the individual property owner
- associations of property owners
- local monopolies in the form of utility companies or municipalities

There will continue to be a need for all the mentioned actors to contribute to climate adaptation.

The new climate reality also makes it increasingly necessary to view climate adaptation within the water cycle, which can be across municipal bound-

aries and across water sources – in the following referred to as *complex climate adaptation*.

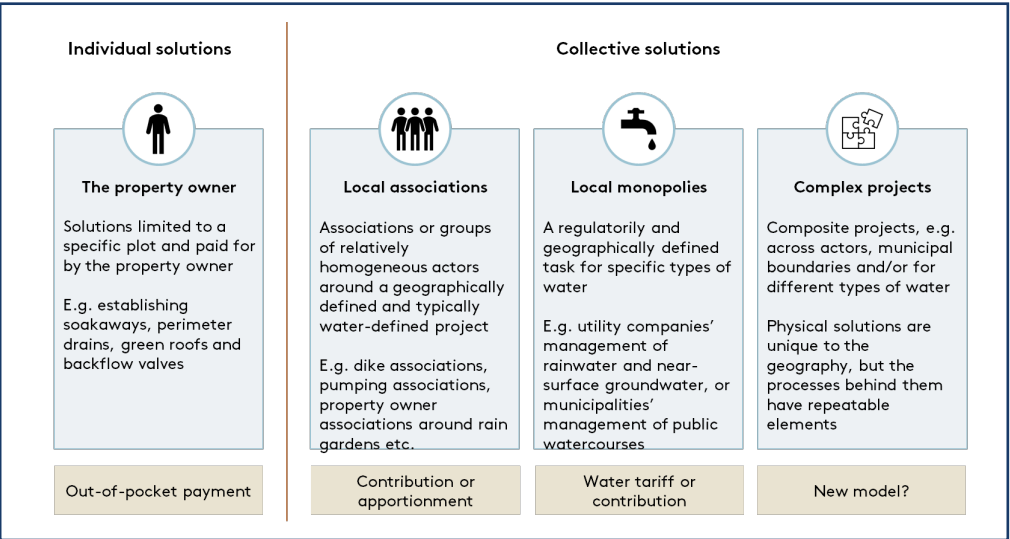
None of the mentioned actors are currently allowed to undertake these types of projects.

However, there are examples of joint projects across municipal boundaries for cross-cutting water sources, for example, watercourses or coasts. Finally, one can also imagine what are here called mega-projects, which must protect very large areas and very large values, and which are unique in both solutions and in character, organisation, and processes.

An example could, for instance, be a future storm surge protection of Copenhagen. Also here, there is currently no obvious actor among those mentioned to be responsible for the project.

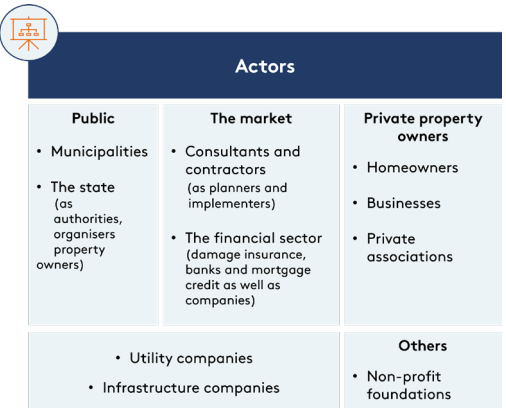
The preliminary analyses for a storm surge protection of Copenhagen have therefore also been driven by Sund & Bælt² together with the Ministry

Figure 4.2 Who is responsible for preventing flood damage



Source: CIP Foundation's own illustration

Figure 4.3. Different actors in climate adaptation



Source: CIP Foundation's own illustration

of Transport in cooperation with the involved municipalities.

In principle, there are a number of different actors that can be involved in climate adaptation across the public and private sectors, cf. Figure 4.3.

When talking about actors in climate adaptation,

there is normally a focus on municipalities and wastewater companies as organisers and on technical competencies as advisors and contractors.

The **financial sector** also plays a central role in climate adaptation, which is sometimes slightly overlooked. But the sector is responsible for both parts of the insurance coverage, but is also instrumental for especially individual prevention with advice and financing.

With its specialised knowledge and widespread experience with pricing and hedging of risks, the sector is an obvious link between the need for climate adaptation, knowledge about risks and options for action, and possible financing solutions (Berg and CIP Foundation, 2026).

KPMG (2026) contains an in-depth description of the actor landscape divided into main actors and supporting actors and accounts for the individual strengths and challenges in relation to different forms of climate adaptation.

VAT RULES MAKE CLIMATE ADAPTATION MORE EXPENSIVE FOR PRIVATE ASSOCIATIONS

The price of climate adaptation is affected by the form of organisation due to VAT rules.

If private associations are responsible for climate adaptation, they do not have income against which to deduct input VAT, whereas municipalities and utility companies typically do, cf. Schjødt (2025). If the municipality gets involved and declares it a municipal joint project, the VAT can be deducted.

To put it bluntly, the VAT rules otherwise make climate adaptation solutions more expensive if private associations are leading them. There should not, therefore, be systematic differences in price depending on who organises the climate adaptation.

² Preliminary investigation of storm surge protection of Copenhagen

ORGANISATION WITH OPPORTUNITY FOR LEARNING

The form of organisation matters for the price. So do the associated competencies, experience, and ability to manage risk. All other things being equal, it is more difficult for an organisation that only has to carry out one major climate adaptation project over a long period to do so efficiently, on time, and within budget.

Some municipalities and especially private associations can find themselves in a situation as a 'first-time actor', where many steps, processes, etc., must first be experienced and perhaps invented for the occasion. Rules must be interpreted and understood. And tenders and contracts must be drawn up in a format that one may not have tried before, or only tests rarely. This can be challenging when it comes to complex climate adaptation projects.

By comparison, professional organisations such as utility companies and infrastructure companies handle these types of tasks on an ongoing basis and build up significant learning and standardisation of processes, which can be repeated and made more efficient.

MUNICIPAL CAPITAL EXPENDITURE FRAMEWORKS ARE CHALLENGED

If the municipality itself is responsible for a climate adaptation project, it will burden the municipality's capital expenditure framework.

Large construction projects over several years will therefore challenge the municipalities' frameworks, which must also cover other construction projects such as the establishment of schools, nursing homes, and day-care institutions. With their long time horizons and large capital sums, climate adaptation projects pose a particular challenge for municipal budgets and political prioritisation.

This constraint applies even if the climate adaptation solution is actually paid for by others than the municipality itself. If the municipality is leading the project, it must be included in the capital expenditure framework, regardless of whether it is subsequently paid for by contributions from those covered or, for example, via a donation from a non-profit foundation.

The constraint on the capital expenditure framework is part of the management of economic activity in Denmark. When the public sector is involved in economic construction activity, it will either have to be part of the municipal or the state capital budget.

Since climate adaptation is a relatively new task for many municipalities, which is expected to grow in scope over time, it will challenge prioritisation further over time. When the constraints become too tight, examples are sometimes seen where municipalities instead transfer ownership and lease a facility from an external party, thereby converting what would otherwise have been a large capital activity into a flat payment stream over time, which instead comes from the service framework (public consumption).

Alternatively, the task can be moved to a company. This happens, for example, when utility companies handle rainwater and groundwater. Their activity does not burden the municipal frameworks (apart from the provision of guarantees), but the possible activities for the utility companies are sharply limited.

USE OF COMPANIES ON MARKET TERMS

By forming external companies that are given an explicit task, this can be limited both economically and in terms of risk, and there is an opportunity to gather specialised knowledge and experience from repeated tasks.

Public incorporation can be used to drive business activities on market terms with a clear political and societal objective, but without being bound by, for example, state budget and appropriation rules. The purpose is to work in a more market-oriented way and seek strengthened efficiency, lower prices, and better quality, among other things through competitive tendering. The companies can be purely public or partnerships with private actors. There are also examples of urban development and area development companies that take care of major construction tasks.

An **area development company** is a partnership – for example between a municipality and private investors or foundations – to transform and prepare larger urban or harbour areas for construction. The company is responsible for developing master plans, constructing infrastructure, and selling building rights to private developers, cf. Kromann Reumert.

Examples are 'Kanalbyen' in Fredericia and 'Naturbydelen' in Ringkøbing-Skjern, while By & Havn I/S is a purely public urban and area development company owned by the City of Copenhagen (95 per cent) and the state (5 per cent). There are also examples of area development companies handling climate adaptation tasks, e.g., the Køge Bugt project, Flodbyen Randers, etc.

At the state level, there are also examples of outsourcing major construction tasks to state-owned companies, for example Sund & Bælt, Metroselskabet I/S (owned by the City of Copenhagen, the state, and the Municipality of Frederiksberg). The actual operation of the metro is handled by a private company.

These companies are examples of how the division of labour can be adjusted, and where one seeks to incorporate the best of several worlds.

It can therefore be considered whether a different division of labour should also be introduced for the new, complex climate adaptation projects, which in terms of size and framework will challenge individual municipalities to be responsible for.

See chapter 6 for a more detailed description of how a new actor can support complex climate adaptation.



PROPOSAL 4.1: New, professional actor for cross-disciplinary climate adaptation

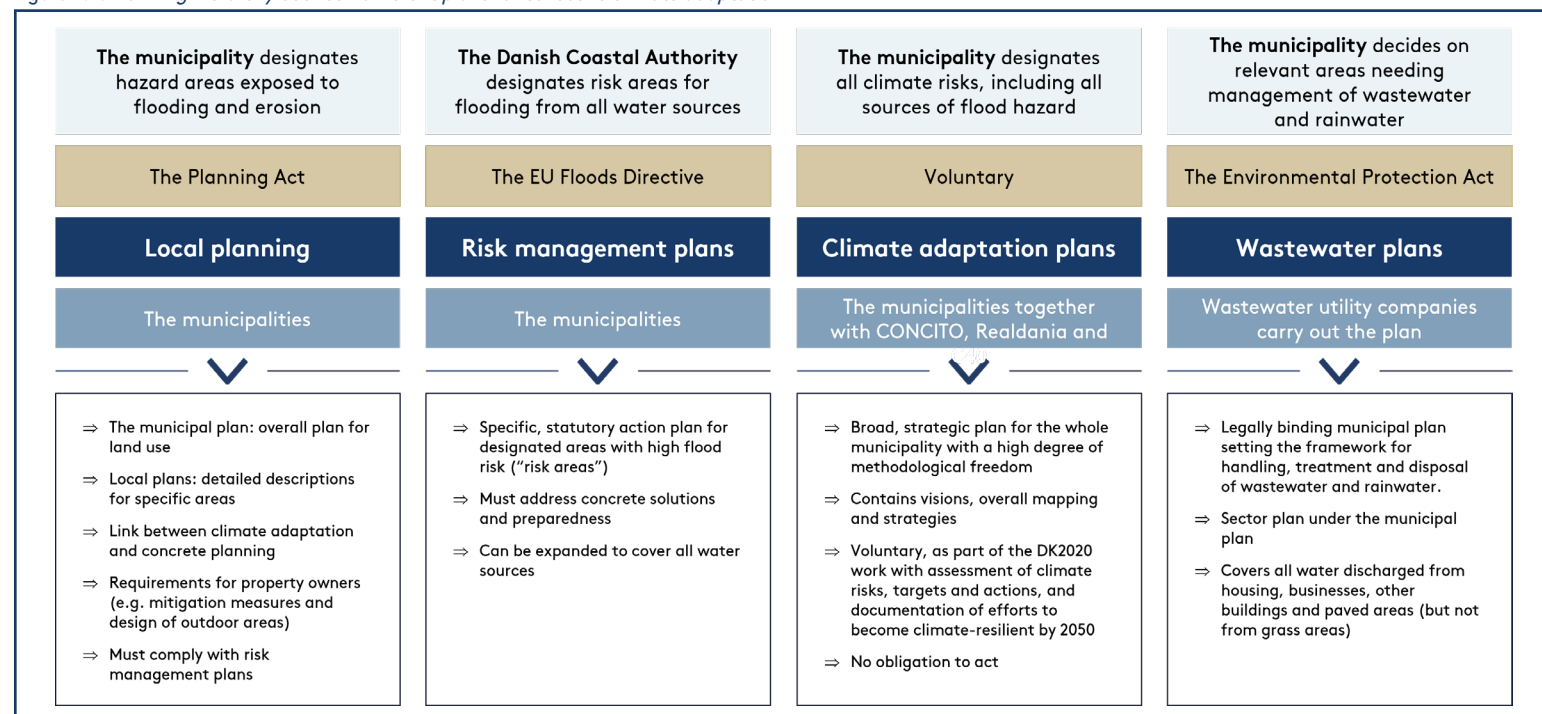
It should be possible for an actor to manage multiple water sources at once if this can provide the best and cheapest solution. It is therefore proposed to give a new type of actor the opportunity for cross-disciplinary water management in a holistic planning of complex climate adaptation.

- Public or private entity working with project companies per climate adaptation project.
- Authority for complex water management and specific tasks is issued through construction acts.
- Subject to state control via tendering

4.3. PLANNING AND PROCESSES FOR COLLECTIVE CLIMATE ADAPTATION

Municipalities are responsible for local planning, cf. the Planning Act, and in this connection, they

Figure 4.4. Planning hierarchy between different plans for collective climate adaptation



Sources: CIP Foundation's illustration based on Schjødt (2026), the Environmental Protection Agency (2025) and [Planning - Climate Adaptation](#)

must also set requirements for what climate adaptation must take place in newly developed areas. The requirements apply to landowners and developers (professional land and property development).

Legislative proposals have previously been put forward to update the Planning Act with, among other things, minimum requirements for what newly developed urban areas must be secured against. It is recommended to reintroduce the proposal as soon as possible in the coming parliamentary session once a new government is in place.

There are also plans for other climate adaptation measures in the municipality, e.g., via voluntary climate adaptation plans, but there are no

requirements for municipal follow-up or a duty to act for the municipality (other than for municipal watercourses).

There is already a larger planning hierarchy as a basis for climate adaptation, the closer purpose and context of which are shown in Figure 4.4. However, the relationship between local planning and water management is not that clear. NIRAS therefore recommends that new, binding water management plans be established for all relevant water sources in the municipality.

VOLUNTARINESS BEHIND CLIMATE ADAPTATION PLAN

The DK-2020 collaboration and the Climate Alliance with the municipalities to develop climate adaptation plans have played a crucial role in

spreading municipal thinking and planning for prevention and have been driven from the private side by CONCITO, assisted by Realdania.

Denmark is the only country in the world where all municipalities have current climate adaptation plans, which are also certified within the C40 framework across the 40 largest cities in the world, cf. CONCITO.

The climate adaptation plans must be updated regularly, and a natural development would be to increase the focus on implementation power and on lessons learned along the way from the first plans to executed measures. Around 70 per cent of the municipalities have allocated funding for the measures in the plans, cf. CONCITO. Conversely, this means that 30 per cent have not.

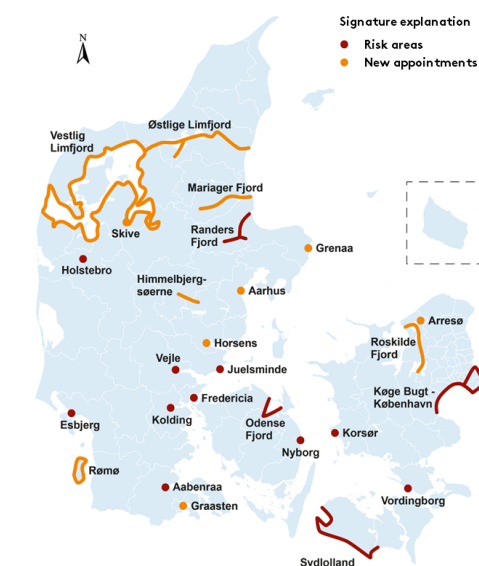
A particular challenge is maintaining political focus and momentum on climate adaptation when the plans are unfolded on a voluntary basis. Here, a consideration could be to link them more closely to the mandatory risk management plans, which, in turn, only cover some of the water sources.

Here, one should consider expanding the risk management plans to include all water sources, as flooding can also occur as a result of, for example, precipitation.

GRADUATION OF RISK AREAS

The Danish Coastal Authority has designated risk areas in 51 of the country's municipalities, cf. Figure 4.5. There are 25 designated areas in total, which, among other things, cross municipal boundaries. For example, virtually the entire Limfjord area is designated as a risk area. This does not mean that the risk of flooding is equally high for

Figure 4.5: Risk areas for flooding from the coast and watercourses in Denmark



Source: The Danish Coastal Authority (2026)

CIP FOUNDATION | Who is responsible for climate adaptation today?

the entire Limfjord. The flood risk varies, just as the exposed values in the area will vary from place to place.

Here, a greater graduation of the risk in the designated areas would be relevant for the action plan and for the area's citizens (proposal 2.4.)

It would also be appropriate if the climate adaptation plans incorporate the entire palette of climate adaptation strategies and thus incorporate a greater temporality with a focus on when different types of solutions can be relevant.

PLANNING WITHIN WATER CATCHMENT AREAS

Most appropriate, however, is if the planning for climate adaptation is based on the physical

cycle of water. Water will – regardless of whether it comes from the side in the form of flooding from the sea and watercourses, or from above in the form of precipitation, or from below in the form of rising or high-lying groundwater – flow together and interact in a water cycle. See, among others, DMI (2025).

Water cycles or water catchment areas do not follow municipal boundaries. But they are established based on watercourses and already exist as administrative cooperation units, cf. figure 4.6.

Figure 4.6. Main water catchment areas in Denmark



Source: Ministry for a Green Tripartite

The 23 hydrologically determined main water catchment areas are currently the starting point for the Green Tripartite's negotiations on the withdrawal of low-lying soils towards watercourses and wetland areas. This means that most municipalities are already in a long-term, established collaboration with planning within these water catchment areas.

This planning forum should therefore also be used to plan for climate adaptation for the individual water cycles.

FLOOD RISK ALSO DEPENDS ON WHAT MEASURES HAVE ALREADY BEEN ESTABLISHED

In the mapping of risk areas and areas at risk of flooding, there is varying degrees of knowledge about what climate adaptation already exists.

DTU's work with updated, national estimates for damage from flooding showed that incorporating knowledge about already existing climate measures in 40 municipalities helped to reduce the risk of damage significantly.

In addition, there is the collection of knowledge about what citizens themselves and homeowners' associations, for example, have established in terms of solutions. This can be crucial knowledge

in the planning and dimensioning of further measures.

LONG PROCESS TIME FOR CLIMATE ADAPTATION

The initiative for collective climate adaptation can, as previously described, come from three sides today: citizen groups, the municipality, or the utility company.

Regardless of the initiator and organiser, collective climate adaptation projects are often very time-consuming and process-heavy, which, all other things being equal, entails a risk that damage will occur in the meantime as a result of flooding.

A collective climate adaptation project contains a number of different process steps. KPMG (2026) describes how collective climate adaptation projects can often last up to 15 years, and sometimes longer. For a project of 15 years' duration, 9 years are typically spent on planning and design, including obtaining the necessary permits.

See Figure 4.7 and KPMG (2026) for a more detailed description of the individual process elements and the risk of iterations between stages that need to be revisited.

The process time challenges the organisation behind the climate adaptation, because it will typically involve a number of handovers, but also because there is an underlying uncertainty throughout about whether the project can be realised.

The value of shortening the processes lies primarily in the fact that fewer damages can occur in the meantime in the physical world. This can involve large sums of money. However, the damages and the insurance coverage 'live' outside the economy of the climate adaptation project and are therefore not necessarily included as a decision factor. The project economy itself is, however, also affected by

PROPOSAL 4.2: The water catchment area as a starting point for planning

In order to create holistic planning for climate adaptation, the starting point should be the water cycle.

Municipalities should cooperate within the main water catchment areas on the management of cross-boundary water sources. Work on climate adaptation can advantageously be included in the Green Tripartite Agreement, as several of the areas taken out of production here will also be suitable for temporary water storage. E.g. when there might be excess water in the watercourses. This makes it possible for climate adaptation – rather than taking place in built-up areas, where it would be far more expensive and intrusive to establish solutions – to take place with nature-based solutions out in the catchment area.

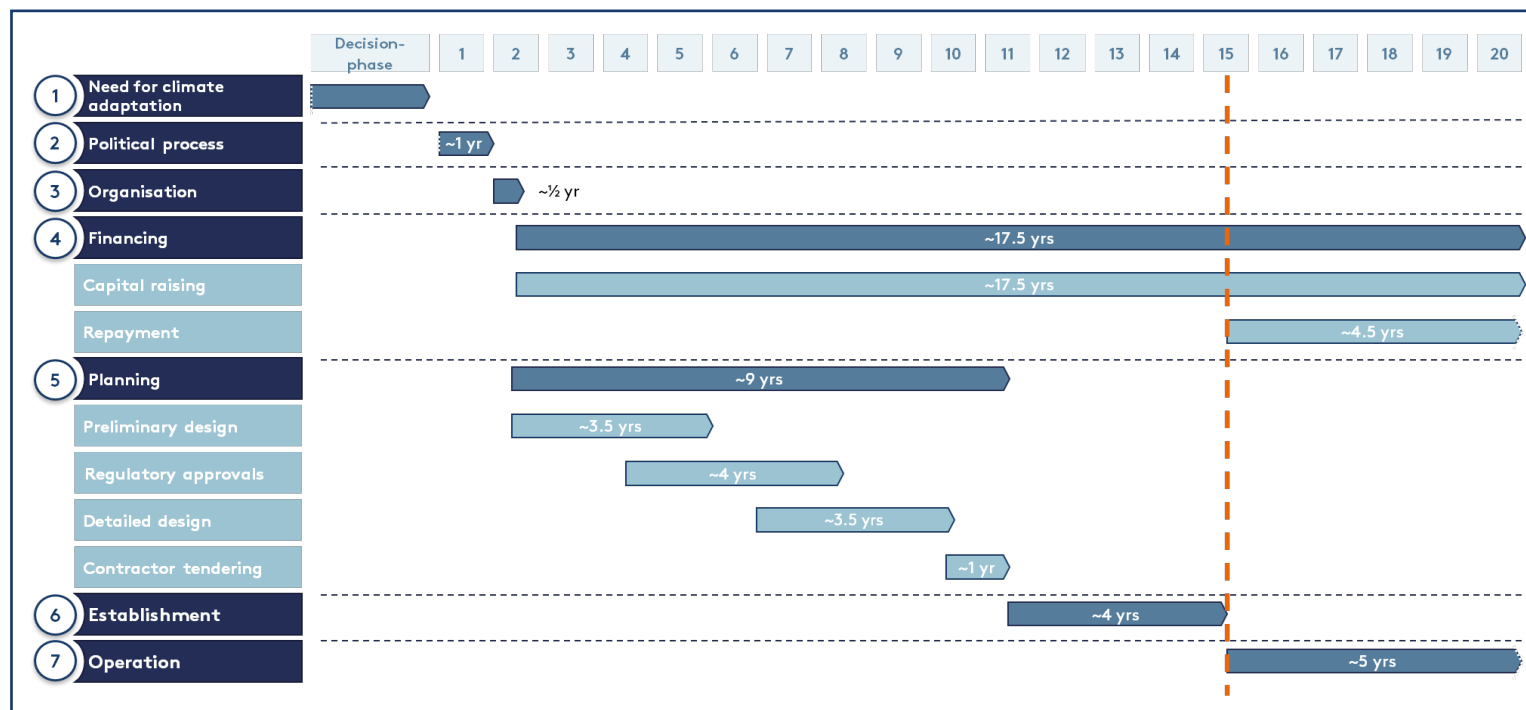
PROPOSAL 4.3: Overview of existing climate adaptation

To make planning and decision-making regarding the need for climate adaptation more effective, it is proposed to collect an overview of already established climate adaptation against flooding.

Municipalities are obvious candidates to handle the inventory for collective solutions within the municipality, as they grant the permits for them.

Citizens' climate adaptation could, for example, be made mandatory to register via the BBR register (Building and Dwelling Register).

Figure 4.7. Overview of elements in the process for collective climate adaptation



Source: CIP Foundation's illustration based on KPMG (2026)

the project's duration. The faster the project can be realised, the sooner repayment can also begin, which reduces interest expenses for the capital outlay. For large infrastructure investments, this can mean quite a lot.

A shorter process time therefore has both an internal cost effect for the project and an external cost saving for society in terms of damage coverage and restoration, which can be quite extensive, cf. DTU's analysis of the consequences of a storm surge (2026).

If the total process time is to be reduced, it will, among other things, require:

- Systematic learning and increased professionalisation and standardisation of the individual processes in the project

- Shorter and parallel approval processes from the authorities
- Strengthened clarification of prioritisation between different considerations

4.4. FINANCING AND PAYMENT MODELS FOR CLIMATE ADAPTATION

Financing of climate adaptation is about both who provides the upfront funding for climate adaptation, i.e. is responsible for capital provision, and under what terms it happens, and who pays for the climate adaptation, and in what ways it happens.

CAPITAL PROVISION – WHO PROVIDES THE UPFRONT FUNDING?

In climate adaptation projects, the construction

cost is most often the largest item, which also falls early in the project. For inter-municipal, collective solutions, it is not permitted to collect payment from those protected before the solution is established, which introduces a need for interim financing. This interim financing is often based on loans or other forms of capital injection.

Municipalities can provide guarantees for loans for public or municipally approved coastal protection projects, which can then obtain financing via KommuneKredit³. The guarantee supports more favourable loans for the project.

Utility companies have, in the same way, access to relatively low-interest financing from KommuneKredit with a municipal guarantee behind them.

The cheap access to financing is a comparative advantage for public actors in climate adaptation (low cost of capital for typically capital-intensive projects). A new, professional actor in climate adaptation is assumed in the same way to gain access to financing with a loan guarantee if they carry out publicly approved projects for complex climate adaptation.

GRANT OPPORTUNITIES

There are various grant opportunities for climate adaptation depending on who is carrying out the climate adaptation project and what type of climate adaptation is involved.

Grant opportunities often reflect that there is some form of externality or market failure associated with the activity, so the full price or cost is not handled by the market.

Climate change is called by some the consequence of history's greatest market failure, as the price for emitting greenhouse gases has not reflected the damage costs that follow.

“Climate change is the consequence of history's greatest market failure”

*British economist Richard Stern,
former chief economist at the World Bank*

The consequence of this has been higher emissions than otherwise, which we globally bear the price for now and in future generations in the form of climate change. The future consequences can be mitigated by green transition and greenhouse gas emissions that are priced according to their damage costs. But it is difficult to send the bill for climate change backwards in time to previous emitters.

³KommuneKredit is a member association owned by municipalities and regions, which offers loans and leasing to municipalities, regions and other actors that carry out public tasks. KommuneKredit's lending is financed by the state by drawing on the state's account at the National Bank.

CIP FOUNDATION | Who is responsible for climate adaptation today?

In addition to compensating for externalities, subsidies and grants can also reflect a political desire to cover goods and societal values that would otherwise not be catered for, e.g. common cultural heritage etc.

The state's grant funds for climate adaptation have primarily taken the form of the annual **Coastal Protection Fund**, which supports municipalities' construction costs⁴ for protection against

Box 4.1. EU funds supporting climate adaptation

Around 1/4 of the EU's total budget for the period 2021-2027 is targeted at climate transition and climate adaptation and must, among other things, help member states to manage climate change and increase resilience. Relevant EU funds and programmes include, among others:

- The LIFE programme: Dedicated grant scheme for nature, environment and climate. The programme supports projects that directly contribute to implementing the EU's climate policy, including climate adaptation initiatives, and has, among other things, supported the 6-year Danish LIFE ACT programme under the leadership of SDU Climate Cluster.
- EU Regional Fund (ERDF): In the period 2021-2027, significant funds have been allocated to activities that promote climate adaptation and prevent climate risks and disasters, e.g. from flooding in the form of coastal protection. The support can, for example, go to investments in infrastructure, technological solutions and other measures that increase resilience to climate change. The ERDF also finances Interreg projects, which involve co-operation between regions on climate adaptation.

Source: The EU Commission

erosion and flooding from the coast. Since 2020, the annual funds have been around 80-150 million DKK. As of 1/1 2026, a total of 41 projects had been awarded funds from the fund, of which 8 were completed, cf. The Danish Coastal Authority. Applications are made for significantly more than the size of the fund, which can help promote a form of stop-go approach in municipal climate adaptation if support is not obtained. A criticism that has, among others, been put forward by the Economic Councils.

The fund is awarded based on various criteria, including how large values the project will be able to protect, which implicitly favours larger cities and areas with high property values. With the current green home improvement deduction, property owners have the opportunity to deduct parts of the labour costs when establishing climate adaptation measures, e.g. soakaways, perimeter drains and backwater valves.

For larger climate adaptation measures, it may also be relevant to apply for EU funds, cf. box 4.1.

NON-PROFIT CONTRIBUTIONS AND ADDED VALUE

Non-profit foundations will also be able to contribute to covering some of the expenses for climate adaptation, e.g. by contributing capital for the preparatory work, where analyses, pilot projects and method development are carried out, but also contribute to projects with great societal benefit and synergies for, e.g., the city's development.

Realdania, the Velux Foundation, the Nordea Foundation and Aage V. Jensen's Nature Foundation are examples of non-profit foundations and associations that have supported climate adaptation through various initiatives with several hundred million.

As another example, the association-owned Forenet Kredit has set aside 1 billion DKK to support homeowners' associations in establishing rain gardens and similar solutions on common areas, which can mitigate the consequences of heavy rainfall and at the same time create recreational areas. Typically, these non-profit contributions have had multiple purposes in mind and have contributed added value and effects that exceed the short-term return on investment.

PAYMENT MODELS

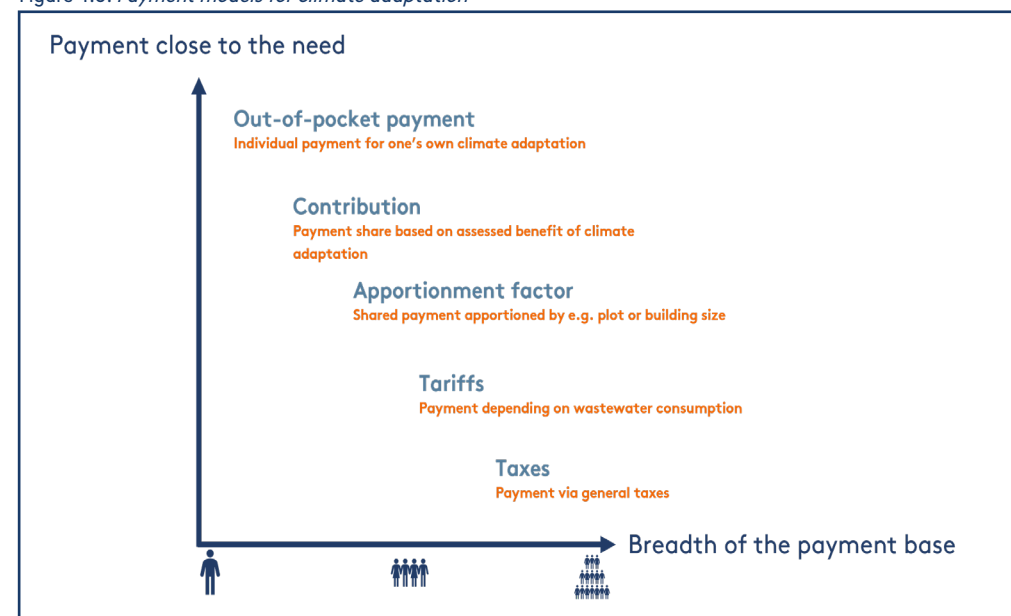
Once capital has been laid out and, in some cases, subsidies, grants, and guarantees for climate adaptation have been received, the remaining part of the bill will need to be repaid after the solution has been established.

Ultimately, there is no one other than the citizens to pay for climate adaptation and pick up the bill for climate change resulting from past emissions.

There are various ways to pay for climate adaptation, which differ in terms of the payer group, the time horizon for repayment, terms along the way, and how close the connection is between the payment and the payers' specific need for climate adaptation, cf. figure 4.8.

In the case of individual climate adaptation, the payment is linked directly to one's own need for climate adaptation. Collective adaptation with contribution payments calculated by the municipality is sought to be designed according to the utility principle (see box 4.2), which in practice includes a group of landowners closest to the specific solution. If climate adaptation is solved within homeowners' associations, the payment model can be agreed upon, most often based on distribution keys for the size of the plots or buildings.

Figure 4.8. *Payment models for climate adaptation*



Source: CIP Foundation's own illustration

⁴ The state subsidy is a maximum of 40 per cent with a ceiling of DKK 30 million per project.

Box 4.2. The utility principle behind contribution payment for climate adaptation

The utility principle is based on the fact that those who gain (benefit) from climate adaptation must pay for it. The size of the payment must reflect how much benefit the individual receives from the protection.

This sounds simple and fair at first glance, but is in practice difficult to administer and to define the circle of payers for the municipalities, cf. KPMG. The contributions are paid by landowners based on their flood risk and the protected values. The costs of the project are distributed according to direct benefit, and the size of the contribution is one of the most complained-about parts.

Contributions based on the utility principle are used for coastal protection (inter-municipal projects) and for protection against flooding from public watercourses.

When wastewater utility companies take care of climate adaptation, the bill is paid via the water bill to customers in the supply area. Here, their need for climate adaptation is linked to their own water consumption. This connection may seem weak and is probably more about the fact that it is customers in the local area who benefit from the climate adaptation.

On the other hand, the utility companies have an effective payment mechanism, and the trend is moving towards more climate adaptation tasks being transferred to the utility companies (ground-level groundwater) and thus to tariff financing.

There is a legal possibility to charge for climate adaptation as a fixed surcharge rather than being linked directly to water consumption, cf. Schjødt (2025), and it should be considered in the future

to use this as a collection unit. In that case, the climate adaptation tariff is a solidarity payment between customers in the supply area. It can also be difficult to determine how much benefit different residents in the supply area derive from sewers, cloudburst tunnels, and common water collection and temporary water storage areas.

The broader the payment base, the greater the redistribution and the more suitable the payment model is for covering a broad and perhaps more diffuse group of beneficiaries.

General taxes are the source of funding when municipalities choose to prioritise supporting climate adaptation, and when the state chooses

**PROPOSAL 4.4: Fixed climate adaptation surcharge for utility companies' solutions**

It is proposed to abolish the current link between the need for climate adaptation and one's water consumption, which is the basis for the charges from wastewater utility companies.

By separating the cost of climate adaptation directly on the bill, it will also be clearer to customers what they are paying for.

- Fixed and solidarity-based climate adaptation surcharge to cover climate adaptation measures in the utility area.

to support preliminary studies, stands for sand nourishment of the West Coast, and offers the Coastal Protection Fund for municipal coastal protection.

The individual payment models can have different visibility for the individual and, of course, also

result in different amounts depending on the chosen method.

PAYMENT FOR PUBLIC GOODS

The current payment models for climate adaptation only concern payments from individual landowners. The underlying assumption behind this is that society's benefit from climate adaptation is equal to the sum of what the individual landowners benefit from (the sum of individual utility).

But as discussed in chapter 3, climate adaptation also concerns a number of public goods or societal values, where the users are not well-defined or cannot be charged user fees.

Public goods include, for example, common nature and recreational areas, specially protected nature, cultural treasures and monuments, and the value of having transport options (trains, planes, ports, roads, and paths) and other infrastructure in the form of functioning utility services.

Here, the public sector must, on behalf of us all (and future generations), lay out the funds to ensure that these goods are also covered by climate adaptation. The public sector can here be both the state and the municipalities, depending slightly on how local the good is.

THE FISCAL BUDGET WILL BE SQUEEZED IN THE FUTURE

In the coming decades, the state will be challenged in being able to cover new financing needs. Here, climate adaptation will be a relatively new financing need for the state, which has slowly been started with Climate Adaptation Plan 1 and the Acceleration Package.

Due to demographics, the public budget from around 2030-2050 will be challenged in staying above the permitted limits for deficits ("the fiscal

hammock"). See e.g. Birch Sørensen, P. and J. Røsted (2026).

This means, all else being equal, that the state will to a greater extent be forced to take out loans if it is to lay out funds for public goods, or work more together with private capital to solve climate adaptation.

Here, the financial sector, as mentioned, plays a very significant role with capital intermediation, but also with damage coverage for the residual risk that is not covered by climate adaptation.

Since the task is very extensive and will stretch over a longer period, it is already proposed to begin a form of joint savings for this type of climate adaptation, e.g., in the form of a climate and resilience fund for society to cover societal values.

CLIMATE ADAPTATION FUND

It is proposed that the fund receives an initial deposit as part of a political agreement on climate adaptation. The size is a political priority, but in the latest proposal for a climate adaptation plan, DKK 14.9 billion was set aside from the fiscal space towards 2040, targeted at state co-financing of storm surge projects.

Looking ahead, it can be considered whether a share of potential surpluses on the state's accounts should be targeted at the fund. In Norway, surpluses from the sale of oil and gas go to the Oil Fund, which is to be used for future-proofing Norwegian society.

A fund's resources are more suitable for one-off investments such as climate adaptation rather than, for example, financing ongoing operating expenses.

At the moment, surpluses on the state budget go towards building up net wealth, which is currently at 20 per cent of GDP, cf. The Ministry of Finance.

Climate adaptation in larger projects is an expression of societal investments that also benefit future generations. This requires a clear and dedicated prioritisation.

MUNICIPALITIES CAN ALSO CONTRIBUTE

Some of the public goods that will be covered by climate adaptation in the future also have significant local importance. Therefore, it can also be considered to let the municipalities contribute – either directly in the individual projects or as part of a joint saving in a climate adaptation fund, or a combination thereof.

This depends on how much equalisation is politically desired between the different parts of Denmark, as climate adaptation, all other things being equal, is a greater challenge per citizen in the more sparsely populated areas.



PROPOSAL 4.5: Climate Adaptation Fund

To support climate adaptation, and not least the financing of the part of climate adaptation that concerns societal values, it is proposed to establish a climate adaptation fund. The fund can contribute both with capital outlays and with payment for public goods.

- State contributions
- Municipal funding
- Contributions from others

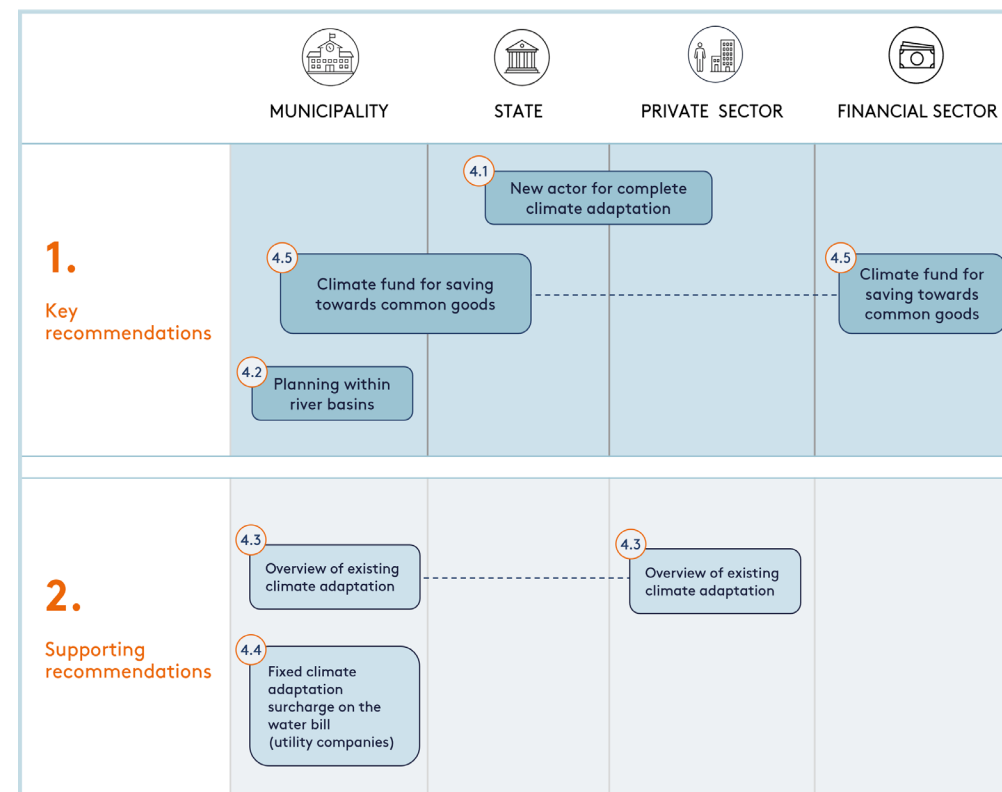
By establishing a fund, it is to a greater extent possible to prioritise a long-term programme for climate adaptation rather than through ongoing prioritisation in the annual Finance Acts. It will increase visibility and is an expression of committed funds.

There are also societal values of a more local nature, which is why it can also be considered to involve the municipalities in the fund's structure.

It can also be considered to let the financial sector contribute to the climate adaptation fund, as the sector has a large derived benefit from climate adaptation and a strong self-interest in it happening. The sector's contribution can, for example, be agreed as part of multi-party discussions on society's climate adaptation (see also "blue tripartite" in chapter 7).

The financial sector can also contribute by pension funds themselves or collectively injecting capital into larger climate adaptation projects, cf. chapter 6, as an investment.

Summary of proposals in chapter 4



5. How are dilemmas in climate adaptation handled?

Climate adaptation is a subject full of dilemmas. This chapter provides an overview of some central dilemmas and conflicting choices that one must navigate when it comes to climate adaptation. This includes looking at: 1) the relationship between nature and climate adaptation, 2) the distribution of responsibility, and 3) the handling of areas with a high risk of flooding in relation to new construction and in relation to already existing activity and buildings.

Key take-aways from the chapter:

- Climate adaptation is full of dilemmas. But it is necessary to have the difficult democratic conversations, otherwise individuals will end up in very difficult situations
- There is a need for better guidance on the relationship between nature and climate adaptation, otherwise climate adaptation can be delayed unnecessarily
- Conversely, nature restoration can also strengthen climate adaptation through nature-based solutions and multifunctional land use
- We are building our way to more risk, and there is no plan for how we should handle the areas that it is not possible or profitable to protect. If this is not rectified, landowners can be trapped in a negative value spiral

5.1. NATURE-BASED DILEMMAS AND SOLUTIONS

The relationship between climate adaptation and nature is complex. There are both ethical considerations (Should one climate-proof nature areas?),

legal considerations (Is it allowed to carry out climate adaptation in protected nature?) and considerations about societal benefit and valuation (What counts as essential societal interests? When are nature areas profitable to climate-proof?). Finally, there are practical questions (What should we do about the areas we do not climate-proof? Can nature restoration and climate adaptation work together?)

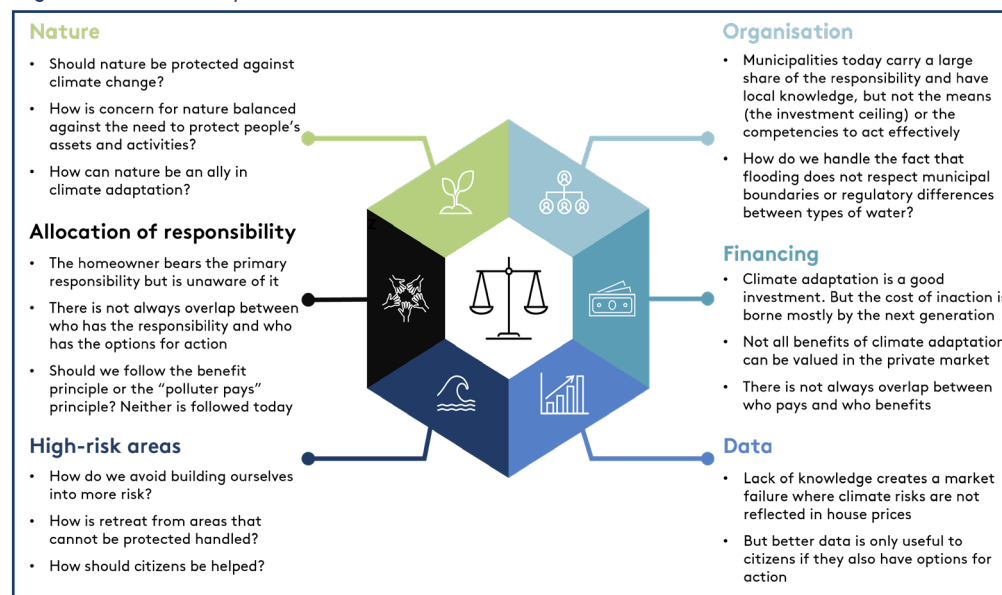
COULD AND SHOULD ONE PROTECT NATURE AGAINST CLIMATE CHANGE?

Denmark has special nature types, e.g. salt marshes and dune landscapes, which are threatened by rising water levels and more frequent cloudbursts as a result of climate change (NIRAS & HaugaardBraad (2025b), COWI (2024)).

When we have thought about protecting nature until now, it has primarily been against direct effects of human activities. If an area is untouched, we have seen it as protected. But how should we relate to the fact that humans now also create indirect damage to nature through climate change?

Some have the view that "Nature should not be protected against nature" and therefore believe that one should not carry out climate adaptation in protected nature areas. On the other hand, the coming extremely rapid climate change (see chapter 2) is not natural but man-made. Unlike with slow natural fluctuations in the climate, ecosystems now do not have time to adapt to the changes in the landscape that humans have set in motion via CO₂ emissions. *Perhaps protected and untouched are therefore not the same - perhaps the best way to keep a nature area as untouched*

Figure 5.1: Climate adaptation is full of dilemmas



Source: Ministry of the Environment (2025a)

as possible in some cases is to build a dyke? That view is held by, for example, the Dutch nature agency, which has supported a climate adaptation project in Texel that protects a nature area with breeding birds against flooding (Ecomare, 2019).

The European Court of Justice believes that effects of climate change are among the types of damage that one can take into account in the protection of Natura 2000 areas (EU Court of Justice, 2005). The Commission's guidance on Natura 2000 areas (EU Commission, 2018) says that it must be assessed on a case-by-case basis whether measures should be taken to prevent climate change from damaging species or nature types. *According to the EU, local authorities may thus well permit climate adaptation projects in protected nature areas, based on case-by-case assessments.* In which cases it is appropriate, however, is a value-based question.

HOW IS THE BALANCE STRUCK BETWEEN NATURE CONSIDERATIONS AND PROTECTION OF SOCIETAL VALUES?

What about when it is not nature areas that need to be protected against climate change, but people's properties and other societal values such as infrastructure and culture?

This question is complex, not only morally but also legally. Legislation allows, to a certain extent, for compromises to be made with nature conservation in order to *protect essential societal interests*, provided it is shown that it is *not practically possible to carry out the project without compromising nature conservation*; see the fact box below.

However, the balance between nature and societal considerations is handled differently within different parts of environmental legislation. In addition, the employees who have to plan climate adaptation projects are *in doubt about what is legal. This leads to abandoned climate adaptation*

projects as well as long processing times with dialogues between various authorities (NIRAS & HaugaardBraad, 2025).

51% of Denmark's coastal municipalities have postponed or abandoned coastal protection projects within the last five years. Of these, 32% cite nature conservation rules as the reason (KL, 2024).

In some cases, it may be permissible to compromise on nature considerations in the project area if compensatory measures such as replacement nature are established.

If a municipality, for example, wants to carry out a climate adaptation project that damages Section 3 nature, they must apply for a dispensation from the Nature Conservation Act. In this connection, the authorities must assess how much replacement nature needs to be established. Protection of a larger area than the one damaged may be required - some use the ratio 2:1 or 3:1 (NIRAS & HaugaardBraad, 2025).

Derogation from the Habitats Directive must be applied for separately for each species. For example, Kolding Municipality has been in dialogue with the Environmental Protection Agency about applying for a dispensation to flood an area to 'park' water, where birch mice are assumed to be present. They also chose to pre-apply for a dispensation under the Species Protection Order for 'intentional killing of bats and otters' just in case, to prevent delays to the project. Employees from several municipalities are of the opinion that it is better to apply for one too many dispensations than too few (NIRAS & HaugaardBraad, 2025).

In some cases, *long periods and significant costs are spent on obtaining legal assessments* before an application is drafted. When some projects are in a preparatory phase for 5-10 years, data about

nature can become outdated along the way. This, combined with staff turnover and ongoing changes in administrative practice, delays the projects further (NIRAS & HaugaardBraad (2025), Jyllinge Nordmark and Tangbjerg Digelag (2021)).

In addition, there is *uncertainty about replacement nature: how much should be established, where, and what are the possibilities for expropriation or subsidies to buy out landowners?* The uncertainty contributes to landowners remaining hesitant in the hope of getting better deals. This can delay projects and affect the prioritisation between using nature or agricultural areas for, for example, temporary water storage (NIRAS & HaugaardBraad, 2025).

A certain degree of uncertainty about what one can obtain permits for in a specific project is unavoidable, as it depends on the specific natural areas. But perhaps the planning phases could be shortened and made cheaper if there were clear common guidelines from the authorities, so that less time could be spent on legal reports and dialogues with the Environmental Protection Agency?

There are some guidelines, see the fact box below, but this has apparently not led to clarity among the actors that NIRAS & HaugaardBraad (2025) have interviewed. This may be due to a lack of knowledge of existing guidelines, or that the guidelines do not provide clarity on, for example, requirements for data basis and balancing between different interests.

It is therefore recommended to prepare a guide for the municipalities based on the EU's guidance as well as precedents from projects that have received permits. In the preparation of guidelines for what is considered 'essential societal interests', one could look at other regulations where essential societal interests are used as a basis for decision-making, e.g., expropriation.

Box 5.1: Possibilities for derogating from EU directives

The EU's nature and environmental protection directives can be derogated from if all practically feasible steps have been taken to reduce the project's harmful effect, and the project is necessary for "imperative reasons of overriding public interest". It is not explicitly mentioned whether climate adaptation counts as imperative reasons of overriding public interest, but HaugaardBraad assesses that this is likely the case in, for example, the Water Framework Directive and the Habitats Directive (NIRAS & HaugaardBraad, 2025).

In some regulations, it is clearer than in others what can be considered imperative reasons of overriding public interest, and when derogations are permitted (NIRAS & HaugaardBraad, 2025):

- The Habitats Directive's provisions on area protection: Derogations may be permitted due to "imperative reasons of overriding public interest, including those of a social or economic nature". HaugaardBraad (2025) assesses that climate protection projects will in some cases fall under this. Increased project costs are not a valid reason.
- The Habitats Directive's provisions on species protection: Overriding public interests can be social and economic, but also "reasons of overriding public interest for the environment".
- The Birds Directive: Derogations from Articles 5-8 may only take place for reasons of "public safety and health"
- The Water Framework Directive: Member States have a certain flexibility to define imperative reasons of overriding public interest. Renewable energy, drinking water supply, and irrigation are recognised. HaugaardBraad (2025) assumes, based on the preparatory work for the Water Planning Act, that this will also apply to major infrastructure projects. Unlike the Habitats Directive, it is also a valid reason here that "other solutions are disproportionately costly". The assessment of "disproportionately" is done via socio-economic analysis. HaugaardBraad (2025) assesses that "The existing administrative practice testifies that the interpretation of the national implementation of the Water Framework Directive is that it must be difficult to obtain permission for a derogation for the realisation of a specific project".

A guide in itself might not be sufficient to change the perception among the executing employees. It should probably be combined with an information effort so that knowledge becomes broader than just the existing guidelines. This could include a 'task force' that advises on specific projects (NIRAS & HaugaardBraad, 2025).

CAN THE VALUE OF NATURE BE INCLUDED IN CLIMATE ADAPTATION?

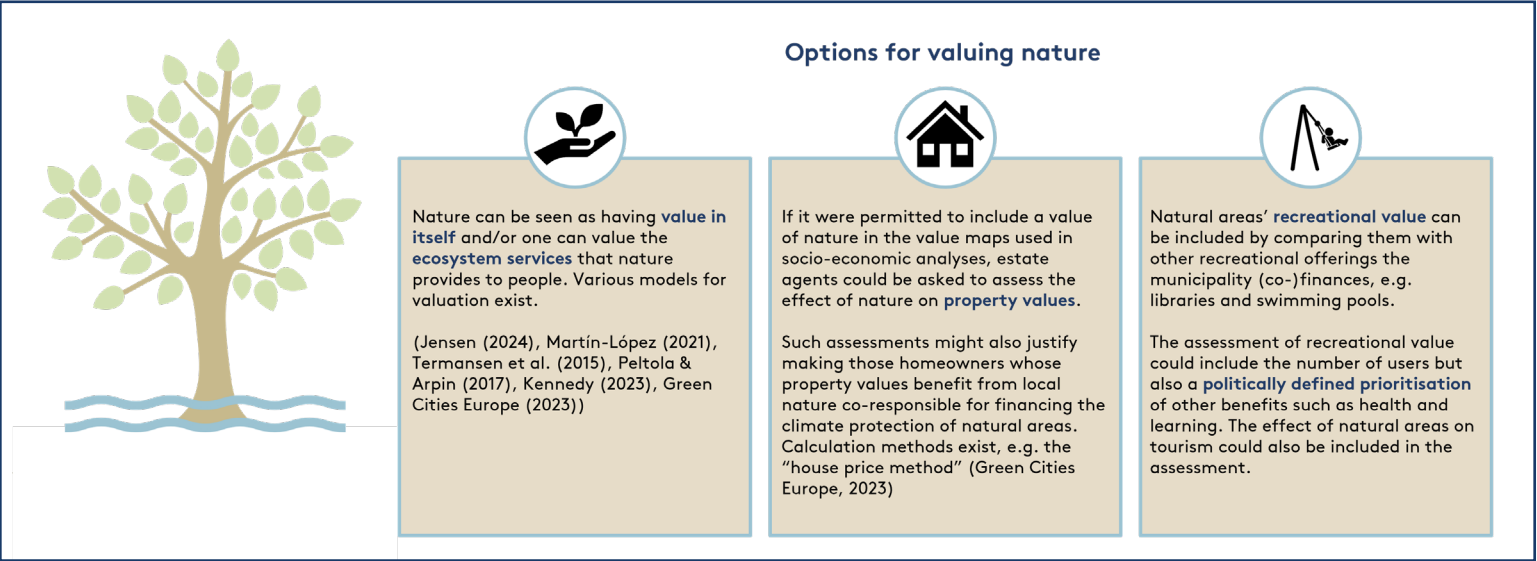
Funds for climate adaptation projects are typically

prioritised based on a socio-economic analysis, which weighs the project's costs against the value of the damage the project is expected to prevent. *Municipalities use different methods. In principle, a value of natural areas could be included here – justified by, for example, their recreational value for citizens, the effect on house prices and tourism revenues, and/or a politically decided value of nature in itself.*

Utility companies, on the other hand, must, according to the Service Order, use a specific method for socio-economic analysis, which determines how much money they are allowed to spend on climate adaptation. According to point 5.8 in Annex 1 to the order, the utility companies' socio-economic analysis may only include market-traded values (buildings, infrastructure, agricultural land, evacuations, emergency efforts, and cleanup) or indirectly market-traded values (production loss, temporary rehousing, and lost working hours in connection with transport delays) (Ministry of the Environment (2022), Environmental Protection Agency (2021), NIRAS (2024)).

The effect that climate change has on housing prices is not included. Typically, a square metre price of expected damage to homes is used, without the possibility of including that the damage also causes a loss in house prices - directly due to the

Figure 5.2: There are various options for calculating the value of nature in connection with climate



buyer's expectations of future damage or indirectly due to damage to natural values or recreational values in the home's local area.

When it is mandatory to use calculation models that do not include a value of natural areas, it is

in practice equivalent to valuing nature at DKK 0. Admittedly, it is difficult to determine accurate values – but one can argue that the current choice of DKK 0 is hardly accurate.

In addition to the requirement to use specific calculation methods, utility companies must document that their chosen level of climate adaptation is cost-effective in terms of both socio-economics and corporate economics. They may only invest up to the level where the socio-economic value is highest, regardless of whether a higher level of protection would still have a positive socio-economic effect at the same level or higher than the utility company's other investments. This can make it difficult for utility companies to choose solutions that not only protect homes and infrastructure but also prevent damage to (or strengthen) nature, biodiversity, and recreational opportunities (Ministry of the Environment (2022), Environmental Protection Agency (2021), NIRAS (2024), Quitzau & Hoffmann (2025)).

It is proposed to change these rules so that utility companies get more flexibility to engage in climate adaptation projects that ensure a high level and create more types of value for the local community.

Box 5.2. Existing guidance on nature considerations in connection with climate adaptation

The Commission has published a guide on managing the effects of climate change on Natura 2000 areas (European Commission: Directorate-General for Environment, Alterra & Eurosite, 2013) and the EU guidance on the management of Natura 2000 addresses climate adaptation (EU Commission, 2018). However, the national habitat guidance does not address climate adaptation (Environmental Protection Agency, 2020).

There is guidance on the derogation process for coastal protection projects (Retsinformation, 2021), but actors behind upcoming climate adaptation projects are requesting guidance on projects in catchments (i.e., not at the coast) as well as guidance on how to weigh conflicting considerations in, for example, the Floods Directive and the Habitats Directive (NIRAS & Haugaard-Braad, 2025).

In Sweden, there are guides and communication materials that can potentially be used for inspiration (County Administrative Board of Västra Götaland, 2018, 2022 and 2023).

PROPOSAL 5.1: GUIDANCE ON NATURE CONSIDERATIONS IN CONNECTION WITH CLIMATE ADAPTATION

We propose that the Ministry of the Environment prepares guidance for municipalities and other actors on handling regulations that may be perceived as contradictory. This is to create less uncertainty and more uniformity in the handling of cases concerning climate adaptation that affect nature areas.

The guidance can be based on the EU's guidance, the communication materials in Sweden (see box 5.2) as well as references to cases where permissions have been obtained.

Written guidance can potentially be combined with a "mobile task force" or network of experience to ensure broad knowledge of the guidance.



PROPOSAL 5.2: INCLUDE THE VALUE OF NATURE

Make it permissible for utility companies to include the value of nature in socio-economic analyses of climate adaptation projects.

This requires an amendment to the Utility Act, so that it is not only market-traded values that can be included.

By giving utility companies some methodological freedom to, for example, apply the methods in figure 5.2, there is a possibility that utility companies can to a greater extent incorporate nature values and recreational values and thereby contribute to holistic climate adaptation solutions that create added value for citizens.

WHAT SHOULD WE DO ABOUT THE THREATENED NATURAL AREAS THAT WE DO NOT CLIMATE-PROOF?

Schjødt (2026) discusses how human dwellings

and activities can be withdrawn from vulnerable areas. Should one similarly consider withdrawal models for nature? Figure 5.3 provides some suggestions as to what that could entail.

HOW CAN NATURE BE A PARTNER IN CLIMATE ADAPTATION?

Nature restoration projects can be designed with built-in climate adaptation, or climate adaptation projects can be designed in such a way that they benefit nature and the environment (NIRAS & Haugaard-Braad, 2025).

Nature-based solutions have greater potential to be used in protected natural areas than traditional "grey" climate adaptation solutions. However, nature-based solutions have so far not been particularly widespread in Danish climate adaptation projects (Sandin et al., 2022).

Concrete measures that promote synergies between climate adaptation and nature include, for example (European Commission (2024), County Administrative Board of Västra Götaland

Figure 5.3: There are a number of options for handling situations where some nature areas are not protected

Habitat expansion or wildlife corridors

Habitat expansion or wildlife corridors give species the opportunity to retreat.
E.g. in the Hondsbossche Dunes project in the Netherlands, habitat expansion through linkage with another natural area was the solution for protecting breeding Wadden Sea birds before sand could be added to climate-proof the coast.

Replacement nature

New natural areas or improvement of the quality of natural areas in a location other than where an area is expected to be damaged by climate change.
It may be set as a goal that the replacement nature should be in areas that improve conditions for the same species harmed in the areas one chooses not to climate-proof.
If the right habitat types are not found within the country's borders, financing replacement nature abroad may be considered.

Biodiversity credits

There are various models for calculating compensation for destroyed biodiversity. However, biodiversity credits have faced criticism: it is difficult to calculate the price of biodiversity loss, hard to guarantee that buying credits leads to real additional biodiversity protection, and there is a risk that credits are seen as "indulgences" that justify weaker protection of local natural areas.
One could potentially establish a decision hierarchy where credits are only used if it is impossible to use habitat expansion, wildlife corridors or replacement nature.

Source: Ministry of the Environment (2025a)

Figure 5.4: Climate adaptation is one of the uses that can best coexist with other purposes (multifunctional land use)

	Urban development	Biological production	Energy	Climate adaptation	Recreation	Drinking water	Biodiversity	Greenhouse gas reduction	Nutrient reduction
Urban development									
Biological production									
Energy									
Climate adaptation									
Recreation									
Drinking water									
Biodiversity									
Greenhouse gas reduction									
Nutrient reduction									

Note: Dark blue = the purposes can to a high degree be promoted in the same area. Light blue = can to some degree be promoted in the same area. Sand-coloured = is difficult to promote in the same area.
Sources: Arler et al. (2017), Bødker et al. (2022), CONCITO (2023, 2024a,b), Iversen et al. (2024), The Climate Council (2024), Ministry for the Green Tripartite (2023, 2025), Petersen (2025), SEGES (2020)).

(2018), Lomma Municipality (2024), NIRAS & Haugaard-Braad (2025):

- Flooding of agricultural land
- Re-meandering of streams
- Removal of ditches and drains
- Salt-tolerant planting in connection with coastal protection
- Integration between water purification and water retention
- Green roofs and rain gardens
- (Re)establishment of stone reefs

If climate adaptation is integrated with the green tripartite agreement, it can promote solutions that provide synergies between climate protection, reduction of greenhouse gas emissions, improvement of biodiversity, and reduction of eutrophication. When multiple purposes are integrated

on the same area, so-called *multifunctional land use*, a more efficient fulfilment of goals can be achieved with lower costs for purchasing land, see Figure 5.4.

Figure 5.4 shows which uses can coexist on the same area. It can be seen that *climate adaptation is one of the purposes that can most easily coexist with other uses.*

Legislation already requires that potential negative effects on nature and the environment are investigated and minimised before climate adaptation projects are initiated. But perhaps more can be done to exploit the potential for positive interaction?

If guidance is prepared for municipalities on navigating the relationship between

climate adaptation and nature, it would be obvious to include a focus on nature-based solutions. Inspiration can be taken from the Nordic Guidance for Nature-based Solutions (Nordic Council of Ministers, 2024).

There is a need to think more broadly than the individual municipality to find solutions that balance climate adaptation, nature considerations, and emission reductions across larger areas (Anker et al. (2022), Quitzau & Hoffmann (2025), Anker (2023)). The tripartite agreement as a model has the strength that it brings stakeholders together for common solutions. Experience from the Netherlands shows that early and thorough stakeholder involvement contributes to faster and more holistic decisions about climate adaptation (NIRAS & Haugaard-Braad, 2025).

Furthermore, the fact that climate change is expected to have serious consequences for

agriculture speaks in favour of incorporating climate adaptation into the work of the tripartite agreement. More and stronger storm surges, precipitation events, and flooding from watercourses in combination with a rising groundwater table will cause far-reaching damage and large yield losses. DTU (2026) estimates that over the next 100 years there will be a loss of agricultural crops with a present value of approx. £7 billion and a loss of the value of agricultural land of £15 billion in present value. This includes estimates of damage from flooding linked to storm surges, cloudbursts, watercourses, and prolonged rain, but not, for example, high-standing groundwater or drought.

It is therefore proposed that climate adaptation be incorporated into the green tripartite agreement, and that new business models be considered, e.g., the possibility for farmers to rent out their land for temporary flooding.



PROPOSAL 5.3: CLIMATE ADAPTATION IN THE GREEN TRIPARTITE

Incorporate climate adaptation into the Green Tripartite. The Ministry for the Green Tripartite should facilitate the incorporation of climate adaptation into land use planning.

The water catchments, which implement the tripartite agreement, are an obvious framework for planning climate adaptation across municipal boundaries.

With the right guidance and data basis, the water catchment secretariats can think in terms of multifunctional land use and seek to get the most possible target fulfilment out of the limited areas, both in terms of CO₂ reduction, nutrient reduction and climate adaptation.



PROPOSAL 5.4: LEASE AGRICULTURAL LAND FOR FLOODING

Municipalities can use agricultural land for temporary flooding via a leasing system, "climate adaptation as a service".

Such a flexible approach to the use of land in water catchments, e.g., in river valleys, can be more cost-effective than constructing larger climate adaptation facilities in cities or expropriating land for water storage.

5.2. ALLOCATION OF RESPONSIBILITY

How should the responsibility for climate adaptation be distributed between the individual and the community? Property owners get the greatest benefit from climate adaptation, as they own assets that are directly affected. But is it appropriate for

the individual to bear the majority of the responsibility for climate adaptation?

The question of the allocation of responsibility raises both practical questions – *how can the allocation of responsibility best enable action?* – and questions of justice: *Can the bill for climate adaptation be placed on the polluter, and/or on the one who benefits from the climate adaptation?*

TODAY THERE IS LITTLE OVERLAP BETWEEN RESPONSIBILITY, OPPORTUNITIES FOR ACTION, AND KNOWLEDGE

Property owners today bear large parts of the responsibility for both damage coverage and the prevention of climate-related damage. But they have limited knowledge about their responsibility (KPMG (2026), Schjødt (2026), Realdania (2026)).

Citizens expect to a greater extent than is the case that the community takes responsibility for climate adaptation. To a certain extent, this expectation is understandable, since many climate adaptation solutions cannot in practice be implemented by individual homeowners and therefore require collective action. In addition, individual protection measures can in some cases create sub-optimisation, as protection of one property can increase the risk for others (KPMG, 2026, OECD (2024)).

However, municipalities and utility companies are also limited in their scope for action due to the Service Act and the capital expenditure ceiling. And particularly for larger, complex climate adaptation projects, there is a need for coordination across municipalities before climate adaptation can be realised (KPMG, 2026).

This creates a need for a national democratic conversation: Is the current distribution of responsibility appropriate, or should more collective responsibility be taken?

NOT ALL BENEFITS OF CLIMATE ADAPTATION CAN BE INDIVIDUALISED

14% of the damage values from flooding are expected to be accounted for by public goods such as public buildings and roads (DTU, 2026). This figure does not include those aspects of public goods that are difficult to quantify in monetary terms. For example, nature is not valued, and culture is only included as reduced ticket revenue (not a value of cultural heritage). The impact on people's mental health is also not included, despite DTU finding a significant impact in the form of, for example, stress and sleep problems.

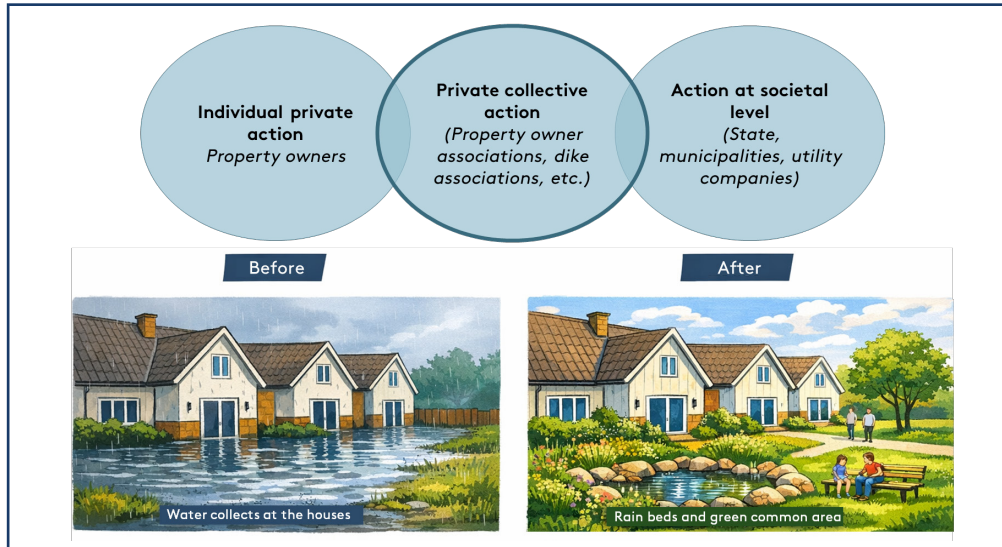
The fact that not all benefits of climate adaptation can be individualised argues for a certain degree of shared public responsibility to protect goods that do not belong to private individuals. On the other hand, the high proportion of private values argues for the existence of private solutions for climate adaptation as well – including for the types of adaptation that cross property boundaries.

An example of private collective solutions is Forenet Kredit's initiative to enable homeowners' associations to implement climate adaptation, see figure 5.5. Catalysed by philanthropic foundation funds, they facilitate the ability of homeowners' associations to implement climate adaptation on common areas. This enables *solutions that would not have been realised if the responsibility were solely shouldered by the individual homeowner*. Private actors and utility companies can in principle participate in supporting action on homeowners' common areas. However, this is rarely done in practice, as it is regulatorily complex for utility companies to enter into agreements regarding construction on private land (Schjødt, 2026).

BOTH THE "POLLUTER PAYS" PRINCIPLE AND THE UTILITY PRINCIPLE ARE CHALLENGED

The "polluter pays" principle is currently not followed when it comes to climate adaptation. On

Figure 5.5: Private individuals can in some cases take collective responsibility, e.g., when homeowners' associations establish private collective climate adaptation catalysed by a foundation



Source: CIP Foundation's own illustration based on descriptions from Forenet Kredit

the contrary: Some of the areas in Denmark that are most challenged by climate change have a socio-economic composition that makes it more challenging for homeowners to pay for climate adaptation (DTU, 2026). At the same time, citizens with lower incomes have on average contributed less to climate change compared to wealthier citizens in Denmark (AE, 2025). *Those who have polluted the least are thus receiving a disproportionately large share of the bill.*

Another principle, the utility principle, dictates that climate adaptation should be financed by those who benefit from the investment. This principle is challenging to fulfil for several reasons: Climate adaptation has indirect benefits for others than the citizens whose properties are directly protected. And it is difficult to graduate citizens' payments for collective climate adaptation solutions precisely according to how much they benefit from the investment (KPMG, 2026).

The indirect benefits that some citizens have from other citizens' climate adaptation are, for example, in the form of protection of collective goods (e.g., roads and nature) as well as the fact that it can affect the value of the entire residential area if individual homes are damaged.

The challenge of graduating citizens' payments for collective climate adaptation solutions according to their benefit from the investment is partly due to the fact that there are no good calculation models for citizens' benefit from climate adaptation. Furthermore, collective climate adaptation is typically financed either by utility companies via the water tariff or by municipalities via tax. These are scaled with the citizen's water consumption and income, respectively, not with their need for climate adaptation (KPMG, 2026).

Neither the "polluter pays" principle nor the utility principle is thus followed at the present time. *This can be partly remedied by some of the concrete proposals in this report* – e.g., an expanded utility

principle (see chapter 6) or a climate fund for savings for public goods (see chapter 4). But this requires a difficult democratic conversation about the distribution of responsibility.



PROPOSAL 5.5: HAVE THE DIFFICULT CONVERSATIONS

Climate adaptation involves many dilemmas that can be difficult to talk about, as they touch upon conflicts between generations, between rural and urban areas, and between the community's responsibility vs. private responsibility.

But if we do not have the conversations, the current situation continues: The responsibility is placed primarily on landowners who do not have the necessary knowledge or options for action, and neither the "polluter pays" principle nor the utility principle is followed.

Therefore, an initiative should be taken from the national level for a democratic conversation about the distribution of responsibility between the individual and the community and how we solve the difficult dilemmas within climate adaptation.

The democratic dialogue should involve municipalities, utility companies, civil society and, not least, the young people who in the future will have to foot the bill for how climate adaptation is handled today.

Box 5.3: Kongens Kær near Vejle combines climate adaptation, nature restoration, biodiversity, climate, nitrogen reduction and recreation

In Vejle River Valley, a former agricultural area has been allowed to flood. This has created a nature area for the benefit of 179 bird species and simultaneously reduces the amount of water that flows into Vejle during cloudbursts. As the project has taken low-lying soil out of agricultural production, it reduces greenhouse gas emissions as well as nitrogen discharge into the fjord.

In addition, the area has gained increased recreational value (well-used paths have been laid out) and amenity value (view from surrounding houses). The project is an example of how converting agricultural land into wetlands can, so to speak, kill 6 birds with one stone: Climate adaptation, less climate impact, less nitrogen discharge, increased biodiversity, improvement of human well-being and higher property values (Hansen (2011), Nielsen (2024), SEGES (2017)).



frequent climate events, seen relative to the value of buildings in the area.

Nevertheless, we are building on exposed land. And we have no overall plan for how we should handle the fact that some assets will likely be

5.3. Handling areas with high risk

Some areas in Denmark are at higher risk of climate-related damage than others. In some areas, it will be very expensive to establish climate adaptation solutions that protect against future

located in areas that are not economically viable to protect.

This raises several difficult questions: Should we allow continued development of assets in the most exposed areas? Or if we are to withdraw from areas, should we let the market handle it, or should the community step in and support a more planned withdrawal?

It is full of dilemmas to talk about what we as a society should do with these areas. For it is not just about economic values, but about people's sense of belonging and social networks. In the absence of a common position at the societal level, however, climate change and market forces will place individual landowners in very difficult situations. Therefore, we are preparing to have these difficult discussions, and we are proposing measures that enable withdrawal from exposed areas not to become solely an individual responsibility.

WE ARE BUILDING OUR WAY TO MORE RISK

People have a tendency to want to live by the water. This is reflected in high property values due to amenity value as well as proximity to job opportunities, which are also often located along the coast.

For the same reason, it is economically attractive for developers to build along the coasts. This is still the case despite increasing knowledge about the expected consequences of climate change in Denmark. *Therefore, extensive construction has been carried out in erosion- and flood-prone areas in the last 15 years, and further new construction is being planned in the future* (The Economic Councils (2024), Aarhus School of Architecture (2025)).

Continued urban development in high-risk areas means that we are building our way into more risk. In principle, municipalities have the opportunity

to prevent new construction via municipal and local plans. However, there is freedom of method, and it varies from municipality to municipality whether assessments of erosion and flood risk are taken into account, as well as which types of flood risk are considered. Therefore, new buildings continue to be erected in exposed areas, and there is no uniform practice for requiring developers to establish climate adaptation measures (Schjødt, 2025, 2026).

A new legislative proposal suggests that the state should set higher requirements for municipalities' consideration of climate risks in local planning (Høringsportalen, 2025). Including:

- Municipalities must designate exposed areas based on flooding from the sea, watercourses, precipitation, and groundwater, as well as erosion
- The state determines the method and data basis and designates potential hazard areas, which are binding for the municipalities
- Municipalities must set protection levels and are in certain cases bound by state-set minimum protection levels
- Municipal plans must specify mitigation measures

We propose that we avoid building our way into more risk. This can be achieved by stopping new construction in high-risk areas, or by limiting it to developments where high requirements for climate adaptation have been set.

RETREAT – INDIVIDUAL AND MARKET-DRIVEN/ CATASTROPHE-DRIVEN OR PLANNED?

Today, there are approximately 245 houses in Denmark that have been hit by storm surges more than once since 2013, according to the Danish Storm Council (Naturskaderådet). That number will rise due to climate change. For some areas, it will not be worthwhile for homeowners to continue repairing the damage, nor will it be

socio-economically profitable to establish climate adaptation due to a relatively low concentration of values in the area (Schjødt, 2026).

Over time, the size of damages for which property owners are themselves responsible for covering increases, as insurance and the storm surge scheme only provide compensation for events of a magnitude that statistically occur every 20 years or less frequently. This can negatively affect property values and contribute to a *downward spiral, especially in areas that already have a tendency towards depopulation*. This can be called a market-driven retreat (Schjødt, 2026).

In some areas, property values will likely not fall steadily in line with climate change, but rather fall abruptly in connection with flooding, after which it is not economically justifiable to re-establish the values. This can be called a catastrophe-driven depopulation (Schjødt, 2026). *In the absence of a political stance, some individuals therefore risk experiencing a large and sudden loss of value*. This can make it difficult for them to move away from exposed areas, as they cannot afford both to settle debt on their climate-exposed properties and then establish themselves elsewhere.

Schjødt (2026) has mapped the current possibilities for supporting a retreat from areas with a high risk of flooding, which is not driven solely by the market or catastrophes, but which is to a certain extent planned and managed collectively. Planned retreat will not replace protection, but can be a supplement. Including this, some areas can be transformed and included in the strategy for protecting other city districts.

Municipalities currently have a duty to map risk, and they have the authority to support climate adaptation as well as purchase properties that are already damaged. However, they do not have the authority to designate an area for retreat and



PROPOSAL 5.6: STOP NEW CONSTRUCTION IN RISK AREAS

We must not build our way into more risk. We therefore propose stopping new construction in risk areas or limiting it to construction with a high level of climate adaptation, as proposed in the possible upcoming amendment to the Planning Act.

The state can take responsibility via an amendment to the Planning Act and/or the municipalities can take responsibility by paying greater attention to the risk of flooding in connection with the planning process and building permits.



PROPOSAL 5.7: LET THE COMMUNITY BUY OUT EXPOSED PLOTS

Allow municipalities to make voluntary purchases of plots as part of their planning for collective climate adaptation.

This requires regulatory changes at the national level to give municipalities more flexible options for action, so that they can both build climate adaptation facilities, temporary water storage, etc., but also consider retreat in the form of purchasing and converting areas.

It should be made possible for municipalities to carry out retreat preventively and with a holistic view of the climate adaptation of the entire neighbourhood – not as it is now, where there is legal authority to 'condemn' individual buildings that have already suffered extensive damage.

proactively offer to purchase properties that are not yet damaged (Schjødt, 2026).

To support a planned transformation of the most exposed areas, we propose that it be made possible for municipalities to carry out voluntary purchases.

Summary of proposals in Chapter 5

	 MUNICIPALITY	 STATE	 PRIVATE SECTOR	 FINANCIAL SECTOR
1. Key recommendations	5.3 Climate adaptation in the Green Tripartite			
2. Supporting recommendations	5.6 Stop new construction in risk areas	5.1 Guidance on prioritising concern for nature 5.2 Include the value of nature (societal goods in cost-benefit calculations) (utility companies) 5.7 Allow voluntary buy-up as part of collective climate adaptation	5.4 Climate adaptation in the catchment "as a service" 5.6 Stop new construction in risk areas	5.5 Have the difficult conversations (about responsibility and retreat)

6. How do we solve complex climate adaptation?

This chapter looks at possible organisation and financing with both capital expenditure and a payment model for larger, complex climate adaptation projects.

Key take-aways from the chapter:

- **Coupled problems require coupled solutions across the board. It is a new way of working with water management, which requires new actors and new forms of financing.**
- **Partnerships and private capital, together with greater state involvement, are necessary to take on this task.**
- **Large investment need of several hundred billion DKK over the coming decades.**
- **Simplified but broader utility principle for payment of climate adaptation with a combination of risk-based contributions and solidarity contributions for the management of public goods.**
- **Climate zone model for individual payment is risk-based, but also more operational.**

6.1. COUPLED EVENTS REQUIRE COUPLED SOLUTIONS

We are looking at having to solve climate adaptation with new strategic approaches and with new organisational and financial approaches if we are to adapt to the new climate reality, where water flows together to a greater extent and flooding occurs from multiple sources.

CRITERIA FOR COUPLED SOLUTION

The new approach must be able to:

1. Handle several types of water sources at the same time (and utilise synergies)
2. Handle several types of water sources at the same time (and utilise synergies)
3. Take its starting point in the water cycle and the structure of the water catchment area, which can cross municipal boundaries
4. Be adaptive and with the possibility of a strategic shift along the way in parts of the area
5. Work with ongoing learning and experience gathering and standardised processes
6. Prioritise efficient design and implementation time to minimise possible damage in the meantime
7. Draw on several different forms of capital, competencies, and risk hedging where they are best found
8. Utilise more areas for climate adaptation and temporary water storage, including also via voluntary agreements with landowners and homeowners' associations
9. Introduce a payment model that takes into account who and what benefits from the climate adaptation

Proposals for handling the above criteria will be addressed throughout this chapter.

AUTHORISATION OF NEW ACTOR AND NEW SOLUTION

Today, as previously described, it is not permitted for any of the existing actors to carry out climate adaptation across water sources. However, an actor who carries out water management of one water source must not worsen the situation for others (Schjødt, 2025), but it is unclear what this

of municipalities in a company, a state-owned company, or a private infrastructure company. Utility companies could in principle also be included, but this would require a change to their structure, purpose, and management, which are oriented

actually entails, and it is not assessed that it, for example, means that the party that might be responsible for storm surge protection against the coast can also simultaneously be responsible for handling overflow from watercourses, which may be affected at the same time and have a need for discharge towards the coast.

This is proposed to be solved in Chapter 4 by allowing a new type of actor for this in combination with state anchoring and coordination in a new partnership for handling complex climate adaptation.

New actors will, however, need to have legal authority for their new activities, just as they – if they establish infrastructure or capacity that has the character of a natural monopoly – are normally regulated economically (like utility companies) or by the municipality setting and approving the charged contributions (when private associations, e.g., dike guilds, establish coastal protection in municipal joint projects).

It is proposed that the state takes the lead in coordinating a number of complex climate adaptation projects, a pipeline of, for example, up to 20 projects. Thereby, a systematic pipeline of projects is created with the possibility of achieving economies of scale in planning and process execution through systematic learning and experience gathering. Projects are selected on the basis of dialogue and proposals from municipalities with special challenges in the water catchment area, cf. KPMG (2026).

The state anchoring for the complex projects must ensure coordination between the new types of projects and at the same time create legal authority and legitimacy for the new construction and support necessary approvals.

towards the specific supply area, towards specific water sources, and with financial management built around their primary purpose as a provider of a utility service.



PROPOSAL 6.1: State approval of complex climate adaptation projects

Rather than establishing an entirely new legislative complex in the style of, for example, the economic regulation of utility companies, it is proposed that complex climate adaptation be solved, inspired by the way other infrastructure is developed in the form of roads:

- State coordination of tendered projects
- Concrete legal basis via construction acts for bundles of specific projects (phased solution)
- Establishment of a partnership between the state and a new infrastructure company (new actor)
- Financing via state guarantees, contributions from municipalities, and private capital from either bonds or direct deposits from pension funds (blended finance)

The approach is also known from the expansion of infrastructure in the form of main roads, where, on the basis of an expansion plan from the Danish Road Directorate, construction acts are continuously passed to support phases of expansion.

USE OF CONSTRUCTION ACTS

A **Construction Act (or Infrastructure Act)** is a special act passed by the Folketing for the approval and initiation of larger public infrastructure projects.

The act establishes the project's framework, financing, and also provides, for example, legal authority for any expropriation of necessary areas, cf. Vejdirektoratet².

² [How we build the roads | The Danish Road Directorate](#)

¹ 'New actor' here refers to an actor that gains new opportunities to handle complex climate adaptation. The actor does not need to be new, but can, for example, be an association



Utility companies are currently allowed to purchase and potentially also expropriate land if there is a need for it to establish collective climate adaptation solutions. But there should also be an intermediate solution, where one instead makes agreements to periodically use, for example, privately owned land for water collection and temporary water storage areas, if it is more appropriate.

- Voluntary agreement on leasing private land for temporary, shared water storage areas
- Private land includes private plots, common areas in homeowners' associations, and privately owned agricultural and natural areas

VOLUNTARY AGREEMENTS ON TEMPORARY WATER STORAGE ON PRIVATE LAND

For example, agreements can be made with homeowners' associations and larger landowners regarding the temporary use of their land for temporary water storage areas. This can reduce

This only happens to a limited extent today, where, for example, utility companies as a starting point must use municipally owned areas for solutions, even though it could be more appropriate to use private areas, such as private plots and common areas in homeowners' associations. Private initiatives also help to relieve the need for larger, collective solutions.

6.2. WHERE ARE COMPLEX CLIMATE ADAPTATION PROJECTS EXPECTED?

There is no comprehensive, national coverage of the need for climate adaptation across water sources. KPMG (2026) estimates that there will likely be around 20 of these types of larger projects in Denmark. In addition, there are similar challenges in other countries, which a new actor could potentially also help to support.

Several of these areas are also characterised by watercourses that risk overflowing from prolonged or intense precipitation. The state pipeline therefore functions as a kind of investment signal for future, larger climate adaptation projects.

[illegible]

Source: Ministry of the Environment (2025a)

Given that no detailed analysis of the individual areas and proposals for solutions has been carried out, it is by nature difficult to estimate the investment scope for complex climate adaptation.

Overall, it is estimated that there is an investment need for prevention of up to DKK 200-300 billion in Denmark for collective solutions, much of which is advantageously implemented within the coming decades. Of this, a portfolio of 20 complex projects could likely consist of investments of around DKK 100 billion, cf. KPMG (2026).

DTU (2026) estimates that an investment scope of around DKK 110 billion for two of the possible water sources (cloudburst protection and storm surge) could cover up to 70 per cent of the expected damage from these water sources.

For storm surges, it pays to secure against even very rare events, as that type of solution tends

For *cloudburst events*, a protection level to a lower level will absorb a certain part of higher events and therefore have a partial effect. Therefore, even partial protection helps here. DTU estimates here that prevention costs to cover 70 per cent of the expected damage will be around DKK 69 billion.

In addition, there is *other precipitation*, some of which is handled by the utility companies and some by the municipalities when overflows occur from public watercourses.

Envidan has estimated for DANVA (2024) that around DKK 840 billion must be invested in water supply and wastewater management towards 2070, of which climate adaptation for precipitation and groundwater management is expected to account for DKK 360 billion. Some is already under planning, and some is about avoiding overflows from sewers during extreme weather events. This can probably not be completely prevented. It is therefore assessed that it will be a subset of this which is new investments.

The Ministry of the Environment has estimated the handling of *shallow groundwater* at DKK 60 billion for the utility companies. As the task is new and the data basis is uncertain, it is a preliminary assessment.

The estimates for prevention may be overestimated, as behavioural changes after damage in the form of, for example, relocation must also be expected, which will limit future damage. Across estimates and water sources, an investment scope of DKK 200-300 billion is likely to emerge over the next 50 years.

In addition to the collective, more permanent solutions, there will be expenses for individual climate adaptation measures for the individual landowner, just as there are public expenses for warning systems and emergency preparedness.

6.3. PAYMENT ACCORDING TO CLIMATE ZONE MODEL

If it becomes possible in the future to establish joint solutions across water sources, it also requires a standardised payment model and a payment mechanism that can support a credible repayment.

None of the current payment models are suitable or operational enough for complex climate adaptation, which can include multiple water sources and go across municipalities. The current, utility-based contribution model is perceived as unnecessarily complicated and is only established for protection against water from the sides. Tariff financing is more operational, but linked to one's water consumption, which is not a good proxy for climate adaptation needs, and only relevant for utility companies as actors, which are typically geographically limited in where they may act.

The payment model must be applied to landowners within the covered area. In establishing a new payment model, emphasis has been placed on it being:

- Simple
- Intuitive and understandable
- Manageable and repeatable
- Possible to supplement with contributions for public goods
- As data-driven as possible

In principle, it is possible to calculate a fully individualised flood risk per property and adjust it in relation to vulnerable values, if one were, for

example, to go for the theoretical utility principle. However, this would be very demanding and require data that is not yet available, and it would work against the fact that time spent is also a crucial factor in the establishment of climate adaptation.

"Perfect is the enemy of the good"

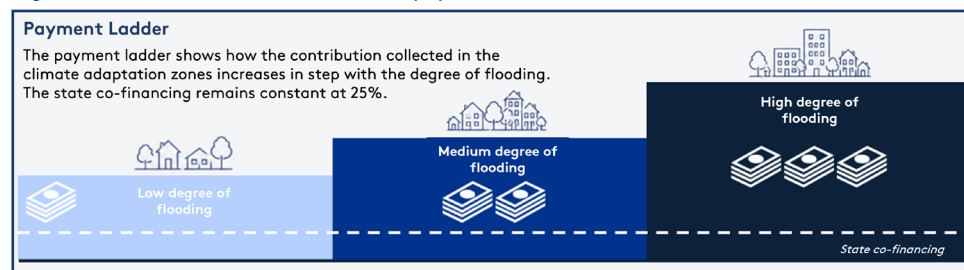
KPMG (2026) has proposed a **climate zone model** where individual landowners in an area for complex climate adaptation are divided into 3 categories based on their overall flood risk and objective criteria such as the building's size and potential location (elevation = metres above sea level).

The model reflects that properties within the same area are broadly affected by the same water events and, all other things being equal, will benefit from the same projects. Everyone in the same zone is based on the same contribution, which is only varied according to the size of the building to make it transparent for the landowners. The payment model is supplemented with a share of joint financing to also cover public goods or societal values whose users are not directly identifiable.

The three steps should be understood in such a way that everyone in an area is placed, where the least exposed pay the lowest rate at step 1, cf. figure 6.2. This will also reflect that all landowners benefit from the local area remaining well-functioning with climate adaptation.

The relatively simple model maintains a connection between risk, protection, and payment, but without full individualisation and with a solidarity element. The combination is assessed to be relatively robust over time (KPMG, 2026).

Figure 6.2. Climate zone model with three payment tiers based on flood risk



Source: CIP Foundation's own illustration

EXTENDED, BUT SIMPLIFIED UTILITY PRINCIPLE FOR COMPLEX CLIMATE ADAPTATION

With the combination of a climate zone model and public contributions to cover societal values or public goods, a credible payment side for climate adaptation can be established.

The payment model is based on the thinking behind the utility principle, but **expands the potential circle of payers** to the entire area that the complex climate adaptation concerns, which may be parts of a water catchment area. This also means that the model can cross municipal boundaries according to uniform principles.

Overall, it is good business to climate-adapt in relation to the exposed assets (see e.g. DTU 2024 and 2026). But when investments are not carried out despite good benefit ratios, it may be because it is not the same group that benefits from the climate adaptation as is set to pay for it.

With the broader utility principle, more types of goods are included in the concrete projects, just as the circle of payers is expanded. At the same time, the repayment profile can be better aligned with the asset's technical lifespan. This increases the probability of a better match between payers and beneficiaries.

Today, the individual municipality can choose to pay for the citizens' contribution itself. This will also continue to be a local prioritisation option.

In the same way, there will be an opportunity to supplement the concrete, complex climate adaptation projects with national, political priorities if, for example, there is particularly critical infrastructure in an area that needs to be handled, or if there are political wishes that specific parts of the country should continue to be accessible for housing and activity.

See figure 6.3 for an illustration of what the simplified, but broader utility principle consists of, and what the total payment side of complex climate adaptation can consist of, i.e. individualised payments and solidarity contributions.

PROPOSAL 6.3: Climate zone model as basic payment for complex climate adaptation

It is proposed to establish a relatively simple, yet risk-based model for payment for complex climate adaptation for landowners.

The model consists of three tiers or climate zones, each with its own base rate, which can potentially be varied with objective criteria such as the size and location of the individual property. To supplement the model, a contribution from the common fund is added to cover societal values.



PROPOSAL 6.4: Simplified, but broader utility principle for payment

It is proposed that complex climate adaptation be based on payment from the various types of gains it entails. This entails, on the one hand, a payment from the directly affected landowners based on the proposed climate zone model. But the expanded utility principle must also take into account that public goods are covered by payments from public funds. In addition, it must be possible to include other political considerations, such as distribution policy and rural districts, through prioritised co-financing.

EFFECTIVE PAYMENT MECHANISM

It is crucial for the construction of complex climate adaptation, and for the possible participation of private capital from, for example, pension funds³, that the greatest possible security can be established regarding the repayment of the climate adaptation solution (credit risk).

This requires that there is a credible and effective payment mechanism for the direct contributions. This exists, for example, for tariff payments to utility companies, which collect payment via the bill for wastewater management, and which at the same time have the possibility to shut off access to water for bad payers.

It is proposed to link the direct contribution payment for landowners via the climate zone model to the **municipal property tax**⁴. It is administratively

simple, is based on an existing system, and enables stable collection with the possibility of recovery of unpaid contributions via state collection (KPMG, 2026).

6.4. POSSIBLE ORGANISATIONAL MODELS FOR COMPLEX CLIMATE ADAPTATION

There are, in principle, three possible actors to be responsible for complex climate adaptation. As the rules are today, the municipality is the actor that is closest to having the authority to establish solutions across water sources and municipal boundaries for the sake of the citizens' and the public's well-being in the municipality, cf. the municipal mandate. The state will also be able to take a cross-cutting consideration, and finally, this could also happen in a partnership with private actors.

Utility companies are disregarded because, through regulation, they may only handle certain water sources⁵, and because they, in principle, may only operate within the supply area. In 2024, there were 108 wastewater utility companies, and by far the majority are municipally owned companies, cf. DANVA.

1) MUNICIPAL MODEL

A municipal solution would correspond to what we know today, where the municipalities can take responsibility for some collective climate adaptation solutions.

However, the complex climate adaptation projects challenge the municipalities on several fronts:

Limited experience: The individual municipality will likely not have to carry out many complex projects over time and therefore has not built up

the organisation, capacity, and experience to be able to do so. This also applies in relation to entering into contracts with the various suppliers and being responsible for various approval processes. One risks having the character of a "first-time actor" despite many experiences with more limited projects. This extends the project period and risks making the projects more expensive.

Restrictions on capital expenditure framework: The individual municipality may find it difficult to prioritise large construction projects within the capital expenditure framework, which must also accommodate other municipal activity. A large climate adaptation project risks tying up the framework for an extended period.

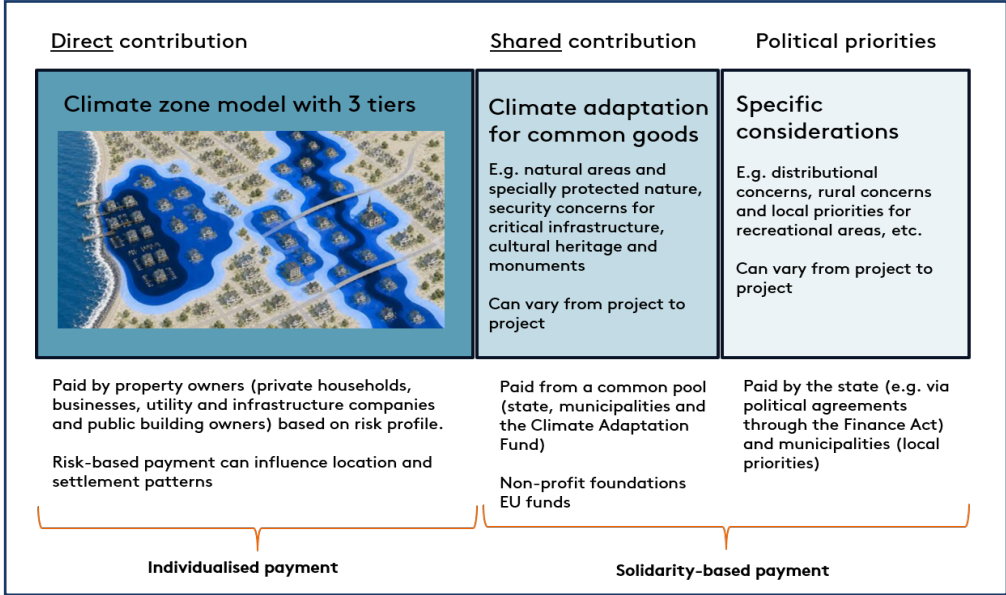
Inter-municipal coordination: Complex projects risk crossing municipal boundaries, which requires parallel and mutually dependent projects in the involved municipalities, which may have different prerequisites, finances, and priorities when it comes to larger, complex projects.

The municipality itself bears the majority of the risks: Large construction projects will be associated with the risk of budget overruns, which must be financeable. See the later section on the types of risks expected to be managed in a complex climate adaptation project if viewed as an infrastructure project.

Figure 6.4 on the following page shows what a municipal organisation might look like, where several municipalities, for example, can join forces on a complex project in an inter-municipal company. This would then need to be repeated for each complex project.

Conversely, municipalities are close to the citizens who are to benefit from the solution, which can

Figure 6.3. Composition of expanded benefit concept

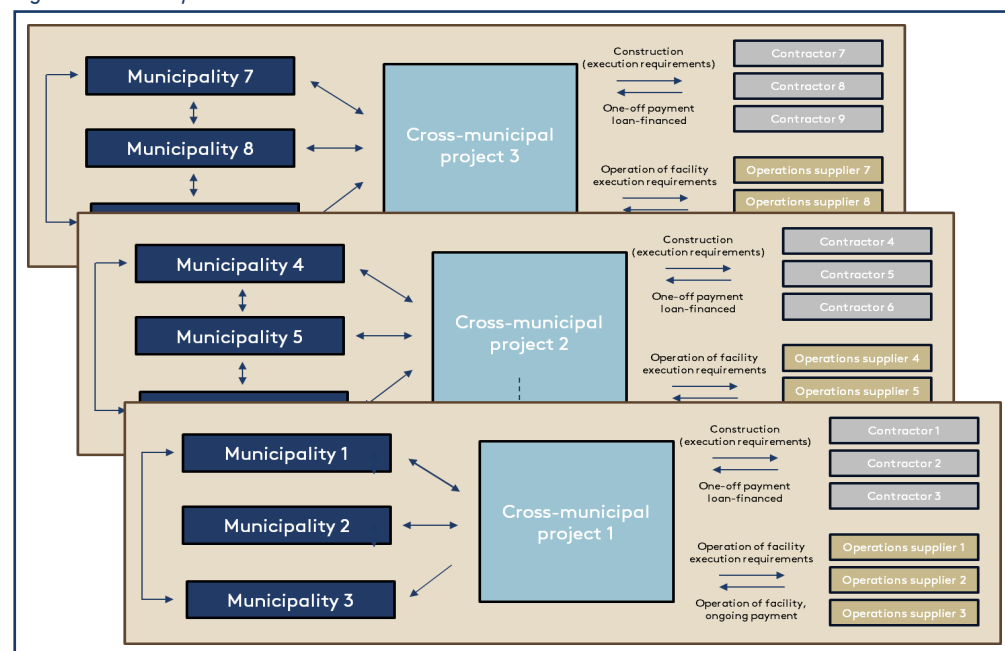


Source: CIP Foundation's own illustration

³The greater the certainty surrounding the revenue stream in a project, the lower the risk-adjusted return requirement.

⁴The property contribution currently covers, for example, waste fees, rat control, and chimney sweeping, and functions as a fee and not a tax, because there is a direct connection between the service provided and the payment, cf. KPMG (2026).

⁵Utility companies are challenged in new tasks such as climate adaptation by a general, ongoing efficiency requirement, which is difficult to implement for large construction investments, where the majority of expenses are incurred in the first years, while the subsequent, ongoing operating expense is limited.

Figure 6.4. *Municipal Model*

Source: CIP Foundation's own illustration based on Ahm Consulting (2026)

be conducive to public and democratic legitimacy, and municipalities may also wish to prioritise climate adaptation alongside other concrete urban development. Therefore, the needs assessment for complex projects must be based on municipally recognised needs, and municipalities will also need to continue contributing, even if not with the total financing, to reflect their shared responsibility.

For large, complex climate adaptation solutions, it is assessed that the task may be too overwhelming for many municipalities, and two other approaches are therefore proposed.

2) STATE-OWNED COMPANY

A similar company could be established to handle complex climate adaptation, drawing inspiration from state-owned infrastructure and area development companies such as Sund & Bælt Holding A/S, By & Havn I/S, and Metroselskabet I/S. Such

a company could function as a commissioning organisation that establishes a subsidiary, an SPV (special purpose vehicle), for each climate adaptation project.

In this way, the company would commission, finance, own, and be responsible for the operation of the climate adaptation solution.

By handling around 20 complex projects, the company will gain continuous experience, which can be utilised to streamline, standardise, and, for example, shorten process times. A state-owned company could house the specialist competencies required to handle difficult approval processes involving diverse considerations, and would also be able to build specialised commissioning competencies and support continuity.

A state-led solution would require state funding, but by moving the task to a state-owned company, the activity does not burden the state capital expenditure framework.

State-owned companies have access to state-guaranteed loans⁶ for financing and therefore have relatively low capital costs (interest expenses).

As a starting point, the companies themselves bear the majority of the project risks, but also have limited liability depending on the company structure.

If the state-owned company is both the commissioner and the developer, this places high demands on competencies and knowledge of available relevant climate adaptation solutions.

As there is currently no market for the establishment of complex climate adaptation with organisation and financing, it may prove necessary for the state, at least initially, to take the lead and define the market. On the execution side, there are already established contractors and consultants.

See Figure 6.5 on the next page for a comparison of the organisation for a state-owned company versus a public-private partnership.

3) PARTNERSHIP MODEL

Based on how infrastructure is established in other cases, a partnership model could also be considered, where private actors are attached to the specific project companies (SPVs) as developers, organisers, and for the establishment of financing solutions.

Here, the state commissioning organisation would need to specify *functional requirements* for a climate adaptation solution, e.g., the required level of protection and expected lifespan, whether

it should provide other solutions and co-benefits such as nature-based solutions, but it would not need to specify the precise construction.

The advantage of a partnership model is that the risk for the specific project is transferred to another party, including risks related to finances and adherence to deadlines.

By committing the private party to establishment and subsequent operation for a certain period, and conditioning ongoing payment (revenue stream) on the delivery of specific services (function) through an incentive-based payment mechanism, a focus on total economy is enforced, ensuring, for example, that savings cannot be made on construction materials without having adverse consequences for subsequent operation.

The participants in the private part of the partnership will all need to invest capital in the solution and have "skin in the game" financially.

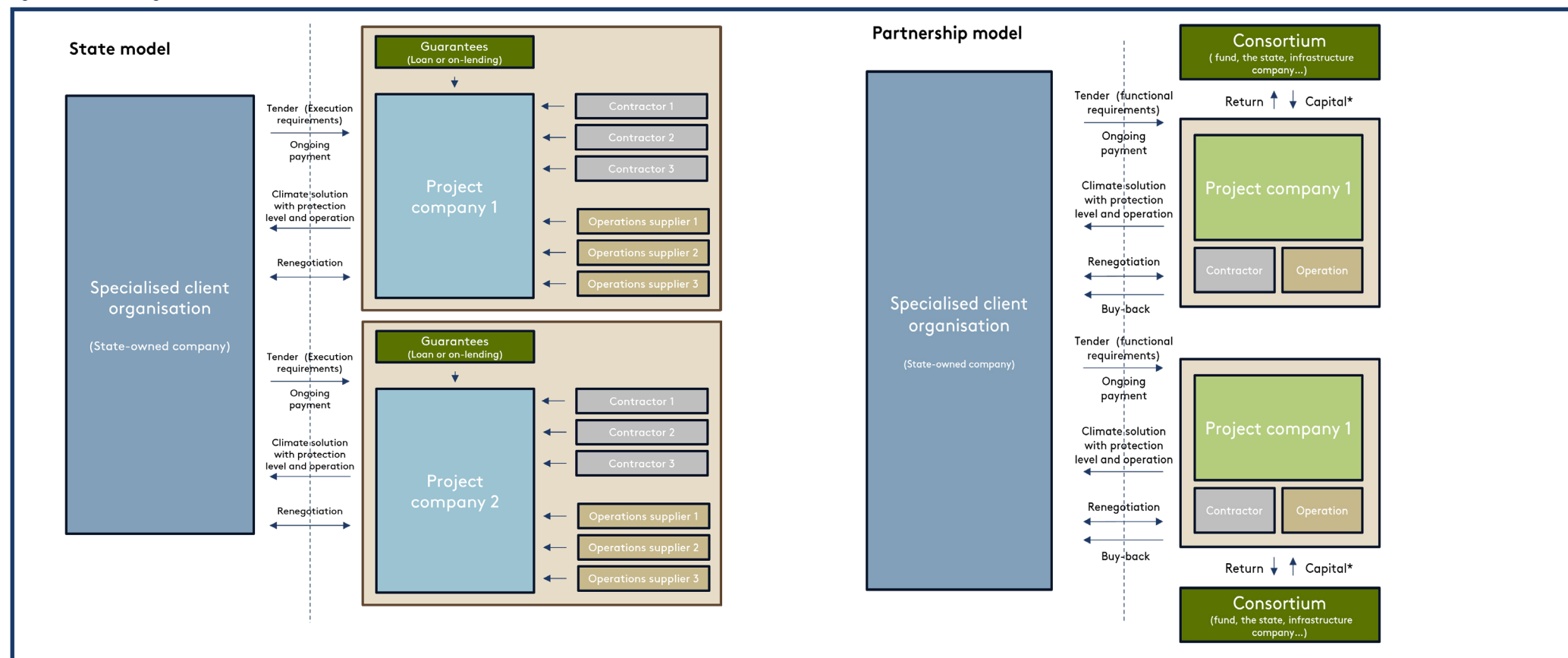
As a starting point, capital costs for partnership solutions will be higher than for a purely publicly guaranteed solution, because there are requirements for returns and risk premiums.

Choosing between a purely state-led solution or a partnership will require weighing the need for risk transfer, including in relation to budget and timeline management, and the potential for more innovative solutions. This should be based on a concrete, comparative analysis rather than an ideological choice.

The partnership can also be purely financial, where the private party contributes specialised competencies in structuring financing and risk hedging. This would be the case, for example, if pension funds invested capital in an aggregated portfolio of complex climate adaptation projects executed by the state-owned company.

⁶ State-guaranteed loans count towards the EMU debt, unless there is a well-established user payment for the settlement of the debt within a certain time horizon.

Figure 6.5. Future organisation



Source: CIP Foundation's own production based on Ahm Consulting (2026)

For more complex projects that also deliver societal benefits, the use of **blended finance** can be a strategy where, by mixing private capital with public funds and, for example, contributions from non-profit foundations, the project's overall risk can be reduced to a level that market-based capital can also participate in. In practice, climate adaptation is an investment in infrastructure that reduces climate risks – also for the financial sector and pension funds.

With the proposed payment model, a fixed and stable revenue stream can be established based

on an effective payment mechanism, which reduces risks from an investment perspective. The necessary required rate of return therefore becomes correspondingly lower, and if one also takes into account in a risk-adjusted rate of return how much risk the adaptation solutions alleviate for pension funds, which typically have also invested in properties, it may fall further. The increased resilience resulting from the solutions also has value for the investors.

Here, the total, systematic portfolio of complex climate adaptation projects will constitute an

investment signal with volume, predictability, and opportunities for standardisation and scaling through learning and process optimisation. A partnership model can involve a mixed consortium of public and private actors who inject capital into the complex climate adaptation projects.

Unlike a purely state-owned actor, the private part of the partnership will also be able to create solutions abroad and thus bring experiences from other places into Danish climate adaptation and vice versa. There is a broader scope.

DIFFERENT TYPES OF RISKS IN CLIMATE ADAPTATION PROJECTS

Climate adaptation is about adapting fixed, immobile assets, production opportunities, and location opportunities to the risk of flooding. But physical risks are not the only ones that need to be addressed in such projects, even if that can be complex enough.

If one views the possible risks as one would in a more classic infrastructure project, some risks are close to the actor's scope of action, while others are external, further away from the project, and further away from being manageable.

See Figure 6.6 for a description of different types of risks that one may encounter in a climate adaptation project, and which must be sought to be managed.

Climate adaptation is about risk management, valuation of risks, and different ways to mitigate risks. When choosing actors for complex climate adaptation projects, it is important to use competencies that are used to working with process and risk management – not just relating to risk in the form of the price of money (interest rate).

STANDARDISED PROCESSES AND ONGOING EXPERIENCE COLLECTION

Regardless of which model is used as a starting point for organising complex climate adaptation, it is crucial that there is ongoing experience collection across the complex projects. It is about being able to make continuously better orders, but not least also about being able to strengthen and shorten the processes behind them, so that faster processes are achieved and more solutions end up being implemented.

Although the physical solutions may be different and unique to the specific location, processes and workflows do not have to be.

Therefore, it is also important that the projects are not sought to be implemented at the same time, but for example, are offered in bundles with a few at a time. This is also to avoid the situation with the largely simultaneous construction of super-hospitals with limited learning across them.

Conversely, it is important for the establishment of an actual market for complex climate adaptation that potential investors can see a pipeline of a certain volume of upcoming projects that come with a certain predictability, so that it pays to build competencies and specialist knowledge. This only succeeds through scaling.

6.5. WHAT CAN PARTNERSHIPS CONTRIBUTE TO COMPLEX CLIMATE ADAPTATION?

Partnerships can include several elements, ranging from solely participating in the financing by providing capital to also participating in the actual organisation, design development, project planning, and establishment, and possibly operation of a climate adaptation solution. Partnerships can thus be established more or less extensively, but the purpose is to utilise where different parties have strengths that the original party with the need for a solution (the client) does not have.

Cf. Ahm Consulting (2026), partnerships can, among other things, contribute to collective solutions by offering:



PROPOSAL 6.5: Ongoing experience gathering to streamline processes behind complex climate adaptation

Regardless of the future form of organisation, it is essential that there is ongoing experience gathering and sharing for complex climate adaptation projects.

This can take place both via the commissioning organisation, which continuously becomes better at structuring the tasks and the associated financing if it is purely state-run, but also via the individual project companies.

If a partnership is chosen with the possibility of involving private capital, this consortium will also over time acquire specialist skills in structuring financing targeted at complex climate adaptation.

Figure 6.6. Examples of risks in climate adaptation projects viewed as infrastructure

Risks		Close to the project (large influence)	Further from the project
Climate adaptation as infrastructure	Physical world	• Technical solutions – What is physically feasible? – Dimensioning, construction, choice of technology, etc. – Risks during construction • Land - identification and securing of the project area • Operational risks – "Operations and maintenance" – Technical failures • Safety conditions and working environment	• Climate change and climate reality – Which emission scenario is most realistic? – Which flood maps can be used? • Geographical conditions and river basin – What constraints does the local geography place on the possible solutions? – How does the water's physical cycle in the area affect the possible solutions?
	Legal and political world	• Design of contract and obligations • Regulatory approvals – Unclear processes and deadlines – Dependence on permits • Right of appeal – Unclear timeline and suspensive effect	• Regulatory framework – E.g. siloed regulation depending on water source, which complicates cross-cutting solutions • Political risk – Sudden shifts in support or direction – Waiting time for clarification of frameworks • ESG risk
	Economic world	• Offtake risk – Are the "customers"/payment base well defined? • Credit risk – Can the customers pay? – Has an effective payment mechanism been established? • Financing and refinancing conditions • Depreciation relative to technical lifetime	• Macroeconomic and market conditions – Interest rates, exchange rates, wage developments, inflation, etc. • Cost risk – Material prices, technology prices, etc.
	Project management	• Organisation • Process overview • Budget management and procurement (purchasing) • Development – Plan for timing and decisions on commissioning, operation and decommissioning or further development (adaptive solutions)	• Stakeholder management • Risks from the value chain – Disruptions in deliveries of goods, services or information from partners

Source: CIP Foundation's own illustration

- Risk transfer and greater attention to risks through valuation
- Greater budget certainty
- Climate adaptation as a service
- Focus on streamlining processes and timely delivery of facilities and service through payment structure
- More flexibility regarding restrictions on municipal construction frameworks
- Possibility of more innovative solutions

Combining design, which best solves the adaptation need, with the construction itself, financing, operation, and maintenance can support a focus on optimising construction and operating economics in the project and on the implementation time itself.

As mentioned, it is also possible to keep the partnership to a financial collaboration alone.

By committing the partner to large parts of the budget certainty, including also operation and maintenance over a longer period, the incentive to make ad hoc savings and save on, for example, quality during the construction phase, which can later have unintended consequences for the facility's function, lifespan, and ongoing operating expenses, is avoided.

PARTNERSHIPS CAN CREATE FLEXIBILITY WHERE PUBLIC BUDGETS ARE CHALLENGED

A partnership model can contribute to relieving public budgets by transforming an otherwise high and early construction expense, which is challenging for, for example, municipalities to prioritise within the construction framework, into a more even payment over time as a service expense ("climate adaptation as a service").

See Box 6.1 as an example of how a municipality has used a financial partnership agreement to carry out a major construction task with climate adaptation perspectives, which was difficult to accommodate on the budget for even a large municipality.

A partnership must be based on the different parties having comparative advantages that are sought to be utilised. It also requires an initial investment in the form of time, organisation, and the building of trust from both sides. The commissioning organisation must be competent enough to formulate relevant and manageable functional requirements. And the consortium delivering a climate adaptation solution must be competent in holistic planning, risk assessment and pricing, and execution power.

Finally, the overall solution must be assessed as better than what one of the parties could deliver on its own.

Box 6.3 describes a Danish example of how private partners support Randers Municipality with a major urban development project that must also deliver necessary climate adaptation solutions. In other words, with a requirement to deliver several types of benefits for the citizens.

RELEVANT TENDER FORMS

A partnership between the public sector and a private party requires a tender. Here, different tender forms can be relevant:

- Competitive dialogue
- Innovation partnership
- Design-build contract
- EPC tender (Engineering, Procurement and Construction)

Competitive dialogue is used for complex projects, e.g. in the energy sector, where a market with

several bidders has been established. Market players are invited to a dialogue to narrow down possible solutions, after which a number of bidders are pre-qualified to submit tenders.

Innovation partnerships are relevant when a solution needs to be developed and executed at the same time, e.g. because it is not known from the start which type of solution is most relevant, or because there is no well-established market for the solution. What is available on the market is clarified through prior market dialogue, cf. UdbudsHuset.

The two last-mentioned tender forms both combine design and execution with one actor, where design-build contracts are often used for traditional construction of housing and commercial buildings, and the client often has some influence along the way on design and material selection.

EPC agreements, on the other hand, involve stricter functional requirements, process guarantees and fixed-price agreements and are often used for complex industrial and energy plants, e.g. wind farms, where there are very specific output and functional requirements. Here, the client's involvement is limited along the way until the handover of the asset.

6.6. HOW CAN MORE CAPITAL BE ACTIVATED FOR COMPLEX CLIMATE ADAPTATION?

As previously described, it can become a financial challenge for municipalities and the state respectively to activate the necessary financing for climate adaptation while simultaneously fitting the tasks into the possible construction frameworks. Climate adaptation represents, to a certain extent, a new task that has not to any significant extent been included in the priorities previously.

Box 6.1: Leasing of sewers for Copenhagen allotment gardens

The City of Copenhagen needed to provide sewerage for a large number of allotment garden associations (39), which were located on municipally owned land, in order to comply with the rules of the Environmental Protection Act.

The municipality could either handle the construction task itself or choose to tender it to external partners, who would then be responsible for financing, establishment, and operation. The utility company HOFOR, which normally handles sewerage, was not legally permitted to undertake the task in the case of the allotment gardens, as they are only allowed to manage the main sewer network, which typically runs along the surrounding roads, but not inside the garden associations themselves. If the municipality were to handle the task itself, it would place an inappropriate burden on the municipality's capital expenditure framework for a number of years, which is why other models were explored.

A public-private partnership can consist of:

- The municipality enters into a contract with a private partner (e.g., KommuneKredit, a bank, or a pension fund) to act as a supplier and be responsible for financing, establishment, operation, and maintenance for, for example, a 30-year period.
- The supplier makes an agreement with a contractor and consultants regarding design and establishment.
- The supplier leases the facility back to the municipality, which pays an annual leasing fee.
- After an agreed period, the municipality buys back the facility at an agreed price.
- The total costs over the entire lifetime of the facility are converted into an ongoing payment for the allotment garden tenants.

The partnership model can be slightly more expensive than if the municipality handles the entire project itself, partly due to return requirements from the private partner. To the allotment garden tenants, the municipality stated that: "The municipality's preliminary calculations indicate, however, that it will be virtually the same expense for the individual allotment gardens, whether the sewerage is done via a PPP or whether the municipality handles the sewerage itself." In return, the solution will give the municipality the opportunity for:

- Greater budget certainty (budget uncertainty is transferred to the supplier)
- Less burden on the capital expenditure framework in the construction phase leading up to the buy-back
- Potentially more innovative solution through tendering

The allotment gardens initially gave their consent to the PPP agreement, but the Allotment Garden Association subsequently withdrew its support, primarily as a result of the expected rent increases, rather than the form of the contract.

The municipality then chose to enter into an agreement with KommuneKredit as an external partner to provide upfront funding for a turnkey contract, which is carried out by a private operator. KommuneKredit then leases the facility to the municipality for 30 years, after which the municipality must buy the facility back from KommuneKredit. I.e. KommuneKredit acts as an external partner with capital and ownership for a period to relieve the municipality's finances of a large capital expenditure in the first phase, which is instead converted into a flatter leasing fee. The payment will be charged to the service budget as ongoing operating expenses. The structure gives the municipality flexibility in terms of timing, profile, and framework management.

The municipality's expense for the project is passed on to the garden association's users as mandatory contributions, where the rent increases by the project expenses plus a 2 per cent real interest rate (return) as an expression of the municipality's alternative. The repayment period is set at 70 years, roughly corresponding to the technical lifetime of the facility.

Source: "Sewerage of allotment gardens in Copenhagen – illustration of the estimated economy behind it", prepared by the allotment garden project team at Copenhagen Properties, City of Copenhagen, January 2026, as well as minutes from the Finance Committee meeting on 17 June 2025, Sewerage basis for 13 allotment garden associations | City of Copenhagen and info-sheet for public meeting in 2021.

Box 6.2: SECCCA – Australian partnership that facilitates climate adaptation

In Australia, a number of municipalities (councils) have joined together in a partnership or alliance, SECCCA (South East Councils Climate Change Alliance), which has been working since 2004 for a coordinated, regional response to climate change. SECCCA is a link between the state and municipalities, which provides mechanisms for climate adaptation.

The municipalities and the state finance (via the Disaster Ready Fund) the Financing Flood Resilient Infrastructure (FFRI) programme under SECCCA.

SECCCA helps the municipalities with:

- Modelling long-term risks from climate change for different types of assets and identifying critical knowledge gaps
- Identifying relevant and robust climate adaptation solutions that are future-proof and cost-effective
- Identifying and selecting three case projects
- Finding innovative ways to attract private and public investments
- Building partnership models
- Supporting cross-learning

The programme supports the municipalities in planning, financing, executing, and delivering climate adaptation solutions across water sources – from rising sea levels to coastal erosion, storm surges in urban areas, and flooding from watercourses as a result of precipitation. Here, climate risk is turned into an investment pipeline rather than a question of cost allocation. Climate adaptation is also included in the annual “Climate Investor Forums”.

Sources: SECCCA and Financing Flood Resilient Infrastructure project (FFRI), Financing Flood Resilient Infrastructure – SECCCA

It can therefore be considered whether other sources of financing can be activated for the necessary capital provision and in that way create a division of labour with the private sector.

PRIVATE CAPITAL AS A SUPPLEMENT

The financial sector traditionally accounts for significant capital provision, either from banks and mortgage credit institutions or from life insurance and pension funds. See also Berg and CIP Foundation (2026) for a description of the financial sector's roles in climate adaptation.

The financial sector itself has a significant vested interest in more climate adaptation.

On the lending side, there is collateral in properties and installations that are to varying degrees at risk of flooding. There is also significant exposure on the investment side. Insurance & Pension (2024) estimates that pension companies (excl. ATP) have invested more than DKK 200 billion in Danish properties.

PENSION FUNDS ARE ALREADY INVESTING IN INFRASTRUCTURE

The Danish pension funds have placed about 1/3 of the pension assets (excl. ATP) in Denmark and 2/3 abroad. The majority in Danish government and mortgage bonds.

In the 4th quarter of 2023, the pension funds had invested around DKK 23 billion in Danish infrastructure. They invest to a slightly higher degree in infrastructure abroad (Berg and CIP Foundation, 2026) and thus have experience in investing in these types of capital investments with a long lifespan and a fixed, flat and secure repayment structure.

When pension companies invest in infrastructure, the starting point is often the possibility of economies of scale and standardisation, where the pension companies themselves develop or collaborate

Box 6.3: “Flodbyen Randers” (River City Randers) – partnership on integrated urban development and climate adaptation

Randers Municipality faces significant climate risks as a result of the city's location by the Gudenå river and Randers Fjord. The municipality has therefore chosen a model where climate adaptation is included as an integrated part of the urban development in Flodbyen Randers. The river and the fjord (the city's so-called blue street) are not only considered a climate threat, but also as a central resource that can strengthen the connection between city life, nature, and new urban development.

THE CLIMATE BAND IS A BENEFIT FOR THE CITY AND THE CITIZENS

The core of the project is the Climate Band – a coherent system of terrain regulation, dykes, urban spaces, and green elements that protect the city centre from flooding. The Climate Band is combined with new urban functions, recreational areas, and improved infrastructure, including the coming climate bridge, which unites climate protection, mobility, and urban quality in one overall solution.

Randers Municipality and AP Pension – via AP Ejendomme – have established a partnership in the form of a joint area development company for the realisation of the first stages of Flodbyen Randers. Over a 30-year period, the company will be responsible for the development and transformation of former harbour areas into a new, central district at the mouth of the Gudenå river in Randers Fjord.

AP Pension owns 51 per cent of the company, while Randers Municipality owns the remaining 49 per cent. In this way, AP Ejendomme enters as a long-term capital partner in a structure where the framework is set by the municipality. The model means that the municipality can draw on private actors' experience with large urban development and climate adaptation projects rather than developing new models and solutions from project to project. At the same time, part of the financial and market-related risk associated with the realisation and timing of the urban development is shifted from the municipality to private actors. Within municipally defined frameworks, the model ensures that climate adaptation and urban development are realised as coherent solutions, where the urban structure simultaneously functions as protection against water from both river and fjord.

Flodbyen Randers thus illustrates how cooperation between a municipality and an institutional investor can enable long-term, large-scale climate adaptation solutions. Climate adaptation can be thought of as a value-creating investment – both for the city, its citizens, and the actors who contribute to financing and realisation.

Source: Flodbyen Randers (2026)

Insurance & Pension (2025) has previously estimated that the Danish pension industry expects to have to invest an additional DKK 400 billion, or approx. DKK 70 billion per year, leading up to 2030, spread across various assets and balanced with what has already been invested.

A potential co-investment need of, for example, DKK 100 billion over a number of years would be a considerable, but not unmanageable, investment for Danish pension and life insurance companies (Berg and CIP Foundation, 2026).

with others to develop specialist competencies in understanding and hedging specific risks in that type of investment. This will also be necessary for investments in climate adaptation.

CLIMATE ADAPTATION AND DIVERSIFICATION

Investments in climate adaptation match well with the pension funds' future needs in the form of predictable cash flows and ongoing payments over a long time with low credit risk.

Since the pension assets are still under development, there is an ongoing need to expand investments and reinvest upon the expiry of previous efforts. Here, climate adaptation is a new segment with the possibility of risk diversification. Unlike many other infrastructure projects, investments in climate adaptation can be categorised as a dark green investment and thus also have a good ESG profile in the pension funds' portfolios.

START-UP WITH A JOINT INVESTMENT FUND

Since the market for complex climate adaptation will be new, it may be relevant for several pension funds to join together in a joint fund with climate adaptation as a special investment purpose, either alone or together with the state.

There are already examples of this form of targeted investment funds, e.g. 55th North, which is the world's largest fund for investments in quantum technology, where the state via EIFO has joined forces with Novo Holdings and other venture funds to invest in promising quantum firms in Denmark, Europe and the rest of the world, and where pension funds can contribute funds to the fund.

ETNA is a defence fund established across Danish pension companies, which will invest in small and medium-sized defence companies in Europe as well as in cybersecurity and critical infrastructure to strengthen Europe's security.

Pension funds also invest via the SDG Investment Fund II, which is a collaboration between the state-owned fund IFD (formerly IFU) and four Danish pension companies to invest sustainably in developing countries, including approximately half in infrastructure.



PROPOSAL 6.6: Pool of pension funds targeted at climate adaptation

It is proposed that the financial sector, under the auspices of interested pension and life insurance companies, join forces to establish a targeted investment fund for climate adaptation.

The private funds could potentially cooperate with a state fund for climate adaptation and resilience to combine climate adaptation that addresses both private and public goods.

The fund can act on the basis of the investment signals that may come from the state for larger, complex climate adaptation projects.

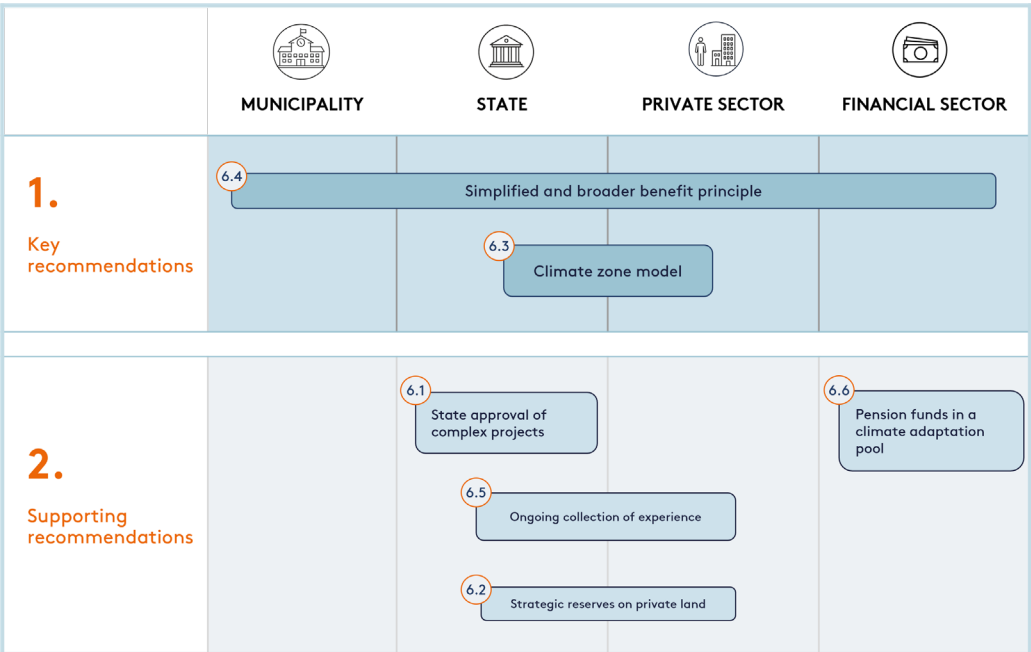
A pool or fund of pension capital could be part of a consortium behind specific project companies and inject financing into several projects to spread the risk.

In order to achieve sufficient diversification and experience gathering, it may also be relevant to carry out similar investments abroad. This will support scalability and repeatability in the processes.

Here, a starting point from the Danish market would be a good foundation and a sought-after competence.

So there are several examples of pension funds being invested in infrastructure, which climate adaptation will resemble. An alternative to direct co-investments would be for a state-owned Climate Adaptation Fund to issue green bonds to finance complex climate adaptation, which the pension funds would also be able to invest in.

Summary of proposals in Chapter 6



7. Summary of proposals and perspectives

This chapter summarises the report's overall conclusions and discusses implications for the possible strategies for handling climate adaptation that should be adopted. At the same time, conclusions and recommendations are put into relation with what is underway and how they can be concretely implemented.

Key take-aways from the chapter:

- Even though there is a prospect of major economic damage, Denmark has good pre-requisites for handling climate change.
- Progress can be strengthened through better frameworks, streamlining of processes, and greater state responsibility.
- Financing can be strengthened through the involvement of private capital and a broader payment base.
- The financial sector has a great vested interest in climate adaptation and can contribute significantly as a mediator of knowledge and capital, with damage compensation, and with contributions for financing and investment.
- Water is also a resource – new opportunities must be considered.

7.1. CLIMATE ADAPTATION – WHAT IS THE STARTING POINT?

The climate changes we see today are the result of past sins with the emission of greenhouse gases. This presents a double challenge. We are both forced to work with climate adaptation in relation to climate change, but also with continuing to reduce emissions, so that the work and the bill for climate change are not pushed to future generations.

"We are the first generation to feel the consequences of climate change... and the last generation that can do something about it"

Barack Obama, President of the USA, speech at the Climate Summit in Paris in 2015 (COP21)

Climate change is slow to reverse, and therefore we must also use the opportunity to see if we can achieve other gains when we are about to invest in climate adaptation.

Climate adaptation is underway and has been for some time, but it is happening slowly, relatively uncoordinatedly, and to an insufficient extent in relation to the expected damage.

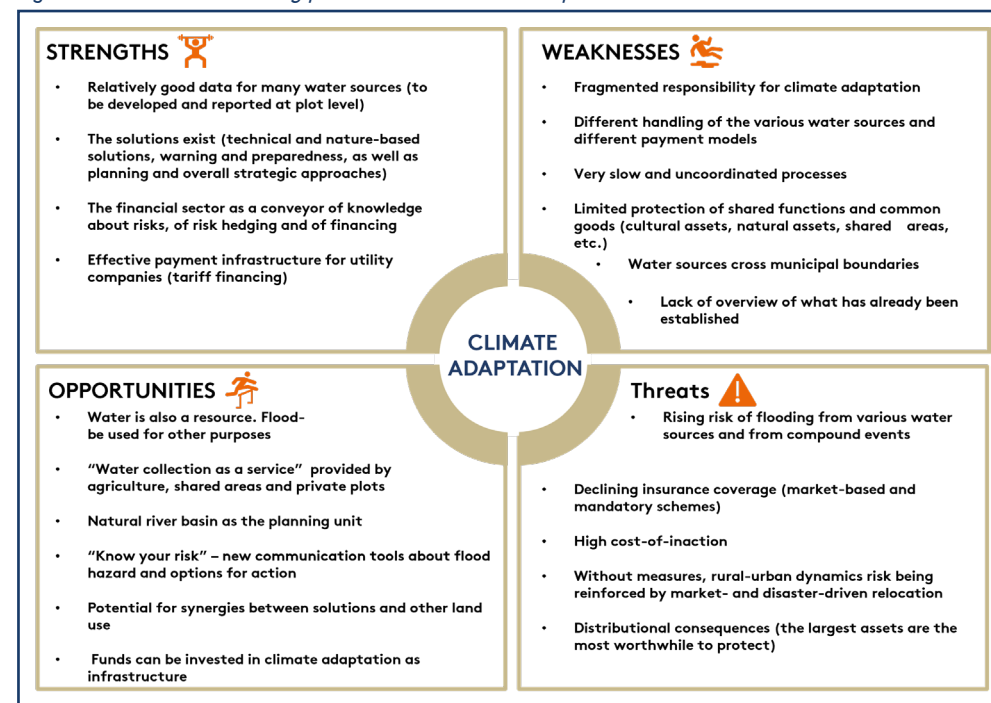
THE STARTING POINT

The Danish starting point for undertaking climate adaptation is good compared to many other countries.

In many other places, the physical challenges are largely about extreme heat, prolonged periods of drought, risk of wildfires combined with the risk of extreme wind conditions and over-flooding.

For Denmark's part, it is generally about more water and more extreme fluctuations between dry and very wet periods. Due to the very long coastline, Denmark has an extraordinary geographical challenge which means that we have to think in terms of several strategic approaches. It is not

Figure 7.1: What is the starting point for more climate adaptation in Denmark?



Source: CIP Foundation's own illustration

possible, nor necessarily desirable, to establish protection along the entire coast. That approach was more manageable, but also more necessary, for a country like the Netherlands, which, with its low-lying location, is very challenged by the sea, but also has a significantly shorter coastline.

See Figure 7.1 for an impression of the most significant challenges, but also opportunities.

GOOD PREREQUISITES

Denmark's economy is in good shape, there is immediately enough capital, and we already know most of the types of solutions that need to be brought into play. We also have a solid data basis for assessing where flooding can be expected, and to what extent.

REGULATION HINDERS PROGRESS

Climate adaptation in Denmark is challenged by the fact that responsibility for it is, in principle, individualised. When it comes to collective solutions, responsibility is fragmented, which is partly due to siloed regulation for individual water sources.

The processes are very time-consuming, despite a high price on time in the form of damage in the meantime, and in practice, no one is responsible for ensuring progress in collective solutions or coordinating them. This also applies to handling flooding from multiple sides, as well as combined events.

Public goods and societal values are currently not sufficiently taken into account in the need for climate adaptation, and there is no systematic coverage for the costs involved.

INCREASED PRESSURE ON RURAL-URBAN ISSUES

Not just in Denmark, but also in several other places, we are seeing a decline in damage coverage from both the insurance market and public schemes. Over time, this will leave a larger share of damage coverage to the individual.

Climate adaptation also plays into other aspects of societal development. Since adaptation currently happens where there are the most private assets, it challenges rural districts and outlying areas, where values are, all else being equal, lower, and where there are fewer people to pay for climate adaptation. At the same time, this is where the expected damage is greatest per citizen, and most often in municipalities with a relatively low income base.

An absence of planning, prioritisation, and climate adaptation will reinforce the ongoing trend of migration towards larger cities (agglomeration). This can challenge the cohesion of society.

CHALLENGES ALSO HOLD OPPORTUNITIES

Fundamentally, water is a resource. Therefore, we must also look at how we can use the more concentrated amounts of water where there may be a shortage of it and better space for it. Where it can help cool down cities, create recreational areas, and where it can be collected for seasonal equalisation and irrigation.

Therefore, **land use** and **spatial planning** are taking on a more central role. Particularly along watercourses and in open areas, consideration should be given to where it makes sense to manage water through collection and retention in the catchment area, for example in parks and common areas, rather than exclusively in urban areas. It is cheaper and can provide more benefits with more nature-based solutions, while also offering the possibility of a revenue stream on new areas ('climate adaptation as a service').

This also applies to former agricultural areas that are, for example, currently being taken out of operation as part of the Green Tripartite agreement. Here, climate adaptation can also be incorporated into areas that are often located down towards watercourses, and where water storage areas can be an advantage for several parties. Water collection also supports irrigation opportunities during drought periods – something that perhaps was not profitable to establish for the individual farm previously, but where the interaction with solving problems elsewhere now makes it more relevant.

CLIMATE ADAPTATION AS INFRASTRUCTURE

Climate adaptation is solved through several strategic approaches. Economically and organisationally, processes can be strengthened by viewing climate adaptation as a form of **infrastructure** – in some cases even critical infrastructure to ensure that society's activities can continue, and that significant values – private and societal values – can be preserved.

In principle, there is no shortage of capital for investment, but there may be challenges in **viewing climate adaptation as a real investment case** based on the different types of risks.

The solutions exist, and there is limited technological risk associated with the various approaches. A relatively secure and fixed **payer base** can be established over the lifetime of the solutions via effective payment mechanisms, and **partnerships** can be established between public and private actors regarding everything from planning and design to execution, operation, and financing.

Financial solutions can relieve public budgets. In terms of competence, and in relation to covering risks, there can also be advantages to public and private parties working together.

Climate adaptation is an example of a challenge that no single party can solve alone. All levels, from landowners to associations, utility areas, municipalities, and larger complex solutions involving state involvement, must be brought into play.

THE FINANCIAL SECTOR AS A CENTRAL PARTNER IN CLIMATE ADAPTATION

A potential, slightly overlooked, actor in climate adaptation is the financial sector. The sector has a great vested interest in climate adaptation and performs many roles that can support climate adaptation and the management of residual risk.

The financial sector is responsible for, among other things, damage insurance, but also capital provision for concrete climate adaptation, advice, assessment, and pricing of risks based on specialist competencies, as well as the investment of, for example, pension funds. Therefore, the sector is central as a link between the need for climate adaptation and the possible execution. And, through a large vested interest, it also has a clear incentive to support climate adaptation.

PARTNERSHIPS AND MULTI-PARTY DISCUSSIONS

Climate adaptation is a team sport that requires the involvement of many different actors. This also increases the need for coordination and the use of partnerships. With inspiration from the Green Tripartite, where it was possible to establish an agreement between different parties that did not necessarily have the same starting point or approach to solutions, it could be considered to create a similar agreement on climate adaptation, where different parties must contribute.

Such an agreement would, in the same way, be a clear signal to others in society that climate adaptation must be prioritised and that all parties must contribute.

**PROPOSAL 7.1: Multi-party discussions on the division of responsibility and financing of climate adaptation ("blue tripartite")**

Inspired by both the Green Tripartite and the climate partnerships, it is proposed to create a partnership for the major task of climate adaptation that lies ahead.

The partnership could, for example, include:

- Common risk picture of flooding
- Division of labour to promote incentives for more climate adaptation
- Joint maintenance of appropriate damage coverage
- Understanding of future burden-sharing and division of labour in relation to risk management and possible losses.
- Possible solution approaches and roles for different parties

The partnership could, for example, include:

- The State
- The municipalities and KL (Local Government Denmark)
- The financial sector

Climate adaptation needs signals of commitment and support for action!

7.2. WHERE SHOULD WE START, AND WHAT ARE RELEVANT STRATEGIC MOVES?

Climate adaptation is necessary at all levels, from what the individual landowner can do themselves, to what can be done at the landowner level and in voluntary associations such as dike guilds, etc. In addition, there are the larger collective solutions

under the auspices of utility companies and municipalities.

With the challenges in the form of impending floods on the horizon, there is a need for some form of coordination, especially for larger projects, so that they at least do not work against each other, but also for coordination regarding timing and resource allocation.

Climate adaptation will tie up labour and funding for many years to come, where both can be a scarce resource, at least for public investments. Fortunately, the need is not equally great everywhere, and various sub-strategies for climate adaptation can be employed.

INPUT FROM EXPECTED DAMAGES TO GUIDE STRATEGY SELECTION

By looking at the expected damages over time, one can get an impression of where the urgency is greatest and which types of solutions are most relevant.

Figure 7.2 shows the expected annual costs of damage from storm surges for five points in time in the 25 most exposed municipalities today. The range over time says something about how much the expected damages are expected to develop in line with rising sea levels. For some municipalities, there is not much development over time, for example Varde, Haderslev, and Vesthimmerland. All things being equal, this gives the impression that it may pay off from the start to dimension a solution to a larger level, as one can benefit from it over a longer period.

For other municipalities, the expected range is, all things being equal, larger. In particular, Lemvig Municipality and Kalundborg, but also Aalborg Municipality and Vejle, will to a much greater extent be forced to work adaptively and with potential shifts in the climate adaptation approach,

as a type of solution today can hardly be dimensioned to cover the entire time period.

Storm surge solutions tend to be very much either-or, i.e., either they are big enough or they are not. Therefore, it has major consequences if one gets under-dimensioned protection solutions.

This speaks in favour of working with other strategies to cover the potential residual risk, partly in the form of buffer zones and temporary water collection, and partly in the form of temporary emergency preparedness around the most critical societal assets.

This approach is also one of the conclusions from a major programme of work at Realdania regarding "The cities and the rising sea water", where it is recommended, among other things, that one works with multiple layers of protection. See also box 7.1 on multilayer safety in climate adaptation.

For the areas where damages are expected to develop very significantly over time, there is also the question of which generations must handle the challenges. Major challenges require major transformations, which the local community must also be able to see itself in and have time to "grow with".

Figure 7.3 shows the corresponding picture for the expected damages from cloudbursts. Here there is far less spread over time in the expected damages, which indicates that it will be easier to create solutions that have capacity for a certain period of time.

Rainwater solutions also have the advantage that even under-dimensioned solutions, after all, take the edge off the expected extent of damage and therefore also help even during larger events.

Figure 7.2: Expected development in annual damages from storm surge (2024-2124)

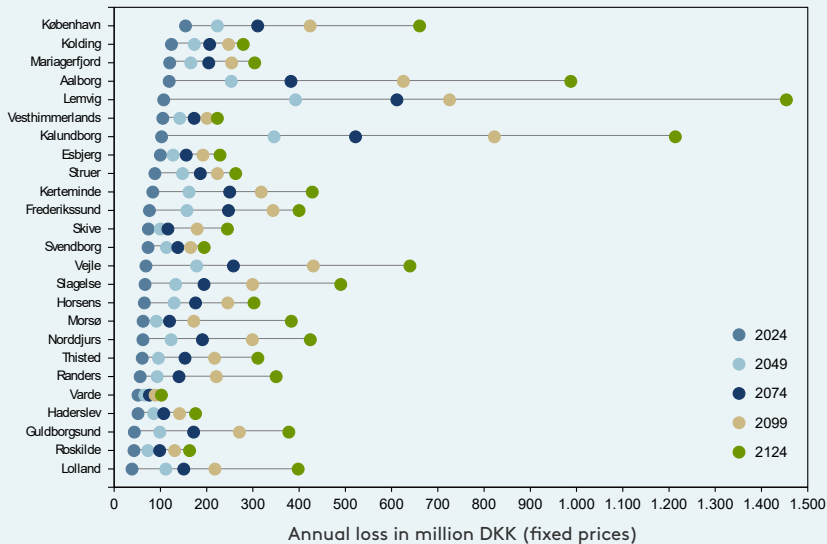
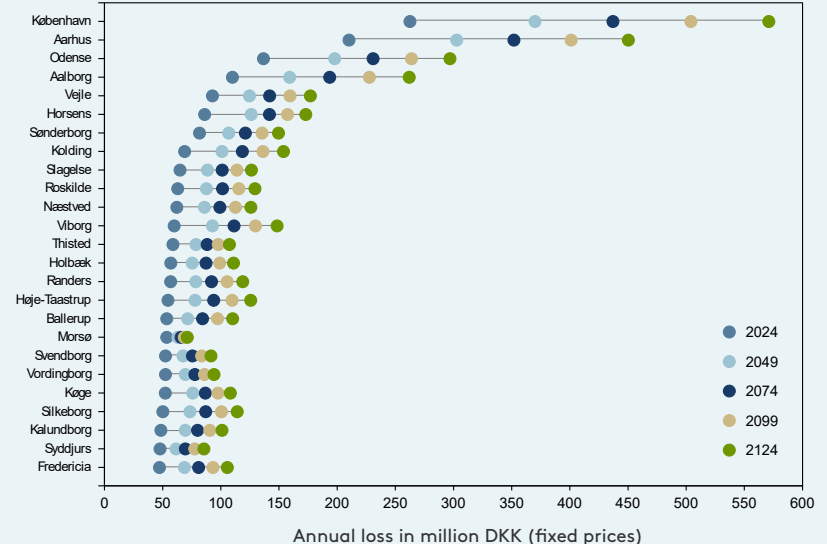


Figure 7.3: Expected development in annual damages from cloudburst (2024-2124)



Source: DTU (2026)

Box 7.1. Multi-layer safety in climate adaptation

Dutch climate adaptation approach, which dictates that an area should be climate-adapted through a combination of measures that offer different forms of safety. No solution is sufficient in itself.

The approach involves:

1. Prevention with protection
2. Physical planning of the areas that limits losses in connection with flooding
3. Emergency preparedness and crisis management

The approach resembles the previously presented, multi-stranded adaptation strategy, which also had several overlapping sub-strategies in play at the same time, but with each their own time horizon.

The motivation is that one will never be able to protect everything against all types of events. Therefore, one must approach the management from different sides – a kind of triangulation with layers of safety.

A transnational project, FRAMES, under the auspices of the EU's Interreg programme, added a fourth element, which is about sustainable and robust reconstruction and recovery after damage.

Sources: Realdania (2025) and the Danish Coastal Authority

7.3. POLITICAL STEPS TOWARDS MORE CLIMATE ADAPTATION

Climate change is created globally, but is felt locally and must also be handled with solutions adapted to local conditions.

[European climate resilience and risk management framework](#) | [EU adaptation policy](#) | [Discover the key services, thematic features and tools of Climate-ADAPT](#) | [Climate-ADAPT](#)

THE POLITICAL FRAMEWORKS FOR ADAPTATION

The framework for climate adaptation also comes from the international community, where one of the UN's Sustainable Development Goals directly concerns climate adaptation, and where funding is agreed upon for the most vulnerable. From the EU's side, climate adaptation has also been in focus; the first common strategy is from 2021, which obliged all member states to create national strategies, cf. figure 7.4.

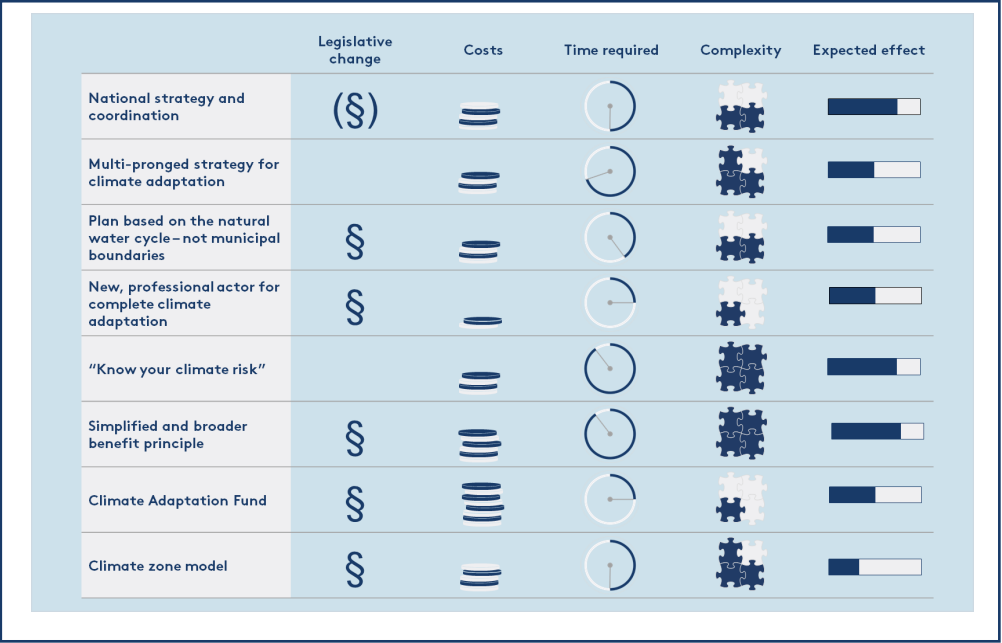
In Denmark, the decision was made to unfold the requirement for a national strategy through a series of climate adaptation plans, the first of which arrived in the autumn of 2023, coinciding with a major storm surge event.

Otherwise, climate adaptation at a national level has typically been handled through appropriations in the annual Finance Acts, and most recently through the Acceleration Agreement from August 2025. See also box 7.2 for various political measures to support climate adaptation in Denmark.

The national measures have a particular focus on coastal protection, with a slightly increasing tendency for the state to lean further into taking shared responsibility together with the municipalities. Among other things, by prioritising more funding for these projects through the continuation of the Coastal Protection Fund, with the Acceleration Agreement, and with preliminary analyses and environmental assessments linked to storm surge protection for Copenhagen.

At the same time, the responsibility for collective solutions for near-surface groundwater has politically been shifted to the water utility companies, and thus to tariff-based financing. In practice, this means that collective solutions can be considered in this area in already sewered or planned sewered areas. Not elsewhere. The water utility companies

Figure 7.4: International frameworks for climate adaptation



Source: European Environment Agency (2023)

can then incorporate groundwater into the design and dimensioning of the sewers. In many areas, this will mean that solutions will only arrive as and when the utility companies were going to replace or repair the sewers anyway. Therefore, many property owners will have to prepare themselves for the fact that they will continue to bear the responsibility for potential flooding as a result of near-surface groundwater for several decades. The state has established the possibility of some financial support for property owners who take care of climate adaptation themselves through the tax deduction for home improved services (Craftsman deduction) and through a new fund for conservation-worthy houses.

Finally, a proposal for a new climate adaptation plan was released just before the General Election in March 2026, which presented a principle of

increased state outlay for municipal climate adaptation (up to 85 per cent), which is subsequently repaid through direct contribution payments.

INTERNATIONAL MEASURES

National coordination will also come into focus in the upcoming climate adaptation plan from the EU, ECAP¹, which is expected in the second half of 2026. Here, climate-related risks in the EU are mapped on the basis of the national climate adaptation plans, and necessary societal preparedness is proposed in relation to central sectors such as infrastructure, energy, water, food, and other land areas.

Later in March 2027, the IPCC (UN Climate Panel) is expected to publish a special report on the consequences of climate change for cities, with a focus on compound risks, coupled events, and

Coastal Protection Fund (annual since 2020)	State fund for co-financing of up to 40 per cent of municipal construction costs for collective coastal protection (though a maximum of DKK 30 million per project). Since 2020, there have been annual funds of DKK 80-150 million, which are currently extended until 2028. 41 projects have in total been awarded funds since 2020, of which 8 were completed as of 1/1-2026, according to the Danish Coastal Authority. Applications are made for significantly more than the size of the funds, with the risk of a form of stop-go planning where grants from the state are awaited. and are currently being processed with great care and diligence to ensure that all requirements are fully met by the applicants.
Climate Adaptation Plan 1 (2023)	The plan includes new funds for the Coastal Protection Fund as well as for sand nourishment of the West Coast, professional assistance from the state to municipalities regarding coastal protection, as well as proposals regarding utility companies' handling of shallow groundwater.
State coastal protection of the West Coast with, among other things, sand nourishment	The Danish Coastal Authority carries out state-financed sand nourishment along the Jutland west coast. For the period 2025-2029, there is a special focus on protecting protecting against erosion and flooding along the coasts in Thisted, Lemvig, Holstebro and Ringkøbing-Skjern municipalities.
Collective measures for shallow groundwater (July 2025)	Wastewater utility companies are given legal authority to undertake collective climate adaptation solutions that can handle high-standing groundwater
Craftsman deduction (2025-2026)	Green Craftsman deduction 2025-2026 for labour costs for individual measures for water management in year-round- and holiday homes (e.g. soakaways, perimeter drains, backwater valves, infiltration systems etc.)
"Acceleration package" (August 2025)	Political agreement where the state for the first time commits itself more deeply to a coordinating responsibility for climate adaptation of coasts by assisting with 3 screenings and 11 preliminary studies of particularly exposed coastal areas. In addition, there is a health check of Danish dikes, funds for the extension of the Coastal Protection Fund, a fund for individual climate adaptation of listed buildings as well as co-financing of risk mapping and the first environmental impact assessments for a storm surge protection of Copenhagen.
Water Regulation Committee (2025-2026)	Expert committee, that must relate to the economic regulation of the economic regulation of water utility companies, so they become more and including also their handling of climate adaptation. The first recommendations concerned in particular the management of the companies, governance and competencies, but also the companies' economic frameworks, transparency and the companies' economic frameworks, transparency and efficiency requirements to efficiency requirements to increase to increase predictability. Final recommendations are expected around the summer of 2026.
Proposal for Climate Adaptation Plan 2 (March 2026)	Proposal for state co-financing of coastal protection (up to 85 per cent against later repayment from the affected citizens after the establishment of a new principle for payment mechanism). The proposal suggests reserving DKK 14.9 billion from the fiscal space up to 2040 to finance the outlay.
Preliminary analysis of Storm Surge Protection for Copenhagen	Sund & Bælt has together with the Ministry of Transport, spearheaded a number for a number analyses of, what it will require technically and economically to create a storm surge protection for Copenhagen and surrounding municipalities, where at the same time consideration is taken value of several types critical transport infrastructure. The total solutions amount to around to around DKK 12-13 billion. kr.
Expert group for new contribution payment model (2026)	The expert group must come up with proposals for a new and simplified contribution payment model for collective climate adaptation in the form of coastal protection (new model to replace the previous utility principle). Was originally supposed to report before summer 2026, but the task was put on pause due to the calling of a general election. terms-of-reference-for-expert-group.pdf

possible cascade effects when critical infrastructure is affected by climate change.

Climate adaptation is therefore still on the international agenda.

NEED FOR MORE STATAL INVOLVEMENT

As the expected damage from flooding increases over time, and challenges come from multiple sources and sometimes at the same time, there is also a need for increasing investments in climate adaptation. Sometimes also in larger, complex climate adaptation. This requires state organisation, tendering, and coordination of the larger projects. And it requires state participation in complex approvals. Today, the Ministry of Environment is coordinated across the various departmental areas in relation to climate adaptation, and that task will only grow in scope and complexity in the coming years.



PROPOSAL 7.2: Expert group to advise the government on climate adaptation

In Denmark, the Climate Council follows the government's efforts to reach the political targets for the reduction of greenhouse gases according to the Climate Act and political agreements and comes up with proposals to ensure goal achievement.

In other countries such as Sweden and the UK, expert councils are used to advise the government on climate adaptation needs and on execution.

It is proposed to establish a corresponding expert council to advise the government in Denmark – with a special focus on shaping action-oriented goals and on handling the challenges from several water sources.

It may therefore be worth considering supplementing this with increased advice from experts.

CLIMATE ADAPTATION COUNCIL

The Climate Council has been established to monitor progress and advise the government on how best and most effectively to achieve the green transition and the necessary reductions in greenhouse gases. The same could be useful for climate adaptation.

There are examples from other countries where the corresponding council also handles climate adaptation, or where it is established as a separate task. In order to increase progress and support continued more effective solutions and understanding of combinations of necessary sub-strategies and their lifespan, it is proposed that an interdisciplinary expert forum also be established to advise the government on relevant climate adaptation and warn against potential policy errors in the organisation and the supporting frameworks.

7.4. NEED FOR GOALS, VISIONS, AND ACTUAL IMPLEMENTATION

Adjusting society in the direction of more climate adaptation with all its facets and sub-strategies is not just a question of political agreements and announcements, but a systemic change. It is going to take decades, and climate adaptation is something that one must continuously address and adjust one's composition of measures. If society is to be engaged over such a long time, it requires a positive goal to strive for – a positive vision of the future.

VISION – SOMETHING POSITIVE TO STRIVE FOR

Climate change in itself offers a sense of urgency for change, but long-term engagement cannot be sustained by fear (of damage and loss) – there is also a need to understand where one is moving to instead. What one gains from leaving a "status

quo" situation or a "laissez-faire" strategy, as it is called in climate adaptation jargon. And which more positive scenario one can then move into. Here, a national strategy for climate adaptation can help create a common narrative about what we gain from adapting to the climate.

MAINTAINING VALUES AND OPPORTUNITIES

Climate adaptation is about **security** and about society and its mode of operation being **robust** enough to handle (weather-related) changes.

That we can continue to settle across most of Denmark and have opportunities for different forms of activity.

Climate adaptation is a form of **generational-contract**. Today's generations are correcting the sins of the past by both undertaking a green transition and starting the long-term process of climate adaptation – for the benefit of future generations, so that they still have good prerequisites.

If we do nothing today, we are gambling with the future. They will not have time to plan and carry out the various time-consuming measures if they have to start from scratch. Conversely, the entire bill should not be paid by the current generation, but shared over time in line with the lifespan of the solutions. Here, the state and the capital markets can help to distribute the bill over time.

NEED FOR ALL ACTORS

If we are to succeed with more climate adaptation in Denmark, an effort is needed from several actors.

The **state** must contribute with long-term political agreements that provide stability regarding frameworks and funding for the often very long-term projects. This must be implemented through regulation and guidelines for municipalities. There is also a need for the state to take an active role

as coordinator of the larger and complex climate adaptation projects, to formulate a common vision for climate adaptation in Denmark, and to set concrete goals to follow up on in a comprehensive climate adaptation plan for Denmark. This also includes a schedule with the timing of some of the larger projects and a signal regarding the extent to which one wishes to involve private capital in the financing (investment signal). The state can form partnerships with relevant market actors regarding both financing, but also organisation and execution.

Municipalities remain the spokespersons for local needs, formulating the demand, and are decisive for establishing effective payment mechanisms. For many of the current project types, the municipalities are absolutely central as authorities with control and permits, and in some cases also as involved in getting the projects carried out. With this report's proposals, they will have a greater role in planning climate adaptation across municipal boundaries, and receive competent assistance from the state and potentially from partnerships for the larger and more complex projects.

Utility companies also remain absolutely necessary actors in water management. They are limited in their regulation as to which types of water they may handle, and in their geographical area of operation, but often have extensive experience and many relevant competencies. As described in this report, they are in some areas hindered from making investments that provide synergies across the board, and reflect local protection wishes, while at the same time providing societal benefits. There are already expansion plans that will entail a significant increase in their investment needs, so even without covering the total climate adaptation need, there is a prospect of significantly higher water bills.

Property owners will also still be central, as there are many sensible individual measures that can reduce the flood risk on the property. Here, increased knowledge of risk and options for action will be central, along with increased market awareness from the signal that lies in, respectively, a clearer risk marking, but also in having taken measures. Local associations of property owners can at the same time do something on common areas, just as property owners should to a higher degree cooperate with municipalities, utility companies, and other climate adaptation companies to provide areas for temporary water storage, where possible.

In a supporting role are various **companies** from consultants to contractors and actual



PROPOSAL 7.3: Financial sector as a mediator of risks, knowledge and action options

The financial sector consists of companies ranging from insurance companies to banks and mortgage credit institutions as well as pension companies. They offer a number of financial services, which in different ways are about pricing and handling risks, mediating capital and making investments. These services are, together with customer contact and the knowledge dissemination and the incentives that are set for the customers, relevant for supporting climate adaptation.

The sector should cooperate with the state on a good data basis to understand the flood risk, and act as a link to those with a need for risk coverage and climate adaptation. The sector must have a return on its services, but climate adaptation also relieves risk from the sector.

infrastructure companies, which as new actors can be responsible for planning, organisation, and execution of more complex projects.

A perhaps slightly overlooked actor in climate adaptation is the **financial sector**. By embracing everything from damage coverage to capital intermediation and investment of pension funds, it comes into contact with virtually everyone with a climate adaptation need. The sector has strong capabilities to act as a link between knowledge of risks, prevention, and concrete options for action.

This is not only as a market service, but also because the sector itself has large values and markets at stake. Society's need for climate adaptation is therefore well in line with the financial sector's need for climate adaptation. It is in the sector's own interest. See also Berg and CIP Foundation (2026) for a more detailed description of the financial sector's roles in climate adaptation.

More effective climate adaptation means that there must be clarity about the different roles, and who has which responsibility. Not that one party should have all the responsibility.

Figure 7.6 summarises which roles different actors have today in the direct handling of different types of water, and what is being proposed going forward.

FROM RECOMMENDATIONS TO ACTION

This report has indicated a number of concrete paths for the various actors in climate adaptation to become more effective in supporting relevant climate adaptation. At the back, there is a comprehensive overview of the recommendations distributed among the actors who must help to implement them, divided into what are assessed as absolutely central proposals and more supporting proposals.

CIP FOUNDATION | Summary of proposals and perspectives

Some will take longer to implement than others, and some will be more demanding in terms of resource draw and complexity. Not everything presupposes legislative changes, but can nevertheless be demanding to implement.

Figure 7.5 shows an assessment of what it will take to implement the central proposals, and what effect is expected from the climate adaptation. A proposal such as "know your climate risk" will not be as demanding of the state in relation to powers and regulation, but primarily consist of an investment in better data quality and documentation, which benefits citizens and businesses. The costs are not assessed as being that high, but the proposal will be time-consuming to implement because it requires development and coordination with several private actors to establish a comprehensive and standardised method for climate risk

marking and display, just as catalogues of options for action and their effect on risk reduction will need to be developed. Just like with the establishment of the energy label, it is a longer and complex process over time, but with potential great effect for behaviour in the form of more private climate adaptation.

It will be far less demanding to allow a professional actor to undertake complex climate adaptation. However, the effect will need to be built up over time as experience and learning effects are gained, which will enable this new actor to reap gains in the form of shorter processes and lower costs. This is in line with building a new market.

On several fronts, climate adaptation in the new climate reality is a form of new market that must be established and made to function. Here, it can help to think of climate adaptation as a necessary

infrastructure, with inspiration from the way one otherwise establishes infrastructure – including critical infrastructure.

Now it is about translating knowledge into decisions – and decisions into action!

Summary of proposals in Chapter 7

	The property owner	Associations (property owner associations, etc.)	Utility companies	Municipalities	The state	Infrastructure company
Which water sources?	All water sources on one's own plot	Coastal protection and private watersources	Rainwater management and high groundwater	Public watersources	Selected coastal areas	No role today
Examples	E.g. perimeter drains, soakways, check-valves, green roofs, rain-garden and back-flow valves	Coastal protection and private watersources	Sewers, rain gardens, flood areas, closed-burst tunnels and the like	Maintenance through e.g. weed cutting and dredging, protection via e.g. dikes, and adaptation via e.g. re-meandering	Seal nourishment along the west coast and maintenance of dikes on Lolland-Falster and older sluices at Højer and Thorsminde	-
Financing: → Who funds the cost? ← Who pays?	→ The property owner or loans via the financial sector ← Own income, wealth or loans	→ Members of the association → Foundation funds* ← Contribution	→ Municipality guaranteed loans and credits financing via the financial sector ← Tariff financing in the utility area	→ Municipal budgets or loans via Kommunekredit ← Municipal taxes and contributions	→ The state's balance or government debt ← The state budget (general taxes)	-
Supporting frameworks today	Trademan deduction for labour costs of climate adaptation for year-round and holiday homes	Trademan deduction for labour costs of climate adaptation for year-round and holiday homes	Well-established payment infrastructure	• Approval/permits • Planning • Coastal fund	Climate Adaptation Plan 1 and potentially 2, plus ongoing political agreements	-
Challenges	Large differences in knowledge about responsibility, flood hazard and options for action	• Lack of professional competence to manage climate adaptation • Liability for damages in case of technical failures	• Possible protection level is limited by the requirement for socio-economic optimum • Annual efficiency requirements on large construction projects	• The project economies burden the investment budget • Has few, large projects and limited learning potential	Finding a balance between increased coordination and preserving local incentives	-
Proposals	21 "Know your risk" for flooding 2A Development of a climate risk label with options for action 2B Setting of framework for flooding as a service	A2 Strategic reserves 2F Savings towards voluntary buy-up of particularly exposed properties	1 Multi-pronged climate adaptation strategy	A3 Planning within river basins A4 Climate zone model 1A Step new construction in the area	A5 Climate fund for savings for common goods 1B Greater national coordination 1C Common goals with shared program A6 State approval of complex projects	A1 New, professional actor for climate adaptation

*Kommunekredit supports property owner associations with DKK 1 billion for managing precipitation on shared areas. *Linked to climate adaptation*

Figure 7.5: Implementation factors and expected effect of key proposals

	Legislative change	Costs	Time required	Complexity	Expected effect
National strategy and coordination	(§)	==			
Multi-pronged strategy for climate adaptation		==			
Plan based on the natural water cycle – not municipal boundaries	§	==			
New, professional actor for complete climate adaptation	§	==			
"Know your climate risk"		==			
Simplified and broader benefit principle	§	==			
Climate Adaptation Fund	§	==			
Climate zone model	§	==			

Source: CIP Foundation's own illustration

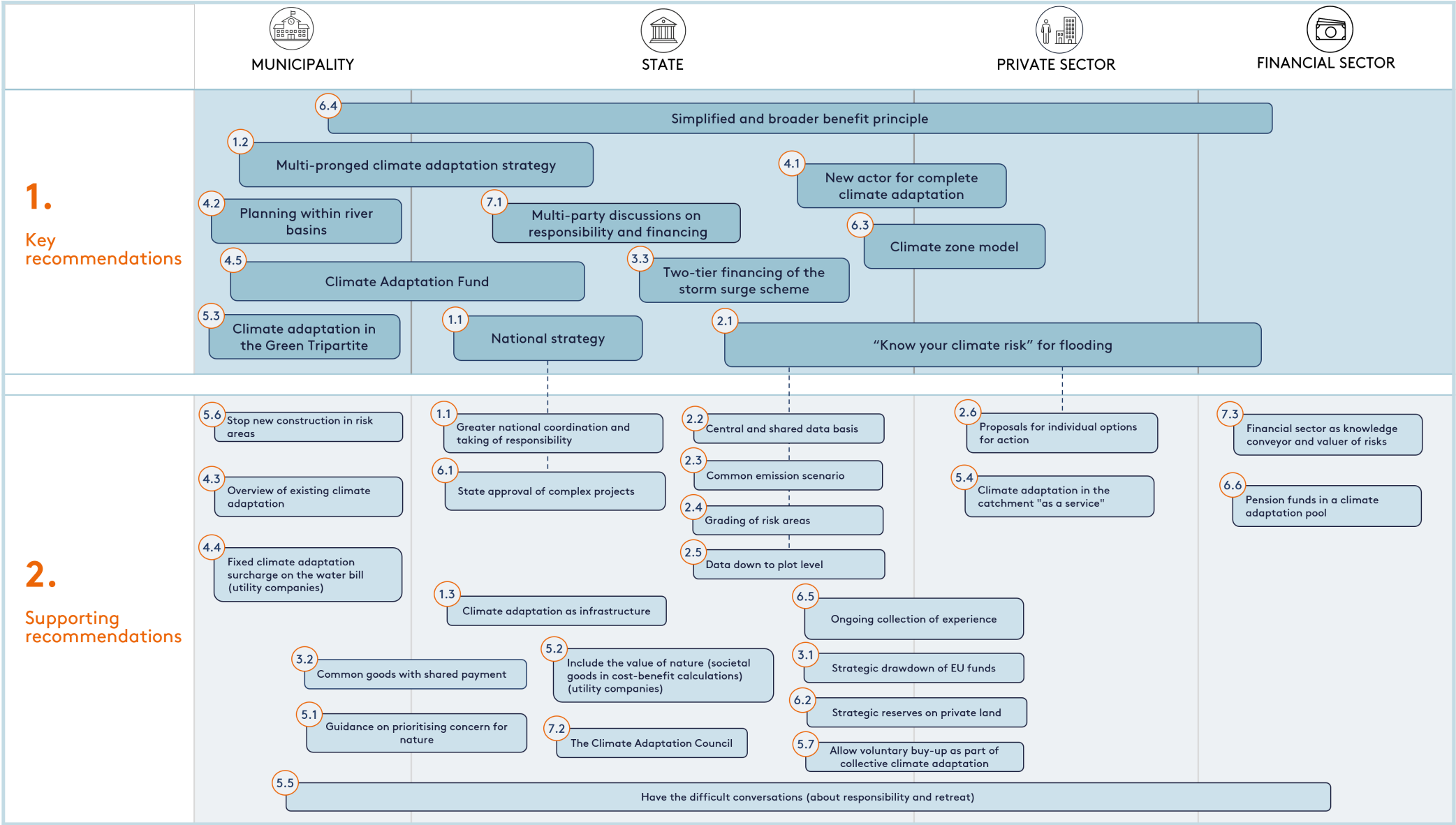
Figure 7.6: Overview of role distribution and proposals

	 The property owner	 Associations (property owner associations, dike associations, etc.)	 Utility companies	 Municipalities	 The state	 Infrastructure company
Which water sources?	All water sources on one's own plot	Coastal protection and private watercourses	Rainwater management and high groundwater	Public watercourses	Selected coastal areas	No role today
Examples	E.g. perimeter drains, soakaways, cloudburst valves, green roofs, rain gardens and backflow valves	Coastal protection and private watercourses	Sewers, rain gardens, flood areas, cloudburst tunnels and the like	Maintenance through e.g. weed cutting and dredging, protection via e.g. dikes, and adaptation via e.g. re-meandering	Sand nourishment along the west coast and maintenance of dikes on Lolland-Falster and older sluices at Højer and Thorsminde	-
Financing: → Who fronts the cost? ← Who pays?	→ The property owner or loans via the financial sector ← Own income, wealth or loans	→ Members of the association → Foundation funds* ← Contribution	→ Municipally guaranteed loans and interim financing via the financial sector ← Tariff financing in the utility area	→ Municipal budgets or loans via KommuneKredit ← Municipal taxes and contributions	→ The state's balance or government debt ← The state budget (general taxes)	-
Supporting frameworks today	Tradesman deduction for labour costs of climate adaptation for year-round and holiday homes	Tradesman deduction for labour costs of climate adaptation for year-round and holiday homes	Well-established payment infrastructure	• Approvals/permits • Planning • Coastal fund	Climate Adaptation Plan 1 and potentially 2, plus ongoing political agreements	-
Challenges	Large differences in knowledge about responsibility, flood hazard and options for action	• Lacking professional competencies to manage climate adaptation • Liability for damages in case of technical failures	• Possible protection level is limited by the requirement for socio-economic optimum • Annual efficiency requirements on large construction projects	• The project economics burden the investment budget • Has few, large projects and limited learning potential	Finding a balance between increased coordination and preserving local incentives	-
Proposals	2.1 "Know your risk" for flooding 2.6 Development of a climate risk label with options for action 5.4 Leasing of farmland for flooding as a service	6.2 Strategic reserves 5.7 Savings towards voluntary buy-up of particularly exposed properties	1.2 Multi-pronged climate adaptation strategy	4.2 Planning within river basins 6.3 Climate zone model 5.6 Stop new construction in risk areas	4.5 Climate fund for savings for common goods 1.1 Greater national coordination 3.2 Common goods with shared payment 6.1 State approval of complex projects	4.1 New, professional actor for climate adaptation

Note: *Forenet Kredit supports property owner associations with DKK 1 billion for managing precipitation on shared areas, [United on climate adaptation](#)

Source: CIP Foundation's own illustration

Summary of the report's proposals



Appendix A: What is included in DTU's assessments of expected damage from flooding?

For the CIP Foundation, DTU has prepared an analysis of "*Flooding in Denmark – economic and human consequences*" from May 2026, which is referenced several times in this report. The basis for DTU's work is therefore set out in this appendix.

THREE TYPES OF FLOODING

In the new analysis, DTU examines three different forms of flooding:

- Storm surge
- Cloudburst
- Prolonged rain and overflow from watercourses

This is the first time that a total estimate of expected national damage across all these categories has been provided. Previously, there have been estimates for expected damage from one water source at a time. DTU previously analysed the consequences of storm surges and cloudbursts combined for the CIP Foundation and Insurance & Pension Denmark in November 2024.

The new analysis therefore entails an updated and expanded estimate of the expected damage from flooding at a national level over the next 100 years.

Unfortunately, data for shallow groundwater, which is also expected to cause flooding in the future, is not included because the data basis was too limited to allow for sufficient geographical location.

Since the last assessment, work has been done with a strengthened data basis and with method development for assessing different types of loss. See Figure A.1 for

a comparison of what was included in the 2024 and 2026 assessments respectively.

DTU'S MODEL FOR DAMAGE ECONOMICS

Both of DTU's assessments for the CIP Foundation are based on DTU's Damage Economics model, which aims to calculate the economic consequences and risks of flooding.

The model uses data from the Storm Council, which contains information on insurance payouts for storm surges at address level for both permanent residences and holiday homes. With the help of the Danish Address Web API (DAWA), the coordinates for each affected address are identified and subsequently processed in a geographic information system (GIS)¹.

In addition, data on crop prices and harvest yields for the relevant crops from the Danish Agricultural Agency are included. On this basis, so-called damage functions are estimated, as well as the costs associated with the flooding of agricultural areas. These are used collectively to assess the socio-economic costs of flooding.

STRENGTHS OF THE MODEL

The Damage Economics model can map the costs of flooding in total, broken down geographically, broken down by economic sub-sectors, and a distinction can be made between the impact on real estate (buildings) and the impact on activity (mobility, crop loss, etc.).

The value of the expected damage is based on information about damage payouts (history from insurance companies and the Danish Storm Coun-

cil). Damage payouts reflect, for example, what it will cost to re-establish the damaged building, i.e., the repair costs.

The starting point here is nationwide list prices. The expected economic damage is therefore not directly related to the specific property value, but to the costs of re-establishment.

The model is freely available to everyone (open source), and all improvements to the method and data basis will therefore benefit a wide circle. The model is therefore also used by municipalities in their work with local climate adaptation.

CHALLENGES OF THE MODEL

When the model maps the costs of flooding, both static and dynamic flood models are used, depending on the type of flooding being measured. When the model maps costs associated with storm surges, these are calculated using a static flood model (DTU (2026a)).

Flooding from cloudbursts is also based on a static flood map, while flooding from watercourses and prolonged rain is based on the Danish Coastal Authority's dynamic flood map (DTU (2026a), NIRAS (2025), KDI (2025)).

The static models assess flooding as a function of maximum water level without a time dimension, while the dynamic models describe the development of the flood over time. This can lead to physically inconsistent results and is therefore considered one of the challenges of the model.

As a starting point, there is also no information in the model about already established climate adaptation. This creates a risk that the potential damage is overestimated. The model also cannot take into account the effect of the emergency services' role in the event of flooding. However, the emergency services must primarily handle danger to shared infrastructure and shared functions, and

thus rarely have a major protective role towards privately owned buildings, etc.

The assessments also do not take into account damage to movable property at Danish ports. This could, for example, be damage to pleasure craft or general port areas. This contributes to underestimating the total costs.

Furthermore, the model assesses business losses based on the number of affected employees, and not based on any potential decline in the companies' turnover. This is also one of the challenges of the model.

WHAT DID THE 2024 ASSESSMENT INCLUDE?

As shown in Figure A.1, the original assessment from 2024 included both storm surges and cloudbursts as water sources.

As another type of loss, the original assessment also included damage to buildings, which constituted a central part of the assessment's results. The 2024 assessment also included losses as a result of extended transport time when flooding makes roads and other infrastructure more difficult to use. In addition, the assessment included lost earnings in the tourism industry, as well as the loss of crops in the agricultural sector.

By including extended transport time as a type of loss, it is shown that flooding does not only affect buildings, tourism, and agriculture, but broadly affects the vast majority of physical capital, while also creating delays for citizens.

WHAT DOES THE NEW ASSESSMENT INCLUDE?

In DTU's new assessment for 2026, a new water source is introduced in the form of flooding from watercourses, typically as a result of prolonged rain. Flooding of agricultural areas as a result of prolonged rain is also included, as well as the consequences of salt impact from storm surges on cultivated areas. The CIP Foundation's own report on the consequences for the agricultural sector

¹[Documentation of the Damage Economics model](#)

from increased flooding goes into more depth on this topic².

The new assessment therefore includes not only acute events such as storm surges and cloudbursts, but also prolonged events.

The assessment also introduces new types of loss for production losses in the business sector, i.e., consequences in the form of affected activity. Here, flooding can, for example, lead to temporary production stoppages, either due to affected machinery and raw materials, or employees and materials that cannot get through.

In addition, the loss basis for agriculture has been strengthened with help from SEGES (CIP Foundation (2026)). Agriculture is also exposed to production losses, as flooding and prolonged precipitation can lead to crop losses, as well as reduced soil quality. Production loss also includes the service sector in the new assessment.

As something new, the new assessment also includes losses associated with lost utility value and recreational value of certain public goods, such as museum visits and library visits. This reflects that flooding also entails a cost when citizens temporarily lose access to places with cultural, social, or recreational value.

NEW ESTIMATE OF HUMAN CONSEQUENCES OF FLOODING

In the summer of 2025, DTU conducted a questionnaire survey on the human consequences associated with a flood. The questionnaire was sent to approx. 123,000 people, of whom approx. 16,000 responded. The respondents all had in common that they resided in most of the areas that were hit by a storm surge in October or December 2023 (DTU (2026a; 2026b)), (Naturskaderådet (2023; 2024)).

The respondents were asked a number of questions about their experiences with flooding, how worried they are about flooding, how often they think flooding occurs where they live, whether they have sought information about the risk, and whether they have done anything to reduce the risk. In addition, they were asked about their perception of the municipality's work to reduce the risk of flooding.

WHERE ARE THE BIGGEST DIFFERENCES?

The total damage costs thus land at approximately the same level in the new assessment as in the original. As shown in Figure A.1, this is because the new estimate is influenced by opposing factors, which cancel each other out by either pushing the estimate up or down. As previously mentioned, the new assessment includes new loss figures for commercial properties, as well as a revised calculation of the flood risk.

The new calculation is based on improved data, including data from the Danish Coastal Authority's flood maps. This is corrected with local data from 40 municipalities regarding, among other things, the existing climate adaptation in these municipalities. These factors contribute to pushing the new estimate down.

NEW TYPES OF LOSSES

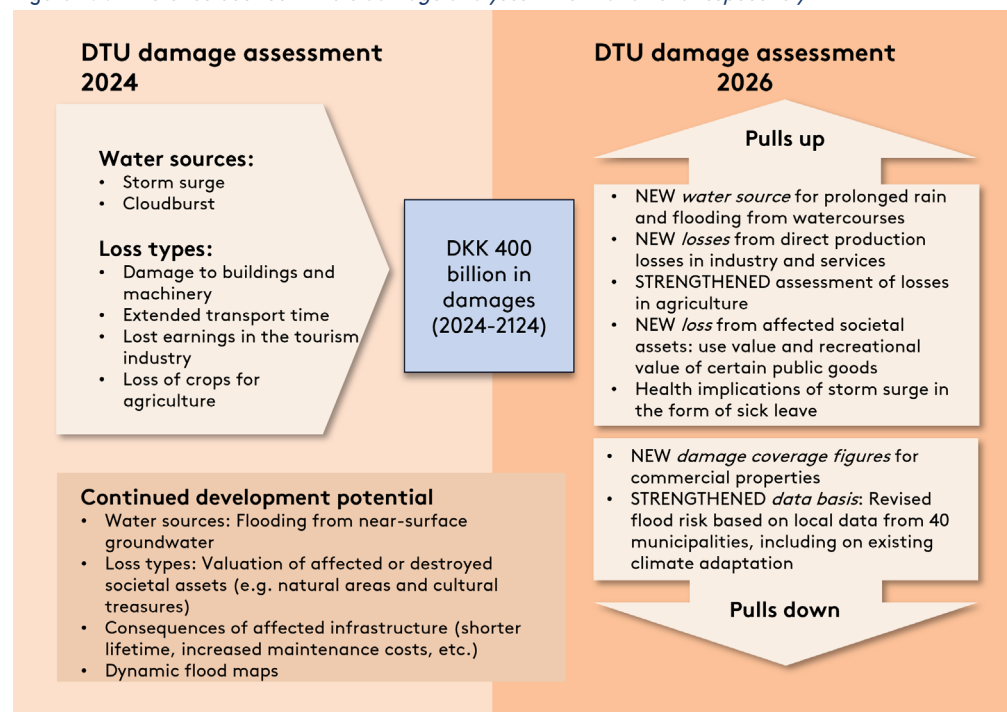
At the same time, the new estimate introduces new types of loss in the form of production loss, lost utility value, recreational value, and the health implications that a storm surge entails. These are factors that help to push the estimate up.

WHERE CAN THE MODEL BE FURTHER DEVELOPED?

There is still potential for improvement. For example, the data basis can be strengthened with better assessments for near-surface groundwater.

The model and its damage functions also cannot take into account the value of highly affected or

Figure A.1: Difference between DTU's damage analyses in 2024 and 2026 respectively



Source: CIP Foundation's own illustration based on DTU (2026)

destroyed public goods in the form of mostly irreplaceable goods such as protected nature areas and cultural treasures. This is because there is no market for these goods, so they do not have a price tag. By only including the lost recreational value from using these goods, the consequences for flooding of this type of public good are underestimated.

For infrastructure, consequences in the form of longer travel time etc. are included, but not the shortened lifespan that various forms of infrastructure are subjected to when flooding and high-standing groundwater in the long term impair the durability of, for example, railway networks, power cables, district heating pipes, and other infrastructure.

The assessment is naturally associated with un-

certainty in projections and in estimated loss values, which can be linked to the data basis, damage functions, and delimitations.

²Consequences for the agricultural sector from increased flooding

Appendix B: “Vandkøbing” as a case for dialogue on complex climate adaptation

THE PURPOSE OF VANDKØBING

The current regulation of how climate adaptation may be carried out is – as described in this report – characterised by silo divisions in responsibility, planning and organisation, possible actors, and financing models.

This limits the possibilities for planning for the water’s natural cycle, and also limits the possibilities for creating integrated climate adaptation solutions for multiple water sources. Today, there is a tendency to solve one water problem locally at a time. Here, there may be a need for more effective and holistic climate adaptation solutions, especially when the water comes from multiple sources and across municipal boundaries.

A common understanding of the challenges between the many involved stakeholders is essential for developing effective solutions. But it can be challenging to talk about the many conflicting considerations and to imagine possible holistic solutions for complex climate adaptation.

Therefore, the CIP Foundation, in collaboration with Realdania and COWI/Arkitema, is developing ‘Vandkøbing’ as a dialogue tool for climate adaptation. A video about Vandkøbing can be found [\[here\]](#).

The tool uses illustrations of a fictional urban area with multiple water challenges, dilemmas, and potential solutions to inspire dialogue on neutral ground regarding the approach to climate adaptation.

Vandkøbing is described in more detail in an upcoming report, which also analyses what possible solutions within current rules and traditions could include and cost, and what a more holistic approach could mean.

“Imagine if we were allowed to think freely in solving climate adaptation”

In the ‘Vandkøbing’ case, COWI Arkitema draws on reports from the CIP Foundation and Realdania to develop a fictional city that is representative of many Danish coastal towns and illustrates some of the many dilemmas that arise in climate adaptation planning.

COWI is collaborating with KPMG to calculate the economic and time savings that can be achieved by thinking about climate adaptation differently.

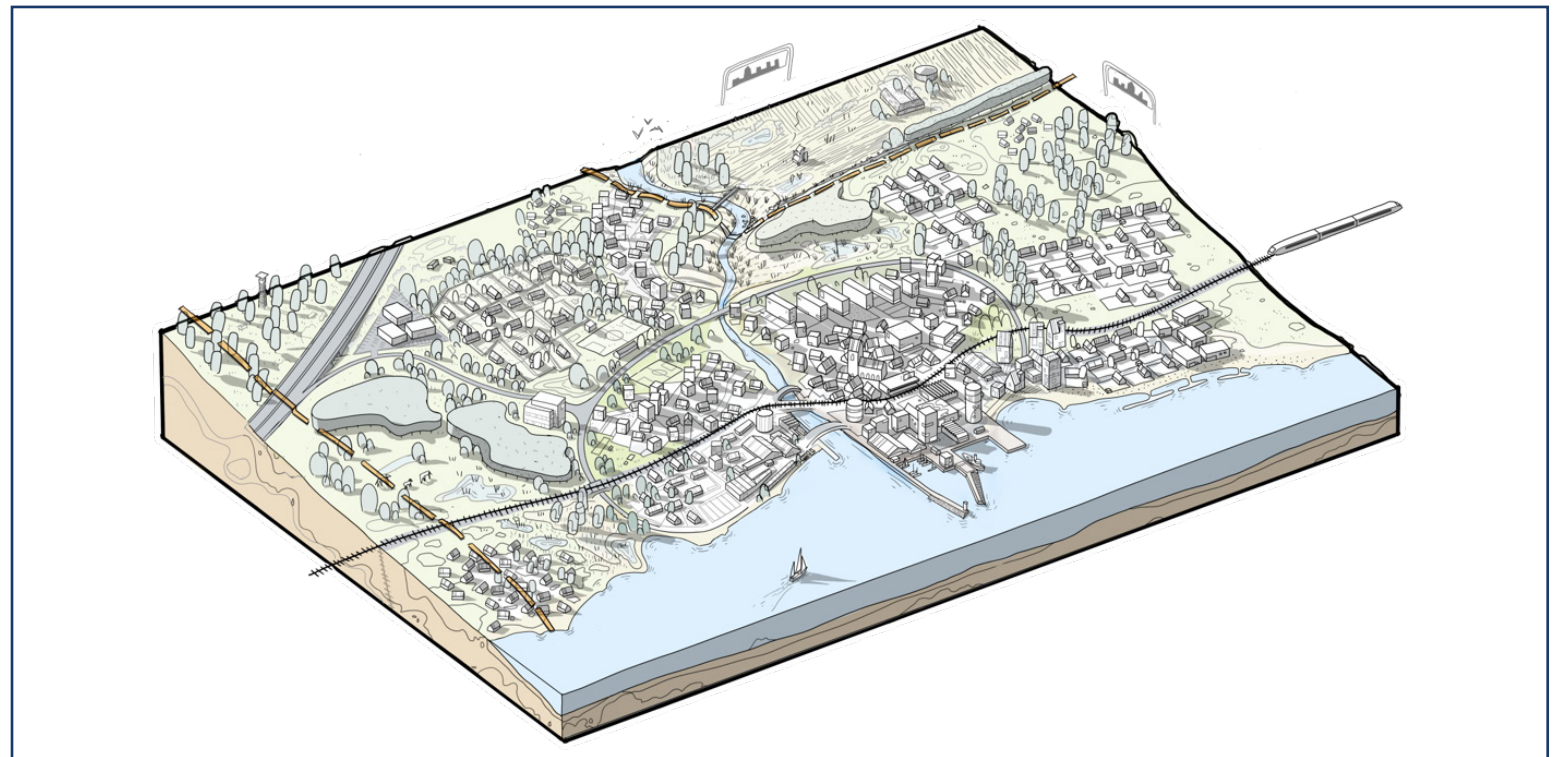
The development of solutions for Vandkøbing has so far shown the following results:

- Effective climate adaptation solutions require long-term and adaptive planning across city districts, water types, and municipal boundaries.
- By being allowed to think across boundaries, we can save time and money and develop better protection that also creates co-benefits such as recreation.

VANDKØBING'S DISTRICTS HAVE RECOGNISABLE CHALLENGES

Vandkøbing is a fictional but representative city for Danish conditions, based on data from a number of Danish towns. The towns on which the various districts in Vandkøbing are based have been

Figure B.1: The fictional town of Vandkøbing



selected to ensure that Vandkøbing is recognisable to many users across the country.

The selection of districts is based on a systematic screening of 49 coastal towns with different sizes, building compositions, and risk profiles.

Vandkøbing resembles an average Danish coastal town with around 30,000-40,000 inhabitants. The various districts in Vandkøbing illustrate issues that will often be recognisable in different municipalities, e.g., a holiday home area across municipal boundaries, as well as challenges with flooding that can come from both the coast and from a watercourse running through the city.

Vandkøbing includes, among other things:

- Two residential areas with vastly different flooding challenges
- A mixed city centre
- Important infrastructure with roads, a harbour, and a railway line with a train station
- A coastal holiday home area

Vandkøbing contains two major residential areas, one of which is located close to the coast and the other further inland, bordering the watercourse. The areas' flooding challenges are vastly different and will be recognisable from different residential areas in Denmark: the homes by the coast are most threatened by storm surges and have limited opportunity for temporary water storage, but conversely, the opportunity to develop adaptive solutions with gradual adaptation of the coastal landscape. The homes further inland are challenged by overflow from the stream during heavy rainfall but are located next to areas where it would be possible to incorporate water storage into the 'green tripartite' agreement – which is, however, complicated by the fact that parts of the solution must be constructed on the other side of a municipal boundary.

Vandkøbing's city centre is located down by the stream. Here, it is challenging to find space for climate adaptation due to dense development and listed buildings. Challenges can arise with 'backwater', i.e., rainwater in the catchment area which is led through the city via the watercourse and out to the sea. Periods of prolonged or intense precipitation can create congestion and cause the water to overflow the banks of the watercourse.

If higher banks are built on parts of the watercourse, it will export the problem to other areas and create more serious flooding elsewhere.

The railway network passes through the city, and the train station is located by the city centre; overall, this is an important piece of infrastructure for the mobility of citizens in both Vandkøbing and the surrounding municipalities.

Vandkøbing's harbour area is mixed. Here there is industry, housing, cultural heritage, and some plots that are under development. There are also a number of areas here where it is possible to set up temporary water storage.

On the outskirts of Vandkøbing lies a holiday home area that continues on the other side of the municipal boundary. This area is located down by the coast and is challenged by both coastal erosion and rising sea levels.

CONCRETE CHALLENGES IN VANDKØBING

Figure B.3 illustrates how Vandkøbing is affected if climate adaptation is not established. As in many Danish towns, it is socio-economically worthwhile to invest in climate adaptation because the expected damages are greater than the cost of climate adaptation. But under the current regulatory frameworks, some of the climate adaptation solutions become relatively expensive.

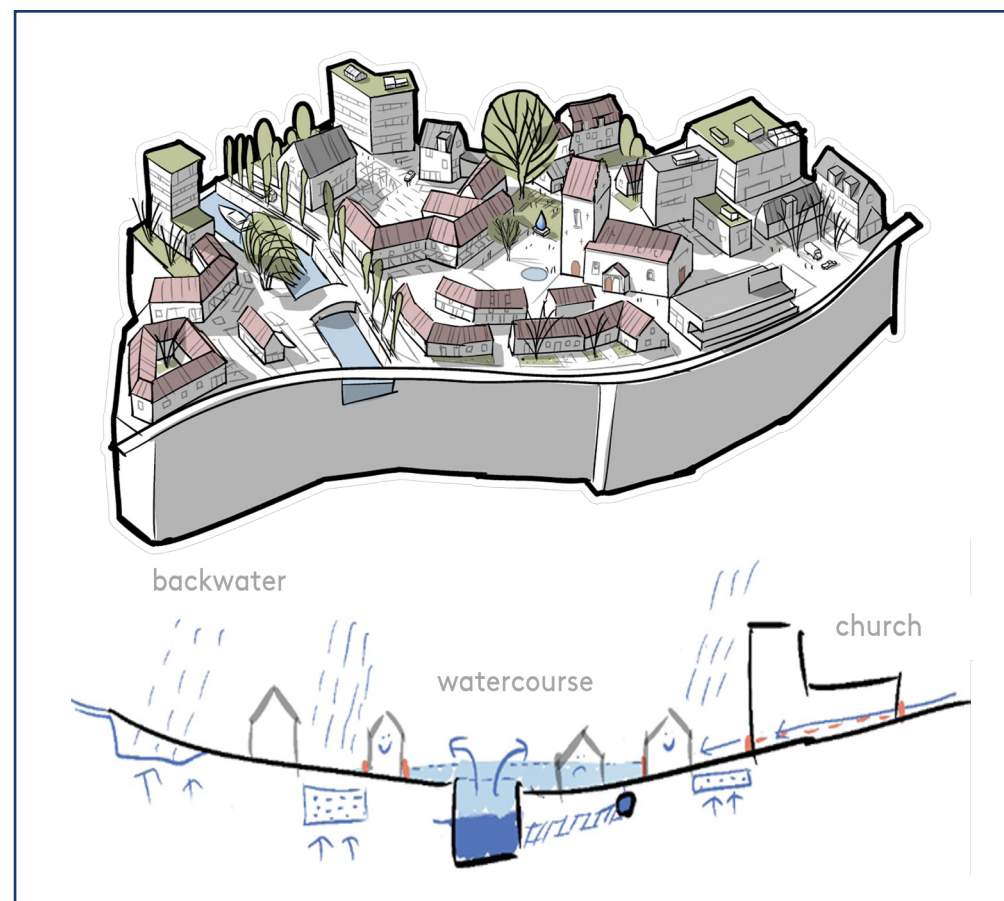
Under the current frameworks, there are a number of barriers to effective climate adaptation in Vandkøbing.

For example, urban development is planned in vulnerable areas, which increases the overall risk. At the same time, there is a nature area that the municipality does not yet include in the protection strategy, partly because the legislation is complex and the guidance is unclear. This leads to uncertainty in administration and long processing times

with dialogues back and forth with the authorities.

In the residential area located inland, climate protection under the current frameworks would not be considered in the green tripartite agreement, and a temporary water storage solution in the catchment area would likely be rejected because it would cross the municipal boundary. This is due to both the complexity of working across municipalities and the fact that the neighbouring munic-

Figure B.2: Vandkøbing's city centre has limited space for climate adaptation, and challenges with backwater can arise



ipality lacks interest in prioritising the solution because the economic benefit accrues to the citizens of Vandkøbing. Therefore, an expensive solution is chosen, where Vandkøbing builds high embankments and a large pump sluice.

The current regulatory frameworks as well as the lack of water management upstream in the water catchment area mean that expensive solutions must be built to manage the water in the city centre, including underground solutions.

Figure B.3: Vandkøbing is flooded if climate adaptation is not established

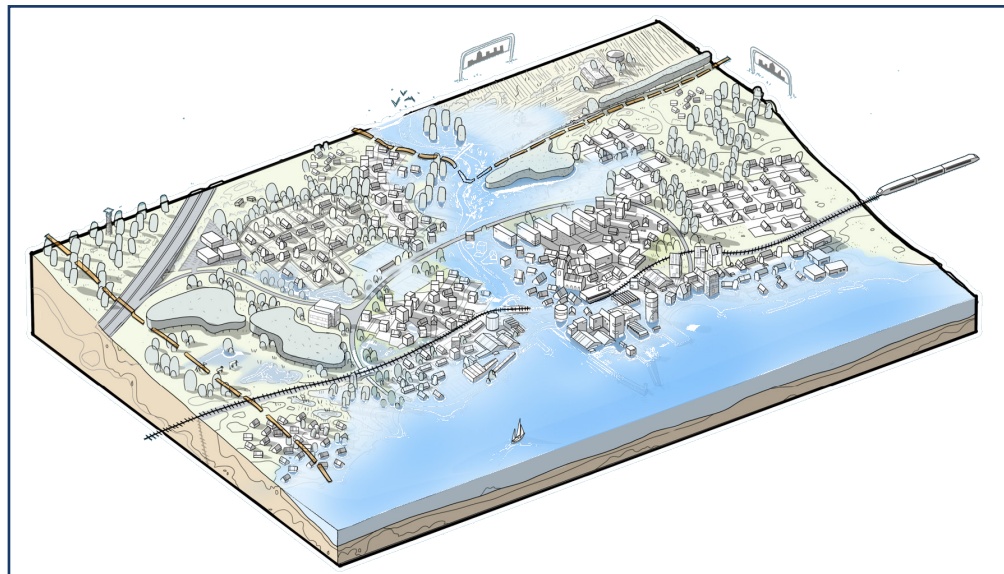
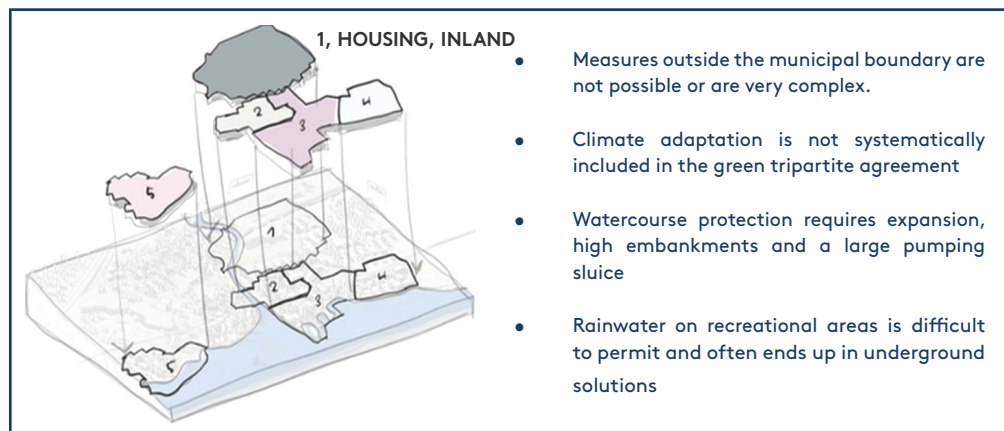


Figure B.4: Example of challenges in climate-adapting one of Vandkøbing's residential areas under the current framework



Due to the capital expenditure ceiling and the Service Act, neither the municipality nor the utility company has the option to choose a solution that creates added value in the form of, for example, recreation for citizens. They choose the cheapest solution, which in isolation handles the water in the city.

BY THINKING ACROSS SECTORS WE CAN CREATE BETTER SOLUTIONS

We imagine a scenario where regulation is changed so that Vandkøbing can choose more holistic solutions.

Figure B.6-B.8 describe some preliminary examples of the solutions developed with Vandkøbing as a tool. More will follow in a more detailed report, which is expected to be published after the summer holidays.

If we imagine that it becomes easier to establish temporary water storage in the catchment area, for example because climate adaptation is integrated into the green tripartite agreement and new financing models are developed, then one of Vandkøbing's residential areas can be protected

as illustrated in Figure B.6. This will simultaneously reduce the amount of water that is led down into the city centre during extreme rainfall events.

With the current framework, climate adaptation in the city centre will typically consist of high edges along the watercourse – an expensive and technical solution with limited added value for the citizens. With more flexible frameworks, solutions can be chosen instead that both protect and create value for the city, as illustrated in Figure B.7.

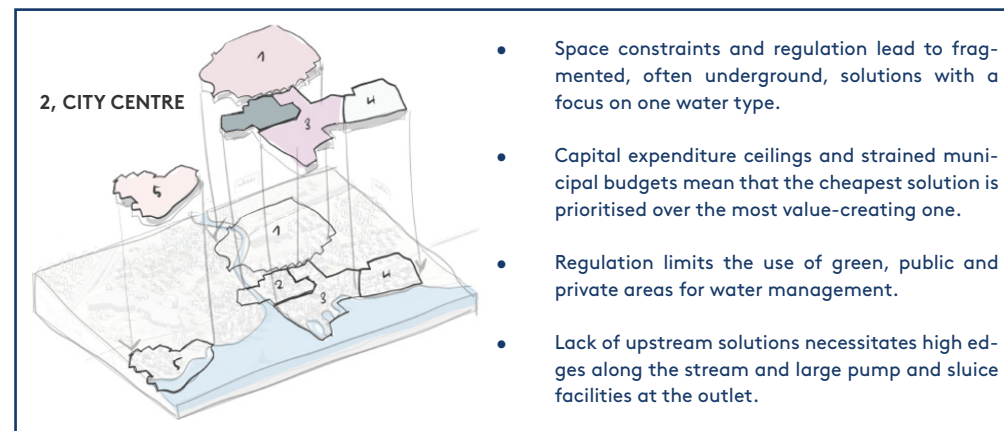
Figure B.8 illustrates a solution at the harbour, which requires the involvement of many stakeholders and a combination of private and collective financing. This would be challenging under the current framework and incentive structures.

In Vandkøbing, we imagine a future where the community pays for the effective securing of collective values, while at the same time models are developed to finance climate adaptation across various privately owned areas.

HOLISTIC SOLUTIONS CREATE VALUE

The preliminary results from the work with the

Figure B.5: Example of challenges in climate-adapting Vandkøbing's city centre under the current framework



dialogue tool Vandkøbing show that it pays to think across sectors.

By retaining water in the catchment area through temporary water storage, the volumes of water through the city are significantly reduced, which makes it possible to settle for smaller measures in the city centre at a cost of approx. DKK 200 million. In a traditional approach (as is), where the water is instead led through the city, extensive and technically heavy solutions are required – including high edges along the watercourse, expansion of bridges and larger pump capacity – at a total price of approx. DKK 700 million.

At the same time, the holistic solution provides better protection, fewer interventions in the city and added value in the form of recreational areas. Vandkøbing becomes more blue and green, and the residents do not just see climate adaptation as a defensive expense but as an investment in nature and recreation.

Overall, the case shows that holistic climate adaptation can reduce costs, improve protection and at the same time create added value for the city.

Figure B.6: Temporary water storage in the catchment area, across the municipal boundary, protects a residential area and reduces the amount of water led down towards the city centre

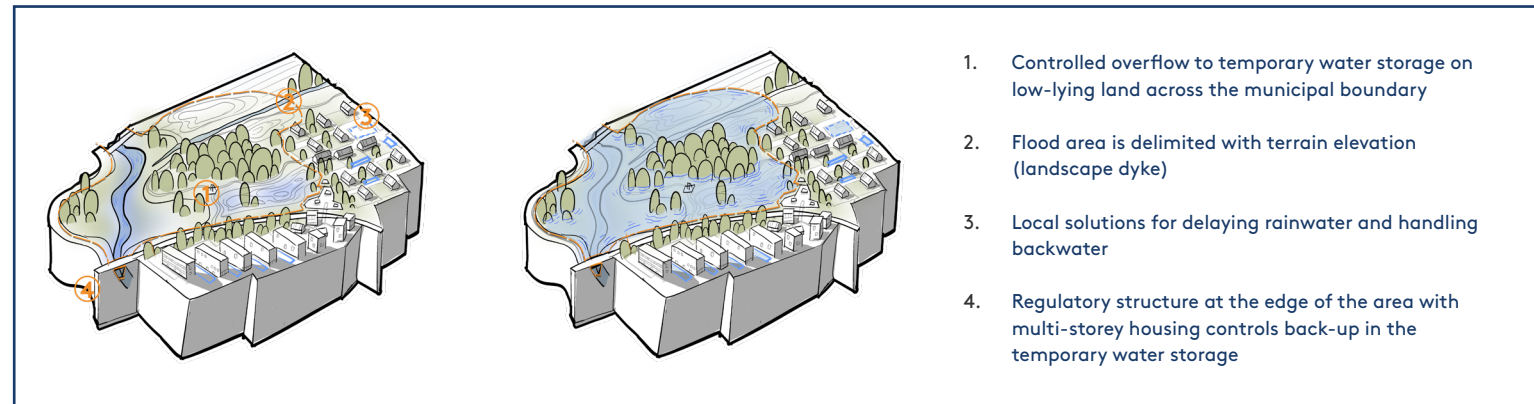


Figure B.7: Holistic climate adaptation solution in the city centre

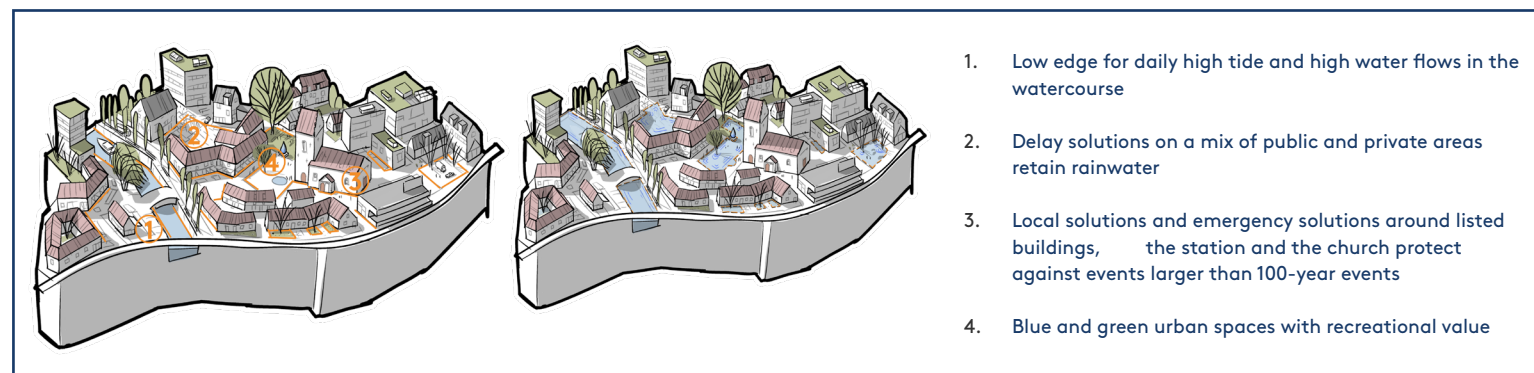
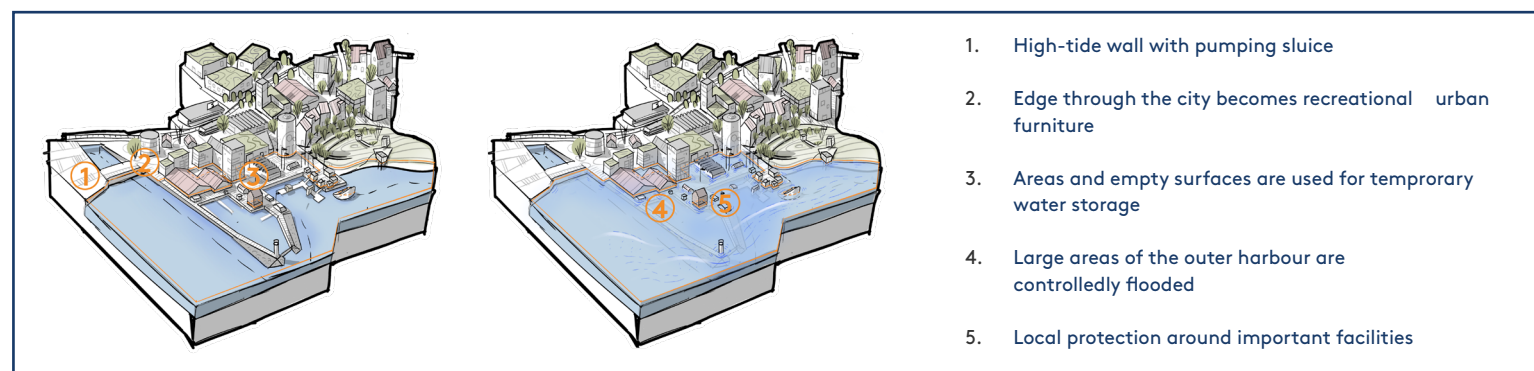


Figure B.8: Adaptive climate adaptation on public and private areas at the harbour



Construction Act	An act that adopts and establishes the implementation of a major public infrastructure project, such as a road, railway, or a group of infrastructure projects.	IPCC	UN Intergovernmental Panel on Climate Change. IPCC – Intergovernmental Panel on Climate Change
Area development company	A company that manages the development of land, typically by owning, planning, and preparing sites for urban development or construction.	Innovation partnership	A procurement procedure where a public contracting authority and suppliers collaborate to develop a new solution, which can subsequently be purchased under the same contract.
Blended finance	A form of financing where public or philanthropic capital is combined with private capital to attract investment for development and sustainability projects.	Climate zone model	Risk-based model for property owners' payment for complex climate adaptation.
Cost-benefit analysis	Economic calculation of whether it is worthwhile to invest in a project based on the value of the project's benefits. E.g., whether the costs of a climate adaptation project are offset by the damages that the climate adaptation prevents.	Climate adaptation	Measures that make society, nature, and the economy better able to handle the effects or consequences of climate change.
Dike association	Association of private landowners responsible for establishing and maintaining a dike.	Municipal property contribution	Ongoing payments to the municipality for services linked to a property, e.g., waste, pest control, and chimney sweeping.
Externality	An unintended cost or benefit from an activity that affects others than those responsible for or participating in the activity, and which is not included in the market price of the activity.	Complex climate adaptation	Composite projects, e.g., across stakeholders, municipal boundaries, and/or for different types of water.
Climate mitigation	Measures that reduce the emission of greenhouse gases (e.g., CO ₂), so that global warming is limited.	Compound event	When the same area is hit by water from several sources simultaneously – e.g., storm surges, which cause flooding from the sea, at the same time as heavy rain, which causes flooding from watercourses (DMI, 2025)
EPC contract	A form of contract where one contractor has overall responsibility for engineering, procurement, and construction.	Competitive dialogue	A procurement procedure where the contracting authority conducts a structured dialogue with selected suppliers to develop solutions for complex needs before final tenders are submitted.
EU Regional Development Fund	An EU fund that finances projects intended to promote economic development and reduce disparities between regions in the EU. Info regio – European Regional Development Fund	Elevation (Kote)	A measure of the height of a point in relation to a fixed reference level, typically mean sea level.
Green bond	A type of bond where the proceeds are used exclusively to finance projects with positive environmental and climate impacts.	Coastal Protection Fund	A public funding scheme that provides grants for projects intended to protect or develop coastal areas.
Grey solutions	Climate adaptation solutions built from steel, concrete, etc. In contrast to blue and green solutions, which are based on letting the water flow somewhere or using the ability of plants and soil to retain the water.	LIFE programme	The EU's funding programme that supports projects within the environment, nature, and climate to implement the EU's climate and environmental policy. LIFE – European Climate, Infrastructure and Environment Executive Agency
Green bond	A type of bond where the funds are used exclusively to finance projects with positive environmental and climate effects.	Multifunctional land use	When the same area is used for several purposes simultaneously. E.g., when climate adaptation is linked with the reduction of greenhouse gas emissions via the flooding of low-lying soils, or climate adaptation is linked with biodiversity via the establishment of stone dikes and the re-meandering of streams.

Multi-layer safety	An approach to risk management that integrates several different strategies to minimise both the probability of an event and the scale of the damage. I.e. combining preventive measures such as a dyke with planning for where the water runs without causing damage in the event that the dyke is insufficient, as well as emergency preparedness planning. Building with nature	Tariff financing	A financing model where investments in climate adaptation are funded via water and wastewater tariffs.
Nature-based solutions	Climate adaptation solutions that utilise natural conditions in the landscape, natural coastal processes, or the ability of natural areas to retain water. Can, for example, be advanced dune areas, stone reefs, and rain gardens.	Shallow groundwater	The uppermost, free groundwater table encountered when moving down through the soil from the surface. Cf. DANVA has approx. 450,000 homes with less than one metre to the groundwater table for the majority of the year.
Utility principle	The benefit principle is a financing principle for coastal protection and climate adaptation of public watercourses, which dictates that the costs of climate adaptation should be borne by those who benefit from the investment. Operationalised by the municipality as contributions from landowners based on their estimated flood risk and vulnerability (values).	Retreat	Reorganisation of activities or conversion of land use in an area that is particularly exposed to climate-related damage, and where other climate adaptation is either not physically possible or cost-effective. May involve relocation over time.
Public watercourses	Watercourses or streams that the public authorities (the municipality) are responsible for maintaining.	Design-build contract	A form of contract where one contractor has overall responsibility for both the design and execution of a construction project.
Societal values (public goods)	Values that do not exclusively benefit a private owner, but are shared by the community, such that one user's use does not affect or reduce the opportunities for other users (non-rivalrous and non-excludable goods). E.g. natural values, infrastructure, hospitals, or cultural heritage.	Catchment area	Geographical area that collects rainwater and surface water, which is led to a common water body. See divisions into main catchment areas here: Water Management Plans 2021-2027
SDG Investment Fund	A Danish investment fund that makes commercial investments in companies in developing countries with the aim of promoting the UN's Sustainable Development Goals. SDG Invest	100-year event	An event that is statistically expected to occur every 100 years. Statistically, there is a 1 per cent risk of the event occurring during any given year.
Cloudburst	A cloudburst is defined as more than 15 mm of precipitation in 30 minutes.		
SSP scenarios	SSP is an abbreviation for Shared Socioeconomic Pathways, which are used by the UN's Intergovernmental Panel on Climate Change (IPCC) to describe different scenarios for CO2e emissions, which form the basis for climate projections.		
Storm surge	Flooding from the sea or watercourses, where strong winds push the water level into coastal areas and create flooding. The event is called a storm surge if it reaches a level corresponding to at least a 20-year event, which requires confirmation from the Danish Storm Council (Naturskaderådet).		

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