STRATEGIC BOARD – SB (Strategisch Beraad)
Meeting date 01-12-2022

UNIVERSITY OF TWENTE.

AGENDA ITEM: SEG Sustainability

AUTHOR: CHERYL DE BOER, ALBERT VAN DEN BERG

TYPE OF DISCUSSION: FOR ADVICE
ESTIMATED TIME OF DISCUSSION: 15 MINUTES

Involved service department(s): **S&P**

Responsible member Executive Board (EB): **Vinod Subramaniam**

Date discussion author/director with responsible member EB: **21-11-2022**

1.PURPOSE OF THE AGENDA ITEM:
UT Climate Initiative by SEG Sustainability

The Shaping Expert Group Sustainability asks the SB for advice regarding the proposed Climate Initiative and the suggested decisions for the CvB

.

---

2. SUMMARY OF THE SUBJECT:

Building upon the university's societal role for delivering education, undertaking research and knowledge transfer, the UT aims to maximize its contribution to climate related system transitions and solutions, and empower students and staff to do so. The UT aims to create an environment where researchers, teachers and students can bundle their skills and expertise in the area of climate in a way that will maximize and accelerate societal impact, fostering a sense of UT wide community and growth opportunities. Doing so provides a clear ear, face and voice to the outside world. Finally, the University of Twente has a core mission to educate well-trained professionals in the climate field, conduct integrated top-level research and focus on the impact pathways that have great potential within the field of climate challenges.

The UT commits to bundling its climate related research and educational strengths. Doing so should
1) increase our impact on climate challenges together with relevant societal stakeholders
2) enable improved visibility, communication and representation and
3) develop our UT Geo-Techno-Social approach as a distinctive feature which will position us well to contribute to important external programs and movements.

ATTACHED DOCUMENT(S):

- UT Climate Initiative Proposition
- Appendix 2: Supporting Report TwynstraGudde

UNIVERSITY OF TWENTE CLIMATE INITIATIVE

ADVICE FROM SEG SUSTAINABILITY:
AMPLIFY THE IMPACT OF THE UT AROUND THE THEME OF CLIMATE

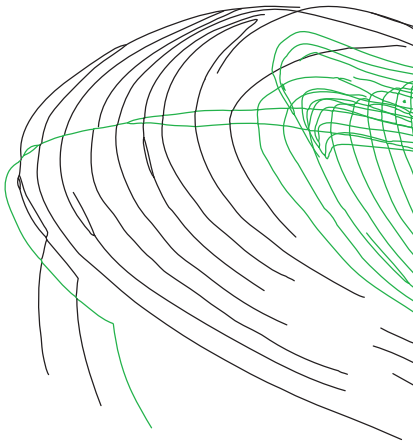
UNIVERSITY OF TWENTE.

UNIVERSITY OF TWENTE CLIMATE INITIATIVE

ADVICE FROM SEG SUSTAINABILITY: AMPLIFY THE IMPACT OF THE UT AROUND THE THEME OF CLIMATE

Reporting supported by: TwynstraGudde, Shaping 2030 Team

Authors: Cheryl de Boer, Albert van den Berg, Miriam Luizink



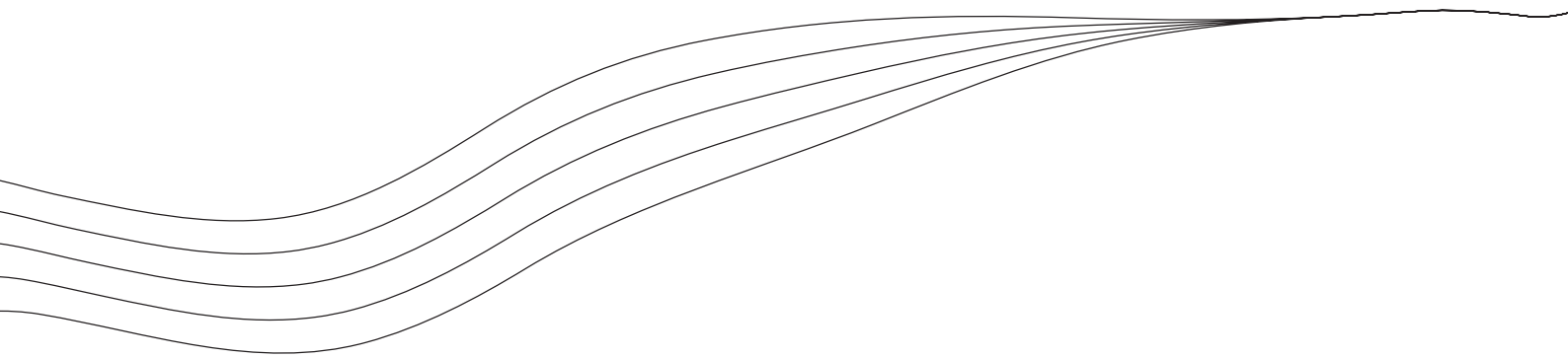


TABLE OF CONTENTS

1. MANAGEMENT SUMMARY 4
Why climate? Why now? 4

2. WHY CLIMATE? 8
Why climate? 8
Why a climate initiative at the UT? 8

3. CHALLENGES AND OPPORTUNITIES 10
2023 Agenda for Sustainable Development: UN Sustainable Development Goals 10
Paris Agreement 11
Dutch Climate Agreement / 'Klimaatakkoord' 12
EU Research Agenda and Missions 12
Dutch Climate Research Initiative (KIN) 14
Region – Twente Board 16

4. WHAT DO WE WANT TO ACHIEVE? 20
Motivation 20
Objective 20
Goals 20
And what do we build upon… 21
A Geo-Techno-Social Approach 21

5. WHAT IS NEEDED? 25
Things to think about 25
A Geo-Techno-Social-Approach 26
Organization 27

APPENDIX 1: LIST OF INTERVIEWEES/CONSULTED INDIVIDUALS 29

APPENDIX 2: TWYNSTRAGUDDE EXPLORATION 30

Colofon
University of Twente – Climate Initiative
SEG Sustainability
Authors: Cheryl de Boer, Albert van den Berg, Miriam Luizink
23-11-2022

1. MANAGEMENT SUMMARY

WHY CLIMATE? WHY NOW?

Climate change is one of the most urgent and wicked challenges of the 21st century that needs to be supported by concerted research and education. Human action has put the system earth under unprecedented pressure, with irreversible consequences that we are already witnessing. To prevent the most dangerous climate change impacts from taking place a societal transition including technical and geophysical knowledge and innovation is required. Universities can play an important role by actively focusing on climate change and can offer a unique and converging lens through which to focus on these challenges. The Strategic Board has recognised this potential and is committed to setting climate as one of the prioritised UTIP themes (Utilising Our Impact Potential).

Students and staff have become more and more vocal about the urgency of the climate crisis and want themselves and their university to more clearly contribute to climate solutions through concerted actions, as well as knowledge and expertise development. They want to be part of a university that is committed to taming the climate crisis. In the absence of a UT wide initiative and commitment, staff and students have been self-organising in numerous and varied ways to be able to contribute to this societal challenge. The UT is in a prime position to respond to and build on this motivation and capacity to address climate challenges.

> **Proposition**
> Building upon the university's societal role for delivering education, undertaking research and knowledge transfer, the UT aims to maximize its contribution to climate related system transitions and solutions, and empower students and staff to do so. The UT aims to create an environment where researchers, teachers and students can bundle their skills and expertise in the area of climate in a way that will maximize and accelerate societal impact, fostering a sense of UT wide community and growth opportunities. Doing so provides a clear ear, face and voice to the outside world. Finally, the University of Twente has a core mission to educate well-trained professionals in the climate field, conduct integrated top-level research and focus on the impact pathways that have great potential within the field of climate challenges.
>
> The UT commits to bundling its climate related research and educational strengths. Doing so should
> 1) increase our impact on climate challenges together with relevant societal stakeholders
> 2) enable improved visibility, communication and representation and
> 3) develop our UT Geo-Techno-Social approach as a distinctive feature which will position us well to contribute to important external programs and movements.

Start quickly!
Climate change is too urgent to permit any delay. Accordingly the momentum is building now for developing partnerships and action plans to mitigate and adapt to it.

Suggested decisions UT Executive Board

- Make "climate" an embedded priority of the University of Twente, forming a UT Climate Initiative to that end.
- Appoint and mandate a coordinating lead team to shape this.
- Ask the service departments (S&P, M&C, SBD / Grants, CELT, …) to support this priority and to structurally make capacity available to participate in this initiative.
- Ask the deans, after consultation with the coordinating lead team, to approach theme leads within their faculty and give them opportunities to work on this.
- Mandate the coordinating lead team to bring together members for the Climate Initiative advisory group.
- Allocate funding: we advise for the continuation of the current coordinating lead team and allocation of operational funds from the remaining Shaping Expert Group funds (2022) for the year 2023. The theme leads can be allocated within the pre-agreed sustainability funds from the faculties. We advise to consider financing of transdisciplinary research activities from central research budgets.

In this way, the Executive Board makes a long-term commitment to climate as a UT priority.

Transdisciplinary approach in research and education

Climate change is a wicked problem; the causes of climate change are multiple and complex, the impact of climate change is uncertain and interrelated, and the potential solutions of climate change may create new problems. Climate change asks not only for an interdisciplinary approach, in which disciplinary boundaries are crossed to focus on a common goal, but for a transdisciplinary approach, in which sectorial boundaries are also crossed. The UT and its close internal connections between and within faculties, the opportunities for Living Labs on campus, as well as its experience in working together with local, regional, and (inter)national stakeholders puts it in an excellent position to champion this new way of working in research.

Addressing climate challenges requires not only a new kind of research, but also a new kind of education. Challenge based learning (CBL) is inherently linked to transdisciplinary research and the UT has been developing expertise and recognition in this area. The UT has been building relationships with the private and public sector through CBL activities (such as the ECIU) and thus enabling its students to contribute to real-life issues. This builds important skills and contributes to increasing motivation of the students involved. A challenge based learning approach for climate themes provides a promising basis for future UT life long learning tracks.

Distinctive Geo-Techno-Social approach

By building upon and professionalising the UT's three Geo Techno Social pillars as an approach to understanding and addressing climate challenges, the UT can contribute to the further acceptance and prominence of transdisciplinary research and education in academia. UT builds on the knowledge and expertise of all faculties, which together bring in the social, geo and technological disciplines. UT's contribution to climate goals is recognized (inter)nationally on the distinctive ability to combine geo, techno and social knowledge and expertise.

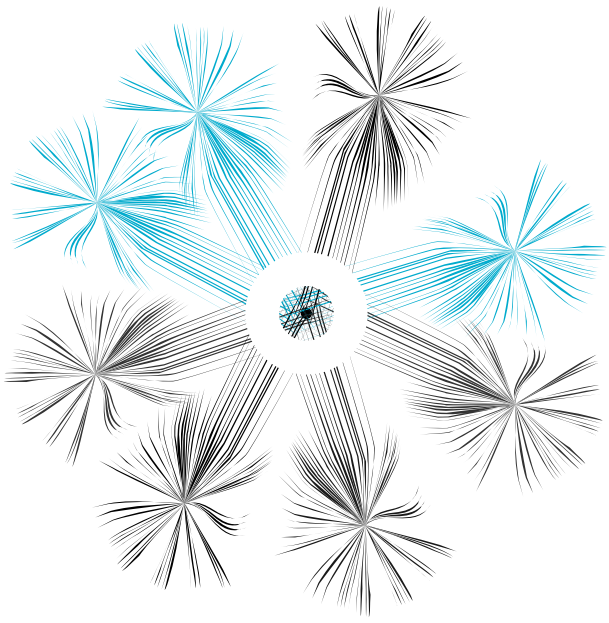
Challenges and opportunities

There's only one conclusion possible: there's ample climate related challenges and opportunities. The EU has made climate action and the Green Deal one of their most prominent programs for research and innovation. The Netherlands is organising a national climate initiative for research. Regions widely recognize the importance and urgency of sustainability and circularity. Besides, it is to be expected that the implementations of climate change, such as the Green Charter and the DNSH ('do no significant

harm') principle, will be extended in the coming years, meaning that climate-related work becomes of relevance for all Research & Innovation efforts. The UT already offers a wide variety of climate related (yet poorly visible and scattered) educational options. While some of these are of the more traditional format, addressing climate challenges requires not only efforts to develop a new kind of research, but also a new kind of education. Finally, the UT's goals for Impact as a 4th Generation University and through the UTIP can be further built upon by the bundling of climate related research and education.

Process

The SEG sustainability was tasked to deliver advice for further embedding sustainability at the UT. In 2022 nearly 40 different interviews, numerous SEG meetings and a key stakeholder workshop with educational and research staff (See Appendix 1 for the list of names) have been held to better understand their needs and goals related to the general aims of this proposal. Climate was signalled as a topic of key importance as well as the commitment of higher management to support the development and communication of clear research themes within which staff from different faculties can collaborate. Further, it was found that many people are already working on this topic, but that the impact is reduced by fragmentation.
A number of potential themes are listed in this document, however what is important in the early phases is to have an open and transparent process where staff can get engaged with and determine what the most appropriate themes will be. These themes are likely to change as societal challenges do. This process can also be supported but will be filled in by the research and educational staff.
TwynstraGudde was commissioned to conduct an exploration, addressing content delineation, organizational building blocks, and organizational forms for this initiative (See Appendix 2). In addition to 15 individual interviews, they convened three focus groups. The outcome of the three focus groups has been published in a report that is both input and an appendix to this proposal.

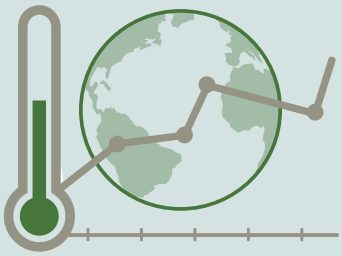


13 CLIMATE ACTION

TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACTS

BEFORE COVID-19

GLOBAL COMMUNITY SHIES AWAY FROM COMMITMENTS REQUIRED TO REVERSE **THE CLIMATE CRISIS**



2019 WAS THE **SECOND WARMEST YEAR** ON RECORD

GLOBAL TEMPERATURES ARE PROJECTED TO RISE BY **UP TO 3.2°C BY 2100**

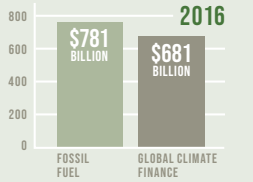
ONLY **85 COUNTRIES** HAVE NATIONAL **DISASTER RISK REDUCTION STRATEGIES** ALIGNED TO THE SENDAI FRAMEWORK

COVID-19 IMPLICATIONS

COVID-19 MAY RESULT IN A **6% DROP IN GREENHOUSE GAS EMISSIONS** FOR 2020

STILL SHORT OF **7.6% ANNUAL REDUCTION** REQUIRED TO LIMIT GLOBAL WARMING **TO 1.5°C**

CLIMATE FINANCE: **INVESTMENT IN FOSSIL FUELS** CONTINUES TO BE HIGHER THAN INVESTMENT IN CLIMATE ACTIVITES



CLIMATE CHANGE CONTINUES TO EXACERBATE THE FREQUENCY AND SEVERITY OF **NATURAL DISASTERS**

AFFECTING MORE THAN **39 MILLION PEOPLE** IN 2018

SUSTAINABLE DEVELOPMENT GOALS

ACCESS MORE DATA AND INFORMATION ON THE INDICATORS AT HTTPS://UNSTATS.UN.ORG/SDGS/REPORT/2020/

2. WHY CLIMATE?

WHY CLIMATE?[1]

Climate change is one of the biggest, if not the biggest, challenges of the 21st century. Human action has put the system earth under unprecedented pressure, with irreversible consequences as a result. To prevent dangerous climate change from taking place a societal transition including technical and geophysical knowledge and innovation must take place, in which universities have an important role to play.

Climate change as a wicked problem

Climate change is a wicked problem; the causes of climate change are multiple and complex, the impact of climate change is uncertain and interrelated, and the potential solutions of climate change may create new problems. For a long time climate change was solely a topic climatologists and geographers focused on. However, seeing the complexity of its causes, impacts and potential solutions, many scientific disciplines are essential in preventing dangerous climate change from happening and preparing the global society for the climate change that is likely to take place.

Transdisciplinary approach

The complexity of climate change makes that universities have a unique position in contributing to its solutions. Climate change asks not only for an interdisciplinary approach, in which disciplinary boundaries are crossed to focus on a common goal, but for a transdisciplinary approach, in which boundaries between academic, business, government and societal stakeholder groups are also crossed. Only this way will it be possible to develop integrated knowledge for science and society.

Society's demand

In order to empower society to apply sustainable solutions found by science, or to develop integrated knowledge with society, it is necessary that the university is found on the topics it excels on. It is for this reason that society calls for clear positioning of the UT on the topic of climate change.

The time is now

At the moment of writing climate action is more urgent than it has ever been. This month the Netherlands Environmental Assessment Agency calculated that, even if the Dutch government implements all climate plans, it will not be enough to reduce greenhouse gas emissions by 55% in 2030. Next to this, climate change will increasingly lead to weather related disasters, sea-level rise and river floods, which will continue even when the CO2 neutrality is reached. Urgent action by all stakeholders in society to contribute to solutions, including universities, is necessary.

WHY A CLIMATE INITIATIVE AT THE UT?

Despite not yet being fully understood, climate change is a challenge which urgently requires solutions. The multitude of climate change related impacts such as "global warming, biodiversity loss, natural disasters, etc. manifest at multiple scales and require both technological and social innovations." In order

[1] TwynstraGudde, Exploration, November 2022

to achieve this, different scientific disciplines need to work together and to fully engage other public and private sector actors, including policy-makers[2].

Transdisciplinary research

Transdisciplinary research (TDR) "is a mode of research that integrates both academic researchers from unrelated disciplines and non-academic participants to achieve a common goal, involving the creation of new knowledge and theory"[2]. It can expand on existing scientific evidence and give rise to more innovative, holistic solutions. It can generate both new scientific insights and practical societal benefits. As such, it is a necessary complement, but not a replacement, to traditional research practices.
Given the urgency society is currently facing, there is a strong argument that TDR needs to be scaled up very considerably and become a mainstream modus operandi for research. TDR approaches differ and have struggled to be recognised in traditional academic structures. By building upon and professionalising the UT's three Geo Techno Social pillars as an approach to understanding and addressing climate challenges, the UT can contribute to the further acceptance and prominence of TDR in academia.

Challenge Based Learning

The UT already offers a wide variety of climate related (yet poorly visible and scattered) educational options. And while some of these are of the more traditional format, addressing climate challenges requires not only efforts to develop a new kind of research, but also a new kind of education. The UT is uniquely qualified to contribute to this call. Challenge based learning (CBL) is inherently linked to trans-disciplinary research and the UT has been developing expertise and recognition in this area, primarily through its leadership within the ECIU.
The UT has been building relationships with the private and public sector through CBL activities as well as giving its students the opportunity to contribute to real life issues. This builds important skills and contributes to increasing motivation of the students involved. A challenge based learning approach for climate themes provides a promising basis for future UT life long learning courses.

Living Labs

The UT is also committed to the development of living labs, in this case especially the Living Innovation Lab LILa which is a key example of how different societal actors can work together to address common questions and concerns. Nearly half of all LILa experiments contribute directly to climate solutions which shows the strong connections that UT researchers see between their own research and the climate challenges that we face.

Engaged students and staff

In the absence of a UT wide initiative, staff and students have been self organising in numerous and varied ways to be able to contribute to this societal challenge. Currently there are over 30 full professors from all 5 faculties that are either a great deal or indirectly connected to the topic of climate. Over the last few years 25 different groups and programs have been set up from a broad range of UT'ers with the goal of actively addressing climate change (with the last few years being particularly active and still growing!). This is a perfect opportunity to support these efforts through enabling collaboration, developing pilots and increasing communication and visibility. The UT is in a prime position to build on this motivation and capacity to address climate challenges. It is widely recognised that these efforts are important yet scattered.

[2] OECD (2020), "Addressing societal challenges using transdisciplinary research", OECD Science, Technology and Industry Policy Papers, No. 88, OECD Publishing, Paris, https://doi.org/10.1787/0ca0ca45-en.

3. CHALLENGES AND OPPORTUNITIES

It is accepted that in many cases, system transitions are an important focus for understanding the complex arenas in which we are working to mitigate and adapt to climate change. Within this perspective we also can seek out substantive challenges where the UT can play a stronger and more impactful role. In this section we outline important ecosystems, networks, agencies, funding opportunities and movements that the UT would be better equipped to tap into by bundling our knowledge and expertise on the climate theme. In this chapter we borrow exerts of relevant policy agenda's to highlight these various opportunities and follow these with insights relevant for guiding UT efforts to build on these.

2030 AGENDA FOR SUSTAINABLE DEVELOPMENT: UN SUSTAINABLE DEVELOPMENT GOALS

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests[3].

The prominent climate goal is a pressing call to action:
SDG 13 – Take urgent action to combat climate change and its impacts[4]
For many, a warming climatic system is expected to impact the availability of necessities like freshwater, food security, and energy, while efforts to redress climate change, both through adaptation and mitigation, will similarly inform and shape the global development agenda. The links between climate change and sustainable development are strong. Poor and developing countries, particularly least developed countries, will be among those most adversely affected and least able to cope with the anticipated shocks to their social, economic and natural systems.

Related sustainable development goals are:

[3] https://sdgs.un.org/2030agenda, available 12 October 2022
[4] https://sdgs.un.org/topics/climate-change, available 12 October 2022

Guiding principles from the 2030 Agenda for Sustainable Development
- For the UT initiative climate action and impact is leading, for the SDG's poverty reduction is.
- Embrace all impactful contributions of UT employees to the climate agenda.
- Link UT climate research and education to the SDGs for a better recognition of UT's added value.

PARIS AGREEMENT[5]

The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at COP 21 in Paris, on 12 December 2015 and entered into force on 4 November 2016. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels. To achieve this long-term temperature goal, countries aim to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate neutral world by mid-century. The Paris Agreement is a landmark in the multilateral climate change process because, for the first time, a binding agreement brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects. Implementation of the Paris Agreement requires economic and social transformation, based on the best available science.

The Paris Agreement provides a framework for financial, technical and capacity building support to those countries who need it.
Finance - The Paris Agreement reaffirms that developed countries should take the lead in providing financial assistance to countries that are less endowed and more vulnerable, while for the first time also encouraging voluntary contributions by other Parties.
Technology - The Paris Agreement speaks of the vision of fully realizing technology development and transfer for both improving resilience to climate change and reducing GHG emissions.
Capacity-Building - Not all developing countries have sufficient capacities to deal with many of the challenges brought by climate change. As a result, the Paris Agreement places great emphasis on climate-related capacity-building for developing countries and requests all developed countries to enhance support for capacity-building actions in developing countries.

Climate Technologies[6]

Technologies that we use to address climate change are known as climate technologies. Climate technologies that help us reduce GHGs include renewable energies such as wind energy, solar power and hydropower. To adapt to the adverse effects of climate change, we use climate technologies such as drought-resistant crops, early warning systems and sea walls. There are also 'soft' climate technologies, such as energy-efficient practices or training for using equipment.

Guiding principles from the Paris Agreement
- The UT aims to have a carbon-neutral campus in 2030, and a carbon-positive campus in 2050[7].
- The UT endorses "the vision of fully realizing technology development and transfer for both improving resilience to climate change and reducing GHG emissions".
- The Paris Agreement places great emphasis on climate-related capacity building for developing countries. The UT, most prominent with its faculty ITC, has a strong international network with students, researchers and alumni in developing countries. This can be regarded as a result of successful capacity building, but on top of that these alumni / relations provide the knowledge and experience to be able to define challenges from the perspective of developing countries.

[5] https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement, available 12 October 2022
[6] https://unfccc.int/topics/what-is-technology-development-and-transfer, available 12 October 2022
[7] https://www.utwente.nl/en/sustainability/sustainability-on-campus/themes/energy/#an-energy-efficient-campus, available 6 November 2022

DUTCH CLIMATE AGREEMENT / 'KLIMAATAKKOORD[8]'

Dutch politicians have set a goal: in 2030 we will emit almost half (49%) less greenhouse gases in the Netherlands than we did in 1990. The Climate Agreement is about the measures we will take in the coming years to reach this goal. The Climate Agreement is an important part of the Netherlands' implementation of the Paris Climate Agreement.

With the Delta Program, the Netherlands is preparing to adapt in time to the consequences of the changing climate. All levels of the Dutch government are investing in making the Netherlands more resilient to the consequences of climate change. In addition, there is the National Adaptation Strategy[9] focused on sectors (including agriculture, nature, health, infrastructure, etc.). Also internationally, with the Global Commission on Adaptation[10], the Netherlands encourages countries to exchange knowledge and get started with climate adaptation.

> **Guiding principles from the Dutch Climate Agreement ('Klimaatakkoord')**
> - The Dutch Climate Agreement was signed by the Association of Cooperating Dutch Universities (VSNU) on September 16, 2019, for the Built Environment theme. This relates to UT's commitment to reduce CO2 emissions as an institution.

EU RESEARCH AGENDA AND MISSIONS[11]

Research and innovation driving transformative change

Becoming the world's first climate-neutral continent by 2050 is a once in a lifetime opportunity to modernise the EU's economy and society and re-orient them towards a just and sustainable future. This European Green Deal stretches the full EU policy spectrum including major investments via the Recovery & Resilience facility, and research and innovation will play a central role in accelerating and navigating the necessary transitions; deploying, demonstrating and de-risking solutions; and engaging citizens in social innovation.

Green Deal in research and innovation

Horizon 2020

The European Commission has issued a dedicated 'Green Deal-related' call for projects under Horizon 2020. With this 1 billion investment, 73 R&I projects have been funded and recently started.

Horizon Europe

Over 35% of Horizon Europe spending is allocated to address climate change and climate considerations are found throughout the programme. Firstly many of the call themes throughout Pillar II of Horizon Europe reflect the general priorities of the European Green Deal, showing a large focus on climate-related research:

· Call area 1: Increasing climate ambition: cross-sectoral challenges
· Call area 2: Clean, affordable and secure energy
· Call area 3: Industry for a clean and circular economy
· Call area 4: Energy and resource-efficient buildings

---

[8] https://www.klimaatakkoord.nl/klimaatakkoord/vraag-en-antwoord/wat-is-het-doel-van-het-klimaatakkoord, available 12 October 2022 (translated)
[9] https://ruimtelijkeadaptatie.nl/overheden/nas/, available 12 October 2022
[10] https://gca.org/global-commission-on-adaptation, available 12 October 2022
[11] https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe_en, available 1 November 2022

· Call area 5: Sustainable and smart mobility
· Call area 6: Farm to fork
· Call area 7: Restoring biodiversity and ecosystem services
· Call area 8: Zero-pollution, toxic-free environment
· Call area 9: Strengthening our knowledge in support of the European Green Deal
· Call area 10: Empowering citizens for transition towards a climate neutral, sustainable Europe
· Call area 11: Accelerating the clean energy transition and access in partnership with Africa

Secondly, the EU Missions, a substantial new part of the research agenda, have a strong focus on climate-related issues. EU Missions are a new way to bring concrete solutions to some of our greatest challenges. They have ambitious, focused goals and will deliver concrete results by 2030. They will deliver impact by putting research and innovation into a new role, combined with new forms of governance and collaboration, as well as by engaging citizens. EU Missions also aim to mobilise and activate public and private actors, such as EU Member States, regional and local authorities, research institutes, farmers and land managers, entrepreneurs and investors to create real and lasting impact. Missions will engage with citizens to boost societal uptake of new solutions and approaches. They aim to capture citizens' imagination and inspire confidence in the transformations ahead. EU Missions are a novelty of the Horizon Europe research and innovation programme for the years 2021-2027.

The 5 EU Missions
1. Adaptation to Climate Change: support at least 150 European regions and communities to become climate resilient by 2030
2. Cancer: working with Europe's Beating Cancer Plan to improve the lives of more than 3 million people by 2030 through prevention, cure and solutions to live longer and better
3. Restore our Ocean and Waters by 2030
4. 100 Climate-Neutral and Smart Cities by 2030
5. A Soil Deal for Europe: 100 living labs and lighthouses to lead the transition towards healthy soils by 2030

4 out of the 5 missions in Horizon Europe directly support the European Green Deal

Finally, the Green Deal appears as a horizontal issue throughout other calls, also in pillar I and pillar III of Horizon Europe. For example, in applications for the Marie Skłodovska Curie Actions, participants are requested to adhere to the MSCA Green Charter[12] on a best effort basis to have a sustainable implementation of research activities and to minimize the environmental impact of their research activities. As Marie Skłodovska Curie Actions are bottom-up, that is, topics are free to be determined by the applicants, this allows implementation of Green Deal principles in all research topics. Furthermore, since Marie Skłodovska Curie Actions focus on training of (young) researchers, sustainability is expected to become a standard consideration in the thinking of all future researchers. Similarly, many applications for R&I projects now require applicants to consider the 'Do no significant harm' principle in their projects, meaning that no measure should lead to significant harm to any of the six environmental objectives:
- Climate change mitigation
- Sustainable use & protection of water & marine resources
- Pollution prevention & control
- Climate change adaptation
- Circular economy
- Protection and restoration of biodiversity & ecosystems.

[13] Dutch Climate Research Initiative (KIN) - Advisory report for the Executive Boards of NWO and KNAW, Summary, pp 8-9, Climate Research Task Force, The Hague, 8 July 2022

Guiding principles from the EU Missions and Research Agenda

- Climate is an extremely important part of the EU agenda: 4 out of 5 missions, and over 35% of Horizon Europe spending is allocated to address climate change.
- Follow a mission driven approach, in line with UT vision Shaping2030. The EU works along a mission driven approach to bring concrete solutions to our greatest challenges. To deliver impact, the EU envisions a new role of research and innovation, combined with new forms of governance and collaboration, as well as by engaging citizens.
- As the nature of funding is changing, the UT needs to be able to organise and communicate its research and educational contributions in a way that aligns with aims of targeted funding organisations, like NWO and the EU.
- It is to be expected that 'horizontal' implementations of climate change such as the Green Charter and the DNSH ('do no significant harm') principle, will be extended in the coming years, meaning that climate-related work becomes of relevance for all Research & Innovation. A strong awareness of climate issues in the UT community will therefore improve the starting position for funding acquisition throughout the UT research portfolio.

DUTCH CLIMATE RESEARCH INITIATIVE (KIN)[13]

According to the UN's Intergovernmental Panel on Climate Change (IPCC), accelerated transitions in our economic and societal systems (such as food, energy and cities) are needed to limit global warming to a 'safe' margin of 1.5°C, to adapt society to the inevitable consequences of climate change and to remain within the planetary boundaries.

System transitions of this nature demand joint action by governments, citizens, companies and a wide range of other societal actors. More targeted research is needed to learn how we can improve the current and prospective actions of those parties. System transitions are complex and require integral knowledge development and close collaboration between knowledge institutions, governments and other stakeholders in society, but the linkage between these parties is currently limited.

The mission of the Dutch Climate Research Initiative (KIN) is to connect, deepen and expand climate-related research in the Netherlands with a view to accelerating system transitions, in collaboration with societal actors. The philosophy of KIN is that this also requires a system change in research itself. The KIN will therefore be a mission-driven, non-competitive programme as part of wider societal change. The programme will follow three pathways:

1 A national programme of integral climate research

The KIN Programme will link and integrate the research in relevant branches of science at Dutch research institutions and will pursue four lines of research designed to accelerate system transitions:

a) collaboration with societal actors in 'living labs' on various scales;
b) research initiated bottom-up by societal and/or scientific actors;
c) interdisciplinary, cross-system research initiated top-down: analyses designed to help find answers for urgent policy issues on different scales; and
d) international collaboration with developing countries for capacity building in relation to policy, research and technology.

2 A national pact for climate research (the KIN Pact)

A national pact for climate research (the KIN Pact) to highlight the activities of the principal Dutch actors

[13] Dutch Climate Research Initiative (KIN) - Advisory report for the Executive Boards of NWO and KNAW, Summary, pp 8-9, Climate Research Task Force, The Hague, 8 July 2022

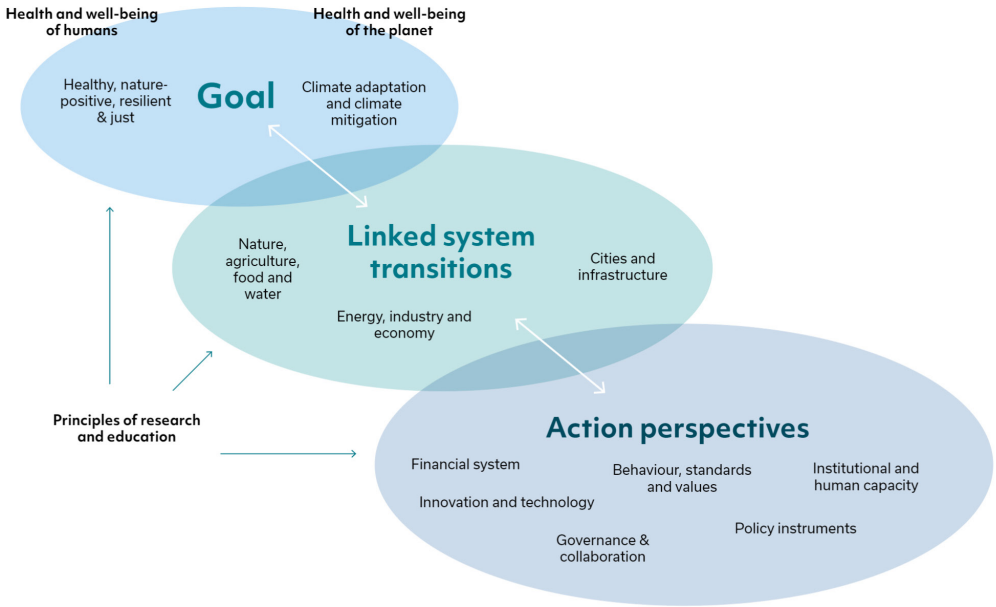
in the field of climate and in which they will jointly generate new climate-related knowledge and applications of that knowledge to accelerate the necessary system transitions. The KIN Pact will embrace knowledge institutions and societal partners, such as government bodies, NGOs, companies and foundations, who will raise relevant issues for which science can provide answers and ensure that knowledge flows better and faster into practice and policy.

3 A national centre

The KIN Centre will coordinate and provide support for the KIN Programme and the KIN Pact. The KIN Centre will bring together researchers, stakeholders and the results of the KIN Programme, for example by organising symposia, workshops and discussion evenings for members of the KIN Pact, and ensure that the ideas expressed at those events are picked up by researchers.

The focus of the KIN Programme is on accelerating the system transitions needed to combat climate change and to adapt society to the consequences of a changing climate. Within those parameters, various research themes and projects will be defined. In addition to the focus on accelerating system transitions, each theme should foster transdisciplinary collaboration but also strengthen the necessary monodisciplinary research. The task force has identified a number of themes on which system transitions are required to create a climate-friendly and climate-resilient society:

- Cities and infrastructure;
- Nature, agriculture, food and water;
- Energy, industry and the economy.



Living Labs

To support living labs, KIN will make efforts to strengthen and support existing living labs, and will, in addition, gradually set up new living labs. Strengthening of existing living labs is necessary to ensure that they contribute maximally to accelerating system transitions by involving all relevant disciplines, and ensuring that they become efficient and optimally connected to the rest of the country and national research.

KIN budget: An annual budget of by 100 M€ would be a realistic use to connect, deepen and broaden national research, and focus on innovative ways to accelerate systemic transitions.

Guiding principles from the Dutch Climate Research Initiative (KIN)

- To pursue impactful collaboration in the Netherlands, the UT is an active partner in KIN.
- The UT Climate Initiative aims to contribute to the three interconnected tracks of KIN:
  1. A national programme of integral climate research, which will promote and facilitate the integration of relevant scientific disciplines;
  2. A climate pact, a national pact in which knowledge institutions and societal partners will actively endeavour to jointly develop, share and apply the knowledge required to accelerate the necessary system transitions;
  3. A national centre, to connect and coordinate the national climate research.[14]
- The UT Climate Initiative participates in the foreseen KIN Programme. The KIN task force has identified several themes on which system transitions are required to create a climate-friendly and climate-resilient society:
  - Cities and infrastructure;
  - Nature, agriculture, food and water;
  - Energy, industry and the economy.[15]"
- The UT Climate Initiative applies a cross-disciplinary way of working, combining socio, geo & techno sciences, integrating research and education and incorporating system transition aspects. In addition, living labs, like LILa and FiDETT, play an important role.
- And above all, like KIN: start quickly! Climate change is too urgent to permit any delay.

REGION – TWENTE BOARD[16]

Leading green technological top region

Twente will continue to develop into a leading green technological top region. With the world as our playing field, we (Twente Board) are working with technology as our engine to create a supported economic agenda to bring together Twente talent, innovations, businesses and capital. Technology contributes to sustainability in the region and to developing solutions for global (social) challenges.

Twente Board opts for a limited number of themes, in order to realize more impact on those themes. The three societal themes to position Twente on are Sustainability & Circularity, Smart Energy and Innovative Healthcare. Two out of three are directly related to Climate.

Sustainability & Circularity

Innovative solutions are needed to reduce the depletion of our earth. Investing in innovation, maintenance and new business models is crucial for our economy to grow towards a system, in which all that is smartly produced remains in use as long as possible. Twente Board is committed to Transition in Agriculture, Water and Circular Textiles.

In line with the national government's agenda, we are committed to agricultural transition, including contributing to solutions for the nitrogen problem and the climate challenge. Through a project such as Mineral Valley, we are investing in various innovations in the areas of soil quality, food supply - and safety, application of drone technology in agriculture.

Water involves both quantity (think of desiccation) and quality (clean and reuse polluted water). We see a role here for Twente Board in identifying opportunities in the field of clean water and connecting parties

[14] Dutch Climate Research Initiative (KIN) - Advisory report for the Executive Boards of NWO and KNAW, pp 21-22, Climate Research Task Force, The Hague, 8 July 2022

[15] Dutch Climate Research Initiative (KIN) - Advisory report for the Executive Boards of NWO and KNAW, p 23, Climate Research Task Force, The Hague, 8 July 2022

where, for example, the quality of the landscape is concerned. We see the Vechtstromen water authority as an important partner in this.
In addition, we (referring to Twente Board) invest in Circular Textiles. For this we organize access to (inter) national networks, concentrate on creating sufficient critical mass/scale and make smart connections within and between production value chains. In addition, we provide joint (research) facilities and continuous learning lines with the aim of knowledge sharing and development at all educational levels.

Smart energy
The East Netherlands is developing as the living lab for integrated energy systems for decentralized generation, storage, conversion and use of renewable energy. This is due to the strong high-tech manufacturing industry, engineering firms and knowledge institutions in the region, in the field of energy storage technology, energy conversion (such as hydrogen technology) and/or system integration. Its location also makes the East Netherlands a good partner to help the Netherlands and Europe accelerate the energy transition (across borders). The focus here is on the development and scaling up of integrated decentralized energy systems. In other words, Smart Energy Hubs.
Twente Board is committed to cross-border cooperation with regard to battery technology, among other things. A Memorandum of Understanding has been entered into with OostNL and on the German side with the IHK. This includes agreements to work together in areas such as energy in relation to grid congestion.
We (referring to Twente Board) are connecting the knowledge positions in Twente with the more production-oriented facilities on the German side, in Munster. We are working to identify opportunities in the area of making energy supplies more sustainable by, among other things, forming clusters in relation to grid congestion in the areas of battery technology, hydrogen, biogas, etc.

RES
Agreements on generating renewable energy are also being worked on regionally. This elaboration of the Dutch Climate Agreement ('Klimaatakkoord'), aimed at combating climate change, is taking place in 30 energy regions, each with its own Regional Energy Strategy (RES). A RES is a region's document containing agreements on sustainable energy. RES Twente spearheads 2021 – 2023 are Optimization and subregional alignment, Spatial quality, Heat networks and optimal utilization of heat sources, Involving the environment: local and regional, At least 50% local ownership, and Energy saving.

Regions in East Netherlands
In East Netherlands regions like the Cleantech region (Deventer, Zutphen, Apeldoorn), Zwolle/West Overijssel, Wageningen/Foodvalley, also have named climate related topics like sustainability, circularity and energy as key priorities.

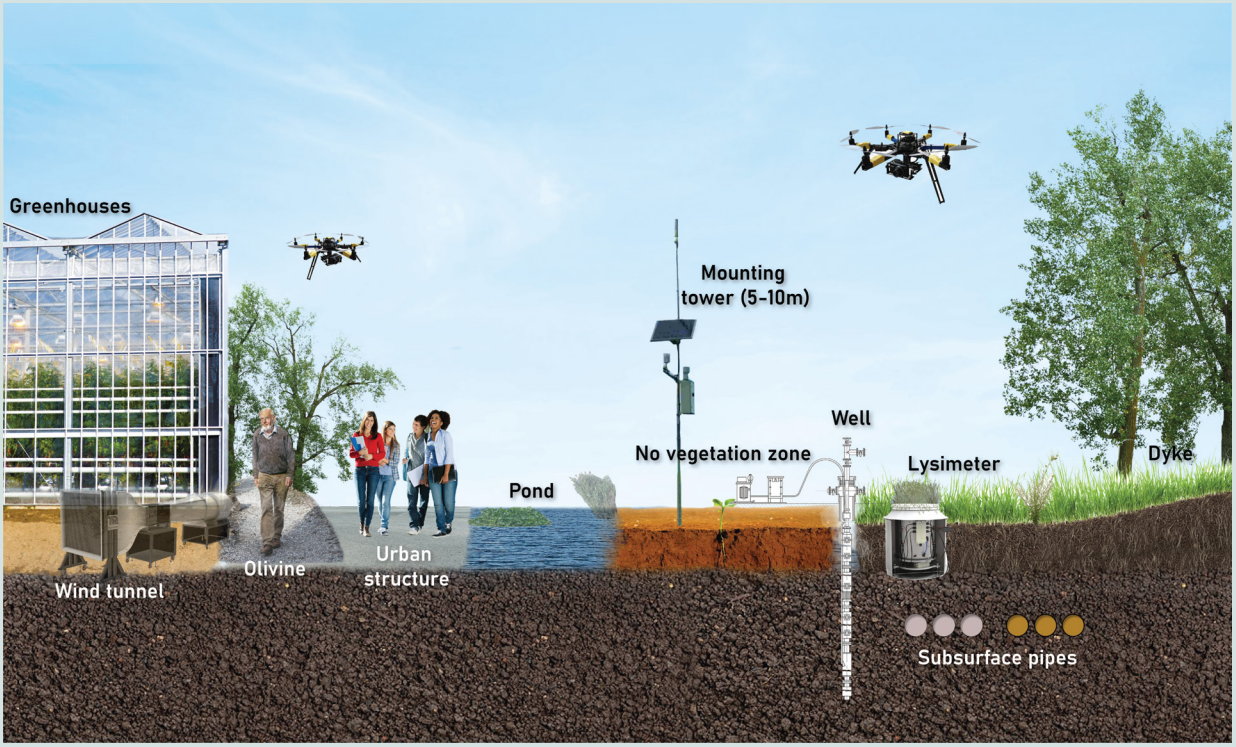
[16] Twente Board, "Working together on Gross Twente Happiness in a green technological top region", translated from "Samenwerken aan bruto Twents geluk in een groene technologische topregio", 2022

Guiding principles related to the region

- The region stimulates and facilitates collaboration, with companies, social partners and knowledge institutions, on climate related themes like sustainability, circularity and energy.
- Living labs play an important role in jointly exploring and working on climate solutions. The region can play an important role here.
- People with relevant education and knowledge in the field of climate solutions will be in high demand in the coming years. The labour market for graduates in this field is excellent and growing. There is also a need for live long learning for professionals.

LILa[17]

The Living Innovation Lab (LILa) will provide a unique (semi-)controlled outdoor setting at the University of Twente campus. Its goal is to advance interrelated research, innovation and education across faculties. Local communities and industrial partners will help connect this lab to the larger global ecosystems in which the UT collaborates. The current design of the LILa site accommodates more than twenty transdisciplinary experimental sections both above and below ground, where work will be carried out on both scientific and societal challenges. Involving scientists from multiple faculties, these experiments cluster around different types of expertise. It offers our students the opportunity to work in realistic settings on major societal challenges such as urban resilience, climate change and the energy transition. It thus provides a perfect study environment for the development of Challenge-Based Learning within UT. Of particular interest for the KIN are the inclusion of a climate tower, green walls, and the detection of underground cables that can significantly increase the speed and efficiency of the energy transition



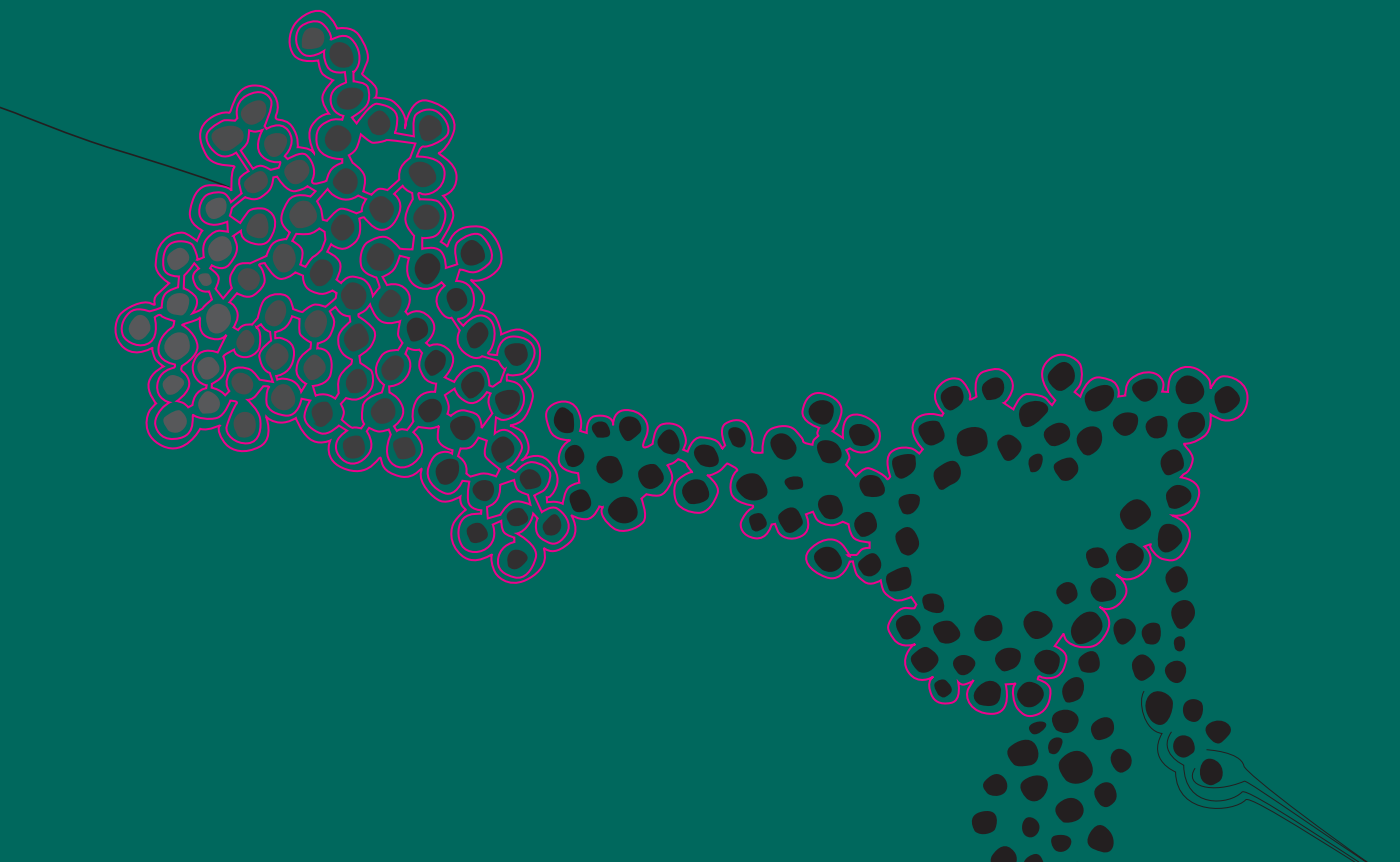
[18] https://www.utwente.nl/nl/lila/news/2021/6/1094358/ut-campus-will-have-a-living-innovation-lab#a-transdisciplinary-lab

> The complexity of the climate challenge urgently requires new solutions. A system transition is what we need to work towards. Thinking across disciplines and creativity are crucial, so that innovative concepts emerge.
> UT can play an outstanding role here.

Stefan Kuks, climate ambassador, Vechtstromen Water Authority, chair of the Spatial Adaptation Delta Program

> There is amazing potential for concerted climate education and research at the UT. Greater focus and visibility will inspire our students and staff, strengthen our partnerships, and enhance our impact on local, national and international climate policy and practice.

Diana Reckien and Maarten van Aalst, Coordinating Lead Authors IPCC



4. WHAT DO WE WANT TO ACHIEVE?

MOTIVATION

Students[18] and staff want to contribute to climate solutions in their actions, knowledge and expertise. Students and staff want to be part of a group, a network, a university, that is committed to the climate. Students and staff want to see and experience what their university, what they contribute together. They want to feel an invitation from their university to make their contribution.

OBJECTIVE

From the university's social role for education, research and knowledge transfer, the UT wants to maximize its contribution to climate related system transitions and solutions, and empower students and staff to do so. The UT aims to create an environment where researchers, teachers and students can bundle their skills and expertise in the area of climate in a way that will maximize societal impact, fostering a sense of UT wide community and growth opportunities and giving them a clear ear, face and voice to the outside world.

GOALS

University of Twente - from the core missions of the university - wants to educate well-trained professionals in the climate field, conduct integrated top-level research and look at the impact in society in the climate field with the following goals:

1. Provide the UT climate researchers with a clear brand under which they can contribute to the global challenges.
2. Develop a community of students, teachers, researchers and other engaged co-workers to take ideas a step further, engage with stakeholders/society, exchange experiences and maximize everyone's contribution.
3. Collectively determine a number of themes under the topics of climate mitigation and adaptation that the UT can use to profile itself at national and international arenas - enabling us to contribute to setting narratives and addressing them.
4. Support innovative projects through seed grants that support multi-disciplinary efforts from a Geo-Techno-Socio Perspective and thus develop expertise in collaboration. These projects are then supported as they look to scale-up.
5. Develop climate themed strategic education options ex - 1) new UT wide Initial Climate Bachelor to meet the demand of incoming students and the labour market and 2) expand VU collaboration on this theme.
6. Enable a stronger and clearer connection between research and education which enables students to be inspired by and learn from the climate research at the UT. This can be further developed to offer more strategic educational options related to the topic of climate/sustainability that will attract and retain student talent at the UT.
7. Contribute as a key player in the developing national climate program, and organize ourselves in a way that we can deliver.
8. Work collaboratively and with self-reflection with the UT program on defining impact pathways as a test case and living experiment in strategically working towards impact as a university.

[18] https://www.duurzaamnieuws.nl/jongeren-willen-meer-aandacht-voor-klimaat-en-milieu-in-onderwijs/

AND WHAT DO WE BUILD UPON…

A GEO-TECHNO-SOCIAL APPROACH

UT builds on the knowledge and expertise of all faculties, which together bring in the socio, geo and technological disciplines. UT's contribution to climate goals is recognized (inter)nationally on the **distinctive approach of combining geo, techno and social knowledge and expertise**.

Resilience to Water Extremes, a Geo-Techno-Social approach

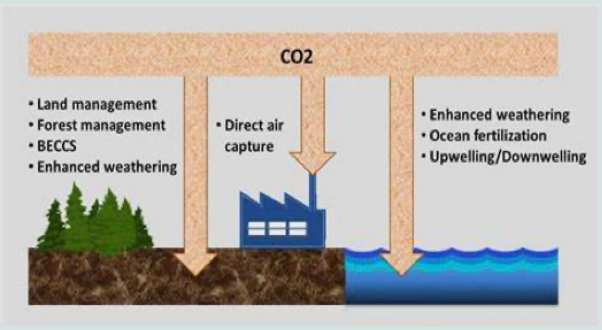
UT expertise that supports drought resilience aligns well with the Geo-Techno-Approach by including monitoring and modelling of key physical systems (water, water-soil, water-vegetation, water-atmosphere) exploiting expertise available a.o. in the Flow for Future cluster. UT develops technical solutions to improve the functioning of systems to make them more drought resilient and including understanding the behaviour and interests of individual actors, multi-actor collaboration, and governance systems and promoting behavioural change, collaboration, governance instruments and business models to improve drought resilience.

Improved batteries, a Geo-Techno-Social approach

Research on improved batteries, which is essential for the energy transition, is traditionally focused on enhancing lithium-based batteries. However, these conventional lithium batteries are far from climate friendly: for every kilogram of lithium more than 2000 l of water is needed. In a co-creation process together with the Center for Energy Innovation (CEI) and facilitated by the DesignLab with geo-observational (ITC) and socio-ethical (BMS) considerations, research for more sustainable alternatives for currently used materials such as cobalt, nickel and lithium is initiated. This then leads to real sustainable cross-disciplinary collaboration with material science on *sodium* based batteries in the ST faculty, *sustainable production and circularity* in the Advance Manufacturing Center of ET and artificial intelligence and power electronics from EEMCS.

Carbon dioxide removal (CDR), a Geo-Techno-Social approach

It is becoming increasingly clear that besides CO2 emission reduction through energy transition, carbon dioxide removal techniques (CDR) are also indispensable in order to reach global net zero emissions in 2050. CDR requires a multidisciplinary approach, since it has *ethical/societal* aspects (can we apply CDR on a global scale, or under what conditions can we imply geo-engineering?), aspects related to *geo observation* (where are most suited olivine mines with respect to availability and olivine composition?) as well as *technical* aspects (CEI; how to optimize and where to carry out direct air capture (DAC)? Can we develop industrial processes for accelerated olivine weathering on a large scale?).



Direct Air Capture (DAC) installation of Climeworks in Iceland.

MSC in Spatial Engineering, a Geo-Techno-Social Approach

Natural disasters, poverty, food shortage, epidemics, climate change; the greatest challenges society is facing today are characterised by enormous complexity. These so-called wicked problems are impossible to solve in a way that is simple or final. The world needs socially committed engineers who won't shy away from these complex challenges but feel the urge to contribute to solutions that will make societies around the world more sustainable and resilient. In this two-year, English-taught Master's, students learn to address large-scale and complex societal challenges by combining both technical and socio-economic knowledge with a strong basis of spatial data analysis and modelling. They become skilled in mapping the conflicting needs of different stakeholders within complex societal, political, economic and cultural contexts. The key is to structure and redefine problems beyond the obvious frames and design solutions based on a multidisciplinary understanding of wicked problems.

TU Delft Climate Action Programme

Herman Russchenberg, TU Delft vice rector magnificus for climate action:
"Take care of anchoring. Embed people, not so much structure. The greatest success is if the program ends as a night candle."

The genesis is important here. In 2020, there was a lot of "fuss" on social media toward scientists speaking out about climate change. The response of TU Delft's Executive Board was to release a climate position paper, a clear vision from the university and support for the researchers involved. The position paper was then developed into the Climate Action program, which takes shape in four broad themes: climate science, climate change mitigation, climate change adaptation and climate governance. All faculties are participating from the start. A call for flagship projects was then organized, with a call for ideas from within the university.

The program includes research, teaching and outreach. A special role is played by the Climate Action Hub, with a small office in The Hague, focused on contacts with governments.

The program has a Program Council, across the breadth of the program. Participants include the four scientific theme leaders, the Climate Action Hub lead, from education. There is also a stakeholder group, including students, SMEs, people with a link to governments. A scientific director leads the program. Within TU Delft there are two such broad strategic programs (the other is in the field of Artifical Intelligence). Both program directors are also vice-rectors and sit at the meeting table when it comes to strategy & content.

The TU Delft Climate Action program started with a size of 22 M€, for a duration of 10 years (2021-2030). To start with, 16 tenure trackers are being recruited. They will each receive a starter package, with a PhD and a small budget. For the first five years, these positions will be funded from central resources, then from faculty. By now (Nov 22), 11 of the 16 people have been recruited and started, the other 5 are expected to start in spring '23. The Delft Climate Action programme is about new positions, new resources. It is not about organizing the existing differently, but rather providing new research, so that this also creates a change and anchoring in the profile of the university.

More information: https://www.tudelft.nl/en/climate-action

Utrecht Copernicus Institute of Sustainable Development

Stefan Dekker, scientific director:
"We became big through education and could never have developed like this based on research grants."

Copernicus' mission is to have a positive impact on the transition to a sustainable society through the development of excellent and relevant knowledge, to influence political and private decisions by communicating this knowledge and by educating the change agents of the future. Given the integrated nature of sustainable development issues, knowledge development often benefits from a multidisciplinary focus.

The institute receives about 600 students each year, half bachelors, half masters. The annual turnover is 22 M€, of which about 12 M€ comes from education, 10 M€ from external funding.

More information: https://www.uu.nl/en/research/copernicus-institute-of-sustainable-development

5. WHAT IS NEEDED?

START!

Climate change is super-urgent and – ironically – has been for many years. The time window for positive contributions to avoid climate catastrophes is shortening. Climate deserves to be named a priority. UT endorses the vision of fully realizing technology development and transfer for both improving resilience to climate change and reducing GHG emissions.

EXPERIMENT

Climate change requires new solutions, new methods, new approaches. The Climate Initiative at the University of Twente is meant to be a learning, continuously developing initiative. Build in that expectation. Apply a cross-disciplinary way of working, combining socio, geo & techno sciences, integrating research, education and living labs, and incorporating system transition aspects.

COMMUNITY

Embrace all impactful contributions of UT co-workers to the climate agenda. Follow a mission driven approach, in line with UT vision Shaping2030. Encourage staff and students to contribute, and provide opportunities for them to do so. Build an inspiring community, where staff and students feel welcome and make part of.

CONNECT

Connect with national and international networks for education, capacity building, research and knowledge and technology transfer. Be a frontrunner and key player in the national climate research initiative (in formation) KIN, pursuing impactful collaboration in the Netherlands. Contribute to the KIN programme, pact and centre. Connect to EU networks targeting EU climate related (4 out of 5) missions.

COMMUNICATE

Make the climate theme at UT visible, provide the UT with a clear climate profile. Link UT climate research and education to the SDGs for a better recognition of UT's added value. Communicate UT climate contributions in a way that aligns with key stakeholders.

ORGANIZE

Organize the UT Climate Initiative according to a new model, in which community, coordination and communication are key in the working method. Bring people in a position to take up responsibility and provide them with the means to do so. No responsibility without a mandate.

THINGS TO THINK ABOUT

Not everything is clear in advance. There are a number of topics where you can ask the question whether there is a choice to be made. Is there a contradiction, or do they go together? Here are some of these issues we need to be aware of as we get started.

System transitions or climate solutions?

"We can't organize system transition as a university, can we?
Shouldn't we just focus on technical solutions?"

The UT Climate Initiative contributes to system transitions and works on climate solutions with a combined Geo-Techno-Social approach as its distinctive feature.

Broad or focus?
"Climate, that's about everything. Moreover, it is not distinctive.
Shouldn't we put a clear focus?"
Embrace all impactful contributions of UT co-workers to the climate agenda. Build a community. Choose a few themes on which the Geo-Techno-Social approach shows its added value and with which UT can distinguish itself, and develop these further. These themes are not set in stone, continue to develop the agenda.

Co-creation and decision-making
"Everything in co-creation, but please do it quickly!"
"How do you give direction? And who actually decides?"
The UT Climate Initiative themes are developed in co-creation with committed colleagues from the UT community and external collaboration partners. To facilitate this process we seek support from the Design Lab. The UT provides an agile decisive organization, easy to understand for cooperation partners, easily approachable, and with a clear responsibility and mandate.

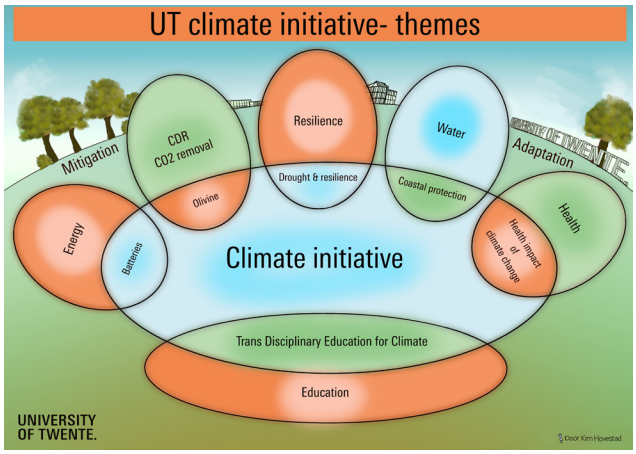
Initiative or institute?
"Initiative, what's that again? It remains vague.
Can't we call it an institute, at least people know that."
Start! Develop along the way, focus on creating opportunities, stay alert to unnecessary obstacles and frustrations in the organizational form, and remove them as much as possible. Commit yourself, as an institution, university board, deans, to that attitude.

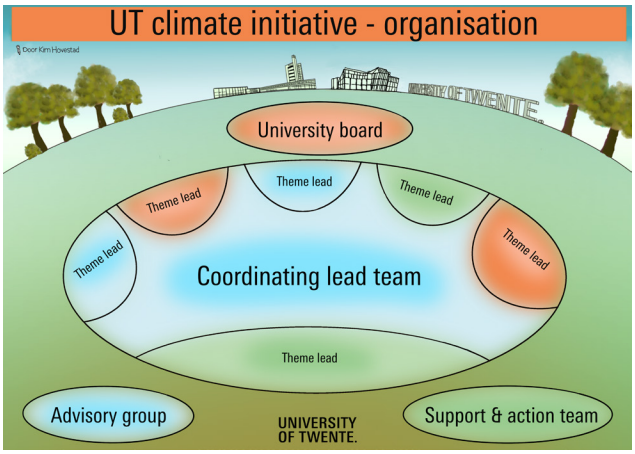
New positions or existing ones?
"If you really want to realize something, money has to go into it, like in Delft.
Ideally, we bring together present driven people and impactful projects, and strengthen the UT climate initiative with additional, new, resources to stimulate certain themes. Expressing commitment to a UT climate initiative here also means that deans, board, colleagues, use the opportunities available to them to acquire resources and deploy them for this priority.

A GEO-TECHNO-SOCIAL APPROACH

UT builds on the knowledge and expertise of all faculties, which together bring in the social, geo and technological disciplines. UT's contribution to climate goals is recognized (inter)nationally on the **distinctive approach of combining geo, techno and social knowledge and expertise.**

Potential themes for the Climate Initiative, building on strong knowledge and expertise areas of the UT, are shown in the illustration. However what is important in the early phases is to have an open and transparent process where staff can get engaged with and determine what the most appropriate themes will be. These themes are likely to change as societal challenges do. This process can also be supported but will be filled in by the research and educational staff.





ORGANIZATION

In line with results of the TwynstraGudde exploration we advise the following:

- Content is at the core of the themes, which are characterized by a Geo-Techno-Social approach, and a strong link between education, research and living labs. A theme is led by a young researcher. The **theme leads** come from different disciplines. Start with 5 themes, like drought & resilience, climate & energy, CO2 removal (CDR), health impacts of climate change, and transdisciplinary education for climate. Provide resources to encourage a particular direction or approach.
- Connect with existing UT programs – like resilience and energy - and living labs – like LILa -, with the objective to build upon what's already there, to strengthen existing climate-related initiatives, connect with (inter)national climate agenda, and present stronger as UT's climate contribution.
- Bring people with strong roles in the stakeholder network together in an **advisory group**. With the goal of sharing relevant opportunities and developments, informing each other about climate-related developments at UT, and enrich the climate initiative with support and advice.
- Bring a **coordinating lead team** into position. Task the team with leading the initiative, organizing the community, developing UT's climate agenda, representing the UT Climate Initiative externally and ensuring clear profiling. They must be able to steer on content, money, and time.
- Build an enthusiastic **action team**, with co-workers from strategy and policy, communications, strategic business development, grants office, finance, faculties, and the university board.
- Provide a recognizable **place** where people can meet and work.

Resources – indicative

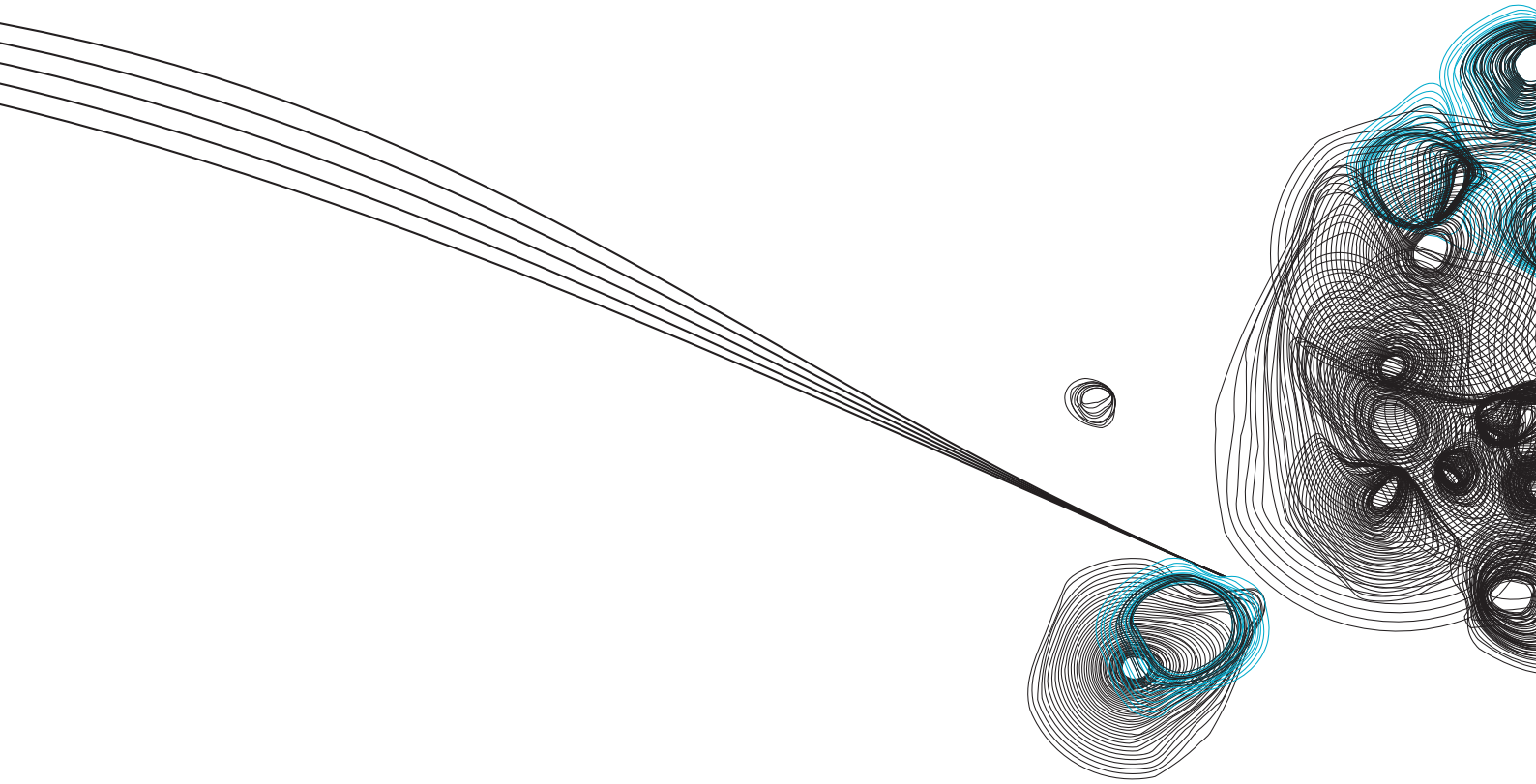
In terms of people and resources, our estimation annually for the first two years (2023-2024):

Theme leads	5* 0,6-1,0 fte	Ideally 1 per faculty
Support and Action Team	8*0,6-1,0 fte	S&P, M&C, SBD, Grants Office, CELT, etc.
Coordinating Lead Team	3*0,4 fte	Selected Staff
Education for Climate Portfolio	2*0,6-1,0 fte	From Faculty
Research for Climate Portfolio	2 PhD's per Theme	Additions to Faculty
Organisational Costs	100k	
Space	PM	

This adds up to about 14 fte (10 – 16 fte) for theme leads, support & action team, education development, and coordinating lead team.

We propose that the coordinating lead team and associated operational funds are allocated from the remaining funds from the Shaping Expert Group budget (2022) for the year 2023. The theme leads can be allocated within the pre-agreed sustainability funds from the faculties or through identifying overlapping programs. We advise to consider financing of transdisciplinary research activities from central research budget.

Finally, we anticipate that through schooling of well-trained climate-tech professionals, leadership in regional, national and international initiatives and coordinated acquisition of large research programs (Growth Fund, NWO, EU) the UT will create large impact. Financially, a return on UT investments (ROI) by a factor of >3 is expected.



APPENDIX 1: LIST OF INTERVIEWEES/CONSULTED INDIVIDUALS

Interviewed/Consulted People @UT

The following list of people have been consulted/involved/interviewed/informed at various stages of this proposal. The final result is naturally the responsibility of the authors alone.

1. Alex Baker-Friesen (Green Hub - SEG)
2. Alexandria Poole (BMS - SEG)
3. Andy Nelson (ITC)
4. Anete Veidemane (BMS - SEG)
5. Ariana Need (BMS-TGS)
6. Arjan Dijkstra (ITC)
7. Bob Hoomans (EEMCS)
8. Bart Koopman (ET)
9. Brechje Marechal (CFM - SEG)
10. Caroline van Bers (SBD)
11. Chris Hecker (ITC)
12. Corjan van der Kuil (M&C - SEG)
13. David Korringa (ITC)
14. Desiree van Delden (BMS)
15. Detlef Lohse (TNW)
16. Diana Reckien (ITC)
17. Efia Ado (ITC - Green Hub)
18. Frank van den Berg (ECIU)
19. Freek van der Meer (ITC)
20. Frieder Mugele (EEMCS)
21. Geert Dewulf (SBD)
22. Gerard van der Steenhoven (ITC)
23. Guus Reinders (TNW - MESA)
24. Haico te Kulve (S&P)
25. Irene Manzanilla (ITC)
26. Jaap Zevenbergen (ITC)
27. Jasper van Alten (S&P)
28. Jelle Ferwerda (ITC)
29. Jennifer Herek (TNW)
30. Joanne Vinke-de Kruijf (ET)
31. Joost Kok (EEMCS)
32. Joris Harbers (Student Union)
33. Jos Keurentjes (CEI)
34. Jurriaan Schmitz (EEMCS)
35. Karin Pfeffer (ITC)
36. Leon Lefferts (TNW)
37. Leontien Kalverda (S&P)
38. Maarten van Aalst (ITC)
39. Maarten van Steen (EEMCS - DSI)
40. Machteld Roos (CvB)
41. Marcus Berger (ET)
42. Marike Boertien (Novel-T)
43. Marielle Winkler (S&P)
44. Mark van der Meijde (ITC)
45. Maroeska Rovers (TNW - TechMed)
46. Miriam Oostinga (BMS)
47. Nico-Tom Pen (CFM)
48. Peter Stegmeier (BMS)
49. Peter-Paul Verbeek (BMS - DLab)
50. Remke Burie (TechMed)
51. Sabine Wildevuur (DLab)
52. Sascha Kersten (TNW)
53. Sander de Boer (S&P)
54. Sean Vrielink (ET - SEG)
55. Sissi de Beer (TNW- SEG)
56. Stefan Kuks (BMS - Vechtstromen)
57. Stephanie Hessing (EEMCS - DSI)
58. Suzanne Hulscher (ET)
59. Tanya Bondarouk (BMS)
60. Theo Toonen (BMS)
61. Tom Veldkamp (CvB)
62. Vanessa Evers (BMS)
63. Vera Barbosa A. S. Sniehotta (BMS)
64. Victor Jetten (ITC)
65. Vinod Subramaniam (CvB)

APPENDIX 2: TWYNSTRAGUDDE EXPLORATION

Recommendations and conclusions from TwynstraGudde exploration

View the report here: https://ut.onl/climate-report.

Climate education and research at University of Twente

final report

Fay van Zeijl
Susan Arts
Marc van Leeuwen

22-11-2022

TwynstraGudde

Impact op morgen.

Executive summary

Shaping Expert Group Sustainability
The Shaping Expert Group on Sustainability (SEG) sees that the topic of Climate is important for much of the sustainability research and education currently being undertaken at the UT. As such the SEG would like to propose actions that can be taken to support the further development of these activities.

TwynstraGudde aided the SEG in identifying the possible thematic focus of the initiative and the possible types of organisation. TwynstraGudde conducted 15 interviews and organised 3 focus group sessions to draw up the conclusions summarized in this report.

Thematic focus
In all interviews and focus groups it was confirmed that UT's unique selling point is the combination of expertise in the technical sciences, the geosciences and the social sciences. This puts the University of Twente in a leading position to contribute to solutions to climate change. There are seven societal challenges identified as extra relevant for the UT, on which the UT can organise sub-communities to stimulate transdisciplinary research.

Type of organisation
We have identified seven 'building blocks' that can structure the organisation of the initiative. If UT is serious about its ambition to become a international, national and regional authority on climate solutions, our advice is to apply all seven. The question is not whether these building blocks should be applied, but in what order, and in which pace.

Scenario 2 is the best fit
We propose three different scenario's of organisation types, that differ in intensity and impact over time. From our perspective scenario 2 is the best fit for the UT. The organisation is agile in the beginning, and gets the chance to grow of time.

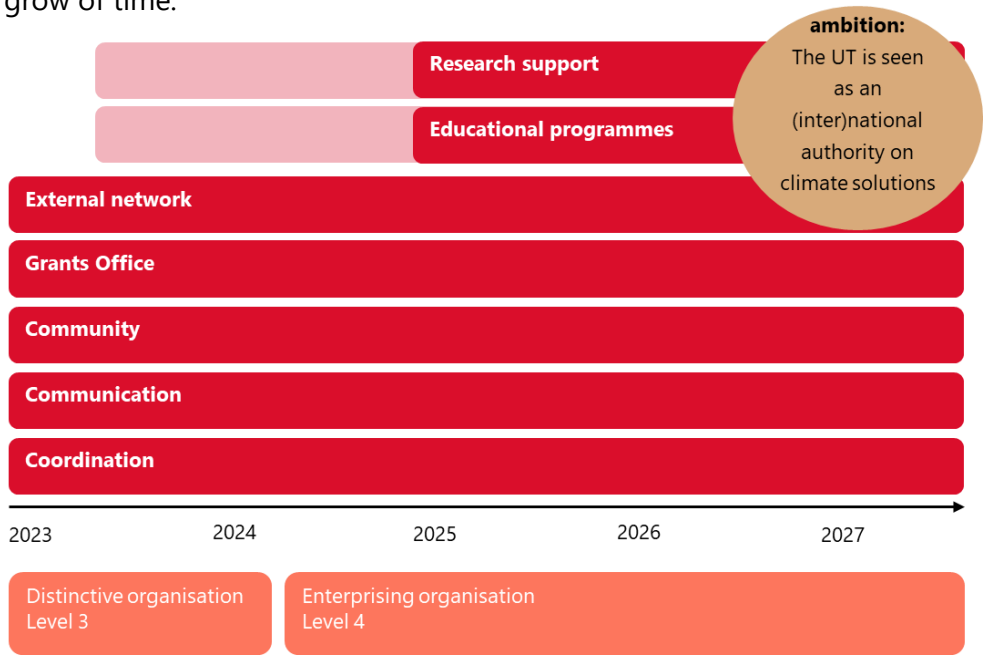


Table of contents

1. Introduction and background
    - Why climate action is urgent
    - Shaping expert group sustainability
    - Our approach
    - Process

2. General findings
    - Interviews
    - Other universities

3. Thematic focus of ‘climate’ education & research at UT
    - Climate research at UT
    - Societal challenges most relevant for UT

4. Building blocks
    - Building blocks to achieve UT’s ambition
    - Education
    - Research
    - Grants office
    - External network
    - Communication
    - Community building
    - Coordination

5. Organisational forms
    - Scenario 1
    - Scenario 2
    - Scenario 3

Annex A: Exposure of other Dutch universities on climate change

1. Introduction & Background

Why climate action is important

Climate change is one of the biggest, if not *the* biggest, challenges of the 21st century. Human action has put the system earth under unprecedented pressure, with irreversible consequences as a result. To prevent dangerous climate change from happening a societal transition must take place, in which universities have an important role to play.

Climate change as a wicked problem

Climate change can be seen as a wicked problem; the causes of climate change are multiple and complex, the impact of climate change is uncertain and interrelated, and the potential solutions of climate change may create new problems. For a long time climate change was solely a topic climatologists and geographers focused on. However, seeing the complexity of its causes, impacts and potential solutions, many scientific disciplines are essential in preventing dangerous climate change from happening and preparing the global society for the climate change that is likely to take place.

Transdisciplinary approach

The complexity of climate change makes that universities have an unique position is contributing to its solutions. Climate change asks not only for a interdisciplinary approach, in which disciplinary boundaries are crossed to focus on a common goal, but for a *transdisciplinary* approach, in which sectorial boundaries are also crossed.[1] The value of transdisciplinary research for complex societal challenges, such as sustainable development, is also stressed by the OECD.[2] Only this way will it be possible to develop integrated knowledge for science and society.

Society's demand

In order to empower society to apply sustainable solutions found by science, and to develop integrated knowledge *with* society, it is necessary that the university is found on the topics it excels on. It is for this reason that society calls for clear positioning of the UT on the topic of climate change.

The time is now

At the moment of writing climate action is more urgent than it is has ever been. In November 2022 the Netherlands Environmental Assessment Agency calculated that, even if the Dutch government implements all climate plans, it will not be enough to reduce greenhouse gas emissions by 55% in 2030.[3] Urgent action by all stakeholders in society to contribute to solutions, including universities, is necessary.

Sources:

1. Utrecht University (2022): 'What is Interdisciplinary research?'
2. OECD (2020), "Addressing societal challenges using transdisciplinary research", *OECD Science, Technology and Industry Policy Papers*, No. 88, OECD Publishing, Paris,
3. NRC (2022) "PBL: Zelfs als het kabinet álle klimaatplannen uitvoert, is dat nog niet genoeg"

Shaping Expert Group S

Shaping 2030

Shaping2030 is the university's mission, vision and strategy for 2020-2030. Within this strategy, the UT has expressed sustainability to be a precondition for everything the organisation does.

Shaping Expert Group on Sustainability

The Shaping Expert Group on Sustainability (SEG) sees that the topic of Climate is important for much of the sustainability research and education currently being undertaken at the UT. As such the SEG would like to propose actions that can be taken to support the further development of these activities. According to the SEG's first impressions these activities are currently dispersed widely across faculties, centres, institutes and programs. This makes it difficult to specify how exactly to support this broad group of researchers and educators.

Benefits for the UT

By defining the focus of the UT within climate education and research, the UT will be able to:

- communicate commitment and expertise on the topic to prospective and current students;
- showcase the UT's capacity to contribute to the climate programs of the national government, different funding agencies as well as regional and local programs;
- make informed strategic choices on how to allocate scarce resources to increase the societal and academic impact of this group of researches and educators;
- facilitate and recognize efforts to work in cross-faculty manner and to strategically couple educational and research activities.

This report

In order to increase the impact of climate education and research the SEG reached out to TwynstraGudde to investigate type of collaboration would be suited, including:

- How can these organizational forms develop in the coming five years;
- How can these organizational forms help to achieve the Shaping 2030 goals.

Our approach

In order to answer the question posed by the UT, we as TwynstraGudde centred our approach along the following, for us essential, elements:

1. Tight process for solid content, with sufficient support

The challenge for us was not only deliver substantive content, but also to organize sufficient support within the organisation. The latter is a specific challenge in academic environments, due to the extensive amount of knowledge and experience there is present on such an important topic of sustainability. The aim was, of course, to include and represent as many people as possible. In the first phase we chose to conduct 15 interviews with UT employees. This way we collected us much input as possible. We consciously included representatives of existing initiatives within the UT, such as the centre for disaster resilience, the centre for energy innovation, etc. In addition, we also observed initiatives at other Dutch universities.
In the second phase we presented our findings in three different focus groups, during which we collectively reflected on the findings from the interviews, and further developed the content.

2. Structure follows strategy

A collaborative organization for sustainability is not an end in itself, but a means to strengthen the impact of the University of Twente in the field of sustainability. The organisation must match the thematic demarcation of “climate” or “sustainability research and education at UT. For that reason the thematic demarcation was an important topic during the interviews and focus groups.

3. Combination of expertise in the fields of sustainability and organisational science

Last but not least, we put together a team consisting of members with experience and expertise in the field of sustainability and organizational science. In addition, we paid special attention to select team members with extensive experience in an academic context. TwynstraGudde is a consultancy that is active in the field of major social transition issues, including sustainability. One of our core competencies is organizing partnerships, between and within organisations.

The next slide gives an overview of the process we followed, including the different phases.

Proces

August | September | October | November

Phase 1:
Kick-off with repre-sentatives of the SEG

Phase 2:
15 interviews UT employees: mostly researchers and management.

- Maarten van Aalst
- Tanya Bondarouk
- Geert Dewulf
- Jennifer Herek
- Suzanne Hulscher
- Jos Keurentjes
- Joost Kok
- Bart Koopman
- Freek van der Meer
- Diana Reckien
- Machteld Roos
- Gerard van der Steenhoven
- Tom Veldkamp
- Marielle Winkler
- Sabine Wildevuur

Phase 3:
Three focus group sessions, to reflect on and further develop the findings from the interviews

Focus group 1:
- Tanya Bondarouk
- Freek van der Meer
- Bart Koopman

Focus group 2:
- Suzanne Hulscher
- Geert Dewulf
- Marielle Winkler

Focus group 3*:
- Diana Reckien
- Suzanne Hulscher
- Tanya Bondarouk
- Marielle Winkler

* Because we felt we were able to include the input provided by the members of focus group 3 in earlier focus groups, the focus group did not come together. Members were nonetheless consulted for written input on the reports.

Phase 4:
Delivery of the **report,** which forms the basis for UT's decision-making proces.

During the process we held bi-weekly meetings with representatives of the SEG sustainability and support staff, to share insights and discuss developments.
- Cheryl de Boer (SEG)
- Albert van den Berg (SEG)
- Vincent Hövels (support staff)
- Miriam Luizink (support staff)

2. General findings

General findings from the interviews

Interviews focused on two main areas:

1. Thematic focus - What are the strengths of the University of Twente in relation to climate related topics, and what are the societal challenges that the University of Twente can contribute to?
2. Type of organisation - What type of organisation is successful within the university to stimulate collaboration?

General findings on thematic focus (question 1)

- The interviewees see a clear role for the UT in solving climate related challenges for society. They support the UT's ambition to become an (inter)national authority on the topic of climate change. The UT already accomplished this position in several societal challenges related to climate change and – in other cases- can grow to become one.
- Interviewees all recognize UT's combination of expertise in the technical sciences, social sciences and geosciences to be the core of UT's contribution to solving climate related challenges.

The findings on thematic focus are summarized in chapter 3, and focus on UT's unique combination of expertise in the technical sciences, social sciences and geosciences in relation to climate change challenges.

General findings on type of organisation (question 2)

- The consensus among interviewees is that uniting the many different climate initiatives at UT is of added value. Collaboration with existing initiatives, such as the Centre for Disaster Resilience and Centre for Energy Innovation is favourable.
- In order to live up to the ambition institutionalization, including representation at the strategic level of the university (strategisch beraad), is necessary. At this moment only institutes are represented at this level, besides the faculties.
- Many interviewees see the opportunity of a 'growth' model, in which a clear ambitious goal is set in the beginning, and the initiative can grow in (activities, finances, fte) over time.
- Opinions differ on the types of leadership the initiative needs: some call for leadership from younger scientists, some from accomplished scientist with an established reputation. Interviewees share the need for representation of the different disciplines/faculties within the initiatives.

The findings on type of organisation are summarized in chapter 4, and focus on what we refer to as 'building blocks:'

- Education
- Research
- Grants office
- External network
- Communication
- Coordination
- Community building

In chapter 5 we have developed three organizational scenario's based on these building blocks.

Examples of other universities

Climate Action Programme at TU Delft

In 2019 TU Delft published its vision document outlining the needs for far-reaching action on climate. The Climate Action programme features plans for research, education, campus development and collaboration with politics and industry. For the next 10 years TU Delft allocate 22 million euros to set up and further shape the programme.

Research
The research component is based on four themes: Climate science, Climate change mitigation, Climate change adaption, Climate change governance

Education
Development of lifelong learning programmes and a Climate Action minor.

Campus
Prof. Andy van den Dobbelsteen was appointed as TU Delft's sustainability coordinator. Together with the various TU Delft divisions he is developing a sustainability vision and programme for the campus.

Climate Action Hub
This public debate needs to be based on facts and knowledge and needs to account for the important societal and ethical issues of responsibility and justice. TU Delft has have the goal to develop a 'Climate Action Hub', with the aim to support global and national leaders, policy makers and industry in planning for and responding to climate change.

Pathways to Sustainability at Utrecht University

Utrecht University focuses its research on four strategic themes, of which Pathways to Sustainability is one. Within this theme, researches with different expertise are joining with societal partners to ponder research questions and strategies on tackling key societal challenges.

Within the Pathways to Sustainability programme, the UU has set up communities. These communities drive and deepen the inter- and transdisciplinary exchange and collaboration on key issues related to societally relevant and recognizable sustainability issues. The following thematic communities focus on different aspects of sustainability:

- Energy in Transition
- Future Food Utrecht
- Transforming Cities
- Sustainable Ocean
- Towards a Circular Economy
- Water, Climate and Future Deltas

Next to the communities above, the UU builds on the following communities to further the goals of the programme:

- Critical Pathways
- Science for Sustainability
- Sustainability Education and Engagement

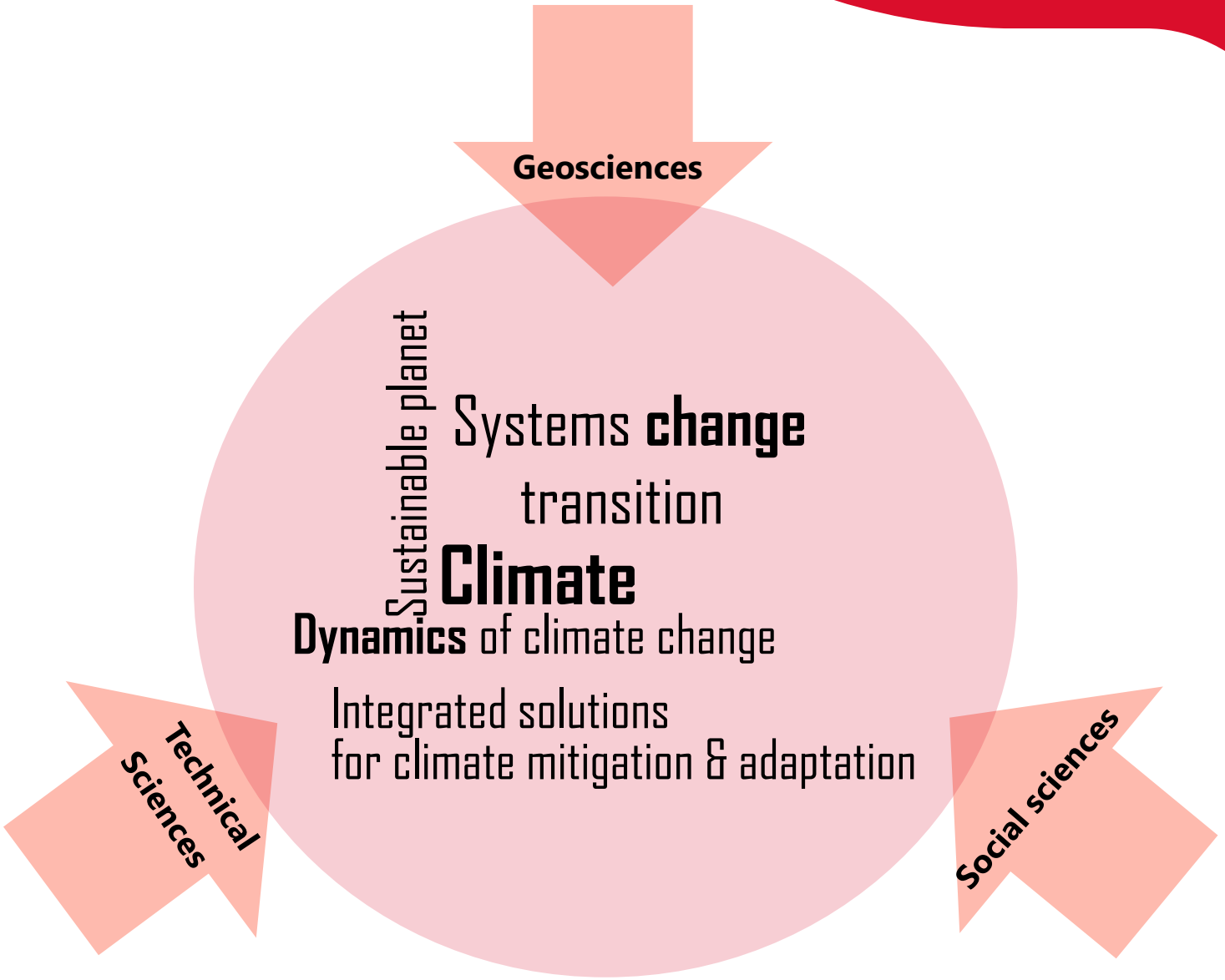
3. Thematic focus

Climate research at UT

In all interviews and focus groups it was confirmed that UT's unique selling point combination of expertise is the technical sciences, the geo-sciences and the social sciences. This puts the University of Twente in a leading position to contribute to solutions to climate change.

These contributions focus on preventing further climate change from happening (mitigation) and technological and societal adaptation to the climate change that will inevitably happen (adaptation).

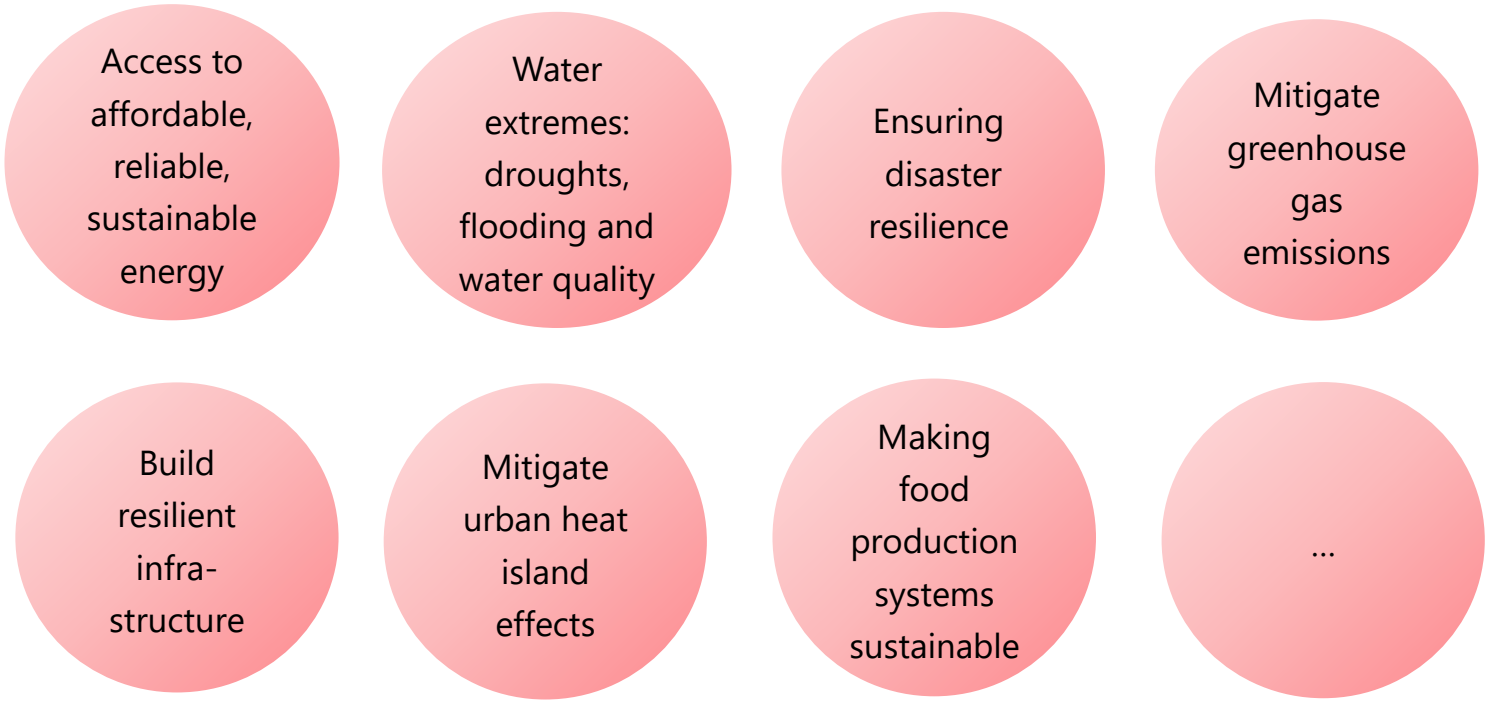
On the right is a visual display of the words and phases used by participants of the interviews and focus groups to describe the 'umbrella' initiative. The bigger the word, the more frequently it was used to describe the initiative by participants of the interviews and focus groups. We advice to use one of these terms or phrases, so the initiative is recognized in- and outside the university.



Societal challenges

At the University of Twente many researchers and educators contribute to solutions for climate change. The UT can form communities on the following societal challenges to stimulate trans- and interdisciplinary collaboration. The societal challenges are based on the UN Sustainable Development (sub)Goals. The next slide gives a brief description per theme.

We advise to select a few topics to create a clear profile of what the UT can be found on. This does not mean not working on the other topics at all, just choosing a clear starting point. Over time with feedback from what is relevant in the UT community the topics can change.



Societal challenges

This sheet gives a description of the social challenges that are potentially relevant for UT. The challenges presented here are based on Sustainable Development (sub)goals[1] that are relevant for fields that the UT is already active in. The numbers refer to the specific SDGs.

Access to affordable, reliable, sustainable energy (7)
We currently still rely on fossil fuels. This causes harm to the planet and means we need to change our ways of producing and consuming energy. To counter climate change we need solutions that can be implemented widely in a short period of time.

Build resilient infrastructure (9.1)
Our societies need functioning and resilient infrastructure as their basis. To function in a world of with changing climate our industries and infrastructure must be adapted. Innovative sustainable production technologies and infrastructure that is able to withstand extreme weather events are needed.

Water extremes: droughts, flooding and water quality (15.3, 11.5, 6.3, 6.6)
The planets ecosystem is severely damaged. It is a challenge to restore degraded land and find solutions to deal with lack of rainfall. Simultaneously, it is necessary to work on preventing deaths and the number of people affected and reducing economic losses caused by flooding, and to ensure water quality.

Mitigate urban heat island effect (11.5)
Intelligent urban planning that creates resilient cities with green living conditions are needed for us to prosper as humans. We need to reduce the number of deaths and affected people and reduce economic losses because of heat.

Ensuring disaster resilience (1.5)
Improving the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.

Making food production systems sustainable (2.4)
Ensure sustainable food production systems that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality

Mitigate greenhouse gas emissions (13.2)
In order to remain well below the 1,5 degrees temperature rise, urgent climate action is necessary. Carbon dioxide removal is one of the techniques which could contribute to this goal.

[1]Description of the themes presented adapted from: https://www.globalgoals.org/goals

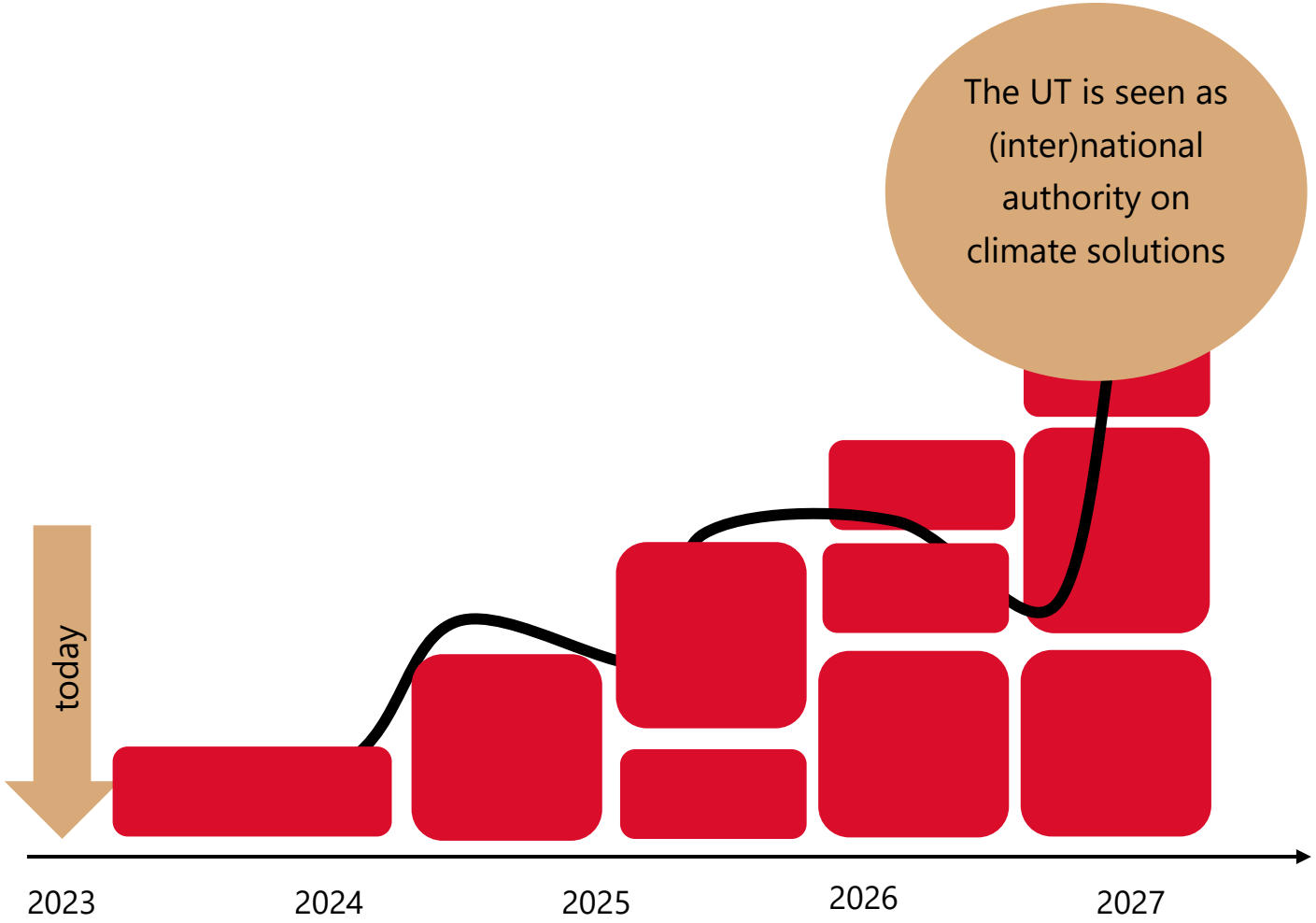
4. Building blocks

Building blocks to achieve UT's ambition

In the coming five years, the UT has the ambition to be seen as an international and national authority on solutions for climate change.

The question that lies ahead is how the UT can shape its organization so this ambition can be met. Based on the interviews, we have identified several 'building blocks.' These building blocks can be used to specify and prioritize what actions the UT should undertake to increase the impact of its climate education and research.

The next couple of slides provide more detail on the seven building blocks that we have identified, based on the interviews and focus groups.



Building blocks (1/4)

Educational programmes

Education on the topic of climate is of great value. Society is in need of professionals who can lead the energy and resource transition, and universities can educate the people who can. The topic attracts current and prospective students, and by investing in educational programmes the university remains its societal relevancy. It is a way not only to communicate expertise to students, but also commitment. An example of a master's programme is *Sustainable Energy Technology*, a two year programme focussing on the energy transition. Besides full-time programmes, there are also many examples of relevant courses on this topic, such as: *Technology, Globalisation and the Environment*, *Solar Energy* and *Sustainable Civil Engineering*.

There is more potential than is currently put to practice, however. During the interviews and focus groups participants mentioned the following methods of investing in climate related education:

- **Bachelor and master programmes:** Setting up new bachelor's and master's programmes, either based on existing courses from different, existing programmes or from scratch;
- **Minor programmes or certificates:** Setting up a climate minor or certificate for bachelor students;
- **Learning goals:** Integrating climate learning goals in all bachelor and master programmes;
- **Lifelong learning**: Setting up Lifelong Learning programmes, to reskill and upskill the workforce.

In addition, investing in educational programmes has two side-effects that are beneficial to the initiative:

- Interdisciplinary programmes bring colleagues from different disciplines together to collaborate. They get to know each other and each other's expertise, which can lead to collaboration in research proposals as well.
- Communicating about education programmes contributes to UT's profile externally. This attracts prospective students and colleagues who are interested in or have expertise on climate-related topics, strengthening the initiative within the organisation.

Building Blocks (2/4)

Research support

Besides the importance of strong monodisciplines, the topic of climate change asks for collaboration across faculties. In many cases this already takes place, researchers are able to find one another. However, the shared view is that there is unused potential. Participants of the interviews and focus groups mentioned the following methods to stimulate cross-faculty collaboration:

- **Seed money** for climate research in which multiple disciplines or faculties are involved in, such as PhD-projects;
- **Facilitating research proposals** by offering assistance in writing and coordinating;
- **Facilitating interdisciplinary research** by offering programme managers for large research projects that have been granted;

The shared view is that these interventions are **temporary** measures, with the aim of establishing a substantive network of climate researchers. Once these connections are made and strong coalitions are built, these collaborations are able to attract external funding without (financial) incentives from the UT.

Grants office

The UT is fortunate to have a Grant Office as part of the current organisation. The existing grant office can play an important role in further developing the climate initiative, internally and externally:

- Internally, by alerting researchers to opportunities for funding. This task must be clearly designated to the grants office, in combination with a clear overview of the relevant researchers. (Also see building block 'network')
- Externally, by representing the UT climate narrative towards international and national funding initiatives, such as Groeifonds and Klimaatonderzoek Initiatief Nederland.

Building blocks (3/4)

Communication

In the current situation there is already a lot of climate related education and research taking place at the UT. It is just not clearly visible.
By choosing for a thematic focus and consciously showing what the UT does in internal and external communication, the theme can be positioned more strongly.

Extra attention may be paid to the modesty of the UT. In many interviews it was stated that UT naturally takes on a 'serving' role instead of a leading one, and that this can hinder the UT's profile on climate. The UT does not have to be careful of its high ambitions; given the complexity of the multidisciplinary issues that the university works on in the field of climate, an outspoken high ambition is appropriate.

External network

As elaborated on the first chapter, climate change can be seen as wicked problem. The complexity makes that universities have a unique position in contributing to its solutions. Not only through a interdisciplinary approach, in which disciplinary boundaries are crossed. But in a transdisciplinary approach, in which sectorial boundaries are also crossed. Only this way it will be possible to develop integrated knowledge for science and society.

In order to develop this type of integrated knowledge, the university must be in touch with society. An extensive external network, existing of governmental organisations, entrepreneurs and other societal actors is vital. Regional, national and international actors are relevant for the UT. Existing collaborations, such as with VU Amsterdam and the region of Zwolle can be enhanced or expanded on through the Climate initiative.

Currently several research disciplines are well connected with the relevant societal actors. In many cases, however, it is very dependent on the personal relations of a specific person. The ideal leader(s) of the climate initiative at the UT, are people that have, or are able to build, an extensive external network.

Building blocks (4/4)

Community

Organizing activities contributes to community building and internal leadership. This can take place on general or on specific topics. It makes people feel involved, the network comes to life. Simple interventions can make a great difference, such as:

- **Activities:** either related to the subject matter (such as conferences, symposia) or social activities (lunch meeting of drinks) can be a way for colleagues to get involved.
- **Information:** in the form of newsletters or items on the UT's intranet.

Coordination

Forming and maintaining a network takes time and attention. What researchers conduct relevant research for the theme, and does he/she know where to find other relevant researchers? There is a need for

- **A point of contact** where developments can come together, both externally and internally. This can be one or multiple people; liasons within faculties or sub-themes can be appointed.
- **Further development of the thematic focus.** Climate research at the UT is in development, and – especially with the interventions consisting of these building blocks – the theme will continue to evolve the coming years. The organisation needs to take charge of the thematic focus and to steer in the direction the UT wants to go.

From building blocks to type of organisation

The building blocks in the previous 4 slides can be seen as activities or interventions the UT can initiate to achieve its ambition. Depending on how ambitious an organisation is, more or fewer building blocks can be implemented.

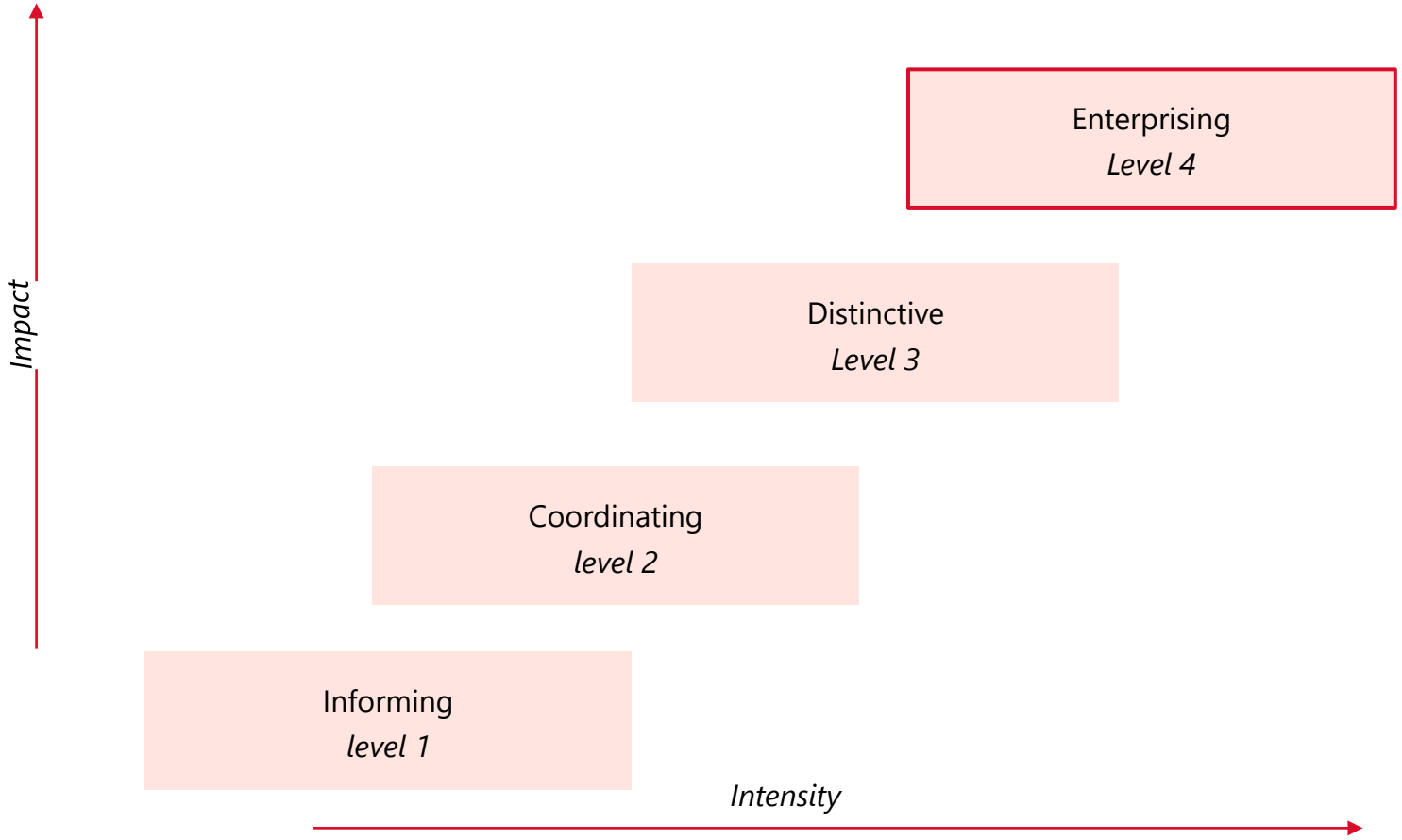
If the UT is serious about its ambition to become an international and national authority on climate solutions, we advice the UT to implement all seven building blocks. In the following chapter we explain why all seven building blocks are essential and what type of organisation is fitting for this ambition.

5. Types of organisation

Different types of organisations

Organisations can differ in various ways. One perspective to look at them is through a perspective of intensity and impact. The more intense an organisation is, the larger the impact ranging from an 'informing' organisation (level 1), to an 'enterprising' organisation (level 4).

We advice the UT to choose for an enterprising organisation. In the next couple of slides we argue why.



Types of organisation

Type of organisation	Ambition	Governance	Finance	Employed
Enterprising organisation *Level 4*	• Investments and risks are taken on collectively. • Positioning of UT is done collectively, and is of strategic importance: the UT is seen as an (inter)national authority on climate solutions. • Permanent implementation of mission and ambition	• Scientific director is part of strategic decision-making processes of UT. • Organisation is housed at the coordinating faculty.	• Financing for coordinating and support staff. • Scientific staff is employed by faculties. • Funding (seed money) is available for specific research- and educational programmes.	5-10 fte • Scientific director • Operational director • Community support • Business relation manager • Grant officer • Communication advisor • Financial controller
Distinctive organisation *Level 3*	• Positioning of UT is done collectively, and is of strategic importance: the UT is seen as an (inter)national authority on climate solutions. • Permanent implementation of mission and ambition	• No representation in strategic decision-making process • Organisation is housed at coordinating faculty or Strategic Business Development (SBD)	• Financing for coordinating and support staff. • Scientific staff is employed by faculties. • Option: Funding (seed money) is available for specific research- and educational programmes.	3-5 fte • Scientific director • Communication advisor • Financial controller
Coordinating organisation *Level 2*	• Visibility and coordination of existing initiatives. • Implementation of temporary mission and ambition.	• Temporary organisational structure (approximately 2 years), afterwards organisation is housed at faculty. • No representation in strategic decision-making process	• Similar to level 3	1-3 fte • Programme manager • Communication advisor
Informing organisation *Level 1*	• Coordination of existing initiatives.	• No formal organisational structure, participation is voluntary.	• None	• None

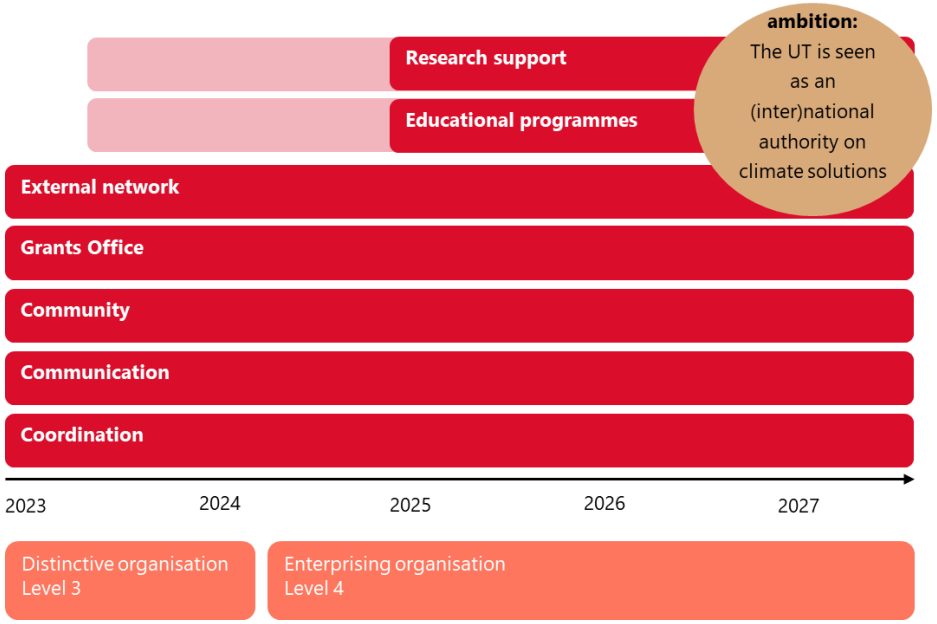
Enterprising organisation would fit UT's ambition

Enterprising organisation
Considering the large impact the UT wishes to make with this initiative, the initiative needs to be matched by an organisation in intensity. *If* the UT is serious about its ambition to become an international and national authority on climate solutions, an enterprising organisation (level 4) would be fitting, and necessary to achieve this aim.

Collective positioning and strategic representation
The reason is that the ambition set by the UT asks for collective positioning of the UT on the topic of climate. In addition, it also asks for representation at the strategic decision-making level. While the first (collective positioning) is also done within a distinctive organisation (level 3), the latter (strategic representation) is *only* accomplished in a an enterprising organisation.

All seven building blocks are necessary
An enterprising organisation is high in impact, and also relatively high in intensity. It is for this reason that we argue all seven building blocks are necessary blocks. The questions is not so much whether a building block should be put to use, the question is in what order you want to apply them. In the following slides we present three possible scenarios.

Scenario 2 most favourable
In the next three slides we give an overview of three different scenarios. From our perspective scenario 2 is the best fit scenario for the UT. The organisation is agile in the beginning, and gets the chance to grow of time.



Scenario 1

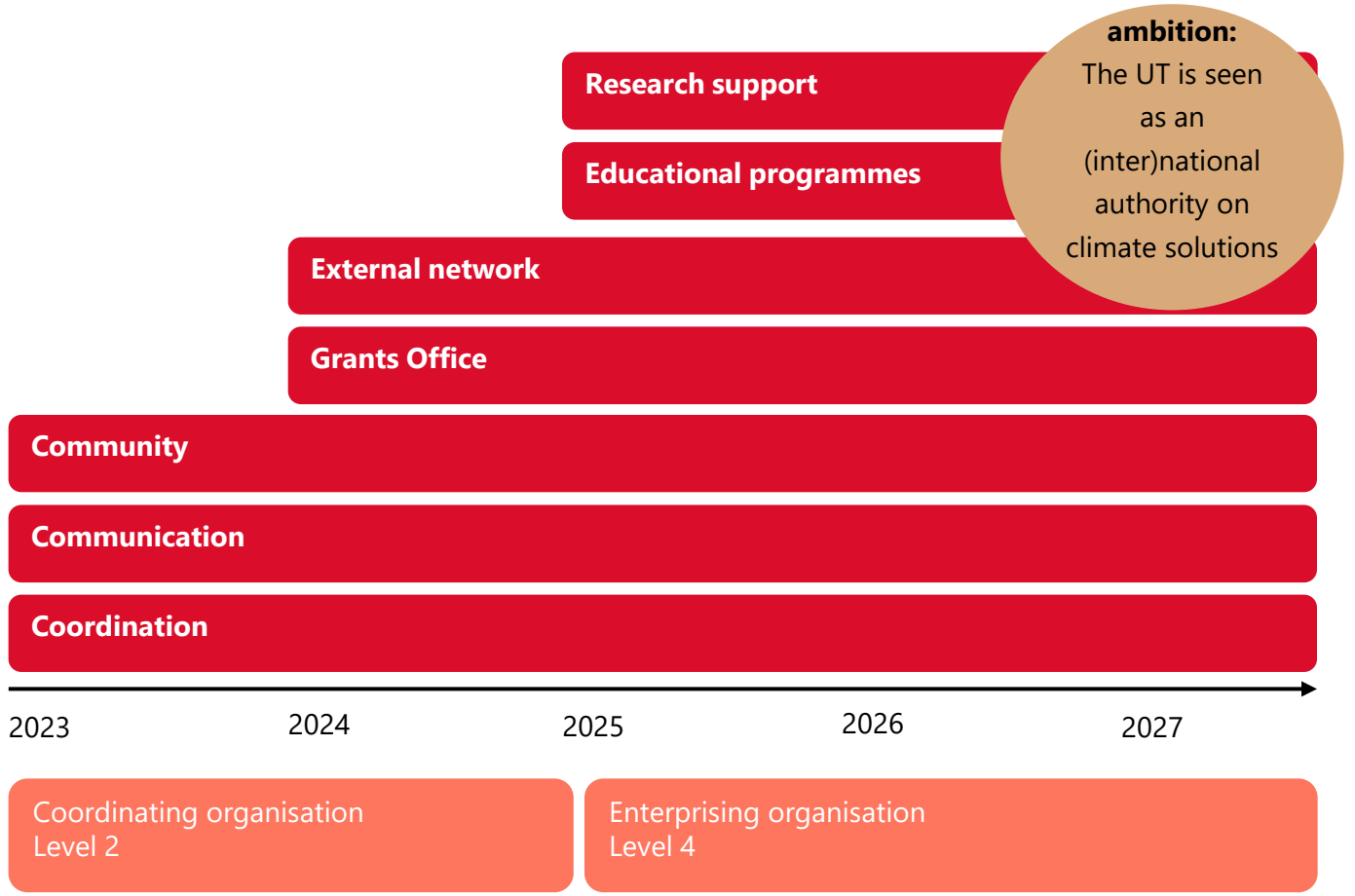
In the first scenario building blocks are applied over time; the organisation grows. It consolidates several tasks first, before it takes on new tasks. The organisation starts off with about 1-3 fte in the first two years, and grows to an organisation with around 5-10 fte in two years.

Advantages:

- Organisation gets the chance to grow over time and prove itself.
- Community, coordination, and communication are relatively easy interventions with a relatively large impact. This so called 'low hanging fruit' is started first. The more complex interventions follow later.

Disadvantages:

- Compared to the other scenario's it takes a relatively long time build the collaboration.
- The start might be interpreted as hesitant, and can be confused with lack of ambition.



Scenario 2

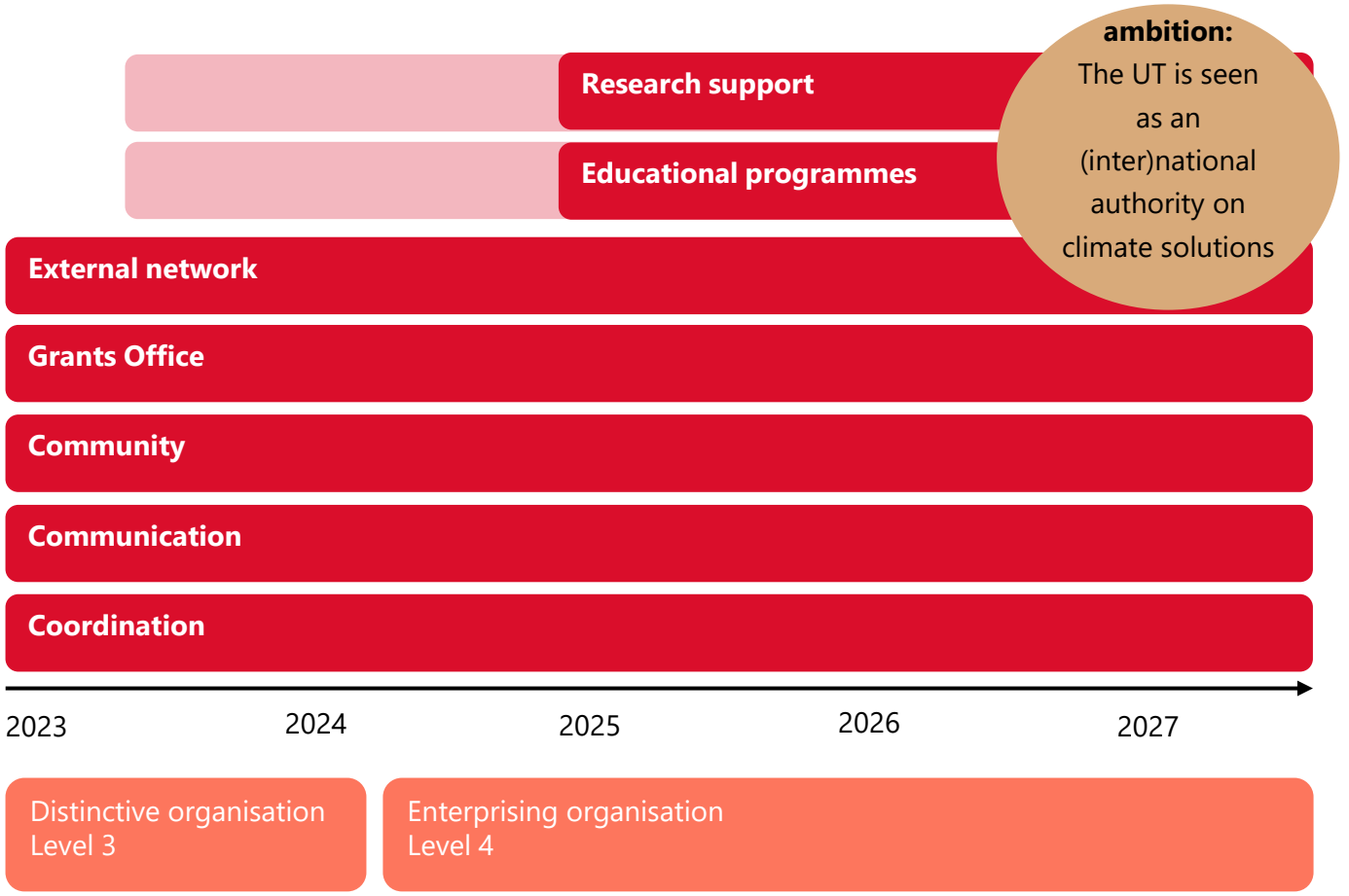
The second scenario takes on more tasks from the beginning, but still focusses on the relatively 'easy' tasks in the from the start. Activities concerning research support and educational programmes are *initiated* in the first 6-12 months, so that the programmes are *actually running* after the second year. We see this as the scenario that fits the current context of the UT best.

Advantages:

- Organisation is agile and flexible from the beginning because there are more 'building blocks' from the beginning. The organisation can 'ride the waves' that give most energy.
- Organisation still gets the chance to grow over time and prove itself.
- Community, coordination, and communication are relatively easy interventions with large relatively large impact. This so called 'low hanging fruit' is started first.
- Facilitating activities in the primary tasks of the university (research and education) are implemented earlier.

Disadvantages:

- A more intense organisation can achieve more impact, but also asks for more resources during the beginning.



Scenario 3

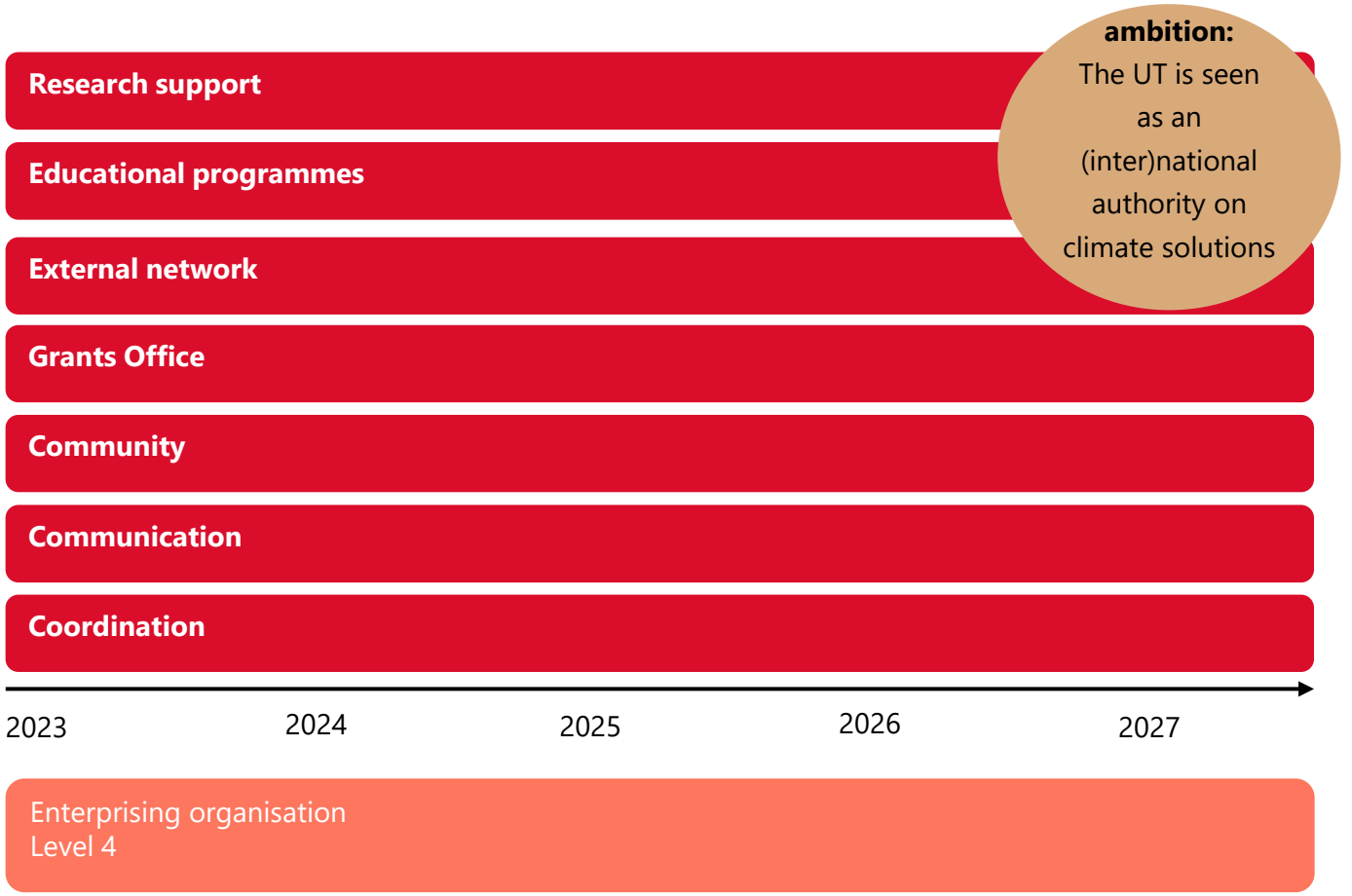
In the third scenario all building blocks are applied from the start on.

Advantages:

- The organisation and commitment speaks for itself; the university is clear on its ambition.

Disadvantages:

- All activities are started from the beginning, while some are more effective if others are established first (e.g. research support is more effective when there is a clear community, that can be reached through communication)
- Compared to the other two scenario's, more financial investments are necessary straight from the start.
- In the current labour market it might be challenging to find enough staff members in a short period of time.



Appendix

Annex A: Exposure of other Dutch universities on climate change (1)

In the table on the next slides an overview is given of publicly financed universities in the Netherlands and their exposure/expertise on the topic of climate change. This is based on a scan of their websites, with a greater focus on the technical universities. The University of Twente itself is excluded and so are the theological universities and university of humanistic studies.

It seems that Delft University of Technology is especially focussed on branding itself as a university that works on climate change. There is climate change institute, experiments on campus, a special part of the website is contributed to the topic. Within setting up the cooperation and communication on climate change for the UT this is an interesting example to look at.

University	Findings
Delft University of Technology	TU Delft's mission is to contribute significantly to a sustainable society for the twenty-first century by conducting ground-breaking scientific and technological research. In their strategic priorities document they make strategical choices of scientific themes (amongst others Climate Action, Energy transition, Health & Care, Digital Society and Urbanizaton & Mobility) and living labs. A whole section of the website is focussed at sustainability. Their Rector Magnificus expressed his wish to make TU Delft the world's climate university. For this they use their own campus as a living lab. There is a specific Climate Institute with a vision on climate action and an action programme. Their research focusses on: • Climate Science (monitoring and modelling to identify what is happening with the climate) • Climate Change Mitigation (what action can we (still) take in order to combat climate change?) • Climate Change Adaptation (how can we adapt to a changing climate?) and • Climate Governance (what can we do to support politics and society in taking climate measures?). The university uses these overarching themes as the basis for their recruitment of additional academics to work on climate solutions as part of seven so-called flagship research programmes. This includes regional monitoring and modelling of climate change, climate engineering, negative emissions, circularity, tackling urban heat and flood protection. There is a team working on implementing sustainability in the different educational programme types. 'A TU Delft graduate is therefore competent to implement gained skills and knowledge into their engineering practices and subsequently contribute to climate action.' Furthermore they aim to set up a climate action hub to support leaders, policymakers and industry.

Annex A: Exposure of other Dutch universities on climate change (2)

The other technical universities also work on the topic. The way the University of Eindhoven is connected to the relevant industries is something that might be considered when looking into the network of the UT climate education and research. Furthermore the WUR very much highlights their focus on implementing nature based solutions. Taking a clear stance on focus topics helps to sharpen the profile.

University	Findings
Eindhoven University of Technology	The university educates students and advances knowledge in science & technology for the benefit of humanity. Their campus is in the centre of technology hub: Brainport Eindhoven. They mention they globally stand out when it comes to collaborating with advanced industries (forming an ecosystem). One third of their professors has a joint assignment in industry. Their aim is to improve quality of life through sustainable innovations. The University Fund has the ambition to contribute to the solutions for societal issues. Their strategic research areas are: Energy, Smart Mobility and Health. Their education is aimed at tackling social challenges through technical innovations through challenge based learning.
Wageningen University and Research	The research and education of WUR focuses on five themes: • Climate Change, • Biodiversity, • Feeding the World, • Circular Economy and • Healthy Food & Living. The (sixth) theme Artificial intelligence runs like a thread through all the themes. On the topic of climate change they focus on the impacts on society and ecosystems, and develop evidence-based, integrated solutions and technology: the Wageningen Climate Solutions. With Wageningen Climate Solutions WUR aims to co-create opportunities to improve the local quality of life. Their approach is an interdisciplinary way of tackling challenges and furthermore they have a strong focus on implementing Nature Based Solutions.

Annex A: Exposure of other Dutch universities on climate change (3)

Also the non-technical universities express interest in the topic of climate change or sustainability in general. For example the Utrecht university seems to also combine alpha and beta fields. For climate it takes up a specific focus on delta's.

University	Findings
Utrecht University	This university uses the motto: 'With open minds, open attitudes and open science, we join forces to create tomorrow's solutions.' Their strategic themes are: Dynamics of Youth, Institutions for Open Societies, Life Sciences and Pathways to Sustainability. In the last one researchers from the humanities, social and natural sciences work together with external partners to develop a more sustainable society. Specific focus areas relevant to climate change are (amongst others): • Energy in transition, • Transforming cities, • Sustainable ocean, • Critical pathways, circular • Economy and water, • Climate & future deltas. • In research and teaching the university wants to give direction to necessary transformations therefore focussing on contributing to the sustainable development goals.
University of Groningen	This university connects education and research with sustainable and economic processes within society. There are three spearheads: • Energy, • Healthy Ageing • Sustainable Society. The university develops a changing stream of projects in which academic knowledge is being developed, and used to improve policy development and decision making. Looking at climate change their focus is on examining (polar) climate change and its associated impacts by using state-of-the-art global climate models and earth system models as well as relevant observations. Their main focus is on understanding the processes and feedbacks that govern climate change that are related to mean changes as well as to climate variability and extremes.

Annex A: Exposure of other Dutch universities on climate change (4)

University	Findings
Tilburg University	Tilburg University focusses at studying and understanding society contributing to solving complex societal issues. They do so by using state-of-the-art knowledge in the disciplines of economics, business studies, and entrepreneurship, the social and behavioural sciences, law and public governance, the humanities and digital sciences, and theology. Although probably part of research and education there does not seem to be a specific focus on climate change.
Maastricht University	Maastricht University research is focused on three themes: Quality of Life, Learning and Innovation and Europe and a Globalising World. Climate change is one of the focus topics under these themes. There seems to be a focus on the legal aspects of climate change.
Radboud University	Combining various scientific disciplines allows this university to delve into multidisciplinary and interdisciplinary research. Their research is focused on the complex issues of today and tomorrow. One of their focus topics is sustainability. Here they look at how products, technology and human actions impact the natural world. Topics mentioned on the website are (amongst others) climate policy, ethics of sustainability, impact of humans on biodiversity, environmental law.
University of Amsterdam	The University of Amsterdam's research is oriented towards building a sustainable, fair, and healthy future through innovative research that examines complex societal challenges. There are interfaculty research priority areas. These have the aim of stimulating innovation at the UvA by bringing together various disciplines from across faculty boundaries. A priority related to climate change is: Energy transition through the lens of the SDGs.

Annex A: Exposure of other Dutch universities on climate change (5)

University	Findings
Erasmus University Rotterdam	The universities research focusses on initiatives around: Dynamics of Inclusive Prosperity, Smarter Choices for Better Health, Vital Cities and Citizens, Societal Impact of AI. When looking at climate change in education this focusses on critical social, economic and governance dimensions.
Leiden University	Sustainability is broadly implemented in education. Research-wise there is Liveable Planet – Sustainable Futures an interdisciplinary research programme that is dedicated to climate change. Their aim is moving towards a society in which energy and raw materials are used in a way that preserves natural capital and keeps the impact on health to a minimum. Research focusses on how natural and economic ecosystems function and their impact on health and natural capital. Furthermore they look at how social drivers affect the human ecosystem and explore new types of government policies and transition management for sustainability.
Open University	The research of the Open University is rooted within their six faculties. Apart from the disciplinary research programmes in eight academic fields, they have defined a multidisciplinary research programme: Innovating for Resilience. This consists of three research lines: Safety and Resiliency in Urban Environments, Learning and Innovation in Resilient Systems, Innovation in education. Focusing on climate change they do from both natural and social science perspectives. They study technical and policy options for mitigating and adapting to climate change.
VU University (Vrije Universiteit Amsterdam)	This university uses their expertise, open mindedness, enterprising spirit and multidisciplinary approach, thereby working on developing sustainable solutions that impact society. There are four profile themes: Connected World, Governance for Society, Human Health and Life Sciences, and Science for Sustainability. Under the last profile theme, scientists and students from VU Amsterdam are studying how they can create an ecologically healthy, socially just and economically viable world.

Bij TwynstraGudde werken adviseurs en managers aan veel van de grote en urgente thema's van deze tijd. Denk aan veiligheid, energie, klimaat, digitalisering, mobiliteit, duurzaamheid, financiën en gezondheid. We bieden onze opdrachtgevers binnen zowel de overheid als het bedrijfsleven unieke, werkbare oplossingen en brengen complexe projecten en programma's tot een goed einde. Iets creëren van blijvende waarde, daar gaan we voor. Daardoor hebben we een directe impact op (toekomstige) maatschappelijke en economische ontwikkelingen. En dus een grote impact op morgen.

Fay van Zeijl
fvz@tg.nl

Susan Arts
sar@tg.nl

Marc van Leeuwen
mlq@tg.nl

TwynstraGudde

Impact op morgen.