Strategic Research Area 2014–2023 NTNU SUSTAINABILITY



On digital transformation and sustainability

NTNU DT workshop, 08.06.2021

Helge Brattebø Director, NTNU Sustainability https://www.ntnu.no/barekraft





NTNU's strategy and sustainability diversity



Kunnskap for en bedre verden

NTNU strategi 2018-2025



https://www.ntnu.no/ntnus-strategi



https://www.ntnu.no/baerekraftmaal



NTNU Sustainability

www.ntnu.edu/sustainability



Knowledge for change

ic Research 114–2023



Director

Helge Brattebø Professor, Director NTNU Sustainability +47-73594744

95022976 helge.brattebo@ntnu.no Department of Energy and Process Engineering

Research Coordinator



Stig A. Larssæther Coordinator 2 +47-47819181

stig.larssather@ntnu.no Department of Energy and Process Engineering

Research Leader Area A: Biodiversity



Anders G. Finstad Professor → +47-+4790018546 anders.finstad@ntnu.no Department of Natural History

Research Leader Area B: Circular Economy



Edgar Hertwich International chair and Professor

+47-97512109 edgar.hertwich@ntnu.no Department of Energy and Process

Engineering

Research Leader Area C: Climate Change



Tomas Moe Skjølsvold Professor J +47-73550189 J +47-93634270 tomas.skjolsvold@ntnu.no Department of Interdisciplinary Studies of

Culture

Reasearch Leader Area D: Sustainable Cities



Annemie Wyckmans Professor, head of NTNU Smart Sustainable Cities +47-40871863

annemie.wyckmans@ntnu.no Department of Architecture and Planning



How to approach the SDGs?



SUSTAINABILITY



How to understand interconnections in the SDGs?





Adapted by Prof. Katherine Richardson, University of Copenhagen, 2019. Design by KØSCH





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6 ECONOMIC GROWTH

D AND STRONG

What is sustainability science?

Report to UNESCO: "Global Sustainable Development Report 2019"

- Interdisciplinary research focused on coupled human-environment systems or socio-ecological systems
- Draws on all scientific disciplines, including social sciences and humanities in a problem-solving approach



GSDR 2019

- Shed light on **complex, often value-laden nature-society interactions**, while generating usable scientific knowledge for sustainable development.
- **Can help tackle the trade-offs** and contested issues involved in implementing the 2030 Agenda, such as dealing with risks, uncertainty, ethical dimensions and the appropriate use of the precautionary principle.
- Involves working with affected groups and communities to recognize problems and goals, and identify key trade-offs.



The SDGs and unintended side-effects!



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The SDG matrix shows that one SDG cannot be reached without influencing also other SDGs!

- Positive synergies can occur and should be stimulated
- Negative conflicts will occur,
 should be minimized, and
 calls for trade-offs

Do we understand these unintended effects, and the system complexity into the future?

A 2 ½ minute video highlights the main messages of the report: https://www.youtube.com/watch?v=N8txczWYzok#action=share

Box 1-2 Interactions among Sustainable Development Goals



The figure above shows the result of a systematic compilation of knowledge about causal interactions among the Sustainable Development Goals, extracted primarily at the target level and using the 7-point scale developed by the International Council for Science (ICSU)²⁶ in terms of co-benefits

Message from Prof. Katherine Richardson

Copenhagen University & Co-author of GSDR2019



SDGs are a vision for how we want to share the Earth's resources among 9-10 billion



Research to support societal development needs to move from "sector (discipline)" to "system" focus!!



Focus not on the goals, themselves, but the interactions between them!



NTNU's Annual Plan 2021

NTNU increases the priority to sustainability with focus on knowledge for transformative changes and integration of sustainability

A sustainability inititative along two pathways:

- A. A new *interdisciplinary research programme for better systems understanding* related to transformative changes for sustainability
- B. Better and more *systematic integration* of sustainability in faculties and departments (education, research, innovation and dissemination)







A: Interdisciplinary research call



Knowledge production on transformative changes (cfr EU Green Deal, UN-panels, Stockholm Recilience Centre and UNESCO), particularly regarding the challenges on climate change, biodiversity and social inequality.

- Systems effects (environmental, social and economic), systems dynamics and positive/negative side-effects across SDGs, as result of major technology shifts and enabling technologies (incl. digitalization/AI, nano- and biotechnology) and up-scaling of new solutions in society over time (incl. scenarios, lifecycle impacts and tradeoffs)
- Processes and strategies that can enable transitions away from today's situation to more sustainable systems at different society scales. How does majnor technology shifts happen and how are enabling technologies developed, implemented and taken into use? How to accelerate, develop and manage transition processes, beyond implementing 'policy' and also understand transition processes given current norms, cultures, practices, organizations, technologies and markets?
- Systems changes on the scale of individuals and actors, in particular based on the SSH-disciplines. How to ensure change through democratic and inclusive processes that give room for different voices and perspectives (e.i. Gender, justice, North-South, health, RRI-perspectives).





Webinars spring semester 2021



Webinars to stimulate the attention to sustainability and discuss different approaches, show examples, inspire dialogue and new initiatives at NTNU.

Webinars:

- 25.01 Introduction to sustainability at NTNU
- 04.02 Why a new sustainability initiative at NTNU?
- 17.02 Core challenges addressed by the UN panels IPCC, IPBES and IRP
- 05.03 Sustainability in education
- 12.03 Partnerships for sustainability
- 22.03 Sustainability in research
- 09.04 Sustainability in university operations
- 18.05 NTNU call for interdisciplinary sustainability projects (40 phds)

Available for streaming at: www.ntnu.no/sustainability



The European Green Deal

https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en



A European Green Deal

Striving to be the first climate-neutral continent



Climate change and environmental degradation are an existential threat to Europe and the world. To overcome these challenges, Europe needs a new growth strategy that will transform the Union into a modern, resource-efficient and competitive economy, where

- there are no net emissions of greenhouse gases by 2050
- · economic growth is decoupled from resource use
- no person and no place is left behind

The European Green Deal is our plan to **make the EU's economy sustainable.** We can do this by turning climate and environmental challenges into opportunities, and making the transition just and inclusive for all.



Green Deal

Policy areas:

- Biodiversity
- From Farm to Fork
- Sustainable agriculture
- Clean energy
- Sustainable industry
- Building and renovating
- Sustainable mobility
- Eliminating pollution
- Climate action

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Actions

The European Green Deal provides an action plan to

- · boost the efficient use of resources by moving to a clean, circular economy
- · restore biodiversity and cut pollution

The plan outlines investments needed and financing tools available. It explains how to ensure a just and inclusive transition.

The EU aims to be climate neutral in 2050. We proposed a <u>European Climate Law</u> to turn this political commitment into a legal obligation.

Reaching this target will require action by all sectors of our economy, including

- · investing in environmentally-friendly technologies
- · supporting industry to innovate
- · rolling out cleaner, cheaper and healthier forms of private and public transport
- decarbonising the energy sector
- · ensuring buildings are more energy efficient
- · working with international partners to improve global environmental standards

The EU will also provide financial support and technical assistance to help those that are most affected by the move towards the green economy. This is called the <u>Just Transition Mechanism</u>. It will help mobilise at least €100 billion over the period 2021-2027 in the most affected regions.

EU Climate Action – Policies

https://ec.europa.eu/clima/index_en

European Commission > Energy, Climate change, Environment >							
Clim	nate	Action					
Hor	me	About us 🗸	Climate change 🗸	EU Action 🗸	Citizens ❤	News & Your Voice 🗸	Contracts & Grants 🗸

Policies

EU climate action and the European Green Deal	Climate strategies & targets	EU Emissions Trading System (EU ETS)		
Effort sharing: Member States' emission targets	Forests and agriculture	Transport emissions		
International action on climate change	Innovation Fund	Protection of the ozone layer		
Fluorinated greenhouse gases	Adaptation to climate change	Funding for climate action		



EU Climate Action – Policies

https://ec.europa.eu/clima/index_en

European Commission > Energy, Climate change, Environment > **Climate Action** Climate change V Main elements of the strategy EU Action ~ Citizens ~ News & Your Voice V Contracts & Grants ~ The Communication identifies three priority areas for action: Increasing the efficiency of the transport system by making the most of digital technologies, smart pricing and further encouraging the shift to lower emission transport modes, Speeding up the deployment of low-emission alternative energy for transport, such as ad-**EU Emissions Trading System** vanced biofuels, electricity, hydrogen and renewable synthetic fuels and removing obstacles to the (EU ETS) Moving towards zero-emission vehicles. While further improvements to the internal combustion **Transport emissions** engine will be needed, Europe needs to accelerate the transition towards low- and zero-emission Cities and local authorities will play a crucial role in delivering this strategy. They are already implementing incentives for low-emission alternative energies and vehicles, encouraging active travel (cycling Protection of the ozone layer and walking), public transport and bicycle and car-sharing /pooling schemes to reduce congestion and



Funding for climate action

Fluorinated greenhouse gases

Adaptation

Energy Efficiency

https://ec.europa.eu/energy/topics/energy-efficiency_en

Energy								
Home	Topics	Data and analysis	Funding	Studies	Publications	Consultations	Events	News

Energy efficiency

Energy efficiency – targets, directive and rules	Energy efficient buildings	Cogeneration of heat and power
The 2012 directive, as amended in 2018, sets rules and obligations for the EU's 2020 and 2030 energy efficiency targets.	Making buildings more energy efficient will contribute significantly to the EU achieving its energy and climate goals.	The EU promotes cogeneration in order to improve energy efficiency in Europe.
Energy label and ecodesign	Financing energy efficiency	Heating and cooling
EU labelling and ecodesign rules promote more energy efficient products, helping consumers to save energy and money.	Mobilising private financing for energy efficiency investments.	The EU has launched a heating and cooling strategy to address the large amount of energy used by the building sector and by industry.



Energy Efficiency

https://ec.europa.eu/energy/topics/energy-efficiency_en





Circular Economy

https://ec.europa.eu/environment/circular-economy/

EU Circular Economy Action Plan

A new Circular Economy Action Plan for a Cleaner and More Competitive Europe



European Green Deal, Europe's new agenda for sustainable growth.

The new Action Plan announces initiatives along the entire life cycle of products, targeting for example their design, promoting circular economy processes, fostering sustainable consumption, and aiming to ensure that the resources used are kept in the EU economy for as long as possible.

It introduces legislative and non-legislative measures targeting areas where action at the EU level brings real added value.



Actions

The new Circular Economy Action Plan presents measures to:

- Make sustainable products the norm in the EU;
- Empower consumers and public buyers;
- Focus on the sectors that use most resources and where the potential for circularity is high such as: electronics and ICT; batteries and vehicles; packaging; plastics; textiles;
- construction and buildings; food; water and nutrients;
- Ensure loss waste;
- Make circularity work for people, regions and cities,
- · Lead global efforts on circular economy.

Implementation

The Commission is committed to ensure a swift implementation of all 35 actions. For an overview of the actions' implementation timetable, see the relevant file in "Key documents".

On 10 November 2020, the Commission adopted the first Action Plan's milestone: a proposal for a Regulation to modernise EU legislation on batteries. The aim is that batteries placed on the EU market are sustainable, circular, high-performing and safe all along their entire life cycle, that they are collected, repurposed and recycled, becoming a true source of valuable raw materials. More information are available <u>here</u>.

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Circular Economy Action Plan

The European

cycle of products in order to modernise and transform our economy while protecting the environment. It is driven by the ambition to make sustainable products that last and to enable our citizens to take full part in the circular economy and benefit from the positive change that it brings about.

3 top environmental concerns to citizens. The interviewed considered that the most effective ways of tackling environmental problems are by changing the way we consume and the way we produce.

ELECTRONICS and ICT

Electrical and electronic equipment is one of the fastest growing waste streams

Two in three Europeans would use their digital devices for longer provided performance is not significantly affected.

Industrial Ecology as an example



Industrial Ecology Programme

An interdisciplinary research programme who specializes in environmental sustainability analysis and modelling

- Life cycle assessment, LCA
- Material flow analysis, MFA
- Input output analysis, IO
- Scenario analysis

Ecosystems and Bioresources



Circular Economy and Resources



Energy, Transport, Buildings



Sustainable Production and Consumption





Life cycle assessment and footprints















Discussion elements



- How can digital transformation and digital technologies support the transitions to sustainability?
 - What new opportunities (that were not there before) can digital technologies offer to support sustainability?
 - Such as data collection, model development and simulations and predictions for decision support?
- Initiating proposals to the new 40 PhD@NTNU call?

