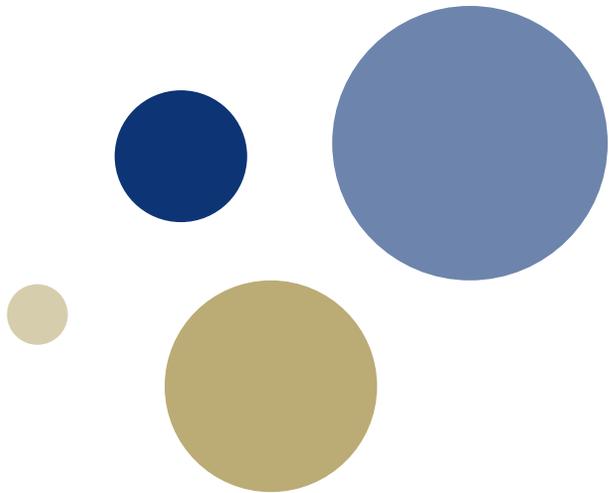
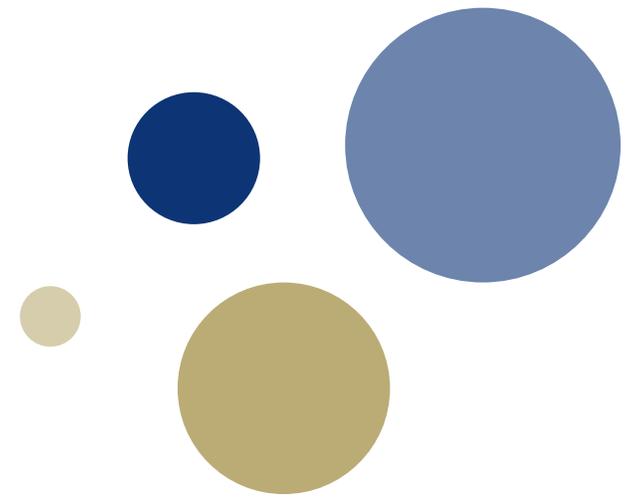
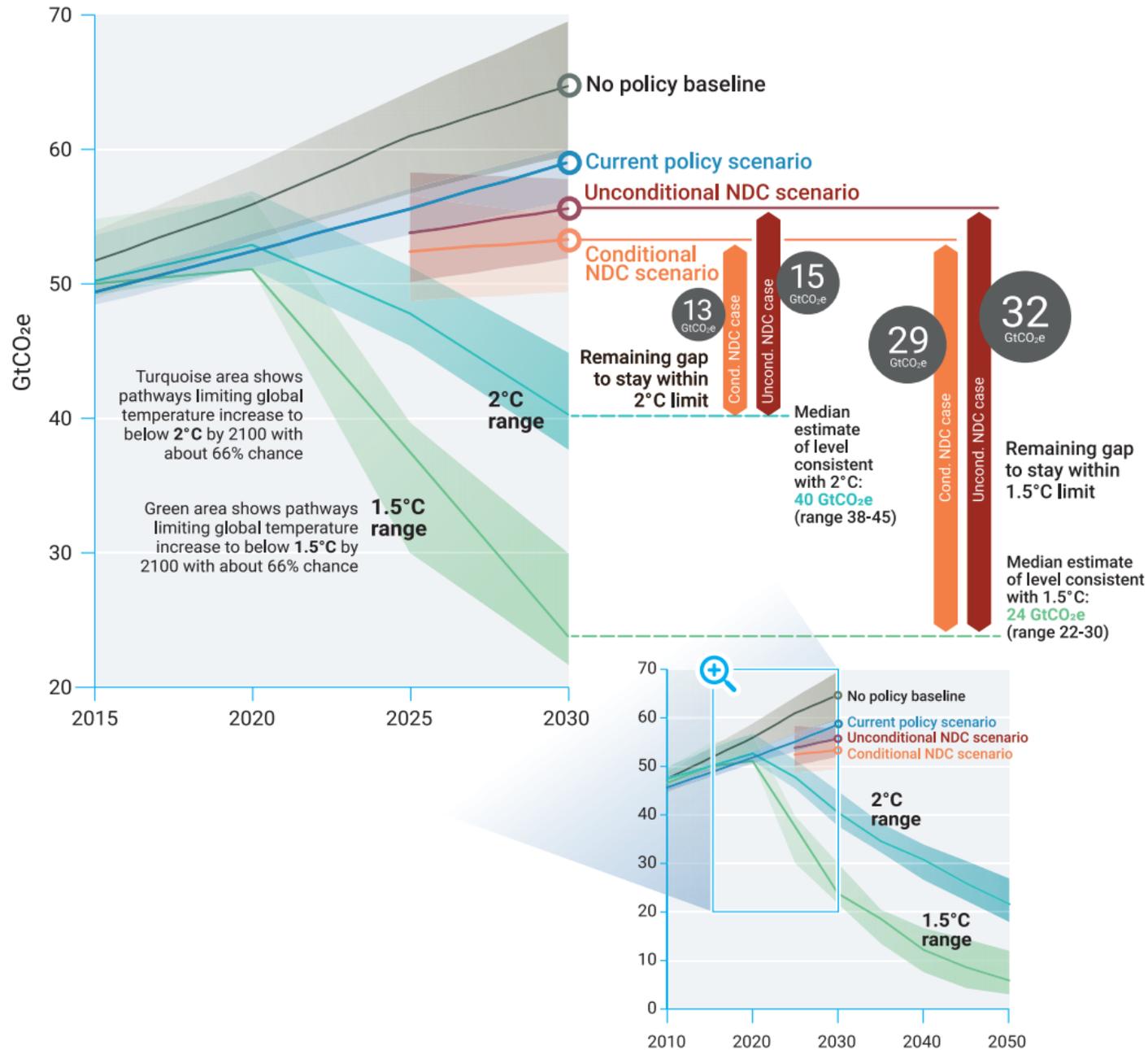


*Climate Change: Today's  
most important variable for  
the Maritime Businesses*

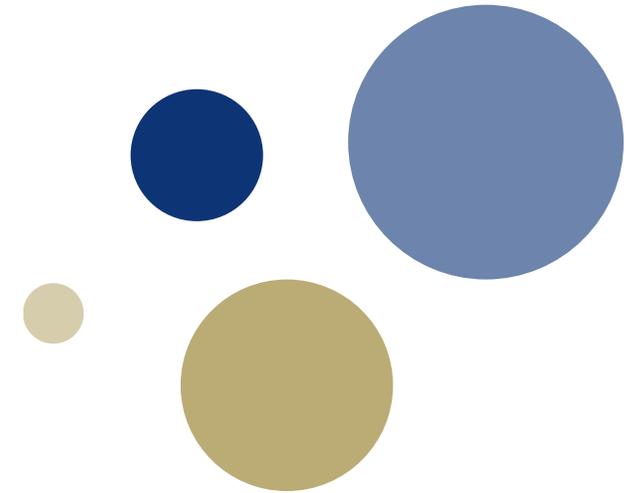
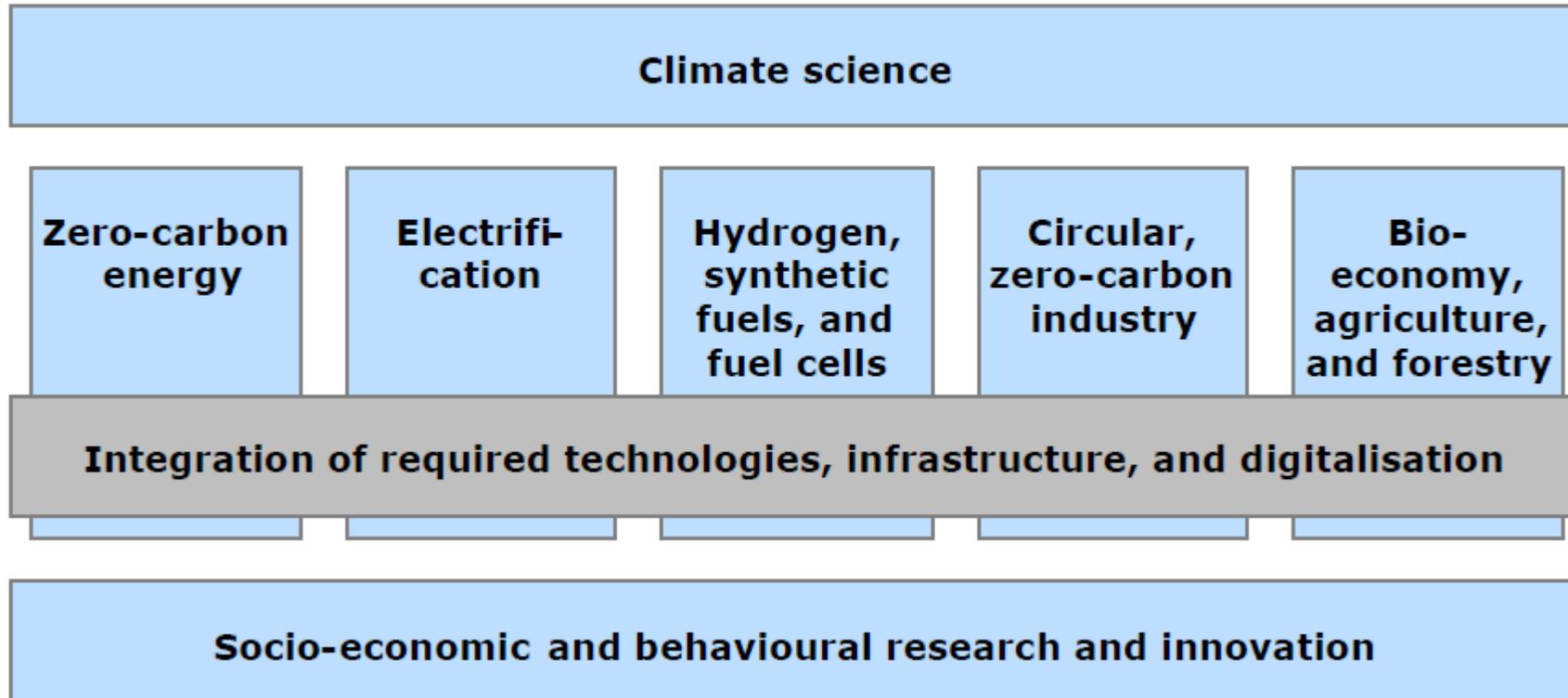


Maria Azucena Gutierrez Gonzalez, NTNU Oceans  
Maritime Hydrogen & Marine Renewable Energy Conference  
Florø, Norway 18-19 September

**Figure 3.1:** Global greenhouse gas emissions under different scenarios and the emissions gap in 2030 (median estimate and 10<sup>th</sup> to 90<sup>th</sup> percentile range).



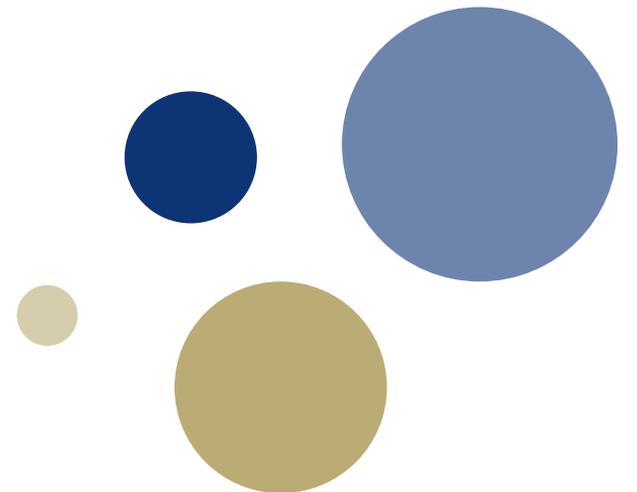
# Relevant research and innovation areas for decarbonisation



HORIZON EUROPE CLUSTER 5: CLIMATE, ENERGY AND MOBILITY: The main objectives of this cluster are to **fight climate change**, improve the competitiveness of the energy and transport industry as well as the quality of the services that these sectors bring to society.

"Missions require a shift from a market-fixing framework to a market-shaping framework, redefining the meaning of public value. Public value represents not just what citizens demand today, but what they may need or desire in the future"

*Mariana Mazzucato*



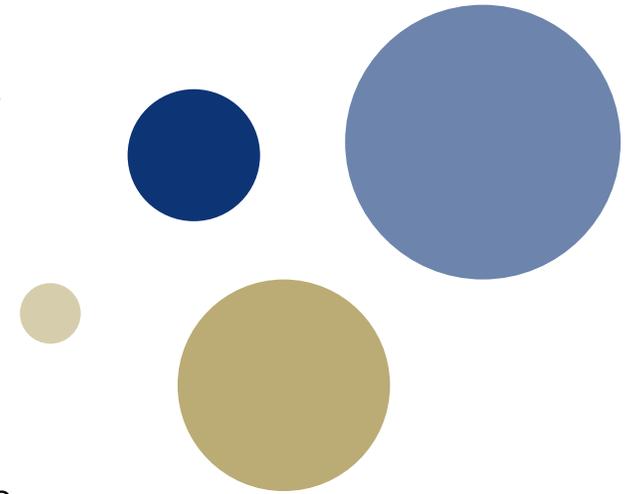
New €300 million investment to help steer green shipping - The Dutch bank ING and the European Investment Bank (EIB) have announced a serious boost towards greening the shipping industry. From **Climateaction.org 20 February 2018**

‘The Ocean is the 7th largest economy in the World’ World Wildlife Fund – From **forbes.com**

Investors are attracted by the growth predictions of the blue economy: Globally, the blue economy, including tourism, fisheries, marine renewable energy and biotechnology, is predicted to grow at double the rate of the rest of the economy by 2030. From **Forbes.com, by James Ellsmoor Jan 26, 2019**

“There remains an appetite for investment in shipping from both new and existing players. That is likely to continue in 2019 so long as shipping lives up to its ESG responsibilities.” Richard Greiner from Moore Stephens - **SeaTrade Maritime News Jan 2019**

Green investing in marine activities is ‘pretty exciting’ ‘If you calculate ... the oceans in an economic term, it is the seventh-largest GDP in the world ... It includes sustainable fisheries, it includes tourism that’s based on (the) ocean’ said Marisa Drew, CEO of the impact advisory and finance department at **Credit Suisse - 27 March 2019 cnbc.com**



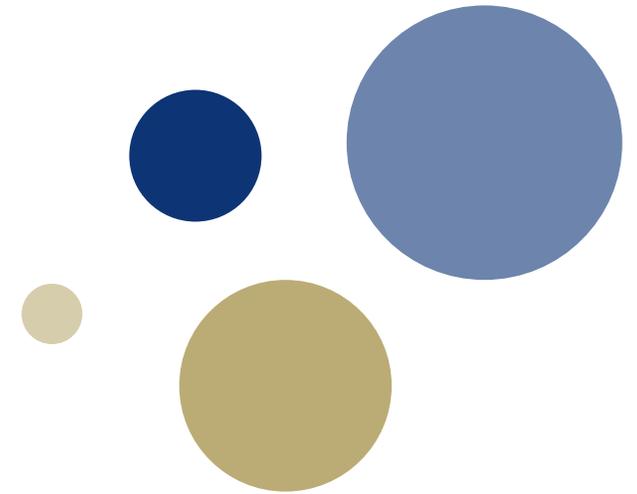
## FIGURE 1: SNAPSHOT OF GLOBAL SUSTAINABLE INVESTING ASSETS, 2016–2018

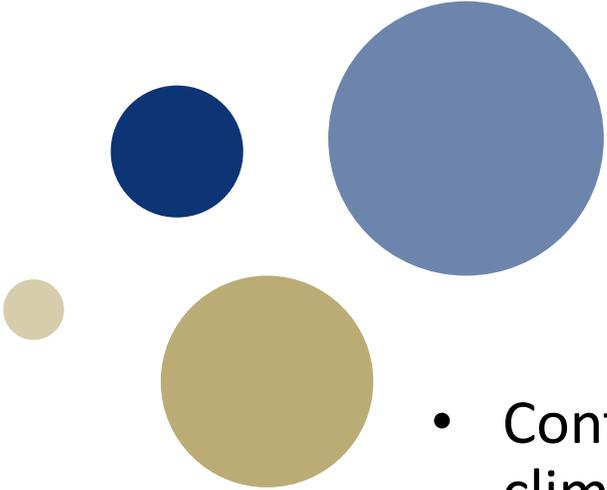
Region	2016	2018
Europe	\$ 12,040	\$ 14,075
United States	\$ 8,723	\$ 11,995
Japan	\$ 474	\$ 2,180
Canada	\$ 1,086	\$ 1,699
Australia/New Zealand	\$ 516	\$ 734
<b>TOTAL</b>	<b>\$ 22,838</b>	<b>\$ 30,683</b>

Note: Asset values are expressed in billions of US dollars. All 2016 assets are converted to US dollars at the exchange rates as of year-end 2015. All 2018 assets are converted to US dollars at the exchange rates at the time of reporting.

GROWTH OF GLOBAL SUSTAINABLE INVESTING ASSETS: At the start of 2018, global sustainable investment reached \$30.7 trillion in the five major markets, a 34 percent increase in two years. Global Sustainable Investment Alliance (GSIA)

Global Sustainable Investment Review, April 2019





# Communicating climate change

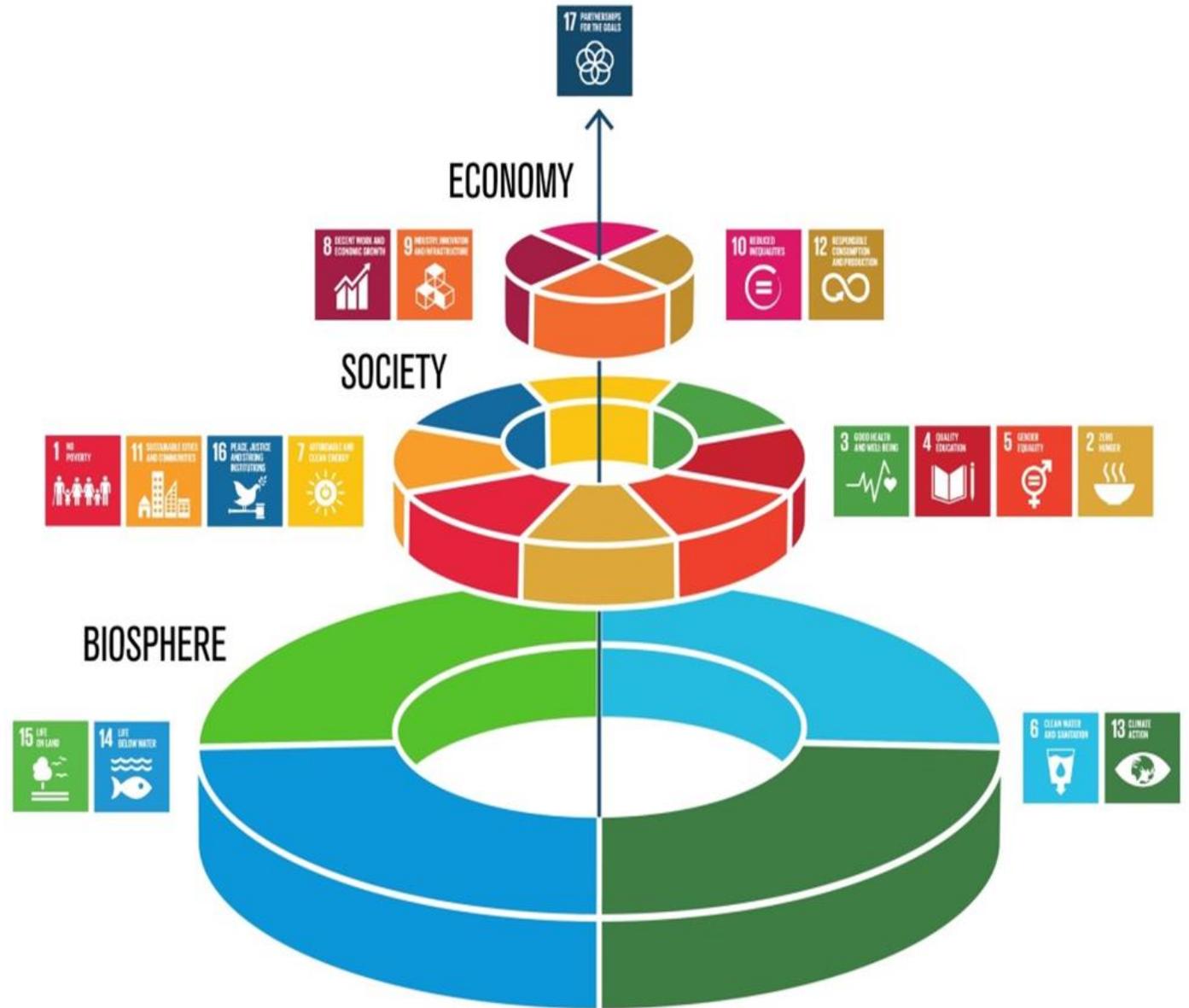
- Continuous confusion between: climate & weather, climate variability and climate change
- Traditional weather & climate as one of the most well-rooted convictions of popular wisdom
- Difficulty in communicating foreseen impacts in the future
- Counter-intuitive perceived effects of climate change
- Climate change science as a science of complexity
- Climate change and ecosystems

15: Life on Land  
 14: Life Below Water  
 6: Clean Water and Sanitation  
 13: Climate Action

1: No Poverty  
 11: Sustainable Cities and Communities  
 16: Peace and Justice Strong Institutions  
 7: Affordable and Clean Energy  
 3: Good Health and Well-being  
 4: Quality Education  
 5: Gender Equality  
 2: Zero Hunger

8: Decent Work and Economic Growth  
 9: Industry, Innovation and Infrastructure  
 10: Reduced Inequality  
 12: Responsible Consumption & Production

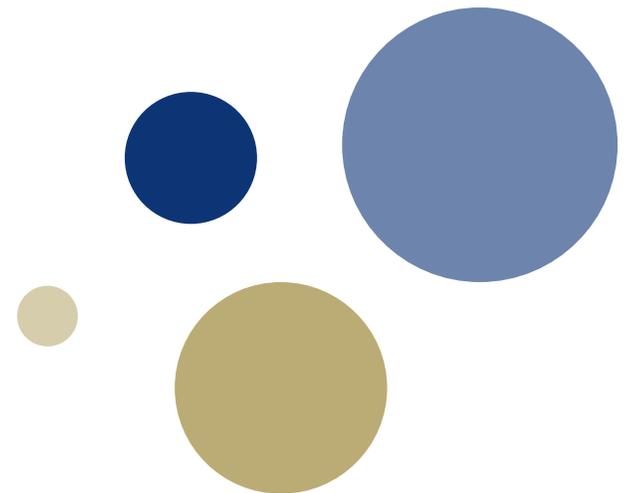
17: Partnerships to achieve the Goal





‘The high-carbon-consuming world must act: behavioral, policy changes, changes in identity and worldview’

Julia Leyda, Associate Professor of Film Studies  
Department of Art and Media Studies Faculty of Humanities  
Climate fiction, environmental humanities, and Anthropocene screen cultures

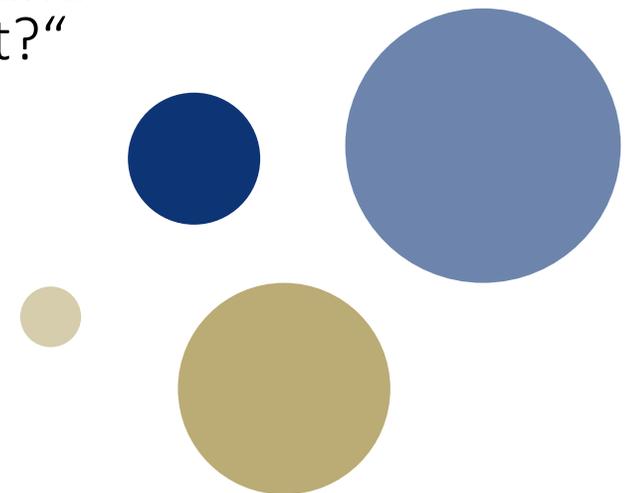


"We are more powerful than ever before, but we have very little idea what to do with all that power. Worse still, humans seem to be more irresponsible than ever.

Self-made gods with only the laws of physics to keep us company, we are accountable to no one. We are consequently wreaking havoc on our fellow animals and on the surrounding ecosystem, seeking little more than our own comfort and amusement, yet never finding satisfaction.

Is there anything more dangerous than dissatisfied and irresponsible gods who don't know what they want?"

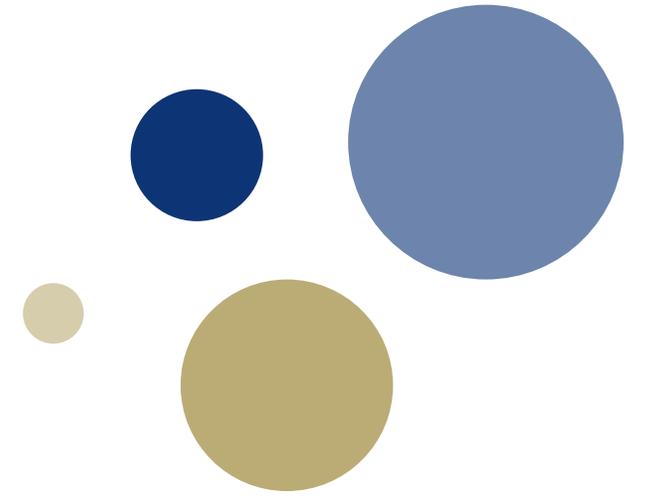
*Yuval Noah Hari*



# Strategic Research Areas 2014–2023



Through interdisciplinary cooperation, NTNU's strategic research areas NTNU Energy, NTNU Health, NTNU Oceans and NTNU Sustainability address complex challenges of great importance for society.



## Oceans at NTNU

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Knowledge for a better world



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