



**Panel:
Science for
sustainability and the
role of policy**



Sustainable Development is in our DNA

Treaty on European Union Article 3

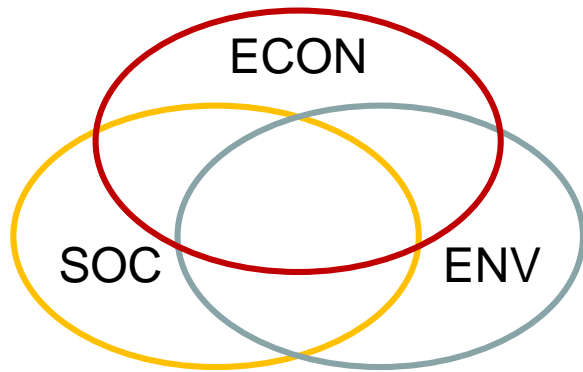
1. The **Union's aim is to promote peace, its values and the well-being of its peoples.**
2. The Union shall offer its citizens an area of freedom, security and justice without internal frontiers, in which the free movement of persons is ensured in conjunction with appropriate measures with respect to external border controls, asylum, immigration and the prevention and combating of crime.
3. The Union shall establish an internal market. It shall work for the **sustainable development of Europe** based on balanced economic growth and price stability, a highly competitive **social market economy**, aiming at full employment and social progress, and a **high level of protection and improvement of the quality of the environment**. It shall promote **scientific and technological advance**.
It shall combat social exclusion and discrimination, and shall promote **social justice and protection**, equality between women and men, **solidarity between generations** and protection of the rights of the child.
It shall promote economic, social and territorial cohesion, and solidarity among Member States.
It shall respect its rich cultural and linguistic diversity, and shall ensure that Europe's cultural heritage is safeguarded and enhanced.
4. The Union shall establish an economic and monetary union whose currency is the euro.
5. In its **relations with the wider world**, the Union shall uphold and promote its values and interests and contribute to the **protection of its citizens**. It shall contribute to peace, security, the **sustainable development of the Earth**, solidarity and mutual respect among peoples, free and **fair trade**, **eradication of poverty** and the protection of human rights, in particular the rights of the child, as well as to the strict observance and the development of international law, including respect for the principles of the United Nations Charter.
6. The Union shall pursue its objectives by appropriate means commensurate with the competences which are conferred upon it in the Treaties.

It is about transforming our world

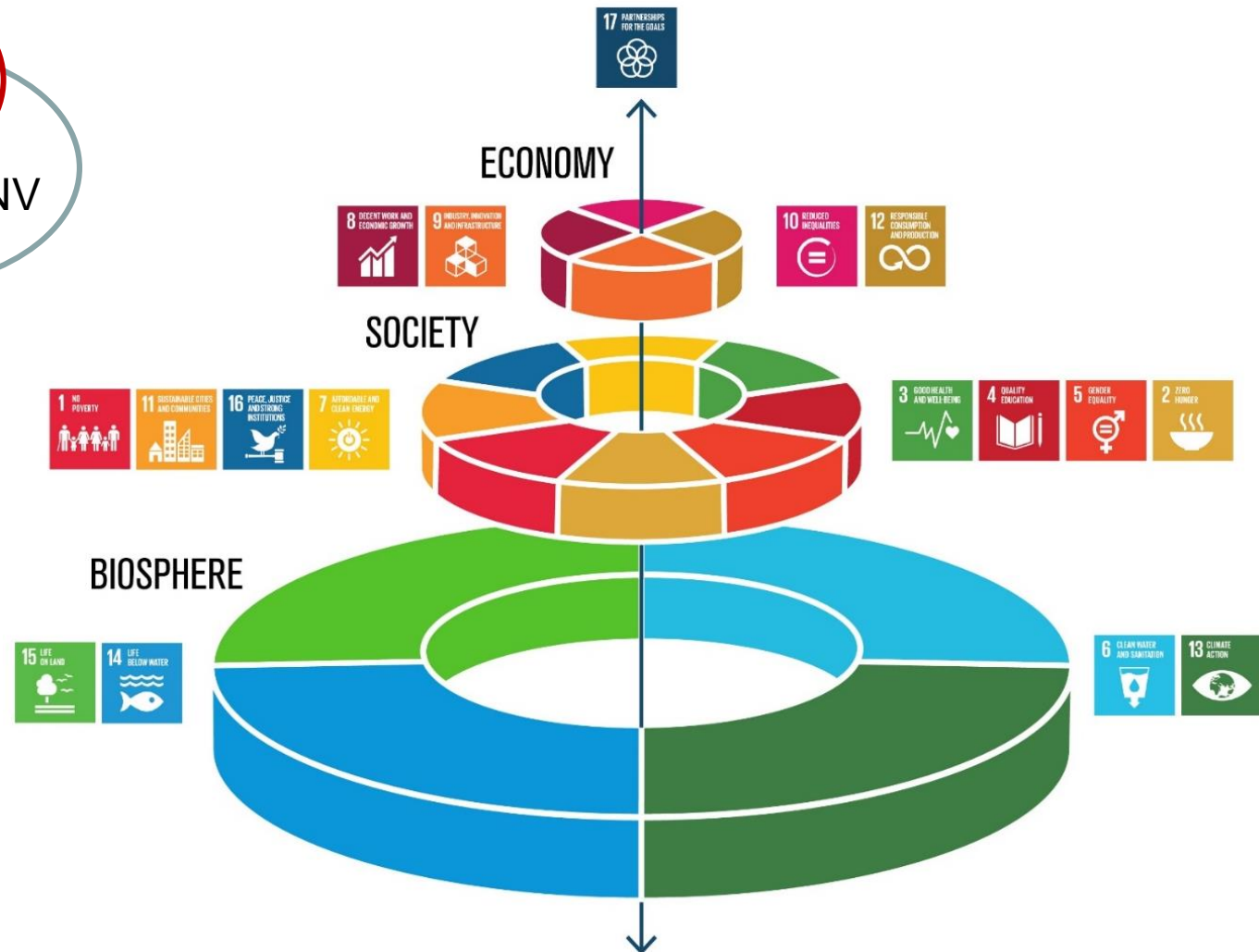
2030 Agenda for Sustainable Development



A holistic approach: the sum is more than 17 goals and 169 targets



Bruntland Commission
Our Common Future, 1987



Towards a sustainable Europe by 2030



3 Scenarios

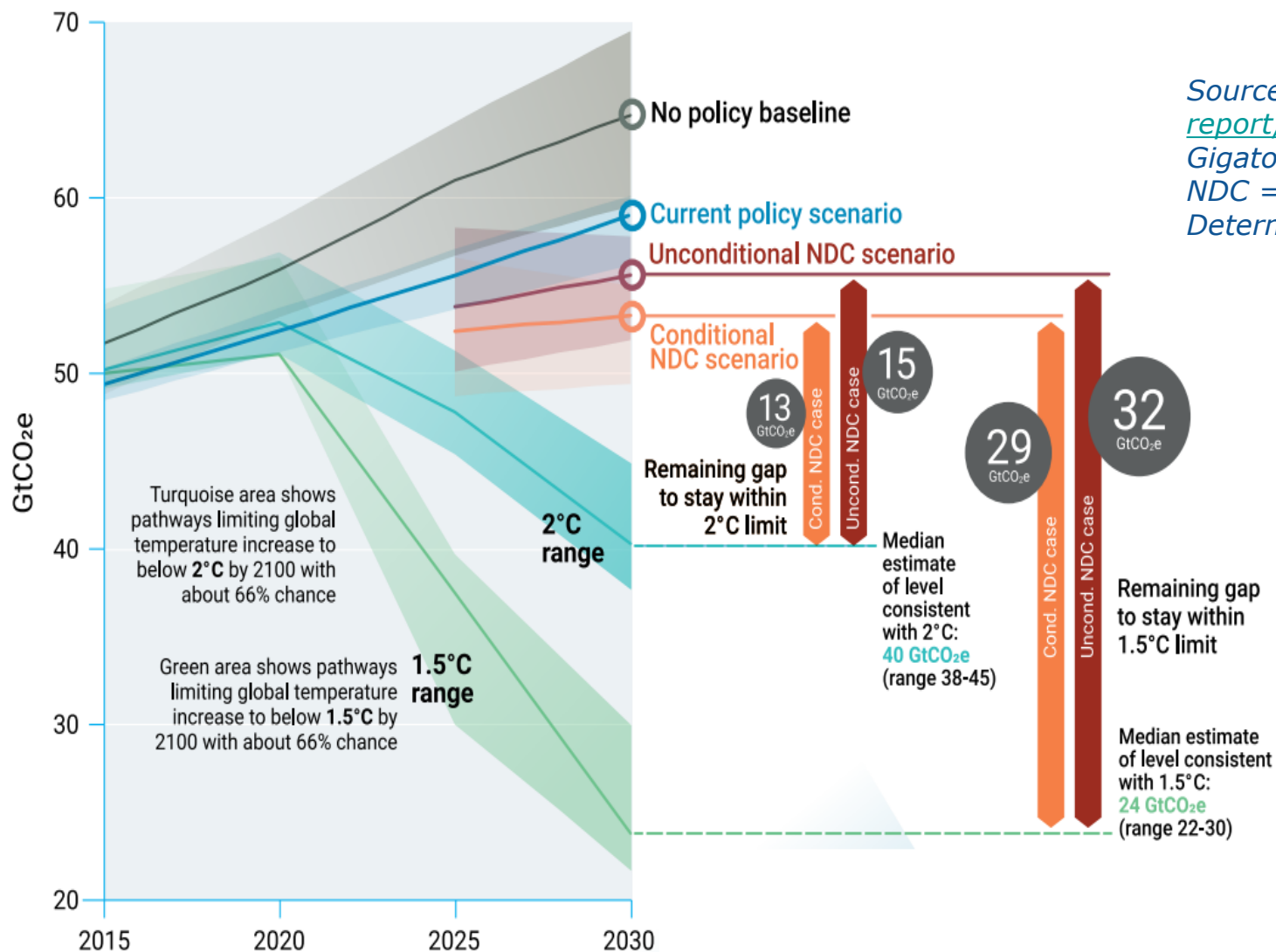
- 1) An overarching EU SDG strategy to guide all the actions of the EU and its Member States

Under this scenario, the United Nations 2030 Agenda and the **SDGs would be our compass and map** and thus determine the strategic framework for the EU and its Member States.

- 2) Continued mainstreaming of the SDGs in all relevant EU policies by the Commission, but not enforcing Member States' Action
- 3) Putting enhanced focus on external action while consolidating current sustainability ambition at EU level

The emissions gap is widening

Figure ES.3: Global greenhouse gas emissions under different scenarios and the emissions gap in 2030 (median estimate and tenth to ninetieth percentile range)



Source : [UN emissions gap report, 2018](#), GtCO₂e = Gigatons CO₂ equivalent, NDC = Nationally Determined Contributions

ENVIRONMENT POLICY

'I would like people to panic' – Top scientist unveils equation showing world in climate emergency

24 September 2019

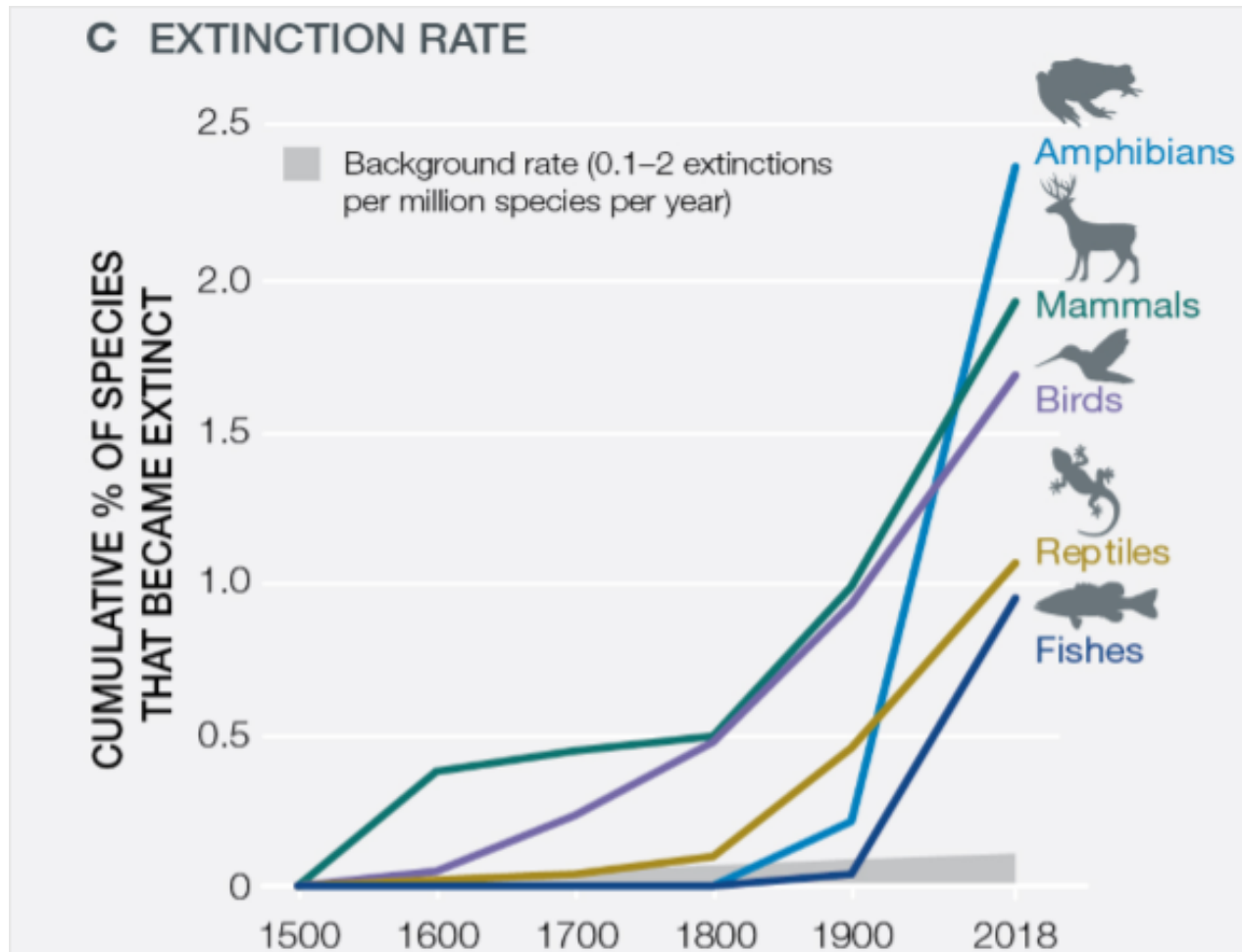
by Joanna Roberts

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'As Greta Thunberg would say, I would like people to panic and take action,' said Prof. Schellnhuber. Image credit - PlanetMallika/ Pixabay

A new equation showing that the world is 'deep in a climate emergency' was unveiled on 24 September by Professor Hans Joachim Schellnhuber, one of the world's leading authorities on climate change, who said that people still don't want to see the truth about the state we're in.

Human actions threaten more species with global extinction now than ever before



Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (2019), <https://www.ipbes.net/global-assessment-report-biodiversity-ecosystem-services>

Sixth mass extinctions threatens web of life

HORIZON
The EU Research & Innovation Magazine

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INTERVIEW ENVIRONMENT

Sixth mass extinction could destroy life as we know it – biodiversity expert

04 March 2019

by Richard Gray

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Prof. Mace says that we need to address the food system which is the major driver of biodiversity loss. Image credit - Courtesy of Professor Georgina Mace

Alarming declines in the number of insects, vertebrates and plant species around the world have raised fears that we are in the midst of a sixth major extinction that could cause a collapse of the natural ecosystems we rely upon to survive.

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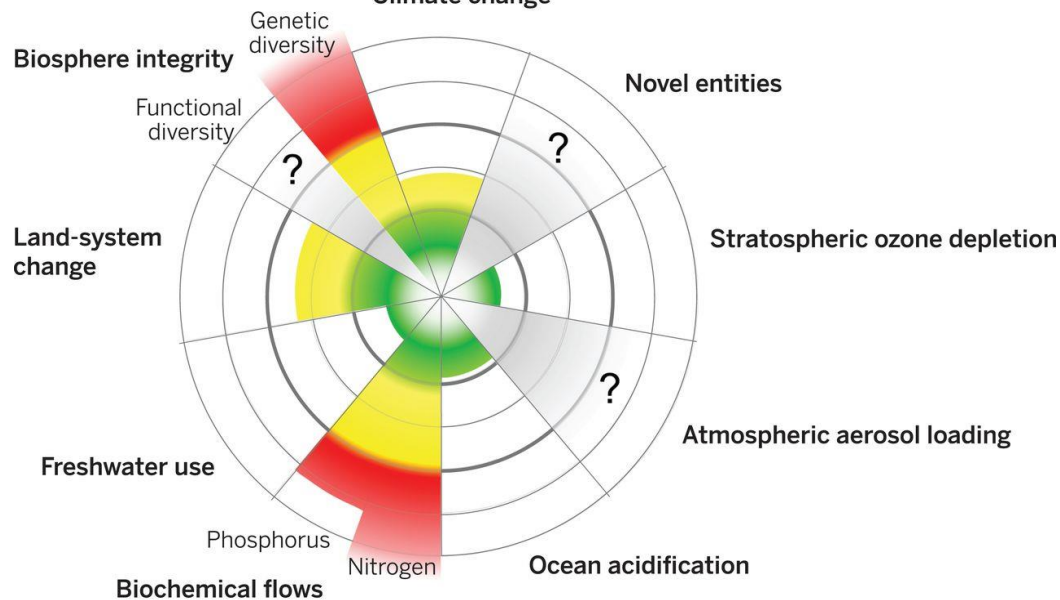
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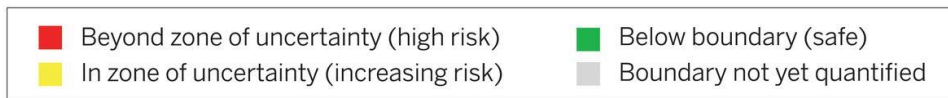
VIEWS

Several planetary boundaries are exceeded

Current status of the control variables for seven of the planetary boundaries. The green zone is the safe operating space, the yellow represents the zone of uncertainty (increasing risk), and the red is a high-risk zone.



[Planetary boundaries: Guiding human development on a changing planet](#)

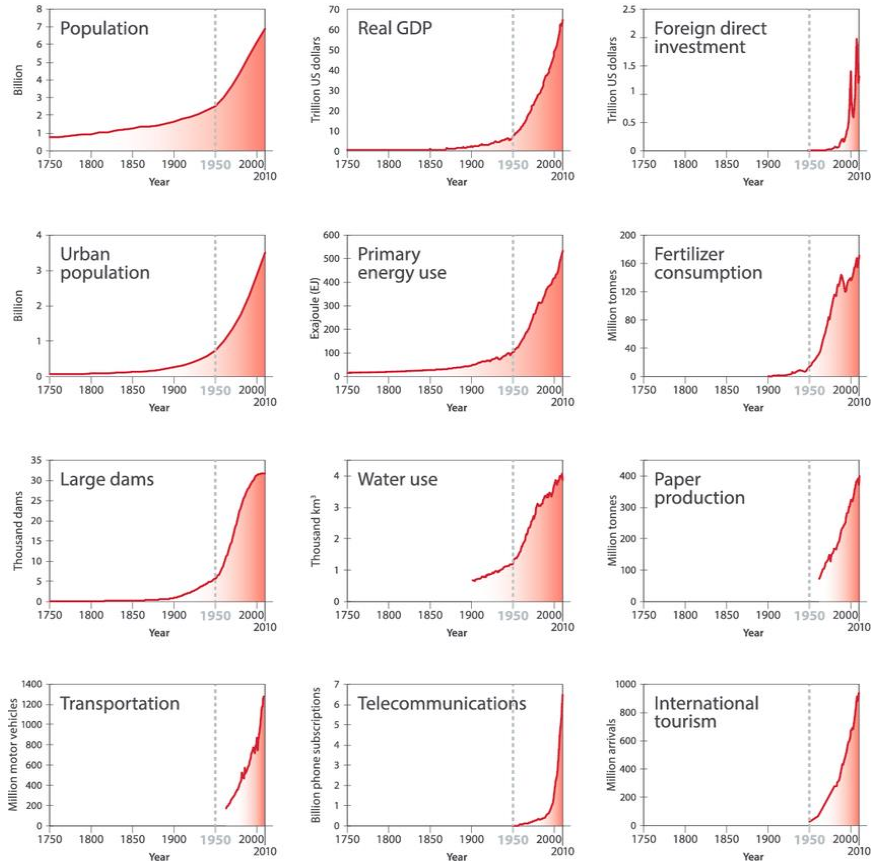


Will Steffen et al. *Science* 2015;347:1259855

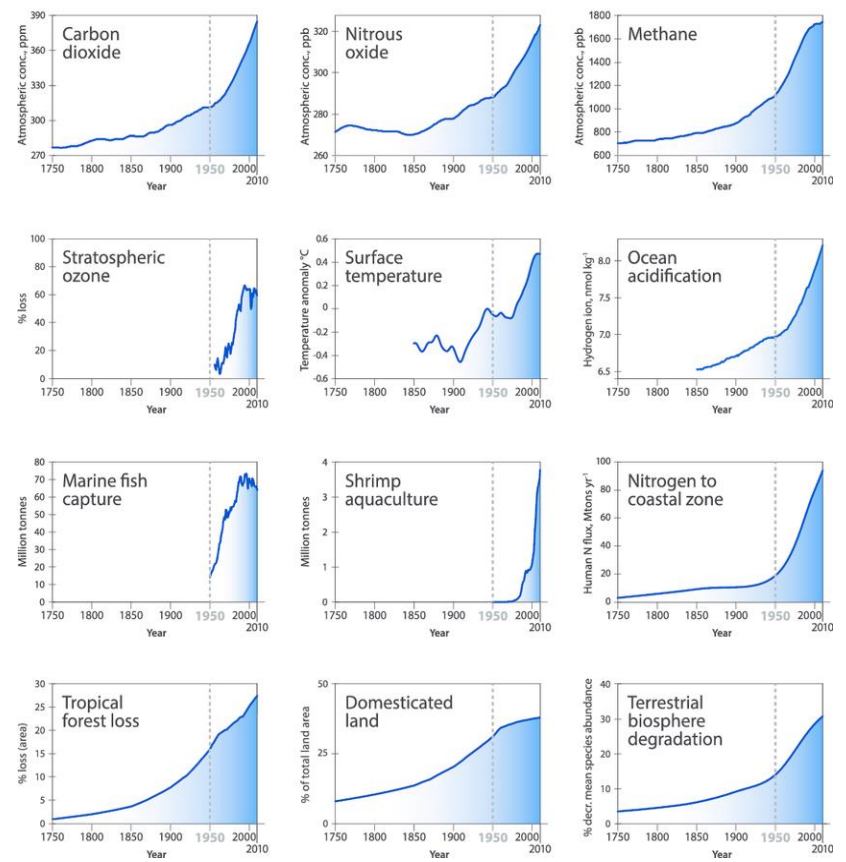


Humankind has entered the Anthropocene

Socio-economic trends



Earth system trends



Steffen et al (2015), [The Trajectory of the Anthropocene, The Great Acceleration](#)

Our resource use is a driver for the planetary emergency



*"Natural resource extraction and processing make up approximately **50 per cent of the total greenhouse gas (GHG) emissions. Resource-related impacts on water stress and biodiversity loss due to land use are even more significant at over 90 per cent. If the rising trend in resource-related impacts persists, the goals of the Paris agreement will become difficult to meet and the achievement of the Sustainable Development Goals, including SDG 15.5 to halt biodiversity loss, will be put at risk.**"*

<https://www.resourcepanel.org/reports/global-resources-outlook>



Johan Rockström

@jrockstrom

Following



Place the IPBES report next to the IPCC 1.5 C report and you have a full picture of a Planetary Emergency. Science cannot be more clear. The World needs to Transform. Now.



Human society under urgent threat from loss of Earth's natural life

Scientists reveal one million species at risk of extinction in damning UN report

theguardian.com

8:36 pm - 6 May 2019

2,404 Retweets 3,782 Likes



47



2.4K

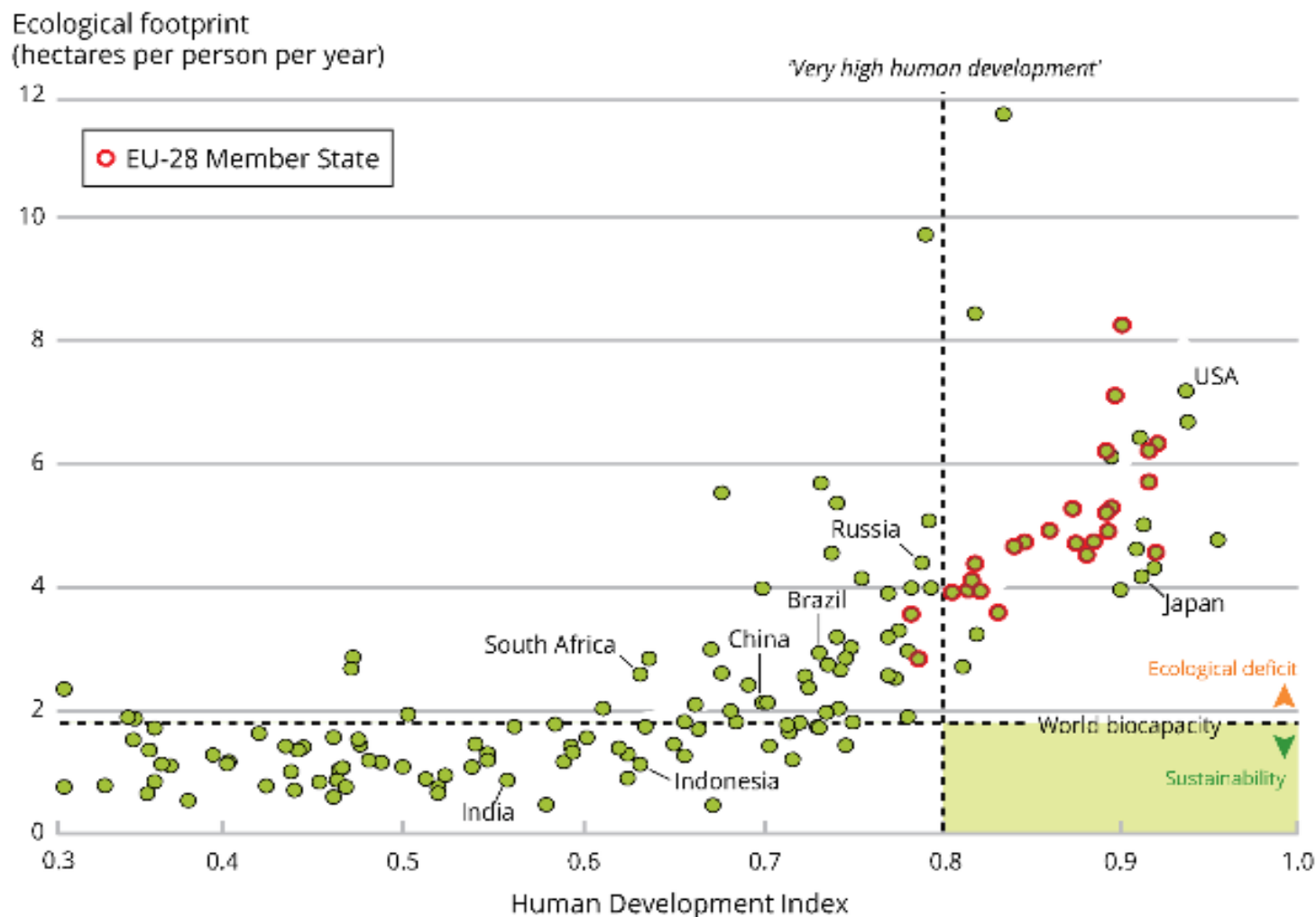


3.8K



European
Commission

Figure 0.1: Correlation of ecological footprint (2008) and the human development index (2012)



Source: Global Footprint Network, 2012; UNDP, 2014a. [National footprint accounts 2008](#) and [Human Development Index \(HDI\)](#)

Source : EEA, Setting the Scene, <https://www.eea.europa.eu/soer-2015/global/setting-the-scene>

Unprecedented change is needed now

- ***"Limiting global warming to 1.5°C would require rapid, far-reaching and unprecedented changes in all aspects of society."***

The [IPCC](#) highlights these linkages in its presentation of the 1.5°C report

- ***"deep transformation based on a fundamental reorientation of human values, equity, behavior, institutions, economies, and technologies"***

[Steffen et al \(2018\)](#)

- ***« Un changement systémique est nécessaire et urgent si l'on veut s'attaquer efficacement aux changements climatiques et à la crise des écosystèmes. »***

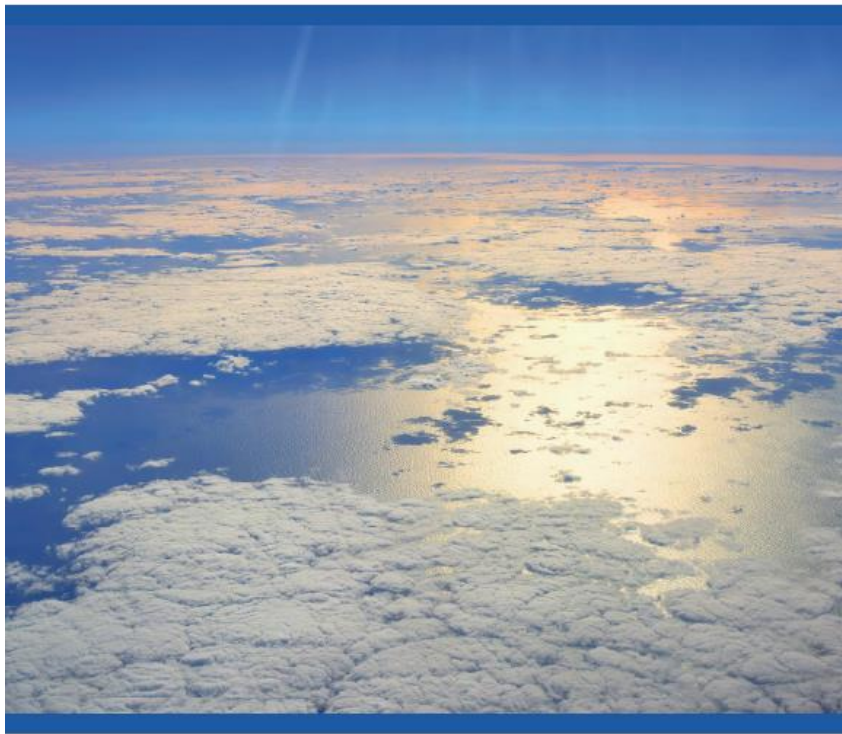
[Panel Climat et le Développement Durable, 2019](#)

Immediate and all-inclusive action Multiply ambition



United In Science

High-level synthesis report of latest climate science information
convened by the Science Advisory Group of
the UN Climate Action Summit 2019



"Only immediate and all-inclusive action [...] will enable us to meet the Paris Agreement."

*"The current level of NDC ambition needs to be roughly tripled for emission reduction to be in line with the 2°C goal and **increased fivefold for the 1.5°C goal**. Technically it is still possible to bridge the gap"*

NDC = Nationally determined contributions



WORLD METEOROLOGICAL ORGANIZATION



GLOBAL CARBON PROJECT



futureearth

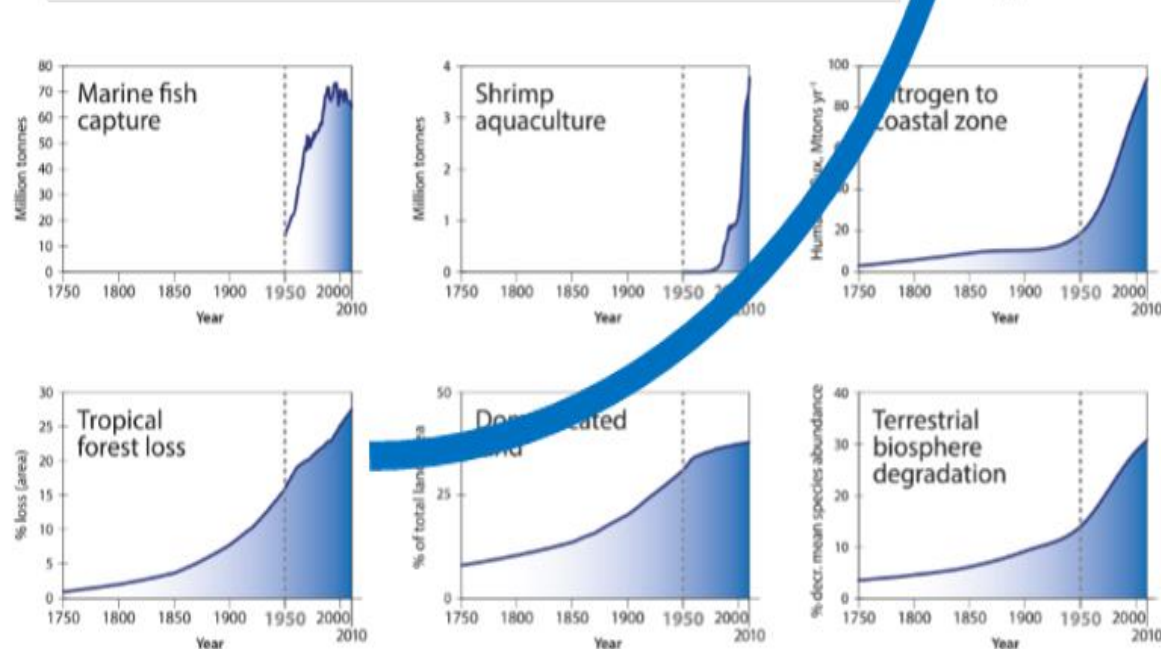
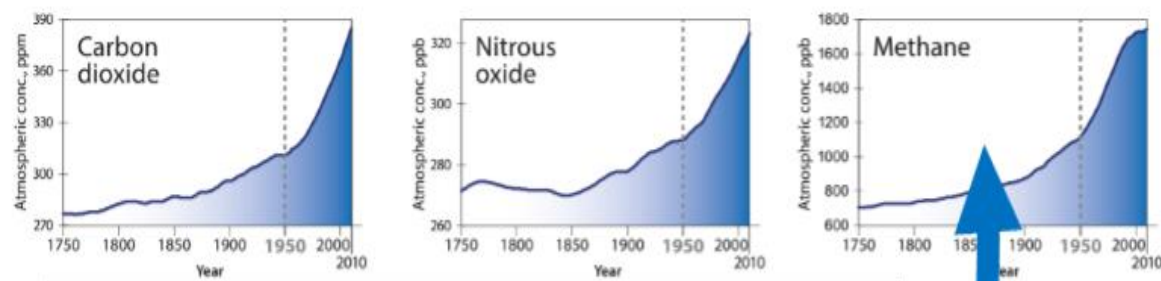


CFCS

Source: WMO 2019, https://public.wmo.int/en/resources/united_in_science



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Global trends

Expectations/
policy promises



OR

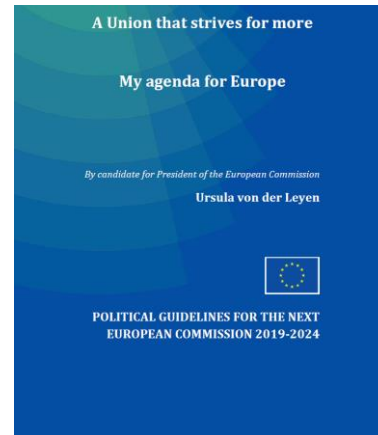


How **credible**?
How **feasible**?
What sort of
policies and
knowledge?

Six headline ambitions for Europe

Need R&I to make them happen

- ✓ *A European Green Deal*
- ✓ *An economy that works for people*
- ✓ *A Europe fit for the digital age*
- ✓ *Protecting our European way of life*
- ✓ *A stronger Europe in the world*
- ✓ *A new push for European democracy*



ENERGY ENVIRONMENT POLICY

Five things you need to know about: decarbonising Europe

16 September 2019

by Jonathan O'Callaghan



Countries in Europe are committed to decarbonising, but experts say not nearly enough is being done and that we need real political action. Image credit - Peter Castleton/Flickr, licensed under CC BY 2.0)

Countries across Europe have, in the past few years, announced their intention to become carbon neutral in the coming decades. Some, like Norway, have targets for 2030, while others, like the UK and France, have goals that extend to 2050. Despite the differences, however, all have agreed to **decarbonise**, but just what will this entail, and how will it work?

"How will it work?"

INTERVIEW POLICY

Missions will require a 'revolution' in European governments – Prof. Mariana Mazzucato

04 July 2019

by *Joanna Roberts*

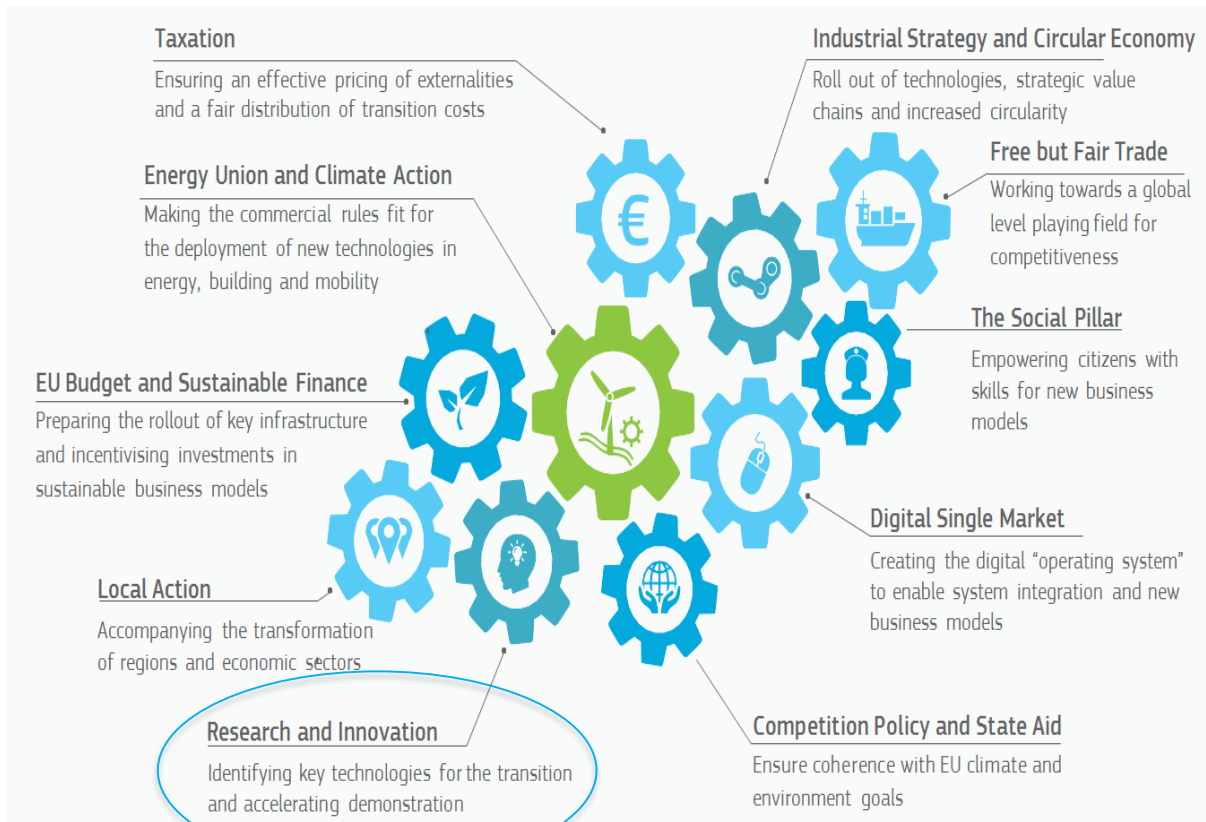


Part of running a mission well is to know when to stop or change direction, says Prof. Mazzucato. Image credit - University College London

The success of European research **missions**, which aim to stimulate innovation to solve major societal problems, will require a complete change in the way governments think about business and risk, according to Professor Mariana Mazzucato, special advisor to the European Commissioner for Research, Science and Innovation, Carlos Moedas.

"Growth and innovation have not just a rate, but a direction"

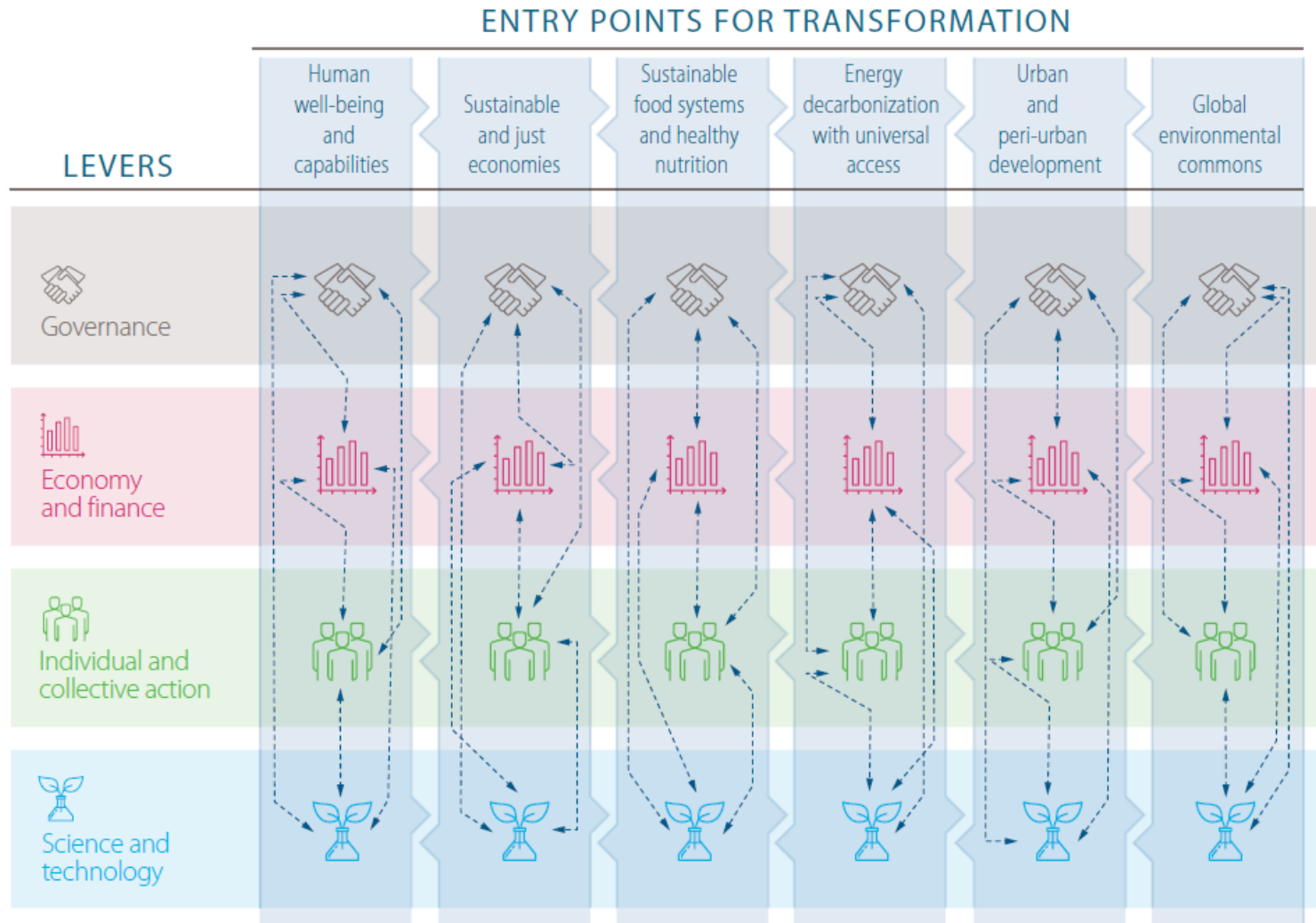
Enabling framework crucial to deliver transformation



“Clean Planet for All”

Communication highlights that a **Research, Innovation and Investment strategy** is necessary in order to de-risk and deploy existing solutions at scale, as well as develop, test and demonstrate the new solutions that will enable us to reach climate neutrality by 2050.

Transformation beyond incremental change needs more than technology

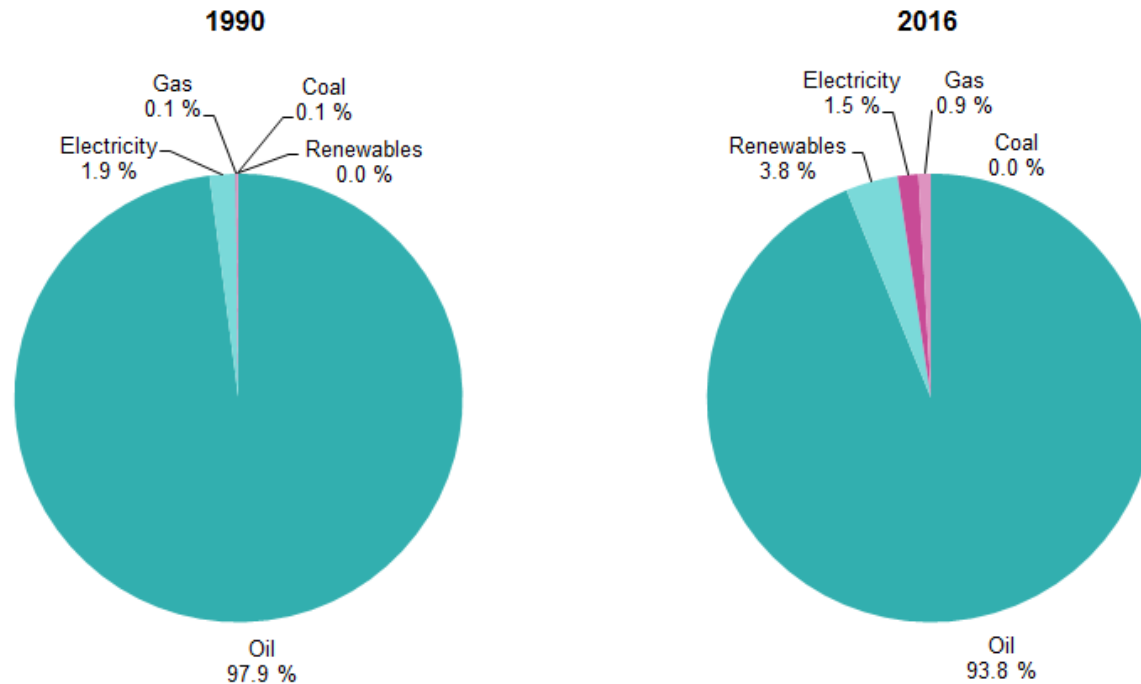


Source: Global Sustainable Development Report (GSDR) 2019,
<https://sustainabledevelopment.un.org/gsd2019>

Current systems are unsustainable

Example: Transport depends 94% on oil

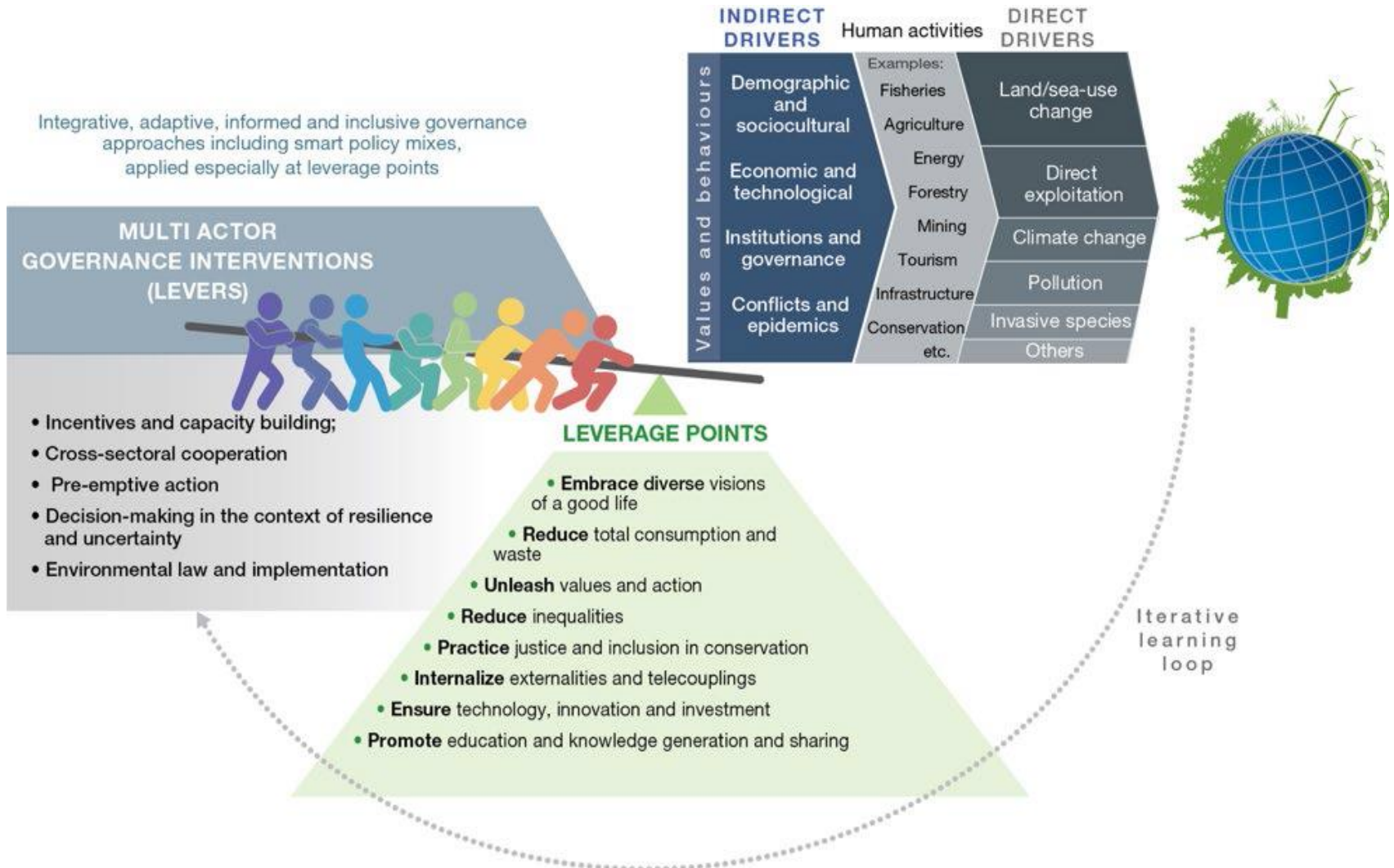
Use of fuels in transport, EU-28, 1990 and 2016
(%)



Source: Eurostat (online data code: nrg_110a)

eurostat 

Systemic solutions are complex

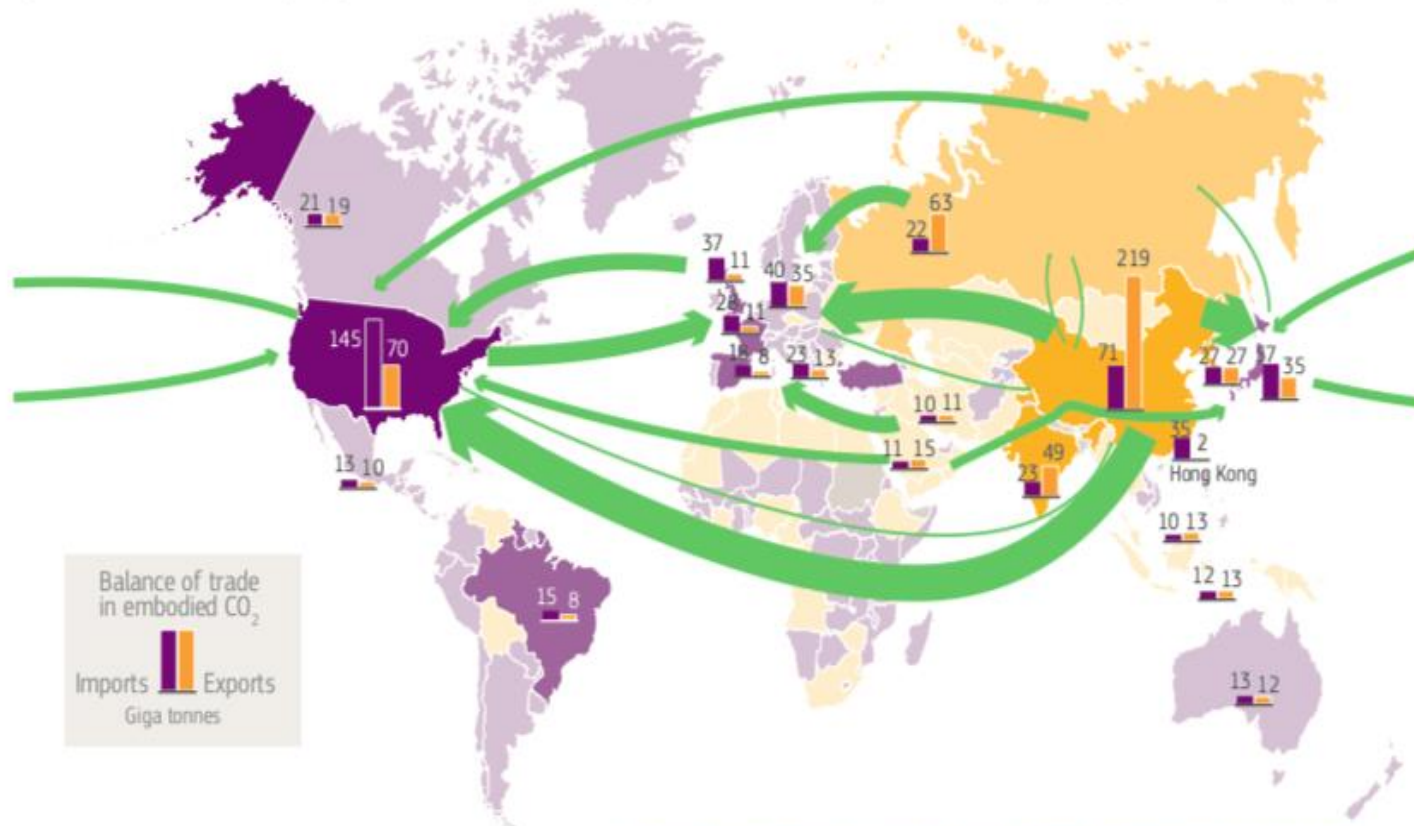


Source [IPBES, Summary for policymakers of the global assessment report on biodiversity and ecosystem services](#)

Policy coherence is a challenge

China and India produce carbon-intensive products for consumption by Americans and Europeans

Purple bars show embodied imports; yellow bars show exports – Purple shaded countries are predominantly importers, yellow are primarily exporters.



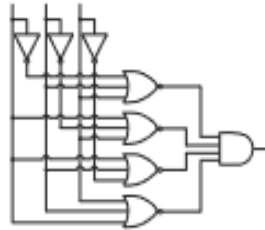
Source: KGM & Associates; Global Efficiency Intelligence, 2018, [The Carbon Loophole in Climate Policy: Quantifying the embodied carbon in traded products](#)

What knowledge, policy and science-policy interaction for wicked problems?

"Acceleration" and "complexity" have become common catch phrases for describing today's challenges, but they are real phenomena that have profound meaning—and technical implications—for the way we understand issues and organize policy responses.

"COMPLICATED" PROBLEMS

- Originate from isolated causes that are clearly identifiable and fall within distinct bureaucratic categories
- Can be dissected into isolated chunks addressed, and pieced back together
- Consequences are generally proportionate to their causes (for every input, there is a proportionate output)
- Fixtures can be put in place for permanent solutions.



"COMPLEX" or "WICKED" PROBLEMS

- Result from concurrent interactions among multiple systems of events, and they erode the customary boundaries that differentiate bureaucratic concepts and missions
- Cannot be broken apart and solved piece-by-piece. They must be understood and addressed as a system
- Do not automatically stabilize, but intrinsically unravel into chaos if not systemically managed
- *Cannot be permanently solved.* Instead, they morph into new problems as the result of interventions to deal with them.

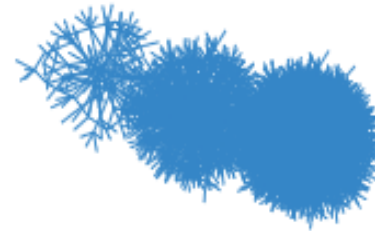
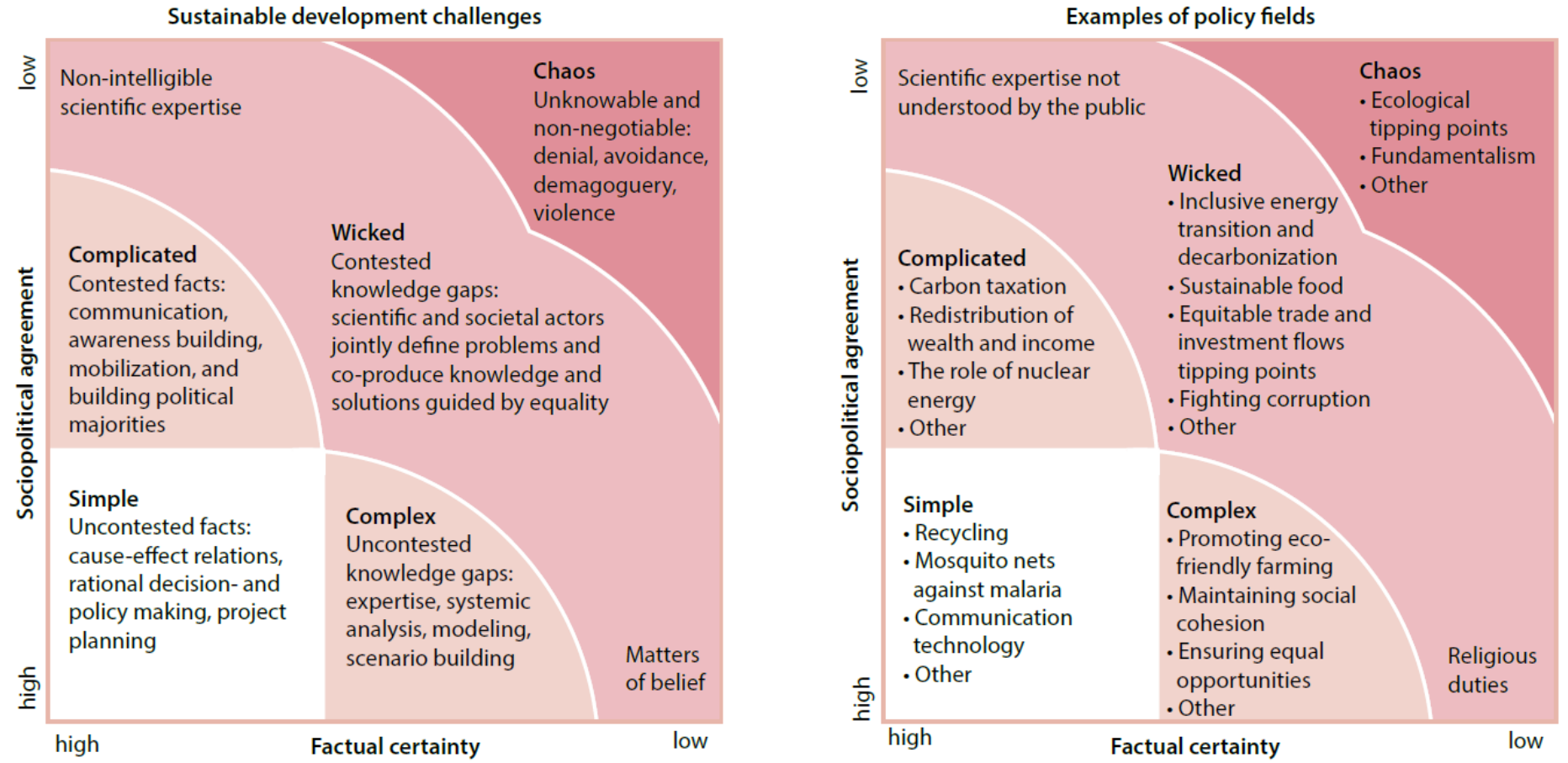


Figure 3-1:
Types of sustainability challenges

The interplay between sociopolitical agreement and factual certainty influences how we approach sustainable development challenges and what scope we see for political action. Different types of sustainable development challenges are shown on the left, and corresponding examples of policy fields are shown on the right.⁸⁰⁰



Source: Global Sustainable Development Report (GSDR) 2019, <https://sustainabledevelopment.un.org/gsd2019>

ENVIRONMENT HEALTH POLICY

A climate-friendly diet means rethinking the entire food system - researchers

03 September 2019

by Alex Whiting



Radical changes are needed to overhaul our global food system, which accounts for 37% of total human-made emissions. Image credit - Lee Wag, licensed under CC0

ENVIRONMENT POLICY

Public action and 'fundamental social change' needed to reverse biodiversity decline

05 September 2019

by *Steve Gillman*



SCIENCE IN SOCIETY

Prosperity is about more than money. But what else should count?

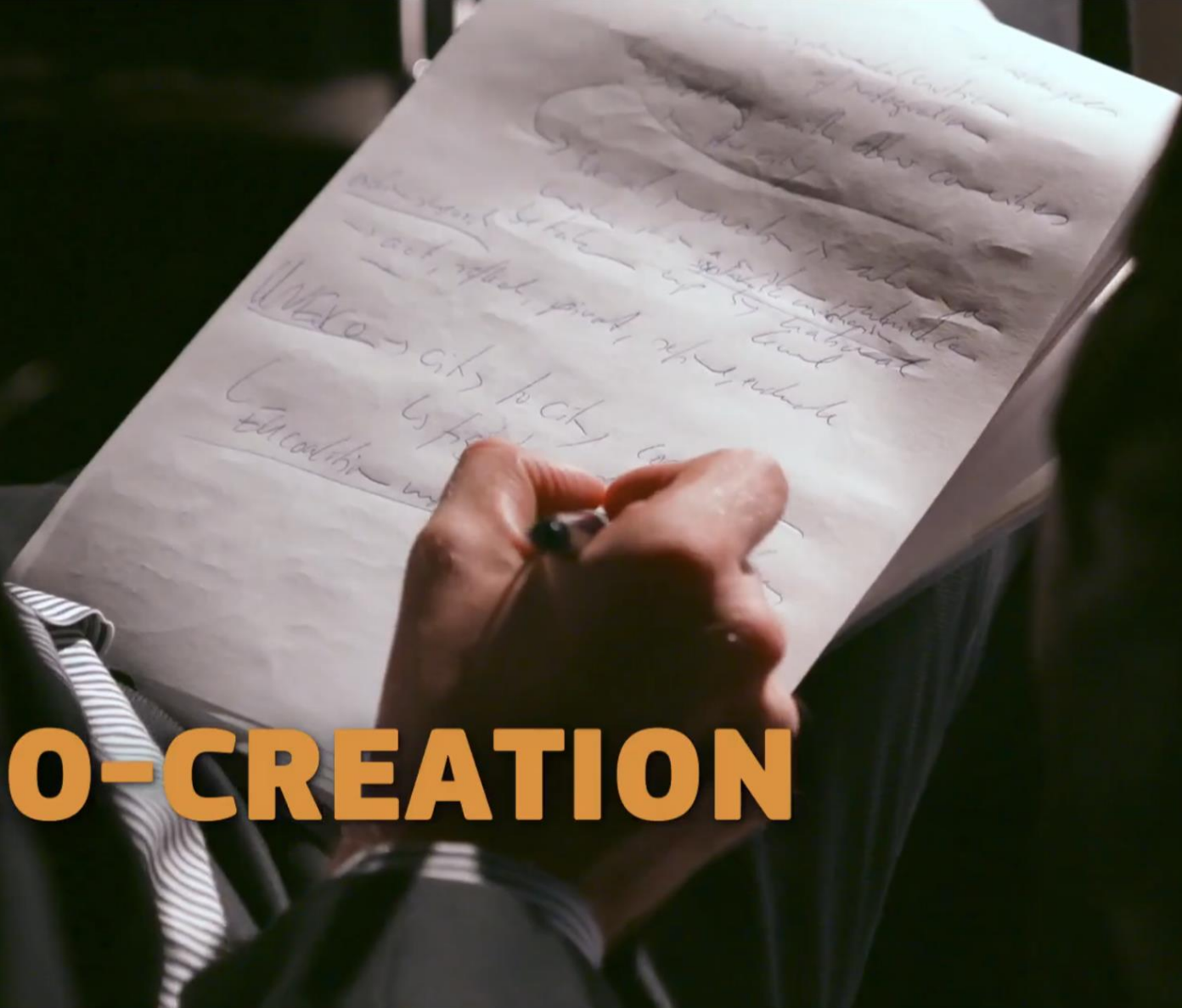
19 September 2019

by Aisling Irwin



The idea that wellbeing encompasses more than economic growth is widespread, but the problem is deciding what to measure. Image credit - Cherylholt/Pixabay

CO-CREATION



EUROPEAN
RESEARCH &
INNOVATION
DAYS

COLLECTIVE
SOLUTIONS

**EUROPEAN
RESEARCH &
INNOVATION
DAYS**

DEBATE



How could a mission best engage citizens

Not much mobilization for plastic from citizens because they don't think of every day

Change behavior of citizens by regulation or public communication

Work in innovation helix
citizen, science, business, regulation

Using the

1.9. ATLANTIC
EMERGO 60
TV
FACE to

Small sticky note

Small sticky note

INTERVIEW POLICY

The future of European research must be inclusive - Jean-Eric Paquet

02 September 2019

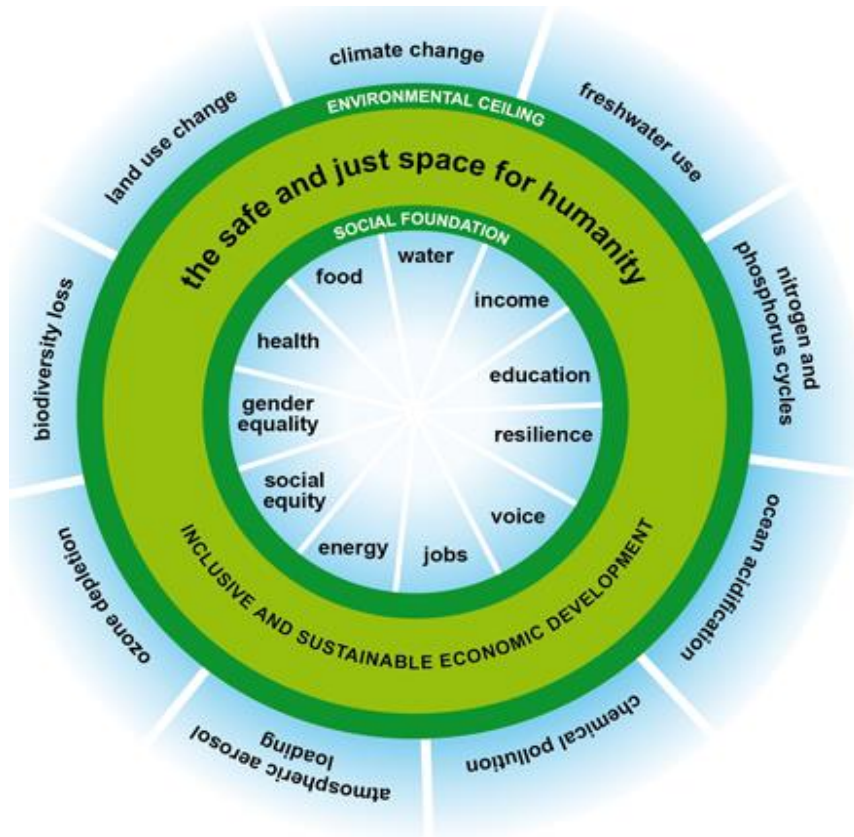
by Joanna Roberts



Europe is capable of tackling the challenges disrupting our societies through research and innovation, says Jean-Eric Paquet. Image credit - Flickr/ ID/ Sander de Wilde

With Europe facing significant challenges over the next decade, it is vital that the EU's research activities are designed not just by bureaucrats but by a wide range of voices to ensure that they're fit for purpose, according

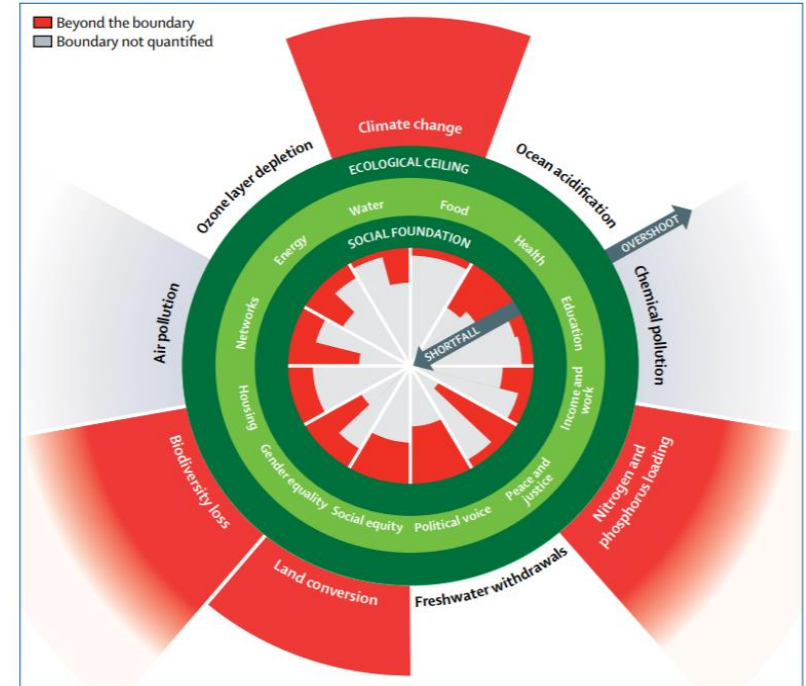
In search of a compass for the 21^o century



K.Raworth. *Doughnut Economics: seven ways to think like a 21st century economist*, 2017.

K.Raworth. *A Doughnut for the Anthropocene: humanity's compass in the 21st century*, 2017.

[www.thelancet.com/pdfs/journals/lanplh/PIIS2542-5196\(17\)30028-1.pdf](http://www.thelancet.com/pdfs/journals/lanplh/PIIS2542-5196(17)30028-1.pdf)



Pillars of DG RTD's implementation strategy for the SDGs

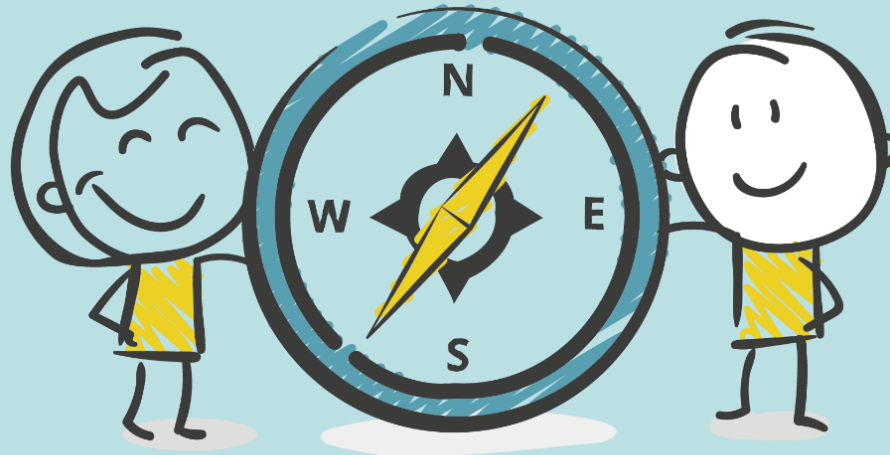
- Develop a **compass** to navigate complexity and inform an overarching SDG strategy
- Co-create **transition agendas** for key socio-economic systems
- Define a new **Transformative Innovation Policy**
 - Identify system specific solutions
 - Cross-systemic optimization
 - Deploy solutions
- Steer **Horizon Europe** strategic planning and mission orientation
- Aligning **partners**
- **Collaboration** with other DGs



European
Commission

High-level seminar
24 May 2019

R&I as a compass for the future we want



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Thank you for your attention