



# The Paris Agreement and the Sustainable Development Goals – Synergies or Competing Agendas?

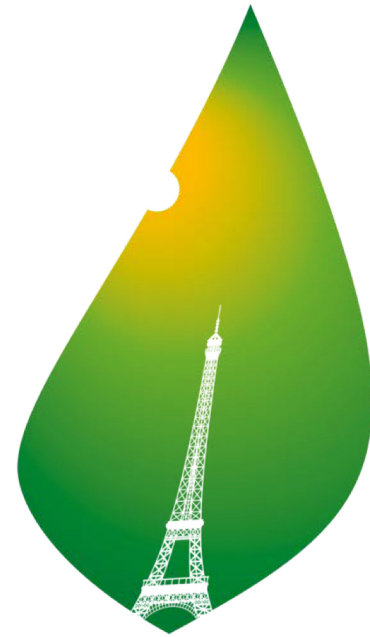
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*Swiss Global Change Day, 18 April 2018, Bern*

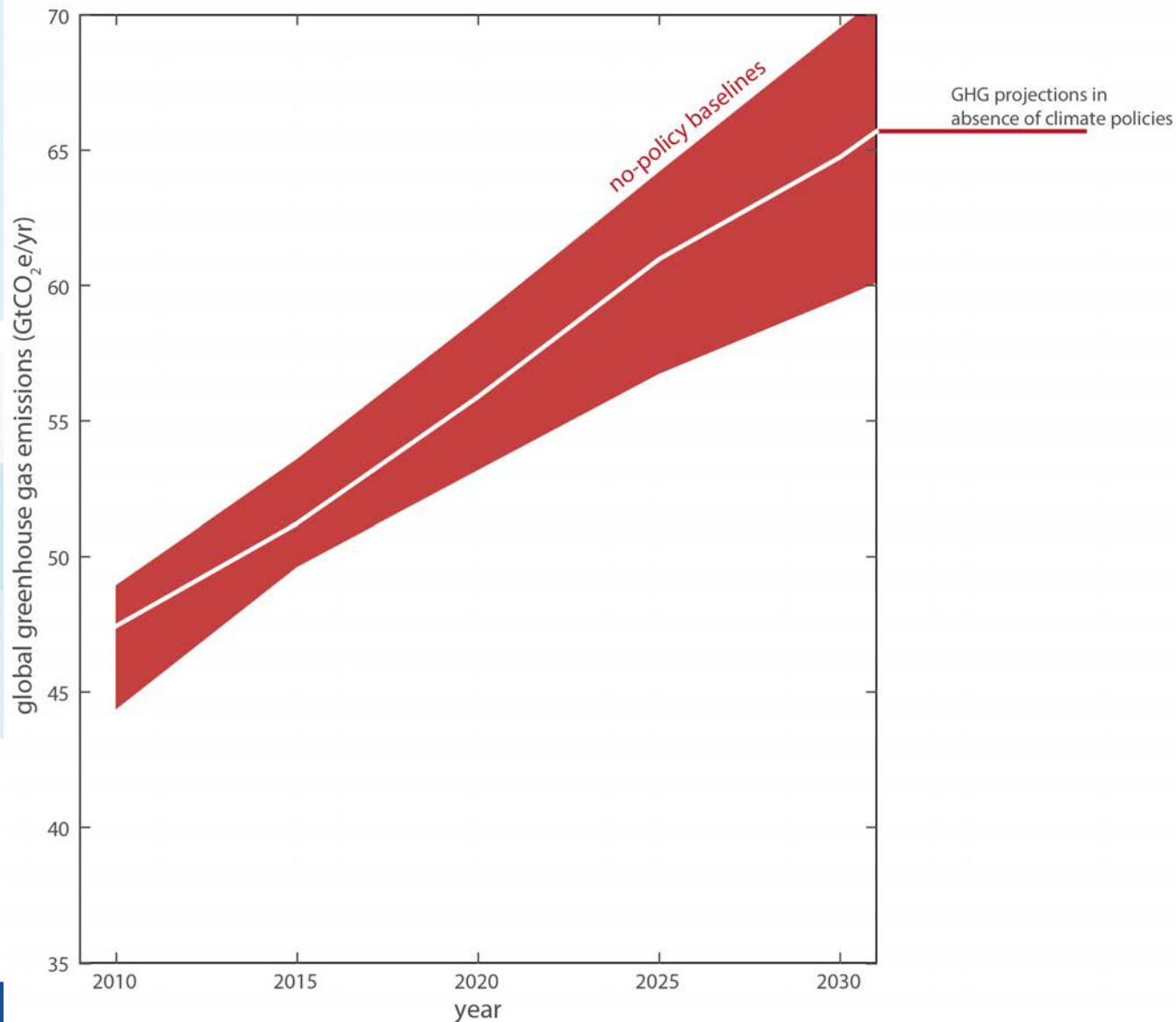




COP21 • CMP11  
**PARIS 2015**  
UN CLIMATE CHANGE CONFERENCE



# Implications of Paris for GHG Emissions



Rogelj et al., 2016





# SUSTAINABLE DEVELOPMENT GOALS

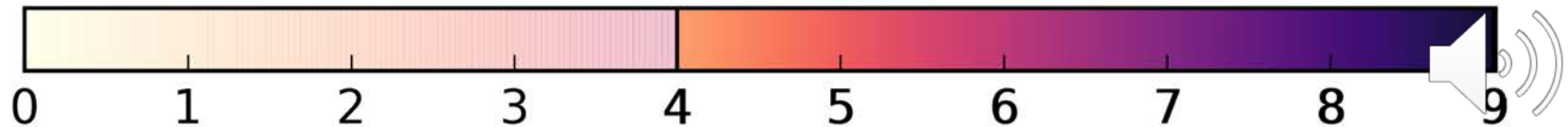
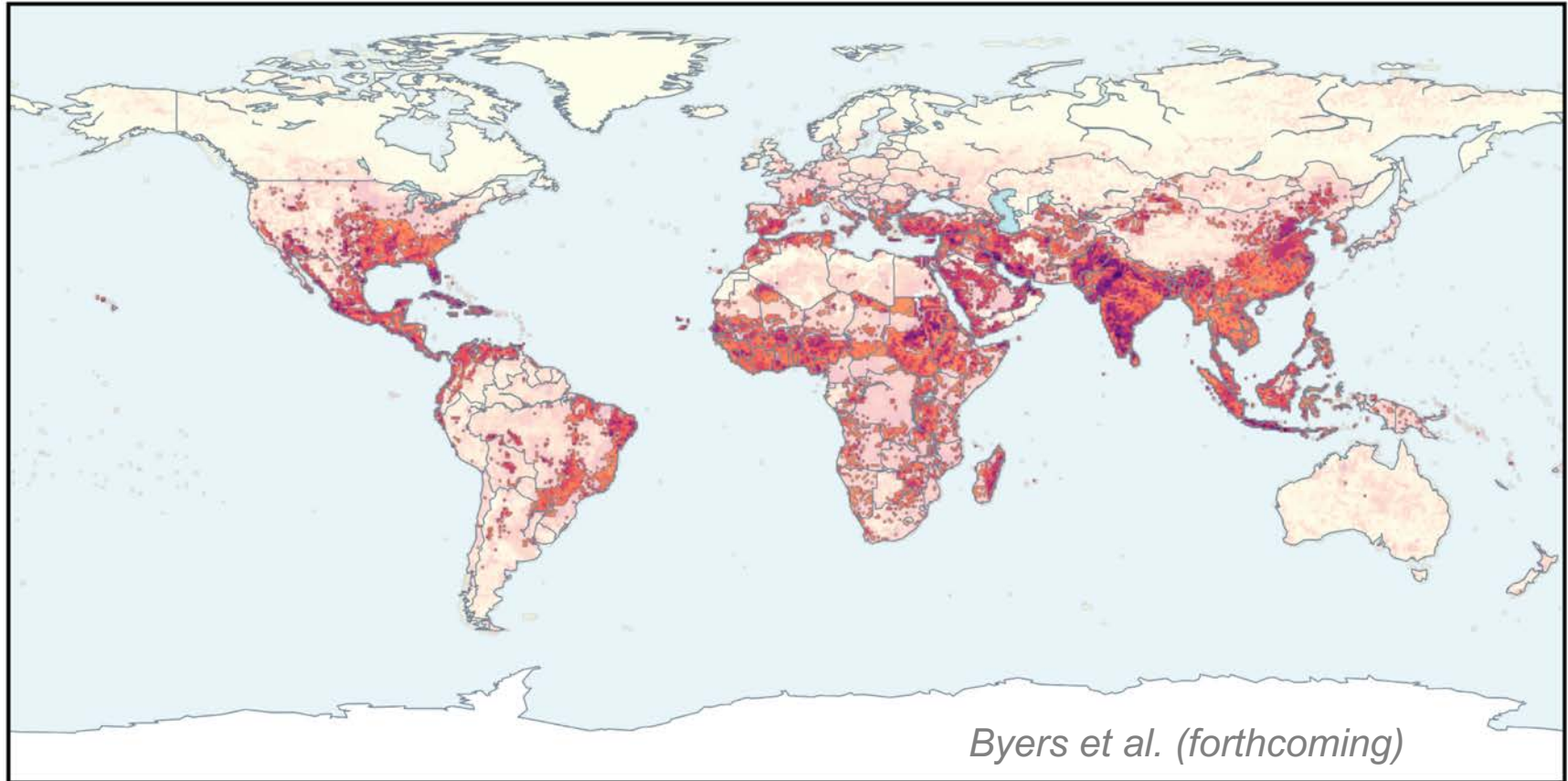


# Exposure to multi-sectoral impacts in 2050



3.0 °C

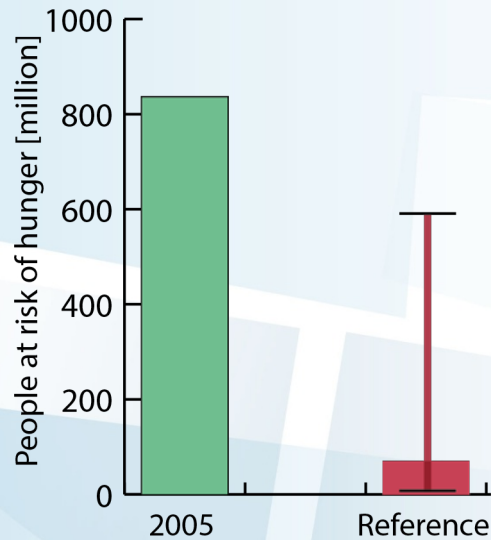
3.0 °C



## Examples of SDG interactions:



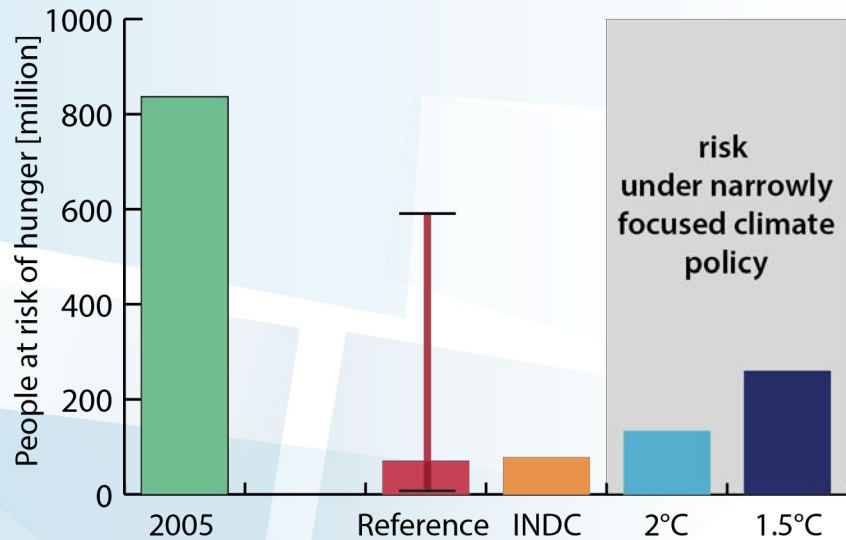
# Food Security in 2050



**Inclusive development & climate policies are key to reduce risk of hunger for simultaneous achievement of SDG 2 (hunger) and 13 (climate).**



# Food Security in 2050

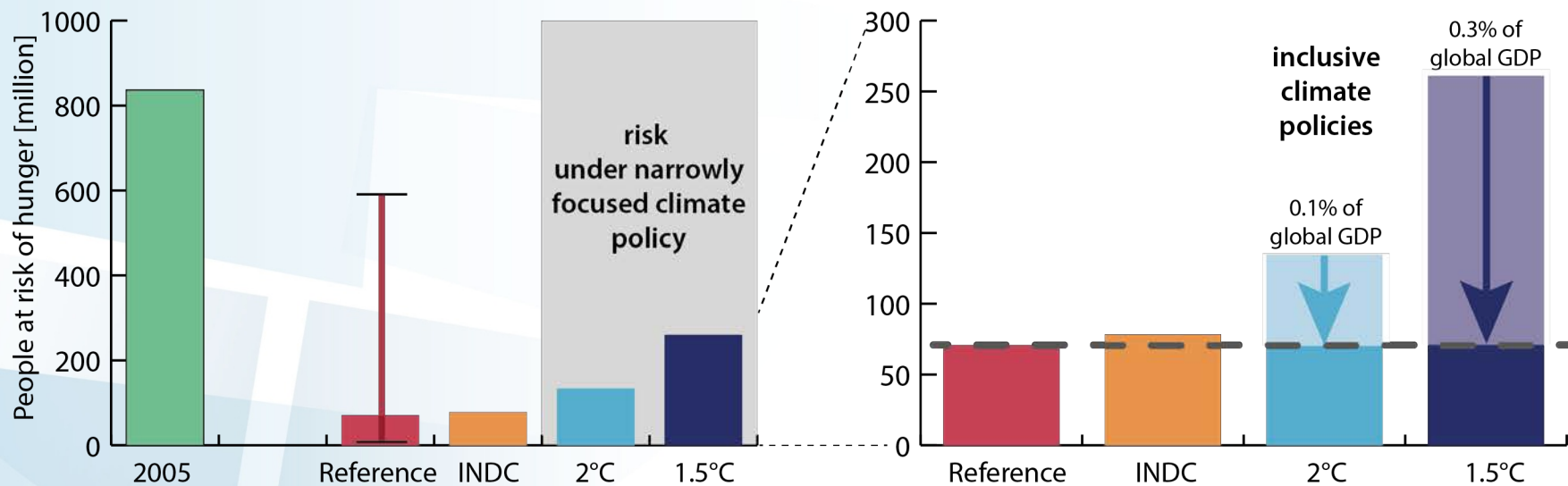


**Inclusive development & climate policies are key to reduce risk of hunger for simultaneous achievement of SDG 2 (hunger) and 13 (climate).**





# Food Security in 2050



**Inclusive development & climate policies are key to reduce risk of hunger for simultaneous achievement of SDG 2 (hunger) and 13 (climate).**



# Water

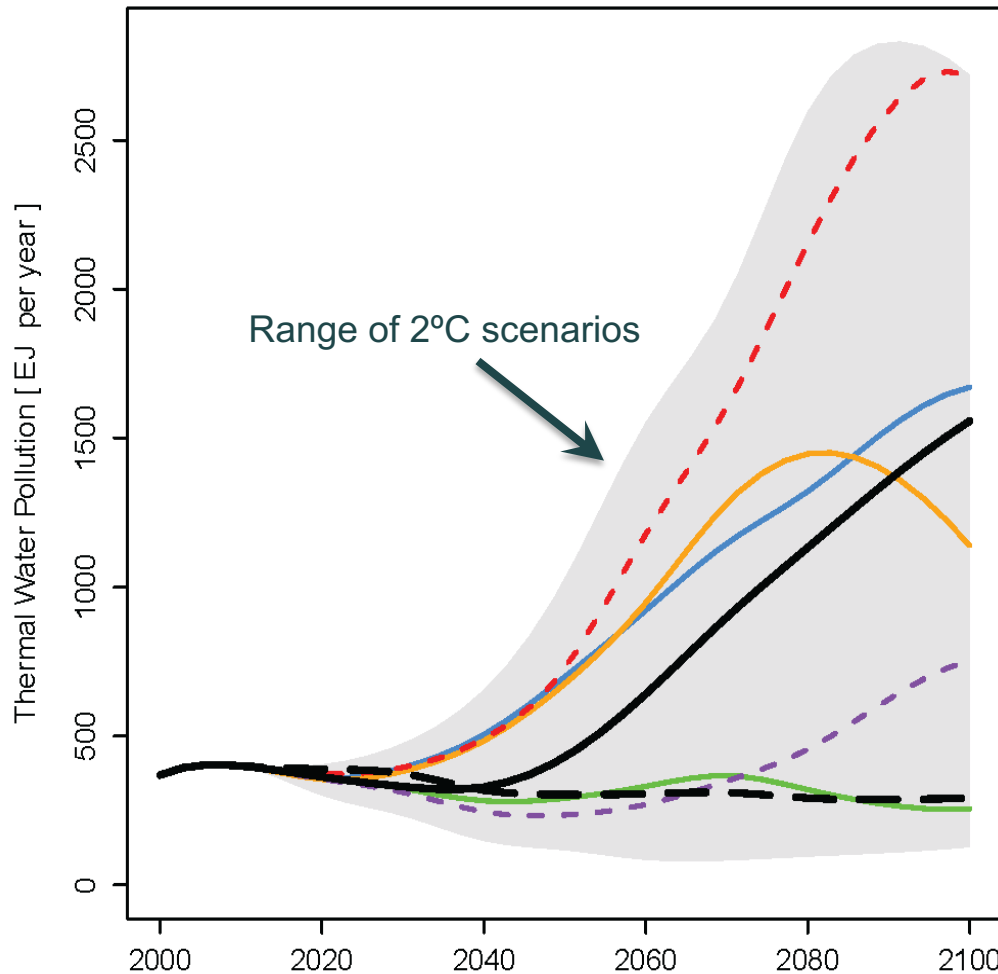
**13** CLIMATE  
ACTION



**6** CLEAN WATER  
AND SANITATION



# Impacts of climate change mitigation policy on thermal water pollution (energy-related)



Fricko et al., 2016, Environmental Research Letters



No climate policy

## Full Technology Portfolios ( Cost % BAU )

- No mitigation BAU ( 100 % )
- Full mitigation portfolio ( 122 % )

## Reduced Technology Portfolios ( Cost % BAU )

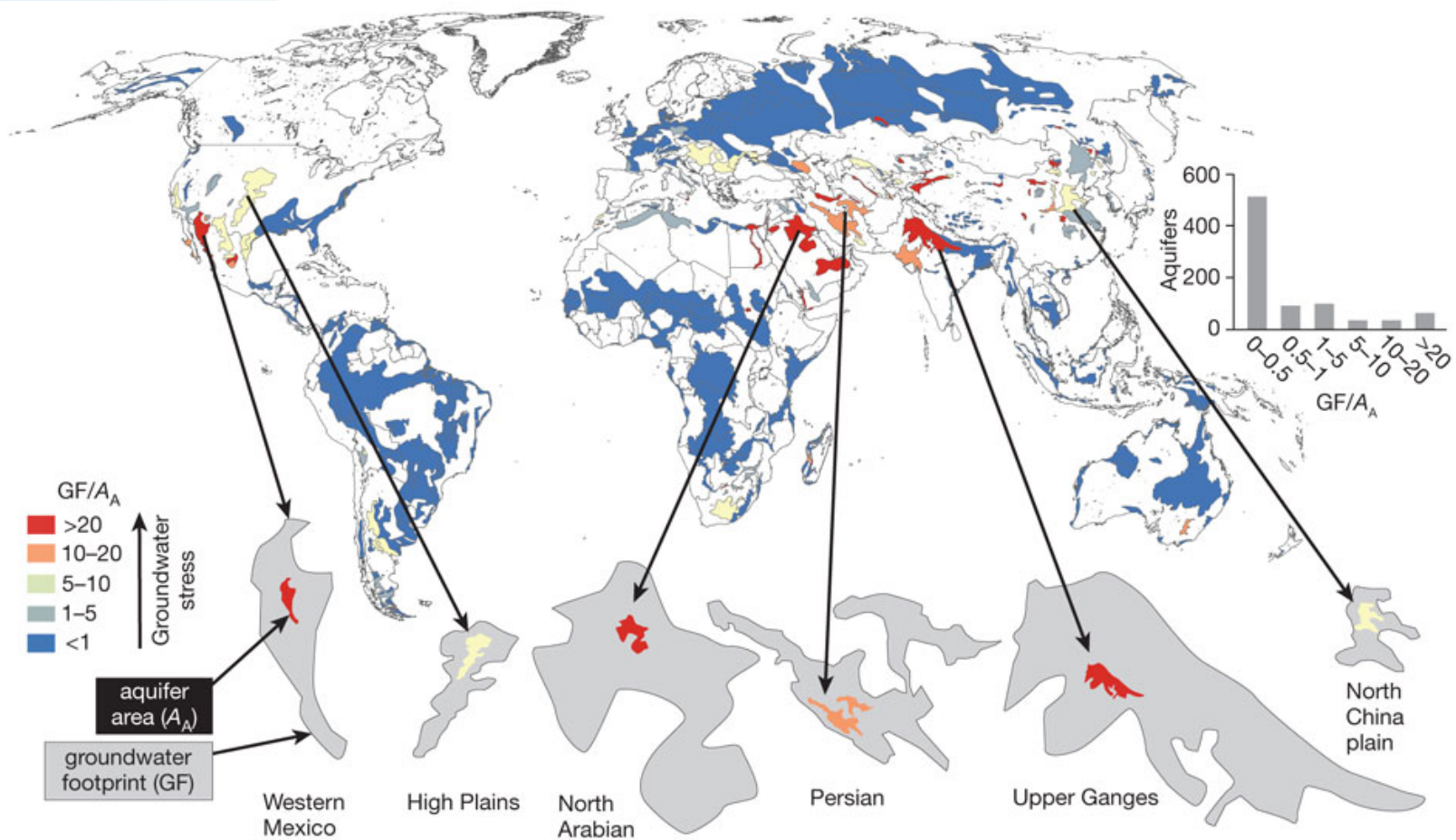
- Limited wind / solar ( 133 % )
- No carbon capture and storage ( 143 % )
- No new nuclear ( 138 % )

## Alternative Demand Portfolios ( Cost % BAU )

- High, full mitigation portfolio ( 144 % )
- Low, full mitigation portfolio ( 119 % )



# Groundwater sustainability



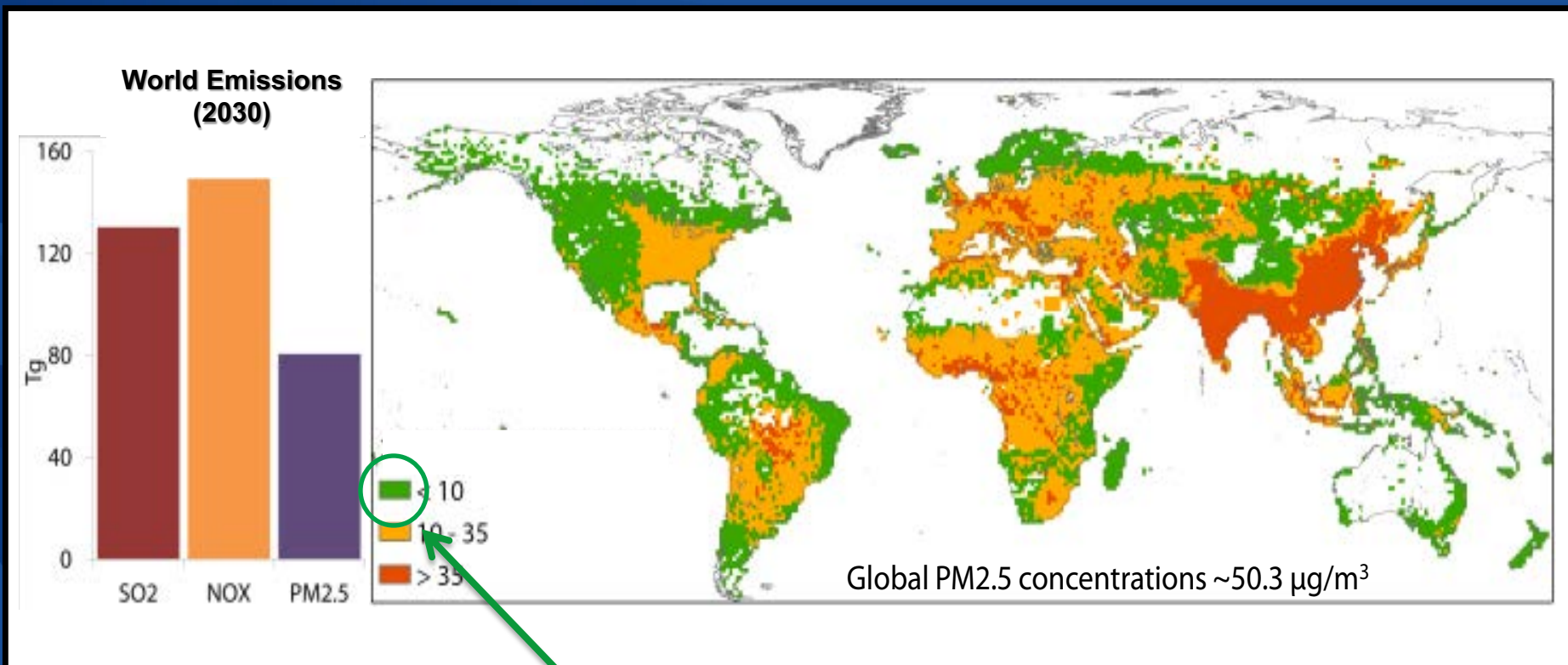


# Air Pollution and Health

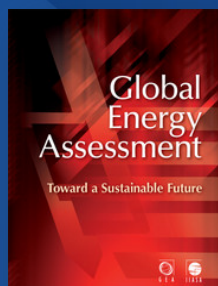


# GEA Health Assessment

## Present air pollution policies to 2030



WHO health guidelines

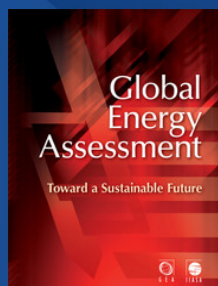
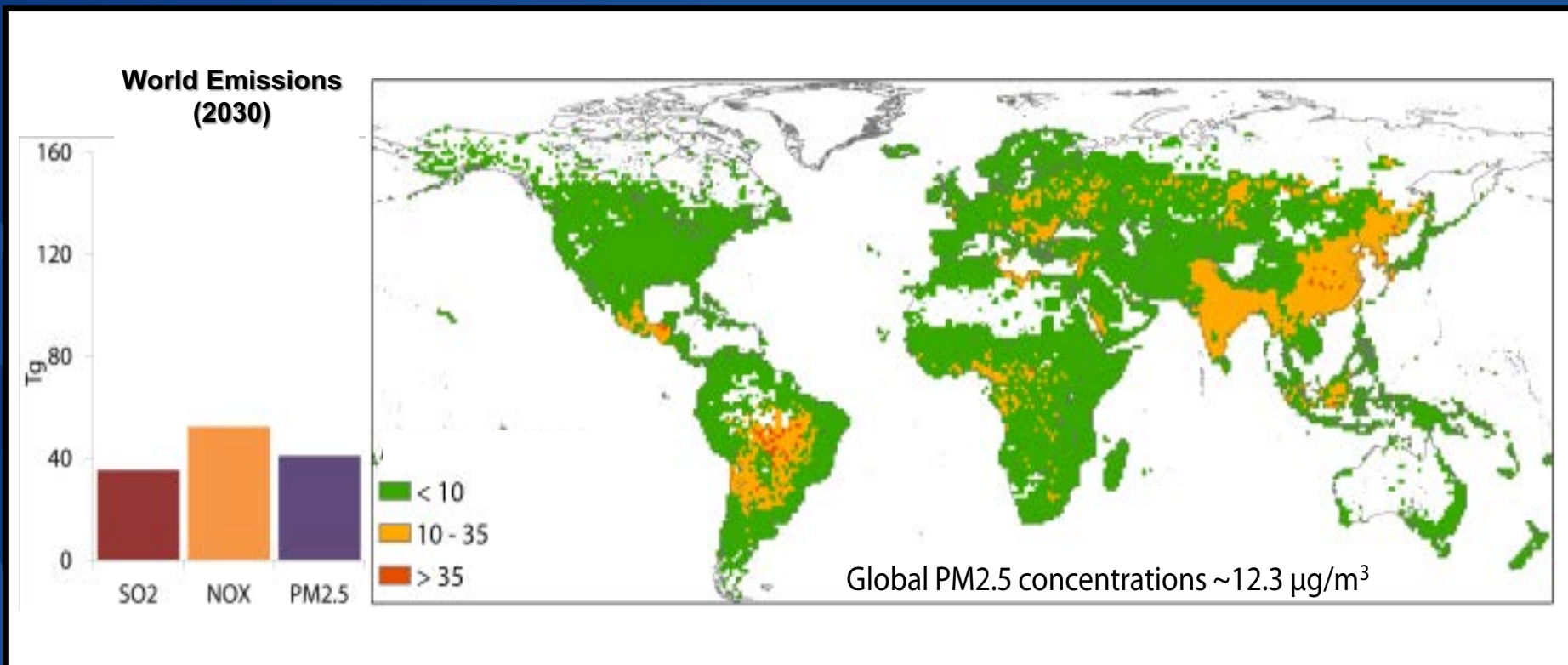


GEA: Chapter 17 (Riahi et al, 2012; Rao et al, forthcoming)



# GEA Health Assessment

## Integrated climate/pollution policies by 2030



**2.6 million lives saved each year**

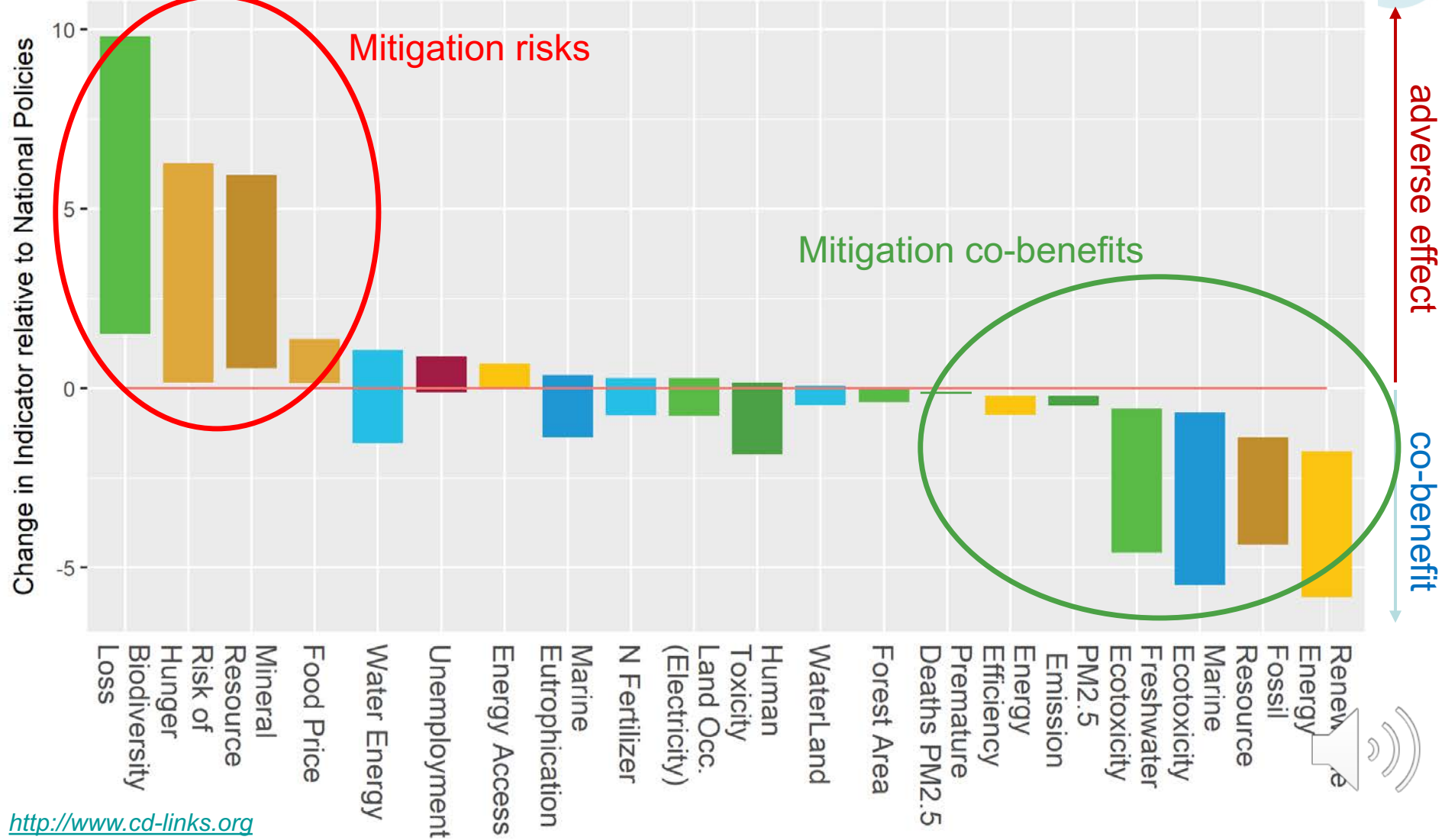


GEA: Chapter 17 (Riahi et al, 2012; Rao et al, forthcoming)

# 1.5°C: Impacts of Mitigation on SDGs

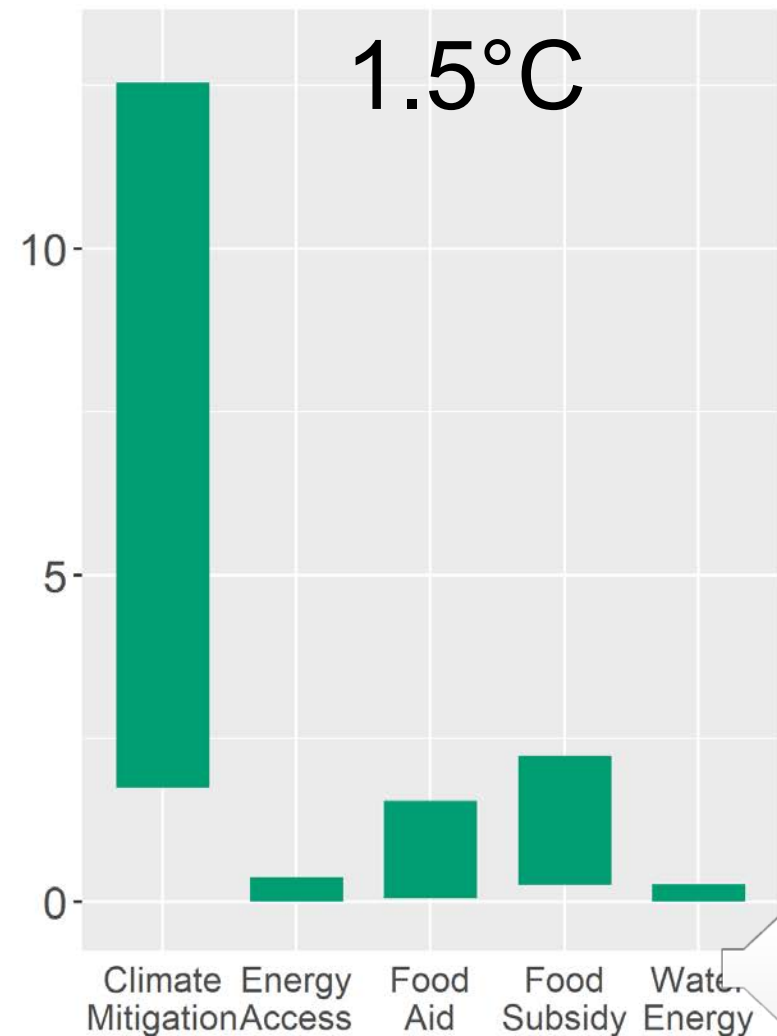
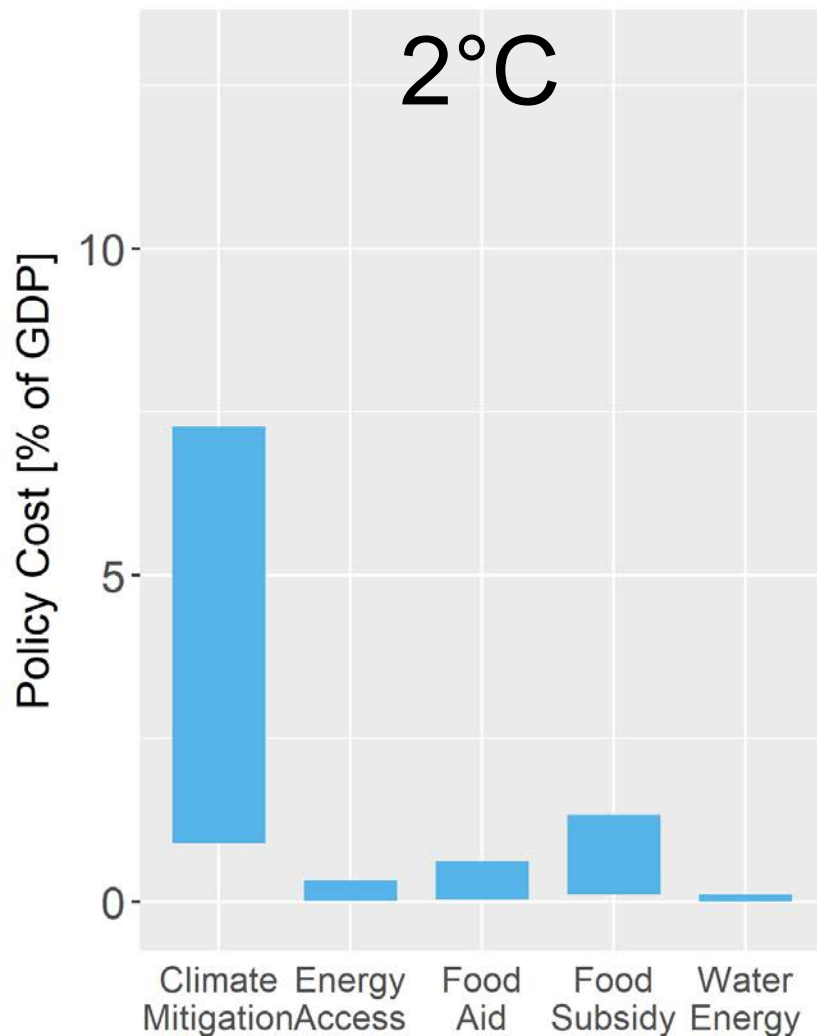


Krey et al. (submitted) – under embargo, do not cite





# Many SDG trade-offs can be eradicated at low costs



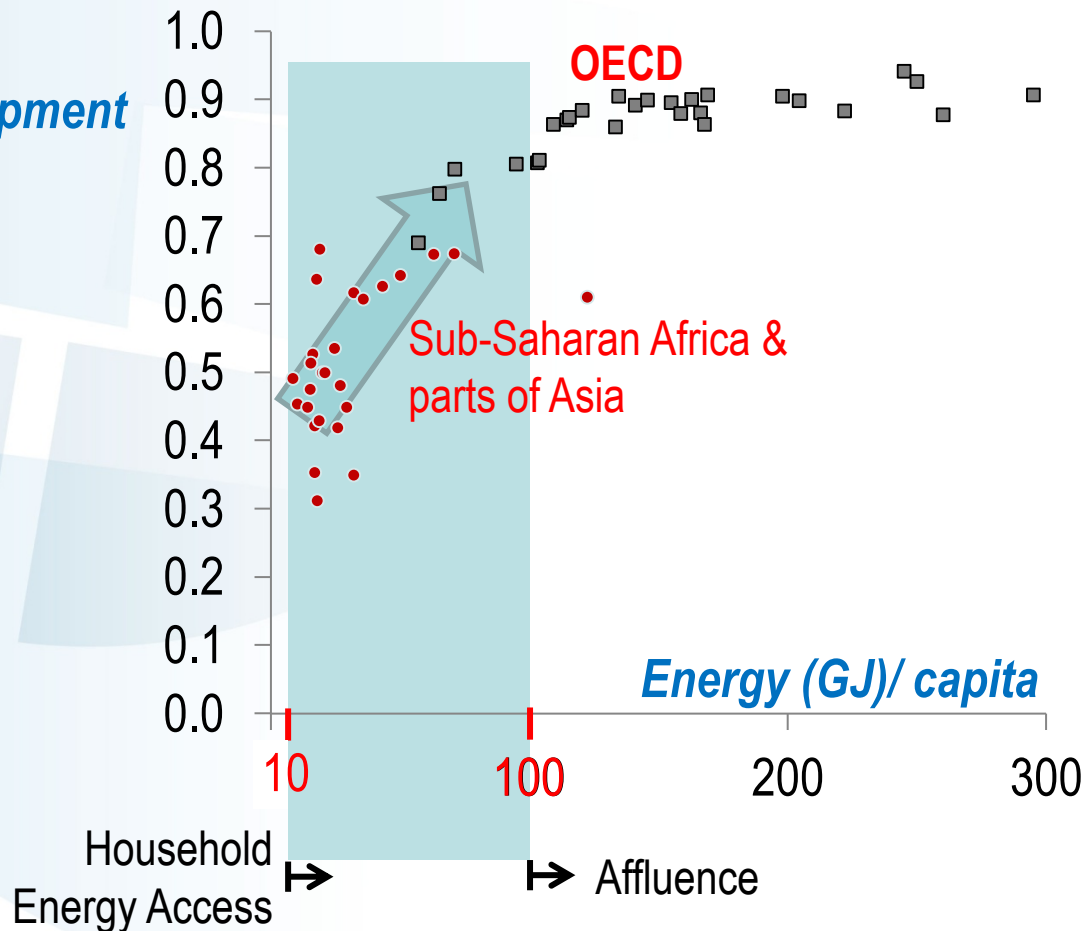


# SUSTAINABLE DEVELOPMENT GOALS



# How much energy does poverty eradication require?

*Human  
Development  
Index*

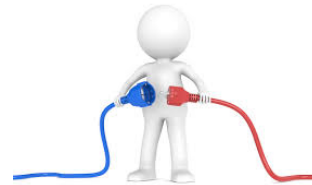


# Energy for Decent Living

**Decent  
Living**



**Energy  
Needs**



**Climate  
Change  
Scenarios**

- Assess the energy needs to provide decent living standards to all
  - food,
  - water/sanitation,
  - shelter,
  - mobility,
  - basic amenities
  - maintenance energy and ‘buildout’ energy, etc..



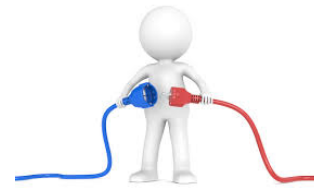


# Energy for Decent Living

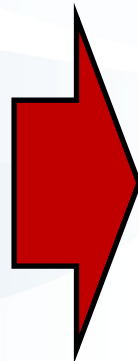
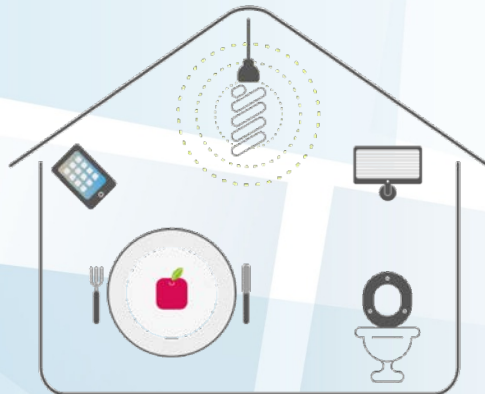
Decent Living



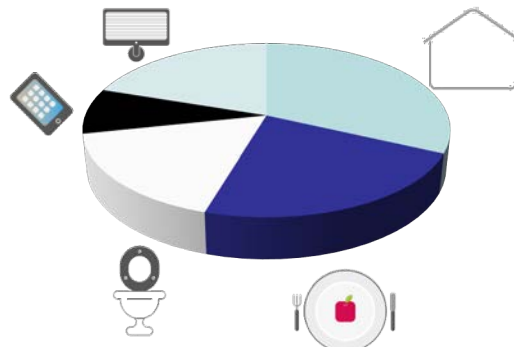
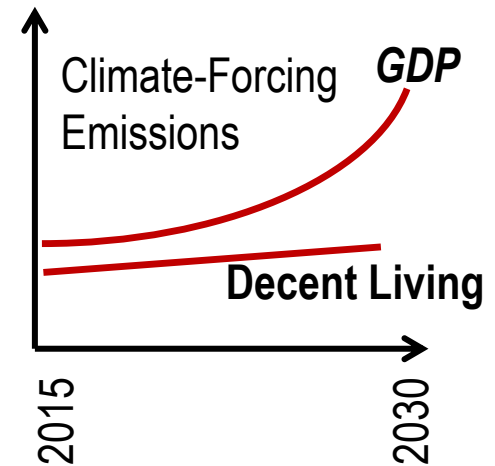
Energy Needs



Climate Change Scenarios



Lifecycle Analysis & Energy Modeling



Energy Intensities



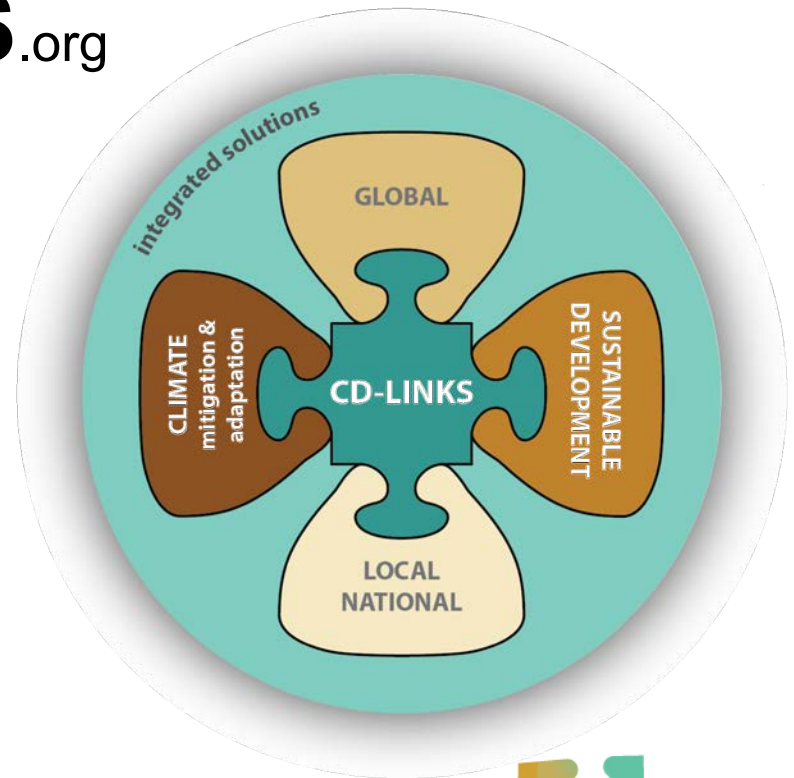
# CD-LINKS.org

## Integrated Approach:

- National AND Global
- Climate AND Development
- Mitigation AND Adaptation
- INDCs + SDGs!

## Multiple Objectives:

- Air quality and health
- Water
- Food security
- Energy poverty and inequality
- Biodiversity
- Adaptation, resilience and reduced risks
- Energy security
- Economic development and equity



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 642147.



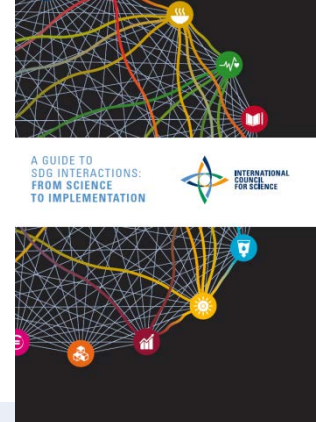
# Thank You!

Keywan Riahi  
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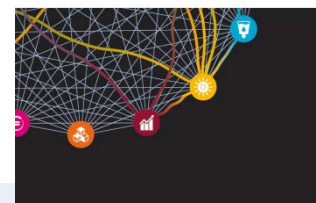




# New Scoring Scheme for evaluation of SDG interactions



A GUIDE TO  
SDG INTERACTIONS:  
FROM SCIENCE  
TO IMPLEMENTATION



## GOALS SCORING

### INDIVISIBLE

The strongest form of positive interaction in which one objective is inextricably linked to the achievement of another. Reduction of air pollution (12.4) is indivisible from improved health and reducing non-communicable diseases (3.4).

+3

### REINFORCING

One objective directly creates conditions that lead to the achievement of another objective. Increasing economic benefits from sustainable marine resources use (14.7) reinforces the creation of decent jobs and small enterprise in e.g. tourism (8.5 and 8.9)

+2

### ENABLING

The pursuit of one objective enables the achievement of another objective. Developing infrastructure for transport (9.1) enables participation of women in the work force and in political life (5.5)

+1

### CONSISTENT

A neutral relationship where one objective does not significantly interact with another or where interactions are deemed to be neither positive nor negative. By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution (14.1) is consistent with target 3.5 Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol.

0

### CONSTRAINING

A mild form of negative interaction when the pursuit of one objective sets a condition or a constraint on the achievement of another. Conserving coastal areas (14.5) and development of safe affordable housing and basic services (11.1) may constrain each other

-1

### COUNTERACTING

The pursuit of one objective counteracts another objective. Ensuring access to safe, nutritious and sufficient food can counteract sustainable water withdrawals (6.4) and reduction of chemicals releases (12.4)

-2

### CANCELLING

The most negative interaction is where progress in one goal makes it impossible to reach another goal and possibly leads to a deteriorating state of the second. A choice has to be made between the two. Developing infrastructure (9.1) could be cancelling the reduction of degradation of natural habitats in terrestrial ecosystems (15.1)

-3

Outdoor and indoor air pollution is responsible for 7 million deaths annually, as well as respiratory and cardiovascular disease but also increases in perinatal deaths. In 2012, ambient (outdoor) air pollution was responsible for 3 million deaths, representing 5.4% of the total deaths. Worldwide, ambient air pollution is estimated to cause about 25% of the lung cancer deaths. Major urban centers in low and middle-income countries are the most exposed to this burden. (WHO, 2016).

Sustainable and diversified strategies for using the marine resource base open up opportunities for small enterprises in fisheries or other harvesting and associated value-addition activities, as well as activities related to tourism. Many SIDS and LDCs that are rich in these resources also have poor, vulnerable and marginalized coastal communities.

Affordable public transport promotes social inclusion, more equal access to different parts of the city, and enabling employment for marginalized groups. In many places, women do not have access to a car and depend on public transport, walking or bicycling to get around, to work places and to social or political activities (NCE, 2016; GSDR, 2016)

There is no significant interaction between the two targets.

Establishing protection areas in the coastal zone and expanding urbanization, infrastructure or transport risks spatial competition especially in densely populated areas. Integrated coastal zone management and marine spatial planning tools are readily available to mitigate spatial competition.

Increasing productivity in agriculture is a necessary (but not sufficient) condition to improve food security. In many places, this might entail increased and/or better irrigation as well as increased use of agro-chemical inputs.

In underdeveloped regions, developing roads, dams, and power grids might be a high priority, although it will cause some unavoidable fragmentation of habitats and compromising the integrity of the natural ecosystem, leading to risks to biodiversity as well as social risks.





# Challenges for Research and Policy Making

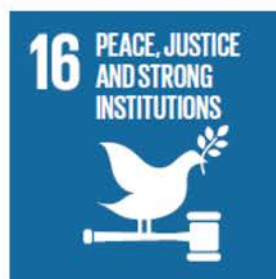
- Interdisciplinarity (natural & social science + economics & engineering)
- Need to connect fundamentally different problems (global commons + diverse local concerns)
- Existing policy heterogeneity (relevant research needs to consider local context that determines policy success)
- Lack of data (beyond techno-economics – more on values, preferences, distributions, etc..)
- Governance and institutional dimension

# Key Requirements

- Systems Approach (multi-objective / supply & demand)
- Bridging of spatial (local to global) and temporal scales (beyond 2030)
- Science-Policy dialogue with focus on integration and multi-objecting framing and evaluation of measures
- Collaborative international networks and cross-university collaborations (particularly for Austria)



# SUSTAINABLE DEVELOPMENT GOALS



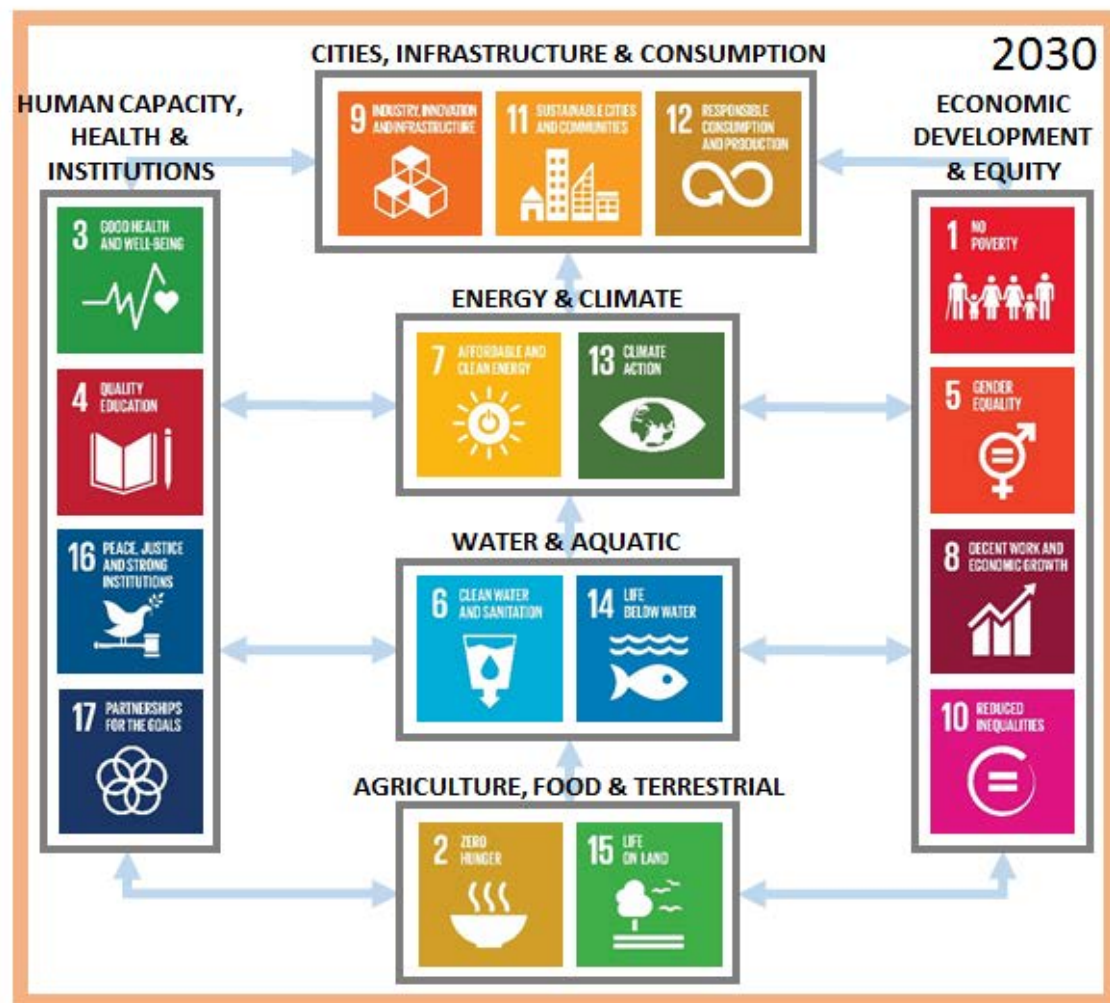


SUSTAINABLE  
DEVELOPMENT

GOALS

- Fundamentally, there are two agendas embedded in the SDGs
  - (i) the human security agenda and
  - (ii) the planetary boundaries agenda
- The challenge is to make these agendas synergistic rather than competitive

# SDGs grouped by “Systems”





# SDGs according to “Objectives”

