



Green Climate Fund Structured Dialogue with Asia
Da Nang, Vietnam
17-20 April, 2018

**Key climate challenges for
Asia –
and projected emission
pathways to a low-carbon
future**

Professor Ralph Sims, Massey University, New Zealand
R.E.Sims@massey.ac.nz

Member, Scientific and Technological Advisory Panel of the GEF

Welcome to the Anthropocene age as driven by the “Great Acceleration”

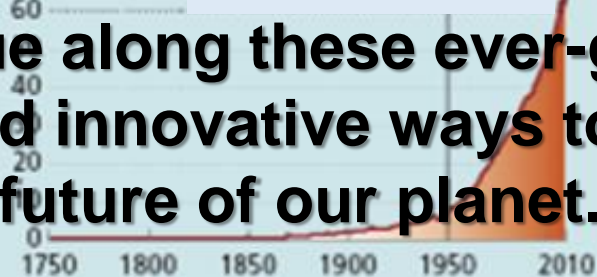
A few indicators of global trends are shown in the following slide.

There are many others not shown, such as marine fish capture, tropical forest loss, nitrogen reaching coastal zones, terrestrial biosphere degradation, methane and nitrous oxide accumulations.

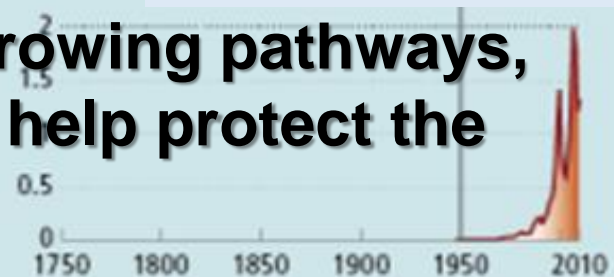
Population



Real GDP

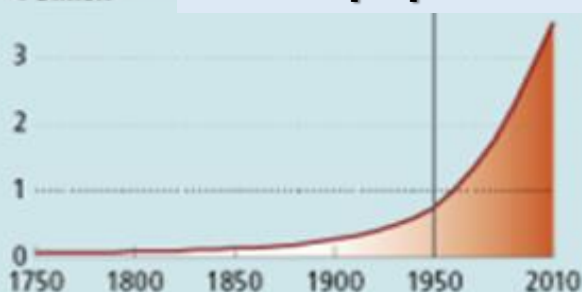


Foreign investment

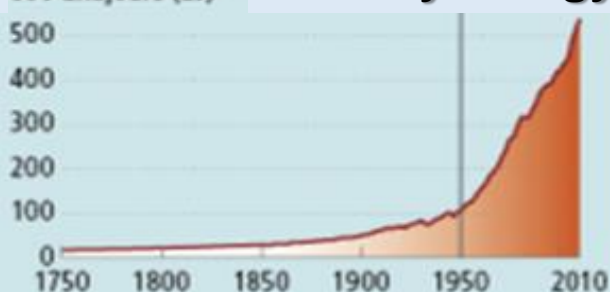


We cannot continue along these ever-growing pathways, so we need to find innovative ways to help protect the future of our planet.

Urban population



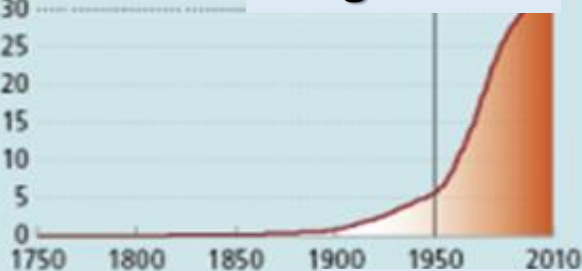
Primary energy



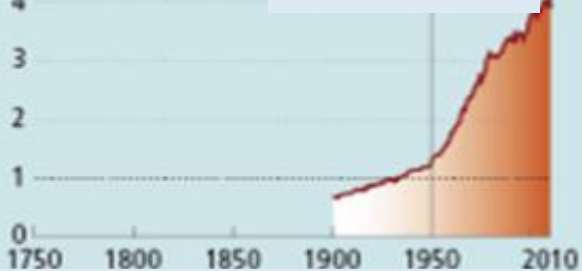
Fertiliser



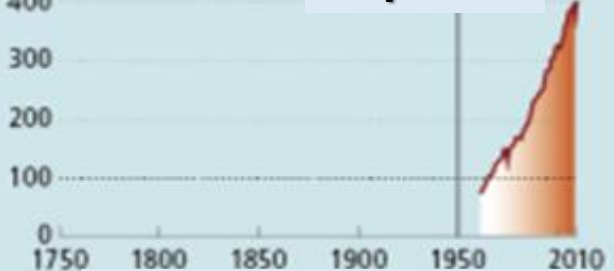
Large dams



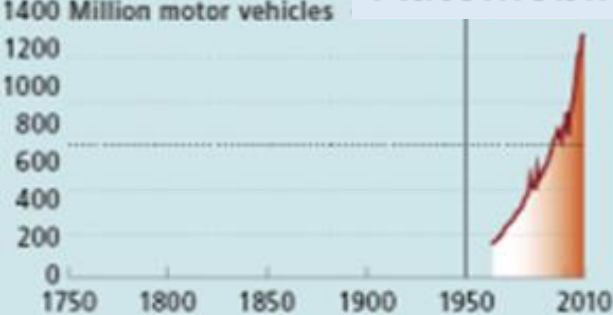
Water use



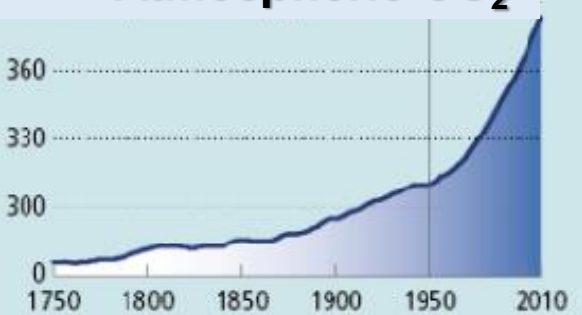
Paper



Automobiles



Atmospheric CO₂



Surface temperature

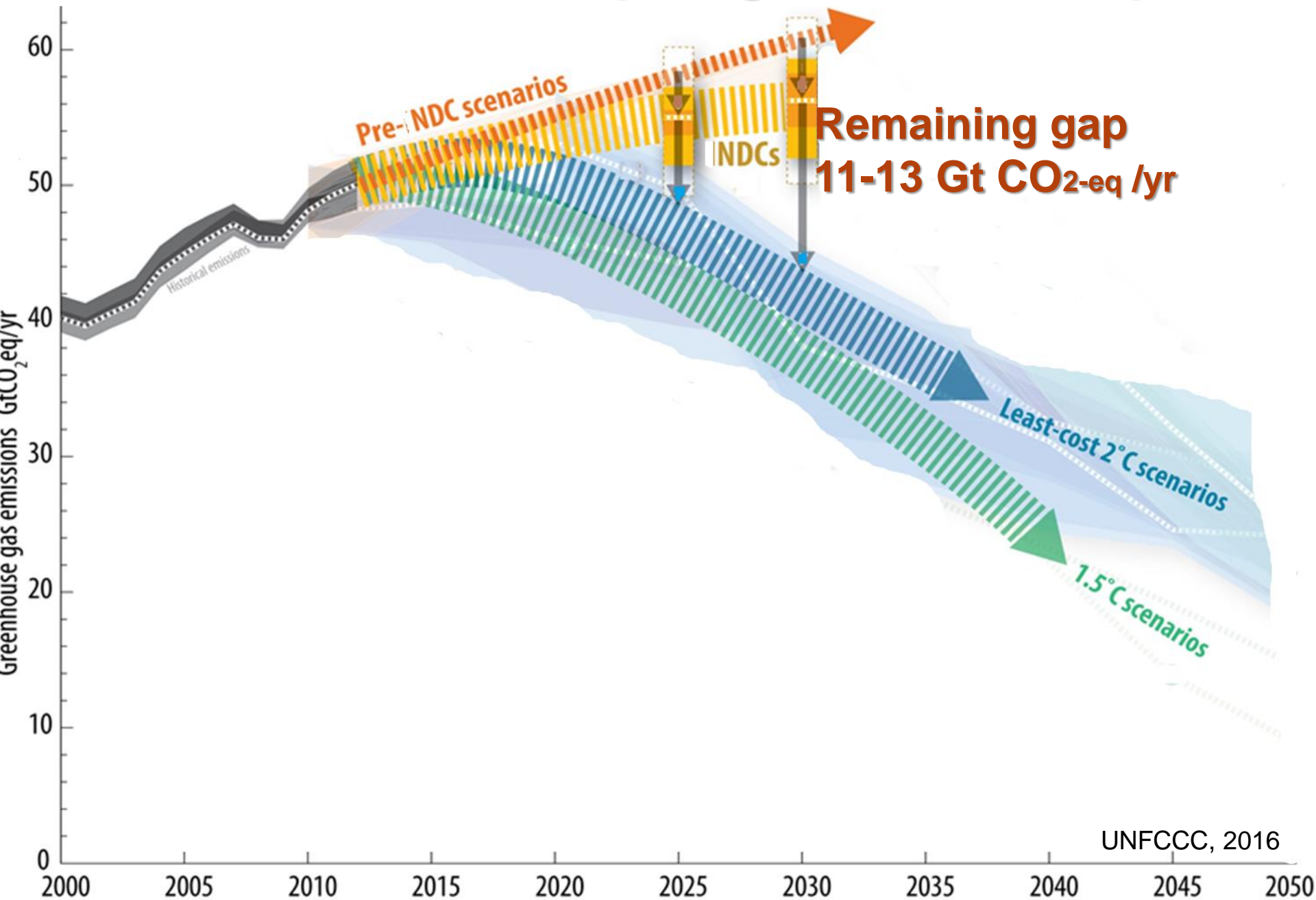


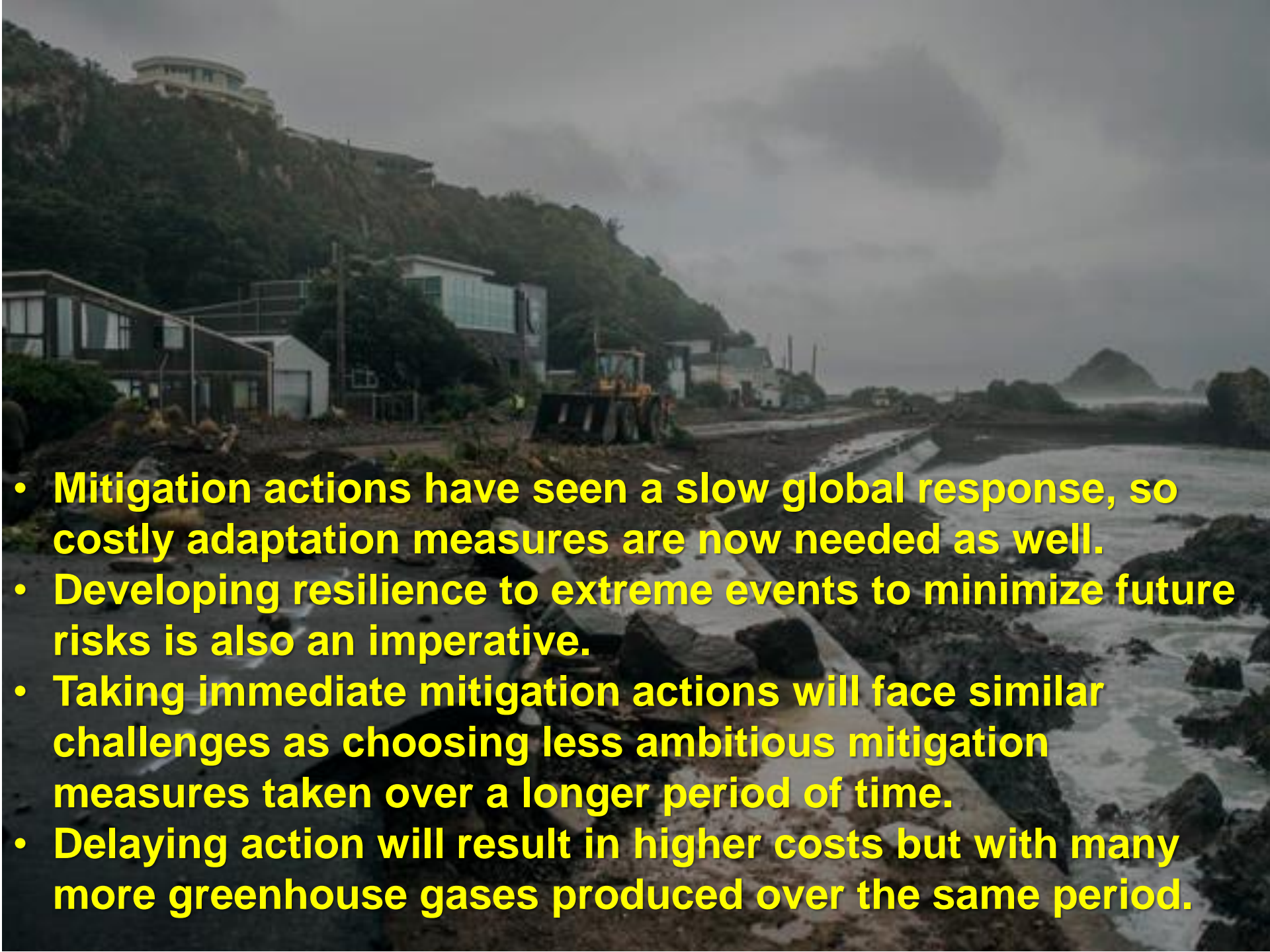
As a reminder, the Paris Climate Agreement aims to strengthen the global response to the threat of climate change:

Nations Unies
Conférence sur les Changements Climatiques 2015
COP21/CMP11
Paris - Le Bourget

- by holding the increase in the global average temperature to “*well below 2°C above pre-industrial levels and to pursue efforts to limit temperature increase to below 1.5°C above pre-industrial levels*”;
- by increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production;
- by making finance flows consistent with a pathway towards low greenhouse gas emissions and climate resilient development.

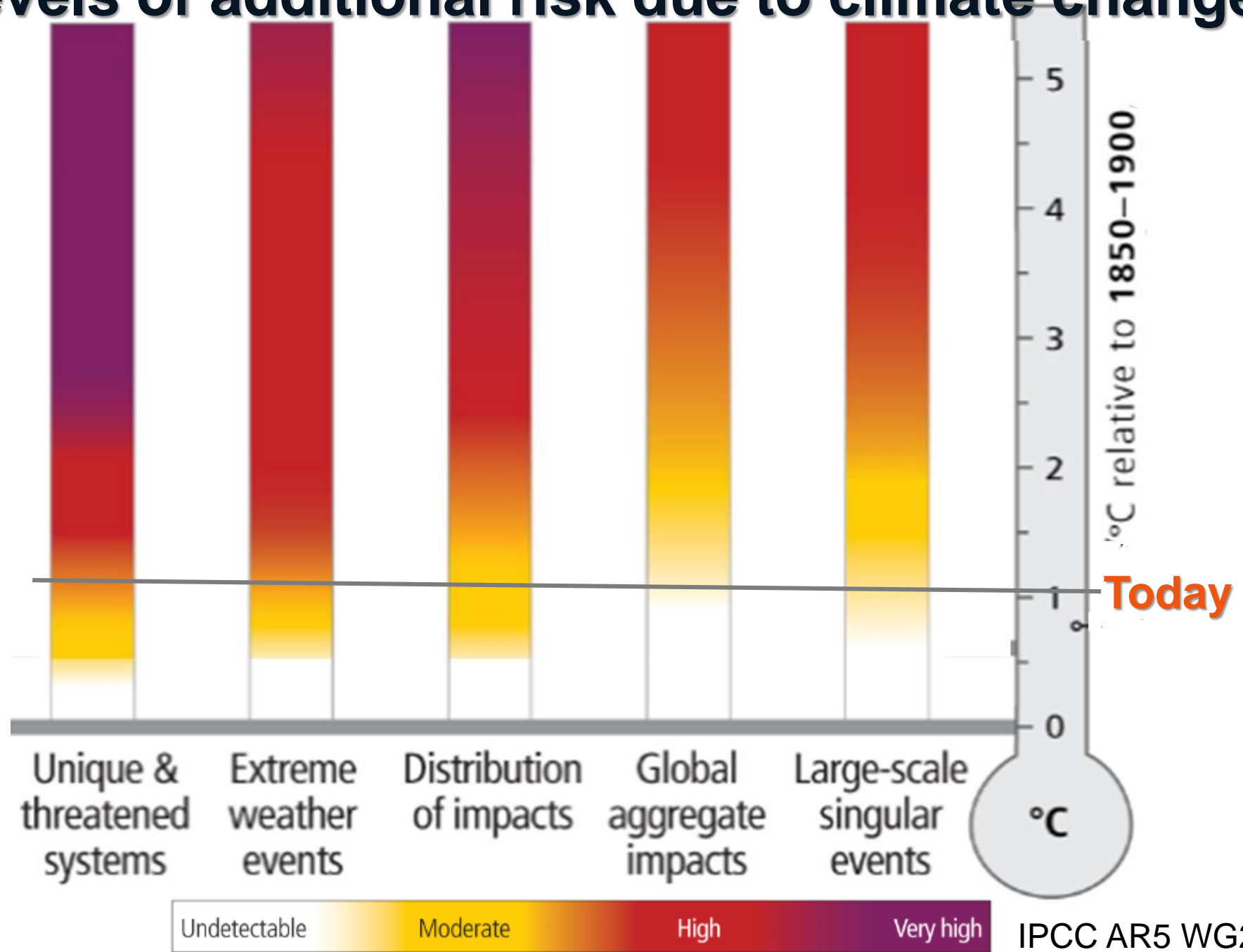
However, the NDC pledges are inadequate





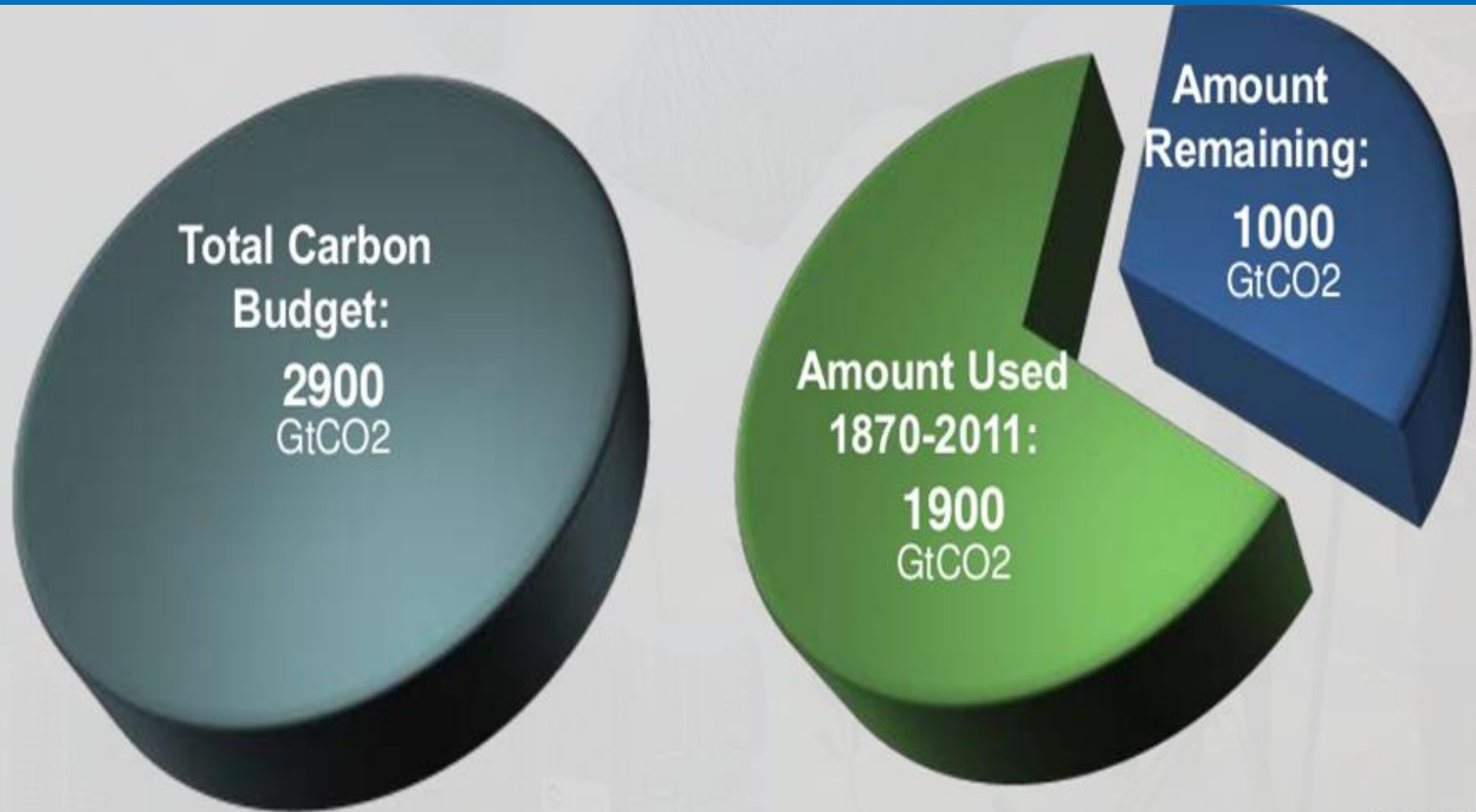
- Mitigation actions have seen a slow global response, so costly adaptation measures are now needed as well.
- Developing resilience to extreme events to minimize future risks is also an imperative.
- Taking immediate mitigation actions will face similar challenges as choosing less ambitious mitigation measures taken over a longer period of time.
- Delaying action will result in higher costs but with many more greenhouse gases produced over the same period.

Levels of additional risk due to climate change

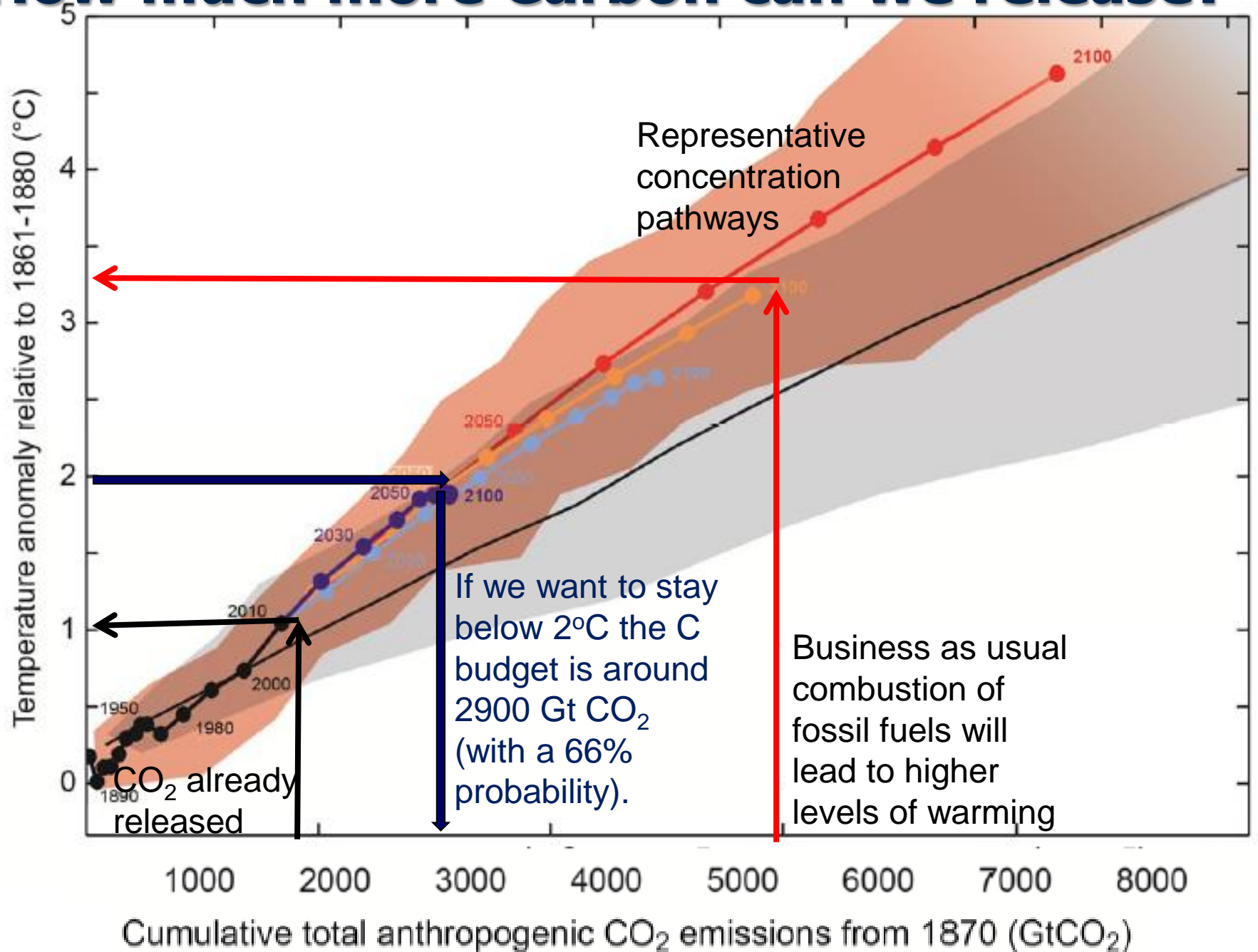


The window for action is rapidly closing

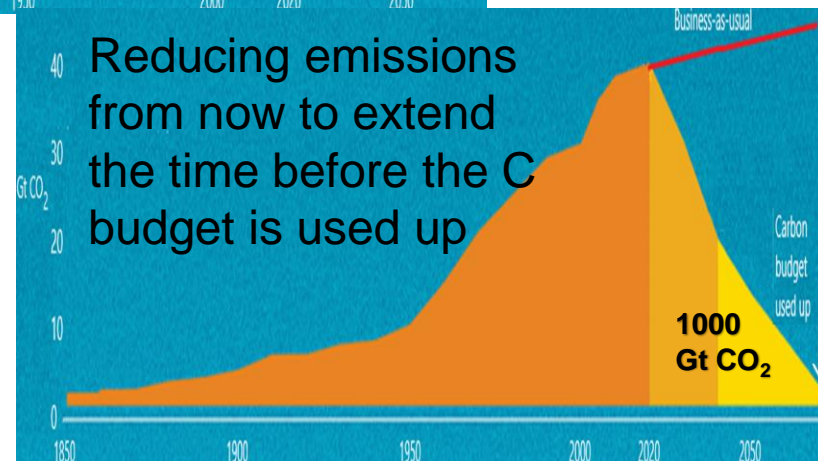
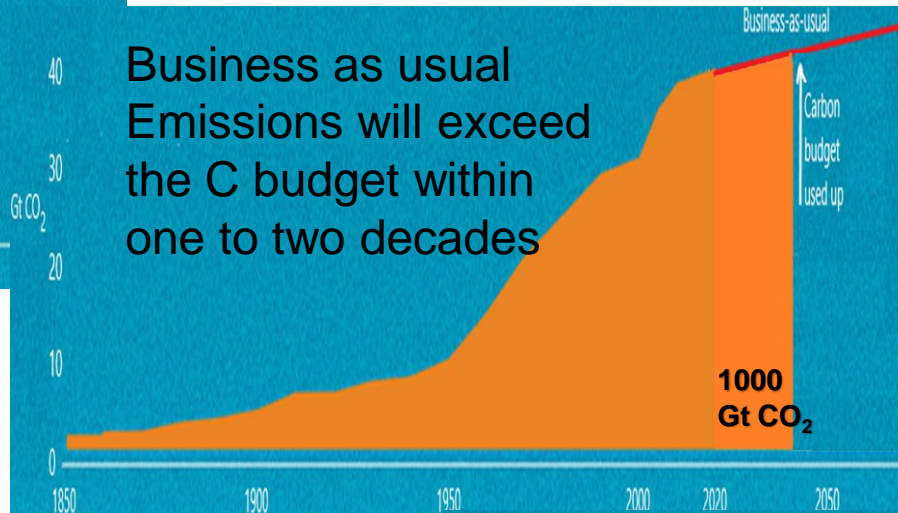
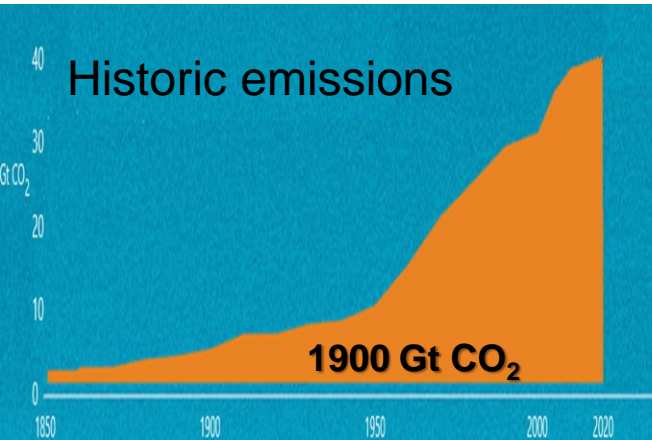
Two thirds of our carbon budget compatible with a 2°C goal has already been used up




How much more Carbon can we release?



Reducing emissions now will extend the time before the carbon budget is exceeded.



The potential to reduce emissions from the food sector, in sustainable cities and transport sector are briefly outlined below.



“As well as energy, climate change discussions should focus more on food production and cutting food waste, but a lack of knowledge is fueling public resistance”.

“All these things can help us ensure that, in producing the food that we need to feed the billions of people on this planet, that we're not destroying the planet in the process”.

Barack Obama. 26 May, 2017

Thomson Reuters Foundation.

Climate change talks should focus on food, despite resistance.

<http://news.trust.org/item/20170526132835-rjekn/>

Producing *Energy-Smart Food* can become part of the greenhouse gas mitigation solution

Key messages:

The global agri-food supply system uses ~32% of end-use energy and produces ~22% of total GHG emissions. Therefore we cannot reach net zero emissions without the sector playing a part.

We fail to consume one third of all food produced (mainly due to post-harvest losses in developing countries and consumer waste in developed countries).

Our present food supply is based on a “take-make-waste” system – so overall it is unsustainable.



**“ENERGY-SMART” FOOD
FOR PEOPLE AND CLIMATE**
ISSUE PAPER

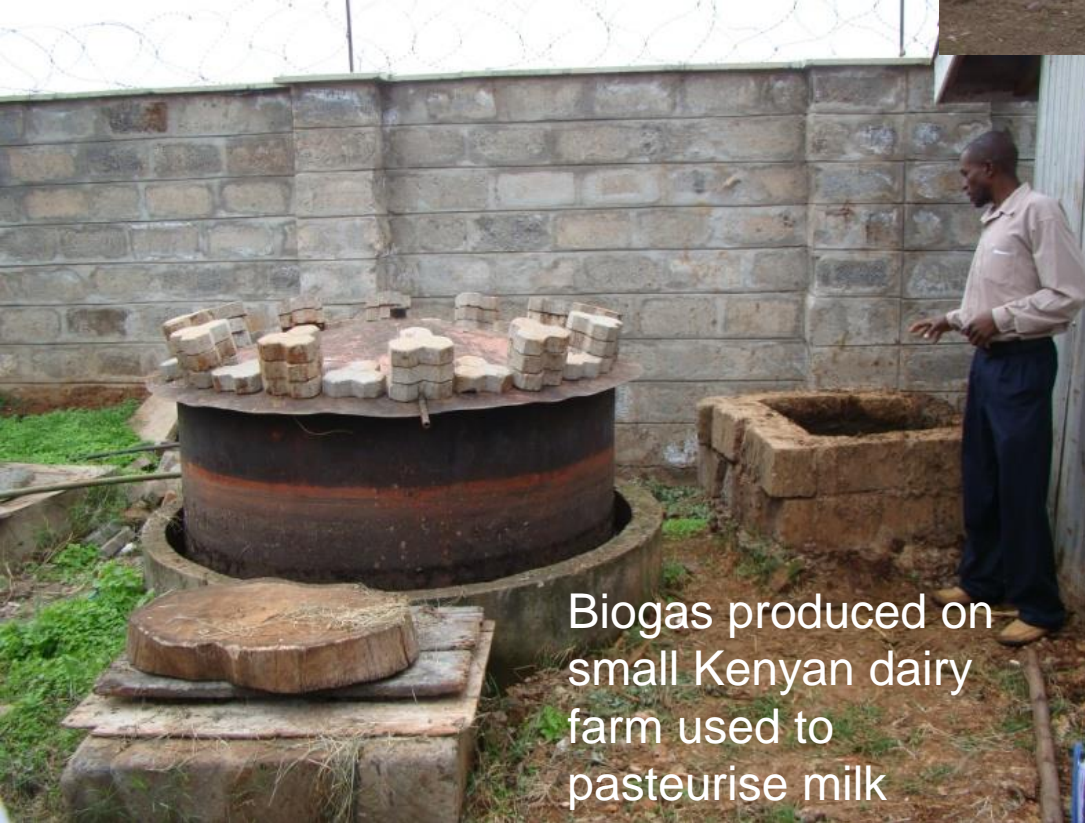
Ralph E H Sims and Alessandro Flammini



Wind, solar and biomass resources from crop residues



30 MW solar farm in UK



Biogas produced on small Kenyan dairy farm used to pasteurise milk

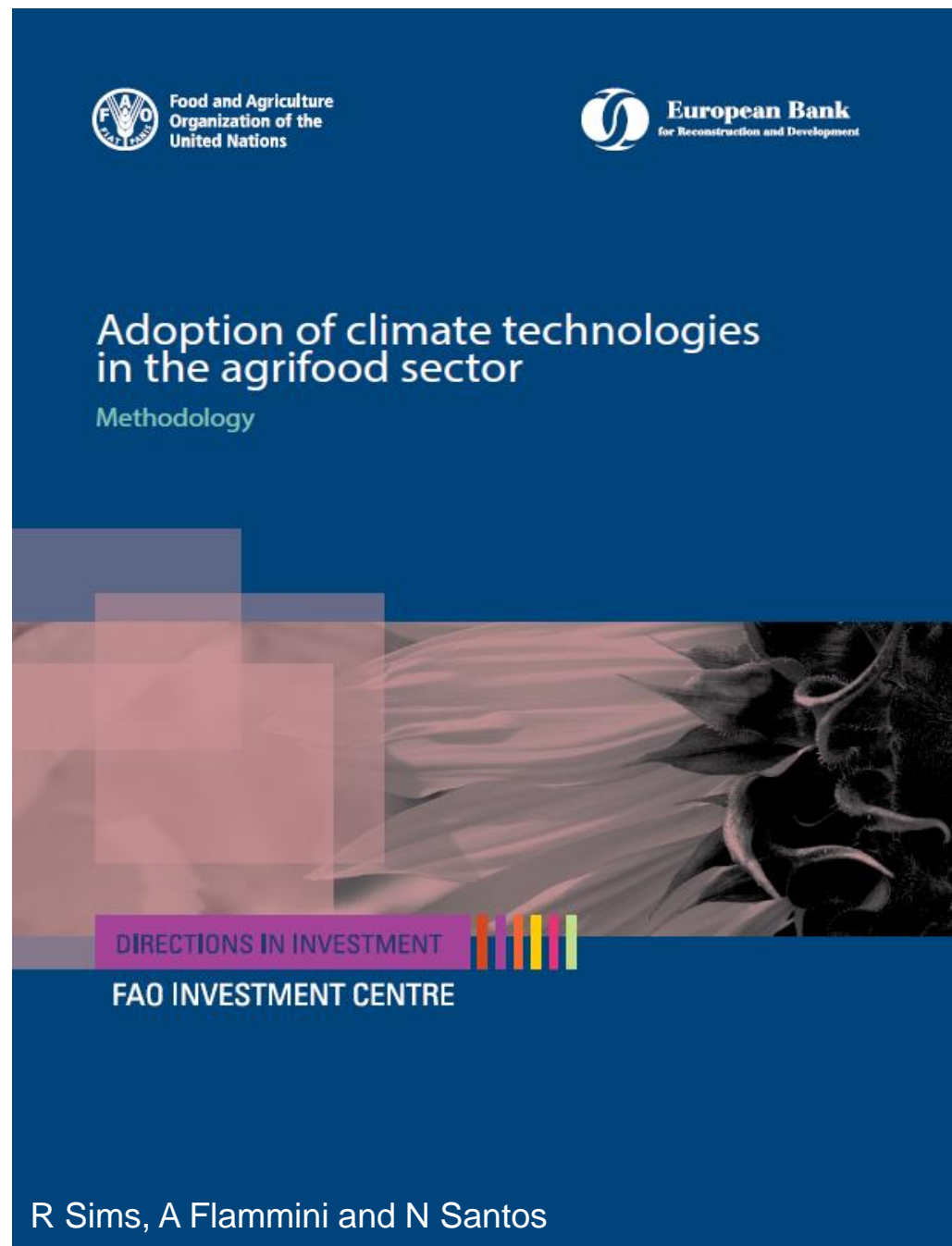


Solar panels above arable land

Another FAO report (2015) outlines a method developed to enable a country to identify priority areas for investment in climate technologies in the agrifood sector.

15 countries were assessed as part of the evaluation.

The methodology has since been tested in Morocco and Kazakhstan with separate FAO reports available.

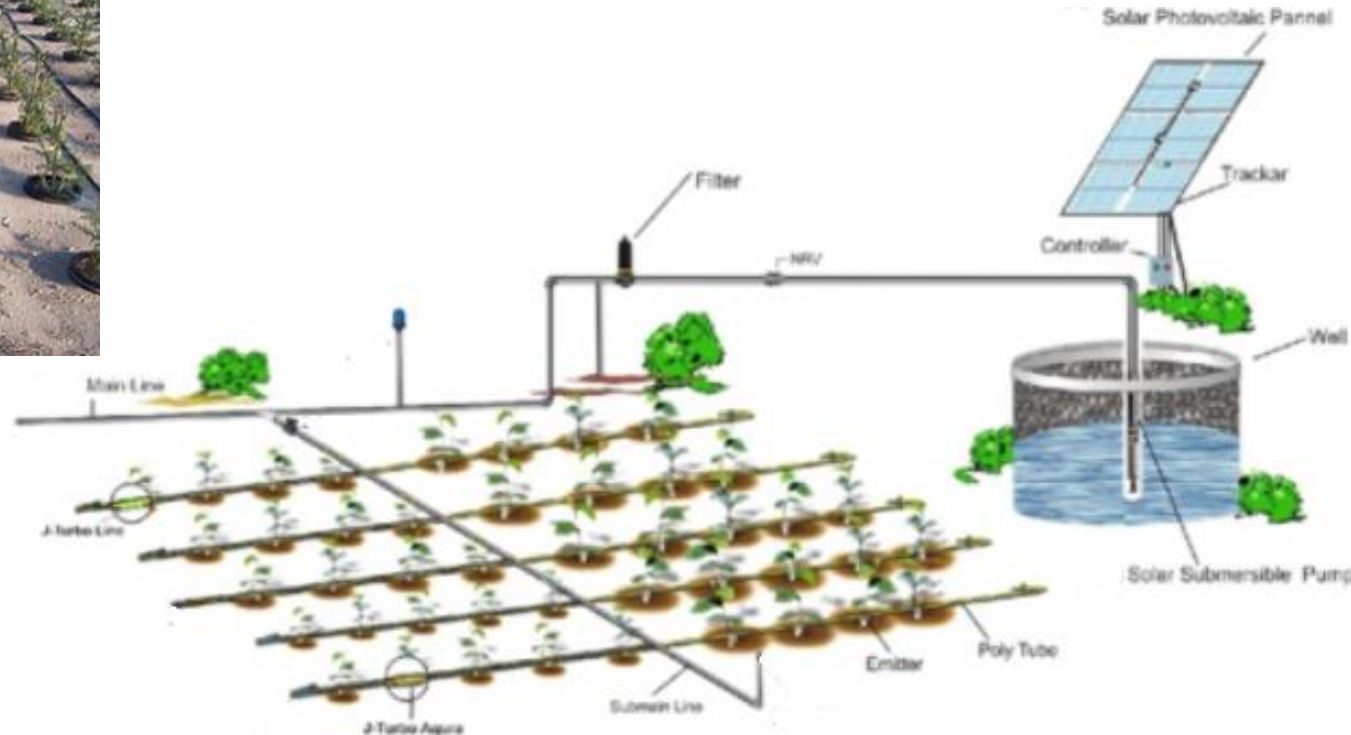


<http://www.fao.org/3/a-i7022e.pdf>

Amongst other things, this report confirmed how the *land / water / energy / climate* nexus is critical for future food security.

As an example of a successful strategy, in Jordan, drip irrigation covers over 80% of all potential irrigated cropping land due to successful government policies. Solar-powered water pumps are used to displace diesel-engines.

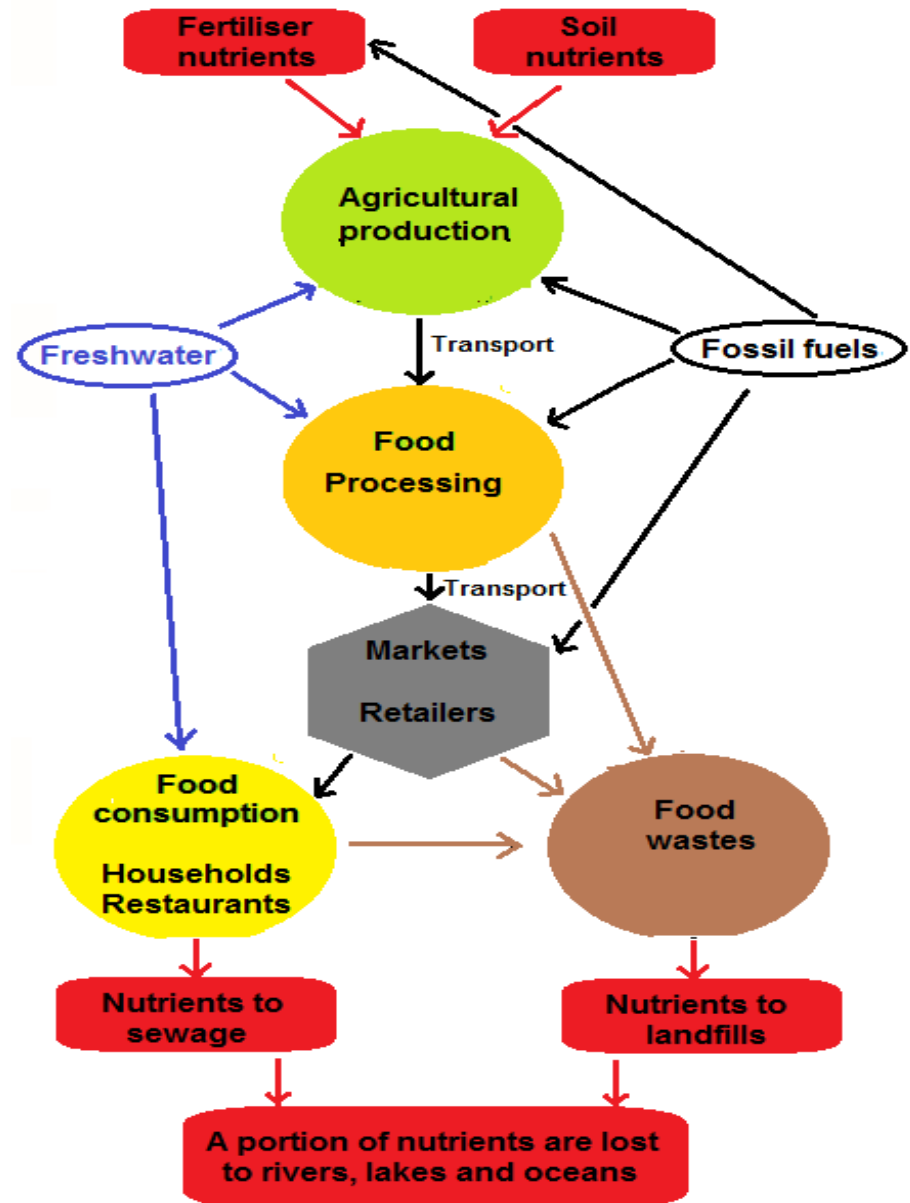
(FAO Aquastats)



Co-benefits: It increases crop productivity, saves water, saves diesel fuel, and hence reduces greenhouse gas emissions.

The present food supply system is “take-make-waste” and is unsustainable

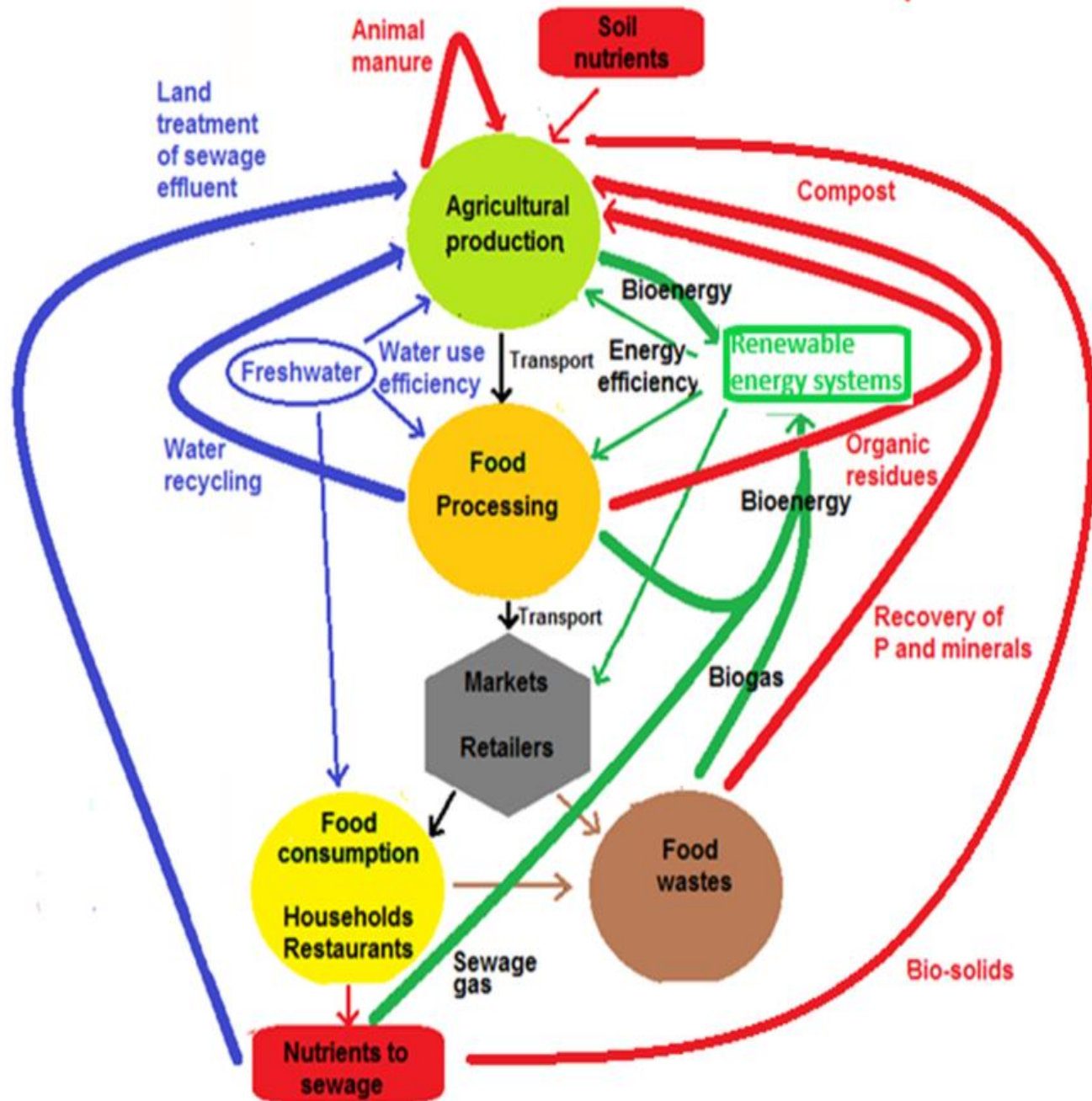
1. Extract natural resources and materials then process them.
2. Add energy (mainly fossil fuels) and freshwater inputs.
3. Consume the product - but we waste one third of all food produced.
4. Dispose of wastes.



We can improve resource use efficiency in the agri-food sector by investing in the Circular Economy that involves:

- deploying low-carbon energy technologies;**
- using organic wastes / residues for bioenergy;**
- improving freshwater use efficiency to reduce water demand;**
- recycle water where feasible;**
- use precision application techniques for fertiliser and agri-chemicals;**
- change fertiliser manufacturing processes;**
- close the nutrient cycle by recycling nutrients.**

Introducing the Circular Economy concept to the agri-food sector.



Sustainable Cities

Many organisations are working in this space.

Many local governments have demonstrated they can move towards a low-carbon transition faster than can national governments.

A wide range of activities have been undertaken over recent years from which other cities can learn from their policies and experiences – such as advocating the uptake of renewable energy systems.

The image shows the cover of an IEA publication. The background is a vibrant blue and green abstract pattern. In the top left, the IEA logo is displayed next to the text 'International Energy Agency'. The main title 'CITIES, TOWNS & RENEWABLE ENERGY' is prominently featured in large white letters, with the subtitle 'Yes In My Front Yard' in yellow below it. Several inset photographs illustrate sustainable urban development: a blue car with 'THE ACTING MAYOR' written on it, solar panels on a roof, a modern glass building, a city skyline, and a waterfall. A small text box in the bottom left corner contains a disclaimer about the PDF's usage. The URL for the publication is at the bottom.

iea International Energy Agency

**CITIES, TOWNS
& RENEWABLE
ENERGY**

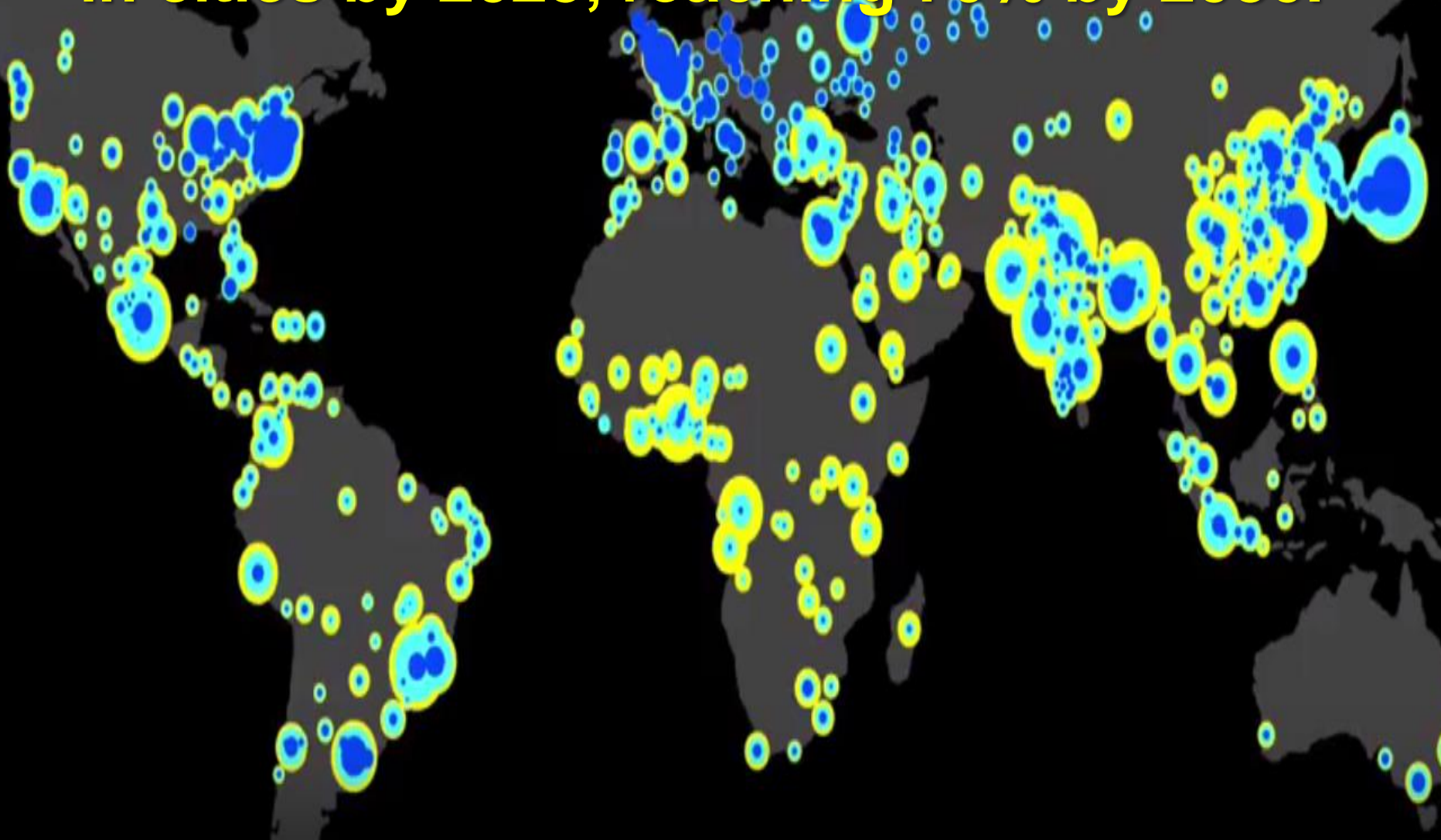
Yes In My Front Yard

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https://www.iea.org/publications/free_publications/publication/Cities2009.pdf

Urban population : 1950, 1990, 2025

Around 60% of the world population will live in cities by 2025, reaching 70% by 2050.



In 2014, APERC reviewed Da Nang to help it become a low carbon city.



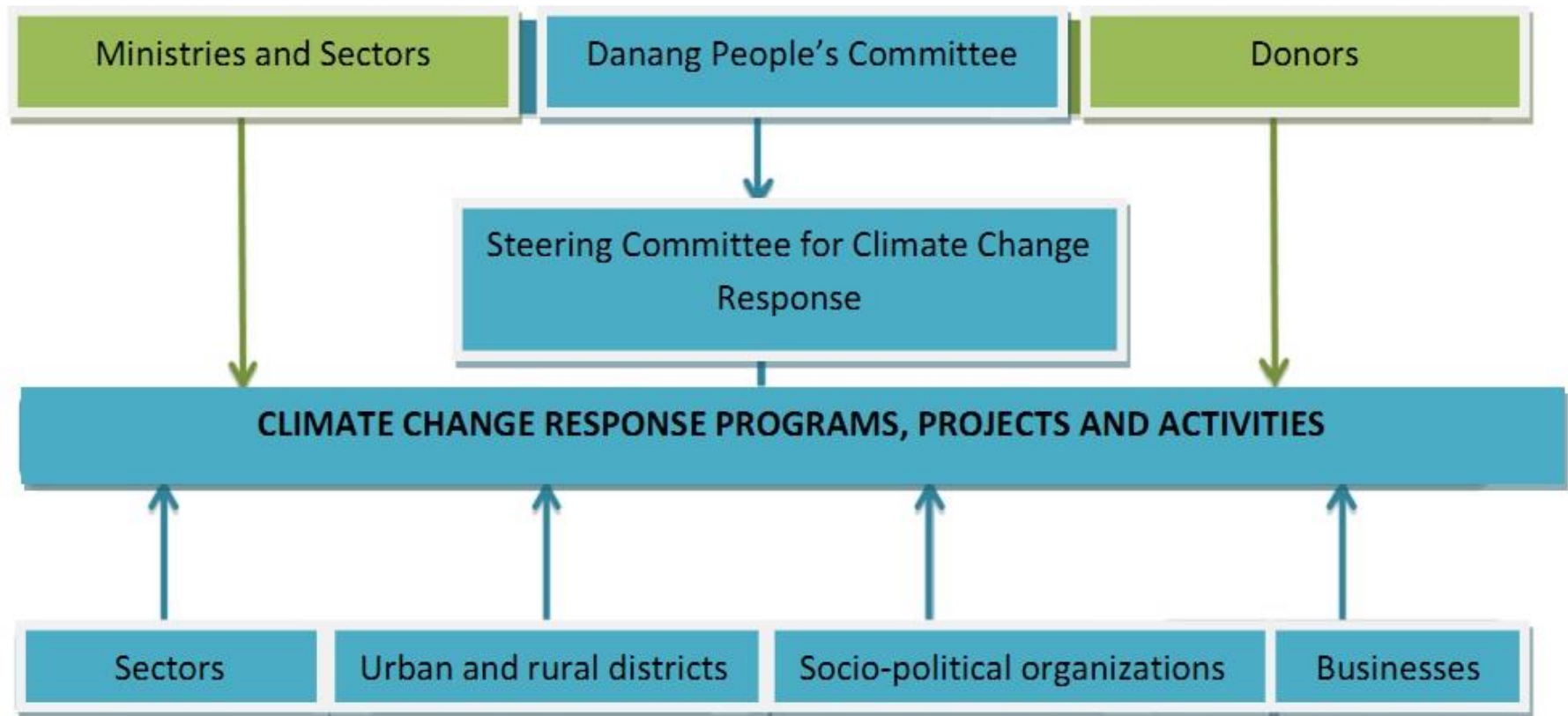
The final report “Policy Review for Low-Carbon Town Development Project in Da Nang, Viet Nam” (May, 2014) can be found here:

http://aperc.iecee.or.jp/publications/reports/lcmt/LCMT_Phase_3_Da_Nang_Viet_Nam_Policy_Review_Report_Final.pdf

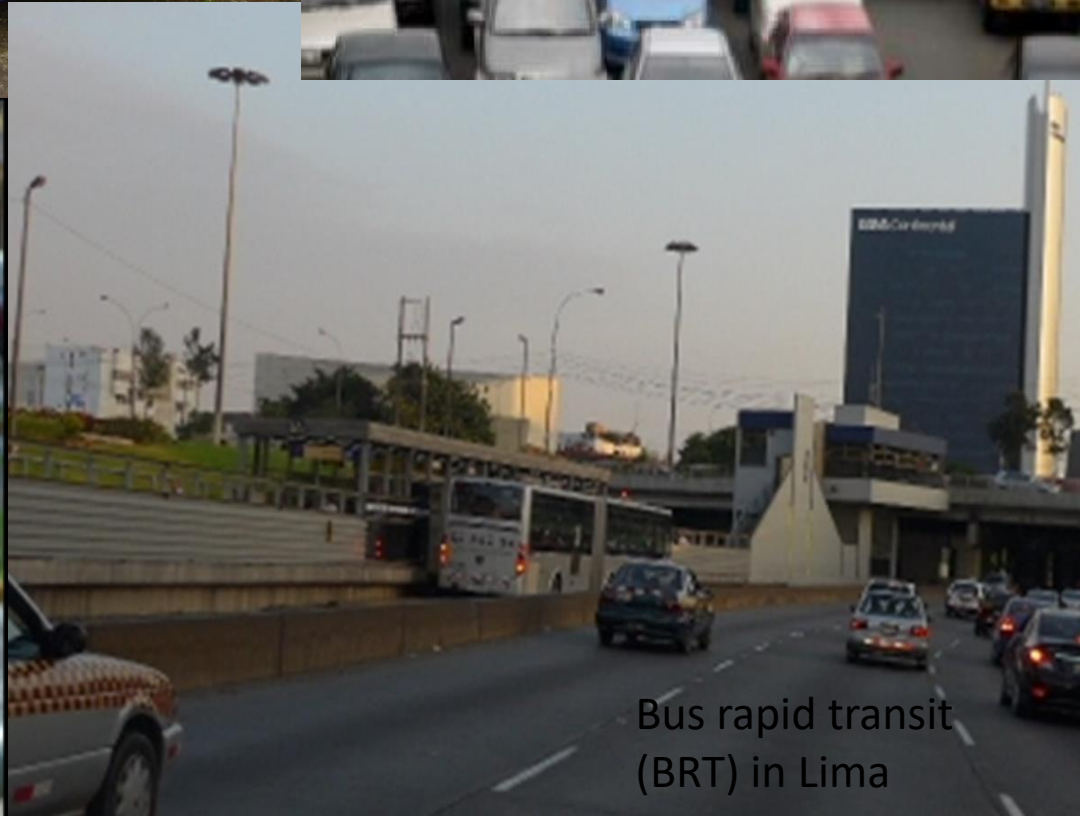
For example, Da Nang's Ngu Hahn Son district has good potential to become low carbon



Da Nang shows how local and national governance, civil society and local communities can link with the private sector and donors (such as the GCF), for Climate Change Response Programs, projects and activities to be initiated.

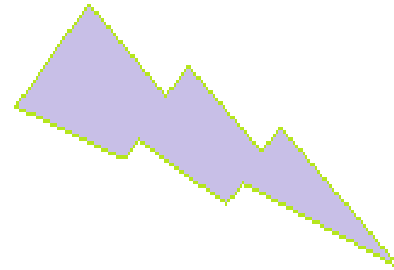
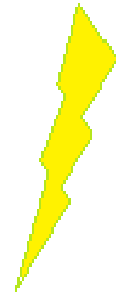
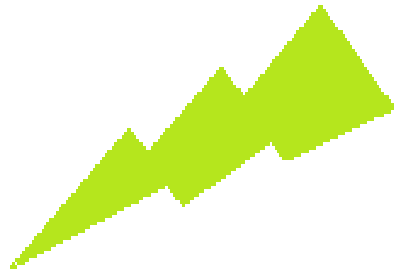


Transport mitigation is not easy!



Bus rapid transit
(BRT) in Lima

TOTAL GHG emissions



**Fuel carbon
intensity**
(gCO_{2-eq}/MJ)

**Energy
intensity**
(MJ / km)
(MJ / t km)

Journey
(km / yr)
(t km / yr)

**System -
infrastructure
modal choice**

Diesel
Gasoline
Biofuels
Electricity
Hydrogen

LDV / HDV / Bikes
Rail
Marine
Aviation
Mass transit
Cycling / walking

Distance to travel
Combine trip
objectives
Avoidance
Internet shopping

Urban planning
Roading / airports /
railways / ports
Choice between
speed / comfort /
cost / convenience

E-bikes



Electric road vehicles

Ownership of EVs by the local community for use by residents.

Electric vehicles need renewable electricity to be truly low carbon.

Land use change is a key part of mitigation.

Implementing REDD+ is key, but also countries can increase the land area under plantation forests, and enable regeneration of natural forests, that would help offset CO₂ emissions over the next few decades.



The key challenge is to stabilise the climate well before reaching a 2°C temperature rise

- All countries will need to strive to reduce both long-lived (e.g. CO₂, N₂O) and short-lived (e.g. CH₄, black carbon) climate forcers, if we are to reach net zero emissions around mid-century.
- The Paris NDCs, linked with the SDGs, provide a valuable opportunity for countries to address their climate actions while remaining true to their sustainable development priorities and needs.
- Supported by other international agencies and the private sector, countries represented at this Dialogue can partner with the GCF and then drive towards urgently reducing their GHG emissions (with a far higher level of ambition than in the present NDCs), whilst becoming more resilient to climate impacts.