

# Towards a carbon neutral economy - what role for economic policies?

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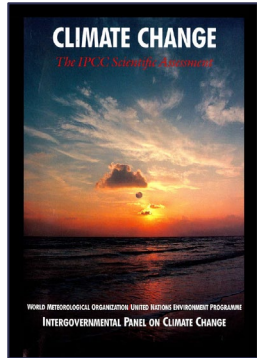
**THE NEW CLIMATE ECONOMY**  
The Global Commission on the Economy and Climate

# Structure

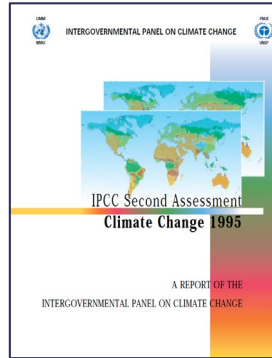
- **The pre-COVID and COVID context**
- Investment, policy and finance for transformation
- The economic analysis of policy
- Working together

Not all details of slides will be presented. They are intended to be accessible independently of the presentation.

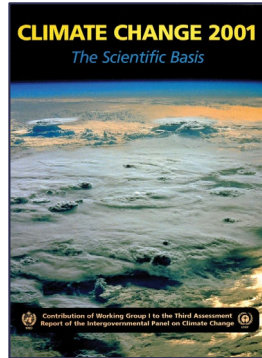
# The science of climate change is looking ever more worrying



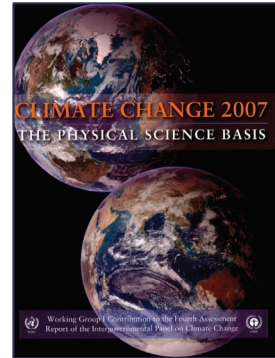
1990



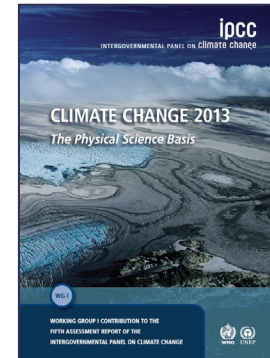
1995



2001



2007



2013



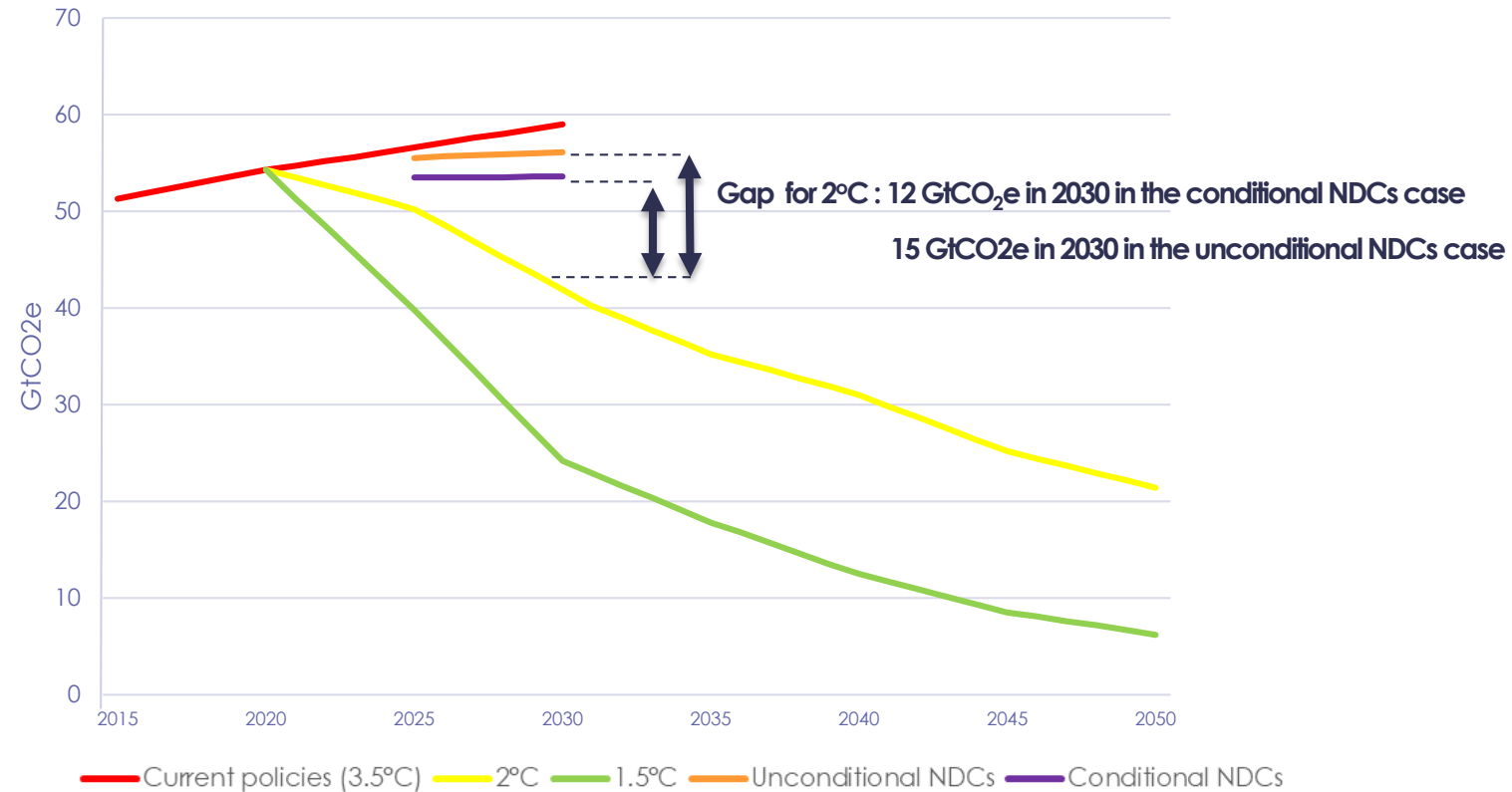
2018

Each IPCC report has looked more worrying than its predecessors.

Effects coming through at greater speed, scale and intensity than anticipated. Emissions still rising.

Our current civilisations are from the last 8-9000 years, following the move to grains and to stable agriculture – the Holocene period, with fairly stable climate and temperature. Already on the edge of those temperatures at  $\sim 1.1^\circ\text{C}$ . Have not seen temperatures  $>3^\circ\text{C}$  for around 3 million years (when, e.g., sea levels were 10-20m higher). Even with strong mitigation, building adaptation and resilience will be crucial.

# But still a large gap between current COP21 NDCs and what is required to reach the Paris temperature targets. Net zero.



Source: Trajectories based on UNEP (2020)

NB: The 1.5°C scenario used by the UNEP report relies on the widespread use of negative emissions technologies (NETs) later in the century.

**The challenge is now to accelerate action to 2030 to close the gap. Requires immediate action across whole economy. Must peak emissions in next few years and go to “net zero” in next 50-60 years.**



# Transition and structural change: investments, innovation, opportunities, dislocation

- The Paris Agreement helped shift expectations/political economy towards the low-carbon trajectory. An early transition to a carbon-neutral economy will require countries to substantially increase the level of **investments** and step up **innovation** in key technologies and sectors.
- Five years of innovation and investment arising from changed expectations have generated **rapid progress** in low-carbon solutions and markets (Systemiq, 2020). But emissions are still rising and rapid acceleration in technological change, especially in hard to abate sectors (e.g. steel, cement, aviation) is urgently required.
- Sectors are on pathways towards **market tipping points** where low-carbon solutions can out-compete fossil-fuel based incumbents, including in electricity across much of the world.
- Many models fail to represent the innovation dynamics underlying **technological change** (e.g. models failed to predict the tenfold reduction in the cost of both solar photovoltaic generation and battery storage over the past 10 years (Bloomberg NEF, 2019)).
- Models and scenarios need to embody the rapid **scaling up of investment and disruptive technological change** that can drive an early transition.
- Importance of “just transition”. Investing in people and places.

# Climate risks, macroeconomic and financial stability, mispricing

- Economies now face both **physical risks** from climate change and **transition risks** from the shift to zero-carbon. Perspectives and theories now look different from those of 1990s in important ways. “We’re all transition economies now” (Knot, 2021).
- These risks have macroeconomic and financial implications and consequences for **price stability**. E.g.: volatility in **output** and **inflation** from extreme weather events; long-lasting effects on structures influencing **growth and inflation** from physical damages, transition policies and innovation.
- The ability of central banks and supervisors to **control climate risks and macroeconomic stability** will become more difficult as global temperatures rise and structural change accelerates. **Financial stability** threatened by both physical risks and transition risks.
- Multiple crucial **market failures** beyond GHG externality (those associated with capital markets, R&D, networks, information and co-benefits - including air, water and soil pollution) are ignored by standard economic models. And key futures markets are absent. Risks continue to be **mispriced** in financial markets. Importance of transparency (TCFD) shaping **expectations** because crucial for fostering sustainable investment.
- With risks mispriced and carbon under-priced, “**market-neutrality**”, narrowly interpreted maybe neither neutral nor in the public interest.

# The dangers and fragilities of the pre-COVID decade

- Low growth and **productivity** slowdown, especially in advanced economies. Recognised investment deficiency relative to savings.
- Rising **inequality** in many nations. Erosion of confidence in government, and political and social processes. Problems with **social cohesion**: rise of populism in some countries.
- Intense discussion around drivers of these trends, including impacts of globalisation on advanced nations. Likely to be a combination of many interrelated factors.
- **Fragility**, including in relation to pandemics, climate and biodiversity.
- **Climate has become macro-critical** in the last few years.

# How the response was building pre-COVID

- The **SDGs** and the **Paris Climate Agreement** (2015).
- Numerous studies (e.g. NCE, 2018; OECD, 2018; Stern, 2015) suggesting that driving to low-carbon can also **drive inclusive growth**.
- **Private industry**, via individual firms, financial institutions, sector initiatives, business associations, coalitions and through organisations like the World Economic Forum, WBCSD, We Mean Business and so on, has made real progress on mobilising commitments and action on sustainability, especially in the last 2 or 3 years.
- **Central banks**: systemic risks and stress tests; NGFS; TCFD. Financial stability could be threatened by climate risks: physical, transition and legal.
- **Coalition of Finance Ministers** for Climate Action launched 2019.
- Global annual **renewable power** capacity expansion exceeded non-renewable capacity expansion every year from 2015-2019 (IRENA, 2020). Strong technological change across the economy.
- COVID crisis has focused attention on **building back better**.

Should tackle the dangers and fragilities of the pre-COVID growth path, and of the COVID crisis together.



# The world has been transformed by the COVID crisis

- **Major crisis** in world economy, finance/debt, health, society and politics.
  - Tragic **human costs** and loss of life.
  - Severe **economic impacts** across countries, with a major threat of **global depression**.
    - Global growth estimated at - 4.3% in 2020, making it the fourth most severe global recession of the past 150 years, exceeded only by the first World War, the Great Depression, and the Second World War (WB, 2021).
    - Over the next five years, the crisis could cost \$28 trillion in output losses (Georgieva, 2020).
  - The crisis is truly **global**, unlike the 2008-09 financial crisis. Economic impacts are particularly severe in emerging markets and developing countries (capital flight, drastically reduced remittances, falling commodity prices).
    - Increase in extreme poverty by 1.4% (WB, 2020a).
  - **Debt stress severe**.
    - Global public debt is projected to reach a record high level of 100% of GDP in 2021 (IMF, 2020).
    - Many low-income countries hit hard.
  - **Danger of mass unemployment and loss of human capital**
    - In 2020 the number of full-time equivalent jobs lost was four times greater than during the 2008-09 financial crisis (ILO, 2021). Youth unemployment, in particular.
    - The pandemic has disrupted education for 90 percent of the world's children and it may roll back years of improvements in human capital (WB, 2020b). Potential **undermining of the social fabric**.

**Danger of lost decade for development.**

# Tackling the COVID and climate crises together: centrality of investment and innovation

- The dangers involved in **climate change** are still bigger than the crisis we are experiencing from COVID.
- We have to tackle these **two crises simultaneously**. They are the big threats of our time. One immediate, the other crisis right behind. It is imperative we tackle both together.
- Recognise the **centrality of investment** in tackling them. Investment is at centre stage right through from rescue to recovery to transformational growth / net zero.
- Across the world there is **great investment potential** and **strong savings** (negative or zero real interest rates for many countries), but a great deficiency in linking potential investment and savings.
- Investment tackles: health/ education; unemployment/ growth; inequality/ social cohesion; climate/ biodiversity.

Failing to take this opportunity would give us a deeply dangerous world.

# The growth story of the 21<sup>st</sup> century: strong, sustainable, inclusive, resilient

5 - 10 years



Investment in sustainable infrastructure and other assets can boost shorter-run demand and growth, sharpen supply and efficiency, reduce waste and pollution, promote sustainable development and reduce poverty.

~ 10 years



Spur innovation, creativity and growth in the medium term, unleash new waves of innovation and discovery.

~ 20 years



Low-carbon is the only feasible longer-run growth on offer; high carbon growth self destructs.

- ***This is a powerful growth story driven by investment and innovation.***
  - Strong job opportunities. Strong multipliers. Powerful effects on health and well-being.
  - By 2030, low-carbon technologies and business models could be competitive in sectors representing over 70% of global emissions (today 25%).\*
- ***Not a story of cost*** but of large ***net benefits***.
- ***Adaptation/resilience*** will be crucial. Many investments foster ***development, reduce emissions and promote resilience*** (SRI for rice, public transport, building design, restoring degraded lands, decentralised solar...).
- But fundamental change involves ***dislocation of work and changing relative prices. A just transition.*** Political economy and ethics. Support training, skills, places, and relocation where necessary. Revenues to protect the poor.

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# The centrality of investment

- **Investment is at centre stage** right through from rescue to recovery to transformational growth / net zero.
- The investment rate has been low over the last decade. Need to invest to drive out of the recession we are in and to re-establish growth. **Magnitudes ~2-3% of GDP** (less in some places, more in others) and change in **composition**. We now know more about what we need to invest in. Would roughly restore levels of two decades ago.
- Investment can tackle **simultaneously**: health/ education; unemployment/ growth; inequality/ social cohesion; climate/ biodiversity.
- The realisation of investment requires **sound policy** and the right kind of **finance**, on the right scale at the right time.
- Across the world there is **great investment potential** and **strong savings** (negative or zero real interest rates for many countries), but a great deficiency in linking potential investment and savings.

**Failing to take strong, internationally coordinated action on investment would give us a deeply dangerous world. A key moment in world history.**



# A credible policy framework can guide investment towards sustainability/climate action

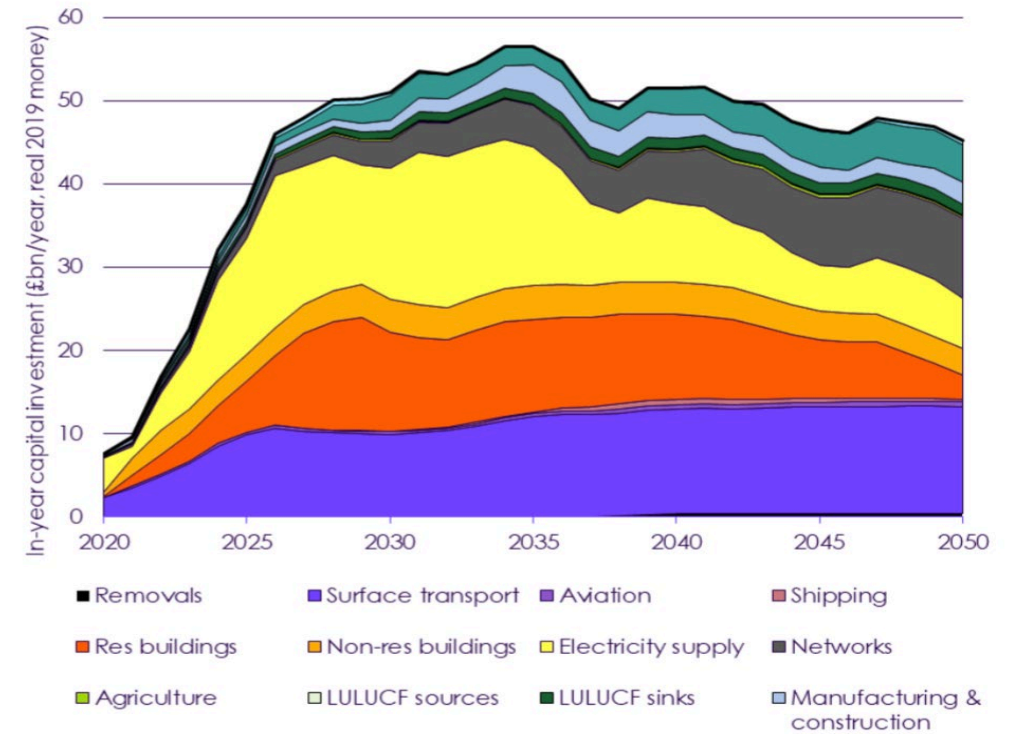
- **Clear, credible signals** can draw through both investment and innovation.
- Different market failures point to the use of **different instruments**, but the collection should be **mutually reinforcing**. We have the tools to drive action.
- Carbon pricing important, taking care of distributional effects; city design; regulation, e.g. no sale of ICE vehicles after 2030; removal of fossil fuel subsidies; government investment in R&D.
- Government-induced policy risk is the biggest deterrent to investment worldwide. Policies must be credible over time; '**predictably flexible**'.
- More detail on policy in next section.

**Sound, stable and credible public policy, sustained and long-term public investment, and a commitment to growth, play central roles in guiding and fostering private sector investment.**

# Financing the investment and innovation

- Critical importance of frontloading investment in the next decade: e.g. in the UK, extra net-zero investment needs to grow x5 to £50bn p.a. by 2030; in Europe, an estimated €350 billion of additional investment needed annually to meet the new 2030 target.
- This means moving the whole financial system (work of Mark Carney on risk, reporting, returns & mobilisation) to get **right kind of finance, on the right scale, at the right time**.
- Special role for development banks (multinational and national) to reduce, manage and share risk. International: SDRs; financing capacity of MDBs and DFIs. Urgency of debt restructuring.
- EC's Green Deal sets a roadmap to net-zero; EIB committed to support €1 trillion of investments in climate action and environmental sustainability in the next decade and align its activities with Paris agreement.
- Private finance pledges for net-zero by 2050 need to be translated into near term targets and delivered through a transition finance approach going beyond green to include resilience & just transition.

Figure 1. Achieving net-zero: estimated additional investment by year



**A recovery with strong investment, collaboration across nations and between private and public sectors, the expansion of finance from international institutions, and debt restructuring, could lay the foundation for a transformation in the world economy.**

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# The beginnings: From Marshall and Pigou to Pearce

- Static model; one externality.
- Marshall - social cost and private cost can differ.
- Pigou – tax the difference.
- Coase et al – allocate property rights and establish markets.
- David Pearce – operationalising Pigou / Coase (e.g. Pearce, Barbier and Markandya, 1989, Blueprint for a Green Economy).

# Early attempts to examine climate and growth: Integrated Assessment Models

- Nordhaus' question: To slow or not to slow? (EJ 1991); **small perturbations** to an underlying **growth model**.
- Mistaken specifications of **functions and parameters** within the chosen framework (including underestimates of climate damages and overestimates of costs of climate action).
- The framework **leaves out the big issues** that worry us and form the real policy challenges (next slide).
- Reasonable first effort turns out to fail to capture the scale of the phenomenon and nature and pace of necessary action.
- Was an attempt to **shoehorn** a “new” problem into a framework and toolkit of the standard workhorses of exogenous growth models and marginal change. The reality of climate change is of a magnitude beyond that framework.
- Have seen some modification of functions and parameters within the framework but it still dominates. **Time to move beyond it.**



# We must have an economics that can handle both extreme risk and fundamental structural and technological change

- Economic analyses of climate change must:
  - i. Take account of **extreme risk**, including possible large-scale and unforeseeable consequences.
  - ii. Recognise that many key markets have critically important **failures** (beyond that of the GHG externality); crucial markets may even be **absent**. And that there are limits on the ability of government to “correct” these market failures.
  - iii. Embody **rapid technical and systemic change**, often exhibiting increasing returns to scale, and corresponding rapid changes in (endogenously determined) beliefs and preferences (see e.g. Besley & Persson, 2020).
  - iv. Take into account **distributive impacts**, both at a moment in time and over time. Assessment of differential impacts requires value judgements, and these require explicit analysis and discussion.
- Arguments and analytics are set out in Stern & Stiglitz (NBER 2021).

**Much of the standard economic modelling of climate change, including Integrated Assessment Models (IAMs), does not embody basic methodological essentials. These models don't grapple with the right questions.**

# There are important market imperfections that policy design must take into account

Market Failure	Description	Policy Options
Greenhouse gasses (GHGs)	Negative externality because of the damage that emissions inflict on others.	Carbon tax/ cap-and-trade/ regulation of GHG emissions (standards)
Research, development and deployment (R,D&D)	Supporting innovation and dissemination.	Tax breaks, support for demonstration/deployment, publicly funded research.
Imperfection in risk/capital markets	Imperfect information assessment of risks; understanding of new projects/technologies.	Risk sharing/reduction through guarantees, long-term contracts; convening power for co-financing.
Networks	Coordination of multiple supporting networks and systems.	Investment in infrastructure to support integration of new technologies in electricity grids, public transport, broadband, recycling. Planning of cities.
Information	Lack of awareness of technologies, actions or support.	Labelling and information requirements on cars, domestic appliances, products more generally; awareness of options
Co-benefits	Consideration of benefits beyond market rewards.	Valuing ecosystems and biodiversity, recognising impacts on health

**Different market failures point to the use of different instruments, but the collection should be mutually reinforcing. We have the tools to drive action.**

# Absent markets and government limitations

- Key futures markets are **absent**. For example, private investors cannot trade fully, over project lifetimes, on future carbon. Some of the relevant insurance markets covering key risks are absent (including some of those around future policy). Markets for unknown, but possibly vital future technologies are not there. As a matter of basic theory, a competitive equilibrium with some absent markets cannot be assumed to be (Pareto) efficient. Similarly, just “correcting” for the greenhouse gas externality does not bring us market efficiency.
- Such absences mean that **expectations**, and how they are formed, are crucial for investment. They can and should be shaped by public action, including by the key public policy and financial institutions which set direction.
- Public policy is set in a way that does not have the full horizon that is relevant in this context, given that governments are made up of complex compromises and coalitions, and not necessarily long lasting. And it is not clear that these structures, as they exist and work in practice, can fully represent the **interests of future generations**.
- Governments have limitations on policy instruments and face **major administrative and political constraints**.
- **Governments cannot fully commit** to future actions in a credible way. Lack of confidence in the future of government policies can be a major deterrent to investment (“government-induced policy risk”).

**Implications for policy: a whole set of instruments; focus on risk and dynamics; public economics as if time matters (Stern, 2018).**

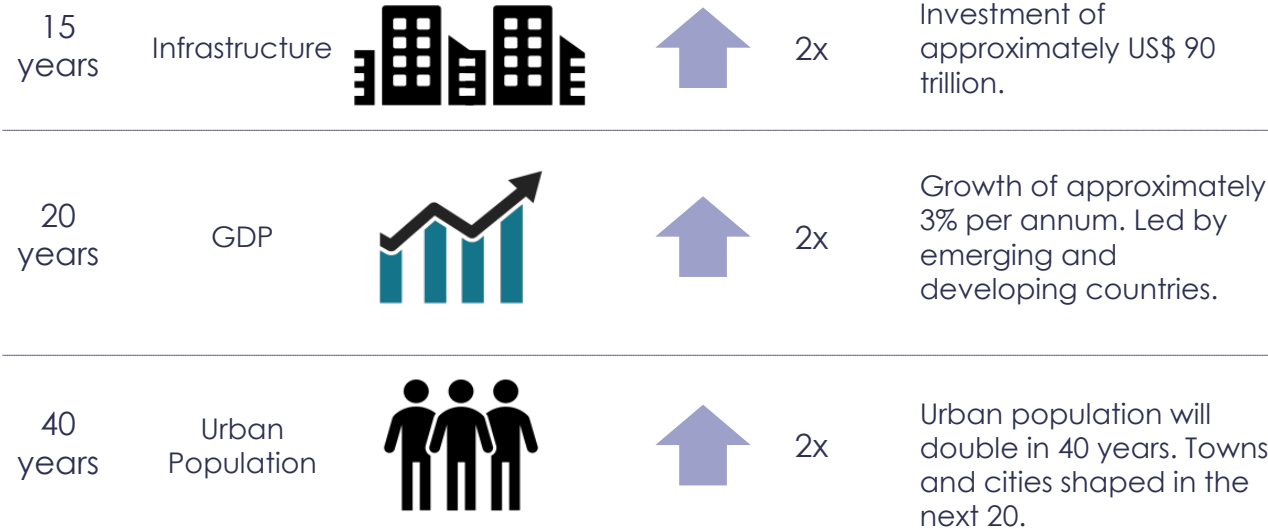
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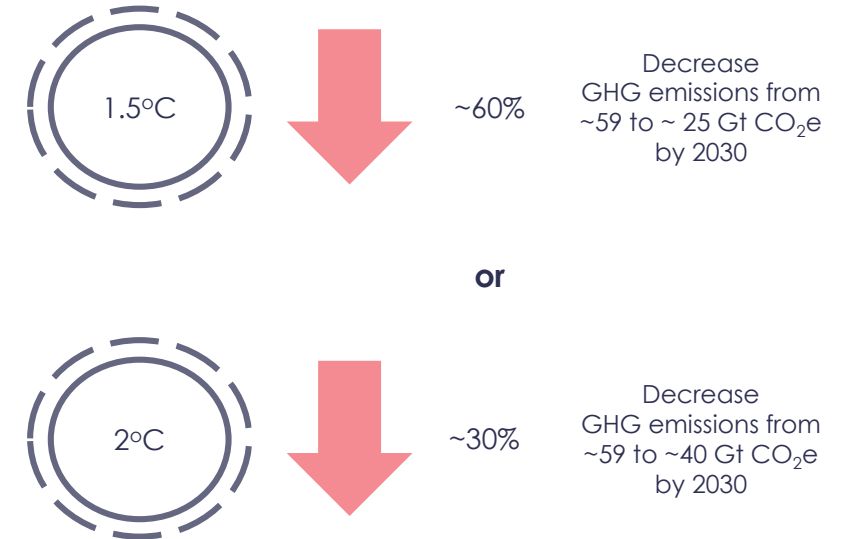
# An important year, a critical decade

- Major events in 2021, including **G7**, **G20** and **COP26**.
- **3 years of G7/G20** could be 3 years of acting together to make this a transformational decade.

## Change in the next decades



## At the same time (to meet Paris targets)



Source: UNEP 2020

**The next decade is critical. Choices made on infrastructure and capital now will either lock us in to high emissions, or set us on a low-carbon growth path which can be sustainable and inclusive. Cities are central.**



# Significant progress in international action

- **EU** declares for net zero by 2050 (December 2019). **China** commits to carbon neutrality by 2060 (September 2020). **Japan** net zero by 2050 (October 2020). **US** re-joined the Paris Agreement (February 2021).
- **UK** first G7 country to commit to net zero by 2050 (June 2019).
- The **ECB** has a secondary objective “to support the general economic policies in the Union” (without prejudice to the primary objective of price stability), including contributing to “the sustainable development of Europe” (Elderson, 2021).
- The remit of the **Bank of England**'s Monetary Policy Committee was recently updated to “reflect the government's economic strategy for achieving strong, sustainable and balanced growth that is also environmentally sustainable and consistent with the transition to a net zero economy” (Sunak, 2021).
- The **US Federal Reserve Board** has formally joined the Network of Central Banks and Supervisors for Greening the Financial System (December 2020).
- The **EU Recovery Fund** alignment with the EU Green Deal and sustainable finance taxonomy sets a model for other countries to follow. It can influence the recovery phase of the world economy.

# Importance and opportunities of international collaboration

- “Four wins” to **collaboration**: Keynesian recovery; expectations and growth; cost/technology; pollution/climate/biodiversity.
- The big challenge of **debt restructuring**.
- Key **institutions** for international finance and policy: MDBs/IMF/DFIs.
- Collaboration of **central banks**, including ECB, BoE, NGFS. Collaboration of **finance ministries**, including Coalition of Finance Ministers on Climate Action.
- WEF and **private sector**.
- 3 years of G7/G20 (UK, Italy; Germany, Indonesia; Japan, India) could be 3 years of **acting together** to make this a transformational decade.

Major events in 2021, including G7, G20 and COP26.

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