UNFCCC Technical Expert Meeting on
the Social and Economic Value of Carbon

INTERNALIZING CO-BENEFITS, INFORMING INVESTMENT DECISIONS, AND RE-EVALUATING RISKS UTILIZING A REFERENCE VALUE OF CARBON

Dr Simon Buckle
Head of Climate, Biodiversity and Water Division
Environment Directorate, OECD

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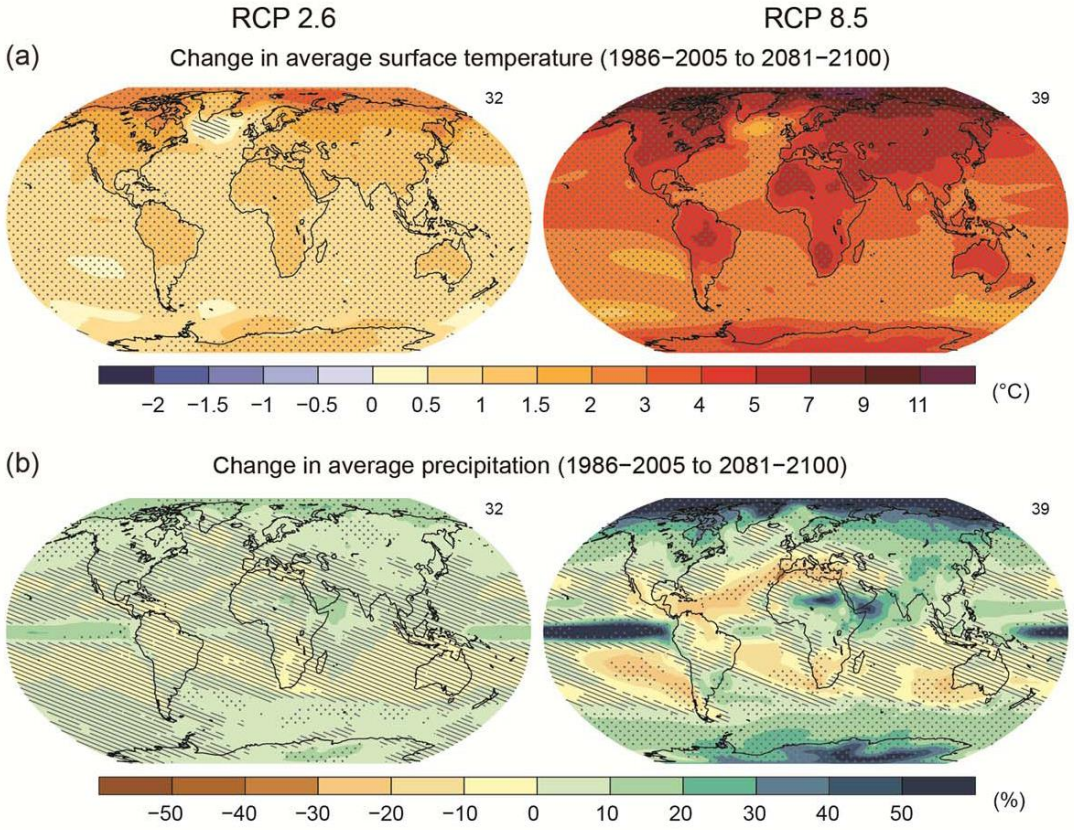
OECD
BETTER POLICIES FOR BETTER LIVES

Outline

- Climate change mitigation challenge
- Emissions pathways
  - Impact of the INDCs
  - Implications of early mitigation action
- Social cost of carbon (SCC)
  - Uncertainties
  - Discounting
- Carbon prices
  - “State and Trends” of carbon pricing
  - Projected carbon prices from models
- Co-benefits from action
- Uses of carbon values in policy appraisal

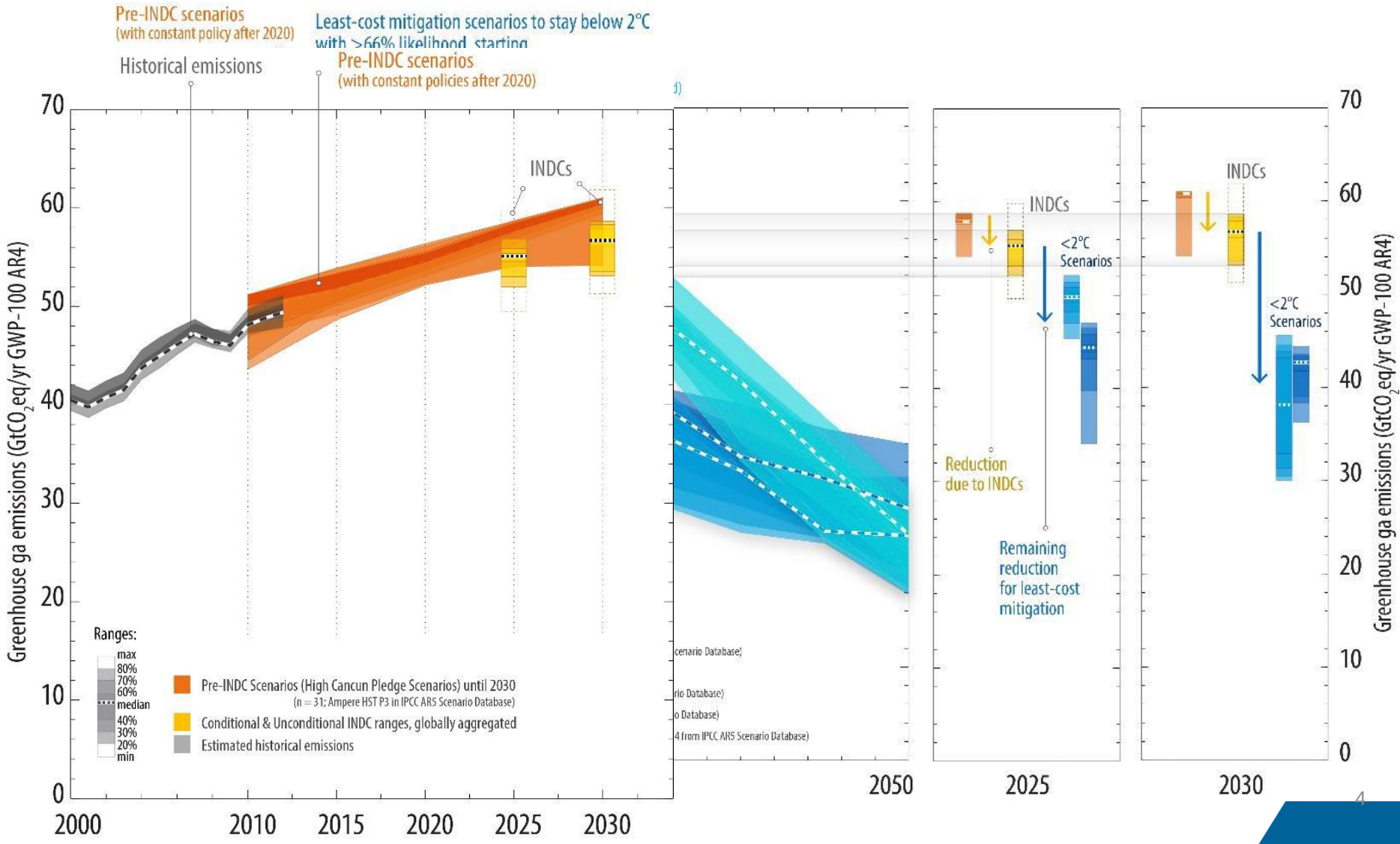
Climate change

- Climate change is an economic externality. Its social costs do not fully fall on those who emit GHGs.
- From a social welfare perspective, policy should address the strong private incentives to over-emit.
- Climate change potentially will lead to non-marginal (i.e. large-scale), long-term potentially irreversible changes
- Raises fundamental issues of responsibility, equity and risk



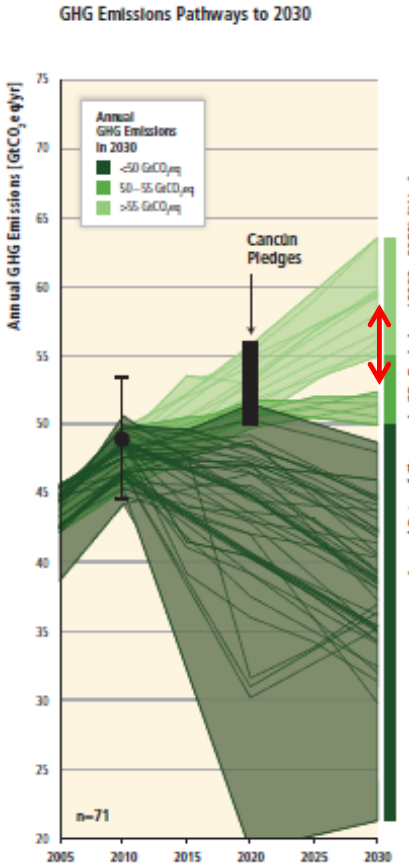
Source: IPCC AR5 WG1 SPM

Global emission levels from INDCs in 2025 and 2030 (UNFCCC 20/10/15)



Early action - projected implications for cost

The implications of different 2030 GHG emissions levels for emissions reductions



Source: IPCC AR5 WG3 SPM

And mitigation costs

2100 Concentration (ppm CO_2eq)	Increase in medium- and long-term mitigation costs due to delayed additional mitigation until 2030 [% increase in mitigation costs relative to immediate mitigation]			
	≤ 55 $GtCO_2$eq		>55 $GtCO_2$eq	
	2030–2050	2050–2100	2030–2050	2050–2100
450 (430–480)	28 (14–50) [N: 34]	15 (5–59)	44 (2–78) [N: 29]	37 (16–82)
500 (480–530)				

NB INDCs are estimated to result in 56.7 (53.1 to 58.6) Gt CO_{2eq} in 2030

The social value of reductions in greenhouse gas emissions

The social cost of carbon (SCC) = the value of the world-wide damage caused by emitting one additional tonne of carbon dioxide.

- The damage caused by an additional tonne of carbon dioxide emissions at any particular point in time will depend on the level of greenhouse gases in the atmosphere.
- The SCC must be defined for a specific level and future trajectory of atmospheric greenhouse gas concentrations, against which its effects are to be measured.
  - This could be “business as usual” emissions
  - Or a chosen abatement trajectory (e.g. an “optimal” trajectory, at which global marginal damage cost equals global marginal abatement cost)
- SCC provides a benchmark, but is not always the value used in policy appraisal.

SCC: Uncertainty

Scientific uncertainty:

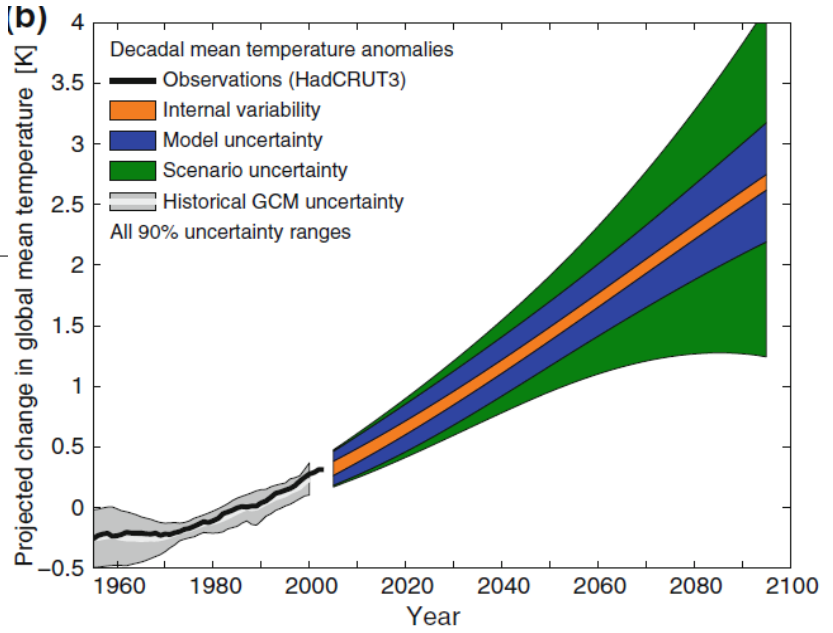
- *Models*
- *Climate variability*

Scenario uncertainty:

- *What policy choices will we make?*

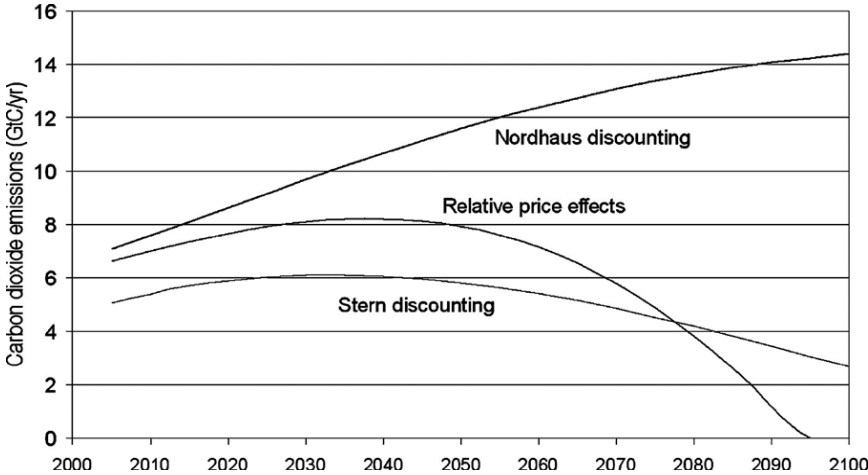
Economic uncertainty:

- *How will physical changes translate into economic values?*



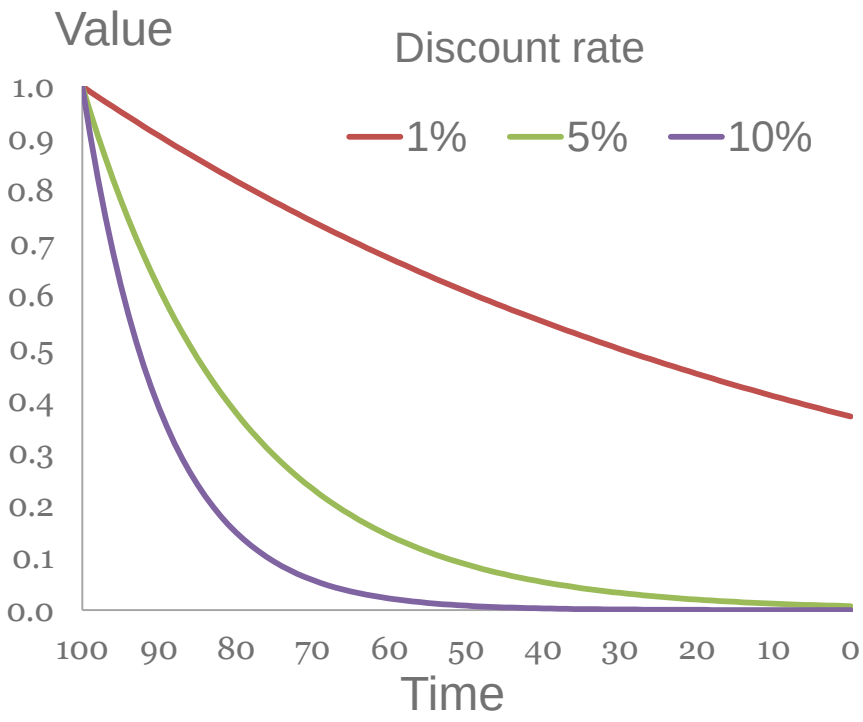
Source: Hawkins & Sutton (2011)

Optimal carbon dioxide emission paths in amended version of the DICE model



Thomas Sterner, and U. Martin Persson Rev Environ Econ Policy 2008;2:61-76

SCC: Discounting



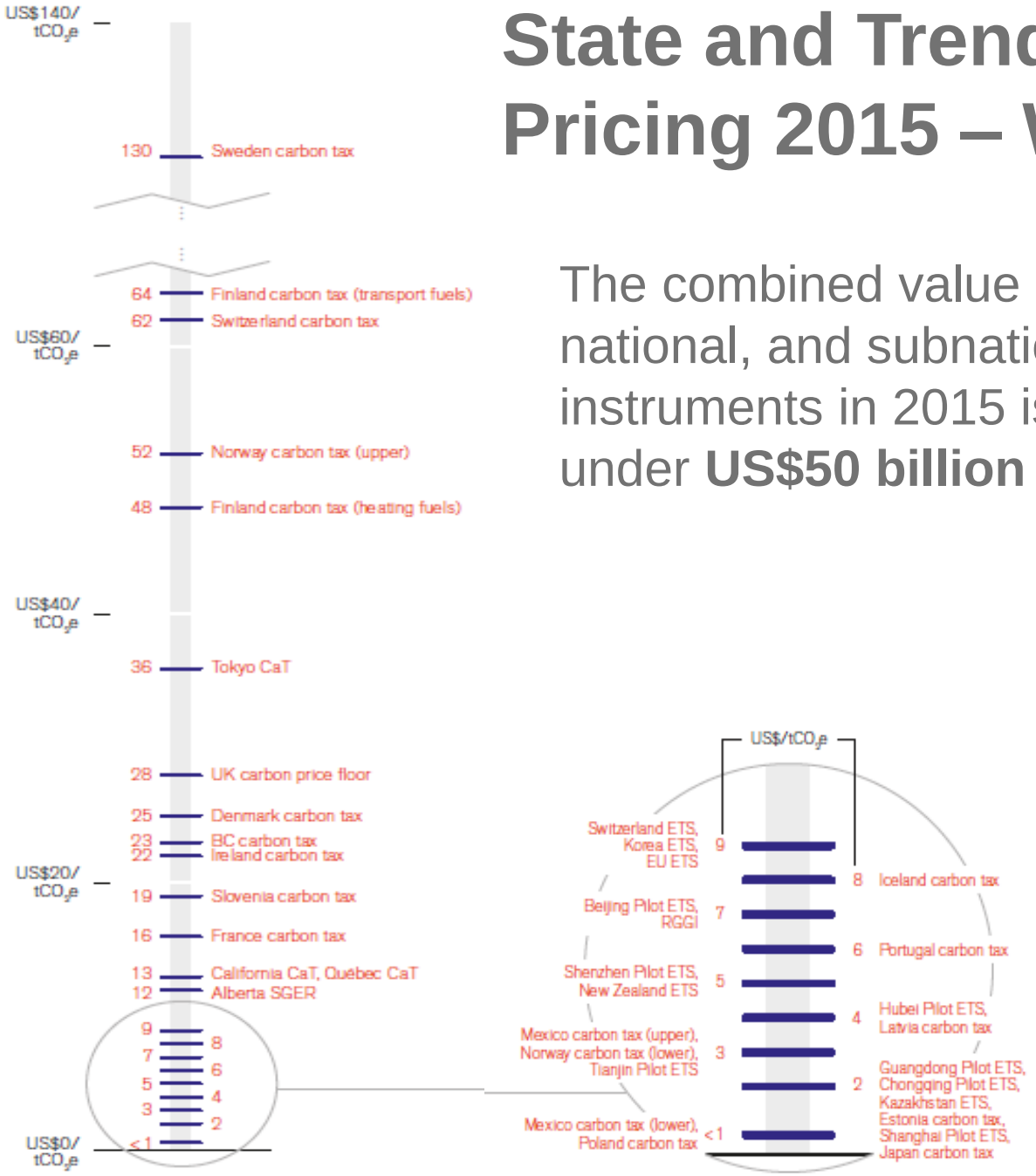
The present value of EUR100 of benefits (or avoided climate damages) received in 100 years' time is only:

- EUR13.80 if discounted at 2%
- 76 cents if discounted at 5%.

IPCC AR5:

An appropriate social risk-free discount rate for consumption is between one and three times the anticipated growth rate in real per capita consumption (medium confidence).

Figure 3 Prices in existing carbon pricing instruments

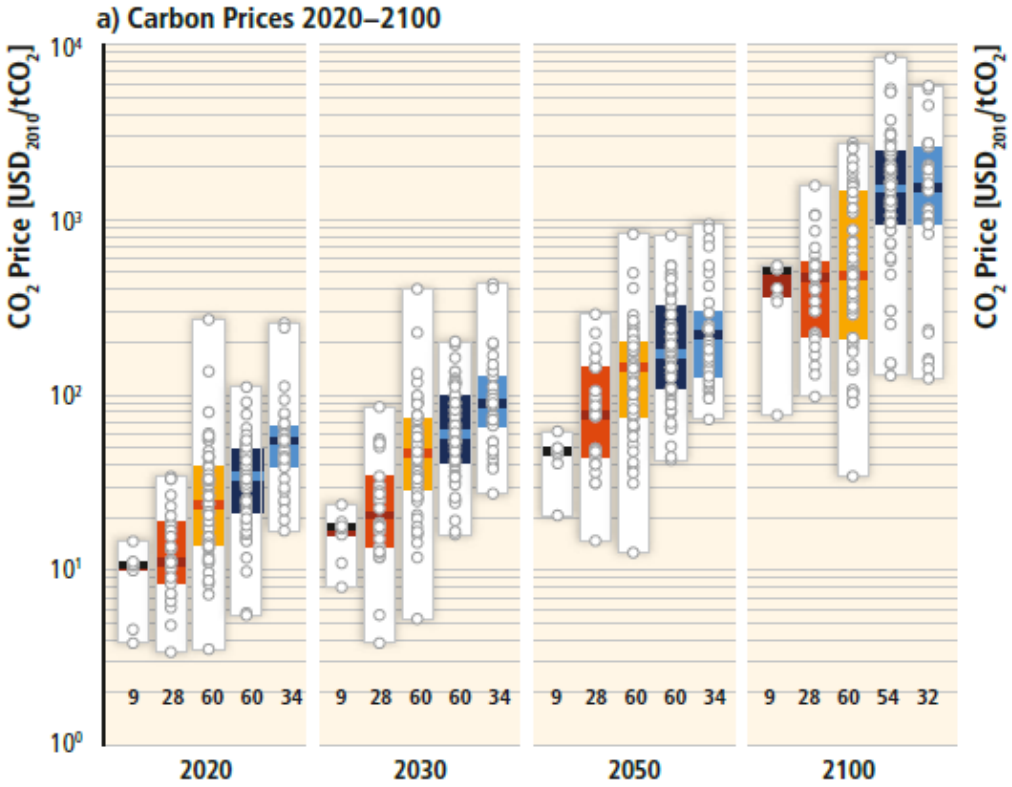


State and Trends of Carbon Pricing 2015 – World Bank

The combined value of the regional, national, and subnational carbon pricing instruments in 2015 is estimated at just under **US$50 billion** globally

But governments and taxpayers still spend about half a trillion US dollars a year supporting the production and consumption of fossil fuels.

Projected carbon prices (energy models)



Global mitigation costs of idealized implementation scenarios. Panels show the development of (a) carbon prices and (b) the average carbon price (2015 – 2100), discounted at a 5 % discount rate. Source: IPCC AR5 WG3 Chapter 6

Benefits from acting on short-lived climate pollutants (NB targeted measures)

Source: Shindell et al Science (2012)

Carbon values in policy appraisal and evaluation – potential applications

- Project cost-benefit analysis (project appraisal).
  - E.g., valuing the changes in carbon emissions from a public transport investment that would reduce private car use.
- Policy cost-benefit analyses (“regulatory impact assessments”).
  - E.g., valuing the carbon emissions savings as a result of regulations imposing an obligation on power generators to generate a certain proportion of their electricity from renewable energy sources.
- Determining the efficient rate at which economic instruments should be set.
  - E.g., setting the rate of a carbon price/tax.
- Making decisions about long-term policy goals
  - E.g., setting carbon targets for national environmental policy, or national negotiating positions in international climate negotiations.

Decision on the Adoption of the Paris Agreement

ENHANCED ACTION PRIOR TO 2020

109. *Recognizes* the social, economic and environmental value of voluntary mitigation actions and their co-benefits for adaptation, health and sustainable development