Investment Leadership Programme

UN environment programme | finance initiative

PRI Principles for Responsible Investment

U.N.-Convened Net-Zero Asset Owner Alliance

Discussion paper on governmental carbon-pricing

In partnership with:

WWF

GLOBAL OPTIMISM

As global asset owners in the Alliance currently responsible for 6.6 trillion US dollars on behalf of our clients and beneficiaries and jointly committed to leveraging our portfolios to limit global warming to 1.5°C, we recognise the imperative to rapidly reduce global greenhouse gas (GHG) emissions over this decade. This requires increasing mandatory regulation of emissions via a carbon-pricing mechanism in a socially responsible and internationally acceptable way.

Global CO_2 emission rates are quickly rebounding after the temporary slowdown in 2020,[1] while other GHG, like methane, have continued to accelerate over the past year.[2] We firmly believe the economic recovery from the COVID-19 impacts must serve a dual purpose of steering the global economy swiftly towards carbon-neutrality while encouraging economic equity. We must "build back better."[3] It is important to shape the transition in a just manner: social and intergenerational implications must be considered when implementing such instruments.[4] Further, there is a strong need for infrastructure investment,[5] and these investments should be compatible with a 1.5°C-aligned future.

The creation and implementation of many emission reduction technologies in high-emitting sectors depends on adequate carbon-pricing and other regulations to promote better outcomes across industries.

To create confidence in the private sector that will direct and attract flows of capital and investment, policymakers will need to transparently outline how they want to deploy the complete toolbox of policy instruments.[6] Appropriate public spending and leveraging of private finance needs to be combined with legislative targets on frontloading absolute emission reductions,[7] effective carbon-pricing[8] and sectoral regulation.[9] In addition, subsidies for fossil fuels should be phased out as quickly as possible as they contradict efforts to swiftly reduce emissions.

1 essd.copernicus.org/articles/12/3269/2020/
2 research.noaa.gov/article/ArtMID/587/ArticleID/2742/Despite-pandemic-shutdowns-carbon-dioxide-and-methane-surged-in-2020
3 unepfi.org/wordpress/wp-content/uploads/2020/12/AoA-position-on-the-coronavirus-recovery.pdf
4 lse.ac.uk/granthaminstitute/investing-in-a-just-transition-global-project/
5 newclimateeconomy.report//2018
6 carbonpricingleadership.org/report-of-the-highlevel-commission-on-carbon-prices
7 As referenced in IPCC's special report on 1.5°C in the scenarios with no and low overshoot of 1.5°C temperatures ipcc.ch/sr15/
8 The term carbon in this statement refers to all GHG.
9 PRI policy briefing: road to COP 26 dwtyzx6upklss.cloudfront.net/Uploads/q/k/c/cop26policybriefingfinal20210427_385169.pdf

Well-designed carbon-pricing schemes are essential

The Alliance acknowledges that countries have very different starting positions. In many cases, different policy instruments acting as pricing on emissions[10] are already in place. They range from carbon taxes to emission-trading schemes (ETS) or hybrids of both. Hence, the way forward to better emission regulation will vary and must consider regional, national, and local circumstances. And while many stakeholders prefer a pricing mechanism such as a carbon tax or ETS, all explicit or implicit pricing instruments have benefits or downsides depending on factors like sector, country, existing regulations, product characteristics. Any instrument depends on political decisions on scoping and design and is inherently prone to socio-economic influence.[11]

Policy instruments that support low-carbon alternatives to fossil fuels can redirect demand away from the latter, but this also usually leads to falling prices for fossil fuels. This is where carbon-pricing comes into play as it makes fossil fuels and other high-emission activities more expensive. It sends a broad signal across the different industries and associated investments. Additionally, it brings governmental revenue, which can be deployed to further support the transition (see section A.1.c).

All in all, governments should back their net-zero targets with effective, robust, reliable and fit-for-purpose carbon-pricing instruments. This will facilitate a cost-efficient and transparent investment path to reach net-zero. Without it, market incentives will remain insufficient to allocate capital in line with a 1.5°C of warming scenario.

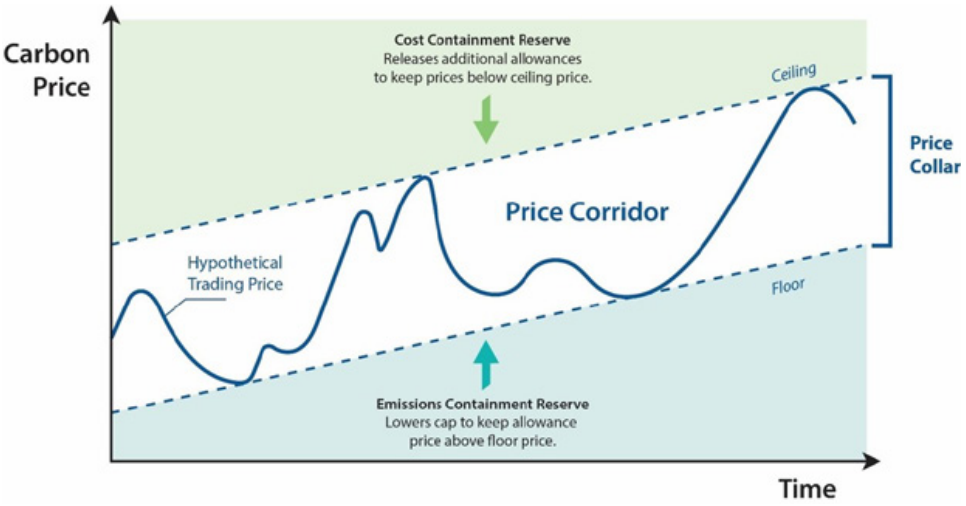
1. Carbon-pricing schemes

There are three main types of market-based explicit carbon-pricing: ETS, carbon taxes and hybrid schemes. Each seeks to apply a price to carbon pollution to incentivise pollution reduction based on their marginal cost of abatement. This helps internalise the costs of carbon emissions. Put differently, the costs related to the impact of GHG on planetary systems and human welfare that are currently mostly borne by the economy as a whole or wider society are redirected to the polluter themselves.

10 E.g. efficiency standards, technology phase-outs, support schemes like contracts for difference
11 Cullenward; Victor (2021): Making Climate Policy Work - Resilience

- **Emissions trading or cap-and-trade scheme:** sets a fixed limit on the total volume of GHG emissions across given industries in a jurisdiction and allocates or auctions emission allowances to companies operating in that sector. By creating supply and demand for emissions allowances, an ETS establishes a market price for GHG emissions. Without adjusting mechanisms, the resulting prices can fluctuate in an unintended and unpredictable manner that is not supportive of long-term strategic planning for emission reduction.
- **Carbon tax or levy:** requires economic actors to pay a fixed price for every tonne of GHG they emit. Generally, carbon taxes are easier to administer, as they do not involve the creation of a new market nor require enforcement rules to prevent market manipulation and can be applied through existing fiscal measures.[12] The costs of emitting are stable and predictable for businesses.
- **Hybrid schemes:** seek to combine elements from both ETS and a carbon tax. This can provide the addition of:
  - **minimum market price (floor price)** to ETS to provide a guardrail against a price crash due to an oversupply of permits and offers greater certainty to investors and companies on policy instruments. Carbon floor prices can be implemented by the auctioning of allowances (e.g. California) and / or direct taxation (e.g. UK).
  - a **maximum market price (ceiling price)** to guard against rapid increase in prices and help avoid triggering a backlash that could undermine political support for carbon-pricing as a policy instrument. A carbon price ceiling can be implemented through a buffer reserve of allowances that can be released at a high carbon price (e.g. California).
  - the symmetry of the hybrid design with a floor and a ceiling price, together with the need to ratchet up policy ambition has led to calls for a **carbon price corridor**, where the floor and ceiling prices rise over time (Figure 1).

Figure 1: Illustration of a carbon price corridor[13]



12 Stern & Stiglitz et al (2017) Report of the High-Level Commission on Carbon Prices—Carbon Pricing Leadership Coalition

13 Source: Glitman (2019) "Cap and invest: a review of policy, design and models and their applicability in Vermont" Centre for Sustainable Energy, San Diego 2019-04_Cap-and-Invest-A-Review_Report (vermont.gov)

2. Recommended carbon-pricing features

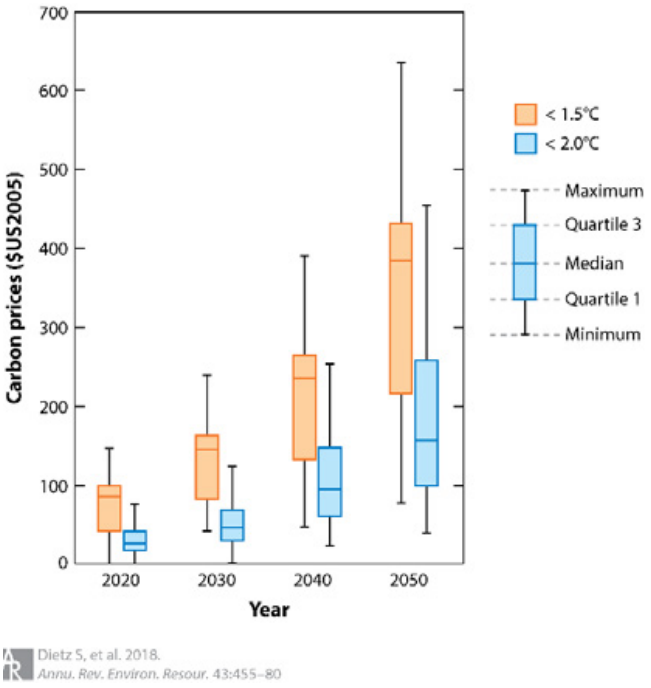
The predictable and robust nature of the hybrid carbon price corridor design provides companies and investors with greater certainty of future price levels for efficient capital allocation. It also creates stable and reliable incentives for entrepreneurs, consumers, and other stakeholders to adopt or develop low or zero-emission technology.

In terms of explicit carbon-pricing, this should involve:

a. **The immediate tightening and introduction of carbon-pricing schemes.** In 2017, a World Bank supported High Commission on Carbon Prices led by Lord Nick Stern and Joseph Stiglitz concluded that a well below 2°C pathway would require carbon-pricing levels of $40~80 per tonne by 2020 and $50~$100 per tonne by 2030 across major economies.[14]

A lower carbon budget in line with a maximum 1.5°C temperature rise requires a faster and deeper decarbonisation of the global economy, in turn necessitating earlier and higher levels of carbon-pricing. A study on the economics of 1.5°C estimated the median carbon price needed to limit global warming to 1.5°C would be $85 by 2020 and $145 by 2030.[15] The OECD sees a central estimate of $147 by 2030 needed if carbon-pricing should facilitate net-zero emissions by 2050.[16] The University of Sydney's One Climate Earth Model assumes a notably lower level of carbon-pricing $62 per tonne by 2025 and $87 per tonne by 2030 in OECD countries.

Figure 2: Carbon prices of 1.5° and 2° pathways



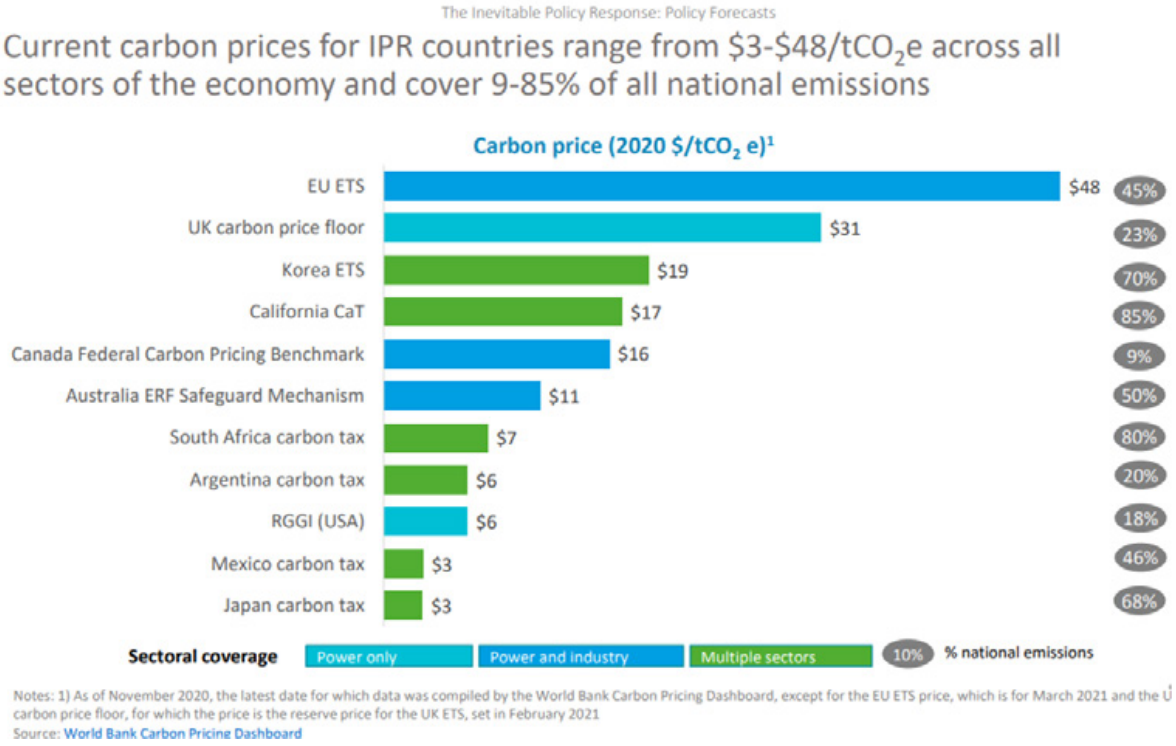
14 Stern & Stiglitz (2017) Report of the High Commission on Carbon Prices.

15 Dietz et al (2018) The economics of 1.5c climate change, London School of Economics and Imperial University Grantham's Institute. The Economics of 1.5°C Climate Change | Annual Review of Environment and Resources (annualreviews.org)

16 OECD (2021) Effective Carbon Rates 2021

Figure 2 illustrates the large uncertainties with the levels of carbon-pricing required to deliver a particular temperature outcome. This is largely due to the varying assumptions on the technology pathway chosen (prices will be significantly higher in scenarios that rely substantially on Carbon Capture Storage (CCS) and negative emissions), marginal costs of emission reduction, technological progress, drivers of investment as well as macro-economic variables such as population growth. Moreover, the adoption of complementary policies could reduce the level of carbon-pricing needed and developing countries may have lower cost emission reduction options. Current levels of carbon-pricing across different countries are far from levels and coverage required as described above (Figure 3).

Figure 3: Current explicit carbon-pricing level and coverage across leading economies[17]



b. **The coverage of these schemes throughout the economy.** The World Bank notes that to date 64 countries, regions and states have implemented carbon-pricing initiatives, covering 16% of carbon emissions. Schemes covering a further 7% of emissions are scheduled, most notably the Chinese ETS.[18]

This means that most global emissions are not yet covered by explicit pricing mechanisms. Even in markets where schemes are operational, the effective price of carbon across the economy varies considerably. This is also due to exception rules granted, free allocations of carbon trading permits, and counter-running subsidies for fossil fuels or their use in industry (notably agriculture). For instance, in the 64 countries analysed by the OECD, the carbon price level applied to electricity

17 Source The Inevitable Policy Response 2021: Policy Forecasts | Articles | PRI (unpri.org)
18 Carbon Pricing Dashboard | Up-to-date overview of carbon pricing initiatives (worldbank.org)

was below €30 (~$37) per tonne for 90% of emissions. On the other end of the spectrum in road transport, 91% of emissions were priced over €30, and 58% of emissions were even above €120 (~$147).[19]

Moreover, the existing schemes face challenges of carbon leakage, particularly as they look to increase policy ambition to meet new 2030 emission reduction targets.

c. **Carbon Border Adjustment Mechanisms (CBAM)** can help keep a level playing field between countries and regions as they can address carbon leakage by theoretically pricing all emissions including those embedded in imports. They can also be combined with inter-regional ETS and thereby lead to emission reductions where it's cheapest. But CBAMs are complex and need to be designed cautiously. They impact global trade patterns, need to comply with the World Trade Organisation (WTO) rules and will impose additional carbon costs to nations exporting energy-intensive goods. Also, the G7 and G20 should align on a potential introduction of CBAMs.

d. **Ending of market distortions.** These most notably involve the continued use fossil fuel subsidies through direct transfer of government funds, price supports and tax expenditures. Consequently, a number of G20 countries are simultaneously subsidising both fossil fuels and renewables whilst taxing carbon. In 2007, G20 countries pledged to phase out of fossil fuel subsidies, a move that investors have long supported. Yet, 14 years on this pledge is still to be implemented.

   Clean energy also faces several non-price barriers particularly in countries where the power industry has not been deregulated from the state. In some cases, these countries do not rely on wholesale generation prices which prioritises the lowest cost generation source for dispatch. This contributes to high rates of renewable energy curtailment and thereby lost potential for emission reduction.

e. **Delivering a just transition.** The removal of subsidies need to be paired with a continued focus on delivering access to clean, affordable, and reliable energy. Also, the use of revenues from pricing schemes can be tailored to deliver a more equitable transition. Currently, more than 40% of carbon-pricing revenues flow into the general budget of jurisdictions.[20] Governments should consider fully earmarking those funds to provide a combination of carbon dividends to disproportionally disadvantaged citizens, often referred to as revenue neutrality, and financing deep decarbonization technologies, where regulation allows.

19 OECD (2021) Effective Carbon Rates 2021
20 i4ce.org/download/global-carbon-account-in-2020/

Carbon-pricing needs to be complemented by additional policy measures—and vice versa

The flipside of the above is that, as leading proponents of carbon-pricing have noted, it is theoretically unsound and impractical to solely rely on a single policy instrument to reduce GHG emissions.[21] Such an approach would put high stakes on the design and effective implementation of carbon-pricing schemes. The scale and pace of the change required, particularly for a 1.5°C pathway, must also be supported by non-pricing policy instruments.

In the near term, carbon-pricing is most effective at reducing emissions in industries where zero or low-carbon substitutes are readily available. This has been most apparent in the UK and EU power markets, where carbon-pricing has driven a shift in power generation mix from coal to gas and renewables. For example, the UK carbon price floor introduced in 2014 contributed to the reduction of coal's share of the generation mix from 41% in 2013[22] to 2%[23] in 2020.

There is limited evidence, however, that carbon-pricing alone drives the pre-commercial development of zero-carbon substitutes.[24] As such, additional policy measures are needed to support public R&D spending and the creation of government accelerator programmes, e.g. procurement performance standards tilted towards zero-carbon alternatives, complementary use of the social cost of carbon approaches, and more, that drive the development and deployment at industry scale of zero-emission solutions. These policies should be designed to replicate the success of the "incentives plus mandates" approach governments took with solar and wind power in the hard-to-electrify sectors (aviation, chemicals, shipping, steel, cement and heating). Carbon-pricing can still play an important backstop role in policy design by acting as a disincentive to future investment that does not consider net-zero abatement options. Carbon-pricing also has a positive effect on early retirement of fossil-fuel based energy supplies, and on efficiency measures if there are insufficiently regulated mandatory standards in place.

21 Stern & Stiglitz et al (2017)

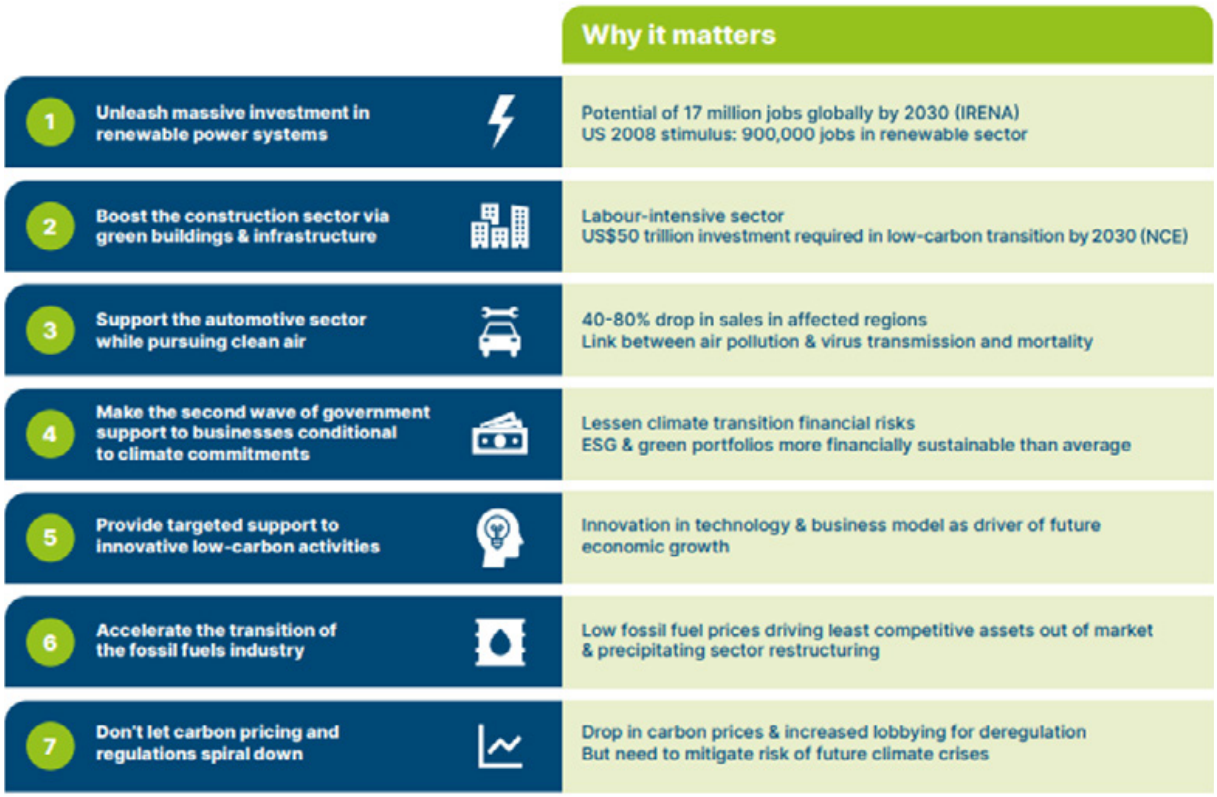
22 Newberry et al (2018) "When is a carbon price floor price desirable?" University of Cambridge Energy Policy Research Group paper When is a carbon price floor desirable? (cam.ac.uk)

23 Energy Trends December 2020 (publishing.service.gov.uk)

24 See for instance Dietz et al (2018) or Mehling & Tvinnereim (2018) "Carbon pricing and the 1.5 target" strathprints.strath.ac.uk/64124/1/Mehling_Tvinnereim_CCLR_2018_Carbon_pricing_and_the_1_5_C_target_near_term_decarbonisation.pdf

In some sectors, carbon-pricing can disproportionately impact lower income earners. When carbon-pricing consumes a larger portion of low earners disposable incomes compared to others it unintentionally acts as a regressive tax. This needs to be addressed through correcting mechanisms. Without these mechanisms, net-zero efforts could be derailed by public opposition, similar to what has been seen in a number of European countries that have proposed increases to fuel duties. Here direct regulation in the form of mandatory technical efficiency standards for appliances, buildings and vehicles, and technology phase-outs are the primary policy mechanism in many countries. A summary of the various policy options for key sectors is illustrated in the image below.

Figure 4: Overview of key policy measures



Source: Energy Transition Commission (2020) "7 Priorities to Help the Global Economy Recover" 7 Priorities to Help the Global Economy Recover | ETC (energy-transitions.org)

Summary of recommendations

Based on our analysis of the current carbon-pricing landscape, the Alliance believes that the following principles should be applied to pave the way for 1.5°C-aligned emission regulation, including pricing of externalities:

All countries and regions should set clear, legally binding, net-zero targets, supported by detailed implementation plans outlining the interaction between carbon-pricing and other policy measures in achieving these aims, as well as a detailed timeline and interim emission reduction milestones.

Such country/region net-zero targets should:

- Incorporate carbon-pricing mechanisms that:
  - Include all human-induced GHG emissions and all relevant sectors, including international shipping and aviation.[25]
  - Set a legally binding, long-term, carbon-pricing corridor in line with best available science for what is required to meet a 1.5°C trajectory.
    - Strengthen existing pricing schemes to enable its scope expansion (e.g. GHG and sectors).
    - Set parameters for explicit pricing scheme that achieve a sufficiently high starting price and is transparently ratcheted up to provide sufficient mid-term price signals.
  - Ensure that policy instruments do not contradict each other and avoid double counting of emissions.
  - Avoid acting at contrary to non-pricing instruments.
  - Make carbon-pricing non-regressive and revenue-neutral, e.g. by earmarking carbon-pricing revenues.
  - Fund research and commercialisation programmes for the hard-to-abate sectors.
  - Include measures to avoid carbon leakage while pricing emissions, including a commitment to seek global agreement on a carbon price floor in the G7 and G20 nations, and targeted use of carbon border adjustments for energy intensive sectors.
  - Explore the complementary use of the social cost of carbon approaches and appropriate assumptions on required rates of return to consider intergenerational aspects of emissions.

25 Such as from stationary and mobile combustion, process emissions, fugitive emissions, as well as emissions from agriculture, forestry and other land use (AFOLU)

- Recognise that carbon-pricing is not a universal solution across all sectors. Instead, decisions on the priorities in the mix of applied pricing and non-pricing instruments to bring down emissions most quickly should be taken sector-sharp.
- Commit to the transparent and swift phase out of fossil-fuel subsidies, paired with a continued focus on delivering access to clean, affordable, and reliable energy as well as measures to protect lower income groups.
- Frontload emission reductions,[26] to avoid over-reliance on atmospheric carbon removal and to support intergenerational fairness.
    - Priority should be on near-term emission reductions that are more feasible such as in power, transport and industry via uptake of renewables, technical standards, and fossil fuel phase-outs. This can also avoid higher carbon prices in later decades.

26 As per the P1~P3 scenarios in IPCC's special report on 1.5°C ipcc.ch/sr15/

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