GA4: Environmental Committee

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Issue: Implementing a global carbon pricing scheme

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Committee: Environmental Committee

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I. Introduction

Climate change, perhaps better named as the climate crisis, is probably the largest and most significant challenge that humanity has ever faced. If business as usual continues, our planet is likely to experience warming to a degree at which global climate patterns and our biosphere will be majorly changed. There is mounting pressure on global policymakers to take immediate action to reduce emissions and mitigate climate change.

Carbon pricing is a policy that seeks to bring a market-oriented solution to a market failure. Climate change is an example of an unpriced externality. Every ton of emissions provides a significant negative impact to society but this impact is distributed to all of humanity, nonetheless the benefits gained from burning fossil fuels are only to the emitter. This leads to emitters continuing to emit on self-interest.

There are two major ways to price carbon: carbon taxes and cap-and-trade systems. A carbon tax, as its name suggests, levies carbon emissions directly with a price set by the government, while cap-and-trade systems involve the government or other institutions setting a cap on total emissions which typically decreases linearly with time and then distributing emissions allowances, by auction or by "grandfathering", the sum of which equals the cap. Emission allowances are retired when the amount of carbon emissions they are equivalent to, are exceeded. Emitters or other agents in the market may then trade surplus allowances or buy allowances to make up for emissions exceeding their allowances.

Carbon pricing is essentially intervening to artificially impose the price of emissions on the emitters and is a way to "make the polluter pay". It also naturally incentivizes emissions reductions where it is cheapest to do so. Evidence from current pricing schemes and economical simulations show that carbon pricing is effective in incentivizing emissions reductions, promoting low-carbon innovation, and initiating investment into low-carbon infrastructure, if well implemented. Carbon pricing is widely regarded as the most cost-effective policy for climate change mitigation. In addition, carbon pricing solves the ethical issue of polluters essentially using a resource (the atmosphere) that should be available to everyone by providing compensation. However, carbon pricing may affect the poor disproportionately in developed economies,

emissions calculations and in the case of offsets verification can be costly and unreliable, and carbon pricing may fail to initiate the systemic shift away from fossil fuels as a society and instead incentivize basic substitutions that may perpetuate “carbon-lock-in”, if not implemented correctly.

II. Involved Countries and Organizations

Top 4 Emitters: China, United States, European Union, Russian Federation

China

In accordance with its climate targets that include a peak in emissions by 2030 and net-zero by 2060, China has implemented a nationwide carbon trading market.

Unlike most other cap-and-trade carbon markets, the market does not cap total carbon emissions. Instead, the unit of trade, and hence the limited quantity, is carbon emissions per economic output. The official purpose of the Chinese government for choosing such a scheme over a traditional cap-and-trade system is the alleviation of worries that a carbon market may stifle growth. In this context, the market would incentivize carbon efficiency and by extension lower carbon growth. The main drawback of this approach rather obviously is that the scheme does not directly limit carbon emissions and therefore cannot provide a route for straightforward yet effective climate policy. In addition, the financial design of the market has been criticised for being too lax, and experts say that allowances being distributed freely and an overabundance of allowances will prevent the market from having large effects in its current initial phase.

United States of America (USA)

The new Biden government has reversed most of the previous government’s decisions to withdraw from the United States’ (US) emissions reduction pathway, including withdrawal from the Paris Agreement. While the Biden government proposes many low-carbon reforms and government investments in clean energy, the conspicuous lack of carbon pricing in their policy tool portfolio has led to speculation that the government fears that a carbon pricing scheme could have regressive effects. The Democrat administration has beliefs that a carbon tax may disproportionately affect disadvantaged communities. However, this policy has come under increasing scrutiny in the party, according to analysts and political experts.

European Union

In 2005, the EU started the largest ever (until the Chinese scheme) carbon pricing scheme: the EU Emissions Trading System (EU ETS). The ETS is a cap-and-trade scheme that has a market stability reserve to reduce price volatility and prevent large permit surpluses. The EU ETS currently auctions about 57% of total permits. The EU has made efforts to link the ETS with the systems of Australia and Switzerland, and the linkage of the EU ETS with the Swiss system was complete as of 2021. However, as Australia repealed its emissions trading system, linkage could not be completed.

The EU is one of the few bodies that has implemented strong and clear climate policy legislation. It has set targets to reduce emissions by 55% by 2030, and reach carbon net-zero by 2050. The European Commission is now proposing a Green Deal, which includes the proposed European Climate Law that makes the aforementioned targets legally binding for all EU member states.

India

India currently has no current initiatives or proposals for carbon pricing. India's Paris Agreement Nationally Determined Contribution (NDC) goals are reduction of emissions intensity of GDP by 35% and achieving a non-fossil energy share of 40% by 2030. India's long-term goal for climate change is to not exceed the current emissions per capita of developed economies. Other goals for climate change mitigation include having at least 30% of new vehicles sold to be electric by 2030, and complete electrification of the Indian Railways' network.

The Indian Government, in its climate policies, emphasizes the acute need for energy and economic output to better living standards and alleviate poverty in its rapidly increasing population, and therefore sets its climate targets in accordance with its goals of economic development. Similar to the Chinese climate policy, current climate policies and mitigation plans view carbon emissions as a function of economic output, and Indian efforts are hence focused on increasing carbon efficiency. The Indian government argues that the responsibility of climate change is not on developing countries like itself and calls on developed countries to do more. The current Minister of Human Resource and Development Prakash Javadekar has emphasized this in his point "We've gone well beyond. Why don't you ask the countries lecturing us to mend their own ways instead? None of the developed countries are Paris Agreement compliant". It is indeed true that the Indian government is on track to meet its NDC targets; however, the targets have been criticized for being insufficient, even in light of the justifications that the Indian government provides for its comparatively low climate ambition. In addition, India's reliance on coal and continuing planning and

construction of coal plants has been under heavy scrutiny, and Indian climate policies have yet to set clear targets for coal phase-out.

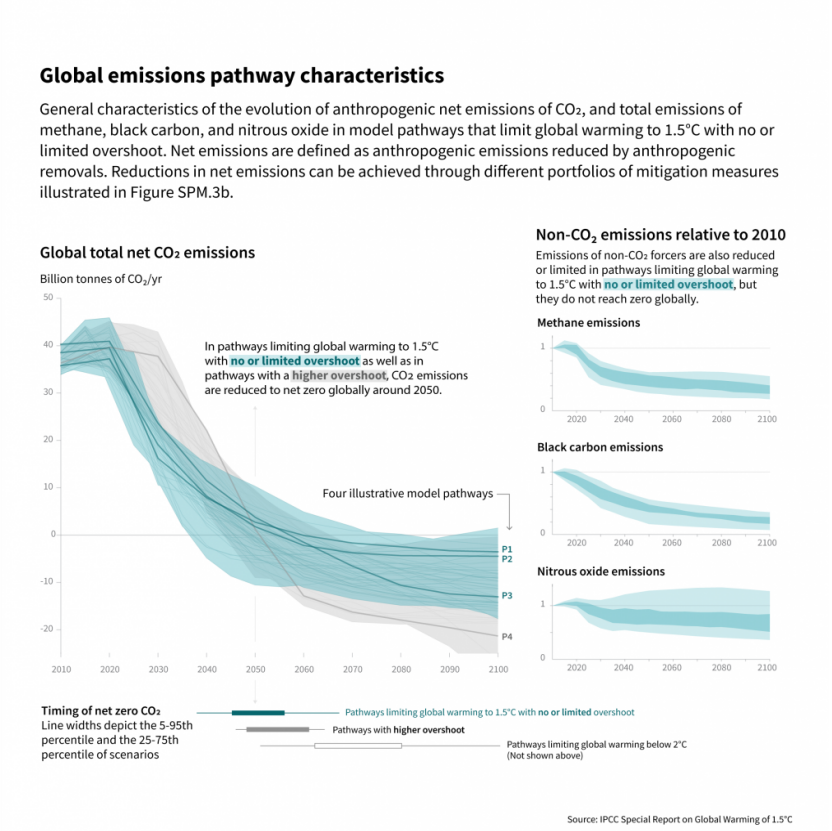
Russian Federation

Currently, the Russian Federation has a very low ambition towards emissions reductions. An independent organization, the Climate Action Tracker, has rated Russia's efforts as "critically insufficient". The country is predicted to overachieve its climate goals specified in its NDC, but that is only because its NDC has very low ambition in tackling climate change, and basically promises no changes in emissions levels. To make matters worse, Russian industry lobbyists have gutted a major climate bill and significantly reduced its effectiveness.

III. Focused Overview of the Issue

1. The 1.5 °C goal and required policy initiatives

There is a strong consensus among climate experts that the extent of global warming should be kept well below 2°C, preferably at 1.5°C. The environmental and societal damage of warming exceeding these levels is predicted to escalate rapidly. Climate models predict that global net greenhouse gas emissions need to reach zero in the 2050s to satisfy the 1.5 °C goal, while the total remaining cumulative global emissions budget to reach this goal is estimated by models to be around 440 gigatons of CO_2 equivalent ($GtCO_2eq$).



"Picture1: Graphic detailing global carbon emissions pathways that result in the satisfaction of the 1.5 °C goal. (Masson-Delmotte et al., 2018)"

Drastic measures, strong political will, and economy-wide mitigation efforts are needed to alleviate the issue. To date, most mitigation and abatement measures have been sector-specific. This is not enough to achieve a quick total and absolute shift away from fossil fuels as humanity as a whole.

Well implemented carbon prices are an example of economy-wide policies for climate change mitigation and are recognized by the IPCC as an efficient and cost-effective measure for climate change mitigation. Most emissions pathways that were demonstrated to be in line with warming targets include a global carbon price (Masson-Delmotte et al., 2018).

2. The case for carbon pricing

Climate change, in essence, is a market failure that stems from the inability of the market to price the climate externality (Stiglitz et al., 3). The capacity of the global biosphere to absorb carbon emissions is a limited resource, however, there is no organic method for the market to price it. As individual actors receive large benefits from utilizing this resource without limit but very insignificant (on an individual level) of the negative consequences of their actions, they are naturally incentivized to maximize their emissions. This has

set the scene for a tragedy-of-the-commons scenario, where the uncoordinated action of many actors in their self-interest has worked to deplete our planet's ability to cope with carbon emissions. Carbon pricing is essentially an artificial intervention that aims to correct this failure by implementing prices on greenhouse gas emissions (Boyce, 53).

Carbon prices can also be seen as a way to "make the polluter pay". The social cost of carbon (SCC) is an important term in this discussion. SCC entails the damages and abatement/mitigation costs that will be inflicted upon society as a result of a specific quantity of carbon emissions. Carbon prices, if implemented and adjusted for SCC, can be used as a method of compensating society for carbon emissions, and as a way to fund public efforts for mitigation and emissions abatement. (Boyce, 55)

Secondly, it is clear that as a part of a holistic approach to tackle climate change and achieve decarbonization, carbon pricing is a pragmatic approach to minimize the losses and costs of these efforts. Carbon pricing will, by the basic principles of a free market, disincentivize carbon emissions and push emitters to innovate to reduce their emissions. Emitters will also be naturally pushed to quickly reduce emissions where it is the cheapest, in contrast with rigid government policies that seek to inflexibly limit emissions that dictate where and how the emissions reductions should be made. Therefore, carbon pricing could also be an efficient and cost-effective solution to decrease carbon emissions if designed and implemented well. (Stiglitz et al., 9)

3. The two methods of carbon pricing: carbon taxation and cap-and-trade

A **carbon tax** is a method of carbon pricing where the government sets a price for a specified quantity of carbon emissions (commonly $GtCO_2eq$). As a result, emitters are incentivized to innovate to reduce their emissions in order to minimize losses incurred due to the tax. In this system, no hard cap on carbon emissions are implemented, while the price of carbon emissions is rigid.

A **cap-and-trade** carbon market, however, involves creating a market with emissions allowances as a tradeable commodity and setting a hard cap on the total number of emissions allowances that are introduced to the market. This creates scarcity, and thus, a tradeable commodity (emissions allowances) with a positive value is created and a market is established. This is in complete contrast with how a carbon tax prices carbon: no direct prices are set, and the market decides the price of emissions, while total emissions are limited.

Both methods of carbon pricing have their advantages and disadvantages.

Studies have shown that a theoretically well-implemented cap-and-trade system outperforms a carbon tax-based system in both cost-effectiveness and emissions reduction. (Chen et al., 2020) However, the efficiency of such a scheme relies heavily upon the quality of implementation and market design, strength of political will, and a fine balance between interference in the market to counter external economic forces (such as a recession) and maintaining the trust that the market will continue and investments will not evaporate due to market disruption or dismantlement. Lastly, if systems such as auctioning of allowances are not used, the initial result of emissions reductions would result in windfall profits for emitters. As emitters decrease their carbon emissions, this results in them having excess permits to trade in the market and thus generate revenue. This could compromise ethical goals and equitable compensation frameworks for carbon pricing, as will be discussed in the Ethics and equity of carbon pricing subtopic.

Carbon taxes, on the other hand, do not have the drawback of price volatility that cap-and-trade systems have. Without systems such as market reserves or price floors and collars, emissions allowance prices may plummet to the point of rendering the market incapable of reducing emissions in a cap-and-trade system. In addition, this volatility also causes traders and emitters to fail to properly judge and adapt to future carbon prices. Carbon taxes, due to their inherent nature, do not have this problem as prices are set by the government or a central institution. However, this also results in the total emissions not being under direct control, therefore continuous adaptation and fine-tuning are required. This requires great trust in political will and ambition to tackle climate change, as the responsibility to hold continued commitment to reach emissions targets and to change the tax rate accordingly lies on the government. Lastly, carbon taxes avoid the issue of granting companies windfall profits and could enable greater climate policy ambition with the generated tax revenue.

4. How carbon pricing may be implemented

a. Carbon tax

In most cases, carbon taxes are directly set in law as an unchanging levy on carbon emissions. Commonly, carbon tax rates differ among sectors, such as industry, domestic heating, transport, or electricity generation. Carbon tax rates for the industry are often lowered to prevent carbon leakage and to conserve competitiveness.

Another important tool to use when setting carbon taxes is relegating the duty to set and adjust tax rates to an independent scientific commission. As discussed above, in order to incentivize innovation and investment in low-carbon technology and achieve deep carbonization there needs to be strong trust by private entities that carbon pricing measures will be long-term and ambition will not decrease. However, entrusting political agents with conserving the carbon tax policy and acting on promises is problematic. This is especially important for carbon taxes, as a carbon tax cannot set directly any cap over total emissions

and is an inherently reactive policy tool. Therefore, it would be advisable to set direct emissions goals and create an independent entity for adjusting tax rates without political and government hindrance based on emissions.

b. Cap-and-trade

A cap and trade system has two basic universal components: a set cap on total emissions and emissions allowances issued by the government whose total number add up to the set cap.

Allowances may be grandfathered (defined later on), where they are distributed for free to emitters based on their past emissions, or they may be auctioned where the highest bidder obtains the allowances. In both cases, there is a revenue flow caused by general price rises as a result of carbon prices, but when allowances are grandfathered this income flow is directed at emitters as windfall profits, and when they are auctioned this revenue ends up in the government. Especially in the case of grandfathering, where the heaviest polluters receive the most allowances, this has led to criticism, as it albeit indirectly subsidizes polluters by granting them windfall profits. This will be discussed further in the Ethics and equity of carbon trading subtopic.

However, to ensure price stability and effective operation of the market, these two instruments are, in most cases, insufficient.

Most cap-and-trade programs utilize **banking**, where emitters or traders may save unused allowances to use or sell later. (Kuusela and Lintunen, 2019) This provides an incentive to emitters to reduce their emissions quickly, as this will allow them to save their allowances and generate revenue selling them. Likewise, borrowing may also be utilized, which involves emitters borrowing from their future allowance allocations, which might incur additional costs or interest rates. Because the temporal location of emissions do not matter in climate change mitigation, and banking and borrowing do not affect the long-term cumulative emissions allowed under the cap-and-trade system but only short-term emissions, these policies on their own are not directly in conflict with emissions reduction goals. However, they can impact market stability and thus need to be implemented very well.

Especially when banking is allowed, the market can become overflooded with emissions allowances when an external economic force such as a recession reduces economic production and emissions. (Gilbertson and Reyes, 41) This can cause the price of allowances to plummet and therefore the efficacy of the market in reducing emissions is hindered. A **market stability reserve (MSR)** is a central reserve that seeks to stabilize the effects of such external shocks via buying and selling allowances in accordance with prices. In order to keep trust in the market high, such a reserve needs to be governed either by pre-set

rules, or a completely independent administration. In addition, a price floor that limits the minimum price of emissions at a pre-defined level may be implemented.

Offsets may also be implemented in a carbon market, in ways such as making equivalent a certain number of offset credits to emissions allowances. However, this may prove problematic, especially if the governance of offset credits is not properly made. Further elaboration on offsets will be provided in the Offsets, carbon-net-zero, and negative carbon technologies subtopic.

Finally, as the carbon emissions that will be generated by using specific fossil fuel is known, pricing can be done via directly calculating the CO_2 emissions that a given emitter has caused from the amount of fuel they have used.

5. Ethics and equity of carbon pricing

As briefly discussed before, the capacity of the biosphere to absorb atmospheric carbon is a limited but, without intervention, unpriced resource in which no one has property rights. Carbon pricing essentially introduces property rights in the atmosphere, which has ethical consequences.

The atmosphere is utilized by every living human being in existence, and it is a basic necessity for everyone. Therefore, some argue that the atmosphere is a “universal property” to which everyone is equally entitled. On its own, however, carbon pricing directly contradicts this, as those who can pay more obtain the right to utilize the resource more intensively. In addition, carbon pricing generates income from selling the rights to utilize the atmosphere. To solve this ethical problem, this income needs to be carefully distributed.

In a carbon tax scheme, this income simply ends up in the hands of the government. However, in a cap-and-trade system, where it ends up depends on the design of the system and the policies involved. In a system where allowances are grandfathered, this income ends up in the emitters as windfall profits, yet the general public still pays for the pricing scheme in the form of increased prices. Therefore, a cap-and-trade system in which allowances are grandfathered is not a desirable system from an ethical standpoint. If the allowances are auctioned, however, the income again ends up in the government.

Currently, except treating the income as regular government income, there are two major policies of utilizing the revenue from carbon pricing schemes in the public benefit: utilizing the income for mitigation and adaptation projects, such as low carbon energy, and offering rebates to citizens.

Rebates are a direct solution to the ethics problem explained above. Rebates essentially compensate the general public for the usage of their rights to the atmosphere.

6. Distributional impacts of carbon pricing

Carbon pricing is considered to be regressive in wealthier economies, i.e. poorer individuals are affected more than wealthier individuals because poorer individuals spend a higher proportion of their income on energy products compared to wealthier individuals. Therefore, a carbon price would affect a higher proportion of their spending compared to wealthier consumers. In addition to this, many mostly poorer individuals such as fishermen or farmers, especially in developing countries, will be disproportionately impacted by carbon prices as their trades require fossil fuels with no viable and cheap replacement in the near future.

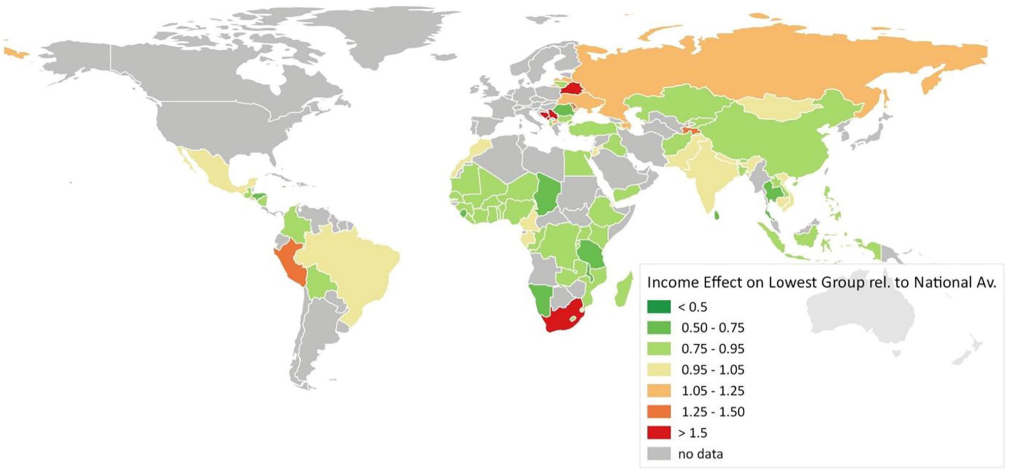
In addition to helping solve the ethics problem with carbon pricing, rebates in the form of lump-sum payments per capita also turn carbon pricing policies progressive in developed economies. Because any lump sum would account for a larger proportion of the income of poorer individuals than richer individuals, it constitutes a larger net benefit for the poor.

Figure 2: Tax change of revenue recycling options as a percent of pretax income. Central carbon tax scenario, fully phased-in effect, **2025**.

"Figure 2: Chart of effective tax change versus income groups in the US, a developed economy, corresponding to different usages of carbon tax revenue. (Rosenberg et al., 22)"

However, in poorer economies, the converse is true. In poorer economies the inverse energy usage distribution is observed, the poorer use less energy in proportion to their total income while the richer use more energy. Therefore, even without additional interventions, carbon pricing policies are progressive in

poorer economies. Furthermore, a positive correlation between the regressivity of carbon pricing policies and the GDP per capita of economies exists. (Dorband et. al., 2019)



"Figure 3: A map showing the distributional effect of carbon pricing in selected countries. A value above 1 (red) indicates regressivity while values below 1 (green) indicate progressivity. (Dorband et. al., 2019)"

7. Offsets, carbon net-zero and negative carbon technologies

Carbon offsetting is the compensation of carbon emissions by preventing equivalent future emissions or creating carbon sinks (such as new forests) that absorb an equivalent amount of emissions generated by the offsetting entity. Because carbon dioxide has a very long residency time in the atmosphere, and because it mixes readily in the atmosphere and has no significant local impacts, this is a theoretically valid strategy as the temporal or spatial locations of emissions reductions or carbon absorption has no effects on cumulative carbon emissions. Therefore, carbon offsets have been implemented in many global, regional, and national schemes, such as the Kyoto Protocol Clean Development Mechanism and the EU ETS, in the form of carbon offset credits which are conceptually very similar to emissions allowances in carbon markets.

However, there are many questions concerning the practical viability, validity and efficacy of carbon offsets. Carbon offsetting schemes have been plagued by overestimation of emissions reductions, reversal of emissions reductions (for example, the destruction of newly created forests, or shutdown of renewable energy generation facilities), and the inclusion of projects that do not actually provide additional emissions reductions as they would have proceeded without revenue from carbon offsets anyway.

Another criticism of carbon offsets is that they encourage incremental mitigation instead of deep decarbonization. Instead of stopping the usage of fossil fuels, emitters rely on carbon offsets as a stop-gap solution to avoid significant investment in low-carbon technologies.

Negative carbon technologies or carbon capture and storage (CSS) are technologies that create artificial carbon sinks, i.e. absorb carbon dioxide directly from the atmosphere and store it indefinitely, therefore creating “negative emissions”. These technologies may pave the way for high-quality carbon offsets, as the exact amount of carbon they will remove is known precisely, in contrast with biomass carbon sinks. Additionally, they can be used to build carbon net-zero power plants, which burn fossil fuels but do not emit carbon into the atmosphere, instead of storing it with CCS technologies.

8. Carbon pricing and deep decarbonization

Deep decarbonization is an economy-wide transition from high-carbon energy to zero-carbon energy. Deep decarbonization should not be confused with carbon net-zero, which implies that emissions are merely equal to the rate of artificial carbon removal (i.e. carbon offsets) from the atmosphere. In contrast with this, deep decarbonization implies that no emissions are made and that all energy production occurs via zero-carbon technologies.

While it is evident that carbon pricing is indeed very effective at bringing about year-to-year incremental emissions reductions, evidence suggests that to date, carbon pricing schemes alone have not been successful in initiating deep decarbonization. Carbon pricing may push emitters to eliminate “low hanging fruit” to reduce emissions, but it must not be forgotten that eventually all the fruit on the tree must be picked.

The most important example of this is the current rapid replacement of coal with natural gas power plants instead of renewable energy sources. Furthermore, most current global emissions reductions are the result of the replacement of coal with natural gas. (Leger et. al., 2018) This is a prime example of the negative results of focusing on short-term incremental reductions. Incremental reductions achieve nothing if they do not prevent humanity from exceeding its finite carbon budget.

Current climate projections suggest that all major economies must achieve deep decarbonization around 2070 to keep global warming under 2 °C, and it is clear that in its current form, carbon pricing is not enough to achieve this. (Tvinnereim and Mehling, 2018)

One key factor in this is that participants in carbon pricing systems are myopic, and they fail to account for long-term carbon prices. This is especially true for cap-and-trade markets, where it is almost a

given that prices will increase in the long term. The current behavioral patterns of emitters suggest that they have a planning horizon that does not exceed 5-6 years. This is exacerbated by the fact that trust in the continued existence of carbon pricing schemes is relatively low. For example, only 70 percent of respondents to a survey of participants in the market believed that the EU ETS would still exist in 2020. (Fuss et. al., 10-11) If participants do not believe in the long-term existence of carbon pricing schemes, they would of course be less likely to adjust their long-term plans and investments in accordance with carbon prices. This leads to the phenomenon of carbon lock-in, where long-term investments in high-carbon assets lead to increased costs of deep decarbonization.

IV. Key Vocabulary

Carbon pricing scheme: a scheme where carbon emissions are priced to incentivize emissions reductions and to balance and mitigate the indirect costs of carbon emissions

Carbon tax: a tax levied on emissions or the carbon content of fossil fuels by governments which constitutes a direct mechanism for carbon pricing

Carbon market: a system in which emitters may trade emissions allowances freely with other emitters or third parties

Cap-and-trade: a mechanism imposed on carbon markets that are based on the principle of having a set cap of total emissions allowances in circulation and the adjustment of this cap according to emissions reduction policies

Grandfathering: the act of distributing emissions allowances in a carbon market to emitters free of charge according to past emissions and future emissions targets

Social cost of carbon: the total cost to society of the damages that occur due to climate change occurring as a result of a standardized quantity of emissions

Windfall profit: profits that are generated as a direct result of policy changes or non-market causes, and that are independent of actual productivity

Carbon leakage: the repositioning of emitters to territories where carbon pricing is not implemented or prices are kept low in response to high carbon prices

Regressive/progressive: a regressive economic policy affects the poor the most and its negative effects decrease with wealth, while a progressive policy has the inverse effect.

Carbon sink: any entity that sequesters and stores atmospheric carbon securely, this includes biomass carbon sinks such as forests and also artificial technologies that store atmospheric carbon

EU ETS: European Union Emissions Trading System.

V. Important Events & Chronology

Date (Day/Month/Year)	Event
4 June 1992	Opening to the signature of the UNFCCC
11 December 1997	The Kyoto Protocol was signed
1 January 2000	Initiation of the Clean Development Mechanism
1 January 2005	Initiation of the EU ETS
16 February 2005	The Kyoto Protocol went into force
8 December 2012	Adoption of the Doha Amendment to the Kyoto Protocol
12 December 2015	The Paris Climate Agreement was signed
4 November 2016	The Paris Climate Agreement went into force
31 December 2020	The Kyoto Protocol expired
16 July 2021	Trading began in the Chinese ETS
2050	Deadline for global carbon net-zero to keep global warming below 1.5 °C

VI. Past Resolutions and Treaties

Kyoto Protocol:

The Kyoto Protocol was an international agreement signed on 11 December 1997 and that went into effect on 16 February 2005. It expired on 31 December 2020.

The Kyoto Protocol imposed legally binding obligations to reduce emissions on 37 parties, which were industrialized and relatively wealthy. However, it imposed little responsibility on less developed countries.

The Kyoto Protocol is widely considered to be a failure. Firstly, because it didn't bind less developed but rapidly growing countries like China and India, any emission reductions made by wealthier countries

were quickly wiped out by these growing economies. Secondly, imposing binding targets on a resource so entrenched in society and in the economy with no easy alternatives meant that many countries withdrew from the agreement, such as Canada and the US, or that they simply didn't sign it.

Paris Climate Agreement:

The Paris Climate Agreement, which was signed on 12 December 2015 and which entered into force on 4 November 2016, is a legally binding treaty signed by 196 parties that sets a worldwide goal for climate change to limit global warming to well below 2 °C, and preferably to 1.5 °C. The Paris Climate Agreement sets several provisions to aid in reaching this goal. The provisions relevant to this report are found in Article 6, paragraphs 2 and 4.

The intentionally vague terms of Article 6 have resulted in extensive negotiations, however, parties have yet to come to an agreement on what these provisions entail.

The Paris Agreement has been in force for less than 5 years, therefore empirical evidence of its efficiency is very limited. However, the agreement is criticized because of its lack of strong enforcement mechanisms to back its ambitious 2-1.5 °C goals.

The Paris Agreement has been ratified by 191 of its 197 signatories.

VII. Failed Solution Attempts

Clean Development Mechanism:

The Clean Development Mechanism (CDM) is a UN-run carbon offset scheme, a part of the UNFCCC, which allows higher income (Annex I) signatories of the Kyoto Protocol to build carbon offset projects in lower income countries (Non-Annex I) and to count the resultant emissions reductions of these projects into their own emissions reduction targets. The CDM's emissions reduction unit is CDR (Certified Emissions Reduction).

The CDM is governed by the Clean Development Mechanism Executive Board, which is supported by expert panels that specialize in different areas in its governance. The vetting and accreditation of entities that oversee projects and award CDR credits is governed by the Accreditation Panel, the Methodologies Panel decides on criteria and methods for calculating emissions reductions and project effectiveness. The Registration and Issuance Team oversees the registration of CDM projects and the issuance of credits.

As discussed in the Focused Overview, the main drawback of conventional carbon offsetting schemes is the difficulty of assessing if the purported emissions reductions brought on by a project are added or not. The CDM was plagued by this exact problem. A review in 2016 found that the vast majority of CDR credits have been issued to projects where additionality is unlikely (indicating that the projects would have happened even without the CDM scheme and CDR revenues), the actual amount of emissions reductions is unclear, and the overall environmental integrity is low. This is mainly caused by the inclusion of large renewable energy projects that were already well funded into the scheme. (Cames et al., 150)

Joint Initiative:

The Joint Initiative (JI) is very similar to the CDM in basic operating principles, but their key difference is that JI involves Annex I countries implementing offset projects in other Annex I countries. The implementation of JI is divided into two tracks: Track 1 and Track 2. Countries that meet eligibility criteria can use Track 1 mechanisms which give these countries the authority to oversee JI projects and issue credits without international oversight. Countries that are ineligible for participation or who have volunteered not to participate in Track 1 utilize Track 2, where all JI projects are conducted under the supervision of the JI Supervisory Committee (JISC).

The JI suffered from the same overallocation and lack of additionality that the CDM was afflicted by. To make matters worse, Track 1 projects being away from international oversight reduced the quality of offset projects massively. In fact, more than half of all Track 1 projects were of low environmental integrity, according to an assessment report. Questionable practices such as arbitrarily changing key parameters, and making unrealistic assumptions. The additionality of the vast majority of the projects was also very implausible. In many cases, projects were registered into the JI program and audited more than 5 years after their implementation. (Kollmuss et al., 5-7)

VIII. Possible Solutions

The implementation of a global carbon tax would be exceedingly difficult due to the inherent nature of taxes. However, a large-scale global cap-and-trade system could be viable, however market design should be carefully constructed (see subtopic 4). Trust must be ensured in the continued and stable existence of a pricing scheme, and the provisions for a pricing scheme should be as clear and neutral as possible. For this, a neutral scientific supervising body could be used. A pilot program to ensure smooth implementation could be considered.

Deep decarbonization should be incentivized. Programs that seek to prevent marginal abatement such as switching to gas from coal instead of investment in zero-carbon infrastructure must be implemented. Such programs may include pricing of long-term carbon emissions, putting caps or fines on new high-carbon development or subsidizing zero-carbon development.

Lastly, all global carbon pricing policy efforts must reflect a fair distribution of burden between low-income and high-income countries. It must not be forgotten that the vast majority of responsibility for global climate change rests on high-income countries, and low-income countries must not be subjected to unfair treatment. In addition, it must not be forgotten that while carbon pricing is indeed progressive in low-income economies, drastic pricing schemes may disproportionately affect the poorest of the poor in low-income countries, in ways such as rendering inaccessible villages without basic electricity due to inhabitants not being able to afford fuel for generators. Subjecting low-income economies to unfair burdens may also hinder humanitarian and development efforts. The welfare of impoverished communities must be carefully monitored in any global carbon pricing initiative. However, artificially lowering carbon costs in low-income economies could result in high carbon development and carbon leakage. Therefore, mechanisms that allow revenue from carbon pricing schemes to fund public goods and low carbon development in low-income countries must be developed.

IX. Useful Links

Mitigation Of Climate Change Summary for Policymakers — IPCC

Summary for Policymakers — Global Warming of 1.5 ºC

Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development

Report of the High-Level Commission on Carbon Prices I

Carbon Pricing Dashboard | Up-to-date overview of carbon pricing initiatives

www.offsetguide.org

EU Emissions Trading System (EU ETS) | Climate Action - European Commission

X. Works Cited

Andersson, Julius J. "Carbon Taxes And CO2 Emissions: Sweden as a Case Study." *American Economic Journal: Economic Policy*, www.aeaweb.org/articles?id=10.1257%2Fpol.20170144

Bowen, Alex. "The Case for Carbon Pricing (Grantham Research Institute)." *Green Fiscal Policy Network*, 3 Apr. 2020, greenfiscalpolicy.org/policy_briefs/the-case-for-carbon-pricing-grantham-research-institute/

Boyce, James K. "Carbon Pricing: Effectiveness and Equity." *Ecological Economics*, Elsevier, 17 Apr. 2018, www.sciencedirect.com/science/article/abs/pii/S092180091731580X

Cames, Martin, et al. "How Additional Is the Clean Development Mechanism ..." *ResearchGate*, www.researchgate.net/publication/316216473_How_additional_is_the_Clean_Development_Mechanism_Analysis_of_the_application_of_current_tools_and_proposed_alternatives_Study_prepared_for_DG_CLIMA

"Carbon Trading - How It Works and Why It Fails." *Transnational Institute*, 15 July 2019, www.tni.org/en/publication/carbon-trading-how-it-works-and-why-it-fails

Chapter 2: MITIGATION Pathways Compatible with 1.5°C in the Context of Sustainable Development. www.ipcc.ch/site/assets/uploads/sites/2/2019/03/SR15_FGD_Chapter_2.pdf

Chen, You-hua, et al. "A Clean Innovation Comparison between Carbon Tax and Cap-and-Trade System." *Energy Strategy Reviews*, Elsevier, 27 Mar. 2020, www.sciencedirect.com/science/article/pii/S2211467X20300365

"China." *Climate Action Tracker*, climateactiontracker.org/countries/china/

Coalition, Carbon Pricing Leadership. “Report of the HIGH-LEVEL Commission on Carbon Pricing and Competitiveness.” *Carbon Pricing Leadership Coalition Reports*, elibrary.worldbank.org/doi/abs/10.1596/32419

“Concerns about How Offset Credits Are Used.” *Carbon Offset Guide*, 29 Dec. 2020, www.offsetguide.org/concerns-about-how-offset-credits-are-used/

“DISTRIBUTIONAL IMPLICATIONS OF A CARBON TAX .” *Columbia University Energy Policy*, 17 July 2018, www.energypolicy.columbia.edu/research/report/distributional-implications-carbon-tax

Dorband, Ira Irina, et al. “Poverty and Distributional Effects of Carbon Pricing in Low- and Middle-Income Countries – a Global Comparative Analysis.” *World Development*, Pergamon, 7 Dec. 2018, www.sciencedirect.com/science/article/pii/S0305750X18304212

European Commission. “International Carbon Market.” *Climate Action - European Commission*, 16 Feb. 2017, ec.europa.eu/clima/policies/ets/markets_en

Fuss, Sabine, et al. “A Framework for Assessing the Performance of Cap-and-Trade Systems: Insights from the European Union Emissions Trading System.” *Review of Environmental Economics and Policy*, 2018, www.journals.uchicago.edu/doi/10.1093/reep/rey010

“Global Carbon Mechanisms: Emerging Lessons and Implications.” *The Carbon Trust*, 23 Mar. 2020, www.carbontrust.com/resources/reports/advice/global-carbon-mechanisms

H. Damon Matthews , and Kasia Tokarska . “New Research Suggests 1.5C Climate Target Will Be out of Reach without Greener COVID-19 Recovery Plans.” *The Conversation*, 10 Aug. 2021, theconversation.com/new-research-suggests-1-5c-climate-target-will-be-out-of-reach-without-greener-covid-19-recovery-plans-151527

Haites, Erik. “Carbon Taxes and Greenhouse Gas Emissions Trading Systems: What Have We Learned?” *Taylor & Francis*, 10 July 2018, www.tandfonline.com/doi/full/10.1080/14693062.2018.1492897 .

“Has Joint Implementation Reduced Ghg Emissions? Lessons Learned for the Design of Carbon Market Mechanisms.” *Eldis*, www.eldis.org/document/A73363 .

“India.” *Climate Action Tracker*, climateactiontracker.org/countries/india/

Ip, Greg. “Carbon Tax Sidelined in BIDEN'S Push on Climate, Taxes.” *The Wall Street Journal*, Dow Jones & Company, 24 Mar. 2021, www.wsj.com/articles/support-for-carbon-tax-grows-except-where-it-matters-most-11616590985

Jaiswal, Anjali. “Climate Action: All Eyes on India.” *NRDC*, 14 Dec. 2020, www.nrdc.org/experts/anjali-jaiswal/climate-action-all-eyes-india

Jeffrey D. Sachs, Director. “What's the Path to Deep Decarbonization?” *World Economic Forum*, www.weforum.org/agenda/2015/12/whats-the-path-to-deep-decarbonization/

Kaufman, Noah, et al. “Putting a Price on Carbon: Reducing Emissions.” *World Resources Institute*, 1 Jan. 2017, www.wri.org/research/putting-price-carbon-reducing-emissions

Kuusela, Olli-Pekka, and Jussi Lintunen. “A Cap-and-Trade COMMITMENT Policy with ALLOWANCE BANKING.” *Environmental and Resource Economics*, Springer Netherlands, 19 Dec. 2019, link.springer.com/article/10.1007/s10640-019-00395-y#Abs1

Léger, Sébastien, et al. “Can Carbon Prices Fire up Gas Demand in Electricity Generation?” *McKinsey & Company*, McKinsey & Company, 27 Mar. 2019,

www.mckinsey.com/industries/oil-and-gas/our-insights/can-carbon-prices-fire-up-gas-demand-in-electricity-generation

Perdan, Slobodan, and Adisa Azapagic. "Carbon Trading: Current Schemes and Future Developments." *Energy Policy*, Elsevier, 4 Aug. 2011, www.sciencedirect.com/science/article/abs/pii/S030142151100526X

"Russian Federation." *Climate Action Tracker*, climateactiontracker.org/countries/russian-federation/

Shefrin, Hersh. "President Biden's Policy Mistake about Carbon Pricing Will Be Monumental." *Forbes*, Forbes Magazine, 25 Mar. 2021, www.forbes.com/sites/hershshefrin/2021/03/25/president-bidens-monumental-climate-policy-mistake-about-carbon-pricing-will-be-very-costly/?sh=1c9b74206b51

"Status of Ratification of the Convention." *Unfccc.int*, unfccc.int/process-and-meetings/the-convention/status-of-ratification/status-of-ratification-of-the-convention

"Summary for Policymakers." *Global Warming of 1.5 ºC*, www.ipcc.ch/sr15/chapter/spm/

"Sweden's Carbon Tax." *Regeringskansliet*, www.government.se/government-policy/taxes-and-tariffs/swedens-carbon-tax/

Tvinnereim, Endre, and Michael Mehling. "Carbon Pricing and Deep Decarbonisation." *Energy Policy*, Elsevier, 27 June 2018, www.sciencedirect.com/science/article/pii/S0301421518304063

UNFCCC. "Mechanisms under the Kyoto Protocol: Emissions Trading." *Unfccc.int*, unfccc.int/process/the-kyoto-protocol/mechanisms/emissions-trading

UNFCCC. “The Paris Agreement.” *Unfccc.int*, unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement.

“United Nations Offset Mechanisms.” *Carbon Offset Guide*, 29 Dec. 2020, www.offsetguide.org/understanding-carbon-offsets/carbon-offset-programs/united-nations-offset-mechanisms/

Warren Cornwall, 2020, et al. “The Paris Climate Pact Is 5 Years Old. Is It Working?” *Science*, 16 Dec. 2020, www.sciencemag.org/news/2020/12/paris-climate-pact-5-years-old-it-working

“What Is The Kyoto Protocol?” *Unfccc.int*, unfccc.int/kyoto_protocol.