

Green Impact Fund for Transformation

The [Green Impact Fund for Transformation \(GIFT\)](#) is intended to expand and accelerate the use of GHG-reducing technologies (GRTs) in developing countries. We are seeking your views and comments, including on the feasibility and the value of such a fund. Thanks to extensive input from many individuals, this discussion of the GIFT is substantially revised as of January 2023.

0. Executive Summary

For effective climate change mitigation and sustainable development, both established and new green technologies must be developed and deployed on a global level. While many high-income countries offer firms strong incentives to adopt low-emissions production – including carbon taxes, regulatory measures, and subsidies –, the same incentives are absent in most low- and middle-income countries. Even when firms want to employ green technologies, the combination of limited budgets and vigorous competition from rivals using lower-cost, polluting technologies may make it financially infeasible. This is problematic for the global effort to mitigate climate change, since it is in low- and middle-income countries that the highest growth rates in GHG emissions are anticipated.

The Green Impact Fund for Transformation (GIFT) is proposed as a way to support the adoption of GHG-reducing technologies (GRTs) by firms in low- and middle-income countries. The GIFT would reward firms that used GRTs, with payment based on verified emission reductions. Financed by a coalition of High-Income Countries (HICs), the GIFT would pay up to \$25 per ton of CO₂e emissions averted, with a cap on total payments. In case total rewards exceed the cap, there would be an equiproportionate reduction in rewards, creating an efficient allocation of financial resources.

While the GIFT could, in principle, operate at a very large scale, it should be piloted at a smaller scale, *e.g.* in a selected region and with preselected GRTs over a 2-year period. With preparation and assessment, a meaningful pilot could be completed for \$20m a year over four years.

1. Introduction

As the IPCC's Sixth Assessment Report shows, the world needs "immediate, rapid and large-scale reductions" in the emission of greenhouse gases (GHGs). To this end, established green technologies must be deployed on a global level, and new innovations developed. One challenge is that often low-emissions technologies are more costly to implement than high-emissions technologies: the additional cost is sometimes referred to as a "Green Premium."

In many affluent countries, Green Premiums are addressed through stringent environmental regulations, taxes on emissions and green subsidies, which encourage the choice of green technologies by prohibiting, limiting, or penalising the use of their dirtier alternatives. But such compensatory measures are largely absent in the less affluent countries because of political challenges, fear of competitive disadvantages and the general lack of unified global standards. Therefore, incentives to adopt green technologies tend to be weak in developing countries.

The failure to support adoption of GRTs in developing countries will have major consequences: in the remainder of this century, developing countries are expected to experience substantial industrial growth, intensified by large increases in population in some countries. The technologies used, the practices and habits formed, and the path taken in developing countries will matter as much as choices affluent nations make within their own borders. Rapid emissions reduction requires that highly effective and locally appropriate green technologies be widely and quickly deployed throughout the developing countries. The GIFT is designed for this purpose.

In addition to the effect that, due to the lack of appropriate incentives, massive amounts of GHGs are released into the atmosphere, poor global utilisation of new technologies also undermines upstream incentives to invest in green R&D. We must address this problem to promote successful global technology development and adoption.

This discussion paper shows how a new system of rewards can complement the existing carbon-policies to support rapid diffusion of GRTs, and to enhance the incentives to develop GRTs of special relevance to developing countries.

2. Operation of the GIFT

The Green Impact Fund for Transformation would invite stakeholders – usually firms –to register green technology adoption projects in developing countries. The registrant would then become eligible for payments from the GIFT, based on the assessed reductions in emissions attributable to the project. Only projects that would not have been undertaken in the absence of the GIFT payments would be eligible, as is common in "offset"

credits; that is, the project should be “additional”. In general, this eligibility criterion would apply when there is a “Green Premium” involved in adopting a low-emissions technology.

The payment would be based on a standard rate per ton of CO₂e averted. An appropriate standard rate is approximately \$25, which is below the generally accepted social cost of emissions.¹ We believe that many firms, however, would find such a payment adequate to induce them to invest in greener alternative production methods, leading to substantial uptake. At the same time, it would be essential to have a known total budget for the GIFT. Reconciling these is an important design feature of the GIFT. If the cost of averting emissions fell below \$25 for a large number of projects, the GIFT could attract so many projects that the total projected payments would exceed the budget. In that case, there should be an equiproportionate reduction in rewards to meet the budget. (It would be appropriate, however, to guarantee a minimum payment per ton for the earliest registrants, who might have uncertain expectations about the number of registrants.) Such an outcome would imply that reducing emissions was relatively inexpensive, justifying an outcome in which the effective payment per unit of emissions reduction was lower than \$25.

The GIFT should be open projects in all countries with an income below a given threshold. We propose that this “GIFT Zone” threshold would be \$10,000 income per capita. The proposed threshold is relatively high because many middle-income countries are important industrial producers but currently lack the kinds of incentives, such as carbon taxes, that are required to drive adoption of green technologies.

The duration of eligibility for payments is also important. We propose that a project should be eligible for payments for at most six years following implementation of the green technology.

Funding for the GIFT should be provided by high-income countries, which have an equal interest in emissions anywhere in the world. Although the GIFT is targeted at developing countries, the benefits would flow to every country. The GIFT fits the [Paris Agreement](#)'s framework for financial, technical, and capacity-building support for developing countries. Furthermore, it fosters capacity-building by rewarding the development, manufacture, installation, and use of appropriate GRTs in developing countries. This shifts a higher share of the (industrial) value chain to those countries and hence contributes to a sustainable development, economically, socially and environmentally.

¹ Ricke, K., Drouet, L., Caldeira, K. *et al.* Country-level social cost of carbon. *Nature Clim Change* 8, 895–900 (2018). <https://doi.org/10.1038/s41558-018-0282-y>

2.1 Efficiency

The GIFT creates strong incentives to adopt green technologies for the most cost-effective emission reductions. With the help of GIFT rewards, developing country stakeholders are enabled to adopt green technologies that they would not be able to afford otherwise, and thus enhance the demand for GRTs.

With fixed annual disbursements, the GIFT reward rate is elegantly self-adjusting: when it is perceived as highly attractive, registrations proliferate, causing the reward rate to decline. Conversely, when innovators perceive the reward rate as unattractive, registrations dry up and the rate rises as older projects exit at the end of their reward period. Such automatic self-adjustment reassures contributors that the reward rate will be held down by competition among firms without declining to an unreasonable level.

The GIFT differs substantially from the strategy of subsidizing specific projects based on proposals. We can broadly categorize mechanisms that support investments into “push” and “pull” mechanisms. With a push mechanism, a subsidy is granted to facilitate an investment; with pull, investments that deliver desired results are rewarded. The benefit of push mechanisms is that they help to overcome liquidity constraints, which are common in developing countries. Unfortunately, they often fail to deliver the promised results; and they usually required substantial up-front costs in assembling grant proposals and assessment of the likely benefits. The benefit of pull mechanisms that they reward success only and are open to all players who can deliver the desired results. Of course, this means that they require assessment of the achieved benefits.

2.2 Feasibility

The GIFT mechanism relies on extensive experience with voluntary carbon credit markets. Firms in high-income countries that are seeking to offset their emissions purchase carbon credits that are verified through several existing organizations using well-established standards. These voluntary offset markets are operating at about \$500m per year and are set to grow substantially. Notably, airlines will be required to [purchase carbon credits to offset any emissions from international flights](#) above 2020 levels, starting in 2027. Airlines in many countries are already participating on a voluntary basis.

Carbon offsets are often seen as unhelpful, in that they allow a carbon-emitting activity, such as international air travel, to be justified by an emissions reduction elsewhere. This is particularly undesirable if the emissions reduction is not real, as sometimes happens. The GIFT mechanism, however, is not an offset mechanism. It merely uses the same mechanism to identify and support emissions reductions. In effect, it would create a centralized, standardized market offering a price at which emissions reduction activities in developing countries would be subsidized.

The effect of the voluntary carbon market is that there extensive existing experience with carbon credits. Moreover, TUEV SUED, an international technical inspection association based in Germany, has expressed its support for the GIFT mechanism and states in a [supportive letter](#) that “in summary, assessment of emissions averted through deployment of new green technologies is feasible. TUEV SUED and similar organisations already have the pertinent practical experience needed for such an effort.”

2.3 Cost Control

The GIFT limits cost by means of a fixed annual budget and secures cost-effectiveness through competition among a variety of green technologies. Financing by high income countries (HICs) should involve strong long-term commitments lest adaptors discount promised rewards by the risk of non-payment. The administration of the GIFT could be established within a UN Organisation that already deals with technology deployment like UNIDO’s [Global Cleantech Innovation Program](#) or the Green Climate Fund which is [mandated](#) to provide “support to developing countries to limit or reduce their greenhouse gas emissions.”

The size of the budget would naturally depend on the willingness of countries to finance the GIFT. However, a reasonable strategy is to build the GIFT up from a small base. This would allow it to be tested and refined. A minimal size might be in the range of \$20m per year as a pilot, which would allow it to fund numerous projects in a small set of countries. With additional experience, and subject to demonstrating cost-effectiveness, the GIFT could be scaled up to the range of billions of dollars. It is helpful to recognize that the wealthy countries have already committed to \$100bn a year in financial support for mitigation and adaptation in developing countries; the GIFT could be one mechanism for delivering that support. Regardless of the size, funding countries would have a fixed and limited commitment.

A reasonable strategy for testing out the GIFT would be a pilot focused on emissions reductions in Africa. The Africa Carbon Markets Initiative was launched at the COP27 in November 2022 to encourage the sale of high-quality carbon credits from Africa. The continent was estimated to have captured a share of only about [11% of all credits between 2016 and 2021](#), with plenty of room for growth. This initiative was able to secure commitments to buy \$200m of credits from several large corporations, but there is a need for much more. The GIFT could collaborate with this initiative as a way to support emissions reductions in Africa. Of course, unlike the standard offset mechanism, it would not permit purchasing countries to increase their own emissions.

2.4 Effect on innovation

The GIFT could substantially increase the demand for green technologies in developing countries. In turn, this would enhance the incentives for innovators to invest in development of technologies appropriate to the needs of firms in those countries. While most green technologies are universal in application, there are also some with very local or regional relevance. For example, copper mining and processing are substantially undertaken in developing countries without carbon taxes. As a result, the incentives to invest in developing emissions-reducing technologies for the sector are weak. With the GIFT, the willingness to invest in purchasing green technologies for this sector would be enhanced. Moreover, because the GIFT would only pay out based on assessed reductions in emissions, it would encourage innovators to focus on ensuring the practical effectiveness of their innovations.

2.5 Fairness

The GIFT would ensure ample rewards to participating firms, support developing countries in their green transformation, and reduce the dangers of climate change for all. At the same time, the budget of the GIFT should largely be borne by HICs that promised \$100bn annually for climate adaptation and mitigation efforts of LMICs. (Currently, the situation is often reversed with innovators in High-Income Countries trying to extract surplus from firms in lower-income countries by charging high prices for their patented green technologies – with the result that uptake is poor because of lacking financial capacity.)

Thus, the GIFT would deliver on the principles of climate justice, namely the ‘polluter-pays-principle’, the ‘ability-to-pay-principle’ and the ‘right to develop’ which are all crucial to combine efforts to align measures for effective climate protection and the Sustainable Development Goals (SDGs). At the same time, the GIFT would support countries in achieving their Nationally Determined Contributions towards mitigating climate change.

3. Design Options

3.1 Fields of technology

In principle, the GIFT could be open to technologies of any kind that reduce emissions. Experience with the Clean Development Mechanism (CDM) shows, however, that additionality is easier to identify for some GRTs than for others. A GRT improving efficiency of carbon capture and sequestration would clearly qualify. But a GRT improving efficiency of the internal combustion engine is more complex as it might end up increasing emissions by inducing people to drive more and in larger vehicles. Such rebound effects

have often accompanied technology advances, and they must be accounted for appropriately. It might be appropriate, in these circumstances, to limit the GIFT to designated fields of technology.

3.2 Funding

The GIFT should be large enough to justify the costs of administration and impact assessment. Should it work well, it could be expanded to support an increasing portfolio of GRTs. There is an obvious funding source: developed countries (via the United Nations process) have pledged \$100bn annually to support developing countries on a low carbon path, including both mitigation and adaptation. HICs have fallen short of fulfilling this pledge. (Indeed, most of the financing has come in the form of loans.) The GIFT could be funded with some of the commitments already made to support developing countries, although there is no need to reduce existing funding.

To ensure that adaptors would be willing to adapt green technologies, contributing countries should make long-term funding commitments. Any contributor would of course have the option of withdrawing its support; but this would have to be a phased withdrawal over at least six years so as not to disappoint legitimate registrant expectations.

While the GIFT could be funded by a single country, if international cooperation in funding exists, one reasonable way to establish contribution requirements would be to base funding per country on [population times (income per capita minus \$10000)]. Countries with income below \$10,000 per capita (lower middle-income and lower-income countries) would not contribute. Countries with higher average income would contribute at a higher rate relative to their gross national income.

3.3 GIFT Zone Countries

In which countries should projects be eligible for carbon credits under the GIFT? A reasonable approach is to limit the GIFT Zone to countries with income per capita less than about \$10,000. If this threshold were higher, the GIFT would require greater annual funding; moreover, the funding countries might have increased concerns that they were assisting industrial competitors. This range of countries includes many upper middle-income countries that are important contributors to GHG emissions globally and important manufacturing locations, as well as low-income countries that have much less industrial development.

3.4 Administration

Assuming that the GIFT is financed by many countries, the most plausible administrative entity would be the Green Climate Fund, established under the Cancún Agreements in 2010 as a dedicated financing vehicle for developing countries within the

global climate architecture, serving the Financial Mechanism of the UNFCCC and the Paris Agreement. However, it is also possible for a single country such as the United States or a single region such as the European Union to finance the GIFT, in which case the funder would presumably also control the administration.

3.5 Who should be rewarded?

An alternative approach to supporting green technology adoption is to directly reward *innovators* who license their technology for free to users in developing countries, instead of rewarding implementers. Rewarding innovators has the advantage that it directly encourages the spread of green technologies in developing countries and might even allow innovators to subsidize the adoption of their technologies. Rewarding the firms that implement those technologies instead has a similar effect but allows support for firms that implement unpatented technologies that are more expensive to use than higher-emission alternatives. In effect, it allows the GIFT to support the adoption of a wider range of green technologies. One significant advantage of directly paying innovators is that a high-income country might find it attractive to reward its own innovative firms, rather than supporting implementation projects in another country.

3.6 Should there be a threshold for emissions?

Bill Gates has argued that rather than rewarding incremental reductions in emissions, we should focus on technologies with net zero emissions. One possible design choice for the GIFT would be to limit eligibility to projects that reduce emissions by at least 90%. This would encourage “radical” innovation that would have long-term effects. Such a limitation would, of course, shrink the pool of possible projects and therefore make the GIFT less internally competitive.

4. Measuring Additionality

The key challenge for the GIFT is measurement of the effect of a given innovation. This is not a problem specific to the GIFT, since all carbon credit schemes must address it. The Clean Development Mechanism (CDM), discussed below, has issued carbon offset credits for over 2bn tons of CO₂e averted. The GIFT aims to pay for a smaller set of possible emissions reductions projects, but the core issues of assessing additionality are similar. The International Carbon Reduction and Offset Alliance has produced a Code of Best Practice, which could form a starting point for assessing the effect of using a specific technology. Verra offers a set of methodologies to assess GHG reduction for various types of projects, which show both the challenges of assessment as well as its feasibility.

5. 5. Carbon taxes and other GHG mechanisms

5.1 Carbon Taxes

The GIFT performs a function similar to that of carbon taxes, by making emission-intensive production methods relatively costly. If carbon taxes were so high as to fully cover the social cost of CO₂ emissions, then there would be no need for the GIFT. However, existing carbon taxes in developing countries are, and are likely to remain, well below estimates of the social cost of carbon, so additional incentives to reduce emissions are desirable.

5.2 The Clean Development Mechanism (CDM) and Offsets

Established as part of the 1997 Kyoto Protocol, the CDM allowed emission reduction projects in developing countries to earn certified emission reduction (CER) credits, each equivalent to one ton of CO₂ per year. These CERs could be traded and sold, and used by industrialised countries to meet a part of their emission reduction targets under the Kyoto Protocol. The volume of CERs issued since initiation exceeds 2bn tons. (For scale, global emissions currently are around 50bn tons of CO₂e annually.) The CDM's purpose was clear: if emissions reductions can be done more cheaply in developing countries than in HICs, then firms in HICs can achieve equivalent reductions in emissions at lower total cost by buying credits from developing countries. The CDM, however, has attracted considerable criticism since if emission reductions are not “additional” (i.e. occurring only because of the CDM), then the effect is that the HIC can increase its emissions without a real matching reduction in developing countries that sell the credit. In this case, there is simply a transfer of money to the developing country as a payment for the credit, but no restraining effect on total global emissions. In effect, the CDM resembled a carbon tax with payments flowing to those developing countries that were able to establish a mechanism to measure emissions “reductions”. In general, one would favour such an allocation as a contribution to sustainable development, but that was not always the case for the CDM. At a price of about \$20 per ton, the CER market represented a meaningful source of income in some countries. Given declining demand and excess supply, prices of the CERs collapsed in 2012. As of 2019, the price range was US\$0.15 - \$0.24 per ton of CO₂e. There are numerous other offset mechanisms that allow for the transfer of “credits” from one party to another.² The experience from these mechanisms generally suggests that to be effective, “integrity of carbon credits must be maintained to provide confidence to purchasers that the credits accurately represent genuine and real emission reductions.”(World Bank 2020, p. 49)

² See World Bank, 2020, Chapter 3.

The GIFT differs from the CDM mechanism in two important ways. First, it is designed to reduce emissions, rather than offsetting emissions in one country with emissions in another. Second, the business of certifying and assessing emissions reductions has matured and the credibility of identifying whether a project is “additional” has improved markedly.

5.3 Patent pledges

There have been numerous efforts to share knowledge through patent pledges, including a recent initiative labelled the "Low-Carbon Patent Pledge" formed by Microsoft, Facebook and Hewlett-Packard. The GIFT would help to make such efforts by innovators more useful by creating a financial reward for firms in developing countries that adopted such technologies and achieved lower emissions as a result.

6. Summary

The Green Impact Fund for Technology offers an important opportunity to use a market-type mechanism to support the use of green technologies by firms in low- and middle-income countries.

For more information, please visit:

<https://globaljustice.yale.edu/green-impact-fund-technology>