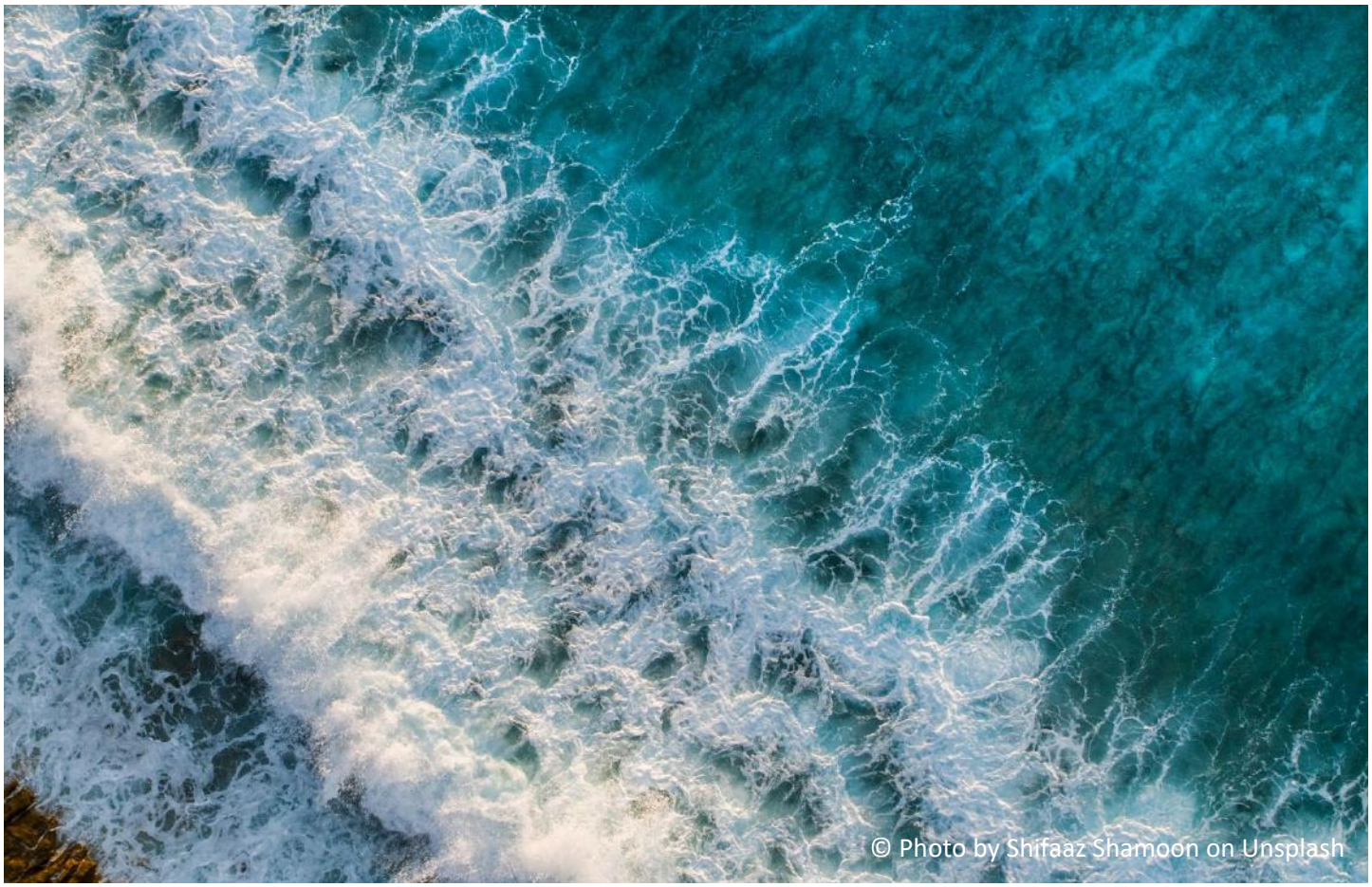

T7 Task Force Climate and Environment

POLICY BRIEF

FINANCING A GREEN FUTURE: THE ENERGY TRANSITION MECHANISM (ETM) AND THE GREEN IMPACT FUND FOR TECHNOLOGY (GIFT)

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Dina Azhgaliyeva, Asian Development Bank Institute, Tokyo, Japan
Aidan Hollis, Incentives for Global Health & University of Calgary
Thomas Pogge, Incentives for Global Health & Yale University
Dil Rahut, Asian Development Bank Institute, Tokyo, Japan
Yixin Yao, Asian Development Bank Institute, Tokyo, Japan

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G7 GERMANY 2022

Executive Summary

The G7 should consider (i) an Energy Transition Mechanism (ETM) and (ii) a Green Impact Fund for Technology (GIFT) to accelerate the transition from fossil fuels to low-carbon technologies in developing countries. *ETM* is a scalable, collaborative initiative led by the Asian Development Bank (ADB) in partnership with developing countries that will leverage a market-based approach to accelerate the transition from fossil fuels to clean energy. It funds the early retirement of coal power plants in developing countries using the proceeds from ETM purchased coal plants for low-carbon technologies. Pilots of ETM have been launched in Indonesia, the Philippines and Viet Nam.

***GIFT* would reward emission reductions achieved in less-developed countries with any patented green technology whose monopoly privileges in this "GIFT Zone" are waived. To prepare for the establishment of GIFT, the G7 should immediately fund a pilot project featuring a single reward pool to be split among preselected green innovations in proportion to the emission reductions achieved with them, affordably priced, in an innovator-selected region of the GIFT Zone over a 2-year period. With preparation and assessment, a meaningful pilot could be completed for €35 million per annum over four years.**

The two proposals complement each other. ETM stimulates demand and GIFT reduces the cost of implementing low-carbon technologies. Both proposals can be implemented in two steps: pilot and scale-up.

Challenges

Our planet urgently needs an ecological transformation to slow and ideally reverse catastrophic climate change by reducing GHG emissions. To achieve this transformation, we must develop and widely deploy green innovations and technologies of many kinds, to move away from fossil fuels to clean fuels, reduce the need for energy, meat, steel, cement, aluminium, and transportation, for instance, and the emissions associated with them.

A quarter of global emissions comes from coal-fired power plants. Financing the energy transition in developing countries is challenging because of fast-growing energy demand, fossil fuel subsidies, limited supply of clean and renewable energy, low electricity prices, lack of access to finance, currency exchange volatility, and policy risks, etc. If emissions from existing coal-fired power plants are not addressed, Asia and the Pacific will fail to meet the Paris Agreement targets. Although the number of socially responsible investors is growing, meeting Nationally Determined Contributions (NDC) in developing countries is constrained by a lack of access to funds, which has become worse during the COVID-19 pandemic.

At the recent COP26, many countries announced ambitious Nationally Determined Contributions in order to keep the 1.5 degrees Celsius goal within reach, and some developing countries pledged to move to net zero carbon emissions by mid-century. The UN Sustainable Development Goals (SDGs) collectively represent the agenda of energy transition, particularly the goals of decent work for all (SDG 8), access to clean and affordable energy for all (SDG 7), climate action (SDG 13) and zero poverty (SDG 1). Achieving the national climate objectives and SDGs is a challenge – particularly in light of the recent pandemic, resource constraints and lack of incentives.

Coal remains a major fuel source for the energy sector in developing Asia, which faces several challenges (ADB 2021a):

- 2/3 of energy demand growth will come from developing Asia by 2040;
- 25% of annual global emissions come from coal-fired power plants;
- 50% of global greenhouse gas emissions originate in the Asia-Pacific region;
- 90% of young (≤20 years) coal-fired power plants are in Asia.

It is essential that there be a rapid transition away from coal-fired electricity generation, which will take substantial financial support. Fortunately, the cost of renewable energy technologies is declining because of technological progress, but they are not replacing coal quickly enough. Part of the problem is that innovation is sustained by 20-year patents that innovators are entitled to claim pursuant to the TRIPS provisions of the World Trade Organization's 1995 founding treaty. Such patents encourage investment in innovation by enabling patentees to charge monopoly prices for their new technologies or to collect royalties or licensing fees for permitting others to do so.

While monopoly markups fuel the quest for innovation, they also impede the diffusion of its fruits. This headwind is especially harmful in the domain of green technologies, where buyers typically enjoy only a small fraction of the social benefit from their use. In deciding whether to pay extra for an emission-reducing

technology, for example, entrepreneurs are mindful of the health benefits for themselves and their employees but may give little thought to the vastly larger benefits to the whole planet, including future generations.

In most affluent countries, this headwind against the uptake of green technologies is mitigated by environmental regulations, taxes on emissions, and green subsidies, which encourage the choice of green technologies by prohibiting, limiting, or penalizing the use of their dirtier alternatives. But such compensatory measures are largely absent in less-developed countries because they would cause substantial cash outflows to patentees. These countries are not keen to pay monopoly rents to wealthy patentees for permission to help avert a global disaster that high-income countries unleashed through their disproportionate production and consumption; nor will they willingly slow or forgo their own development because high-income countries have emitted too much already.

Coal-fired power plants provide a telling illustration. Frontier technologies can substantially reduce emissions but cost more because of fees to patentees. Mitsui Babcock charged manufacturers of steam boilers license fees of about $1.5 million per 600 MW boiler for its patented "ultra-supercritical" technology (Tan and Seligsohn 2010, p. 7). As a result, many plants in India and elsewhere deployed less efficient subcritical or supercritical technologies (Barnes 2016, p. 4), which will generate up to 30% higher emissions for decades.[1]

The scant deployment of green technologies in the developing world is a big problem. In the remainder of this 21st century, these countries will experience massive economic growth, intensified by large increases in population. The technologies they will use, the practices and habits they will form, and the roles they will be prepared to play in the fight for a livable planet will matter far more than any choices affluent nations will make within their own borders.[2] Rapid emissions reduction requires that highly effective and locally appropriate green technologies be widely and quickly deployed throughout developing countries.

Proposals

The G7 should consider (i) an Energy Transition Mechanism (ETM) and (ii) a Green Impact Fund for Technology (GIFT) to accelerate the transition from fossil fuels to low-carbon technologies in developing countries. These proposals complement each other by promoting effectiveness and cost reduction. ETM stimulates demand and GIFT reduces the cost of implementing low-carbon technologies, which will further reinforce ETM.

(i) ETM to accelerate the transition from coal to low-carbon energy in developing countries

ETM is an ADB-led public-private finance vehicle with two main goals: lowering emissions through the early retirement and repurposing of coal-fired power plants, and the use of proceeds from ETM-purchased coal plants for clean energy. The objective of ETM is to retire coal power assets earlier than if they had remained with their current owners. Speeding up the retirement of coal-fired power plants can double or triple the demand for low-carbon energy technologies. ETM will help developing countries achieve more ambitious emissions targets. ETM will help to "crowd in" investments in low-carbon technologies. Funding may come from governments, multilateral banks, private sector investors, philanthropies, and long-term investors.

(ii) GIFT to accelerate the deployment of green innovations in developing countries

GIFT is designed to accelerate the deployment of green innovations in less-developed countries.[3] GIFT would invite patentees to register any new green technology, with two effects in the GIFT Zone (all countries below a certain per-capita income, e.g. $10,000 *per annum*):

- the innovator grants permanent cost-free licenses on its registered technology throughout the GIFT Zone;
- GIFT rewards each registered technology for six years for emissions averted with it in the GIFT Zone.

Rewards can be paid through fixed annual disbursements – initially of $2 billion–$3 billion, perhaps, with a possible subsequent scale-up. Any new green technology could be registered for participation in six consecutive such disbursements, each split among registered innovations according to the emissions averted with them in the GIFT Zone in the preceding year.

Because demand for high-priced green innovations is weak in less-developed countries, limiting GIFT to these countries substantially reduces the opportunity costs of GIFT registration and GIFT's endogenous reward rate (€/tonne of CO2e) while increasing its ecological impact relative to the amounts it disburses.[4] This GIFT reward rate would be self-adjusting and is, hence, stable. When innovators find it unattractive, registrations dry up and the reward rate rises as older innovations exit at the end of their reward period. When the reward rate is seen as highly attractive, registrations proliferate, and the reward rate declines. Such predictable adjustment reassures registrants and GIFT funders alike that this rate will be fair. GIFT would create a new market in which green innovations of many different kinds could compete in the quest to achieve the most cost-effective emission reductions. Registered technologies would be rewarded based on their performance, of which diffusion is an essential part.

GIFT's novel incentives would transform motivations. While monopoly rewards incite massive efforts to deter, detect, and terminate patent infringements, impact rewards encourage innovators actively to promote the rapid, widespread, and effective deployment of their technology for optimal impact. Such innovators would not merely charge nothing for the use of their innovation but would encourage its deployment by providing technical assistance or even by subsidizing its use — if and insofar as the increase in impact rewards earned from such promotional investments is expected to exceed their cost.

Not merely avoiding the headwind of monopoly rents but also adding a tailwind of impact rewards, GIFT would boost the deployment of key green technologies in the GIFT Zone, with massive reductions in emissions in less-developed countries. Especially for technologies geared to poor populations and tropical regions, GIFT would also open whole new areas of green R&D, accelerate the overall pace of green innovation and expand capacities for innovation and manufacturing in the developing world.

GIFT's climate impact would greatly exceed the sum of the assessed and rewarded impacts of all GIFT-registered innovations. Not only would it help to increase the diffusion of important low-carbon innovations but it would also accelerate innovation. It is likely to be especially significant in classes of green technologies that, under the current regime, suffer neglect because they are suitable for use only in developing countries, are more expensive than their dirtier alternatives, or bring widely diffused benefits that buyers/users care little about.

Faced with a climate catastrophe that threatens to cause trillions of euro in damage, massive loss of life, and severe harm to the health of billions of human and other living beings, GIFT is an opportunity we cannot afford to pass up.

Implementation

Implementation of both proposals ETM and GIFT involves 2 steps: (a) pilot and (b) scale-up.

Step 1: Pilot

(i) ETM pilots, led by ADB, have been already launched in Indonesia, the Philippines, and Viet Nam to purchase coal-fired power plants, thereby accelerating their retirement and helping jumpstart reliable and affordable clean energy (ADB 2021b). Funds came from the governments of the US, the UK, Japan (ADB 2021d), and Denmark, and from stakeholders from the private sector, and philanthropic foundations. The objective of the pilots is to retire/repurpose 5–7 coal-fired power plants in the pilot countries. Repurposed plants will be converted to renewable energy generation or alternative uses. Ultimately, retiring 50% of the coal fleet in ETM's three pilot phase countries would reduce CO_2 emissions by 200 million tons annually, the equivalent of taking 61 million cars off the road (ADB 2021e).

(ii) GIFT could be piloted with a single reward pool of, say, €120 million, to be split among preselected green innovators in proportion to the emission reductions achieved with their respective innovations, affordably priced, in a self-selected region of the GIFT Zone over a 2-year period. The pilot would show concretely how green innovators respond to the novel competitive impact rewards and how ecological impact can be assessed in a reliable and timely manner. It would help refine impact assessment and provide an indication of the cost-effectiveness of competitive impact rewards. The GIFT pilot would also yield its own ecological benefits through the pilot projects it monitors and rewards. GIFT and its pilot should be financed by affluent countries. They can most easily afford it and have contributed the most to the climate crisis. As the preeminent association of advanced industrialized countries, the G7 is best positioned to launch this initiative. Making such a "gift" toward a green transformation in the developing world would help the affluent states meet their responsibilities and commitments to Sustainable Development Goals 13 and 17,[5] to reaching 0.7% of GNI in development assistance,[6] and to devoting $100 billion annually to helping lower-income nations adapt to climate change and mitigate further rises in temperature as promised at the 2009 COP-15 in Copenhagen (Timperley 2021).

Step 2: Scale-up

(i) ETM is a scalable, collaborative initiative developed in partnership with developing countries that will leverage a market-based approach to accelerate the transition from fossil fuels to clean energy. ETM has the potential to be scaled up to other parts of Asia and the Pacific, as well as Latin America and Africa and to be the largest carbon reduction model in the world (ADB 2021c). ADB is working with developing countries and key partners to ensure ETM is a replicable and scalable mechanism that can be successfully adjusted and adopted in various regions and contexts (ADB 2021f). More public and private funds will be needed for

scaling-up ETM. G7 can help with scaling up ETM to other developing countries and 'crowding in' investments.

(ii) GIFT is a promising initiative because it can be implemented unilaterally by a few willing states and because, conferring a clear benefit, it would be well-received by the countries of the GIFT Zone. The most obvious alternative would involve paying or pressuring developing countries to institute stronger environmental regulations, taxes on emissions and/or green subsidies – an effort that might easily be perceived or maligned as high-handed interference in the policy decisions of weaker states or as a threat to their rapid development. The GIFT proposal is likely to be well received by companies with significant green technology patent portfolios, as GIFT would substantially increase their opportunities to develop, sell, and derive earnings from their green technologies in the GIFT Zone. The proposal is likely to find support also among potential green-technology customers in the GIFT Zone, as they will gain cheaper options for greening their operations. States and populations in the GIFT Zone will benefit from price reductions and from substantial reductions in air pollution[7] and, in the longer run, from a deceleration of climate change. Green movements around the world would applaud the initiative, as would organizations concerned about living conditions in the developing world. Corporations and lobbying groups committed to the defense of intellectual property rights would find the initiative palatable because it leaves everything as it is in the more affluent countries outside the GIFT Zone and, within the GIFT Zone, fully respects intellectual property by leaving it up to each innovation's patentee whether to exchange its monopoly privileges for green impact rewards. Some wealthier states might be initially reluctant to contribute to the cost of GIFT – but the G7 could readily proceed without them. GIFT would, as intended, reduce demand for obsolete dirty technologies throughout the GIFT Zone but would also give the firms supplying these technologies ample new opportunities to supply state-of-the-art green substitutes. We foresee no significant resistance to the GIFT proposal. It would be a gift to the world, welcomed almost universally.

Endnotes

[1] Converting 35% rather than 45% of the coal's energy content into electricity (Pearce and Prater 2020).

[2] For example, sub-Saharan Africa's electricity production will increase dramatically as its *per capita* consumption — currently about 2% of the EU level — will catch up and its population will increase from the current 1.1 billion to about 4 billion by 2100.

[3] For ongoing work on the GIFT project, see https://globaljustice.yale.edu/green-impact-fund-technology.

[4] 'Tonnes of CO2e averted' is a widely used metric that weights different greenhouse gases according to their warming potential and their persistence in the Earth's atmosphere. The 'e' stands for 'equivalent'.

[5] "Take urgent action to combat climate change and its impacts" and "strengthen the means of implementation and revitalize the global partnership for sustainable development." https://sdgs.un.org/goals.

[6] https://www.oecd.org/development/stats/the07odagnitarget-ahistory.htm.

[7] Vohra and Vodonos (2021) estimate that some 8.7 million human beings die prematurely each year because of air pollution – accounting for about 15% of all human deaths.

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About the Authors

Dina Azhgaliyeva - Asian Development Bank Institute

Dr. Dina Azhgaliyeva is a Research Fellow at the Asian Development Bank Institute (ADBI). Before joining ADBI in July 2019, she worked as a Research Fellow in the energy economics division of the Energy Studies Institute, National University of Singapore. She was also a Research Fellow at the Henley Business School, University of Reading (UK) where she worked on a project 'Kazakh-British Centre for Competitiveness'. She also worked as a leading and chief specialist for the Tax Committee at the Ministry of Finance of Kazakhstan. Her research focuses on energy policy, particularly renewable energy, energy efficiency, and energy storage. Dina has published articles on these topics in journals such as Technological Forecasting and Social Change, Australasian Journal of Environmental Management, Journal of Environmental Management, Energy Policy, and Journal of Sustainable Finance & Investment. She is currently a guest editor for the Applied Energy's special issue "Integration of Renewable Energy in Energy Systems, Perspectives on Investment, Technology, and Policy". She earned her Ph.D. and MSc in economics from the University of Essex (UK). More information is available here: https://www.adb.org/adbi/about/staff-profiles/dina-azhgaliyeva

Aidan Hollis – University of Calgary and incentives for Global Health

Aidan Hollis is Professor of Economics at the University of Calgary, Associate Professor in the Leslie Dan Faculty of Pharmacy at the University of Toronto, and President of Incentives for Global Health, a US-based NGO focused on the development of the Health Impact Fund proposal. Hollis studied at Cambridge University and the University of Toronto, where he obtained a PhD in economics. His research focuses on innovation and competition in pharmaceutical markets, and he has published over eighty peer-reviewed articles and two books in a range of fields of economics. He served on the WHO Guideline Development Group on Antimicrobial Use in Food Animals and the Expert Advisory Group for the Global Anti-Microbial Resistance R&D Hub.

Thomas Pogge – Yale University and Incentives for Global Health

Having received his PhD in philosophy from Harvard, Thomas Pogge is Leitner Professor of Philosophy and International Affairs and founding Director of the Global Justice Program at Yale. He co-founded Academics Stand Against Poverty (www.academicsstand.org), an international network aiming to enhance the impact of scholars, teachers and students on global poverty, and Incentives for Global Health (www.healthimpactfund.org), a team effort toward creating new incentives to improve access to advanced pharmaceuticals worldwide. https://campuspress.yale.edu/thomaspogge/

Yixin Yao - Asian Development Bank Institute

Dr. Yixin Yao is a Senior Research Fellow at the Asian Development Bank Institute (ADBI). She joined ADBI in September 2021. Previously she served in the Ministry of Finance of China (MOF PRC) as the director responsible for bilateral and multilateral financial cooperation between PRC and ADB, KFW, OFID, GCF, Austria, Israel etc. Before that she was Financial Partnership Specialist responsible for PRC Poverty Reduction and Regional Cooperation Fund in ADB HQ. Prior to entering ADB, she worked in MOF PRC responsible for fiscal policy research and international financial cooperation, in the Mission of PRC to European Union (EU) in Belgium responsible for public policy research, in the National General Bureau of Press and Publication of PRC responsible for copyright research and has been Senior Fulbright Visiting Scholar in the University of Minnesota, USA, and visiting scholar in the University of Hong Kong. Her research focuses on sustainable development, climate change, green finance, and intellectual property. She earned her PhD degree in Economics from Northwest University, MA and BA degree in law from Peking University, PRC. More information is available here: https://www.adb.org/adbi/about/staff-profiles/yixin-xiao .

Dil Rahut - Asian Development Bank Institute

Dil Rahut is Senior Fellow at Asian Development Bank Institute (ADBI). He was a global program manager for the International Maize and Wheat Improvement Centre's (CIMMYT) socioeconomics and sustainable intensification programs. He also served as chair of the staff's committee at CIMMYT. He previously worked for the Royal Monetary Authority of Bhutan's Research and Statistics Department. He also served as a research fellow at the WorldFish Centre; senior fellow and Japan chair at the Indian Council for Research in International Economic Relations; chief of research, planning, and monitoring and Visa/Mastercard director at the Bank of Bhutan Ltd; and assistant professor of development economics at South Asian University. He has a Ph.D. in development economics from the University of Bonn's Center for Development Research, a master's degree in economic policy management from the University of Tsukuba, an MBA specializing in finance, and a Bachelor of Science degree from India. He has over 130 publications (H Index 26) in Scopus indexed journals focusing on development issues across Asia and sub-Saharan Africa.

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