
CLIMATE AND ENVIRONMENT

Strengthened Actions towards Decarbonised and Climate Resilient Society

Satoshi Kojima (Institute for Global Environmental Strategies (IGES))
Mariko Ikeda (Institute for Global Environmental Strategies (IGES))
Naoki Matsuo (Institute for Global Environmental Strategies (IGES))
Ryu Koide (Institute for Global Environmental Strategies (IGES))
Kentaro Tamura (Institute for Global Environmental Strategies (IGES))
Bijon Kumar Mitra (Institute for Global Environmental Strategies (IGES))
Kenji Asakawa (Institute for Global Environmental Strategies (IGES))
Sunhee Suk (Institute for Global Environmental Strategies (IGES))
Lewis Akenji (Institute for Global Environmental Strategies (IGES))
Aryanie Amellina (Institute for Global Environmental Strategies (IGES))
Shelagh Whitley (Overseas Development Institute)
Joe Thwaites (World Resources Institute)
Helena Wright (E3G)
Caroline Ott (Rocky Mountain Institute)
Michael Lettenmeier (Wuppertal Institute for Climate, Environment and
Energy (WI))



March 15, 2019

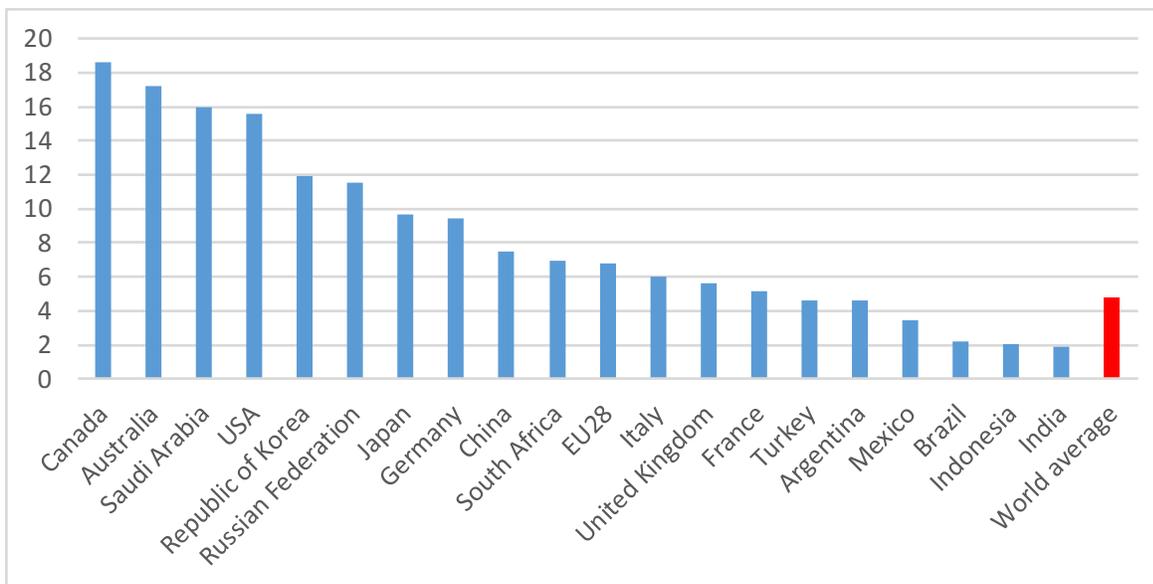
Abstract

Scientific evidence suggests that cumulative GHG emissions have already caused climate change, which tolled victims all over the world but quite often charged disproportionately high costs to poor segment of the world, and substantial mitigation actions are needed to avoid irreversible catastrophic change in ecosystems that underpin very human survival. As a group of world leading countries, G20 is expected not only to pioneer ambitious actions for transition to low-carbon or decarbonized society but also to lead international cooperation in capacity development of less-developed countries for implementing ambitious actions and in financing such actions.



Challenge

Climate change is one of the most urgent global problems as documented in a series of IPCC reports including its latest IPCC Special Report on the Impact of Global Warming of 1.5 degrees centigrade (IPCC 2014, IPCC 2018). Substantial mitigation and adaptation actions at all levels are needed to ensure survival of human society, as scientific evidence suggests that cumulative GHG emissions have already caused climate change. G20 covers both developed countries whose carbon intensity is in general high, and emerging countries whose carbon intensity is in general lower than world average (Figure 1).



Source: European Commission, Joint Research Centre (EC-JRC)/Netherlands Environmental Assessment Agency (PBL). Emissions Database for Global Atmospheric Research (EDGAR), release EDGARv4.3.2_FT2016

Figure 1 G20 countries' CO₂ emission per capita [t-CO₂/capita/year]

As a group of world leading countries across different development stages, G20 is expected to pioneer effective and feasible actions for transition to low-carbon o decarbonised society.

Carbon intensive members of G20 are expected to take initiative in devising and implementing ambitious mitigation efforts, with considering potential applicability of such efforts in other members. Many developed countries have



improved carbon efficiency in terms of GDP per tonnes of CO₂ emissions, but substantial emission reduction in absolute terms, which is required to respect the Paris Agreement, has yet materialised. In this regard this policy brief takes three issues, that is, decarbonisation of consumer lifestyles (Proposal 1), carbon pricing for facilitating and promoting the transition to low-carbon and/or carbon neutral society (Proposal 2), and finance flow aligned with the Paris Agreement (Proposal 3).

In addition, G20 is an ideal forum to seek opportunities in international cooperation in capacity development of less-developed countries for implementing ambitious actions and in financing such actions. For example, it is often said that funds, such as The Green Climate Fund (GCF) and other funds, have already been contributed and made available, but not sufficiently utilised in a prompt manner and appropriate scale. Consequently, the realisation of adaptation projects has been delayed. This policy brief discuss G20 contribution to capacity building in developing countries in the areas of development of project proposal for fund raising, for instance, from the GCF (Proposal 4), preparation of statistics for “activities” to address climate change mitigation (Proposal 5), and implementation of biennial reporting system under the Paris Agreement (Proposal 6).

Proposal

Transition and Ambitious Actions by G20 Countries

Proposal 1: G20 member countries should take a lead on enabling and facilitating the transition towards decarbonisation of consumer lifestyles through footprint assessment, strategic planning, and transition experiments.

Rationale

- Household consumption is the largest final demand sector to the greenhouse gas emissions, responsible for at least 65–70% of global emissions (Ivanova et al. 2016; Hertwich and Peters 2009). In particular, G20 countries have high carbon footprints. The average per-capita CO₂ footprints are nearly double of the global average, and total



footprints of G20 countries exceed their territorial CO₂ emissions by almost 20% (Wiebe and Yamano 2016).

- A recent publication by a research consortium including IGES suggests that the global population should aim at per-capita lifestyle carbon footprint targets of 2.5 tCO₂e by 2030 and 0.7 tCO₂e by 2050 to achieve the targets of the Paris Agreement (IGES, Aalto University, D-mat 2019). This implies that, on average, G20 citizens need to reduce their current footprints by over 70% by 2030 and 90% by 2050.¹ Even some of industrializing G20 countries will require over 60% reduction by 2050 (IGES, Aalto University, D-mat 2019).
- Decarbonisation of daily living cannot be realized solely by individual efforts of citizens. Research suggests that citizens' lifestyles are 'locked-in' by the existing infrastructure, product availability, and institutional setups (Akenji and Chen 2016). Enabling sustainable lifestyles requires ambitious and strategic actions by stakeholders, especially businesses and governments.

Suggestions on means to implement

Despite the enormous impacts of household consumption on the global greenhouse gas emissions, current policymaking efforts by the governments mostly focus on territorial-based emissions and technology-based solutions that lack perspective on lifestyles and their global footprints. Considering their extremely high footprints, G20 countries should take a lead in assessing the lifestyle carbon footprints of citizens and the mitigation potential of low-carbon lifestyles, through national footprint assessment and multi-country efforts. The lifestyle carbon footprint is an indicator of household consumption impacts to the global climate change, referring to the greenhouse gas emissions induced directly and indirectly from the final demand by the household sector (IGES, Aalto University, D-mat 2019). It is useful to understand the underlining causes of carbon intensive societies and to identify solutions to reduce global emissions. Moreover, while footprint accounting is already standardised for corporates and products, further development of guidance for accounting of

¹ In comparison with the per-capita household carbon footprints from Ivanova et al. (2016)



consumers' carbon footprints would be desired.

Citizens' lifestyles, in terms of mobility, housing, nutrition, leisure, and goods, are all relevant to climate change mitigation. Shifting consumption modes (e.g., adopting dietary habits with less meat and less dairy products; shifting to public transport and bicycles; switching to renewable electricity) and reducing physical consumption (e.g., reducing mobility distance by teleworking or living closer to workplaces; reducing excess nutritious intakes for health-nexus) are expected to have a large reduction potential (IGES, Aalto University, D-mat 2019). Currently, majority of government and awareness raising efforts predominantly focus on small actions rather than higher-impact actions (Wynes and Nicholas 2017). On one hand, there should be more efforts to incorporate ambitious actions in the awareness raising programmes. On the other hand, a systemic approach, such as through changes in policies, infrastructures, product and service options would be required to enable lifestyle changes towards decarbonisation.

G20 governments and businesses should take a lead in facilitating the low-carbon shift of citizens' lifestyles, considering their influences on the global supply chain and consumption patterns. In line with the time to prepare decarbonisation strategies, the governments should incorporate systemic changes to facilitate low-carbon lifestyles into their strategies and immediately take actions. Businesses also should start strategic planning and long-term investment for opportunities with new business models enabling citizens' low-carbon lifestyles. Without such proactive efforts by the governments and companies, citizens may not be able to spend as they are 'locked-in' by the current system of carbon-intensive production and consumption.

Transition experiments and evidence-based policymaking can support establishing a groundwork for scaling-up decarbonized lifestyles. Considering the level of required changes, such as over 70-90% reduction per capita, new ways of lifestyles and policies to enable them are necessary. Transition experiments, or "deliberate interventions that test novel configurations of social and technical elements that could lead to substantial low-carbon change" enables learning, capacity building, de-risking, and public engagement (Rosenbloom et al. 2018). Experiments on sustainable lifestyles can be a useful tool for mutual learning by consumers and other stakeholders (Laakso and



Lettenmeier 2016; Laakso 2017). Such approach can be combined with evidence-based policymaking to identify more effective solutions and gradually scale up them. G20 countries should establish model cases at the level of communities or municipalities, where citizens can spend high-quality life with reduced footprints. The diverse context of G20 countries provides great opportunities for initiating such transitions.

Proposal 2: G20 member countries should promote carbon pricing, carefully designed not to cause excessive economic shocks and negative social impacts, for facilitating and promoting the transition to decarbonised society.

Rationale

- There is a positive trend of implementing carbon pricing, in terms of carbon tax and emissions trading system (ETS), and voluntary introduction of internal carbon price by individual companies.
- Carbon pricing can send explicit price signal that rewards and encourages decisions and behaviour leading to decarbonised society.
- Potential negative economic and welfare impacts of carbon pricing can be addressed by appropriate design of carbon pricing (Klenert et al. 2018).

Suggestions on means to implement

Carbon pricing is expected to promote structural changes from the existing carbon intensive economic system to low-carbon or carbon-neutral one in an efficient manner (Baranzini et al. 2017). To fully utilise price signal effect, carbon price must be sufficiently high with clear announcement of pricing schedule with gradual escalation of carbon prices.

At the same time, transition management including job training is important to avoid negative socio-economic impacts associated with such structural changes. Preparation of available low carbon/decarbonised options are also crucial. For example, simply introducing sufficiently high carbon pricing would cause severe welfare loss for the people who heavily depend on private cars without proper alternative options, as often observed in rural areas. Carbon



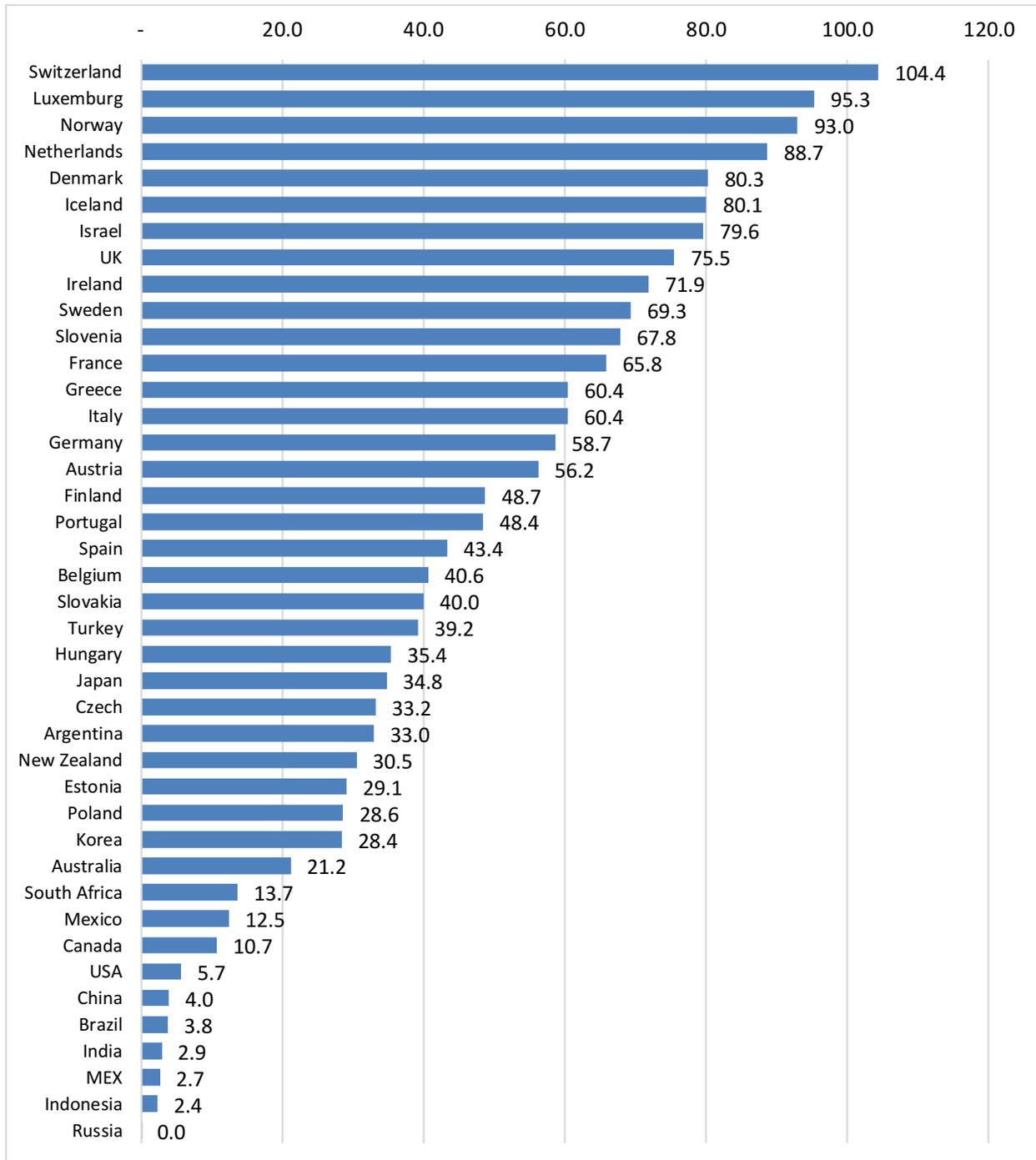
pricing must be packaged with policies affording low-carbon/decarbonised mobility options.

Not only distributional equity but also equity related to burden sharing of cost increase must be considered. For the former, revenue recycling must be designed to improve income distribution. For the latter, cost pass-through mechanism plays important role and careful examination is needed to induce appropriate mitigation efforts across different stages of product life cycle.

There is an argument that taxes on fossil fuels are regarded as a type of carbon pricing. OECD (2016) defined effective carbon rates (ECR) as the total of explicit carbon pricing and energy taxes in terms of dollar per carbon content, and estimated ECR of member countries and key partners (Figure 2).

Fuel taxes could result in more carbon intensive energy mix if the tax rates of carbon intensive fuels (e.g. coal) is set lower than those of less carbon intensive fuels (e.g. natural gas), but the implementation of sufficiently high carbon pricing would be facilitated by modifying these existing taxes into carbon tax.

A number of countries (e.g. Sweden and Switzerland) have already introduced high carbon prices without significant negative economic impacts nor significant carbon leakages (Boutabba and Lardic 2017). Still it is desirable to seek possibility of internationally coordinated carbon pricing for further improving efficiency and effectiveness of carbon pricing at the global scale. In this regard, it is also advisable that the G20 countries consider promoting internationally coordinated carbon market for example through linking regional ETS, and take supporting measures for individual companies to introduce internal carbon price.



Source: OECD. 2016. Effective Carbon Rate: Pricing CO₂ through taxes and emissions trading systems.

Figure 2 Effective Carbon Rates [EUR/t-CO₂]



Proposal 3: G20 member countries must take the lead in making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development – as part of their commitments under the Paris Agreement.

Rationale

- Parties to the UNFCCC Paris Agreement have committed to ‘making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development’ (Article 2.1c).
- Realignment of finance is a necessary condition for achieving the parallel long-term temperature and adaptation goals of the Paris Agreement.
- There is no time to delay: the recent Intergovernmental Panel on Climate Change (IPCC) report found that to keep warming to 1.5°C the world needs to reach net-zero greenhouse gas emissions within 25 years, and that this will require a ‘major reallocation of the investment portfolio’.

Suggestions on means to implement

Tackling climate change requires realignment of all finance (both public and private, domestic and international) and ensuring it is supportive of, and not undermining, the transition to a low-greenhouse gas emission, climate-resilient world.

To give a sense of the scale of investment that needs realigning, the IPCC references available statistics of the global stock of \$386 trillion of financial capital (\$100 trillion in bonds, \$60 trillion in equity and \$226 trillion of loans managed by the banking system).

Investors with \$30 trillion of assets under management have called for G20 governments to ‘lead in implementing the Paris Agreement and enacting strong climate and low carbon energy policies’, and that as a result they will ‘see significant economic benefits and attract increased investment that will create jobs in industries of the future’.



This is borne out by recent research, which finds that if climate compatible investments are made over the near-term – including an estimated \$90 trillion which is expected to be invested in infrastructure over the next 15 years – this will support economic growth, innovation, public health and employment, and avoid locking economies into high-polluting, low-productivity and deeply unequal pathways.

The success of the transition to climate compatible investment will be driven by the interplay of the financial sector and the real economy. Change must come from both public and private actors. But, given the urgency of action needed, it cannot be only voluntary and will therefore need to be triggered by policy instruments. Governments are therefore crucially important in this space, as they can deploy incentives to drive the real economy's demand for low emissions and climate-resilient finance and to increase supply of climate-compatible finance.

G20 member countries can deploy four key tools to this end: (1) financial policies and regulations; (2) fiscal policy levers; (3) public finance; and (4) information instruments. Increased public and private investment, and a shift away from high-carbon and maladaptive investment, are both an output of the application of these tools and a catalyst to further climate-compatible investment (Figure 3).

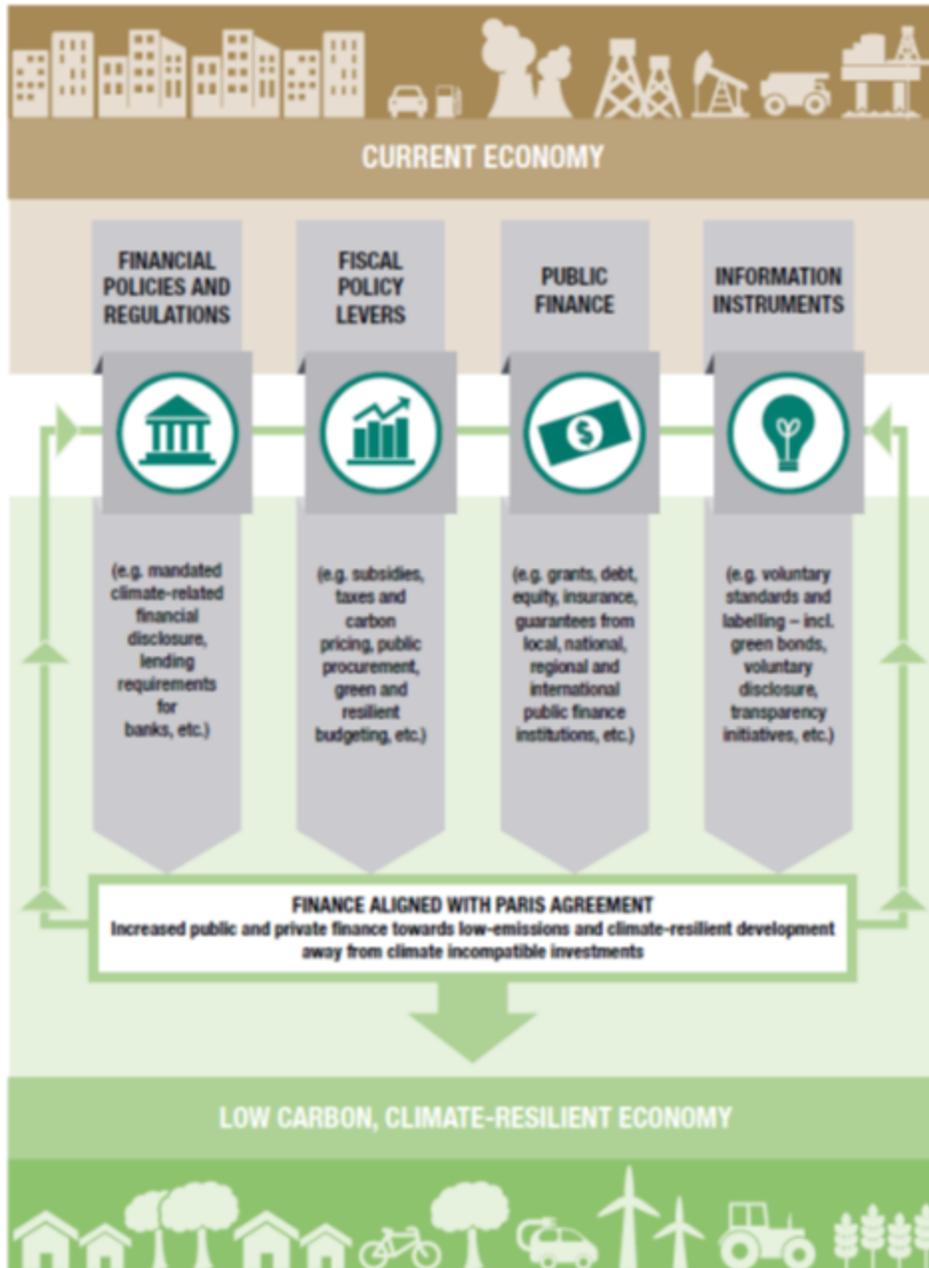


Figure 3 Effective Carbon Rates [EUR/t-CO₂]

Full Paper Source: <https://www.odi.org/publications/11253-making-finance-consistent-climate-goals-insights-operationalising-article-21c-unfccc-paris-agreement>



G20's Leadership for Capacity Building

Proposal 4: G20 member countries should support more detailed preparation of funding proposals for external climate related funds such as Green Climate Fund (GCF).

Rationale

- However many LDC countries need more adaptation finance emergently, the lack of the ability to making concrete funding proposal hindered the delay of getting approval from external funding.
- In the GCF Adaptation Rational Workshop 2018, the data shows that around 100 proposal were submitted, but only less than half of proposal were approved and endorsed.
- Other sources of external fund such as the Adaptation Fund, it is reported that some countries are struggling with the language issues to submit the new funding proposal because their official language is not English, sometimes French. In addition to technical experts, language experts should be supported for such countries.
- Strengthening the capacity building for government officials who are engaged in the fundraising section is urgently needed to negotiate and require fund pool or new investment scheme from private sectors.

Discussion/Suggestions on means to implement the proposal

It is often said that funds, such as The Green Climate Fund (GCF) and other funds, have already been contributed and made available are not sufficiently utilized in a prompt manner and appropriate scale, and that the realization of adaptation projects has been delayed. One of the main factors for this is the lack of capacity in developing countries to support the development of project proposal that can acquire funds, for instance, from the GCF. Even though many LDC countries are facing with the emergent finance needs, the proposals which were not adopted remains enough in reality. Private sectors participation for adaptation finance and investment is accelerating in recent years, disrupted and not well utilized the funding is serious problem for developing and



developed countries. G20 lead countries should support for government officials how to make the concrete and detailed funding proposal and to encourage the utilization of the pooled funds.

Proposal 5: G20 member countries should start an initiative to prepare statistics for “activities” for all country to address climate change mitigation, starting from energy.

Rationale

- Climate change issue has a cross-cutting nature over SDGs. Each GHG inventory component is calculated by $GHG = \sum_i(\text{activity data})_i \cdot (\text{emission factor})_i$ for each activity i . For the latter (emission factors), IPCC Guidelines are prepared and much efforts have been undertaken, while the former—extracted from relevant national statistics—has several difficulties in many developing countries, e.g., lack of statistical arrangement, unreliable numbers with procedures and/or limited monitored parameters.
- It is emphasized that the activity data with relevant national statistics are much more important for implementation of policies and measures. Reliable statistics is the basis for knowledge base for development.
- Since ‘energy’ dominates and determines the trend of whole GHG emissions, such efforts should be started from energy.
- Differentiated by countries, simplified/aggregated statistics for less developed countries, while detailed energy-related statistics could be initiated as piered approach.

Suggestions on means to implement

G20, together with relevant international organizations, should initiate a program to analyse and prepare such underlying statistics in all developing country.

Taking the relevance to the economic growth and importance, the targeted area should be prioritized to energy followed by agriculture.



The initiative will be implemented by the Expert Forums commissioned by G20. The Expert Forum on energy should be experts nominated by the governments, the International Energy Agency, IPCC GHG Inventory Taskforce, UNFCCC Secretariat, CGE (Consultative Group of Experts), as well as NGOs. T20 is willing to support this initiative. In addition, several developing countries' experts (on energy and on statistics) shall play the essential roles for this initiative, especially focusing on each country.

The outputs of the initiative on energy are:

- Database of status-quo of each developing country's energy statistics;
- Step-wise challenges required for each country (with cost figures and barriers); and
- Recommendations to G20 to go forward.

In the first year, the initiative could target 10 countries to accumulate experiences/lessons learned. In the following years, several dozens of countries are targeted.

Another initiative for energy on detailed information for developed countries will follow.

Proposal 6: G20 member countries should lead to utilize biennial reporting system under the Paris Agreement in order to strengthen voluntary activities by all Parties beyond transparency, and initiate institutional process to share the experiences.

Rationale

- 'Transparency' framework for biennial and mandatory reporting and review has been enhanced under the Paris agreement to track progress and put pressure for implementation and strengthening each Party's commitment (known as NDC).
- 'Reporting' is a good on-the-job exercise and opportunity for every country to understand the current status precisely and reconsider/adjust the actions as a key part of a PDCA-cycle-MRV is a



part of this cycle, for more workable and extended introduction of the policies and measures.

Suggestions on means to implement

It is preferable for all Parties to utilize this international framework in such a way domestically, especially for developing countries with less capacity.

G20 countries, with rich experience and capacity, should demonstrate how the reporting could provide net benefits for the Party, in a concrete manner, by undertaking and reporting additional useful analyses in the biennial reporting as good samples.

In addition, G20 should initiate an institutional setting, especially for developing countries, to share their experiences and lessons learned among Parties with similar situation, including by adding useful analytical expertise, linking to this biennial process.

References

- Akenji, Lewis, and Huizhen Chen. 2016. “A Framework for Sustainable Lifestyles: Determinants and Strategies.” Paris: United Nations Environment Programme.
- Boutabba, M.A. and Lardic, S. 2017. “EU Emissions Trading Scheme, competitiveness and carbon leakage: new evidence from cement and steel industries”. *Annals of Operations Research* 255: 47–61.
- Hertwich, Edgar G., and Glen P. Peters. 2009. “Carbon Footprint of Nations: A Global, Trade-Linked Analysis.” *Environmental Science and Technology* 43 (16): 6414–6420. <https://doi.org/10.1021/es803496a>.
- Institute for Global Environmental Strategies Aalto University and D-mat. 2019. “1.5-Degree Lifestyles: Targets and Options for Reducing Lifestyle Carbon Footprints.” Hayama, Japan.
- IPCC. 2018. *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.*



- IPCC, 2014. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change
- Ivanova, Diana, Konstantin Stadler, Kjartan Steen-Olsen, Richard Wood, Gibran Vita, Arnold Tukker, and Edgar G Hertwich. 2016. "Environmental Impact Assessment of Household Consumption." *J. Ind. Ecol.* 20 (3): 526–36.
- Klenert D., Mattauch L., Combet E., Edenhofer O., Hepburn C., Rafaty R., and Stern N. 2018. Making carbon pricing work for citizens. *Nature Climate Change* 8(8): 669-677.
- Laakso, Senja. 2017. "Giving up Cars – The Impact of a Mobility Experiment on Carbon Emissions and Everyday Routines." *Journal of Cleaner Production* 169 (December): 135–42. <https://doi.org/10.1016/j.jclepro.2017.03.035>.
- Laakso, Senja, and Michael Lettenmeier. 2016. "Household-Level Transition Methodology towards Sustainable Material Footprints." *Journal of Cleaner Production* 132 (September): 184–91. <https://doi.org/10.1016/J.JCLEPRO.2015.03.009>.
- OECD. 2016. *Effective Carbon Rates: Pricing CO2 through Taxes and Emissions Trading Systems*. OECD Publishing, Paris.
- Rosenbloom, Daniel, James Meadowcroft, Stephen Sheppard, Sarah Burch, and Stephen Williams. 2018. "Transition Experiments: Opening Up Low-Carbon Transition Pathways for Canada through Innovation and Learning." *Canadian Public Policy* 44 (4): 368–83. <https://doi.org/10.3138/cpp.2018-020>.
- Wiebe, Kirsten S, and Norihiko Yamano. 2016. *Estimating CO2 Emissions Embodied in Final Demand and Trade Using the OECD ICIO 2015: Methodology and Results*. OECD Science, Technology and Industry Working Papers No. 2016/05. <https://doi.org/DOI: http://dx.doi.org/10.1787/5jlrcm216xkl-en>.
- Wynes, Seth, and Kimberly A Nicholas. 2017. "The Climate Mitigation Gap : Education and Government Recommendations Miss the Most Effective Individual Actions The Climate Mitigation Gap : Education and Government Recommendations Miss the Most Effective Individual Actions."