**Keynote Address**

**F20 High Level Forum**

**Tokyo**

For those of us who for a long time were deeply concerned about the lack of international coordinated action to tackle climate change, a situation that frankly prevailed over the life span of the Kyoto Protocol, it would be tempting to look at events occurring during the last decade – since the Copenhagen Accord – at least as a story of a glass half full. Notwithstanding its limitations – like being full of nuances about flexibilities, voluntarism and non-punitive mechanisms to promote compliance– the Paris Agreement constituted a remarkable achievement of diplomatic brinksmanship, not least because unlike its Kyoto predecessor, it committed practically all countries, in principle, to contribute effectively towards climate change mitigation.

Also remarkable was that the agreement got ratified by nearly all of the subscribing countries in record time for an instrument of such high caliber. As established in the agreement, countries also submitted their nationally determined contributions (NDCs).

Very importantly, the regrettable announcement by the U.S. government that it will withdraw from the agreement in 2020 fortunately was not followed by similar decisions by other countries. That notification by the American administration in June 2017 in fact gave rise to multiple reactions by American subnational governments and private actors in favor of still realizing the pledges made by the U.S. as a whole stemming from the Paris agreement, in defiance of Mr. Trump's opprobrious decision. American states, cities, and businesses, rather than embrace their national government's disregard for the agreement, have made a point of reinforcing their actions to reduce emissions of greenhouse gases (GHG's).

Notwithstanding the global public good nature of climate change mitigation --since the atmosphere has no borders and abatement once achieved is non-rival and non-excludable,

many American actors are trying their best, within their limited jurisdiction, to honor their country's responsibility to be compliant with the previously submitted 2025 targets. Indeed, some members of this F20 have been promoters of the more than welcome response of numerous US entities to the Trump administration's repudiation of the U.S. international obligations on climate change policy.

Propitiously, many other States and actors across the world continue their engagement to deliver on their commitments. Despite its imperfections, the Paris agreement has played a catalytic role on trends, either policy-caused or purely market-induced, that had been present for some time and that are proving unquestionably that mitigation is technologically and economically possible.

The best news is on the renewable energy front where fast progress is patently taking place. Falling costs propelled by technological change along with more intense competition in expanding markets that are attracting unprecedented investments (280 US billion dollars in 2017 alone), are making renewables by far the main source of growth in global power capacity.

Largely thanks to the increasing competitiveness of solar PV and wind power, renewables are now providing more than two thirds of the net growth of power capacity in the world. Remarkably, solar PV is contributing almost forty percent of this growth in power capacity, a share that surpasses that of fossil fuels and nuclear together, while wind already provides one fifth of it. Renewable energy sourcing by companies and homes as well as stand-alone and off-grid or mini grid systems are also beginning to add meaningfully to installed power capacity. Energy produced in solar thermal heating systems is also starting to count among the power capacity statistics.

It is especially noteworthy that investment in renewables has become larger in emerging and developing countries than in developed countries. As in other aspects of global growth, China´s contribution is outstanding –45 percent of the world's total investment in renewables.

While a virtuous cycle between technological change and economic incentives has played a key role in the ongoing energy transformation, this would hardly be taking place without the evolution in public policies undergone over recent years. Policies in many countries are incorporating targets on key variables such as net-zero emissions, renewable power capacity – economy wide or sector specific, as well as reducing fossil fuel subsidies, trying some modalities of carbon taxes and emissions trading schemes, and enacting smarter regulations conducive to faster adoption of new technologies for attaining reduced emissions of GHG.

As encouraging as these and other news should be, the big question remains: Is the world on track to attain the reduction in emissions needed to abate sufficiently the likelihood of a climate disaster? Unfortunately, the answer must be a resounding no. The impact of national policies along with that of the initiatives of individual non-state and subnational actors is still extremely limited relative to the extent of the challenge.

The latest reports by UNEP and the IPCC and -along with many others also backed by serious scientific work- have delivered the bad news hands down.

For starters, UNEP informs us, loud and clear, that the current NDCs (even assuming they are delivered) are unequivocally insufficient to put the world on a path to keep warming below the 2°C, and consequently below 1.5 °C, limit that has been argued as a considerably safer scenario by the IPCC. We are told by UNEP that *pathways reflecting current NDCs imply global warming of about 3 ℃ by 2100, with warming continuing afterwards*.

Furthermore, the current scenarios imply that global emissions would not peak any time soon -- not even by 2030. In fact, after a few years of stabilization, emissions increased again in 2017 and 2018. The International Energy Agency reports that, driven by strong energy consumption, energy related CO2 emissions rose to a historic high in 2018.

Dauntingly, the majority of the G20 countries are not even on track to deliver their NDCs for 2030, nor would their emissions peak collectively by the same year. To place the world on a pathway consistent with the 1.5°C ideal warming limit, global emissions should not exceed 24 GTCO2e in 2030. Shockingly, the current policy scenario would result in emissions of almost 60 GTCO2e in that year, implying an enormous gap. Even full compliance with the conditional NDC scenario would leave a gap of 29 GTCO2e. This substantial gap reveals the unfortunate reality that the current NDCs are highly heterogeneous in their ambition and stringency across countries and undoubtedly insufficient.

The bottom line stemming from the best evidence and scientific analysis is that, notwithstanding the laudable progress of recent years --particularly in renewable energy, the world is significantly off-track to prevent a major climate disaster. The impact of the ongoing policy, economic and technological shifts on the pattern of production and consumption, globally and across countries, is clearly insufficient to keep the earth's average temperature within a safe range.

Why is this the case? Well, simply said because it is hard to do it. Reducing emissions is about fixing what we economists call an externality, a situation in which if market forces are left to play out on their own, there will be a tendency for individuals to produce something that socially will be bad but is not necessarily perceived as such by each individual. The standard remedy for fixing externalities is to charge individuals sufficiently to induce a change in behavior to the point that the bad is not produced, at least not beyond the socially tolerable limits. The charge cannot be voluntary because individuals would be tempted to free ride on that of others.

The challenge for correcting the externality of excessive GHG emissions is even more complicated than other cases of adverse externalities because with no borders (or walls if you wish) in the atmosphere, the externality is not just a local or national problem; it is a global one. Even worse, it is not only a transboundary externality but an intergenerational one as well.

Emitters of GHG impose a cost, beyond their own burden, not just on other national and foreign individuals living today but also on those who will live in the future. Hence the indispensability of tackling the problem through international collective action that considers the well-being of all people in all countries now and in the future. This characteristic of the global public good of climate change mitigation is what makes it one of the hardest, if not the hardest, to be provided.

My boring reiteration to you of the basic economics of climate change is to stress the point that fixing the problem is about applying a rather old insight from my discipline: to fix pollution, it is indispensable to make polluters pay for their pollution. A corollary of this principle is that you should never subsidize polluters for polluting. We fail terribly on both accounts so it is not surprising that we are extravagantly off-track to prevent a climate calamity.

The extent to which governments provide subsidies that ultimately cause emissions leading to climate change can be illustrated by the enormous magnitude of energy subsidies dispensed by governments all over the world.

It should be obvious why energy subsidies end up having perverse consequences. They certainly drive increasing concentrations of CO2 in the atmosphere and cause other environmental damages. They discourage investments in renewables, in particular; and in energy efficiency, in general. They have a large fiscal cost, diverting resources that could be used to achieve a high positive social and economic impact. They are also highly regressive since typically they benefit the richer rather than the poorer individuals.

Notwithstanding these significant drawbacks, it has been estimated –for 2015—that energy subsidies reached 6.5 percent of global GDP, about 5.3 trillion US dollars. Admittedly this calculation, by IMF experts, is in reference to a more comprehensive definition of subsidy, but it is the one I prefer since it incorporates not only the difference between the price of energy paid

by consumers and the cost of supplying it, but also the cost of the environmental damage caused by that consumption.

The insufficiency of current policies can also be highlighted by looking at the net result of all existing economic interventions that ultimately render a price on carbon emissions and comparing it with the price that would be needed to put the world on the right trajectory of climate change mitigation. At present, the current global average CO2 price is just 2 US dollars per metric ton, which is merely a fraction of the price of between 40 and 80 dollars per ton that already would be needed, and then would rise predictably over time, in order to induce the shifts in patterns of production and consumption consistent with the optimal emissions and mitigation trajectory.

The huge differential between the current and the required price on carbon is distressing. Pricing carbon comprehensively to reflect its true social cost is what is required to accelerate, even more, technological change away from hydrocarbons while incentivizing energy conservation where it is now wasted. Furthermore, the revenues from pricing carbon properly could be used to foster employment, productivity and growth in economies across the world.

It was an important achievement of the Paris Agreement to give up the explicit global cap and trade approach instilled in the Kyoto Protocol and thus make room for alternative ways to pursue the necessary emissions trajectories. A climate mitigation agreement based on emission quotas was bound to yield not only a sub-optimal emission trajectory, but also a situation in which the coalition sustaining that agreement would tend to be unstable and prone to collapse –precisely as happened with the Kyoto Protocol.

We must be mindful, however, that the spirit of the Kyoto cap and trade was preserved implicitly in the Paris Agreement with elements such as the NDCs and the ITMOs (Internationally Transferred Mitigation Outcomes). We should be afraid that the NDCs progress

reports due in 2020 will confirm that pledges made by countries are not only insufficient but also fall short, in most cases, of full compliance. That inauspicious confirmation should encourage subscribers of the UNFCCC that the regime agreed at Paris must be significantly enhanced with the objective to adopt a harmonized carbon price trajectory --by all parties of the Convention although not each reaching that trajectory simultaneously, in consistency with the right principle of common but differentiated responsibility.

This proposition has solid intellectual underpinnings, not least in the work of one of the latest awardees of the Nobel Prize in economics, Professor William Nordhaus of Yale University, my own university.

Nordhaus has submitted for a long time (and he is now joined by many others, including some who used to be firmly in the global-cap-and-trade camp) that the way to have a better chance of achieving a "good" international regime, meaning one that could deliver in a sustained fashion the necessary global emissions trajectory, would be to have one in which the negotiating parties have the price of carbon emissions as the sole "focal point".

This proposition has been further elaborated by Nordhaus –inspired by Buchanan's Theory of Clubs- arguing that what is really needed is a coalition of countries coming together to negotiate the required carbon price. This coalition would be considerably smaller than the so-called universal participation of the Framework Convention or the Paris Agreement. Based on theoretical arguments and numerical simulations of his model, Nordhaus believes that a coalition coming together out of self-interest (and perhaps a modicum of internationalist enlightenment) would be robust enough to derive into a good regime.

I adhere to the Nordhaus persuasion and truly believe that we must start thinking about a Paris Agreement permutation that would commit the key players to a harmonized-carbon-pricing regime. A set of countries that would seem fit to form the initial carbon club would be those that are large emitters, their NDCs are consistent with a substantial domestic carbon price, and/or the domestic externality is not hugely different from the global externality caused by their respective emissions.

Ladies and gentlemen:

Members of the Elders --the group on whose behalf I joined you today-- have been involved in a truly exemplary way in the cause of promoting a healthy planet for us and our descendants. There is of course Gro Harlem Brundtland, considered the "mother" of the concept of sustainable development that was put forward in the *Our Common Future* report back in 1987 by a commission chaired by her when she was Prime Minister of Norway. Gro has sustained her advocacy for a healthy environment ever since, not least in her role as UN Special Envoy for Climate Change, a responsibility also held by another Elder, former President of Chile Ricardo Lagos, who attended this meeting last year.

Our Chair, Mary Robinson, is also the "mother" of another concept at the heart of the concerns we all share, the notion of Climate Justice, which Mary first articulated and has disseminated, and inspired others to adopt thanks to her characteristic lucidity and passion. And the Elders' Vice-chair, Ban Ki-Moon, exercised his leadership as UNSG to motivate the international community both to adopt the SDGs and achieve the Paris Agreement. The towering luminary, Kofi Annan, the Elders' chair until his passing away last August, was also—both during and after his tenure as UNSG-- a relentless champion of sustainable development.

I feel privileged for having the inspiration of my fellow Elders, along with the rigorous intellectual influence of mentors like Professor Nordhaus, when I think that notwithstanding how enormously threatening and complex it proves to be, climate change is a challenge that can be overcome through international cooperation based on enlightened self-interest.

Of course, Kofi Annan was right when he said: *Given the compelling weight of evidence, it can be hard to understand why anyone is still dragging his or her feet on the coordinated action*

*needed to reduce greenhouse gas emissions. Every year the world fails to act brings us closer to the tipping point when scientists fear that climate change may become irreversible. This is a terrible gamble with the future of the planet and with life itself… as my fellow Elders and I have repeatedly stressed, a tax on carbon emissions can make an important contribution to the fight against global warming*.

Kofi was echoing what Gro had submitted a bit earlier*: We know what needs to be done: carbon dioxide emissions must be taxed and reduced. Fossil-fuel industries must have their subsidies cut off. And financial support must be delivered to the least-developed countries that are most vulnerable to the effects of climate change, despite having contributed almost nothing to the problem*.

It is not idle to insist with the same sense of urgency that Ban Ki-Moon expresses in effectively concrete terms: *time is running out. The more we delay, the more we will pay*!

But the transition to a cleaner, healthier world must be achieved in the way that Mary Robinson tirelessly demands: *with a human centered approach, equitably and fairly, safeguarding the rights of the most vulnerable people*.

I know that the organizations and people who constitute the F20, are working hard for that crucial transition. Please be assured that in that indispensable endeavor of yours, the Elders are unwavering allies.

Thank you very much

Ernesto Zedillo

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