Cancun: muddling or policy reversal

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Abstract: The Copenhagen Accord made a seizure in the unwieldy UNFCCC crawling. However, the Accord's *urgent combat* against climate change and *deep cuts in emissions* ask for a real policy reversal, ending the zero sum games on pledged caps, creating clarity on immediate marching directions and eliciting worldwide action by today's operational institutions at all levels. Surprisingly all components of an effective mitigation policy architecture are available. First the global 2°C ceiling needs translation in by country future paths of CO_2 emissions per person, being the product of three drivers: wealth, energy and carbon intensities, observed annually for most countries in the world. Parties commit to yearly improvements on the drivers. Transfers from rich to poor countries depend on ability to pay and spend, and on countries' mitigation progress. The hands-on approach dissolves barriers like outdated emissions baselines, illusory global instruments, blocked graduation of Parties, unclear transfer mechanisms, neglect of basic principles like universality, sovereignty, transparency, realism, diversity, and equity. The new architecture stimulates climate policy emulation among Parties.

Keywords: UNFCCC climate policy, Copenhagen Accord, contraction & convergence, tax or budget reform, performance indicators, transfer funding, graduation

1. Introduction

Slow progress in international climate policy is due partly to the huge stakes involved, partly to the stupefying complication of the Conference of Parties (COP) processes. On stakes and related distributional aspects it are representatives of constituencies that negotiate. But processes should be designed and run to facilitate negotiations. COP processes today seem to do the opposite with apparent bottlenecks at emissions targets, Kyoto instruments and their institutions, and distributional mechanisms.
First, pledged emissions caps by (Annex I) countries correspond with distant, moving, and fuzzy targets [1]. They dilute the state of urgency, allow deferment in real actions on the ground, and cover up defecting policies. Cap negotiations among Parties are played as zero sum games, seeding distrust and causing stalemates [2].
Second, new global instruments have been imagined like global emissions trading [3] or the universal carbon tax [4-5]. These scythes were assumed to efficiently shave emissions around the globe, forgetting however what giant institute would be necessary to forge and handle the scythe. Several new institutions have been created without expedient audits of operational institutions with trained and experienced staff, knowledge and know-how, data and memory, etc. Even with giants available, uniform scything is little effective, inefficient and unfair because emissions are resulting from trillions of decisions made by billions of people [5], representing the high diversity and complexity of human communities on earth. Instruments creating the necessary additional climate pricing pressures must take into account the pressures already in place and the different areas the forces are working on, considering also unequal

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carrying capacity of people [6]. Third, distributional issues stay central in the appropriation of commons. The CDM is not an effective and efficient vehicle for augmenting fairness in climate relations between rich and poor nations. Neither are ad-hoc pledged funds where results systematically fall short of announcements. Preserving the climate commons implies that all countries must own low-carbon energy economies by 2050, creating a framework for universal mitigation efforts. Transfers of finances, technologies, and institutional capabilities from rich to poor nations are necessary, and should be adequate, predictable, sustainable, and performance steered. Classification of donors and recipients, and graduation of countries in this ranking must be obvious.

The process and outcomes of the 2009 COP15 in Copenhagen are evaluated differently by the variety of participants and observers. Measured by process efficacy and efficiency COP15 is a failure: the set objectives (and implicit higher hopes fostered by most attendants in and around the meeting rooms) are not realized, with disproportional resources spent on the event (some call "non-event" [7]). Some scholars have been critical for the Kyoto approach since longer [8-9] and may find their analysis confirmed by the facts. Proponents of the Kyoto-Bali-Copenhagen (KBC) route were very disappointed by the COP15 outcome but seem to lack alternatives: preparatory meetings (Bonn, August 2010; Tianjin, October 2010) for Cancun prolong the usual approach.
However, the Copenhagen Accord made a seizure, of depth and length to be assessed. This article contributes to this assessment with five items: 1) review of the Accord; 2) salient conditions that the Accord's urgent combat and deep cuts impose on policy creatures; 3) Kyoto pledged caps or targets are less useful than mostly believed, and the better alternative is immediate stepwise progress on four today known and observed intensity indicators; 4) decomposition of the indicators to see what's in for change; 5) a brief word on transfers and related issues like graduation of Parties on the donor-beneficiary scale and performance adjusted transfers.

The feasibility of the proposed policy reversal results from respecting actual diversity, from using available and proven institutions, from steady progress on transparent and available indicators, from light, but comprehensive and consistent, enforceable coordination and supervision at the UN (COP) level, from respecting rights to development [10]. The hands-on approach dissolves many barriers created by the unwieldy processes since Kyoto.

2. Highlights of the Copenhagen Accord [11]
The Accord covers two main issues: (1) goals and targets, and (2) means, what implies the sidelining of other components of the policy process (for example: instruments like emissions trading, of high interest since the 1997-COP in Kyoto). The main result of the Accord is the confirmation of climate policy *goals* with as eye catcher the 2 degrees Celsius ceiling on global temperature increase (art.1). This is further strengthened by art.12 announcing consideration in 2015 of a 1.5 degrees Celsius ceiling. The "will to *urgently combat* climate change" (art.1) is confirmed by "an assessment of this Accord to be completed by 2015" (art.12). The latter halves the horizon of reconsideration compared to the KBC route with 2020 as next signpost. It is agreed "that *deep cuts* in global emissions are required" (art.2), for developing countries "a low-emission development strategy is indispensable" (art.2) and "low emitting economies should be provided incentives to continue to develop on a low

emission pathway" (art.7). Next to mitigation is stressed "the need to establish a comprehensive adaptation programme" (art.1). Art.6 exclusively addresses deforestation and forest degradation and the role of forests.
For meeting the goals the Accord follows two main ways: (a) emissions (reduction) *targets* and *actions*, and (b) cooperation, transfers and support. Similar to the KBC approach, pledged emissions reduction targets are adopted as proofs of advancement. By 31 January 2010 Annex I Parties submit their "quantified economy-wide emissions *targets* for 2020" and mention also the base year (art.4 and Appendix I). Non-Annex I Parties will implement mitigation *actions* (art.5 and Appendix II) with extensive attention for the measuring, reporting, and verification aspects of such actions (art.5). The Accord emphasizes cooperation on adaptation and mitigation: "developed countries shall provide adequate, predictable and sustainable financial resources, technology and capacity-building" (art.3), reiterated in art.8 as "scaled-up, new and additional, predictable and adequate funding" where also the USD 30 billion for the period 2010-2012 and the "goal of mobilizing jointly USD 100 billion dollars a year by 2020" are mentioned. "A High Level Panel" for financial supervision is announced in art.9, "the Copenhagen Green Climate Fund" in art.10, and "a Technology Mechanism" in art.11.

The brief coverage by articles 9, 10 and 11 reveals that the institutional framework is not thought through nor developed. The same holds for the policy instruments that could or should be applied to convert means into results. Scant reference is made to joint implementation (art.4), REDD (art.6 and 8), markets (art.7), offsets (art.10). The lack of clarity on institutions and instruments confirms the intentional character of the Accord, but conveys also an implicit rejection of top-down uniform KBC policies (for example the global carbon market). The Copenhagen Accord has pricked the unwieldy crawl of the UNFCCC Conferences and closed the wharfs of global instruments; it engaged major non-Annex I countries in preparedness to take mitigation actions, but maintained cap pledging by Annex I Parties and new institutions were announced again. The Accord provides openness and room to reconsider the KBC approach and instruments, and to investigate what else could bring more immediate progress and long-term success in climate policy. As such the Accord may be the best occurrence for climate policy since the UNFCCC (1992).

3. Urgent combat and deep cuts impose conditions on policy designs
The Accord emphasizes the urgency of a climate policy that realizes deep cuts in the emissions. The Stern review [12] argued along the same lines, and derived the necessity of pricing carbon emissions, technological innovation, removal of barriers to behavioral change, international collective action and cooperation between developed and developing countries. Yet, the steps from willing to doing seem difficult to take. In exploring ways forward, some conditions are salient, but the five highlighted here are only a small selection from many considerations discussed in the literature [13-14].
First, when urgency is important, time is lacking for extensive new institutional and capacity building experiments. Effective urgency is but deliverable by performing organizations, trained people, proven data collection and processing systems, established monitoring, reporting and verification mechanisms. At the global level World Bank and IMF govern economic and financial issues, IEA (and similar institutes like OLADE [15]) provides energy balances, UNDP knows best to care for development problems, etc. Also at regional, country, state, provincial and municipal

levels, existing policy processes, legislation, administrations, instruments, etc. are starting points for urgent advancement in climate policies [16]. Adopting performance indicators that are available or derivable from already measured and processed statistics is a win-win option.

Second, managing and sharing the atmosphere and climate as global commons demands for a complexity of nested approaches and polycentric governance systems [17-18]. The Copenhagen Accord opens that road by sidelining the top-down directed instruments. Effectiveness, efficiency and equity criteria are not respected by imposing uniform rules on a tremendous diverse reality [14]. On the contrary: matching a uniform fiction with diverse realities necessitates never-ending ad-hoc adjustments, mostly through opaque "comitology" processes [19]. This destroys trust and goodwill needed in lubricating workable instruments for managing and sharing the commons. Diversity in climate policy leaves responsibilities and power with the Parties of the UNFCCC. The urgently needed post-Kyoto international agreement should respect and build upon the efforts already undertaken by national and local authorities and by their constituencies, households and companies. Then a light overarching construction, the simplest solution that still solves the problem, suffices.

Third, and related to the previous condition, what is internationally discussed and agreed should be transparent, verifiable, and acceptable by the majority of sovereign nations and their peoples. The UNFCCC (1992) and Copenhagen Accord (2009) are appealing in providing oversight, different from the unwieldy KBC processes with very complex arrangements. A workable agreement uses a limited number of indicators that are precise and robust, transparent and verifiable. Monitoring, reporting and verification of actions and programs are cumbersome and seldom satisfactory (see CDM as latest experience). Better is to measure performance by few quantitative indicators available at a regular (annual or shorter) frequency and applicable on all Parties.

Fourth, addressing the right price signals to the many diverse emissions sources requires they are ordered in rather homogenous groups. Finding the right degree of diversity is a difficult balancing exercise. Already Aristotle stated: "treat equal cases equally, unequal cases unequally". Economists argue that diversity has a cost, for example loss of economies of scale [20]. Institutional economics [18] and evolutionary economics [21] assign an indispensable role to diversity. For climate policy, the main split is between categories of globally registered, enumerable large sources on the one hand and all other numerous small sources on the other hand. Registered categories are for example steel making, aluminum, cement, basic chemical processes, power generation, ocean-borne shipping, aviation (all above given scale thresholds). A global approach by registered category is recommended to avoid discrimination among the members. Redirecting the price signals for the all other (small scale) sources is the result of steadily advancing reforms of subsidies and levies applied autonomously by the COP countries and by their subsidiary authorities.

Fifth, transfers and support from developed to developing countries, from rich to poor people, the Accord states should be "adequate, predictable and sustainable" (art.3), "scaled up, new and additional" (art.8). The Accord plans "mobilizing jointly" billions of USD. The pledges for more transfers and support are crucial to respect the basic principle of common but differentiated responsibilities and respective capabilities. But money transfers are always hard to materialize and to manage. By preference the contributions by donors and the receipts of beneficiaries are both

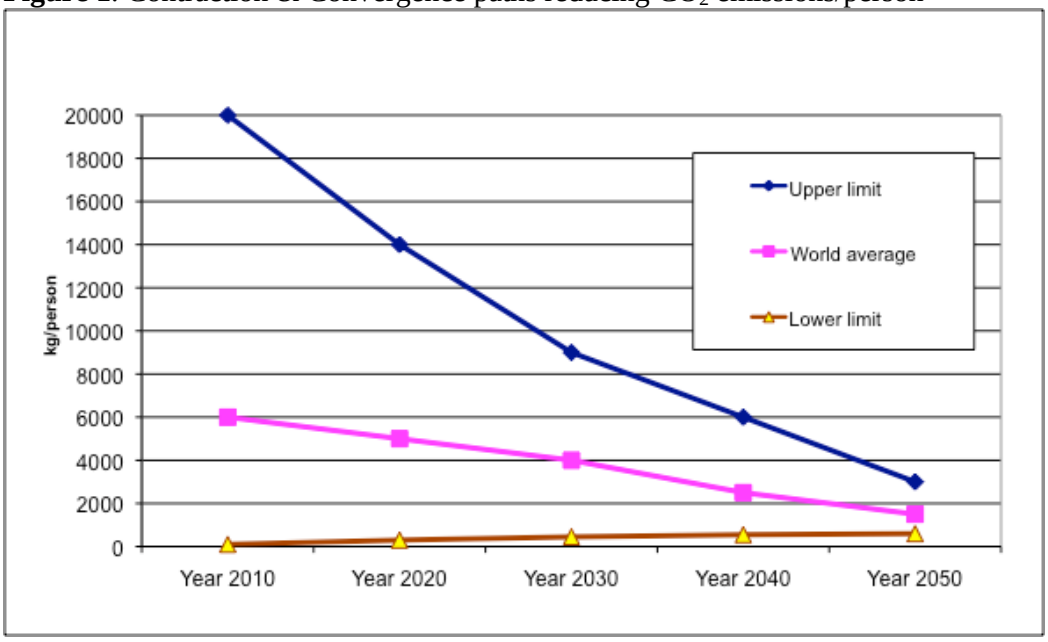
linked to their respective performance on adequate, predictable and verifiable indicators, reflecting progress linked to efficient spending. In addition the status and degree of donor and beneficiary should depend on clear metrics (like GDP/person), with yearly graduation of countries according their economic successes [22].

4. Emissions caps versus progress indicators

Emissions caps own a few positive, but many more negative, properties as the totem of mitigation policies. Caps like the Copenhagen Accord's global 2°C increase ceiling imply a wake-up call for rallying stakeholders. The real job starts when this overall long-term goal must be specified in work packages by country. For reasons of clarity and mutual understanding the global 2°C ceiling is best translated in individual Parties' annual emissions per person "contraction and convergence" trajectories from 2010 to 2050 (figure 1). The London based Global Commons Institute has propagated the contraction and convergence idea since the 1990s. When not fixated at a globally uniform emissions budget per person, the concept stays central in discussing long-term responsibilities [23]. Some rich countries are emitting more than 20,000 kg CO_2/person annually, with several poor countries below 100 kg CO_2/person [24]. The world's major economies will wrangle in outlining trajectories within the bands necessary to respect the 2°C increase limit.

During the starting years of the agreement it is not important to reach full consensus on precise long-term (2030-2050) goals; orders of magnitude suffice [13]. More important is to clearly fix and agree on immediate *marching directions* for the coming years (in figure 1: the gradients starting at the left side entrance of the funnel).

Figure 1. Contraction & Convergence paths reducing CO_2 emissions/person



Caps by tons of emissions in some future years are difficult to understand and not precisely identified [1]. Dividing a global cap in packages for assignment to responsible parties is troubled by uncertainties, growing exponentially with the number and diversity of parties involved. Parties readily slip into zero-sum games on sharing the cap, raising distrust and the demand for intense monitoring, reporting and

verification of programs, actions and measures. Yet, target enforcement is not guaranteed, neither is the additional character of emissions reductions [25]; volatility in economic up- or downturns and offset projects continuously trouble the picture.

Focus on the present state and on documented drivers of the emissions should substitute for continued trials to fix countries emissions caps in distant future years. Two main groups of drivers are: fossil energy use and land use (the latter mostly expanded to LULUCF: land use, land use changes and forestry). Fossil energy use causes more than two-thirds of the emissions, is narrowly related to today's development and wealth, and has received most attention in climate policy analysis. Emissions of energy use are decomposed into a few drivers [26-28]:

$$CO_2 \text{ emissions} = \text{Number of People} \times \frac{\$ \text{ GDP}}{\text{Person}} \times \frac{\text{kWh energy}}{\$ \text{ GDP}} \times \frac{CO_2 \text{ emissions}}{\text{kWh energy}} \quad (1)$$

Formula (1) highlights that emissions are partly determined by population size and by the average level of wealth in a country. Both factors are linked to the sovereignty of nations, and efforts by third parties to influence them are contentious. This makes negotiating significant emission reduction targets tedious among industrial nations and almost unfeasible for industrializing nations [29]. In addition, GDP can be volatile, especially in many developing countries. This erodes the meaning and predictability of emission reduction targets, particularly over the longer run [30].

A reduced form of equation (1) provides average emissions per person:

$$\frac{CO_2 \text{ emissions}}{\text{Person}} = \frac{\$ \text{ GDP}}{\text{Person}} \times \frac{\text{kWh energy}}{\$ \text{ GDP}} \times \frac{CO_2 \text{ emissions}}{\text{kWh energy}} \quad (2)$$

The drivers in (2) are respectively: wealth intensity, energy intensity of wealth, and CO_2 intensity of energy use. Figure 1 shows the left hand side (dependent) variables as contraction and convergence patterns. Total emissions are checked when population growth is controlled [31], and when the product of the associated drivers (right side variables) is reduced. Intensity targets receive criticism because they do not guarantee absolute emissions reductions. This critique is not valid when various intensities are managed in context and monitored for irrevocable and deep decline (80-95% emissions reductions by 2050). The multiplication at the right side of equation (2) equals zero when one of its factors is zero; it becomes small when one of the factors is very small (assuming the others do not increase in a commensurate pace). A way to achieve this is the widespread adoption of low-carbon energy technologies. Most impact is expected from renewable energy technologies [32] that, however, will not simply appear across the globe. To make and keep the full transition to renewable energy globally affordable, significantly decreasing commercial energy intensities of economies are a prerequisite. This in turn will require economic reforms, such as taxes and subsidies to increase costs for CO_2-intensive activities and reward low-CO_2 activities [33].
Table 1 dissects the definition of Kyoto emissions targets in the first column, explains the weaknesses in the second column and offers a workable alternative in the third column. Baseline issues are millstones round the neck of the present Kyoto treaty and targets; suggestions like the use of action targets provide better but not satisfying alternatives [34-35].

Table 1: Kyoto emissions reduction targets:
Definition, Weaknesses and Workable Alternative.

Definition	**Weaknesses**	**Workable Alternative**
Pledged targets for (caps on) GHG emissions reductions	GHG emissions cover too much at once: population, wealth, energy intensity, and carbon intensity.	Address drivers one by one, for lowering energy and carbon intensities.
numbered tons or percentage reductions	Actual meaning of numbers is opaque and shifts with population, economic and technology dynamics, offsets allowed	Obligations for step-wise reducing a country's energy and carbon intensities are defined unambiguously
by some distant future year (e.g. 2020, 2030, 2050)	Delivery beyond 5-8 years (one or two presidential terms) lacks urgency and erodes responsibility	Immediate steps in the right direction, with yearly evaluating progress and adjusting step-width
from baseline 1990	Link with reality is further diluting with every year passing. However, updating baselines entails perverse effects, and would create an additional stalemate	Intensity baselines are two year back, and move up every year; energy intensity must ever fall and carbon intensity must decline to almost zero
for Annex-I countries	Annex I / II classification is too rudimentary, linked to historical emissions	Countries are ranked only by $GDP/capita, and yearly graduate on that scale

5. Decomposition of the drivers of energy related emissions

For their better understanding the content of the three intensity drivers [36], they are decomposed one level down.

5.1. Wealth Intensity

Total wealth in a country is mostly measured by its Gross Domestic Product (GDP), being the aggregate of particular quantities of activities A (goods & services) times their prices P_A, or [37]:

$$\text{Wealth Intensity} = \frac{\$\ \text{GDP}}{\text{Person}} = \sum_A \frac{P_A \text{ x Activity}_A}{\text{Person}} \qquad (3)$$

GDP is subject to criticism for not including all the right activities, for not excluding detrimental activities, and for applying biased prices. GDP and wealth vary with the structure of the economy (what activities happen) and with applied prices, both components being interrelated by the "Law of demand": when the price of an activity is low, more of it will be demanded; and vice versa with high prices. The composition of wealth depends on historic, geographic, cultural, demographic, economic, technological, etc. factors. Public policy has a high impact on the composition of GDP, e.g. by subsidizing some and levying other activities. "Re-pricing GDP" or budget reform is a workable policy to shift interest of households and companies from carbon-intensive towards low-carbon activities [38]. Influencing prices by subsidies and levies is a core task of public authorities at all levels, and documented by IMF,

OECD, EU, national banks, etc. They record subsidies and levies by category. For example EUROSTAT publishes the shares of environmental taxing in the GDP of EU member states [39]. By labeling subsidies and levies on carbon-intensive and on low-carbon activities, one obtains four shares of the GDP that can be assembled to an indicator of "climate budget reform". For example, the share of climate tax revenues in total tax revenues could be a good starting indicator. Year after year progress on this indicator can be measured. It is a necessary and sufficient indicator of a country's progress in creating price pressures towards a low-carbon economy. The diversity of activities and of policies by country can be respected, with the aggregate indicator of budget reform monitored at the international level.
This indicator is a good substitute for the futile trials (and errors) to install globally uniform pricing instruments like emissions trading or a universal carbon tax rate.

5.2. Energy Intensity
Energy intensity of wealth is the product of the budget shares of activities in the GDP with the energy use for realizing the activity. The second factor of the product includes the technical efficiency (how much energy is used in performing an activity).

$$\text{Energy Intensity} = \frac{\text{kWh energy}}{\$\ \text{GDP}} = \sum_A \frac{P_A \text{ x Activity}_A}{\$\ \text{GDP}} \text{ x } \frac{\text{kWh energy}}{P_A \text{ x Activity}_A} \qquad (4)$$

Energy Intensity is lowered by shifts in activities towards alternatives asking less energy supplies and by improving the technical energy efficiency of activities. Efficiencies as such are difficult to accurately define and measure in practice [40-41]. Improving efficiencies is technology driven. Inducing disruptive innovations in efficiency technologies is a mainly price driven process [42]. Reduction of energy intensities is crucial for the affordability of the global transition to energy economies where the full cost is borne by end-users, as would be the case when the full transition to a renewable energy economy is made.

5.3. Carbon Intensity
Carbon dioxide intensity of energy use can be decomposed as:

$$CO_2 \text{ Intensity} = \frac{CO_2 \text{ emissions}}{\text{kWh energy}} = \sum_E \frac{\text{kWh type}_E}{\text{kWh energy}} \text{ x } \frac{CO_2 \text{ emissions}}{\text{kWh type}_E} \qquad (5)$$

This intensity is the sum of several products of two factors: the share of particular energy uses in the commercial energy mix with their CO_2 emission intensity. Implementing available renewable energy technologies and developing more performing and efficient technologies to harness renewable resources are the main way to sustainable, low-carbon energy economies [32]. As long as that future is distant CO_2 intensity has to be abated.

6. Transfers for climate change mitigation
A global climate agreement on mitigation is not functional when industrialized nations foot drag in transferring technologies and finances to developing nations. The Global Environmental Facility, the Clean Development Mechanism, the System for Transparent Allocation of Resources, the Copenhagen Green Climate Fund, etc. are transfer mechanisms set up. Their coverage and performance are mostly far below announced levels [43-44]. Ad-hoc repairs (see the frequent CDM rule changes in

2010) are permanently under way showcasing the deficiency of the mechanisms. Duties of donors and rights of beneficiaries remain unclear, making actual transfers vulnerable for circumstantial changes.
Improvement in climate mitigation transfers is due on mainly two points: delineation of donors and beneficiaries, and quantification of duties and rights including indicators of mitigation performance by donating and by receiving parties. Delineation of donors and beneficiaries is feasible by yearly graduation of all countries on the GDP/person metrics, eventually with the adoption of graduation classes [45]. Mitigation performance is yearly measured as a distance to targets on a few performance indicators. On their long-term indicative paths of converging emissions per person (figure 1), countries yearly commit to percentages improvement for the next three years on three indicators: climate tax shares in GDP, changes in energy intensity and decline in carbon intensity of energy use. Commitments and performance are requested from all Parties, be they donors or beneficiaries. Donor countries agree on initial GDP-dependent yearly transfers to a climate fund, but their actual payments are adjusted with their performance on the three climate policy progress indicators. Beneficiary parties get an initial GDP-dependent drawing right on the fund that can significantly increase by their performance on the three indicators [46]. As such the principles of “ability to pay” and “ability to spend” are respected, with incentives stimulating all countries to improve their mitigation policies and results.

7. A light and realistic international policy architecture

The Conferences of Parties of the UNFCCC are unlikely to generate a climate policy architecture when continuing the Kyoto-Bali-Copenhagen road. It is time to ditch Kyoto, as Prins and Rayner [9] advised, to avoid throwing good money after bad. Surprisingly, for a workable global architecture all components and institutions are available, ready to function, but their assembling and ignition are blocked by political deadweight.
The proposal here is a hands-on approach for mitigating CO_2 emissions from energy use: all variables are transparently and clearly defined; statistics for the yearly measurement by country are available today; the institutes generating the statistics are globally respected and can further improve accuracy and clarity of the metrics. Progress on the indicators can start immediately (the urgency of climate policy) and do guarantee the stepwise realization of deep cuts. No new institutions are needed and the Parties to the FCCC are fully made responsible and empowered to organize advancement on the indicators, starting from the policies in place today. Countries differ in their present performance on CO_2 emissions mitigation. There are many reasons and causes, but for advancing in a global agreement attention should not be focused on spitting out differences and historic responsibilities. Every country anyhow can but start from the position it is in today. Policy best focuses on step-by-step progress in lowering energy and carbon intensities and restructuring GDP. Progress by the year is measured on (rolling) intensity baselines of two years ago. This avoids setbacks like reproving pioneers, rewarding laggards, stimulating status quo and perverse incentives. The unfounded belief that global uniform instruments would be superior is replaced by a reorientation of actual ongoing policies and practices towards low-carbon technologies and activities. The proposal respects basic principles like universality, sovereignty, realism, transparency, diversity, and equity. Alongside or connected to energy related emissions mitigation, additional policies are necessary for mitigating the emissions caused by changing land-uses, for direct

technology transfers, and for adaptation. The approach of year-by-year progress monitored by reliable indicators may also prove helpful here, but the detail analysis is beyond this article.
In her opening speech as Executive Secretary of the UNFCCC [47] (Bonn, August 2010) Christiana Figueres stated: "Time is not on our side. Decisions need to be taken, perhaps in an incremental manner, but most certainly with firm steps and unwavering resolve", where she also cited Nelson Mandela: "We must use time wisely, and forever realize that the time is always ripe to do right."

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