Climate Action Network International

Long Term Global Goals for 2050

Phase out all fossil fuel emissions and phase in 100 % Renewable Energy

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Climate Action Network International (CAN-I) is the world's largest network of civil society organizations working together to promote government action to address the climate crisis, with more than 900 members in over 100 countries.
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Climate change is here, now, and is a matter of survival. The recently released Fifth Assessment Report (AR5) from the Intergovernmental Panel on Climate Change describes the impacts of climate change on the planet, people and nature in much more detail and with even more robust science. Some present and projected future impacts, such as those on food security, sea level rise or ocean acidification, are occurring with more intensity than previously anticipated. These impacts will be disruptive for all countries; especially for the global poor and vulnerable peoples.

The agreement to be reached at COP 21 in Paris must signal the end of the fossil fuel era and an accelerated transition to a 100% renewable energy future for all by 2050. The cornerstone of this legally binding agreement must be ambitious mitigation commitments and actions from all countries, the nature and stringency of which will vary depending on their common but differentiated responsibilities and respective capabilities (CBDRRC).

In order to achieve deep emission reductions, action needs to start now with peaking of global greenhouse gas emissions no later than 2015. This is extremely critical for long-term climate stability. Any delay in peaking will make achieving the lowest levels of warming even more challenging, will substantially increase costs of mitigation and adaptation efforts, and may necessitate the need for environmentally and socially questionable technologies to be deployed in order to reduce emissions. While near-term emission reductions are necessary to keep the door open to limiting warming below 1.5°C, long-term emission pathways are critical to its achievement. Therefore, in addition to ambitious near-term action, Paris must also outline a vision for a carbon emissions-free future in the form of a binding long-term goal.

Climate Action Network calls for phasing out all fossil fuel emissions and phasing in a 100% renewable energy future with sustainable energy access for all, as early as possible, but not later than 2050.

It is not enough to stabilize emissions or to slow down their growth. Eventually, emissions have to be brought to zero. The use of fossil fuels accounts for about 70% of all GHG emissions from all sectors worldwide. So, all is nothing without cutting fossil fuel emissions to zero. To stay within a below 2°C carbon budget requires that more than 2/3 of all present commercially viable fossil fuel reserves will need to stay in the ground[1]. This share

[1] Carbon in energy reserves and energy infrastructure; pp. 259ff, in: World Energy Outlook 2012, International Energy Agency, Paris 2012

of unburnable fossil fuels increases when looking at new, and in many cases, unconventional fossil fuel resources, such as shale oil and gas.

There is no alternative but to transition to a world free from fossil fuels. This just transition must and can be achieved while ensuring that everyone has access to sustainable energy that would enable all people on the planet to achieve a decent standard of living. The agreement in Paris must acknowledge this fact and send a transformational message to investors, business-leaders and decision-makers around the world.

Achieving this goal will require immense transformational changes in all countries and everyone has a role to play in its attainment. Developed countries should take the lead on reducing emissions – achieving a phase out much earlier than developing countries and with a sufficiently high level of ambition to enable developing countries to attain their sustainable development goals while not overshooting the global carbon budget. This global transformational change will require substantial public and private sector investment and political commitments from every government. Clearly, developed countries must also lead on these efforts and provide considerable financial, technological and capacity building support to those countries that need it in line with CBDRRC. Developed country governments must fulfill this commitment in particular to enable a faster transition towards 100% renewable energy in developing countries. CAN would like to remind governments that while taking decisions on public climate finance, they need to remember that protecting the climate, achieving sustainable development, eliminating poverty and ensuring energy access for all are not mutual exclusive, but are part of the same winning strategy.

The remainder of this brief outlines in greater detail steps countries need to take in order to realize the above goals. It should be read together with other CAN positions.[2]

Start NOW: The goals may be long-term, but deep reductions in emissions need to start today

The 'significant gap' that exists between current aggregate efforts to cut emissions and emission pathways consistent with a high likelihood of holding increases in global average temperature below 1.5°C has been repeatedly acknowledged at successive COPs.[3] The implications of delayed action on deep reductions are also well known,[4] but bear repeating.

Delaying action to cut emissions now will, *inter alia*:

- Lead to higher and augmented costs for the required mitigation action and adaptation efforts as well as higher costs from climate impacts and disasters.

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[2] See http://www.climatenetwork.org/policy-information/publication/organizations/973 .

[3] Decision 1/CP.19: Further advancing the Durban Platform.

[4] AR5 WGIII Ch6, p6: "Emissions through 2030 will have strong implications for the challenges of, and options for, bringing concentrations to between 430 and 530 ppm CO_2eq by the end of the twenty-first century *(high confidence)*. … Scenarios with emissions above 55 $GtCO_2$eq in 2030 are predominantly driven by delays in mitigation. These scenarios are characterized by substantially higher rates of emissions reductions from 2030 to 2050, a larger reliance on CDR technologies in the long term, and higher transitional and long-term economic impacts."

- Require steeper emission reduction rates in the future to respect temperature limits (with the feasibility of doing so less certain)
- Necessitate the use of certain untested technologies,[5] like bioenergy with carbon capture and storage (BECCS), the risks of which are unknown. The equity implications, particularly in terms of the land-use implications in developing countries and for food security, are poorly understood and must also be further studied in order to avoid negative feedbacks on poverty eradication efforts or human wellbeing.

The AR5 concluded that in order to have a greater than 66% likelihood of not exceeding the 2°C threshold, a cumulative CO_2eq carbon budget of less than 2900 GtCO_2eq (790 GtC) must be respected. Given that, by 2011, 1890 GtCO_2eq (515 GtC) had already been emitted[6], and that around 50 Gt CO_2eq (13 GtC) is currently emitted annually, the remaining budget for 2015 onwards is around 860 GtCO_2eq (236 GtC). If annual global emissions remain at the current level, this budget will be completely used up in less than 20 years, with one third of it gone after only the next 5-6 years. It goes without saying that the remaining budget to limit warming to 1.5°C is even smaller and exhausted in less time; this situation is compounded if the probability of achieving such a temperature limit is increased from 66% to 90%.

Phasing out Fossil Fuel Emissions is Necessary and Inevitability

Zero or negative emissions are required eventually in order to achieve any stabilization level.[7] *Whether* to phase out emissions is not the question, but rather *by when*? How quickly emissions must be phased out is a function of how much risk society is willing to accept in terms of irreversibly crossing tipping points (like the now inevitable collapse of the West Antarctic Ice Sheet) and the extent of exposure to ever more severe climate impacts. **CAN believes that global average surface temperature warming should be limited to less than 1.5°C above pre-industrial levels by 2100**. Limiting warming to such a level would avoid some of the worst impacts of climate change, though it would still pose significant risk to many vulnerable peoples, communities and regions; further stress unique ecosystems, such as the Arctic and coral reefs; and continue to expose many to ever more extreme weather events.[8] The risks at 2°C are even more dangerous and are not acceptable when the survival of cultures, countries and ecosystems is at stake.

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[5] The AR5 warned: "Delays in mitigation thus reduce technology choices, and as a result some of the currently optional technologies might become 'a must' in the future" (WGIII CH7, p69).

[6] AR5 WGI SPM p25.

[7] AR5 WGIII Ch6, p7: "Stabilizing greenhouse gas (GHG) concentrations at any level will require deep reductions in GHG emissions. Net global CO_2 emissions, in particular, must eventually be brought to or below zero. Emissions reductions of this magnitude will require large-scale transformations in human societies, from the way that we produce and consume energy to how we use the land surface. The more ambitious the stabilization goal, the more rapid this transformation must occur."

[8] See generally AR5 WGII SPM, Assessment Box SPM.1; M. Schaeffer *et al.*, *Adequacy and feasibility of the 1.5C long-term global limit* (Climate Analytics 2013), http://www.climateanalytics.org/sites/default/files/attachments/news/Adequacy%20%26%20feasibility%20of%201.5c%20long-term%20global%20limit%20-%20July%202013-v2.pdf .

The AR5 concluded that a reduction of 90% or more of global CO_2 emissions from 2010 levels in the energy supply sector is needed between 2040 and 2070 in order to reach 450 ppm CO_2eq concentrations by 2100.[9] However, 450 ppm CO_2eq in 2100 only provides a likely chance of limiting warming to less than 2°C relative to pre-industrial levels. To have at least a 50% chance of staying below 1.5°C, atmospheric concentrations of GHGs must be stabilized at below 430 ppm CO_2eq,[10] and would necessitate cuts in global CO_2eq emissions on the order of 70-95% below 2010 levels by 2050.[11] **It is therefore clear that we need to eliminate all fossil fuel use as soon as possible and no later than 2050 to keep open the reasonable possibility of limiting warming to 1.5°C**.

While phasing out fossil fuel emissions is essential, deep cuts in all greenhouse gases are necessary. Any solution to the challenge of climate change must address the land sector, which produces a quarter of the world's annual greenhouse gas emissions – more than all the world's buildings and vehicles. To stabilize the climate while satisfying growing demand for food and other agricultural products, including ensuring livelihood of millions of small holder farmers, the world must protect and manage forests and promote sustainable agricultural practices so that they act as sinks rather than sources of emissions – sequestering more carbon than they release, as soon as possible, while sustaining the human communities and ecosystems that rely on them while ensuring food security across the world is not hampered with these efforts. As part of these efforts, zero deforestation must be achieved no later than 2020.

The global consultancy Ecofys has calculated that a phase-out of all GHG emissions by 2050 would ensure a 50% chance of staying below 1.5°C throughout the 21st century, with a more than 60% chance of respecting 1.5°C in 2100 (i.e. overshoot and return).[12] A phase out of all gases would also ensure a more than 90% chance of respecting the 2°C limit in 2100 with no overshooting.

The message is clear: the only direction for all GHG emissions to go is down, rapidly, starting with a complete phase out of fossil fuel emissions.

Phasing in 100% Renewable Energy for All

In addition to phasing out the dangerous fossil fuel based energy system, we also need to phase-in the future energy system we need – a clean energy system that ensures sustainable energy access for all - and avoids the up-take of high-risk sources like nuclear energy. Renewable energy and energy efficiency measures both provide short-term mitigation and long-term economic decarbonisation benefits. Most renewable energy technologies are already technically mature, are addressing sustainable developmental challenges much better

[9] AR5 WGIII SPM, p21.

[10] AR5 WGIII SPM, p11-12.

[11] AR5 WGIII SPM, footnote 20.

[12] N. Höhne *et al*., *Feasibility of GHG emissions phase-out by mid-century* (Ecofys 2013), available online: http://www.ecofys.com/files/files/ecofys-2013-feasibility-ghg-phase-out-2050.pdf .

than conventional energy, and are increasingly cost-effective, particularly when the ecological costs of fossil fuels are taken into account.

Fossil fuels, particularly coal - the most carbon-intensive conventional energy source, should not be a part of the future energy mix. In addition to CO_2 emissions, fossil fuels generally have many negative impacts on people and nature. Fossil fuels have many unaccounted for external costs that accrue throughout the supply chain and the life cycle. These costs result from air and water pollution from the associated mining, combustion, and waste disposal; significant freshwater use; permanent land disfiguration; infringement of human rights; and worker and public health and safety impacts. Despite some enhanced national revenues, industrial focus on mining and trading fossil fuels has only led to enhanced economic vulnerability and large income disparities resulting in overall political instability in several countries.

In addition, in many countries, a fossil fuel and nuclear based electricity supply has led to a centralised and often inflexible, inefficient and expensive transmission system that is inherently hostile to the integration of large quantities of renewables, such as solar and wind, as well as energy efficiency. In many developing countries, there is inadequate grid coverage for much of the population and renewable off-grid or mini-grid solutions are much better suited to fulfil the goal of sustainable energy for all. Developmental co-benefits of renewable energy, when it replaces fossil fuel-based infrastructure, include minimizing local environmental impacts, improved health due to reduced air and water pollution, improved energy security, poverty reduction through reliable and affordable decentralized energy access, potential for industry development and reduced vulnerability to issues related to high fossil fuel import dependence, such as international oil price spikes.

Phasing out fossil fuels and moving to 100% renewables makes economic sense – especially when the true costs of our current energy system are taken into account.[13] In recent years, the costs of wind and solar energy have declined substantially. Today, some renewable technologies are the most economical solution in a growing number of countries and regions, and are increasingly the preferred choice for new grid-connected capacity where viable resources are available. The share of renewables is growing and already provides almost 10% of primary energy use for the world (excluding traditional biomass).

The main constraints on increased use of renewables, particularly in the power sector, come from lack of intelligent regional grid system integration, the need for improved infrastructure, the lack of adequate electricity storage, still comparably high upfront capital needs and political pressure from the incumbents to protect their investments in fossil fuels.[14]

Policies such as binding renewable energy targets; phasing out fossil fuel subsidies; establishing support schemes, such as feed-in tariffs, long-term government contract auctioning, preferential grid access for

[13] The Ecofys report notes that: "in the high renewables scenario, net costs peak around 2040 and then decrease due to cumulative fuel savings and decreasing costs of renewables offsetting investments in infrastructure. The other scenario, which assumes a significant adoption of CCS after 2030, sees increasing costs after 2050."

[14] IPCC SRREN.

renewables; citizen ownership of renewables[15] as well as adopting strict efficiency standards for all energy consuming appliances, buildings and vehicles, deployment of smart meters and intuitive grids, can all help immensely in increasing the share and uptake of renewable energy.

All countries have a role to play in phasing out emissions, with developed countries taking the lead

CAN has long stressed the importance of an equitable agreement in Paris (see here[16]). While further work is needed on how precisely to operationalize common but differentiated responsibilities and respective capabilities in the new agreement, three points should be stressed: (1) limiting warming to 1.5°C will require emissions reductions by all countries,[17] which is both in their own and the global interest; (2) developed countries must lead to both bring their emissions to zero at the earliest and to provide substantial financial, technological and capacity building support to others; (3) significant scaling up of climate finance around the world is required to make this transition possible. Provision of finance to developing countries is a pre-requisite for many developing countries before they embark towards this transition.

Phasing out fossil fuel emissions benefits all; whether it is the local community currently ravaged by the health impacts of coal use or the global community suffering from all of the compound impacts from climate change. The co-benefits of climate protection are significant, regardless of a country's development level. That said many countries will not be able to reap these co-benefits and phase out emissions as quickly as possible without significant financial assistance. The AR5 stressed that where emission reductions occur (especially if those are to happen at least cost) and who pays for such reductions can be separated. Of course, this does not change the fact that any fair effort-sharing framework will be one in which developed countries lead the way in ambitious emissions cuts, retiring fossil fuel reserves, phasing out emissions before others and assisting other countries financially and technologically to eliminate emissions as well.

The Phase Out/In is Technologically Feasible and can be Politically Feasible if we so choose

Phasing out fossil fuel emissions and phasing in a 100% renewable energy future is a very ambitious goal, and will not be easy to achieve. But how can we be anything less than ambitious when the survival of cultures, countries and ecosystems is at stake? Is there really an alternative?

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[15] WWF/WRI "Meeting Renewable Energy Targets" (2013), http://awsassets.panda.org/downloads/meeting_renewable_energy_targets__low_res_.pdf .

[16] See e.g. CAN Discussion Paper on an Equity Reference Framework, http://www.climatenetwork.org/sites/default/files/can_erf_discussion_paper_-_05062013.pdf and Equity Indicators, http://www.climatenetwork.org/sites/default/files/can_equity_indicators_brief_-_two_page_summary.pdf .

[17] While there are various ways to design effort-sharing arrangements, the AR5 found that the stringency of the mitigation effort is of 'equal or larger importance' for many regions than the specific effort sharing approach adopted and that efforts by all would be required for the lowest concentration levels examined (between 430 and 480 ppm CO_2e in 2100) (WGIII Ch6, section 6.3.6.6).

Critics of such a transition will point to the lack of a blueprint to phase out every last drop of fossil fuel, the perceived high costs for various economies, stranded investments, the lack of a reliable energy supply based on weather-dependent renewables such as solar and wind, as reasons to disregard such a goal. These are but myths and legends![18] While it is true that every measure necessary to achieve a complete phase out/phase in has not been expounded, various proposals exist. An Ecofys report shows that with the technology available today or in the near future, roughly 90% of all GHG emissions can be eliminated.[19] Several scenarios on how to kick-start a 100% renewable future have also long existed.[20] Clearly enough is known to get the ball rolling. Necessity is, after all, the mother of invention.

It is important that governments around the world heed warnings from the scientific community and the natural world, and accelerate the transition from fossil fuels to renewable energy now, in Paris and complete it well before 2050. Governments must start listening to people and not the polluters: climate protection and 100% renewable energy for all is the future we want!

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[18] WWF: "Busting the myth on renewables" (2013), http://awsassets.panda.org/downloads/busting_the_myths_low_res_v3.pdf .

[19] N. Höhne *et al*., *Feasibility of GHG emissions phase-out by mid-century* (Ecofys 2013), available online: http://www.ecofys.com/files/files/ecofys-2013-feasibility-ghg-phase-out-2050.pdf .

[20] See e.g. *The Energy Report: 100% Renewable Energy by 2050* (WWF 2011), http://awsassets.panda.org/downloads/101223_energy_report_final_print_2.pdf ; *Energy [R]evolution: A Sustainable World Energy Outlook*, 4th edition (GWEC/EREC/Greenpeace 2012), http://www.greenpeace.org/international/Global/international/publications/climate/2012/Energy%20Revolution%202012/ER2012.pdf ; see generally http://www.energyblueprint.info/ for a number of regional and national scenarios.