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"10 under 10" – Together We Can Save up to $1 Trillion Annually

Over the past decade, we have mainly seen the pursuit of higher abatement cost options to achieve emissions reductions. Emphasis has been mainly on power generation (primarily electricity and heat) and on other measures with high annual abatement costs, without focusing simultaneously on lower-cost abatement measures in areas such as transport, agriculture, forestry, and land use. Moreover, capital expenditure for those measures is lower, and many measures require zero capex from the society, as it is paid by companies.

If this kind of tendency continues, climate policy implementation runs the risk of not delivering benefits at a reasonable cost, and being tagged as "just another example" of high-cost spending without delivering broad economic returns.

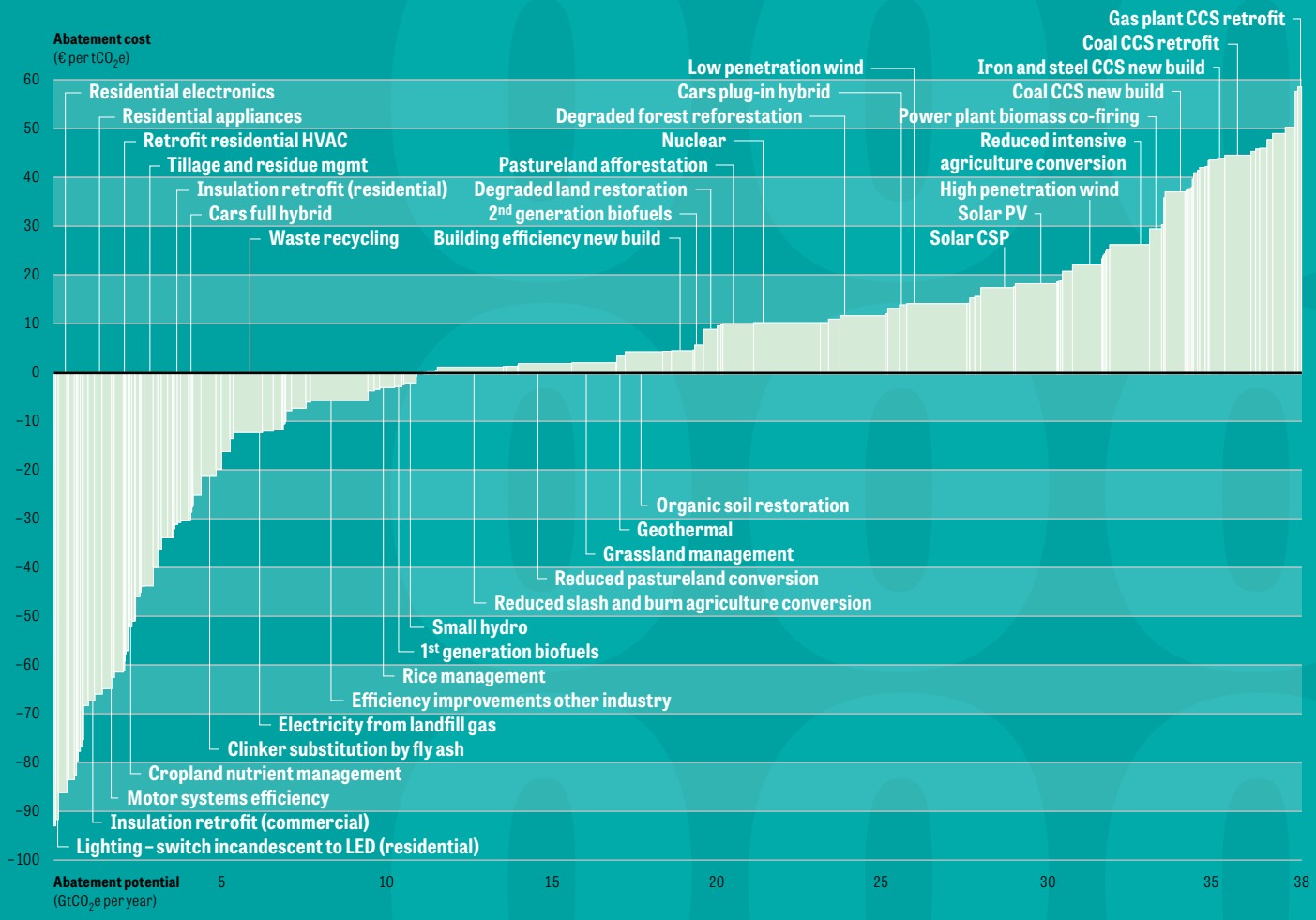
It is fully understandable that such lower-cost measures are often hard to implement and their "real" costs are hard to estimate. However, the focus should not be on the complications involved in measuring the "real" cost of implementing low-cost or no-cost options, but, rather, on the costs of not implementing them which would arise from the increased need to implement marginal measures with annual costs of $110/t per tonne of CO_2 equivalent or more.

The Paris Agreement came into force on 4th November 2016. A total of 195 countries signed up to national targets to reduce greenhouse gas (GHG) emissions. The forthcoming investments into emission abatement are massive.

A good step would be to set a goal of identifying in all industries worldwide a combined 10 gigatonnes of CO_2 equivalent at an annual abatement cost of less than $10 per tonne – the "10 under 10". From multiple discussions with prominent policy makers, members of the climate community, and consultants, this looks like an achievable goal.

In an extreme scenario, when none of the 10 < 10 measures is implemented, the total incremental cost to society would amount to $1 trillion p.a. – 1 percent of global GDP, and one-third of $3 trillion p.a. which the International Energy Agency (IEA) estimates is needed to achieve the 2 °C goal.

Figure 1: Global GHG abatement cost curve beyond business-as-usual – 2030
Note: The curve presents an estimate of the maximum potential of all technical GHG abatement measures below €60 per tCO_2e if each lever were pursued aggressively. It is not a forecast of what role different abatement measures and technologies will play.
Source: Global GHG Abatement Cost Curve v2.0



Estimated investments to run into trillions of dollars

The climate-related regulatory framework will be the largest new set of regulations since the establishment of the World Trade Organization (WTO) in 1995, and estimates are that the international community will invest trillions of dollars to reach GHG reduction targets and keep "the increase in the global average temperature to well below 2 °C above pre-industrial levels."[1] The IEA estimates that the world needs $75 trillion of investments through to 2040 to meet its 2 °C scenario.[2] The latter equates to approximately $3 trillion p.a., or 3 percent of global GDP.[3]

Past focus on power generation and right-hand side of abatement curves

Given that capital is not an unlimited or cost-free resource and that there are competing demands for this resource, this raises the question of how to effectively and efficiently allocate capital to achieve desired GHG reduction targets. The marginal abatement cost curve (MACC) approach was a good first step. Typically, the marginal abatement curves would have cutoff at a certain cost – in this example at €60/tonne (Figure 1)[4]. However, the marginal costs of abatement go up very rapidly beyond that cutoff limit, quickly reaching $110/tonne.

Although some progress has been made on cost-negative or cost-neutral abatement measures, government efforts have largely been focused on the "right-hand side" of the abatement curve – options focused mainly on power generation fuel mix. This is understandable given the contribution of power generation to GHG emissions (responsible for ca. 40 percent according to World Bank data), the focus on new sources of power generation, and related new power grid infrastructure. Although policy makers and regulators face an incredibly complex backdrop to policy decisions, including trade-offs between energy security, prices, and emissions, the fact that power generation projects tend to be one-off decisions – with a bulk implementation effect and an emotional appeal to the electorate – gives governments an additional incentive to take action on them. Furthermore, as global demand for energy to support sustainable development keeps rising, there is a real need to continue developing and investing in clean technologies and infrastructure while cleaning up, retiring, or dismantling inadequate infrastructure.

Low-cost abatement opportunities need to be pursued

In the meantime, there is an opportunity to more actively pursue the lowest cost options – possibly negative cost options – from the "left-hand side" of the marginal abatement cost curve. This is not a simple task because these measures tend to be more fragmented, more difficult to measure and monitor, and harder to implement, plus transaction costs can be high and/or social acceptance low, depending on how successfully the measures are implemented. Government frameworks have relied on voluntary approaches to reduce emissions in these sectors with varying levels of success. As the UK Committee on Climate Change noted in its website summary of the July 2016 progress report[5], "The Progress Report shows that UK emissions have fallen rapidly in the power sector, but that progress has stalled in other sectors, such as heating in buildings, transport, industry and agriculture."

Our key argument is that the focus should not be on the inability to measure the "real" cost of implementing low-cost options, but, rather, on the cost of not implementing them – which would arise from the increased need to implement marginal measures with annual costs of $110/t per tonne of CO_2 equivalent or more.

The focus on high-cost options risks clashing with the electorate's current level of frustration with "business as usual" governments. Climate policy implementation risks being tagged as "just another example" of high-cost spending without delivering broad economic returns. The idea, then, is to bring the goals of the climate movement into maximum alignment with economic priorities, and doggedly pursue low-cost but difficult-to-implement measures. "No-regret moves" – if one can pull them off – are a great place to start. They would provide a common basis of agreement, while letting societies sort out the costlier choices, like Germany's *Energiewende* (energy transition) or the UK's nuclear program. A focus on lower-cost moves is also likelier to be perceived as economically sensible, and hence worth pursuing by warier administrations in high-emitter countries like the USA, China, India, and Russia.

1 Paris Agreement

2 IEA World Energy Investment Outlook 2016

3 GDP data sourced from the International Monetary Fund World Economic Outlook 2016

4 Pathways to a low carbon economy, McKinsey & Co. 2009

5 Meeting Carbon Budgets – 2016 Progress Report to Parliament

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Sectors beyond power generation have significant abatement opportunities

There are a number of abatement options on the left-hand side of the MACCs – in energy efficiency (both in buildings and in infrastructure, such as power grids and gas and oil pipelines), in transportation, in agriculture, forest management, and waste management – all of which could be more actively pursued by government policy.

One example is slow-release fertilizers. These reduce N_2O emissions and nitrate run-off, while representing very low or even negative abatement costs, especially in high-labor cost countries such as Germany or France, because they only need to be spread twice a year as opposed to four times a year for traditional fertilizers. Farmers have some interest from a cost perspective, but there is no government policy encouraging take-up, which would be at no cost to the society.

Another example is the regulation of battery-powered electric vehicles – which could play a transformational role for the deployment of intermittent energy sources like solar energy and wind energy. Current regulations do not allow for bi-directional charging, meaning that batteries of electric vehicles cannot discharge energy into the grid, and small decentralized units are not allowed to offer balancing services to the grid operators. However, if such operations were to be allowed, the owner of a Nissan Leaf could earn up to €1,000 p.a. – which, seen over the service life of the car, would be much higher than the electric car purchase bonus offered by Germany and other European countries. This would save taxpayer money, including the €600 million budgeted by Germany until 2019 for electric car purchase bonuses.

These are also sectors that are most in need of an upgrade to their methodologies. By basing them on consistent assumptions in emissions measurement and modelling, one can reduce variation in outcomes, both in volume and cost calculations and make these methodologies easier to apply to define abatement incentives – and easier to trust. An example of this is in the temperate and boreal forest sector. Among US, Canadian, and Russian forests (37 percent of the global forested area[6]), there is a large difference in claimed CO_2 absorption rates, ranging from 2.1 t/ha for managed forests in the USA to 1.0 t/ha for managed forests in Russia, and even lower in Canada at 0.4 t/ha.[7] One of the main reasons for the discrepancy is the definition of forest area. Whereas the USA counts all areas over 0.4 ha as forest, Canada and Russia have a higher threshold of 1 ha, which most likely decreases the total area of accounted forests in Russia and Canada. Another reason is the methodology of measuring carbon in the soil. In Russia, CO_2 absorption in the soil is measured at a depth of 30 cm whereas a depth of 100 cm is applied in the USA and in Canada. Transparency of definitional and methodological differences is important because the rate of carbon absorption is a key determinant of the cost of abatement per tonne of CO_2 from forestry measures which, in turn, sends a price signal as to whether to pursue this option. If measured the right way, the abatement/absorption of 1 tonne of CO_2 equivalent in Russia would cost approx. $7/tonne p.a. – a clear candidate for $10 < 10$.

These are just some examples of no-cost or low-cost abatement options. A much more systematic and rigorous approach is needed to identify those options, verify the assumed costs and benefits, and deploy them as a priority.

To date, policy makers have not pursued low-cost or no-cost options in a systematic and rigorous way. The business community has to step up, otherwise the total incremental societal cost of climate policies may amount to $1 trillion p.a. – 1 percent of global GDP p.a. This cost will impact economic growth and increase the overall cost of doing business.

6 World Bank World Development Indicators, last updated 14/10/2016

7 National Inventory Submissions to UNFCCC, sectoral report for land-use, land-use change and forestry, 2014