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A 'perfect' agreement in Paris is not essential

Success at the latest climate talks will be a recognition by the world's nations that incremental change will not do the job, says **Johan Rockström**.

So here we go again. Nations are meeting in Paris for their twenty-first attempt to agree on decisive action to avoid what the United Nations defines as dangerous climate change.

The climate negotiations have set this danger threshold at 1.5–2°C of global warming above pre-industrial levels. With such a guard rail established, the required components of a 'successful' climate deal more or less fall into place. A reasonable chance of attaining 2°C translates to a finite global carbon budget of about 900 gigatonnes of carbon dioxide from 2015 onward that must be shared in a fair way between all nations.

Can and should the Paris talks deliver an agreement that gives a binding commitment from all nations to meet this outcome? The last time the world gathered for a decisive global agreement on climate change, in Copenhagen in 2009, the remit was that, yes, world leaders needed to do nothing less than decide on a global, legally binding agreement that met the scientific targets of a safe and just future below 2°C.

But since Copenhagen, the global discourse has changed. In 2009, it was possible to show convincingly only that we needed to tackle the climate challenge; it was not easy to show that it was possible. Today, the need is more apparent than ever. And, more importantly, there is ample evidence that scaling up economically competitive, clean-energy solutions is possible.

Before Copenhagen, economists generally thought that a high oil price was the best way to enable a transition to a decarbonized future. The surprising reality is that low oil prices seem to be the most effective way of ensuring a transition away from fossil fuels. Renewable energy systems compete even at low oil prices, which in turn closes the door on unconventional, expensive oil, such as offshore oil and exploitation in difficult environments such as the Arctic. It also opens a unique window to introducing a global price on carbon — clearly the most effective policy measure for accelerating the transition to fossil-fuel-free energy.

Experience across industrial sectors shows that new solutions can scale up and become part of the mainstream in markets and societies only once they have penetrated at least 15–20% of the marketplace or society. For renewable energy, this penetration has been achieved in enough countries only in the past three to four years.

In this new situation, is it possible to envisage a transformation to a decarbonized world by around 2050 even if Paris does not deliver the 'perfect' agreement? The answer is yes. To get there, the threshold for success in Paris should not be at the level of 'resolving the climate problem' through

incremental change, but rather 'the assurance that the world is serious about a transformation'. We need an agreement that is good enough to tip the world decisively towards rapid decarbonization. A new treaty does not need to force nations into compliance, but rather should create confidence and send the right signal — to investors, businesses and societies at large — that the global political leadership is turning irrevocably towards a new sustainable era.

How ambitious must the Paris agreement be to decisively support such a trajectory? To meet the 2°C limit, the world must cut carbon emissions at about 6% per year. National pledges on the table at Paris will not get us close. From experience, we know that emissions cuts in the range of 0–2% per year are within the realm of incremental policy measures. A range of 2–3% requires ambitious adaptation. Once levels

exceeding 3–4% are reached, experience indicates that radical measures are needed, such as carbon taxes and the phasing out of coal power.

These are the kinds of changes needed to decarbonize the world economy, and above all, to send clear signals of a shift from incremental to transformative change. Success in Paris should thus be viewed as an agreement that corresponds to a pace of emissions cuts of greater than 3–4% per year, starting in the 2015–20 window.

In turn, this would suggest that Paris must accumulate 80% of the national pledges needed to stay within the 2°C guard rail, with at least 20% of the countries committing to more than 4% average cuts per year, to create a large enough critical mass of nations committed to decarbonization and to influence the global logic (see go.nature.com/luxlyn). Achieving this goal

is ambitious but realistic. And it comes with a decent chance that, once nations realize the benefits of decarbonization, they will increase their pledges. It is crucial, therefore, that the Paris agreement allows for recurrent recalibration of the pledges, at least every third or fifth year.

It would be dangerous to allow 'success' to be reduced to a low level of political achievement so that the world continues along an incremental policy path that stands no chance of supporting a transition to decarbonization. Equally, scientists can no longer dismiss as failure an agreement that is not fully in line with the demands of climate science. For if Paris is widely perceived to have failed, political leadership is likely once again to enter a post-Copenhagen climate trauma and instead focus on other more urgent (and politically rewarding) issues. ■

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