

The Themis Mechanism: A Proposal for Equitable Global Emission Reduction

Themis is a proposal for an international mechanism to reduce global greenhouse gas emissions in a fair and effective way. It addresses mitigation deficiencies in the Paris Agreement. For example the growth rate of CO₂ (not merely the concentration) in the atmosphere is higher now than when the Paris Agreement was adopted in 2015.

Themis is an ancient Greek goddess of justice, an organiser of the communal affairs of humans. She is often depicted with the scales of justice, but without a sword, because she represents common consent, not coercion. And she can see the future. All essential traits for tackling climate change.

The Themis Mechanism is built on four foundations:

1. Our atmosphere is a shared resource

Our atmosphere is the ultimate *commons*; regardless of their geographic origin, greenhouse gases contribute to determining the climate everywhere on earth. Since the global temperature grows with greenhouse gas concentration, any fixed temperature implies a maximum amount of greenhouse gas in the atmosphere. Therefore, the amount of greenhouse gases that can be emitted is a finite shared resource.

While fossil fuel users receive the full benefit from fuel consumption, the CO₂ cost is spread globally. This dilution effect makes continued use rational for individuals but collectively disastrous. The individual versus collective dilemma exists even if the cost exceeds the benefit for every single user. To prevent this, we must cooperate to guarantee climate results.

Fortunately, we know a lot about human cooperation. The political theorist Elinor Ostrom's *Governing the Commons* identifies necessary conditions for successful cooperation as: binding commitments, mutual trust, transparency, reciprocity and enforceable sanctions. The Paris Agreement shares none of these critical attributes.

2. Pricing greenhouse gas emissions

The root cause of climate change is the failure to account for the true cost of emissions. By treating the atmosphere as a free resource, we encourage over-exploitation. Themis internalises this *unpriced externality* by pricing greenhouse gas emissions.

While we routinely pay for resources, utilising the atmosphere's finite capacity to absorb greenhouse gases without exacerbating climate change remains an exception. This is a choice, not an inevitability, and we can opt to value this capacity differently.

Estimating the true cost of emissions is impractical. The cost of the changing climate is difficult to estimate, it may be very different for separate regions, and it may depend crucially on the time horizon. To circumvent this hurdle, Themis uses voting to determine the price, detailed below.

3. Urgency

We have left effective action to the eleventh hour. Our climate collaboration cannot depend on long term promises for the future, such as Nationally Determined Contributions (NDCs) for 2030 or 2035, and NetZero by 2050. Verifying long term commitments logically necessitates waiting to check their fulfilment. But we don't have time for that. Instead we need to focus on immediate emissions.

Decarbonisation requires changes in infrastructure which take time. However, one should not confuse the timeline for the incentive mechanism with the one for implementation. Incentives must be immediate to enable societal change.

4. Equitability

Effective cooperation requires a fair guiding principle. Themis upholds *equity*: that our atmospheric resources should be shared equally between all humans. It's a moral and ethical judgement with wide potential acceptance.

This conception of equity differs from the corresponding Common But Differentiated Responsibilities (CBDR) principle of the United Nations Framework Convention on Climate Change (UNFCCC). Since greenhouse gas emissions are strongly correlated with wealth, the Themis definition of equity will tend to equalise economically, thereby helping with the goals of the Paris Agreement Green Climate Fund (GCF), but through a mechanism rather than voluntary donations.

Themis

Themis is built entirely on immediate annual commitments. Adherence is verifiable by partners, enabling the building of mutual trust. The mechanism is governed by a single number, p , the price of emitting one ton of carbon dioxide equivalent, or CO₂e. The annual cycle is based on four steps:

1. Each year, all nations are invited to join at a predefined emissions price, p .
2. At year-end, each member reports emissions and pays p per ton of CO₂e.
3. Proceeds are redistributed immediately among members, in proportion to population.
4. Members vote openly on next year's price; the median vote determines p .

Prior to launch, all nations are invited to vote for the initial price, p .

A consequence of the mechanism is that only *per capita* emissions are relevant, reflecting equitability. Nations with above average member per capita emissions will be net contributors; all others will be net beneficiaries. All members (not just large emitters) immediately experience economic pressures to reduce emissions. The Themis Mechanism is deliberately as simple as possible. It is designed for efficiency, eliminating complex negotiations that would delay urgent action. Themis can coexist with and mutually benefit other initiatives, including the Paris Agreement and the EU Emissions Trading System (ETS).

Why would nations join?

The overwhelming reason to join would be that all countries benefit from diminished climate change enabled by the mechanism. Below average emitters also have an immediate economic incentive to join. Themis does not require universal participation to be effective; widespread

adoption is sufficient. Members may in time seek to sanction free-riding non-members, but this is not part of Themis.

Currently, carbon footprints for wealthy nations are often underestimated because they import carbon intensive manufactured goods. What would happen under Themis membership? The price of the carbon intensive manufactured goods would increase, the importer would pay more, reflecting their climate load. There would be no pressure to move manufacturing between member nations, since the emissions price is identical everywhere.

The complex regulation in the Paris Agreement related to the international transfer of carbon credits (the so-called Article 6), would be eliminated under Themis. Nations could financially support developing countries to reduce emissions and share the resulting Themis payout, without any need for explicit rules in the mechanism.

Refinements

The basic structure is captured by the four point annual cycle, but in practice we need to be specific about a couple of details:

1. To enable reciprocity, decisions to join may be *conditional*. For example, the UK may join only on the condition that France and Germany join. Or on the condition that countries responsible for at least 50% of emissions join. Reciprocity is a key enabler of cooperation and helps ensure against imbalances.
2. In the case where a country has initially been outside the mechanism, and wishes to become a future member, they must pay their fees right back to the inaugural year. This is necessary to avoid an incentive for nations to postpone membership. Postponement is unacceptable because it further exacerbates the already troubling problem of differing historical emissions. This rule would make it more difficult to join later, increasing the pressure for prompt membership.

Price dynamics

The price, p , is likely to start modest and grow with time. Once a country has joined, it becomes in its interest for other, larger emitters to join too. How are members likely to vote? Below average emitters will favour higher prices, but not so high that large emitters quit. Similarly, above average emitters may favour a low price, but not so low as to undermine the emission pressure.

Even while the price is too low to massively reduce emissions, the mere existence of the mechanism and annual membership decision and open ballot price vote are welcome recurring opportunities for nations to show their hand.

Hurdles

Implementation may face some challenges: enforcement of emissions reporting may be difficult. Themis does not resolve differing historical emissions. Some nations may choose not to participate for economic or ideological reasons.

The short annual cycle and absence of a known future price within Themis has been criticised for creating unwanted uncertainty for treasuries and may make planning of energy systems difficult. These may be genuine concerns, but the rapid cycle is necessary since we have very little time left, and long term promises create mistrust which poisons cooperation. There is

nothing to stop nations declaring their votes ahead of time or coordinating their price votes. Themis just doesn't require countries to do so.

The existence of hurdles should not themselves spoil Themis. The real question is not whether Themis is perfect, but whether it is better than its absence.

Next steps

The Themis Mechanism is an idea in early stages needing support to be implemented. What can you do to help make Themis a reality? Two things: First, you can help spread awareness of the fact that there are constructive ways to deal with climate change. It's our choice whether we implement them or not. Second, you can engage your leaders and decision makers: What price will they vote for? Under what conditions will they join?

While Themis is not a complete solution, it is a crucial step toward fair and effective global emissions reduction. Supporting Themis means taking immediate, verifiable action toward a fairer and more effective global climate strategy.