# Think in Systems To Deliver India's Long-term Climate Strategy

Solutions that target a single aspect of the energy transition often overlook impacts on other climate and development goals. It's time for a more holistic approach to climate action.

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The 2015 Paris Agreement required countries to submit their long-term climate action strategies by 2020. At COP26, India made a surprise announcement of a target to reach net-zero carbon emissions by 2070, which means it will aim to balance the amount of carbon dioxide emitted with the amount absorbed.

India's pledge is contingent upon the provision of USD 1 trillion in climate finance by 2030. Ministers have since reiterated that India will not increase its official climate targets, or Nationally Determined Contributions, without funding.

## A Systems Approach

There has been much speculation on the scope and details of India's plan. Despite some short-term targets for its energy sector, many questions remain about how the announcement will be put into practice.

To fulfil their promises, India and all other signatories of the Paris Agreement urgently need to develop clear transition roadmaps with milestones and climate finance expectations for climate action.

In developing a transition roadmap, we must rely on systems thinking rather than a sector-based approach. Systems thinking focuses on the interlinkages between parts of a system instead of rigidly separating it into individual components.

A systemic approach to building roadmaps helps to identify 'co-benefits', or complementary benefits, from tackling a combination of individual issues. It also helps minimise 'trade-offs', or inadvertent consequences, that might arise from trying to tackle issues present in one component of a system without paying attention to how the corrective measures impact the rest of it.

## The Problem with India's Green Energy Ambitions

At COP26, India pledged that by 2030 50% of its total installed electricity capacity would be from renewable energy sources, as well as setting a net-zero target. Since land acquisition is already a significant deterrent for the deployment of large renewable energy installations

such as solar or wind parks, we can expect the problem to become more aggravating as India strives to deploy more capacity.

For example, we may see increasing competition between solar farms and pastoral or agricultural land, which already face yield stagnation and land degradation. This in turn would have a direct impact on India's food security. Solutions such as floating solar plants are already being pursued by affected states like Telangana, where this conflict is particularly acute, as are offshore wind and rooftop solar elsewhere.

By using more land, large-scale solar deployment can change the natural vegetation of some areas. If trees and shrubs are removed, solar installations can actually release a certain amount of carbon previously stored in the plants. Large solar plants could also in some cases stand in the way of afforestation efforts. Studies indicate that these combined factors can cause a net release of carbon.

In India, renewable energy projects are classified as 'green' by most state regulatory agencies. This means that most of the time it is not mandatory to carry out an environmental impact study prior to construction. This widely recognised policy oversight prevents states from efficiently addressing land issues in renewable development. Better coordination when planning land use for various sectors, as well as more robust land use accounting, could play an important part in mitigating the trade-offs that come with the development of renewable energy projects.

## A Systems Approach to Urban Development

Cities are another key area of interest in the design of any climate mitigation policy, as they are hubs of emissions-intensive activity. India is urbanising rapidly, and over half of its future building stock is expected to be constructed by 2030. This means that the country has the unique opportunity to develop on a low-carbon pathway, which would encompass the buildings and construction, transport, industrial, land and power sectors.

Compact urban design, as opposed to sprawling metropolises like Delhi, could lower the consumption of land and ecosystem degradation that comes with it as trees are razed and the ground is paved. More compact cities could also lower transport emissions, if planned to minimise travel distances between essential activity zones. However, concrete-heavy, poorly vegetated compact urban areas could substantially increase the 'urban heat island' effect, a problem affecting many Indian cities today. This would ramp up buildings' cooling energy requirements, thus increasing greenhouse gas emissions.

In this case, using alternative construction materials with better thermal properties can have multiple benefits. It can lower indoor cooling demands, reducing electricity consumption and the associated greenhouse gas emissions. Lowering air conditioning use also helps avoid the release of HFCs, potent greenhouse gases used in cooling appliances.

The adoption of eco-friendly materials can also indirectly reduce industrial emissions by lowering cement demand. Producing cement emits vast quantities of carbon. Some alternative construction materials use industrial and agricultural byproducts such as fly ash, paper fibre and rice husk. Their use can lower demand for cement as well as having other minor ecological benefits such as relieving pressure on the ecologically devastating sand mining industry, a key component of the cement production chain.

## Biofuels for Transport Not a Low-carbon Win-win

When it comes to transportation, biofuels offer energy security and a low-carbon alternative to conventional fuels. But the blending rates (the proportion of biodiesel to regular diesel) currently envisaged in India's National Policy on Biofuels require extra sugarcane cultivation exclusively for ethanol production. This will mean diverting land needed to maintain food security towards the cultivation of water-intensive sugarcane. With limited viable water resources in the country, more sugarcane cultivation could also have severe localised impacts on water availability. This could in turn lead to an increase in groundwater extraction, also requiring more electricity to power a growing number of pumps.

Ultimately, the envisaged emissions savings from the use of the proposed fuel blends could be partly or wholly offset by the various impacts of the extra sugarcane production that enables them. These unintended consequences could be mitigated if the policy is designed with a holistic approach, instead of focusing on the benefits for the transport sector only.

## Long-term Goals Not Enough To Deliver India's Climate Strategy

These are just a few examples illustrating the need for a long-term roadmap that takes into account the complexity of any energy transition policy. To achieve this, India needs to foster more effective partnerships between the central government, states, industries and the public.

Crucially, the announcement of long-term strategies such as India's net-zero target should not distract us from the short-term, consistent efforts we need globally, or from global responsibilities to provide assistance – both technological and financial. It is easy to sit back and feel satisfied at the decarbonisation plans already announced. But there is a real danger that without solid roadmaps to back them up, net-zero strategies could simply induce procrastination, deferring immediate, necessary climate action.