

## Green Recovery: Opportunities for India

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**ABSTRACT** The COVID-19 pandemic has had a massive economic and social fallout for India, as it has across the globe. In India, large numbers of people lost their jobs, and supply chains across industries and agriculture have been disrupted. At the same time, environmental indicators—notably air and freshwater quality—showed improvements following the long period of a nationwide lockdown. This brief outlines why India must make a focused decision to move towards a path of economic recovery that is both environmentally sustainable and inclusive. The opportunities that exist are in sectors such as agriculture, sustainable mobility, and renewable energy.

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## INTRODUCTION

Estimates say that 300 million people across the world will likely fall into poverty because of the direct negative consequences of the COVID-19 pandemic.<sup>1</sup> This will hurt deeper in lower middle-income countries like India which already have high levels of poverty, to begin with, or else have large populations who are barely above the poverty line and for whom a single crisis can prove disastrous to their lives and livelihoods.

The crisis threatens 1.6 billion jobs worldwide.<sup>2</sup> In India, unemployment rates rose sharply during the lockdown; while the rates have recovered slightly in recent weeks, they still hover around 18 percent.<sup>3</sup> The country's GDP growth dipped by 23 percent in the first quarter of the financial year 2020.

The economic fallout of COVID-19, in turn, will influence climate action. A resource-constrained government may deprioritise climate change mitigation at a time when the risks from global warming are getting more pronounced.

Yet, at the same time, the pandemic has opened up certain opportunities. While the nationwide restrictions on movement were in place, for example, air quality improved. The levels of particulate matter PM<sub>10</sub> and PM<sub>2.5</sub> reduced by half, for one. These gains are temporary, however. For them to endure

for the long term, India must transition to a paradigm that de-links greenhouse gas emissions from economic growth – and do it in a more difficult timeline than those chosen by countries such as Germany, which will quit coal only in 2038.

## THE DANGERS

The immediate threat wrought by the pandemic is that it would lead states to implement a “brown” stimulus instead of a “green” one.<sup>a</sup> In an attempt to recover from the crisis in a shorter time and prevent further hardships to their populations, countries are adopting growth strategies that aim at a faster recovery; in most cases, these mechanisms are not green. For India, the US and China, for example, only one to three percent of their stimulus packages comprise green programmes. The European Union (EU) is an exception, with about 25 percent of their stimulus allocation being green.<sup>4</sup> This pattern will have an influence on the global targets for climate action. According to some estimates, Asia's share of total coal demand will expand from about 77 percent to around 81 percent<sup>5</sup> by 2030. The trend seen before the pandemic could easily be reversed: in 2019, the world witnessed the largest fall<sup>6</sup> in the amount of electricity produced by coal.

In China, for example, coal consumption fell by some 36 percent in February 2020 due to the lockdown.<sup>7</sup> Yet, that same period saw the country approve new coal plants.

a “Green” means environment-friendly measures; “brown” are investments in fossil fuel and other dirty fuels.

China's recovery stimulus, too, is giving a big push to coal-intensive projects, and its Belt and Road Initiative (BRI) is supporting coal projects in the participating countries. India, for its part, has reinforced its commitment to the use of coal: INR 50,000 crores<sup>8</sup> in the government's stimulus package is being allotted to the production of coal.

The US has reversed more than 100 environmental laws on the grounds that it would affect industry and businesses.<sup>9</sup> Federal funding for science and technology has been cut, and limits on carbon dioxide emissions from automobiles and power plants have been weakened. Meanwhile, India has amended its Environment Impact Assessment (EIA) Act, reducing the time given to the public to submit their objections to large infrastructure projects.

The relocation of global manufacturing supply chains has raised hopes in many developing countries that they will finally get their fair share of the manufacturing pie. However, this competition will turn perverse if cost advantages are bought through weakening environmental regulation.

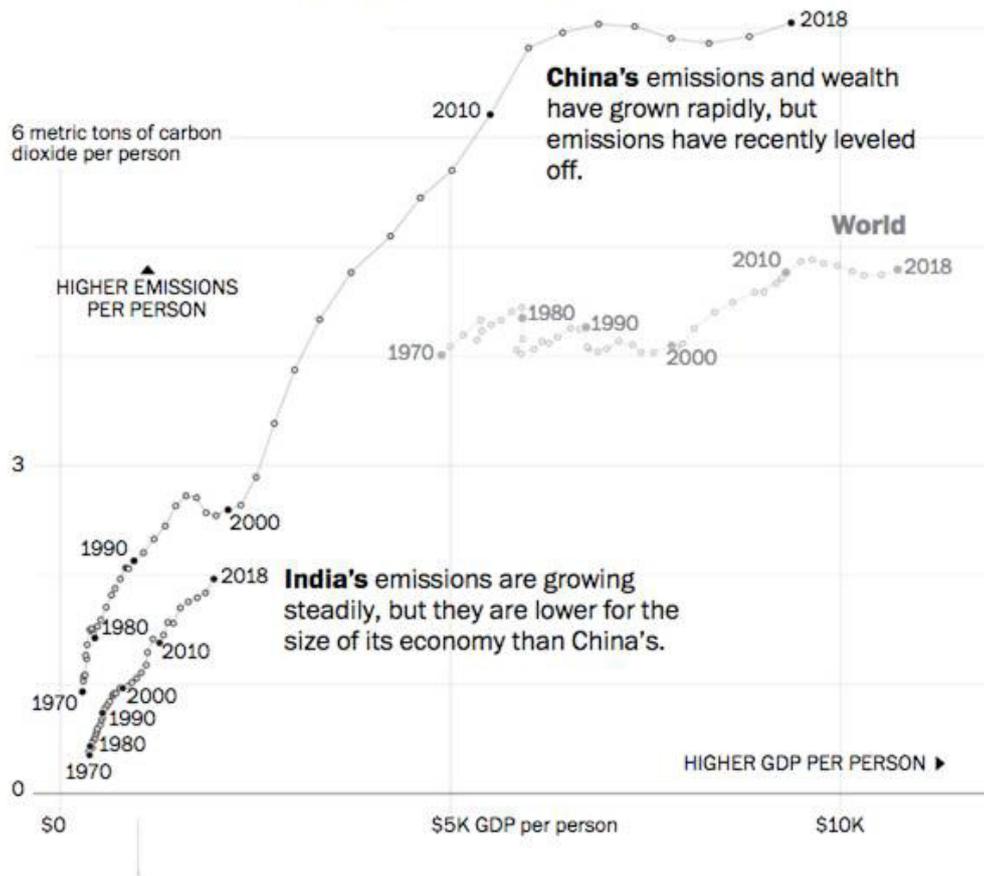
While attracting manufacturing centres looking to leave China is likely to provide an economic boost, it will also raise the emissions intensity of GDP. India's growth has so far been less energy-intensive than that of any other major economy (See

Figure 1) Energy use per capita remains far below that of, say, China at comparable levels of income. Prior to the pandemic, hopes were high for a seamless transition to greener growth models. This is now being threatened.

To be sure, the Government of India's policy focus for the country's post-COVID-19 economic recovery has been on structural reforms to agricultural, business and labour laws, in the hope of attracting greater investment. Gains may be lost, however, unless these reforms are accompanied by a thrust on specific change-making sectors that have a particular impact on climate action and the Sustainable Development Goals (SDGs).

The current crisis provides an opportunity for India and the world to embrace a more sustainable growth path. The health infrastructure has been put under immense stress due to the pandemic, in both developing and developed countries alike. Further, the migrant crisis underlined the failings of India's current development model that is disproportionately focused on the urban sector; indeed, when the pandemic hit India, it shone the light on issues in housing, long-distance transport, health, hygiene, social security, and infrastructure. India should expand its green infrastructure and build more resilient health infrastructure, affordable and good quality housing, schools, and urban infrastructure.

Figure 1. How India compares with the world's biggest carbon emitters



Source: *Washington Post*<sup>10</sup>

## GREEN OPPORTUNITIES

India has repeatedly declared its commitment to climate action, particularly in promoting renewable energy. For example, it is a founding member of the International Solar Alliance, and recently proposed the 'One Sun One World One Grid' (OSOWOG) initiative<sup>11</sup> for a globally connected electricity grid in a phased manner. India has also been proactive in taxing carbon, with a tax on coal at INR 400 per tonne, and the highest duties on motor fuels in the world. Fossil fuel subsidies have been steadily phased out over the last few years.

However, any commitment to climate change mitigation requires huge financial resources. The pandemic has exacerbated India's already-constrained financial position to pursue a green transition. The challenge is to focus efforts on leading sectors like mobility, storage, agriculture and solar energy, which would help attain goals of economic recovery, social regeneration, and carbon transition.

### Mobility

As the pandemic recedes and becomes more manageable, India will require a new paradigm for mobility. It can take

the lead – through cooperation between the government, the private sector, and philanthropy – to a path of faster adoption of electric vehicles (EVs) that can result in positive health and environmental outcomes.<sup>12</sup> To begin with, India's entire passenger traffic is dominated by the road sector.<sup>13</sup> Moreover, its urban population is expected to touch 50 percent by 2050.<sup>14</sup> These twin patterns make it imperative for India to rethink mobility.

Smaller urban cities that lack public transport systems will increasingly rely on personal vehicles. This will lead to an increase in petroleum products, unless there is a shift towards EVs. Further, modal shift in the transport sector towards public systems will be critical to achieving reduced emission targets and import bills.

The Indian government, at both the state and central level, has pushed for policies that aim to make EV vehicles cost competitive over the last few years in terms of fiscal and tax incentives as well as support to industry and building charging infrastructure.<sup>15</sup> The government has already laid down plans to have public charging stations.<sup>16</sup> Under Fame II, the emphasis is on procuring more e-buses and to switch to their use in the long run. Many states have also come out with their own state EV policies. The government aims to have 30-percent penetration of EV vehicles by 2030. Indeed, there was already an increase in sales by 20 percent in 2019.<sup>17</sup> However, progress has still been slow and at current rates of implementation, 100-

percent electric mobility will be achieved only by 2047. A comprehensive policy support is crucial for the development of the industry and development of supporting infrastructure. It would also help in the sectoral revival of the automobile sector. The government has prepared a draft scrappage policy that aims to eliminate old polluting vehicles, including two- and three-wheelers. The policy will help in increasing the intake of more fuel-efficient vehicles as well as EVs.<sup>18</sup>

Focused effort for the EV sector would help India move towards a green recovery post-pandemic. The supply chain in EVs is increasingly getting localised.<sup>19</sup> Companies are setting up production facilities in the market destinations. This is true even for battery-cell manufacturing. This is an opportunity for India to attract global firms to set up supply chains in the country.

One of the critical aspects of developing a manufacturing base is to attract investment to secure sources of raw material. China is already becoming a critical part of the global supply chain by securing sources of raw material.<sup>20</sup> Support to the industry would also help to develop local supply chains which are heavily reliant on imports from China. India's electric mobility plan will require large investments that would need tapping into sources such as green bonds and foreign funds. Thus, the vast size of the market that India offers could prove to be an opportunity. A green transition in mobility, with EVs as one of the central sectors, is possible for India.

## Storage Systems

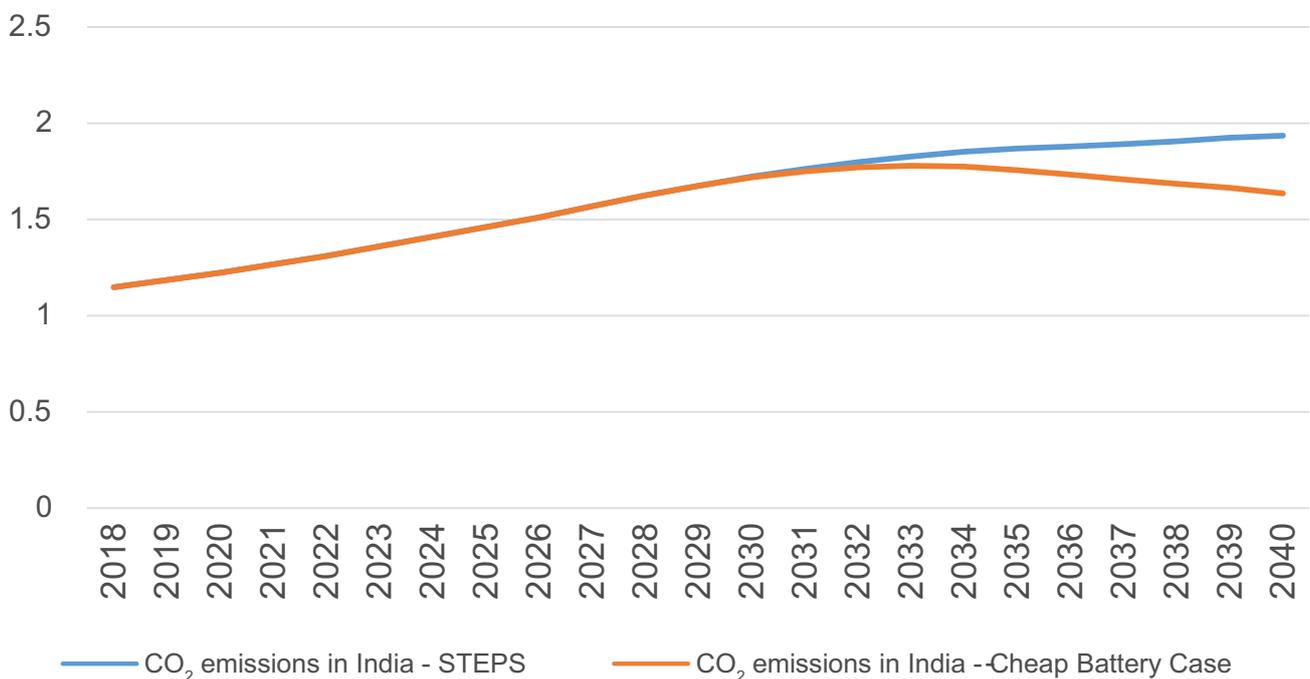
Energy storage systems (ESS, whether stationary or mobile) will be critical in helping India's transition to greener technology. Developing countries will constitute 80 percent of all energy demand by 2035,<sup>21</sup> and more than two-thirds of such demand will come from renewable energy sources. India's per-capita electricity consumption is much lower than the world average. This provides an opportunity to put them on a system that has a lower carbon footprint. Renewable energy can help transform the rural economy. Micro-mini-grid systems for remote areas can provide a sustainable source of energy with the help of a battery storage system. This would be a cost-effective method to provide electricity that can power agriculture, schools and

entire communities. It will also be a source of livelihood and employment. This could contribute to the vision of development that is distributed, instead of being centred on a few urban hubs.

The energy battery system would help accelerate India's transition to a greener economy. A study<sup>22</sup> (See Figure 2) shows the difference in the carbon emission in the two scenarios where the cost of batteries are to fall to one-third of today's level.

Investment in ESS also presents an economic opportunity for India to give a boost to its manufacturing and start-up sector by nurturing a battery manufacturing ecosystem. The government can facilitate investments from domestic and international sources through strong

**Figure 2. CO<sub>2</sub> emissions in the two scenarios**



Source: International Energy Agency study<sup>23</sup>

regulation and designing innovative financing models. The market for storage batteries is expected to grow to 300 GWh in 2026<sup>24</sup> which will help achieve economies of scale and can help cater to the global market as well. In 2019, India got its first grid-connected battery storage system of 10 MW capacity.<sup>25</sup>

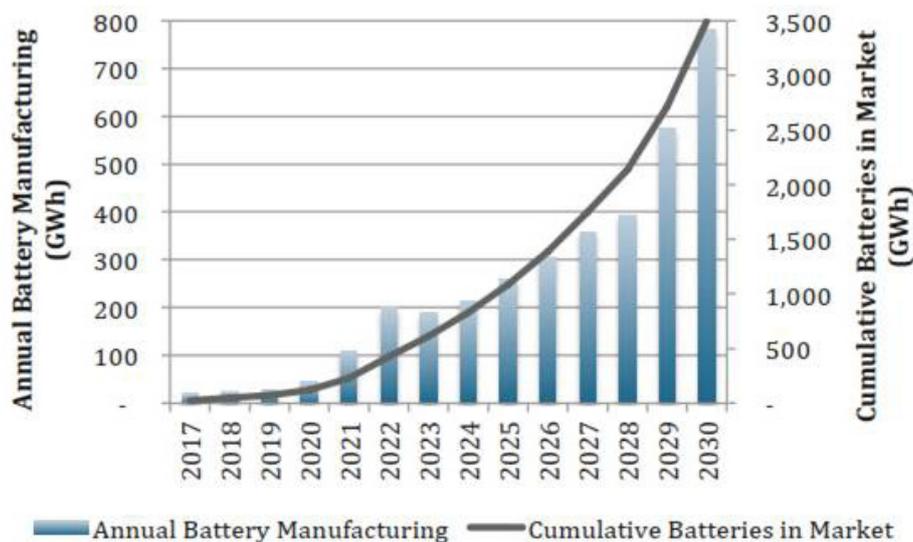
Attracting investment into this sector would require clear long-term policies that reduce any uncertainties. Pilot projects are an important part of the process of understanding new technologies and demonstrating their utility. Given resistance towards a transition to newer technologies, the initial push must come from the policymakers. Incentives in the form of tax credit, grants and other forms of subsidies would be necessary to encourage the initial uptake of the technology. NITI Aayog has also recommended three stages for the development of the battery storage

supply chain in India through collaborative research, cooperation between different stakeholders, and a policy environment that reduces risk for investment.<sup>27</sup> Collaboration between the government and industry will be key. Investments in the sector would be influenced by policy, including those related to procurement of battery storage systems in long-term planning and incentives.

### Renewable Energy

The electricity sector in India has a large carbon footprint due to the huge dependence on coal-fired power plants. Even as the cost of renewable energy has been declining, the grid infrastructure for the integration of renewable energy remains inadequate. The renewable energy sector must increase its share in the total power supply. Energy storage infrastructure will be able to respond effectively to changes in demand and supply and thus

**Figure 3. Market projection for batteries**



Data from NITI Aayog report<sup>26</sup>

help in the grid integration of renewable power. An analysis by TERI offers a model of how it is possible for India to transition to a more integrated system of renewable power without any further investments in coal.<sup>28</sup> While the government has set targets to increase the share of renewable energy, there is a need to change the focus from overall targets for solar and wind power, to “greening” the grid.<sup>b</sup>

In 2019, India started the rooftop solar scheme with state-wise targets. The government has encouraged each state to have at least one ‘solar city’ that would meet their electricity needs through solar power. Rooftop technology could also be one way towards low-cost urbanisation where employment can be created away from a few urban centres. The renewable energy sector has the potential to create job opportunities, especially in rural India.

Besides domestic investment and incentives, the renewables sector needs foreign assistance in technical know-how. Foreign investment in the renewables sector has increased over the past three years, crossing US\$ 1 billion in 2018.<sup>29</sup>

Amidst the COVID-19 pandemic, India can invest in local manufacturing such as of solar modules which is currently heavily reliant on imports from China. India has also levied an import duty on solar cells,

modules and inverters.<sup>30</sup> But securing the supply chain in the solar industry would require focused and transparent policy at the various stages in the value chain, such as raw material, technological know-how, skilled personnel, strong R&D, quality of products, and availability of low-cost finance. Skills development programmes such as Suryamitra<sup>31</sup> focus on the rural youth so they can access more opportunities for employment. There is a need for such centres to be made more accessible to the rural population.

### Green Investment

A study of state finances by the Centre for Policy Research (CPR)<sup>32</sup> suggests that even prior to the pandemic, policy reforms such as GST, restructuring of the centrally sponsored scheme (CSS), and Ujwal DISCOM Assurance Yojana (UDAY) scheme, have already constrained the fiscal space of the states. Thus, their ability to undertake further expenditure amidst the economic fallout of the pandemic would depend on how well they mobilise independent sources of revenue. The same is true for the local and sub-state organisations. Their ability to tap into independent sources of finances would be crucial.

Municipal green bonds could be a way to borrow money from the markets.<sup>c</sup> But the municipal bonds have had only partial

b This refers to grid integration of renewable energy.

c Green bonds are bonds that are specifically designated for raising funds from the market for climate and environmental projects. Municipal green bonds refers to those bonds that are used by municipalities to raise funds from the market.

success in India and it forms a paltry share of the total municipal revenue.<sup>33</sup> In developed countries, municipal bonds form the principal source of revenue for city authorities. To tap into this resource, India would require both financial and institutional reforms to increase the creditworthiness of the municipalities and local bodies. The second tranche of the economic stimulus ties the borrowing limits of states to their performance in improving their urban local bodies' finances. This could give states an added incentive to push for long-pending reforms for urban local bodies.

### 'Green' Start-ups

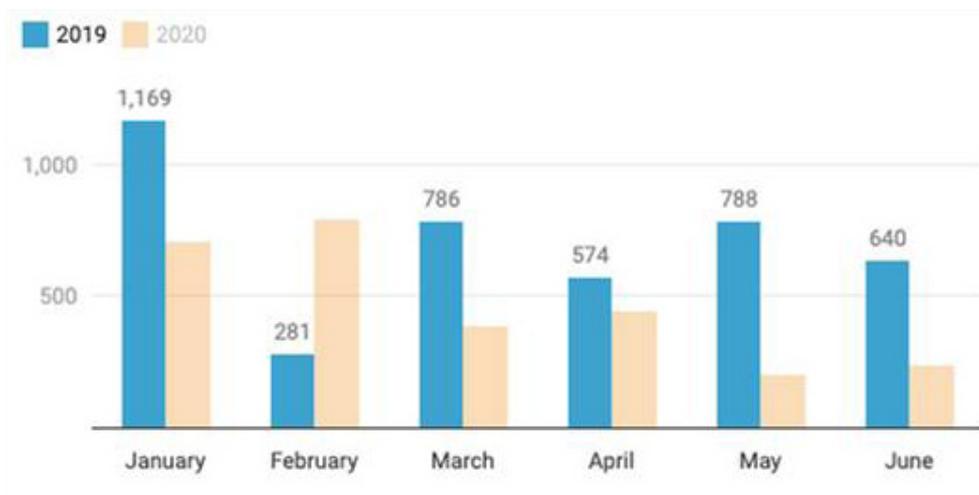
The 'green' start-ups sector can operate in a wide variety of sectors such as agriculture, energy, manufacturing, waste management, sanitation, services, and R&D. In the EU, as part of the Green Deal, it is supporting

some 64 game-changing green startups that offer innovative solutions across different sectors.<sup>34</sup>

In a recent survey by National Association of Software and Service Companies (NASSCOM), conducted on the overall start-ups sector in India on the effect of the pandemic, nine out of 10 start-ups are said to be facing a decline in revenues and up to 60 percent face closure.<sup>35</sup> Early to mid-stage businesses have been hit the hardest. The pandemic is making start-ups scale down their growth plans. Though some sectors such as online media, education, food and health services have benefitted, the overall impact has been a slowdown. Venture capital funds have slowed down, with May 2020 being the worst hit as seen in Figure 4.

A study by Mariana Mazzucato<sup>37</sup> has shown how successful start-ups benefit

**Figure 4. Comparison of Venture Capital Funds**



Data from Livemint<sup>36</sup>

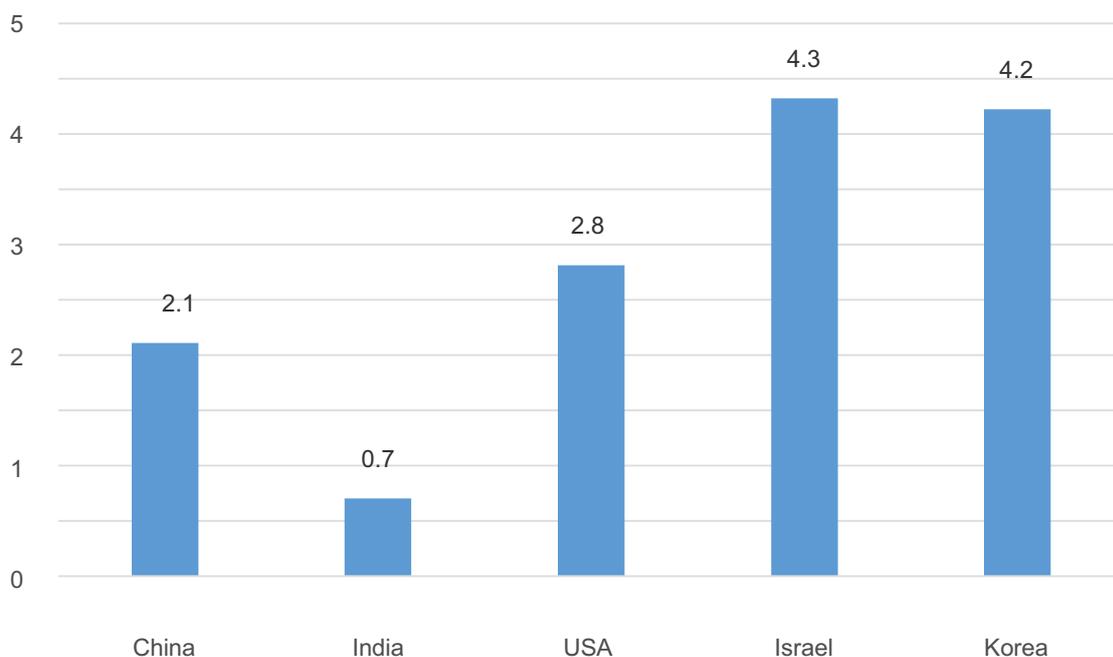
most from government funded research and are built around technologies that have government support. Such an ecosystem is essential in addition to availability of funds at low cost. The study also pointed out that venture capital is not the primary source of funding that can support innovation that requires long timeframes. But investment in greener technology comes with greater risk and longer gestation periods. New start-ups find it harder to get funding due to these factors. Thus, government support and partnership assumes even greater importance in the current scenario.

The role of government funding in the start-up sector or to support technology shifts to renewable energy is primary. Government expenditure on R&D has been

stagnant for the past two decades at 0.6-0.7 percent of GDP.<sup>38</sup> With the push for 'AatmaNirbhar Bharat' (self-reliant India), developing such an ecosystem should be a priority. Scarce government resources can be used to support efforts in areas that may reap the highest social benefits.

Another element of creating such an ecosystem is the amount of spending on research and development by the established companies in the market. Although expenditure on R&D has increased, it is still a small part of the overall sales revenue of firms. There are certain focus areas that receive the largest spending in R&D such as software, electronics and other areas get a smaller share of the pie that includes education

**Figure 5. Government R&D expenditure as percent of GDP**



*Economic Survey 2017-18, Department of Economic Affairs, Ministry of Finance*

and green technology. Partnership with industry in R&D can ensure synergy with the needs of the market.

## Agriculture

Agriculture in India employs nearly 50 percent of the population but contributes only about 17 percent to GDP. It was the only sector that registered a growth despite the lockdown, of three percent.<sup>39</sup> It is also the occupation of a majority of employed women in rural India. Immediate policy measures were also taken to help the farming community. The Operation Greens Scheme from Tomato, Onion and Potato (TOP) scheme was extended to all fruits and vegetables for a period of six months each to prevent distress sales.<sup>40</sup> Government has also announced the transfer of INR 2000 each to the accounts of farmers. RBI has also granted a moratorium of three months on agricultural and crop loans.

Advancement in agricultural productivity, infrastructural investments and efficiency have both economic and social benefits. The COVID-19 pandemic led to a disruption of supply chains in the food system. The government, in the third tranche of the stimulus package, has announced the allocation of 1 lakh crore (US\$ 13.4 billion) for the creation of infrastructure for agriculture such as cold storage.<sup>41</sup> Investment in infrastructure would help strengthen resilience for farmers against changes in demand and disruptions in supply chains.

Three new bills drafted by the government aim to give greater freedom to farmers to directly sell their produce outside of the state mandis: Farmer's Produce Trade and Commerce (Promotion and Facilitation) bill 2020; Farmer (Empowerment and Protection) Agreement of Price Assurance and Farm Services Bill, 2020; and the Essential Commodities (amendment) Bill, 2020. These bills formalise some of the measures taken earlier this year where farmers were given the freedom to sell their produce outside of the state-regulated mandi market.<sup>42</sup> There are concerns, however, since more than 80 percent of the country's farmers in India are small and marginal. This raises questions about how well the unregulated market will be able to protect these poor farmers and deliver their rightful dues.

Investments would help build a strong supply chain with a focus on warehousing, cold storage and processing. The government has over the years taken steps to make agriculture more environment-friendly and ensure more efficient use of irrigation water, micro irrigation, encouraging more efficient cropping techniques, adoption of solar pumps for farmers and fertilisers that are eco-friendlier. The passage of the bills has rightly brought focus on the issues faced by the sector and the long pending structural reforms that agriculture needs. Studies have shown how government expenditure has more impact on productivity in agriculture than does private sector expenditure.<sup>43</sup>

There is a huge opportunity for a range of reforms to improve productivity, correct the imbalance in fertiliser use, rationalise fertiliser subsidies, and move towards a more sustainable cropping pattern suited to the agro-climatic conditions of a region.

## CONCLUSION

As India continues to battle COVID-19, it must also begin on a new path of economic revival—one that will mitigate the negative consequences of climate change, and promote sustainable and inclusive development in the long run. It is important to prioritise investments in sectors that could help the transition to a greener economy. Understandably, the governments have in the first wave of stimulus focused more on economic revival without a specific focus on green efforts.

A second wave of stimulus—which is not off the cards—will present opportunities to restructure long-term economic policies and give priority to green technologies and investments. The present stimulus had a large credit element and the direct spending was low. The second one must have more in terms of direct spending and should include policies that promote investments in greener sectors.

The push for a green recovery was recognised after the 2008 financial crisis. However, not many countries incorporated green policies as part of their stimulus packages. Those who did are today leading in the development of such technologies.<sup>44</sup> It is time that India rethinks its stimulus to address both the economic downturn caused by COVID-19, and to steer the economy on a more sustainable growth trajectory. 

### ABOUT THE AUTHOR

**Nandini Sarma** is a Junior Fellow with ORF's Green Transitions Initiative.

## ENDNOTES

- 1 “Study warns of poverty surge to over 1 billion due to coronavirus,” *The Hindu*, 12 June 2020, <https://www.thehindu.com/news/international/study-warns-of-poverty-surge-to-over-1-billion-due-to-coronavirus/article31810064.ece>
- 2 Yoshita Singh, “Nearly half of world workforce may lose job due to Covid-19 pandemic: UN body,” *Livemint*, 30 April 2020, <https://www.livemint.com/news/world/nearly-half-of-world-workforce-may-lose-job-due-to-covid-19-pandemic-un-body-11588214875137.html>
- 3 Prashant K. Nanda, “Urban unemployment falls sharply, rural job loss rate largely unchanged: CMIE,” *Livemint*, 08 June 2020, <https://www.livemint.com/news/india/urban-unemployment-falls-sharply-rural-job-loss-rate-largely-unchanged-cmie-11591607048197.html>
- 4 Kate Larsen et al. “It’s Not Easy Being Green: Stimulus Spending in the World’s Major Economies”, *Rhodium Group*, September 02, 2020, <https://rhg.com/wp-content/uploads/2020/09/Its-Not-Easy-Being-Green-Stimulus-Spending-in-the-Worlds-Major-Economies.pdf>
- 5 Will Wade, “COVID-19 pandemic has everyone ditching coal quicker, except India, China and rest of Asia,” *Deccan Herald*, 10 June 2020, <https://www.deccanherald.com/business/covid-19-pandemic-has-everyone-ditching-coal-quicker-except-india-china-and-rest-of-asia-847911.html>
- 6 Justin Rowlett, “Coal: Is this the beginning of the end?,” *BBC*, 25 November 2019, <https://www.bbc.com/news/science-environment-50520962>
- 7 Antti Tulonen, “On China, COVID-19, and Coal,” *The Diplomat*, 03 April 2020, <https://thediplomat.com/2020/04/on-china-covid-19-and-coal/>
- 8 “Stimulus Part 4: Govt ends Coal India's monopoly in coal mining; raises defence FDI limit to 74%,” *The Economic Times*, 16 May 2020, <https://economictimes.indiatimes.com/markets/stocks/news/covid-19-fourth-tranche-govt-ends-coal-india-monopoly-allows-commercial-mining-of-coal/articleshow/75775421.cms?from=mdr>
- 9 Nadja Popovich et al., “The Trump Administration Is Reversing 100 Environmental Rules. Here’s the Full List,” *The New York Times*, 15 July 2020, <https://www.nytimes.com/interactive/2020/climate/trump-environment-rollbacks.html>
- 10 Joanna Slater, “Can India chart a low-carbon future? The world might depend on it.” *Washington Post*, 12 June 2020, <https://www.washingtonpost.com/climate-solutions/2020/06/12/india-emissions-climate/?arc404=true>
- 11 Tim Buckley, “The One Sun, One World, One Grid vision from India’s Narendra Modi,” *Renew Economy*, 14 June 2020, <https://reneweconomy.com.au/the-one-sun-one-world-one-grid-vision-from-indias-narendra-modi-80390/>
- 12 Purva Jain, “Post COVID19 Green Mobility: Time for a long-term vision for Electric Vehicles in India”, *ORF*, 24 September 2020, <https://www.orfonline.org/research/post-covid19-green-mobility-time-for-a-long-term-vision-for-electric-vehicles-in-india/>

- 13 India Transportation, *World Bank*, 23 September 2011, <https://www.worldbank.org/en/news/feature/2011/09/23/india-transportation#:~:text=Roads.,60%20percent%20of%20its%20freight.&text=It%20carried%20some%2019.8%20million,of%20the%20world's%20largest%20employer>.
- 14 “Urban population in India may go beyond 50% by 2050: MoHUA Secretary” *The Statesman*, 22 May 2019, <https://www.thestatesman.com/business/urban-population-india-may-go-beyond-50-2050-mohua-secretary-1502757868.html>
- 15 Sarita C. Singh, “Electric Vehicles may get 2,600 charging stations in a year,” *The Economic Times*, 12 February 2020, [https://economictimes.indiatimes.com/industry/auto/auto-news/electric-vehicles-may-get-2600-charging-stations-in-a-year/articleshow/74089535.cms?utm\\_source=contentofinterest&utm\\_medium=text&utm\\_campaign=cppst](https://economictimes.indiatimes.com/industry/auto/auto-news/electric-vehicles-may-get-2600-charging-stations-in-a-year/articleshow/74089535.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst)
- 16 Power Ministry Guidelines for Charging infrastructure, October 01, 2019, [https://powermin.nic.in/sites/default/files/webform/notices/Charging\\_Infrastructure\\_for\\_Electric\\_Vehicles%20Revised\\_Guidelines\\_Standards.pdf](https://powermin.nic.in/sites/default/files/webform/notices/Charging_Infrastructure_for_Electric_Vehicles%20Revised_Guidelines_Standards.pdf)
- 17 “Electric Vehicle Sales In India Up 20% In 2019-20, Industry Body Says,” *Bloomberg*, 20 April 2020, <https://www.bloomberqunt.com/business/electric-vehicle-sales-in-india-up-20-in-2019-20-industry-body-says>
- 18 “Vehicle scrappage policy soon, says Gadkari” *The Hindu*, 07 May 2020, <https://www.thehindu.com/news/national/vehicle-scrappage-policy-soon-says-gadkari/article31528189.ece>
- 19 Thomas Gersdorf et al. “McKinsey Electric Vehicle Index: Europe cushions a global plunge in EV sales”, McKinsey & Company, July 17, 2020, <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/mckinsey-electric-vehicle-index-europe-cushions-a-global-plunge-in-ev-sales>
- 20 Henry Sanderson, “Electric cars: China powers the battery supply chain,” *FT*, 22 May 2019, <https://www.ft.com/content/455fe41c-7185-11e9-bf5c-6eeb837566c5>
- 21 Ajay Sawhney, “Battery energy storage systems in India: New kid on the block,” *Energy World*, 22 March 2019, <https://energy.economictimes.indiatimes.com/energy-speak/battery-energy-storage-systems-in-india-new-kid-on-the-block/3487#:~:text=On%208%20May%202020%2C%20ReNew,%2Dthe%2Dclock%20power%20supply>.
- 22 Claudia Pavarini, “India is going to need more battery storage than any other country for its ambitious renewables push,” IEA, 23 January 2020, <https://www.iea.org/commentaries/india-is-going-to-need-more-battery-storage-than-any-other-country-for-its-ambitious-renewables-push>
- 23 Claudia Pavarini, “India is going to need more battery storage than any other country for its ambitious renewables push”
- 24 “GST Rate Cut: GST on Lithium Ion Batteries slashed from 28% to 18%,” *India Energy Storage Alliance*, <https://www.indiaesa.info/news-menu/1422-gst-rate-cut-gst-on-lithium-ion-batteries-slashed-from-28-to-18>

- 25 Uma Gupta, “India gets first grid-scale battery energy storage system,” *PV Magazine*, 13 February 2019, <https://www.pv-magazine.com/2019/02/13/india-gets-first-grid-scale-battery-energy-storage-system/>
- 26 Shikha Juyal et al., “India’s Energy Storage Mission,” *NitiAayog*, [https://niti.gov.in/writereaddata/files/document\\_publication/India-Energy-Storage-Mission.pdf](https://niti.gov.in/writereaddata/files/document_publication/India-Energy-Storage-Mission.pdf)
- 27 Shikha Juyal et al., “India’s Energy Storage Mission”
- 28 Thomas Spencer et al., “Renewable Power Pathways: Modelling the integration of Wind and Solar by 2030 in India,” *Teri*, July 2020
- 29 Utpal Bhaskar, “Foreign investors pumped \$1.02 bn equity in India’s clean energy space in FY19,” *Livemint*, 13 Jul 2019, <https://www.livemint.com/industry/energy/foreign-investors-pumped-1-02-bn-equity-in-india-s-clean-energy-space-in-fy19-1562984674870.html>
- 30 Shashwat Mohanty “Government plans to impose 15-25% duty on solar gear imports,” *Economic Times*, 26 Jun 2020, <https://economictimes.indiatimes.com/industry/energy/power/import-duty-on-solar-modules-to-rise-to-40-in-a-year/articleshow/76621967.cms?from=mdr>
- 31 Suryamitra, Skill Development Programme, <https://suryamitra.nise.res.in/info/About-Suryamitra.html>
- 32 Avani Kapur et al. “Study of State Finances 2020-21 (Provisional),” *Centre for Policy Research*, 10 May 2020, <https://www.cprindia.org/research/papers/study-state-finances-2020-21-provisional-0>
- 33 Isher Judge Ahluwalia et al. “State of Municipal Finances in India,” *ICRIER*, March 2019, [https://fincomindia.nic.in/writereaddata/html\\_en\\_files/fincom15/StudyReports/State%20of%20Municipal%20Finances%20in%20India.pdf](https://fincomindia.nic.in/writereaddata/html_en_files/fincom15/StudyReports/State%20of%20Municipal%20Finances%20in%20India.pdf)
- 34 Green Deal, July 23, 2020, [https://ec.europa.eu/info/news/first-green-deal-funding-european-innovation-council-awards-over-eu307-million-64-startups-set-support-recovery-plan-europe-2020-jul-23\\_en](https://ec.europa.eu/info/news/first-green-deal-funding-european-innovation-council-awards-over-eu307-million-64-startups-set-support-recovery-plan-europe-2020-jul-23_en)
- 35 Alnoor Peermohamed, “India's startup story hanging by a thread,” *Economic Times*, 19 May 2020, <https://tech.economictimes.indiatimes.com/news/startups/indias-startups-story-hanging-by-a-thread/75812875>
- 36 “How covid-19 has changed VC investing in India,” *Livemint*, 23 June 2020, <https://www.livemint.com/news/india/how-covid-19-has-changed-vc-investing-in-india-11592896613103.html>
- 37 “Startup myths and obsessions,” *The Economist*, 3<sup>rd</sup> February 2018, <https://www.economist.com/schumpeter/2014/02/03/startup-myths-and-obsessions>
- 38 “India's R&D spend stagnant for 20 years at 0.7% of GDP,” *The Economic Times*, 29 Jan 2018, <https://economictimes.indiatimes.com/news/economy/finance/indias-rd-spend-stagnant-for-20-years-at-0-7-of-gdp/articleshow/62697271.cms?val=3728&from=mdr>
- 39 Samyak Pandey, “Agriculture sector to grow at 3% in 2020-21 despite Covid-19 lockdown: Modi govt,” *The Print*, 29 April 2020, <https://theprint.in/india/agriculture-sector-to-grow-at->

3-in-2020-21-despite-covid-19-lockdown-modi-govt/411458/

- 40 Operation Greens, Ministry of Food processing Industries
- 41 “Covid-19 package: Rs 1 lakh crore for agriculture infrastructure,” *India Today*, 15 May 2020, <https://www.indiatoday.in/india/story/covid-19-package-agriculture-supply-chain-in-focus-1678433-2020-05-15>
- 42 “Farmers can soon sell their produce to any buyer,” *Economic Times*, 16 May 2020, [https://economictimes.indiatimes.com/news/economy/agriculture/farmers-can-soon-sell-their-produce-to-any-buyer/articleshow/75766798.cms?utm\\_source=contentofinterest&utm\\_medium=text&utm\\_campaign=cppst](https://economictimes.indiatimes.com/news/economy/agriculture/farmers-can-soon-sell-their-produce-to-any-buyer/articleshow/75766798.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst)
- 43 K. N. Selvaraj “Impact of Government Expenditure on agriculture and performance of agricultural sector in India”
- 44 “Greening Post Covid-19 Economic Recovery in India,” *TERI*, May 2020





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