

Article

Glasgow Commitments: Implications for India

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Abstract

India made ambitious commitments on climate mitigation in its first Nationally Determined Contribution (NDC) in 2015 and upgraded it further at the Glasgow summit in 2021. Additionally, it made a commitment to achieve a net-zero emission level by 2070. While some of the NDC commitments may be difficult to realise, particularly due to the current economic situation, it is difficult to comment on the feasibility of the net-zero emission by 2070 as the basis for such a commitment is not known, and it is a long-time horizon, making any prediction difficult. For India, living up to its commitment will not only be determined by its own internal factors and challenges but also by how other major countries perform on their mitigation commitments. Similarly, the implications of the Glasgow summit will not be determined by its own commitments, but the commitments made by others and their follow-up actions.

For a long time, India followed a cautious approach to its mitigation commitments which attracted criticisms, particularly from the developed world, but also from some developing countries that expect substantial impacts of climate change. However, this changed since the Paris Agreement and India's first Nationally Determined Contribution (NDC). Even the erstwhile critics of India's approach now concede that

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India showed huge courage to accept bold commitments to address the problem of climate change, probably beyond its means. India's NDC included a reduction in the emissions intensity of its GDP by 33-35% by 2030 from the 2005 level and the creation of an additional carbon sink of 2.5-3 billion tonnes of carbon dioxide (CO₂) equivalent through additional forest and tree cover by 2030 (See Table 1). India's NDC also builds on its goal of installing 175 GW of renewable power capacity (100 GW from solar alone) by 2022 by setting a new target to increase its share of non-fossil-based power capacity to about 40% by 2030 (with the help of international support). The 2022 target is extremely ambitious, given that the world's entire installed solar power capacity was 181 GW in 2014, and it is unlikely that the 2022 target is going to be achieved. India also gave a positive signal to the global community by quickly ratifying the Paris Agreement.¹

India delayed its updated NDC, and the Indian Prime Minister announced the revised commitments at the Glasgow ministerial meeting. At Glasgow, India increased its emission intensity reduction target from 33-35 percent to 45 percent by 2030 (Table 1). Similarly, India increased its targeted share of non-fossil fuels in power generation capacity from 40 percent to 50 percent by 2030. India also enhanced its wind and solar power generation capacity target for 2030 from 450GW to 500GW. Thus, India enhanced three of its four NDC commitments as announced in 2015, while it left its commitment on forest coverage untouched. As there was a global call to fix a target year for achieving net-zero emission, India announced 2070 as the year to achieve this target. India, however, made another promise – it will reduce one billion tonnes of emission from its projected emission between 2021 and 2030. This was not quite expected as this is the first time India talked about emission reduction in an absolute sense, as previously, India always talked in terms of emission intensity. This is, however, inextricably linked to emission intensity. So, in a sense, it is another way of confirming its emission intensity reduction target.

Even though India did not make any commitments on phasing out coal as demanded by many external stakeholders and set the target year of net-zero emission in 2070 as against the expectation of 2060, it is generally agreed that India's commitments are bold considering that India's per capita emission is substantially lower than the global average and its per capita income is much lower than the global average. Reducing emission for India, even in relative terms, will not be quite easy. It would be useful to

understand the principal challenges that India could face in implementing the plan on the energy supply front and associated impacts on the energy-related ecosystem of India. Moreover, given that the commitments have already been made, it will be useful to explore the most feasible and cost-effective strategies to deal with the challenges in India's transition to an alternative non-fossil fuel energy mix.

Table 1: India's NDC Commitments and Progress

	2015 NDC (target for 2030)	2020 NDC (target for 2030)	Progress as of 2019
Carbon intensity reduction (compared to 2005)	33-35%	45%	21%
Non-fossil share in power capacity	40%	50%	37.1%
Forest volume increase (compared to 2005)	2.5-3 billion tonnes of CO2 equivalent	—	1.88 (2005 base year) 0.40 (2015 base year)
Wind and solar power generating capacity	450GW (175GW by 2022)	500GW	96.96GW (2021)
1 billion tonnes of emissions from its projected emissions between now and 2030 Net-zero year: 2070			

Source: Compiled by the author from Government of India sources.

Given this backdrop, it would be useful to look at the possible implications of the Glasgow summit on Indian economic and social development as well as on the environment. While some may question how ambitious the Indian targets are, it is also important to understand how realistic and plausible they are compared to what India could achieve over the last few years. It is also important to remember that India is still a developing country, and it has to ensure economic growth to ensure the minimum human development standards for its people.

However, how India will perform will depend not only on its own challenges and measures adopted, but it will also depend on how other countries also perform. It is well recognized that climate change is already underway, and a substantial increase in

extreme weather events in India is already being experienced. This is likely to intensify further. Most experts also agree that, given the commitments made by most countries, it will not be possible to limit temperature rise within 1.5 degree Celsius, and it may even breach 2-degree Celsius level. Given that India is among the most vulnerable countries, it will also be impacted substantially. This can disturb all calculations and if India is forced to divert more resources to adaptation measures and also fails to attract technology and finance from developed countries, it will be difficult for India to stay on the path that it is envisaging now. In the future, therefore, the crucial question before India will be how to balance mitigation and adaptation efforts.

Challenges for India

As against the initial (2015) target of 33-35 percent reduction in emission intensity by 2030 with respect to the 2005 level, India achieved a 19 percent reduction by 2019. So, it is quite feasible to achieve the initial target by 2030. However, the new target of 45 percent would not be that easy. Nevertheless, it would not be impossible with concerted actions as outlined by other related climate targets. Most important in this regard will be the target on the share of non-fossil fuel in installed power generation capacity in 2030 which was fixed at 40 percent in the 2015 NDC commitment. As against this, India's share of non-fossil fuel in the installed capacity was 37.1 percent in 2019. It is quite likely that India has already achieved that target much ahead of time. Therefore, India's commitment of enhancing this target to 50 percent by 2030 is quite reasonable. A study by the Central Electricity Authority states that the percentage of non-fossil fuel in installed capacity in India is likely to increase to 64% in March 2030.² It is also expected that non-fossil fuels generation contribution is likely to be around 44.7% of the total gross electricity generation by the year 2029-30.³

The percentage of non-fossil fuel in installed capacity in India is likely to increase to 64% in March 2030.

India's commitments in NDC were partly conditional upon receiving outside technology and finance. For example, achieving about 40 percent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030 was based on receiving transfer of technology and low-cost international finance, including from Green Climate Fund (GCF). However, it is well known that India has not received much of foreign assistance in this regard. Despite that, Indian progress has been quite

good in this area, though the recent progress has been slow due to the ongoing Covid-19 pandemic. Nevertheless, India might achieve the target or reach quite close to it without any external assistance.

However, India's initial (2015) commitment of creating 450 GW of solar and wind power generating capacity is going to be tough. It is likely going to miss the interim target of 175 GW of wind and solar power capacity by 2022, since by the middle of 2021 it was slightly less than 100 GW. Despite that, India has enhanced this target to 500GW in the 2021 commitment made at Glasgow. The Covid-19 pandemic as well as its economic impact have made the task even more difficult as it is not possible to create renewable energy generation capacity when the overall energy demand remains stagnant. Thus, achieving the new target will be extremely difficult unless India can quickly recover from the economic shock of the Covid-19 pandemic.

As far as the additional carbon sink is concerned, the target for the year 2030 will be easily achieved if 2005 is taken as the base year. However, if 2015 is taken as the base year, it might not be easy to achieve the target.⁴ This lack of clarity and the perceived difficulty in attaining the already adopted target were probably the reasons why India did not upgrade this part of the NDC commitment at Glasgow.

India needs to enhance its energy supply to ensure a decent living for its people. Studies have shown that it can be provided with approximately 40 gigajoule (GJ) of per capita energy consumption, taking into account both direct and indirect uses. With technology improvement and higher efficiency of use, this can be brought down further.⁵ But that will take time. As of now, India's energy consumption is far below this level, but for all other major countries, the current consumption level is much higher than this. Hence, there is no way for India to ensure a decent living standard for its people without increasing energy consumption. In the short run, it will not be possible to enhance energy supply without increasing emissions as well.

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It is well recognized not only in India but also by development banks such as the World Bank and the Asian Development Bank (ADB) that India suffers from a massive deficit in its infrastructure. According to the World Bank Logistics Performance Index,

China's infrastructure has been better than the Organisation for Economic Co-operation and Development (OECD) average for a long time. India's infrastructure condition is far below that. Even countries like Brazil, Russia and South Africa would like to improve their infrastructure, even though they are ahead of India in this regard. Hence, as India tries to improve its infrastructure, it will use energy and material resources in substantial quantities even if direct consumption of energy and resources by its people at home or in transport do not increase much. The direct energy use is linked to the energy which the residents buy and consume directly to cook, heat, light, travel, etc.; indirect energy use is the energy uses that occur during the lifecycle of commodities utilised.

Most Indians are yet to secure some of their basic needs such as a decent home for living. In 2015-16, only 57 percent of Indian households lived in pucca (permanent structure) houses. But even this figure does not give the true picture. Among those who live in pucca houses, many families live in houses that are too small for the size of the family. As India builds proper houses for about three-fourths of its families, there would be huge indirect consumption of energy and material resources.

Other aspects that are important for India are the stage of economic growth, the structure of the economy and its development strategy. While India has been trying to increase its share of the manufacturing sector in its Gross Domestic Product (GDP) for a long time, in reality, just the opposite has happened. India has suffered premature deindustrialization since around 2008. Infrastructure deficit has been considered as one of the factors behind this.⁶ India's success in reaching its sustainable development goals will crucially depend on its ability to increase its share of manufacturing in GDP. Hence, India plans to improve its infrastructure as well as enhance its share of manufacturing in GDP, which has been the key objective of its Make-in-India programme launched in 2014. This will not be possible without a substantial increase in energy use, at least in the near future.

It is more or less a consensus view that it will be difficult for India to maintain higher growth momentum in the economy without a vibrant and growing manufacturing sector. Both mitigation and adaptation will require substantial financial resources that will be difficult to mobilize in the absence of strong economic growth in the country. It is also politically difficult for any country to support programmes and activities that need fiscal support or subsidies if they do not add substantially to the economy, particularly in a developing country that needs to generate jobs for its growing

population. In other words, providing government support for mitigation activities will be difficult if they depend heavily on imports. Hence, focusing on mitigation in the absence of co-benefits will be quite difficult. India's mitigation efforts involving solar power, electric vehicles and hydrogen fuels will require substantial manufacturing activities related to these programmes in the country to have political buy-in.

Since there is also a broader sustainable development agenda at the global level that is recognized and owned by all nations, it would be useful to look at how climate change and mitigation efforts will impact the sustainable development goals. The impact of climate change on sustainable development goals are quite well documented. Almost all Sustainable Development Goals (SDGs) are likely to be more difficult to achieve due to the impacts of climate change (Table 2). That does not automatically imply that climate mitigation will have positive impacts on all SDGs. While in some sectors, the impacts will be positive, in some cases, they can be uncertain or even negative. The major reason for negative impacts will be the likely diversion of funds and efforts from socio-economic programmes to climate mitigation. Even adaptation efforts can create similar impacts – diversion of funds and efforts from non-climate priorities.

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Climate Plans of Major Jurisdictions

For understanding the challenges that India is likely to face, it is also important to look at the experience of other countries and their climate commitments, especially those that are more developed than India. It is well understood that if other major countries do not aggressively pursue their ambitious targets, it will be difficult for India to go ahead with its climate mitigation plans. This will mean India's resources will be diverted more towards adaptation efforts and mitigation will take a backseat. While India's current and near-term challenges can be understood by looking at itself, its long-term challenges will be better understood by looking at countries that are more developed than India.

Among other major countries, the experience of China is quite relevant for India as both were at a similar stage of development some three decades back. Since then,

Table 2: Likely Impacts of Climate Change and Mitigation Efforts on SDGs

SDG	Impact of Climate Change	Impact of Mitigation Efforts
SDG 1: No Poverty	Lower growth and lower poverty reduction	Risk of diversion of funds from poverty reduction programmes
SDG 2: Zero Hunger	Decline in crop yield with adverse effect on food security	Risk of diversion of funds from poverty reduction programmes
SDG 3: Good Health and wellbeing	Rise in disease burden	Lesser pollution to improve health and wellbeing
SDG 6: Clean Water and Sanitation	Adverse impact on availability of usable water	Can improve water availability, but clean energy generation might increase the demand for water
SDG 7: Affordable and Clean Energy	Can adversely impact hydropower generation	Energy become cleaner, but affordability can be an issue
SDG 8: Decent Work and Economic Growth	Job loss in climate impacted sectors	Not certain
SDG 10: Reduced Inequalities	Poor are more vulnerable – can enhance inequality	Not certain
SDG 11: Sustainable Cities and Communities	Can adversely impact the availability of resources like water	Less pollution will make cities and communities sustainable
SDG 12: Responsible Consumption and Production	Not certain	Less consumption of resources and more responsible consumption and production
SDG 13: Climate Action	More adaptation requirements can lead to reduced focus on mitigation	Positive
SDG 14: Life Below Water	Degradation of water bodies and adverse impacts	Positive (if water is not an issue)
SDG 15: Life on Land	More disease burden and food and water scarcity	Less pollution - positive
SDG 16: Peace, Justice and Strong Institutions	Climate change related conflict areas within and across countries	Not certain
SDG 17: Global Partnership	Not certain	Past experience is not encouraging

Source: Prepared by the author

China has achieved phenomenal growth leaving India substantially behind, and India aspires to catch up with China. Moreover, though the nature of China's commitments was quite similar to those of India, surely the scale had to be differentiated, given that China's current emission level as well as its economic status is far higher than those of India. China committed (in 2015) to reduce its carbon intensity of GDP by 60-65 percent with respect to 2005 (Table 3). This might appear to be high, but China has already achieved emission intensity reduction of 48.1 percent by 2019. A fast-growing economy that adds substantially every year in terms of new production capacity achieves a faster reduction in emission intensity as well because the new production capacities embrace the latest and more energy-efficient technologies. Hence achieving 60-65 percent was not too high a target. Consequently, China could update its target to be more than 65 percent by 2030, before the Glasgow meeting.

China's emission reduction strategy is primarily based on the enhancement of energy efficiency rather than through cleaning up of its energy system.

China's commitment to reducing the share of non-fossil energy in its energy mix is, however, not ambitious enough. It gave a commitment of just 20 percent by 2030 in 2015 and has already achieved a level of 15.3 percent in 2019. Hence, the updated commitment of 25 percent also appears to be rather low. It essentially means that China's emission reduction strategy is primarily based on the enhancement of energy efficiency rather than through cleaning up of its energy system as it does not foresee much rise in the share of non-fossil fuels. This has important lessons for India.

China has committed to increase its forest volume by about 4.5 billion m³ (cubic metres) whereas it achieved an additional forest volume of 5.1 billion m³ by 2019. China, however, updated its target in this regard and set it at 6 billion m³. Achieving this target should not be difficult for China. This also has important lessons for India. India was quite optimistic on this but now is quite cautious, and it did not upgrade its commitment regarding forest cover. Unlike India, China did not give any commitment (in 2015) on solar and wind power generation capacity. However, while updating its NDC, it fixed a target of over 1200 GW by 2030. Achieving this target will not be difficult as its generation capacity was 414 GW in 2019 and it is already a major producer of photovoltaic cells with high technical capability.

Table 3: China's NDC Commitments and Progress

	2015 NDC (target for 2030)	2020 NDC (target for 2030)	Progress as as of 2019
Carbon intensity reduction (compared to 2005)	60-65%	over 65%	48.1%
Non-fossil share in the primary energy mix	about 20%	about 25%	15.3%
Forest volume increase (compared to 2005)	approx. 4.5 billion m ³	approx. 6 billion m ³	5.1 billion m ³
Wind and solar power generating capacity	No target	Over 1,200 GW	414 GW
Net-zero year: 2060			

Source: Compiled by the author from UNFCCC and other sources.

China has also committed to achieving its carbon emission peak by 2030 as it has already developed its infrastructure and is a global manufacturing powerhouse. Surely, India could not have made a similar commitment. At the September 2020 General Assembly of the United Nations, China also committed to achieve a net-zero emission level by 2060. While the global community has welcomed this announcement, it has also expressed concern that China has not announced a detailed roadmap in this regard and has given approval to a number of coal power plants as part of the post-pandemic stimulus. It may, however, be noted that no country has given a detailed roadmap beyond 2030 in this regard.

While India and China made only relative or indirect commitments, some developing countries like Brazil, Russia and South Africa made commitments on the absolute level of emission. These countries, of course, already have a high level of per capita emission. In its 2015 NDC, Brazil committed to reduce its GHG emission by 43 percent by 2030 with respect to its 2005 level. It also set an intermediate target of 37 percent reduction in emission by 2025 (Table 4). Both the 2030 target and the intermediate target are reasonably high. Hence, its emission reduction path is not skewed towards the end date. In its updated NDC in 2020, however, it did not upgrade this commitment. Nevertheless, it committed to achieving net-zero emission by 2060. It is, however,

noteworthy that between 2005 and 2015, Brazil's emission declined substantially but increased thereafter to reach almost the 2005 level in 2019, raising serious doubts over its ability to meet its commitments. Nearly half of Brazil's emission is due to land-use change and forest fire, and as a result, its emission fluctuates drastically, depending on what happens in the Amazon. While it is difficult to comment on the net-zero emission target of any country, in the case of Brazil, the target looks even more difficult as the 2030 commitment also looks problematic.

Table 4: NDC Commitments and Progress of Major Countries

		2015 NDC (target for 2030)	2020 NDC (target for 2030)	Progress as of 2019	Net-Zero Year
US	GHG emission reduction (compared to 2005)	26-28% by 2025	50-52%	17%	2050
EU	GHG emission reduction (compared to 1990)	At least 40%	At least 55%	26%	2050
Brazil	GHG emission reduction (compared to 2005)	43%	43%	1%	2060
Russia	GHG emission reduction (compared to 1990)	25-30%	30%	30.3% (2018)	2060
South Africa	GHG emission target (incl. LULUCF)	398-614 Mt CO ₂ e (17 to 28%)	398-440 Mt CO ₂ e	478.61Mt CO ₂ e	2050

Source: Compiled by the author from UNFCCC and different government sources.

Russia is another major emitter, with per capita emission at a high level. In its 2015 NDC, it made a commitment to reduce Greenhouse Gas (GHG) emission by 25-30 percent by 2030. However, this target is with respect to the year 1990, rather than 2005 as is the case with most other countries. In its 2020 commitment, however, it raised its ambition marginally to make the target to 30 percent rather than a tentative target of 25-30 percent. However, the base year of 1990 makes its target rather

insignificant. Its emissions decreased drastically between 1990 and 1998 due to disruptive restructuring of the economy, as well as the dissolution of the Soviet Union. Since 1998, its emission has been growing and yet to achieve the 1990 level. As a matter of fact, its emission level in 2018 was lower by about 30 percent compared to the 1990 level. So, in a sense, Russia did not make any reduction commitment. In reality, however, it has been on a growth trajectory, and hence, its emission is likely to rise for some time before it starts declining, reaching the 2018 level once again by 2030.

South African 2015 NDC made a commitment for GHG emission targets, including land use, land-use change, and forestry (LULUCF), of 398-614 Mt CO₂e by 2030. The target has a wide range meaning that does not give a clear-cut commitment to reduce emission. More importantly, given that its emission level in 2005 was around 480 Mt CO₂e, in percentage terms, its emission reduction target was 17 percent to 28 percent (increase in emission). So instead of a reduction, its emission could even increase by 28 percent by 2030. However, in its updated NDC, it has fixed the target range at 398-440 MtCO₂e in 2030, meaning that its emission can reduce by 8-13 percent – not an ambitious target. South Africa's emission level (including LULUCF) in 2019 was about 478 Mt CO₂e, implying that between 2005 and 2019, its emission level has remained almost at the same level. Therefore, for South Africa, reaching its emission reduction target will not be too difficult. Nevertheless, even if South Africa reaches this target, its per capita emission will remain much higher compared to India.

Within the developed world, the US and the EU account for more than 60 percent of the current global emission. In terms of historical emission, however, 62 percent of global emission occurred in these jurisdictions, which account for 80 percent of historical emission of the developed world. While these two regions account for more than 40 percent of global GDP, their combined per capita income is more than four times the global average. Hence, not only would the actions of these two regions have an important bearing on the global climate, but they are also in a formidable position to lead the global emission reduction mission.

In its 2015 NDC, the US pledged to reduce its 2005 emission level by 26-28 percent till 2025. At the same time, the EU committed to reduce its emission by at least 40 percent by 2030. Had the US gone ahead with its commitment and followed a similar

path beyond 2025 up to 2030, it would have reduced its emission by 38-40 percent till 2030. Hence, the US and the EU made similar commitments, though the EU target was slightly higher. However, by 2019, while the EU was able to reduce its emission by about 26 percent, the US could reduce only by 17 percent. Hence, while the EU, by and large, continued on its planned emission path, the US fell behind. This was mainly due to the Trump administration's refusal to fulfill its 2015 NDC commitments. With the change in government in the US, it has come back to join the global effort on climate mitigation and has made an updated commitment of 50-52 percent reduction in emission. The EU, on the other hand, gave an updated commitment of at least a 55 percent reduction in emission by 2030. While the return of the US has raised hope, given its history, one cannot be absolutely sure that the US volte-face will not be repeated in the future. There is no denying the fact that there is a strong constituency in the US which is against substantial mitigation efforts. Both the US and the EU have pledged to reach net-zero emission by 2050. Although neither has given a complete plan of action for reaching this target, the EU has provided more detailed strategies and time plan. This was quite expected as the US was outside the global framework for some time and did not get enough time to prepare for the same. Nevertheless, only the future will tell whether they will be able to walk the talk.

There is a strong constituency in the US which is against substantial mitigation efforts.

Consumption of fossil fuel resources in India and other countries or regions also give an idea of India's challenges in light of the experiences of those countries. As expected, India's per capita consumption of fossil energy resources is the lowest among the major countries (Table 5). This is indeed noteworthy, as coal is a dominant energy resource in India, and the coal resources in India have a much lower calorific value per kilogram. Despite this, India's per capita consumption is quite low.

It is also interesting that in 1970, India's per capita income was not very different from that of China, yet China's per capita consumption of fossil energy resources was three times that of India. In 2017, China's per capita fossil energy resource consumption became slightly more than three times that of India. Hence, the relative position of China and India in terms of fossil energy consumption has not changed much. Brazil's per capita fossil energy consumption is marginally higher than India's but quite similar. South Africa's fossil energy consumption is almost four times higher than India's, which

is quite similar to the OECD average. Russia's per capita consumption is the highest in this regard and is about five times higher than that of India. Given this situation, it is quite odd that the developed world expects India to phase out coal consumption in a similar manner that they plan to do.

**Table 5: Per Capita Domestic Consumption of Fossil Energy Resources
(Thousand Kilograms)**

	Brazil	China	India	Russia	South Africa	OECD
1970	0.32	0.51	0.17	..	3.15	..
1975	0.45	0.60	0.20	..	3.23	..
1980	0.54	0.71	0.21	..	3.62	..
1985	0.50	0.83	0.26	..	4.27	..
1990	0.53	0.94	0.34	..	3.76	..
1995	0.57	1.15	0.41	4.48	3.92	..
2000	0.69	1.15	0.46	4.28	3.82	..
2005	0.67	1.90	0.54	4.48	4.07	..
2010	0.77	2.81	0.72	4.61	4.23	4.26
2011	0.81	3.07	0.74	4.83	4.14	4.23
2012	0.83	3.17	0.77	5.02	4.05	4.12
2013	0.89	3.25	0.79	4.93	3.96	4.03
2014	0.93	3.15	0.86	4.82	4.06	4.00
2015	0.96	3.02	0.86	4.91	3.73	3.99
2016	0.98	3.17	0.89	4.92	3.73	3.93
2017	0.99	3.31	0.92	4.93	3.73	3.90

Source: OECD Statistics

Conclusion

Even though India is often compared with countries like Brazil, China, Russia, and South Africa, there are huge variations in terms of geographical area, the population as well as the levels of economic development. These differences are also reflected in the nature and scale of commitments made by India at the UNFCCC vis-à-vis those made by the other countries. While Brazil, China and Russia have promised to achieve carbon neutrality by 2060, and South Africa made a commitment to achieve the same by 2050, India's target is to achieve this by 2070. But India has given a very significant commitment in this regard. India is committed to pursue a growth path that would be climate-friendly and cleaner than the one followed hitherto by others at a corresponding level of economic development. Comparing India's energy and resource consumption trajectory with other major countries and the OECD average, it appears that India may be able to live up to its commitment. On the other hand, net-zero emission commitments of most countries are not accompanied by appropriate roadmaps, and since the current emission profiles of most countries are far from the neutrality level, achieving this status would not be easy.

China and India have made similar commitments owing to both having developing country status. Although China's commitments may appear to be higher, India's commitments are actually more ambitious considering that China is far bigger in terms of GDP and its current status in emission intensity, share of non-fossil energy in power generation capacity, as well as the use of fossil fuel in an absolute sense. Moreover, even though Brazil, Russia and South Africa have made commitments on reduction in absolute emission levels, their commitments are so modest that virtually they will not reduce much. Further, considering their progress over the last few years, the possibility of these countries achieving their targets is quite slim, compared to India, which is likely to reach at least some of the targets. Brazil's emission level is highly unstable and depends on what happens in the Amazon forest in terms of forest clearance and forest fires that have increased in recent times. While the EU might reach its targets, the US might find it difficult as it has already lost a few years and assuming that it will not see a reversal of its climate policy in the future.

India was quite reluctant to make a commitment on net-zero emission as it is inherently difficult to envisage what will happen 30 or 50 years down the line. The

government has not yet made public the basis on which such a target was fixed. Some experts are of the opinion that if the developed countries can achieve this by 2050 as they pledged, that will happen only and only if breakthrough technologies come up much before that. In that case, India will have substantial time to adopt those technologies and cut its emission drastically to achieve the net-zero emission target of 2070. Nevertheless, huge international pressure could have been a factor behind this. India was under pressure to phase out coal use as well as announce a timeframe for a net-zero emission level. Since it was more difficult to announce coal phasing out, which was more definitive, India chose the other option, as committing to none could have damaged its global image. It was an astute move by India, because if developed countries achieve net-zero emission by 2050, India may just achieve the same by 2070, but if they fail, they will not be in a position to question India.

Most experts believe that even if all countries meet their NDC targets, the global temperature rise will still breach the 1.5-degree Celsius limit. If other countries do not meet their targets and climate change breaches the 2 degree Celsius mark, India will face double jeopardy. It would have to divert substantial resources to adaptation measures, and it might have already diverted resources from poverty reduction, health, education, etc.-- a situation India would like to avoid. But this is not a one-period game, and India will keep monitoring the situation. If countries do not make adequate efforts, India will also go slow and will deviate from its commitments.

While several countries have committed to net-zero emission by 2050 or 2060, no country has a clear roadmap and strategies for achieving net-zero targets. The EU has a roadmap for 2030, but not for 2050. For most countries, there is not even a clear roadmap for 2030. But in the long run, we are all dead, and none of the leaders who are making these promises are likely to be at the helm by 2050. So, who would be held accountable? Hence, promises without a clear roadmap and monitoring do not mean much. Since it is difficult to predict the situation 30-50 years from now – and technology can be disruptive, how would it be ensured that indeed would be the case? Given this, it would be more appropriate not to rely entirely on technology and rather embrace a paradigm shift by mainstreaming ecology. It is also important to note that India is also committed to “a healthy and sustainable way of living based on

traditions and values of conservation and moderation”, as stated in its NDC. It would be useful if all countries adopt this idea on their own rather than being pressured by others to do so.

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