



ICRA's CLIMATE SERIES

Carbon Capture Utilisation and Storage (CCUS)

CCUS inevitable for climate goals; timely
policy intervention to help attract global
technology and funding

August 2023

CLIMATE CHANGE
The biggest crisis of our time

CCUS is inevitable for meeting climate goals with unavoidable fossil fuel dependence.

Investment may range from Rs. 400 billion to Rs. 700 billion towards capex and infrastructure for CCUS projects till 2030, apart from the recurring capture cost.

Given the nascent stage and high costs, policy intervention may help India to attract global technology, investors and funding.

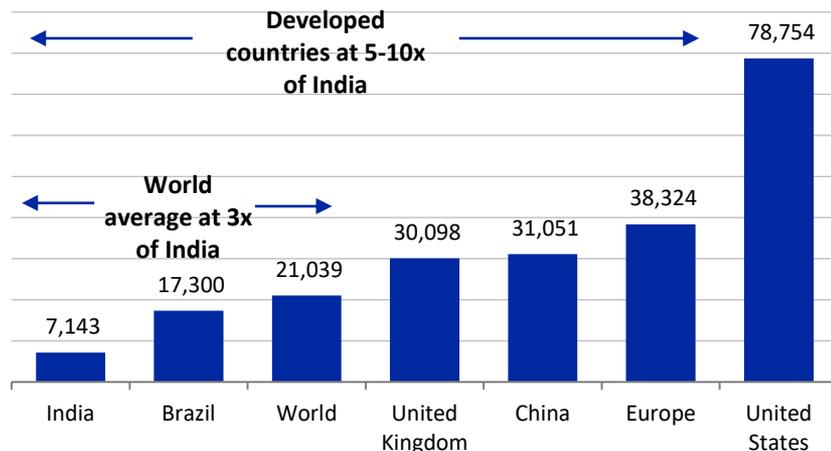
- As the Indian economy continues to grow at a healthy pace, energy consumption in the country is likely to expand by 3-7x by 2070. To meet the surging demand with increase in population, India will remain dependent on fossil fuels at least for the next 40 years.
- To achieve the climate goals with continued dependence on fossil fuels, India needs to explore more ways of carbon sequestration (the process of capturing and storing atmospheric carbon dioxide). Carbon Capture Utilisation and Storage (CCUS) and forestation are some of the ways of carbon sequestration.

- Globally, CCUS facilities capture only 0.2% of the total carbon emissions. With more than 500 projects planned till 2030, the share of carbon capture to global Co2 emissions will remain negligible at 2%.
- The US and Canada, which have nearly 80% of the global CCUS facilities, eye Government support and funding as critical factors for success.
- India, which is 4th largest carbon emitter in the world, is at a pilot stage currently for CCUS projects against China, which has 2% share in global operational CCUS facilities. China being the largest carbon emitter in the world, started the first facility in 2015.

- Coal-fired power plants, iron and steel, and cement are the most carbon-emitting sectors; focus on these sectors will help while implementing CCUS in India.
- Co2 emissions in India from these sectors are estimated to rise to around 2,300-2,600 million tonne per annum (mtpa) by 2030 from around 1,300-1,600 mtpa in 2020. For India to successfully capture around 30% of the estimated carbon emissions, the required capital investment in carbon capture is estimated at Rs. 400 bn to Rs. 700 bn, including transportation and storage till 2030 (as per Niti Aayog). Additionally, the capture cost will be a recurring expense, varying according to the carbon capture volume.
- Considering the high capex and operational cost, timely policy intervention will help attract investors, technology, funding and private sector participation.

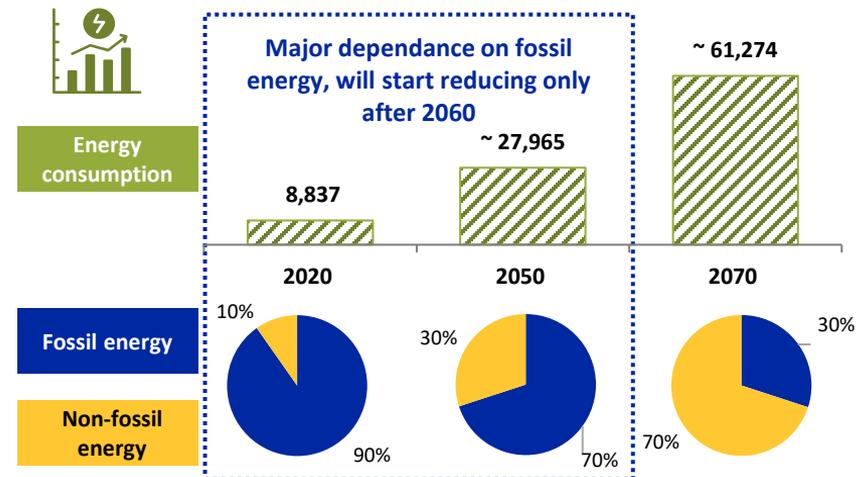
India's multi-fold expansion in energy consumption could keep it bound to fossil fuels in the visible future

Exhibit : Energy consumption per capita (kwh) – Year 2022



Source: Our World In database, ICRA Research

Exhibit : Energy consumption for India in tWh (terawatt-hour)



Source: Our World In database, ICRA Research

- The world average stands at ~3x of India's per capita energy consumption, skewed by developed economies (up to 10x of India). Even Emerging Market (EM) countries like China and Brazil stand at 3x and 2x of India's per capita energy consumption. As India continues to grow, we see energy consumption for the country expanding by 3-7x by 2070.
- To meet this surging demand along with an increasing population, India will remain dependent on fossil fuels at least for the next 40 years.



ICRA

Analytical Contact Details

Name	Designation	Email	Contact Number
Aditi Nayar	Chief Economist, Head – Research and Outreach	aditin@icraindia.com	0124 - 4545 385
Madhura Nejjur	Assistant Vice-President	madhura.nejjur@icraindia.com	022 - 6114 3417





ICRA

Business Development/Media Contact Details

Name	Designation	Email	Contact Number
L Shivakumar	Chief Business Officer	shivakumar@icraindia.com	022-61693304
Neha Agarwal	Head – Research Sales	neha.agarwal@icraindia.com	022-61693377
Rohit Gupta	Head Business Development - Infrastructure Sector	rohitg@icraindia.com	0124-4545340
Vivek Bhalla	Head Business Development - Financial Sector	vivek.bhalla@icraindia.com	022-61693372
Vipin Saboo	Head Business Development – Corporate Sector - West & East	vipin.saboo@icraindia.com	022-61693348
Shivam Bhatia	Head Business Development – Corporate Sector - North & South	shivam.bhatia@icraindia.com	0124-4545803
Naznin Prodhani	Head – Media & Communications	communications@icraindia.com	0124-4545860





© Copyright, 2023 ICRA Limited. All Rights Reserved.

All information contained herein has been obtained by ICRA from sources believed by it to be accurate and reliable. Although reasonable care has been taken to ensure that the information herein is true, such information is provided 'as is' without any warranty of any kind, and ICRA in particular, makes no representation or warranty, express or implied, as to the accuracy, timeliness or completeness of any such information. Also, ICRA or any of its group companies, while publishing or otherwise disseminating other reports may have presented data, analyses and/or opinions that may be inconsistent with the data, analyses and/or opinions in this publication. All information contained herein must be construed solely as statements of opinion, and ICRA shall not be liable for any losses incurred by users from any use of this publication or its contents.



ICRA

Thank You!