WEBINAR:

INDIA

Challenges, Considerations, and Opportunities for Canadian Pellet Producers

WOOD PELLET ASSOCIATION OF CANADA

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ABOUT THE MISSION

Forestry Innovation Investment

To explore the state of the market in India today, the impact of the shifting competitive landscape and prospects for Canadian wood products. Specifically:

- Assess market opportunities and challenges.
- Reaffirm B.C.'s continued commitment to Indian manufacturers in light of strong European competition and ongoing logistics challenges.
- Facilitate strategic discussions on the future direction of the India program, progress being made, challenges experienced and thoughts on new directions/changes that should be considered.

ABOUT THE MISSION

Forestry Innovation Investment

- During the week of January 16, 2023, FII led a forest sector mission to India, primarily focussed on solid wood products.
- WPAC, which has had a strong relationship with FII, saw this as an opportunity to join the mission to learn more about wood pellet opportunities in India.
- With assistance from trade commissioners Kapil Malhotra and Saroj Mishra who are based at the Canadian High Commission in Delhi, Gordon Murray met with several key participants in the Indian pellet and coal power sectors including equipment manufacturers, logistics providers, pellet manufacturers, and coal power producers.

PARTICIPANTS

BRITISH COLUMBIA

Sundher Group

SAN GROUP

TOLKO

WOOD PELLET ASSOCIATION OF CANADA

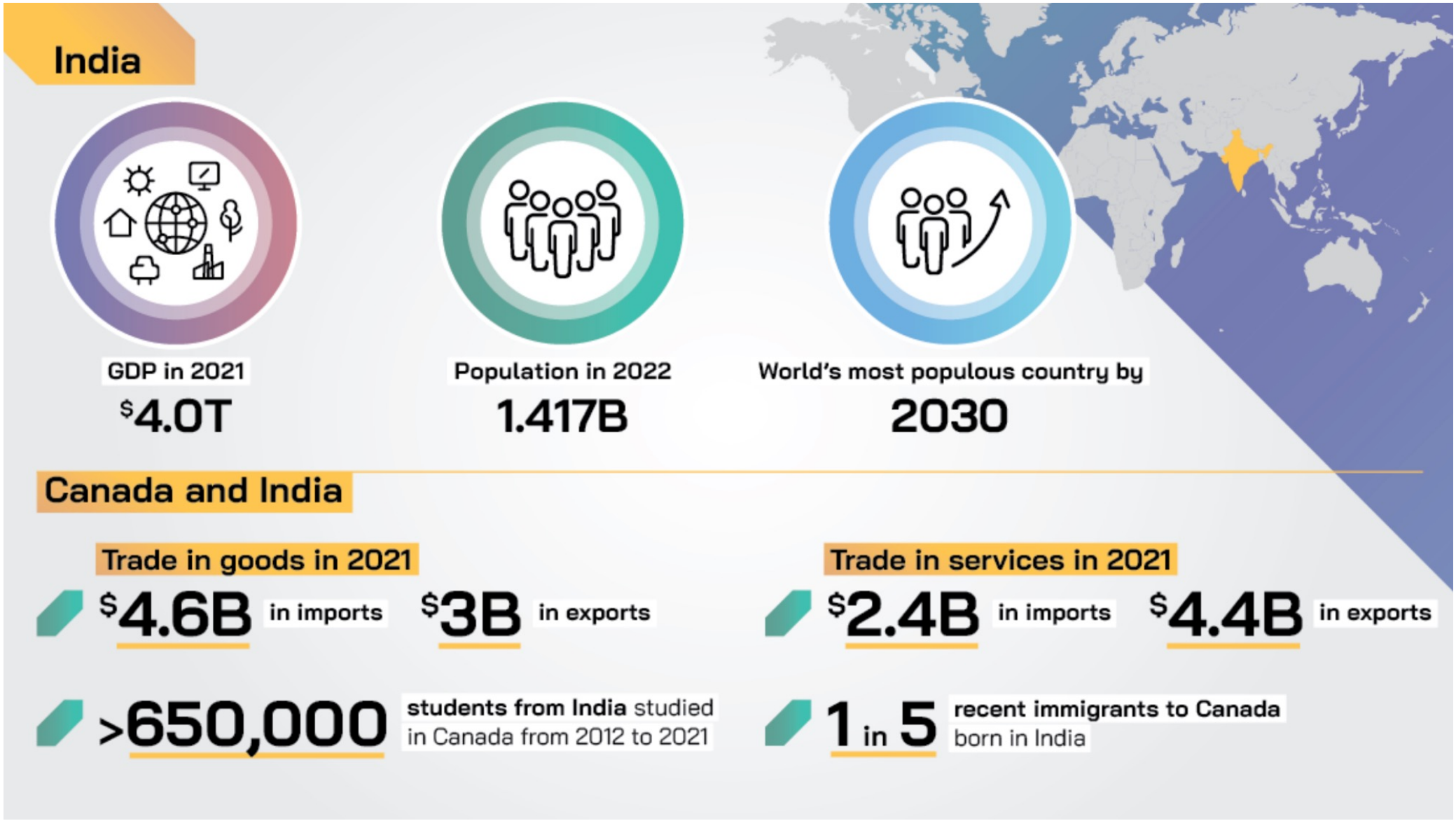
Canada Wood
Produits de bois canadien

Canada

Natural Resources Canada | Ressources naturelles Canada

ABOUT INDIA

- Total area 3,287,263 km^2
- Population: 1.4 billion
- The Indian economy is one of the largest and fastest growing in the world.
- GDP growth of 6% is estimated over the next two years. Growth is expected to average 5.1% per year for the period 2022-50.
- The coalition government led by Prime Minister Modi of the Bharatiya Janata Party (BJP) will serve out its full term until 2024.
- His high approval rating, and the lack of an effective national political opposition limit risks to political stability.


India
GDP in 2021
$4.0T
Population in 2022
1.417B
World's most populous country by
2030
Canada and India
Trade in goods in 2021
$4.6B in imports
$3B in exports
Trade in services in 2021
$2.4B in imports
$4.4B in exports
>650,000 students from India studied in Canada from 2012 to 2021
1 in 5 recent immigrants to Canada born in India

AN IMPORTANT TRADE PARTNER

The Government of Canada (GOC) recently released an Indo-Pacific Strategy.

- It recognizes India as a critical partner based on a shared tradition of democracy.
- Canada is seeking to expand Indian market access through a Comprehensive Economic Partnership Trade Agreement (EPTA).
- GOC plans to create a Canada-India desk within the Trade Commissioner Service to promote implementation of the EPTA for businesses and investors looking to enter the Indian market, or for those partnering with Indian businesses.
- The GOC seeks to accelerate cooperation in deploying green technologies and has committed to send enhanced Team Canada trade missions in priority sectors of mutual interest, such as renewable energy and clean technology.

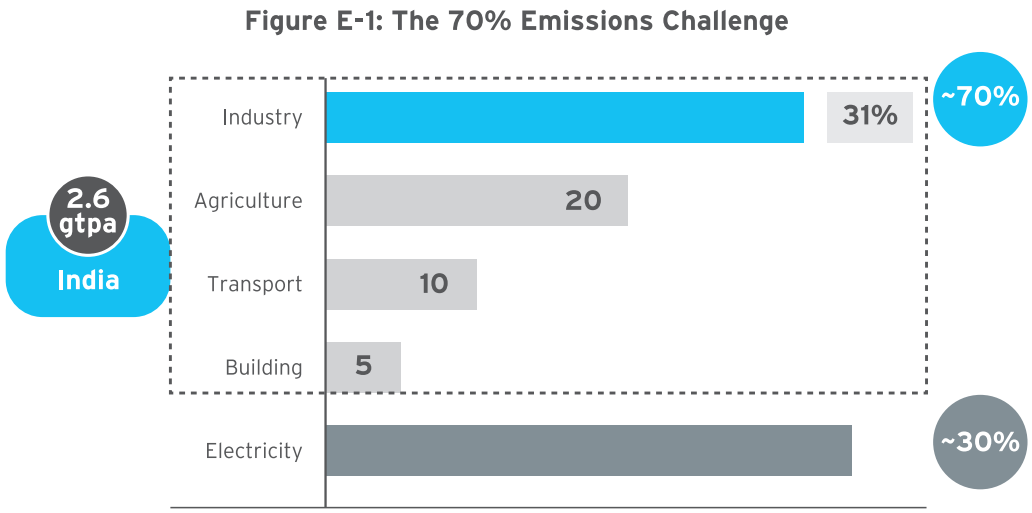
INDIA:
THE SITUATION

HEALTH & CLIMATE CRISIS

- The International Energy Agency (IEA) reports that air pollution will be one of India's gravest social and environmental problems.
- India's growing economy is driving CO2 emissions, which increased by more than 55% in the last decade and are expected to rise by 50% to 2040.
- In addition, stubble burning in Punjab and Haryana states, part of the farm belt that borders the capital, New Delhi, accounts for 30-40% of air pollution in October and November.
- In 2019 alone, India experienced an estimated 1.2 million air pollution-related premature deaths.

AMBITIOUS TARGETS

- India is the 3rd largest emitter of CO2 in the world after China and the US, with estimated annual emissions of about 2.6 gigatonne per annum (gtpa).
- The Government of India (GOI) has committed to reduce CO2 emissions by 50% by 2050 and reach net zero by 2070.
- The GOI has mandated biomass co-firing in coal plants.

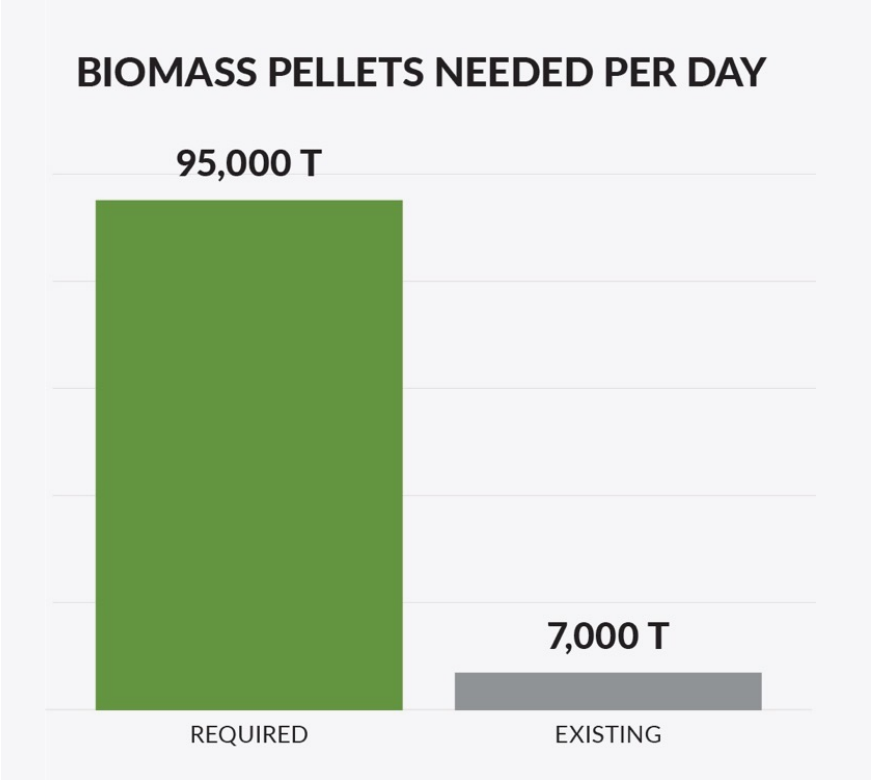


AMBITIOUS TARGETS

- India burns approximately 670 million tonnes of coal annually for power generation.
- The GOI has directed coal companies to move to 5% co-firing by Oct 2022 and 7% co-firing by Oct 2023.
- The government estimates that this action could save 38 million tonnes of carbon dioxide emissions, improve air quality, and mitigate climate impacts.
- The GOI also created the National Policy for Management of Crop Residues, the National Green Tribunal Act, and the Straw Management System to restrict agricultural burning and make use of crop waste.

LITTLE PROGRESS

- India has about 180 thermal power plants with a collective capacity of 198,734 MW.
- As of 2021, only 8 power plants had co-fired biomass pellets; by October 2022, this had increased to 39.
- As of date, 83,066 MT of biomass has been co-fired at these plants for a combined capacity of 55,390 MW.



LITTLE PROGRESS

The GOI held a meeting in October 2022, to review progress, key outcomes of the meeting include:

- The GOI will impose fines on plants if they failed to co-fire enough biomass.
- The potential to reduce coal supply in those thermal power plants that do not comply with the co-firing policy.
- Directed all thermal power plants in NCR region to install biomass pellet manufacturing plants (torrefied / non-torrefied).
- Financial incentives to set up pellet manufacturing plants (CA$)
  - Pelletization plant: up to CA $22,000 per tonne of plant capacity per hour as one-time financial support up to a total of CA $114,000.
  - Torrefaction plant: up to CA $44,000 per tonne of plant capacity per hour as one-time financial support to a total of CA $228,000.

CHALLENGES & OPPORTUNITIES

- The GOI has established a National Mission on use of Biomass in coal-based thermal power plants, also called SAMARTH (Sustainable Agrarian Mission on use of Agro-residue in Thermal Power Plants).
- SAMARTH estimates 95,000 to 96,000 tonnes per day of biomass pellets are needed while existing capacity is around 7,000 tonnes per day.
- Annually, the demand could reach 35 million tonnes per year of biomass pellets.
- Agricultural biomass holds potential for coal power plants and would reduce crop burning. However, pellets made from agriculture residues tend to have higher ash content along with varying levels of other elements such as chlorine or silica. These can create problems such as corrosion, fouling and slagging in boilers.
- One way to mitigate these issues is to blend with wood pellets to keep undesirable components in acceptable concentrations.

INDIA: TRADE MISSION OBSERVATIONS

PELLETS & FEEDSTOCK ARE AN ISSUE

- 70-80 existing pellet manufacturers, are producing 7,000 tonnes per day or 2.5 million tonnes per year, while 35 million tonnes per year are needed for biomass co-firing.
- Crop residues are used as bedding material for animals, livestock feed, soil mulching, bio-gas generation, bio-manure/compost, thatching for rural homes, mushroom cultivation, biomass energy production, fuel for domestic and industrial use, etc.
- Gross agriculture residues total 560 million tonnes per year of which 260 million tonnes are surplus. The top residues by quantity are sugar cane bagasse 41%, rice straw and husks 25%, wheat straw 23%, corn stover 7%, and cotton stalks 4%.

PELLETS & FEEDSTOCK ARE AN ISSUE

- The state of Uttar Pradesh (north India) produces nearly a quarter of India's total agro-residue. Punjab (north India), West Bengal (east India), Madhya Pradesh (central India), Maharashtra (west-central India) and Bihar (east India) are the other top agro-residue producing states.
- Biomass residues are seasonal. Although India can produce multiple crop cycles annually, residues are generally only available for around three quarters of the year.

PRICE EXPECTATIONS ARE UNREALISTIC

- Indian pellet suppliers favour selling their product to industries such as textile, food processing, metal-based or in the open market for the highest price they can obtain.
- Many of these industries, especially in the Delhi-National Capital Region are under pressure to switch to cleaner fuels.
- They can sell pellets at Rs 12,000-13,000 per tonne (CA $195-$215), instead of supplying it to coal thermal power plants at the offered price of Rs 8,000-9,000 per tonne (CA $130-$145).
- India is known to be a hugely price sensitive market and given the Indian coal power pellet price expectation of around CA $130-$145, it is unlikely that Canadian wood pellets could compete in India.

LOGISTICS ARE A CHALLENGE

- For Canadian producers, the logistics are a serious obstacle for market entry.
- Pellets would have to cover 15,739 NM from Vancouver to Mumbai.
- The voyage from Canada's east coast is only slightly better at 9,127 NM.
- Pellets from Quebec and Ontario, even if shipped from Quebec, would face same logistical challenge.
- India is the world's third largest country. Upon entry into the country, the pellets would have to be transloaded, then shipped long distances by rail to power plants scattered throughout the country's interior.

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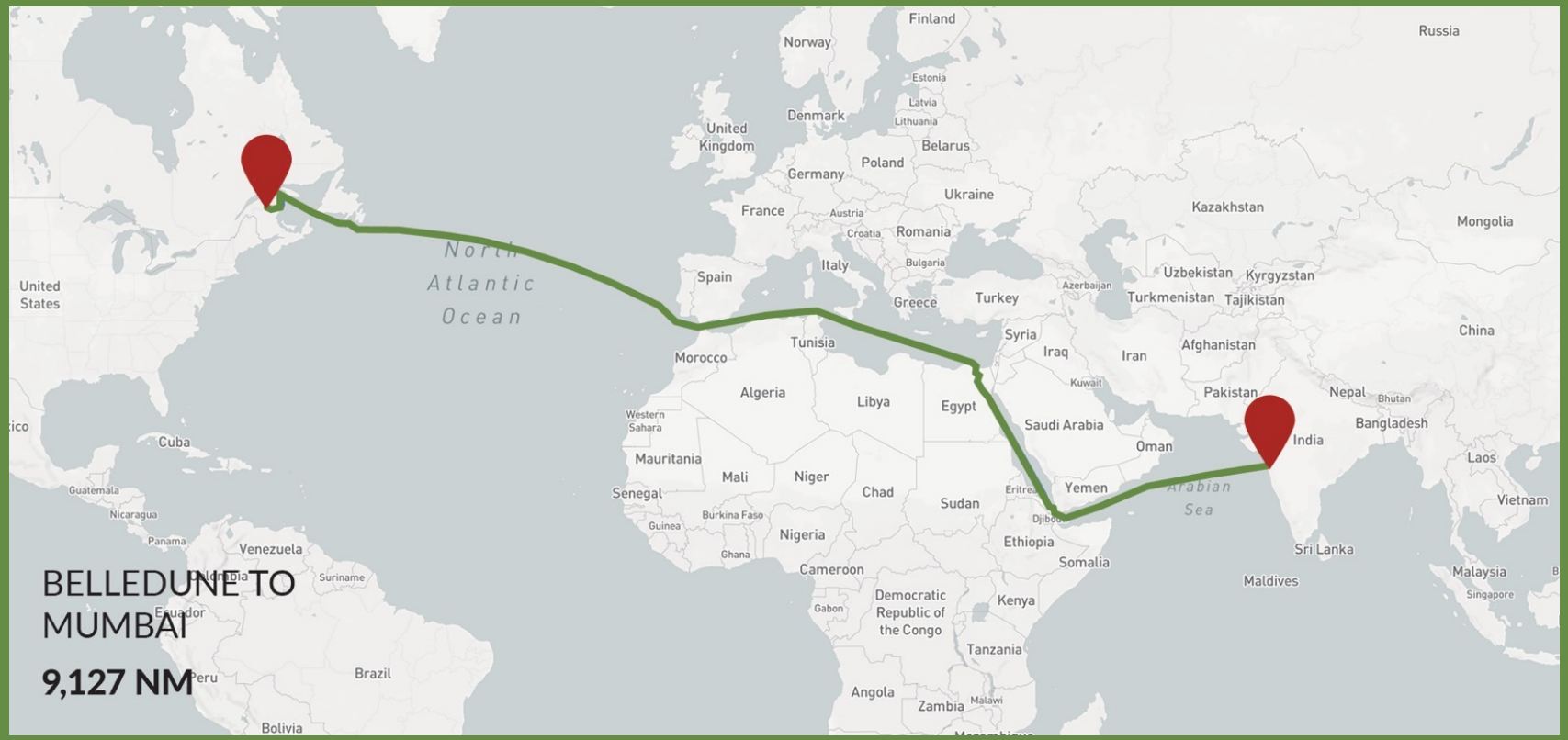

SUPPLY CHAIN IS COMPLICATED

- There are an estimated 100 to 150 million farms in India.
- India has 122 major languages, 60% able to speak Hindi and 10% able to speak English.
- Nearly 67% of India's farmland is held by marginal farmers with holdings below one hectare, against less than 1 % in large holdings of 10 hectares and above.
- While the cropped area in India is estimated at 193.76 million hectares, nine states account for 78%: Andhra Pradesh, Karnataka, Gujarat, Madhya Pradesh, Maharashtra, Rajasthan, Uttar Pradesh, Punjab, and West Bengal.

SUPPLY CHAIN IS COMPLICATED

- Presently biomass collection is mostly unorganized.
- Developers would need to find Indian partners who understand local customs and can communicate in local language with farmers to organize systematic collection of agriculture residues.
- Nevertheless, there is a huge, largely untapped opportunity to mobilize a local biomass pellet industry in India based on agricultural residues as feedstock.
- This would include construction of large-scale pellet plants fed by agriculture residues collected from millions of small farms.

IT'S STILL EARLY DAYS FOR CCUS

The National Institution for Transforming India (NITI) is a public policy think tank of the GOI. In 2022, it recently a report on the potential for CCUS.

- CCUS has an important and critical role to play to cut CO2 emissions in half by 2050 and to accomplish net-zero by 2070.
- CCUS is required for both industry and the power sector.
- The theoretical CO2 Storage Capacity in India is 395-614 gigatons.
- However, India relies on coal for meeting over 70% of its electricity needs.
- Even if India can meet its renewables target of 500 GW installed capacity by 2030, baseload power demand from fossil fuels will be required.
- A cash and tax credit-based policy is more likely to incentivize CCUS adoption in India

IT'S STILL EARLY DAYS FOR CCUS

The National Institution for Transforming India (NITI) proposes that a multi-pronged approach to incentivizing:

- Technology transfer of commercially proven CCUS technologies;
- Promoting R&D in novel technologies, particularly in CO2 utilization; and
- Encouraging private sector participation in implementing CCUS demo projects.

R&D SYNERGIES ARE POSSIBLE

- The Biomass and Bioenergy Research Group (BBRG) is a world-class research group, based at the University of British Columbia.
- The Group conducts advanced research and develops innovative solutions to meet the needs of the emerging biobased businesses in Canada and around the world.
- Currently, BBRG's engineers and scientists are focused on turning raw biomass to industrial feedstock that would meet the requirements of industry.
- For the past five years, BBRG has been researching the mobilization of agricultural feedstocks.
- Both National Thermal Power Corporation Limited (NPTC) and GMR Energy expressed interest in connecting with BBRG.

INDIA: CONCLUSIONS & NEXT STEPS

CONCLUSIONS

- **It is not feasible, in at least in the short term, for Canada to export wood pellets to India**.
  - This is due to the extremely low-price expectations of Indian coal power producers coupled with vast distances and high shipping costs from Canada.
- There is a **huge, largely untapped opportunity to mobilize a local biomass pellet industry in India based on agricultural residues** as feedstock.
  - This would include construction of large-scale pellet plants fed by agriculture residues collected from millions of small farms.

CONCLUSIONS

- The Indian government and Indian coal power companies would **welcome foreign investment and expertise**.
- It would be **essential to have local partners** to help navigate customs and language.
- India also **needs to deploy carbon capture, utilization, and storage on a massive scale**. This is another significant opportunity to pursue.

NEXT STEPS / RECOMMENDATIONS

Overall, the mission was informative and highlights some important next steps for WPAC and interested members:

1. Interested potential investors or project developers should **discuss the opportunity with representatives of the trade commissioner office** in the Canadian High Commission to India in Delhi.
2. Developers will need to **meet with a greater sample of coal power companies**.
3. Coal power companies are being asked by GOI to enter long term supply contracts. These **companies may be willing to consider joint ventures**. They do not presently appear to have the interest or expertise about how to mobilize a large-scale biomass pellet feedstock supply.

NEXT STEPS / RECOMMENDATIONS

4. A key step would be to **map the location of coal power plants in relation to biomass feedstock supply** and to determine the optimum location and size of biomass pellet plants.
5. This is a large enough opportunity that it is **worth a trip to India to investigate further**.

WOOD PELLET

ASSOCIATION OF CANADA