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AR20-21 Notes

Praj Industries

India’s Leader in Bio-Fuel Technology

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Annual Report 20-21

praj
Innovate • Integrate • Deliver

1/ Current Achievements

Achievements

Praj was ranked 2nd in the list of 50 Hottest companies in bioeconomy for 2021 in Low Carbon Fuels and Renewable Chemicals category and ranked 3rd in the newly introduced Biodesign & Engineering category by US based Biofuels Digest.

2/ Chairman's Message

~Ethanol Demand to rise from Govt push for 20% ethanol blending by 2025
~Launched BioPrism tech portfolio for producing bio-based Renewable Materials
~Identified growth areas like Bioplastics, Lignin products, specialty chemicals, & others

Transportation sector is identified as the 2nd largest emitters of GHG after industry. Praj's pioneering Bio-Mobility™ platform of technology solutions utilizes biological resources to produce low carbon renewable transportation fuels in liquid as well as gaseous form. While Bio-Mobility™ platform is already helping reduce GHG emissions in surface transportation, there is tremendous growth potential globally for deeper penetration. With stringent environmental norms being envisaged in air and water transport, Bio-Mobility™ is poised for big strides in aviation and marine sectors in near future. It may be noted that Bio-Mobility™ platform also helps address brown clouding of cities caused by stubble burning. Agricultural waste post harvesting is used as a feedstock for production of biofuels and as such helps create employment and entrepreneurship opportunities in the rural areas.

Considering social, environmental & economic benefits of ethanol blending program (EBP), the government of India has advanced 20% ethanol blending target by 5 years from 2030 to 2025. This is creating visibility of growth in ethanol demand & helping build industry structure alongside robust ecosystem across the value chain. This bodes well for Praj, as your Company is a market leader in developing & deploying innovative technology solutions for sugar as well as starch based ethanol plants.

3/ CEO & MD's Note

~Praj continues to dominate the bioenergy sector in India

~Engg Business saw good unique opportunities

~Delivered Solutions as part of critical vaccine supply chain

Domestic Bio Energy segment witnessed significant Industry structure changes along with favourable developments in the overall eco system. Your Company's flagship bioenergy business continues to dominate the domestic market. Your Company is offering innovative technology solutions for ethanol production from sugary as well as starchy feedstock. I am happy to add that we are building India's largest capacity syrup based ethanol plant. Our innovative technology led EPC solutions are helping our customers win and in turn us.

BioMobilty™, our platform for promoting technologies for low carbon fuels for all modes of transportation is gaining traction. Apart from our undisputed leadership position in first generation ethanol we are progressing positively with the construction of three 2nd generation ethanol plants in the country. Celluniti™ our

4/ Technologies introduced under Biomobility Platform in FY21 provided

~Reduced water requirement

~Enhanced plant capacity

~Increased ethanol yield

~Reduction in emissions

~Pharma Grade Ethanol

~Production of Compressed Biogas from agri-residues and pressmud

Under Biomobility™ Platform – providing decarburization solution to all modes of transportation, number of technologies introduced during the last financial year -

- SHIFT: High Brix fermentation technology for reduction of effluent quantity thereby reducing water requirement in fermentation and reduction of energy requirement in Evaporation (ZLD) section. Technology has been commercially implemented on multiple feed stocks namely cane juice syrup, B-heavy and Molasses-C. This technology helps to upgrade capacity of existing facility ensuring round the year operation.
- Maximol: Ethanol dehydration plant capacity was upgraded by 30 % using this technology in more than ten plants helping clients to enhance plant capacity.
- Bio-syrup technology giving the customer, increase in ethanol yield as well as flexibility to store sugar rich stream to extended number of days of operation.
- Alcohol MVR: Reduction of thermal energy (Greenhouse gas emissions) by integration of MVR with distillation section. ACHE : Optimized design of Air Cooled Heat Exchanger (ACHE) being now offered for water stressed projects. Process Integrated Boiler (PIB) : HBCS (High Brix Concentration using Agitated Thin Film Dryer) technology was developed to concentrate Spent wash (process effluent) generated from molasses based distillery to self-combustible level 70 % concentration of solids on weight basis., thereby reducing supplementary fuel requirement in incineration boiler by more than 30 %
- Rengas Technology: Advanced biomethanation technology based on proprietary microbiological pre-treatment developed for production of Compressed Biogas (renewable methane gas) from agri-residues and pressmud. Pilot plants for this technology are also installed at Matrix R&D Centre.
- Celluniti™ Technology is under development for production of ethanol from soft wood.
- Sustainable Aviation Fuel: Technology is in final leg of optimization and commercial offering.
- Co-product maximization: Human grade proteins would be the need of the hour in current pandemic. Looking at this, we are developing technology for production of human grade protein as valuable co-product from grain-based distillery.
- In addition to the above technologies for Bio Mobility™ platform, the Company also introduced in Pharma Grade Ethanol with unique capex and opex optimized solution for global clients meeting their local statutory norms for production of pharma grade ethanol.

5/ Bio-Prism Platform & Lignin Valorization

Bio-Prism™ Platform :

Praj's formally announced its foray into the global Renewable Chemicals and Materials (RCM) industry in July 2020. Praj' strategy has been to expand its business horizons leveraging its innovative, technology solutions in "Clean energy-based Bioeconomy". As a part of its newly launched Bio-Prism™ portfolio, Praj is developing technologies to produce bio-based Renewable Chemicals and Materials (RCM). RCM produced from bio-based feedstocks, are sustainable alternatives to products made from fossil resources and hence tagged as "Nature Reimagined – The Promise of Sustainability".

Our stride in RCM is the result of exclusive work in molecular biology, microbiology, fermentation and chemical synthesis. Praj is open to exploring newer business models with strategic partners for Bio-Prism™ portfolio. To bring this vision into reality, Praj has technical collaborations with renowned global organizations.

Lignin Valorization :

Praj has developed three value added products from the lignin generated from our 2G ethanol process viz. Lignosulphonate, Bio Bitumen and Bio-oil as Marine fuel. These technologies have been developed at laboratory/pilot scale and are ready for demonstration. Our Bio Bitumen sample was approved by Competent Authority for application in asphalt blending.

6/ R&D & Award Highlights

~Gained 5 Indian & 6 Foreign Patents in FY21

~Bagged awards for innovation and waste management

Key Highlights for Financial Year 2020-21:

1. During the year, your Company was granted 5 Indian patents and 6 foreign patents. The Company filed 2 Indian and 92 international patents during financial year 2020-21. In all your Company has 84 Patents granted to its name.
2. Praj bagged the CII innovation award for SHIFT technology.
3. Praj is among India's 8 leading companies who received CII 3R (reduce, recycle, reuse) waste management award.

7/ Business Highlights

1st Gen Ethanol Domestic:
~Govt push to create opportunity for new 10 bn liters PA capacity
~Good traction for B-heavy molasses and sugar syrup based ethanol plants
1st Gen Ethanol International
~Traction for Pharma grade Ethanol
~Demand up for biofuels

Bioenergy

Your Company's Bioenergy portfolio comprises of technology solutions for

- **Biofuels** such as 1st generation ethanol, biodiesel
- **Advanced biofuels** such as 2nd generation ethanol and Compressed Bio Gas (CBG)
- **Future biofuels** such as Sustainable Aviation Fuel (SAF), biomarine fuel, bio methanol and biohydrogen

Praj's Bio-Mobility™ platform envisages use of renewable biological resources to produce low carbon transportation fuels across all modes of mobility i.e. Surface, Air and Marine. Bio-Mobility™ platform comprises of Biofuels both in liquid as well as gaseous form. Biofuels are produced using any of the three types of bio-based feedstock namely sugary (C molasses, B molasses, sugar syrup etc.), starchy (damaged/ surplus grains) and cellulosic (agri residues and biomass).

8/ Business Highlights Contd

2nd Gen Ethanol
~Has 3 orders for advanced biofuel refineries in India
~Expect demand from North Europe

Compressed BioGas
~Expecting setup of 5000 CBG plants in next 5 years

Others
~Developed process for making Isobutanol
~Scaling up SAF in India

2nd Generation Ethanol

The execution of three numbers of advanced biofuel refineries in India, based on Praj's proprietary 2G enfinity™ technology is on course. In addition to earlier two orders from OMCs, this year your Company received a third order for supply of critical equipment.

Construction and Installation activities are in full swing at all sites. We expect mechanical completion of first project by Feb 2022 and commissioning in June 2022.

9/ Business Highlights Contd

~CPES got orders from a US-based Industrial Gases Company
~Slowdown in domestic Brewery Segment
~Got repeat orders for Zero Liquid Discharge Solutions
~HiPurity to see demand rise from pharma & personal care segments

Critical Process Equipment & Skids (CPES)

CPES offers engineering and manufacturing solutions to world leaders in Clean tech, Green tech, industrial gases, specialty chemicals as well as conventional energy.

In FY 2020-21, CPES business continued to strengthen its relationships with select Global Technology and EPC players.

Praj has process knowledge, multi-disciplinary engineering strengths and expertise of manufacturing the modular plants. This has enabled to secure preferred partner status with several large process technology companies for modular plants.

Last year, CPES received multiple contracts from a US-headquartered Industrial Gases company for supply of Critical Equipment and Modules used for production of Hydrogen. We are working with a US-based "waste to energy technology" player to develop modular design architecture and detailing for its plants.

Your Company received a prestigious supplier award from Baker Hughes, one of our key customers, for mitigating Covid-19 impact and delivering first set of Block surge vessels with zero D, i.e. zero defect, zero deviation and zero delay.

10/ R&D Developments

~Joined with Institute Of Chemical Technology, Mumbai (ICT) for process development and reactor design research
~Produced breakthrough in making "Bio-bitumen" based on Lignin
~Filed for over 300 patents to date

Innovation and R & D

In order to promote the usage of biofuels in transportation sector, your Company has entered into MoU with Automotive Research Association of India (ARAI) to jointly drive application development of advanced biofuels. Through this collaboration, Praj and ARAI are developing technologies to propagate use of biofuels in variety of transportation applications. Your Company is making steady progress in ethanol blending with diesel program.

Your company's strategy has always been to expand its business horizons in the bio-economy by leveraging its innovative, technology solutions. Your Company has now expanded its offerings in bioeconomy namely, renewable chemicals and materials with Bio-Prism™ portfolio of technologies. We are developing different molecules and biopolymers that are sustainable alternatives to products made from fossil resources. We have identified specific growth industries such as Bio-plastics, Cellulose –Lignin refinery products, Specialty chemicals, Agri-supplements and Bio-industrial products. These renewable products have application in various industries that include paints and coatings, automotive, packaging, furnishing, construction, agriculture; nutraceutical and food. We are soliciting strategic partnerships across the value chain for joint development and commercialize this potential.

11/ Outlook for the Future

~Ethanol demand to rise for blending
~CBG opportunity to rise
~Bioenergy to become mainstream due to focus on sustainability

Future Outlook

As a built up to COP 26 Glasgow summit scheduled in Nov 2021, a strong momentum is gathering in "race to zero" campaign. There is increasing pressure on the nations around the world to curb GHG emissions. India has reiterated its Nationally Determined Contributions (NDC) honoring the Paris climate summit commitments. Pursuit of clean green environment will continue to be a driver for biofuels industry.

Volatility in international crude prices and exchange rates has triggered urgency for the country to renew its focus and efforts in the area of energy self-reliance.

The decision of advancing 20% blending target by 5 years from 2030 to 2025, is expected to create opportunity of additional 10 billion liters per annum ethanol capacity. Decisions of opening of expanded range of feedstock, especially starchy, will encourage ethanol production across the country.

Ecosystem development currently underway is expected to open up the potential of the CBG opportunity. Commissioning of initial commercial scale CBG projects in immediate future will demonstrate end to end functioning of the value chain. This is expected to instill confidence in prospective developers, paving way for realization of CBG plants. The engineering and Hi Purity businesses continue to expand their horizons. PHS business will continue to focus on opportunities in complex injectable, fermentation and Bio-pharma space. CPES business will focus on enhancing its reach with global clean tech, green tech companies to position itself as their strategic supplier. With water as an essential resource, our ZLD solution will continue to find increasing acceptance for treatment of industrial effluent.

While signs of economic recovery are evident, business environment is still experiencing challenges owing to restrictions on mobility, high commodity prices, uncertainty over sustained availability of labor, under vaccinated population. These challenges have potential to impact financial performance of businesses. Your Company stays cautiously optimistic as we learn to effectively deal with these testing times.

Opportunities for our BioMobility™ platform that offers technologies for variety of biofuels are emerging beyond surface transportation. As call for curbing GHG emissions gains momentum in aviation as well as marine sector, biofuels are poised for scripting a very interesting future.

A new wave is now ushering in the industrial revolution viz. Industry 5.0 Version 2. Bioeconomy is envisaged as integral part of industry 5.0 acceding due importance to sustainability in all business endeavors. The emphasis is going to be on deeper penetration of green energy in the overall energy basket and adoption of green products & materials. This clearly demonstrates mainstreaming of bioeconomy as part of global economy.

12/ Financials

~Consolidated Balance Sheet

~Consolidated P&L Statement

~Consolidated Cash Flow Statement

Consolidated Balance Sheet as at 31st March 2021

(All amounts are in Indian rupees million unless otherwise stated)

Particulars	Note no.	31 March 2021	31 March 2020
ASSETS			
Non-current assets			
Property, plant and equipment	3	**2064.172**	2167.065
Capital work-in-progress	3	**6.144**	20.795
Investment property	3	**136.928**	136.928
Goodwill	3	**626.150**	626.150
Intangible assets	3	**8.400**	8.196
Financial assets			
Investments	4	**398.073**	398.073
Loans	5	**65.903**	59.859
Others	6	**84.983**	126.689
Deferred tax assets (net)	26	**104.205**	180.606
Other assets	7	**89.709**	92.889
		3584.667	**3817.250**
Current assets			
Inventories	8	**1289.136**	1111.388
Financial assets			
Investments	4	**2950.067**	1237.090
Trade receivables	9	**4534.411**	3301.379
Cash and cash equivalents	10	**1011.087**	458.427
Other bank balances	11	**313.375**	34.696
Loans	5	**-**	0.141
Others	6	**45.657**	39.383
Current tax asset (net)		**-**	85.156
Other assets	7	**2209.810**	1531.558
		12353.543	**7799.218**
TOTAL ASSETS		**15938.210**	**11616.468**
EQUITY AND LIABILITIES			
EQUITY			
Equity share capital	12	**366.458**	366.320
Other equity	13	**7651.774**	6826.168
Sub-total - total equity attributable to parent		**8018.232**	7192.488
Non-controlling interests		**6.815**	6.697
Total equity		**8025.047**	**7199.185**
LIABILITIES			
Non-current liabilities			
Financial liabilities			
Borrowings	14	**-**	-
Other financial liabilities	17	**113.159**	151.679
Provisions	15	**157.014**	171.770
		270.173	323.449
Current liabilities			
Financial liabilities			
Trade payables	16	**3416.142**	1874.933
Other financial liabilities	17	**197.473**	174.726
Other current liabilities	18	**3762.605**	1971.657
Provisions	15	**251.130**	72.518
Current tax liabilities (net)		**15.640**	-
		7642.990	**4093.834**
TOTAL LIABILITIES		**7913.163**	**4417.283**
TOTAL EQUITY AND LIABILITIES		**15938.210**	**11616.468**
Corporate Information	1		
Summary of significant accounting policies	2		

The accompanying notes are an integral part of the financial statements.

As per our report of even date

13/ End ■■

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