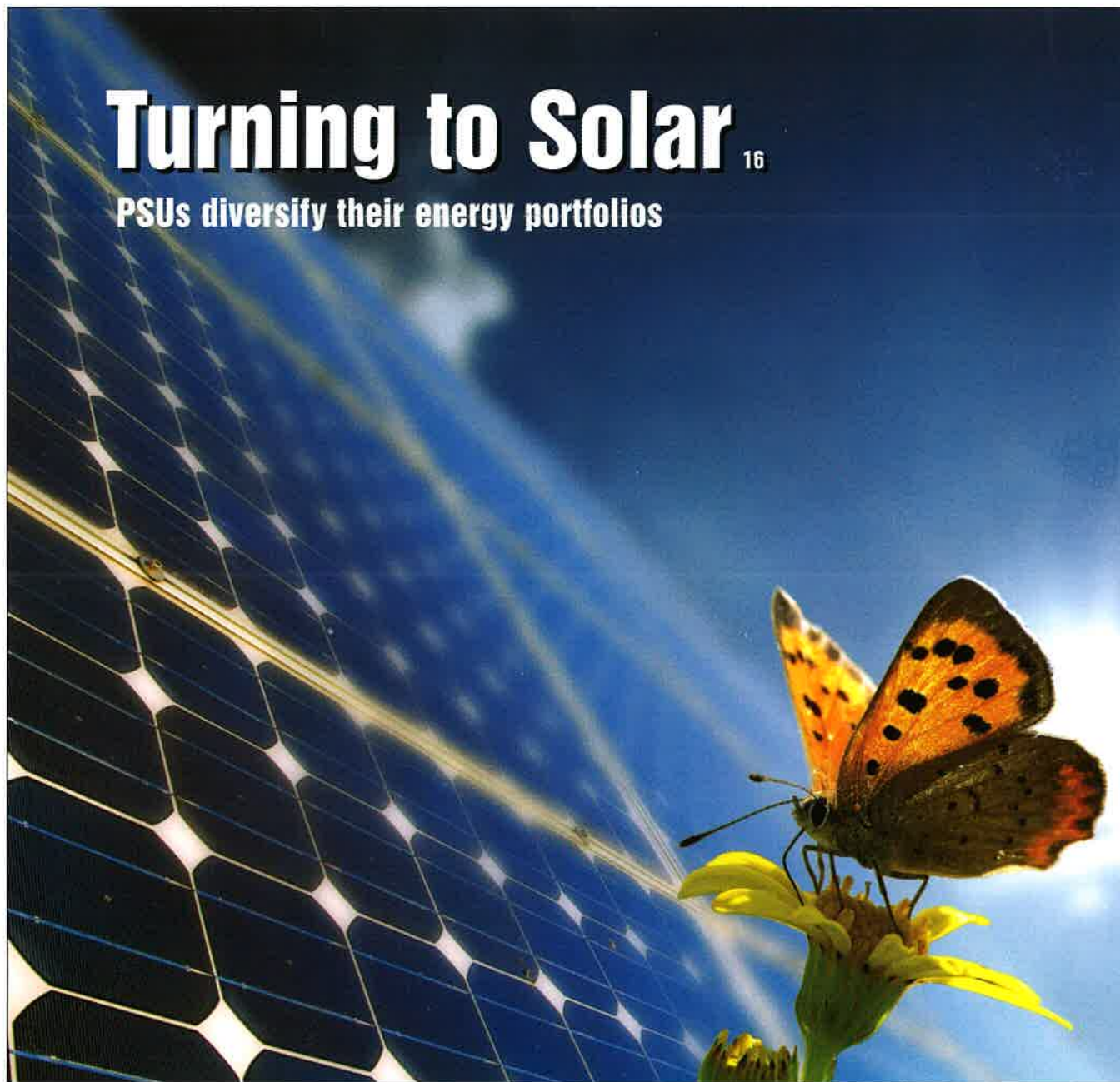


# RenewableWatch

Volume 10 • No. 3 • January 2020

## Turning to Solar <sup>16</sup>

PSUs diversify their energy portfolios



**Perspective**

Interview with EverSource's  
Satish Mandhana

38

**Spotlight**

O&M for  
Solar Plants

50

**Technology Focus**

Solar Plant  
Performance

58

**Plus**

- Rajasthan floats new renewable energy policies . . . . 20
- Government approves higher ethanol prices . . . . . 30
- IREDA well positioned to fund renewables' growth . . 34
- Maharashtra's efforts to meet its renewables targets . 46

# “The bioenergy momentum is building”

Interview with Praj Industries' Pramod Chaudhari

The bioenergy space in India has been witnessing slow uptake, often overshadowed by wind and solar power. Challenges related to feedstock and finance still prevail, though government initiatives such as the National Policy on Biofuels can help boost this segment. In a recent interview with *Renewable Watch*, Pramod Chaudhari, executive chairman, Praj Industries, discussed the recent developments in the bioenergy space, key technology trends and the outlook for the segment.

## What are the key business verticals of Praj Industries? What is its scale of operations in the biofuel space?

Praj is a leading process solutions company with expertise in integrated offerings for bioenergy, high purity water solutions and engineering businesses. In the bioenergy space, the company offers a complete suite of solutions for the biofuel industry such as multi-feed multi-product biorefineries, modernisation of existing process plants and renewable fuels like Isobutanol, among others. The engineering business includes critical process equipment and skids, brewery plants and zero liquid discharge solutions.

Praj supplies complete turnkey plants along with technology-engineering, procurement and construction (T-EPC) to produce biofuel from agricultural residues such as rice and wheat straw, corn cobs and industrial waste like sugar factory press mud and distillery spent wash.

We have executed a wide range of capacities (10 KLPD to 400 KLPD) and are one of the few organisations in the world that offer integrated innovative and a range of engineering solutions in the bioenergy space. Praj is globally known for its innovative solutions and domain expertise in biotech processes and systems that include fuel ethanol plants, bio-CNG, bio-nutrients, process equipment, agri-services and zero liquid discharge solutions.

Praj has a unique approach towards innovation, from R&D to D&D (design and deployment), thus ensuring robust technol-



ogy packages that exceed customer expectations of performance, cost and quality.

## Who are the company's key technology and service partners in this space?

Praj recognises that the development of an ecosystem comprising partners across the value chain is important for the industry's growth. We have, therefore, partnered with academia, industry forums, government agencies, technology institutions and customers.

Among academic institutions, Praj is working closely with IIT Bombay, Indian Institute of Science Education and Research, Pune, D.Y. Patil University, International Centre for Genetic Engineering and Biotechnology, National Chemicals Laboratory and Indian Institute of Petroleum.

Praj has been associated with many eminent industrial and government agencies such as the Department of Biotechnology, Biotechnology Industry Research Assistance Council (BIRAC), Confederation of Indian Industry (CII), FICCI, MCCIA and Association of Biotechnology Led Enterprises (ABLE), among others.

The company has signed partnership agreements with GEVO for technology to produce Isobutanol using sugar-based feedstocks, and Novozymes for enzyme technology to produce biodiesel.

## What role do you expect ethanol to play in reducing the dependence on fossil fuels?

Ethanol has an overarching role that has several facets.

In terms of energy security, the country's energy mix today is dominated by fossil fuel, with India importing around 80 per cent of crude oil. Biofuels are a renewable source of energy and being captive in nature, facilitate energy security. Bio-mobility is a concept that denotes transportation powered by fuel derived from biological sources. With over three decades of expertise and experience in the realm of industrial biotechnology, we are proud to be a torchbearer of bio-mobility.

In terms of economy, ethanol helps reduce the country's high import bill and foreign exchange payout for crude oil. To that extent, it also helps mitigate spikes in volatile pricing of crude oil.

As a renewable source of energy, ethanol



is environment friendly and carbon efficient. Ethanol uses agriculture-based feedstock and, therefore, contributes to sustainable decarbonisation through circular bioeconomy.

In the social context, collection of agriculture waste creates employment in rural areas, and is an alternative sustainable revenue stream for farmers to boost the rural economy. Rural entrepreneurship gets a fillip to build a robust ecosystem to facilitate the supply chain for feedstock, bio-aggregations and transportation.

**What are the recent trends and technology advancements in the bioenergy segment in India? What are Praj's key offerings in this space?**

There are several recent trends in the bioenergy segment. There is a positive push by the government to propagate transportable renewable fuel by way of progressive policies such as Biofuels Policy 2018 and SATAT (Sustainable Alternative towards Affordable Transportation).

Sugary feedstock options such as sugar syrup, B-heavy molasses, etc. have expanded to improve ethanol supply and narrow the demand-supply gap. State-owned oil marketing companies are setting up biorefineries based on Praj's proprietary 2G ethanol technology to increase ethanol blending percentage.

The government has announced several fiscal benefit schemes such as viability gap funding, interest subvention, etc. to facilitate the financial feasibility of ethanol plants and is also mulling over the introduction of bio-jet fuels as a sustainable aviation fuel (SAF).

Praj offers advanced technology solutions to produce liquid and renewable gaseous biofuels.

Under liquid biofuels, Praj's 1G technology is deployed to produce ethanol from sugary and starchy raw material, while its 2G technology utilises lignocellulosic feedstock to produce ethanol. Praj has developed a new enzymatic process

technology to produce biodiesel from used cooking oil and non-edible oil.

Praj has added CBG technology to its bioenergy basket to support the government's ambitious plans of setting up 5,000 CBG plants in the next five years in line with the SATAT policy.

For brownfield projects, Praj has developed technologies to improve throughput and minimise energy footprint. Our zero liquid discharge solutions help reduce effluent, minimise the water footprint and conserve water.

**What are the challenges that the industry is facing and what needs to be done to overcome them?**

There needs to be a robust ecosystem to ensure smooth functioning of supply chain of feedstock to produce biofuels. Various statutory clearances and permissions relating to the environment as well as land acquisition are taking longer than expected and can be sped up.

Farmers burn agri-waste, which leads to brown clouding. They need to be made aware and educated about supplying paddy straw for advanced biofuel projects. The government may consider making biomass aggregation machinery available and announcing a minimum support price for rice straw to address feedstock concerns. Attractive funding at various stages of the project lifecycle is proving to be a challenge and proliferation of fiscal benefits and financial schemes need more focus.

**How did the cost economics of biofuel production and consumption change over time? What trends do you foresee in this regard?**

Volatility of fuel pricing is a deterrent to the biofuel industry. The biofuel industry worldwide is supported by a conducive policy environment. The benefits of biofuels are being looked at beyond the profitability objective in the form of sustainable development. This includes environment conservation, greenhouse gas reduction and inclusive growth by way of employment

generation in the farming community.

Technology has evolved in terms of optimising energy and utility footprint, which has helped improve project feasibility.

Policy interventions have recently kicked in and the momentum is building. As volumes increase, ecosystems develop and there is more active participation of the private sector in setting up 2G biorefineries, CBG plants and biodiesel plants. The first batch of 2G refineries set up by oil marketing companies go online next year.

Development of an ecosystem and streamlining of the supply chain will facilitate more participation from the industry. Further, business models for CBG and biodiesel plants are continuing to evolve.

**What are the company's future plans in terms of growth and innovation?**

Oil marketing companies are setting up 2G-integrated smart biorefineries in Uttar Pradesh, Haryana, Odisha and Karnataka based on our award-winning patented "enfinity" technology. The refineries process multiple feedstocks like corn and sugarcane residue, rice or wheat straw and various lignocellulosic biomass to produce fuel-grade ethanol and other value-added products like lignosulphonate. Internationally, too, we have been receiving a positive response for enfinity from many countries in Europe.

Isobutanol is a high energy feedstock for bio-jet fuels/SAF, which present an emerging opportunity for the aviation and racing industries. Praj has joined hands with Gevo Inc, USA, to develop and commercialise technology to produce Isobutanol using sugar-based feedstock and set up plants worldwide.

Supporting three decades of experience in bio-based solutions, Praj Matrix conducts research in the area of industrial biotechnology to develop renewable chemicals and materials in the area of monomers for biopolymers and health and wellness ingredients. ■