CII National Award for Environmental Best Practices Award– 2023

A Presentation By

Hindustan Unilever Limited Sonipat

On: 21st – 23rd June 2023

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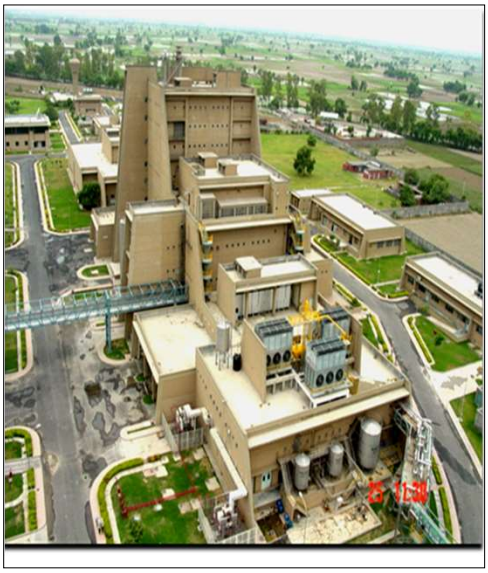
Company Profile



- We're driven by our purpose: to make sustainable living common place.
- With nearly 90 years of heritage in India, Hindustan Unilever Limited (HUL) is India's largest fast-moving consumer goods company.
- Sonepat Plant came into existence in year 2000 with commissioning of Spray Dryer.
- Sonepat Plant consumes 10% of total energy utilized in Unilever South Asia.
- Manufacture: Horlicks, Boost & Malaysia Horlicks. SD Capacity: 90 TPD, VBD: 60 TPD
- In Indian household, 9 out 10 are Hindustan Unilever's products.

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HUL Sonepat-Zero Fossil Fuel Use in Operations

B100 Green Biodiesel Use in DG Sets

100% Green Biodiesel in redundant OFB

ETP Biogas use in FBC Boiler

100% use of Biomass in Primary Boiler

Project Trigger :

- HUL has committed to be net zero in our operations by 2030.
- Our Honorable PM Shri Narendra Modi had committed at COP27 to be net zero by 2070 and generate 500GW of energy through non-fossil fuels.
- National Green Tribunal shuts down our operations for 45 days owing to high air pollution with onset of winters.
- Owing to high usage of fossil fuel in operations, site had high CO2 emissions.

Uniqueness of Project

- **HUL Sonepat is the first site in India to utilize 100% Biodiesel in DG sets with No Drop in SFC.**
- No Capex was invested in Boilers to be make them compatible for use of Bio-fuels.
- Fuel being sourced from local farmers to give additional livelihood to them and to prevent uncontrolled burning of stubble.

Project Timelines

#	Project	Project Delievery Date	Planned Date
1	B100 Green Biodiesel Use in DG Sets	Oct-22	Jan-23
2	100% Green Biodiesel in redundant OFB	Jan-22	Jun-22
3	ETP Biogas use in FBC Boiler	Nov-22	Jan-23
4	100% use of Biomass in Primary Boiler	Jul-22	Jul-22

Project Milestones

#		Milestone 1	Milestone2	Milestone 3
1	B100 Green Biodiesel Use in DG Sets	Check Fuel specification vs HSD &Establish B30 blend	Establish B70 blend	Establish B100
2	100% Green Biodiesel in redundant OFB	Check Fuel specification vs HSD	Study of existing infra to use Bio-diesel	100% firing of Bio-diesel
3	ETP Biogas use in FBC Boiler	Gas qualitative & quantitative analysis	H2S Scrubbing & Burner Installation	Burner Commissioning
4	100% use of Biomass in Primary Boiler	Establish 20% blend with Coal	Establish 50% blend with Coal	Establish 100% biomass

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Project Savings & Society Support

B100 Biodiesel Use in 1650 KVA DG Sets

Savings & Society Support

Cost Saving :

INR 32 Lac/annum

Society Support :

CO2 - 892 Ton/Yr → CO2 - 00 Ton/Yr

100% use of Biomass & Biogas in Primary Boiler

INR 166 Lac/annum

CO2 - 6700 Ton/Yr → CO2 - 00 Ton/Yr

100% Green Biodiesel in redundant OFB

INR 66 Lac/annum

CO2 - 1606 Ton/Yr → CO2 - 00 Ton/Yr

Total Cost Savings: INR 264 Lac/annum

CO2 Footprint Reduction: 9198 Ton/annum

Intangible Benefits:

- Source of livelihood for local farmers.
- Reduction in uncontrolled burning of stubble which helps in controlling air pollution.
- Flaring of CH4 eliminated from site which was contributing to carbon emissions.
- Elimination of HSD storage from site. Site moved out of storing flammable liquids.
- Support to small biodiesel manufacturer with a consistent business.

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Project Replication

Within Hindustan Unilever

- Biodiesel established in DG sets being replicated globally in Unilever. 3 sites in India(Amli, Rajamundry & Kandla) have already established the B30 blends in their DG sets.
- Use of biomass in primary boilers replicated in Hindustan Unilever. 24 sites moved to use of biomass as primary fuel in boilers.
- Biomass is being established in hot air generators for spray drying operations across HUL.
- 3 sites moved to use of bio-diesel in place of furnace oil in HUL.

Within Sector

- Site took the lead in engaging CAQM by submitting various representations on biogenic nature of biomass and its benefits. We have been able to successfully get biomass as approved fuel for use during GRAP period.
- As per a recent study sponsored by MNRE, the current availability of biomass in India is estimated at about 750 million metric tonnes per year. The Study indicated estimated surplus biomass availability at about 230 million metric tonnes per annum covering agricultural residues corresponding to a potential of about 28 GW which means there is huge potential and space for industry to adopt biogenic fuels as primary source of energy in boilers. Most of the boiler types like FBC, travelling grate, stocker grate etc. can utilize biomass.
- Site engages with FICCI on their program of 'Knowledge Mission' where we visit other sites and cross learn. We have presented our case at various other prominent organizations.

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Project Execution Summary

B100 Biodiesel Use in 1650 KVA DG Sets

Challenges faced & Technical Details

- Tests were done on B20, B30, B50, B80 & B100 blends.
- Comparison on parameters BD Vs BS VI

Sr. No.	Description	HSD BS VI	Abhilasha
1	Oxidation Stability g/m3	Max 25	25
2	Acid Value KOH/g	Max 0.20	NIL
3	Cold filter plugging point -Winter deg C -Summer deg C	6 8	6 8
4	Density kg/m3 at 15 Deg C	820-845	825-860
5	Viscosity Kinematic Cst @ 40 deg C	2-4.5	2.5 – 4.5
6	Sulphur Content mg/kg	10	< 10
7	Flash Point deg C	35	>35
8	Cetane Number	51	46

- Assessment on DG operational parameters –

Date	Time	DG No.	Engine RPM 1497-1510	Totalizer reading Running hrs	Fuel consumption3 50 liters/hr s max	Total Fuel consumption totalizer reading	Engine oil pressure 379 -445 kpa	Coolant temp - 80°C - 98°C	Battery voltage 24V - 28V	Fuel pressure 360 - 445kpa
21/06/2023	08:20	DG 5	1500	-	-	4126960				
	09:00		1500	23748	275	4127140	431	83	26	377

- Environmental study through stack monitoring done. Pre and post emission testing
- DG inspection post run done by OEM

100% use of Biomass in Primary Boiler

Challenges faced & Technical Details

- Difference between bulk density of Biomass Vs Coal, need to increase RPM of feeders & crusher.
- Difference between GCV of Biomass & Coal , need to put extra fuel for same heat input.
- Higher alteration of Biomass fuel vs Coal, which was leading to frequent change in Boiler parameters.
- Very few Biomass vendors, leading to monopoly in Biomass supply.
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100% Green Biodiesel in redundant OFB

Challenges faced & Technical Details

- Converting the burner designed for HSD on Biodiesel.
- Vendor base development for Biodiesel suppliers.
- Stability of flame on biodiesel
- Developing programming inhouse for Biodiesel firing.

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Project Benchmarking

Achieving National Benchmark standards

National Standards :

- IS 15607:2016- Indian standard for sampling and test for Bio-diesel(B100).
- First Site in overall Unilever to run Biodiesel in DG Sets
- CAQM direction 53, dated 04th February 2022.
- CAQM direction 62, dated 17th March 2022.
- First Site in Nutrition to be on 100% Biomass

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Priority Plan + 1 Yr & +2 Yrs

Priority Plan +1 Yr

- Eliminating HSD Usage at Sonepat Factory.
- Eliminating CFC's usage in Sonepat Factory and moving toward low GWP refrigerant eg: R1234ze.
- Use of Biogas in FBC Boiler.
- Responsible Sourcing of Sawdust Biomass.
- Increase number of type of biomass which can be used as fuel.

Priority Plan +2 Yr

- Eliminating HSD in all other factories of Unilever.
- Eliminating HSD/RFO usage in Oil Fired Boiler across HUL.

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Top Best Practices

- Regular energy audits to reduce energy wastage
- Awareness to farmers for better & responsible use of water for irrigation in near by 7 villages
- Re-use of ETP treated water in HVAC Cooling tower
- Water recharge facility in society through ponds & rainwater harvesting system in schools
- Zero water discharge of ETP treated water
- Online stack monitoring connected with CPCB
- Use of Biodiesel in DG & Boiler
- Use of By Product Husk in FBC Boiler
- Waste Ash use for Brick manufacturing
- Use of Food waste in Animal Feed Manufacturing

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Major Learnings

- Government authorities are supporting industry proactively when the issues are represented in a scientific way.
- Explored and learned about various agri based fuels available in various parts of India as per seasons to ensure security of supplies.
- Established strategic buying of biomass as per season to ensure cost competitiveness.
- Studies specifications of bio-diesel available in market to establish its use for various equipment like boiler, DG sets, HAG and diesel pumps.
- Still there is lack of quality bio diesel manufacturers in India owing to biodiesel manufacturing being in nascent stage.
- Biomass cost can be optimized by mixing multiple biomass fuels in boilers.
- ETP gas post scrubbing has GCV of 8500 Kcal/Nm3 and is a viable fuel.

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Project-सौर ऊर्जा

441KWp Roof Mounted
2017
2% Green Energy

800KWp Ground Mounted
2018
4% Green Energy

550KWp Ground Mounted
2019
2% Green Energy

2500 KWp
10% Green Energy

=

4300 KWp
18% Green Energy

4.3 MWp Solar Power

Approx. 5.8 million units electricity per year, 18% of total consumption

4355 Tons of Carbon emissions avoided per year

Project – Robotic Cleaning

Result Achieved

Water Saved: 400KL/A

2.5% increase in Unit generation

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Thank you !

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