

# **PLASTIC TO DIESEL – POWERING SUSTAINABLE ENERGY**

**By  
Muhammad Ameen  
2 Degrees Clicon Pvt Ltd**

**“We don’t inherit the earth from our ancestors, we borrow it from our children”**

# 2 Degrees CliCon Pvt. Ltd



2 Degrees CliCon (2DC), a subsidiary company of Ideation3x Pte Ltd, Singapore



Fuel manufacturer from end of life plastics using Catalytic Thermal Cracking



Patented technology.



Large Manufacturing capacity of Fuel oil from End of life waste plastics



Offers EPR (Extended Producers' Responsibility) and carbon-credits

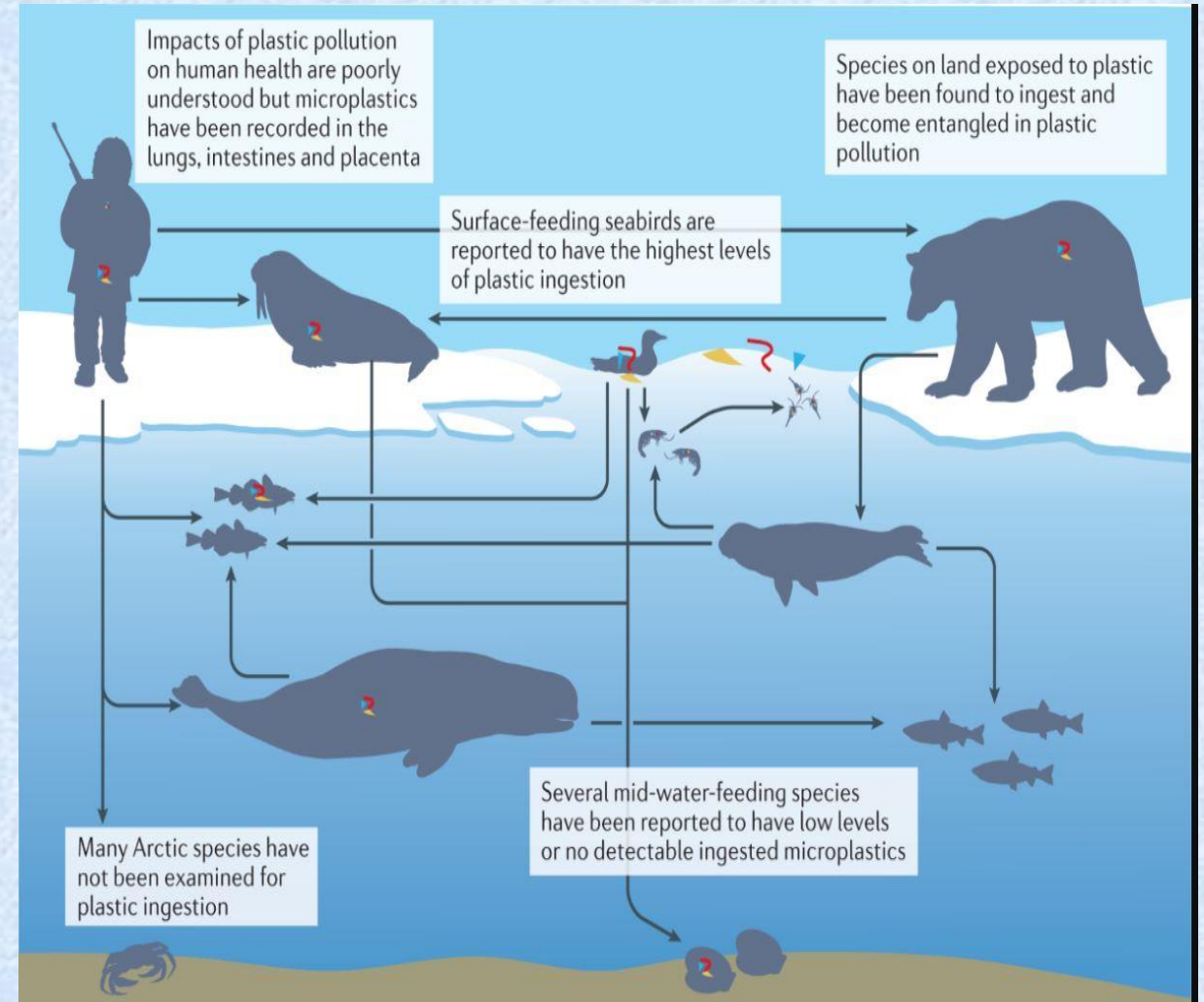
# 2 Degrees CliCon, Mission < 2 Degrees

- Inspired by the Paris summit on **Climate Change** held in December 2015 which has resolved to keep the global temperature increase **'well below' 2 degrees** Centigrade by curbing the fossil fuel gases imperilling the Earth's climatic system, the name 2 Degrees CliCon in which **CliCon** is short for **Climate Control** was incorporated. Merged unit names: G.K Industries, R.S Industries & Infini Industries
- 2 Degrees (2DC) **manufactures liquid fuels** from **End of life (EOL) Plastics** using Catalytic Thermal Cracking (CTC)
- It sells under the name **Alternate Diesel Fuel (ADF)** and **Petro Polymer Fuel (PPF)**
- It is a **Diesel equivalent fuel** for any **Fuel Oil application**
- Has **replaced Diesel & LDO** in many industries
- Commercial, **ESG complaint** company with large fuel manufacturing capacity
- Headquartered in Hyderabad, India
- Track record of more than **10 years**
- Fuel **approved & certified** by India's largest boiler manufacturer **Thermax**
- Backed by **Japanese** Institutional investors – Unison Capital



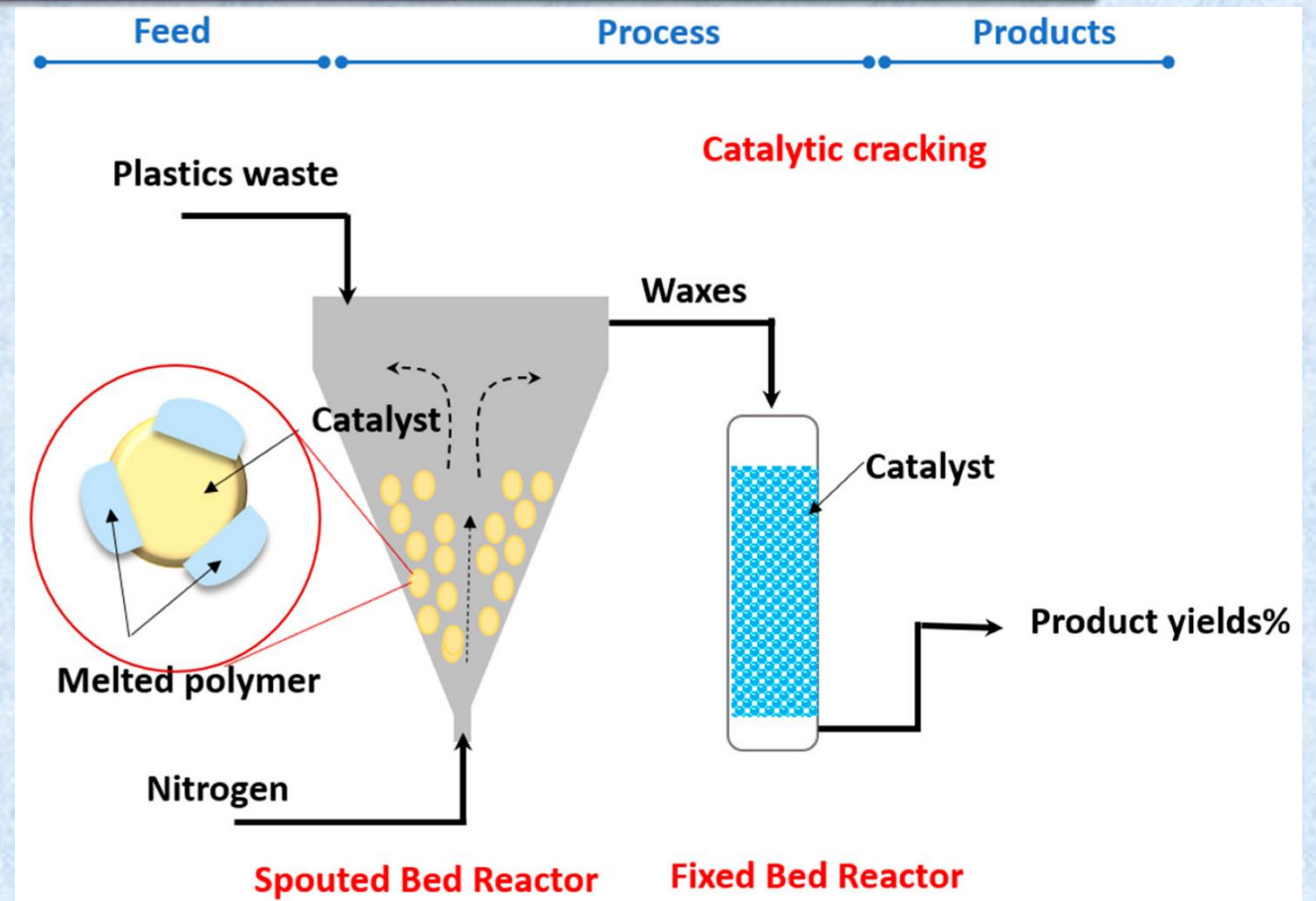
# Plastic Pollution – Key Facts & Impacts

- India has secured the top spot as biggest plastic polluter in the world, releasing 9.3 million tonnes (Mt) annually, according to a new study.
- This amounts to roughly one-fifth of global plastic emissions.
- Plastic waste significantly contribute to landfill mass , where it can take hundreds to thousands of years to decompose.
- Micro plastics have been found in water, food and even in air posing potential health risks to humans and wildlife
- Governments and Organizations spend billions on cleaning up plastics waste from the environment
- Marine species and land animals are known to be effected by ingesting plastic or getting entangled in plastic waste



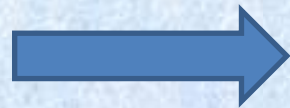
# Which Plastics can be recycled into fuel?

Common Plastics with Code 2, 4, 5 & 6 can be recycled into fuel using Catalytic Thermal Cracking (CTC). CTC is safe high temperature indirect catalytic cracking of plastic which converts it into Syngas which when condensed converts to fuel.



# Plastic Fuel Grades

PPO (LDO grade)  
Plastic Pyrolysis Oil



ADF  
Alternate to Diesel Fuel



ADF +  
Refined ADF



# Benefits Of Plastic Fuel in Power Plants

- **Waste Reduction & Environmental Impact :**
  - a. Reduces plastic waste in landfills and oceans
  - b. Reduces the consumption of fossil fuels, promoting the resource efficiency and supporting a circular economy.
- **High Energy Output :**
  - a. Plastic Fuel has higher calorific fuel compared to traditional fossil fuels
  - b. Plastic derived fuel provides energy efficiency compared to fossil fuels
- **Lower Carbon Emissions :**
  - a. Reduces Green House gases like CO<sub>2</sub> and methane
  - b. Contributes to cleaner energy production with fewer pollution
- **Cost Saving & Economic Benefit**
  - a. Offers a cost effective alternative to conventional fuels.
  - b. Supports job creation in waste management and energy sector

# Case Study: Successful Adoption of ADF (Alternate Diesel Fuel)

## 1. Tata Metaliks – Reheating Furnace

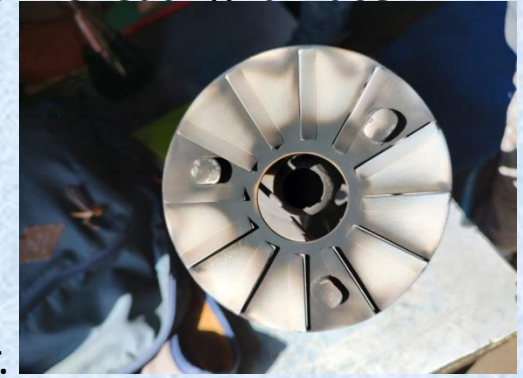
- **Initial Usage:** Tata Metaliks began by blending ADF with HSD (High-Speed Diesel) in their reheating furnace.
- **Transition:** After initial testing, they successfully transitioned to 100% ADF.
- **Result:** Achieved seamless operation with no adverse impact on equipment.

## 2. Assam Carbon Pvt Ltd – Boiler Application

- **Study by Thermax:** A study was conducted 3 months after the use of ADF in the boiler.
- **Key Findings:**
  - No residue was found in the burner or diffuser plate.
  - Maintenance was the same as when using traditional diesel.

## 3. Berger Paints – ADF Testing & Transition

- **Testing:** Berger Paints conducted tests comparing ADF with conventional diesel.
- **Conclusion:** Found ADF to be similar to diesel in performance.
- **Outcome:** Successfully switched to ADF with no operational issues.





# Properties ( Diesel Vs Plastic Fuel)

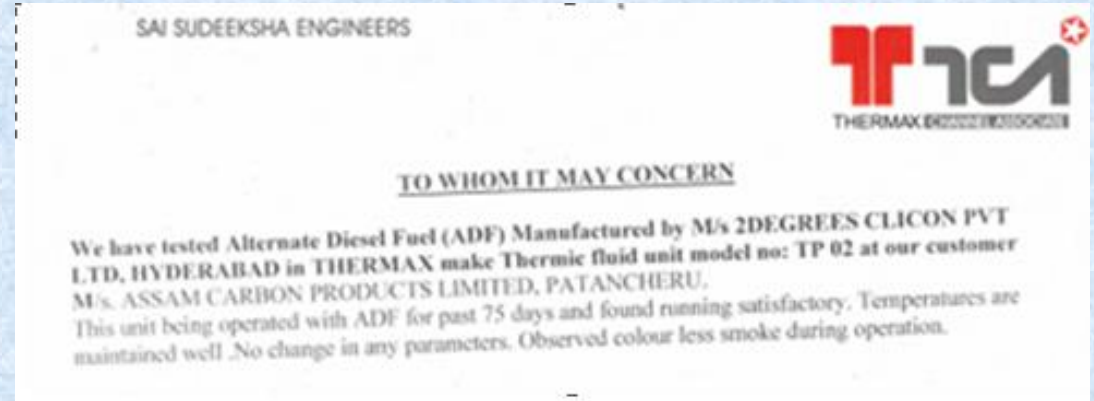
Test Parameters	Diesel (ASTM)	ADF
Gross Calorific Value (K.cal/kg)	~10500	10500+
Specific gravity at 15 deg C (Range)	0.82-0.84	0.80-0.82
Sulphur as S (% by mass)	0.1 – 0.2	0.1 – 0.2
Flash Point deg C	Min 35	30-50
Pour Point deg C	Max 3 (Summer) Max 15 (Winter)	<0
Total Sediment (% by mass)	0.01	< 0.01
Viscosity at 38 Deg C (cSt)	2-4.4	2-4
Moisture Content (% by mass)	<0.01	<0.01
Ash Content (% by mass) Max	Max 0.01	< 0.01

## 5 BIG Reasons to TRY ADF®

- ADF® can replace HSD/Diesel in any Furnace/Boiler **WITHOUT ANY** infrastructural **CHANGES**
- **ADF® Blends** easily **with Diesel** and can be used **exclusively** or **mixed** in any ratio **with Diesel**
- **Diesel can replace ADF®**, if needed, **WITHOUT ANY CHANGES** et all
- **ADF®** can be **stored** in the **existing Diesel tanks**
- **Diesel** and **ADF®** are **interchangeable 100%**

# Industry Recognition & Certification

- **Thermax**, Pune, has **certified** the fuel as a **viable** replacement for Diesel in their boilers
- HPCL, **Hindustan Petroleum**, has awarded 2 Degrees CliCon a grant to setup more manufacturing facilities across India to manufacture fuel from plastic.
- **Multiple satisfied** customers and testimonials over the years
- Brand recognition and associated with big industry brands like Tata especially in Hospitality sector like Apollo





## हिन्दुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड

(भारत सरकार का उपक्रम) रजिस्टर्ड ऑफिस : 17, जमशेदजी टाटा रोड, मुंबई - 400 020.

### HINDUSTAN PETROLEUM CORPORATION LIMITED

(A GOVERNMENT OF INDIA ENTERPRISE) REGISTERED OFFICE : 17, JAMSHEDJI TATA ROAD, MUMBAI - 400 020.

---

आर एण्ड सी बिल्डिंग, सर जे. जे. रोड, भायखला, मुंबई - 400 008.  
 टेलिफोन - 2378 9000 • तार : हिन्दपेटवेज, फॅक्स : 2378 2496  
 R & C Building, Sir. J. J. Road, Byculla, Mumbai - 400 008.  
 Tel. : 2378 9000 • Telegram : Hindpetwez, Fax : 2378 2496  
 CIN : L23201MH1952GOI008858

PURCHASE ORDER		ORIGINAL
<b>TO</b> : 2 DEGREES ALTERNATE FUELS PVT LTD H.NO. 2-38/A GURUKRUPA NAGAR, SERILINGAMPALLY, HYDERABAD HYDERABAD-500019 Telangana India	<b>PO Number</b> : 16000002-OP-10156/AA <b>PO Date</b> : 5/7/2016 <b>LOI Reference</b> : <b>Tender Number</b> : 15000003 HD 10156 <b>Vendor's Offer Reference</b> : <b>ERP Vendor Code</b> : 27044159 <b>PR Number</b> : 15000018 HP 10156 <b>Entity Code Type</b> : N04 (Private Ltd. Co . Non SSI)	
<b>Fax No.</b> : 9949509900 <b>E-Mail</b> : vik.agarwal@gmail.com		
<b>Title :EPC for WPF Plant</b>		
<b>Please supply the following items / service, as per the terms and conditions mentioned below and in attachments :</b>		
<b>Deliver to :</b> Gas, Renewables and BD Marketing,HINDUSTAN PETROLEUM CORPORATION LIMITED,4th FLOOR, R&C BUILDING,SIR J J ROAD,BYCULLA,MUMBAI,400008,Maharashtra,India, Phone:080-25063100(Ex		

# Test Reports from Customers



## R. V. BRIGGS & CO. PRIVATE LTD.

ANALYTICAL CONSULTING & TECHNICAL CHEMISTS  
(AN ISO 9001:2015 & ISO 45001: 2018 CERTIFIED COMPANY)

TAHER MANSION, 1ST FLOOR  
9, BENTINCK STREET, KOLKATA - 700 001  
Phone : (033) 4044-3380/3381/3382 / 3383, Fax : 33 2248-0447  
E-mail : rvbriggs.kolkata@gmail.com, Website : www.rvbriggs.com  
CIN : U51109WB1931PTC007007

### TEST REPORT

No. FUEL/22-23/327 Date: 10 February 2023 Page 1 of 1

Issued to : M/s. BERGER PAINTS INDIA LTD.  
Berger House, 129, Park Street,  
Kolkata - 700017.  
Your Ref. No. : E mail dtd. 03.02.2023  
Description of sample : Liquid Fuel  
Mark on Sample : Nil  
Sample Submitted by the Party on : 07.02.2023  
Analysis Completed on : 10.02.2023

#### TEST FINDINGS:

Sl. No.	Test Parameters	Test Method	Unit	Results
1.	Flash Point (P.M.C.C.)	IS:1448 (Part-21)	°C	48
2.	Pour Point	IS:1448 (Part-10)	°C	(-) 6
3.	Total Sulphur	IS:1448 (Part-33)	%	0.14
4.	Nitrogen	IS:1350 (Part-V, Sec.II)	%	0.21

(T. NANDI)  
Technical Manager  
Authorized Signatory  
For R.V.BRIGGS & CO. (P) LTD.

Mitra S. K. Private Limited



### TEST REPORT

Name & Address of the Customer :  
'BERGER PAINTS INDIA LTD.'  
14 And 15, Swarnamoyee Road,  
P.O. Botanic Garden, P.S. Shibpur, Howrah,  
West Bengal, Country- IN, Postal Code-711103

Report No. : WB/ED - 4002A  
Report Date : 14.02.2023  
Sample No. : MSKGL/ED/2022-23/02/01040  
Sample Description : Liquid Fuel Sample  
Sample Mark : Liquid Fuel Sample (ADF)  
Date of Submission : 07.02.2023

Ref. No. & Date: As per mail, dtd - 03.02.2023

#### ANALYSIS RESULT

Sl No.	Parameter	Unit	Result	Test Method
1	Gross Calorific Value	Kcal/kg	10996	ASTM D 5865_(O)

Report Prepared By:

for Mitra S. K. Private Li  
Authorized Signatory

- The results relate only to the item(s) tested.
- This Test Report shall not be reproduced except in full, without the permission of Mitra S.K. Private Limited.

Head Office: Shrachi Centre (5th floor), 74B, A.J.C. Bose Road, Kolkata - 700 016, West Bengal, India.  
Tel : 91 33 40143000 / 22650006 / 22650007 Fax : 91 33 22650008  
Email : info@mitraak.com. Website: www.mitraak.com

Page 1 of 1

## SAI SUDEEKSHA ENGINEERS

G 1, SATYA ENCLAVE, NIZAMPET, HYDERABAD - 500090. TEL: 8125014147,  
E-mail: [admin@saisudeeksha.com](mailto:admin@saisudeeksha.com) / [hydservice@saisudeeksha.com](mailto:hydservice@saisudeeksha.com)  
GSTIN: 36ABEFS4160N1ZT



### SERVICE REPORT

CLIENT: M/s. ASSAM CARBON PRODUCTS LIMITED, PATANCHERU  
DATE OF VISIT: 13-JUNE-2022  
VISIT TYPE: PAID BASIS  
UNIT: TPCM02/ONF/  
KIND ATTN: Mr. AMEEN  
SERVICE ENGINEER: Mr. B MAHESH KUMAR & Mr. S SASHI  
PURPOSE OF VISIT: UNIT PERFORMANCE TEST

#### OBSERVATIONS:

- Visited the site on clients call to check the unit performance when operated with the Alternate Fuel in place of diesel.
- Unit is being operated with alternate fuel from 30 days.
- Observed the unit in running condition. Checked & ensured for all the safeties of the unit are in line & working properly.
- Observed the fuel pressure is 14 Kg/Cm<sup>2</sup>.
- Unit is running fine.
- Checked for the flue-gas parameters in this condition & observed as follows:
- Observed the flue gas parameters after during unit operation:
 

a) Flue gas temperature	-	300°C to 312°C
b) TF Inlet temperature	-	229°C to 231°C
c) TF Outlet temperature	-	232°C to 235°C
d) O <sub>2</sub>	-	7.3% to 7.9%
e) CO	-	19ppm to 33ppm
f) CO <sub>2</sub>	-	9.7% to 10.9%
- As per operator feedback there is no clinker formation on diffuser plate & blocking of nozzle during weekly check of the unit.
- Observed no smoke from chimney during the unit operation.
- No ON/OFF issue of the unit as per operator feedback.
- Maintenance of the unit is being carried out weekly (Every Sunday) as the unit will not be in operation.
- Average fuel consumption is 12 - 14 litres.

# Who has replaced Diesel with ADF ?

- Tata Metaliks – Annealing Furnace & Boiler
- Berger Paints - Boiler & Thermic Fluid Heaters ( Successful trials )
- Ultratech Cement – Kiln Lightup
- JSW Cement – Hot Air Generator(HAG)
- Gulbarga Power Plant – For Powerplant Steam Boiler startup/lightup
- Suvan Steels Pvt Ltd
- Maha Cement - Kiln startup/lightup
- Imerys Vizag Pvt Ltd

**TATA METALIKS**



**JSW Cement**



**IMERYS**



# Some more Customers ( Hyderabad)

Name	Type of Boiler	Application
<p><u>Akshaya</u> Patra Foundation/Hare Rama  Hare <u>Krishna</u> Foundation/ISKCON  <a href="https://www.akshayapatra.org/">https://www.akshayapatra.org/</a>  Food Preparation</p>	Diesel Fired Boiler 3 Nos from Thermax India Ltd	Generation of Steam for <b>cooking of  Rice/Vegetables</b> for supply to Schools in partnership with state of Telangana, India
<p>Polymer Industries Limited  <a href="https://polymerindustriesindia.com/">https://polymerindustriesindia.com/</a></p>	Diesel Fired Thermic Fluid Heater from Thermax India Ltd	Manufacturing of specialty plastics
<p><u>Sanvita</u> Biotechnologies  <a href="https://www.sanvitabiotech.com/">https://www.sanvitabiotech.com/</a></p>	3.5 Ton/hour Diesel Fired Boiler from Forbes Marshall	Manufacturing of vaccines for dogs
<p>Assam Carbon  <a href="http://assamcarbon.in/">http://assamcarbon.in/</a></p>	Diesel Fired Thermic Fluid Heater from Thermax India Ltd.	Manufacturing of specialty product



# Customer TESTIMONIALS



**POLYMER INDUSTRIES  
INDIA LIMITED**



Date:14.04.2022

To Whomsoever it may concern

We have been using ADF – Alternate Diesel Fuel made from end of life plastics, supplied by 2 Degrees Clicon Pvt Ltd in our Thermax boilers.

The experience of using this fuel is good and the calorific value is equivalent to Diesel Oil which we used earlier. As a result, our fuel cost has got down than earlier without any environment issues.

Hence, we are happy to use this alternate fuel as a replacement for Diesel Oil and also very happy that we are able to use a Alternate Fuel instead of a Fossil Fuel and contribute a bit towards containing Climate Change.

We wish them all the best in their endeavor in helping contain global warming.

For polymer Industries India Limited



Date: 06-11-2021

To Whomsoever It May Concern

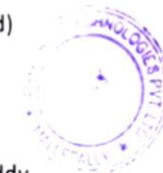
We have replaced HSD/Diesel with Alternate Diesel Fuel (ADF) manufactured, from end of life plastics, by 2 Degrees Clicon Pvt Ltd at their Manufacturing plant in Gollapalli, Hyderabad, TS. We have visited the fuel manufacturing facility which is about 3 kms from our Manufacturing facility in Sangareddy, TS.

We have a Forbes Marshall boiler, 3500 Kg/Hr, and consume 1000 litres/day. Over the past month we have found most parameters (performance and emissions) satisfactory.

For (Sanvita Biotechnologies Pvt Ltd)

Name- Chintham Rajani kantha Reddy

Purchase Head



# Customer TESTIMONIALS

SAI SUDEEKSHA ENGINEERS



## TO WHOM IT MAY CONCERN

We have tested Alternate Diesel Fuel (ADF) Manufactured by M/s 2DEGREES CLICON PVT LTD, HYDERABAD in THERMAX make Thermic fluid unit model no: TP 02 at our customer M/s ASSAM CARBON PRODUCTS LIMITED, PATANCHERU. This unit being operated with ADF for past 75 days and found running satisfactory. Temperatures are maintained well. No change in any parameters. Observed colour less smoke during operation.

For SAI SUDEEKSHA ENGINEERS,

*Ashok Pathuri*  
ASHOK PATHURI  
29/06/22



MANUFACTURER OF ELECTRICAL & MECHANICAL  
CARBON MATERIALS & COMPONENTS  
Cin No: L23101AS1063PLC001200

Dated: 25.06.2022

## TO WHOM SO IT MAY CONCERN

We have been using ADF made from end of life plastics, supplied by 2 Degrees Clicon Pvt. Ltd. in our Thermax Boilers.

Using this fuel is good earlier we used LDO. As a result our maintenance cost has got down & running smoothly, without any environment issues.

Hence, we are happy to use this Alternate Fuel instead of Fossil Fuel & contribute a bit towards containing climate change.

We wish them all the best in helping contain global warming.

For Assam Carbon Products Limited, Patancheru



REGISTERED OFFICE & GUWAHATI PLANT  
NARENGI CHANDRAPUR ROAD  
BIRKUCHI, NARENGI, GUWAHATI : 781026  
Phone : (0361) 2640262, 2640630  
Fax : (0361) 2640368  
E-mail : acplghy@ascarbon.com

PATANCHERU PLANT  
PLOT NO. 2, I.D.A., PHASE - I,  
PATANCHERU : 502319, TELENGANA  
Phone : (08455) 242087, 242089  
Fax : (08455) 242237  
E-mail : acplpat@ascarbon.com



# Ultratech Cement says



For initial Kiln heat-up at Line IV, we have used Petro Polymer Fuel (An alternative fuel made from plastic scrap) supplied by M/s. GK Industries & M/s. R.S. Industries, a part of Infini Industries, Hyderabad, as a substitute of HSD.

The experience of using this fuel is satisfactory and the Calorific Value of this fuel is higher by 5% than that of HSD, which has resulted in lower oil consumption which helped in optimizing Kiln start-up cost.

We are happy to associate with this company for this product.

For **UltraTech Cement Limited**  
(Unit:Rajashree Cement Works)

A handwritten signature in blue ink, appearing to read "Naresh Agrawal".

**(Naresh Agrawal)**  
Sr.Vice President (Technical) Line IV



# MAHA Cement Says:



We are currently using PPF, an alternative fuel made from scrap polymers, supplied to us by **M/s GK INDUSTRIES** located in Hyderabad, TS. We use it as a startup fuel in place of High Speed Diesel (HSD) in our Cement Kiln at our plant located at Mellacheruvu Village, TS.

This fuel is a direct substitute for Diesel (HSD) since we are using the same pumping, filtering, firing systems (burners, blowers etc). Our startup cost reduced by opting for this fuel and we are happy with the quality of this Alternative Fuel and the services offered by M/s GK Industries.

We wish them all the best in their endeavor in helping contain global warming.

FOR My Home Industries Private Limited,

  
**V.H. CHOUARY**



# Why **No** to Diesel & **YES** to ADF ?

<b>DIESEL</b>	<b>ADF<sup>®</sup></b>
Calorific Value ~10500+ Kcal/Kg	Similar Calorific Value ~10500+ Kcal/Kg
<b>High</b> NOx and CO <b>emissions</b>	<b>Low</b> NOx and CO <b>emissions</b>
<b>High Sulphur</b>	<b>Low Sulphur</b>
<b>Expensive</b>	<b>Economical</b>
<b>FOSSIL FUEL</b>	<b>ALTERNATE FUEL</b>
Net <b>CO2 emissions = 3 tons</b> per ton of Diesel fired	Net <b>CO2 emissions = Lesser than HSD</b>
<b>NON GREEN FUEL</b> Made from CRUDE OIL	Considered as more sustainable and environmentally friendly option .

# Our Current Manufacturing Facility



# Thank You - The best ROI is **ROE – RETURN ON EARTH**

*We believe that the world is finite in its resources but solutions are infinite. We are a group of companies with powerful technologies to change the future. Our mission is to create a group of people who realise the importance of under 2 Degrees and step forward.*



**Vikas Agarwal**  
Founder & Director

