RECEIC Awards on Resource Efficiency & Circular Economy

INDIAN OIL CORPORATION LIMITED

INDEcoP2F Technology

AWARD CATEGORY : *CIRCULAR TECHNOLOGY DISRUPTORS - INDUSTRY*

21st APRIL 2026

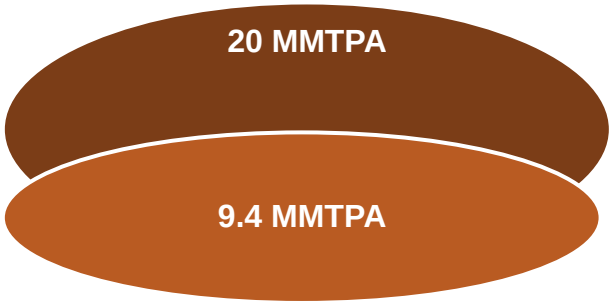
Agenda

ABOUT THE INITIATIVE

ACCOMPLISHMENTS

WAY FORWARD PLAN

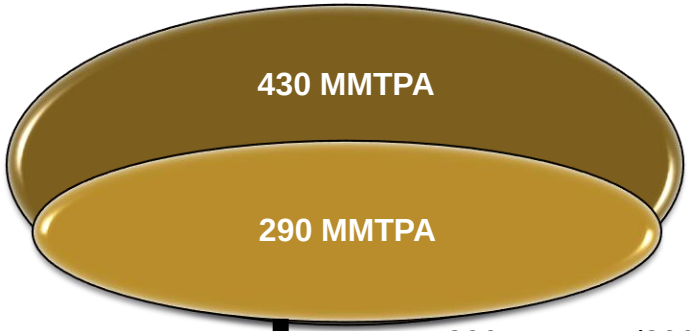
Waste Plastics – Background & Challenges



India*

Plastic Consumption

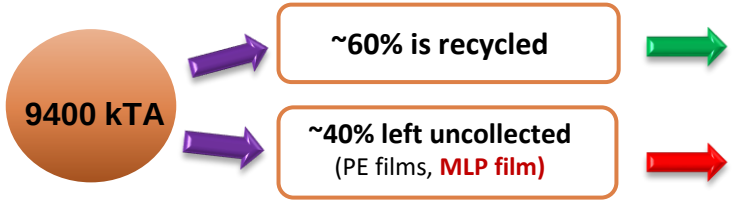
Waste Plastic Generation



1200 MMTPA (2060)

World#

Waste Plastic Recycling in India



Mechanical recycling (PET & Rigid Package)

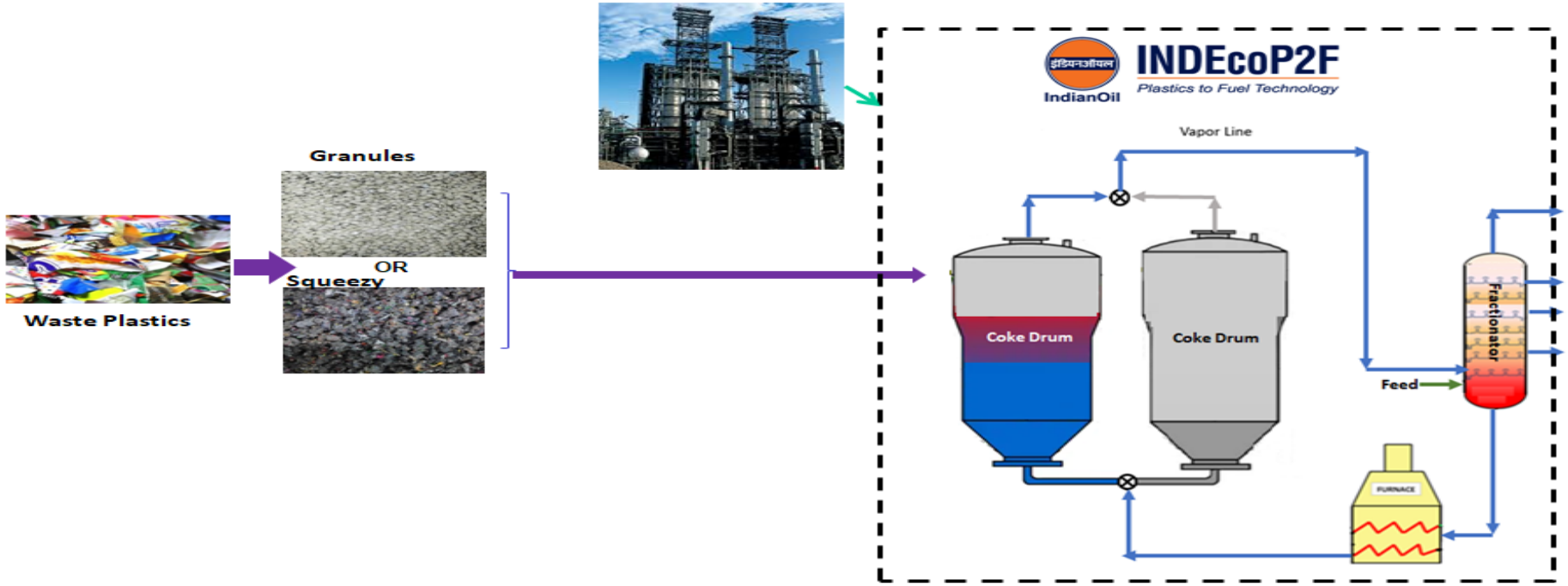
Cause land, air & water pollution

- Plastics Growth ~ **1.4 x GDP growth**
- Per capita consumption in India (**13 kg**): **~1/3rd world Average**
- **Metallized/Multilayer Packaging (MLPs) least recycled & poses high risk to the environment**

(*) AIPMA 2018, Ministry of housing and urban affairs 2019 (#): IHS Markit 2021, UNEP Report 2018, OECD (2022)

Need to develop a cost effective & viable waste plastic processing Technology

INDEcoP2F Technology



- ***Processing of Waste Plastics through Delayed Coking Process of Oil Refinery***
  - *Coke Drum Temp: 480 - 490 °C*
  - *Pressure: 1 – 3 Kg/cm²(g)*
  - ***Conversion: 95% to Distillate, 5 % Coke***

Patent granted in India, USA, Japan, China & Saudi Arabia; FTO established in India

Approach & Methodology

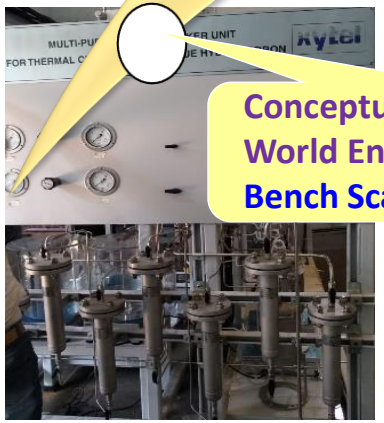
Resource Efficiency and Circular Economy Industry Coalition

In-house development of BDEP, Detailed Engg, HAZOP study

Installation, Commissioning & Commercial Demonstration at DCU of Digboi Refinery

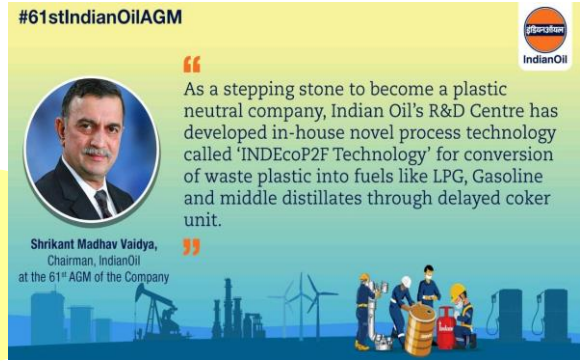
Developed & validated in 1 bbl/day capacity DCU Pilot plant & Hydrodynamic study

Conceptualization – World Environment Day Bench Scale study



Ongoing activities for continuous mode operation

Leadership commitment

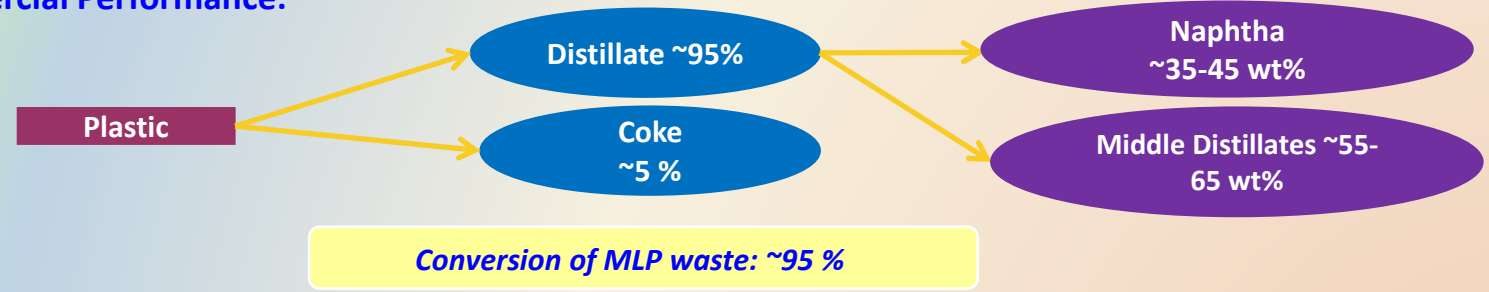


Concept to Commercialization by in-house teams

Commercial Demonstration: A Snapshot

INDEcoP2F Commercial Unit

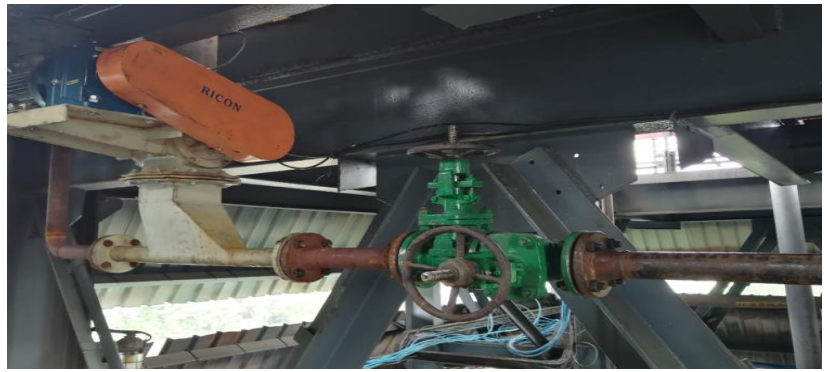
- **Technology Demo unique to Petroleum Industry – Probably 1st time globally**
- **Hardware installation:** Vessels (2 nos.), Rotary valve (2 nos.), Instrumentation & piping
- **Commercial Performance:**



Conversion of MLP waste: ~95 %

  - 0.5- 1.5% (3.3 to 9.8 MT per run)
    - ➢ *Stable Plant Operation & All product properties within specifications*
- **Cost of Demonstration :** Rs. 1.31 Cr
- **Estimated Benefit :** GRM improvement ~INR 14 Cr/MMTPA of DCU (1.5% dosing)

Demonstration team



Rotary Valve

Conveying gas line

Novel Features

- ***Capable to handle & convert all types of waste plastics like PE/PP etc., including MLP waste***
- **Simple & low cost hardware→ possible to synergize with existing DCU**
- **Easily implementable & ensuring trouble free operation**
- **No impact on unit throughput→ Generation of Product is Additional Revenue**
- **Overcomes issues related to furnace choking due to impurities present in waste plastic**
- **Amount of plastic to be processed decided on case-to -case basis**

On purpose installation of technology & processing of waste plastic without any impact on DCU operation

Queries received from multiple parties across the globe

(India, South Korea, USA, France etc.)

Global Scalability

Refinery wise DCUs in India	Capacity (MMTPA)
IOCL Panipat	**3**
IOCL Gujarat	**3.7**
IOCL Barauni (2 units)	1.1
IOCL Bongaigaon (2 units)	1
IOCL Guwahati	0.45
IOCL Digboi	0.17
IOCL Paradip	4.1
IOCL Haldia	1.7
CPCL Manali	2.2
Numaligarh, Assam (NRL)	0.306
HMEL Bhatinda	3
BORL, Bina	1.36
RIL Jamnagar	15.2
Nayara Energy	7.5
BPCL, Kochi	3.84
ONGC MRPL, Mangalore	3
Total Coking Capacity, India	**51.63**
Total Coking Capacity, IOCL	**17.42**

	IOCL	India
DCU capacity, MMTPA	**17.4**	**51.6**
Plastic qty, kTA	**261**	**774**
GRM improvement, INR Cr	**243.6**	**722.4**

DCU Capacity (MMTPA)*	
Global	**425**
US & Canada	140
China	105
Other Asia Pacific	55
Latin America	40
Europe	35
Russia & Caspian	25

~6400 kTA MLP could be processed

*OPEC 2019

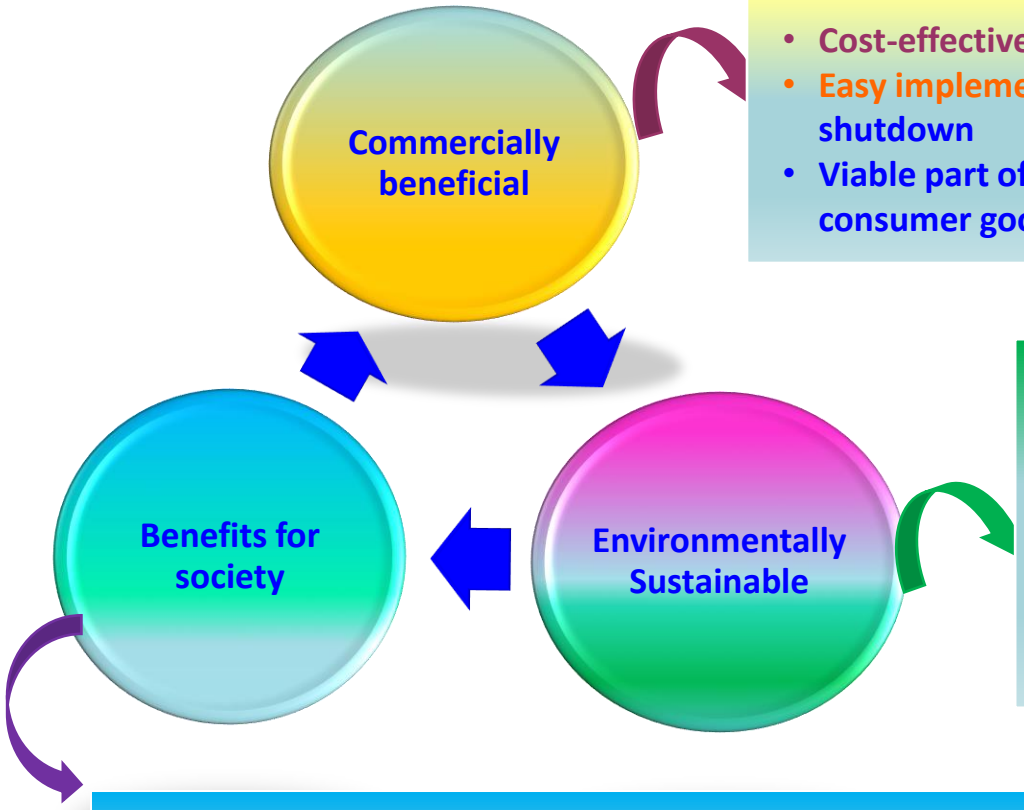
Further Implementation Plan:

- PR DCU: 3 MMTPA
- JR DCU: 3.7 MMTPA
- Discussions with CPCL & non-IOCL refineries under progress

INDEcoP2F implementation will help to achieve 'Circularity' / 'Plastic Credits'/ 'Recycle mandates' / 'Certified Mass Balance' / Reducing crude imports

Impact & Accolades

Resource Efficiency and Circular Economy Industry Coalition



- Cost-effective & Simple Technology
- Easy implementation in existing DCUs by revamp without shutdown
- Viable part of 'Extended Producer Responsibility' of the packaged consumer goods industry – as 'end of the life' option

- Reduction in land, groundwater, air & marine pollution
- Adds value to the least recycled plastic waste
- Achieves '*circular economy*' of plastic
- ~1 MMTPA of CO_2 emission reduction per ~1 MMTPA INDEcoP2F compared to 'incineration'

- Boost to social entrepreneurs for setting up waste plastic recycling infrastructure
- Creation of jobs in the sectors like waste plastic collection, segregation, logistics, supply & processing
- Better quality of life for the labor force involved in waste plastic collection & segregation

FICCI Chemicals & Petrochemicals Award 2025

MoPNG Innovation Award 2023

Summary & Way Forward

- INDEcoP2F - a need of the hour, Cost-effective & environmentally benign technology for conversion of waste plastics (including MLP) to value added products
- Commercial Demonstration of INDEcoP2F technology within a petroleum refinery → 1st of its kind in India & world → Enabler for Circular Economy
- Synergistic Green technology solution under the 'Waste to Wealth', 'Make in India' , 'Swachh Bharat', 'Smart cities' & 'Atmanirbhar Bharat ' initiatives of Govt of India
- Patented indigenous technology available for licensing globally & planned for implementation in Indian Refineries
- Additional forex benefit to the nation by crude oil import substitution (~Rs 3400 Cr)
- Technology inline with new 'Plastic Economy' aims to minimize waste & reduce Carbon footprints

Continuous mode operation of INDEcoP2F technology demo unit commenced at AOD Digboi Refinery

Continuous mode operation currently underway at Digboi

INDEcoP2F technology aims to achieve clean & sustainable environment through Existing Refinery Infrastructure

FICCI 100
100 YEARS OF BUILDING TOMORROW

Resource Efficiency and Circular Economy Industry Coalition

THANK YOU