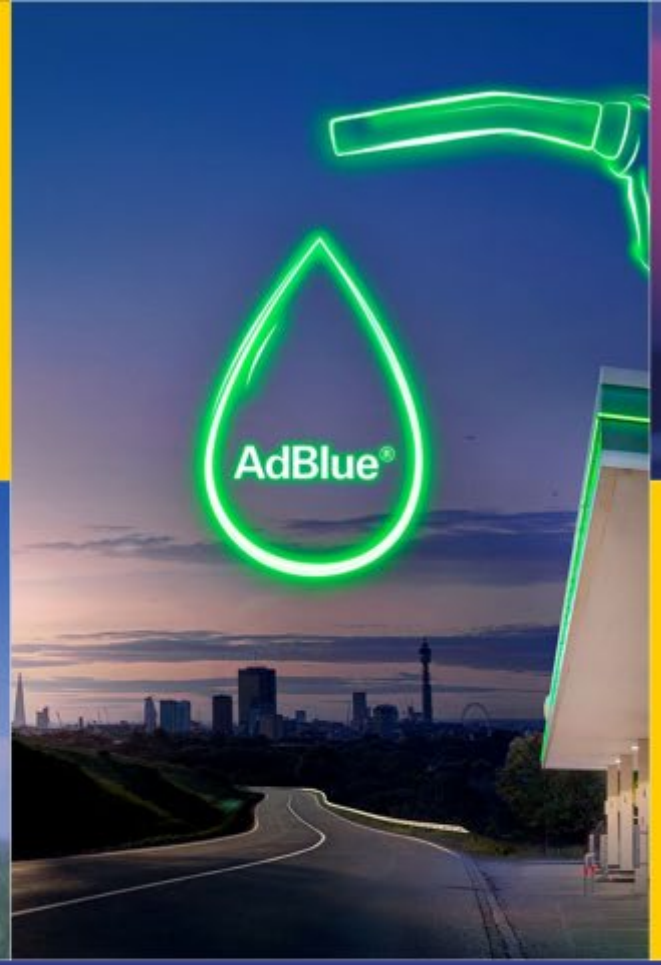
VELVEX®

AdBlue®



NPL | KRUSE AUTOMOTIVE

NPL BlueSky Automotive

Technical JV between Nandan Petrochem and KRUSE Automotive GmbH, Germany

To Go Green,
add a bit of Blue!

AdBlue/ DEF /AUS 32

Scenario-India Market

Presentation by

NPL BlueSky Automotive Pvt Ltd

Nov 11th, 2022

Your Speaker – Varun Agrawal, CEO

Contents

- About NPL and NPL BlueSky Automotive Pvt Ltd
- What is AdBlue / DEF / AUS 32 ?
- DEF Potential in India Market
- Price vulnerability in Urea Market.
- Implications/ failures associated with sub standard quality of AdBlue/ DEF.
- Measures by Developed countries to overcome sub standard quality.
- Initiatives in India to overcome substandard product quality.
- Way forward

Nandan Group of Companies

Manufacturing of Automotive and Industrial Lubricating Oils & Greases, Specialties etc

NPL
Nandan Petrochem Limited

Manufacture of Plastic Containers for lubricants & Essential Oil

Repacking of Lubricants | CFA for PSU Oil Cos

NIPL
Nandan Impex Pvt Ltd

NANDAN
GROUP OF COMPANIES

NPL BlueSky Automotive

Technical JV with Kruse Automotive GmbH, Germany for manufacturing of AdBlue

Health Food Products

NutraHelix
Making health sense in foods

Nandan Bulk Carriers

Company owned Inbound | Outbound Logistics for Bulk Liquid cargos

NPL Group: Business at a Glance

25+
Years experience in Lubricants

16 Production
Site in India with R&D and in house LAB facility

400+
Employees

USD 185M+
Annual Turnover

NPL 1 POINT
FOR COMPLETE LUBRICANT SOLUTIONS

Total Production Capacity
96,000 MT
of Lubes
9,000 MT
of greases
4,00,000 MT
Of AdBlue

30%
YOY sales Growth

German
Technology Lubricants

In-House
Container manufacturing unit

1200+
Variety of SKUs

15+ OEM
Genuine oil & AdBlue Mft

15 Major
Industries catered

ISO, IATF, VDA, BIS
Certified

Portfolio

Automotive | Industrial Lubricants
Transformer oil - Process oils
Greases – AdBlue
Pharma Grade White Oil
Coolant

NPL BlueSky Automotive

NPL BlueSky Automotive

Pioneer of AdBlue® Manufacturing in India. Plant established in 2011.

Manufacturing plants to produce AdBlue® meeting ISO 22241 standards have been established **around the country to meet the increasing demand of AdBlue .**

NPL BlueSky Automotive Pvt Ltd is a **Technical Joint Venture between Nandan Petrochem Ltd (NPL) and KRUSE Automotive GmbH, Germany.**

The objective of setting up this company is to supply AdBlue® to **Automotive OEMs in India for their first fill as well as aftermarket requirement.**

NPL BlueSky Journey So Far

2011 — NPL BlueSky Automotive (NPL BS) was incorporated as a joint venture between Kruse Automotive, Germany and Nandan Petrochem Ltd (NPL)

2012 — Started relationship with Tata Motors

2012-17 — Expansion Of OEM business

2017 — BS IV emission norms introduced in India from 1st April 2017

2017 — Expanded current facility and added our 2nd manufacturing facility

2018 — Set up our 3rd and 4th Manufacturing facility

2019 — Set up of add. 4 New manufacturing facilities

2017-19 — Expansion Of OEM business with Car manufacturers

2019-23 — Setting up of State-wise AdBlue manufacturing plants

NPL BS Plant Locations

Green – Existing NBS Plants
Yellow – New Upcoming
Red – Proposed

	No of Plants	Capacity (KL)
Annual Capacity	13	4,00,000

- 13 State-of-the-art manufacturing plants strategically located across INDIA, with plans to expand locations based on pick up of volume.
- Certified by VDA as per ISO 22241 standards
- Certifications :
  - ISO 90001 :2015 | ISO 140001 : 2015
  - BIS certified : IS 17042
  - IATF 16949 : 2016 Certified

Quality & Deliverables @ NPL BlueSky

- Central team at HO for periodic plant audits to ensure:
  - Consistency of Quality
  - Commonality of processes across all plants
- Plants are automated to ensure consistency.
- Design, Manufacturing and after sales service support for AdBlue Dispensing System (ADS)
- Logistics team to optimize and improve the supply chain challenges

Our Valued Customers

Mahindra

DAIMLER

Ford

EICHER

TATA

TOYOTA

Mercedes-Benz
Trucks you can trust

FCA
FIAT CHRYSLER AUTOMOBILES

VOLVO

NPL BlueSky Automotive

What is AdBlue / DEF / AUS 32 ?

Emission Regulations in India (Recap)

- **From 1 st April 2010 :**

  BS IV norms were introduced in select 13 cities.

- ***During 2016 :***

  Part of country.

- ***From 1st April 2017 :***

  BS IV norms implemented All Over India.

- ***By 2020 :***

  BS VI norms nationwide implemented .

Two Technologies EGR and SCR

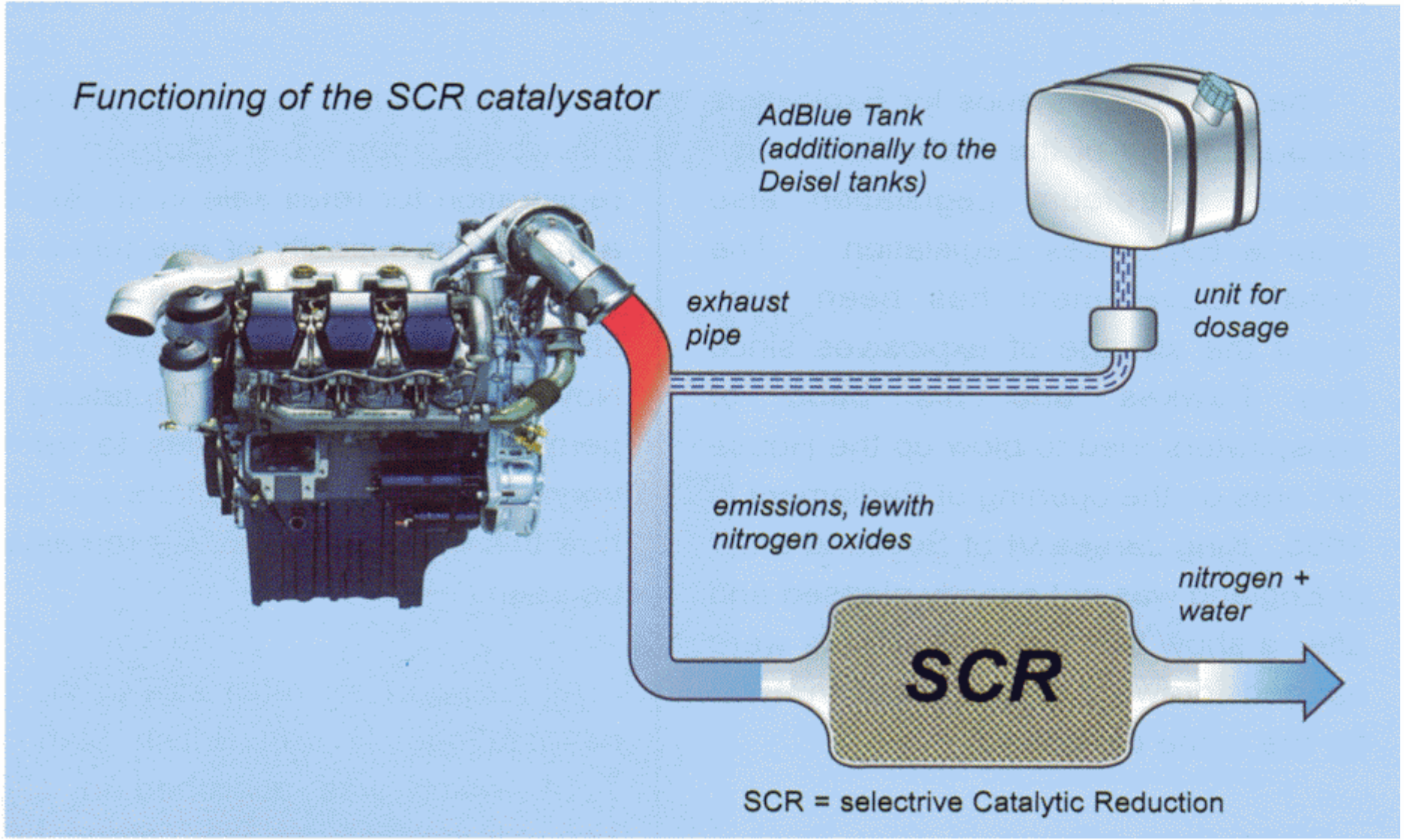
1. **Exhaust Gas Regulation (EGR):**
   1. works by recirculating a portion of an engine's exhaust gas back to the engine cylinders to reduce **NOx (Oxides Of Nitrogen)**
   2. The process makes combustion less efficient and increases wear and tear of the engine.

2. **Selective Catalytic Reduction (SCR) :**
   1. SCR is an emissions control technology to clean **NOx** from the exhaust gases.
   2. In 2006, European heavy-duty diesel market, implemented SCR technology to enable trucks to meet the Euro IV and V limits.
   3. An SCR system uses **AdBlue® to reduce NOx to water vapor and Nitrogen.**
   4. SCR technology is **more fuel efficient** than EGR technology **by 3-5%.**

- **With BS IV, majority of CV manufacturers had adopted SCR Technology for MHCV**

- **Post BS VI, SCR for Diesel engines for entire range was imperative.**

How SCR Works



What is AdBlue / D.E.F. / AUS 32?

- AdBlue® is also called as DEF, AUS 32, Nox Doser etc.
- AdBlue® is essential for the correct operation of SCR After treatment device.
- **AdBlue® is a 32.5% solution of Automotive Grade urea in deionized water.**
- AdBlue® is a high specification solution and is to be manufactured as per ISO 22241 standards.
- **AdBlue® is** a **registered trademark of VDA**.
- It is not a diesel additive
- AdBlue is Non Hazardous, Non Toxic , Non Flammable & Non explosive.

AdBlue Quality Standards

- SCR systems is sensitive to potential chemical impurities in the urea solution. Therefore, it is essential to maintain high quality standards of AdBlue / DEF.

- Applicable Quality Standards:
  - ISO 22241-1
  - IS 17042 (Indian Standard) Part I

- These Quality standards ensure that **product** is manufactured in accordance to requirements of SCR technology.

Automotive Grade Urea (AGU) Formaldehyde Free, Low Biuret Urea

32.5%

+

Deionized Water

67.5%

=

NPL BlueSky Automotive

AdBlue Specifications

Characteristics	Unit	Limits		Test methods
		min.	max.	
Urea content [a]	% (m/m) [d]	31,8	33,2	ISO 22241-2 Annex B [e] ISO 22241-2 Annex C [e]
Density at 20 °C [b]	kg/m^3	1 087,0	1 093,0	ISO 3675 or ISO 12185
Refractive index at 20 °C [c]	—	1,381 4	1,384 3	ISO 22241–2 Annex C
Alkalinity as NH_3	% (m/m) [d]	—	0,2	ISO 22241–2 Annex D
Biuret	% (m/m) [d]	—	0,3	ISO 22241–2 Annex E
Aldehydes	mg/kg	—	5	ISO 22241–2 Annex F
Insoluble matter	mg/kg	—	20	ISO 22241–2 Annex G
Phosphate (PO_4)	mg/kg	—	0,5	ISO 22241–2 Annex H
Calcium	mg/kg	—	0,5	ISO 22241–2 Annex I
Iron	mg/kg	—	0,5	
Copper	mg/kg	—	0,2	
Zinc	mg/kg	—	0,2	
Chromium	mg/kg	—	0,2	
Nickel	mg/kg	—	0,2	
Aluminium	mg/kg	—	0,5	
Magnesium	mg/kg	—	0,5	
Sodium	mg/kg	—	0,5	
Potassium	mg/kg	—	0,5	
Identity	—	identical to reference		ISO 22241–2 Annex J

AdBlue Specifications Significance of each characteristic

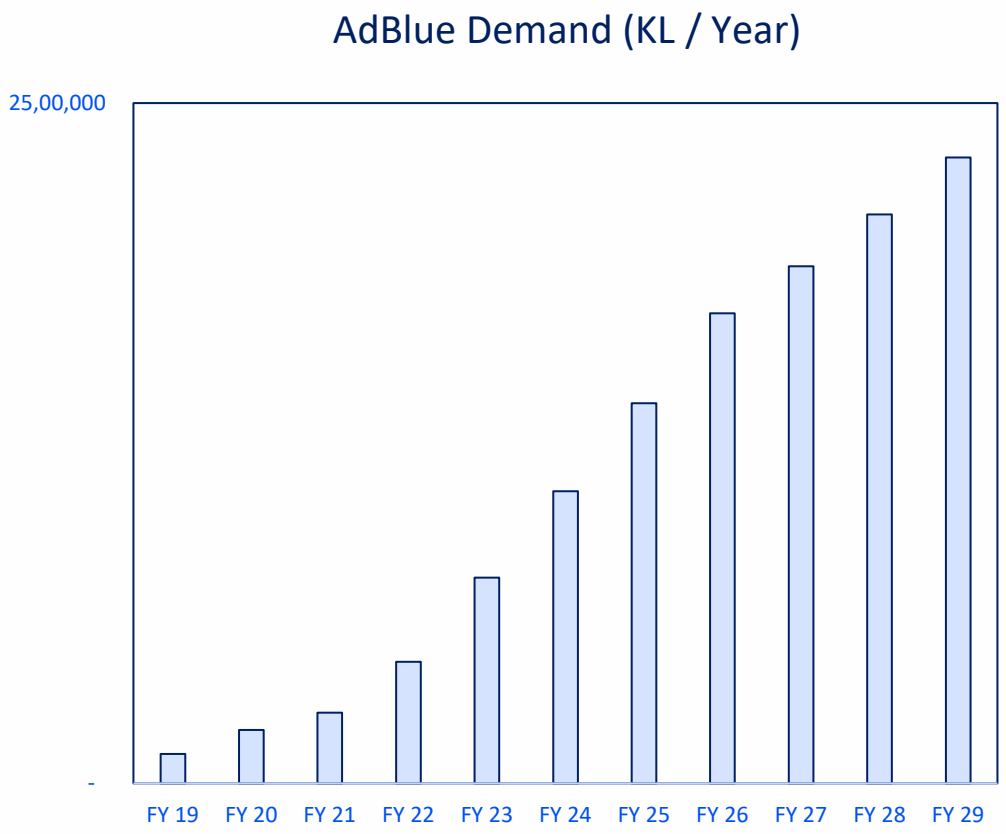
Characteristics	Significance
Urea Content	It is very critical to be in the range as an ideal solution as it provides the lowest freezing point. Also, to get the optimum Nox reduction, the SCR system will be calibrated to 32.5% Urea content
Density @ 20°C	Product Identification and to check possible contamination
Refractive Index at 20°C,	Product Identification and to check possible contamination
Alkalinity as NH3	To Determines its shelf life
Biuret	Poison to catalyst
Aldehyde	Form Deposits
Insoluble Matter	Causing Injector Clog
Phosphate (PO4)	Poison to catalyst
Calcium	Causing Injector Clog
Iron	Poison to catalyst
Copper	Poison to catalyst
Zinc	Poison to catalyst
Chromium	Poison to catalyst
Nickel	Poison to catalyst
Aluminium	Poison to catalyst
Magnesium	Causing Injector Clog
Sodium	Poison to catalyst
Potassium	Poison to catalyst

AdBlue Potential in India Market
&
Price vulnerability

Indian Market

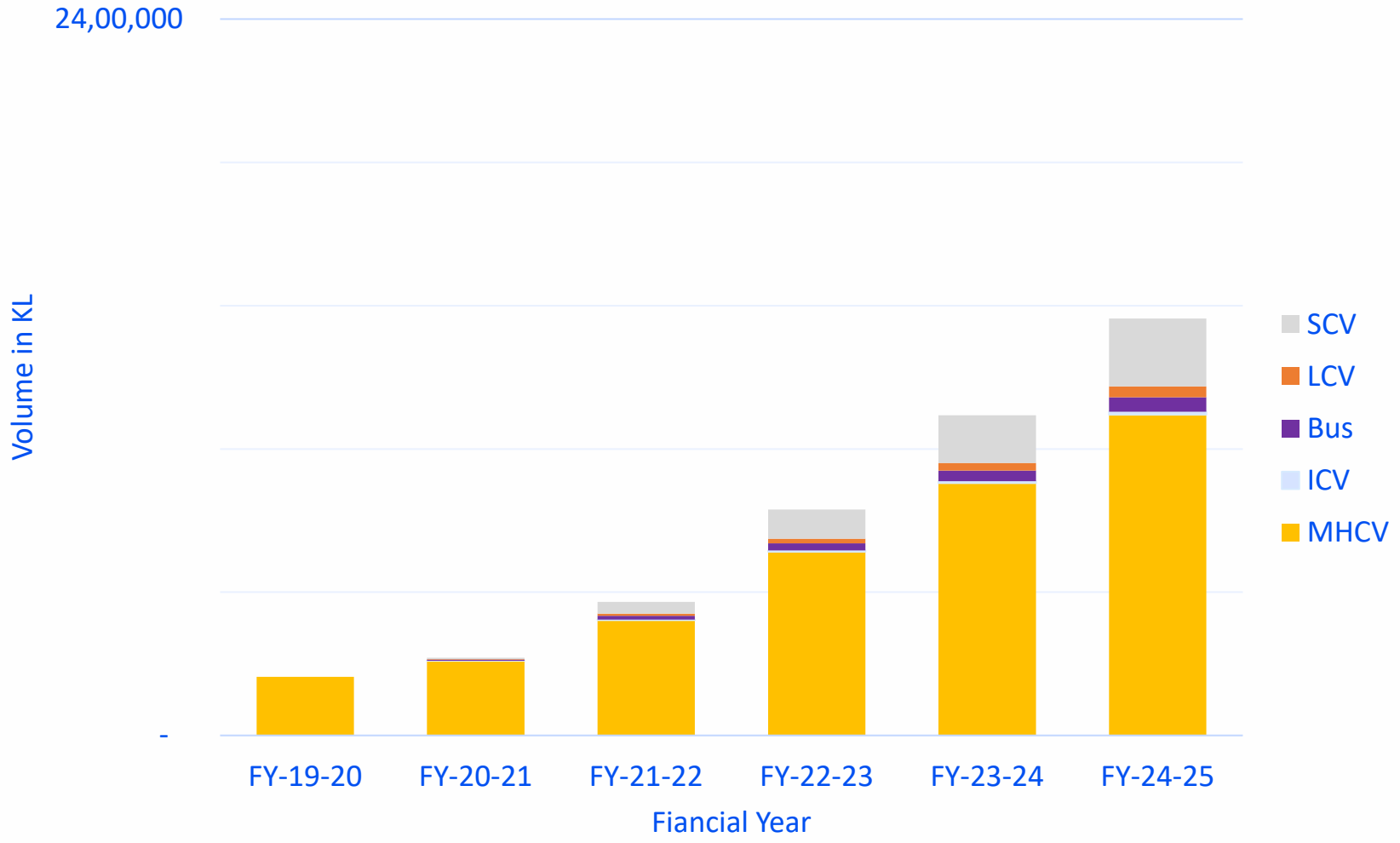
- In India, with BS IV (2017) implementation, AdBlue was introduced for Trucks using SCR technology primarily having a tonnage of over 16 tons and above.
- With implementation of BS VI (April 2020) emission norms in the country, further increase in vehicle park using SCR technology.
- AdBlue consumption in BS VI vehicles are at an average of 5 - 8% to their diesel consumption.
- FY 22-23, AdBlue demand is estimated to be 750,000 KL and by year FY 24-25, around 1.4 Million KL, with an estimated total of 3.7 million vehicles with SCR Technology on road.
- Potential at high selling diesel outlets for AdBlue is envisaged to be 10 KL to 30 KL per month.

AdBlue demand for the next few years



NPL BlueSky Automotive

Spread of volume between models



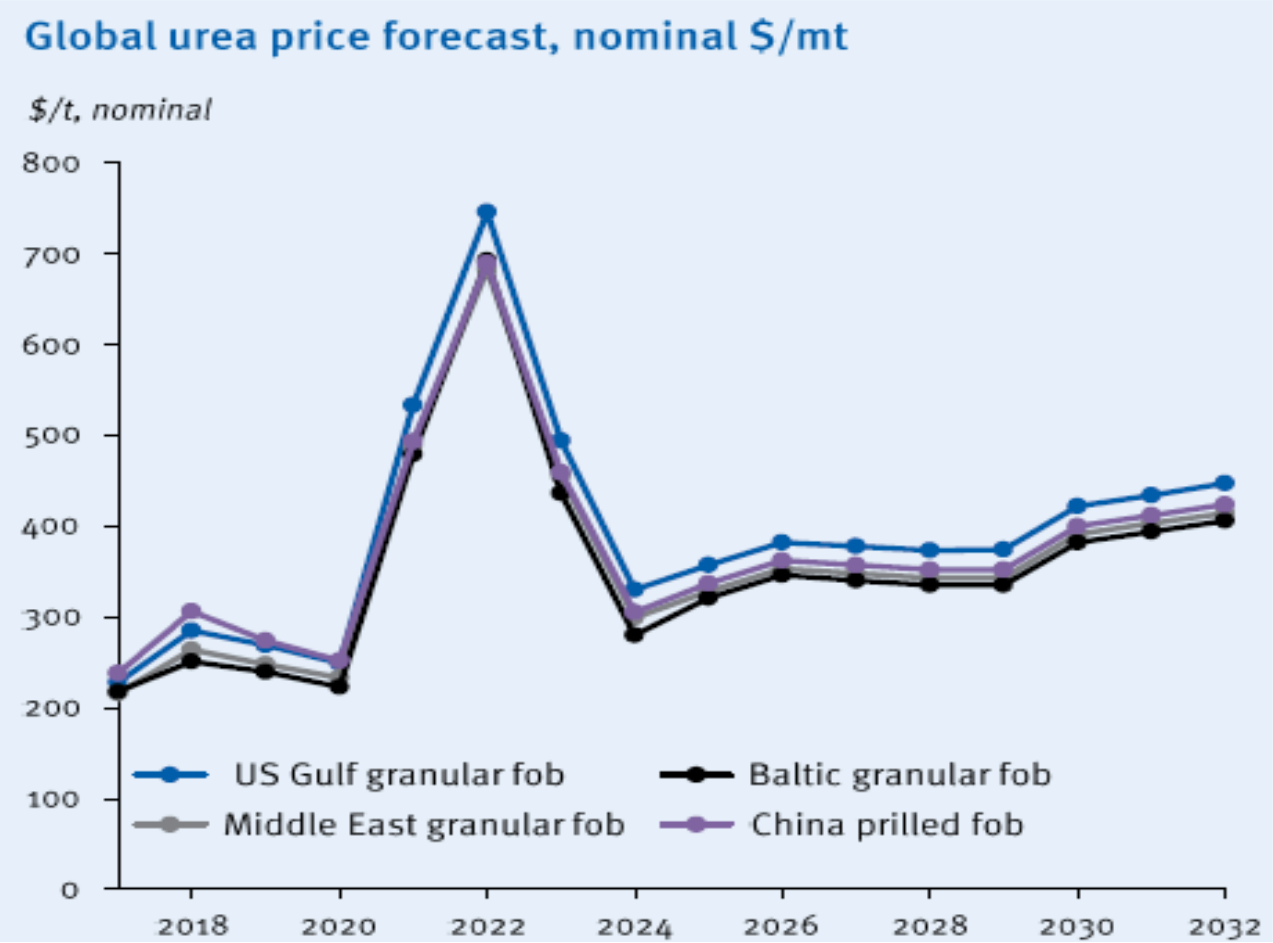
Transformation of packed products to bulk dispensing

Packed Products: 210,20,10,5,2 Ltr pack sizes

Bulk Tankers- Bowser style

AdBlue Dispensing System (ADS)

Urea Price Vulnerability and Long Term Forecast



AGU prices are largely determined by the wider fertilizer grade urea market and AGU producers use the global urea bench mark prices to account for the price fluctuations in the market

Export ban for urea by China had created unprecedented situation for urea prices.

Situation continued to be vulnerable due to Ukraine urea crisis.

To overcome the crisis, Automotive manufacturers supported with monthly PVC

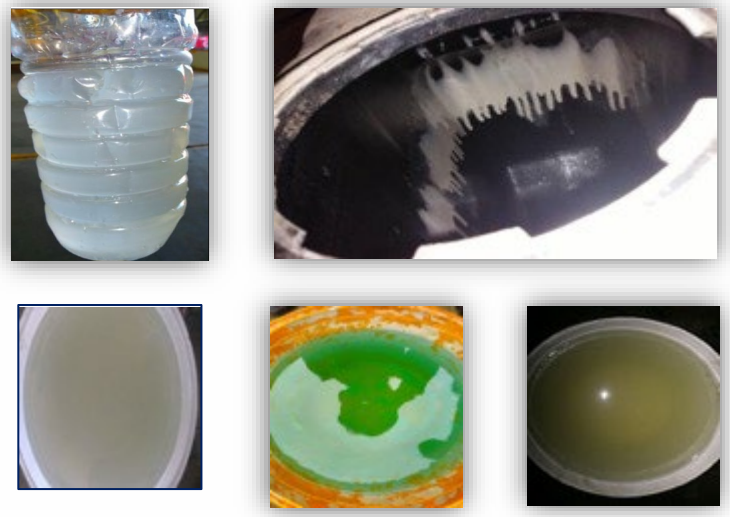
Concerns for the market

Sub-standard quality AdBlue/DEF is being sold in the market…

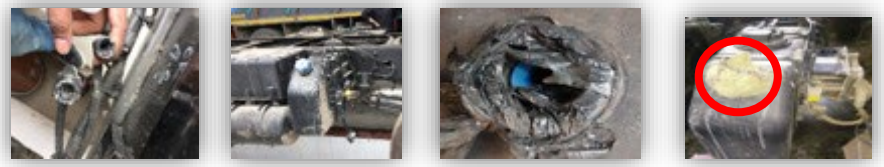
Major Reasons:

- Inferior quality of urea (industrial/fertilizer grade urea)
- Lack of proper manufacturing infrastructure
- Using AdBlue sub-license to promote product
- Lower concentration of urea to cut cost (less than 32.5%)
- Inadequate Laboratory equipment to test all parameters specified in ISO 22241

- **Off Spec products from the Market**



- **Improper handling of SCR systems**



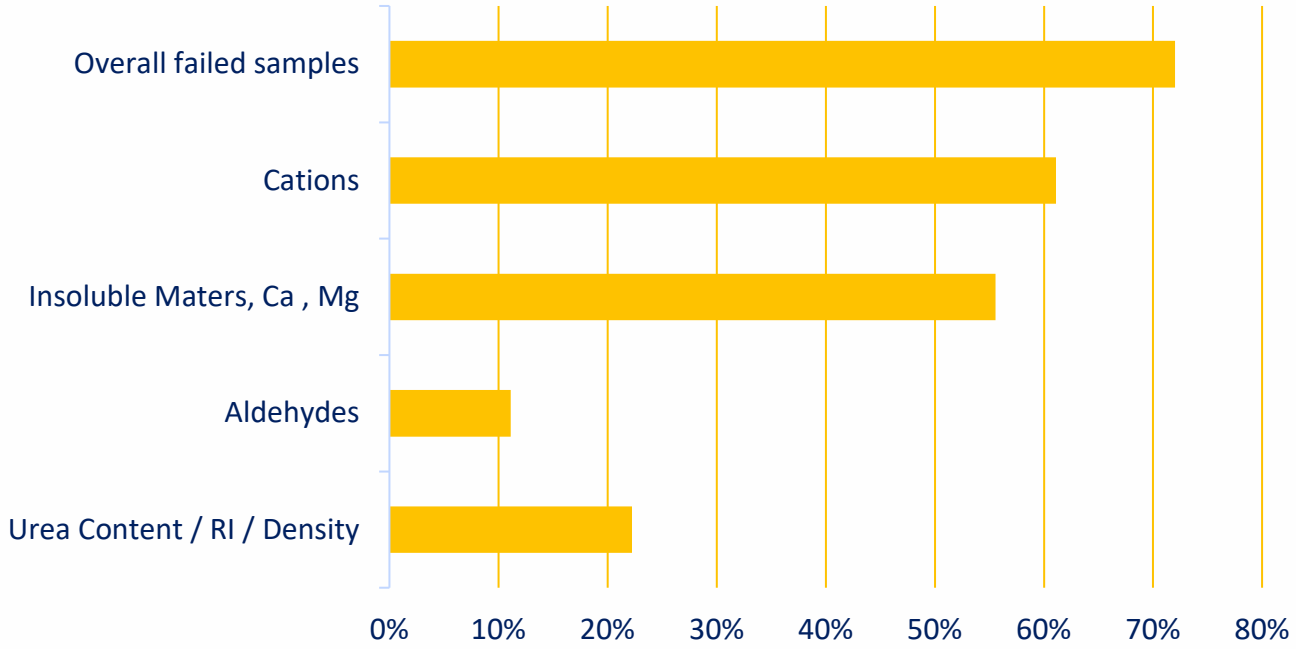
Contents

Implications/ failures associated with sub standard quality of AdBlue/ DEF.

Market Study

- Analyzed 50+ samples from the market, with approximately **72% of them being off spec**
- Many samples failed on basic requirement of Urea content along with other parameters
- Failures predominantly on Urea concentration, Sodium, Phosphates, Calcium, Potassium & Aldehydes levels
- Retail price for these off spec products are really low
- Spurious products of famous AdBlue/ DEF brands available in the market. Spurious/ local brands being sold in cash without GST invoice there by evading 18% GST on the product

Product failure - Category wise (Market samples)

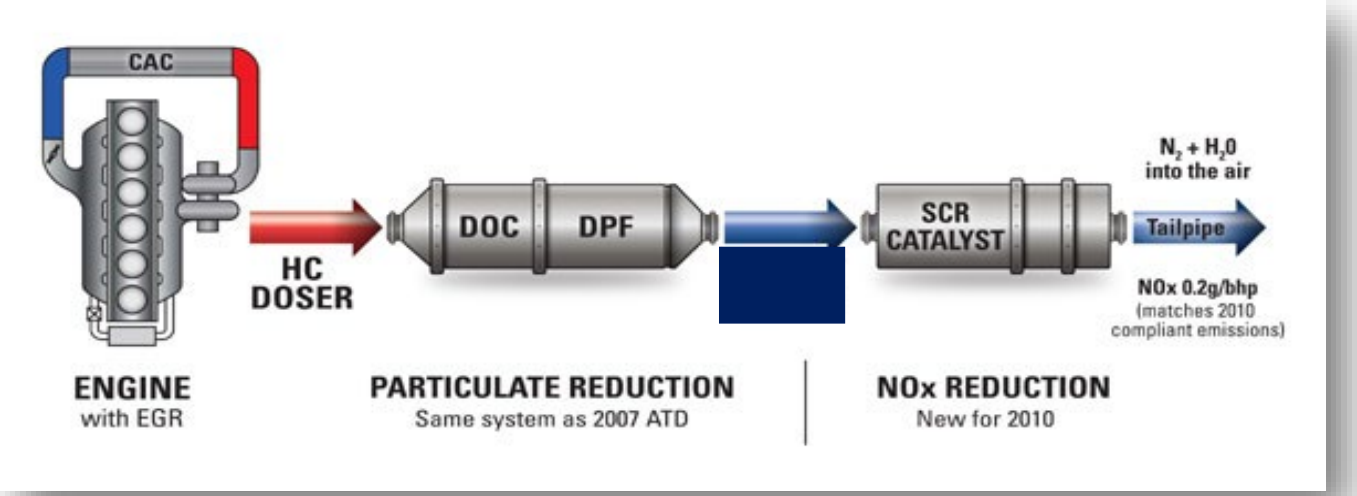


Implications of using wrong AdBlue

- Contaminants are the biggest cause of damage to an SCR System and the repair costs are expensive

- Major components that can be damaged include:
  - AdBlue Dosage Pump
  - Urea Injector
  - The Catalyst

- Effective NOx conversion does not take place which will lead to engine torque reduction



Damage to SCR system

- Visibly **clogged strainer filter** clogged due to contamination
- Comparison of Contaminated and Regular filters

- AdBlue tank strainer **filter found detached** from the suction port leaving no filtration at the suction port.
- Risking reduced service life of main filter.

- **Damaged SCR systems**

Effects of Sub Standard Product

ENVIRONMENT:

- Increased NOx emissions in the environment equal to BS-I levels worsening air quality
- Purpose of BS-IV implementation at a huge investment is defeated

VEHICLE OWNER:

- Engine de-ration due to ineffective NOx conversion
- Repair costs post warranty
- Loss of business due to frequent breakdown

OEMs:

- Breakdown of SCR system leading to increase in repair costs
- Negative perception on BS-IV technology affecting OEM Brand Equity
- In addition there are cheat technologies called OBD Emulators available for sale on e-commerce websites.
- These devices bypass the SCR system to avoid usage of AdBlue, hence increasing NOx emissions.

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Initiatives to overcome substandard product quality

by Developed countries

&

Way forward for India

Steps Taken in Other Countries

Europe: AdBlue is a registered trademark of VDA. VDA audits and certifies the manufacturing plants and certifies them to use the AdBlue trade name

USA: American Petroleum Institute (API), on lines of VDA, has set up an audit and licensing framework and manufacturers qualifying the audit can use the API logo on their packs.

China: In April 2015, the Internal Combustion Engine Industry Association set up a certification system for AdBlue and those enterprises who meet the manufacturing specification are authorized to use their trademark called CGT.

Brazil: The In metro (Brazilian Institute of Metrology) is responsible for conformity assessment of a range of products manufactured and sold in Brazil.

India Market - Way Forward

- BIS has adopted ISO 22241 standard and has published quality standard IS: 17042 for AdBlue/DEF
- An urgent need of having Government Agency like BIS to audit and license manufacturing units
- Government to issue Control Order Copy to mandate BIS audit and license for AdBlue/DEF manufacturing
- Accordingly only quality manufacturers will be allowed to supply product in the market
- Need to reduce GST from 18% to 5% to reduce price gap
- Ban on sale of OBD Emulators (these are also available on e-commerce websites in India)
- Since the development of the market for AdBlue is in its nascent stage , this is the right time to set up a regulatory mechanism in the country **to ensure that the emission norms are well and truly complied with and the citizens get cleaner air to breath**

Vehicles running without DEF are more harmful to the environment as they emit more NOx than BS I standard

Quality Control Order and Reduction of GST

- Quality Control Order
  - Inter-ministerial meeting was held regarding mandatory mechanism
  - All ministries & stake holders have given their consent including BIS & MORTH
  - Gazette notification awaited
  - The issuance of Gazette notification will take time
- For Reduction / waiver of GST
  - Request, letters are sent to all concerned including FM & PM
  - Work is on hold till Gazette Notification on Mandatory Mechanism is issued

- Working closely with SIAM & our OEM partners to use their good offices for the above

Thank You