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# Philippine National Standards (PNS) on Petroleum

**E-Power Mo: Empowering Filipinos through Informed Energy Plans and Policies**

Grand Xing Imperial Hotel H. Montinola cor. Muelle Loney St., Iloilo City  
09 October 2018

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**Oil Industry Standards and Monitoring Division**  
**Oil Industry Management Bureau**



# Standardization Mandate

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## ***Downstream Oil Industry Deregulation Act (R.A. 8479)***

- ensure a truly competitive market for petroleum products under a regime of fair price, adequate and continuous supply of environmentally, clean and high quality petroleum products
- Use of clean and safe (environment and worker-benign) technologies

## ***Clean Air Act of 1999 (R.A. 8749)***

- Set the specifications for all types of fuel and fuel-related products (Section 26)
- Every two (2) years or thereafter or as the need arises, the specification of ULG and diesels shall be reviewed and revised (Section 26)

## ***Biofuels Act of 2006 (R.A. 9367)***

- Establish technical fuel quality standards for biofuels and biofuel-blend gasoline and diesel which comply with the PNS (Section 7c)



# Standardization Technical Committees

## A.) Technical Committee on Petroleum Products & Additives (TCPPA)

- Chair : DOE and DENR
- Members

### Government:

DOE  
DENR  
BPS-DTI  
ITDI-DOST

### Oil Industry Sector:

Petron  
Shell  
Chevron  
PIP  
IPPCA

### Engine Suppliers/Manufacturers:

CAMPI, AMMDA, MDPPA

### Consumer Sector/NGO:

FilCar Foundation, AWMA

### Academe:

UP-NCTS, AIPSI



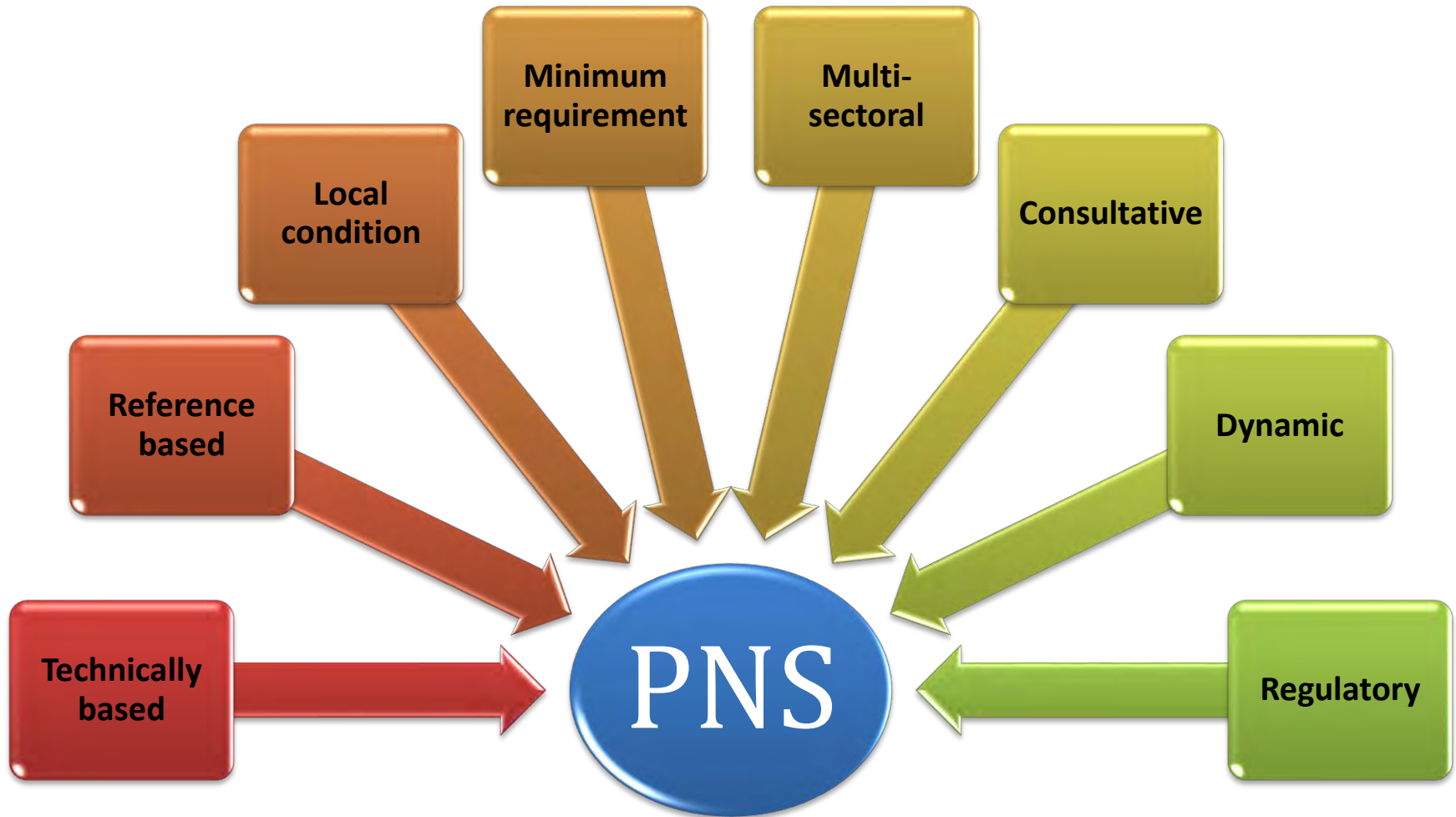


# Standard Development Process

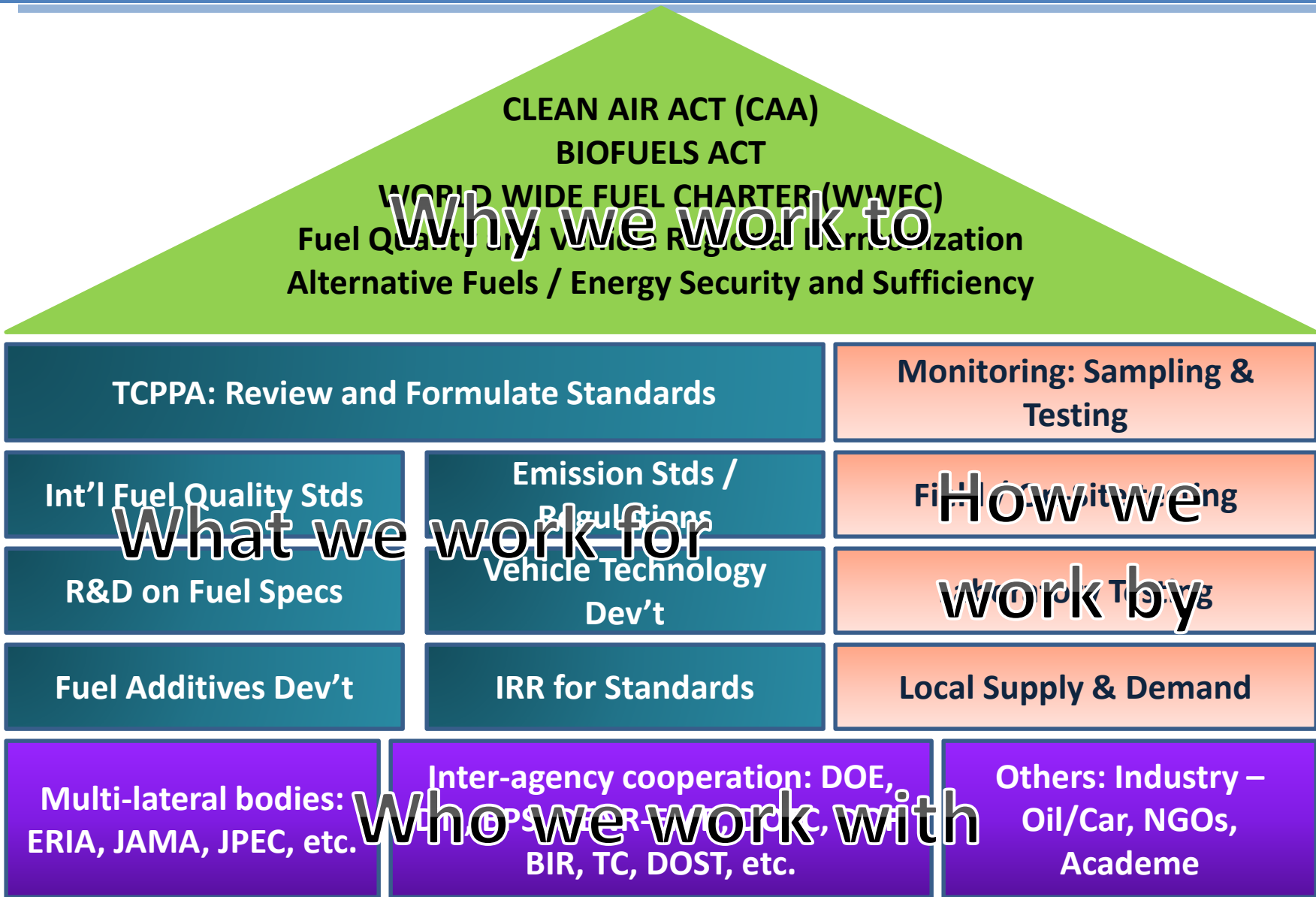
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# Elements of PNS Development



# Fuel Quality Standard Development





**PHILIPPINE NATIONAL  
STANDARD**

PNS/DOE QS 008:2012  
ICS 75.160.20

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Petroleum products – E-Gasoline fuel –  
Specification



**BUREAU OF PRODUCT STANDARDS**

Member to the International Organization for Standardization (ISO)  
Standards and Conformance Portal: [www.bps.dti.gov.ph](http://www.bps.dti.gov.ph)

**PHILIPPINE NATIONAL  
STANDARD**

PNS/DOE QS 004:2012  
ICS 75.160.20

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Petroleum products – FAME-blended diesel oils –  
Specification



**BUREAU OF PRODUCT STANDARDS**

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Standards and Conformance Portal: [www.bps.dti.gov.ph](http://www.bps.dti.gov.ph)





PNS/DOE QS 008:2012

Table 1 – Chemical and physical requirements for E-Gasoline

Property	Regular	Premium	Premium plus	Euro 4-PH <sup>a</sup> gasoline	Test method <sup>d</sup>
Appearance	Clear and bright, visibly free of suspended or precipitated contaminants				Visual
Color	Green	Red	Blue	91RON – Green 95RON – Red 97RON – Blue	Visual
Copper corrosion, 3 hr @ 50°C, max.	1	1	1	1	PNS ASTM D130
Density at 15°C, kg/L, max.	0.725-0.783	0.725-0.783	0.725-0.783	0.725-0.783	PNS ASTM D1298 or PNS ASTM D4052
Distillation temperature, °C at: 10% recovered, max. 50% recovered 90% recovered, max. End point, max. Residue, % vol, max.	70 70-110 180 215 2	70 70-110 180 215 2	70 70-110 180 215 2	70 70-110 180 215 2	PNS ASTM D86
Existent gum, mg/100 mL, max.	4	4	4	4	PNS ASTM D381
Hydrocarbons <sup>a</sup> : Aromatics, % vol, max.	35	35	35	35	PNS ASTM D5443 or PNS ASTM D5580 or PNS ASTM D5769 or PNS ASTM D5986 or PNS ASTM D6729 or PNS ASTM D6730 or PNS/ASTM D6839
Benzene, % vol, max.	2	2	2	2	PNS ASTM D3605 or PNS ASTM D5443 or PNS ASTM D5580 or PNS ASTM D5769 or PNS ASTM D5986 or PNS ASTM D6277 or PNS ASTM D6729 or PNS ASTM D6730 or PNS/ASTM D6839
Ethanol (C2) <sup>b</sup> , % vol,	9.0 – 10	9.0 – 10	9.0 – 10	9.0 – 10	PNS ASTM D4815 or PNS ASTM D5599 or PNS ASTM D5845 or PNS ASTM D5986 or PNS ASTM D6729 or PNS ASTM D6730 or PNS/ASTM D 6839
Ethers (e.g. MTBE) <sup>c</sup> , % vol, max.	2	2	2	2	PNS ASTM D4815 or PNS ASTM D5599 or PNS ASTM D5845 or PNS ASTM D5986 or PNS ASTM D6729 or PNS/ASTM D 6730 or PNS/ASTM D 6839
Lead content (not added) <sup>e</sup> , g/L, max.	0.005	0.005	0.005	0.005	PNS ASTM D3237 or PNS ASTM D3348 or PNS ASTM D5059
Octane rating, min. Research Octane Number (RON) Anti-knock Index (AKI) <sup>f</sup>	91 91 87.5	95 95 87.5	97 97 87.5	91/95/97 91/95/97 87.5	PNS ASTM D2699 PNS ASTM D4814

PNS/DOE QS 008:2012

Table 1 (concluded)

Sulfur, % mass, max.	0.05	0.05	0.05	0.005	PNS ASTM D1266 or PNS ASTM D2622 or PNS ASTM D4294 or PNS ASTM D5453
Vapor Pressure at 37.8°C, kPa, max.	68	62	62	68 (RON 91) 62 (RON 95/97)	PNS ASTM D4853 or PNS ASTM D5191 or PNS ASTM D5482
Water content, % w/w, max.	0.1	0.1	0.1	0.1	PNS ASTM E203 or PNS ASTM D6304

- <sup>a</sup> Based on certificate from production site. The product shall not contain methanol.  
<sup>b</sup> As per specification for Fuel Bioethanol in the PNS of Anhydrous Bioethanol Fuel.  
<sup>c</sup> Allowable contamination tolerance only. Intentional addition not permitted for both imported and locally-produced gasoline.  
<sup>d</sup> Methyl Tertiary Butyl Ether.  
<sup>e</sup> To be reported quarterly with Motor Octane Number (MON) using ASTM D2700.  
<sup>f</sup> Oxygen content to be reported preferably not to exceed 4.0% mass max.  
<sup>g</sup> Euro 4-PH (50 ppm sulfur) gasoline to be introduced not later than January 1, 2016.



**4.2 Industrial diesel oil (IDO)** – Diesel oil used for off-road vehicles, marine vessels, direct driven equipment such as pumps and compressors, and stationary equipment such as power generators, boilers and furnaces.

## 5 Requirements

FAME-blended diesel oils shall conform to the chemical and physical requirements specified in table 1.

Annex 1 provides minimum reference specification for base diesel oils

Table 1 – Chemical and physical requirements for FAME-blended diesel oils

Property	ADO	IDO	Euro IV –PH <sup>a</sup> ADO	Test methods
Cetane number, min. or Derived cetane number, min.	50		50	PNS ASTM D 613 PNS ASTM D 6890 or PNS ASTM D 7170
Carbon residue on 10% Distillation residue, % mass, max.	0.15	0.35	0.15	
Conradson or Ramsbottoms or Micro				PNS ASTM D 189 or PNS ASTM D 524 or PNS ASTM D 4630
Color, ASTM	2.5 max.	5.0 min.	2.5 max.	PNS ASTM D 1500
Copper strip corrosion, 3 h at 50°C, max.	No.1	No. 1	No.1	PNS ASTM D 130 or PNS ISO 2160
Density at 15°C, kg/L	0.820 - 0.860	0.880 max.	0.820 - 0.860	PNS ASTM D 1298 or PNS ASTM D 4052
Distillation, 90% recovered, °C, max.	370	Report	370	PNS ASTM D 86
FAME <sup>b</sup> content, % vol.	1.7 – 2.2	1.7 – 2.2	1.7 – 2.2	PNS EN 14078 or PNS/DOE TM 01 or PNS/DOE TM 02
Flash point, Pensky-Marten, °C, min.	55	55	55	PNS ASTM D 93
Kinematic viscosity, mm <sup>2</sup> /s at 40°C	2.0 – 4.5	1.7 – 5.5	2.0 – 4.5	PNS ASTM D 445 PNS ASTM D 7042
Lubricity, (HFRR), wear scar dia. (@50°C, micron, max.	460		460	PNS ASTM D 6079
Methyl laurate (C12 ME), % mass, min.	0.8	0.8	0.8	PNS/DOE TM 01
Sulfur, %mass, max.	0.05	0.30	0.005	PNS ASTM D 4294 or PNS ASTM D 2622 or PNS ASTM D5453
Water, % volume, max:	0.05		0.05	PNS ASTM D 6304 or PNS ISO 12937 or PNS ASTM E 203
Water and sediment, % volume, max.	0.10	0.10	0.10	PNS ASTM D 2709

<sup>a</sup> As per PNS for B100  
<sup>b</sup> Euro IV-PH (50 ppm sulfur) automotive diesel oil (ADO) to be introduced not later than January 1, 2016.



# Fuel Quality Standards Developed

## E-Gasoline (E10)

- PNS/DOE QS 008:2018 [May 2018]
- Implementing the New Standard Specification for Gasoline (PNS/DOE QS 008:2018) [Department Circular : On-going]

## CME-blended Automotive Diesel Oil (ADO B2)

- PNS/DOE QS 004:2017 [18 December 2017]
- Implementing the New Standard Specification for Automotive Diesel Oil (ADOB2) & Industrial Diesel Oil (IDOB2) [Department Circular : On-going]

## CME-blended Industrial Diesel Oil (IDO B2)

- PNS/DOE QS 013:2017 [18 December 2017]
- DC on Implementing the New Standard Specification for Automotive Diesel Oil (ADOB2) & Industrial Diesel Oil (IDOB2) [Department Circular : On-going]

## Anhydrous Bioethanol & Bioethanol Fuel (E100 & E98)

- PNS/DOE QS 007:2014 [29 January 2014]
- Implementing the PNS Specifications for Anhydrous Bioethanol Fuel [Department Circular DC No. 2015-07-0012]



# Fuel Quality Standards Developed

## Coconut Methyl Ester (B100)

- PNS/DOE QS 002:2015 [27 November 2015]
- Implementing the Modified Philippine National Standard Specification for Biofuels-Coconut Methyl Ester [Department Circular DC No. 2016-05-006]

## High FAME Blended Diesel Oils (B5)

- PNS/DOE QS 004:2017 [27 November 2015]

## Liquified Petroleum Gases (LPG) as Non-Motor Fuel

- PNS/DOE QS 005:2016 [22 December 2016]
- Implementing the New Standard Specification for LPG [Department Circular : On-going]

## Liquified Petroleum Gases (LPG) as Motor Fuel

- PNS/DOE QS 012:2016 [22 December 2016]
- Implementing the New Standard Specification for LPG [Department Circular : On-going]



# Fuel Quality Standards Developed

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Kerosene

- PNS/DOE QS 009:2007 [24 August 2007]

Aviation  
Gasoline Grade  
100L

- PNS/DOEASTM D910:2010 [2010]

Two-stroke (2T)  
Lubricating Oil

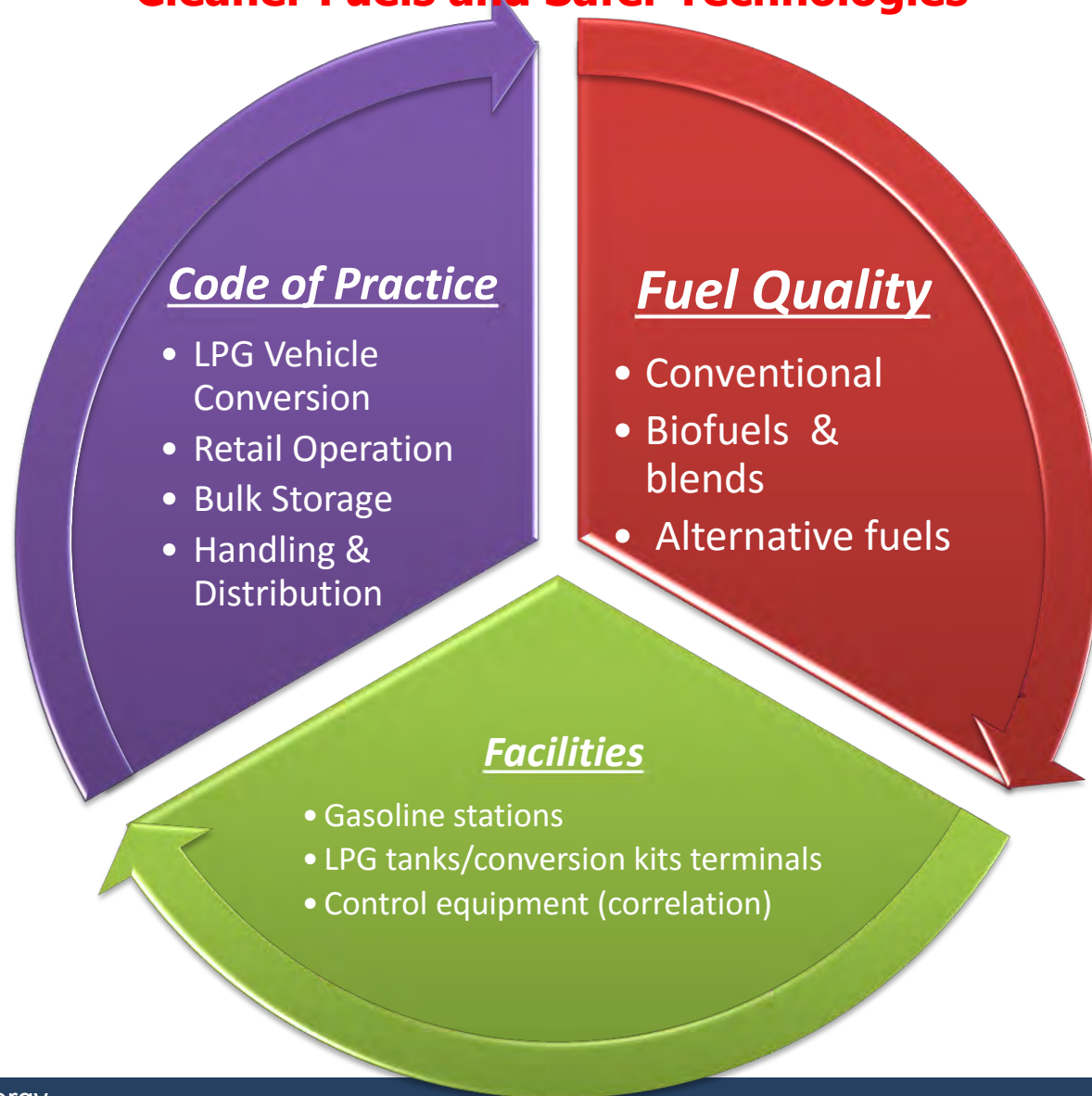
- PNS/DOE QS 003:2003





# Standards Harmonization in Downstream Petroleum Industry

## Cleaner Fuels and Safer Technologies



# Standardization Technical Committees

## B.) Technical Committee on Petroleum Facilities and Processes (TCPPF)

- Chair : DOE
- Members

### Government:

DTI-BPS  
DENR-EMB  
DILG-BFP  
DOLE (BWC,  
OSHC)

### Industry:

Petron  
Shell  
Chevron  
Total  
IPPCA

### Testing:

DOST-MIRDC, UP

### Prof. Assoc.:

SOPI





# Facilities / Practice – Liquid Fuels

## Prohibited Acts



## Informational/Safety Signs



# Facilities/Practice- Auto LPG

**illegal practice**



**correct practice**



# Facility Standards Developed

## LPG Refilling Plant – General Requirements

- Final Draft PNS/DOE FS: 2 - 2018 [June 2018]
- Endorsed to DTI – BPS for promulgation

## Code of Safety Practices in LPG Refilling Plant

- Covers the typical activities associated in the normal operations of an LPG Refilling Plant

## Code of Safety Practices for LPP in Retail Outlet

- PNS/DOE FS: 10 - 2017
- Covers the typical activities associated in the normal operations of a Retail Outlet applicable to all kind of lots from mid-block lot, corner lot and passing –thru lot.

## Code of Safety Practice in Auto-LPG Dispensing Station

- PNS/DOE FS: 9 - 2016
- Intended for managers/operators collectively referred to as Responsible Officer of Auto-LPG dispensing station focusing on safety and good practice procedures with reference to relevant health and safety standards.





# Facility Standards Developed

## Transportation of Petroleum Product by Pipeline

- *PNS/DOE FS: 8 - 2013*
- To ensure the safety of the general public and pipeline workers and the protection of the environment against the risk of petroleum contamination, fire and other similar hazards in areas where the pipeline system operates and/or transverses

## Storing and Handling of CME and CME-Blends in LPP Depot

- *PNS/DOE FS: 5 – 2009*
- Describes practices and requirements for the storing and handling and fire protection of CME and CME blends at LPP Depot

## Liquid Petroleum Product Depot

- *PNS/DOE FS: 4 - 2007*
- Covers the design and constructions of depots and associated facilities involved in marketing/redistribution of liquid petroleum product

## Auto LPG Dispensing Station (Revision)

- *PNS/DOE FS: 3 - 2013*
- Covers the requirements for the installation of Auto-LPG Dispensing Stations for Retail Operation and Garage based sites for on-vehicle dispensing of LPG for vehicle of any type.



# Facility Standards Developed

## Storing and Handling of B5 in Retail Outlet

- *PNS/DOE FS: 7 - 2011*
- Review of PNS 1-4 Retail Outlet pursuant to Sec. 8 of the BPS Directives, Second Edition 2004 (Maintenance of Standards) and likewise covers the facilities, clearances and distances therein intended for retail outlets storing and handling up to B5 and applicable to all kinds of locations either with mid-block lot, corner lot and passing- thru lot.

## Storing and Handling of E-Gasoline in Retail Outlets

- *PNS/DOE FS: 6 – 2011*
- Describes good engineering practices, as well as safety, environmental and fire protection requirements for the Storing and Handling of E-Gasoline in Retail Outlets

Retail Outlet  
Health, Safety and Environment  
Underground Storage Tank  
Piping System  
Dispensing Pumps

- *PNS/DOE FS: 1-4 : 2005*
- Covers the requirements for the installations of LPP Retail outlet including its associated appurtenances



# On-going Standards Development (DPNS)

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## Fuel Quality Standards

- A. Marine Fuels**
- B. Emulsified Fuel**
- C. Bunker Oil**
- D. Kerosene**



# Enforcement of PNS

## A.) Denaturing of Imported Ethanol





# Enforcement of PNS



## B.) Petroleum Product sampling and facilities check

**Sampling frequency:**

**At least once a year inspected for major facilities nationwide**





# Enforcement of PNS



## C.) Mobile Lab Testing for PNS Compliance on Retail Stations



# Enforcement of PNS

## Instrument Based Sample Testing

### Portable Fuel Analyzer



### *MINISCAN IR VISION*

Top Performer in Portable Fuel Analysis

The MINISCAN IR VISION is a high speed, compact and robust FTIR fuel analyzer for the comprehensive and automatic measurement of gasoline, jet and diesel fuels. The analyzer is configured to measure more than 100 fuel parameters and components for fuel blending, for quality inspection and to check compliance with fuel specifications directly at the point of sale.



Data based on real samples collected and analyzed by SGS®!

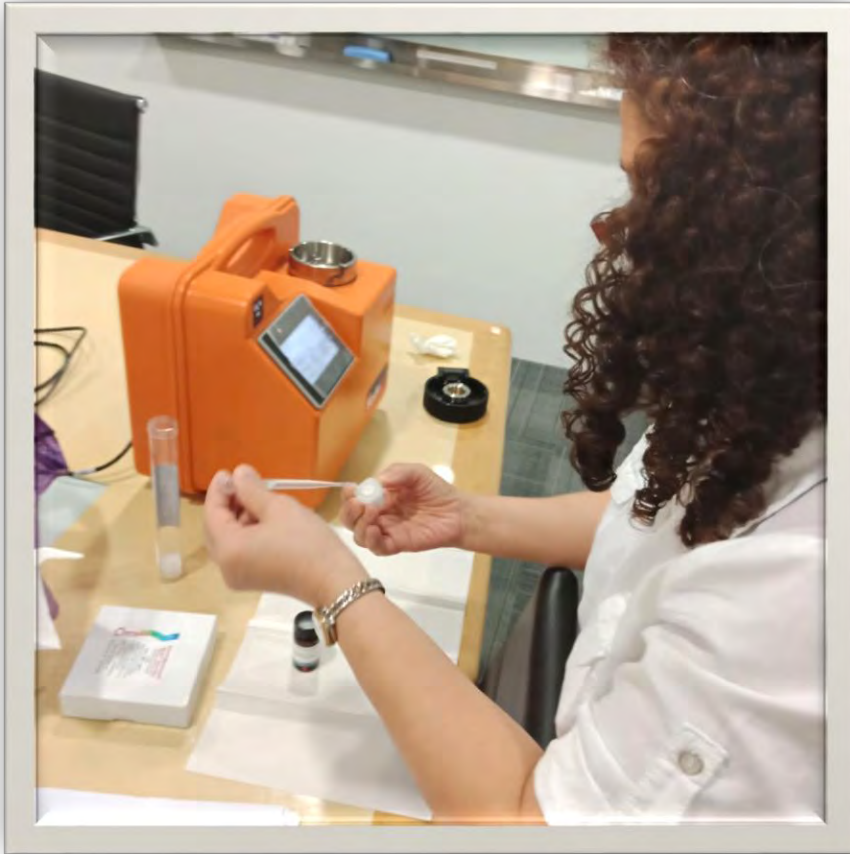
### Portable Sulfur Analyzer





# Enforcement of PNS

## Instrument Based Sample Testing



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“Quality in a service or product is not what you put into it. It is what the client or customer gets out of it.”

– Peter Drucker



# Thank You!



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