RUSHED TRANSITION TO EURO-V STANDARD FUELS: NEED FOR A PUBLIC DEBATE

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Dr. M. Ilyas Fazil

ipi Islamabad Policy Institute

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ISLAMABAD POLICY INSTITUTE (IPI)

Contents

FOREWORD

The transition to Euro-V fuel standards has begun. According to a notification issued by the Ministry of Energy – Petroleum Division, all petrol imports from September 1, 2020 would have to be in accordance with Euro-V specifications. In the next few months, diesel imports too are planned to be switched over to this standard.

The federal cabinet's decision to move to higher grade fuels is motivated by environmental concerns. It is indeed government's responsibility to enforce stringent vehicle emission and fuel standards to clean the pollutant filled air that also brings with it serious health issues. To that extent the move is welcome.

However, attainment of that goal is dependent on number of other factors like having Euro-V compliant engines, tighter vehicle maintenance and tune-up regime, and enforcement of the emission standards. Moreover, for ensuring that vehicles in Pakistan actually start getting Euro-V standard fuels, a major upgrade of Downstream Industry, especially the refineries that provide for 30% of domestic petrol and 50% of the diesel requirements, is required. The storages and even the retail outlets may also need to be updated.

It further needs to be emphasized that Hydrocarbon Development Institute of Pakistan (HDIP) too will have to develop its product testing capacity, which till lately was seriously lacking even with regards to lesser quality fuels. It needs to be recalled that the government allocated Rs55.5 million in the current fiscal year for up-gradation of HDIP testing capacity, which means its capacity may take some time to come up to the mark. In such a situation, it is feared that consumers can end up paying the price premium for Euro-V fuel while getting lesser grade fuel.

The objective of this report, which primarily focuses on the supply chain shortcomings in the country for a big jump from Euro-II to Euro-V standard, is to initiate a much-needed public debate about the government's move, which carries a certain air of abruptness. The report at the same time advocates a gradual transition to allow time for related requirements to be met. It is a very important policy decision that has to be synced up with ground realities. Therefore, IPI believes that until an enabling environment is created for this transition to higher grade fuel, the goal of environmental improvement would not be met, but the ordinary consumers may end up paying for this hurriedly pushed decision.

The report importantly underscores the question if we were already unnecessarily making motorcyclists buy higher grade fuel than what their engines actually required. Using a fuel with a much higher octane rating than engine specifications with regards to compression ratio is unnecessary and of no operational benefit.

It is hoped that the government would review its deadline for the introduction of Euro-V in the country and come up with a realistic roadmap so that the stakeholders get sufficient lead time to make the necessary arrangements for a meaningful transition.

Syed Muhammad Sajjad Shabbir
Executive Director
Islamabad Policy Institute

EXECUTIVE SUMMARY

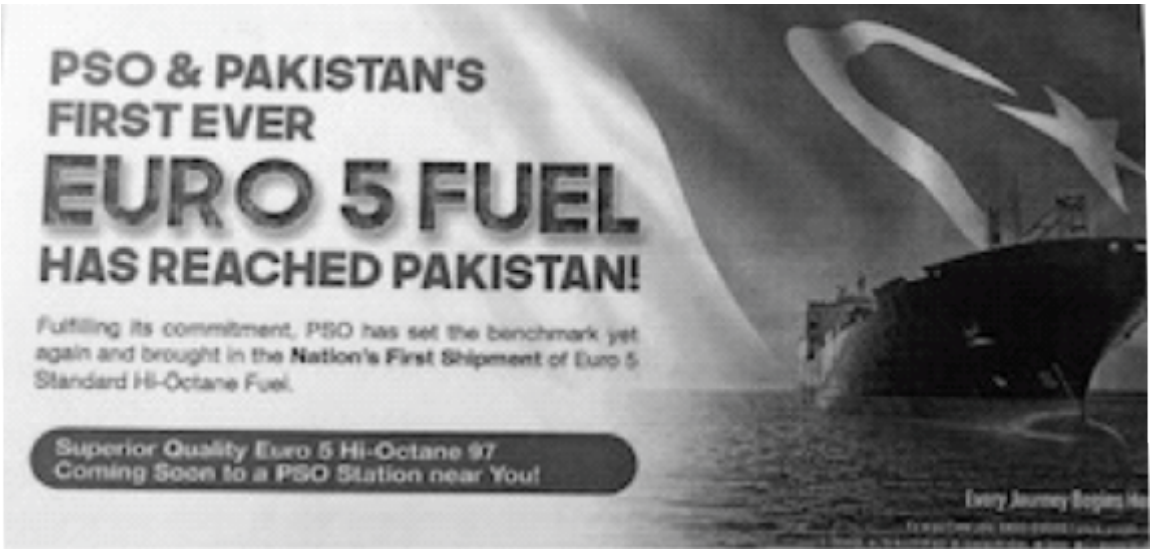
The government has ordered that all petrol imports from September 1, 2020 should be Euro-V compliant. The decision in this regard was taken at a meeting of the federal cabinet on July 28, 2020.

The government had initially planned to implement the Euro-V standards from August 1, 2020, but later delayed the implementation for a month for 'smooth transition' to the higher grade fuel. According to the specifications provided by the government Euro-V petrol would have octane rating of RON-92/95/97. The 92 RON petrol is regulated (price fixed by the government, based on PSO's import price) whilst 95/97 are De-regulated (price fixed by the Oil Marketing Companies [OMCs] themselves, based on their own import costs).

Earlier, Euro-II standards were being followed in Pakistan with regards to petrol since 2016, with 92 RON Regulated and 95/97 RON De-regulated.

Pakistan State Oil (PSO), the state owned company engaged in the marketing and distribution of POL (petroleum, oil and lubricants) products started the import of Euro-V standard fuels from August.

The company published an advertisement in the local newspapers on August 4, 2020 announcing the arrival of the higher-grade fuel.



Similar advertisements from two other OMCs have also appeared since then.

It is expected that the government would subsequently move to implement the Euro V standards on High Speed Diesel, (10 parts per million, ppm). The Euro V HSD specifications have also been notified by the Petroleum Division on July 7, 2020.

Apparently, the transition has been done in haste without adequate consultations. There are technical issues involved in the implementation of the decision in addition to the additional economic burden for the consumers.

Consultations ahead of such an important move are important. Even in 20016/17, before the

implementation of Euro II standard Premier Motor Gasoline (PMG)/High Speed Diesel (HSD), the Downstream Industry's inputs were sought and submitted by Oil Companies' Advisory Council (OCAC). However, it appears that either this time Industry input was not sought or (a more serious lapse) totally ignored. Introducing fresh specifications for Transport Fuels: PMG and HSD, is a very serious issue and entails looking at the decision holistically which was not done in 2016 nor appears to have been done this time as well.

The following factors could result in derailing of Pakistan's supply chain (which already saw a crisis in June 2020, and which cannot be ignored):

Fact 1 Readiness of local refineries for Euro V. **The refineries are simply not ready.**

Fact 2 Limitations of the existing Retail network and upcountry storages which only allows for the storage and distribution of existing higher sulfur PMG/HSD. **The Retail network is not aligned as additional tanks and dispensing units at the forecourts will be needed.**

Fact 3 How do we distinguish 3 PMG products at the forecourt? Not by adding Green, Yellow and Red Dyes, which was opposed even in 2016/2017 but ignored completely by Ministry of Energy – Petroleum Division (MoEPD) as well as Hydrocarbon Development Institute of Pakistan (HDIP).

Fact 4 Are MoEPD and HDIP aware of the full gamut of EURO V tests, not simply 10 parts per million (PPM) Sulfur and 92/95/97 RON for PMG and 10 PPM Sulfur for HSD? **Cursorily introducing Euro V specifications is neither professional nor does it represent the seriousness that this particular aspect necessitates.**

Fact 5 Has HDIP now developed the right equipment/testing capabilities that they did not possess till 2019? Have they again targeted Test Methods to suit their capabilities or those methods that are required by Euro V? **We need to be enlightened here as well! And truthfully!**

Fact 6 The current storages at Pak-Arab Pipeline Company (PAPCO) Port Qasim cater to co-mingled products. **Separate gantry filling arrangements for receiving and delivering ends at the Distribution Network are not available!**

Fact 7 Fauji Oil Terminal and Distribution Company (FOTCO) cannot handle additional product at its 30'' Dia and 4 Km Trestle. OMCs have already been facing contamination issues while receiving dual product (Euro II PMG and HSD) from the Import Tanker discharge line. **Is a separate Mogas Line available for the additional Euro V PMG? It is not!**

Do we have Euro-V compliant engines? NO! The Auto Industry of Pakistan has not even been asked nor taken to task for this blatant oversight! The onus has always been targeted at the Downstream Oil Industry! And Pakistan Automotive Manufacturers Association (PAMA)/OEMs are left non-compliant! Why? This lobby needs to be asked some tough questions in this regard.

The foregoing problems faced by OMCs and the country's import infrastructure due to variation in specifications, Terminal Storages along with dispensing units at the Retail Outlets will definitely lead to product shortages if not recognized and immediate action is not taken to remedy them!

Since the enabling environment for moving from Euro II to Euro V with regard to environment/emissions does not exist, and un-tuned smoke-spewing vehicles continue to clog our roads, where is the necessity to move to EURO-V?

It took the West 20 years to move from Euro I to Euro V. This was because the methodology adopted globally was to first design the Euro II, Euro III, Euro IV, Euro V emissions-compliant engines and thereafter mandate Fuel specifications required by those engines, giving the Industry adequate time to upgrade their facilities. It had been a tortuous road globally, and yet here we are, contemplating to do it all in one go, move from Euro II to Euro V. It simply does not make sense!

We all acted out of haste in 2016/17 and continue to face problems even now! Can we ignore the tell-tale warnings now in 2020? The mandarins at the MoEPD need to be ready for the fallout! We landed ourselves in trouble in 2016 due to intransigence of some OMCs (both local and foreign owned!) and we appear to not have learnt any lesson over the past less than 4 years! We must remove our heads from the sand at least this time.

The main Stakeholder in the use of Euro V is the Pakistani consumer. The largest chunk of his domestic monthly budget goes into fuel and energy costs. Yet, he has been totally ignored whilst taking the extreme decision to convert totally to Euro V.

A Public debate on the issue is suggested, with all stakeholders' inputs sought and policy defined thereafter. It could be much like the Public Hearings held by OGRA on Gas price increases. Since a price increase will result due to switch-over to Euro V, holding public hearing is essential. After all, the Downstream Oil Industry too falls within the purview of OGRA as do prices of PMG and HSD, which OGRA initiates on a monthly basis as per its mandate.

Till such time that the proposed Public Hearings are held, and an acceptable Road Map defined, the decision to switch over to Euro V must be held in abeyance!

Let us be rational. We may emulate the West by all means but should also understand the local environment and the ramifications of the move first. Is a leap into the abyss really called for?

BACKGROUND

Pakistan imports 70% of its Premium Motor Gasoline (PMG) and 50% of its High Speed Diesel (HSD) requirements with 30% PMG and 50% HSD, respectively, provided by our local Refineries. Last year, we spent over US$ 12 Billion on imports of Petroleum Product and Crude.

The local refineries are all topping (not conversion) refineries and their potential for changes in configuration and investment potential is limited and strictly linked to their relatively small sizes and original configurations.

Even the configuration changes at the local refineries to comply with Euro II involved almost an investment of a billion dollar. Incentives were offered, but those did not materialize.

Since October 2016, PSO has been importing 95 RON Euro II, with some 97 RON Euro II also since May, 2018. The other Oil Marketing Companies (Shell, Total, APL, Hascol, GO) have, however, during the period September 2016 imported mostly 97 RON Euro II.

Both 95 RON Euro II and 97 RON Euro II, are Deregulated, meaning that the OMCs can set their own price for these two grades at their retail outlets.
The main Premium Motor Gasoline product imported by all OMCs, however, still continues to be 92 RON Euro II. And this product is still 'Regulated'. Its price is fixed by the Government, based on PSO's import price.

The price of 95/97 RON at the retail outlets has always been higher than 92 RON, at times by as high a differential as Rs. 14-20 per litre, thus making 92 RON still the product of choice for the vehicular population of Pakistan.

Sales statistics show the following average demand/sales for the PMG Euro II grades since September 2016:

92 RON Euro II	97.5 %
95 RON Euro II	1.5 %
97 RON Euro II	1.0%

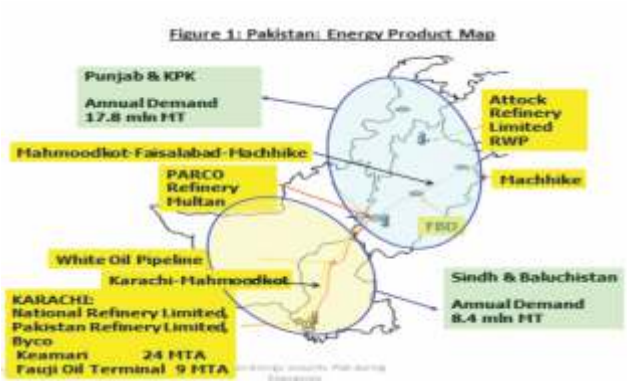
What this confirms is that EURO II 92 RON has been the product of choice for the Pakistani consumer, with very small volumes of 95/97 RON being consumed. The main reason is the price differential as explained above.

The Country's supply chain is given below in Figure 1: There are 5 Refineries NRL, PRL, and Byco in Karachi, PARCO in Muzaffargarh (near Multan) and ARL at Rawalpindi.

The 36" White Oil Pipeline (WOPP) originates at Port Qasim Karachi and ends up at Machhike via Faisalabad. The section from Machhike to Peshawar is missing. So, we have an incomplete pipeline backbone.

Along the pipeline route are storages of the Oil Marketing Companies (OMCs) that currently cater for HSD only, as that is the only product pumped through WOPP.

Figure 1: Pakistan: Energy Product Map



The current storages at PAPCO Port Qasim cater to co-mingled products. Separate gantry filling arrangements for receiving and delivering ends at the Distribution Network are not available!

FOTCO cannot handle additional product at its 30 " Dia and 4 Km Trestle. OMCs have already been facing contamination issues while receiving dual product (Euro II PMG and HSD) from the Import Tanker discharge line. A separate Mogas Line for the additional Euro V PMG is not available!

With the foregoing background, let us examine if we will be able to handle Euro V PMG and HSD or not.

But first, as part of the background, we must also examine the Euro Fuels Journey of Europe/USA which we are attempting to emulate.

Euro Standards

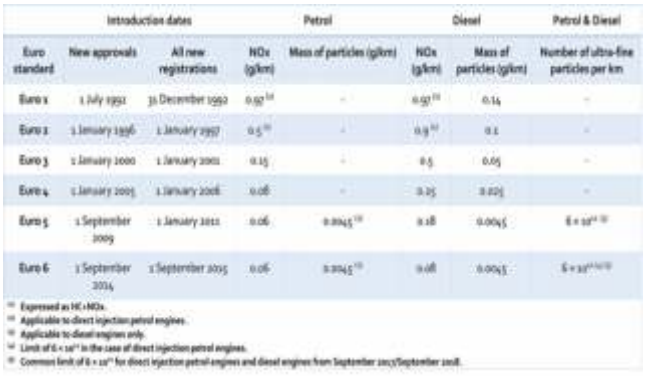
Cars and commercial vehicles sold in Europe are subject to strict limits on the emission of tailpipe pollutants and from other sources on the vehicle, e.g. evaporative emissions from the fueling system.

Normally referred to as 'Euro' standards, these were introduced in 1991 with 'Euro 0' (symbolized with Arabic numerals) for passenger cars and in 1992 with 'Euro I' (symbolized with Roman numerals) for commercial vehicles (emission standards did exist before Euro 0, but this was taken as the starting point for Euro standard references). Innovation has helped meet progressively tighter emission standards as the legislation has developed. Technologies such as variable valve timing, direct fuel injection and improved and highly sophisticated engine management systems have all played a major role. So too have exhaust after-treatment systems, where the engine and the exhaust after-treatment are designed as a system (not forgetting the need for consistent and high quality fuels in all EU markets - even beyond the EU borders for commercial traffic). All new diesel cars and all new trucks are now fitted with particulate filters to meet tough Euro standards.

Transportation has been identified as the largest source of particulate pollution in most cities; in some cases up to 90% of pollution in a city comes from vehicle emissions. Both fuels and motor vehicles are the major contributors to the degradation of air quality.

Since its implementation from 1991, European fuel emissions legislation has been adjusted progressively in line with the region's policy goals and actual results achieved.

The Figure 2 below summarizes the Euro Emission Specifications journey just described. These have been prescribed for the automobile manufacturers and their vehicles.



	Introduction dates		Petrol		Diesel		Petrol & Diesel
Euro standard	New approvals	All new registrations	NOx (g/km)	Mass of particles (g/km)	NOx (g/km)	Mass of particles (g/km)	Number of ultra-fine particles per km
Euro 1	1 July 1992	31 December 1992	0.97 [1]	-	0.97 [1]	0.14	-
Euro 2	1 January 1996	1 January 1997	0.5 [1]	-	0.9 [1]	0.1	-
Euro 3	1 January 2000	1 January 2001	0.15	-	0.5	0.05	-
Euro 4	1 January 2005	1 January 2006	0.08	-	0.25	0.025	-
Euro 5	1 September 2009	1 January 2011	0.06	0.0045 [2]	0.18	0.005	6 × 10^12 [3]
Euro 6	1 September 2014	1 September 2015	0.06	0.0045 [2]	0.08	0.005	6 × 10^11 [4] [5]

[1] Expressed as HC+NOx.
[2] Applicable to direct injection petrol engines.
[3] Applicable to diesel engines only.
[4] Limit of 6 × 10^12 in the case of direct injection petrol engines.
[5] Common limit of 6 × 10^11 for direct injection petrol engines and diesel engines from September 2017/September 2018.

Figure 2: European Emission Specifications

The fuels required by the automobile industry have been the next and concurrent target, closely aligned with the aforementioned emission standards. Figure 3 below summarizes this timeline:

Figure 3: The Evolution of Euro Fuel Specifications

THE EVOLUTION OF EURO SPECIFICATIONS		
	ENGINES	SPECS
GASOLINE		
Euro I	1988	1990
Euro II	1992	1993
Euro III	1996	2000
Euro IV	2000	2005
Euro V	2005	2009
HIGH SPEED DIESEL		
Euro I	1988	1990
Euro II	1992	1993
Euro III	1996	2000
Euro IV	2000	2005
Euro V	2005	2009

It took the West 20 years to move from Euro I to Euro V refining its fuel strategy and the entire transportation ecosystem enroute.

The Worldwide Fuel Charter (WWFC), which is the authoritative source on Euro Gasoline and Diesel, was first established in 1998 to promote greater understanding of the fuel quality needs of motor vehicle technologies and to harmonize fuel quality world-wide in accordance with vehicle needs. It provides recommended fuel specifications for a range of grades of Gasoline and Diesel fuel for use with engines designed for different levels of emission control. It also provides a full explanation of the various aspects of fuel quality and their effects on vehicle emissions. It is developed and published by the World-Wide Fuel Charter Committee, made up of representatives of Auto Manufacturers from Europe (ACEA), the USA (AAM) and Japan (JAMA) and Engine Manufacturers (EMA), with associate members from most other countries where automobiles are manufactured, and with the support of OICA.

By choosing to implement Euro V PMG and HSD in Pakistan, we have in fact chosen Category 4 of both these transportation fuels, which are for markets with advanced requirements for emission control, such as US Tier 2, US Tier 3, California LEV II, JP 2009 or equivalent emission standards, and automobile systems that enable sophisticated Nitrous Oxides (NOx) and Particulate Matter (PM) after-treatment technologies.

For Category 4 PMG, in accordance with the WWFC Edition 6, 2019, the targeted limits are: Sulfur less than 10 parts per million (ppm) w/w, Benzene less than 1% v/v, trace metals undetectable, Aromatics less than 35 % v/v, and octane ratings of 91/95/98 RON minimum, respectively.

For Category 4 HSD, similarly, the targeted limits are Sulfur less than 10 ppm w/w, Cetane Number 55 Minimum, Viscosity 2.0 to 4.0 mm/s, trace metals non-detectable, and Flash Point 55 C Minimum.

By asking our Downstream Industry to adhere to these limits, we are, by inference accepting that we have the sophisticated Euro V emissions-compliant car engines in our vehicular population of Pakistan. We do not!

Summarized in Figure 4 below are the Category 4 PMG and HSD detailed specifications and test methods sourced from the World Wide Fuel Charter Edition 6, 2019.

Part of Asia's clean fuels challenge is that the majority of the refineries in the region are not equipped to handle the complex refinery processes to produce clean fuels. The capital investments for infrastructure upgrades can be daunting and prohibitive for the smaller refineries. For government-owned refineries on the other hand, such capital investments are in direct competition with other social expenditures for limited government funds. In competitive markets, some

Figure 4: Specs and Tet Methods for Euro V Transportation Fuels

Specifications and Test Methods Euro V Transportation Fuels
(Source: Worldwide Fuel Charter 6th Edition, 2019)
Category 4: For Markets with highly advanced requirements for emission controls; enables sophisticated Nox and particulate matter after-treatment technologies

	Test	Unit	Euro Spec		Method		
PMG				ISO	ASTM	JIS	Other
1	Research Octane Number		91/95/98	EN 5164	D2699	K2280	
2	Oxidation Stability	minutes	480 Min		D2622	K2287	
3	Sulfur, Max	mg/KG	10	20846	D5453		
4	Trace Metal	mg/KG	No intentional addition		ICP/D7111 modified		
5	Oxygen	%m/m	2.7		D4815		
6	Olefins	%v/v	10	3837	D1319	K2536	
7	Aromatics	%v/v	35	3837	D1319	K2536	EN 13132
8	Benzene	%v/v	1		D5580	K2536	EN 238
9	Vapor Pressure	KpA	45-60				
	End Point	C	205 max		D-86		
10	Sediment (total partculate)	mg/litre	I		D5452		
11	Unwashed gums	mg/100 ml	30	6246	D381	K2262	
12	Washed gums	mg/100 ml	5	6246	D381	K2262	
13	Density	kg/m3	715- 770	3675	D4052	K2249	
14	Copper corrosion	Rating	Class 1	2160	D130	K2513	
15	Appearance		Clear and bright, no free water or partculates		D4176		CEC F-03-T
16	Carburettor cleanliness	merit			D5598		
	Fuel injector cleanliness	%flow loss	10		D5598		
	Intake valve cleanliness	merit	30				CEC-F05-A
17	CombustionChamber Deposits	% of base fuel	140		D6201		

Notes
4. Trace metals cannot exceed 1 mg/Kg; trace metals refers to that generated through the refining process, not deliberate additions of metallic additives; MMT is not recommended as it will irreversibly reduce the efficiency of exhaust emission control systems

5. Where oxygenates are used, ethers are prefered. Methanol is permitted only if it complies with EN228 i.e. 3% v/v
6. Compliance with this requirement can be demostrated by the use of proper detergent additives in comparable base gasolines
No use of any Dyes is mentioned

HSD **Category 4: For Markets with advanced requirements for emission controls. Enables sophisticated NOx and PM after-treatment technologies**

	Test	Unit	Euro Spec	Method			
				ISO	ASTM	JIS	Other
1	Cetane Number		55 Min	5165	D613	K 2280	D6890/D7170
2	Cetane Index		55 Min	4264	D4737	K 2280	
3	Density @ 15 C	kg/M3	815 -840	3675	D4052	K 2249	
4	Sulfur Content	mg/Kg	10 Max	3104	D445	K 2283	
5	Viscosity @ 40 C	mm2/s	2.0 Min; 4.0 Max	20846	D5453	K 2541	
6	Trace Metal	mg/Kg	Non-detectable				
7	Total Aromatics	%m/m	15 Max		D5186		EN 12916
8	T90	C	320 Max	3405, 3924	D86	K 2254	D2887
9	T95	C	340 Max	3405, 3924	D86	K 2254	D2887
10	Final Boiling Point	C	350 Max	3405, 3924	D86	K 2254	D2887
11	Flash Point	C	55 Min	2719	D93	K2265	D 56
12	Carbon residue	%m/m	0.20 Max	10370	D4530	K2270	
13	CFPP or LTFT or CP	C	equal to lower than the lowest minimum ambient temperature		D6371, D4539, D2500	K 2288	EN 516, IP 309
14	Water	mg/KG	200 Max	12937	D6304	K2275	
15	Oxidation Stability	hours	35 max	12205	D2274		
16	Biological growth		zero content				NF M 07-075
17	FAME (Fatty Acid Methyl Esters)	%v/v	5 Max		D7371		EN 14078
18	Other Biofuels	%v/v	(11) Max	6618	D664		
19	Ethanol/Methanol	%v/v	Non-detectable		D4815 (modified)		
20	Total Acid Number	mg KOH/g	0.08 Max				
21	Ferrous corrosion		Light rusting				
22	Copper Corrosion	rating	Class I	2160	D130	K2513	
23	Ash	%m/m	0.001 Max	6245	D482	K 2272	
24	Particulate contamination		10 Max		D6217 FAME-free		EN 12622
25	Appearance		Clear and bright, no free water or partculates		D4176		
26	Injector cleanliness	% air flow loss	2 Max				CEC (PF-023)
	Lubricity (HFRR wear scar dia @ 60 C)	micron	400 Max	12156-1.3	D6069		CEC F 06-A, D7688

projects may be viewed to be not financially viable.

To summarize, the methodology adopted globally was to first design the Euro II, Euro III, Euro IV, Euro V emissions-compliant engines (see preceding Figure2) and thereafter mandate Fuel specifications required by those engines (Figure 3), giving the Industry adequate time to upgrade their facilities. It had been a tortuous road globally, and yet here we are, contemplating to do it all in one go, move from Euro II to Euro V. It simply does not make sense!

The reason for this is given in the subsequent sections.

LIMITATIONS OF PAKISTAN's SUPPLY CHAIN!

With the foregoing background, let us examine if we will be able to handle Euro V PMG and HSD or not.

Limitation 1: Non-Readiness of local refineries for Euro V

To reiterate, the local Refineries are all topping (not conversion) Refineries and their potential for changes in configuration and investment potential is limited and strictly linked to their relatively small sizes and original configurations. They are already constrained whilst producing Euro II PMG with use of metallic additives such as MMT (Methylcyclopentadienyl Manganese Tricarbonyl). Euro V PMG specifications state clearly that 'No intentional addition of metal-based additives is allowed'. This means that if Manganese (Mn) is allowed as part of trace metals (limit is non-detectable), it can be only from process operations, not intentional blending). In current Euro II specifications issued by MoEPD, Manganese (Mn) is allowed to as high as 24-40 mg/litre. This necessitates the use of MMT. How can the local refineries, all of whom expressed serious reservations on the imposed Mn limits for Euro II (all of which is on the official record of the Petroleum Division) now be expected to produce Euro V with no metal-based additives allowed?

Euro V specs also state: 'Where oxygenates are used, ethers are preferred. Methanol is not allowed. By exception, up to 10% by volume ethanol is allowed if permitted by existing [country] regulation. Blendstock ethanol should meet E100 Guidelines published by the WWFC Committee. Fuel pump labeling is recommended for gasoline-ethanol blends to enable customers to determine if their vehicles can use the fuel.' The Euro V specifications being notified by MoEPD must adhere to these restrictions.

The above-stated limits will also apply to all Euro V imports by OMCs. Last year, OGRA and HDIP had discovered that OMCs imported product exceeded the then prescribed Mn limits, some very considerably. A heated debate had ensued and thereafter the present Mn limits were introduced.

With the Refineries obviously unable to provide the Euro V product, the Oil Marketing Companies (OMCs) will be having to bring the new deficit product from import sources.

The product testing regime of HDIP will also have to be vigilant vis a vis imported fuel as well, so as to avoid any disputes/legal ramifications for the OMCs, which can be significant given the millions of dollars involved on each import consignment.

Limitation 2: Inadequacy of existing Infrastructure

The OMCs entire network, from receipt at KMR or PQA to transfer to their depots, installations and retail outlets currently caters for Euro II PMG/HSD (500 ppm Sulfur and 5% v/v Benzene for PMG, and 500ppm Sulfur for HSD, respectively).

If, as stated in the press reports, the target is complete switch-over to Euro V by January 2021, then the adequacy or otherwise of the OMC network will depend on confirmation of certain facts by MoEPD, namely:

> What will be the ratio of 92/95/97 Euro V PMG that will be imported?
>
> Sales statistics show the following average demand/sales for the PMG Euro II grades since September 2016:

92 RON Euro II	97.5 %
95 RON Euro II	1.5 %
97 RON Euro II	1.0%

The main Premium Motor Gasoline product

imported since 2016 continues to be 92 RON Euro II! And this product is still Regulated! Its price is fixed by the Government, based on PSO's import price!

The price of 95/97 RON at the retail outlets is de-regulated (OMCs can fix their own price) and their price has always been higher than 92 RON, at times by as high a differential as Rs. 14-20 per litre, making 92 RON still the product of choice for the vehicular population of Pakistan!

The answer to whether the ratio remains the same or changes will determine what modifications to their network will be needed by the OMCs.

The news in the market is that whilst PSO has imported 97 RON Euro V, Total has imported 92 RON Euro V, and GO has imported 95 RON Euro V. This may indicate that the OMCs were still not very clear about it. Whether this is deliberate instructions by MoEPD to cover the entire range initially is not clear. Such lack of clarity for the long-term will not facilitate proper planning.

Even the present import storages as well as the transport of imported product to upcountry depots and storages are a constant challenge as the recent petrol crisis of June 2020 amply demonstrated. PMG is transported only through Road Tankers whilst HSD is transported through PAPCO's White Oil Product Pipeline (WOPP). Plans to make the WOPP dual-fuel handling-capable have been on the drawing board since the past 5 years but the project is not completed. This is because PAPCO's pipeline operations on dual fuel (PMG and HSD) are dependent on a number of factors including primarily the availability of PMG storages along the pipeline route from Karachi to Mid-country and onwards to the North. PMG cannot be stored in HSD storages and vice versa. This lack of pipeline flexibility was one of the shortcomings that made timely handling the June 2020 petrol crisis impossible.

The Euro V decision will also definitely change the dynamics surrounding the dual-fuel project of PAPCO's WOPP. So, back to the drawing board?

Then, at the Ports where imported product is received, namely Keamari and Port Qasim at Karachi, current storages are barely able to handle the current Euro II PMG and HSD grades. Here, too, serious issues of new product co-mingling with existing volumes cannot accepted and fresh storages will be needed, both for Euro V PMG and HSD.

Ignoring these facts will not only result in product quality issues but also impact the berthing of incoming Oil Tankers, causing potentially serious delays, demurrages to the OMCs, as well as legal issues with the foreign suppliers of the imported product which past experience amply demonstrates rarely goes in favor of the importer. The result will be chaos, panic, arm-twisting calls to OCAC/KPT/FOTCO leading to supply chain disruptions.

FOTCO, it is reiterated, cannot handle additional product at its 30 " Dia and 4 Km Trestle. OMCs have already been facing contamination issues while receiving dual product (Euro II PMG and HSD) from the Import Tanker discharge line. A separate Mogas Line for the additional Euro V PMG is not available.

Limitation 3: Inadequacy of the Testing Facilities

Are MoEPD and HDIP aware of the full range of Euro V specifications? Not simply 10 pp Sulfur and RON for PMG, and not only 10 ppm Sulfur for HSD?

On the next two pages are MoEPD notified specifications of Euro V PMG and HSD, respectively, the highlighted items are those that

deviate from Euro V specs of Figure 4 above, and also indicated are the missing specifications.

These can be summarized as follows:

PMG

Deviations: Spec 4, Spec 15, Spec 18 and Spec 19

Missing: Oxidation Stability, Trace Metal, Carburettor Cleanliness, Fuel Injector Cleanliness, Intake Valve Cleanliness and Combustion Chamber Deposits

HSD

Deviations: Spec 1, Spec 6, Spec 7, Spec 8, Spec 11, Spec 13, Spec 14, and Spec 15

Missing: Trace Metal, Total Aromatics, Oxidation Stability, Biological Growth, FAME, Ethanol/Methanol, Ferrous Corrosion, Particulate Contamination, and Injector Cleanliness.

It must be appreciated that the specs of Figure 4 are the result of research over the past two decades and have evolved along with the car engines that, too, have adjusted their systems (especially environmental controls) in order to conform to the air emissions requirements. Each specification has a reason behind it linked to the engine's performance and ignoring the importance of the specifications in their totality will raise legal issues for the MoEPD. Unless the specs are brought in line with Figure 4, it will give the automobile industry (PAMA) fodder to blackmail the other stakeholders. This happened 3 years back when a major car manufacturer attempted to introduce a turbo model that was reliant on lower sulfur specs than in the market, which affected the car's emissions control unit which had to be subsequently replaced but not before causing considerable ruckus and unprofessional accusatory behaviour on the said manufacturer's part.

This is a very important aspect to be addressed to avoid any adverse ramifications for the OMCs who import product worth millions of dollars and a correct testing regime must be ensured not only to avoid financial losses but also supply issue related to imports failing tests.

The importance of aligning MoEPD's Euro V Specs cannot, therefore, be understated! MoEPD, along with HDIP are requested to have a relook at the specs and consult experts as needed.

SPECIFICATIONS OF IMPORTED EURO-V MOTOR GASOLINE (RON 92/95/97)

Sr No.	Test Description/ Parameters	Unit	Test methods : ASTM or IP or equivalent	Specifications
1.	Colour (Visual)	-	-	Un-dyed *
2.	Odour	-	-	Marketable
3.	Appearance	-	-	Bright, Clear, and free from water and suspended impurities
4.	Specific Gravity @15.6 °C (60°F)	-	D-1298 or D-4052 or IP-160	From 0.720 to 0.775
5.	Octane Number (RON)	-	D-2699	92, 95, 97 *
6.	Distillation	°C (°F)	D-86 or D-7344 or ASTM D-7345	
	10% Vol. Recovered			80 (176) maximum
	50% Vol. Recovered			125 (257) maximum
	90% Vol. Recovered			180 (356) maximum
	End Point			205 (401) maximum
	Residue	Vol%		2.0 maximum
7.	Reid Vapour Pressure at 37.8 °C	kpa (psi)	D-323	
	i) Summer (Mar-Oct)			62 (9) maximum
	ii) Winter (Nov-Feb)			69 (10) maximum
8.	Sulphur	Wt % (ppm)	D-7220/ D-4294/ IP-107/ D-2622	0.001 (10) maximum
9.	Copper Strip Corrosion at 50 °C (122 °F)	-	D-130	1 maximum
10.	Existent Gum	mg/100 ml	D-381	5 maximum
11.	Induction Period	minutes	D-525	No breakdown in 360 minutes minimum
12.	Dr. Test	-	D-4952/ IP-30	Negative
13.	Oxygen Content	Wt%	D-4815, D-5845	2.7 maximum
14.	Oxygenate Contents	Vol%	D-4815, D-5845	Methanol - 3 maximum Ethanol - 5 maximum Iso-propyl alcohol Iso-butyl alcohol Tert-butyl alcohol Ether (5 or more C atoms) Other Oxygenates **
15.	Olefins	Vol%	D-6730, D-1319, D-6839	18 maximum
16	Aromatics	Vol%	D-6730, D-1319, D-5134, D-6839	35 maximum
17	Benzene	Vol%	D-5134/ D-4053	1.0 maximum
18.	Lead contents	g/litre	D-3237 or D-5059/ IP-224/ IP-352	0.005 maximum (no intentional addition)
19.	Manganese	mg/litre	D-3831	2.0 Maximum
20.	Iron (Fe)	mg/litre	UOP-391	No iron based Octane enhancing additive permitted

* Dye to be added before marketing, so that to meet the market specification as:
  i. Green for 92 RON
  ii. Yellow for 95 RON
  iii. Red for 97 RON

** Volume blending restricted to 2.7% (m/m) maximum oxygen content

MISSING SPECS:
Oxidation Stability
Trace Metal
Carburettor cleanliness
Fuel injector cleanliness
Intake Valve cleanliness
Combustion Chamber Deposits

Annex-III

SPECIFICATIONS OF IMPORTED EURO IV & V HSD

Sr. No.	Test Description	Units	Test Method ASTM/ IP or Equivalent of ASTM/IP	Euro IV	Euro V
1.	Ash	% Mass, Max	ASTM D-482	0.01	0.01
2.	Carbon Residue Conradson (% wt. of 10% residue)	% Mass ,Max -	ASTM D-189/4530	0.1	0.1
3.	Cold Flow Properties				
a	Cloud Point Summer (Mar-Oct)	°C, Max	ASTM D-2500	5	5
	Winter (Nov-Feb)			-1	-1
b	Pour Point Summer (Mar-Oct)	°C, Max	ASTM D-97	0	0
	Winter (Nov-Feb)			-6	-6
	or				
c	Cloud Point Summer (Mar-Oct)	°C, Max	ASTM D-2500	11	11
	Winter (Nov-Feb)			5	5
d	Cold Filter Plugging Point (CFPP)	°C, Max	IP 309		
	Summer (Mar-Oct)			3	3
	Winter (Nov-Feb)			-3	-3
4.	Color	Max	ASTM D-1500	2.5	2.5
5.	Corrosion, Copper Strip (3 hour @ 100 °C)	Max	ASTM D-130	No.1	No.1
6.	Cetane Index	Min	ASTM D-4737/D-976	46	46
7.	Flash Point PMCC	°C, Min	ASTM D-93	66	66
8.	Density@ 15 °C	Kg/Lit, Min	ASTM D-1298/4052	0.82	0.82
		Kg/Lit, Max		0.86	0.86
9.	Sediments	% Mass, Max	ASTM D-473	0.01	0.01
10	Sulphur	% Mass, Max (ppm)	ASTM D- 1552/2622/4294	0.005 (50)	0.001 (10)
11	Viscosity, Kinematic @40°C	cSt, Min	ASTM D-445	1.6	1.6
		cSt, Max		5.5	5.5
12	Water	%Vol, Max	ASTM D-95	0.05	0.05
13	Distillation; 95% Volume Recovery	°C, Max	ASTM D-86	360	360
14	Neutralization Value				
a)	Total Acid Number	mg.KOH/gm, Max	ASTM D-974	0.5	0.5
b)	Strong Acid Number	mg.KOH/gm, Max		Nil	Nil
15	Lubricity, corrected wear scar diameter (wsd 1.4) at 60°C	um(micrometre),Max	ASTM D-6079 EN ISO 12156-1	460	460
16	Conductivity, pico Siemens per Metre	pS/m, Min	ASTM D-2624 ISO-6297		50

MISSING SPECS

Trace Metal
Total Aromatics
Oxidation Stability
Biological Growth

FAME
Ethanol/Methanol
Ferrous Corrosion
Particulate Contamination
Injector Cleanliness

CONCLUSIONS

1. We do not have enough Euro V Engines in Pakistan's Vehicular Fleet.

Has the Automobile Industry confirmed that Euro V engines with Euro V Emissions-control systems are available? If not, we will be spending millions of dollars without justification.

2. Our existing Refineries are not capable to produce Euro V PMG or HSD.

Complete changeover to Euro V will not be possible till the Refineries confirm their capability. In such a scenario too we will be spending millions of dollars without justification.

3. Our Infrastructure (Ports, Import Storages, Pipeline Transportation, OMCs Storages at Karachi and Upcountry, or along the WOPP route) cannot handle the additional multi-grade imports.

If this aspect is not addressed properly, we could end up spending Millions of Dollars without justification.

4. Our MoEPD notified specifications are not Euro V specs but previous Euro II specs modified at places, ignoring correct specs and Test Methods according to the Worldwide Fuel Charter Edition 6 2019.

The so-called Euro V Specs notified by MoEPD lack credibility and can lead to legal issues because of the question: is HDIP's laboratory equipped with handling the tests? Till last year they were definitely not capable of testing even according to Euro II.

If this aspect is not addressed properly, OMCs could end up spending Millions of Dollars without justification on demurrages and associated legal issues.

5. Almost 50 % of our vehicular population comprises of Motorcycles, used by the poorest segment of our population. These require the RON rating much below the current 92. They are paying the same price as the car drivers, which is ~ Rs. 10 per litre higher than what they should be paying. Is it fair to ask them to bear an additional estimated burden of Rs. 7-8 per litre on Euro V?

Instead of looking at reducing the burden on the poor segment of our population, we will end up burdening the segment more, whilst paying Millions of Dollars without justification.

6. We do not have mandatory annual vehicular inspections and certifications prior to renewal of registrations.

Euro fuel specifications also necessitate that the engine in which the fuel is used is compatible with the fuel being used. We always assume that it is vice versa. It is not. Has the Ministry of Climate Change made annual vehicular inspections mandatory by law? If not, we will be spending Millions of Dollars without justification.

Since the enabling environment for moving from Euro II to Euro V with regard to environment/emissions does not exist, and un-tuned smoke-spewing vehicles continue to clog our roads, where is the necessity to move to Euro V?

Even now, the Pakistani Motorcyclist, the poor consumer of our Country, is using 92 RON when the requirement of the motorcycles is a much lower octane. Why is he paying the same price as the rich segment of our society, namely the Car user? Even the Car user, except for a minimal percentage (less than 2%) is not using 95/97 RON even now! A proposal made to the Honorable Prime Minister in early 2019 to address this anomaly has still not seen the light of day. Why? Because of lobbies that do not have objectivity in their agendas nor are they patriots of Pakistan but playing to the gallery of their foreign masters.

And here we are now moving to Euro V 92/95/97 RON where the RON 92 product will still remain the product of choice but at a much higher price to the motorcyclist! B y some counts in the Industry, the product will cost Rs. 7-8 per litre more! Is that fair on the motorcyclist? AN EMPHATIC NO!

The Downstream Industry (Refineries and OMCs) will also need to invest upwards of 300 Million Dollars for the upgrades by both! Is this additional cost of Rs. 500 Billion justified? What will this do to our balance-of-payment status?

Pakistan is already facing serious balance-of payment issues without initiating new decisions that will further hurt us! We have serious financial constraints to our economy already without initiating an action blindly that will add to our debt burden and will please whom?

RECOMMENDATIONS

The main Stakeholder in the use of Euro V is the Pakistani consumer. The largest chunk of his domestic monthly budget goes into fuel and energy costs. Yet, he has been totally ignored whilst taking the extreme decision to convert totally to Euro V.

A Public debate on the issue is suggested, with all stakeholders' inputs sought and policy defined thereafter on the lines of the Public Hearings held by OGRA on Gas price increases.

Till such time that the proposed Public Hearings are held, and an acceptable Road Map defined, the decision to switch over to Euro V must be held in abeyance!

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Oil Companies Advisory Council (OCAC): Pakistan Oil Report 2017-18

Hydrocarbon Development Institute of Pakistan (HDIP): Energy Yearbook 2018

Worldwide Fuel Charter: Edition 6 2019

ABOUT THE AUTHOR:

Dr M. Ilyas Fazil holds a PhD in Petroleum Rening. He is currently a distinguished fellow with Islamabad Policy Institute. He has previously served as Member (Oil) OGRA and CEO Oil Companies Advisory Council (OCAC). He can be reached at i_fazil@yahoo.com.

ABOUT IPI:

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Tel No: 051-8444830, Email: info@ipipk.org,
P.O.Box 3393, GPO Islamabad