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Energy and Climate Change Committee  
Committee Office  
7 Millbank  
London  
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Dear Sirs,

**UKPIA'S SUBMISSION TO THE ENERGY AND CLIMATE CHANGE COMMITTEE'S INQUIRY:  
THE UK'S ENERGY SUPPLY: SECURITY OR INDEPENDENCE?**

The UK Petroleum Industry Association (UKPIA) represents the oil refining and marketing interests of the nine main downstream oil companies in the UK. Our member companies operate all the major crude oil refineries, supply one-third of primary UK energy demand and ~85% of the transport fuels and other oil related products used in the UK. As such, we have a major interest in the topic of security of energy supply and welcome the opportunity to respond to the Committee's consultation on this important issue.

Our responses to the Committee's Inquiry are confined mainly to those questions or areas where we have specific knowledge or expertise, namely the wide range of fuels and feedstocks derived from the refining of petroleum.

**Background context**

UK operating refinery capacity is ~1.7million barrels of crude oil per day ( ~12% of the EU). Oil currently accounts for ~37% of all the UK's energy needs and UKPIA member companies supply around 85% of transport fuels used in the UK.

One UK refinery closed in 2009 and currently 4 of the 8 operational refineries are for sale, with announcements in the last weeks of agreed terms, subject to completion, for two of them.

The main markets in the UK are:

Retail (forecourt service stations): ~ 29 million tonnes per year of petrol and diesel

Aviation: ~12 million tonnes per year jet kerosene

Commercial: ~18 million tonnes per year (Commercial vehicles, Heating fuels & Marine)  
Speciality (Bitumen, Lubricants, LPG, Solvents and Coke etc): ~5 million tonnes per year  
Petrochemicals: ~2 million tonnes per year

UKPIA members also:

- Invested £3bn in fixed assets over the last 5 years, much of it to meet tighter fuel and environmental standards and to enhance process safety.
- Operate 36 distribution terminals & 1500 miles of pipeline
- Own 2,230 out of the 8,921 filling stations in the UK
- and support the employment of ~150,000 people across the UK either directly or indirectly.

The value of refining to the UK economy is estimated at £200bn+ and each large refinery is estimated to inject ~£60m+ into the local economy where it is located.

The downstream oil sector collected ~£33bn in duty and VAT on fuels in the last financial year.

## Summary

UKPIA's views can be summarised as follows:

1. **Oil products will continue to be an important part of the future fuel mix.** The oil industry believes that due to their low cost, on-going availability, and ease of use petrol and diesel will remain the dominant road transport fuels globally to 2035 and beyond, a view that is shared by the International Energy Agency (New Policies Scenario) and others in their forecasts of future energy use. However, a range of alternative fuels, including initially first generation biofuels, will have an increasing role to play in what is likely to become a more diverse energy mix aimed at meeting carbon reduction and other environmental targets. The oil refining industry will also play an important role in facilitating the introduction of these alternatives as part of the oil industry's investment in low carbon infrastructure to complement fossil fuels. However, some of these alternatives, especially advanced biofuels, are likely to take time to develop fully for commercial scale production so are unlikely to make a significant contribution until at least 2020.

It is important that policymakers bear in mind the importance of oil in making this transition to a lower carbon future. In some transport sectors, due to technical and other reasons, this change is not going to happen overnight. For some industrial sectors oil feedstocks may be impossible to substitute. Even under the most promising scenarios, it will take decades for alternatives to reach the affordability, reliability and scale of fossil fuels. The thrust of recent policy and indications of future direction largely ignores the important role oil will continue to play beyond 2020.

2. **Energy security and diversity of supply should be part of overall policy, consistently applied.** Meeting the UK's future energy needs in a secure, diverse and sustainable way that also meets environmental and air quality objectives, is a huge challenge. It requires policy that is closely aligned in these key areas. UKPIA believes that energy

and environmental policy should continue to be based on maintaining a reliable UK energy system meeting all three pillars of sustainability - economic, environmental and social – with clear targets underpinned by a framework for their achievement. Policy objectives should not be dominated by any one of these pillars, should also avoid ‘picking winners’ and be applied in the UK on a basis that is consistent with the relevant EU Directives and avoids ‘gold plating’. Sound science should also be a cornerstone of this policy to ensure goals are met cost effectively and with sufficient flexibility to take account of developments in technology/scientific knowledge so that unintended consequences are avoided.

UK refining and the associated storage/distribution infrastructure will need investment in order to meet the UK’s changing energy needs in the coming decades. Competition for investment funds is global and the oil industry works to long-term time scales, given the size and complexity of major projects. Confidence in future policy direction and stability in the way it is applied is essential to attract future investment.

In shaping its energy policy, the Government must recognise the crucial importance of a healthy UK refining sector and define its policies to help deliver the desired outcome. Clearly market and commercial considerations are important influences but if Government wants a strong domestic refining industry in the UK, then energy and other policies must not place it at a commercial disadvantage compared to its overseas competitors.

The right policy conditions will assist UK refining in continuing to be an important element contributing to the UK’s energy supply security and resilience.

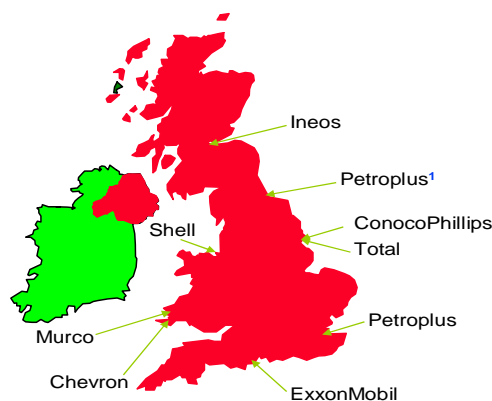
- 3. Oil refining sector and its contribution to security of supply.** The UK derives significant benefits from having a competitive domestic refining industry that substantially enhances supply security and resilience. However, although greater reliance upon imports is a feasible solution to meeting the UK’s changing fuel needs, the international crude oil market is far larger than that for refined products so a domestic industry potentially enables a rapid domestic response in an emergency. However, refinery closures in Europe may in future reduce the fluidity in the NW Europe refined products market as the supply chain lengthens with greater reliance upon middle distillate (diesel, gas oil, jet fuel) supply from outside Europe.

The number of UK refineries has declined from eighteen in the late 1970s to eight currently, in response to changing market conditions and demand. The UK has the fourth highest refining capacity in the EU and until 2009 had nine major operational oil refineries. One closed at the end of 2009 and has become an import terminal. Four of the remaining eight refineries are for sale, with buyers recently announced

for two of them- Valero for Pembroke refinery and Essar Energy for Stanlow.

Main Fuel Refineries	Owner	Capacity (bpcd)
Coryton	Petroplus	163,400
Fawley	ExxonMobil	317,000
Grangemouth	INEOS	196,650
Killingholme (Humber)	ConocoPhillips	190,000
Lindsey	Total	218,000
Milford Haven	Murco	102,600
Pembroke	ChevronTexaco	209,000
Stanlow	Shell	267,000
Teesside <sup>1</sup>	Petroplus	111,000

**8 refineries ~ 1.8 mb/d. ~ 12.5% of EU**



Note 1: Teesside closed end 2009



**UKpia**

The UK refining industry recognises the inevitable challenges associated with the transition to a lower carbon economy. However, this coincides with a period when the sector is also experiencing difficult commercial conditions and many other challenges, as outlined in 4 below.

A combination of all these factors may result in further closures; once a refinery closes it is rare for it to re-open.

- UK refining faces challenging conditions.** UK refining faces many challenges. These partly stem from difficult market conditions (weak demand, low return on capital employed), competition from new export orientated refineries in Asia and a depressed outlook for refining margins to 2020 (energy analysts Wood Mackenzie report). However, there are also mounting costs associated with meeting tougher EU/UK legislative requirements (EU Emissions Trading Scheme, EU Renewable Energy and Fuels Quality Directives, EU Industrial Emissions Directive which together will impose a £1 billion plus burden on the UK refining industry) that do not apply to non-EU refineries, and UK only policies on climate change (e.g. CRC Energy Efficiency Scheme, Carbon Floor Price etc) that may penalise UK refining versus its EU and global competitors.

The refining sector also faces a growing imbalance in petrol and diesel supply/demand. The effect of fiscal policy and the better fuel efficiency of diesel vehicles have increased diesel demand in the UK by ~38% since 1998. Petrol demand has been in steady decline since the peak reached in 1990 and the surplus is exported, much of it to the USA. The same trend is apparent in the rest of the EU. Addressing this imbalance is a growing challenge for UK refineries; solutions include substantial investment (£500 million+ per refinery) to equip refineries with upgrading units to produce more diesel or alternatively greater reliance upon imports. There are also consequences for air quality and for refinery emissions in meeting this additional diesel demand - more energy intensive refining processes

to upgrade heavier residues into diesel with associated increases in CO<sub>2</sub> and other emissions.

Increasingly, EU/UK refineries are facing competition from new large –scale refineries in Asia designed to maximise the output of diesel, aviation fuel and kerosene with a low proportion of heavier residue products such as fuel oil for marine use. These refineries in the shorter term have a significant export capability and crucially do not face the same burden of legislative cost as UK refineries.

## **Responses to Questions posed by the Committee:**

### **1. How resilient is the UK energy system to future changes in fossil fuel and uranium prices?**

#### **1.1**

Provided UK government policy recognises the value of UK refining, the ability of the industry to process crude oil from over 120 global sources will ensure the nation's ability to mitigate against energy supply tensions – without indigenous refining capacity the nation is at 'the end of the chain' in terms of finished fuel products. In common with most developed economies, the UK is heavily dependent upon oil- 30% of UK primary energy demand and ~95% of road transport demand comes from oil. Oil derived feedstocks are also vital for many industrial processes such as manufacture of petrochemicals.

#### **1.2**

The era of comparatively cheap energy is over and the challenge of meeting future energy demand is well illustrated in the International Energy Agency's World Economic Outlook 2010. By 2035, the IEA's 'New Policies Scenario' estimates that global primary energy demand is likely to be about 36% per cent higher than in 2008. Most of this additional demand will be driven by population growth, higher living standards and expanding non-OECD economies, particularly those of China, India, the Middle East, Asia and Latin America.

#### **1.3**

Measures to improve energy efficiency and diversify the UK's energy mix may reduce the UK's exposure to fossil fuel price increases but the alternatives are not necessarily cheaper or less volatile. Indeed, with the EU and many OECD countries pursuing similar alternative fuel policies, similar demand driven cost pressures affect these feedstocks.

#### **1.4**

The UK economy has in the past had to face several oil price shocks, starting in the early 1970's. Generally the impact has been to suppress economic activity but over time industry and consumers have adjusted. The impact of these events has varied across sectors but at the macro level, the UK benefited during the period when it was a net exporter of crude oil from the North Sea. However, oil is a significant element of transport costs, so in the short term this also feeds into domestic inflation.

1.5

In recent years the UK economy has become less energy intense due to a shift away from heavy industry, overall energy consumption having increased by 7% between 1990 and 2009 (Source: DECC, DUKES data). Since 2004, oil prices have been on an upward trend, despite the post 2008 peak adjustments and recessionary impact, which was reflected in overall energy consumption in 2009 falling by 10% in comparison with 2004.

1.6

Within the transport sector, road fuel demand has increased by close to 50% since 1973 with much of this increase pre 1990. Since 1990, road fuel demand has increased by 7% but registered a decline in 2008 vs. 2009 in response to a combination of recession, higher oil prices and duty increases.

1.7

The path to greater resilience will lie in the UK having a robust and diverse mix of energy sources, in which oil is likely to play an important part, allied to increased efforts to improve energy efficiency across all sectors. This will most likely entail a mixture of domestic as well as imported sources.

1.8

The challenge is to ensure that in the coming decades the UK continues to have access to affordable, secure supplies of the required oil products as both sources of crude oil and consumer demand change. In this respect UK refining can have an important role. If investment is not made in UK refineries to keep up with changing consumer demand, the UK can import products in deficit and export products in surplus. However, a growing dependence on imports/exports could result in:

- reduced security of supply as imported products may be less immediately available in times of emergency or crisis
- pressure on the profitability of UK refineries which in future periods of poor refining margins may lead to further UK refinery closures
- the added value of UK refining being captured in part by overseas refineries
- the UK balance of payments being adversely affected

## **2. How sensitive is the UK's energy security to investment (or lack of investment) in energy infrastructure, including transmission, distribution and storage?**

2.1

**The UK's energy security is extremely sensitive to attracting inward investment into its refining sector. As stated in 1.1 above, a healthy indigenous refining sector has the reach and versatility to provide finished fuel products, provided government policy recognises the importance this vital industry.** Currently the domestic UK oil refining industry, with its good links to other European refiners, access to North Sea crude oil (from both the UK and Norwegian sectors) and other crude oil sources, provides the UK with a secure, reliable and economic source of transport fuels and other petroleum products. As supplies of crude oil from the North Sea decline, the UK's security of supply for oil products can be maintained by a strong and healthy refining sector, able to process a range of crude oils from diverse sources, domestic or overseas.

## 2.2

The market for refined petroleum products is global by nature, and although domestic production of key fuels gives added flexibility in the event of external disruptions or emergencies, in recent years the growing deficit in middle distillate products- diesel and aviation fuel- has resulted in an increased level of imports. By 2020, the import requirements for diesel and jet fuel are likely to double (increasing to 7 million tonnes per year from the current 3.5million for diesel and from 5 million tonnes to 9 million tonnes for jet fuel. *Source: Wood Mackenzie study for DECC*). If the UK were to lose 25% of its capacity because of refinery closures, it is likely that imports of each of these products could increase to ~ 11 million tonnes per year.

## 2.3

The capacity and efficiency of the country's refining and distribution infrastructure has been a significant factor in helping to deliver the benefits of a secure and flexible system responsive to the needs of consumers. The industry has made significant investment to develop and maintain this infrastructure but in the last two decades much of it has been geared to meeting tighter operational, safety and environmental standards as well as production of cleaner fuels.

## 2.4

This investment has not increased refinery output significantly or improved the profitability of UK oil refineries. Major refinery projects take five years or more to plan, build and commission which exposes companies to the risk that future return on capital may not cover the investment costs. Combined with uncertainty over the future policy framework and the cost of meeting legislation, this may lead to investment being delayed or permanently shelved, as importing products rather than building new processing equipment may be a more attractive option. The investment strategies of integrated oil companies may also mean that internal competition for investment funds globally is strong, with investment being channelled to those projects in exploration and production or overseas downstream projects that produce higher returns than those in UK refining.

## 2.5

These structural changes and challenges, and the likely increase to 90 days in the UK's Compulsory Oil Stocking Obligation under IEA/EU rules in the coming decade as UK North Sea oil declines, will require further investment in refining and storage infrastructure.

This will involve increasing UK strategic storage capacity by over 50% in the next 10 years or more, at a cost of £3 - £4 billion. Our government is fairly unique amongst its EU partners in placing the nation's strategic oil stocks burden on the UK refining and importing companies. Most other Member States have recognised the 'national' aspect of these stocks and manage the issue through an agency.

**UKPIA and its members urge the Government to take the opportunity to reform the current stockholding system to establish an independent stockholding entity to address now the long-term challenges of security of supply that will be faced in the coming years as North Sea oil decline increases the UK's stocking requirements.**

### **3. What impact could increased levels of electrification of the transport and heat sectors have on energy security?**

The main area of interest for UKPIA is electric vehicles for road transport.

### 3.1

Electric vehicles fall broadly into two main categories; full electric (BEV) and plug-in hybrid (BHEV) that work in conjunction with an internal combustion engine. The advantage of a battery electric vehicle is that it has zero tailpipe emissions compared with a vehicle powered by an internal combustion engine using fossil fuel. This brings benefits for local air quality as well as reducing noise pollution. For these reasons and to reduce fossil fuel dependence, government policy in the UK is aimed at fostering the uptake of electric vehicles.

### 3.2

The zero emissions, however, are only at the point of use; in order to charge the battery, electric power is required that in turn will have generated CO<sub>2</sub> emissions at a power station unless the source is wholly renewable or zero carbon. The use of well to wheels studies is therefore essential to give a fair comparison between options with different patterns of emissions from use and production.

### 3.3

The main technical challenges with current battery technology are performance, payload, range, cost and battery life, linked to the trade off between the battery energy density (driving range) and power density (charging/discharge rate). BHEVs are an interim step to overcoming some of the performance/range problems until such time as a step-change from current leading lithium-ion battery technology to the next generation advanced lithium-ion batteries is achieved.

### 3.4

For these reasons, and barring a major breakthrough in energy storage, it seems unlikely that BEVs will form a significant part of the road vehicle fleet within the next 15 years but in the meantime on-going research and wider availability of BHEVs will move technology forward. In the interim, there is a real danger that policymakers will look optimistically towards a BEV future and enact policies harmful to fossil fuel production. Refineries do not reopen once closed – when they're gone, they're gone.

### 3.5

However, there are major implications for power generation and grid distribution to facilitate the move to more electric vehicles. The Climate Change Committee's recommendation to largely decarbonise electricity power generation by 2030 is central to this but achieving it presents major challenges technically and environmentally, as well as gaining consumer acceptance. Power generation from a low carbon or CCS source will be crucial to meeting carbon emission targets so the proportion of renewable, nuclear, gas or coal fired will influence the security of energy supply of each energy source. Aside from raw materials used in the primary energy source, there are also security of supply issues affecting many of the raw materials that go into components used in these generation processes.

## **4. To what extent does the UK's future energy security rely on the success of energy efficiency schemes?**

### 4.1



In this context we refer to schemes aimed at cutting energy consumption rather than encouraging energy from renewable sources. Improved energy efficiency in the short to medium term is one area where there should be added focus, as energy saved immediately has a major impact upon both carbon emissions and security of supply. However, this appears to be an area where comparatively slow progress is being made, although DECC estimate that domestic energy consumption might be twice the current level vs. 1970 if efficiency improvements had not been made. For the industrial sector consumption has fallen 31% 2009 vs. 1990 (DECC, DUKES data) but much of this may be attributable to structural changes in the UK economy relating to domestic manufacturing being substituted by imported goods/components.

#### 4.2

For domestic consumers there are numerous measures to incentivise householders to save energy – for example Warm Front and the Carbon Emission Reduction Target requiring energy providers to take action to help consumers reduce consumption. Generally, the UK still lags many other EU countries in the level of energy efficiency of our dwellings. High cost of energy is a major influence upon behaviour and an incentive to reduce consumption but has major implications for fuel poverty. For industries exposed to carbon leakage, it has significant implications for competitiveness.

#### 4.3

The oil refining sector has improved energy efficiency in recent years through the adoption of Combined Heat & Power systems for refinery process operations. It is also subject to the EU Emissions Trading Scheme and the CRC Energy Efficiency Scheme (CRC).

#### 4.4

CRC is a mandatory UK scheme designed to encourage energy efficiency by large non-industrial public & private sector energy users through a system of a CO<sub>2</sub> emissions cap and allowances with auctioning. The scheme is complex and administratively burdensome.

#### 4.5

The cost of the Scheme to UKPIA member companies increases by over £12m+/year and there are concerns about consistency of treatment of refinery CHP plant. The impact varies by company, but is dominated by cost increases incurred by refineries, due to the need to purchase allowances for self-supplied electricity.

#### 4.6

Following the Comprehensive Spending Review, auctioning revenues go to HM Treasury; the scheme is now looking like a burdensome additional tax that does little to encourage energy efficiency beyond what prudent businesses do already and indeed potentially penalises CHP which is designed to use energy more efficiently with benefits for security of energy supply.

### **5. What will be the impact on energy security of trying to meet the UK's targets for greenhouse gas emissions reductions as well as increased penetration of renewables in the energy sector?**

#### 5.1

The use of renewables can have unintended consequences. The Renewable Heat Incentive levy as originally planned would have been applied to fossil fuel derived

co-process heat used in refinery production, the effect of which would have been to potentially wipe out the gross margin made by refineries. Although the RHI is now to be funded from general taxation, for much of 2010 there was complete uncertainty about the impact upon refining for a scheme that was due to commence in April 2011.

## 5.2

The use of biofuels in road fuels is one of the measures to reduce carbon emissions. It should be noted that UKPIA members have a wide spectrum of views on the extent to which biofuels will contribute to diversity in the supply of UK liquid fuels. Some members believe that biofuels have a positive role in diversifying the UK's liquid fuel mix and thus contributing positively to security of supply. Others take the view that their use tends to complicate the supply chain both in terms of the reliable supply of quality assured biofuels and operational requirements: segregated blending of ethanol at road tanker loading points (not at refinery); extra housekeeping associated with storing biodiesel blends; careful batching of biodiesel blends in pipelines; risk of FAME in jet fuel. With EU countries pursuing the same biofuel targets there is a shortage of vegetable oil even before non-transport sector requirements come into effect. Most of the biofuel components are imported from non-EU sources and in the shorter term until issues of sustainability and indirect land use change are resolved, the benefit to security of supply diversity is unclear.

## 5.3

The Renewable Energy Directive and Fuel Quality Directive currently being transposed into UK law require refiners to reach 10% by **energy** biofuel content in transport fuels (RED) and reduce carbon content by 6% by 2020 (FQD).

## 5.4

The targets for both the RED & FQD trajectories towards 2020 must be set at levels that are both practicable and achievable in the market. They should be consistent with the capabilities of vehicles, forecourts and existing distribution infrastructure. Also full trading of Carbon and Energy certificates should be allowed with buyout options and also the flexibility to carry over certificates from one obligation year to the next. The Directives also need to take serious note of the sustainability issues around biofuels and UKPIA's longstanding position that the most effective use of biomass is in replacing inefficient power and heat generation.

## 5.5.

An impracticable target will restrict supply of fuel to the UK market (refiners unable to meet the target so cannot supply) with the potential for supply shortages. Targets should be no higher than other EU states to allow fuels to be transported across member states and therefore increasing availabilities of fuels suitable for the UK market.

## 5.6

Achieving the 2020 targets may require 4 grades of fuel on larger forecourts (from 2015>) with 2 high bio blends of at least for petrol E10+ and diesel B10+. Smaller filling stations may be disadvantaged as they can only accommodate 'protection grades' E5 and B7. It is vital therefore that there is flexibility in the way in which the Renewable Energy Directive is transposed into UK law in order not to increase the risk of further closures of rural/small filling stations unable to meet these requirements. This will affect supply resilience particularly in those rural areas where sites already face considerable commercial pressures.

**6. What would be the implications for energy security of a second dash-for-gas?**

We have no comment on this question as it is outside UKPIA's remit.

**7. How exposed is the UK's energy security of supply to international events?**

This question is largely addressed in response to 1 & 2 above but also see 9 below.

**8. Is the UK's energy security policy sufficiently robust to be able to deal with uncertainties and risks inherent in all of the above areas? If not, how could this be improved?**

**As stated previously, UKPIA's firm view is that a strong and healthy indigenous refining sector ensures the nation's 'base load' of transport fuels, chemical feedstocks and other vital products is maintained whilst the transition to a lower carbon economy takes place. Policies that take careful note of this fact will also secure the significant energy requirement that only oil can provide for decades to come.**

**9. Are there any other issues relating to the security of the UK's energy supply that you think the Committee should be aware of?**

In 2.5 UKPIA pointed to the key importance an Agency to manage the nation's strategic oil stocks has on the future of UK refining. The significant investment needed to meet the UK's obligation under EU/IEA rules are best met from a central entity, rather than by imposition on commercial undertakings.

In a similar vein, the cost of permits for UK refineries under the EU ETS Phase III scheme is likely to be around 150 million Euros in 2013 in one hit with no transition arrangements.

The first issue is totally within the gift of UK government. The second requires recognition by UK policymakers that industry cannot easily withstand costs of this nature. UKPIA assume government would prefer UK refining and energy intensive industry generally to survive climate change policy and provide their vital products for the nation's future wellbeing.

We thank you for the opportunity to contribute to this important debate and would be pleased to elaborate on our views should the Committee so wish .

Yours sincerely

*Chris Hunt*